THE PROBLEM OF HOUSING DENSITY IN HONG KONG

WITH REFERENCE TO DECENTRALISATION

A Thesis Submitted to the Faculty of Graduate Studies and Research McGill University. In Partial Fulfilment of the Requirements for The Master's Degree in Architecture

By Anna P.Y. Lam

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INTRODUCTION

The reasons for the choice of subject

This subject has been chosen because the housing density in South East Asia is incredibly high, particularly in Hong Kong where as many as 1,500 persons per acre live in new developments. No density in other countries can compare with it.

The population of Hong Kong has increased since the war due to major political events in the Far East that have lead to a large scale migration from China. The population increase has been augmented by a rapidly rising birth rate. In 1954 there was an excess of births over deaths of 1,000 a week in the Colony, and the Government estimates that in ten years this excess may well reach 80,000 a year. Land and building shortage in the central area appears to be the main cause of high housing density, and although there has been considerable progress in the construction of new buildings, the problem of overcrowding has not been solved and an precedented ratio of houses per unit of land area has resulted. The object of this thesis is to present a simple review of housing density in the West; to give an account of the present housing circumstances in Hong Kong; and to suggest the applicability of a theory of dispersal for Hong Kong with a proposal of an overall scheme of urban decentralization.

The scope of the inquiry

This thesis has four parts.

The first part is a brief review of theoretical considerations of the concepts and economic aspects of housing density. Because the term "Density" is used with various meanings in books, reports and articles, the first part includes definitions of terms.

The second part of the thesis provides a review of decentralisation and two examples of high housing density in England and America. A simple account is given of the manner in which decentralisation and high housing density have been achieved and their effects.

The third part of the thesis covers an account of the present state of housing density in South East Asia and includes descriptions of the geographic setting, general background, and economic aspects. It also includes a description of proposed schemes in Hong Kong for low cost housing developments that illustrate the extent of the acute housing problem.

The fourth part of the thesis is a consideration of decentralization and an analysis of the applicability of dispersal to Hong Kong.

In summary, the thesis is concerned with a simple discussion of housing density, a brief outline of the theory of urban dispersal and its suggestion as a possible solution for the problem of overcrowding in Hong Kong.

PART 1 MATERIAL DRAWN FROM DOCUMENTS ON HOUSING DENSITY

PART 1 MATERIAL DRAWN FROM DOCUMENTS ON HOUSING DENSITY.

CHAPTER 1 CONCEPTS OF HOUSING DENSITY

Section 1 Definition of Density

Density is a quantitative measure of crowding. Density signifies the degree of proximity with which dwellings, and hence the people occupying them, are arranged in an area[1]. Density measurements indicate a relationship between a given area of land or floor space and population or families housed in that area[2].

Community life and spatial nearness are inseparable[3].

Community life requires that people live near one another to cooperate for common ends. Therefore, the connection between density and social development is close in a general way. "The very idea of a city carries with it that of a concentration of population"[4]. Concentration implies some form of high density: high population density, crowding, high housing density, high bulk density, and high lot density.

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1. Ministry of Housing and Local Government. The Density of Residential Areas. London 1952.
2. Coleman Woodbury. Urban Redevelopment: Problems and Practices. University of Chicago Press. p.107.
3. E. Fooks. X-Ray the City. Melbourne; 1946.
4. J.L. Sert. Can Our City Survive. p.12.

CHAPTER 1

Section 2 Measurements of Density

In physical planning the fundamental problem of the relationship between people and the amount of land needed for their accommodation may be measured in various forms. For instance, it may be necessary to estimate the amount of land which a given number of people will require for their dwellings and other associated purposes, or it may be necessary to ascertain whether in an existing city there are too many or too few people living within a certain area.

The measurement of density has two main purposes. First, it is connected with rate of land use: density measurements are made for the estimation of land needs. Second, it is connected with living conditions: density measurements are made to ensure that in new development certain standards are obtained, and in existing development an idea of present standards is conveyed[1].

Different terms are used in measuring density, and various meanings arise because density figures are often presented without a precise definition of the measurement implied. Density standards used in one place can seldom be compared with those used elsewhere[2]. However, some forms of measurements are of general application and subject to modification when applied to specific purposes. Factors measured are population, housing, bulk and lot per unit area.

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1. Ministry of Housing and Local Government. The Density of Residential Areas. London 1952.

2. E. Fooks. X-Ray The City. Melbourne, 1946.

CHAPTER 1

Section 3 Notion of Density Control and Necessity of Control

Walter Gropius has stated in this regard "that buildings in New York and Chicago are a planless chaos...The problem is one that can only be solved by controls of building density..."[1]. When density increases beyond the limit at which all the advantages of urban living conditions become disadvantages, there is the need for control. Control is a means for regulating the ratio of population and space in order to achieve a form of balanced distribution.

High density causes crowding. High density and crowding are interrelated: one stresses population, the other the space factor. Density figures form the basis for crowding standards, and crowding standards result in certain density figures[2]. These two factors together with their related areas determine the necessity for the control.

Crowding has various forms: room crowding which exists where there are too many people per room, lot crowding where there are too many buildings per lot; area crowding where there is too little space, and unbalanced distribution of community facilities for the area or population. Room crowding is concerned with living space requirements; lot crowding is concerned with out door space requirements; area crowding is concerned with natural environments.

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1. Gropius, W. The New Architecture and the Bauhaus. London: Faber and Faber Limited, 1953. P.108.

2. E. Fooks. X-Ray The City. Melbourne, 1946.

Other reasons determining the need for control and hence a basis for the standards of control of housing density are health, privacy, safety, and the convenient use of community facilities. All express the environmental factors of urban living conditions.

Therefore, controls are necessary to regulate high density and to provide good living conditions.

CHAPTER II ECONOMIC ASPECTS OF HOUSING DENSITY

Section 1 Housing density in relation to planning

Planning is a purposeful and systematic activity based on a careful study of relevant problems which are often complex. One problem is density. In physical planning density is a fundamental consideration in neighbourhood and town[1] as it is a quantitative measure of occupation.

Neighbourhood[2] The control of development by means of limitations on residential densities on different sites was concerned originally with the achievement of 'proper sanitary conditions, amenity and convenience.' It was usual to specity densities in terms of houses per acre and density requirements tended to be regarded as maxima. At present density is regarded also as a standard that is subject only to a restricted range of variation so as to achieve a close approximation to the population for which a Development Plan is designed. In the United Kingdom, the requirements of the Ministry of Town and Country Planning for density indications are, in brief, the reference number of the area, its extent in acres, and the average gross residential density for the area in terms of persons per acre[3].

These requirements do not seem to be of much use because in planning each neighbourhood it is necessary to have an indication of the net residential

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1. "Usefulness and Validity of Density Indication of Development Plan", Journal of the Town Planning Institute. November 1955. p.289.
2. Appendix I is a glossary of terms used in this section.
3. "Usefulness and Validity of Density Indication on Development Plan", Journal of the Town Planning Institute. November 1955.

density and of the total population for which the neighbourhood is intended[1].

The amount of land required for the whole neighbourhood will depend partly upon the net density of the various groups of dwellings within the neighbourhood and partly upon the amount of space devoted to other facilities such as public open space, streets, etc. Such facilities will be for the use or enjoyment of the residents of the neighbourhood, and the space required will depend directly or indirectly upon the number of people using them. Therefore, the first step in assessing total land requirements for planning a neighbourhood must be to establish the quantitative relationships which exist between people and the space for facilities[2].

Town[3] A residential area should be related in position and scale to the rest of the town, allowing reasonably good access to the town centre, the main area of employment and other residential areas. This relationship is partly a matter of density[4].

In fundamental planning a town is considered as a group of residential and industrial areas around a central area. The accessibility between the units will depend partly upon their size and density[5] and partly upon their spatial arrangement in relation to each other.

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1. "Usefulness and Validity of Density Indication on Development Plans". Journal of the Town Planning Institute. November 1955.
2. Ministry of Housing and Local Government. The Density of Residential Areas. London, Her Majesty's Stationery Office. 1952.
3. Appendix I is a glossary of terms used in this section.
4. Ministry of Housing and Local Government. The Density of Residential Areas. London, Her Majesty's Stationery Office, 1952.
5. Ibid..

The variations of size and location between towns depend broadly upon density as the size of central areas of towns depends largely upon the number of people served[1].

In all towns the residential areas are the largest land consumers, yet they show variety of size and density from town to town and within individual towns, depending upon economic aspects. It is impossible to have specific density figures.

E. Fooks has stated "Density figures lose their practical value if they are not related to an area, the size of which represents a function of man's social activities."[2] Thus, in the concentrated urban areas, the distribution of population is the basis of physical planning.

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1. Ministry of Housing and Local Government, The Density of Residential Areas. London, 1952.

2. E. Fooks. X-Ray The City. Melbourne: 1946.

CHAPTER 2

Section 2 Housing density in relation to land limitation and cost of development

Land A factor governing the arrangement and hence the density of housing is the availibility of land.

Technological and economic development has created many organized social and utility services in the community upon which the urban dwellers largely depend. In order to obtain these services, people settle near by and create a trend towards an increasing aggregation of population[1]. Concentration of population leads inevitably to the scarcity of land available for housing in a certain area. This in turn causes overcrowding. Due to the economic condition of the population, the actual lack of housing accommodation is seldom the decisive factor in overcrowding; it is the lack of housing within the means of population which forces families to crowd together[2].

Lot overcrowding is one of the principal features of bad housing. In America and Europe most of the bad housing areas consist of huge tenement buildings. Many of these buildings are several hundred years old. They have been altered and sanitary facilities have been added, and in many cases the space allowed for a rear yard has been used for extentions to the house. The English and Australian slums are characterized by long rows of small houses or by single family units erected on tiny allotments with little or no space in the rear and at the side[3].

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1. E. Fooks. X-Ray the City. Melbourne, 1946.
2. Ministry of Housing and Local Government. The Density of Residential Areas. London, 1952.
3. E. Fooks. X-Ray the City. Melbourne, 1946.

In the case of new development, the difficulty of assembling enough suitably located land to accommodate the necessary number of dwellings may lead to densities far in excess of even that required to cover the cost of the land and the site development. Thus, the opportunities for profit tend to put densities, in terms of individual properties, on an ever ascending scale.

In site development certain aspects of planning have to be considered in relation to density. The more important planning aspects are the type of buildings and the lay-out of buildings in order to obtain sufficient open space for lighting, space for privacy and space for access. A two-storey house and a multi-storey building occupying the same amount of lot area have different population densities, and also have different amounts of open space between them which are determined by the lay-out in terms of daylighting angle measurement.

DIAGRAM (1) Illustrates the daylighting angle of 25° as it affects the spacing of houses.

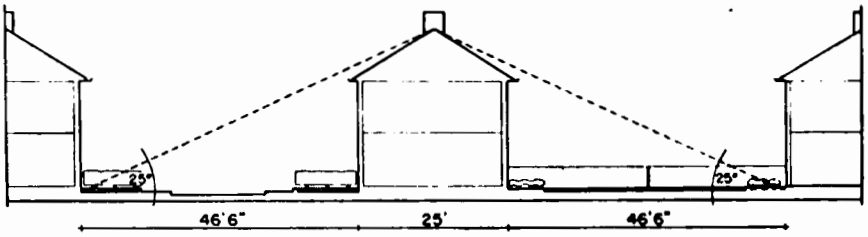
DIAGRAM (2) Illustrates the relationship between density and form of lay-out.

DIAGRAM (1) DAYLIGHTING ANGLE

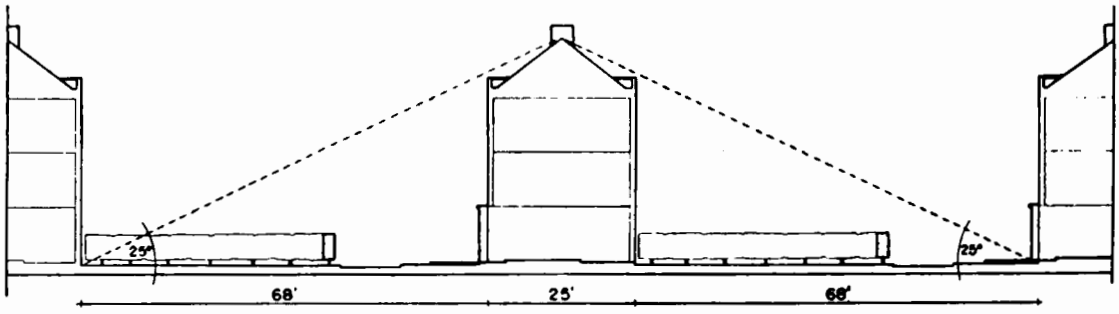
illustrates how a critical daylighting angle of 25° affects the spacing of continuous of 2- or 3-storey houses.

DIAGRAM (2) DENSITY AND FORM OF LAY-OUT

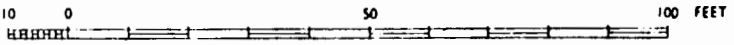
illustrates the effect on density of various forms of layout based on daylighting angles. 'A' shows 8-storey blocks in parallel rows at 152 rooms per acre. 'B' shows 8-storey blocks also in parallel rows, but by staggering the gaps and making the blocks slightly longer it is possible to increase the density to 166 rooms per acre. 'C' shows 8-storey blocks in broken cruciform layout at a density of 174 rooms per acre. 'D' is exactly the same layout as 'C' but it has been possible to insert 4-storey link blocks without obstructing daylight, and the result is an increase of density to 207 rooms per acre.



A TWO STOREY OBSTRUCTION



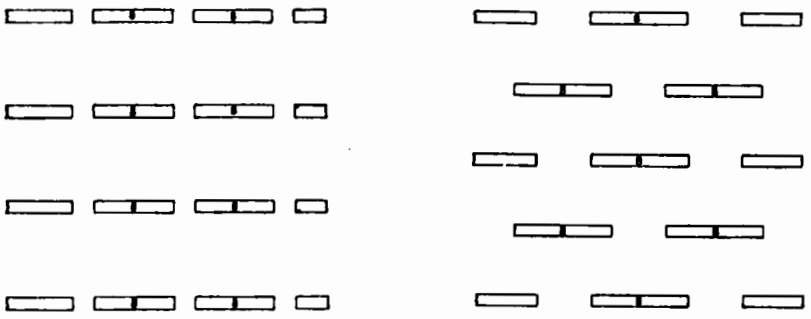
B THREE STOREY OBSTRUCTION



I. OBSTRUCTION OF DAYLIGHT

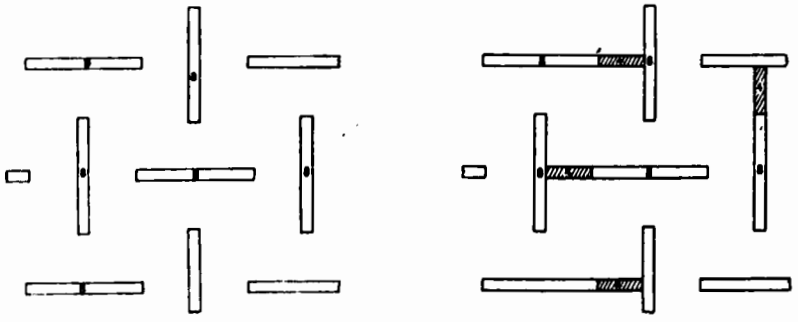
This figure shows how a critical daylighting angle of 25° affects the spacing of continuous rows of 2- or 3-storey houses.

DIAGRAM (1)



A BLOCKS IN PARALLEL ROWS
152 ROOMS PER ACRE

B BLOCKS IN PARALLEL ROWS, WITH STAGGERED GAPS
166 ROOMS PER ACRE



C BROKEN CRUCIFORM LAYOUT
174 ROOMS PER ACRE

D BROKEN CRUCIFORM LAYOUT, WITH VARIED HEIGHTS
201 ROOMS PER ACRE

RELATIONSHIP BETWEEN DENSITY AND FORM OF LAYOUT

DIAGRAM (2)

Cost The relationship between density and the cost of development needs to be considered. One aspect is the price that may have to be paid for urban expansion in the future through losses of agricultural land. The density at which urban expansion takes place will have an important bearing upon the scale of these losses. Another aspect is the relative cost of preparing awkward building sites. A third aspect is the cost of accommodating people in different types of buildings. The latter to some extent is interrelated with the cost of land or its value for other uses: if an appreciable amount of land is to be saved by increasing density, it may involve putting up more tall buildings.

There are different results in cost in high and low density development. The low density open type development requires more land, needs longer roads, involves longer and more costly circulation schemes. In high density development the construction costs of high buildings far exceed those of low buildings; operating and maintenance cost of buildings with lifts are high; and intangible items such as loss of quietness and open play space for children need to be considered.

The individual private developer of a single lot, a large subdivision, or an apartment project ordinarily makes his decisions as to density type and design of structures in order to obtain the greatest financial return. The cost of land is the important factor in making these decisions in relation to expected rental or sale price. Even with inexpensive land the developer often strives to crowd the greatest number of lots, houses or apartments onto his holdings restrained only by government regulations. He attempts to minimize expense per dwelling by the process of increasing density. Thus to control profit it is necessary to have density restrictions.

CHAPTER 2

Section 3 Housing density in relation to community facilities and public services

"Residential density is not the sole index of the standard of living conditions"[1]. Social facilities and utility services upon which the urban population is largely dependent are indispensable in community life. These facilities and services are primarily conditioned by balanced population-space coordination[2].

Community Facilities

The significance of housing density in relation to living conditions is complex[3]. The essential community facilities that must be supplied in a residential area will be affected by alternations in density figures. The minimum facilities that urban families can reasonably expect to be provided are shops, schools and playgrounds. The need for schools is considered to be of primary importance by families with children of school age. The provision of facilities depends upon the size of the neighbourhood and hence upon its housing density.

Public Services

Public services are basic necessities in all civilised communities. In order to obtain these services people must concentrate in urban areas: this concentration of population makes the use of elaborate community services economical.

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1. Ministry of Housing and Local Government, The Density of Residential Areas. London, 1952.
2. E. Fooks. X-Ray The City. Melbourne, 1946.
3. Ministry of Housing and Local Government, The Density of Residential Areas. London, 1952.

The cost of most services, such as electricity and gas, tends to become cheaper per person the more densely their consumers are concentrated.[1] Some services, such as water supply and traffic provisions, tend to become more expensive to provide both above and below certain densities of consumers[2]. A factor that must be taken into account is the standard of living. For example, a limited supply of water may provide for the needs of a residential area for low income groups where the consumption of water is low, but would not satisfy the needs of a residential area of higher income groups of the same size and density where a greater water supply is required. Similarly problems arise in the provision of streets. A street may function well in one area and be hopelessly congested in another, depending on the ratio of cars per person.

The provision of public services depends upon the number of consumers and the size of areas served; variations emerge according to the particular needs of different groups.

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1. E. Fooks. X-Ray The City.

2. Ibid.

CHAPTER 2

Section 4 Housing density in relation to communication

Communication is another factor that governs distribution and hence density of housing.

The relationships of people and their social and cultural activities depend upon transportation facilities. Good or bad communication determines the size and structure of a town, and this in turn partly determines the density of the residential areas within a town.

Transportation is required for the movement of goods and people. Efficient transit services and good roads need to be provided for the inhabitants between their homes and places of work. The "journey to work" is a deciding factor, and if transport facilities are efficient in one area people will naturally choose that area in which to live. Therefore, traffic connections are the means of a balanced distribution of population[1].

The arrangement of housing as well as the distribution of residential areas within a neighbourhood is affected by the road pattern which is the physical basis of planning. An effective internal road pattern may allow a considerable amount of land to be used for other purposes or for the erection of more houses. A town plan is fundamentally a road plan. Therefore, effective means of controlling the use of roads is essential.

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1. E. Fooks. X-Ray The City. Melbourne, 1946.

PART 2 A BRIEF REVIEW OF DECENTRALISATION AND THE DEVELOPMENT OF HIGH DENSITY POLICY IN ENGLAND AND AMERICA

PART 2 A BRIEF REVIEW OF DECENTRALISATION AND THE DEVELOPMENT OF HIGH HOUSING DENSITY POLICY IN ENGLAND AND AMERICA

CHAPTER 1 OUTLINE OF THE IDEAS OF DECENTRALISATION ACHIEVED IN ENGLAND

Section 1 Introduction

In England and America housing redevelopment has reached an advanced stage, particularly in cities like London and New York. In both cities high density has occurred as a result of housing shortages and overcrowding in the central areas. Conditions are more acute in Britain because of the destruction of large areas during the war.

Dr. J. Bronowski[1] in the United Nations Housing and Town Planning Bulletin on International Building Research estimates that Europe and North America will need to build thirty million more houses in the foreseeable future, whereas in underdeveloped countries there is the need to build 150 million houses. This tremendous demand for houses is apparent throughout the world due both to the increase in population and the rise in living standards. Sir John Wrigley when presiding at a discussion meeting at the Housing Centre, commented that fundamental factors in the housing problem seemed to be the same everywhere but individual factors differed in various parts of the world[2].

Since World War II proposals for redevelopment and decentralisation have been prepared and are in operation in England and America. Their standards and

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1. "Housing as a World Problem", Housing Centre Review, International No. 6, Nov. - Dec. 1954. p.1.

2. Ibid.

practices are partly applicable in other countries even while the differences in climate and traditions are acknowledged.

Therefore, a review is necessary to determine where Western standards can be used in other parts of the world and whether these standards can be modified to suit other requirements.

CHAPTER I

Section 2 Structure and Character of Growth

Structure

According to the Greater London Plan[1] prepared for the London County Council by Abercrombie in 1944, the London Region[2] is said to have a tendency towards growth in concentric rings that can be measured in terms of housing density. Four rings can be distinguished from the centre outwards encompassing the vast spread of London beyond the County boundary.

The rings are described as follows:

(i) the Inner Urban

(ii) The Suburban

(iii) the Green Belt

(iv) the Outer Country

(See diagram 3)

The Inner Urban Ring is an overspill of the fully urbanised portion of the County of London. This area due to high density and lack of sufficient open space requires decentralising, but there is not sufficient vacant land to adjust the overcrowding within its own boundaries. A net population density of 75 to 100 persons per acre has been adopted in different parts in this ring[3].

---

1. Abercrombie, Sir Patrick. Greater London Plan 1944. London, 1945.

2. Ibid. Chapter I, p.22. The Plan deals with an area of 2,599 square miles. This area extends outwards from the London County Council boundary to a distance of roughly 30 miles from the centre of London.

3. J. H. Forshaw and Patrick Abercrombie. County of London Plan. 1943. London. 1944. Calculations and definitions of population density.

DIAGRAM (3) THE FOUR RINGS OF GREATER LONDON

GREATER LONDON PLAN

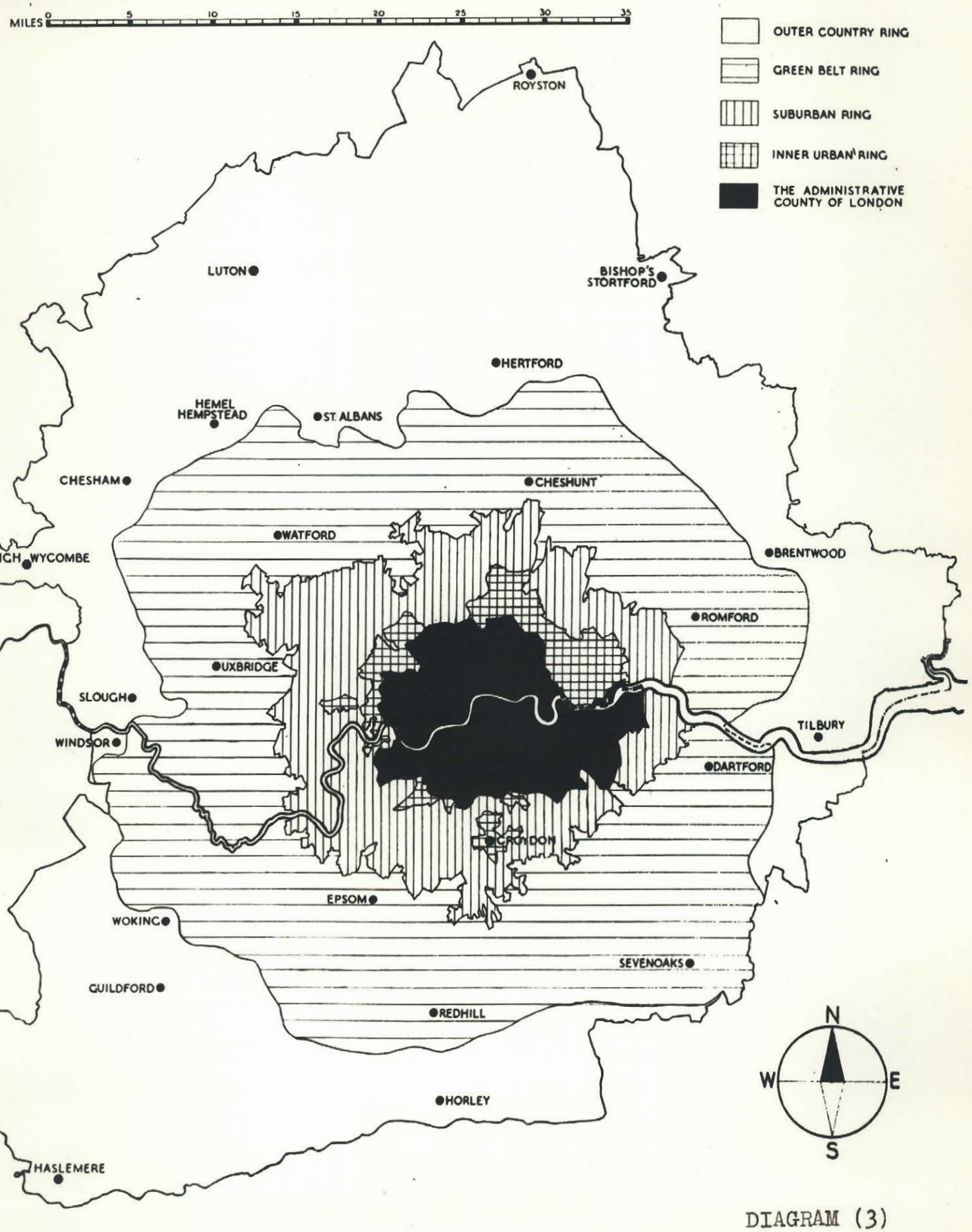

DIAGRAM (3)

The Suburban Ring contains the major part of London's sprawl, though ribbon development, scatter and spotting occurs farther out. With regard to population and industry this ring can be described as a static zone. It is not a reception area for decentralised persons or for industry; it does not require decentralisation except for a number of the pockets of overcrowding that cannot be adjusted within it. A maximum net residential density of 50 persons per acre has been determined for this ring.

The Green Belt Ring includes most of the land acquired under the Green Belt Act of 1938. This area includes open land and extends for about five miles beyond the Suburban Ring. Abercrombie commented that one is tempted to find here the solution for the housing problems but that this area is of great importance to London since it provides the first stretch of open country within the urban area. It is in this ring that public open space lacking in the County of London will be provided.

The Outer Country Ring contains land used less intensively and having great possibilities for development. It contains distinct communities situated in land that is open in character and used primarily for farming. It is the intention of the Authority to allow within this ring sites for new satellites and a more generous expansion of existing centres. The expansion of old settlements and the creation of new developments will provide accommodation for decentralised population and industry of inner London. Therefore, this ring may be described as the chief reception area for overcrowded London.

Character of growth

Housing Between 1918 and 1939 the growth of London proceeded without adequate

control[1]. The relationship between housing and industry was almost entirely ignored: huge schemes for decentralised dwellings were carried out by local authorities on one site while vast unrelated housing estates were created by private enterprise on another. The lack of focal points for new community life become tragically evident. Before World War II, the highest housing density amounted to 436 persons per acre while the average net density was about 186.

The existing types of housing were:

(i) old cottages that formed the pre-19th century villages around London and had since been engulfed in the growing metropolis;

(ii) pre-Bylaw housing of two storey terraces built in large numbers during the period of industrial expansion;

(iii) relatively large houses of three storeys with basements that had been built originally for single family use and later converted to accommodate a number of families;

(iv) buildings that were attached to large houses and originally used as stables and for coach accommodation;

(v) isolated or detached villas in the suburbs that were occupied by more than one family;

(vi) two-storey and three-storey houses that extended over large areas and had been built 50 or 60 years ago;

(vii) tall tenement blocks that were erected during the early 20th century.

The acute problems of housing were due to overcrowding, improper alternation from single to multi-family use, and lack of repairs.

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1. Abercrombie, Sir Patrick. Greater London Plan 1944. London, 1945. p.2.

Transport Modern transport enables people to live at greater distances from their work where costs are less; thus suburban sprawl is fostered. Due to the spread of housing a demand for extended transportation facilities is created, and yet road improvements which would save lives and prevent economic waste have not been fully realised.

Land Use The misuse of agricultural land is an aspect of the rapid extension of London. If land was available for building, little or no attention was paid to its agricultural value; the difference between good or poor farming land was far outweighed by building values. Fortunately the Green Belt became law in 1938 and secured land for farming and recreational purposes.

In view of the character of the growth in the London Region, the Greater London Plan was prepared according to certain assumptions. The first of these was the recommendation that no new industry should be admitted to London and the Home Countries except in special cases[1]. This involved consideration of the industrial future of London and its surroundings. The second assumption was the desirability of decentralising population and industry from the congested centre. While formerly preferring a density of 100 persons per acre for central areas, a density of 136 persons per acre was decided upon as it was felt that the actual numbers to be decentralised would be difficult to equate with the amount of industry which could be expected to migrate.

If there were a mere move of population without a corresponding move of work-places, there would be a worse transport congestion and a greater loss of time, money and energy would result. Therefore, the best possible plan involved a rearrangement of population and industry within the region.

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1. J. H. Forshaw and Patrick Abercrombie, County of London Plan. 1943. London, 1944. Chapter 2, p.5.

CHAPTER 1

Section 3 Decentralisation

After a careful consideration of the pattern of growth of Greater London, decentralisation was advanced as necessary to improve housing conditions in overcrowded areas. It was also considered necessary to reduce the concentration of industry in the London area which had caused the expansion of the metropolis to a size that had become unmanageable.

Industry

Industry and population are twin problems[1] in industrial England. It is suggested in the Greater London Plan that approximately 30 per cent of Greater London's factory growth since the World War II is accounted for by the decentralisation of industry from congested sites in Inner London.

Diagram (4) shows the growing concentration of industry in Greater London.

Most of the industries were established on the west and north-west side of London, though the principal labour pools remained on the east side. Great dormitory housing estates were built in areas where little work was available.

Diagram (5) shows the concentration of industry in London Region including the County of London.

The industrial proposals in the Greater London Plan[2] were both negative and positive in character. Areas were indicated in which industry should be encouraged and in which further London industry should be prohibited principally within the inner urban, suburban and green belt rings.

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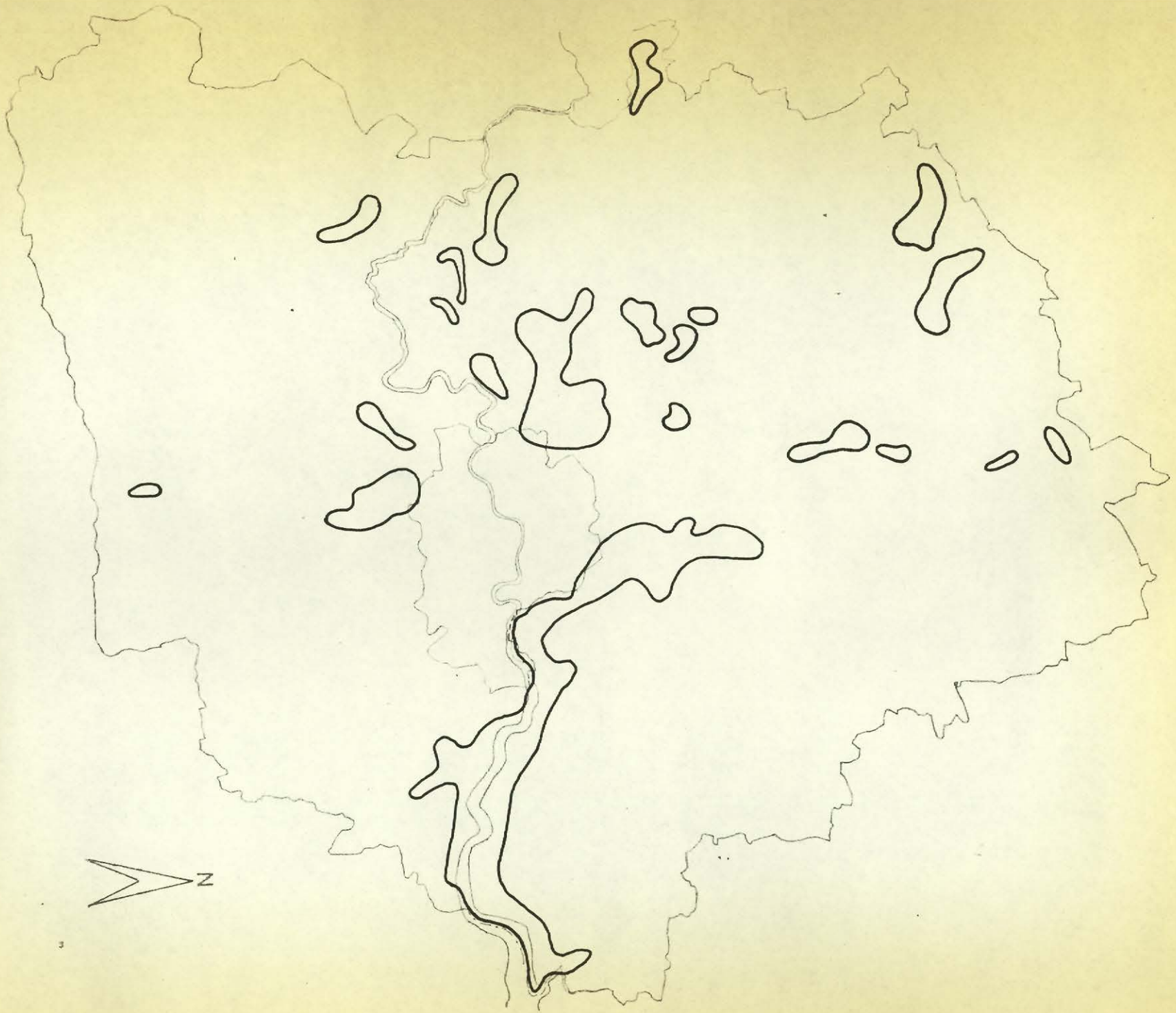
1. J. H. Forshaw and Patrick Abercrombie. County of London Plan. 1943. London, 1944. Chapter 2, p.30.
2. Abercrombie, Sir Patrick. Greater London Plan 1944. London, 1945. Chapter 4, p.55.

DIAGRAM (4) THE GROWING CONCENTRATIONS OF INDUSTRY IN GREATER LONDON



LEGEND: Concentrations of Industries in London

DIAGRAM (4)

There are four possible types of areas in which factories might seek to settle:

(a) existing towns and new satellites planned for industrial expansion;

(b) other market, residential and dormitory towns;

(c) rural villages; and

(d) the open countryside.

Communication

"Communication is the basis of the town structure".[1] In considering communications the fundamental principle should be the encouragement of each particular form of transport which serves the community efficiently and economically to the limit of its own special potentialities. The value of "combined operations" of transport by land, sea and air is essential.

Roads The road system in the London Region required improvement.

Diagram (6) shows the proposed road system of County of London.

Diagram (7) shows the proposed road system of Greater London Region.

It was proposed that great care should be exercised to make the maximum use of existing main roads, especially those which included important public services. There were three types of roads in the proposed plan:

(a) the arterial roads, or one purpose motor roads;

(b) the sub-arterial roads, or all-purpose roads; and

(c) the local roads.

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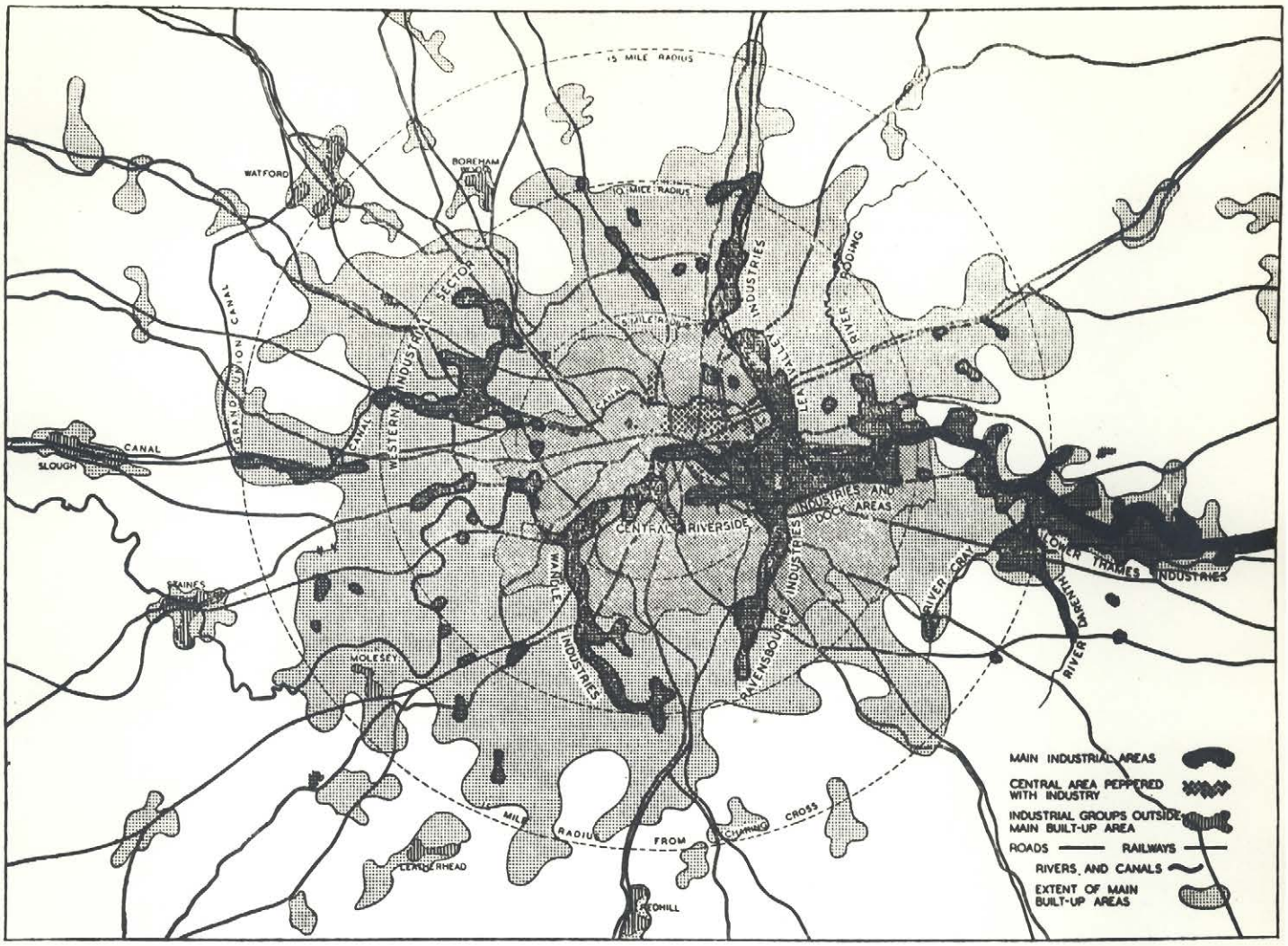
1. Rasmussen, S.E. Greater Copenhagen Planning. Status. 1952. p.66.

DIAGRAM (5) CONCENTRATION OF INDUSTRY IN LONDON REGION INCLUDING THE COUNTY OF LONDON

DIAGRAM (6) PROPOSED ROAD SYSTEM OF COUNTY OF LONDON



Diagrammatic map showing the main concentrations of industry in the London Region, against a background of the built-up area. Their location has been mainly determined by suitable level ground

DIAGRAM (5)

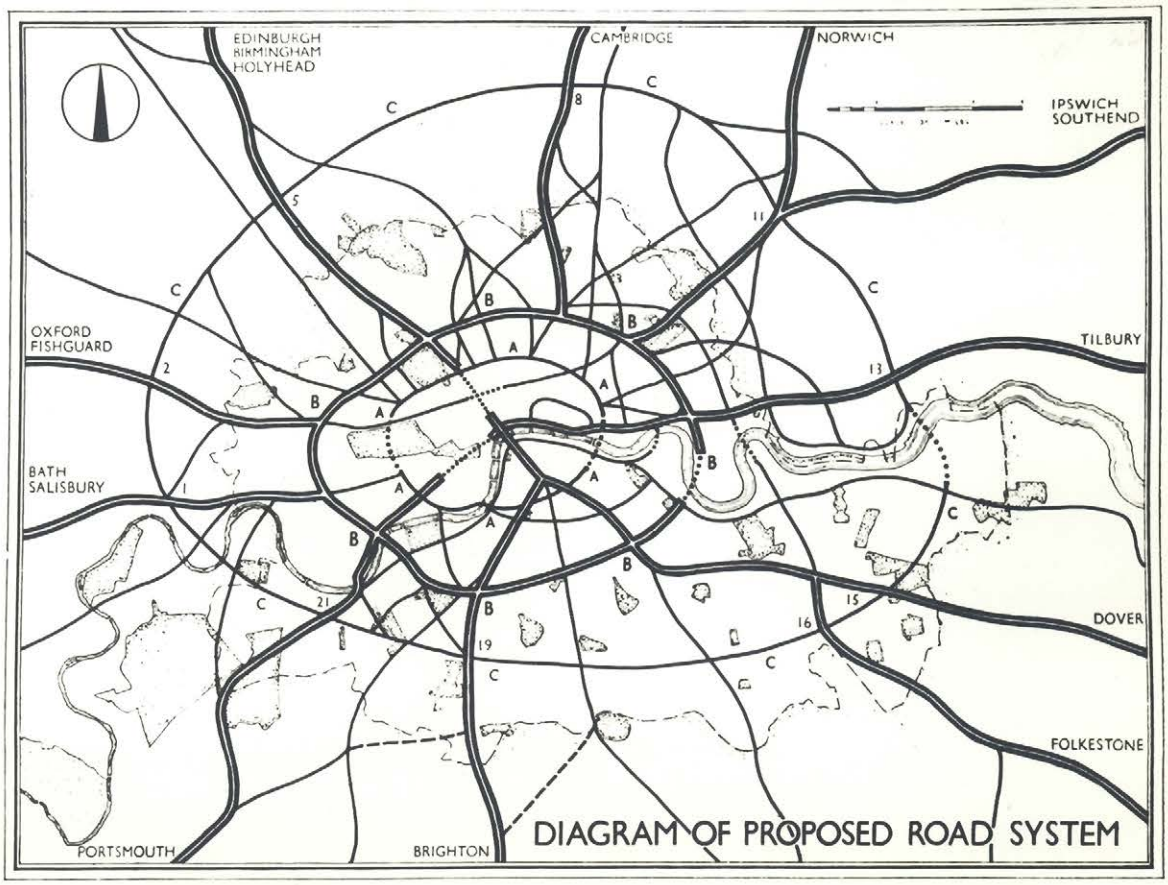


DIAGRAM (6)

DIAGRAM (7) PROPOSED ROAD SYSTEM OF GREATER LONDON REGION

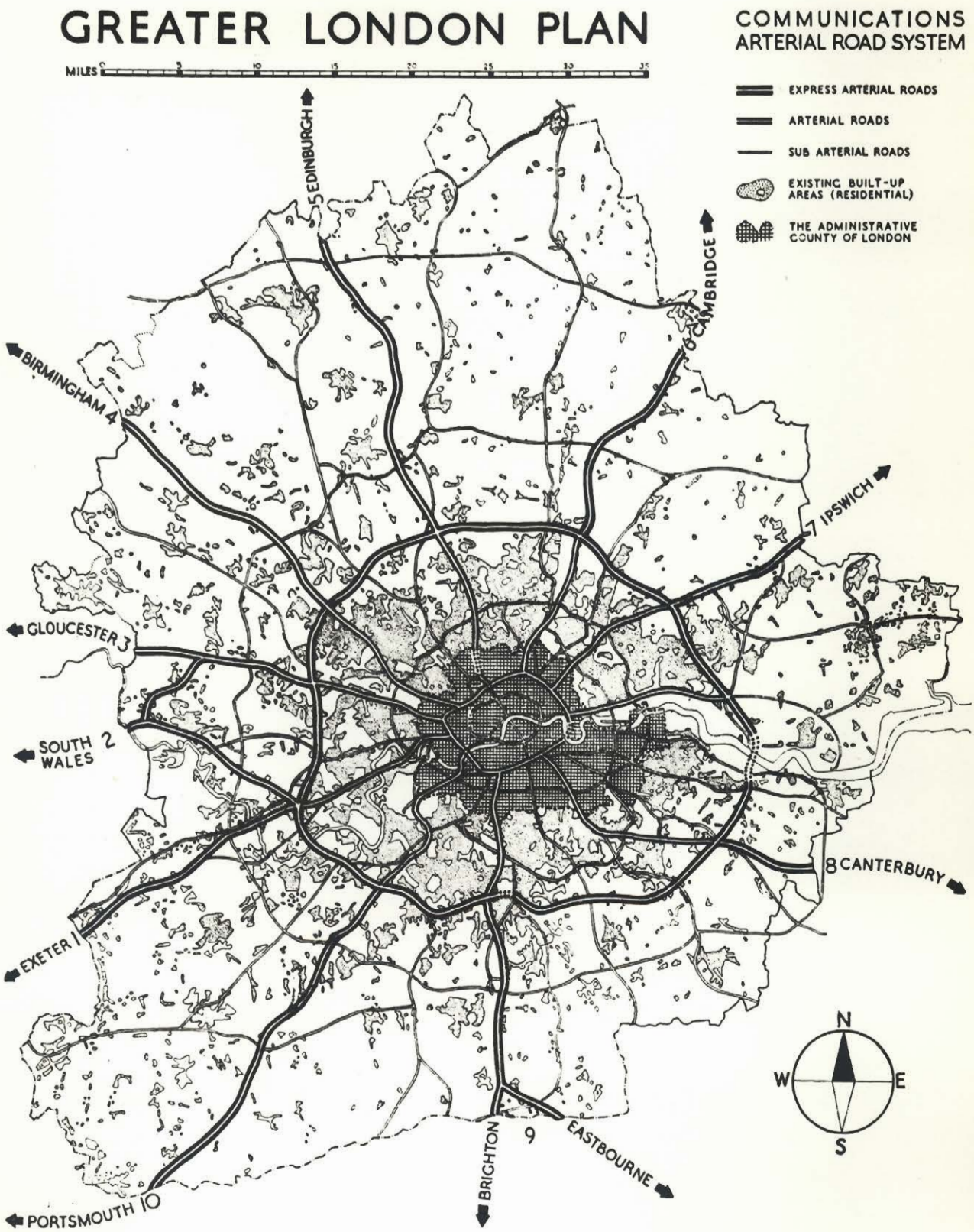

GREATER LONDON PLAN
MILES 0 5 10 15 20 25 30 35
COMMUNICATIONS
ARTERIAL ROAD SYSTEM
EXPRESS ARTERIAL ROADS
ARTERIAL ROADS
SUB ARTERIAL ROADS
EXISTING BUILT-UP AREAS (RESIDENTIAL)
THE ADMINISTRATIVE COUNTY OF LONDON
5 EDINBURGH
6 CAMBRIDGE
BIRMINGHAM 4
7 IPSWICH
GLOUCESTER 3
SOUTH WALES 2
8 CANTERBURY
EXETER 1
BRIGHTON
9
EASTBOURNE
PORTSMOUTH 10
N
W
E
S

DIAGRAM (7)

In planning the road system the objectives were:[1]

(a) improvement of traffic circulation;

(b) reduction in the number of accidents;

(c) segregation of fast long-distance traffic from traffic of purely local nature; and

(d) maintenance of existing communities free of through traffic, and in communities where through roads existed to provide bypass routes.

Railways The railway system in the Greater London area has been built up in a haphazard way over a long period by numerous companies. There are no large populated sections without rail facilities. The suburban growth relied on convenient means of daily access to the central area of London and urban development mainly followed the lines of the existing railways. The report stated that decentralisation of population and industry could be achieved without radical alteration in the railway system. Existing communities could be increased in size and new communities could be created within the framework of existing lines. The report proposed no drastic alterations or additions to the railway system.

Airways As Civil air transport would become a normal means of communication between large cities, the planning of a system of airports was considered important. The disposition of the airports would be determined by the communications of road and rail, the availability of land and the location of population.

Diagram (8) shows the existing and proposed communications of the County of London and the Greater London area.

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1. J. H. Forshaw and Patrick Abercrombie, County of London Plan 1943. London, 1944. p.49.

DIAGRAM (8) EXISTING AND PROPOSED COMMUNICATION OF THE COUNTY OF LONDON AND THE GREATER LONDON

DIAGRAM (8)

Proposed Airports

Proposed Satellites

Existing Main Railways

Proposed Main Railways

Proposed Electric Rails

Proposed Underground Rails

Population

The population distribution of the Greater London Area had been influenced by natural growth and migration. The trend of growth depended mainly upon the opportunities for work providing a decent standard of living. It has been estimated that 60 per cent of the inhabitants of the Greater London Area were born elsewhere[1]. Assuming that natural growth and migration will continue, it is estimated that the future population of Great Britain and of the Greater London Area may be as follow:

Population forecast for Great Britain[2] (Registrar General's Annual Report.)

1937	46,008,000
1940	46,565,000
1950	47,501,000
1960	47,192,000
1970	45,980,000

Actual population in 1931 was 46,180,870; and in 1951 was 50,211,602.[3]

Greater London Area[4] (i.e. the City and Metropolitan Police Districts.)

1937	8,655,000
1941	9,136,000
1951	8,944,000
1961	8,713,000
1971	8,631,000

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1. J. H. Forshaw and Patrick Abercrombie. County of London Plan 1943. London, 1944. p.27.

2. Abercrombie, Sir Patrick. Greater London Plan 1944. London, 1945. p.191.

3. Seltzer, L.E. The Columbia Lippincott Gazetteer of the World. New York, 1952.

4. J. H. Forshaw and Patrick Abercrombie. County of London Plan 1943. London, 1944. p.29.

Actual population in 1931 was 8,203,942 and in 1951 was 8,346,137[1].

These were merely statistical estimates and it was believed that the imminent decrease in population would not affect the need for decentralisation.

As mentioned previously, one of the assumptions of the Greater London Plan was that decentralisation of industry and movement of population had to be carried out together. The aim was to reduce "house to work" movements to a minimum by arranging the place of work near and yet not right on top of the place of residence. There had also to be margins to provide for cases where people would find new jobs in another locality but would not wish to move from their homes.

Within the County of London five types of units were suggested for the possibility of dispersed industrial population:[2]

(a) filling gaps in incomplete schemes within the County:

(b) immediate close-in housing groups that were attached to areas where there was work and would be gradually integrated into balanced communities that might be called metropolitan satellites;

(c) satellites located within the metropolitan traffic area;

(d) outer satellites that were usually developments of existing towns on the fifty miles radius;

(e) dispersal remote from the metropolitan influence.

There was ample land in the Greater London Areas to receive the population. There were localities capable of large expansion and other capable of smaller

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1. Seltzer, L.E. The Columbia Lippincott Gazetteer of the World. New York, 1952.

2. J. H. Forshaw and Patrick Abercrombie. County of London Plan 1943. London, 1944. p.29.

growth. It was considered that expansion would not take place within an existing town or be an addition to it, but would take the form of a series of small satellites. A new settlement would be large enough to allow for a community group based upon the standards which the Greater London Plan had adopted. Therefore, two types of population movements would occur, namely, mass and sporadic movements. Oscillation or sporadic movement is a movement in and out and to and fro within town and suburb; it represents that margin for free and individual movement which must always exist in a human community. The mass movement would be from old dwellings to new settlements.

A careful and detailed study was made of the areas that lie within the Greater London Area but outside the County of London. It was estimated that 1,033,000 persons had to be decentralised. Calculations for decentralisation purposes were based on the "population per unit of area" method.

The total figure for mass-decentralised population was grouped under five broad headings based upon calculations and certain principles:

(a)	Decentralisation In and Near the Region.			
	(i)	Addition to existing towns	261,000 persons	
	(ii)	New sites	383,250 persons	
	(iii)	Quasi-satellites	125,000 persons	
				769,250
(b)	Dispersal Outside the Region.			
	(iv)	Addition to towns within a 50 miles radius	163,750 persons	
	(v)	Beyond the metropolitan influence	100,000 persons	
				263,750
Total number of regrouped population				1,033,000.

Assuming standard sizes of lots at each varying density and an average of 4 persons per dwelling, calculations were made for sporadic movement on existing vacant lots. The following divisions were made:

(1)	The Inner Urban and Suburban rings for	92,407	persons
(2)	The Green Belt ring for	177,920	persons
(3)	The Outer County ring for	115,695	persons
	Total	386,022	persons

This figure represents 4 per cent of the total population of the whole area of the County of London and Greater London. It provided a margin for free and individual movement in a human community.

Housing density

Housing was considered to be of first importance among the many aspects of London's future as it was a matter affecting every citizen. Opinions about suitable standards of housing were continually changing.

The condition of housing in London has declined due to:

(a) overcrowding of dwellings because of high density and lack of space;

(b) overcrowding of people in dwellings;

(c) haphazard penetration of industry and commerce into older residential districts to the detriment of both;

(d) lack of open spaces;

(e) change from single to multi-family occupation without adequate alterations being made; and

(f) bomb damage and abnormal deterioration due to war-time lack of repair and disturbance of occupation.

Diagram (9) shows a typical exixting mixture of housing and industry in County of London.

A number of factors must be considered for rehousing on large urban and central sites, such as geographical relationship of dwellings to places of work, high cost of land, and the need for open space. To meet these circumstances, a large percentage of flats must be included in new layouts although families with children generally prefer houses to flats.

In brief, the problem in London was to rehouse as many people as possible in the reconstruction areas at a density that would ensure adequate light, air and other amenities. A balance had to be found between the number of people to be rehoused, the type and size of the dwellings, the amount of open space to be provided for recreation and amenity, and the degree of decentralisation. In the County of London Plan the "population per unit area of land"[1] method for calculating densities had been adopted. There were also proposals for rehousing in terms of a mixed lay-out of houses and flats with the proportion of one to the other varying according to local conditions and requirements. Thus a desirable variety of treatment and a more agreeable social pattern was produced.

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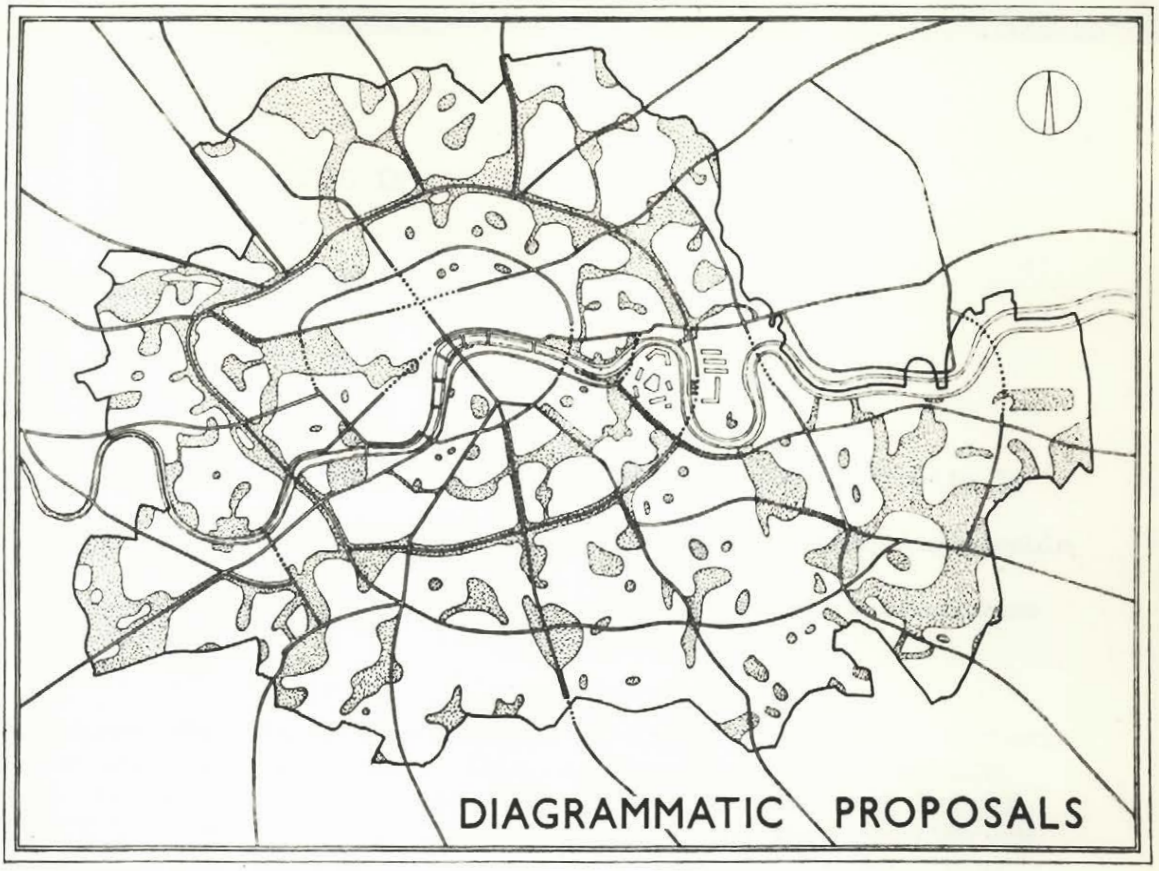
1. J. H. Forshaw and Patrick Abercrombie. County of London Plan 1943. London, 1944. p.77.

DIAGRAM (9) TYPICAL EXISTING MIXTURE OF HOUSING AND INDUSTRY IN COUNTY OF LONDON

OPEN SPACE PLAN



DEVELOPMENT

DIAGRAM (10)

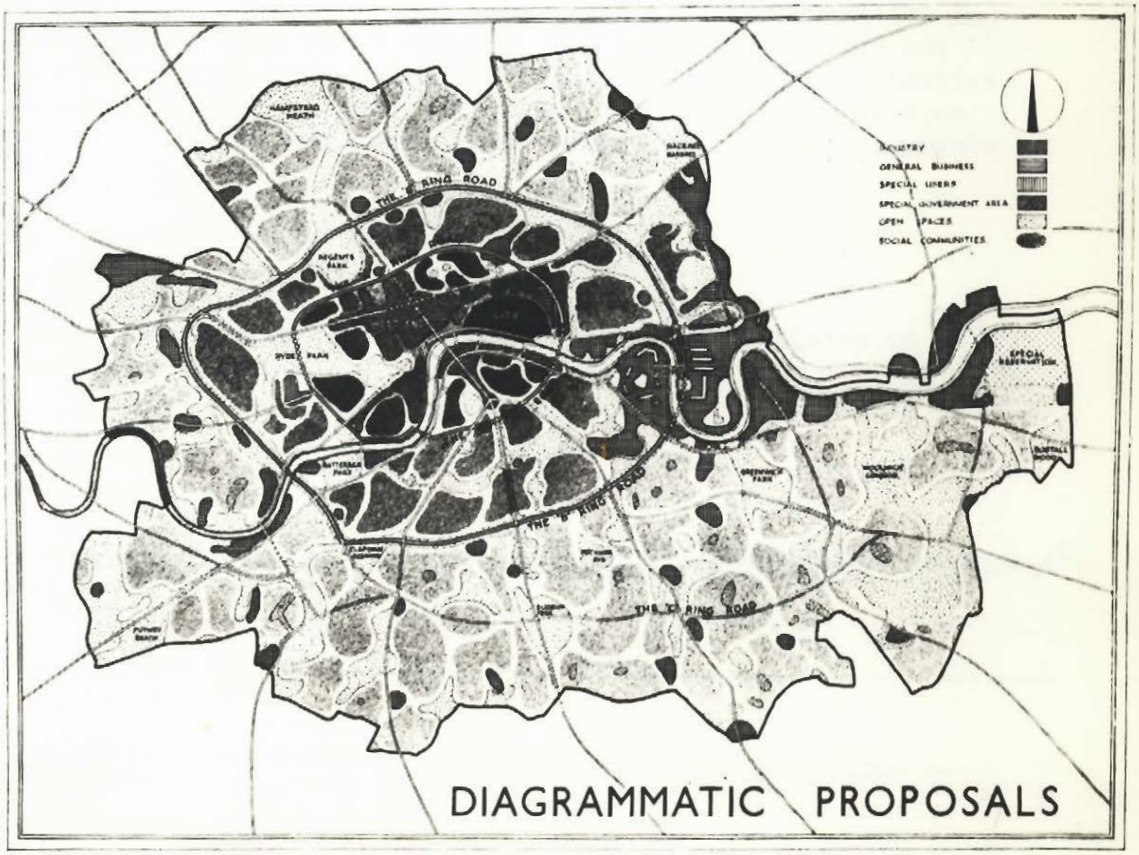


DIAGRAM (11)

TYPICAL AREA IN THE EAST END, SHOWING THE EXISTING INTERMIXTURE OF INDUSTRY, HOUSING ETC.

DIAGRAM (9)

The proposed net densities[1] of 200, 136 and 100 give the following comparative densities when community buildings and open spaces are included:

Net density housing area alone	Density of housing area, plus community buildings	Density over total area, including 4 acres of open space for 1,000 community buildings and housing
200	160	97.5
136	110	76.4
100	80	60.0

For residential neighbourhoods a population of 5,000 to 10,000 was suggested[2]. These two figures were proposed because they related to the school proposals of the Ministry of Education.

Suggested floor space standards for the different types of accommodations were:

(a)	3 bedroom house	200 square feet per person
(b)	2 bedroom flat	200 " " " "
(c)	1 " "	225 " " " "
(d)	Bed-living room flat	275 " " " "

Open Space

Open space was considered a highly important aspect of the County of London Plan. Adequate open space for both recreation and rest was mentioned as a

1. J. H. Forshaw and Patrick Abercrombie. County of London Plan 1943. London, 1944. p.77. Appendix I p.155. By 'net density' is meant the number of persons per acre of the housing area which comprises the curtilages of the dwellings (with gardens and open space between flats)

2. Abercrombie, Sir Patrick. Greater London Plan 1944. London 1945. p.113.

vital factor in maintaining and improving the health of the people. A standard of open space of 4 acres per 1,000 population was adopted as a reasonable figure for highly developed areas. An extra 3 acres per 1,000 were to be provided outside the County Area, giving a total of 7 acres per 1,000.

The main types of open space considered in the County of London Plan were as follow:

(1) amenity parks and parkways;

(2) general playing fields for adults and school children;

(3) school playing fields;

(4) recreation and sports centres;

(5) small play centres for children located near their homes;

(6) small amenity open space in the form of formal squares or rest gardens within the residential area;

(7) riverside pleasances;

(8) amenity open space and playing fields between adjacent communities and in business areas as well as in industrial areas where such space would provide a cut-off between industry and adjoining residential areas; and

(9) allotments.

Apart from the needs for recreational facilities, the preservation of the most productive land for farm and other cultivation was an important factor in the Greater London Area. When additional development took place, new units had to be arranged. Increased recreational facilities were also to interfere as little as possible with farming operations.

Diagram (10) shows the proposed open space for County of London.

Diagram (11) shows the proposed development plan for County of London.

DIAGRAM (10) PROPOSED OPEN SPACE FOR COUNTY OF LONDON

DIAGRAM (11) PROPOSED DEVELOPMENT PLAN FOR COUNTY OF LONDON

CHAPTER II HIGH DENSITY HOUSING IN ENGLAND

Section 1 Tendency of Development

Policy

London is one of the cities in England where the highest housing density is found. The "County of London Plan" by J. H. Forshaw and Professor Abercrombie, prepared for the London County Council in 1943, examined existing conditions and made proposals. The authors stated:

> "The tendency has been to zone residential areas for a density approximating to the existing density. This has the effect of maintaining not only the existing high densities in places like the East End and South Bank boroughs where the land is low-lying and the amenities are poor, but also the existing low densities in areas where the living conditions are good, on account of high ground or proximity to large open spaces, e. g. Hyde Park. A more equitable distribution of population, so as to make the maximum use of good residential areas, is desirable. A guiding principle should be to allow higher densities on this higher and open ground, as compared with lower densities in the low-lying, less healthy districts. The reverse principle has been operative in the past, and a stablisation of existing densities would, therefore, only maintain the mal-distribution of population in relation to the areas with the most favourable residential amenities."[1]

These principles were accepted by the Council.

Diagram (12) shows the existing and proposed residential densities in County of London.

Mixed Development.

The post-war tendency in London has been increasingly towards mixed development[2]:

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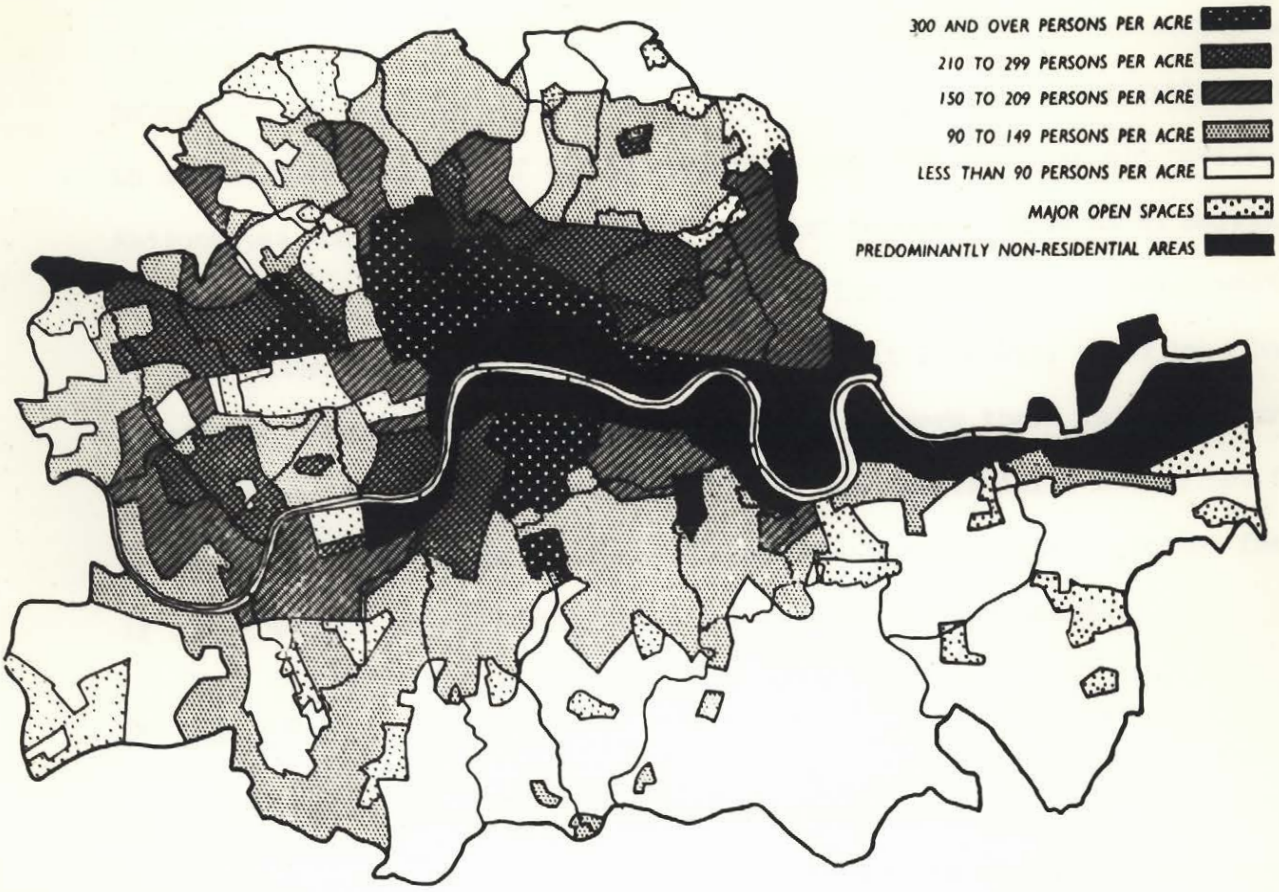
1. J. H. Forshaw and Patrick Abercrombie. County of London Plan 1943. London, 1944. p.114.

2. Informations obtained from the London County Council Architects' Department. April 1957.

DIAGRAM (12) EXISTING AND PROPOSED RESIDENTIAL DENSITIES IN COUNTY OF LONDON

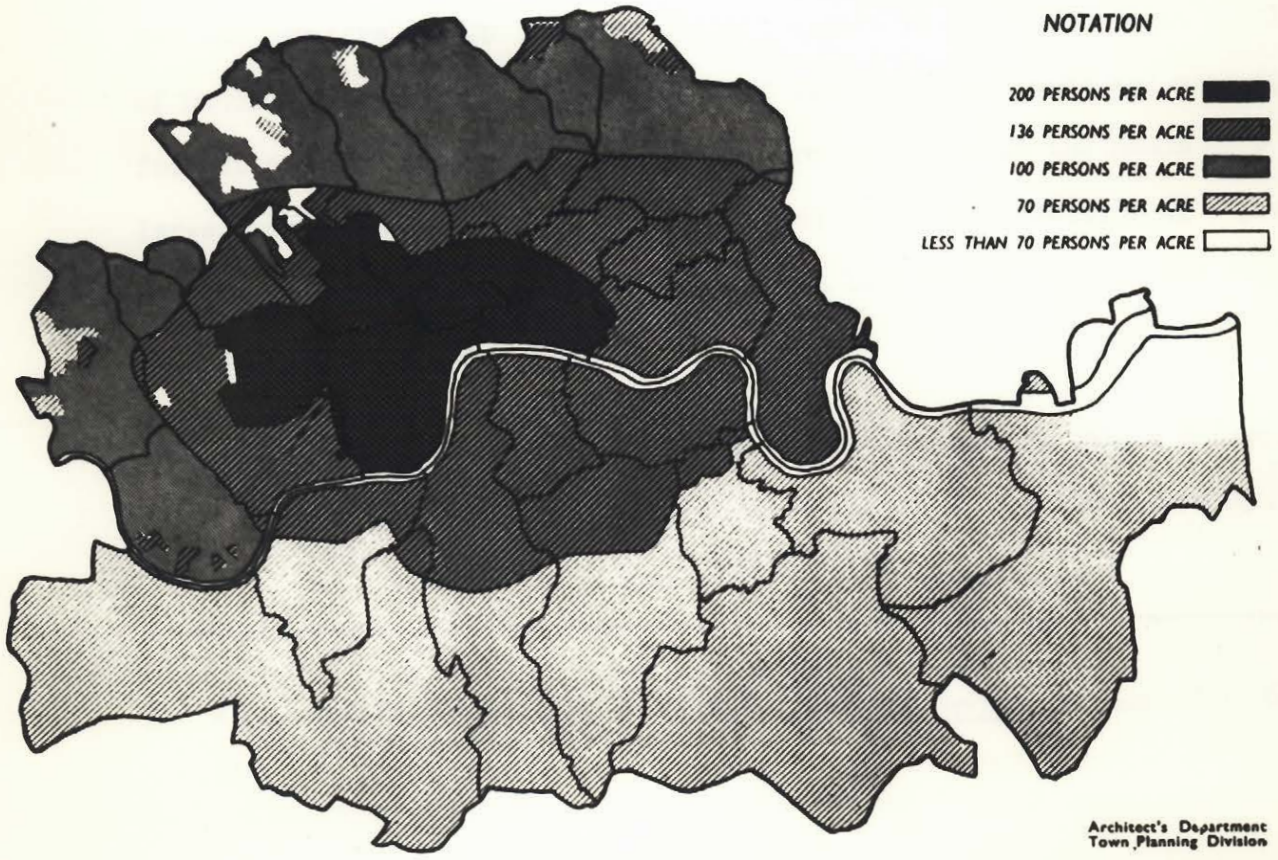
EXISTING RESIDENTIAL DENSITY

NOTATION



PROPOSED RESIDENTIAL DENSITY

NOTATION



Architect's Department
Town Planning Division

DIAGRAM (12)

tall blocks of flats, lower blocks of flats, maisonettes and two-storey houses integrated in comprehensive schemes that afford a wide range of dwelling types to accommodate families of all sizes and to meet the needs of old people. Maisonettes and tall blocks of flats are most popular. Miss M. J. Mayell, housing manager of Finsbury Borough Council, London, in a discussion meeting of high flats[1], said that for large families flat life will never be a happy solution. If a family requires four bedrooms or more there is a need for a clothes line, back-yard and dustbin. There are few families who do not feel constricted in flats; maisonettes on the other hand provide a greater feeling of space and are popular with those who have moved from houses.

Density and size.

In present day open form development it is not generally possible to give separate densities for the various sections, but the overall schemes are at densities conforming to the Development Plan zones with the maximum of 200 persons per acre[2]. Any increase in this figure would give rise to problems of public transport and the provision of further educational and open space facilities with consequent demands for more land to meet the needs of a larger population. The lower density zones permit the erection of a proportion of houses with gardens to satisfy a long established demand found in all communities in England.

The well planned housing estate of 200 persons to an acre can be a happier place than the less satisfactorily planned one at a much lower density.

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1. M. J. Mayell, "Rehousing in Flats", Housing Review, London. Vol. 6, No. 2. March-April, 1957. p.41.

2. Informations obtained from the London County Council Architects' Department. April 1957.

While the shape of the site and the size of flats required are the determining factors, there is a general need for estates of mixed sized flats. Miss M. J. Mayell reported at the same discussion meeting on 23rd January 1957 that it is surprising to find how soon the original requirements of even the most carefully selected families change. The architect and planner are therefore faced with a zoned density, a particular site, and a demand for flats in the proportion locally required. As the flats will inevitably be occupied by a large number of children, the layout should be both open and easily supervised and playgrounds should be adequately provided.

Preference for privacy.

As most people in England are anxious "to keep themselves to themselves", those living in flats appear to be more affected by their neighbours than by the actual size and type of building they live in[1]. The attitude of people who live on an estate is often determined by the sort of neighbours they have. Small groupings of people can become very important. Most people tend to be reserved in their social contacts, believing that it is not good policy to be too friendly with neighbours but only to know them well enough to ask for help if an emergency arose.

When a choice was offered of living in a small block of flats or in a larger building, those preferring a smaller block of flats thought that there would be less annoyance and more privacy, while those preferring a larger building wished to have the opportunity of choosing friends from a larger number. Although high flats can provide certain advantages, in the investigation

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1. Willis, M. "Choice of Type of Dwelling", Living in High Flats, London County Council. 1955. p.7.

carried out among tenants by the London County Council Architects' Department, about two-thirds said that they would like "a little house and a garden." However, if people are able to choose their floor in the block of flats as far as possible and if their immediate neighbours are congenial, they are more likely to be content.

Height.

Unlike New York, London's growth in general was lateral rather than vertical: it was not all in the form of local increase or of accretion from without.

The highest flats so far proposed for London are nineteen storeys[1]. High buildings do not necessarily imply high densities. Questions of daylighting and over-shadowing which arise in England preclude the close juxta-position of tall blocks which might be found in more southerly latitudes.

A survey[2] was carried out by Margaret Willis for the London County Council in January 1955 among families living in 8 to 12 storey blocks of flats on nine estates in London. One hundred and fifty-six families, a large proportion with young children, who lived above the fourth floor and 58 families on the lower floors were interviewed. The advantages of living high were given far more frequently than the disadvantages. The main reasons were: better air, healthier atmosphere, greater quiet, and the view or out-look. A further advantage of living high is the privacy it gives and the feeling of not being overlooked. Other favourable points include light and sunshine,

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1. Information obtained from the London County Council Architects' Department. April 1957.

2. M. Willis. "Choice of Type of Dwelling", Living in High Flats. London County Council, 1955. p.7.

the feeling of space and openness, and the greater cleanliness, particularly less blowing dust and smoke.

Although the main disadvantages of living at a height are related to problems arising with young children, other criticisms are mentioned. These include the noise made by the wind, the cold compared with a lower level and the feeling that it is too high. The lift is another major disadvantage, particularly for those families with children and for elderly people. One criticism against very high blocks of flats is the remoteness of the top floors from the outside world and the feeling of being cut off. This criticism was made mainly by people who are at home all day and especially those who would like to be sociable and friendly with neighbours. Therefore, upper floors are more popular with people who go out to work all day and who welcome the quiet and isolation on their return.

Economics and design.

Mr. A. G. Sheppard Fidler, chief architect of Birmingham City Council, speaking in the meeting held at the Housing Centre on November 6th, 1956 on development of high flats[1], said that the problem of designing to high densities had come to the fore in recent years. The flats versus houses controversy had ceased to exist and the problem today was how to produce an acceptable environment in a high density. He believed that as the stage of working to standards had been reached, further economies of a major kind could be sought along two lines. First, the study of the plan, its shape, the relationship of stairs, lifts, etc., could prove a fruitful source of investigation. An

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1. H. J. Whitefield Lewis, "Further Developments in High Flats", Housing Centre Review, Vol. 5 No. 6, November 1956. p.196.

enquiry on these lines was undertaken by the Ministry of Housing and Local Government in London. Second, an investigation into structural principles and techniques of building could lead to good results. Vast sums of money are spent on building and it is important that what is built should be of a high standard.

Benefit of building high.

Mr. H. J. Whitefield Lewis, principal housing architect of the London County Council, at the same meeting spoke about recent developments in high flats[1] and emphasized the reasons for building higher than hundred feet in a scheme where density requirements, economies and site conditions made it advantageous. First, he said that beyond eleven floors the increased height did not make much difference as far as physical effects were concerned: the feeling of insecurity did not increase beyond this height. Second, increased height was desirable from the point of view of economy. If costs were to remain reasonable, it was necessary to exploit services to the utmost by making the best use of lifts, etc. which could be done by increasing the number of units per floor and per block. This consideration had an effect on the proportion of blocks erected in mixed development. Third, a few really high blocks had a remarkable effect on the openness of a layout. Fourth, as sites in London became scarce and more difficult to develop particularly in high density zones, there was an increasing tendency towards piecemeal development. One tall block on an immediately available site provided an enormous housing profit and facilitated the more rapid clearance of the remainder of the site

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1. H. J. Whitefield Lewis, "Further Developments in High Flats", Housing Centre Review, Vol. 5 No. 6, November 1956. p.196.

and the completion of a comprehensive development. Fifth, on the assumption that central heating was basic to high flats, blocks containing 90 to 100 units could be heated economically. Sixth, though it might not have been the Government's real intention, the new financial arrangements encouraged high building because an additional subsidy was available for each floor above six storeys. Though this did not cover the increased cost of building high, it was an incentive.

CHAPTER II

Section 2 Demonstration of a High Density Scheme in London

This chapter contains a further consideration of high density development in Britain. The following scheme gives an over-all idea of the manner in which mixed development including high blocks has been achieved.

The Brandon Estate, Southwark, County of London, England.

The Brandon Estate is an interesting scheme of mixed development and includes the rehabilitation and conversion of sound Victorian houses. Beside old dwellings there are new buildings of appropriate scale, and the overall zone density of 136 persons per acre has been maintained by building high next to the future extension to Kennington Park. Two-thirds of the area retains its original urban domestic scale and one quarter of the dwellings have private gardens. In the six eighteen-storey blocks at the west end of the site, the local density is about 170 persons per acre.

Central heating and hot water for the high blocks as well as for the projected seven-storey blocks and various buildings in the shopping centre is supplied by a single boiler house adjacent to one of the high blocks.

The design for the high block contains sixty-four three room flats of an average area of 660 square feet and four attractive one room penthouse flats. All flats are reached from a central hall on each floor. There are two high speed lifts that stop at alternate floors and one staircase that is approached from a "cut-off" lobby. All window walls are fronted by recess balconies that give a sense of security to tenants and make repainting and maintenance

easy. The recess balconies were expensive but in the end will pay for themselves. All Flats have internal bathrooms and water closets that are artificially ventilated. The ground floor contains tenants' stores, bulk storage space, refuse chambers and the entrance hall.

Owing to the height of the building, it was necessary to vary the form of structure and the appearance has been improved by emphasising every fourth storey.

Diagram (13) shows the layout of the Brandon Estate.

Diagram (14) shows the perspective and layout of high blocks of flats in Brandon Estate.

DIAGRAM (13) LAY-OUT OF THE BRANDON ESTATE

mixed development of various types of buildings are shown in the scheme

Brandon Estate Southwark

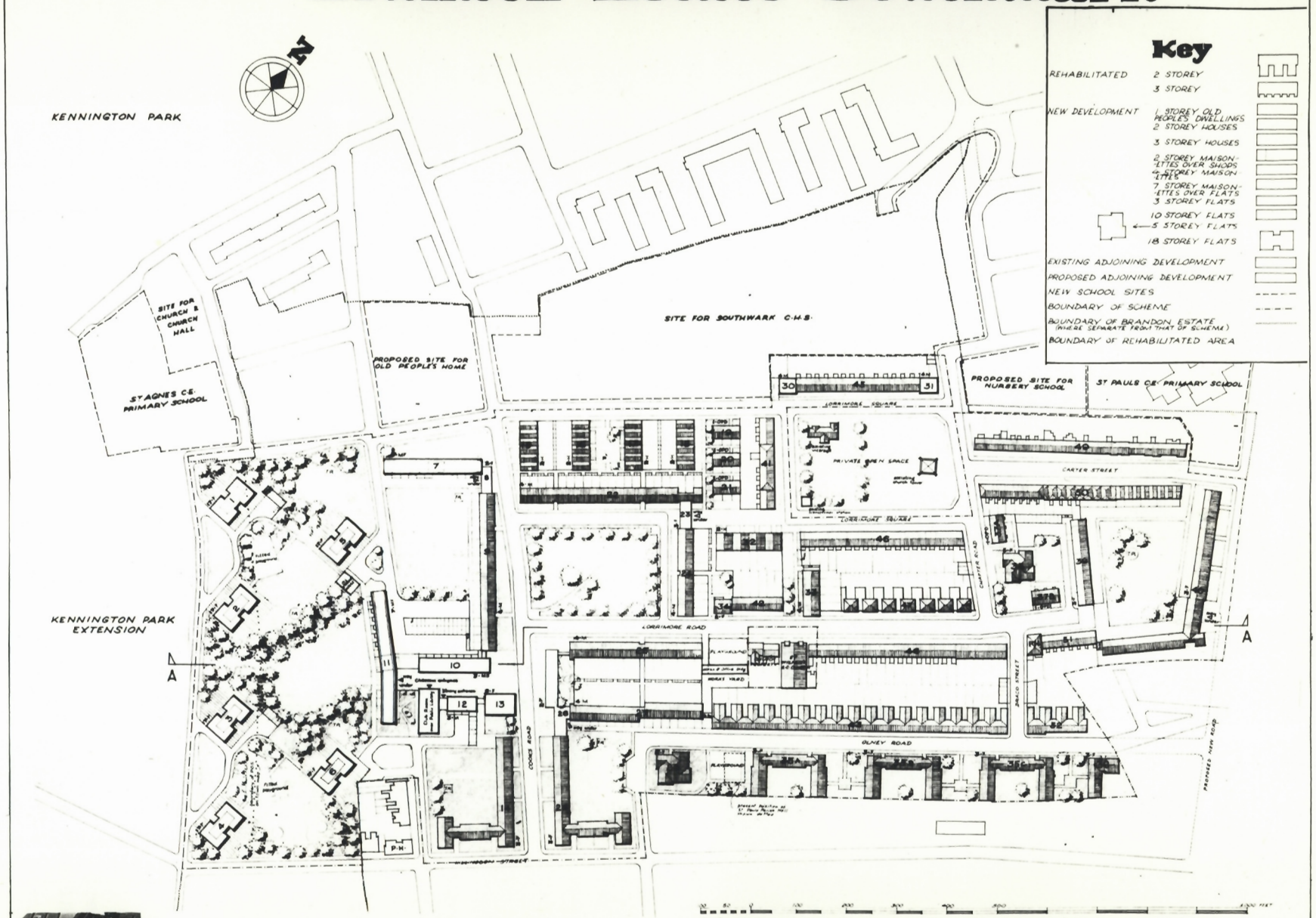
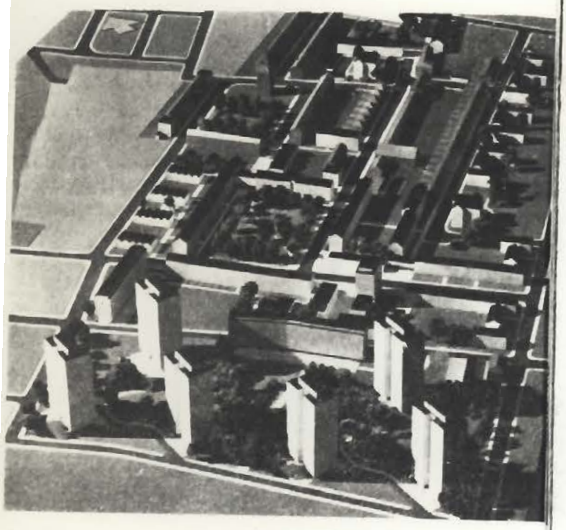


DIAGRAM (13)

DIAGRAM (14) PERSPECTIVE AND LAYOUT OF HIGH BLOCKS OF FLATS IN BRANDON ESTATE

six eighteen-storey blocks are located at the west end of the site in this mixed development scheme



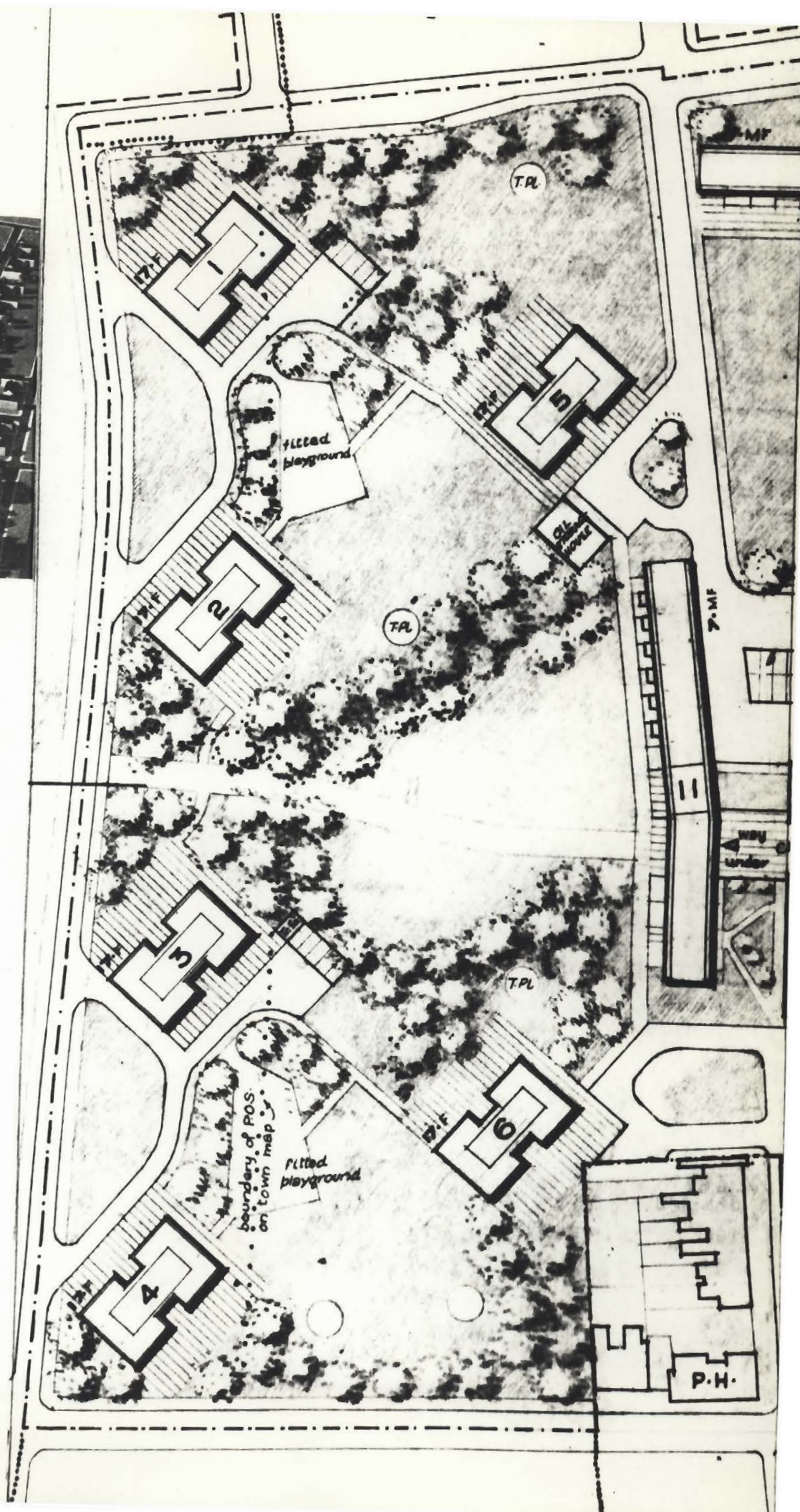


DIAGRAM (14)

CHAPTER III HIGH DENSITY HOUSING IN AMERICA

Section 1 Tendency of Development

New York is one of the cities in America where the highest housing density is found. New York has the longest history in slum clearance and rehousing programmes. The New York City Housing Authority, established in 1934, is a public corporation dealing with housing for low income people who occupy overcrowded and sub-standard housing areas.

Existing situation.

There is a vast number of sub-standard houses in New York that are the legacy of many decades of no standards, uncontrolled growth, and inadequate remedies. No less than a quarter of a million city apartments are sub-standard by present U.S. Bureau of Census standards: there are 52,000 Old Law tenements that still house over 400,000 families[1]. These tenements were built prior to the Tenement House Law of 1901 and would have been unacceptable even when newly built by today's standards.

Most of the bad housing is concentrated in the older central areas of the city. Other centrally located areas, where housing was originally good, have followed a pattern of decay common to most American cities. As the city grew outward, housing in the older neighbourhoods was neglected, inadequately maintained, overcrowded, and exploited as its original inhabitants moved to outskirts and their places were taken by families whose choice of accommodation was severely limited by financial or other considerations. Comparatively

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1. New York City Housing Authority. Twenty-second Annual Report, 1955. New York. p.8.

little vacant land remains in the city and practically none in large continuous tracts suitable for mass development. Ways to achieve redevelopment had to be found.

Policy.

The New York City Housing Authority has concentrated on the older areas of the city where slum clearance and rehousing could be achieved on a scale large enough to have meaning. Spots of redevelopment, often of very high density, have been undertaken recently with extremely interesting results.

Type of projects.

The need to provide housing for all economic groups and the value of economic diversification within neighbourhoods have long been recognised. In existing slums there is a surprisingly broad range of incomes. However, the limits in low rent public projects have in the past restricted public housing to a comparatively narrow economic segment of population - the very low income group. Where projects are large, whole neighbourhoods have a concentration of a single income group. Besides the low rental projects, medium rental projects form a part of the work of the Authority and assist in the development of better grouping and a better economic balance. The Authority provides new housing in low and medium price ranges where it is most needed. The medium rental projects are public housing schemes for subsidized low rent public housing. The rents are not as high as those for even the lowest priced new private housing. There is concern about the continuous movement of middle income families to the suburbs which is a normal manifestation of outward growth and reflects the shortage of suitable middle income housing available in the central areas.

Economic Balance.

It is considered important that wise use be made of the limited supply of vacant and underdeveloped land. The Authority has endeavored to effect a net housing increase of 50 per cent by providing at least three apartments for every two families displaced by the various slum clearance and reclamation programmes. Economic balance is considered necessary in the development of remaining vacant areas as well as in the redevelopment of slum areas.

Superblock development.

Public housing in New York City since 1936 has usually consisted of superblock projects that are integral planning units and as a rule take in and consolidate two to six or seven adjacent city blocks, (see diagram 20) The superblock has many advantages: it frees planning from the rigid confines of old and archaic street patterns; it permits wide spacing of buildings that allows more sunshine to enter and a freer flow of air; it provides lawns, trees and shrubbery; it offers safe play areas for small children and benches for adults; it is said to cut a broad swath of good housing through a slum neighbourhood, and is sufficiently large and self-contained to resist the adverse influence of the surroundings and to extend its own influence. It is a consolidated unit and lends itself to economical and efficient planning, construction, and management.

Decentralised project.

Conditions have changed since 1936[1] and slum clearance sites covering large

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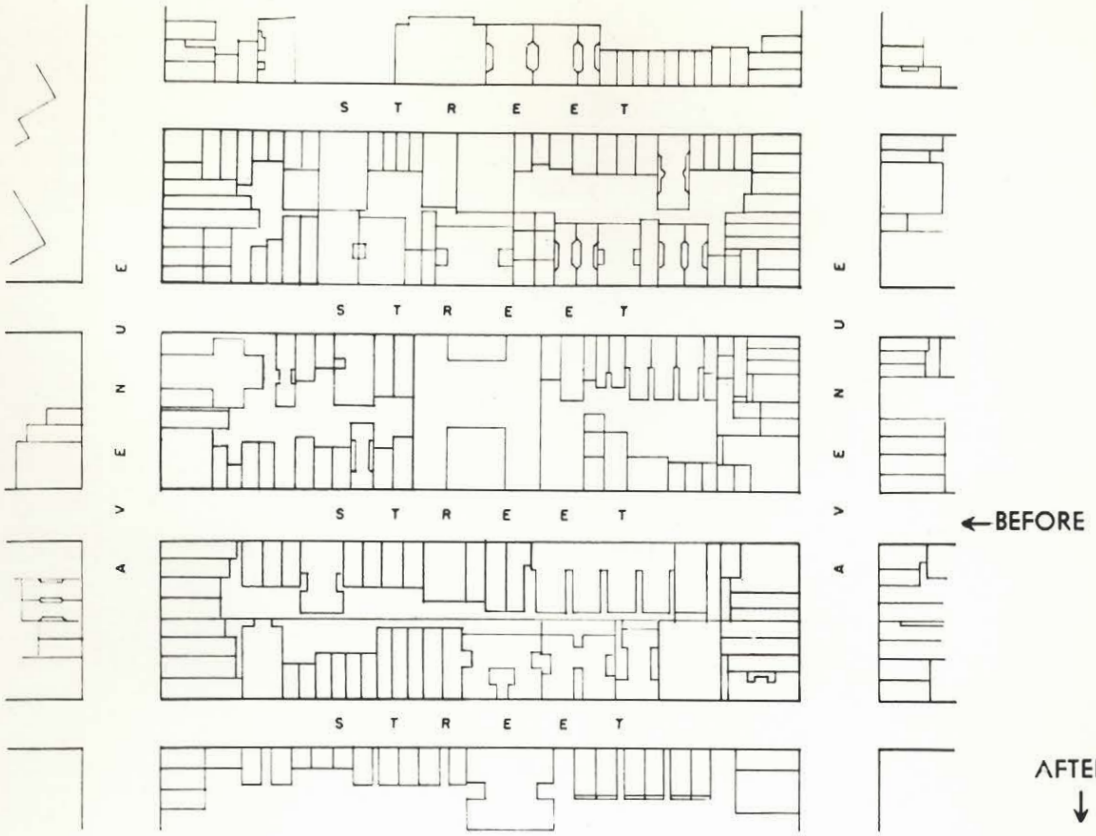
1. New York City Housing Authority. Twenty-second Annual Report, 1955. New York. p.8.

areas or of solidly bad housing are harder to find. The Authority, in seeking slum sites, often finds good or at least salvageable housing interspersed with the bad. Slum areas are often found dotted with religious and secular institutions which serve the neighbourhood and are part of community life. Therefore, public housing programmes need to be adapted to circumstances and can no longer be based solely on superblock projects. The Authority is aware of this circumstance and is planning a type of decentralised housing new to New York City. Decentralised projects may be small and encompass a block, a halfblock, or even a single building or they may be larger in size but composed of a number of smaller elements spotted through an area where they are most needed. Thus, public housing programmes will have more flexibility and will permit housing and neighbourhood institutions of value to be preserved.

It is believed that many of the best characteristics of superblock planning will be retained in decentralised projects but changed in scale. Coverage will be kept low with open space around even a single-building project. Such projects are considered particularly useful in urban renewal as the purpose is to save or renovate declining areas that do not require complete rebuilding. The aim is to diversify and to coordinate a programme of rebuilding, rehabilitation, and conservation emphasizing maximum private investment and initiative. Manhattan's Upper West Side has been chosen as the pilot project of the decentralised programme.

Diagram (15) shows the idea of a decentralised project on small site spotted among useful buildings that can be saved from demolition for a few more years.

DIAGRAM (15) DECENTRALISED PROJECT



An example of a new kind of housing project being planned by the Authority, the decentralized project. Such projects will provide the public housing program with new flexibility, enabling it to reach out fingers of good housing to obliterate pockets of slums and spots of decay. They will be a means for extending the good influence of existing housing projects.

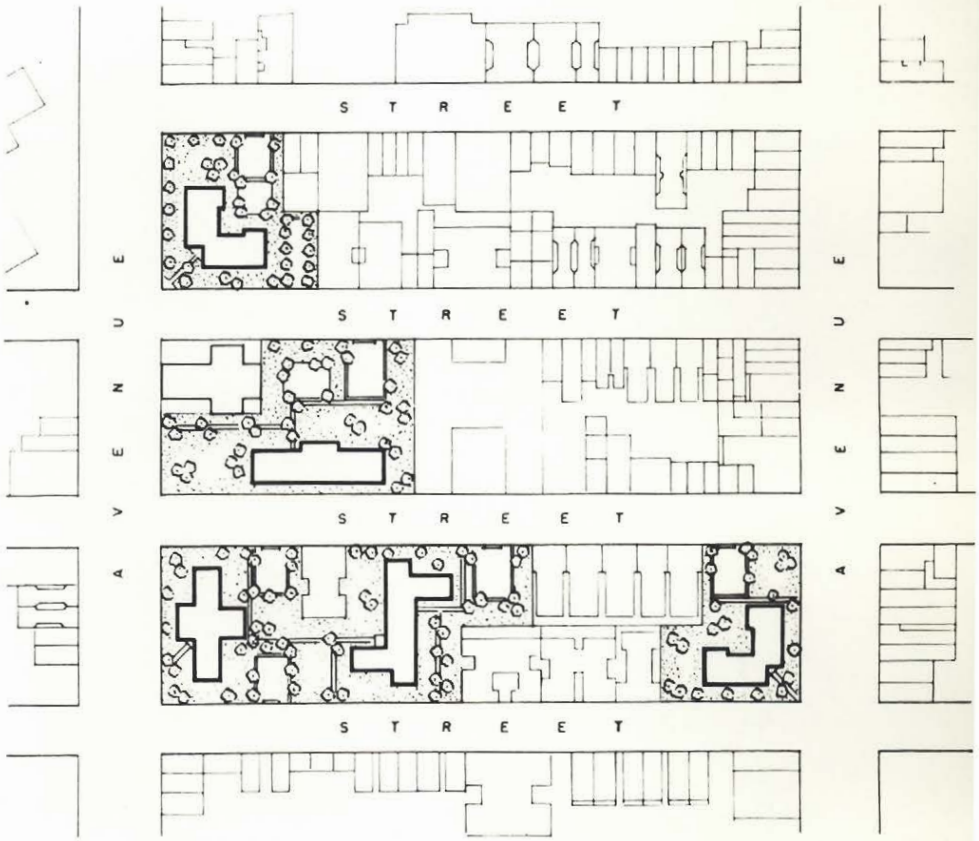


DIAGRAM (15)

CHAPTER III

Section 2 Demonstration of High Density Schemes in New York City.

Apartments in tall blocks of large or small scale are the main development in America at the present time. Unlike the mixed development in England, redevelopment in American cities has tended to be by apartment buildings due to the cost and the scarity of land. It is not reasonable to assume that the prevalence of apartment buildings in America is the result of preference. A more likely assumption is that this form of structure is selected by developers as the most profitable type of residential building.

Type of apartments.

The two bedroom apartment has been common in public housing projects as it has been considered best suited to the long term needs of low income families.

According to the Authority's investigation however, the proportion of large families has been increasing in recent years, and an increase in the proportion of aged single persons and couples has become more evident. To meet the changing circumstances, the apartment-distribution ratios for low rent housing have been revised. The number of large (three or more bedrooms) and small (one bedroom or combined living-bedroom) apartments has been increased, and the number of two-bedroom apartments has been decreased although they still comprise the bulk of apartments.

The designs for some projects had provided for simple and inexpensive future conversion of the apartments when needed. As indicated in diagram (16), by breaking through one wall and sealing off a door or passage-way, one or two

rooms could be taken from one apartment and added to another. This adaptable design permitted seventy-four apartments in five projects to be converted in 1955.

Density.

Though public housing densities have been high, they have not been as high as most private housing in New York City.

Diagram (17) shows the existing density in New York by the Census Tract of 1950.

Densities of 300 to 400 persons per gross acre are common on Manhattan Island. The densities in public housing developments vary ranging from as low as 90 persons per acre to as high as 497 persons per acre. They will probably become higher as the population and need for housing increase and the amount of available land shrinks.

Site Coverage.

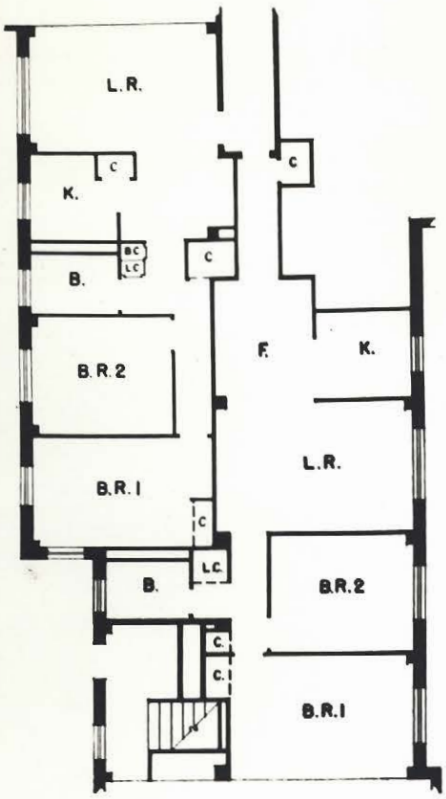
Authority projects have always featured low site coverage and high buildings. Buildings are well spaced so as not to shut out sunshine and fresh air. In many projects as much as 85 per cent to 90 per cent of the site is left open for landscaping, lawns, playgrounds, walks, benches and off-street parking.

Height.

As tall blocks are the feature of redevelopment housing in New York and coincide with the policy of low site coverage, the height of buildings in one new project has reached twenty-one storeys. This is the tallest yet built by the Authority and is about as high as it is practical to build using

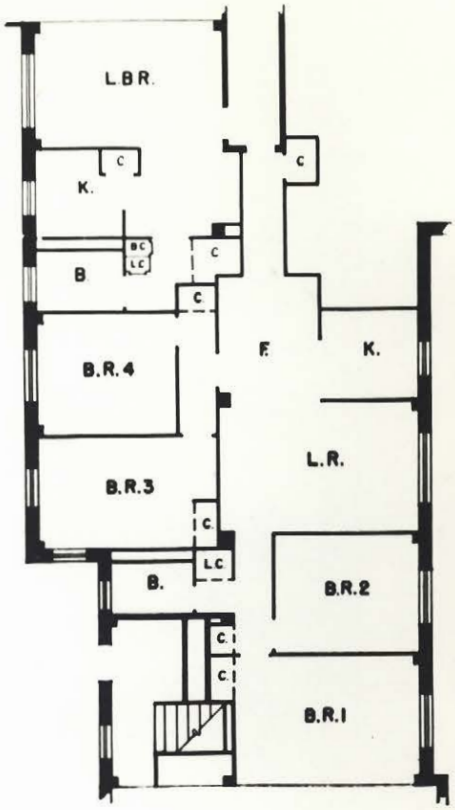
DIAGRAM (16) CONVERSION OF APARTMENTS

DIAGRAM (18) REINFORCED CONCRETE MAT FOUNDATION



Two adjacent 2-bedroom apartments are simply and inexpensively converted into a 4-bedroom apartment and an apartment with a combined living-bedroom at Johnson Houses. The Authority is presently converting a number of similarly adaptable apartments in several State-aided projects to help meet the increased demand for very large and very small apartments.

DIAGRAM (16)



Tallest yet. The Authority will save $1,900,000 by using reinforced concrete mat foundations instead of conventional piles for General Grant Houses' 21-story buildings, the tallest it has so far built.

DIAGRAM (18)

DIAGRAM (17) POPULATION DENSITY IN NEW YORK

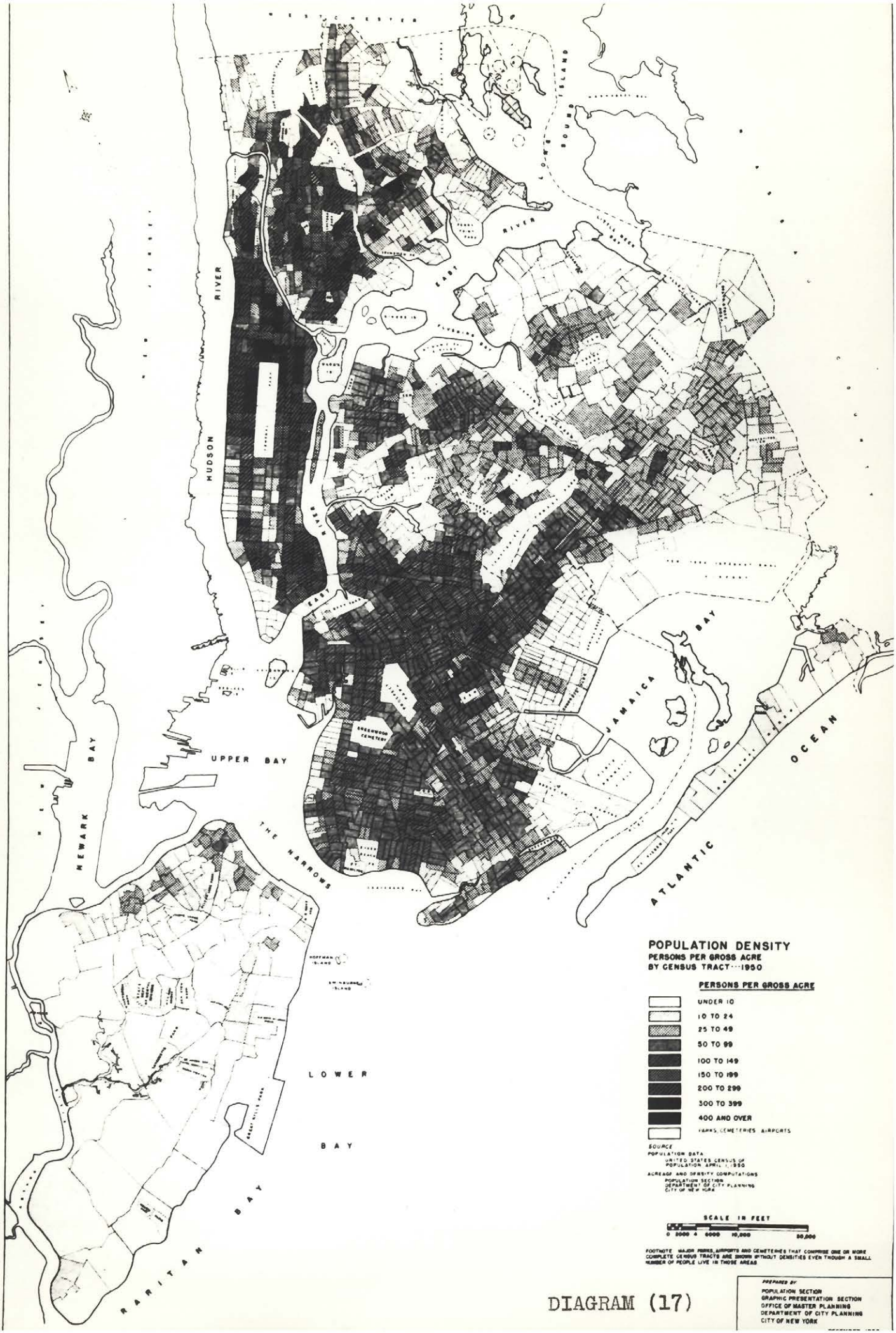

HUDSON RIVER
EAST RIVER
HARLEM RIVER
KILL VAN KULL
NEWARK BAY
UPPER BAY
THE NARROWS
JAMAICA BAY
ATLANTIC OCEAN
OCEAN
LOWER BAY
RARITAN BAY
GREENWOOD CEMETERY
POPULATION DENSITY
PERSONS PER GROSS ACRE
BY CENSUS TRACT···1950
PERSONS PER GROSS ACRE
UNDER 10
10 TO 24
25 TO 49
50 TO 99
100 TO 149
150 TO 199
200 TO 299
300 TO 399
400 AND OVER
PARKS, CEMETERIES AIRPORTS
SOURCE
POPULATION DATA
UNITED STATES CENSUS OF POPULATION APRIL 1, 1950
ACREAGE AND DENSITY COMPUTATIONS
POPULATION SECTION DEPARTMENT OF CITY PLANNING CITY OF NEW YORK
SCALE IN FEET
0 2000 4 6000 10,000 20,000
FOOTNOTE MAJOR PARKS, AIRPORTS AND CEMETERIES THAT COMPRISE ONE OR MORE COMPLETE CENSUS TRACTS ARE SHOWN WITHOUT DENSITIES EVEN THOUGH A SMALL NUMBER OF PEOPLE LIVE IN THOSE AREAS
PREPARED BY
POPULATION SECTION
GRAPHIC PRESENTATION SECTION
OFFICE OF MASTER PLANNING
DEPARTMENT OF CITY PLANNING
CITY OF NEW YORK

DIAGRAM (17)

reinforced concrete construction and present day equipment. Anything above this height gives rise to problems of the provision of daylight and of firm foundations to hold the weight of the building. A survey carried out by the Authority showed that at times it was necessary to excavate to a depth of 210 feet below street level in parts of Manhattan Island in order to reach bedrock. To sink piles to that depth is an expensive operation; a concrete mat is cheaper but the load that can be placed upon it is limited.

Construction.

The reinforced concrete construction of large housing projects has proved to be economical and has been favoured by the Authority. It is a type of construction that is particularly well adapted to projects consisting of a number of buildings where there is a repetition of basis design: forms and equipment can be moved from building to building in an orderly sequence of construction.

The concrete matting method is used in the General Grant House in the Upper West Side of Manhattan. The twenty-one storey buildings in this project have been erected on a foundation of reinforced concrete mats. Each mat is five feet thick and as large as the base of the building that restsupon it.

Diagram (18) shows a concrete mat under construction in the General Grant Project.

Design and economy.

Exterior designs of public housing in New York City are characterised by variations of the cross-shaped building. This type of building consists of a

number of apartment wings projecting from a central core where elevators, stairhalls, incinerators and public corridors are confined. The main virtue of this design is economy as unnecessary space is minimised.

The recent trend of design has been toward the strip-shape building. The experience of the Authority has proved that even if the public corridor takes more space, economical construction can be obtained in the strip building particularly if the strip is sufficiently elongated to provide a considerable number of apartments to a floor.

The strip plan has other advantages over the cross plan because it permits better orientation of buildings for sunlight and prevailing breezes, better design in public entrance ways and balconies that are features expected to mark the future public housing designs, and more apartments designed with living room privacy so that it is not necessary to walk from the front door through the living room to the kitchen and bedrooms. The plan in diagram (19) is an example of this advantage.

The design of the strip is basic to other forms of buildings that result from variations and combinations of it. Two strips may be linked together by a narrow neck which provides the elevators and stairwells or three strips may be linked together in the form of a "Y". These forms are shown in the Linden House Project in Manhattan. (See diagram 20). Each of the three wings of a "Y" shaped building form a single strip that is serviced by its own public corridor. The 120° angle between the wings gives the tenants a view of more than their neighbours' windows.

The idea of the public balcony is in the nature of a backyard in the sky and

is a further step to improved apartment living. It is screened for protection and provides a safe place for young children to play while their mothers are busy and a place where adults can relax on warm summer evenings without being far from their apartments and children.

The public balcony plan has been extended for use in the gallery type buildings of the Marlboro House Project. This plan provides an open, screened balcony that extends the length of the building and replaces the usual interior public corridor. It is designed so that there is through ventilation for all apartments and outdoor space for every family.

Diagram (19) shows the public open balcony.

Statistics of Schemes

Many public housing projects have been completed in New York City for lower and middle income families. Diagrams (21) and (22) show the change within two decades of New York's Lower East Side where housing density has been consistently high.

The following are project statistics[1] of old and new public housing and illustrate the highest housing densities accomplished by the New York City Housing Authority:

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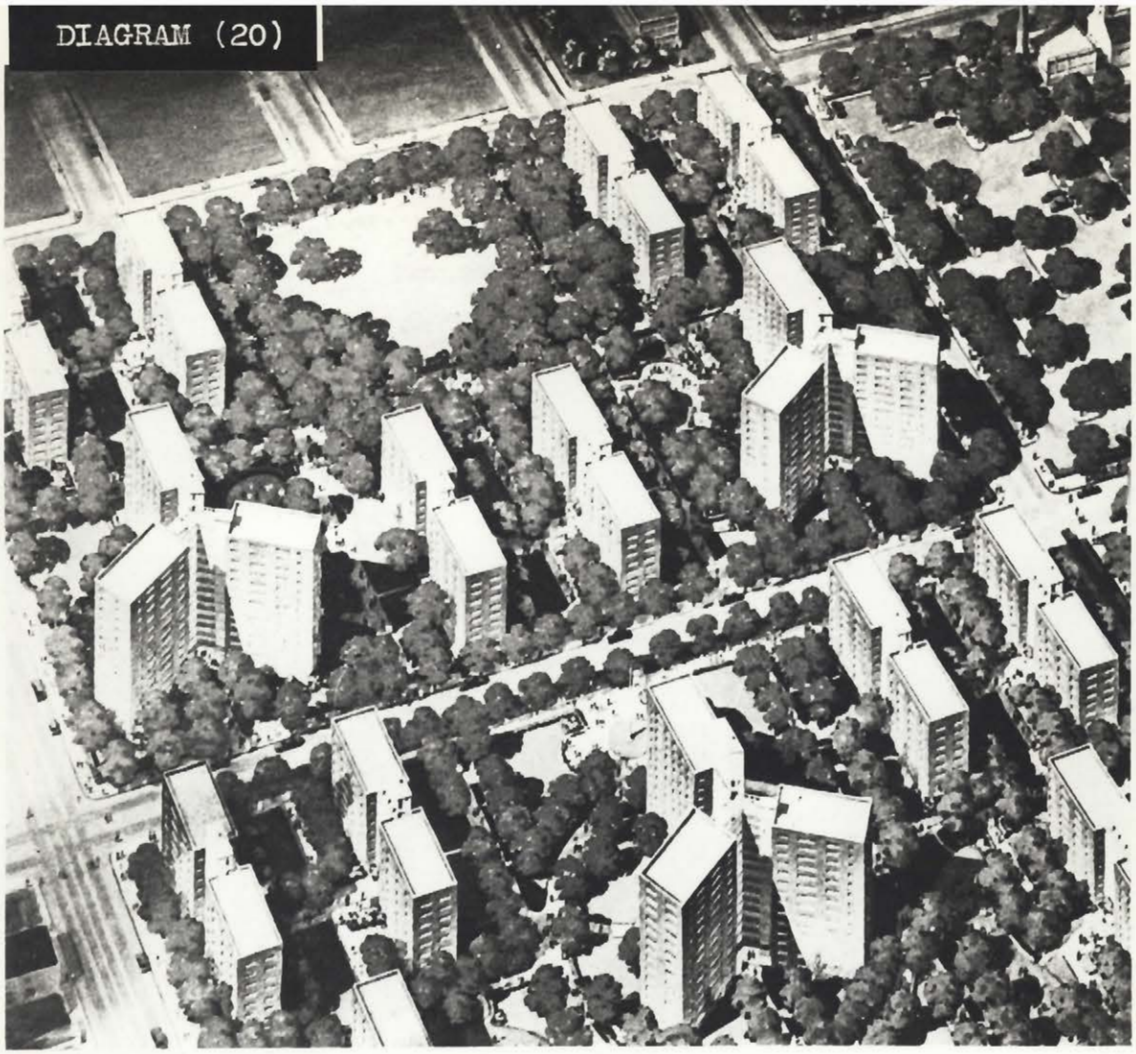
1. New York City Housing Authority. Project Statistics. New York, June 1956.

DIAGRAM (20) VARIATIONS AND COMBINATIONS OF THE STRIP DESIGN IN PUBLIC HOUSING PROJECT

DIAGRAM (19) PUBLIC OPEN BALCONY IN THE STRIP PLAN BUILDING

DIAGRAM (20)



In Marlboro Houses, an open, screened gallery replaces the conventional interior corridor, and serves a dual function: as a public corridor, and as outdoor space for each family at its front door.

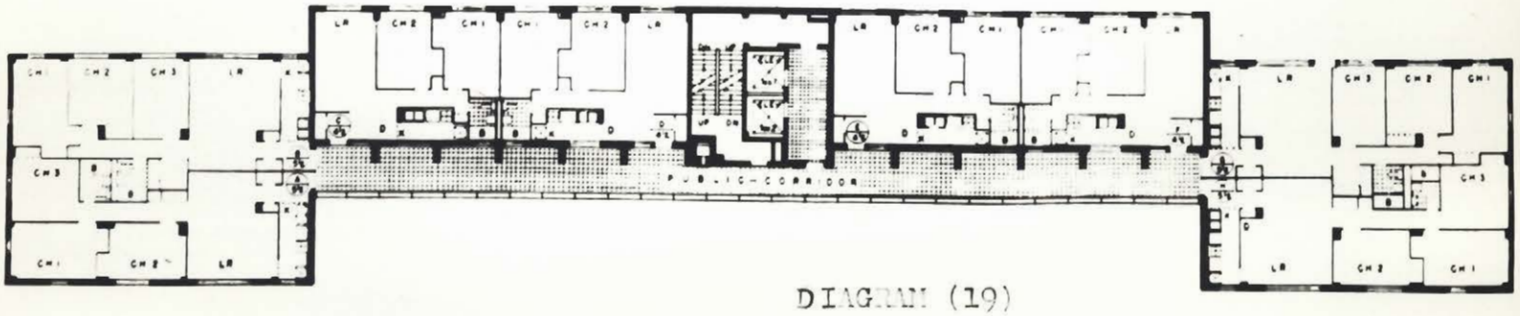
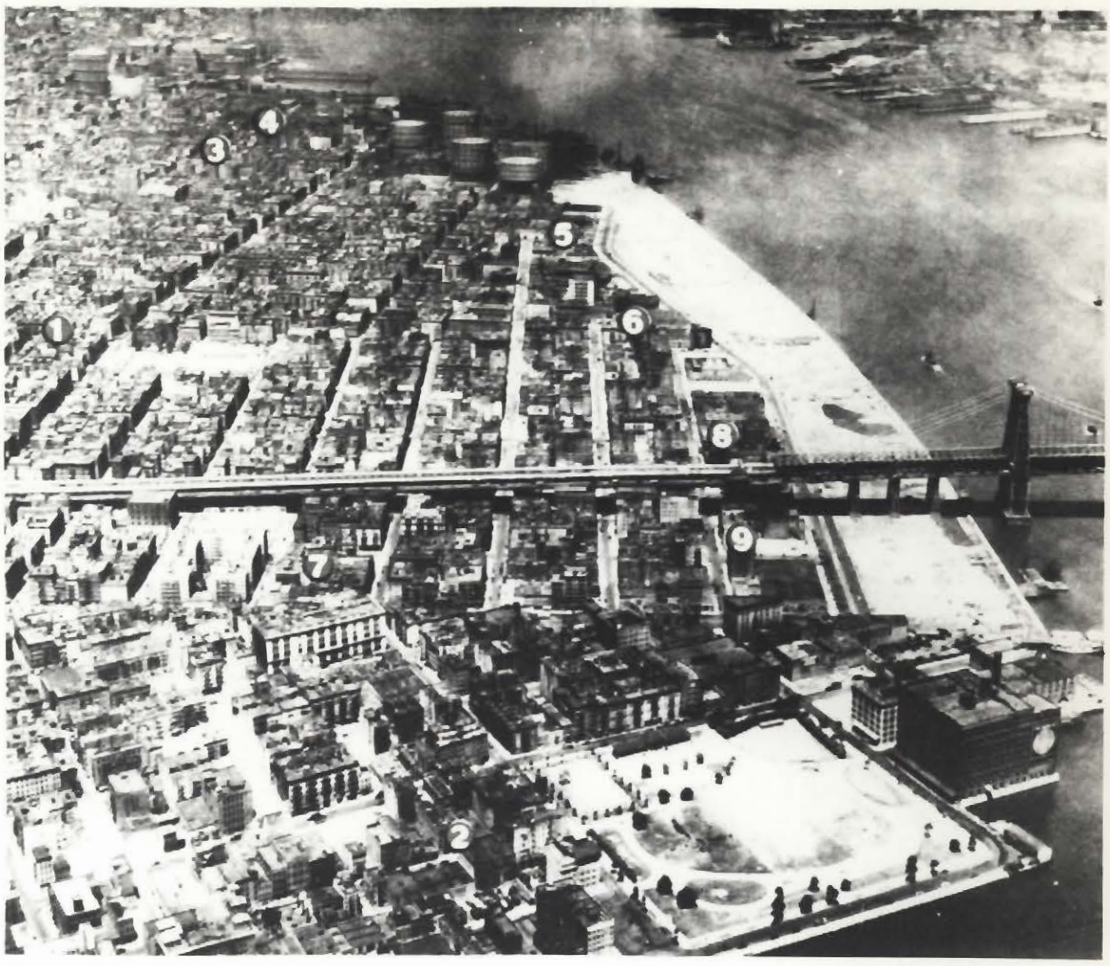


DIAGRAM (19)

DIAGRAM (21) NEW YORK'S LOWER EAST SIDE IN 1935



The change that has transformed New York's Lower East Side in two decades is vividly marked by aerial photos of the area taken in 1935 and 1954.

1. **First Houses** (1935) City-aided public housing.
2. **Vladeck Houses** (1940) Federal and City-aided public housing.
3. **Stuyvesant Town** (1947) Redevelopment Company rental housing.
4. **Peter Cooper Village** (1947) Private rental housing.
5. **Jacob Riis Houses** (1949) Federal and City-aided public housing.
6. **Lillian Wald Houses** (1949) State-aided public housing.
7. **Hillman Houses (1950)**
   Redevelopment Company union-sponsored cooperative housing.
8. **Baruch Houses** (under construction) Federally aided public housing.
9. **Corlears Hook** (under construction)
   Title I and Redevelopment Company union-sponsored cooperative housing.

DIAGRAM (21)

DIAGRAM (22) NEW YORK'S LOWER EAST SIDE IN 1954

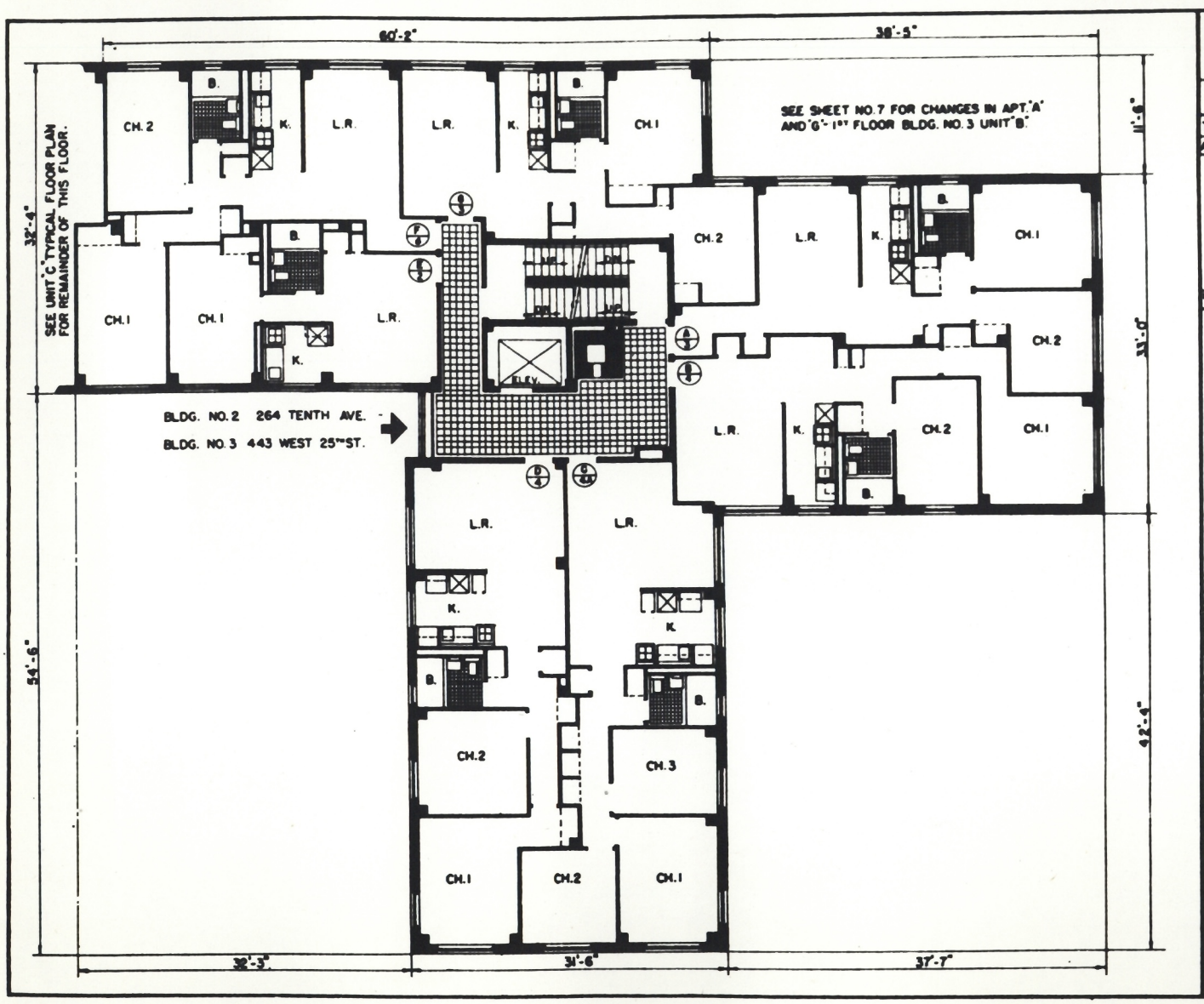
DIAGRAM (22)

Project Data		J.L. Elliott project (Manhattan)	General Grant project (Manhattan)
1.	Number of apartments	608	1,940
2.	Number of rental rooms	2,789	9,138
	Average No. of rental rooms per apartment.	4.59	4.71
3.	Population (estimated)	2,338	7,419
4.	Residential buildings	4	9
5.	Number of storeys	11-12	13-21
6.	Total area-sq. ft.	204,530	655,681
	acres	4.7	15.1
7.	Net housing area-sq. ft.	204,530	655,681
	(excluding park) acres	4.7	15.1
8.	All building area-sq. ft.	45,023	101,477
9.	Cubage - cu. ft.	4,301,454	16,701,596
10.	Coverage - %	22%	15.5%
11.	Density (persons per acre)	497	491
12.	Boundaries	W 25th St. Chelsea Park 9th Ave. 10th Ave.	W. 125th St. Morringside Ave. W. 123rd St. Broadway.
13.	Completion Date	1947	1957

Diagram (23) illustrates the typical plan of J.L. Elliott Project, New York.

Diagram (24) illustrates the typical plan of General Grant Project, New York.

DIAGRAM (23) J.L. ELLIOTT PROJECT, NEW YORK



NEW YORK CITY HOUSING AUTHORITY

RENTAL DRAWING

UNIT DISTRIBUTION

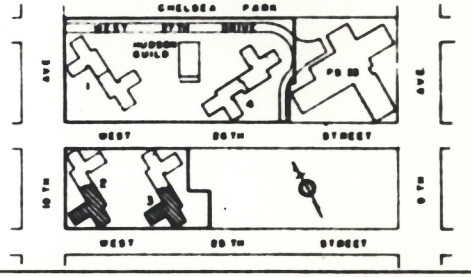
TYP. FLOOR			APTS. PER FLOOR											UNIT TOTALS		
APT.	PER.	RMS.	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH	9TH	10TH	11TH	APT.	PER.	RMS.
1	3	4	1A	2A	3A	4A	5A	6A	7A	SEE SHEET NO. 9	9A	10A	11A	20	60	80
1	4	4	1B	2B	3B	4B	5B	6B	7B		9B	10B	11B	20	80	80
1	4A	5	1C	2C	3C	4C	5C	6C	7C		9C	10C	11C	20	80	100
1	2	3	*G											1	2	3
1	4	4	1D	2D	3D	4D	5D	6D	7D		9D	10D	11D	20	80	80
1	2	2	1E	2E	3E	4E	5E	6E	7E		9E	10E	11E	20	40	40
1	4	4	1F	2F	3F	4F	5F	6F	7F		9F	10F	11F	20	80	80
1	3	4	1G	2G	3G	4G	5G	6G	7G		9G	10G	11G	19	57	76
*7	*24	*27	TOTALS											140	479	539

*IN BUILDING NO. 3 ONLY (SEE SHEET NO.7)
*EXCLUDES APT. 1-G IN BLDG. NO.3

NO. OF UNITS 2
STAIR HALL NO.4 264 TENTH AVE.
STAIR HALL NO.6 443 WEST 25TH ST.
BUILDING NO.2, 3

FOR 8TH FLOOR PLAN SEE SHEET NO.9

GROSS AREA = 4,951 ♦



ELLIOTT HOUSES
NEW YORK, NEW YORK
PROJECT N.Y.C.-2

UNIT "B"

SCALE IN FEET 0 5 10 15 20 30

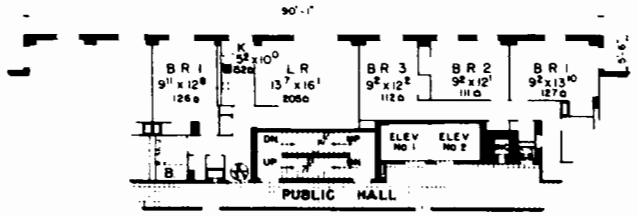
DATE 1-27-47

DR. BY-MSC.
CH. BY-H.J.T.

DIAGRAM (23)

DIAGRAM (24) GENERAL GRANT PROJECT, NEW YORK

DIAGRAM (2/4)



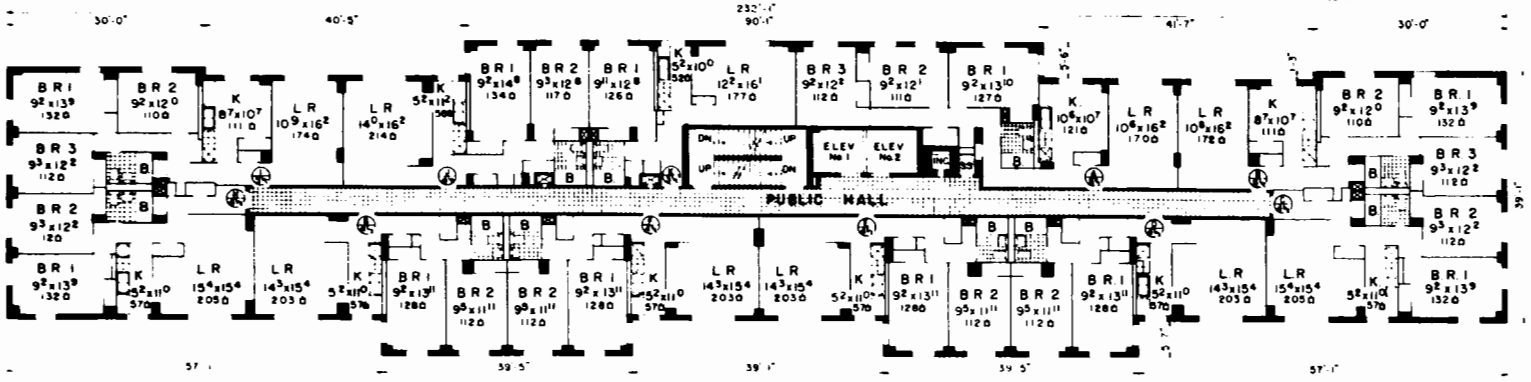
PLAN VARIATION - TYPICAL FLOORS
BUILDING NO 8

UNIT DISTRIBUTION

NO OF STORIES 21 — NO OF TIMES USED 6

SCHEDULE FOR BUILDINGS NO. 1-2-3-4-6-8-9 — STAIRHALLS 1-2-3-4-6-8-9

TYPICAL FL			APARTMENTS PER FLOOR																				UNIT TOTALS		
APT	CR	RR	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH	9TH	10TH	11TH	12TH	13TH	14TH	15TH	16TH	17TH	18TH	19TH	20TH	21ST	APTS	CR	RR
1	5	5½	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A	15A	16A	17A	18A	19A	20A	21A		20	100	110
1	5	5½	2B	3B	4B	5B	6B	7B	8B	9B	10B	11B	12B	13B	14B	15B	16B	17B	18B	19B	20B	21B		20	100	110
-	-	-	1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1	6	6½
1	4	4½	2C	3C	4C	5C	6C	7C	8C	9C	10C	11C	12C	13C	14C	15C	16C	17C	18C	19C	20C	21C		20	80	90
-	-	-	1C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1	6	6½
1	4	4½	2D	3D	4D	5D	6D	7D	8D	9D	10D	11D	12D	13D	14D	15D	16D	17D	18D	19D	20D	21D		20	80	90
1	4	4½	2E	3E	4E	5E	6E	7E	8E	9E	10E	11E	12E	13E	14E	15E	16E	17E	18E	19E	20E	21E		20	80	90
-	-	-	1E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1	4	4½
1	4	4½	2F	3F	4F	5F	6F	7F	8F	9F	10F	11F	12F	13F	14F	15F	16F	17F	18F	19F	20F	21F		20	80	90
-	-	-	1F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1	4	4½
1	4	4½	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G	13G	14G	15G	16G	17G	18G	19G	20G	21G		20	80	90
1	4	4½	2H	3H	4H	5H	6H	7H	8H	9H	10H	11H	12H	13H	14H	15H	16H	17H	18H	19H	20H	21H		20	80	90
-	-	-	1H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1	6	8½
1	5	5½	2I	3I	4I	5I	6I	7I	8I	9I	10I	11I	12I	13I	14I	15I	16I	17I	18I	19I	20I	21I		20	100	110
-	-	-	1I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1	6	6½
1	4	4½	2J	3J	4J	5J	6J	7J	8J	9J	10J	11J	12J	13J	14J	15J	16J	17J	18J	19J	20J	21J		20	80	90
1	3	3½	2K	3K	4K	5K	6K	7K	8K	9K	10K	11K	12K	13K	14K	15K	16K	17K	18K	19K	20K	21K		20	60	70
TOTAL PER UNIT																								226	982	1068



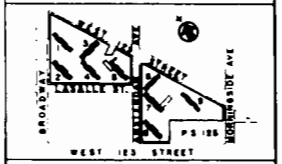
SEE SHEET NO. 3 FOR ENTRANCE FLOOR PLAN

SEE SHEET NO 4 FOR UNIT DISTRIBUTION SCHEDULE FOR BUILDING NO 5 & NO 7 & FOR BUILDING NO 8

SLOP SINKS LOCATED ON ALL FLOORS

ELEVATORS STOP AT ALL FLOORS

GROSS AREA 9797 SQ. FT.



NEW YORK CITY HOUSING AUTHORITY
RENTAL DRAWING

GENERAL GRANT HOUSES

PROJECT NO NY 5-30
MANHATTAN NYC

EGGERS & HIGGINS
ARCHITECTS
100 EAST 42 ST NYC

TYPICAL FLOOR PLAN
BUILDINGS NO 1-2-3-4-5 6-7-8 & 9

DR BY-S | SCALE IN FEET | DATE
CH BY | 0 5 10 | 20 9-26-55

CHAPTER IV SUMMARY

Section 1 Findings in the Cases Studied

In redevelopment schemes the highest overall densities are most likely to be found in public housing projects such as those undertaken by London County Council in England and New York City Housing Authority in America. In previous chapters the development of high density housing has been reviewed and the distinctive parts of many schemes have been pointed out. The following is a brief summary of findings in the cases studied:

A. England

1. Population is decentralised by infilling, by dispersal to existing towns on a 50 miles radius and by dispersal to new satellites within a metropolitan traffic area.
2. Decentralisation of population takes place with a corresponding move of work centres, and dispersal is restricted to the Region.
3. A maximum density of 200 persons per acre is set for central areas.
4. Communication is guided by suburban spread and is the basis of town structure.
5. Mixed developments of houses and flats in England permit density to approximate that which exists.
6. Normal social grouping is desirable in neighbourhoods.
7. Blocks of flats to a height of nineteen storeys can be managed economically.

B. America.

1. Superblock projects are effective in central areas where planning can be broad in scale.

2. Medium and low rental projects are necessary for economic balance and to meet public need.
3. In smaller areas decentralised projects spotted among decent housing can be used to clear pockets of blight and at the same time protect home owner investment.
4. Large three bedroom and small one bedroom or combined living-bedroom apartments are increasing in housing projects in keeping with demand.
5. Low site coverage provides more open space.
6. Tall building blocks on concrete mats provide foundations that give good results in Manhattan.
7. Combinations and variations of strip design in buildings create new forms and improve orientation.
8. Public balconies of multi-purposes are an improvement in apartment living.

CHAPTER IV

Section 2 Applicability of Findings

In the Far East Hong Kong is the area in which highest densities are found. Housing development conditions in Hong Kong have not yet been fully studied and the applicability of the findings that were reviewed in previous chapters is not certain. However, the shortage of building land in the centre of a city and the mixture of good and bad housing within a city are common everywhere in the world. In addition, there is the need for economical design and construction.

London and New York have varying policies in housing development, although most major points are common to recent improvements in both cities. Decentralisation was advanced to improve housing conditions in over-crowded areas in England. The tendency has been to spread houses laterally to the outskirts in London while vertical dwellings fill the centre of the city in New York. In both cities there is the problem of land shortage. Mixed development in England is a compensation for people who prefer to live in houses as well as a method of reducing high density in tall blocks. American decentralised projects spotted in blighted areas are an excellent method of obtaining improvement and diversity in development.

In the following section an attempt will be made to apply or modify these policies to meet the particular conditions in Hong Kong.

PART 3 AN ACCOUNT OF THE PRESENT STATE OF HOUSING DENSITY IN HONG KONG AND A DEMONSTRATION OF THE PROPOSED SCHEMES FOR LOW COST HOUSING DEVELOPMENT

PART 3 AN ACCOUNT OF THE PRESENT STATE OF HOUSING DENSITY IN HONG KONG AND A DEMONSTRATION OF THE PROPOSED SCHEMES FOR LOW COST HOUSING DEVELOPMENT

CHAPTER I GEOGRAPHICAL SETTING AND GENERAL BACKGROUND

Hong Kong is not well known to the Western World and, therefore, a general description of the Colony may be necessary before the housing problems can be discussed. Moreover, the housing problems can be attributed to the impact of diverse and unusual ways of life in a large population centre in the tropics.

Section 1 Topography

The Colony of Hong Kong consists of a number of islands and a portion of mainland on the south-east coast of China. The total land area of the Colony is 391 square miles[1].

(a) Hong Kong Island has an area of 32 square miles and includes Green Island, Aplichau, and other immediately adjacent islets. On the Island there is the capital city, Victoria, two important fishing towns, Shaukiwan and Aberdeen, and a number of villages, such as Stanley and Shek O, that have developed into popular residential areas.

(b) Kowloon peninsula embraces $3\frac{1}{4}$ square miles and Stonecutter's Island $\frac{1}{4}$ square mile. The northern limit of the original ceded territory of Kowloon is Boundary Street, and the urban zone north of it is the New Kowloon.

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1. Hong Kong Annual Report, 1955. Hong Kong, 1956. Chapter 23, p.196.

(c) The New Territories have an area of 355 square miles. This area consists of a substantial mainland section north of Kowloon and 198 islands adjacent to it in the vicinity of Hong Kong Island. There are a number of centres of population in the New Territories, but many of the small islands are waterless and uninhabited.

Hong Kong Island is 11 miles long from east to west and varies in width from 2 to 5 miles. The land rises steeply from the northern shore to a range of treeless hills of volcanic rock; the highest point is Victoria Peak (1,805 feet) near the western end. Between the hills and the harbour lies the city of Victoria. The old part of the urban area ascends the steep hillside in narrow stepped streets and terraces; more modern parts of the town have developed on a strip of reclaimed land that averages 400 yards in width and extends for 9 miles along the north shore of the island.

Between the island and the mainland lies the Port of Victoria. It has an area of 17 square miles and varies in width from one to three miles. On the east side the entrance to the harbour is deep but narrow and is from 500 to 900 yards wide; the entrance on the west side is wider but shallow.

Kowloon originally consisted of a number of low, dry foothills running southward from the Kowloon hills in a V-shaped peninsula 2 miles long and not more than 2 miles wide at any point. Most of the foothills have been levelled, and the rock and soil that was cut away has been used to extend the land by reclamation from the sea. The town of Kowloon covers the entire peninsula and stretches northward into the New Territories. The Kowloon hills limit further expansion to the north, but urban development is extending around the harbour into several rural areas.

A large part of the New Territories is mountainous. The highest point is 3,142 feet and is situated approximately in the centre of the mainland area. The northwestern slopes of this peak descend to the Colony's largest area of cultivable land in the centre of which is the important market town of Yuen Long. Beyond Yuen Long the land extends to marshes and oyster-beds on the verge of Deep Bay. The eastern area of the New Territories consists of irregular mountain masses and narrow valleys. Villages are found where there is flat watered land, valleys or small plateaux. Much of the high land in the areas nearest to Kowloon has been eroded as a result of the felling of trees during the Japanese occupation[1].

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1. District Commissioner, New Territories. "Forestry". Hong Kong Annual Departmental Reports, 1954-55. Hong Kong.

CHAPTER I

Section 2 Climate

The Colony lies just within the tropics and it enjoys a variety of weather that is unusual in tropical regions. The climate is governed by monsoons: the period of the northeast monsoon is from October to April and brings cool air from high latitudes; the southeast monsoons last from June to August. Summer is the rainy season and is continuously hot and humid; early winter is the most pleasant time of the year when the weather is generally dry and sunny. Typhoons may occur during the period from July to October.

The mean monthly temperature ranges from 59°F in February to 82°F in July; the average temperature is 72°F. The mean relative humidity exceeds 80 per cent from March until August but occasionally it may fall as low as 20 per cent during the early winter. The average daily period of sunshine ranges from 3 hours in March to 7 hours in October. Average annual rainfall is 84.76 inches.[1]

Tropical weather conditions in the Colony necessitate the application of scientific techniques to the design and construction of buildings that provide protection against solar radiation and humidity. Special attention needs to be given to rodent and insect control.

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1. Hong Kong Annual Report, 1955. "Climate". Hong Kong, 1956.

CHAPTER I

Section 3 Population

The population of Hong Kong at the end of 1955 was estimated to be 2,400,000[1]. The natural rate of increase is considered to be about 3 per cent a year. No census has been taken since 1931 when population was found to be 847,751. Since the Japanese invasion of China in 1937, conditions have been unsettled and the Colony has been subject to fluctuations in population.

Political events in the Far East have brought a continuous flow of refugees from China. The birth rate in the Colony is high and is evidently rising. In 1955, registered births exceeded registered deaths by 71,431[2] - an increase of 1,374 per week.

The population of Hong Kong is predominately Chinese. Excluding Service personnel and their dependents, there are about 13,000 British subjects from the United Kingdom and the Commonwealth. Other non-Chinese residents include Americans (1,800), Portuguese (1,700), Philippines (370), Dutch (300), French (290), Italians (250), and Japanese (200).

The Chinese population, amounting to 220,000, live in villages in the New Territories and the remaining population are city dwellers: 500,000 are refugees of which 300,000 are squatters[3].

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1. Hong Kong Annual Report, 1955. "Population". Hong Kong, 1956.
2. Ibid.
3. Hong Kong Government Public Relations Office. Hong Kong. p.22.

CHAPTER I

Section 4 Communication

Sea

The Port of Victoria is a world famous harbour and a safe anchorage and typhoon shelter in the China Sea.

There are ferry services for passengers and cars across the harbour between various points on Hong Kong Island and Kowloon. The average daily passenger load of 96,000 persons is carried by one ferry company. Another ferry company operates five cross-harbour ferry services, one of which is the Colony's only vehicular ferry connecting Hong Kong with Kowloon. In addition, there are outlying district services which link Hong Kong with the more important islands of the New Territories.

Railways

A railway connects Hong Kong and China: Kowloon is the southern terminal. The British section of the main line to China is 22 miles long. The total length of rail line in the Colony is 35 miles[1] and is owned by the Hong Kong Government.

Services between Hong Kong and China have been suspended since 1949. Passengers proceeding to and from China must change trains at the frontier and walk 300 yards between the two railways. 92.79 per cent of the total passengers travel within the territory of Hong Kong. People living in the

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1. General Manager, Railway. Hong Kong Annual Departmental Reports, 1955-56. Hong Kong.

New Territories take local trains to their place of work in Hong Kong.

Roads

The road system in Hong Kong and Kowloon is unplanned. During recent years the volume of traffic has increased and it is now considered necessary to widen the existing roads and to adopt a higher standard of road construction, particularly on main traffic routes.

Roads on Hong Kong Island are narrow and steep while those in Kowloon are usually wider. There are main roads running around Hong Kong Island as well as along the coasts in the New Territories.

The existing main roads, railways, and the ferry routes are shown in Diagram (40).

Public transportation systems are maintained by private companies. There are electric tramway services on Hong Kong Island running east and west along the north shore, and all routes pass through the City of Victoria.

There are Peak trams running from town to the Peak in Hong Kong Island. This means of transport has been provided almost without interruption for over sixty years.

Bus services on the island run over steep, narrow and winding roads in the mid-level districts as well as in the town of Victoria. There are also buses operating in Kowloon and the New Territories[1].

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1. Hong Kong Annual Report, 1955. "Public Utilities". Hong Kong, 1956. p.152.

Air

The facilities for air travel are among the best in Asia. The only airport is situated on the mainland about four miles from the southern extremity of Kowloon peninsula. The airport is adjacent to Kowloon Bay and is suitable for land and sea aircraft.

CHAPTER I

Section 5 Public Utilities

Water Supply

Water supply has been a serious problem in Hong Kong. The Colony is almost entirely dependent on rain that falls during the monsoon season in the summer for its water supply. The supply is retained in 13 storage reservoirs which have a total capacity of 5,970,000,000 gallons of which only 2,362,000,000 gallons of water can be held on the island[1]. These reservoirs are normally filled during the rainy season but are inadequate for the demands of a growing population, increased development, expansion of industries, and large scale squatter resettlement schemes. Severe restrictions on the use of water are imposed during dry seasons. New reservoirs are under construction.

Hong Kong possesses a system of catchwaters 35 miles long. These channels run along the mid-levels of various hillsides, intercept streams and water courses, and convey their waters to the various storage reservoirs. Water in the reservoirs of the New Territories is conveyed across the harbour by marine pipes and large quantities must be pumped because of the hilly nature of the Island. Water is filtered and sterilized by chemical treatment.

In the New Territories all principal towns are supplied with water either from the main sources or from local streams.

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1. Director of Public Works. "Water Works". Hong Kong Annual Departmental Reports, 1955-56. Hong Kong.

Electricity

Electricity is supplied to all principal towns on the mainland, part of the New Territories, and to villages situated within a reasonable distance of main roads. Electricity services also extend to the populated islands. The demand for electricity grows steadily each year as new urban and industrial development takes place.

Gas

Gas is supplied by a private company. It is not used extensively for cooking by the majority of lower income families but in recent years the number of consumers has increased.

Drainage

Water-borne sewage systems are provided in nearly all built-up areas and in the larger towns in the New Territories. The reconstruction of old buildings to large new blocks of flats has caused many of the old sewers to be loaded beyond their intended capacity, and the work of relaying and enlarging them is progressing steadily. The provision of intercepting sewers has abolished numerous outfalls into the harbour and brings the sewage to selected sites where it is chemically treated and discharged by submarine outfalls[1].

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1. Director of Public Works. "Sewage". Hong Kong Annual Departmental Reports, 1955-56. Hong Kong. p.28.

CHAPTER I

Section 6 Public Health

The mortality rate is high in Hong Kong. Tuberculosis is the major health problem, and, while the gross overcrowding and economic depression continues, there is little prospect of achieving improvement. Many thousands of people still live in squatter shacks or herd together in insanitary and congested tenements where as many as 80 people share a kitchen, one tap and one latrine[1].

The administration of public health measures is divided between the Department of Medical and Health Services, the Urban Council, the Urban Services Department, and the New Territories Administration. There is a School Health Service for all schools and health education is conducted at Health Centres. A system of house inspection has been introduced and the health inspectorate personally advises tenants in cleaning methods and hygiene. The Urban Service Department is subdivided into interrelated sections dealing with sanitary maintenance of buildings and open spaces, pure food supplies, the establishment and control of public retail markets, the licensing and control of hawkers, the prevention of disease, and the collection and disposal of refuse. A regular service has been maintained for the cleaning of street gully-traps and the nightly washing of roads and footpaths.

Pest control is also a responsibility of the Urban Services Department. Parks and Gardens are also maintained under this department.

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1. Hong Kong Annual Report, 1955. "Public Health". Hong Kong, 1956. p.96.

CHAPTER I

Section 7 Administration

Under the general direction of the Colonial Secretary, the administrative functions of Government are discharged in 30 departments by members of the Civil Service.

A Department of Resettlement has been organised by a select committee of the Urban Council to deal with the resettlement of squatters. All members of the Council and three additional members who are nominated by the Government comprise the Housing Authority.

The New Territories are divided into three administrative districts: Yuen Long in the northwest, Taipo in the northeast, and the Southern District that includes the southern and southeast part of the mainland, Lantao, Cheng Chau, Lamma and other islands around Hong Kong Island.

CHAPTER I

Section 8 Social Welfare

Social Background

As Hong Kong is a free port under British rule, skilled and semi-skilled workers and business men have flooded into the Colony from China and elsewhere. Hong Kong has grown and prospered economically by this influx but the standard of living has not improved to any extent because of the lack of good housing and recreation space.

Community Development

Community development is achieved mainly through "Kaifongs" or neighbourhood associations that are based on Chinese traditions but organised for the efficient execution of present day welfare programmes. Twenty-three "Kaifongs" are now recognised by the social welfare office in which there is a special section to give guidance and encouragement to "Kaifong" work.

The sense of family obligation is strong among Chinese, but in squatter colonies where poverty is common, welfare organisations have to provide for the needs of the majority of the residents.

Education

Education in Hong Kong is voluntary but there is great public demand for schools. Thirty-seven per cent of all schools in the Colony are either administered directly by the Government or assisted by Government grants and subsidies. Government assistance is given also to private schools in the form of grants of land on favourable terms and interest-free loans.

The rapid industrialisation of the Colony has created a demand for technical education; there is also a growing need for adult education. There are few records dealing with these matters but it can be assumed that education like housing is a serious problem.

CHAPTER II ECONOMIC ASPECTS

Section 1 Occupation and Wages

Occupation

The principal sources of employment in Hong Kong and Kowloon are industry, commerce, and internal distributive trades.[1]

Since 1954 the main factor affecting employment has been the continued expansion of local industry and a consequent increase in the number of factory workers. The number of officially registered and recorded industrial establishments has risen 17 per cent while the number of factory workers increased by 12 per cent. Partial surveys made by the Government in 1955 suggest that the total number of people engaged in industry is 325,000 and that industry constitutes the largest single source of employment.

The principal industries that employ about 80,000 people are textiles, metal goods, shipbuilding and ship repairs. There are 13,500 workers in the textile group[2].

Farming and fishing are the two principal occupations in the New Territories, but the pattern of country life has been modified. Urban influences have begun to attract young men away from their villages in search of work either in the towns or overseas.

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1. Hong Kong Annual Report, 1955. Hong Kong, Hong Kong. p.24.
2. Ibid. p.25.

Wages

As the vast majority of Hong Kong's population are of the lower middle income group, wages earned affect the living standards throughout the Colony. There has been no significant change in wage rates during the past year due to the surplus of workers for the number of jobs.

The average wage ranges for daily-rate workers are:[1]

Skilled workers	$7 - $12 H.K. (equivalent to $1.20 - $2 U.S.)
Semi-skilled workers	$5 - $6 H.K. (equivalent to 85¢ - $1 U.S.)
Unskilled workers	$3 - $5 H.K. (equivalent to 50¢ - 85¢ U.S.)

Some highly skilled workers receive as much as HK$15 per day ($2.50 U.S. currency). Women workers receive the same rate of pay as men, although their earnings may differ if they have not worked as many hours a day.

The working hours in the building trade are 9 hours a day during a 7 day week. The long hours are accepted by the Chinese workers so their earnings are correspondingly greater. As a rule a 48 hour week is the standard working week. There is a system in some factories of three shifts of 8 hours to maintain continuous production. Rest days are arranged in rotation and are usually a Sunday every second week.

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1. Hong Kong Annual Report, 1955. Hong Kong. p.96.

CHAPTER II

Section 2 Industries

The first industries in Hong Kong were allied to the development of the Port, but in the last ten years the pattern of Hong Kong's economy has changed and industry now has the major role. Much of the industrial expansion has been due to unsettled economic and political conditions elsewhere in the Far East. An influx of industrialists from China who sought security for their capital and equipment has had a stimulating effect on existing industries. The adoption of new types of machinery brought about a considerable improvement in the output and the quality of products.

At present there are 2,925 recorded factories that employ a labour force of 129,465 workers. In addition to these registered factories, there is a large number of smaller concerns that produce handicrafts of a traditionally Chinese character. It is estimated by the Government that almost 200,000 people find employment in these smaller industries. The range of manufacture is remarkable in so small a territory where more than 140 different kinds of industry are listed[1].

There is scope for further industrial development in the Colony when means have been found to overcome problems such as the severe shortage of water and the limited amount of land suitable for industrial sites. Most of the textile industries are situated along communication lines on the south shore of the New Territories and on the northeast sections of Hong Kong

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1. Hong Kong Government Public Relations Office. "Industrial Expansion", Hong Kong. W.S. Cowell Ltd., Butler Market, Ipswich, Great Britain.

Island. Combined residential and light industrial areas are frequently found in sections of the Colony.

Diagram (25) shows a typical section of Hong Kong where mixed residential and industrial development are found.

DIAGRAM (25) TYPICAL MIXED RESIDENTIAL AND INDUSTRIAL DEVELOPMENT IN HONG KONG

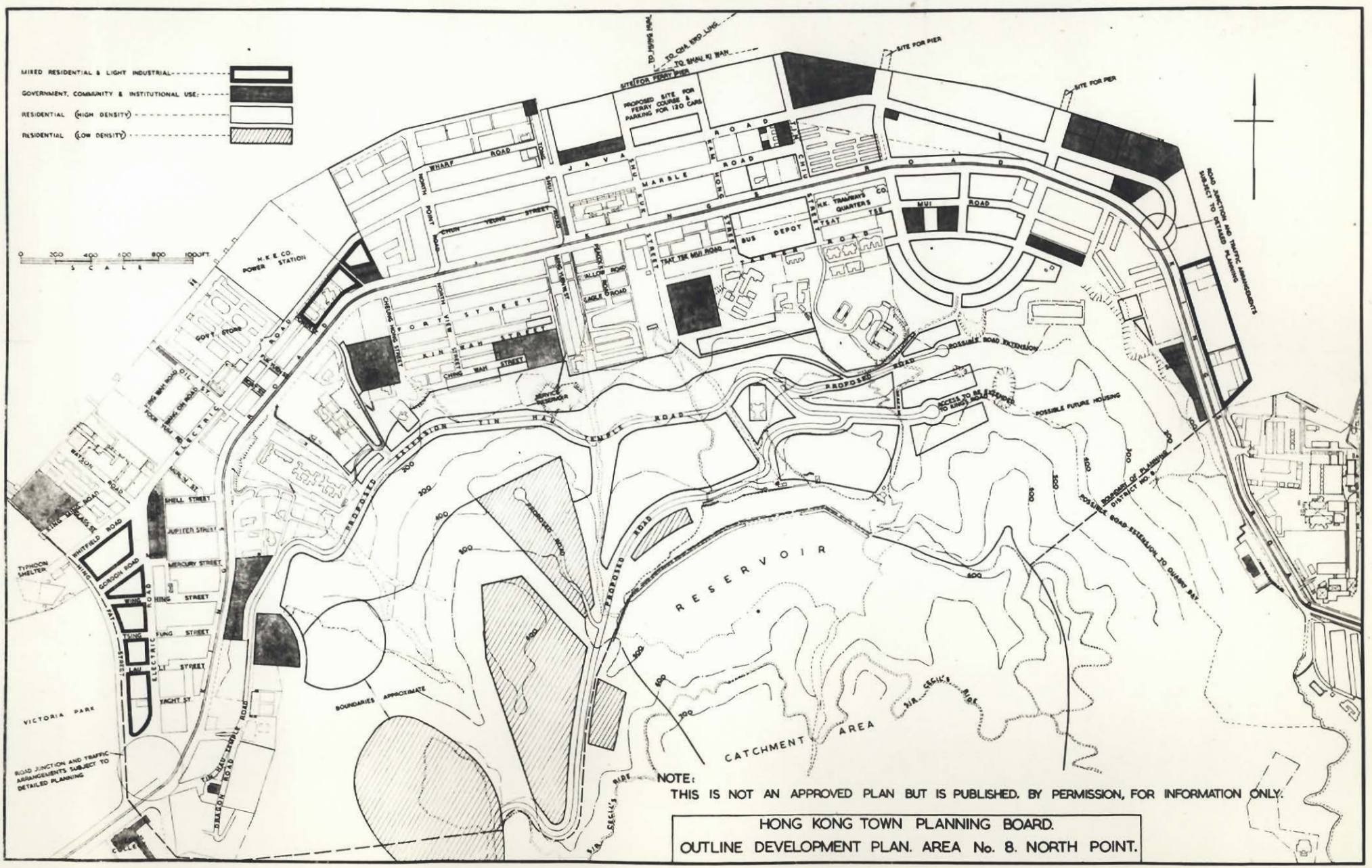
MIXED RESIDENTIAL & LIGHT INDUSTRIAL
GOVERNMENT, COMMUNITY & INSTITUTIONAL USE
RESIDENTIAL (HIGH DENSITY)
RESIDENTIAL (LOW DENSITY)
SCALE
SITE FOR PIER
SITE FOR FERRY PIER
PROPOSED SITE FOR FERRY COURSE & PARKING FOR 120 CARS
TO SWAN KI WAN
TO CAUSEWAY LINE
TO HUNG HOM
JAVA ROAD
MARBLE ROAD
WHARF ROAD
NORTH POINT ROAD
OWEN YEUNG STREET
KING'S ROAD
HONG KONG ELECTRIC CO. TRAMWAYS QUARTERS
BUS DEPOT
MUI ROAD
SAT TIK MUI ROAD
NORTH VIEW STREET
CHEUNG HONG STREET
KIN WAH STREET
CHING WAH STREET
MOUNT PARKER ROAD
ALLOW ROAD
EAGLE'S NEST ROAD
N.E.E. CO. POWER STATION
GOVT. STONE YARD
HONG KONG ELECTRIC CO. OIL FUEL STORAGE
SERVICE RESERVOIR
PROPOSED EXTENSION TIN HAU TEMPLE ROAD
PROPOSED ROAD
POSSIBLE ROAD EXTENSION
ACCESS TO BE RESTRICTED TO KING'S ROAD
POSSIBLE FUTURE HOUSING
BOUNDARY OF PLANNING DISTRICT NO. 8
POSSIBLE ROAD RESERVATION TO QUARRY BAY
RESERVOIR
CATCHMENT AREA
BOUNDARIES APPROXIMATE
ROAD JUNCTION AND TRAFFIC ARRANGEMENTS SUBJECT TO DETAILED PLANNING
WATSON ROAD
KING'S ROAD
SHELL STREET
JUPITER STREET
MERCURY STREET
WING HING STREET
WING TUNG STREET
YAU LEE STREET
YACHT ST.
WHITFIELD ROAD
GORDON ROAD
TYPHOON SHELTER
VICTORIA PARK
TIN HAU TEMPLE ROAD
DAIRY FARM ELECTRIC ROAD
CECIL'S RIDE
NOTE:
THIS IS NOT AN APPROVED PLAN BUT IS PUBLISHED, BY PERMISSION, FOR INFORMATION ONLY.
HONG KONG TOWN PLANNING BOARD.
OUTLINE DEVELOPMENT PLAN. AREA No. 8. NORTH POINT.

DIAGRAM (25)

CHAPTER II

Section 3 Living Conditions and Family Sizes

In recent years, the cost of living in Hong Kong has remained constant though changes have occurred as a result of normal seasonal fluctuations in the price of food.

The average family income for the large lower middle income group ranges from HK$600 (U.S.$100) to HK$900 (U.S.$150) per month. (See chart 1). The amount of rent paid by families varies to a great extent as there is no fixed rule for the amount payable. The local welfare authorities recommend that one sixth of the total family income is a reasonable figure.

Families vary in composition and few remain static. Housing projects, therefore, must have a variety of unit plans to meet differing requirements. The following chart (1) shows the living conditions and family size of typical lower middle income families. Chart (1) indicates that there is a general average of five persons per family; however, family sizes vary and it is desirable to provide at least two sizes of units for the accommodation of from three to five persons.

The problem of living accommodation has become increasingly difficult in Hong Kong during the last decade. The rate of increase in population, the high cost of living, unemployment and the high costs of land and materials are all factors which contribute to the present extremely congested conditions of living among the wage earning class.

CHART I TYPICAL LOWER MIDDLE INCOME FAMILIES[1]

Occupation	Monthly Wages	No. of Dependants	Other Incomes	Total Family Income	Servants	Present Accommodation	Rents
School Teacher (female)	HK$357	3	Sister HK$250	HK$625	1	L.R. 18x10-6 B.R. 9x7 S.R. 7x5 b.r. 6x4) sharing with 3 K. 12x8) other families	HK$150
Clerk (Import Export firm)	HK$380	1½	Wife HK$110	HK$490	1	L.-B.R. 20x12 b.r. 7x7 * K. 8x10 * Servant sleeps in bath room	HK$175
Printer	HK$770	1	-	HK$770	-	L.-B.R. 15x9 b.r. 7x6-6) sharing with K. 10x8-6) 2 other families	HK$80
Accountant	HK$889	6	-	HK$889	1	L.R. 11x10 B.R. 9x12, 9x9 K. 7x7 W.C. 4x2-9 no bath, washing in kitchen	HK$210
Doctor (Housemanship)	HK$450	2	-	HK$450	-	L.R. 14x20 (sharing) B.R. 10x10 K. 8x8 (sharing) W.C. 5x5	HK$150
Teacher	HK$600	4	Wife HK$250	HK$850	1	L.R. 12x12 B.R. 8x10 K. 8x8 (sharing) W.C. 3x5	HK$240

1. Information obtained from the records of prospective tennants of the Housing Society.

The following is a description of accommodation provided for lower middle income families in the old type of flats[1].

Living-room The majority of lower middle income families have no living-rooms in the western sense of the word. Usually accommodation is in the form of a large room partitioned off by plywood or fibre boards into sleeping areas and into areas used as sitting rooms that are often shared by families.

Bedroom The bedroom is either a partitioned area or an enclosed balcony. In many cases the centre bedroom is dark and has no ventilation, but when low partitions are used there is a total lack of privacy. In extreme cases, a room is partitioned off into a number of cubicles according to the size of the family and double deck beds are used to afford more sleeping accommodation.

Kitchen In few cases do families have their own kitchens. Normally a kitchen is shared between three or more families and in some cases the kitchen is also used as the bathroom.

Bathroom Water closets are provided in recently constructed buildings but the habit of sharing a flat necessitates the use of a single bathroom by three or four families. In most existing flats there are no water closets or wash basins but a water tap is normally provided. In some cases, only a water closet is provided and washing has to be done in the kitchen. Floors have a cement finish and are flooded most of the time. The walls

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1. "Investigations on High Block of Flats for Lower Middle Income Group". Unpublished investigations for an Architectural design thesis, Hong Kong University, 1955.

are plastered and, owing to the dampness of the floor, the plaster usually drops away exposing the brickwork behind.

Staircase hall None of the old types of flats in Hong Kong have more than five storeys. No lifts are required in flats less than five storeys high and there are no staircase halls, but a system of direct access to flats off landing space is used. Usually the flight of a single staircase is too long for comfortable ascent. Artificial lighting is necessary throughout the day.

Drying Areas Proper drying areas are seldom provided. The problem is often solved by installing temporary wooden racks on the front facade of a building and clothes are hung across bamboo sticks. This spoils the front elevation of the building and the water drips onto the streets.

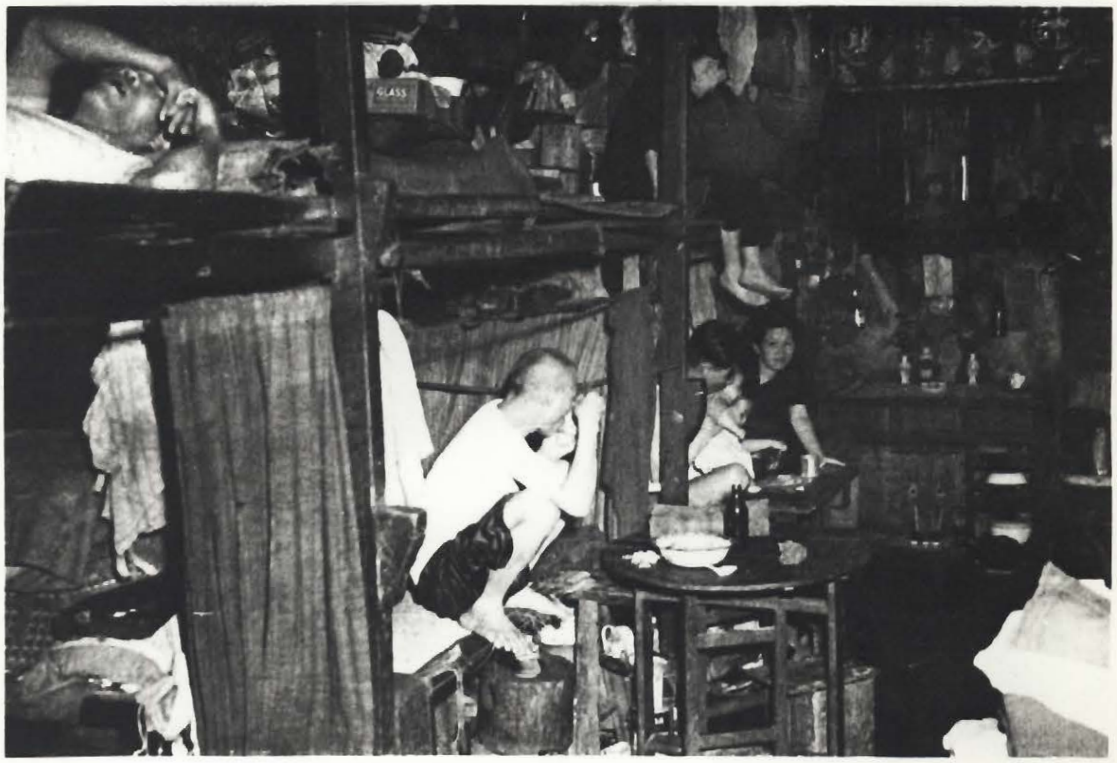
It is not uncommon for a family of four or more to live in a single cubicle or a bedspace that contains only a bunk bed with two or more tiers and the space it occupies. Privacy is provided by curtains. (See diagram 26). Ventilation depends on the whims of the tenants with access to the windows. Water is scarce, sanitary arrangements are insufficient and cooking facilities have to be shared by all. Disease flourishes and quarrels are frequent.

Diagram (27) shows the typical slum tenements.

Those who cannot afford even this type of accommodation have to establish themselves as squatters. They build huts for themselves from whatever material is at hand and huddle together in insanitary places wherever there is space.

In contrast the well-to-do can provide themselves with modern conveniences

DIAGRAM (26) TYPICAL INTERIORS OF THE SLUM TENEMENTS.



THE HOUSING PROBLEM.
Interiors of the tenements shown overleaf.

DIAGRAM (26)

DIAGRAM (27) TYPICAL SLUM TENEMENTS.

THE HOUSING PROBLEM—Typical slum tenements.

DIAGRAM (27)

and keep pace with the high standards of the Western World.

CHAPTER II

Section 4 Land Value and Land Scarcity

All land in the Colony is held on leasehold tenure granted by the Crown. In early days leases were granted for 75, 99, or 999 years. The present practice is to grant leases for 75 years that are renewable for a further 75 years at a re-assessed Crown rent.

Policy concerning the sale or grant of Crown land is governed not so much by the availability of land as by its scarcity. In order to ensure that available crown land is put to the best possible use, all sales or grants are subject to a covenant wherein the lessee undertakes to develop the lot to a certain value within a specified period; the amount of expenditure depends on the location and type of development allowed. The basic principle behind the disposal of crown land is that the maximum use shall be made of it, either industrially or for the provision of the greatest possible amount of living space allowed within a town plan[1].

Land in the New Territories is classified separately as either agricultural land or building land. The policy governing land within New Territories follows the same general lines as that for the urban areas, particularly in towns and in areas required for industrial development.

A survey made by the Government showed that only about 30,000 acres or 13 per cent of the total land area of the Colony was being used for

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1. Hong Kong Annual Report, 1955. "Reproduction", Hong Kong. 1956.

agriculture and animal industries. Wherever possible urban extensions in the Colony are concentrated on land reclaimed from the sea. In the past much of the residential and commercial development has been achieved by the simple expedient of excavating hillsides and using the spoil to reclaim land from the sea.

Besides the direct sale of crown land, the value of private property leased from the Crown is many times higher. This is due to the fact that crown land has to be bought under auction and it is not immediately released. The bid is always much higher than the set price.

As the Government owns the freehold of virtually all land in the Colony, there is little or no impediment to the controlled use of unleased crown land. When planned improvements affect land already leased, compulsory purchase or purchase by negotiation is necessary.

The increase of the private investment in new building has been remarkable in the past six years. Fifty-seven per cent of all private investment occurred in Hong Kong Island of which half was placed in Victoria and half outside Victoria, and 43 per cent was invested in Kowloon and the New Territories[1]. The present indications suggest that investment in Kowloon is rapidly reaching the same proportion as in Hong Kong.

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1. Commissioner of Rating and Valuation. Hong Kong Annual Departmental Reports, 1955-56. Hong Kong. p.8.

CHAPTER III EXISTING HOUSING CONDITIONS

Section 1 Present Form of Development

Most of the population that is to be re-housed prefers to be accommodated near their places of livelihood. It is thus self-evident that land within the urban area, or at least the accessible parts of it, must not be wasted through the erection of cheap single-storey housing. To house people on the limited amount of land, vertical development in the form of multi-storeyed buildings has been undertaken but it is not an ideal form of dwelling. The long-term planning of the Government envisages the eventual provision of a minimum of 10,000 housing units a year. To make this target feasible it has had to accept net densities of 1,500 or more persons per acre, but even on this excessively high density basis it has not been easy to find suitable land in the central areas.

Squatters' huts filled up the free spaces in the built-up areas. Many of the tenement blocks in the central area have been pulled down and replaced by multi-storey buildings. As space can only be found vertically, those who can only afford a cheap single storey house have now to find land in the New Territories. Thus the dispersal of a small population to the existing towns in the New Territories has begun. Furthermore, the expansion of industry in the New Territories attracted many workers and they have stayed near their places of livelihood there. In short, the form that development has taken in the Colony is the filling in of the built-up areas by multi-storey buildings and the dispersal of a small population to New Territories where cheaper land can be found.

Housing in the New Territories is at present substantially influenced by modern ideas, particularly in new buildings such as school houses. In

certain areas city-dwellers have built modern bungalows and small weekend houses. In market towns, where 2 or 3 storey buildings have existed for many years, modern shops and tenement buildings differ little from those in Kowloon.

Although there has been considerable progress in the construction of new buildings in recent years, only the rich can afford the new homes that are being built. Private enterprise cannot produce the accommodation required at rents within the means of the poorest inhabitants. Government assistance is essential.

CHAPTER III

Section 2 The Government Resettlement Policy

In addition to the densely populated built-up areas in the Colony of Hong Kong, refugees or squatters were found on every inch of the land. There were estimated to be 300,000 squatters in or near the urban areas. Several big fires in the squatters areas in Kowloon City rendered 85,000 persons homeless[1]. This made the housing problem more acute and brought about Government intervention.

In an attempt to meet this grave situation, the Government set up a Housing Authority in April 1954 that was charged with the duty of providing accommodation for people living in over-crowded and unsatisfactory conditions. The Authority functions as a commercial enterprise. Rents are kept as low as possible but they must be sufficient to cover expenditure. Crown land is allocated at half the normal price, and Government loans are granted at a low rate of interest from $3\frac{1}{2}$ per cent to 5 per cent per annum. All housing schemes must receive Government approval and private development also receives every encouragement from the Government. A number of larger business concerns have constructed quarters for their employees, and schemes of this sort are aided by the allocation of land on favourable terms. Government itself has started to assist local officers to build their own homes on a co-operative basis. In addition, the Hong Kong Housing Society, the Hong Kong Model Housing Society, and the Hong Kong Economic Housing Society are making significant contributions in dealing

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1. Commissioner for Resettlement. Hong Kong Annual Departmental Reports, 1954-55, Hong Kong.

with this difficult problem.

One of the main difficulties experienced by the Authority is the lack of suitable building sites, particularly on a large scale.

Squatters occupy almost all the crown land which otherwise could be made available for immediate development. In the worst areas which are filled with buildings and shacks of single storey construction, the density is 2,000 to the acre. See diagram (28).

The Government decided to rehouse the fire victims at a similar or greater density per acre but in hygienic multi-storey buildings equipped with filtered water supply, a main drainage system and served by proper roads that provide access to open spaces. There was no alternative method of dealing with the emergency case.

Due to the scarcity of land, the squatters' resettlement housing had to be built high. The basic design chosen was a seven-storey block, 'H' shaped in plan. The long arms of the 'H' provide 64 rooms on each floor and the cross-piece contains two water stand-pipes, six communal flush latrines and a communal open space for washing clothes. Each room is 120 square feet and access is by a balcony which runs completely round each long arm of the 'H'. At each of the four corners of the building there is a staircase. It was decided that the average density of resettlement should be five adults to a room: two children of 10 years or under were considered as one adult. The allowance of 24 square feet per adult represents a considerable degree of overcrowding. The buildings of this emergency sub-standard accommodation were of permanent construction and they were designed with the intention of conversion at a later date into orthodox self-contained flats. Each converted flat would be of about 250

square feet and would include a small private balcony.

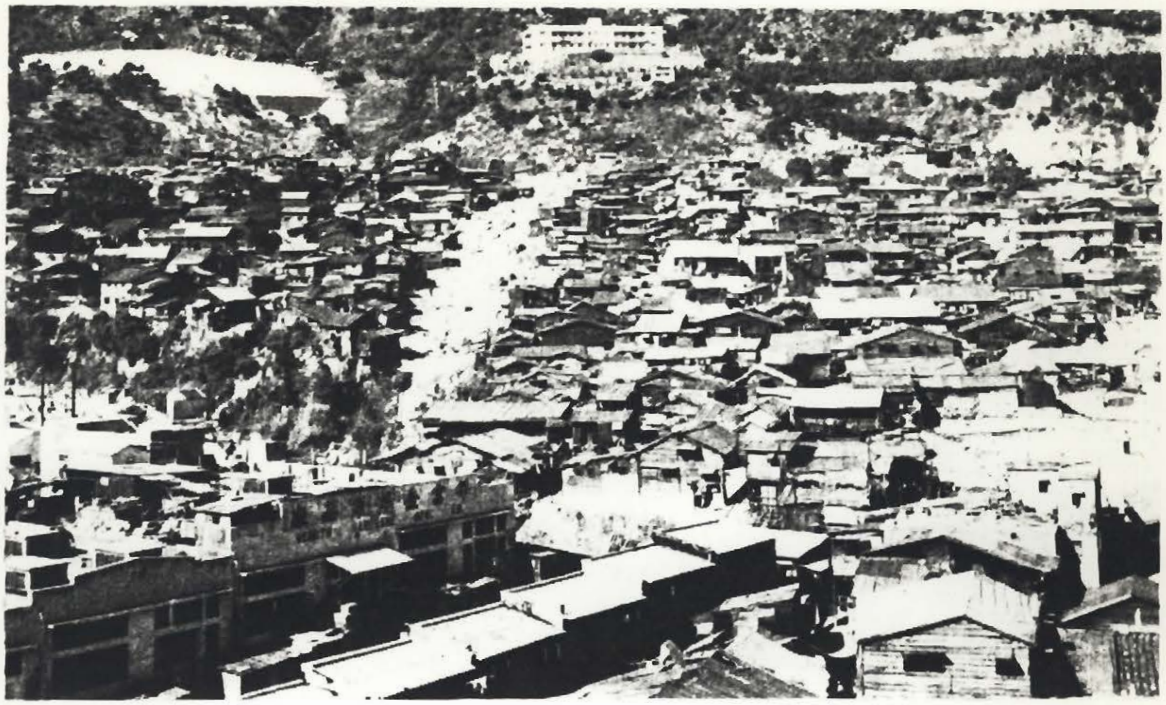
Diagram (28) shows the typical squatter areas and the resettlement buildings.

Diagram (29) shows the typical floor plan of the resettlement buildings.

Diagram (30) shows the manner in which the resettlement building could be converted into self-contained flats.

DIAGRAM (28) TYPICAL SQUATTER AREAS AND
RESETTLEMENT BUILDINGS.

One of the fire lanes cleared at So Uk during the summer of 1954.



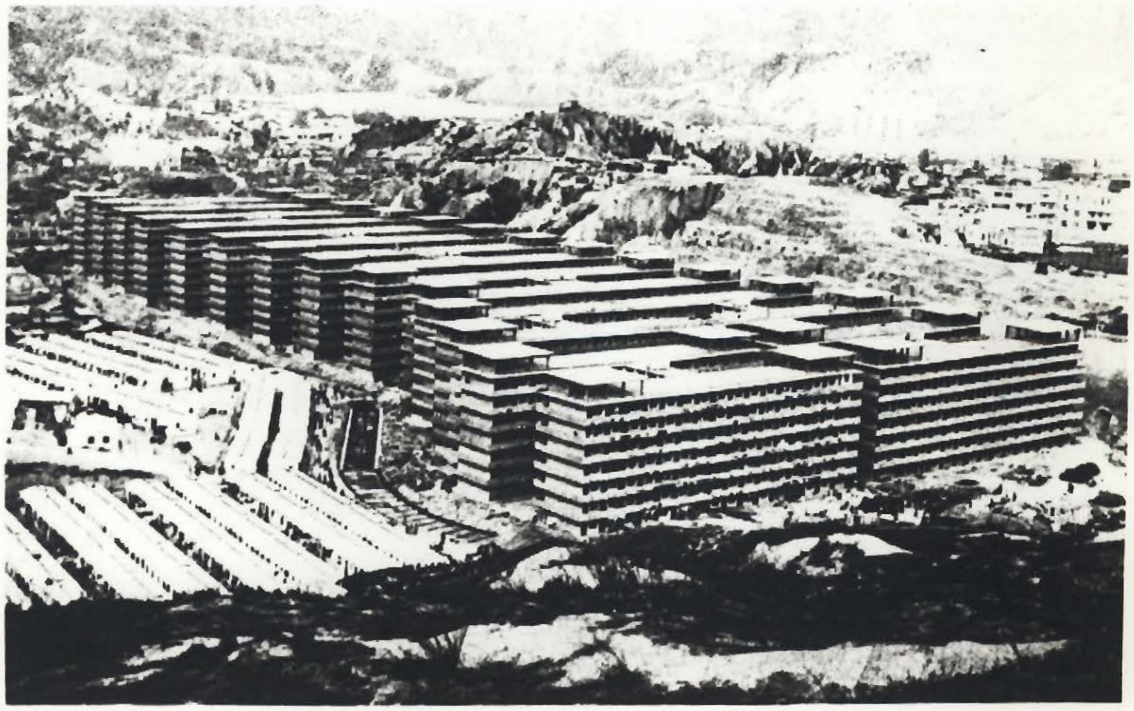
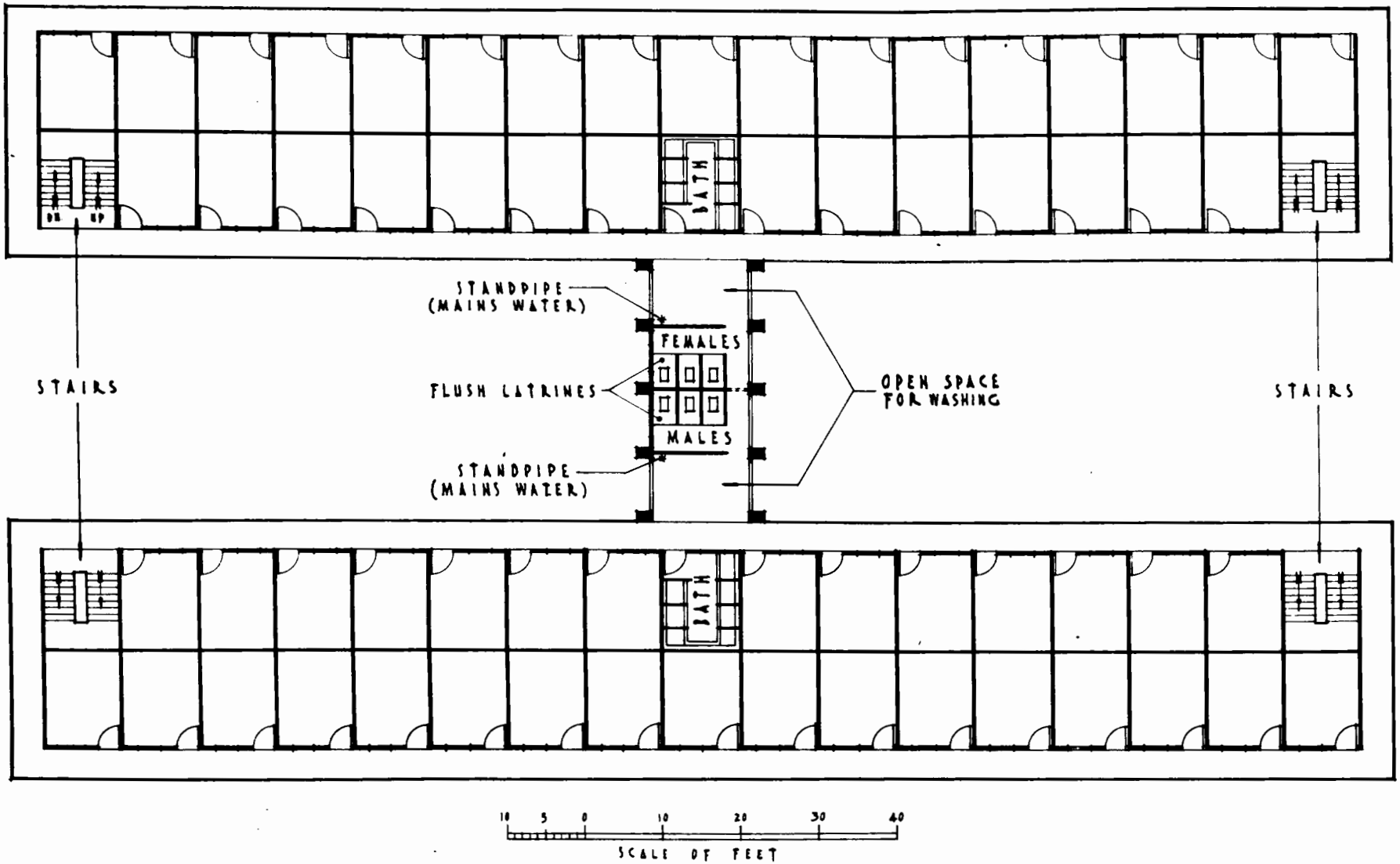


DIAGRAM 28

DIAGRAM (29) TYPICAL FLOOR PLAN OF THE RESETTLEMENT BUILDING.

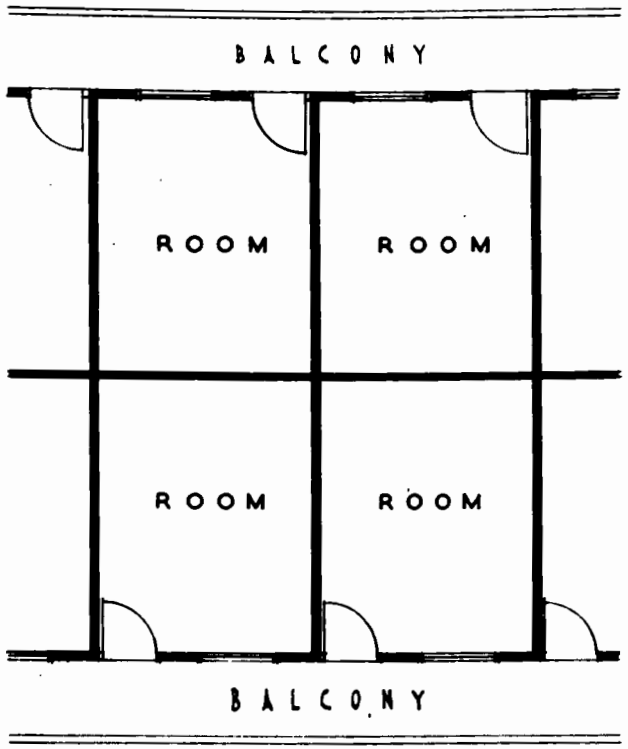
SEVEN - STOREY RESETTLEMENT BUILDING
TYPICAL FLOOR PLAN



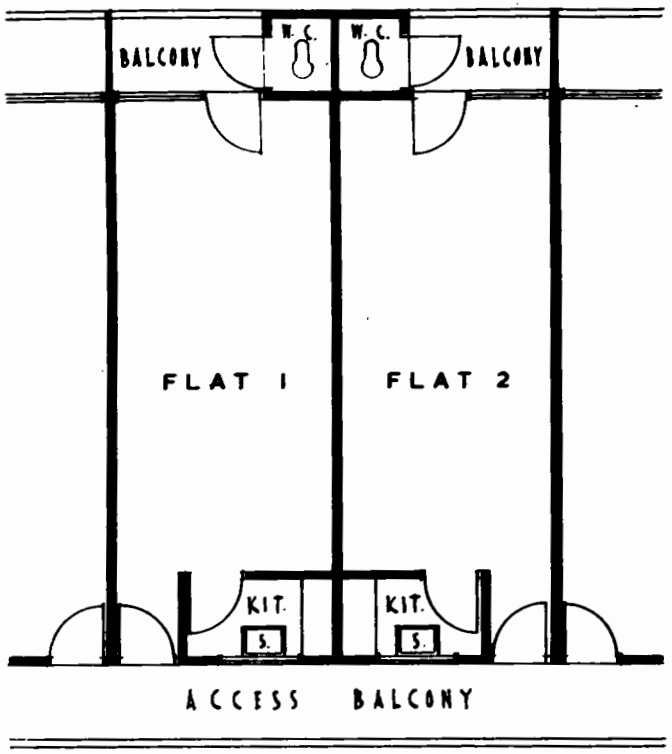
THE OCCUPANTS OF THE SIXTY TWO DOMESTIC ROOMS HAVE COMMON ACCESS TO TWO WATER STANDPIPES, TWO BATHROOMS AND SIX FLUSH LATRINES.

DIAGRAM (29)

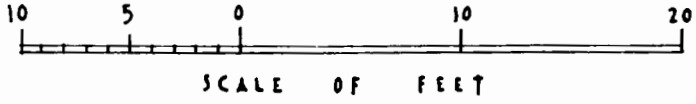
SEVEN - STOREY RESETTLEMENT BUILDING
METHOD OF CONVERSION INTO SELF-CONTAINED FLATS



PLAN AS BUILT FOR SQUATTER RESETTLEMENT



PLAN OF PROPOSED CONVERSION



THE DIAGRAMS SHOW HOW EACH PAIR OF RESETTLEMENT ROOMS COULD BE CONVERTED IN THE FUTURE INTO ONE FLAT BY THE REMOVAL OF THE PARTY WALL AND THE INSTALLATION OF THE USUAL SERVICES. THE NEXT ILLUSTRATION SHOWS THE CONVERTED FLAT IN GREATER DETAIL.

DIAGRAM (30)

CHAPTER III

Section 3 Effect of Existing High Housing Densities

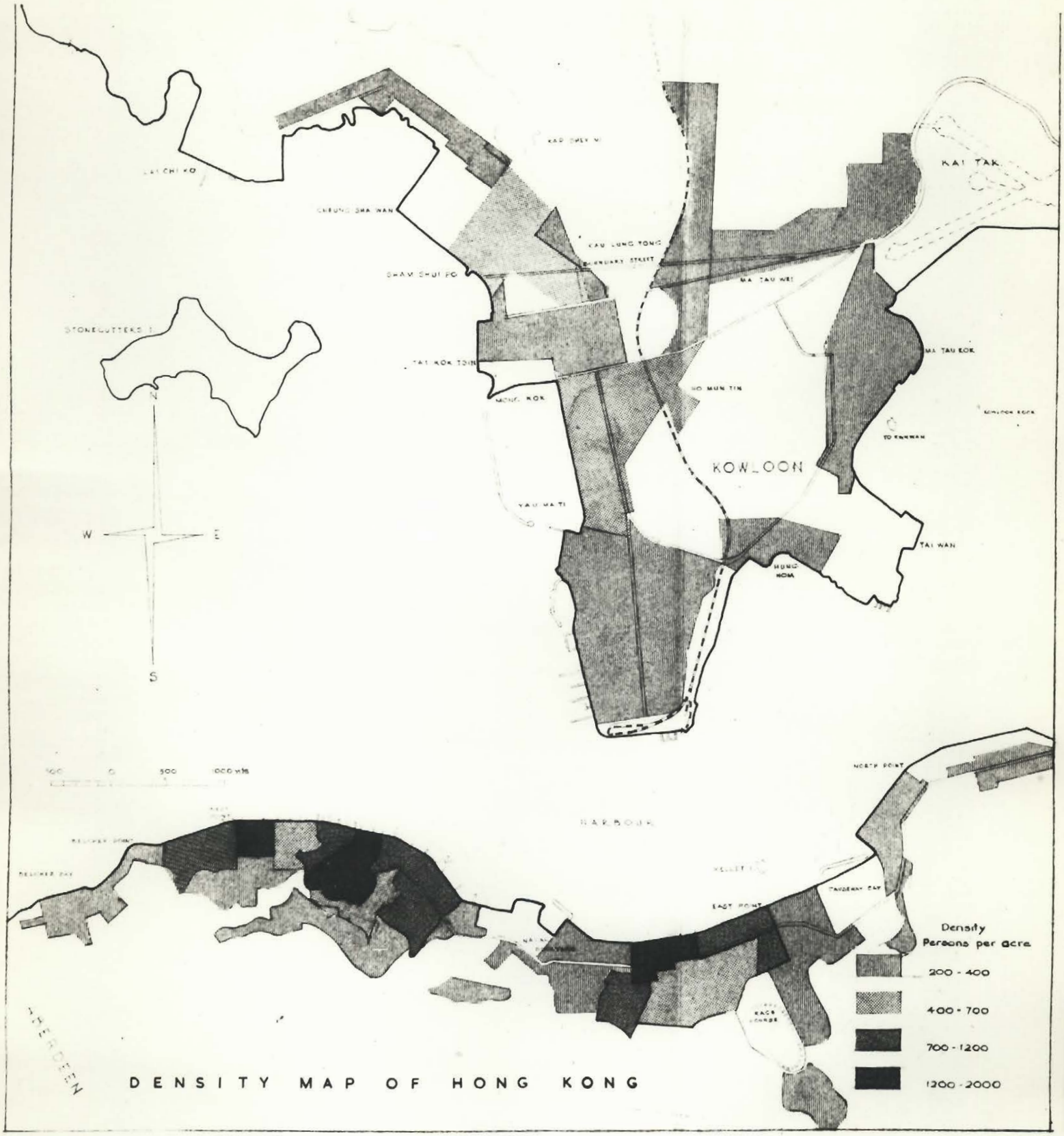
Today, Hong Kong is probably one of the most densely populated places in the world. The total area of the Colony, including the New Territories, is about 391 square miles and the estimated population is about $2\frac{1}{2}$ million, that is, about 10 persons per acre. It is estimated that about 2,000,000 people live in the twin cities of Victoria and Kowloon where densities of 2,000 persons per acre occur.

Diagram (31) shows the density of Hong Kong and Kowloon.

The normal unit of housing in the Colony is the tenement block. This generally has a narrow frontage and consequently long narrow rooms. The old tenements are obsolete in design, are overcrowded, and many lack the most elementary sanitary facilities.

The legal minimum living space in the Colony is 35 square feet per adult, and the average tenement has a maximum legal accommodation for 14 adults. If this legal provision were enforced, it is estimated that about another 350,000 people would have to be rehoused. The general average of the actual number of persons on each floor is estimated to be 19; in the poorer class of tenements the average is considerably higher. The Colony has at least 650,000 people living in substandard conditions.

DIAGRAM (31) DENSITY OF HONG KONG AND KOWLOON.



DENSITY MAP OF HONG KONG

DIAGRAM (31)

CHAPTER III

Section 4 Housing Standards and Planning

Building standards in Hong Kong are reasonably high: the best building materials and the most up-to-date methods of construction are widely used. Modern apartment blocks, private residences, banks and commercial offices can be compared with those in any other city in the world.

The Building Ordinance specifies minimum standards of design, material and construction that cover all aspects of housing, including health, ventilation, drainage and safety. Control of buildings in the New Territories is exercised by the New Territories Administration and standards are similar to those of the Building Ordinance where town buildings are concerned.

Local building materials are used to a maximum extent in order to reduce cost. Building stone of the best quality can be obtained from the local Government quarry. The reinforced concrete structure with brick filled exterior walls and light interior partitions appears to be the most economical method of construction.

The development of Hong Kong has been unplanned but growth has been controlled. A preliminary planning report for Hong Kong was prepared by Sir Patrick Abercrombie in 1948. This set out the main lines along which long term development should proceed. However, the population has risen far beyond the limit of 2,000,000 envisaged at the time of Sir Patrick Abercrombie's visit. Several large new reclamations, which had not been expected to take place for many years to come, have already been completed. Also the growth of industry and the reconstruction of the Airport, necessitated by world developments in aviation, has altered data upon

which the report was based. Development has exceeded expectations, but wherever possible the main intentions of the report were followed.

CHAPTER IV A DEMONSTRATION OF PROPOSED SCHEMES FOR LOW COST HOUSING DEVELOPMENT

Section 1 Policy of the Housing Authority

It is the largest housing organisation in the Colony and its policies and achievements provide an example of housing developments in the area.

Generally speaking the policy of the Authority is to erect flats of good standard and at the lowest possible rent[1]. Self-contained flats are provided with kitchen, lavatory and balcony. It is realised that this type of flat does not offer the cheapest possible rent within the means of the poorest classes, but it is hoped that by providing good accommodation on a large scale the general level of rents will be lowered. The Authority has also accepted the fact that accommodation must be provided in multi-storey flats with a maximum number of people to the acre as sites in urban areas are scarce.

Tenants for the flats are selected in accordance with their housing needs. Applications are limited to those families whose monthly incomes correspond with the proposed rent levels. The main factor in selection is the degree of overcrowding experienced by applicants at the time of their application. Careful supervision of the project ensures that flats are not overcrowded or sublet and that the conditions of tenancy are being observed.

The objective of the projects to be described is to provide flats of a good

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1. Hong Kong Housing Authority. Housing Authority Annual Reports, 1954-55. Printed and published by the Government Printer, Hong Kong.

standard suitable for and within the means of the white collar class of workers.

CHAPTER IV

Section 2 Demonstration of a Scheme on Reclaimed Land

The design of the scheme

Scarcity of land and high housing density are the main problems that govern design. The architect of the "North Point" project designed a scheme to satisfy the following conditions:

1. 13,000 persons or more were to be housed on $6\frac{1}{2}$ acres in better and cheaper accommodation than had hitherto been provided with due regard to local ways and conditions of living, the economics of housing, and the shortage of available sites;
2. flats were to contain two or more bedrooms, with a dining-living room, a wash room and water closet, and a kitchen;
3. rents, all inclusive, were to be within certain limits;
4. flats were to have balcony access, floor to floor height of 8 feet 6 inches, through draght, refuse chutes, lift services, balconies, and laundry lines;
5. the ground floor was to provide shops, a school, clinics, a community hall, covered play areas, and offices for the Authority.

The scheme did accomplish these objectives with a housing density of 1538 persons per gross acre. An interesting design was produced with some human quality even for so severe a problem.

Statistics of the scheme.[1]

The site is on Java Road in North Point as indicated in diagram (25). It embraces 6½ acres of reclaimed land that borders the sea. The scheme provides three separate blocks that surround a proposed ferry, a bus terminal and a car park. The plan provides for 1,975 flats, built in blocks of 11 storeys each, with accommodation for 13,114 persons at a gross density of 1,538 persons per acre. There is also a school with 18 classrooms for 800 pupils, a school health clinic and out-patients clinic, an Assembly Hall for 555 persons, a post office and 73 shops.

In spite of the high density on the estate, provision has been made for playgrounds and gardens which cover nearly half the total site area. The ground floors of most of the blocks of flats have been left as covered playgrounds for use in wet weather. The school, clinics and the post office will be run by Government and have been designed in accordance with its specifications. The shops will be let by tender.

The plan

The flats are self-contained and have a kitchen, lavatory and shower, a balcony and facilities for drying clothes. They have the same basic pattern but vary in size and are designed to accommodate families of from 5 to 10 persons calculated on the legal minimum of 35 square feet for each adult. Each flat has one or two bedrooms and the largest flats have three which are separated from the living rooms by permanent partitions.

Diagram (32) shows two typical flats of two and three bedrooms. Also an architect's model of the scheme.

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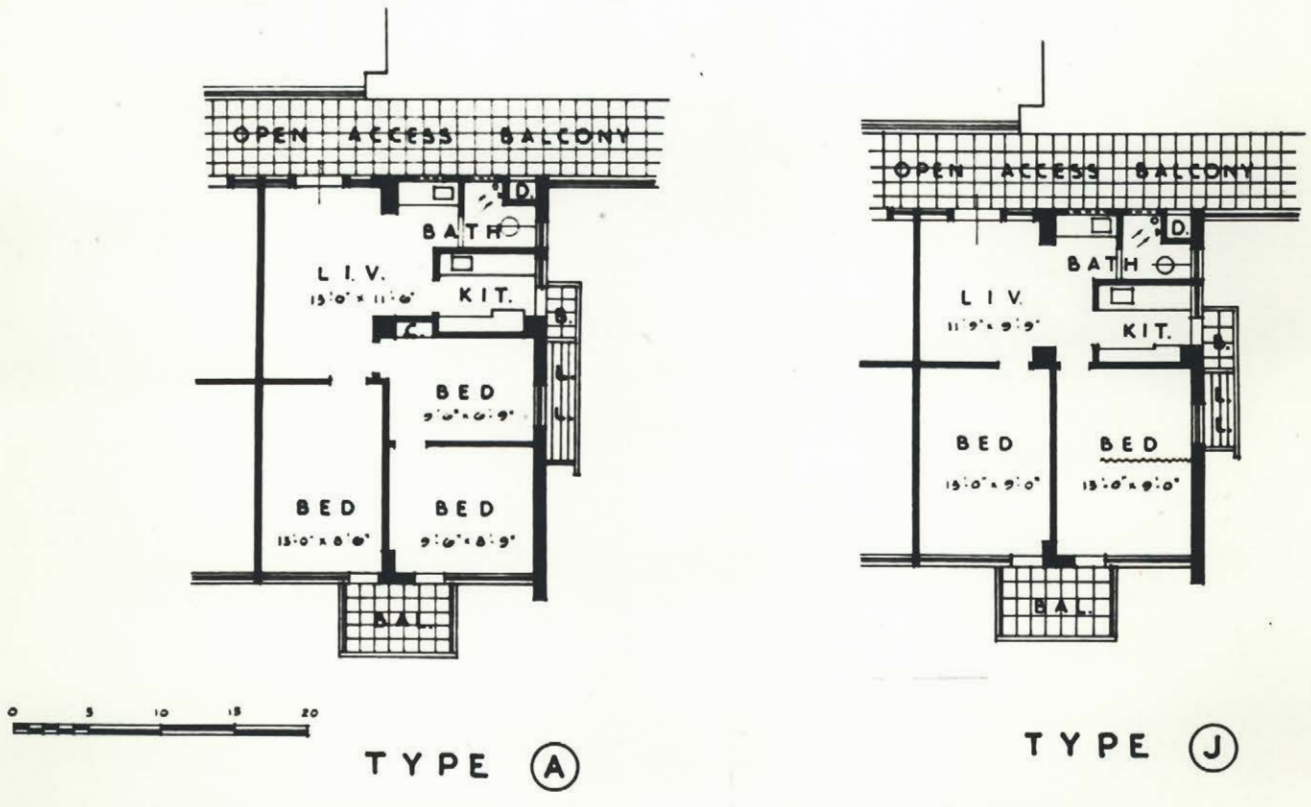
1. Cumine, Eric, "North Point Housing Scheme". Unpublished Architect's Report, Housing Authority, Hong Kong Government. June 1955, Sixth Revision.

DIAGRAM (32) MODEL OF NORTH POINT HOUSING ESTATE
TYPICAL TWO AND THREE BEDROOM FLATS

NORTH POINT HOUSING ESTATE.



North Point Estate. Ground plans of typical flats.

DIAGRAM (32)

Access is by a central corridor that is five feet wide but the line of flats on either side has been broken at regular intervals to give each flat ventilation, light and air.

Diagram (33) shows the layout of the scheme and the arrangement of the flats for ventilation.

The flats are designed so that every room, kitchen, and water closet and, if possible, curtain-made cubicles have fresh air. With this arrangement the ceiling heights have been reduced to 8 feet which is below the standard usually required for buildings of this type in the Colony. Furthermore, the staggering of the flats along an open access balcony provides 50 per cent more flats.[1]

The main economies are to be derived from solving basic problems of design; for example, windbracing in tall buildings is generally a large concealed cost that can be avoided. As the units are generally narrow and the building slender, the solution was an acceptable plan that had depth as well as openness.

Every tenant will have the psychological enjoyment of a balcony. The flats are small, like ship cabins, but the balcony together with the banks of windows in the bedrooms will avoid any feeling of confinement.

Adequate lift service is provided. To meet the problem of refuse disposal in such large blocks, refuse chutes are installed at central points in

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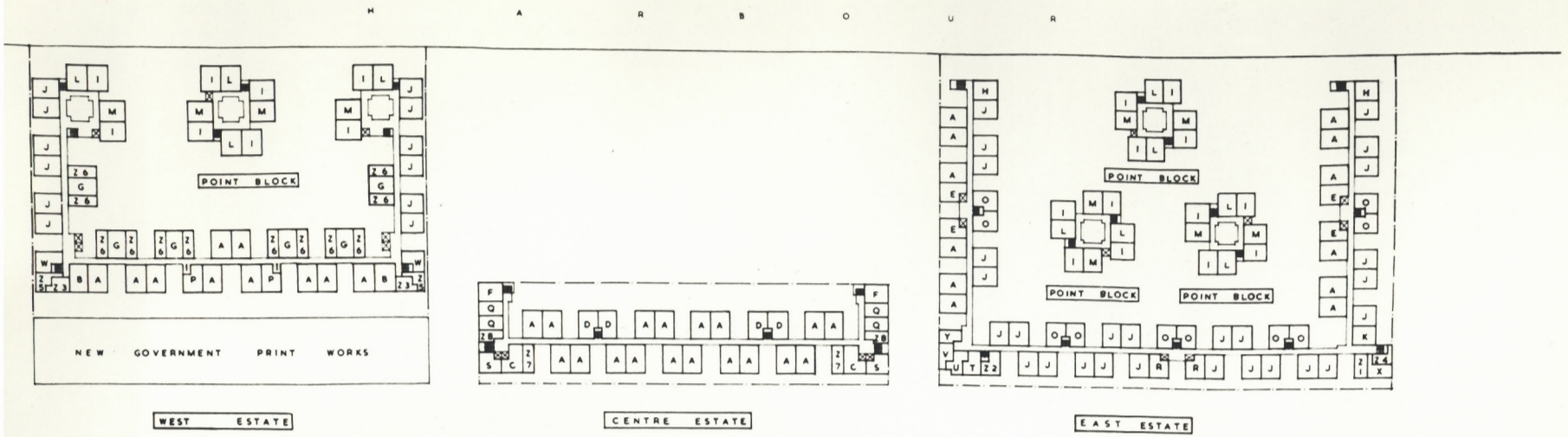
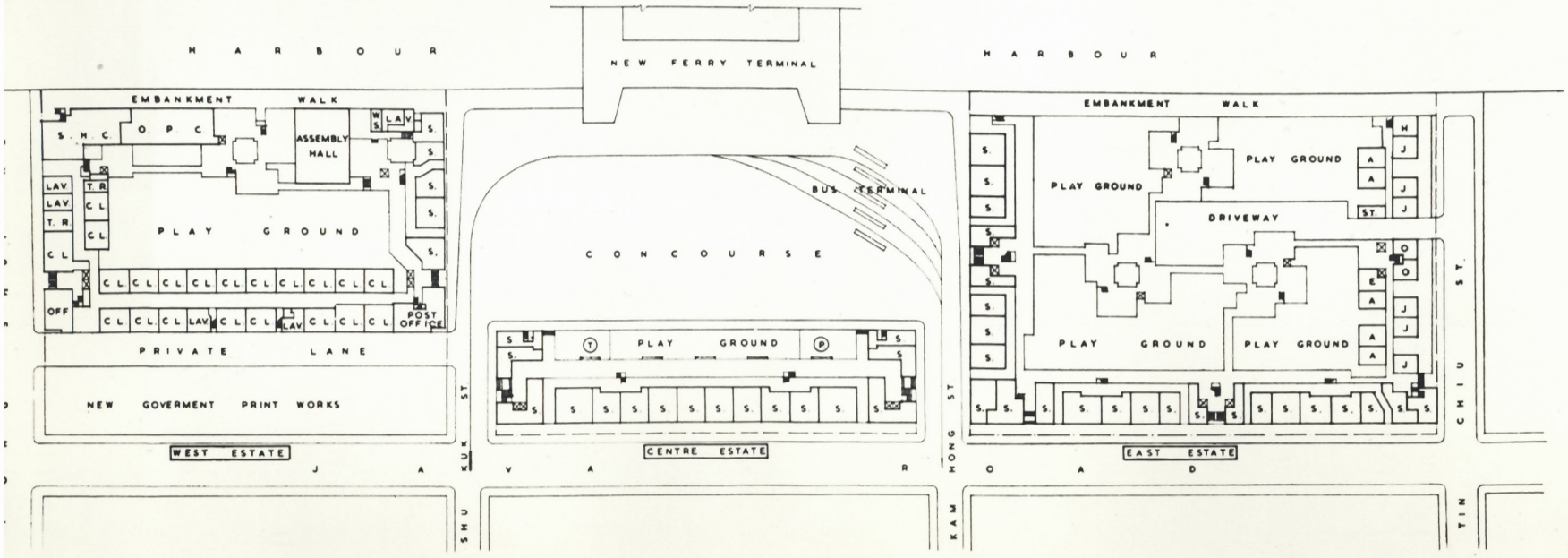
1. Cumine, Eric. "North Point Housing Scheme". Unpublished Architect's Report, Housing Authority, Hong Kong Government. June 1955. Sixth Revision.

DIAGRAM (33) THE LAYOUT OF THE NORTH POINT HOUSING SCHEME

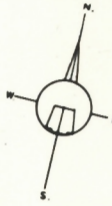


TYPICAL FLOOR PLAN



GROUND FLOOR PLAN

S.H.C. – SCHOOL HEALTH CLINIC
O.P.C. – OUT PATIENT CLINIC
LAV. – LAVATORY
T.R. – TEACHER ROOM
OFF. – OFFICE
C.L. – CLASS ROOM
W.S. – WORK SHOP
S. – SHOP
ST. – STORE
T. – TRANSFORMER ROOM
P. – PAVILION



HONG KONG GOVERNMENT HOUSING AUTHORITY

KEY PLAN

THE NORTH POINT HOUSING SCHEME

DIAGRAM (33)

each block designed in conformity with the British Standard types.

All flats have a special projection for laundry lines which gives a sense of order to the fluttering washing. There is a solid part to the projection for a dust bin and mop to be placed in the open. The partially closed sides of this device protect the washing from the high winds and give more security to the laundry poles.

In every flat the wash basin is placed outside the shower and water closet in the lobby and thereby allows two functions to have separate areas and provides a tap for clothes washing. This is necessary in a flat occupied by a big family.

CHAPTER IV

Section 3 Demonstration of a Scheme on Hilly Site

As most of the land in Hong Kong is hilly, a brief description of a housing scheme on a hilly site also undertaken by the Authority will show that the housing problem is more difficult in Hong Kong than elsewhere. Sites are obtained in most cases by labourious excavation and infilling, Only Venice can compare in site difficulties.

The design of the scheme

The design problem in this scheme was to provide high density housing not only with good shelter but also amenities and a grouping of units without monotony. It is believed that the inhabitant feels a sense of dignity and individuality through variety in design, and easier management and building procedure can result from a basic repetition of units. World ideas are rapidly moving away from the barrack-like treatment of units. The scheme provides compact development without serious overcrowding and includes open and covered spaces for recreation and relaxation.

Statistics of the scheme[1].

The "So Uk" site in Kowloon embraces 18.5 acres and is situated on hilly land. The scheme has 14 separate blocks and contains 5,130 flats

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1. Cumine, Eric. "Report on Housing Scheme at So-Uk". Unpublished Architect's Report, Housing Authority, Hong Kong Government. February 1956.

to house 27,294 persons. A gross density of 1,452 persons per acre has resulted.

The density is calculated at about 40 square feet per person and is more generous than the present day legal minimum of 35 square feet. There are two schools of 18 classrooms, an Assembly Hall for 750 persons, a clinic, covered play grounds, open paved areas and 40 shops.

According to information obtained from the Housing Society, the statistics dealing with the demand for flats is as follow:

No. of persons in family	Applications
4 and under 4	30.8%
4 to 6	46.1%
6 to 8	15.4%
over 8	7.7%
	100.0%

The "So-Uk" figures are as follow:

4 persons flats	20.5%
$4\frac{1}{2}$ persons flats	35.7%
6 persons flats	29.2%
7 persons flats	1.8%
8 persons flats	13.8%
	100.0%

The smaller the flat the greater the proportion of the area of kitchen, water closet and access balcony is to the sleeping area and, therefore, small flats reduce density with the same amount of building.

The solution of the scheme

The solution of the layout is dictated by contour, view and aspect.

The main slope of the hilly site is on a diagonal that stretches from north to south and thus provides the ideal solution to the problem of building along contours. It makes building easy without difficult site formations adjacent to the buildings. Some buildings would require piling and it is not economic to design cross-contour work when piling is needed. It is always necessary to design for more cutting than filling because of the high cost of cartage. The ideal condition exists when cut fill is of exactly equal proportions and there is to be only a gentle change in contour.

Most of the blocks of flats face the south which is the ideal orientation in Hong Kong and coincide with the along-contour layout. The higher level flats have a fine view of the harbour. The circulation around the site has already been decided by the existing roads, and steps are the solution to extreme change of levels.

The buildings are constructed so that there is always a view. Through traffic routes bypass the development. The number of different types of flats are kept to a minimum and yet develop prototypes of buildings which could be used and re-used to make up new combinations.

There are five main types of buildings that are arranged so as to provide

more space between buildings.

Diagram (34) shows the "So-Uk" housing scheme layout in perspective.

DIAGRAM (34) "SO-UK" HOUSING SCHEME LAYOUT IN PERSPECTIVE

DIAGRAM (34)

PART 4 DECENTRALISATION AS A PRINCIPLE IN THE SOLUTION OF HIGH DENSITY PROBLEM

PART 4 DECENTRALISATION AS A PRINCIPLE IN THE SOLUTION OF HIGH DENSITY PROBLEM

CHAPTER I CONCEPT OF DECENTRALISATION AND THE IDEA OF DISPERSAL

Section 1 Definition of Terms

Decentralisation is a loose, generic term for the spreading out of urban population and development from large concentrated centres into some other pattern or patterns[1]. Urban decentralisation is a process of the redistribution of basic urban units, usually people, or of functions from centres of concentration. Industrial decentralisation, therefore, is a process that has the effect of redistribution upon the physical location of industrial plants and facilities. Industrial decentralisation in most of its conceivable forms would bring about other types of urban decentralisation as well, but it would be possible to have certain degrees of industrial decentralisation within the metropolitan area with little or no decentralisation of residential or commercial land use. Conversely, these types of land use might be partially decentralised without a corresponding change in the distribution of industrial location[2].

Dispersal is the movement of metropolitan population to distant smaller communities[3]. Dispersal of both industry and population is the outward movement from the congested urban areas. It involves the pattern of land use.

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1. Woodbury, Coleman. Urban Redevelopment: Problem and Practices. p.167.
2. Ibid. p.207.
3. Riemer, Svend. The Modern City: An Introduction to Urban Sociology. New York, 1952.

CHAPTER I

Section 2 The Forms of Decentralisation

Decentralisation can be applied to the spread of metropolitan population to communities of smaller size and to the settlement of these populations at the fringe of the metropolitan territory itself. Therefore, there are two major forms in the process of both population and industrial decentralisation, they are diffusion and dispersal[1].

Diffusion is the redistribution of population, industries or functions from a major area of concentration, such as a central city of a metropolitan area, to a nearby or adjacent district, such as an outlying or peripheral part of the metropolitan area.

Dispersal means a wider redistribution. It involves movement of a concentration of people in a large city or metropolitan area to a number of smaller localities throughout a major economic region or even over the country as a whole[2].

In general, it is considered to be decentralisation when it takes place within the limits of a definite economic area such as a standard metropolitan area. It is considered to be dispersal when it takes place beyond the limits of such districts.

Dispersal affects the urban pattern. Therefore, in planning a development, it is important to consider the manner of decentralisation in terms of suitability.

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1. Woodbury, C. Urban Redevelopment: Problem and Practices. p.209.
2. Ibid.

CHAPTER I

Section 3 The Need for Dispersal and its Importance

Cities are growing in an outward direction from the centre; they are growing more in land than in population[1]. When a city reaches a certain size, which may vary within wide limits, continuous growth around the fringe may create disadvantages: people are so far from the downtown area that daily journeys are a burden for the commuters and communications and services are costly. When peripheral growth is not the solution, any further outward development should be in terms of dispersal taking the form of completely planned units.

These units or satellites[2] are understood to mean new selfcontained towns, separated from existing urban units by a protecting belt of open land. Satellite towns are intended to offer properly planned facilities for industrial and residential developments. Such towns are considered neighbourhoods of an existing large town and to some extent depend upon it.

Decentralisation in terms of dispersal has become national policy and is characteristic of present day urban growth. It is important because it is desirable for purposes of defence, as a measure against urban congestion for industrial location, and for the purpose of large scale residential neighbourhood planning[3]. Therefore, dispersal should be encouraged for both industries and population in congested urban areas.

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1. Riemer, S. The Modern City: An Introduction to Urban Sociology. New York, 1952. p.60.

2. Dant, Noel. "Guided Growth: The Satellite Pattern", A Case for Satellite Towns. Ottawa, 1953. p.17.

3. Riemer, S. The Modern City: An Introduction to Urban Sociology, New York, 1952. p.448.

The need for decentralisation arises from the twofold desire to improve housing conditions in overcrowded areas and to reduce the concentration of urban centres[1]. Improvement in housing conditions implies among other things an improvement in living conditions and in the facilities for recreation and the provision of open spaces.

The incredibly high housing density in Hong Kong, augmented by the shortage of building sites in central areas, suggests that Hong Kong needs decentralisation. It appears to be a better solution to the housing problem than further tall buildings.

It is unreasonable to assume that people like crowding into the thickly populated areas. Most likely there are no alternatives: there is no new planned development that provides an escape for people from congestion, and also no improvement in transport facilities. People have to stay near their work place. Therefore, population and industrial decentralisations are considered necessary.

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1. Abercrombie, P. Greater London Plan 1944. London, 1945. p.30.

CHAPTER II THE APPLICABILITY OF DISPERSAL IN HONG KONG

Section 1 General Approach to Achieve Dispersal

Existing conditions in Hong Kong have been discussed and decentralisation has been advanced as a solution to congestion. The theory of urban dispersal through which an approach is made possible now must be analysed.

The theory

An attempt is made here to follow Sir Patrick Abercrombie's theory of dispersal which he applied to Greater London: an example has been described in previous chapters. His postulates were to admit no new industry to London except in special cases, to rehouse as many people as possible in the reconstruction areas in terms of mixed developments varying according to conditions and requirements, to decentralise industries and industrial population at the same time so as to minimise the "house to work" movements, and to restrict decentralisation to the Region.

His general rules set a maximum net density figure of 200 persons per acre for central areas and a maximum net density of 100 persons per acre for areas beyond the central areas. The units to be decentralised in his scheme were the old inner boroughs that required reconstruction, the built-up suburbs that needed greater community grouping, the existing towns beyond the central areas that were ready and able to receive large or small additions, and the sites upon which completely new communities were to be created.

The circumstances

There was ample land in the greater London areas to receive the dispersed population. If one centre of population became too great, it was possible to encourage migration within the land or region and so regroup the population.

On the one hand land was available; on the other, the population could be anticipated. Therefore, some attempt could be made to regulate the size of population in relation to land. The Greater London Plan cannot be applied to Hong Kong without modification. Hong Kong is confronted with two major problems: the shortage of land for any sort of urban expansion in central areas, and the unlimited immigration. There does not appear to be any limit to the number of people who pour into Hong Kong from beyond the New Territories.

Besides the population movement, the physical features of the Colony present another problem to be solved. The population of London was dispersed to the immediate surroundings where there was land. Circumstances are different in the case of Hong Kong. Dispersal in Hong Kong would have to take place across the harbour in the limited suitable land of Kowloon or in the less limited land of the New Territories. In the case of New York there is adjacent land available for tall buildings for business and population. This is not possible in Hong Kong.

The possibility

In view of the problem of the scarcity of land and the need to provide for a growing population the only possibility of achieving dispersal in Hong Kong appears to be in a consideration of the physical features and a rigid enforcement of density figures.

An attempt is made to assume a maximum density for Hong Kong upon which regulations to restrict population and to impel the movement of people from overcrowded areas into new districts could be imposed. This maximum density is assumed.

CHAPTER II

Section 2 Consideration of Land and Its Characteristics

Physical features

The location of the Kowloon peninsula and the physical characteristics of the island of Hong Kong have far reaching consequences. The hilly sites of Hong Kong leave no choice of building land except the more level parts of the northwestern New Territories, the coastal areas and land at the base of the mountains. Low lying land near streams is best for paddy fields while steep and stoney ground can be used for open spaces and other purposes.

Land classifications

Land in Hong Kong varies considerably and this variety influences its use for urban development, agriculture and other purposes.

The classifications of land in Hong Kong is shown in Diagram (35) and is broadly delineated as follows:

Built-up areas are found mainly on the northern part of Hong Kong Island and the southern part of Kowloon. These areas are either urbanized towns, military camps or cemeteries. In addition, there are a number of villages which are growing rapidly into sizable towns[1].

Rough grassland and scrub cover more than two-thirds of the total area of the Colony[2], which, if properly cleared, could be used for urban development.

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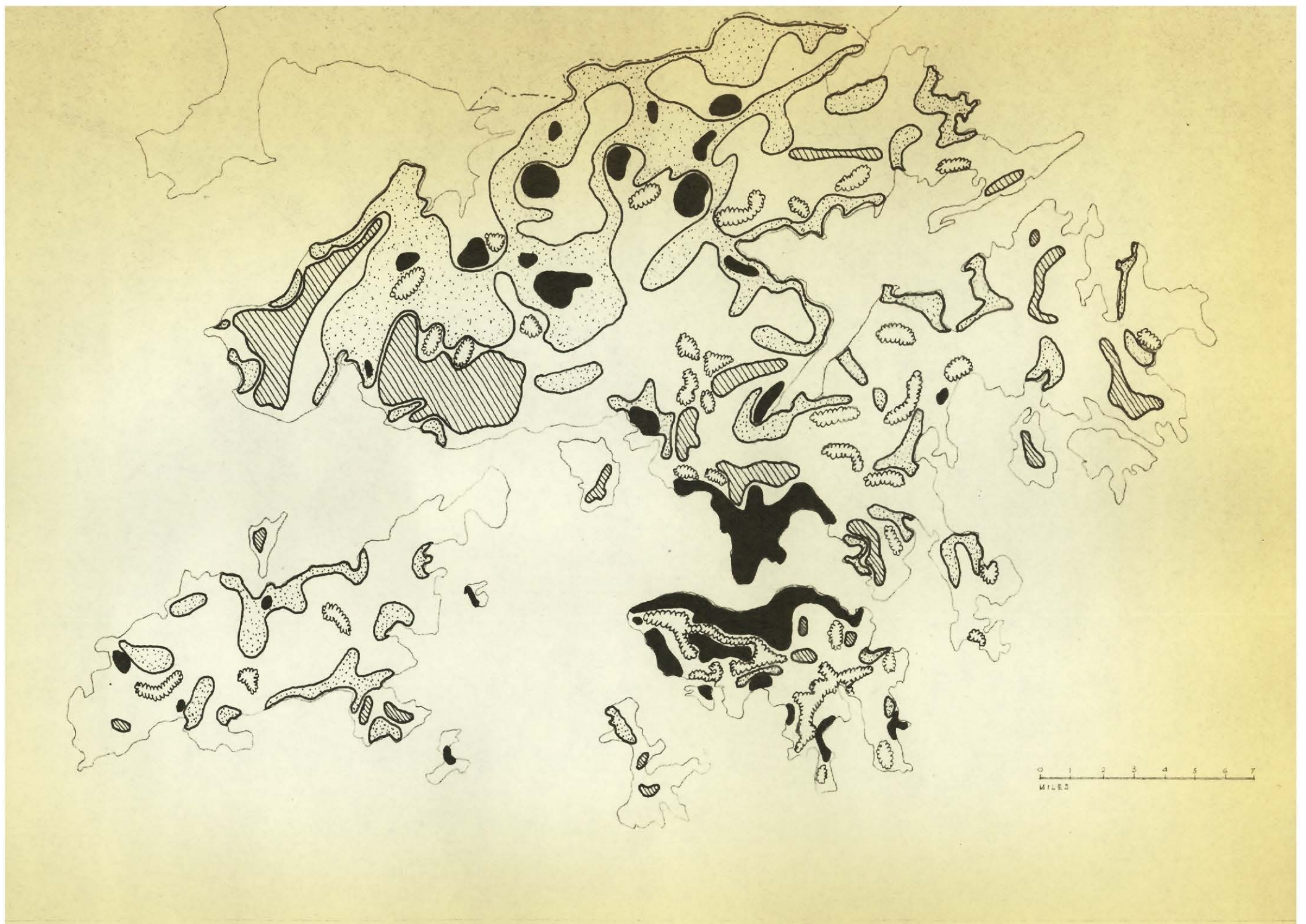
1. Hong Kong Annual Report, 1955. Hong Kong, 1956. p.198.
2. Tregear, T.R. Land Utilisation In Hong Kong. 1955.

DIAGRAM (35) LAND CLASSIFICATION.



LEGEND:

- Built up areas Agriculturally Unproductive
- Woodland
- Peorland
- Rough grassland and scrub
- Arable land

DIAGRAM (35)

The chief rural fuel is grass.

Arable lands are found on the flat plains which lie mainly in northwestern areas of the New Territories.

Poor lands are heavily eroded lands found mainly in the southwest of the New Territories and the northern part of Kowloon.

Woodlands are scarce and are found only in small areas. Only in Hong Kong itself is there any considerable amount of tree cover. The trees are retained to prevent erosion and to promote regularity of stream-flow in catchment areas. Woodlands also provide lumber for small woodwork industries[1]. About one-sixth of the area of Hong Kong is covered with woodlands.

Relief

The relief of land affects its use for urban development, agriculture, and other purposes. The slope and its roughness are important to settlement and economic development.

Hong Kong is characterized by rugged and irregular shore lines. Its uplands and mountains are eroded remnants of rock formations. The soil and rock mantle on the hills are left unprotected except by their own cohesion. The plains are alluvial except in the northwest of the New Territories where swamps are found along the Deep Bay.

There are many creeks and streams which flow in all directions to the sea.

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1. Hong Kong Annual Report, 1955. "Forestry". Hong Kong, 1956. p.71.

The undulating profiles of the rolling hills drain the land well.

Diagram (36) shows the relief of Hong Kong.

Rough slopes vary from steep to less steep and are found where there are mountains. The gradients vary from 1,000 feet to 3,000 feet. They are generally too steep for development.

Rolling uplands between mountains have gradients that vary from 200 feet to 1,000 feet. They are steep enough to provide natural drainage and gentle enough for settlement.

Flat plains are found above sea level to 200 feet, and, if economically drained, could be used for agricultural or urban developments.

Administrative units and existing towns

Hong Kong Island is one administrative unit, while the New Territories are divided into three administrative units described in Part 2, chapter I, section 7.

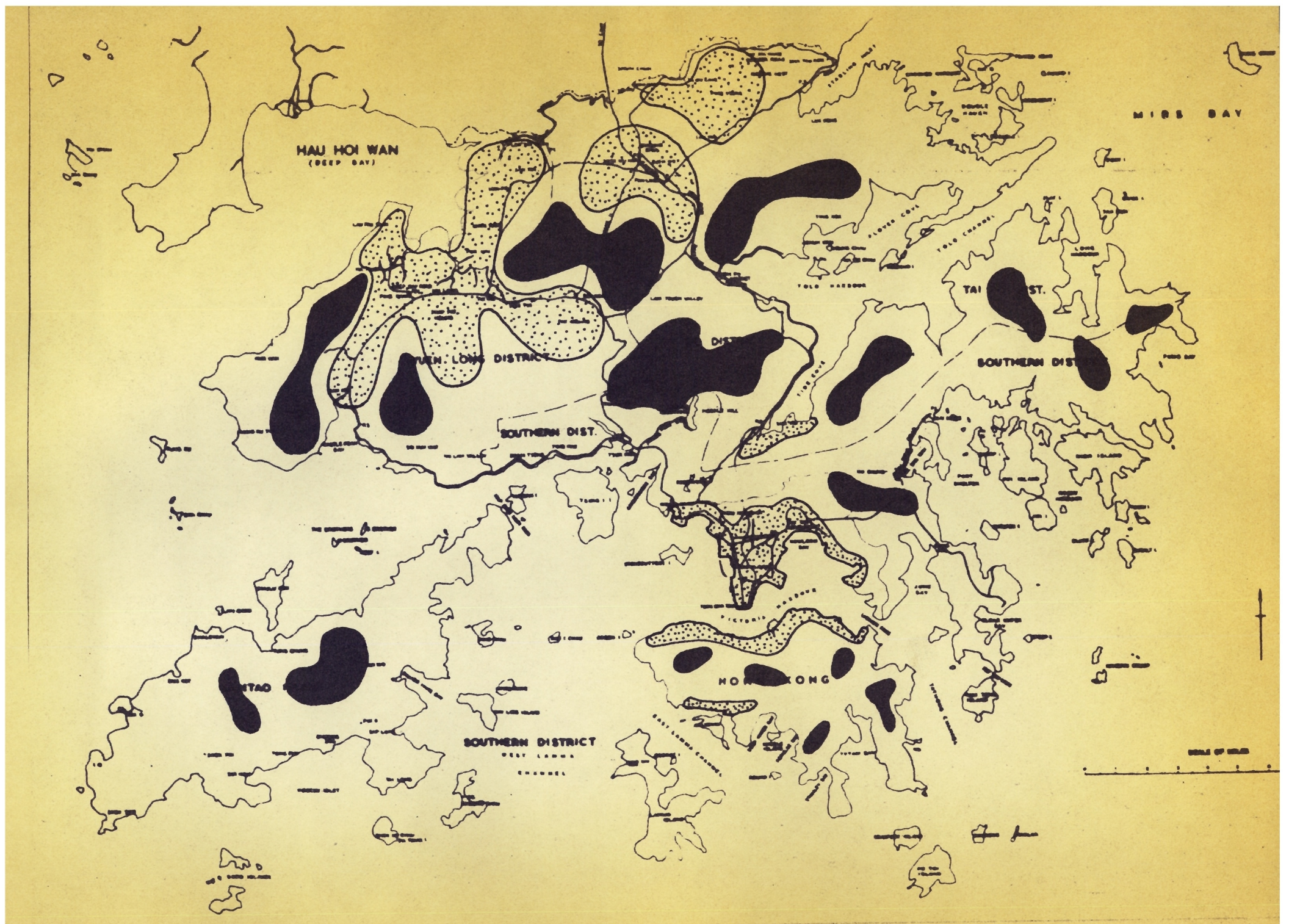
Diagram (37) illustrates the administrative districts and the locations of the existing towns in the New Territories.

Present use of land

The use of land to its full extent implies a balance between urban, agricultural and other demands. When urban development grows rapidly encroachment upon the most valuable agricultural soils should be avoided. Land suitable for other purposes such as forestry and mining should also be safe-guarded.

It is estimated that about 50 square miles of land in the Colony of Hong Kong is under cultivation. The cultivated land is used mainly for rice and vegetable production. In 1953, more than 21,000 acres were under rice while

DIAGRAM (36) RELIEF



LEGEND: Rough slopes Rolling uplands Flat plains

DIAGRAM (36)

DIAGRAM (37) ADMINISTRATIVE UNITS AND EXISTING TOWNS.

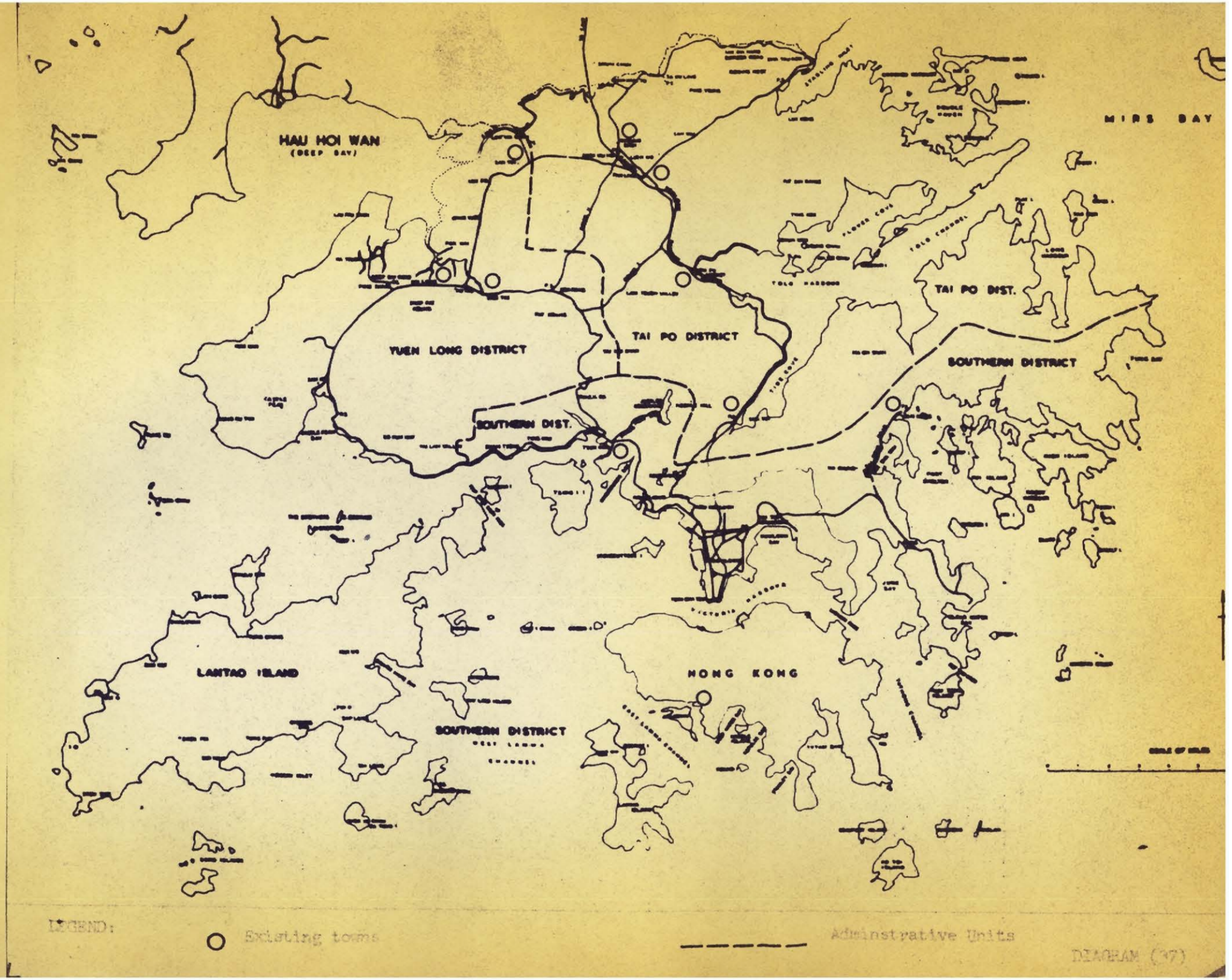

HAU HOI WAN
(DEEP BAY)
MIRS BAY
TAI PO DIST.
TAI PO DISTRICT
YUEN LONG DISTRICT
SOUTHERN DISTRICT
SOUTHERN DIST.
LANTAO ISLAND
HONG KONG
SOUTHERN DISTRICT
LEGEND:
Existing towns
Administrative Units

DIAGRAM (37)

2,400 were devoted to vegetables. The remainder was used for fruit and miscellaneous crops[1].

In the northwest of the New Territories, along the banks of the river mouths and the coast of Deep Bay, there are extensive areas of marshland and swamp. Oyster beds cover about 4,500 acres of these swampy lands. About 300 acres of land in the northwest of the New Territories are used for fish ponds. A dairy farm has a holding of some 360 acres[2].

Diagram (38) shows the present use of land in Hong Kong.

Industry and urban growth are interrelated. In Hong Kong mixed residential and industrial developments are common. A survey of the existing industrial, residential and commercial areas is essential for re-development of urban centres.

Diagram (39) indicates broadly the existing industrial, residential and commercial areas in Hong Kong and Kowloon.

In the town of Victoria on the north of Hong Kong Island, buildings of all kinds are crowded into the narrow strip of reclaimed land that stretches from east to west. Here are found all the chief business and commercial offices, shops, warehouses, dwellings and tenements. The steep northern slopes behind this narrow strip are covered with residences which gradually thin out as the height increases but which continue to the tops of some of the hills.

Kowloon is wider and flatter and consequently not so crowded. It is largely

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1. Tregear, T.R. Land Utilisation in Hong Kong. 1955.

2. Ibid.

DIAGRAM (38) PRESENT LAND USE

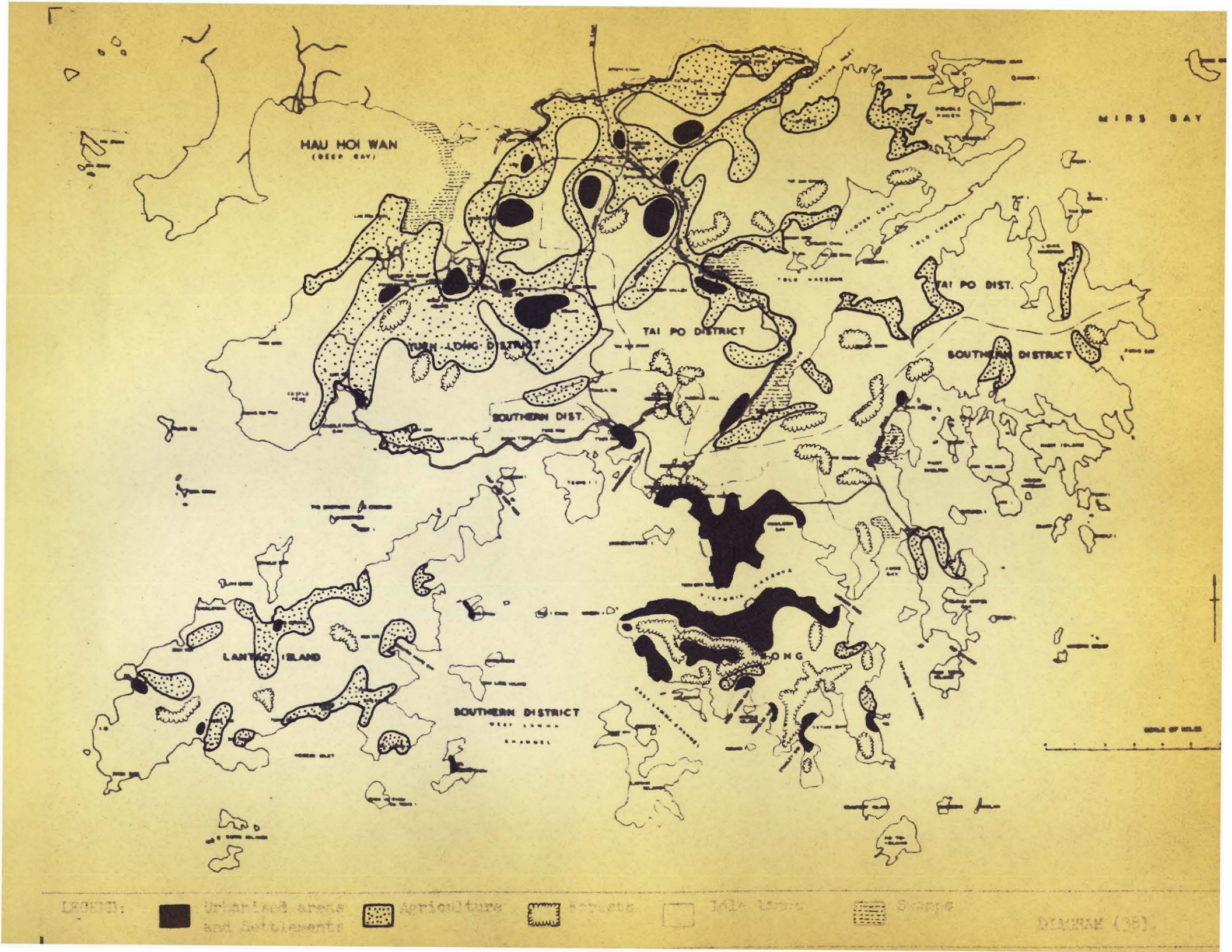
HAU HOI WAN
(DEEP BAY)
MIRS BAY
TAI PO DIST.
TAI PO DISTRICT
TUEN LONG DISTRICT
SOUTHERN DIST.
SOUTHERN DISTRICT
LANTAU ISLAND
SOUTHERN DISTRICT
LEGEND:
Urbanised areas and Settlements
Agriculture
Forests
Idle Lands
Swamps
DIAGRAM (38).

DIAGRAM (39) EXISTING RESIDENTIAL, INDUSTRIAL AND COMMERCIAL AREAS.

KOWLOON

HONG KONG

LEGEND:

- Residential areas (low)
- Residential areas (high)
- Commercial areas
- Industrial areas

Scale: 1/80,000

DIAGRAM (39)

a residential area. Most of the Colony's recent developments in light manufacturing are located here.

Communication

Communication affects the shape and structure of settlement. A network of circular and radial routes and rails are essential to link towns, industries and urban centres. Communications in Hong Kong have been described in a previous chapter. They do not as a rule occupy a large part of the land, nevertheless, they play a very important part in its development.

In spite of the mountainous nature of the land, Hong Kong has developed a framework of roads. The existing roads are sharply divided according to hillside and level ground. Roads on the level ground are exclusively gridiron in pattern; on the hillsides a free landscape treatment is dictated by the contours.

The New Territories are served by a circular route running through most of the towns such as Sha Tin, Tai Po, Fan Ling, Un Long, Castle Peak and Tsun Wan. New roads were built connecting Un Long with Tai Po and Fan Ling via Kam Tin and Shek Kong. A military road cuts right over the Tai Mo Shan mountain range and connects Shek Kong with Tsun Wan.

The railway runs from Kowloon to the border via Sha Tin, Tai Po and Fan Ling.

Diagram (40) shows the existing main roads and the railway of Hong Kong, and the ferry route services between Hong Kong, Kowloon and the New Territories.

DIAGRAM (40) COMMUNICATIONS

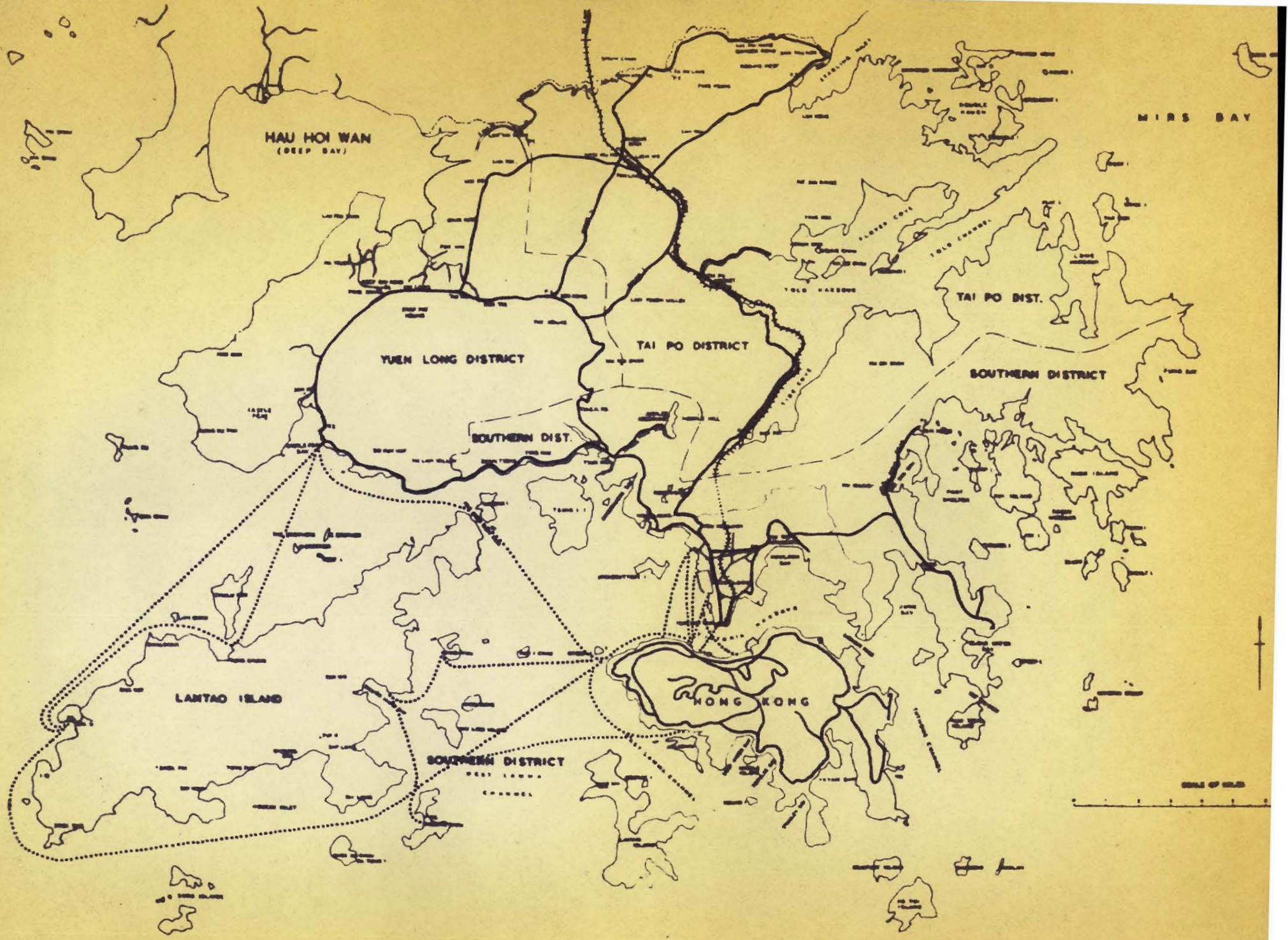
HAU HOI WAN
(DEEP BAY)
MIRS BAY
TAI PO DIST.
YUEN LONG DISTRICT
TAI PO DISTRICT
SOUTHERN DISTRICT
SOUTHERN DIST.
LANTAO ISLAND
HONG KONG
SOUTHERN DISTRICT
LEGEND:
Railways
Main Roads
Ferry Routes

DIAGRAM (Ac)

CHAPTER II

Section 3 Factors Leading to the Preparation for Dispersal

The characteristics of land in Hong Kong and the existing conditions have been indicated. Dispersal has now to be considered.

Acquisition of Land

The only way to acquire land in the built-up area is by central clearances and new site developments in the New Territories. There are many difficulties, especially with regard to the ownership of individual sites where replanning involves either open spaces or some other type of building, using the individual site and part of adjoining sites.

The first way to overcome such difficulties is for the Government to purchase the land in question, either compulsorily or otherwise, and to re-sell it at the best possible terms after dividing it into new building sites. The second method involves the leasing of the land to developers by the Government. The third method is the development of the land and construction of the building by the Authority.

Planned development

A planned development should be the aim in order to achieve a successful result. Planning ensures the processes of development. It provides a basis upon which judgement can be made for the best use of land. A decision is important concerning the pattern of dispersal.

There are two major factors in approaching the problem of planning: one is to relieve overcrowding and to provide new sites for the population; the other is the fundamental question of industrial location.

An outline for the development plan is essential:

1. The overcrowded urban areas can only be relieved by large scale reorganization to achieve lower density and more spacious development. Those who work in factories and live in high density urban areas should be moved to the New Territories where industries would be re-located.

2. The existing towns that are favourable for expansion should be expanded. Sites suitable for new developments should be chosen.

3. There are three categories of industrial re-location:
   (a) industry that is tied and fixed due to too big an establishment on the existing site;
   (b) industry capable of being moved and comparatively free to move, such as a small scale factory;
   (c) industry that it is desirable and essential to remove.

Those industries that are badly located, cramped, and in difficult and expensive surroundings should be moved to new sites where probably better facilities could be obtained. New locations for industry should be arranged near towns where natural resources and manpower are available.

Structure of the development plan

The structure of the development plan is the next item to be considered. In view of the hilly nature of land and the possible development sites in the New Territories, dispersal is limited if there is not good transportation. A network of communications between towns and urban centres is required to make dispersal possible. Therefore, communication is considered as the basis of the development structure with the towns' locations related to major roads. A system of radial routes from urban centres to development towns and of

circular routes between towns are needed.

Possible maximum density for the development plan

In the development plan the selection of a maximum density figure is very important so that the number of people required to be decentralised and the amount of land needed can be estimated. A rigidly enforced standard of maximum density should be the aim.

In Sir Patrick Abercrombie's Planning Report for Hong Kong in 1948 mentioned in previous chapter, a general proposal for development was made[1]. An estimate of the population in the Colony of Hong Kong at the beginning of 1948 was 1,500,000. A maximum density of 300 to 500 persons per gross acre was the target. Two thousand acres in Kowloon and the near south side of the New Territories were the suggested location to accommodate an additional population of 500,000 and an overspill of 100,000. Another 106,000 people required to be moved from Hong Kong and Kowloon, and a new satellite town of 100,000 inhabitants with its own industrial trading estate in New Territories was proposed.

However, conditions in Hong Kong have changed tremendously. The maximum density should be accepted at a much higher figure than that proposed by Sir Patrick Abercrombie.

In order to secure a sensible figure for the maximum density and the amount of land required for the number of dispersed population, a review of the data essential for decentralisation is necessary.

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1. Abercrombie, Sir Patrick. Hong Kong Planning Report, 1948. Hong Kong.

Data for calculation of decentralisation

LAND AREAS:

1. Colony of Hong Kong - 391 square miles.
2. Hong Kong Island - 32 square miles (19,200 acres).
3. City of Victoria - approximately 3 square miles (1,920 acres).
4. Kowloon - $3\frac{1}{2}$ square miles (2,240 acres).
5. New Territories - 355 square miles (227,200 acres).
6. Agriculture and animal industries - 13 per cent. (32,000 acres).

POPULATION:

7. Total, Colony of Hong Kong - 2,400,000.
8. Hong Kong and Kowloon - 2,000,000.
9. Kowloon - 1,000,000.
10. Towns in the New Territories - 180,000.
11. Villages in the New Territories - 220,000.
12. Natural increase of population - 3 per cent a year.
13. Number of people living in sub-standard conditions - 650,000.
14. Number of people living in squatter areas - 300,000.

There are 950,000 people who should be moved from overcrowded urban centres where a high density of 1,500 persons per acre is commonly found. (See Data 13 and 14). This number is almost half of the total population in Hong Kong and Kowloon (See Data 8). If 950,000 people are decentralised, the density figure would be lowered to half of the existing one. Therefore, suggestion is made that no gross density should exceed 750 persons per acre. This provides the basis for dispersal. Maximum density being aimed at is higher than any other country in the world.

CHAPTER III SUGGESTIONS FOR AN OVERALL SCHEME OF URBAN DISPERSAL FOR HONG KONG

Section 1 Approach to a Solution

Policy of development

Planning proposals, whether for a whole country or a town, are usually divided into short and long terms. There are certain obvious reforms or reconstruction policies which should be put in hand immediately. Proposals for short term development usually take the form of actual work to be done and are not concerned with the sort of planning which governs the natural growth of the community. Usually this short term development is the initial stage of a long term policy.

It is believed that fifty years is as far ahead as any plan can be expected to foresee. A ten years' programme of urban decentralisation for Hong Kong is proposed. This programme is to take place in two stages: in the first stage, overcrowding in urban centres is to be dispersed; in the second stage, overcrowding as well as new growth are to be directed to existing towns and new developments.

Scale of dispersal

A maximum gross density has been assumed and the total number of people to be dispersed in the scheme must be determined so the amount of land needed can be easily calculated. Moreover, it is very important to have these figures in view as the scale of improvements and provision of public services must be based upon them.

Safety measures of growth have to be taken into account. Ultimate increase of population has to be estimated.

The possible growth of population is estimated as follows:

It is assumed that 220,000 of the population in villages in the New Territories will not be included in the population to be dispersed.

Existing urban population:

Urban centres	2,000,000		
Ten towns (to be increased in size)	180,000		
		2,180,000	
Population growth by the end of 5 years: (3% increase of total population each year)			
Urban centres	300,000		
Ten towns	27,000		
		327,000	
Total population by the end of 5 years		2,507,000	
25% of the total population to be dispersed by the end of 5 years			626,750
Population remaining in urban centres by the end of 5 years		1,880,250	
Population growth by the end of 10 years: (3% increase of total population each year)		376,050	
Population remaining in urban centres by the end of 10 years		2,256,300	
Another 25% of 2,256,300 population to be dispersed			564,075
Total population remaining in urban centres by the end of 10 years		1,692,225 (say 1,700,000)	
Total population dispersed by the end of 10 years			1,190,825 (say 1,200,000)

Thus, about half of the total population is to be decentralised and half is to remain in urban centres. This result coincides with the assumption made that a maximum gross density of 750 persons per acre should be exercised in the city.

These calculated figures would be realised if full development were to take place during ten years' time. Existing towns would need to be enlarged and new developments would have to be established to provide the necessary accommodation.

Amount of land required for developments

Because of the scarcity of land suitable for urban developments, estimates of the amount of land required by and available for residential and industrial developments are essential.

In allocating land for housing purposes, a "gross" acre was recommended by Sir Patrick Abercrombie in the Hong Kong Planning Report[1] to allow for all community purposes. In addition an area for an open space of 3/4 acre per 1,000 persons was suggested.

Amount of land available for urban redistribution.

Estimated population to be redistributed in urban centres		1,700,000
Amount of land in urban centres:		
Victoria	1,920 acres	
Kowloon	2,240 acres	
		4,160 acres

Gross density (approximately) 409 persons per acre.

It is, however, recognised that in the existing overcrowded areas this target would be difficult to obtain except by complete rebuilding which should eventually take place. Therefore, a maximum gross density of 750 persons per

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1. Abercrombie, Sir Patrick. Hong Kong Planning Report, 1948. Hong Kong.

acre is a safe estimate which would allow sufficient open spaces.

Land required for dispersal.

Estimated population to be dispersed	1,200,000
Inhabitants assumed in each dispersal area	120,000
Number of dispersal areas established	10

A lower gross density of 200 persons per acre is suggested for the dispersal areas.

Therefore, land required for each dispersal area	600 acres
Total land required	6,000 acres

Land required for industrial developments.

There are no precise factors for determining the exact amount of industry to be expected for a given number of people. However, rough measures can be calculated. There are 2,925 recorded factories in Hong Kong and 129,465 persons employed. Therefore, there is an average of 45 persons to each factory. By Government estimates 329,465 persons are employed in industrial undertakings, that is, 14 per cent of the total population. (See Part 3 Industry).

Industry will continue to expand and it would be safe to estimate that 20 per cent of the total population will be employed in factories in the future.

Twenty per cent of the total population employed in factories in 10 years time	580,000
Assumed number of persons in each factory	70
Number of factories required (approximately)	8,286
Therefore, number of acres required for industry	16,572 acres
	(say 16,600 acres)

Land available for urban development in the New Territories.

To know the amount of land available for population and industrial developments a total estimation is most important:

Total land in the New Territories	227,200	acres
Estimated 3/4 bad land and islands	170,400	"
Estimated 1/4 good land	56,800	"
Present agricultural use	32,000	"
Total land available for urban developments	24,800	"
Land estimated for 10 dispersal areas	6,000	"
Land estimated for industrial developments	16,600	"
Total land required for urban developments	22,600	"

Therefore, a balance between land available and required is reached.

CHAPTER III

Section 2 Element of the Proposed Scheme

Suitability of land

The classification of land suitable for urban development is the initial stage in preparing a development plan.

Diagram (41) indicates the suitability of land use and the position of developments.

The land is classified according to the balance of land use between urban, agriculture and other physical features. Arable land is considered to be used for urbanisation while the existing urbanised areas are retained. Woodland is maintained to its original purpose and open space is alloted to its full extent.

Population distribution

Six of the existing towns and four new sites in the New Territories are chosen for the estimated dispersal population. Their locations are indicated in Diagram (42).

The remaining estimated population is to be re-located in urban centres as indicated in Diagram (43).

Community planning should be introduced in the urban developments. The function and desirability of neighbourhood units with community centres should be realized. In rebuilding the urban centre the "height for site" principle should be introduced. A limited number of high buildings with ample open space between them should be encouraged so as to obtain low site coverage to compensate for the shortage of building land in urban centres.

DIAGRAM (41) SUITABILITY OF LAND


HAU HOI WAN
(DEEP BAY)
MIRS BAY
TAI PO DIST.
TUEN LONG DISTRICT
TAI PO DISTRICT
SOUTHERN DIST.
SOUTHERN DISTRICT
LANTAO ISLAND
SOUTHERN DISTRICT
KONG
Urbanised Areas
Land suitable for Urban Development
Agricultural Land to be preserved
Open spaces

DIAGRAM (42) PROPOSED DISTRIBUTION OF POPULATION
AND INDUSTRY IN THE NEW TERRITORIES.

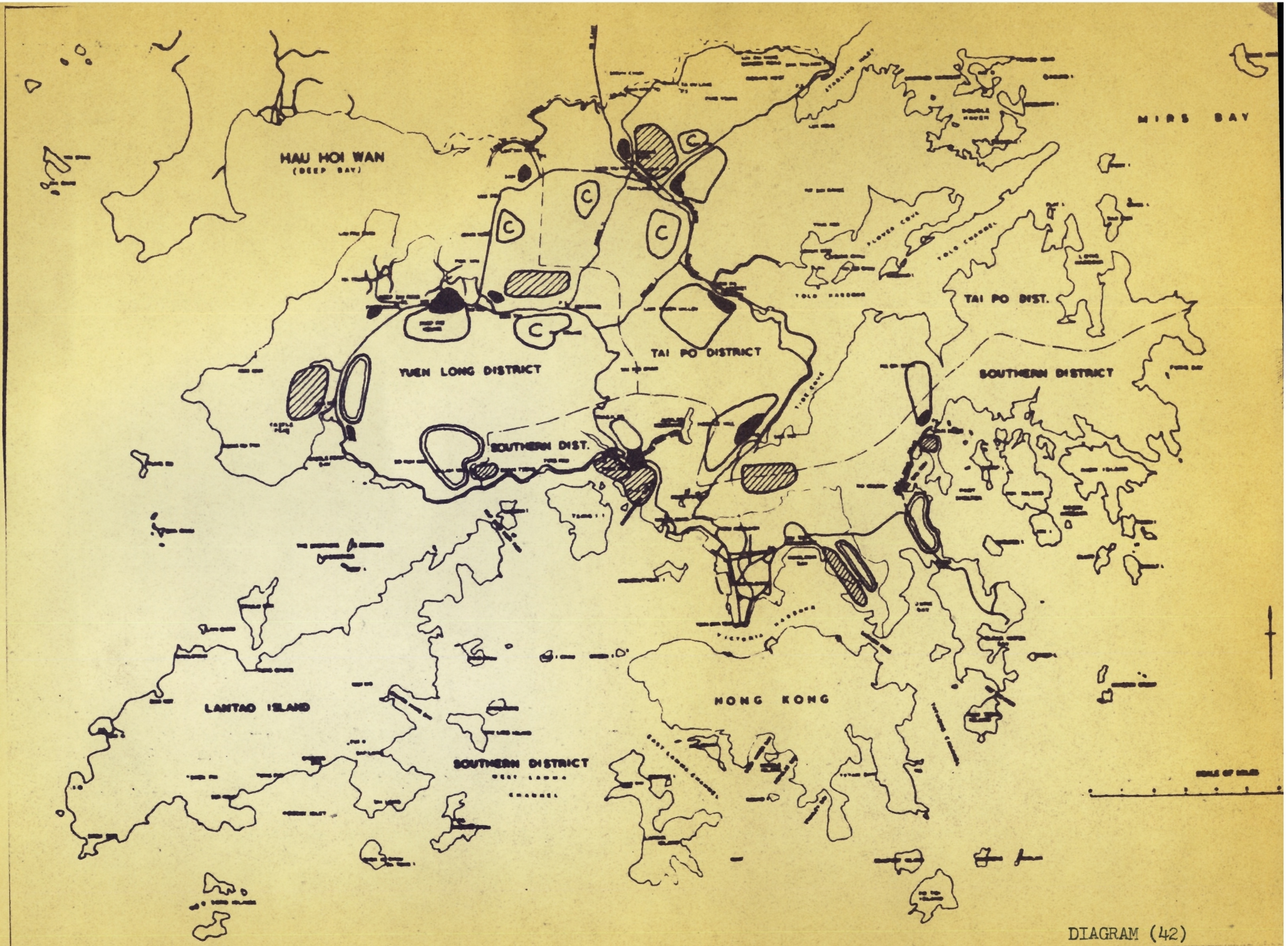

DIAGRAM (42)

LEGEND:

- Existing towns
- C — Military camp
- Extension of existing towns
- Proposed new developments
- Proposed industries
- Existing roads

DIAGRAM (43) PROPOSED DISTRIBUTION OF RESIDENTIAL, INDUSTRIAL AND COMMERCIAL AREAS IN URBAN CENTRES.

KOWLOON
HONG KONG
A
B
S
C
S
A
Scale: 1/20,000
Legend:
Residential (low)
Residential (high)
Recreational areas
Commercial areas-
A Administration
B S Central business and shopping
Light industry
Heavy industry
Mixed industry
DIAGRAM (1)

The administration centre as well as general business premises and shopping facilities are to be grouped in the commercial area.

Industrial development

Existing industries are to be relocated as far as possible according to conditions. New industrial sites are proposed that correspond to population movements.

The proposals in Sir Patrick Abercrombie's Hong Kong Planning Report for land use in urban centres are followed but modified.

Industries in urban centres are broadly classified to follow the existing trends and to confine industries already established rather than to direct development. "Light industry" includes the "domestic" workshops on the ground floors of tenements. The establishment of industries of this type would minimise the distance between home and work.

Diagrams (42) and (43) indicate the proposed industrial developments.

Communication system

Existing communications are to be adjusted and new roads and railways are proposed. Sir Patrick's proposal to change the course of railway in the Kowloon urban centre is followed, and the Government's proposal for a tunnel is included[1].

The existing rail line in Kowloon is to be replaced by an urban traffic

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1. Abercrombie, Sir Patrick. Hong Kong Planning Report, 1948. Hong Kong. p.13.

artery. Existing roads that serve arterial traffic are to be widened. All proposed developments are to have direct transportation system or are to be connected to main traffic routes.

Diagram (44) illustrates the existing and proposed communication lines.

The final aggregates

The elements of the proposed scheme have been considered and illustrated separately. These elements have been adjusted to form final aggregates for the development envisaged within the next ten years.

This overall scheme is limited to general suggestions and is offered as a guide to development. Elaboration of the details has to be based upon more complete information.

Diagram (45) is the outline scheme for urban decentralisation.

DIAGRAM (44) PROPOSED NEW ROADS AND RAILWAY.

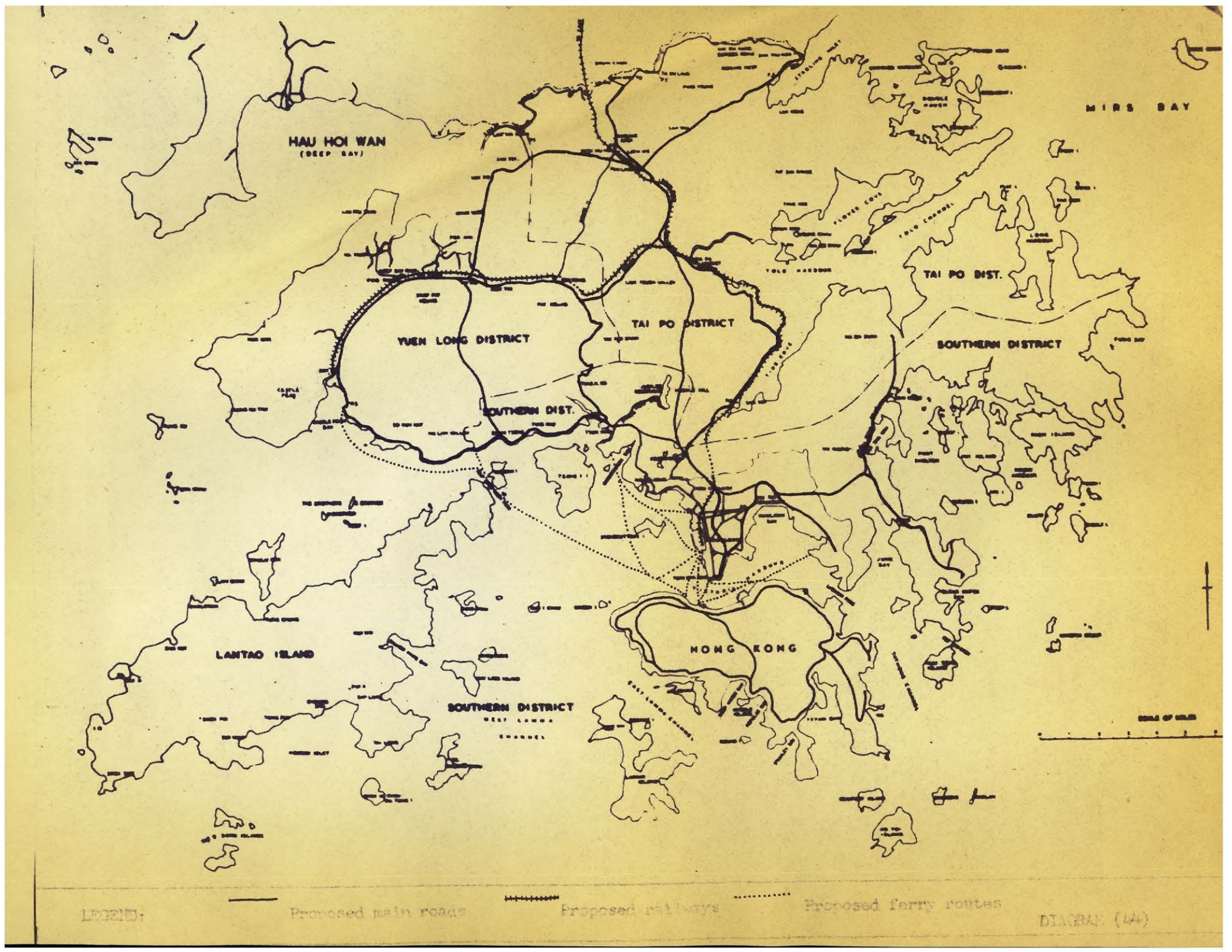
HAU HOI WAN
(DEEP BAY)
MIRS BAY
TAI PO DIST.
TAI PO DISTRICT
YUEN LONG DISTRICT
SOUTHERN DISTRICT
SOUTHERN DIST.
LANTAO ISLAND
HONG KONG
SOUTHERN DISTRICT
LEGEND:
Proposed main roads
Proposed railways
Proposed ferry routes

DIAGRAM (44)

DIAGRAM (45) OUTLINE SCHEME FOR URBAN DECENTRALISATION.

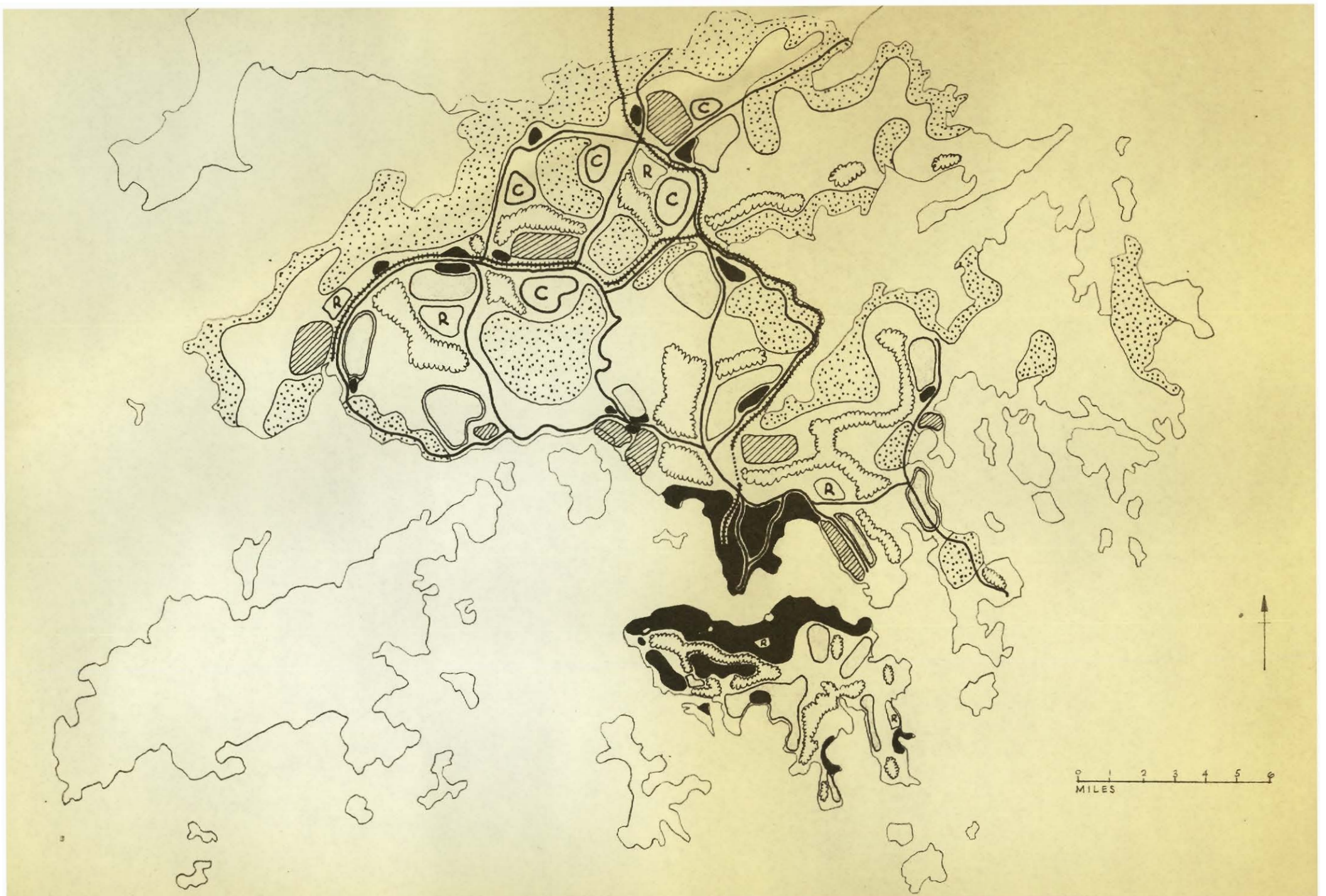

DIAGRAM (45)

LEGEND:

- Existing Urbanised Areas
- Proposed Industrial Aggregates
- Proposed Extension of Existing Towns
- Proposed New Developments
- Agricultural Areas
- Forests
- R Recreational Areas
- C Military Camps
- Open Spaces
- Main Roads
- Railways

CHAPTER III

Section 3 Conclusion

A scheme for decentralisation has now been proposed and many of the findings from the cases reviewed previously have been followed. It is further assumed that all developments were undertaken with consideration of financial, social and economical conditions.

Planning for urban development would effect changes. Therefore, a planning authority and administration would have to be established to control the growth.

The Government of Hong Kong has accepted a proposal from the Planning Authority to disperse population and industry by developing new towns and suburbs as well as by erecting buildings in urban areas for resettlement purposes[70]. Therefore, the idea of urban decentralisation is not impossible in the future. To bring about such a scheme of urban dispersal, Government action should be called upon, and a bold system of legislation for land use and the development of land should be introduced.

It is to be hoped that the Government may realize the urgency of bringing into being such a scheme and whatever legislation that may prove to be the most satisfactory.

It is stressed here that this study has been undertaken as an exercise in order to find a solution for the incredibly high density in Hong Kong. The proposal is based on a supposition.

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70. Information obtained from authorised newspaper, South China Morning Post. 2nd April, 1956.

APPENDICES

APPENDIX I A GLOSSARY OF TERMS[1]

BUILDING - A "building" is any structure that:

a. is permanently affixed to the land;

b. has one or more floors and a roof; and

c. is bounded by either open space or lot lines of a zoning lot.

A "building" may consist of a one-family detached residence, a two-family house, and an apartment house; of a single store or a row of stores; or a single factory.

BULK - "Bulk" is the term used to describe the size and mutual relationships of buildings and other structures, and therefore includes:

a. the size of buildings and other structures;

b. the shape of buildings and other structures;

c. the location of exterior walls of buildings and other structures, in relation to lot lines, to the centre line of streets, to other walls of the same building, and to other buildings or structures; and

d. all open spaces relating to a building or a structure.

DWELLING UNIT - A "dwelling unit" is a room or a group of rooms which are designed for residential occupancy by a single family and occupied by a single family unit. There may be one or more "dwelling units" within a single building.

FAMILY A "family" is one or more persons who live together in one dwelling unit and maintain a common household. A "family" may consist of a single

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1. Definitions of terms derived from Ministry of Housing and Local Government. The Density of Residential Areas. London, 1952. Appendix 3.

person, or of two or more persons, whether or not related by blood, marriage or adoption. A "family" may also include domestic servants and gratuitous guests.

FLOOR AREA - The "floor area" of a building or buildings is the sum of the gross horizontal areas of the several floors of the building or buildings, measured from the exterior faces of exterior walls or from the centre line of walls separating two buildings.

RESIDENCE or RESIDENTIAL - A "residence" or "residential" shall include a building, or any part of a building, which contains living and sleeping accommodations for permanent occupancy. "Residences" therefore include all one-family and two-family houses, multiple dwellings, boarding and rooming houses, and apartment houses.

RESIDENTIAL AREA - Residential sections of a metropolis, a single municipality or a portion there of, large enough to support an elementary school, and a variety of other commercial and local community facilities that primarily serve the residents of the sections, such as shops, offices, school, open space, parks, playground and service industries.

NET RESIDENTIAL AREA - The area of land actually developed or to be developed as dwellings, and including:

1. the sites of the houses and other residential buildings and their curtilages;
2. any small public or private open spaces included in the layout; and
3. half the width of any street on which land mentioned in (1) or (2) abuts, except where a curtilage abuts upon a principal traffic road

only 20 feet of the width of that road is included.

NET RESIDENTIAL DENSITY - The total number of persons divided by the net residential area in the area. It is expressed as persons per net residential acre.

GROSS RESIDENTIAL AREA - The area includes the net residential area and:

1. the sites and curtilages of primary schools, local shops, offices and business premises, cinemas, public houses, local service industries and workshops, churches and public buildings;
2. open spaces not included in the net area; and
3. half the width of any street on which land mentioned in (1) or (2) abuts.

GROSS RESIDENTIAL DENSITY - The total number of persons in an area divided by the gross residential area.

TOWN - A town consists of the following groups of land uses:

1. residential areas: including all neighbourhood uses;
2. central areas: including the town's central shops, offices, public buildings, and wholesale warehouses;
3. industrial areas: including light industrial, industrial and special industrial uses; railways and goods yards; gas works and power stations;
4. educational uses: secondary schools, colleges and technical schools; large independent schools;
5. open land including: large parks, private playing fields, unused land etc. (not included in residential areas), allotments; and
6. large establishments: including hospitals, barracks, and asylums.

NEIGHBOURHOOD - Residential areas having a fair measure of self-contained land for certain facilities. **i.e.** Residential areas situated within certain other facilities which the residents can reasonably expect to have close at hand. These facilities include every day shopping, primary school, public buildings such as clinics, library and churches.

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