

UNIVERSITY  
COLLEGE  
NAIROBI  
PRELIMINARY  
STUDY OF A  
MASTER PLAN  
1968

Afr.  
L4  
422  
.U5.5U5

X  
/

**UNIVERSITY  
COLLEGE  
NAIROBI  
PRELIMINARY  
STUDY OF A  
MASTER PLAN  
1968**

**Peter Bredsdorff Associates  
Poul Kjaergaard Associates  
Copenhagen**

Afr  
Lg  
422  
.MS.545

This study is published in 1968  
in Copenhagen by:

Architects and town planners:

Peter Bredsdorff Associates  
Poul Kjaergaard Associates,  
Toldbodgade 12, Copenhagen, Denmark  
Tel.: 01-157650

Consulting engineers:

Civil engineers:  
Carl Bro, Roughton and Partners,  
Sofielundsvej 23, Glostrup, Denmark  
Tel.: 01-968011

Acoustic and ventilation engineers:

Johannes Joergensen A/S,  
Bjerregaardsvej 16, Valby, Denmark  
Tel.: 01-302011

Traffic engineers:

Anders Nyvig A/S,  
Oestre Pennehavevej 1, Hoersholm, Denmark  
Tel.: 01-861900

Printed by Tutein and Koch, Copenhagen

## **FOREWORD**

For a number of years now, University College Nairobi has felt the need for a long-term plan for the physical development of the College. The lack of such a detailed plan has meant in the past, ad hoc arrangements for the siting of new buildings and for the allocation of areas for specific development, whether academic, administrative or residential.

Emphasis was given to this by our Chairman in his foreword to our document "Capital Requests 1967-70" submitted to the Conference on the University of East Africa held here in Nairobi in October 1967, when he wrote:

There is now a clear need for a long-term development plan, not only for future growth of Departments and for new Faculties but also a plan which will include a land use development objective for existing sites as well as additional land of which future need is indisputable".

We are most grateful to the Danish Government for the interest it showed at this Conference in our development plan and in particular about the need for a physical development master plan. In addition to granting financial support for a building to house our Faculty of Architecture, Design and Development, the Danish Government encouraged us to submit proposals for the physical plan.

Accordingly we consulted a Danish planning office, Peter Bredsdorff Associates, and a Danish firm of Architects, Poul Kjaergaard Associates (architects for the Architecture Faculty Building) and with them worked out proposals for a paper and budget for a long-term plan consisting of a preliminary report and a final report which it is hoped will be ready in about a year's time.

These proposals were submitted to the Danish Government and in April, a grant was made to cover the first six months of the work up to the presentation of the preliminary report. We wish to record here our

sincere thanks and appreciation to the Danish Government for this additional donation and further evidence of their interest in our development.

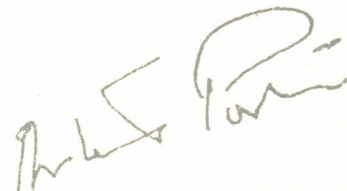
In June, Professor Peter Bredsdorff and Professor Poul Kjaergaard with colleagues from their firms visited the College and had a number of meetings and discussions with various College committees as well as with officials of the Municipality of Nairobi and the Kenya Government.

This provides in brief the background to this Preliminary Report.

We have also asked our planners if they would, in addition, provide us with more detailed views on the siting and appearance of some of the buildings which are of immediate importance and for which finance is available. These questions have been dealt with in one of the appendices of the report.

We wish now to express our thanks to the planners for the work undertaken so far. We are confident of the part the plan will play as we deliberate and map out the future" growth of our institution. We are confident that this Report when presented in September will be received positively by all concerned the Ministry of Education, the Treasury, the Ministry of Economic Planning and Development, the Ministry of Lands and Settlements and by the College - and it is our sincere hope that the next phase, the work on the final report, will proceed without any break after receipt of the preliminary report.

For this we will look to the Danish Government for their continued assistance and support.



Arthur T. Porter  
Principal

# INDEX

|   |    |
|---|----|
| S U M M A R Y   | 5  |
| T H E P R E S E N T S I T U A T I O N   | 11 |
| THE CENTRAL CAMPUS  | 12 |
| Topography, vegetation, soil conditions,<br>storm-water disposal, sewage disposal,<br>water supply, electricity | 15 |
| TRAFFIC   | 21 |
| The present traffic system  |    |
| Roads planned by Nairobi city   | 22 |
| UTILIZATION OF LAND   | 23 |
| Utilization of U.C.N. land  |    |
| Land neighbouring the U.C.N. premises,<br>its characteristics and feasibility for<br>U.C.N. development         | 26 |
| BUILDINGS   | 32 |
| Existing buildings  |    |
| Formulated future building requirements<br>and allocations  | 37 |
| F U T U R E C O N D I T I O N S   | 39 |
| Man power requirements and future trends  | 40 |
| Short-term projections 1968-1975  |    |
| Long-term projections   | 40 |
| Demand for floor space  | 42 |
| T H E M A S T E R P L A N   | 47 |
| BASIC ASSUMPTIONS   |    |
| Land available for development  | 48 |
| Working and living accommodation  | 50 |
| The planning idea   | 51 |
| MODELS OF DEVELOPMENT   | 53 |
| Traffic   | 54 |
| Main architectural features   | 55 |
| Phases of development   | 56 |
| LAND USE  | 60 |
| DEMANDS FOR LAND  | 62 |
| SUMMARY OF RECOMMANDATIONS  | 63 |
| SITING OF BUILDINGS   | 66 |
| APPENDIX A Basic viewpoints on the planning<br>of universities  |    |
| APPENDIX B Examples of university plans   |    |

# SUMMARY

The main conclusion of this report there are strong reasons to support continued central location of the University College Nairobi, vis-à-vis the City of Nairobi and its life.

In all places where higher education is in progress, one important common feature seems to be the attempt to group as many different disciplines as possible in one locality. Such concentration permits a better and greater utilization of lecturers, special equipment and common facilities. As experience shows, new disciplines are constantly emerging in between the traditional ones, and will continue to do so. Furthermore this sort of concentration is bound to provide fertile ground for creating new patterns of education and research. If the advantages of concentrating disciplines in terms of locality are fully to be reaped, the buildings must be laid out in a manner permitting variations in the uses of the available floor space. In order to meet different faculty demands, often unforeseen and growing at different rates, this type of flexibility is essential. Furthermore the lay-out must be concentrated in order to reduce internal lengths of circulation as much as possible. In fact, many new university lay-outs are tending towards this sort of high concentration. This means that, even in the case of explosive university development, growth can be much more efficiently organized and controlled. The recent rise in student numbers at the U.C.N. has been a surprise to all the authorities concerned.

In spite of this trend in recent years, a trend strongly influenced by Africanization in education and government, it is doubtful that this rate of growth can form the basis for long-term projections. Furthermore, in view of the fact that important new faculties have been placed on campuses which are detached from the existing College premises, a relatively small increase in space demands within the Central Campus areas is likely to be the outcome of short-term projections.

The report states that around the Main Campus and Choromo there are relatively large portions of undeveloped ground, with the result that the space requirements may well be met for many years to come, using a fairly concentrated lay-out. If the possibility of extending the University College in the areas around the existing Campus had not existed, it would have been necessary to consider large scale re-location, e.g.: in the area North of the Karura Forest which, in fact, has been offered to the University College. The authors of this report consider the latter solution to be less favourable. For many years the large distances separating the new and the old campus would be a source of considerable inconvenience. It seems economically sound to have the existing and usable buildings forming the nucleus of a future and more comprehensive scheme. It is also sound for a university to be in immediate contact with the community later to be served by the young people being educated there, rather than isolating them in ivory towers.

Chapter I of the report outlines the present situation. The buildings of the University College, like those of so many other universities, are scattered over a wide area: there are at present the Main Campus, Choromo, Kenyatta Hospital, Kabete and the School for Adult Studies at Kikuyu.

However, the greater part of the university premises are to be found close to and on the Main Campus and contain the bulk of students, lecturers and administrative functions. This latter campus area is situated in the centre of Nairobi, on the border of the down town concentration of shops, businesses, administration (government) and cultural activities. The Main Campus has room for further development, especially if the Norfolk Hotel is acquired by the U.C.N. These reserves, however, are regarded as necessary for special purposes. Functions strongly orientated towards the City and towards this nuclear part of the U.C.N. should have priority of claim to this land. In spite of the disturbing nature of a number of arterial roads (the Uhuru Highway, University Way and the projected highway north-east of the Faculty of Engineering, and in spite of increasing parking problems, this Campus area is singled out as an area that must develop its potential to form part of the City for the mutual benefit of students, staff, certain special university institutions and gatherings, and for the benefit of Nairobi itself.

The students' Halls of Residence have been located on the slopes of Hospital Hill, facing the Main Campus west of the Uhuru Highway, and screened from the latter by sports fields and Central Park. The surrounding premises are mainly occupied by public amenities such as schools, churches etc. and by private low density residential

properties. This land is, in principle, favourable for University development. Today no more than 8 % of the students live outside the Halls of Residence, and this percentage is decreasing. The only means of internal communication between the Halls and the Faculties is along a pedestrian path connected to the Main Campus through a tunnel running under the Uhuru Highway.

In the Choromo area, which is topographically separated from the Main Campus as well as from the Halls, a number of faculty and laboratory buildings have been, or are in the process of being built to house students of biology, medicine and veterinary science. Owing to steep slopes and cleft cuttings, only a limited portion of this area is suitable for building purposes of an economic, rational and flexible nature. These 3 sectors of the Central Campus (i.e. the Main Campus, Hospital Hill and Choromo) are connected by the flat land around the rivers. The major part of this land belongs to the U.C.N. but is not suitable to build on in view of foundation costs generated by the presence of black cotton soil and excessively steep contours. Furthermore this land is susceptible to disturbance from both the Uhuru Highway and a projected highway between Hospital Hill and Choromo.

In order to throw light upon the possibilities of development within the total area, a rough mapping of the area has been carried out, dealing with foundation problems, risk of flooding, steep slopes, and existing systems of power distribution.

In order to be able to illustrate the opportunities for the University gradually to take over areas which may create a better connection between the central campuses and the Halls of Residence, the report tries to interpret the existing ownerships and property values around and between the Cen-



tral Campus areas, based on information from the Commissioner of Lands and Settlements.

In accordance with negotiations with the Government Town Planning Advisor and the Senior Planning Officer of Nairobi an attempt has been made to explain the main principles for the future development of the city relevant to this report, principles which, e.g. by choice of a main development axis and by establishing relief centres, are consistent with current town planning ideas in other countries.

Besides the physical conditions for planning, information is given about the present development of the individual faculties at the existing University College, including numbers of students,

Finally, the report contains a short outline of building activities already carried out, and of the activities planned for the next few years, based on the investment plan.

Having dealt with the existing conditions and planning efforts in chapter I, chapter II reflects upon future conditions. It must be admitted that it has only been possible to point towards some conceivable trends of development.

In 1970 the University College may become the University of Kenya involving important changes in existing conditions. This will, of course, depend upon the political evaluation of the situation. Whether the aim will be to enlarge the university in Nairobi with new faculties or to create another university college in an other part of the country, it will influence the speed of development in Nairobi, but the authors of the report have nevertheless found it necessary to consider the first mentioned possibility, i.e. that the authorities will

choose to add as much strength and efficiency as possible to the one existing university, and at a much later date to have it supplemented with regional colleges.

What has been attempted is to combine these alternatives with other assumptions which are equally uncertain - ranging from a gradual continuation of the growth of the existing faculties to a reduction of the number of students within certain faculties commensurate with an increase in other faculties who will supply more skilled people where the need is greatest, in agriculture and industry for example.

Based upon some general views of such a nature the report has estimated some maximum and minimum numbers of students in the central campuses both on a short-term and on a long-term basis (6 years and 20 years).

1975 no less than 2.400 students and no more than 3.300 students.

1995 no less than 4.000 students and no more than 15.000 students (?).

A statement more detailed than these rough estimates would hardly yield anything but false security.

Even in the older countries, with relatively slow development, higher education has been characterized during the last few years by unforeseen growth, changes of social structure, etc. The main objective must be to keep possibilities open - including the possibility of developments that differ from traditional patterns.

It has been assumed that the majority of students (including senior students and research fellows) should be accommodated within the planning area, while it has been assumed that the existing obligation of procuring housing for teaching staff should be gradually given up.

Chapter III is the main section on the Master Plan.

Some basic assumptions have been made, viz.,

- a) Main Campus should not be abandoned just to avoid traffic problems etc. Its close relation to the city is of a sufficiently positive value that future extensions of the university should have the closest possible connection to Main Campus. Attention is called to one example of university planning, shown in appendix B from the University of Edinburgh. There, however, it is much more costly to preserve the integration with the city than is the case in Nairobi where possibilities of extending are at hand.
- b) The future lay-out of buildings for educational purposes should be relatively highly concentrated. In the foreseeable future it is reckoned that pedestrian traffic will be dominant within the Central Campus area keeping in mind the extension of the area.
- c) The future extensions should - as far as possible - be arranged as a linear development allowing for the possibility of "prolongation of the band" thus enabling changes in use of the different sections of "the band", - and preferably also allowing for possibilities of "broadening the band" in order to avoid constant re-locations.
- d) In order to obtain sufficient mobility within such a linear development (well-known from other university developments) the use of simple standardized buildings is self-evident.
- e) Various common facilities, like kiosks, club premises, exhibitions premises, etc. should be located along the main pedestrian spine, which should be made attractive - not only by offering various and changing activities, but also by providing shelter from rain and sun.

- f) The hostels should be in close contact with "the band" but need not form one continuous area. An outspoken separation of male and female students or of students from different faculties is not advocated.

Then follows an attempt to state some reasonable densities for educational buildings and hostels, and, based upon the prognoses of chapter II, the demand for areas of these two categories is illustrated for the periods 1969-1975 and 1976-1995.

Two main models with several variations have been examined on basis of such conditions. Both models are able to function with an almost immediate layout of university buildings West of Uhuru Highway, facing Main Campus and using the existing pedestrian tunnel as a link during the first stage.

- a) One model bends "the band" towards North, West of the existing men's hostels towards Choromo.
- b) An other model leads "the band" towards West in a more rectilinear manner, right up to State House Road, and which accepts Choromo as being a precinct of the university with possibilities of extensions for the faculties in question.

The conclusion of the analysis is that model a) is preferable in spite of the fact that direct physical contact between university functions on Hospital Hill and Choromo will never be achieved thanks to topography and the traffic network of the City. It is of extreme importance to bring the centre of gravity of the University nearer to Choromo in order to reduce the distances isolating it. One of the arguments against model b) is its inevitable interference with Nairobi Primary School and the valuable private properties in this part of Hospital Hill.

The two long-term models include a common first stage (two trienniums) covering 1) a completion of Main Campus, and 2) an

incipient university development and a continued development of hostels West of Uhuru.

This stage has been described in greater detail (scale 1:2.5000) and covers proposals for the final location of the Central Catering Unit and for the siting of the Educational Building, the Faculty of Architecture, the Faculty of Science, and the proposed swimming pool, etc. Furthermore there is a more detailed proposal for land use, and an outline for a local road and parking system. As regards the ensuing stages, the report concludes with a preliminary Master Plan with proposals for zoning, road pattern, and land "claims".

Two appendices have been added with the object of detailing and clarifying certain aspects of this report.

#### Appendix A

"Basic view points on the planning of universities"

written by Mr. Jan Schroeder, secretary to the Danish Principals' Association. This paper lays out in general terms the trends of modern university planning and development, emphasizing the importance of physical concentration and flexibility. Furthermore the author stresses the present fluid situation of development in university education where entirely new types of training are emerging in between and across the traditional faculty boundaries.

#### Appendix B

"Examples of University Plans"

describing in figures and drawings contemporary university development plans. Attention is drawn to the University of Edinburgh in particular, where the extension of the old central university has been adopted in preference to relocation in spite of the extremely heavy costs involved when redeveloping a central urban area.

#### POSTSCRIPT

This preliminary study is the result of a few months work. A short visit in Nairobi where officials of the U.C.N., the Nairobi City and the Kenya Government were consulted was an important, but far too small part of this work.

To venture presenting a proposal for a development plan so soon has two main reasons:

1. The U.C.N. needs immediate advice on the final siting of a number of buildings to be constructed in the near future. It would be irresponsible to site those buildings outside the comprehensive context of a development plan.
2. An interim presentation of the University's anticipated development will help clarify and define problems, correcting errors and debatable points present in this study. Thus will the ground be prepared for the later submission of an adjusted and adapted plan.

It is the wish of the U.C.N. to have such a thoroughly prepared plan, a plan which will express realistically the U.C.N.'s own demand for development in correlation with the Government's policies for higher education and with the intentions of Nairobi City Council in its town and traffic planning.

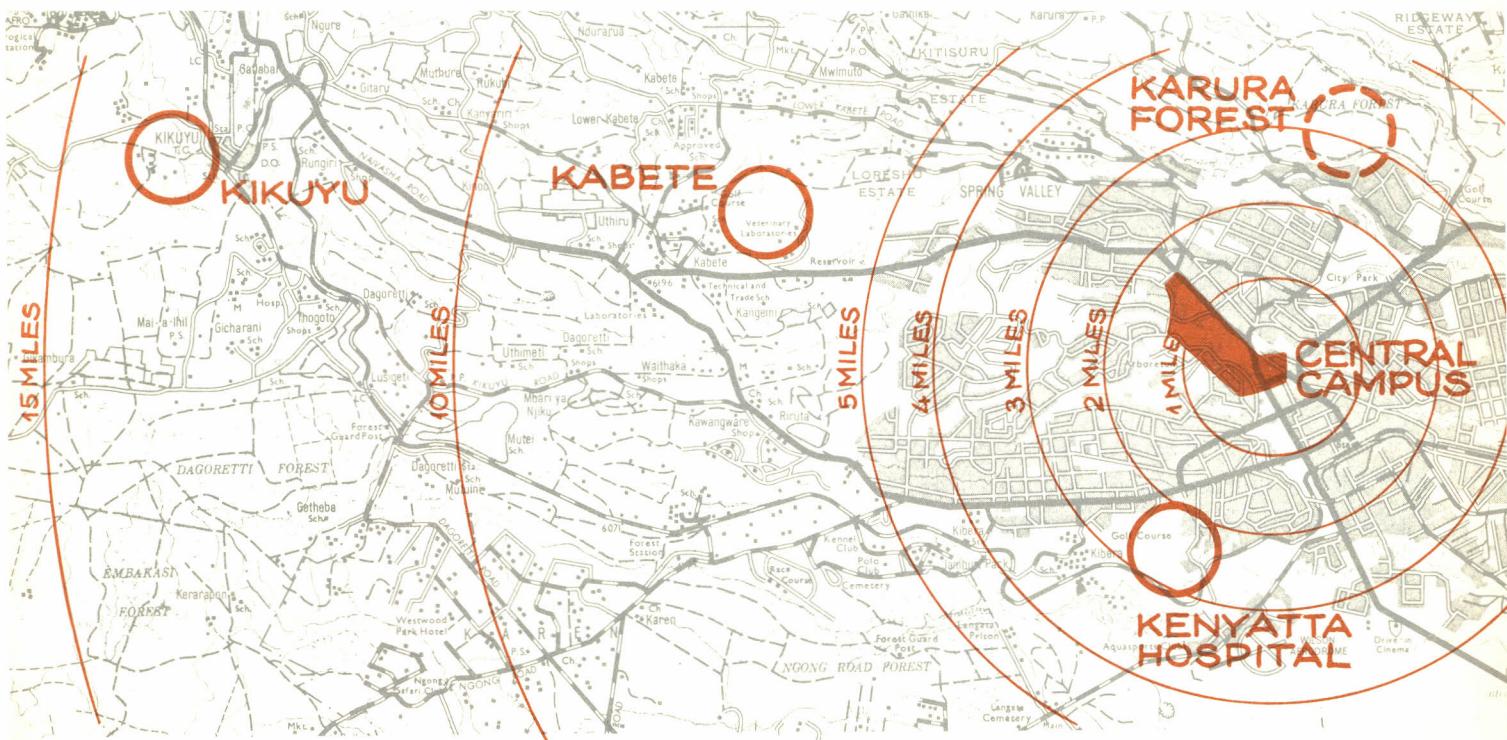
The U.C.N. requires a plan which can form a basis for negotiation with future financial donors in respect of their contributions for future development. Further, the plan should have the character of being a guide for architects, engineers etc. who participate in the physical development of the U.C.N.

The future Master Plan is intended to include:

1. Corrected information on the existing conditions (U.C.N. functions, U.C.N. projects and the relations to the city and its planning.)

2. Information on future conditions (student numbers, space demands etc.) after consultations with the authorities concerned.
3. Processed development plans for the Kabete campus, the Kenyatta Hospital campus and the Kikuyu campus (similar to the plan for the Central Campus area).
4. Proposals for the standardization of various types of U.C.N. buildings to enable rational and economic building construction with high flexibility of utilization.

After receiving and analyzing reactions on the present preliminary study a detailed programme of work and a time schedule should be worked out. Based on this, a budget should be proposed for an application to finance this final task. Funds should be made available before this year is over. Within the same period of time the authorities concerned in Kenya should have stated their opinions on this preliminary study.



THE LOCATION OF U.C.N. CAMPUSES IN NAIROBI

1:150,000

# I THE PRESENT SITUATION

Nairobi is a city with only one centre of gravity. Its main function as a service centre for the nation and the region has created a situation where all these facilities are concentrated in one highly developed area, namely the city centre (or city-core) of Nairobi. The centre includes the commercial life, the administration, government and high courts of the country, and encloses the industrial area of Nairobi as well.

From this city-core, the residential areas stretch out in various directions: Towards the West, the North-West and the North i.e. along the main traffic lines out of the town. These roads serve regional as well as urban functions and in some cases act as national lines of communication as well.

The most important link of the entire road system is the Uhuru Highway coming in from the N-W, and leaving towards the S-E. This road serves a variety of functions: it is the most important traffic link within the city, and is also the most important national road connecting Uganda and the inland regions to the coast at Mombasa.

Other important roads in the system are the Limuru Road-Ngong Road, leading from the West and North-West towards the center of the town and the Fort Hall Road leading from the North-East directly to the city-core of Nairobi.

In between these main roads a diffuse system of local roads penetrates the Nairobi area. The pattern of Nairobi and its system of roads is largely influenced by topographical features: Numerous rivers and streams, valleys and ridges subdivide the town into long and narrow strips. These topographical characteristics complicates the creation of a simple traffic system.

## U.C.N. - CAMPUSES AND LOCATION OF FUNCTIONS

The University College Nairobi, consists, at the moment, of 4 or even 5 campus areas. The Central Campus area is located next to the city-core and constitutes the original Campus. The other campuses are at Kabete (close to the main road to Uganda), and at Kikuyu (also to the main road but further to the N.W.). The Kenyatta Hospital Campus (the medical campus) is on the Ngong Road not far from the city centre.

By virtue of their location the University College campuses are decentralized in character. Apart from the Central Campus area, the other campuses are scattered over a radius of several miles from the city-core. The Kenyatta Hospital, Kabete and Kikuyu campuses are situated 2, 7 and 13 miles respectively from the centre of town. At the same time it must be pointed out that all the campuses, thanks to their proximity to main roads in some respects have relatively easy inter-communications.



BUILDINGS ON THE MAIN CAMPUS SEEN FROM NORTH WEST  
To the left the Library, and following on, the Taifa  
Hall and the Gandhi Wing.

#### THE CENTRAL CAMPUS

The Central Campus consists of the Main Campus which is the original campus of the college adjacent to the city-core and to the Uhuru Highway, and the Hospital Hill area which is situated across the Uhuru Highway facing the Main Campus and the Choromo area appr. 1 mile from the Main Campus.

From a modest beginning on the Main Campus the college gained university status 4 years ago by becoming one of the three constituent colleges of the University of East Africa, the others being at Dar-Es-Salaam and at Kampala.

This explains why the development until now has proceeded on a "day to day" basis. It was, however, difficult to foresee the developments which are now taking shape. This also explains the general character of the buildings in this campus area, buildings which were indeed designed and built for educational purposes, but not exactly university purposes. In spite of new develop-

ments on other campus areas, the Main Campus remains the backbone of the University College as a whole.

#### MAIN CAMPUS

It accommodates teaching facilities for the vast majority of students and lecturers in the college. The administration of the University College is also housed within this area and all the faculties, except two, have their main facilities here. The Main Campus includes the following faculties:

Faculty of Engineering.

Faculty of Architecture, Design and Development.

Faculty of Arts.

Faculty of Science.

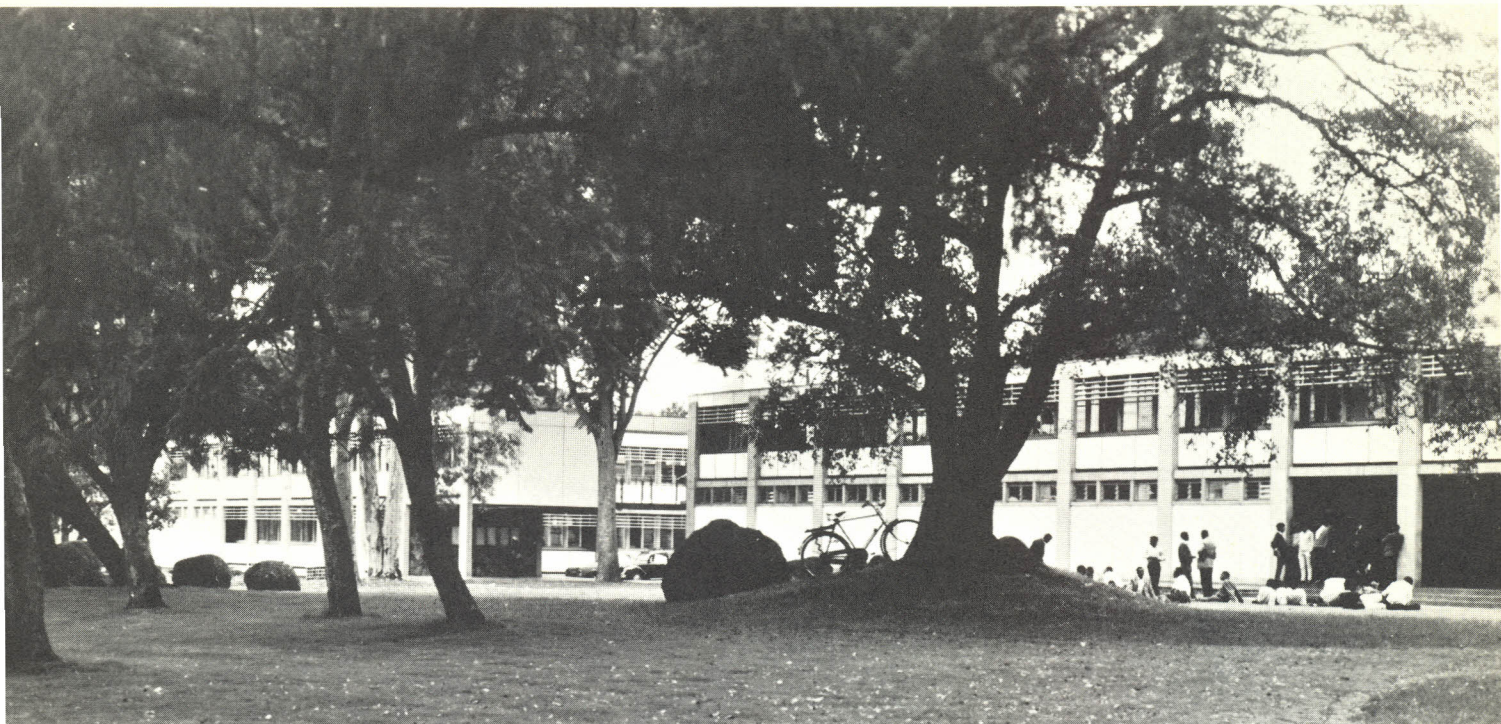
Faculty of Commerce

The Administration:

The Principal's Office

The Registrar's Office and their executive assistants

The Finance Office



#### BUILDINGS ON CHOROMO

Buildings for Anatomy and Physiology are seen.

#### Catering

Junior and Senior Common Rooms

Students Refectory

#### The Library

#### The Bookshop

Independantly owned but situated on the College premises.

#### CHOROMO

The Choromo area contains mainly academic functions. The area is developed for educational purposes and is entirely dominated by the biological sciences. The following faculties and departments are located her:

The Faculty of Medicine containing the Department of Anatomy and Physiology

The Faculty of Veterinary Science with its Departments of:

Animal Anatomy

Biochemistry

The Faculty of Science with its Departments of:

Botany

Zoology

This development started as recently as 3 years ago, and the area is being developed at the moment to provide for the pre-clinical training of students of medicine and veterinary science. The campus has its own library under construction serving these faculties.

#### HOSPITAL HILL

This area is given over to the students' Halls of Residence for men and women and catering for about 1.150 students. Besides this the area includes a number of staff houses, and the staff flats in Protectorate Road. The Halls of Residence also provide sport amenities and a small college clinic for staff and students. This clinic (or infirmary) is attached to one of the Halls.



Sec. 1

Parklands  
Sierra Ground

L. R. No. 209





THE CENTRAL CAMPUS AREA SEEN FROM THE EAST  
 In the foreground the city-core, the Main Campus and the Nairobi River, in the background the Masonga Wai River with Choromo to the right and Hospital Hill to the left.

## PHYSICAL CHARACTERISTICS OF THE CENTRAL CAMPUS AREA

### VEGETATION

Tree growth has an enormous impact on the character of the Central Campus area. The hills and the slopes West of the Uhuru Highway are largely covered by forest-like growth where the land is not subdivided into residential plots. Wherever this vegetation could survive in a future development, it might well form the backbone of the scheme, creating the significant character of the areas concerned.

### TOPOGRAPHY

The Central Campus contains areas which are typical of Nairobi's general geography. The Main Campus is situated on the westernmost border of the Athi Plains, and the rest of Central Campus to the West of the Uhuru Highway lies at the foot of the escarpment which runs all the way up to the Aberdares.



VEGETATION IN THE CENTRAL CAMPUS AREA  
 Registration on aerial photography 1966

|                           |                      |
|---------------------------|----------------------|
| GRADIENTS OF LAND         | 1:10.000             |
| Full colour: approx. 1:7, | very steep           |
| Dark:                     | 1:7 - 1:15, steep    |
| Medium-dark:              | 1:15 - 1:60, gentle  |
| Bright:                   | less than 1:60, flat |



THE CENTRAL CAMPUS AREA SEEN FROM THE NORTH EAST

In the foreground left is the Main Campus. In the background left is the women's Halls of Residence, to the right is Choromo.

The slopes of the valleys around the Masonga Wai and Nairobi Rivers form a strong contrast to the smoothness of the rest of the land. These slopes, and the valleys between them, also create difficulties in the construction of buildings and roads. Above the slopes the land again flattens out to an almost even surface. The topography of the Central Campus is divided up into four areas: The Hospital Hill area, from the Processional Way to Masonga Wai; the Choromo area, between Masonga Wai and Nairobi River; the Main Campus, between Nairobi River and Uhuru Highway; and finally the floors of the valleys along Uhuru Highway and the rivers. The area has been analysed according to the gradients of the slopes, indicating where difficulties are to be found for purposes of construction.

SOIL CONDITIONS, STORM-WATER DISPOSAL, SEWAGE DISPOSAL, WATER SUPPLY AND ELECTRICITY SUPPLY

The conditions in the Central Campus have been especially investigated by a firm of consulting engineers (for detailed information their report is available). Here is a condensed version of their conclusions.

SOIL CONDITIONS

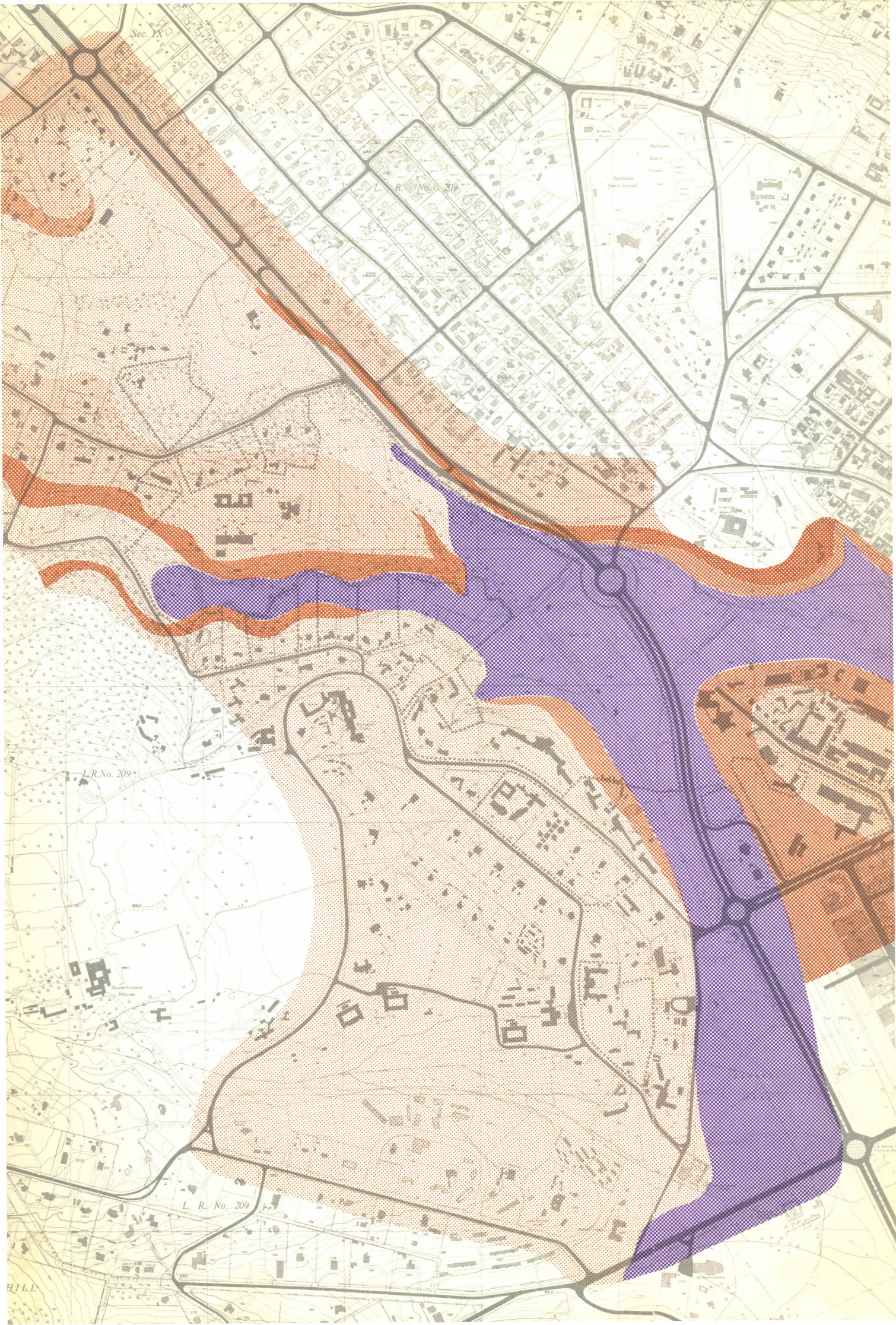
The different parts of the Central Campus area possess wide variations in soil conditions, influencing the cost of construction through extras for foundations in certain soils. Various types of volcanic ashes and tuff and trachyte are found as the solid bases for foundation of buildings. Due to the varying degrees of weathering, the top layers can be more or less suitable for direct foundations.

SOIL CONDITIONS

1:10,000

Dark brown: Middle tuffs or Nairobi building stone.  
 Medium-dark brown: Grey and black ashes and tuffs. Soil investigations must be carried out along the border lines to the alluvial deposits before buildings can be finally located.  
 Bright brown: Nairobi trachyte.

Medium bright brown: Kerichwa Valley tuffs. Much less favourable for foundations at Choromo, where the foundation depths vary from 3 ft. (1 metre) to 16 ft. (5 metres), than on the Main Campus.  
 Green: Alluvial grey and black clayey soil demanding expensive extra precaution.



Sec. 17

L.R. No. 209

Partisan Sports Ground

L.R. No. 209

Government House

L.R. No. 209

1111

## STORM-WATER DISPOSAL

### Main Campus

The run off is on to the adjacent grounds or into the existing road and storm-water channels from where it drains into Nairobi River.

### Hospital Hill and Sportsgrounds

The run off is on to the low lying areas and onwards to Masonga Wai River.

When the playing fields adjacent to the Uhuru Highway were laid out the natural run off to the Masonga Wai River was interrupted, hence the persistent flooding of the fields. Under extreme weather conditions the Masonga Wai River is also liable to flood the fields. Both causes of flooding need further study, but any or all of the following precautions may immunize against flooding:

- a) Construct open storm-water channels approximately parallel to the 9" (23cm) diameter sewer and at the foot of the hills. These channels can discharge into the Masonga Wai River or into the existing large City Council channel adjacent to the round-about.
- b) Place subsoil drains in the low lying areas for discharge into Masonga Wai River, and build up the area if necessary.
- c) If the flooding of the fields by the Masonga Wai River is unacceptable (though it only happens under extreme weather conditions) then a stone gabion bank would be the answer. This bank could be used as an internal access road to Choromo and the Hospital Hill Road areas.

### Choromo

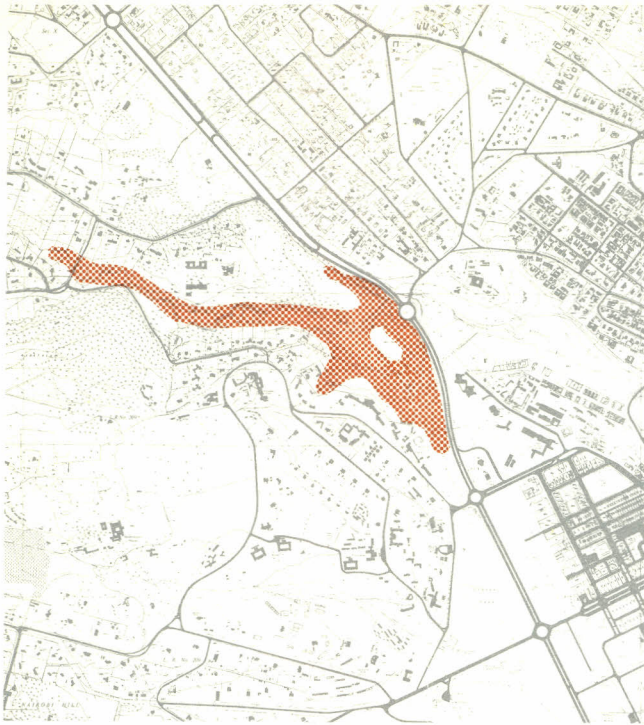
The run off on to adjacent ground and onwards into the Nairobi River and the Masonga Wai River.

This does not cause any major nuisance due to the gradients and the better soil conditions.

## SEWAGE DISPOSAL

### Main Campus

At the present served by a 9" (23cm) diameter and available is a 27" (68cm) diameter City Council sewer. This is therefore adequate for considerable development in all three locations.



### FLOODED AREAS

1:30,000

The signature, which is approximate, covers two types of flooding occurring: Persistent flooding caused by the run-off from the surrounding slopes, and flooding caused by the Masonga Wai River under extreme weather conditions. The latter type of flooding last occurred six years ago.

In other areas base is buried under heavy layers of alluvial grey and black clayey soil (black cotton), which is most unsuitable for foundations.

According to this the different parts of the Central Campus area are characterized in terms of foundation problems.

The area includes all types of conditions described as very good, good, fairly good and bad.

The areas described as bad are covered by clay and are found on either side of the Masonga Wai River, the Nairobi River and the Uhuru Highway (the old Nairobi River bed). Buildings can be built on this heaving clay using bearing piles or other special foundation techniques. Calculations indicate that an extra cost of at least 25 % will have to be added to the cost of construction under these conditions.

This type of soil is the only one which has been found to influence the construction of buildings to an unreasonable extent.



SEWAGE DISPOSAL 1:30,000  
 Full line: Existing Sewers  
 Dotted line: Planned sewer  
 Arrows indicate main direction of sewers for U.C.N. development.

#### Hospital Hill

At the present served by a 9" (23cm) diameter City Council sewer adequate for approximately 3000 people at 60 gallons (270 litres) per head and possibly serving 1700 i.e. it should be adequate for a development of up to 1300 people.

The 9" (23cm) diameter main runs adjacent to the YMCA and under the United Kenya Club and pumping will therefore be required if the area between the main and Uhuru Highway is to be developed. This will, however, only be temporary as the area will be served by the new 27"/24" (68cm/60cm) diameter sewer, when built, except that basements can not be drained due to lack of fall.

#### Choromo

At the present not served by any sewer, all drainage being to individual septic tanks and soak away pits.

The Nairobi City Council intend in the near future to install a new 27"/24" (68cm/60cm) diameter sewer capable of serving over 7500 people at 60 gallons (270 litres) per head

This new sewer will serve most of Choromo and a great part of Hospital Hill.

#### Septic tanks

The alluvial soil is impermeable and septic tanks will therefore most likely not work satisfactorily in these areas.

#### WATER SUPPLY

There are two water reservoirs serving the Central Campus area, namely the Kabete reservoir and the Hill Tank reservoir.

The Hill Tank reservoir is fed from the Kabete reservoir, which is being fed from Nairobi's main source of water. The supply is a balanced flow, so that the water level (T.W.L.) in the tanks remain constant even if the demand is greater than the tank capacities. Should the pumps fail then the reservoirs are capable of supplying 11 million gallons (50 million litres) as detailed in paragraph 1.143.

A new reservoir is under construction at Sasumua (Nairobi's main source of water). A further reservoir is planned for 1975 at Chania.

#### Main Campus

Supplied by the Hill Tank reservoir 3" (8cm) diameter main at an estimated average pressure of 30 lbs per sq.inch. (2.0 kg per square centimetre).

#### Hospital Hill

Supplied by the Hill Tank reservoir 6" (15cm) diameter main at an average pressure of 40 lbs per sq.inch. (2.8 kg per square centimetre).

#### Choromo

Supplied by the Kabete reservoir 4" (10cm) diameter main at an average pressure of 40 lbs per sq.inch (2.8 kg per square centimetre) and a minimum pressure of 20 lbs per sq.inch. (1.4 kg per square centimetre).

The above pressures should be checked by inserting pressure gauges if they are critical for the development as the pressures given are approximately only.

#### ELECTRICITY SUPPLY

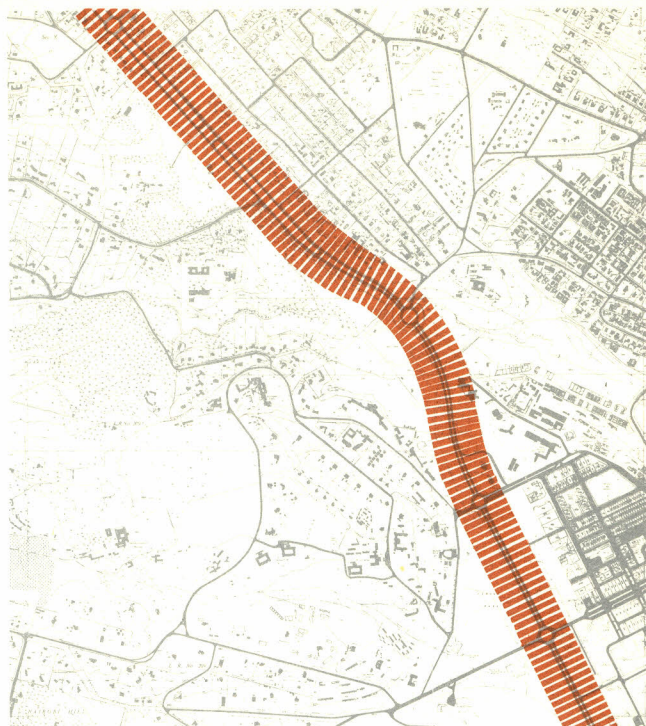
There is ample supply of electricity in all locations of Nairobi.

TRAFFIC NUISANCES

The heavy traffic on the big arteries within the area influence and obstruct U.C.N. activities. Close to the roads the effect of vibrations, dust and noise together make it almost impossible to study, lecture or carry out laboratory work - unless expensive steps are taken to prevent the impact from penetrating the buildings.

The influence of this for example has made it rather doubtful whether a building for the Dept. of Physics can be constructed at all on the Main Campus because of the highly sensitive research equipment required.

Noise affects a far wider area than vibrations and dust. Recent research results indicate that highways not should be built closer than 750 ft. (250 metres) to human activities demanding a certain amount of quietness.



TRAFFIC NUISANCE 1:30,000  
 As no exact information on the effects of traffic nuisances is available an "impact band" is shown as a symbol 375 ft. (125 metres) on each side of the Uhuru Highway.



## TRAFFIC

### THE PLANNING SITUATION

As already stated the Central Campus area is located centrally in present-day Nairobi which stretches out mainly to the West and East for 5-8 miles.

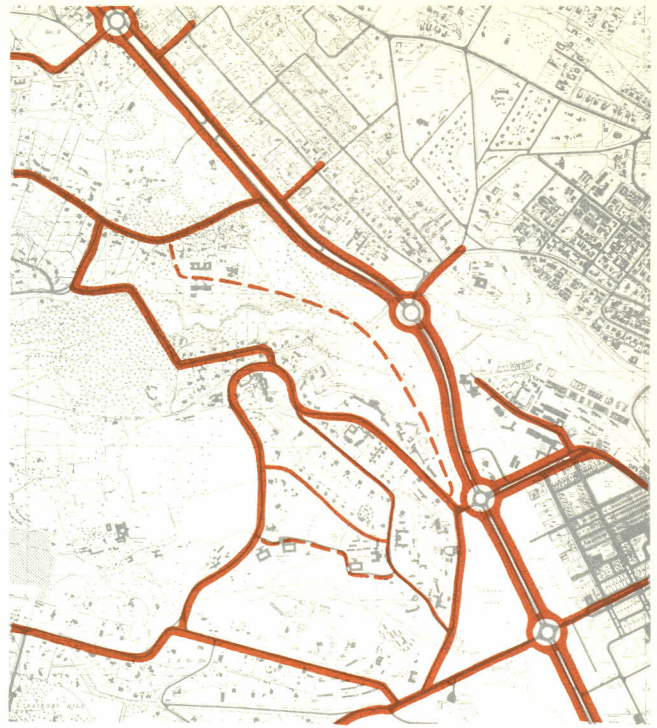
The problems of this site reflect the problems of the city-core traffic and parking. Solving these problems is mainly a Nairobi City responsibility and the U.C.N. can only contribute to this by expressing points of view on the actual traffic lines in so far they penetrate or touch U.C.N. premises. The present trend is to invest in the road system of the central city and by this, conditions for the U.C.N. will improve.

This central situation has its disadvantages with regard to traffic nuisances which can not be overcome, but precautions can be taken to minimize their effect on university life.

At the beginning of this year the N.C.C. started a study group to look into the effects of a traffic planning programme on a Master Plan for Nairobi. Besides studying the present situation, this group is also studying the possible future pattern of urbanization and traffic systems within the Nairobi region.

The image of the future pattern is that of a huge conurbation stretching in a bow-like shape from Limuru to Thika via Nairobi accommodating 3-4 million people by the end of the century.

The Central Campus will remain central in this Greater Nairobi - and the problems evolving, seen from a U.C.N. point of view, will still be traffic problems which have to be mastered by the town as a whole. It is difficult to foresee a situation where the U.C.N. is left alone to face those problems.



THE PRESENT ROAD SYSTEM

Thick line: Major road

Thin line: Minor, but important road

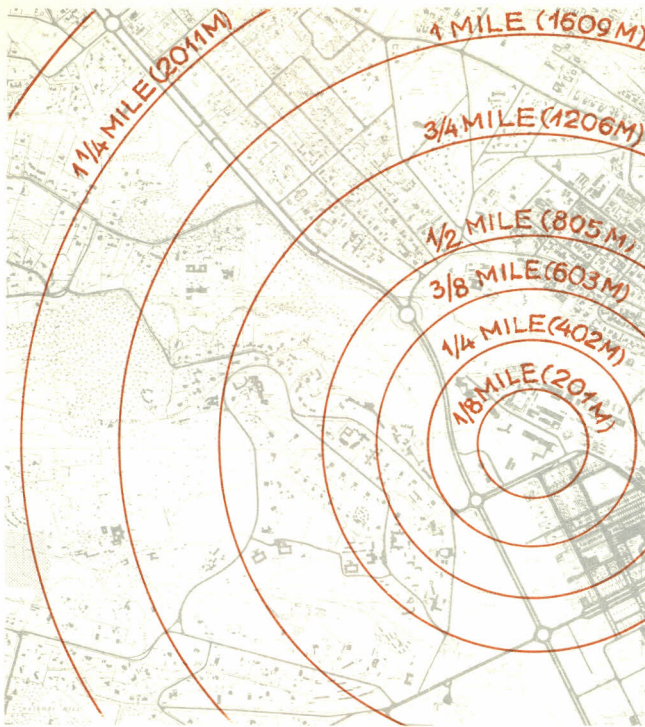
1:30,000

### THE PRESENT TRAFFIC SYSTEM

The road system in the Central Campus area consists in fact of the Uhuru Highway and its junctions. From here all the traffic is distributed to and from the city-center. From these junctions a number of high-capacity arteries subdivide the city-core.

The Uhuru Highway penetrates the campus by separating the Main Campus from the other parts. The University Way skirts the Main Campus's south eastern boundary.

To-day access to the Main Campus is difficult. Access to the parking place is continually interrupted and the only real access is through the College Road junction. Even this connection functions badly in peak-hours.



DISTANCES ON THE CENTRAL CAMPUS

1:30,000

The Hospital Hill and the Choromo areas are served by ordinary public roads. The roads in this area have no clearly defined function to-day. For example in peak-hours the Kenton Drive-State House Road is used as a by-pass for commuters avoiding the overcrowded Uhuru Highway. At the same time this road serves residential purposes and by this confusion of functions, inconvenience is generated to all concerned.

Two important parts of the Central Campus, the Main Campus and the Hospital Hill area, are at present only directly connected by way of a modest pedestrian subway under the Uhuru Highway. The distances within the area are important considerations as there is a distance of more than one mile from the Main Campus to the educational section of the Choromo campus to the north, and the distance between the Halls of Residence on Hospital Hill and the Main Campus represent approximately half this distance, with the women's Hall of Residence situated to the South representing a distance of 3/4 of a mile.

There is no physical continuity between the different developments of these three areas. The very important pedestrian links connecting these 3 areas are therefore vague in character, and moreover no direct connection exists between the considerable hours there have been several cases of robbery when female students were proceeding number of Halls of Residences. One of the effects of the casualness of these arrangements is the lack of security, experienced especially by the female students, when commuting to and from their Hall of Residence and the Main Campus. In the late hours there has been several cases of robbery when female students have been proceeding to the library.

#### ROADS PLANNED BY NAIROBI CITY

The Nairobi City Council is planning a number of new roads, extensions and junctions within the Central Campus area or adjacent to it.

In the near future, University Way will be extended to the north-east to link up with the new round-about in the Nairobi River Valley. By this, the whole of University Way down to the Uhuru Highway will probably be reconstructed and the traffic flow will increase rather than decrease. Access to the Main Campus will be even more difficult than it is to-day.

From the above-mentioned round-about a new arterial road will be built along the Nairobi River to the junction at the U.C.N. sports grounds. This road will be a part of the new system duplicating the functions of the Uhuru Highway, by serving the city-core from the eastern side. Because of this road, the Main Campus will suffer an even greater impact of traffic noise, dust and vibration. This is, however, an inescapable factor in the entire road system, and could be of benefit for the U.C.N. if a junction were placed approximately behind the Norfolk Hotel, thereby offering improved access to the





THE PRESENT AND PLANNED ROAD SYSTEM OF NAIROBI CITY IN THE CENTRAL CAMPUS AREA 1:30,000

Thick line: existing or major roads planned by N.C.C.  
 Thin line: existing minor, but important roads  
 Dotted line: suggested changes in the system

Main Campus. The designs of the two junctions on the Uhuru Highway are not yet finalized. Nevertheless, in the long run, they will probably not allow for direct access to College premises. The U.C.N. should therefore be consulted on the designs of these junctions as they are likely to encroach on University land, particularly as regards the northern junction where, be it complex or simple (conventional) in shape, it will occupy some considerable portion of the College sports grounds (see chapter III, traffic, suggesting a possible solution in sketch outline).

On the western side of Uhuru Highway one major artery is planned, serving the residential areas to the West, and linking up with the round-about at the U.C.N. sports fields. At the moment its anticipated location crosses the slopes of Hospital Hill through a potential development area of the U.C.N. Here the proposal is to move it so that it follows the Masonga Wai River and connects at the Kilileshwa bridge. This road

is a necessary part of the entire city system but the proposed new location will minimize the inconveniences seen from an U.C.N. point of view.

In the Choromo area the land has been laid out for the extension of the Ring Road Kilileshwa. In the long-term development this extension should allow for moving Riverside Drive to a location which is more rational for the U.C.N. development within this area. Furthermore it should be considered whether a more southerly junction to Uhuru Highway of the Ring Road would be preferable.

No other road plans are known at present. But to demonstrate an entire and clear road system within the Hospital Hill area a supplementary road to the Ngong Road-Hurhingham Road should be considered. The proposal is to locate this line in the valley where the processional way formerly existed. Through such a road, the entire State House area and the western suburbs would improve their contact with the city.

#### UTILIZATION OF U.C.N. LAND

The Central Campus area covers a total of 157.1 acres (63.6 ha), of these 16.5 acres (6.7 ha) are on the eastern side of the Uhuru Highway (the Main Campus) and 140.6 acres (56.9 ha) on the western side of the Highway covering Hospital Hill and the Choromo area.

These areas are in the possession of the University College and of this total 16.1 acres (6.5 ha) are developed for academic purposes with 316,000 sq. ft. (29,600 m<sup>2</sup>) floor space on the Main Campus and 106,000 sq. ft. (10,000 m<sup>2</sup>) floor space in the Choromo area.

24.3 acres (9.9 ha) are developed for residential purposes with 13.0 acres (5.3 ha) for students' hostels accommodating approx. 1,150 students and for staff housing with 11.3 acres (9.6 ha). A total of 115.2 acres (46.6 ha) is to-day undeveloped.

| Present utilization                  | Academic functions  | Communal functions | Residential         | Total area used     | Not developable | Reserve        | Total UCN-land |
|--------------------------------------|---------------------|--------------------|---------------------|---------------------|-----------------|----------------|----------------|
| MAIN CAMPUS                          |                     |                    |                     |                     |                 |                |                |
| Land in acres (ha)                   | 9.4<br>(3.8)        | 1.5<br>(0.6)       | 0                   | 10.9<br>(4.4)       | 1.7<br>(0.7)    | 3.9<br>(1.6)   | 16.5<br>(6.7)  |
| Floor space sq.ft. (m <sup>2</sup> ) | 316.000<br>(29.600) | 64.000<br>(6.400)  | 0                   | 385.000<br>(36.000) |                 |                |                |
| HOSPITAL HILL                        |                     |                    |                     |                     |                 |                |                |
| Land in acres (ha)                   | 0                   | 0                  | 22.6<br>(9.2)       | 22.6<br>(9.2)       | 33.6<br>(13.6)  | 19.5<br>(7.8)  | 75.7<br>(30.6) |
| Floor space sq.ft. (m <sup>2</sup> ) | 0                   | 0                  | 200.000<br>(19.000) | 200.000<br>(19.000) |                 |                |                |
| CHOROMO                              |                     |                    |                     |                     |                 |                |                |
| Land in acres (ha)                   | 6.7<br>(2.7)        | 0                  | 1.7<br>(0.7)        | 8.4<br>(3.4)        | 30.1<br>(12.2)  | 26.4<br>(10.7) | 64.9<br>(26.3) |
| Floor space sq.ft. (m <sup>2</sup> ) | 106.000<br>(10.000) | 0                  | -                   | 106.000<br>(10.000) |                 |                |                |

A major part of this land is not suitable for the construction of standardized buildings. Black cotton soil in the flat low-lying areas along the Uhuru Highway demand special precautions in foundations. Persistent flooding of the area and storm-water also create difficulties in building construction and it has been calculated that construction on this land will raise building costs by at least 25-30 %. This land amounts to a total of 65.4 acres (26.5 ha).

#### MAIN CAMPUS

This campus is significant through its content of communal facilities which in fact mainly is due to the presence of the U.C.N. administration, library and the large lecture theatres and the Taifa Hall. Especially the lecture theatres have city-like functions besides their academic. Concerts and other public events take regularly place within these premises and during the long vacations conferences are accommodated here using ordinary lecturerooms as well.

A special feature is the Great Court which forms the scene for important events of the U.C.N. as the annual congregation.

In floor space the Faculty of Engineering is dominating in covering a total of 109.000 sq.ft. (10.200 m<sup>2</sup>).

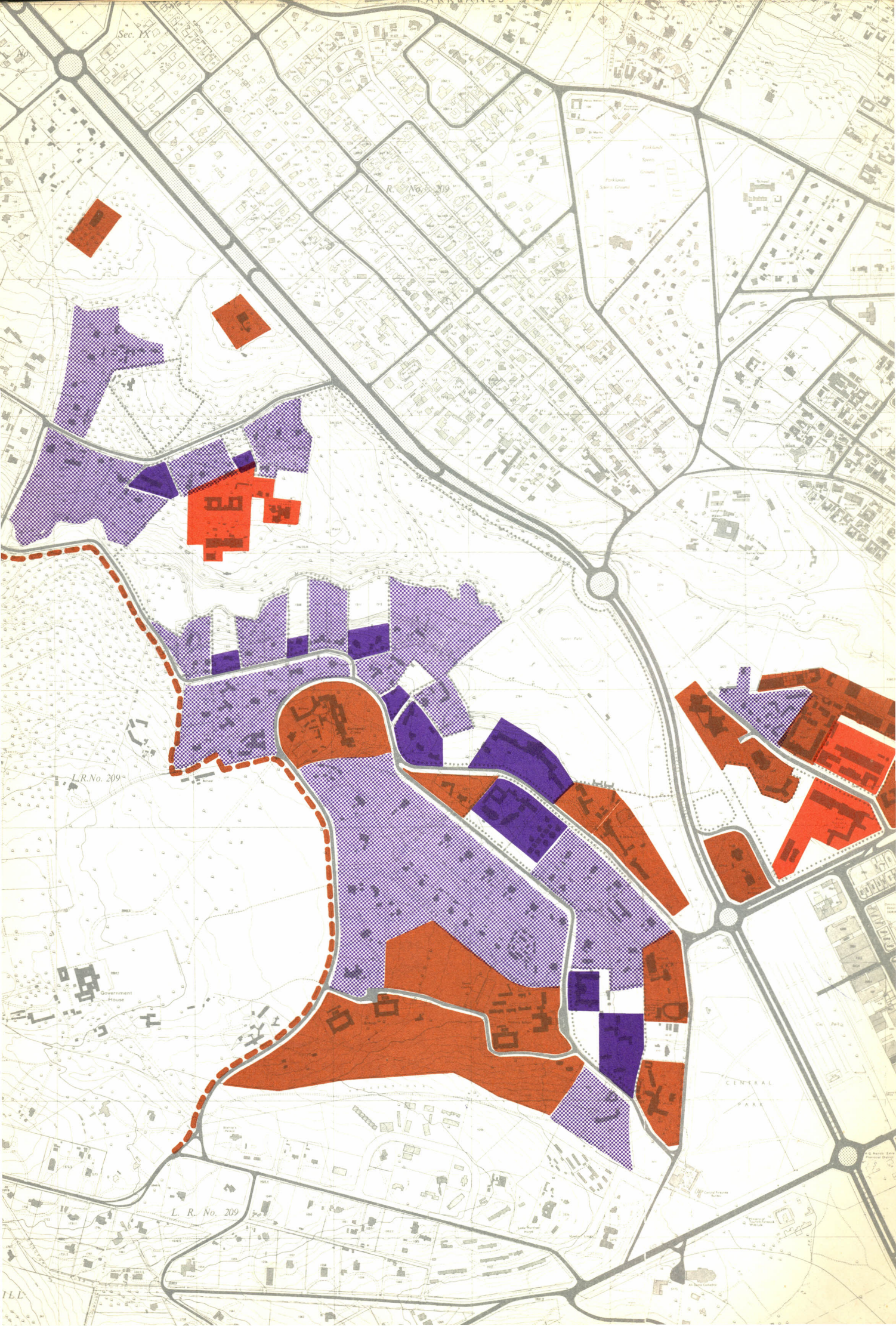
As formerly stated the Main Campus is where the U.C.N. started its existence as a technical college more than 10 years ago. In spite of its mixture of architectural styles the campus has its own character, suitable to serve also in future as the nucleous point of contact to society.

The traffic and parking facilities are the major problems and concern in developing this campus further as they already to-day are unsatisfactory.

#### PRESENT UTILIZATION OF LAND

Red: Academic functions of the U.C.N.  
Violet: Residential functions of the U.C.N.  
Bright violet: Residential areas  
Brown: Public or commercial functions of the city

1:10.000



Sec. XX

L.R. No. 209

L.R. No. 209

L.R. No. 209

Government House

CENTRAL PARK

## HOSPITAL HILL

This area is predominantly residential with all Halls of Residence concentrated here. The Halls have been constructed without a total concept as isolated units and by this no means of organized features give opportunities of communication between the Halls or between residential areas and the academic facilities.

The southern part of the area accommodates a number of staff flats, the Protectorate Road flats.

Within the low land at the Uhuru Highway the U.C.N. sports grounds are located facilitating for football, basketball, athletics and tennis.

## CHOROMO

Academic functions dominate this campus entirely. As mentioned the biological sciences are accommodated here together with pre-clinical training in medicine and veterinary science.

The major draw-back of Choromo is its isolation from the other parts of the Central Campus area. As the students of the sciences concerned only will amount to a relatively small number (extensive land use) this isolation must be felt even stronger.

When these areas are deducted from the undeveloped areas a reserve of only 49.6 acres (20.1 ha) is left for development. Even a minor part of this land creates further difficulties because of steep gradients.

From engineering considerations the area is very suitable for development if the area west of the present academic premises is used for housing with septic tank drainage only.

LAND NEIGHBOURING THE U.C.N. PREMISES, ITS CHARACTERISTICS AND FEASIBILITY FOR U.C.N. DEVELOPMENT.

## MAIN CAMPUS

The U.C.N. premises are only parts of an area including other urban functions. Public services in the area are: The Kenya Cultural Centre, The National Theatre, The Voice of Kenya, Police station, a section of The Survey of Kenya and The Jewish Synagogue.

The land occupied by these public services should be regarded as land to which the U.C.N. can have no immediate claim.

The Commercial activities are: The Norfolk Hotel and shops and workshops in Grogan Road.

Road West.

The activities in Grogan Road are split up among so many properties that to develop the U.C.N. here would be most difficult and expensive, and resulting in very small portions of land.

Left for consideration are the two plots belonging to the Norfolk Hotel.

The northernmost plot is scarcely developed, but further development will be strongly affected or made impossible by the planned highway along the Nairobi River.

The other part accommodates the majority of the hotel facilities including kitchen, restaurant and service buildings nearest Grogan Road.

Except for the service buildings, all constructions are sound and well maintained. But none of the buildings are likely to be converted for academic purposes.

The kitchen and restaurant facilities could possibly serve as a catering and assembly unit for the Main Campus.

The hotel accommodation consists of a number of separate rooms and tiny flats. These could easily be converted to accommodation for university staff on short-term appointments or post graduate students.

The site is suitable for limited extensions to the Faculty of Engineering.

According to the restaurant building a special point is to be made. Very few buildings in Nairobi are of architectural value. The main building of the Norfolk Hotel is one of the rare exceptions and it should be preserved as a typical and outstanding example of good architecture from the past. In many developing countries there has been tendency to neglect buildings from colonial days. To-day a more positive policy for preservation is usual.

#### HOSPITAL HILL AREA

Functions in the area other than functions of the U.C.N. are:

Public facilities as churches, YMCA, YWCA, United Kenya Club, 3 primary and secondary schools, the Secretarial College etc.

Residential areas consisting of individual plots in a low density lay-out.

The major part of the plots on the flat top of the hill between State House Road and Protectorate Road Hill are on governmental land, the plots on the fringes of the hill are private. For the mostpart the houses on government-owned plots are of a lower quality than other houses.

From engineering considerations this area is very suitable indeed for development, except for the westernmost plots along Kenton Drive.

#### CHOROMO AND THE AREAS NORTH OF HERE BETWEEN UHURU HIGHWAY AND THE PLANNED RING ROAD.

Half of the non U.C.N. land is occupied by individual houses in a low density lay-out. The other part is occupied by two churches or missions to which certain educational activities are attached. The area is split up in two separate parts by the Nairobi River, and the valley around the river reduces the possibilities of developing the area.

#### KENYATTA HOSPITAL CAMPUS

In connection with the existing Kenyatta Hospital, the newly established Faculty of Medicine is organizing clinical departments (for 3rd, 4th, and 5th year students). A comprehensive plan for the development of the university hospital will be produced by the Ministry of Works. Residences for students and staff are included in this development plan.

#### KABETE CAMPUS

The site area is about 20 acres (approx. 8 ha). This relatively small area is surrounded in all directions by open farm land and coffee estates. Thus excellent possibilities for further development obviously exist and should be utilized.

The existing area is almost fully covered by buildings for the Faculty of Veterinary Science (2nd, 3rd, and 4th year). The greater part of the buildings are serving educational and research purposes, adjacent to stables, animal houses etc. The remaining buildings consist of residences and common facilities for about 100 students and members of staff.

#### KIKUYU CAMPUS

This site, about 27 acres (approx. 11 ha) is slightly hilly and in the northern part is densely overgrown. Presumably the surrounding areas will allow for later expansion. The area is utilized solely by the Institute of Adult Studies. The group of buildings, situated on the southern part of the site, consists of residences and their related common facilities for 60 students, educational and administrative accommodation for correspondence courses. Furthermore a few staff houses are built on the site.

## LAND VALUES

Information on land values has been made available by the Commissioner of Lands. Values East of Uhuru Highway are naturally much higher than on the western side, but the variations in value from Hospital Hill to the Choromo area are small. As the private houses are of a much higher value than the major part of the government houses, the values of private property will go up per acre to approx. the double of the bare land values.

### LAND VALUES

1:10.000

|                     |                   |
|---------------------|-------------------|
| Full colour:        | 11-30.000 Sh/acre |
| Medium-dark:        | 15.000 Sh/acre    |
| Medium-bright:      | 7-8.000 Sh/acre   |
| Bright:             | 6-7.000 Sh/acre   |
| Extra bright:       | 4-5.000 Sh/acre   |
| Single dotted line: | private property  |
| Double dotted line: | government land   |



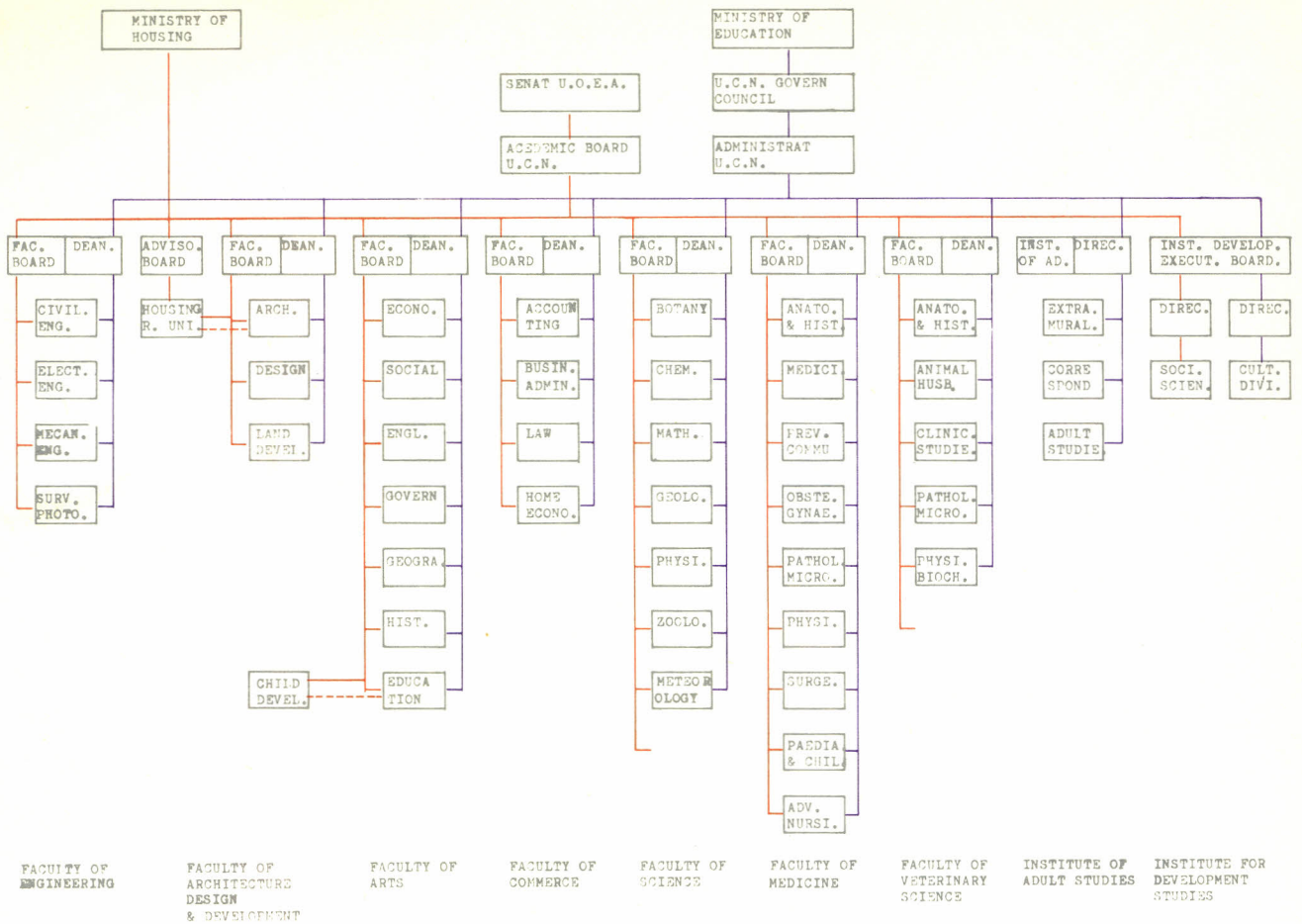


DIAGRAM SHOWING ACADEMIC AND ADMINISTRATIVE ORGANIZATION



| F A C U L T Y                        | A C T U A L 1967/68 |            |             |       | 1974/75     |            |             |       |
|--------------------------------------|---------------------|------------|-------------|-------|-------------|------------|-------------|-------|
|                                      | Under grad.         | Post grad. | Total stud. | Staff | Under grad. | Post grad. | Total stud. | Staff |
| Engineering                          | 279                 | 26         | 305         | 36    | 560         | 50         | 610         | -     |
| Architecture<br>Design & Development | 137                 | -          | 137         | 20    | 224         | 6          | 230         | -     |
| Arts                                 | 335                 | 50         | 385         | 43    | 491         | 75         | 566         | -     |
| Commerce                             | 228                 | 10         | 238         | 14    | 420         | 21         | 441         | -     |
| Science                              | 203                 | 66         | 269         | 30    | 420         | 100        | 520         | -     |
| Medicine                             | 30                  | -          | 30          | -     | 426         | -          | 426         | -     |
| Veterinary                           | 140                 | 15         | 155         | 36    | 222         | 20         | 242         | -     |
| Development<br>(Domestic Science)    | 44                  | -          | 44          | -     | -           | -          | 56          | -     |
| Agriculture                          | -                   | -          | -           | -     | -           | -          | 186         | -     |
| Education                            | -                   | 50         | 50          | -     | -           | -          | 80          | -     |
| GRAND TOTAL                          | 1396                | 217        | 1613        |       |             |            | 3357        |       |

UNIVERSITY COLLEGE NAIROBI. STUDENT NUMBERS 67/68, 74/75

#### LOCATION OF THE VARIOUS U.C.N. FACILITIES

##### Faculty of Engineering:

Main Campus

##### Faculty of Arts:

Main Campus

##### Faculty of Commerce:

Main Campus

##### Faculty of Science:

Main Campus except Dept. of Zoology and Dept. of Botany, both placed in connection with the biological sciences (Medicine and Veterinary sciences) in Choromo.

##### Faculty of Architecture, Design and Development:

Main Campus

##### Faculty of Medicine:

Preclinical departments in Choromo, clinical in Kenyatta Hospital.

##### Faculty of Veterinary Science:

Preclinical departments in Choromo, clinical in Kabete.

##### *Institute for Development Studies:*

*Main Campus*

##### Institute of Adult Studies:

Kikuyu

Along with these existing U.C.N. faculties mention should be made of the now resolved Faculty of Agriculture, the structure and location of which are under consideration. Certain departments might be located in Choromo.

#### STUDENT HOSTELS

The Central Campus area accommodates a total of appr. 1150 students, of these 200 are women.

Rooms are organized into Halls of Residence with capacities ranging from appr. 100 to 200 students each. The hostels were originally designed on basis of single occupancy rooms sharing common facilities such as bathrooms, catering facilities etc.

To-day the majority of the rooms have been converted into double rooms and it is obvious from this that the common facilities are over-utilized. Dining halls, common rooms, washing facilities etc. deteriorate rapidly and the problem of maintenance is apparently increasing.

The problems of a decentralized cooking system and the family life of the new-comers suffers has led the U.C.N. to a decision of constructing a Central Catering Unit to enable more economic and better cooking. to the detriment of the work to be done.

The men's Halls of Residence are concentrated in the northern part of the Hospital Hill area - the women's are located in splendid isolation in the southern part.

From many points of view this isolation is not really desirable. One point alone one can mention is the problem of the physical security of female students commuting through no-man's land to the U.C.N. academic premises.

#### STAFF HOUSING

The Central Campus area also includes a number of staff houses and a number of flats located in the southern part of the area on Protectorate Road.

From a planning point of view the accommodation of permanent staff is of little importance. The staff should be absorbed within the residential areas of Nairobi rather than from islands of academics within or around the campus area.

Contrary to this, the accommodation of short-term visiting professors, lecturers, research fellows etc., and in the near future senior post-graduate students, are creating an increasing problem.

This group of academics will be working hard in a concentrated manner for shorter periods and will need accommodation in the close vicinity of their place of work. In most cases it is likely that they will not bring their families with them and that they will only need limited accommodation, but with very good service facilities.

Another related problem is the accommodation of arriving new-comers to the staff. In most cases these new staff members and their families are accommodated in hotels for shorter or longer periods. The U.C.N. pays heavy charges to the hotels - competing for accommodation in a tourist orientated market -

#### EXISTING BUILDINGS

As has also happened in certain rapidly developed European universities, the existing buildings of U.C.N. seem to have been planned one by one, following different planning and structural principles. Mostly, the buildings have been built as finite structures designed to satisfy particular specialized functions. Possibilities for the natural growth of faculties or departments are limited, and similarly for other changes in the use of space.

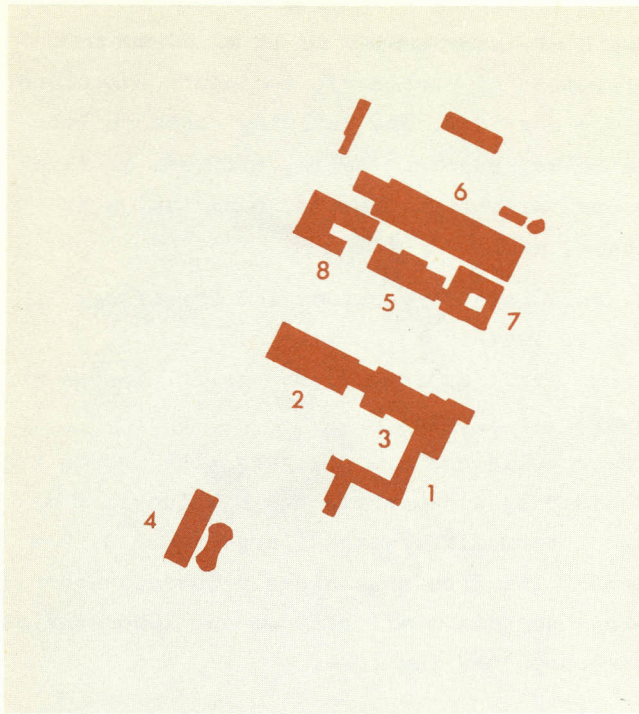
It seems difficult to convert or expand these highly individual buildings.

A common building type is that with side-corridors (i.e. single banking) excellent for cross-ventilation but creating long lines of communication and limiting the possibilities for change.

Most of the buildings, especially on the Main Campus, follow the directions of the surrounding roads, thus preventing ideal sun orientation.

Although it has been possible to make a calculation of the total amount of existing building floor areas within the different sites (Main Campus, Choromo, Kabete, Kikuyu etc.), it has not been possible to categorize all of these areas according to faculties. Moreover calculations are blurred by the fact that certain essential premises are used by different departments from various faculties.

The rate of floor area per student will, in the same way, possess some uncertainty (which is the case indicated in most of the existing literature dealing with universities and colleges). The survey of floor areas includes only such buildings as are now completed and in use. On the list of single buildings, however, those under construction have also been taken into account.



A. MAIN CAMPUS. EXISTING BUILDINGS

#### MAIN CAMPUS

Total: 385,000 sq.ft. (36,000 m<sup>2</sup>) academic floor space.

##### 1. Original buildings of the Royal Technical College

Built: 1955 - 1968.

Gross area: approx. 116,000 sq.ft. (10,800 m<sup>2</sup>).  
Number of floors: 5-6.

The college buildings form a number of connected units, designed with either single or double banked corridors. The room depth of lecture rooms is approx. 6.7 m. On the bottom two floors there are common rooms, canteen, staff-room, etc. Owing to the orientation of the site sun-screening is made difficult. The surrounding streets generate dust and noise nuisances. The type of building chosen limits the availability of ancillary space.

##### 2. Library

Built: early sixties.

Gross area: approx. 69,000 sq.ft. (6,400 m<sup>2</sup>).  
Number of floors: 4.

This building has a high-ceilinged ground floor with a recessed balcony, and above that,

three staggered floors. The reading-room area totals 520 m<sup>2</sup>. There are shelves for 320,000 volumes (running metres of shelves: approx. 800). Area of offices etc. approx. 1,200 m<sup>2</sup>, 370 m<sup>2</sup> of which are occupied by various faculties. Lecture-rooms totals approx. 500 m<sup>2</sup> with an average room depth of 10.5 m.

##### 3. Taifa Hall

Built: 1963.

Gross area: 48,000 sq.ft. (4,500 m<sup>2</sup>).

Number of floors: 1½.

The building contains a hall with 810 ground-floor seats and 220 balcony seats, and a stage with adjacent facilities. Owing to the lack of a ventilation plant, doors to the outside are kept open during lectures and consequently the noise problem is considerable.

##### 4. Hyslop Building

Built: 1961.

Gross area: approx. 40,000 sq.ft. (3,700 m<sup>2</sup>).

Number of floors: 4 exclusive of loft.

This is designed as a central-corridor building with room depth approx. 6 m; full-depth rooms (laboratories) approx. 15 m. Partly open ground floor. The building is well suited for both larger laboratories and lecturer rooms, and smaller seminar rooms and offices. It is fitted out with installations specific to the Department of Chemistry. In a connected one-storey building there are two lecture halls of 80 and 180 seats respectively.

##### 5. American Wing

Built: ?

Gross area: 30,000 sq.ft. (2,800 m<sup>2</sup>).

Number of floors: 4.

This wing is designed chiefly with closed side-corridors and a depth of lecturer rooms of approx. 8 m.

##### 6. Workshops and heavy laboratories

Built: ?

Gross area: approx. 22,000 sq.ft. (2,100 m<sup>2</sup>).

Number of floors: 1.

A shed building of simple design.

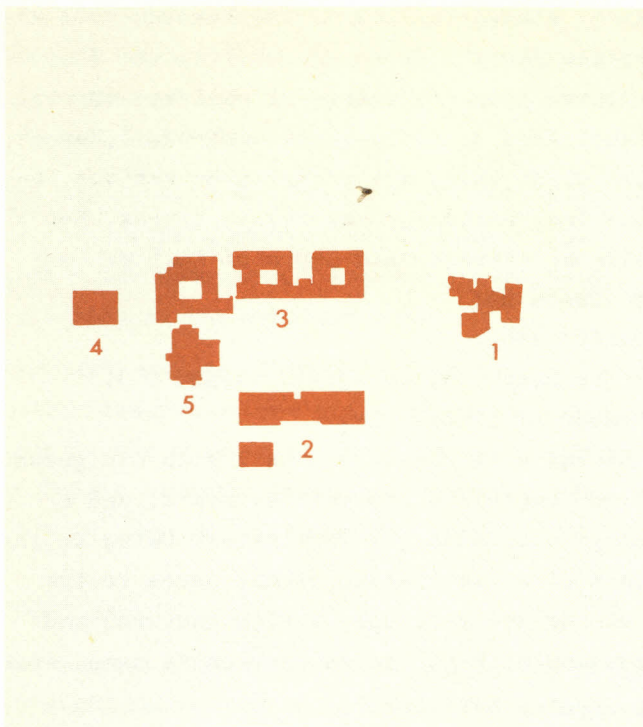
##### 7. Civil Engineering

Built: 1963, extended in 1965.

Gross area: approx. 14,000 sq.ft. (1,300 m<sup>2</sup>).

Number of floors: 2.

Depth of tuition rooms and laboratories 10-12 m.



B. CHOROMO. EXISTING BUILDINGS

Depth of building is 21 m and maximum room depth of laboratories is 11 m. Asymmetric placement of corridors, secondary functions along corridor. The building contains laboratories, research cells, offices, lecture-rooms, scientific museum, aquarium, workshops, etc.

3. Buildings for Anatomy and Physiology  
Built: 1964-68.

Gross area: approx. 73,000 sq.ft. (6,800 m<sup>2</sup>).  
Number of floors: 2.

These buildings are designed with courts surrounded by side-corridor wings (depth 7 m) and intermediate wings (large rooms of 9 m depth, lit from both sides). The side-corridor wings contain staff offices and laboratories, workshops and the like.

4. Library

In construction.

Gross area: 8,400 sq.ft. (780 m<sup>2</sup>).  
Number of floors: 2.

The house is designed on a simple post-and-beam principle as a large-room library, containing approx. 120 m<sup>2</sup> reading-room area and librarian's office, stacks, etc.

5. Lecturer room

Under construction.

Gross area: 8,900 sq.ft. (830 m<sup>2</sup>).  
Number of floors: 1 and 2.

The building contains a small and a large lecturer room of 80 and 110 m<sup>2</sup> respectively, common room and cafeteria with a total area of 240 m<sup>2</sup> and adjacent kitchen and storeroom.

### 8. New Engineering Block

Built: 1967-68.

Gross area: approx. 43,000 sq.ft. (4,000 m<sup>2</sup>).  
Number of floors: 2-5.

Central-corridor house, room depth of tuition and office area 5.6 m, depth of building approx. 13 m. Suitable for varying tuition and laboratory purposes. A 150 m<sup>2</sup> lecture-room and some heavy laboratories are situated in the ground floor.

### CHOROMO

Total: 106,000 sq.ft. (10,000 m<sup>2</sup>) academic floor space.

#### 1. Choromo Mansion

Built: ?

Gross area: approx. 12,000 sq.ft. (1,100 m<sup>2</sup>).  
Number of floors: 1½ (?).

Not used for academic functions.

#### 2. Building for Zoology and Botany

Built: 1964.

Gross area: approx. 32,000 sq.ft. (3,000 m<sup>2</sup>).  
Number of floors: 2.

### HOSPITAL HILL AREA

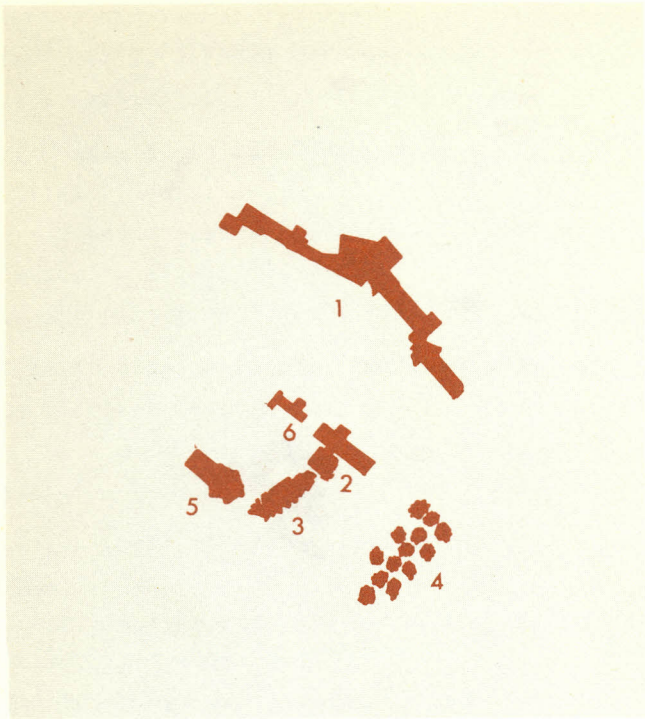
Total: 200,000 sq.ft. (19,000 m<sup>2</sup>) residential floor space.

#### 1. Halls of Residence Nos. 1-2-3

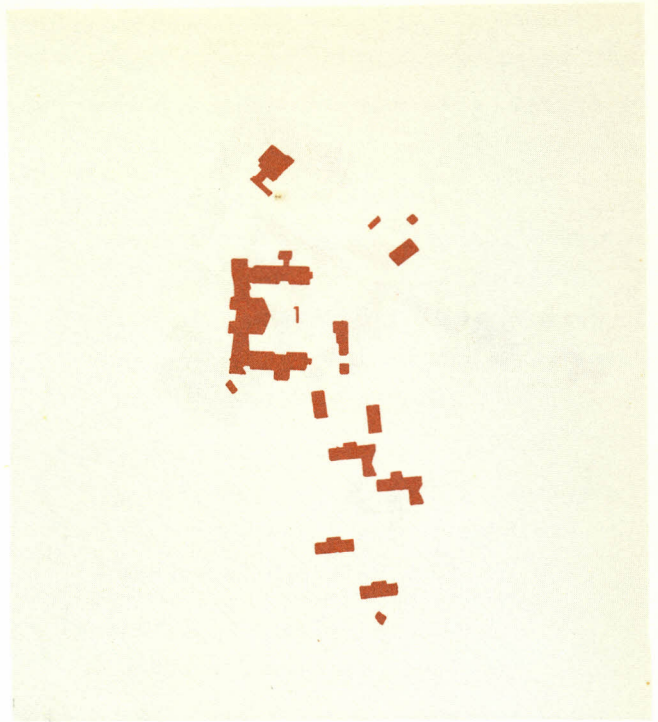
Built: 1956-57-58.

Gross area: approx. 64,000 sq.ft. (6,000 m<sup>2</sup>).  
Number of floors: 4.

Each block designed as a central-corridor



C. HOSPITAL HILL NORTH. EXISTING BUILDINGS



D. HOSPITAL HILL SOUTH. EXISTING BUILDINGS

building, containing 103, 104 and 91 rooms respectively. Common bath and toilet facilities per floor. On the roof there is a staff flat. Connected to the Halls of Residence are a dining-room and a common room with a total area of 1,500 m<sup>2</sup>.

2. Hall No. 4

Built: 1963.

Gross area: approx. 23,000 sq.ft. (2,100 m<sup>2</sup>).

Number of floors: 4.

This building contains 100 single rooms of approx. 11 m<sup>2</sup> each, bath and toilet facilities and common facilities on every floor.

3. Hall No. 5

Built: 1966.

Gross area: approx. 32,000 sq.ft. (3,000 m<sup>2</sup>).

Number of floors: 5 + ½ basement.

Central-corridor building, 90 rooms of 15 m<sup>2</sup>, common bath and toilet facilities per group.

Common rooms on the ground floor.

4. Halls Nos. 6-7-8

Built: 1967-68.

Gross area: approx. 75,000 sq.ft. (7,000 m<sup>2</sup>).

Number of floors: 4-5.

This building contains 202 double rooms, common bath and toilet facilities per group, and common rooms on the ground floor.

5. Dining-hall

Built: 1966.

Gross area: approx. 6,200 sq.ft. (580 m<sup>2</sup>).

Number of floors: 1.

230 m<sup>2</sup> of the area is taken up by kitchen and 350 m<sup>2</sup> by dining-hall etc.

6. Warden's house

Built: approx. 1966.

Gross area: approx. 4,700 sq.ft. (440 m<sup>2</sup>).

Number of floors: 2.

HOSPITAL HILL (PROTECTORATE ROAD)

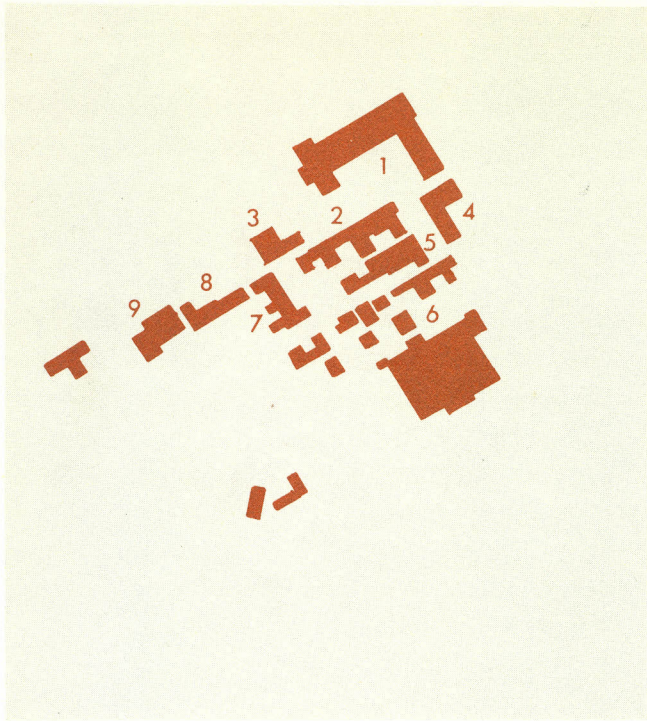
1. Women's Halls

Built: 1955-63, extended in 1968.

Gross area: approx. 23,000 sq.ft. (2,100 m<sup>2</sup>).

Number of floors: 2.

Rooms etc. occupy 1,500 m<sup>2</sup> divided into 96 double rooms; bath and toilet on every floor; dining-hall and kitchen total area of 600 m<sup>2</sup>. During 1968 extension of room wings by 64 units.



E. KABETE. EXISTING BUILDINGS



F. KIKUYU. EXISTING BUILDINGS

## KABETE

Total: 75,000 sq.ft. (7,000 m<sup>2</sup>) academic floor space, 18,000 sq.ft. (1,700 m<sup>2</sup>) residential floor space.

### 1. Main Tuition Building

Built: 1962.

Gross area: approx. 27,000 sq.ft. (2,500 m<sup>2</sup>).

Number of floors: 2.

The building consists of an administrative wing of 720 m<sup>2</sup> (central-corridor), the Department of Pathology of 820 m<sup>2</sup> (access balconies along both sides), and a main wing of 950 m<sup>2</sup> containing the Department of Microbiology (central-corridor). In the administrative wing there are two lecturer rooms of 130 and 60 m<sup>2</sup> respectively and a small museum.

### 2. Main Block

Built: ?

Gross area: approx. 12,000 sq.ft. (1,160 m<sup>2</sup>).

Number of floors: 1.

Central-corridor building usable for normal tuition purposes.

### 3. Library

Built: 1962, with later extension.

Gross area: approx. 4,300 sq.ft. (400 m<sup>2</sup>).

Number of floors: 1.

Two library rooms, various offices and entrance hall.

### 4 and 5. Animal Clinics

Built: ?

Gross area: approx. 8,900 sq.ft. (830 m<sup>2</sup>).

Number of floors: 1.

### 6. Boxes, Kennels, Isolations

Built: 1965.

Gross area: approx. 23,000 sq.ft. (2,100 m<sup>2</sup>).

Number of floors: 1.

### 7. Students' Hostel

Built: 1962.

Gross area: approx. 5,800 sq.ft. (540 m<sup>2</sup>).

Number of floors: 1 and 2.

The hostel contains 30 rooms.

### 8. New Hostels

Built: 1966.

Gross area: approx. 6,400 sq.ft. (600 m<sup>2</sup>).

Number of floors: 2.

The area is divided into 40 rooms of 8 m<sup>2</sup>; bath and toilet facilities per group.

9. Common Rooms and Dining-hall

Built: 1966-67.

Gross area: approx. 5,900 sq.ft. (550 m<sup>2</sup>).

Number of floors: 1.

Dining-hall area 320 m<sup>2</sup>, divisible by means of a folding partition. The remainder occupied by kitchen etc.

#### KIKUYU

1. Institute of Adult Studies

Built: ?

Gross area: approx. 19,000 sq.ft. (1,750 m<sup>2</sup>).

Number of floors: 1-2-3.

The buildings are grouped around a small court. They contain tuition rooms, library, and offices, and besides, there are 36 single rooms of 7.4 m<sup>2</sup> and 12 double rooms of 13.0 m<sup>2</sup> with the appropriate common facilities. The residential blocks are designed as two- or three-storeyed central-corridor houses. The other buildings are one-storeyed.

#### FORMULATED FUTURE BUILDING REQUIREMENTS AND ALLOCATIONS

Moreover, building requirements have been formulated for faculties, common facilities and student hostels.

From U.C.N. Capital Requirements 1967-1970 and Land Requirements, Appendix 1 the following is quoted:

Faculty of Arts:

Buildings for Education and Arts (L 250.000 + L 170.000).

Faculty of Science:

Building for Dep. of Physics and Dep. of Mathematics (L 140.000). Laboratory extensions for Dep. of Botany and Dep. of Zoology (L 150.000) together with Radio Isotope Building (L 16.000)

Faculty of Architecture, Design and Development:

New faculty building (L 400.000).

Faculty of Medicine:

Buildings for Clinical Science (L 500.000). Lecturehall, library and student residences (L 150.000).

Faculty of Veterinary Science:

Veterinary Science Training Hospital (L 200.000) and further Nutrition teaching Laboratory, enlargements of accommodations for animal experiments and student residences.

Institute of Adult Studies:

Additional buildings for correspondence course and extensions for students' hostels.

New Faculty of Agriculture:

Faculty buildings etc.

To supplement the existing common facilities plans exist for a Central Catering Unit (L 150.000), a Student Centre (L 150.000) and buildings for Sports Development (L 69.000).

For the further development of residences for the students working on the Main Campus and Choromo, the need has arisen for five new halls of residence, four for men (L 500.000) and one for women (L 100.000).

Besides these demands for individual buildings, mention must be made of the ancillary site works required (roads, sewers, power lines etc.) which will occur both on and in between the sites concerned.

Thought has been given to means of providing effective communications between university functions: roads, pedestrian walks, bicycle tracks, parking etc.

With the increasing density in student-population it will be necessary to provide for various recreation areas with differentiated functions, such as squares, meeting places, gardens, parks etc.

It is worth noting that the usual way for U.C.N. to provide new buildings, i.e. through isolated donations, may hamper the co-ordination of the common siteworks and landscaping so essential to the unity of the University Campuses as a whole.

## II FUTURE CONDITIONS

Forecasts on the future development of the U.C.N. are most difficult to establish. The college has processed figures up to 1975 indicating a total of 3300 students (1600 today) but for a long-term development plan this period of prognosis is far too short to indicate trends.

The major uncertainties in forecasts are due to 1) the future economic development in East Africa and 2) the possible transition of The University of East Africa into 3 national universities and 3) the demand for high level man-power.

### PRESENT TRENDS

The actual initial and extreme growth in university education cannot be regarded as a typical long-term trend.

Initially there has been a tremendous lack of academic trained personnel in administration and secondary schools. The U.C.N. has to meet the demands within these sectors of public life but the development has in some respects apparently been pushed to extremes and these last few years cannot therefore be regarded as typical of a stable national or regional demand. The university is to a certain degree geared towards the education of Masters of Arts - of secondary school teachers - and in a not too distant future the boom of this education will have reached its peak and most posts for a generation to come will then be filled by young people.

The extraordinary growth rate in recent years is most unlikely to happen again this century. The limited economic reserves of the countries will not allow for this.

The cost of training one student in one year in East Africa lies between 15.000 and 20.000 Shillings. The average annual national income in E.A. ranges between 500-600 Sh per capita. This indicates that political considerations might easily lead to a more modest investment in higher education, in spite of the possible demand for fully trained people.

### THE POSSIBLE CHANGE TOWARDS NATIONAL UNIVERSITIES IN E.A.

If the Working Committee and the Governments of the 3 East African territories finally conclude that the creation of three national universities is desirable, the uncertainties in long-term forecasts increase. How far, or how soon, will a national university expand to cover all educational and research branches? How soon will the regional demands in a country create a second university?

There is at present no answer to such questions and the only course open is to indicate a wide-angle view of growth possibilities by defining an upper and a lower limit.



## MAN-POWER REQUIREMENTS AND FUTURE TRENDS

The demand for man-power is, of course, the key to this problem, but again, how far have man-power requirements been worked out or argued by the governments concerned? At the moment it is only possible to suggest in which professions or economic sectors development is likely to happen.

For the next 5-10 years it is likely that the education in the Common Faculties will continue at the same high rate as now. After that the demand will slow down.

The declared policies on agricultural development will rapidly increase the demand for trained academics in veterinary and agricultural science and further will very soon create the demand for "semi-academics" within these domains.

The need for industrialization, which is closely linked to increasing urbanisation in East Africa, will possibly step up the demand for professionals in the "technical sciences", first of all in engineering.

Educational branches training for service-occupations will expand in so far as they serve the public sector. If they depend on the commercial sector they will probably not increase before the average standard of living (or income per capita) has considerably increased.

All other disciplines will probably increase if they support only the priorities already mentioned.

If the national economic trends develop less favourably than recently, it is not unlikely that public investments in university development will be reduced in most branches except agriculture and veterinary science.

Based on these necessarily rough generalisations, estimates have been calculated for the first 6 years of development and the following 20, up to 1995.

The truth will not appear in the form of exact figures, but rather as a scale indicating minimum and maximum requirements for future university growth.

## SHORT TERM PROJECTIONS 1968 - 1975

The figures indicate trends for the three groups of faculties: professional faculties, common faculties and agricultural faculties - up to 1974/75. The heavy lines indicate projections worked out by the U.C.N. leading up to a total of approx. 3.300 students. The dotted lines indicate a certain reduction in growth - which might be realistic in respect of the economic situation in East Africa. The reduced projections lead up to a total of 2400 students which is regarded as an absolute minimum.

### Figure I. Professional Faculties

#### ENGINEERING

It is suggested that a stabilization of student numbers will already occur as from 1970 thanks mainly to the possible early start of a faculty of engineering in Tanzania.

#### ARCHITECTURE, DESIGN AND DEVELOPMENT

A modest rate of growth is suggested judging by the impression gained of the present intake into architecture.

#### MEDICINE

A reduced growth rate is introduced from 1970 instead of 1973. Because of the social aspects it is unlikely that further decreases in the rate will take place.

The total student number for the professional faculties are:

Maximum: 1266

Minimum: 900

### Figure II. Common Faculties

#### ARTS

#### SCIENCE

#### COMMERCE

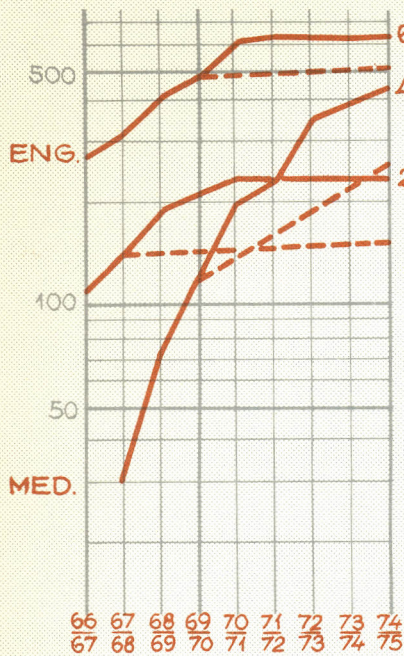


Figure I: Professional faculties

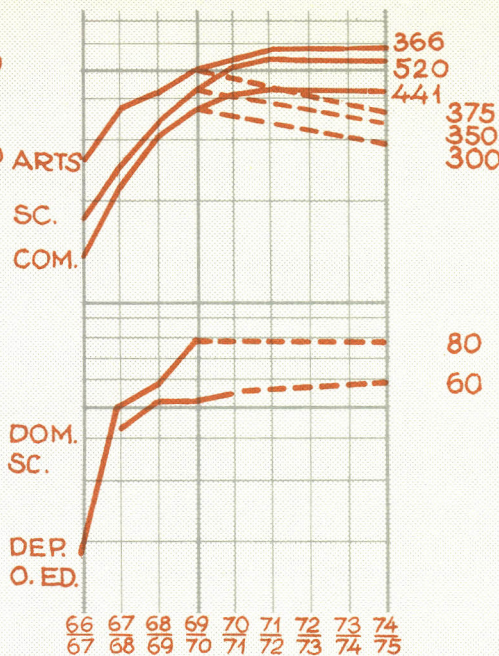


Figure II: Common faculties

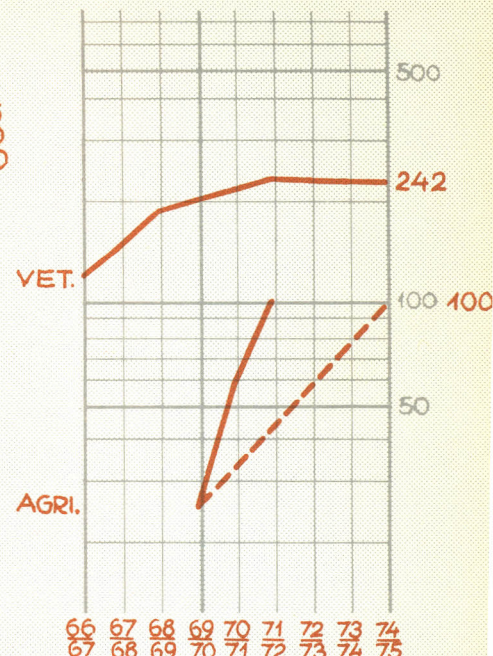


Figure III: Agricultural faculties

SHORT TERM PROJECTIONS 1967-1975 FOR DEPARTMENTS  
 Full line: U.C.N. forecasts  
 Dotted line: Discussed reduced forecasts

A definite decrease in student numbers is considered to take place from 1970. This decrease is due to the fact that 2/3 of students have education as an option.

DOMESTIC SCIENCE AND THE DEPARTMENT OF EDUCATION

are stabilized on the projected figures of 1970 for the possible trends in education already discussed.

The total student number for the common faculties are:

- Maximum: 1167
- Minimum: 875

Figure III. Agricultural Faculties

VETERINARY SCIENCE  
 AGRICULTURE

No reductions are anticipated.

The total student number for the agricultural faculties is:

- Maximum and minimum: 342.

LONG-TERM PROJECTIONS

Detailed projections can not be carried further than 1975. After that rough generalizations have to be used indicating possible future trends.

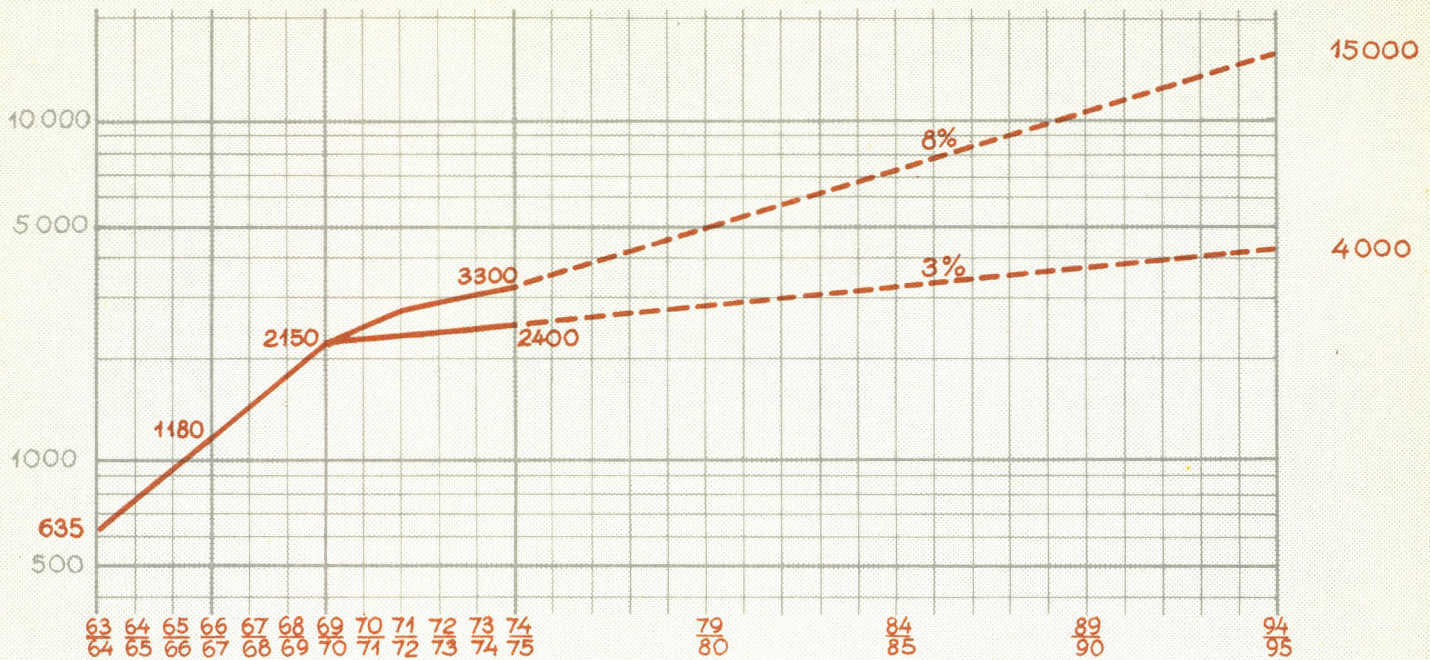
From 1975 the short-term minimum and maximum forecasts have been projected by two rates of growth up to 1995.

The minimum figure in 1975 of 2400 has been projected by an annual growth rate of 3%, the equivalent of the birth rate in Kenya today. This is simply the lowest possible rate if university education is not to deteriorate compared with the situation to-day.

This projection ends at a total of 4.000 students in 1995.

The maximum figure of 3.300 students in 1975 has been projected by a rate of growth of 8% per annum - the approx. rate of growth of the state revenues in Kenya.

This rate of growth expresses a situation where the investments in higher education



LONG-TERM PROJECTIONS FOR U.C.N. 1995  
 Full line: Short-term projections 1995  
 Dotted line: Alternative projections 1975-95

continue to keep on a par with the national budget.

This projection ends at a total of 15,000 students in 1995.

The final outcome will probably lie somewhere between these two projections, but exactly where, it is impossible to indicate to-day. For the calculations of space demands on the Central Campus area the following figures have been used:

3,000 students out of a total of 3,300 students approx. in 1975.

5,000-5,500 students out of a total of 6,000 students, possibly 10 years later.

8,000-9,000 students out of a total of 10,000-11,000 students in approx. 1995.

#### DEMAND FOR ACADEMIC FLOOR SPACE

A survey of building requirements, expressed in sq.ft. of floor area, is made on the basis of the U.C.N. forecasts of student numbers belonging to the various faculties in 74/75. This part of the report, however, will only deal with faculties intended to be located on the Central Campus (Main Campus and Choromo). Consequently the total student numbers are reduced by the number of students having their education on other areas as Kenyatta Hospital, Kabete and Kikuyu.

Table 1 shows the building areas available on the three main campuses (Main Campus, Choromo and Hospital Hill) for the different faculties. Also, the corresponding figures for the average area per student are shown.

It should be noticed that the newly established faculties of Medicine and Veterinary Science have not yet reached a number of students corresponding to the areas of the first building stage, in terms of the figures given in table 1 relative to the area per student.

|               |                  | Actual 1967/68 |            |              | Prognosis 1974/75 |              |            |                |               |
|---------------|------------------|----------------|------------|--------------|-------------------|--------------|------------|----------------|---------------|
|               |                  | Areas (sq.ft.) | Stu- dents | Sq.ft. stud. | Areas: campus     | Sq.ft. stud. | Stu- dents | Areas (sq.ft.) | Areas: campus |
| MAIN CAMPUS   | Engineering      | 115,000        | 305        | 364          |                   | 375          | 610        | 221,500        |               |
|               | F.A.D.D.         |                |            |              |                   | -            | -          | -              |               |
|               | Arts             |                |            |              |                   | 215          | 566        | 127,000        |               |
|               | Commerce         |                |            |              |                   | 215          | 441        | 94,000         |               |
|               | Dep. Education   | 304,000        | 1079       | 268          |                   | 215          | 80         | 17,000         |               |
|               | Dep. Dom. Sci.   |                |            |              |                   | 215          | 56         | 11,500         |               |
|               | Science          |                |            |              | 385,000           | 430          | 170        | 75,000         | 546,000       |
| CHOROMO       | Science          |                |            |              |                   | 430          | 175        | 75,000         |               |
|               | Med. (1st year)  |                |            |              |                   | 430          | 190        | 81,400         |               |
|               | Vetr. (1st year) | 73,000         | 43         | 996          |                   | 430          | 60         | 25,800         |               |
|               | Agriculture      |                |            |              | 107,000           | 430          | 60         | 25,800         | 208,000       |
| HOSPITAL HILL | F.A.D.D.         | -              | -          | -            | -                 | 375          | 230        | 86,000         |               |
|               | Science          |                |            |              |                   | 430          | 175        | 75,000         | 161,000       |
| TOTAL         |                  | 492,000        | 1457       | 332          |                   | 330          | 2880       | 915,000        | 915,000       |

ACADEMIC FLOOR AREAS 67/68, 75/75

In table 1 also gives the U.C.N. prognosis for the year 74/75 with student numbers for the various faculties. As a basis for estimates of the requirements for educational buildings the average area per student is used for the faculties in question. These average figures are estimated partly from the actual U.C.N. student numbers 67/68 and partly from corresponding figures from European universities.

It should be emphasized that the figures used for the areas concerned are subject to considerable uncertainties for the following reasons:

Changing educational systems will cause widely differing demands for building space, the tendency of which can be for more as well as for less. As an example the growing use of audio-visual teaching aids.

Education in which an essential amount of research is involved will for certain subjects (e.g. engineering, physics and other natural sciences) show a tendency to accelerate the demand for space. (The Development Plan for the new Danish Technical University envisages

an area per student of around 550 sq.ft., certain German and Swiss engineering schools are operating with figures as high as 800 sq.ft.).

The sizes and diversity of faculties and indeed whole universities will influence the consumption of space. In principle small units demand relatively larger areas because of the multiplying of ancillary services.

The appearance of new faculties such as the faculties of Forestry and Pharmacy can contribute to the general uncertainty. The consequences will be reflected in changes in student numbers, that means higher total numbers or a reversal of numbers between faculties (with probably lower student rates in Arts and Science).

The possible consequences of this situation are:

- that new and specialized buildings may be required
- that the available floor space at the time can be adapted to changed functions

c) that certain departments could share existing facilities owing to the changes in student ratios from one department (or faculty) to the next.

In all events the most effective utilization of available space is the question raised by the uncertainties under discussion.

The total area for various stages of the future development might be roughly estimated, according to the total number of students, in the following way:

Total student number approx. 6,000:

At this stage the number of students on central campus can be assumed to round 5,000 - 5,500 students.

In this uncertain future it would be irrational to base a forecast on anything but quite simple average figures for area per student. It is therefore roughly estimated that each student will need about 330 sq.ft. of actual academic building space, which indicates a development of up to approx. 1,700,000 sq.ft. of floor area.

Total student number approx. 10,000 (maximum prognosis):

Approx. 9,000 of these are envisaged to be located on Central Campus.

With the above rate of area per student the result will be a total building volume of approx. 2,800,000 sq.ft. floor area.

#### DEMAND FOR RESIDENTIAL FLOOR SPACE

##### Men's residences:

|   | Sq.ft.           |
|---|------------------|
| Halls Nos. 1, 2 and 3                   | : approx. 48,000 |
| Hall No. 4                              | : - 22,000       |
| Hall No. 5                              | : - 32,000       |
| Halls Nos. 6, 7 and 8                   | : - 73,500       |
| Kitchens, Dining-halls,<br>Common Rooms | : - 22,000       |

##### Women's residences:

|                                      |   |
|--------------------------------------|---|
| Hall No. 1                           | : approx. 16,000                                  |
| Kitchen, Dining-hall,<br>Common Room | : - <u>6,500</u>                                  |
|                                      | approx. 220,000<br>(appr. 20.800 m <sup>2</sup> ) |

The existing Halls of Residence contain a total of 495 single rooms and 290 double rooms. If the rooms were occupied according to their originally designed purpose, they would house 1,075 students, which would give an area of approx. 200 sq.ft. per inhabitant.

Owing to the lack of accommodation single rooms are used as double rooms and consequently the rate of area per student is as low as approx. 150 sq.ft. It would be unjustifiable to use this exceptionally low figure as a basis for the forecast of future space requirements. A rate of approx. 200 sq.ft. per student should by now be acceptable, but this figure will probably go up when an increasing number of post-graduates will have to be accommodated in the students' residences. (The corresponding average figures in Scandinavian students' hostel are approx. 300 sq.ft. per student).

According to the U.C.N. prognosis for 1974/75 the number of students working on the Central Campus will be approx. 2,800. Provided that only 5 % of these are living outside the Campus it will be necessary to accommodate approx. 2,650 in the residences. The corresponding floor area can be estimated as approx. 550,000 sq.ft., which means an addition to the existing building volume of around 320,000 sq.ft. (30.000 m<sup>2</sup>).

At the present time an extension of the Women's Halls is being built containing approx. 130 beds and Hall No. 9 with approx.

300 beds is on the drawing-board. Later on further Halls of Residence are projected to the East and North of Halls Nos. 1,2,3 providing about 500 beds (the same number that was previously estimated adjacent to Halls Nos. 6,7,8). The Women's Halls will be further extended by about 50 beds, and finally 500 units will be built on the slopes along the Masonga Wai River.

To accommodate the necessary number of students, when the total student population grows to about 6,000, a further development of the residential areas will be needed, providing for about 2,000 extra hostel beds

(floor area approx. 400,000 sq.ft.). This extension could consist of 200 beds adjacent to the existing Women's Halls, 400 beds in Protectorate Road, 600 beds in the small valley North of the Halls Nos. 1,2,3 and 400 further beds on the slopes along the Masonga Wai River.

Further residential areas accommodating for a total number of up to 9,000 students will be found on the Choromo Campus North of the academic building zones.

#### KABETE

The Faculty of Veterinary Science has actual plans for building extensions to accommodate its clinical departments. Once these are carried through, the student population on Kabete will be 150-200 (2nd, 3rd, and 4th year students).

The lay-out of buildings for education, research and residence should be carefully considered as an integral part of the entire development of the Faculty of Veterinary Science.

In this connection it is worth emphasising that the establishment of a Faculty of Agriculture, recently resolved by U.C.N., seems to open up very attractive opportunities for a thorough integration of all agricultural education if all the relevant departments for this new faculty could be located in Kabete. The surrounding open farmland will probably offer almost ideal conditions for the considerable expansion of the U.C.N. Kabete Campus to house such new important activities.

These extensions will accommodate 90 students. With additional space for education and administration, the extension will bring the total floor area up to about 40,000 sq.ft., not including a few extra staff houses.

After this it should be possible to expand still further up to a total approx. 60,000 sq.ft. of floor area for educational and residential purposes.

In order to arrive at meaningful assumptions of the student population on the Central Campus reductions have been made for a number of students located in other university sections: Kenyatta Hospital, Kabete and Kikuyu. This report, however, deals primarily with the possible development of the Central Campus, and it is not until the next planning stage is reached that three other sections can be made subject to similar studies. Therefore only short mention is made here of development trends to be expected in these other areas.

#### KENYATTA HOSPITAL

According to previous decisions the clinical departments of the Faculty of Medicine will be developed adjacent to the hospital buildings. A student number of about 250 (3rd, 4th, and 5th year students) is anticipated for 1975.

Besides the necessary academic buildings, residences for students and members of staff will also be situated in the area.

#### KIKUYU

This area has certain development possibilities and presumably these should be reserved for the Institute of Adult Studies. The programming of the Institute is in progress to erect additional buildings, partly for the Correspondance Course and partly for Residential Courses.

# III THE MASTER PLAN

## THE MASTER PLAN

### BASIC ASSUMPTIONS

The main question posed when planning the future development of the university is whether to continue development within the central areas or to abandon this site and move the entire university to a new place, where opportunities of developing on virgin land could create easier conditions for physical development.

This question has been answered by a clear "No". The university's close attachment to the central functions of the city must be regarded as being of great importance, not only in developed countries, but even more so in developing countries such as Kenya. The city functions are bound to influence the education and in return could greatly benefit from the research and educational activities being carried out in the university. Further to this is added the fact that various types of education and training, which are not regarded as university disciplines to-day, will in the future, possibly be attached in one way or another to the university.

The indications are that the present central site should continue to be developed in view of the fact that a number of such educational institutions already exist in the city centre and are likely to multiply there in the future.

The problems emanating from an isolated new location far out of the city are difficult to dismiss and are most likely to increase the existing cleft between the academics and society. The isolation of students and lecturers can to a certain extent be prevented, if not avoided, through a central siting of the most important university functions.

In a number of cases in the developed countries similar discussions have led to decisions to develop existing university campuses within densely developed city areas in spite of the heavy costs attached to urban redevelopment.

E.g. this is the case of the University of Edinburgh.

### A PLANNING METHOD

Owing to the difficulties of establishing reliable forecasts on the future number of students and the future size of the university, a definite size is not regarded as a major guideline for planning. The university is regarded as an integral part of the city with its rights and obligations parallel to other city functions. This indicates that the College and its development should be seen as another town element, and the methodology of planning has been developed on this view.

*This leads to a physical pattern where the central part of Nairobi can be described as consisting of three functional zones: the commercial, the governmental and the cultural and educational zone. The commercial sector remains east of Uhuru Highway.*

*The fast growing government functions have already stepped over the Uhuru Highway from the core, and are crawling up the hills opposite the parliament.*

The sector north of this can be regarded as a cultural and educational sector where not only the University College is located, but also other educational and cultural facilities such as the Museum, the National Theatre and the Cultural Centre all the way to the Arts

Center and the primary and secondary schools on top of Hospital Hill. If the development pattern here can be regarded parallel to the extensions of the government functions, the area west of the Uhuru Highway adjacent to the Main Campus is preferred for educational and cultural functions up the hill. Within this area the College functions (or the university functions) will then have to fit in as a natural element.

This element has its special demands in development. Because of the need to keep geographical distances as small as possible, and because of the fluctuating situation of a developing university, with the accompanying changes in space-requirements for existing branches of education as well as new and unknown branches, the university has a demand for a pattern of development, allowing for concentration and flexibility.

#### TRAFFIC

Seen as a town element, the University College is dependent on the traffic system of the city of Nairobi. The city is planning and developing its traffic system, and it is therefore time for the College to analyze its traffic demands and to define what special requirements can be put forward to the City of Nairobi to be included and considered in the traffic plan.

The already obvious troubles caused by heavy traffic passing along the fringes of the university grounds will increase, not only by an increase in traffic itself, but also because new roads will be built as a consequence of the continued development of the city-core of Nairobi.

The inconveniences caused hereby should be minimized by taking special precautions in the lay-out of roads in the lay-out of U.C.N. itself.

#### LAND AVAILABLE FOR DEVELOPMENT

The Main Campus has only small areas left for

further development, and some adjacent land, namely the Norfolk area, has been considered for development purposes as well. It is recommended that the Norfolk Hotel itself should be re-shaped for the University, accomodating guest-professors, research-fellows and other staff members above ordinary student level. A smaller part of this area can further be re-developed for extensions to Faculty of Engineering.

The Hospital Hill area offers extremely good opportunities for future development. A greater part of the area is sparsely developed with dwelling houses. The present land use of this area is minimal compared to its true potential in being better suited for such city functions as university education and other cultural institutions.

The Choromo area is much less regular as the land is divided up by rivers and valleys. The already built educational facilities cater for the biological sciences and the pre-clinical training of vetenary and medical students. In view of the possible future development of higher education, this area should cater mainly for the development of the training of lab. assistants, nurses etc., meanwhile another part should be kept aside for the extension of already known university functions within this sphere of education and research.

#### LOCALIZATION OF FACULTIES

The future educational pattern is unknown, but a certain grouping of academic functions can be foreseen and to a certain extent are recommended for College development.

The humanities are in many respects city-orientated and depend furthermore very much on the services of the library situated on the Main Campus. For this reason the Faculty of Arts should remain on the existing Main Campus.

LAND WITHOUT RESTRICTIONS FOR DEVELOPMENT 1:10,000  
Brown: Already developed by U.C.N.  
Green: Foundation problems  
Violet: Persistently flooded areas  
Yellow: Traffic nuisances  
Land without signature is regarded as suitable for development.





Sec. 1X

L. R. No. 209

L. R. No. 209

L. R. No. 209

Government House

Other university functions within this area are the administration and the greater Assembly Halls, also utilized by the city, and should also remain here.

The Faculty of Engineering presents a problem. This faculty may possibly grow rapidly. In spite of the fact that Engineering is one of the better accommodated faculties, it will need more space in the not too far distant future. Thus, three possibilities are open for consideration. The first is to extend the school where it is by converting the Norfolk Hotel area into an extension area of the Engineering School. The second is to extend the activities of the faculty into the existing buildings on the Main Campus and remove other faculties or departments from here to new sites elsewhere. The third is to remove the school entirely into a new area. No final recommendation can be made at the present moment, but all the mentioned possibilities should be kept open for the time being.

The development area of Hospital Hill is regarded as the main development area for the College as such. This means that all faculties orientated towards professions, the Sciences, Architecture and in the long run maybe the Faculty of Engineering should be located here.

#### ZONING PRIORITY

The physical development demands certain priorities. The major concern is to establish the whole of the development on both sides of the Uhuru Highway. This means aiming at a localization of most building activities within the next 5 to 6 years in this area, and to limit the development of Choromo as far as possible.

#### WORKING ACCOMMODATION

All functions of a university, however special and varied they may seem, can be sorted and arranged in a few categories. In the physical planning of a university therefore, one can operate with a limited number of room types and with possible combinations of these.

The choice of room types should be based on knowledge of existing categories of functions, the extent to which these may be assumed to mix, and a survey of possible future developments. Concerning U.C.N. probably two standard room types will predominate.

The choice of combinations will be decisive for the way in which, on a smaller scale, the individual rooms are assembled within a certain building block, and for the way in which, on a larger scale, the whole complex of buildings is grouped on the site.

Essential for the planning furthermore, is the choice of the building system. The German Universities of Bochum and Marburg are good examples in this respect.

In Bochum a definite clustering of separate standardized buildings is preferred, thus producing a rather closed solution, while in Marburg a building system is chosen which allows for more flexible adjustments to the various functions already under construction and still leaves possibilities open for later alterations and additions.

In the preliminary sketches of future U.C.N. buildings, certain choices of both room types and their combinations are apparent.

In the normal buildings, planned on a firm modular grid and of considerable depth, there are offices, laboratories (singles and in "landscapes"), teaching rooms of varying sizes, services, ancillary rooms and circulation spaces.

The most uncomplicated fitting in and linking together of even larger rooms has been an important objective.

Special laboratories, workshops etc., the volume of which is at the present time uncertain, is thought of as hall-like one-story buildings fitted into the normal modular grid but with larger spans and heights.

The academic areas along the pedestrian way are dominated by the normal buildings where the majority of students are moving around. The more special laboratory halls and workshops will primarily be placed alongside the Southwestern boundaries on the assumption

that continuity is most essential for the normal educational area.

At the same time the building volumes are segmented in horizontal layers. The normal rooms here are situated on the upper floors, the ground floor left free for the inclusion of more specialized rooms, such as lecture-halls, common rooms and other enclosures (possibly of a more temporary character) in close connection with some department and frequented by its students and members of staff.

The obvious advantages of the described planning principles and building systems are not confined to better building efficiency and economy alone. Further benefits will be apparent in a more flexible utilization of the building spaces, in the long run being able to meet even considerable and unforeseeable changes.

Thus the objective for new U.C.N. developments should be to define systems rather than buildings. In these systems areas can grow and change on an orderly basis and the result will be those neutral and flexible buildings so often emphasized in this report.

#### LIVING ACCOMODATION

##### Students

The students' hostels are to-day concentrated west of the Uhuru Highway. In many respects the environment here plays an enormous rôle in the daily life of the students and their social situation. This affects the Halls of Residences themselves but even more the way they are <sup>kind</sup> laid out, the way they stimulate intercommunal activities, not only in sports but also for the majority of daily demands. This means that all facilities serving the students should be in close relation to the hostels and at the same time, of course, in close relation to the educational facilities, where the students live and work more than half the time.

##### Staff

Housing for the teaching staff is not considered as a serious problem in the physical

planning of the University College, and the present trend where the teachers live spread out, so to say, absorbed within the natural pattern among other members of the society should be continued.

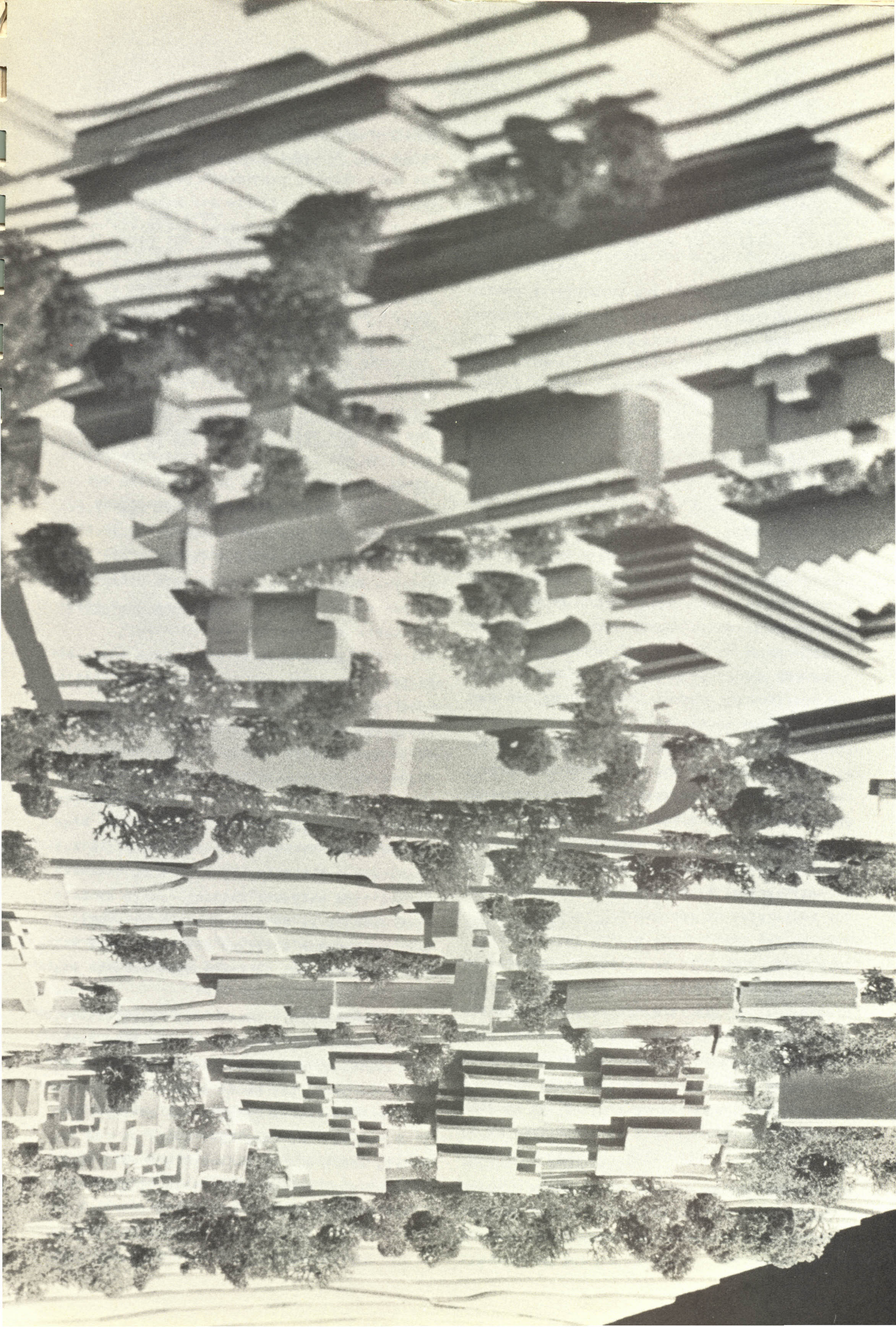
An accommodation of significance for planning of the Central Campus area is the accommodation for visiting lecturers or professors, research-fellows and others who do not have the demand for long-term accommodation elsewhere in the town but have to be housed close to the University facilities for shorter periods.

#### THE PLANNING IDEA

All these considerations lead towards the planning concept of a ribbon development, or "linear" development, where distances are geographically small, where the concentration of educational activities is high and where flexibility exists in the greatest measure for change inside buildings and extensions outside. In Nairobi a linear development can be directed from the Main Campus towards the West and North-West on top of Hospital Hill, where academic buildings can be constructed in continuity along a pedestrian spine, where students' facilities, catering, kiosks etc. can be placed. The students' accomodation is orientated from the opposite side of the spine towards the same common facilities.

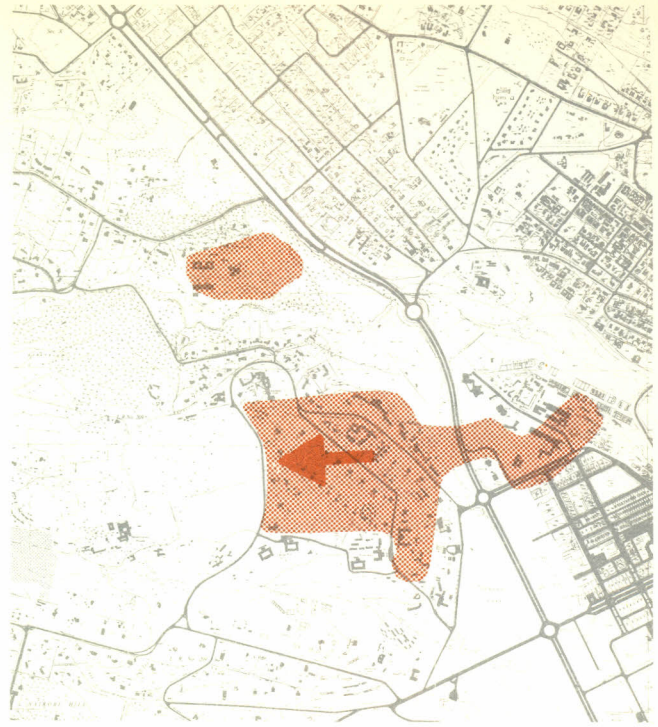
In the foreseeable future, pedestrian traffic will be predominant within the Central Campus. The conclusion is to provide pedestrian ways which are as direct as possible, and as comfortable as possible. The pedestrian way must follow the main educational facilities, the main communal facilities and the hostels, and should be sheltered from rain and sun. It is possible to create this within the context of linear development and concentrated building construction.

Sports facilities should be in close contact with the hostels and are, in a secondary sense, attached to the pedestrian system; whilst the Choromo area will have to be regarded as an isolated location for a long period to come.





DEVELOPMENT MODEL I



DEVELOPMENT MODEL II

#### MODELS OF DEVELOPMENT

Based on these assumptions two main models with several variations have been examined. These two models have a common first phase in connecting the Main Campus more effectively with the Hospital Hill area.

##### Model I.

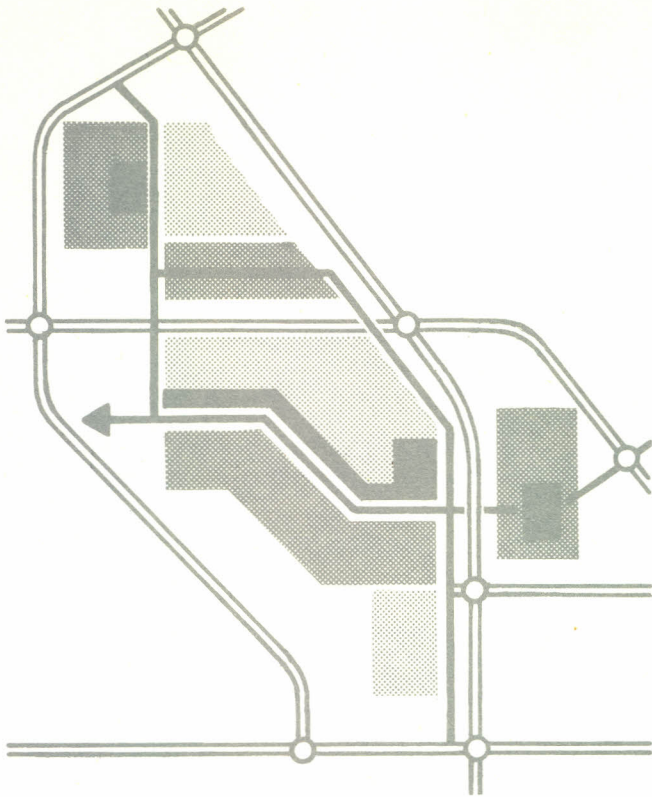
The model bends the linear development uphill towards North-West of the existing men's hostels towards Choromo. This model is technically apparently the most suitable choice to make. The traffic pattern, land tenure and land values indicate that the development of this model is possible, and furthermore this line of development will provide an earlier linking of the university as a whole with the university functions already in Choromo area. For a later stage the model gives a reasonable and justifiable background of further development north of Choromo and towards the West.

##### Model II.

This model leads the linear development directly towards the West uphill to State House Road. The model accepts Choromo only as being a permanently isolated precinct of the University with possibilities of extensions only to faculties already there. This model has certain virtues through its apparent simplicity, but a number of technical difficulties are attached to it. The major one is that a projected road, serving this development from the round-about at the Uhuru Highway has to be constructed up the Hill. This would be expensive and would separate the women's Halls of Residences from other parts of the University College functions.

Furthermore this development would encroach on the premises of the Nairobi Primary School and penetrate into expensive residential areas.

The comparison between the models therefore, comes out in favour of the bent development which is recommended for consideration.



#### TRAFFIC

The existing traffic- and planning situation has been described in Chapter I. To clarify the future situation of the U.C.N., a proposal for a traffic plan for the Central Campus has been worked out involving certain assumptions and suggestions for the road system of the City of Nairobi.

The objectives are:

1. To create a system which can be constructed in phases following the development of the University whereby the first phases of development require only small changes or extensions to the present road system.
2. To create a system where sections can be defined as serving mainly the U.C.N. to allow the construction of this system independently of the N.C.C. development of roads should this be necessary.

The university system can be described as consisting of three combined sectors - the Main Campus, the Hospital Hill and the Choromo system.

1. The Main Campus system develops between the junction at University Way and a proposed junction at the new by-pass along Nairobi River. By means of the latter junction, the Main Campus can be connected with areas on the other side of the valley.

A new road from this junction along Norfolk Hotel leads to a central parking lot at the Uhuru Highway, from where a subway, for internal U.C.N. communication westwards is proposed by widening the existing pedestrian subway to allow the passage of cars as well as pedestrians.

2. The Hospital Hill system consists of a lower and upper system. The lower system is connected to the Main Campus and follows the foot of the slopes serving as an internal line of communication. It skirts communal facilities, students' hostels and sports facilities, and continues up to Choromo. Parking facilities can be attached to this system.

The upper system is the public road system of Hospital Hill. State House Road-Kenton Drive is the feeder of the system. Smaller roads can lead from here into the area, as cul-de-sacs in later stage if required. This system should develop as the public access to the future university grounds. A short-cut between the lower and upper system is proposed North of Delamare Girls High School.

A more direct connection than at present between State House Road and Kenton Drive is considered in future.

3. The Choromo system has only one road linking the low-lying system of Hospital Hill to the planned extension of the Ring Road. In a long-term development a relocation of Riverside Drive should possess advantages.

A direct pedestrian connection from Choromo to Hospital Hill can, in later stages, be developed across the Masonga Wai River Valley.

The N.C.C. system consists first of all of the highways within the area.

The junction at the U.C.N. sports grounds will probably acquire one of the heaviest traffic intensities in Nairobi. It will cross the Uhuru Highway with a new East-West highway along the Nairobi River and Masonga Wai River Valleys.

For this purpose a special type of junction has been sketched to create as little inconvenience as possible for the U.C.N. use of land here. For this reason also, the proposal is brought forward to place the highway low down in the Masonga Wai River Valley and not high up on Hospital Hill.

Whether a new road "line" could appear in the Hospital Hill area in the future is a problem open to investigation, for if the Ngong Road-Kenyatta Avenue system should be too difficult to improve, a new road along the line of the Processional Way might be a solution to the problem of feeding traffic to the western suburbs.

In the Choromo area attention has been paid to the possible changes of the road system at the junction at the Westlands market shopping centre by pointing at the possibility of creating a more southerly connection of the extended Ring Road to Uhuru Highway.

#### MAIN ARCHITECTURAL FEATURES

As the development plan concludes in proposals for the siting of buildings in the present triennial plan, and also for buildings evolving from the projections until 1975, it is necessary to state a few intentions on the architectural aspects of the plan.

#### LANDSCAPING

It would be natural to respect and to exploit the topographic features of the ground. The

flat, empty land between Uhuru Highway and the foot of Hospital Hill should be kept free of vegetation presenting itself as flat, green sports grounds. The communication lines within this area should therefore strictly lie along buildings or other constructions along the foot of the hills.

The forest-like character of the slopes of Hospital Hill and the entire Choromo area should be preserved as far as possible.

The high density lay-out of buildings should assure that landscaping between buildings be finalised as soon as construction work is finished. These areas can be paved and landscaped.

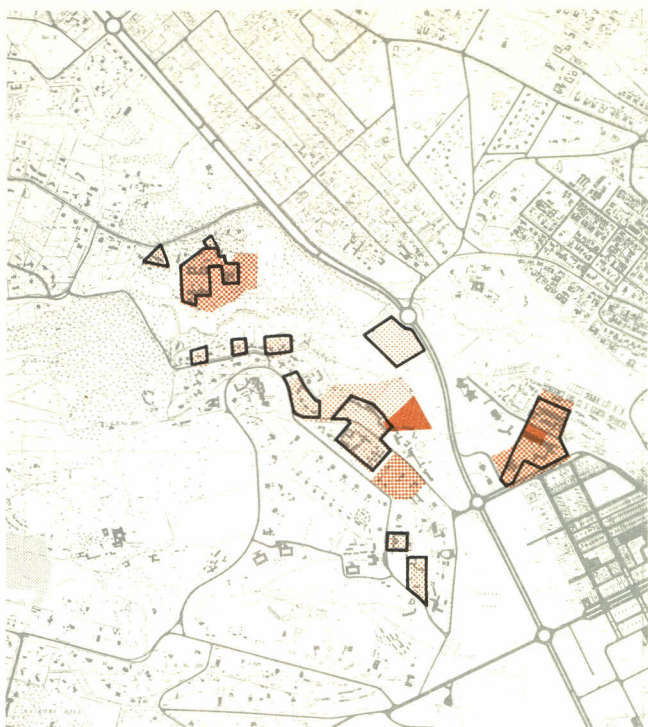
#### BUILDINGS

A major concern is the orientation of buildings as regards sun-radiation. The optimal situation is to orientate facades to South and North by which the facades need no further sun-protection than roof projections.

The orientation can vary slightly from this without creating functional inconveniences, and accordingly an orientation on Hospital Hill has been chosen minimizing the difficulties in combining orientation with the main direction of development towards North-West.

The buildings on the Main Campus can not be designed on this assumption. So many and large buildings already exist compared to a relatively small future addition, and the intention is therefore to complete the Great Court complex. Inconveniences from sun-radiation must, in this case, be met by control devices built into the fabric of the buildings themselves.

The major part of the buildings, academic and residential, should be constructed in low rise. No more than 3 to 4 floor levels should be the rule in order to avoid the inconveniences or expenses arising out of vertical communication problems for students and staff.



FIRST PHASE OF DEVELOPMENT

1:30,000

This illustrates the land to be developed up to 1975.

Full line indicates areas utilized to-day.

- Dark brown: Common facilities
- Brown: Academic facilities
- Medium brown: Students' residences
- Bright brown: Sports facilities.

THE FIRST PHASE OF DEVELOPMENT

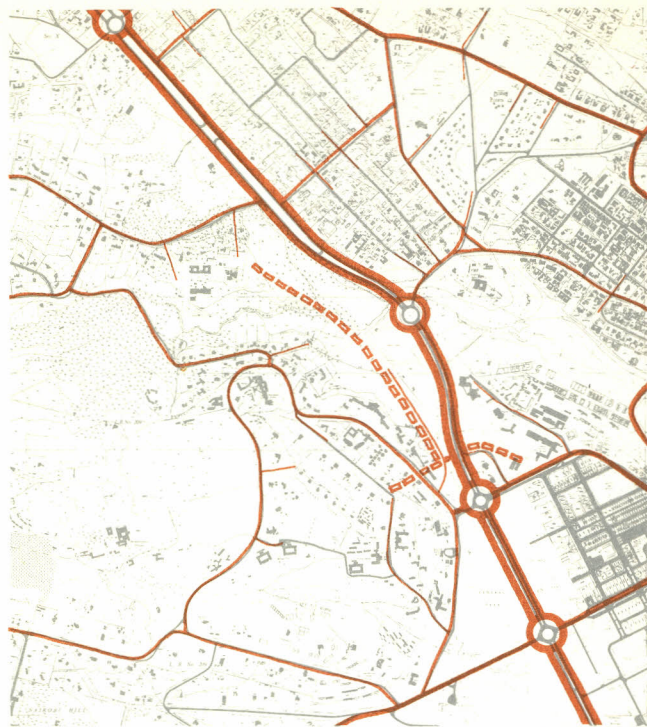
This phase covers approx. the demand until 1975. According to the objectives argued in favour of concentrating development initially in the southern parts of the Central Campus area, a first phase of development has been proposed.

Academic buildings are to be added to the Main Campus but the major part of academic development is on Hospital Hill.

Only a small portion of building activity is added on Choromo. The existing residential areas on Hospital Hill are expanded to cater for all new student accommodation.

Sports facilities are provided for by a swimming pool, and the Central Catering Unit is also built in this area.

No changes in the traffic system are necessary during this initial growth, but the first part of the internal U.C.N. communication line along the foot of Hospital Hill is constructed in combination with the Central Catering Unit, swimming pool and Halls of Residence.



FIRST PHASE OF THE TRAFFIC SYSTEM

1:30,000

Thick line: major roads

Medium line: minor but important roads

Thin line: local road access

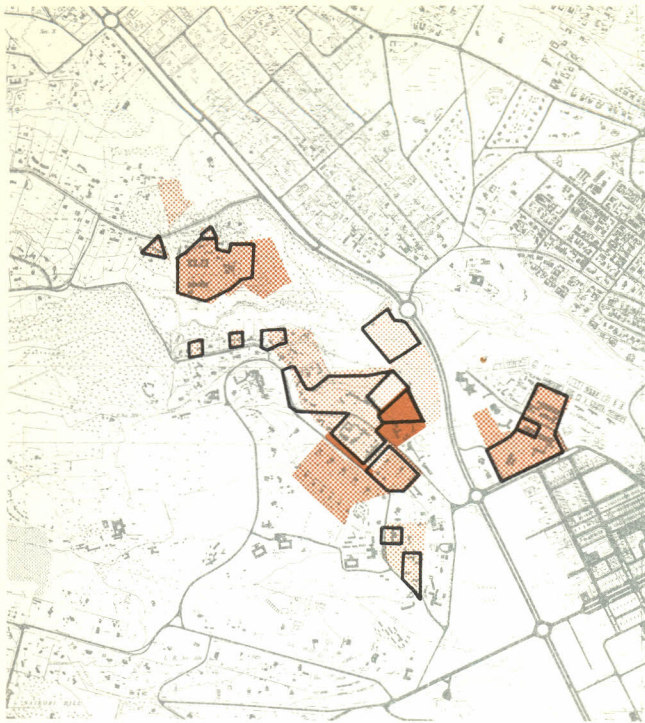
Dotted line: pedestrian way

In this phase the Central Campus will cater for a total of approx. 3,000 students, which represents an addition of 1,300 students to the present number.

The total demand for land will be 27.4 acres (11 ha), 16.9 acres (6.8 ha) for academic buildings and 10.5 acres (4.2 ha) for students' Halls of Residence.

All students' accommodation will be on Hospital Hill. The 1,300 new students will require approx. further 10.5 acres (4.2 ha) of land for residential use. The development of academic floor space is 210,000 sq.ft. on the Main Campus (20,000 m<sup>2</sup>) requiring 5 acres (2 ha) of land. On Hospital Hill it is 210,000 sq.ft. (20,000 m<sup>2</sup>) requiring 4.9 acres (2 ha), and on Choromo 105,000 sq.ft. (10,000 m<sup>2</sup>) requiring 7 acres (2.8 ha) of land.

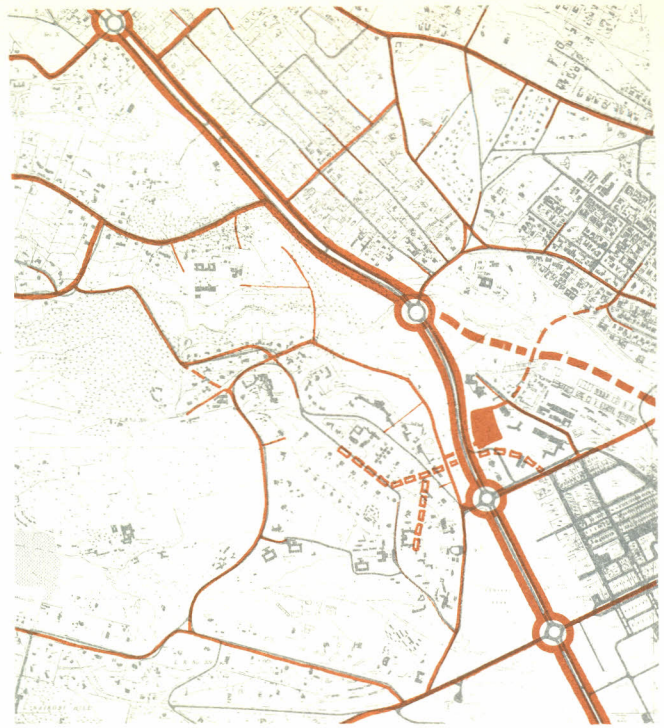




SECOND PHASE

1:30,000

This phase presents a situation which might occur in approx. 1985. The land developed in this phase represents a student number of approx. 5,500. Full line indicates areas utilized in phase one.



SECOND PHASE OF THE TRAFFIC SYSTEM

1:30,000

Thick line: major roads  
 Dotted thick line: possible construction of major roads  
 Medium line: minor but important roads  
 Thin line: local road access  
 Dotted line: pedestrian way

#### THE SECOND PHASE OF DEVELOPMENT

Academic development continues on the Main Campus and on Hospital Hill. Further extensions on Choromo are most likely to take place.

Residential development continues on Hospital Hill and residential development starts on Choromo.

The Norfolk Hotel is converted into university premises accommodating senior students and staff and supplementary catering facilities.

The road pattern might start to change in this phase. The University Way will have been extended to the East and (by dotted lines) it is indicated that the new highway along Nairobi River is under construction.

The internal U.C.N. Road is extended along the foot of Hospital Hill and the short-cut up to Kenton Drive is a reality. From the short-cut, the development of the road to Choromo across Masonga Wai River is constructed as well.

The subway under Uhuru Highway to the parking lot is constructed and possibly its continuation across Nairobi River Valley is under construction.

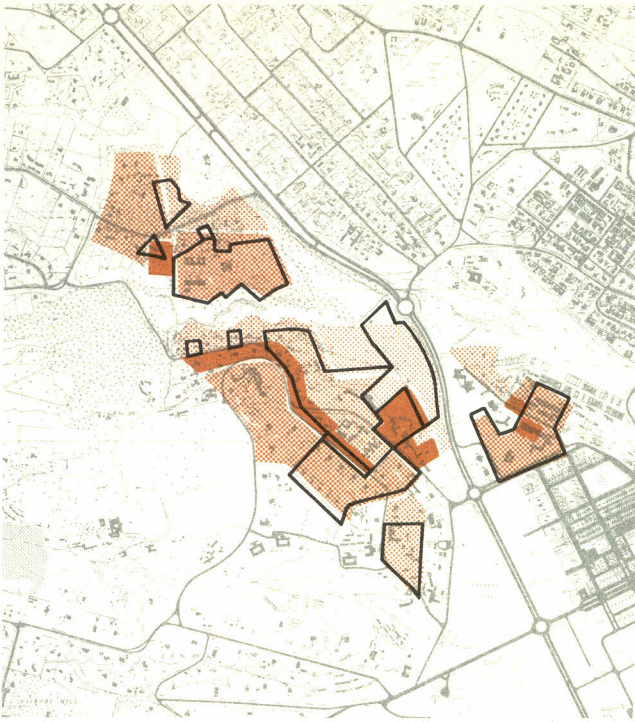
In this phase the Central Campus area will accommodate 5,000-5,500 students, an addition of 2,000-2,500 compared with first phase.

The total demand for land will be 41.5 acres (16.8 ha), 23.5 acres (9.5 ha) for academic buildings and 18 acres (7.3 ha) for students' Halls of Residences.

On Hospital Hill a further 530,000 sq.ft. (50,000 m<sup>2</sup>) academic floor space will have been developed requiring approx. 12.5 acres (5 ha) of land.

Approx. 2,000 students in this area will demand a further 16 acres (6.5 ha) for residential use.

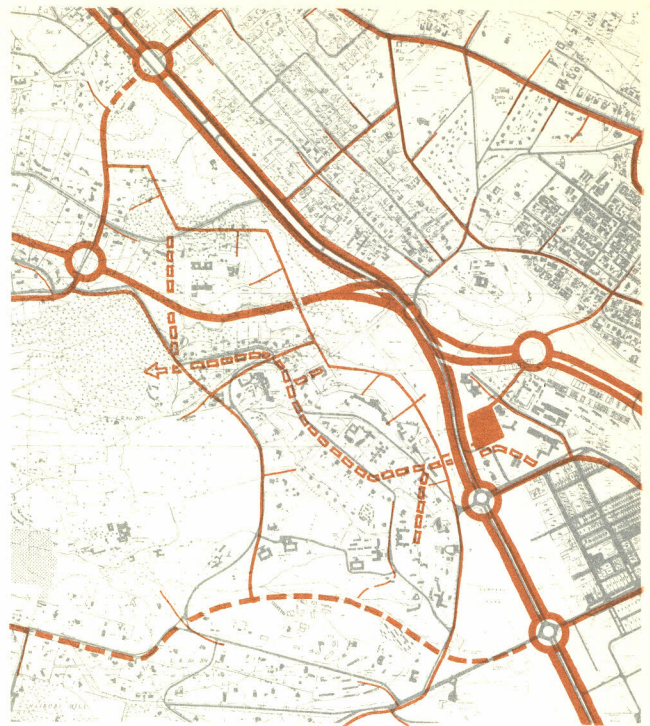
On Choromo a further 160,000 sq.ft. (15,000 m<sup>2</sup>) academic floor space has been developed requiring approx. 11 acres (4.4 ha) of land. Approx. 250 students in this area will demand a further 2 acres (0.8 ha) for residential use.



**THE MASTER PLAN FULLY DEVELOPED**

1:30.000

In this stage, representing a student number of approx. 9,000, which may well be a reality in 1995, decisions for further allocations of land should have been taken. Good possibilities exist to the West.



**FINAL TRAFFIC SYSTEM**

1:30.000

Thick line: major roads  
 Dotted thick line: possible construction of major roads  
 Medium line: minor but important roads  
 Thin line: local road access  
 Dotted line: pedestrian way

In this phase the Central Campus area will accommodate approx. 9,000 students, an addition of 3,500-4,000 students compared with second phase.

The total demand for land will be 71 acres (28.8 ha), 43 acres (17.4 ha) for academic functions and 28 acres (11.3 ha) for residential functions.

On the Main Campus a further 105,000 sq.ft. (10,000 m<sup>2</sup>) academic floor space will have been developed requiring approx. 6.5 acres (2.6 ha) of land.

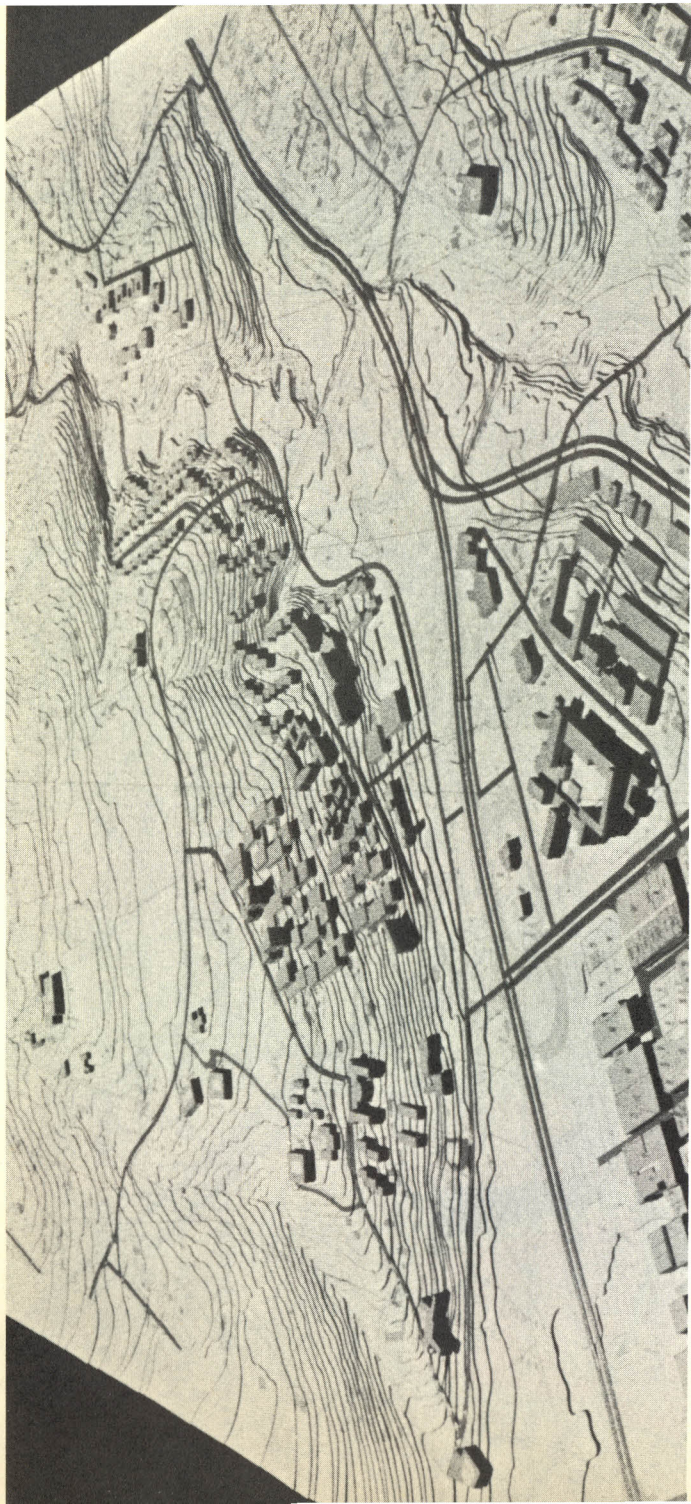
On the Hospital Hill a further 800,000 sq.ft. (75,000 m<sup>2</sup>) academic floor space will have been developed requiring approx. 18.5 acres (7.5 ha) of land.

Approx. 2,000 students in this area will demand a further 16 acres (6.5 ha) for residential use.

On Choromo a further 270,000 sq.ft. (25,000 m<sup>2</sup>) academic floor space will have been developed requiring approx. 18 acres (7.3 ha) of land.

Approx. 1,500 students in this area will demand a further 12 acres (4.9 ha) for residential use.

The total demand of additional land compared with to-day will be 139.9 acres (56.7 ha) 83.4 acres (33.8 ha) for academic functions and 56.5 acres (22.9 ha) for residential use.



SECOND PHASE OF DEVELOPMENT



THE MASTER PLAN ALMOST FULLY DEVELOPED

## LAND USE

The Master Plan can accommodate a total of 3,100,000 sq.ft. corresponding to 294,000 m<sup>2</sup> floor space in academic buildings.

In the awareness that the U.C.N. is not likely to utilize all the land singled out for long-term expansion in the immediate future, it is important to produce a plan spacious enough for large scale development when expansion does occur.

The Master Plan combines the three campus areas, i.e. the Main Campus, Hospital Hill and Choromo.

Each of these are in the long run regarded as partly selfcontained units emphasizing the concentration of communal facilities of all sorts for the students on Hospital Hill.

By concentrating these facilities, i.e. hostels and academic buildings, the centre of gravity can move towards the West and the North.

The indications of land use carry slightly different meanings from area to area.

## ACADEMIC BUILDINGS

On the Main Campus this refers to development of educational and administrative buildings. The density of development is the same as in recent development.

On Hospital Hill this reflects standardized building construction in a high-density lay-out of a floor space ratio aiming at a space ratio of no less than 1:1. Low-rise construction (max. 3 floors) is closest to the pedestrian spine, and higher buildings can be built farther to the West leaving open spaces between buildings for service roads and short-term parking.

On Choromo the land use indicates buildings within a similar lay-out as at present.

## RESIDENTIAL PURPOSES

On the Main Campus this means utilization of accommodation in the Norfolk Hotel for short-term staff and post-graduates, on Hospital Hill and Choromo the land is for students' Halls of Residence in a high density lay-out.

## COMMUNAL FACILITIES

On the Main Campus this refers to the restaurant and kitchen facilities of the Norfolk Hotel to be converted into catering facilities for this campus.

At the foot of Hospital Hill it indicates the location of the Central Catering Unit, the Students' Union building and possible other larger units. Along the pedestrian spine the signature indicates smaller amenities as kiosks common rooms etc.

On Choromo the communal facilities are defined as a sub-location of catering facilities.

## SPORTS

These areas are only shown in the low lying areas around the present sports grounds and express the wish to concentrate larger sports facilities in one area.

Smaller facilities should, however, be located near to all students' Halls of Residence allowing for occasional sport such as badminton, table tennis etc.

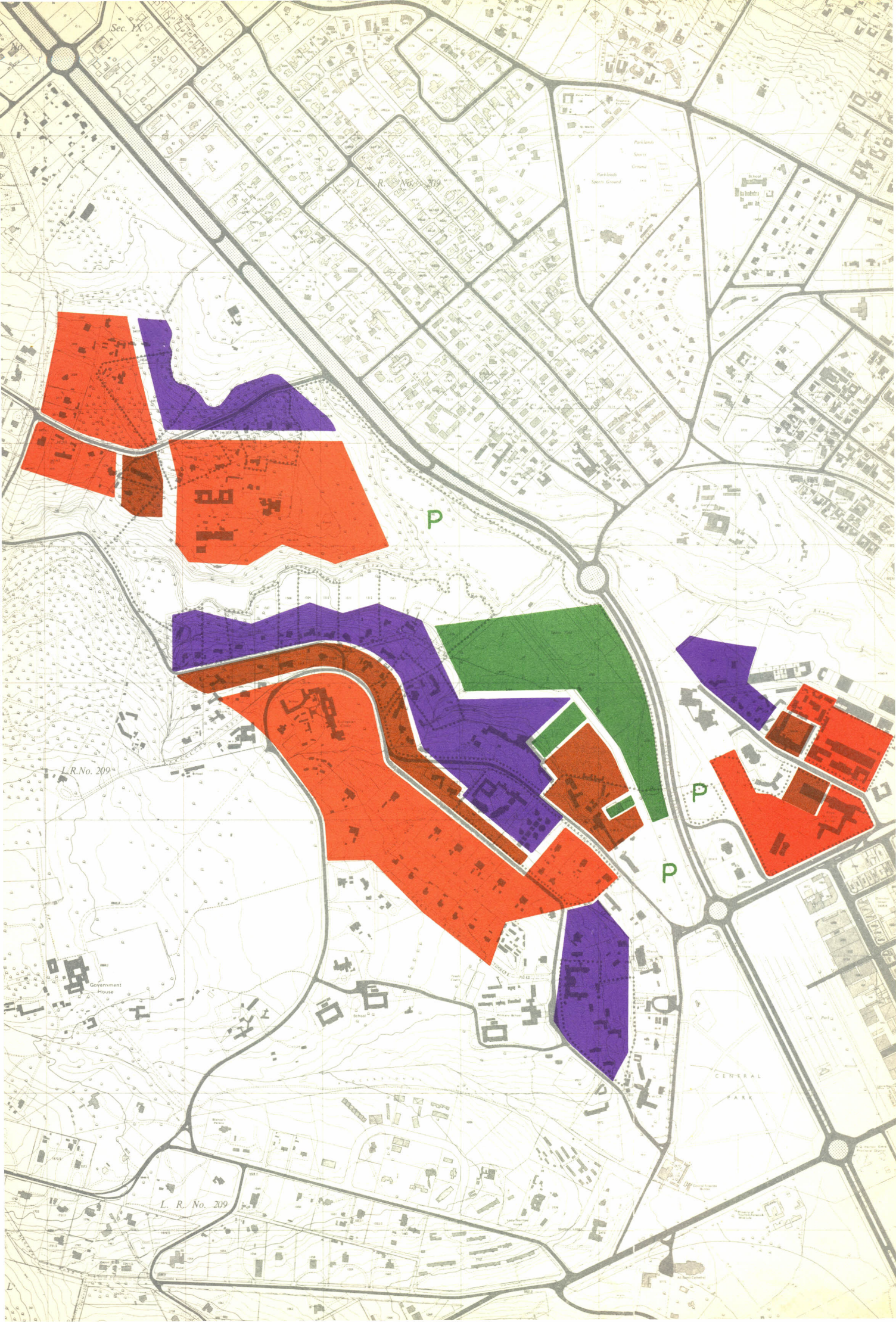
## PARKING

Important traffic functions are singled out as indications for the localization of parking lots required for long-term parking, and in some places, serving other than university demands.

PROPOSAL FOR U.C.N. USE OF LAND

1:10,000

Brown: Common facilities  
Red: Academic purposes  
Violet: Residential purposes  
Green: Sports facilities



Sec. 11

L. R. No. 209

Parklands  
Sports Ground

Police  
Station

P

L.R.No. 209

Government  
House

P

P

L. R. No. 209

CENTRAL  
PARK

DEMANDS FOR LAND

The demand for floor space has been described in Chapter II. How much land this development acquires depends on the ratio of floor space to ground which can be achieved.

As large portions of the U.C.N. premises can not be used for construction, the ratio of existing floor space to land available would create a false impression. It is difficult, however, clearly to indicate such a ratio for the existing premises and the calculations are therefore tentative.

On the developed part of the Main Campus, the floor space ratio is approx. 0.7:1. It is possible to build an extra 350,000 sq.ft. over and above the present 300,000 sq.ft. for academic functions. The resulting floor space ratio would then be 0.9:1.

On Hospital Hill the objective is to achieve a ratio of no less than 1:1 in the construction of academic buildings. The present rate of students' accommodation is 125 per acre, which is being used as a future standard as well.

On the developed part of Choromo the floor space ratio is 0.3:1. In the future a similar ratio is foreseen.

|  | LONG-TERM DEMAND FOR ADDITIONAL LAND |                | ADDITIONAL LAND OF THE MASTER PLAN |                |                   |
|--|--------------------------------------|----------------|------------------------------------|----------------|-------------------|
|  | ACADEMIC FUNCTIONS                   | RESIDENTIAL    | ACADEMIC FUNCTIONS                 | RESIDENTIAL    | COMMON FACILITIES |
| MAIN CAMPUS<br>Land in acres             | 11.3<br>(4.6)                        | 0              | 11.4<br>(4.6)                      | 0              | 1.2<br>(0.5)      |
| HOSPITAL HILL<br>Land in acres (ha)      | 35.8<br>(14.5)                       | 42.5<br>(17.2) | 44.4<br>(18.0)                     | 34.3<br>(13.9) | 23.5<br>(9.5)     |
| CHOROMO<br>Land in acres (ha)            | 35.8<br>(14.5)                       | 14.1<br>(5.7)  | 40.7<br>(16.5)                     | 9.6<br>(3.9)   | 4.0<br>(1.6)      |
| TOTAL PER FUNCTION<br>Land in acres (ha) | 83<br>(33.6)                         | 56.5<br>(22.9) | 96.5<br>(39.1)                     | 43.9<br>(17.8) | 28.6<br>(11.6)    |
| TOTAL<br>Land in acres (ha)              | 139.5<br>(56.5)                      |                | 169.1<br>(68.5)                    |                |                   |

## SUMMARY OF RECOMMENDATIONS

Based on this preliminary study the planners recommend:

- A. That the University College Nairobi remain, with the major part of its functions and facilities, in the Central Campus area and that these functions and facilities be further developed within this area.
  1. The Faculties of Arts, Commerce, Science, Architecture, Design and Development and Engineering, with their associated institutions, and the pre-clinical training in Medicine and Veterinary Science are developed here.
  2. The Faculties of Veterinary Science and Agriculture are developed on the Kabete campus.
  3. The Faculty of Medicine is developed at the Kenyatta Hospital.
- B. That the University College Nairobi agree to the principles of the preliminary development plan for the Central Campus area.
  1. The building activities for the present and next triennial period should be concentrated in the southern part of the Central Campus area. Normally only facilities directly related to the biological sciences should be located on Choromo.
  2. The Main Campus should during this period of time be developed as little as possible considering the likely, but undefined, growth demand of the Faculty of Engineering.
  3. If possible the U.C.N. should take over the Norfolk Hotel to utilize it as:
    - a) Accommodation for visiting professors, short-term appointed staff and senior students.
    - b) Catering facilities for the Main Campus and reception facilities for the U.C.N.
    - c) A development area for the Faculty of Engineering (behind the restaurant building).
- C. That the following buildings or facilities be finally sited as indicated in Chapter III of the study.
  1. Central Catering Unit in front of the men's Halls of Residence Nos. 1, 2, 3 and the Secretarial College.
  2. The building for the Department of Education on the Main Campus.
  3. Students' Halls of Residence North and West of men's Halls Nos. 1, 2, 3.
  4. The building for the Faculty of Architecture, Design and Development South of men's Halls of Residence Nos. 6, 7, 8.
  5. The building for the Department of Physics on the same site as 4.
  6. A swimming pool in front of men's Halls of Residence No. 1 and The Central Catering Unit.
- D. That prior to the completion of the final development plan, U.C.N. should negotiate to gain possession of the following land:
  1. a) Norfolk Hotel (comp. with B. 3)
  - b) Supplementary land for the central parking lot on the Main Campus.
  - c) Land in front of the YMCA and land adjacent to the YMCA swimming pool and in front of the Secretarial College for communal facilities (the Central Catering Unit and the Students' Union building).

- d) Parts of the residential area on Hospital Hill for a pedestrian way connecting the Women's Halls of Residence with the main pedestrian spine.
- e) A strip of land between YMCA and the United Kenya Club to the subway under Uhuru Highway for the construction of the main pedestrian spine.

These areas mentioned are for utilization before 1975.

- 2. a) Private properties South of Masonga Wai River and along the Riverside Drive for students' hostels.
- b) Government land on top of Hospital Hill (refer to second phase of development, Chapter III).

These areas mentioned are for utilization after 1970, but more likely after 1975.

E. That the University College Nairobi start negotiations to clarify whether claims can be established to the following land:

- a) The land on top of Hospital Hill in continuation of the area mentioned as D.2.b).
- b) The land North of Women's Halls of Residence.

This land will most probably not be utilized before 1975 but for the final Master Plan it is of importance to clarify the position as regards this land.

F. That for the preparation of the Master Plan 1970, the U.C.N. ask the Nairobi City Council to consider mainly the following proposals of the preliminary study:

- a) The proposed major road system of the Central Campus area.
  - 1. The location of the new highways in the Nairobi River-Masonga Wai River Valleys and their junction

with Uhuru Highway.

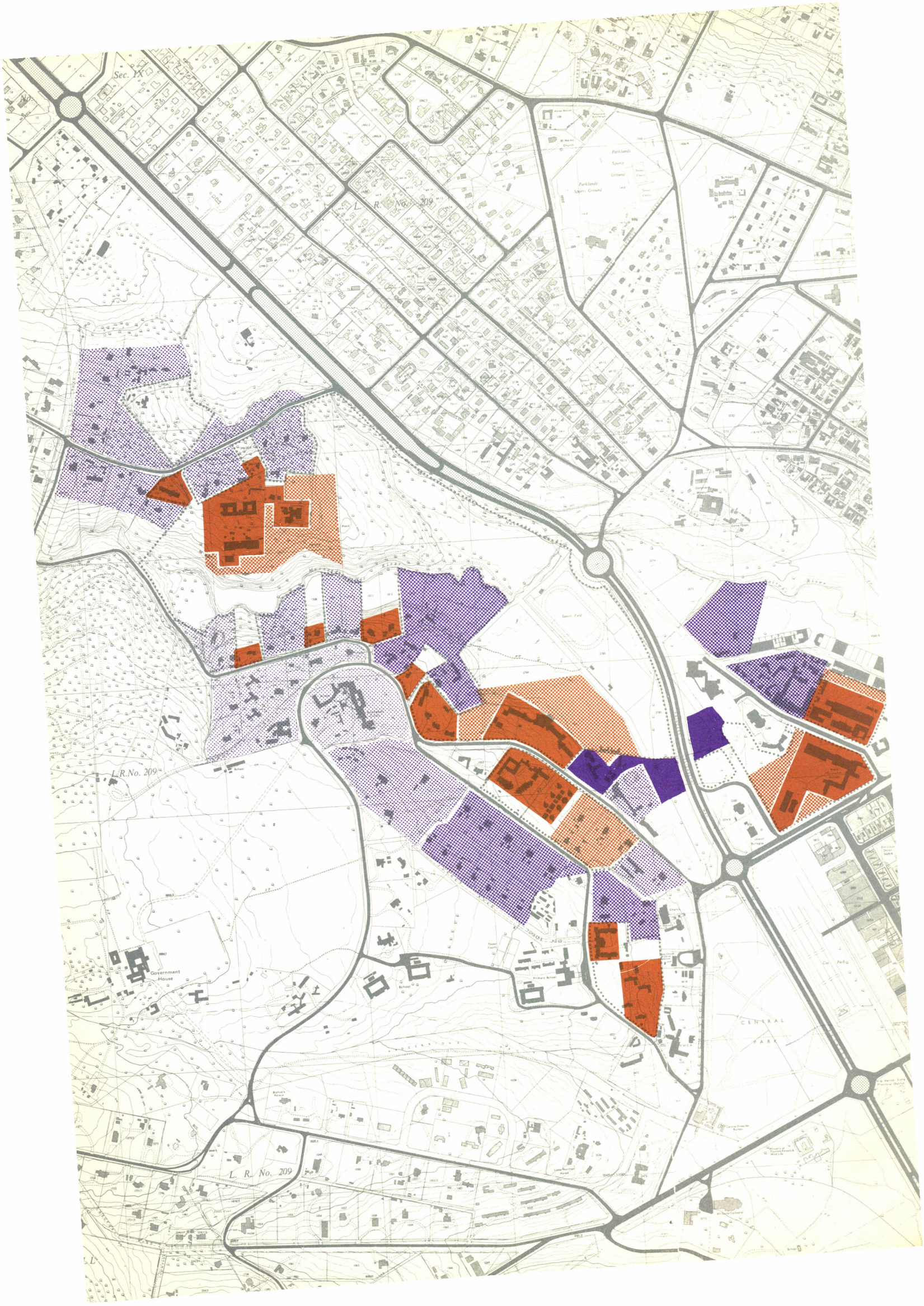
- 2. The location of State House Road and its connections to the major roads.
- 3. The location of a new road along the line of Processional Way as a possible substitute to the Ngong Road-Kenyatta Avenue.
- 4. The relocation of Riverside Drive and a possible new position of the extension of Ring Road and its junction with Uhuru Highway.
- b) The proposed internal road system of the U.C.N.
  - 1. A central and public parking lot on the Main Campus.
  - 2. Roads on the Main Campus, Hospital Hill and Choromo and their junctions to the major roads.
- c) The proposed systems of storm-water disposal and sewage disposal.

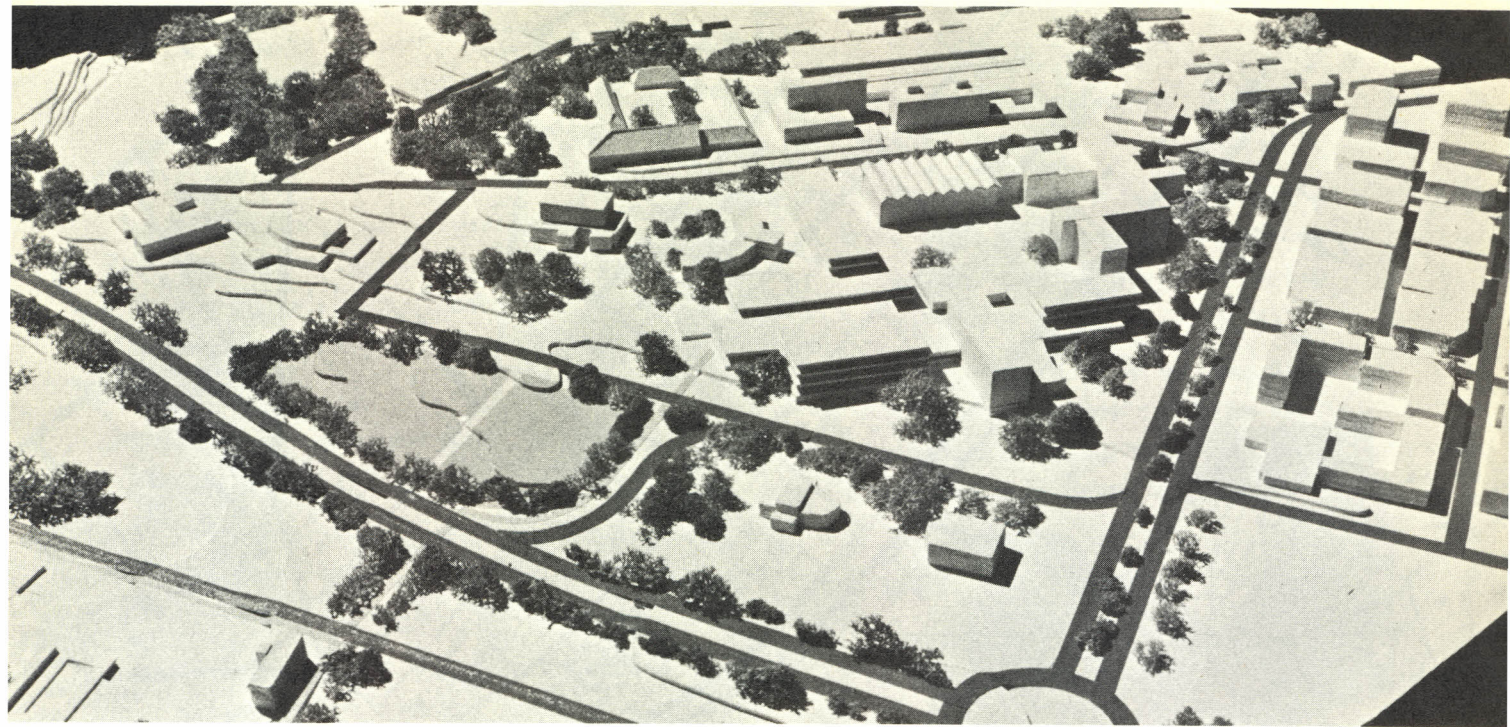
PRIORITIES IN LAND REQUIREMENTS

1:10.000

- Dotted line: encircles U.C.N. property
- Dark brown: Land utilized by U.C.N. in 1968
- Medium brown: U.C.N. land to be utilized within the first phase of development
- Dark violet: Land required by U.C.N.
- Violet: For immediate use
- Medium-violet: For use approx. 1975
- Medium-bright: For later use
- Bright-violet: For later use







#### SITING OF BUILDINGS ON MAIN CAMPUS

This page: Seen from south-west

Opposite page: View from above (seen on plan) approx. scale 1:2,500

#### SITING OF BUILDINGS

1st Stage, 74/75

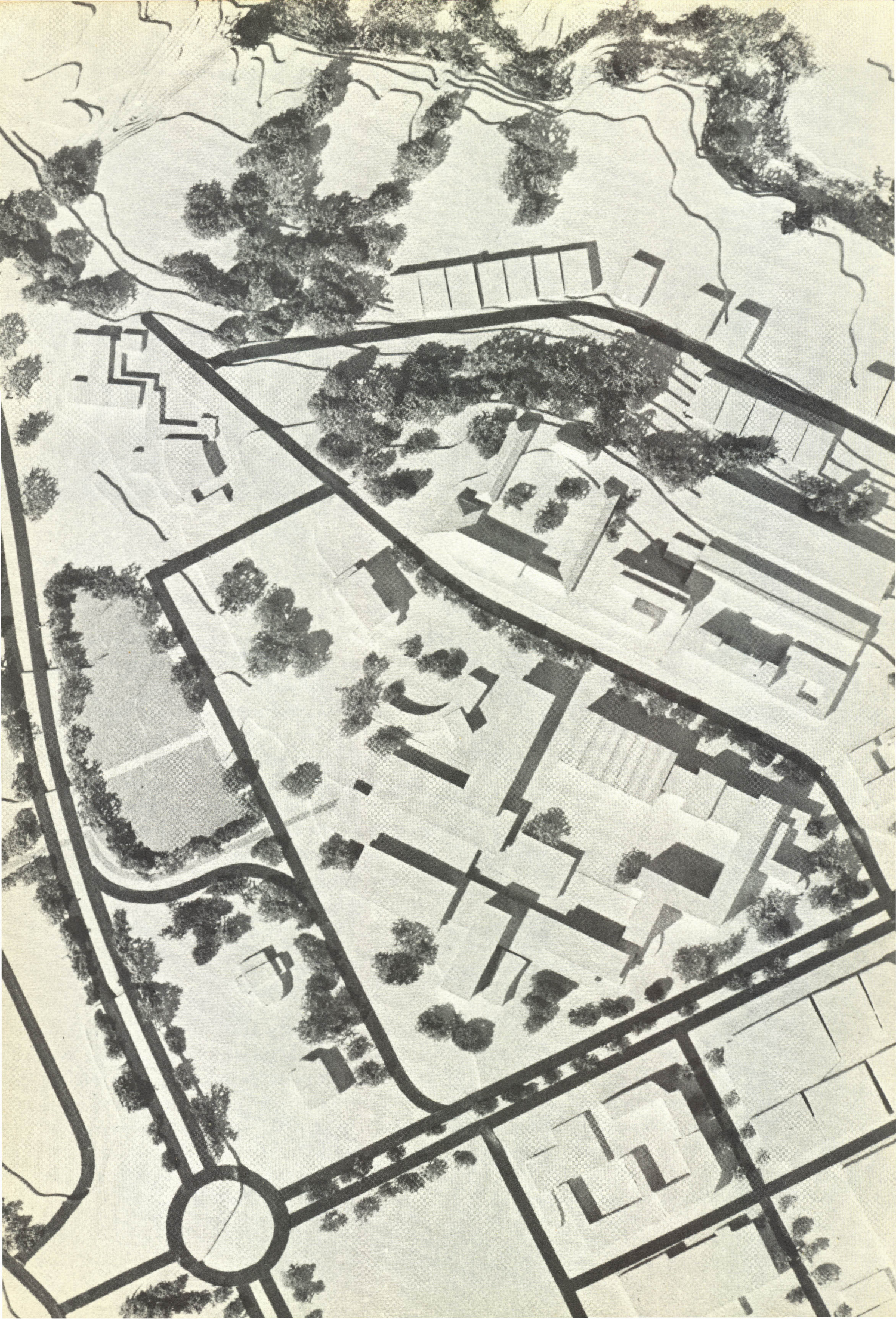
##### MAIN CAMPUS

Buildings of 2 and 4 stories for Education and Art will enclose the Great Court on its Western side.

Standardized academic buildings are envisaged on both sides of the existing Department of Chemistry building. There, together with a possible large lecture theatre, will close off the Court to the South.

North of the buildings for the Faculty of Engineering a single building volume is shown in varying heights of 1-2 stories to be used for specialized laboratories etc. Further extensions to the academic spaces might occur by transferring areas in existing Main Campus buildings to the Faculty.

Total academic floor area for Main Campus in this stage approx. 55,000 m<sup>2</sup> (589,000 sq.ft.).





#### SITING OF BUILDINGS ON HOSPITAL HILL

This page: Seen from North

Opposite page: View from above (seen on plan) approx. scale 1:2,500

#### HOSPITAL HILL

An arrangement of standardized terraced structures - "multipurpose" buildings - are shown on the sloping area South of Halls 6-7-8.

The Faculty of Architecture, Design and

Development is placed in these "neutral" buildings together with Departments of Physics and Mathematics.

New students' Halls of Residence are placed in continuation of Halls 1-2-3 and on the slopes in front of these halls.

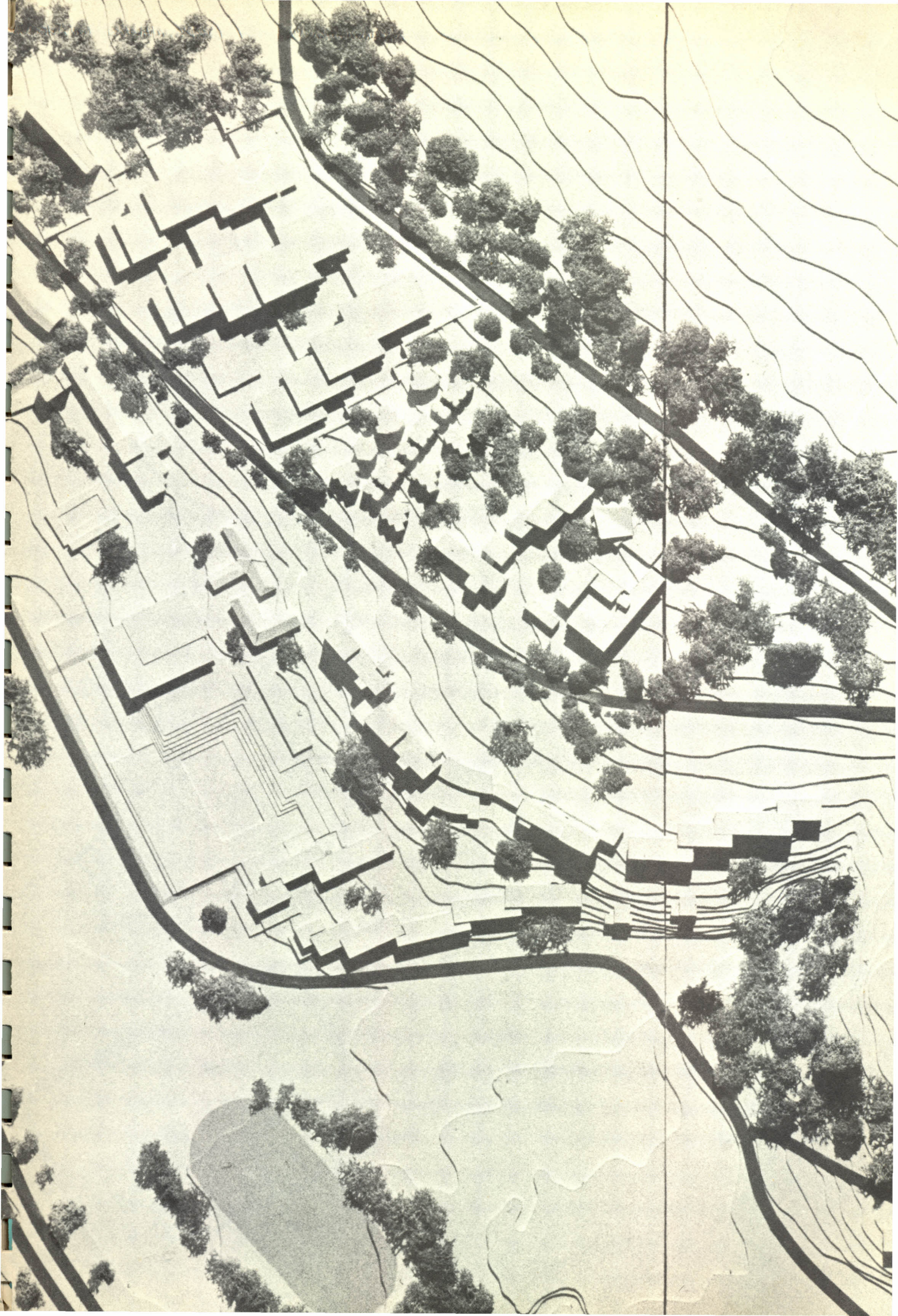
The Central Catering Unit is situated next to the pedestrian way leading from the Main Campus to the new academic and the existing residential areas. The swimming pool and other common buildings are close to the unit.

Total academic floor area for the Hospital Hill in this stage approx. 21,000 m<sup>2</sup> (224,000 sq.ft.).

#### CHOROMO

At this stage only minor building activities will appear. The preclinical schools of the Faculties of Medicine and Veterinary Science are under establishment on the area in close connection with the existing Departments of Botany and Zoology.

Total academic floor area on Choromo in this stage 20,000 m<sup>2</sup> (214,000 sq.ft.).



2nd Stage (6,000 students)

MAIN CAMPUS

In principle no further development takes place beyond the 1st stage, except for certain extensions of the Faculty of Engineering.

Total academic floor area for Main Campus in this stage approx. 60.000 m<sup>2</sup> (645,000 sq.ft.).

HOSPITAL HILL

The area between Protectorate Road and Turners Road is now built up with a floor area of approx. 49.000 m<sup>2</sup>. Next to the pedestrian spine are standardized buildings of 3-4 stories intended for general academic purposes and for research in normal laboratories.

Towards Turners Road, however, certain buildings of a more specialized character should be envisaged, e.g. one-story buildings coordinated in planning modules with the above mentioned standardized buildings but with larger spans and ceilingheights to be used for laboratory halls, workshops, etc.

Standardized buildings in 6-8 stories might also occur in this area accommodating post-graduate research and members of staff.

Residences will be further developed at Women's Halls, on Hospital Hill Road and along the slopes down to Masonga Wai river. Common buildings for students' Union etc. should be placed in close connection with the Central Catering Unit.

Total academic floor area for the Hospital Hill in this stage approx. 70.000 m<sup>2</sup> (750,000 sq.ft.).

CHOROMO

The Biological Departments are developed further. Standardized buildings for the eventual establishment of new faculties are placed on the Eastern part of the area.

Total academic floor area on Choromo in this stage approx. 35.000 m<sup>2</sup> (375.000 sq.ft.).

VIEW FROM ABOVE (SEEN ON PLAN) OF SECOND PHASE OF DEVELOPMENT ON THE CENTRAL CAMPUS  
Approx. scale 1:10.000

3rd Stage (approx. 10,000 students)

#### MAIN CAMPUS

The Faculty of Engineering gets its laboratories and teaching accommodation further extended on the slopes behind the Norfolk Hotel.

The remaining Main Campus is rounded off by standardized academic and common buildings along the pedestrian way leading up to Hospital Hill.

Total academic floor area for the completed Main Campus approx. 65.000 m<sup>2</sup> (695,000 sq.ft.).

#### HOSPITAL HILL

The development of the academic building types is continued towards Northwest.

In the Southeastern corner, YMCA's site is disposed of for further centre functions.

The residential area to the North is totally built up.

Total academic floor area for the Hospital Hill premises approx. 140.000 m<sup>2</sup> (1,500,000 sq.ft.).

#### CHOROMO

A further development by standardized academic buildings has taken place. The Northern part of the Choromo site is occupied by groups of student hostels.

Total academic floor area on Choromo approx. 60.000 m<sup>2</sup> (645,000 sq.ft.).

VIEW FROM ABOVE (SEEN ON PLAN) A  
VIEW FROM ABOVE (SEEN ON PLAN) OF ALMOST FULL DEVELOPMENT OF THE  
CENTRAL CAMPUS  
Approx. scale 1:10,000





# APPENDIX A

## BASIC VIEW POINTS ON THE PLANNING OF UNIVERSITIES

By Jan Schroeder  
Secretary to the Vice Chancellor's Assembly,  
Copenhagen

### INTRODUCTION

We think that for this interim planning report a few general viewpoints on the functions of universities are required, partly as a background for the initial physical planning, partly to contribute to the current discussions and negotiations on the problems of higher education in Kenya.

Considering the short time available and the limitations of information available, it has only been possible to point at a few of the problems which will be in the limelight while processing a final development plan for the University College.

The author of this paper is relatively free in not feeling bound by British, American or African university traditions. His background is that type of university education which has been developed in Scandinavia, especially in Denmark. This type of university, which has been influenced by the traditions of German and French universities, can be described as Continental. The viewpoints dealt with in this paper will be very general and only to a limited extent directed especially towards African or Kenyan university conditions.

In the recent past a general debate has been going on in Scandinavia on higher education, its organization and purposes. The institu-

tions of higher education<sup>1)</sup> have come into the public eye after a very long period of isolated existence in society. An important reason for this is that a number of the conditions and assumptions relating to the previous organization of higher education have been radically changed, mainly as a result of the explosive growth in student numbers. This growth stems from the changes in occupational patterns which have occurred in all the industrialized countries: That is to say there has been a decrease of employment in the primary occupations (agriculture etc.), a stagnation or decrease in the secondary occupations (industry etc.) and a heavy increase in the tertiary occupations (commerce, liberal professions etc.). The increase in student numbers has stepped up the demand for public investment in the whole of higher education.

Universities and other institutions for higher education have lagged behind in the process of adapting to changing conditions particularly with regard to the changes needed in syllabus structure, subjectmatter

<sup>1)</sup> Besides the universities there are institutions for higher education such as the engineering sciences, veterinary science, schools of agriculture and forestry, schools of architecture, music, dentistry, commerce, education and pharmacy.

and methods of education. Similarly the accommodation problem has been stepped up and taken on catastrophic proportions. Working and studying conditions for students and teachers alike have deteriorated. Discontent with the present organization has become general. This again has created a growing feeling that the heavy public investment in the entire structure for higher education is not utilized purposefully. It is on this background that the discussion about the functions and objectives of universities has started.

So far it has been agreed that it will be necessary to reorganize the entire system of higher education. As a first step in this direction the analysis of a wide range of conditions which are of importance has been started in reaching the aims set. In so doing it should be emphasised that the experience gained by other universities in other countries and in parallel situations ought to be used.

Based on his participation in this work, the author has tried to point out some important aspects. As the system of higher education in most developing countries is established upon European or American patterns, probably the present critical discussions of these patterns may be of interest for discussions in a developing country.

#### UNIVERSITY PATTERNS

All universities deal with education at a higher level. Furthermore teaching staffs in universities are engaged in research work, in addition to purely teaching activities.

The concept of the university in the Western world has arisen in three major forms: the Continental, the British and the American.

These university patterns have much in common but the Continental system emphasizes studies as a professional orientation and puts less weight on general or all-round education.

Great Britain emphasizes the creation of a general intellectual attitude amongst the students. The American universities are peculiar in underlining that no divisions between scientist and citizen, or between academic knowledge and practical knowledge should exist. The great seal of Cornell University has the inscription "I would found an institution where any person can find instruction in any study".

In American universities the education seems to include any topic at any level, e.g. some universities offer 12.500 different courses within areas spreading from running hotels to symbolic logic. It can therefore be said that no limits exist to the number of areas of education which can be developed within an educational system described as a university. On the contrary, it is difficult to imagine that a university should only offer education within a single area, or that all candidates should have the same training. By virtue of post graduate training and research in the most up to date scientific and other academic fields, the level of education in universities takes on a special character. In Scandinavia it is a condition that unless post-graduate education contains the latest research activities at some point in the course, the institution concerned can not claim to be a phase of higher learning. It follows that specialization does occur in the education and finds its place towards the end of training.

In Denmark, the idea for the future is to concentrate or localize universities and institutions of higher learning in "university centres" so that co-operation between many different faculties can be achieved. Furthermore, the present trend in thinking in Scandinavia is that a number of branches of higher learning which hitherto have not enjoyed university status should now be incorporated with the universities. E.g. a centre concentrating on biological education, medicine and veterinary science could very well co-operate with schools nearly in training laboratory assistants, nurses etc..

## SIZE OF UNIVERSITIES

In spite of many attempts it has not been possible until now to indicate optimal sizes of universities, expressed in numbers of students. This problem was recently dealt with by the West Deutscher Rektoren Konferenz and no result was arrived at. Apparently there are no minimum limits for student numbers. The Robbins Report <sup>2)</sup> has indicated that British universities should be developed to include not less than 10.000 students. This minimum is probably based on the fact that many British universities have traditionally had small numbers of students ranging from 1.000 to 2.000 which is the situation the commission has wanted to change.

In Denmark it has recently been said that new university centres should initially be of the order of 5.000 students. It is anticipated that through this an effective utilization of the sources can be achieved in terms of teaching staff, accommodation etc..

Maximum sizes for universities are probably impossible to indicate. In some countries universities exist with student numbers well above 20.000. The Robbins Report states that approximately 2.000 students will be the upper limit for higher education within a single branch or skill, if numbers exceed this internal communication between colleagues is bound to suffer. If it is at all possible to draw a general conclusion from the above statement, once faculty numbers exceed the upper limit the faculty concerned should consider duplication.

## TYPES OF EDUCATION

Higher education will be strongly influenced by the rapidly accelerating explosion of knowledge which we are experiencing to-day. It is estimated that the total body of knowledge within individual spheres of knowledge is being doubled every 10 years. There is no sign that this growth is likely to decrease. This knowledge explosion is bound to influence the content of curricula. Emphasis will apparently be laid on what is called Methodology. It must be assured that the students assimilate the methodology of their special domain and utilize it later in specialization and the adjustment of knowledge within their sphere. The imparting of straight knowledge will not be involved to the same degree in the target of the education.

In this connection it should be mentioned that it is necessary to introduce modern teaching methods (audio-visual aids, seminars, group work etc.). As an example of a possible consequence for the physical planning of the university one may surmise that the demand for large lecture-theatres may well be reduced, especially in relation to education in the developing countries.

The great pace of expanding knowledge, moreover, makes it desirable that research and education belong to the same institution. This contributes to improved communication of research data and conclusions on the practical work being done to society as a whole. This also means that the new generation of scientists will find inspiration and influence from the scientists training them, early on in their education.

The most important direct or indirect demand placed upon a physical plan by the rapid expansion of knowledge is the need for flexibility.

The content of special branches of knowledge is undergoing steady changes and also the teaching methods. The importance of professions or subjects change, and the number and distribution of students change accordingly.

<sup>2)</sup> Committee of Higher Education: Higher Education. Report of the Committee appointed by the Prime Minister under the Chairmanship of Lord Robbins 1961-63. Presented to the Parliament by the Prime Minister by command of Her Majesty, October 1963. Her Majesty's Stationary Office.

The study of Theology originally dominated the University of Copenhagen, but to-day accounts for less than  $2\frac{1}{2}$  % of the total number of students. This mutation has taken decades. Similar mutations will nowadays occur very much more rapidly. Reserves in accommodation will be necessary to house guest-professors, research- and educational branches which are being created in between the traditional boundaries of subjects or professions.

Consequently the physical planning must operate within building systems which give opportunities for unforeseeable expansion.

Finally many arguments point out that future development will necessitate that the university be increasingly responsible for at least a part of the necessary re-training of erstwhile graduates in need of refresher training, and for post-graduate activity. When re-training and post-graduate activity is seen as necessary it will be understood to be a direct result of the changes created by the expansion of knowledge.

#### DIFFERENT EDUCATIONS GEOGRAPHICALLY CLOSE TOGETHER

As already mentioned universities can include all professions and subjects. This means that it is in fact impossible to say exactly what should be regarded as belonging to the institution when speaking of the planner's "vision".

An indication or decision on how far the university penetrates the entire system of education horizontally by subjects is of the greatest importance in planning. The vertical dimension must be considered as well. This has implications as well on basic education as on the already mentioned re-training or post-graduate activities. However, it should be stressed that many arguments point towards the fact that a high degree of concentration of training capacity should be aimed at within the larger domains of professions or subjects. To support this point of view it

should be mentioned that an American university, through lack of space, decided to move its medical school out to another campus area. A few years later this was considered a disaster because of its lack of contact with the main body of university life, and it was decided, in spite of heavy costs, to move the department back to its former position.

The idea of creating special centres for higher education has already been mentioned. The proposed centres are different from the ordinary concept of this university since they incorporate not only research and the more conventional academic subjects, but also training centres for technicians and other service professions associated to the faculties. Through this co-ordination it should be possible to utilize resources and facilities more economically and purposefully but in addition the centres should all be regarded as having great value for the continued education at all levels.

Founding such university centres it is stressed to be necessary for a centre to concentrate its activities within specific fields. The permanent commission known as the planning council of the higher education has stated that such centres - very broadly sketched - has to concentrate its activities about three principal subject groups, which abstractly are described as follows:

##### a) The "costly" subjects.

These include subjects that demands extremely expensive facilities such as apparatus (instruments) and voluminous space of room (great areas for research and teaching). Many of such subjects require comprehensive, scientific environment because of its division in subspecialized fields of studies.

In this group you may find the basic subjects of the natural and medical sciences, chemistry, physics, astronomy and to a certain extent biochemistry, biophysics, geology.

b) The "environment"-demanding subjects.  
Hereby is meant subjects which have to found its teaching and research upon present organization and natural conditions - such as lawcourts, public assistance offices, hospitals and wellfare-institutions, schools, tradeorganizations, material for soilbiology etc.

c) The "archive-demanding" subjects.  
Disciplines which are mainly dependent on the existence of material collected over many years such as libraries, museums etc. Consideral parts of history research work, archeology and spcific language and cultural fields of study belong to this group.

Furthermore a university or centre which includes a number of subjects or professional spheres provides very good opportunities within a relatively limited geographical area to concentrate scientists within a community, which is of greatest importance for co-operation and inspiration, and hence for the development and inspiration, and hence for the development of various branches of research. All experience in recent years goes on the line that scientific progress now and in the future will occur when the boundaries between the traditional spheres of knowledge and education merge. This creates the need for density or physical concentration among related or familiar subjects.

#### POLICY OF EDUCATION

As one of the concerns of universities is to educate at a higher level, an education policy raises 4 main questions:

1. Who shall receive the education ?
2. What is the content of the education ?
3. What shall the education train people for ?
4. What is the demand for fully trained persons in terms of numbers ?

An analysis of these main questions will show that decisions can not be made on one question without influencing all the others. From further analysis of the above questions it follows that there must be coherence in decision-making, coherence between different decisions

which otherwise might appear to be unrelated in overall policy making, which have to be made when planning higher education. Keeping this in mind stating and decision-making can be made on as rational a basis as possible.

The reason for stressing this coherence is not often recognized as existing at all. The coherence is very often hidden because the "decision-making" involved is related to administratively and geographically separate organizations. Quite independently of the situation in a given society, it seems important to stress that these questions be viewed in a comprehensive way. Different patterns have been tried to solve this difficulty.

In Sweden a new central organization has been created (Universitetskansler-embedet) which has a very wide scope and range and powers (i.e. it can take steps to influence the traditional self-government of the universities) and it takes care of functions of co-ordination. It is responsible to government and parliament for appropriate development within the total higher educational system. One of its functions is to process applications for funds from the State budget on behalf of all higher educational institutions so that applications can be made according to profession and subject and not necessarily according to institution.

To solve similar problems in Denmark 6 recently established commissions have started their work. The commissions are: the Vice-Chancellors assembly and 5 so-called co-operation commissions covering 5 different main fields of subjects, namely humanities, social sciences, "health"-sciences (medicine, veterinarian, pharmacy etc.), natural sciences and technical sciences.

The commissions have mainly consultative tasks and no executive powers what so ever. Their possiblitiy to influence the development of the entire higher educational system occurs because, all essential matters that are estimated to be of common educational interest to some - or all - foundations have to be submitted to the commissions.

## UNIVERSITY AND SOCIETY

In general it is characteristic of universities that they exercise their functions in academic freedom and as selfgoverning institutions.

In his book "Universities: British, Indian, African"<sup>3)</sup> Eric Ashby defines academic freedom as: "That freedom of members of the academic community assembled in colleges and universities which underlies the effective performance of their functions of teaching, learning, practice of the art and research. The right to academic freedom is recognized in order to enable faculty members and students to carry on their rôles". This definition is likely to be supported by the majority.

In his writings, however, Ashby characterizes a number of African university constitutions as unreasonably based upon the western university tradition, and he foresees a movement towards entirely new formulations suitable for the demands of developing countries: <sup>4)</sup>"Africans are now seeking a formula which will allow universities the essential academic freedoms - freedom to appoint staff, to select students to determine standards, and to design curricula - and which at the same time will ensure that universities serve the essential needs of the State. In desiring a new formula I am sure the African leaders are right, for the social purpose of a university in Africa differs from its traditional social purpose in Europe. In Europe universities have stood for continuity and conservation; in Africa universities are powerful instruments of change. They must, therefore, go into partnership with the State, and for this purpose they require a fresh constitutional pattern".

Theories on organization have described universities as so-called closed systems. By

<sup>3)</sup> Eric Ashby: "Universities: British, Indian, African. A study in the Ecology of Higher Education" Weidenfel and Nicolson, London 1966, p. 291.

<sup>4)</sup> Eric Ashby: "African Universities and Western Tradition" Oxford University Press, 1964, p. 97-98.

this the organization is described seen from its inner structure. Two models must be mentioned: the hierarchic (the pyramid of professors) and the bureaucratic. But a new attitude has been developed in recent years describing the possibility of viewing universities as open systems which depend on the whole social environment and as existing as a result of the balance between the various groups of interests.

These interest groups influencing the university structure are, among others, the State, the Principal's office, various boards and commissions, the lecturers, the students, public and private organizations, research institutions. It should be emphasized that the university is much more than merely the sum of all these interests. As an institution the university itself is an organization with a policy of its own created by its interaction with the environment.

The acknowledgement that a university is an environment-dependent institution (internally and externally) necessitates that the planning of the university - organizationally as well as physically - must include considerations on the place of the university in society as a whole. In the Scandinavian countries the majority argues that the universities should be located in such a way that they are integrated as far as possible with the structure of society.

At the University College, Nairobi, this factor has already influenced the educational pattern by the creation of practice-orientated research units, orientated towards demands formulated by the government as an experiment for demands of the society.

By the end of the 19th century in Denmark it was experienced that an institution for higher education led the strongly needed reorganization of a most important sector of the economic life.

A newly created University of Agriculture investigated, through its research bodies,

the possibilities of reorientating agriculture away from corn crops for export, upon which it had hitherto subsisted, towards a refined dairy industry producing milk, butter, cheese, etc..

Within 10 years hundreds of dairy co-operatives had been created as a direct result of the University of Agriculture's research and information activities.

A more recent example from our small Danish society is the technical research which has grown up in close connection with the Technical University. A number of research institutions, financed partly by industry and related organisations and partly by the Government, have been created during the last 10 years with duties in external advice as a most important part of their task.

Surely parallels might be drawn up from such examples as a pointer to what a developing society should demand from a university besides its educational obligations. The research which, at U.C.N., is done by "The Institute for Development Studies" is to be seen as an expression of such aims. The tasks of the institute are formulated by the government which assists in creating the necessary financial background by virtue of which the institute is more independent than other faculties or departments carrying out research. A parallel to this is the research and development activities within the field of low cost housing being carried out at the U.C.N. by the Housing Research and Development Unit attached to the Faculty of Architecture, Design and Development.

These hitherto modest activities are clearly orientated towards society. Problems and tasks are defined by society and are guided by a communal board representing the university and the interested parties in the government. Similarly there is the intention to create a research and development activity within the field of industrial design which could serve the purpose of making East Africa independent of the unnecessary importation

of certain industrialized equipment from western countries which in principle could be manufactured at home.

During its short working period, the planning team has not had the opportunity to study the report of 1962 written by the Davidson Nicol's Committee which analysed the needs and priorities for the University of East Africa.

The summary of this report, as given by Ashby, indicates general agreement between what has been stated in the preceding paragraphs and the committee's proposals to expand different types of extra-mural activities.

#### CONCLUSION

As mentioned in the introduction it is clear that this paper has limited itself to pointing out a number of factors about which the planning authorities should be informed, in general or in detail, before decisions on university development can be finally taken. The tasks handed over to firms of pure architects is therefore to a lesser extent concerned with considerations of university functions, organization patterns, education patterns, research facilities etc.. The preliminary proposal for a comprehensive development plan is therefore based first of all on town planning considerations and theories with the result that the planners have become aware of the more general need for concentration and flexibility within the physical form and shape which, among other factors can be deducted from these notes.

If a more detailed long-term plan is required on the basis of a real analysis of education, and indeed the author believes this to be the right approach, then a very big task lies ahead in collecting all the necessary data.

# APPENDIX B

## EXAMPLES OF UNIVERSITY PLANS

| Context                                    | Page |
|--|------|
| UNIVERSITY OF EDINBURGH<br>Great Britain   | 3    |
| UNIVERSITY OF LOUGBOROUGH<br>Great Britain | 4-5  |
| UNIVERSITY OF ESSEX<br>Great Britain       | 6-7  |
| UNIVERSITY OF ODENSE<br>Denmark            | 8-9  |
| UNIVERSITY OF MARBURG<br>W. Germany        | 10   |
| UNIVERSITY OF BOCHUM<br>W. Germany         | 11   |

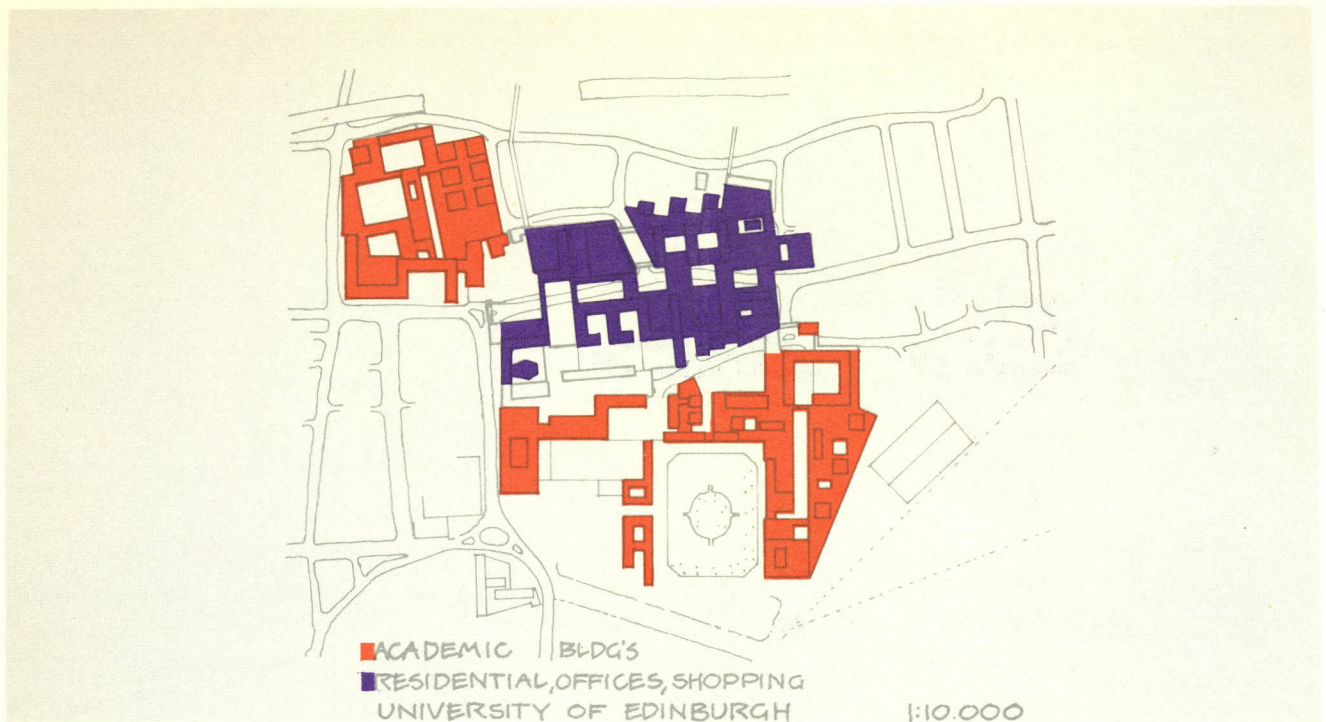


## B. Examples of University plans

In this section we have tried to extract some examples, which could illustrate either special or general principles for contemporary university planning.

It seems to be a general trend that the internal structure of universities, i.e. the functional pattern, will form the basis of the physical planning. In the last ten years academic planning has been especially concerned with specializing, concentration, flexibility and co-operation between the faculties. These are then the elements one will see reflected, more or less distinctly, in the present plans.

The examples given illustrate different types of universities, ranging from the university within a city (University of Edinburgh), through the removed university with close links to the city (Loughborough, Essex, Odense and Marburg), to the university which is a city in itself (University of Bochum).



UNIVERSITY OF EDINBURGH, Great Britain.

Architect: Percy Johnson-Marshall.

#### PREFACE

The University of Edinburgh is an instructive example of a university within a city. It has on the one hand the advantage of an almost complete integration of students and society, and on the other, the problem of adequate space. In the past this has involved the establishment of parts of the University in places separated from their original centre. The architect considers that it would be unfortunate if the University were permanently to be broken into widely scattered and separate parts. The University should occupy one coherent area and steps should be taken immediately to unite the parts at present separated.

#### THE BASIS OF PLANNING

A committee set up by the University reached the conclusion that the most rational and sensible form of development was in fact around George Square for all but the science faculties, which would remain on their actual site a mile and a half south of the University area.

As Edinburgh has a very fragile and beautiful skyline it was recommended, that, except for two tall buildings already approved, the University should consist of fairly low buildings forming quadrangles and urban spaces. The plan should provide for flexibility. This can be done in two different ways:

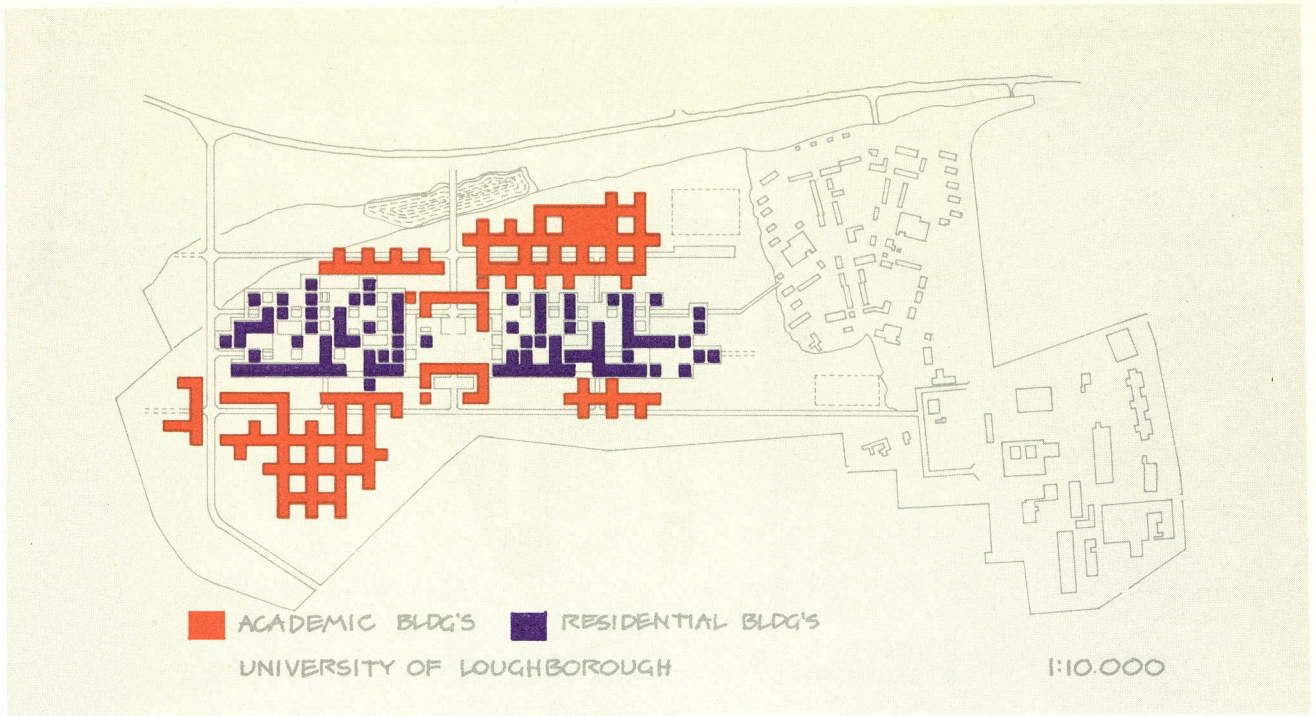
1. Building temporary and very light structures.
2. Erecting permanent buildings with some flexibility within the buildings.

Permanent buildings were chosen in order to produce continuity in Edinburgh's building tradition.

#### THE MASTER PLAN

Johnson-Marshall was appointed planning consultant to the University in 1961. He was asked to prepare a plan not only for University buildings but for a comprehensive development area involving other uses, such as a shopping centre, offices and housing, in close proximity to the University, and covering an area of 125 acres.

Circulation and parking. The pedestrians will be separated from motor traffic by means of upper level decks and bridges. At street level most of the building sites will consist of carparking.



LOUGHBOROUGH UNIVERSITY OF TECHNOLOGY,  
Great Britain.

Architects: Arup Associates.

#### PREFACE

The University is a technological institution which is a new type in Great Britain. The Vice-Chancellor M.L. Haslegrave says in a statement about the University plans: "On the building side, there are many who wish to erect impressive, palatial buildings - to build for posterity. There are many who press for highly specialized facilities being built permanently into the fabric - so making buildings unsuitable for other purposes without a large expenditure of effort and money. The plans that have been prepared by our architects take account of the need to make the utmost use of scarce resources. They provide for flexibility."

#### THE PROBLEM

The architect's statement about the planning of the Campus. A stage will inevitably be reached when the problems of expansion or conversion of building become impossible to solve. There is therefore a strong case for a predetermined plan.

The architect's proposal is to develop a pattern of discipline which will ensure a sense of order and continuity in the development, but which will be flexible enough to provide the framework within which future requirements can be met.

#### THE BRIEF

The Brief was to prepare a master plan for the growth of the existing College of Technology with about 1500 students into a University of Technology with about 5000 students or more.

The master plan should provide for:

The possibility of changes in the academic structure. Almost complete residential accommodation on the site. Change of use of teaching areas. Varying rates of expansion. The integration of the existing college buildings.

The total area of the site owned by the College is about 130 acres, including the existing residential and academic developments which occupy about 40 acres.

The site has a fairly consistent cross section and slopes steeply to the North.

Residential Accommodation. Loughborough is

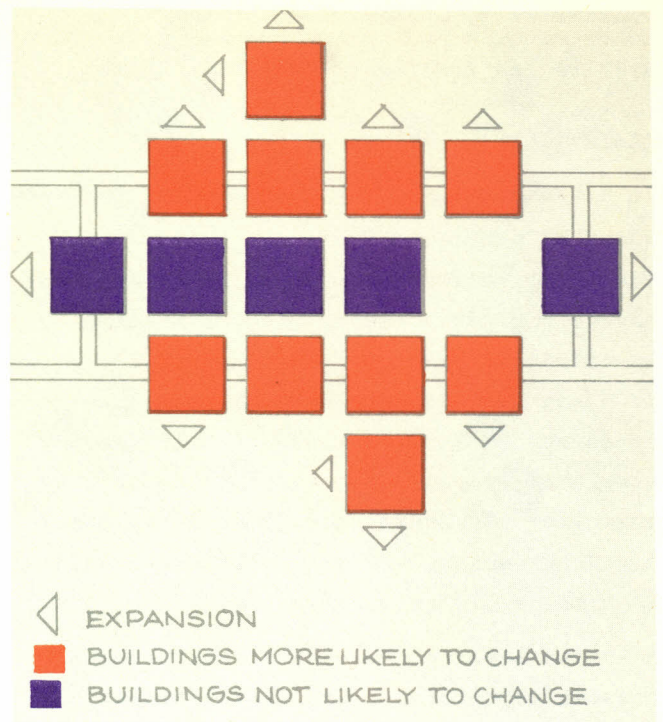
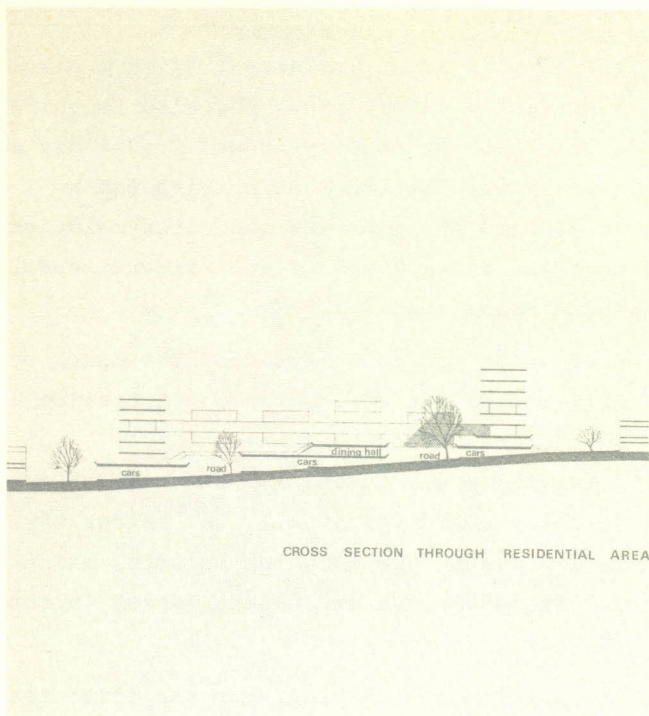


Diagram showing growth pattern. The buildings most likely to change and expand are placed towards the periphery, while the residential halls are placed in the central area.

fairly unusual among the new universities in requiring nearly 100 % residential accommodation on the site. This will account for nearly half of the total university building area.

#### THE MASTER PLAN

**Academic areas.** Physical continuity between the various buildings is strongly recommended in order that future re-organization of the space use may be inhibited as little as possible and expanding units not overflow into physically separated buildings.

**Residential areas.** The size of the halls should be of about 250 students. All floors should be accessible by stairs to encourage informal and casual meetings.

The pedestrian decks should run in several levels under, over, or through the residential buildings.

It is intended that the central zone of the development should be designed to create a series of interlocking spaces contained by the halls of residence and the communal buildings. These buildings are also less likely to change than the academic buildings.

**Circulation.** It is proposed that pedestrian and vehicular traffic will be segregated as far as possible. The gradient of the site facilitates this by making necessary the creation of several levels traversing the complex. A network of roads run through the scheme at ground level, with the pedestrian routes mainly confined to the upper levels of the complex.

**Car parking.** If the present ratio of cars to students - 1:4 - is maintained, and it is more likely to increase, the area of car parking will be in the order of ten acres. Providing this as surface parking would be at the expense of the sports facilities. It is therefore suggested that, as the fall in the site necessitates either cutting and filling or building the lowest floors above the slope, the latter method should be used, and the voids thus formed be used for car parking.

Architects: Architects Co-Partnership.

#### BASIC IDEAS

In a statement about the planning five basic ideas were pointed out.

The first one concerns size. Essex must one day be big, very big by present English standards. I mean not less than 10,000 students. About size and concentration. The Essex scheme of 6,000 if not of 10,000, is theoretically more concentrated than any other. If Essex is to have a high place in the hierarchy of universities, it must attract absolutely first-rate staff. To do this we must give the staff scope, and scope means big departments, and big departments mean, in time, a big university.

A second idea concerned the relationship between departments. The disadvantages of having big departments are that they can grow into departmental isolationism and self-sufficiency. This should be avoided because the departments have much to learn from each other and because many of the growing points of knowledge fall between departments. We aimed, therefore, to group our departments in schools, though most departments will be members of more than one school. We wanted this close link between departments to be reflected in the physical plan.

The third idea was about residence. The idea of a college or a hall of residence was rejected, because the students should have as much freedom and responsibility as possible. And I was anxious to avoid an institutional kind of life so we decided to provide flats.

The fourth idea was to integrate the teaching buildings with the residential buildings. We have aimed at merging the teaching and the social life of the students.

The fifth idea arose from the siting of the University, and possible links between it and the community it serves. We felt that there should be as strong a link as possible between the University and Colchester (the nearby town).

#### THE MASTER PLAN

The site is about 204 acres. It is a simple eighteenth-century park. The site is quite unlike all the country around it, it has a big valley. The other main thing which influenced the plan was the close relationship and integration of the various schools and disciplines.

A principle was to abolish the idea of specific teaching buildings at all, but rather try to make a continuous teaching building which can remain continuous and become larger in the future.

Circulation and parking. For the first ten years the servicing of the buildings takes place from one road. There are two car parks coupled with parking underneath the causeway, and this should deal with the needs of the staff for the next ten years.

Pedestrian movement will be up and down the street with teaching on either side, although the centre of teaching will really be at one end. There are also pedestrian ways at right angles feeding the residential towers. Everybody should be within five minutes walk from the centre.

The plan. The architects believed that to implement the general idea, not only had they to concentrate teaching in the centre but simultaneously had also to allow for the expansion of the teaching buildings and yet maintain the residences right in the centre.

Residential towers. The flats are grouped, twelve or thirteen, around a kitchen and a common room, and the only way to the flats should be through the common rooms.

Academic buildings. The main buildings stretching in a line back and forth across the central spine are proposed at 60 ft. wide, with short 30 ft. wide linking sections. The proposition is that all academic accommodation can be *satisfactorily planned within these constraints.*

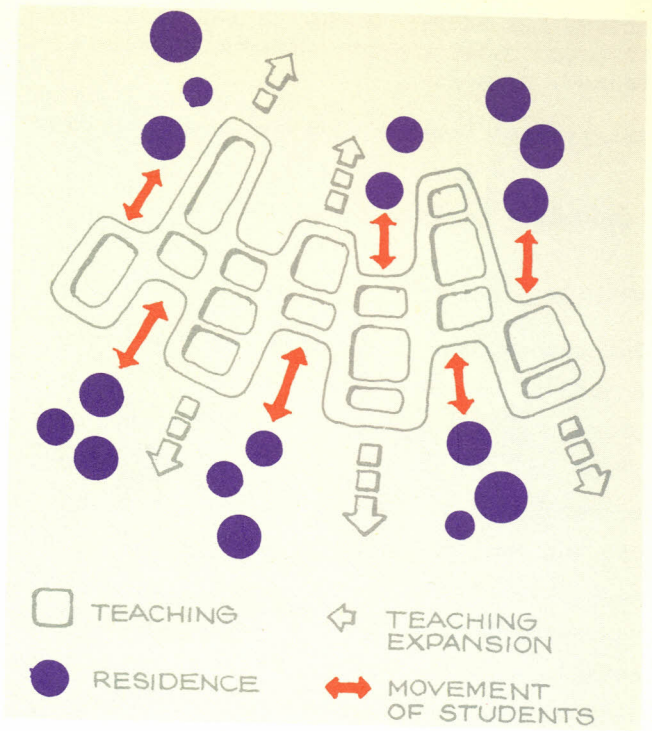
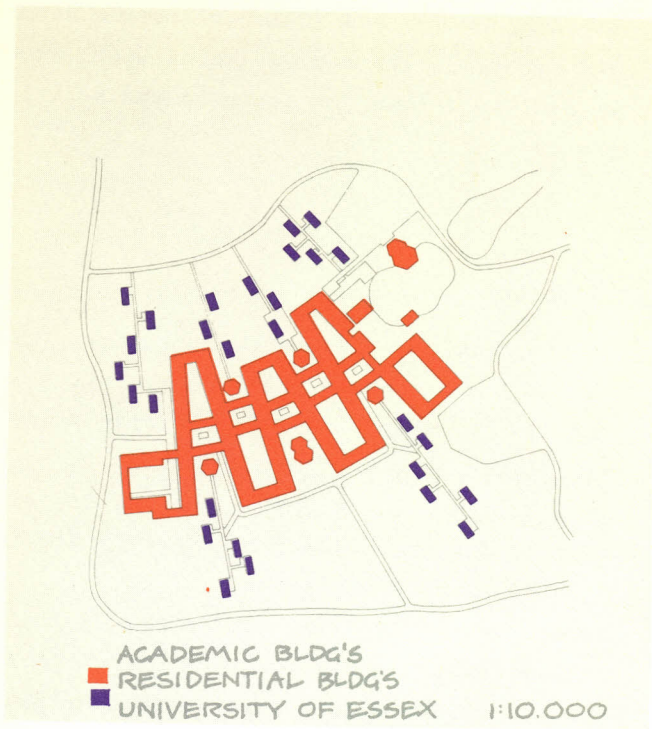


Diagram showing how teaching and residential buildings can be near each other, without inhibiting expansion.

CENTRE FOR HIGHER EDUCATION AND RESEARCH,  
Odense, Denmark.

Architects: Krohn & Hartvig Rasmussen with  
Knud Holscher.

Landscape: Jørgen Vesterholt.

#### PREFACE

The authors envisaged that the new centre should be considered as an entity, wherein every possibility should be afforded for close contact between teachers and students, research and teaching activities and between the various faculties.

Along with these stipulations was added the requirement that the new centre should be capable of adapting itself fully to further demands made by any new developments in science and education. The need for a flexible and economic solution was also stressed, incorporating short construction and development periods. The site is about 1200 acres and the size of the University is about 5000 students. There is no residential area within the site, because the University wanted the students to form an integral part of the life in the town.

The Centre contains the following departments: Medical Science, Faculty of Arts, Social Sciences, Veterinary, and Agronomy.

#### OVERALL LAY-OUT: CHOICE OF BUILDING TYPE

The unlimited physical and technical building structure of the University requires an architectural order, an intellectual discipline, that will above all determine the organization of the Centre.

Thus, when one considers the Centre as an entity, in terms of its educational and scientific functions, the form of the buildings will express this entity as a university town.

#### THE CENTRAL AREA

The central area forming the spine of the University contains the communal facilities such as administration, the main university, library and reading rooms, auditoria, ordinary

teaching rooms, and students' common rooms and canteens. The shared use of these rooms is desirable both for economic and social reasons.

#### FACULTIES

In the faculty and departmental areas, those rooms in most common use i.e. general teaching rooms, laboratories, collective studying facilities etc. are placed nearest the central area on the one principle that the majority of students are collected centrally for the sake of short circulation.

Rooms used for research and other specialized purposes which serve fewer of the University's population are placed towards the periphery of the building area, giving quieter working conditions. Moreover, where the actual space requirements are difficult to predict, a peripheral position allows better extension possibilities.

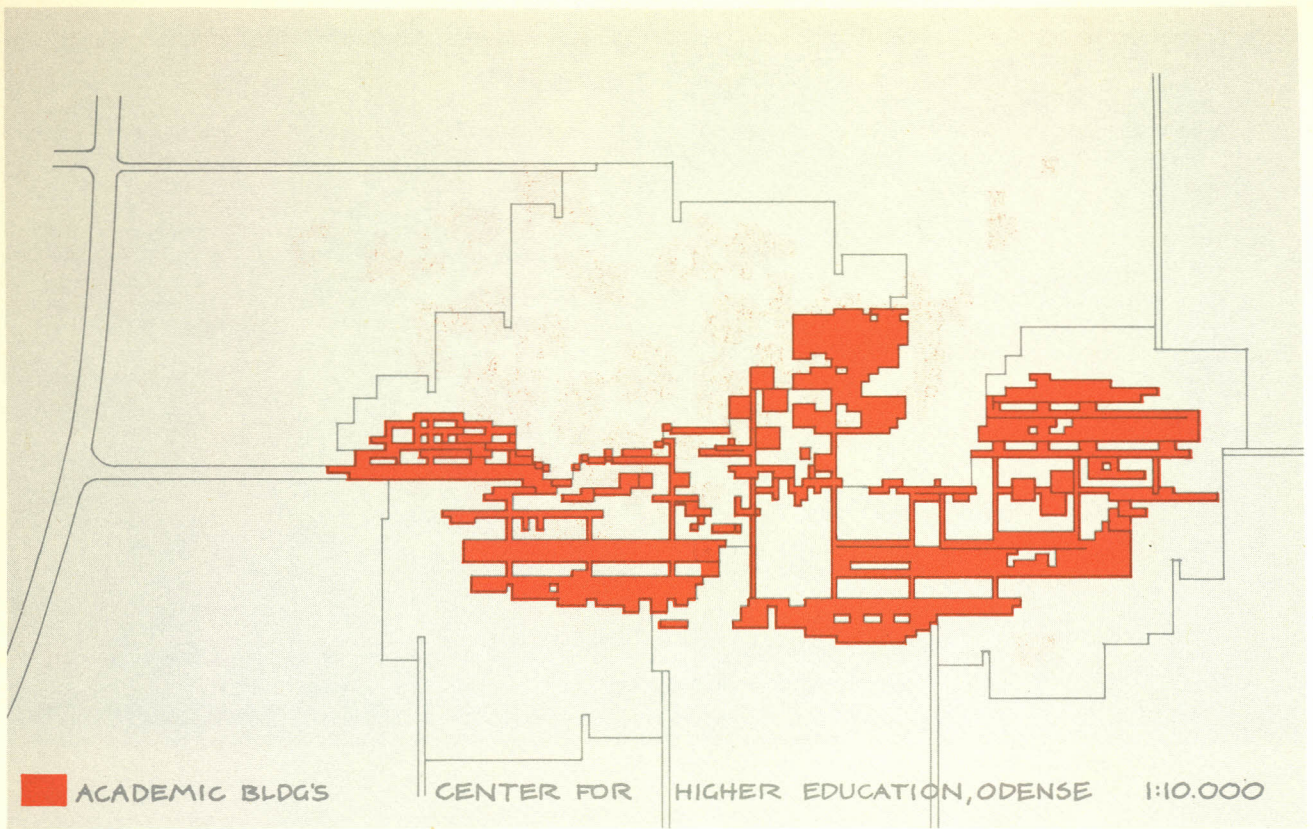
#### CIRCULATION AND TRAFFIC

In buildings of this scale, designed primarily for pedestrian traffic, all previous ideas on composition must be rejected. The natural walking speed must be included in the basic criteria.

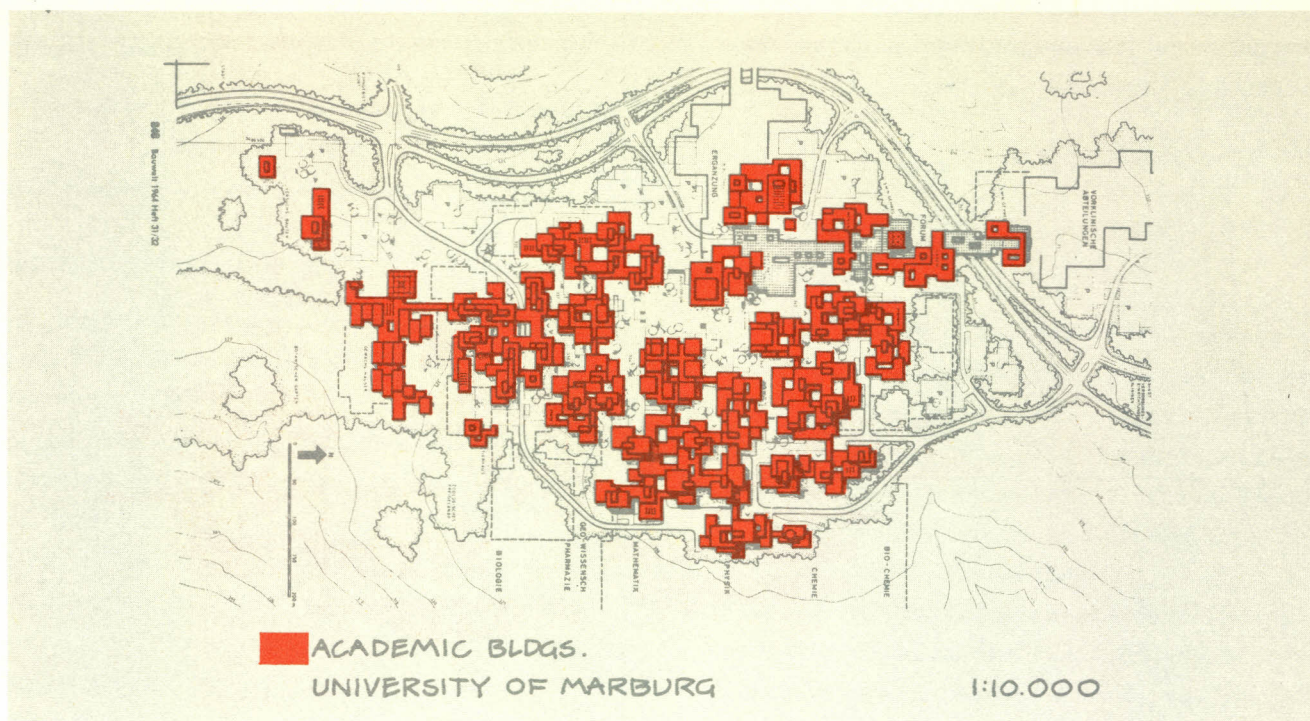
There is a screened parking area from which the Campus is approached. The traffic system is segregated with cars using the central one way roads beneath the central pedestrian deck, thus allowing the pedestrians free and safe circulation throughout the site.

#### EXPANSION

There are various possibilities for expansion: Building up the periphery, infill building, building over existing buildings, and building whole new faculties or departments in the remaining open areas. The plans provide for a certain degree of expansion within the existing faculties, and new departments can be easily created without encroachment on the central area.







UNIVERSITY OF MARBURG, W. Germany.

Architects: Marburg City Planning Team,  
Kurt Schneider.

#### PREFACE

Towards the end of 1961 it was decided that new buildings for the Faculties of Science and Medicine, including clinics, of the Philips University, Marburg, should be erected.

For want of a suitable site in town a wooded site of approx. 625 acres east of the town was chosen. Here the Faculties of Science and Medicine were to be placed, while those of Theology, Law, and the humanities were to remain in the centre of the town. This meant a removal of 85 % of the University, or approx. seven million square feet. Thus, it is almost a whole university.

#### THE BASIS OF THE PLANNING

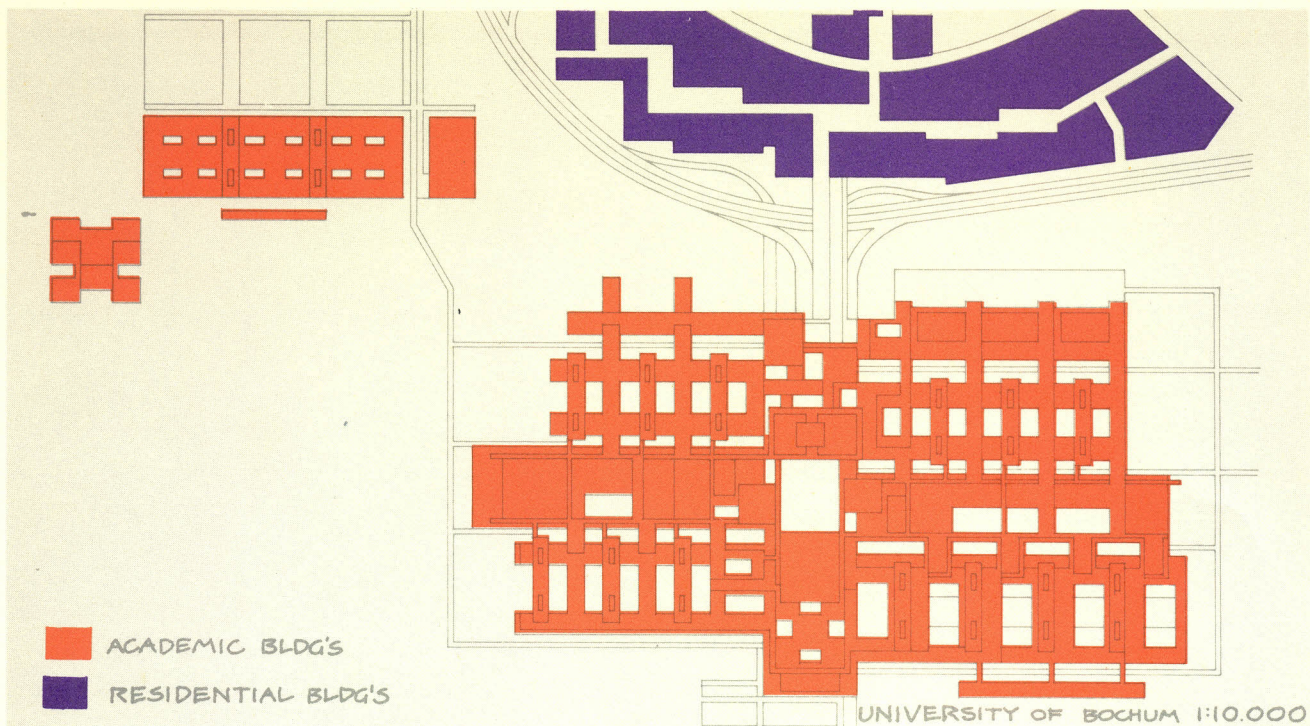
The long debated university reform had to be considered. In view of the continuous progress of the sciences and their aids, of the increasing number of students, and of the varying syllabuses, it is obviously impossible to

reach an unambiguous definition. The variability of the theme can only reflect variability, exchangeability, and flexibility in the building project. The increasing specialization necessitates a close co-operation between faculties. What is aimed at is, therefore, a concentrated campus for approx. 10,000 students.

#### THE MASTER PLAN

With its 625 acres the site is within the limits of the area recommended. There seems to be ample space reserves. Good communication facilities to the campus have been secured. Circulation and parking. There will be one main access road, with direct connection to the parking grounds. Secondary roads will be for delivery of supplies only. There is to be surface traffic, but pedestrian traffic between faculties is segregated from the vehicular traffic. Maximum walking distance within the area is approx. half a mile.

The building system. The basic element of the scheme is an adaptable building system, which by addition in every direction permits any type of building required. Facades and partitions are movable, thus enabling extensions and changes of room sequences to be made.



UNIVERSITY OF BOCHUM, W. Germany.

Architects: Hentrich & Petschnigg, Dipl.-Ing.

#### PREFACE

The University is required to serve a population of about six million people living within a radius of 36 miles. The site area is approx. 1,310 acres and the building activity is calculated to go on for the next twenty years or so. The basis of the planning is the German classical university concept plus the new ideas inherent in the Bochum reform.

#### THE STRUCTURAL PATTERN OF BOCHUM, A DECIDING FACTOR FOR THE BUILDING PROJECT

1. This is a comprehensive university of between 10,000 and 15,000 students.
2. The main principle is an all-round coupling of subjects (faculties) and optimum co-operation.
3. The engineering sciences will be integrated.

#### THE UNIVERSITY AS A TOWN PLANNING PROBLEM

1. Because of its size and nature the university as such can not be developed any further as a city university.

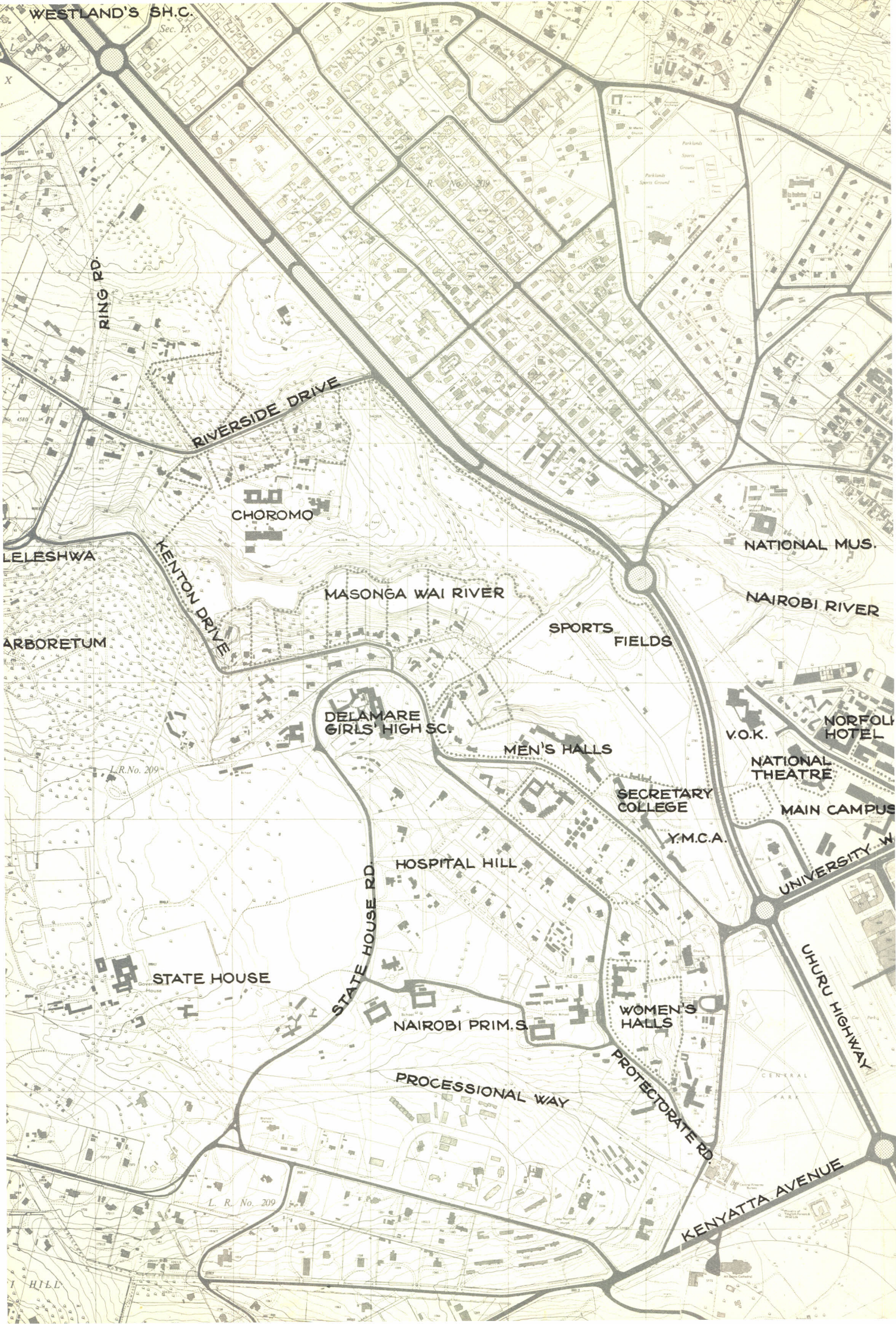
2. The university itself can not develop any further as a building complex, but must, on account of its size and differentiation, be built as a town having a specific shape and functional pattern.
3. The Bochum plan is based on a high degree of centralization, which is believed to be the most suitable and economic principle.

#### THE UNIVERSITY AS AN ARCHITECTURAL PROBLEM

1. The architectural design should be expressive of the following factors: advanced university views, flexibility, variability, economy, and prefabrication.
2. The more concentrated the appearance of the functions and buildings of the campus, and the more pronounced the introduction of ideas of rationalization and economy - the more important it is for the central areas of the campus to be individually and expressively designed.

#### CIRCULATION

Vehicular and pedestrian traffic are segregated. The pedestrian traffic is at surface level, while vehicular traffic is at one or more underground levels beneath the central area and pedestrian streets.



WESTLAND'S S.H.C. Sec. IX

RING RD.

RIVERSIDE DRIVE

CHOROMO

KENTON DRIVE

MASONGA WAI RIVER

NATIONAL MUS.

NAIROBI RIVER

LELESHWA

ARBORETUM

SPORTS FIELDS

DELAMARE GIRLS' HIGH SC.

MEN'S HALLS

V.O.K.

NORFOLK HOTEL

NATIONAL THEATRE

SECRETARY COLLEGE

MAIN CAMPUS

Y.M.C.A.

HOSPITAL HILL

UNIVERSITY W.

STATE HOUSE RD.

STATE HOUSE

NAIROBI PRIM.S.

WOMEN'S HALLS

UHURU HIGHWAY

PROCESSIONAL WAY

PROTECTORATE RD.

KENYATTA AVENUE

L. R. No. 209

HILL