A SURVEY OF INDUSTRIAL ESTATES
WITH SPECIAL REFERENCE TO MONTREAL

by

Otto Graser, Dip. Arch.

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Department of Architecture
McGill University
Montreal

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PART ONE

I. Introduction

Industrial estates deal with a very specialized use of land. The 20th century - and especially the post-war period - has been a period of rapid expansion in all fields of urban growth and change. To accomodate the new growth (and in many instances to encourage new growth) various concepts and new methods of land organization have evolved to facilitate these pressures of rapid expansion. Among these are the shopping centre, the neighbourhood and community unit, the civic centre, the new plaza offices complex, segregated vehicular and pedestrian traffic, and among others the planned industrial estate.

This research paper deals with the aspect of planned industrial estates as a modern town planning device or instrument, firstly to meet the needs and requirements of industry and industrial development, and, secondly, siting to meet the needs of the community as a whole - that is, the detailed relationship of industry to the surrounding area, and thirdly as a tool for location, within the boundary of specific objectives and policies of governments.

Planned industrial districts, parks and trading estates, therefore, may be considered the industrial counterpart of some of the above mentioned concepts - the shopping centre and the residential subdivisions - and likewise reflect differences in quality of their planning, aims and

purposes and operations.

II. Terminology

Because of the various nomenclatures used both between and within many countries, it is perhaps first of all necessary to clearly establish just what is meant by an industrial estate. The term has been widely used to cover both public and private developments and is known under various other names. In Britain it is also referred to as 'trading estate' or 'factory estate'. American usage prefers 'industrial parks', 'industrial districts' and 'industrial tracts' to describe industrial estates. In this research paper, however, the British term 'industrial estate' will be used for the specific form since:

1. it is highly descriptive, implying the possible provision of buildings as well as improved land.
2. it is comparatively free from limiting or confusing connotations.
3. it is used throughout a greater part of the world than the other names.

Also the term 'industrial estate' will be used to express the generic concept.

III. Definitions

A. Industrial Estate:

In 1952 the Industrial Council of the Urban Land Institute defined an industrial district as follows:-

"An industrial district, in the usual sense, is any area dominated by industrial activity. But where such an area incorporates a deliberate allocation to restricted use coupled with proprietary control, its designation takes on special significance. This distinction is best referred to by the term "planned or organized industrial estate". A planned industrial district may be further described as a suitably located tract of land subdivided and promoted for industrial use by a sponsoring managerial organization. In this sense "industrial estate" connotes a restricted use of improved land over which there is a proprietor who devotes himself to the area's planning and development. The term may thus refer to either the tract of land or to the operating company."*

The matter of further defining industrial estates was the subject of a considerable discussion at the

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*Planned Industrial Districts, Technical Bulletin No.19, Urban Land Institute, October 1952, pp.4

Dartmouth College conference on Industrial Estates in June 1958 and resulted in the following definition:-

> "An organized or planned industrial district or estate is a tract of land which is subdivided and developed according to a comprehensive plan for the use of a community of industries. The plan includes detailed provision for streets, rail lead tracts and utilities, either installed before the sites are sold or otherwise assured to prospective occupants. The comprehensive plan must insure adequate control of the area and buildings through zoning, private restrictions incorporated as legal requirements in deeds of sale or leases, and the provision of continuing management, all with a view to protecting the investments both of developers of the district and industries occupying the improved sites. The management handles negotiations with local governmental authorities on behalf of the tenants, and it may erect buildings prior to sale or lease for speculative purposes."*

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*A Report on the Dartmouth College Conference on Industrial Parks prepared by W.L. Baldwin. June 1958, p.27

B. The term "nursery factory" will be used in this paper to refer to units designed for initial occupancy by small industrial concerns which are likely, once established, to need more space and may then move to larger quarters on the estate or expand into the adjacent factory unit. Other terms used for this principle are "nest factory", "incubator factory" or "sectional factories".

C. The term "flatted factory" is used for a multi-storey concentrated factory development. It contains factory units to be occupied by different manufacturers and, in effect, consists of sectional or nursery factories stacked one on top of another. They are generally used in central locations where land is congested and land cost is high.

IV. Classification of Industry

It would be useful here to touch upon the classification of industry. Industries which locate in industrial estates are usually classified as "secondary manufacturing", "light industries" or "small industries".

The problem of classifying industry is extremely difficult and various standards are adopted depending upon the point of view of the classifier.

A. United Kingdom

In the United Kingdom classification is based upon the kind of nuisance the industry is likely to cause to adjacent property, and for that purpose the Ministry of Town and Country Planning has established three basic classification groups.

The first group is called "Light Industrial Buildings", that is factories in which no solid fuel is used for processes, and in which only electric motors (up to ten horse-power per single motor) are used for driving machinery.

The second group is "Special Industrial Buildings". They are all industries which have a nuisance value. "Noxious Industries" such as tanning, blood boiling, candle works; "Extractive Industries", such as brickworks, lime kilns, coal and salt mines; and "Heavy Industries", such as steel and iron works, all come in this group.

The third group, called just "Industrial Buildings", are those which are neither "Light" nor "Special", but set problems in their siting by reason of their size or the power they require. They include all those large manufacturing complexes like motor-car production, wool and cotton works, etc. *

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*The Re-development of Central Areas. Ministry of Town and Country Planning (H.M.S.O.)

B. U.S.A. (Small Industry)

"Small industry" is defined by the Stanford Research Institute as that segment of manufacturing industry carried on in relatively small establishments - that is, in establishments having several (but not necessarily all) of the following characteristics:

1. Little or no specialization in management, essentially management by one man, perhaps with a few assistants;

2. Close personal contact of the manager (often a manager-proprietor) with all those involved in the business;

3. Lack of access to capital through the organized securities market;

4. No dominant position in a major product market; and

5. Close integration with the local community by reason of local ownership, management, raw materials sources, or markets.*

C. China

Before discussing the classification of industry in Canada, it may be of interest to examine the definitions and classifications of an under-developed country. The following is from the "Terminology of the First Five-year

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*Eugene Staley, Small Industry Development. Research Program on Small Industry Development, Miscellaneous Paper No.1, December 1958, International Industrial Development Centre, Stanford Research Institute.

Plan" published by the State Planning Commission of mainland China -

1. By Type of Product (Irrespective of Scale and Operation or Means of Production).

   a) Heavy Industry - Those engaged in producing means of production, such as power, coal, petroleum, iron and steel, nonferrous metals, machinery-building, basic chemicals, building materials and lumber industries.

   b) Light Industries - Those engaged in producing consumer's goods, such as textile, food, pharmaceutical, pulp and paper, printing and porcelain, leather, matches, and articles and apparatus for use in the fields of culture, education, science and the fine arts.

2. By Level of Administration (Irrespective of Scale of Operation or Means of Production).

   a) Under Central Administration - Industries operated by various ministries of state council of the central government.

   b) Under Local Administration (or local industries) - Industries owned and operated by the local governments (provincial, municipal, district, county or village) as well as those operated by cooperatives, joint state-private enterprises, and private enterprises.

3. By level of mechanization (Irrespective of Operation).

   a) Modern Industries - Those which have mechanized their major production processes.

   b) Handicraft Workshops - Those which have adopted division of labour (or specialization) in production but have not yet mechanized their major production processes.

4. By Size of Scale of Operations.

   a) Individual Handicraftsmen - Those who depend on their own labour or that of the members of their families in production. In case of hiring outside workers or taking in apprentices, the total number does not exceed four (4) persons.

   b) Large Industries (i) Those which use motive power and employ more than 15 persons; (ii) those which do not use motive power but employ more than 30 persons; and (iii) power stations with a capacity of more than 15 kw, irrespective of their number of employees.

   c) Small Industries - Those with a scale of operation or number of employees which fall between individual handicraftsmen and large industries is defined above.

D. Canada

The source of industrial classification of industry in Canada is the Dominion Bureau of Statistics. In its "Division of Manufacturing, Classification by Sub-groups", it includes both primary and secondary manufacturing.

Appendix No.1 sets out the individual groups of industries under the above two general categories.

W.F. Lougheed in his book "Secondary Manufacturing Industry in the Canadian Economy"* approaches the subject from an economist's point of view and states that the words "secondary industry" are all inclusive and cannot be thought of as applying to a neatly-packaged group of companies or industries. The age, influence, financial strength, growth rate and reputation of the various firms composing secondary manufacturing in Canada all vary; and there is no common denominator among them which is understandable and apparent to all.

The differences mean that the only factor common to this group of industries is an economic one, namely the desire to show as big a profit as possible. Mr. Lougheed while discussing secondary industry in Canada adds the cautionary note that the diversity of secondary manufacturing industry in each and every one of its aspects, aims and

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*Baxter Publishing Company, Toronto, 1961.

influences should always be remembered; too often it is regarded as a homogeneous entity.

The analysis of Canada's industrial structure reveals that broadly speaking the difference between primary and secondary manufacturing, as classified by the Dominion Bureau of Statistics, lies in (a) degree of processing, (b) location of market, (c) source and type of materials used.

Primary industries are of two types. The first involves minor processing of domestic raw materials or other resources and here the value added in manufacturing is relatively low; such as flour milling and cheese manufacture. The second type includes pulp and paper making, smelting and refining, and its characteristic is that by use of capital equipment and complex machinery it processes domestic raw materials for eventual use chiefly in export markets. While their markets are predominantly export, the production location of the primary industries is normally near the raw material source. The goods produced are industrial goods, that is they are in turn used by other industries to make a final end-product.

Secondary manufacturing industries, by contrast, are distinguished by a high degree of processing, by a dependance on the domestic market and by location near to markets. During the manufacturing process a relatively

high value is added by a complexity of operations. The raw materials or even semi-fabricated components used by Canadian manufacturers sometimes originate in a foreign country, but as a rule the products of Canadian secondary industry are end-products sold in the domestic market.

V. Related Industrial Developments

The industrial estate should be differentiated from other industrial classifications and developmental activities, as the above definitions eliminate from the planned industrial estate concept miscellaneous collections of industrially marked land, raw acreages under single ownership offered for sale to industry but lacking a comprehensive development plan and services, and especially from industrially zoned portions of a city.

The Industrial Zone

City zoning ordinances specify certain areas of a community in which industrial activities may be performed. However, residences and commercial buildings are intermixed with industrial properties since few zoning codes restrict land use in these zones since higher uses are generally permitted in the lower zoned areas.

An industrial estate, while legally approved for industrial activities, differs from an industrial zone

in the following ways:-

1. The land comprising the district usually has been developed and improved by one organization.
2. The tract has been planned as an entity with a view towards protecting the land values in the area. Consequently, land preparation has included levelling of the ground, the installation of streets, rail lead tracks, utilities and storm and sanitary sewers, and the landscaping of individual sites.
3. The developer has established protective controls regarding building design and the activities which will be permitted in the district. The restrictions usually appear in protective covenants.
4. In many instances, the developer inspects the contemplated operations of a company that is interested in locating within the subdivision to determine compatability of the processes with those of other firms already established in the subdivision.
5. The developing organization either provides or arranges for the architectural, construction

and financial assistance as a service for its clients.

VI. General Classes or Types of Industrial Estates

A. Introduction

Planned industrial estates are established in many forms and provide a wide range and variety of services.

This may be due to any or a combination of factors; such as the attraction of similar industries, the combining of complementary supporting industries, certain financial assistance, and the extent to which the developer's participation in management and control are involved.

It should also be noted that the objectives sought in establishing industrial estates in North America and some advanced European countries reflect an appreciable difference in form and services not only from country to country, but from one estate to another. Most estates, in economically advanced countries, and in particular in North America, are fundamentally venture undertakings where sites are developed and sometimes standard factories are erected for speculation.

On the other hand, the approach adopted for classification of industrial estates in or for under-developed countries, is usually discussed from the standpoint of

economic planning. The types listed for underdeveloped countries are classified according to facilities provided which are most suitable for under-developed countries.

B. North American Industrial Estates

1. Industrial tract: This is an improved tract of land including provisions for streets and access roads, and installation of utilities. No buildings are provided.

2. Industrial subdivision: This is an improved tract of land with industrial buildings designed for a small group or cluster of enterprises. No special services or facilities are provided in a subdivision.

3. Fully packaged estate or "Turnkey Plan": This is an improved tract of land provided with industrial buildings and large enough in area to provide sufficient economies of scale to offer special facilities and services to industrial occupants. This may consist of an integrated service for the location, design, construction and financing of new facilities on an ownership or long-term net lease basis. Thus, the package plan makes it possible for the occupant to complete all necessary negotiations (tailored to his needs and specifications) in one office.

4. Single Industry Estates: As the name implies, this is a well planned industrial tract of land taken over by a single industry. These are usually prestige developments

where a major emphasis is placed on compatability - both within the estate and the community in which it is located. G.E.'s Appliance Park, City of Louisville may be taken as an example. However, since they are single company operations and are not occupied by a community of industries, they do not meet the definitions of a planned industrial estate given above. They do, nevertheless, illustrate the importance modern industry places on aesthetics and compatability in the location and establishment of new plant facilities.

5. Research Parks and Single Activity Estates: Here the tenants are limited, by private covenants, deed restrictions and rigorous conditions, by the developers, to those engaged in a specified industrial activity or to those engaged in research and research-orientated activities and compatable operations. An example of a research park is Royal Park, Ontario Research Community, built by private industry and the Ontario Research Foundation.

6. Balanced Community or New Town: The terms self-contained, integrated, satellite and balanced are recently found terms, used to describe new communities which are designed to accomodate residential, commercial and industrial uses in harmonious patterns and compatable surroundings. Don Mills, a new community in the Metropolitan Toronto Area is a notable example of this type of balanced community.

7. Industrial Urban Renewal: Urban renewal is now gaining increasing attention to providing space for industry in some urban renewal projects. The Victoria area in Montreal is a proposal to renew a blighted area with industrial development. Whether these redevelopment areas, including privately financed projects, qualify as planned industrial estates depends upon the degree of planning, the effectiveness of the controls and the quality of the management which is provided.*

8. Airport Industrial Estates: This is an industrial estate located actually on the airport, with taxiways tied into the runway system so that aircraft can taxi right up to the plant, warehouse or office site. Airport industrial estates are comparable to early industrial estates set up by the railway companies to promote concentration of freight generating industries with rail facilities, branch and spur lines interlaced with the estate./

C. Under-developed Countries

1. A fully planned estate with 'custom' factories designed for selected industries: This is a totally balanced industrial estate, where preplanning of all the industries to be set up on the estate are determined in advance; with feasibility studies, industrial complex analysis, taking into account the inter-dependance of related industries and services.

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/Airports Attract Industry - Urban Land, October 1962.

This type of estate is suggested for a rural area where opportunities for industrial development are limited and where enterpreneurial initiative is unlikely to be spontaneous. In other words, a complete "blue print" would ensure a rational composition of industries and good operating conditions. It is interesting to note that no country has yet established an estate of this type.*

2. A large estate including both 'custom' factories and general-purpose factories built in advance of demand: In this estate the 'custom' factories are erected first usually to foster desirable industries from the standpoint of general economic needs and for the further development of the estate. The general-purpose factories are designed for small-scale light manufacuring industries.

This form of organization lends itself to combining full planning in the initial stage - when most difficulties arise - with flexible and controlled development in the future for growth. Such an estate is appropriate both for a centre where some industry is already established and for an undeveloped locality where industrialization is likely to be induced.

3. General-purpose factory estate: This is the type of estate usually found in India. In this estate the factories may range from divisible "nest" providing workshop units for handicrafts and very small concerns to well established

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*United States International Cooperation Administration, 1958

small-scale industries. Such an estate is suitable for urban and rural localities with good prospects for industrialization.

4. An estate offering general-purpose factories, improved sites, and custom-built factories: This type of estate, which is similar to the British trading estate of the pre-war period, would allow maximum flexibility and organization and use of land and in services extended to industry.

5. An estate providing only imprpved sites: The establishment of such an estate in or near a large urban centre is sufficient incentive to the formulation of industrial undertakings and the relocation of existing industries from congested urban areas.

VII. Reasons for the Rapid Growth of Industrial Estates

Interest in industrial estates has increased significantly in all parts of the United States, Europe, and in under-developed countries since the post war period. A number of factors have been responsible for the growing employment of the planned industrial estate in these countries. They are:-

1. The accelerated demand for industrial land brought about by the post-war expansion and dispersion of industry, especially light assembly and distribution facilities;

2. The lack of suitable industrially zoned land in older

central cities.

3. Blight, traffic congestion and cramped conditions of older industrial areas with no possibility for expanding existing facilities.

4. Change in plant design from multi-storey mill-type buildings to modern single and two-storey plants allowing for more efficient horizontal-line production methods but demanding larger sites.

5. Improved production techniques which eliminated or reduced industrial nuisance, thereby making industry acceptable in communities where it would previously have been excluded.

6. The increased use of the automobile as a preferred method of commuting to work, making it necessary to provide ample parking space for employees at new plant sites.

7. Increased truck transport of industrial products, requiring additional space for service parking and loading.

8. Recognition by industry of the importance of creating a pleasant working environment for its employees.

9. Recognition by industry of the advertising potential and public relations value of a handsome plant in an attractive landscaped setting.

10. A preference by institutional investors for financing construction in planned districts where security of investment is more certain.

11. The convenience, and in the case of small and medium

sized firms, the economy of locating a plant in a development where the bothersome and costly details of securing appropriate zoning, planning and building all necessary utilities and services, preparing (grading and filling) the plant site, etc., have all been taken care of in advance by a development and management organization.

12. In under-developed countries, industrial estates provide an efficient and controlable tool for planning industrial and social development.

OUTLINE

PART TWO

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1. The United Kingdom

I. Introduction

The early history of industrial estates in the United Kingdom reveals that it began about the same time as in the United States - at the turn of the century. The British experience is of particular interest, firstly because it is different from that of the United States, and secondly because the policies and objectives established in the United Kingdom, for the development of industrial estates, has greatly influenced other parts of the world, especially the newly emerging nations, countries associated with the Commonwealth, and the so-called under-developed countries.

The earliest industrial estate of any size in Britain was begun at Trafford Park, Manchester, in 1896. A speculative company acquired some 1,200 acres of land adjoining the Manchester Ship Canal. It proceeded to develope the areas for factories by putting in services, providing road and railways linked with the main line railways and the Manchester Dock.*

Further developments on industrial lines took place in the two early private "garden cities" -

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*GROSS, Anthony, British Industry and Town Planning. Fountain Press, London, 1962. Chapter Five, Industrial Estates, pp.65-81.

Letchworth and Welwyn. At Letchworth, a site was chosen for industrial development adjoining the railway with sidings connected to it. Here, small standard factories were erected for letting on long lease. At Welwyn the process was taken further with much more varied sizes of standard factories being made available.*

The industrial estate at Slough in Buckinghamshire was started in 1920 on the basis of an existing military service depot. This was also a private speculative venture. The company responsible constructed a road and rail transport system and divided the area into an approximate layout, providing standard factories to let and services to them.

The Slough Industrial estate is chiefly noteworthy because of the extent of the industrial services provided, electricity, steam, water supply and railway facilities. In addition, it developed a large social centre and welfare and sports facilities provided through financial co-operation between local manufacturers and the County Council.

Although a certain number of industrial estates were privately owned, developed and operated on

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*GROSS, Anthony, British Industry and Town Planning. Fountain Press, London, 1962. Chapter Five, Industrial Estates, pp.65-81.

a commercial basis, the majority of subsequent development in the United Kingdom was started upon the initiative and with the assistance of the Government.

Industrial estates in the United Kingdom may be grouped into four main types:-

1. Strictly commercial estates, operated by joint stock companies, such as Trafford and Slough discussed above.
2. Estates developed as part of a planned community such as those in the New Towns of Basildon and Harlow.
3. Estates formed in the Development Areas to encourage new industries to settle there and create new employment opportunities, such as Team Valley and Hillington.
4. Estates established in connection with rehousing schemes of local authorities, in which the provision of industry was a secondary consideration.*

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*William Bredo. Industrial Estates, The Free Press, 1960. pp.16-17.

II. Government legislation - Industrial location policy, (1928-1960)*/

Government participation in the establishment of industrial estates in the United Kingdom was an answer to the severe economic depression of the late twenties and early thirties which focussed attention upon the industrial problem. Therefore, the participation was a response to an urgent practical need.

Between 1930 and 1933 unemployment over the whole country averaged 20%. This figure was very much higher in some industrial occupations, 37% in coal mining, 46% in iron and steel, and 57% in ship building and engineering.

A. Special Areas (Development and Improvement) Act 1934

The first definite steps were taken by the Government when in 1928 the Industrial Transference Board was set up. This operation was designed to encourage labour to move out of depressed areas. Following this the Government passed the Special Areas (Development and Improvement) Act in 1934, and Commissioners

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*Methods of Industrial Development, edited by Albert Wisemius and John A. Pincus.

/Peter Self, Cities in Flood, Faber and Faber, London 2nd edition, 1961.

#Regional Planning in Europe, by Leslie B. Ginsburg, pp.133-140 in Regional Planning, United Nations, Housing, Building and Planning. Nos.12 & 13. Department of Economics and Social Affairs, New York, 1959.

were appointed to take steps to facilitate the economic development and social improvement of the four areas of high unemployment: Central Scotland, West Cumberland, the North-east Coast and South Wales. Later, the Special Areas Reconstruction Association was formed in 1936 to grant loans to small firms establishing industries in the Special Areas.

Direct participation was also taken in the Special Areas by the Government in the form of establishing industrial estates. The Commission has been impressed by the success of two privately owned industrial estates and decided to promote and finance non-profit making Industrial Estate Companies for the Special Areas. The Estate Companies were asked to provide firms with factories at low rents, with power supplies, sewerage, water supply and electrical services laid on. Loans were available to cover initial costs of plant and machinery and firms could obtain reliefs from local rates and even from taxes.

These inducements produced encouraging results. By 1938 six Industrial Estates had been established in England and Wales, and four in Scotland. Over 300 factories had been built, varying in size from 2,000 square feet to 100,000 square feet, and by 1939, 12,000 people were employed in these factories.

However, the problem was by no means solved. There were still 300,000 unemployed in 1938 in the Special Areas.

B. The Royal Commission on the Distribution of Industrial Population - 1940.

By 1937 the Government, realizing that the problem of unemployment was national in scope and that the unbalance of overcrowded cities on the one hand and unemployment and decay elsewhere, called for a comprehensive study and a comprehensive and continuous national policy to overcome the situation. The Government set up a Royal Commission under the chairmanship of Sir Montague Barlow to consider:

> "What social, economic and strategical disadvantage arises from the concentration of industries and of industrial population in large towns or in particular areas of the country; and to report what measures, if any, should be taken in the national interest."*

The Commission reported in 1939. It recommended the establishment of a central authority whose objective would be:

> "a) continued and further re-development of congested urban areas where necessary;
>
> b) decentralization or dispersal, both of industries and industrial population, from such areas; and
>
> c) encouragement of a reasonable balance of industrial development, so far as possible, throughout the various divisions or regions of Great Britain, coupled with an appropriate diversification of industry."*

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*Report on the Distribution of Industrial Population (Barlow Report) Cmd. 6153, H.M.S.O., 1940.

The Authority should also have the duty of:

> "anticipating cases where depression may probably occur in the future and encouraging before a depression crisis arises the development in such areas, as far as possible, of other industries or public undertakings."*

This report was consequently temporarily laid aside due to the war. The Barlow Commission's report was, however, treated as the basic document by the Government when considering plans for post-war reconstruction.

C. The Distribution of Industries Acts 1945, 1948 and the Town and Country Planning Act, 1947.

The Goverment's White Paper on Employment Policy published in 1944 proposed measures to deal with local unemployment by improving the efficiency of the basic industries, by influencing the location of new enterprises so as to diversify the industrial structure in areas particularly vulnerable to unemployment and by facilitating the transfer of workers from one area to another and from one occupation to another. The effect of this intention was the passing of two acts: The Distribution of Industries Acts of 1945 and 1948, and the Town and Country Planning Act of 1947 (which applied to England and Wales) and the corresponding Act for Scotland. The Town and Country Planning Acts are

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*Report on the Distribution of Industrial Population (Barlow Report) Cmd. 6153, H.M.S.O., 1940

administered under the Minister of Housing and Local Government in England and Wales, and in Scotland under the Secretary of State for Scotland through his Housing Department, the Department of Health for Scotland. The Distribution of Industry Act (now replaced by the local Employment Act) was administered throughout the whole country under the President of the Board of Trade.

It is significant to draw attention to the fact that the key provision affecting industrial location is contained not in the Distribution of Industries Acts but in the Town and Country Planning Acts. The latter Act states "that no factory of more than 5,000 square feet may be built anywhere at any time unless the Board of Trade has first given a Certificate - called an Industrial Development Certificate - certifying that the development in question can be carried out consistently with the proper distribution of industry". The Barlow Commission recommended a Central Authority, this Authority is of course the Government as a whole, but administration is shared mainly by two Governmental Departments - the Board of Trade and the Housing and Local Government Departments.

D. Distribution of Industry (Industrial Finance) Act, 1958.

By 1958 a change had taken place in the pattern of employment distribution. Some 'Development Areas' no longer suffered unemployment while other areas - 'black spots' - were not benefitting from the Distribution of Industry Acts (1949 and 1948) due to lack of jurisdiction in these areas. Power was taken under a new legislation to cope with this situation by the passing of the Distribution of Industry (Industrial Finance) Act, 1958, to give financial assistance to firms "in any location in which, in the opinion of the Board of Trade, a high rate of unemployment exists and is likely to persist" provided that the project was economically sound and the firm "could not obtain the necessary finance on the requisite terms from other sources". But this act did not extend the factory building powers to any of the areas outside the Development Areas. This situation led to some confusion and to administrative difficulty. The Government therefore revised and consolidated all the Distribution of Industry powers in a single comprehensive Statute. The Local Employment Act 1960 was passed and came into force in April 1960. This Act is much more flexible and permits ready adaptation to changing circumstances.

E. The Local Employment Act, 1960.

The Local Employment Act, enables the Board of Trade to define as a "Development District" "any locality in Great Britain in which, in the opinion of the Board of Trade, a high rate of persistent unemployment exists, or is to be expected within such a period that it is expedient to exercise the Board's power". The powers are to be exercised "with due regard to the proper diversification of industry" and "to provide, for the benefit of any development district, employment appropriate to the needs of the district". The Act is flexible because the Act does not itself list the development districts nor does it define the rate of unemployment which is to be considered as high.

In place of the old Industrial Estate Companies, three Estate Management Corporations have been set up - one each for England, Scotland and Wales. They perform, on behalf of the Board of Trade, all the functions of landlord. Rent agreements are usually for a period of 21 years; the rents are not economic rents but are negotiated by the tenant with the District Valuer. The greater the economic depression in the area, the lower the rent is likely to be.

The Act also enables the Government to finance Local Authorities for the clearance of derelict

neglected sites and this may be done even if the offensive site is not intended for industrial use. There are also powers to assist Local Authorities with basic services. Under the Housing (Financial Provisions) Acts the Government provides grants for houses for "key" workers who have to be brought into an area so that the less skilled resident labour force may be employed. Training grants are also available to industries under the Employment and Training Act 1948 which may also be applied to assistance for the transfer, maintenance, welfare and resettlement of workers and their dependants who are moved by their employers when it is decided to transfer the whole or part of an undertaking to a development district.

III. General Analysis of Industrial Estates in the United Kingdom.

A. Introduction

Since 1945 a total of 32,000 factory building projects have been approved. These projects covered a total factory area of 826 million square feet, and are expected to employ 1,500,000 workers.

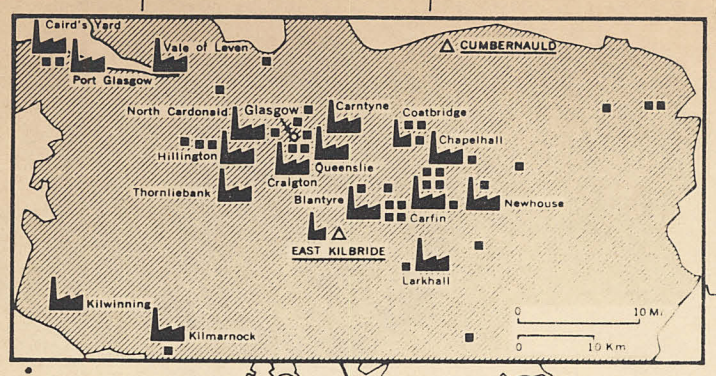
Government financed factories have been built mainly on industrial estates of which there are now 46 in Britain. Most of the estates have canteen facilities for workers on the estates. Boiler houses

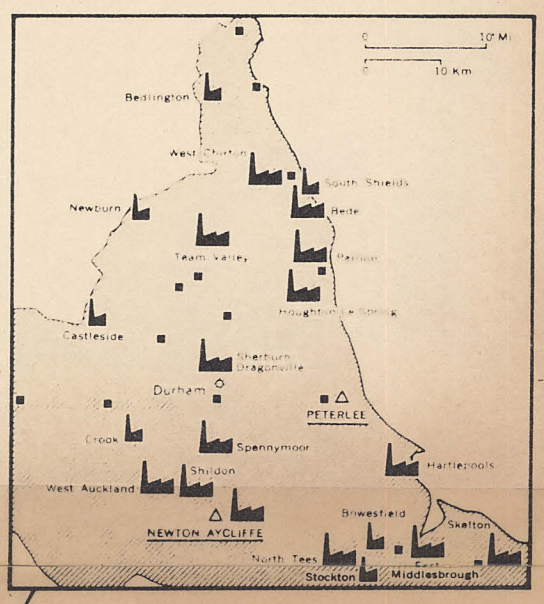
UNITED KINGDOM

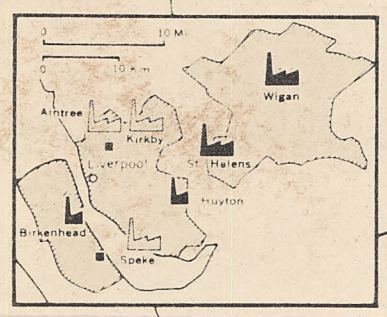
INDUSTRIAL ESTATES, GROUP SITES AND INDIVIDUAL FACTORY SITES IN THE DEVELOPMENT AREAS OF GREAT BRITAIN AND IN NORTHERN IRELAND, AND NEW TOWNS

(AS OF THE MIDDLE OF 1960)

- Development Area and Northern Ireland
- Hirwaun — Industrial estate
- Treorchy — Group site
- Individual site
- Slough — Privately-owned trading estate
- △ HARLOW — New Town
- ○ Bristol — Main City







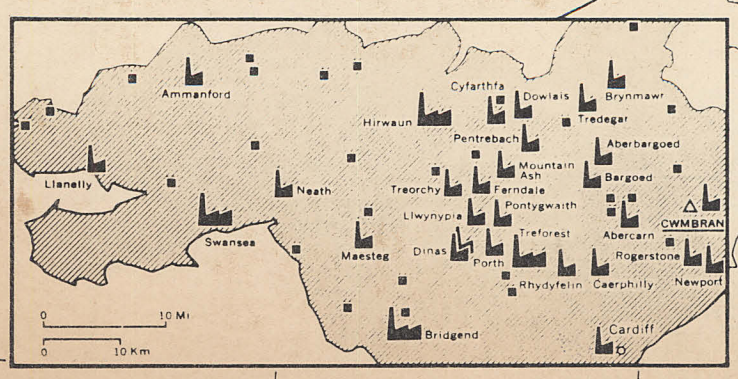


FIGURE NO. 1

are usually provided for each block, or group of factories and these supply hot water for lavatories, space heating, and for process steam. (See Figure No.1).*

Restrictive covenants are incorporated in the lease contracts on all estates. The restrictions are similar to those in practice in the United States (discussed below), but usually provide for lower land use ratios. The Board of Trade furnishes detailed locational information to the prospective tenant, and the Estate Companies assist them in solving installation problems, such as hiring manpower and securing housing, etc.

B. Site Selection

In Great Britain the selection of an industrial estate site travel distance for the worker is considered to be even more important than the transportation of materials. The practice of the Northeastern Trading Estates Company has been to start its site selection from the centre of the unemployment pocket and then to look for sites within a half-hour bus travel in all directions, checking off every site that is not used for industrial purposes according to the master plan of the Local Authority.

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*Map reference - Establishment of Industrial Estates in Under-developed Countries. Department of Economic and Social Affairs, United Nations, New York, 1961.

The form of survey varies greatly according to the type of area involved, the type of development proposed, the policy to be implemented and the nature of the sponsoring authority. In general terms, the scope of such an investigation would cover some or all of the following features:

"1. A review of the economic and industrial structure of the areas to determine its strengths and weaknesses. This would include an examination of the size, location and type of all industrial undertakings already in operation within the areas as a whole, an appraisal of their general potential, their present and future needs and their linkages with other undertakings.

2. An occupational and industrial analysis of the working population, with special reference to unemployment trends and to skills available.

3. A demographic analysis of the population within the area, to test what the future size of the local labour force is likely to be and how this compares with local employment trends and opportunities.

4. An examination of the transport network, with particular reference to industrial traffic and journey to work.

5. A review of the public utility services, with special reference to their capacity to cater to industrial users.

6. A field survey of land availability to determine the location, extent and physical characteristics of all areas physically capable of industrial development, bearing in mind general planning policy and the needs of other types of use for both new development and re-development."*

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*The Physical Planning of Industrial Estates; Department of Economic and Social Affairs. United Nations, New York, 1962. p.15

TABLE No. 1

SIZE OF INDUSTRIAL ESTATES IN THE UNITED KINGDOM, 1959

	Small (up to 50 acres)	Medium (51-100 acres)	Large (101-500 acres)	Very Large (over 500 acres)
Government Estates:				
Scotland	9	4	3	1
North-east England	14	3	1	2
South Wales	-	-	4	-
West Cumberland	2	-	-	-
South Lancashire	2	-	-	-
Total (45)	27 (60%)	7 (16%)	8 (18%)	3 (6%)
Non-government Estates:				
Private Estates	-	1	-	3
Local Estates	-	-	5	1
Total (10)	- (0%)	1 (10%)	5 (50%)	4 (40%)
Total - all estates (55)	27 (49%)	8 (15%)	13 (24%)	7 (12%)

Source: Rita D. Kaunitz, THE BRITISH TRADING ESTATES, A STUDY IN COMMERCIAL, LOCAL AND CENTRAL GOVERNMENT ENTERPRISE, a doctoral dissertation, Radcliffe College, Harvard University (Cambridge, Mass., August 1950), p. 248.

In some cases where estates are located outside the centre of towns, and consequently further than the half hour travelling time, special services by rail and bus are provided between the estate centre and the residential areas. Bus terminals have therefore become an important part of the estate, particularly where the estate is designed to serve a wide area, as is the case with estates in Development Areas. For the rush-hour bus congestion, on estates where bus terminals are more than a five minute walk from the factory, individual firms co-operate by staggering the hours of arrival and departure.

C. Size of Industrial Estates in the United Kingdom

The sizes of estates which have been successfully operated range in size from under 50 to over 500 acres. Table 1 illustrates the distribution of sizes between Government and non-Government estates.

The great number of small Government estates is accounted for by the Government's almost literal interpretation of the 'work to the workers' policy to ensure that most towns with acute unemployment would be provided with estates within their own industrial area.

It was pointed out in the Clyde Valley

Report that the policy to scatter small estates through the areas of unemployment was somewhat uneconomic and expressed the view that a group of towns and villages, rather than the individual town, should be the unit for the planning of estates, and that the estates should be larger, above 50 acres wherever possible, thus reducing operating costs.*

The question therefore arises in the United Kingdom whether an estate of less than 30 acres can provide full estate services economically, or whether the limit should be set at 50 acres. Although in terms of facilities and services, it is suggested that no benefit is gained if the estate is larger than 100 or 150 acres.

The size of an estate is actually determined by the objectives set. If sufficient land is available (the availability of land is highly controversial in the United Kingdom, and all Local Planning Authorities must consult with the Agricultural Land Service of the Ministry of Agriculture before sanctioning any development proposals), the usual approach is to begin by estimating the total amount of employment the estate is to provide. Once established, some estimate of the probable future

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*Sir Patrick Abercrombie and R.H. Matthew, The Clyde Valley Regional Plan, Edinburgh, H.M.S.O., 1949

TABLE No. 2

EMPLOYEE DENSITY PER ACRE IN EIGHT BRITISH INDUSTRIAL ESTATES

Industrial Estate	Developed Acreage	Number of Workers	Gross Density
Trafford Park	1,200	50,000	41
Slough	390	16,500	42
Welwyn Garden City	154	8,300	54
Letchworth	170	9,700	57
Speke	325	10,200	32
Team Valley	175	8,800	50
Hillington	260	13,800	53
Treforest	250	9,700	39
	2,924	127,000	43.5

Source: Great Britain, Ministry of Town and Country Planning, SOCIAL AND ECONOMIC RESEARCH (August, 1950), Draft of Report on Trading Estates.

TABLE No. 3

FLOOR SPACE PER WORKER BY SIZE OF ESTATE
36 British Industrial Estates

Classification of Estates by Total Employment	Number of Estates	Range in Floor Space (thousand)	Average Floor Space per Estate (thousand)	Range in Floor Space per Worker (sq. ft.)	Average Floor Space per Worker (sq. ft.)
Less than 500	15	7 to 250	75	90 to 933	353
501 - 1,000	5	50 to 210	135	100 to 230	192
1,000 - 4,000	11	207 to 998	485	130 to 415	241
More than 7,000	5	1,541 to 3,187	2,732	183 to 240	212
				Average:	222

Source: Great Britain Ministry of Town and Country Planning, New Towns Research Section, TRADING ESTATES SIXTH PAPER - FLOOR SPACE RATIOS, June 14, 1950, p.3.

density of development in terms of workers per gross acre of industrial land allocated can be determined. Tables No.2 and No.3 illustrate employee density per acre and factory floor space per employee which summarize information from the studies of the Ministry of Town and Country Planning.

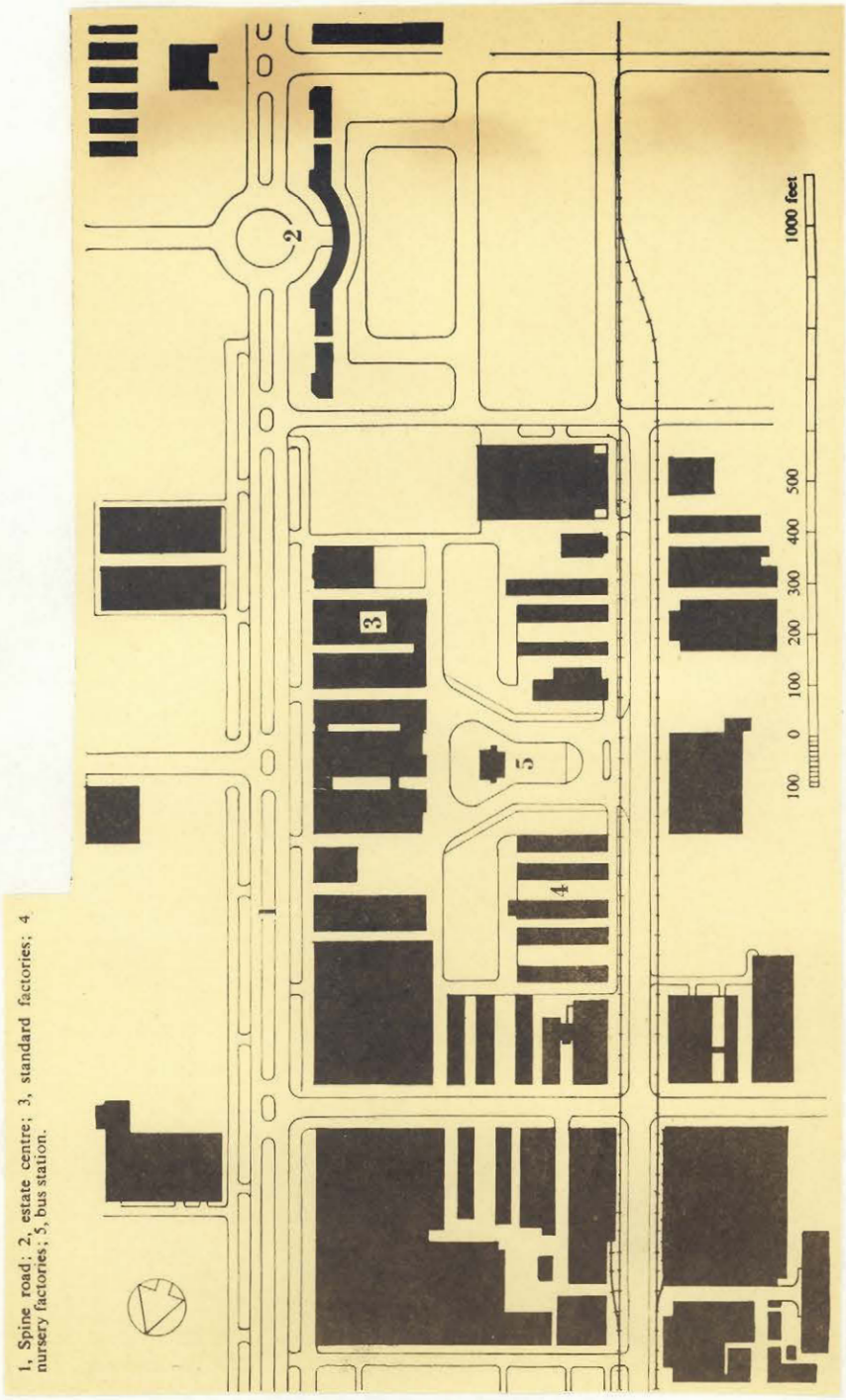
It should be remarked that the size of an industrial estate may be considered either in relation to its total site area, developed or undeveloped, or in relation to the total number of workers. A number of difficulties arise in attempting to combine the two methods of measurement - acreage and employment - in order to obtain comparable industrial density figures for different estates.

First, there are different units of measurement both for gross and for net industrial density and it is rather difficult to compare the gross density of different estates, since services and amenities are not provided to the same extent in all places.

Secondly, the figure of either gross or net industrial density may be computed on actual present conditions or when the estate is complete and totally occupied.

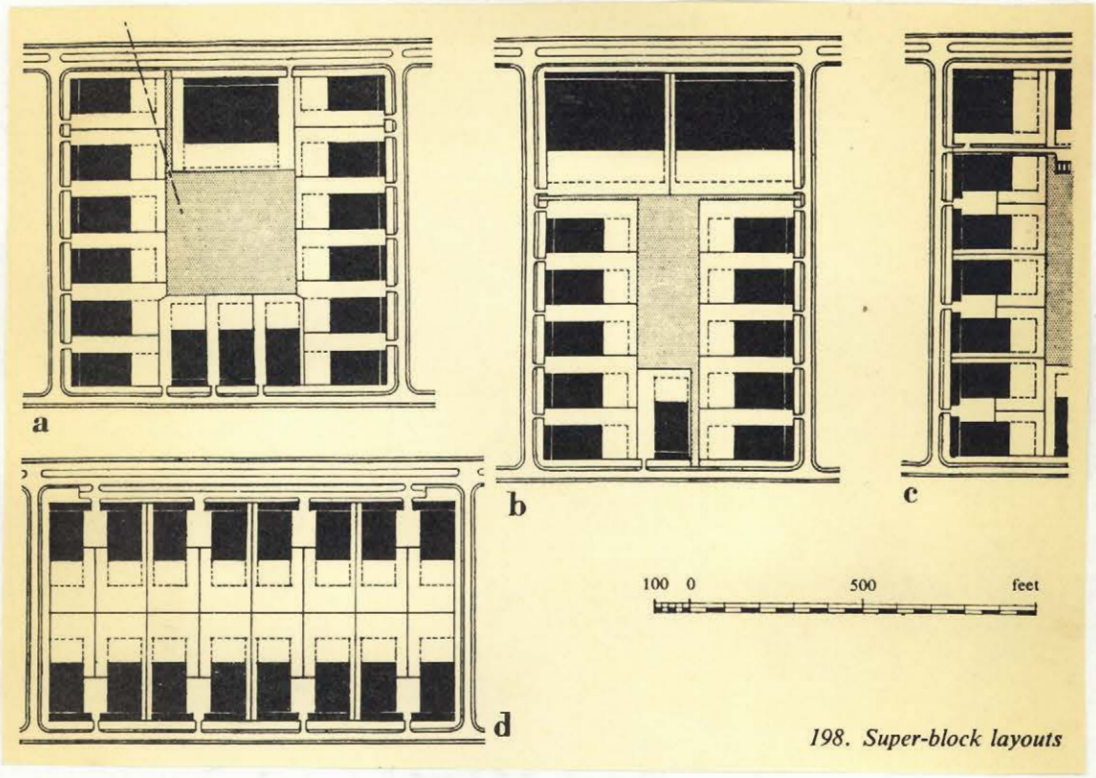
Thirdly, and obviously, different industries have different space requirements. Thus the difficulty

FIGURE No. 2



TEAM VALLEY TRADING ESTATE, as built, Co. DURHAM

FIGURE No. 3



198. Super-block layouts

TYPICAL SUPER-BLOCK ARRANGEMENTS

arises in arriving at an industrial classification which is suitable for this purpose. An extremely detailed list of industries is needed in order to show groups which are homogeneous in terms of their space requirements. Moreover, while industrial estates may have similar industries, they still differ from one another in terms of their industrial layout and productive methods. Therefore overall figures of the industrial density of industrial estates are not strictly comparable. With regard to floor space per employee, similar difficulties of interpretation arise due to the technology of production.

D. Super-blocks

The most satisfactory solution of plot layout, in the United Kingdom, has been subdivision on the super-block system. This system was first introduced on the Team Valley Estate (see Figure 2)* and has been adopted for the New Towns and other Development Area Estates.

Figure 3† depicts some comparative plans of typical arrangements of super-blocks. Fifty per cent expansion space, of factory area, is usually allowed.

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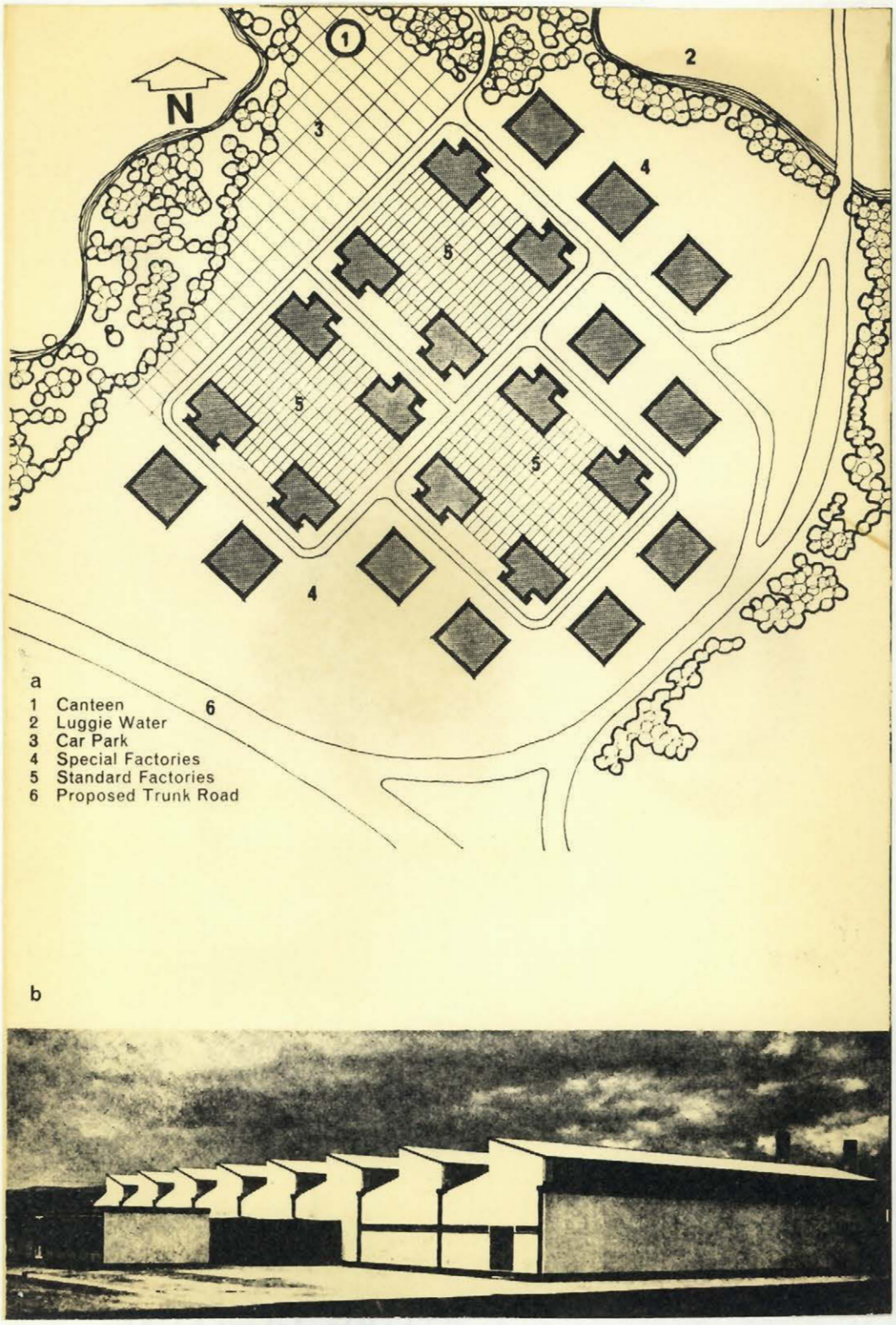
*Figure reference: Frederick Gibberd, Town Design, The Architectural Press, London, 3rd edition, 1959, p.215.

†Ibid., p.198

FIGURE No. 4



STANDARD FACTORIES - CUMBERNAULD NEW TOWN

The layout is obtained by setting up a road grid on each side of a spine road, to form large rectangular super-blocks. The factories are then placed side by side on these blocks, with their office buildings facing the road. The space at the rear, in the middle of each super-block, is left for expansion and for car parking.

Figure 4* illustrates standard factories arranged into super-blocks at the Blenheim Industrial Estates in the New Town of Cumbernauld. The relationship between these standard factory units has been carefully considered to produce a wide range of changes in production and administration areas. The layout of the estate groups four of these factory units in a square with the production areas based on a steelwork grid measuring 48 feet by 24 feet. The production area is so designed that extensions may be added to it either at the side or at the rear, or two standard units can be connected by more standard bays to make a much larger factory or alternatively a standard factory can be divided into two smaller units for independent tenants.

The administrative blocks are separated from the production areas by single-storey link units containing lavatories, cloakrooms, etc. In this way

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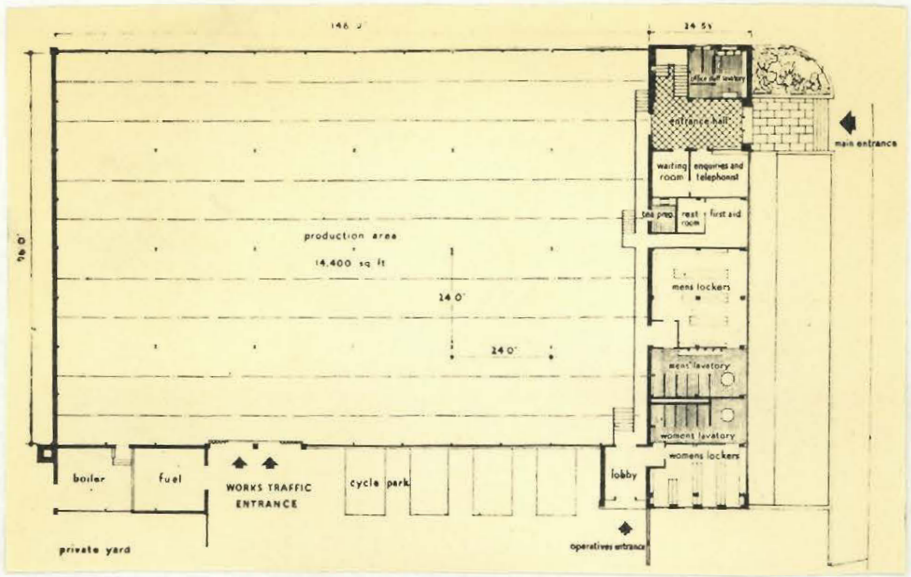
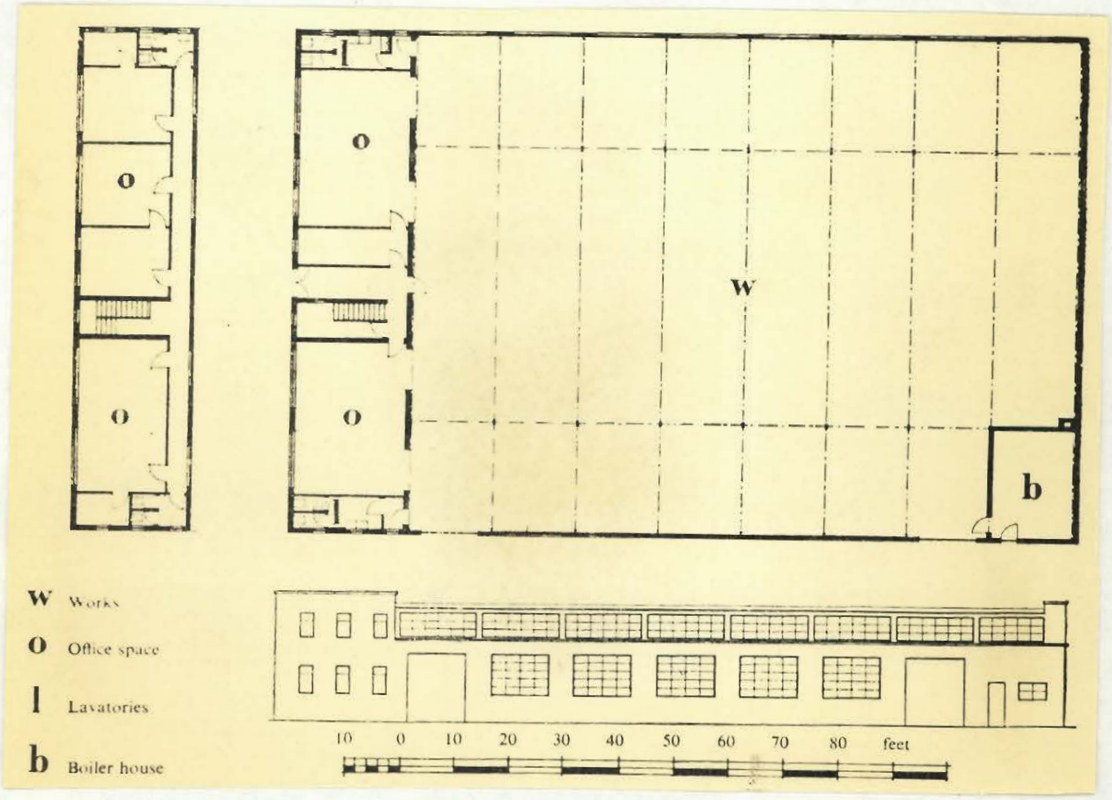
*Goss, op. cit. p.162

FIGURES No. 5a & 5b



STANDARD FACTORY - HARLOW



STANDARD FACTORY - TEAM VALLEY

it is possible to expand the block at either end quite independently of the productive area. It can also rise an additional floor by extending the steel frame as the roof construction is of sufficient strength to form the floor of an upper storey.

E. Standard Factories and Nursery Factories

The standard factory, in the United Kingdom, was used as one of the incentives offered to industrialists during the early years of the Development Areas programme. The standard factory is usually of extremely simple design and erected into super-blocks as described above. The construction of a standard factory is so designed that it may be expanded with little difficulty. Figures 5a and 5b* illustrate two typical standard factories. 5b was designed by Sir William Holdford for the Team Valley Estate, and is typical of most standard factories in the United Kingdom. They consist for the most part of a single-storey, light framed structure with a one or two storey office and service block in front. The size of the basic unit varies, the object being to enable buildings to be built of any size from 5,000 square feet to 20,000 square feet or more to be constructed in sectional units of 5,000 square feet.

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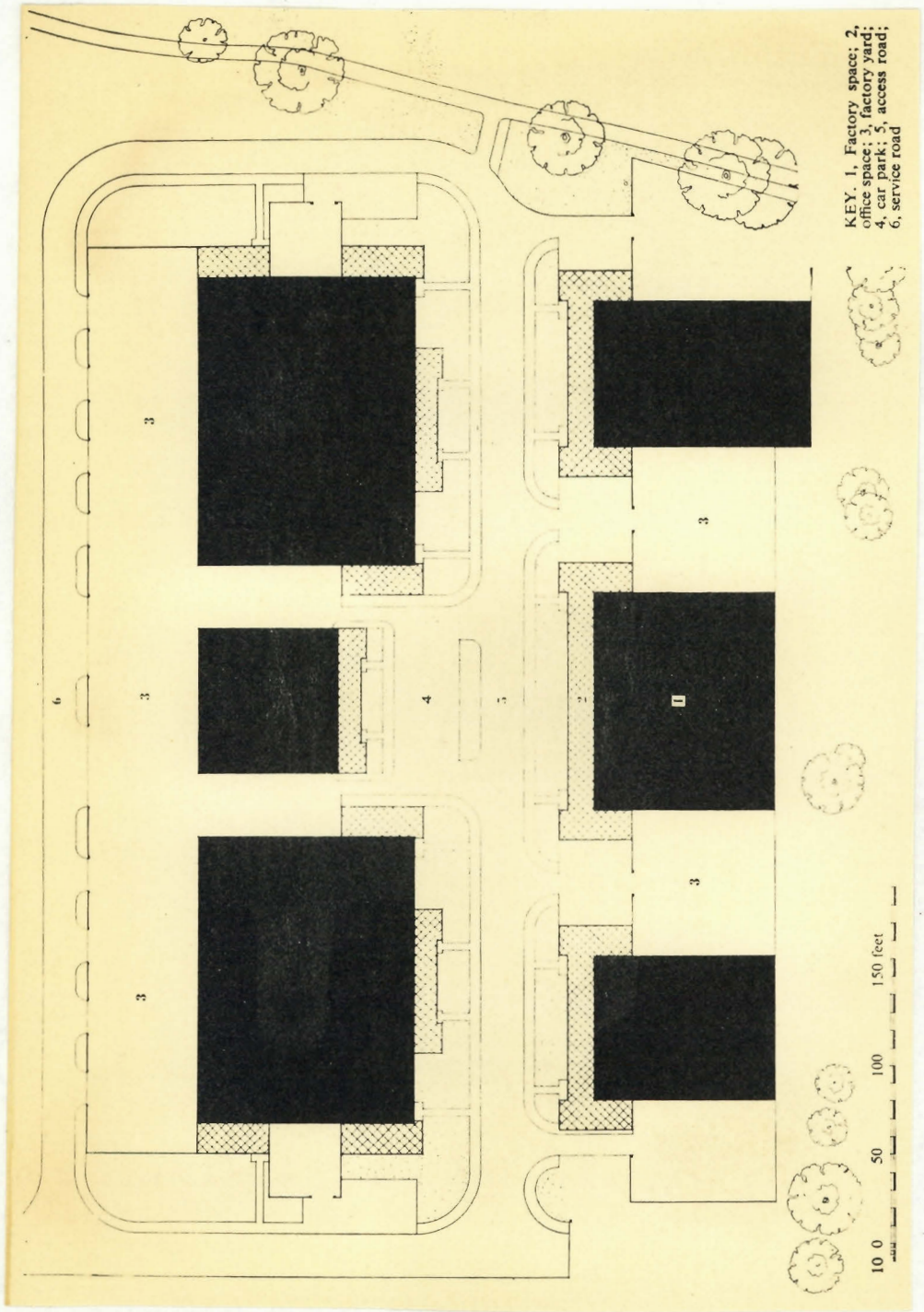
*Gibberd, op. cit. p.191 & p.192.

FIGURE No. 6



SECTIONAL FACTORIES - CRAWLEY

At Crawley New Town, sectional factories were built to serve for both standard factories and nursery factories. (See Figure 6.*) The buildings in this case are grouped around an access road, which is carried round in a loop to make a service road to factories in the north - those on the south have side yards only. The factories are built of shell concrete band vault roofing to a basic constructional bay of 40 feet by 20 feet. The buildings are in units of 5,000 square feet arranged so that they can be let in sizes ranging from half a unit to four units.

Standard units on a smaller scale have been used on many industrial estates to meet the needs of small but potentially expanding industrial firms. Such buildings are known as "nursery" or "sectional factories". These range in units of 1,000 to 5,000 square feet, erected in blocks to a standard design so that the manufacturer can expand by taking over adjacent units.

The prototype of the nursery factory was also designed for the Development Area Estates in the 1930s by Sir William Holford. A factory building containing 6,000 square feet was planned for subdivision

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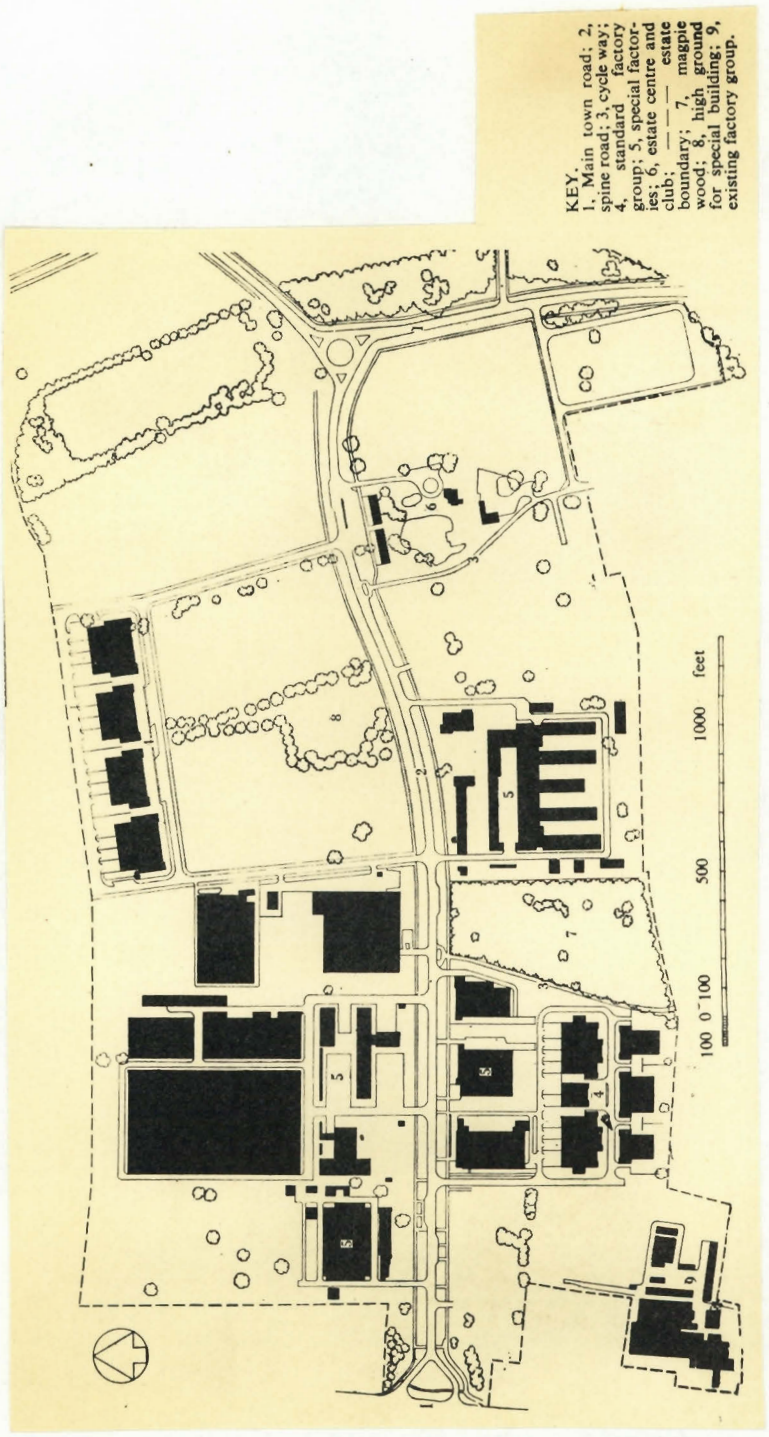
* Gibberd, op. cit. p.193.

FIGURE No. 7



CRAWLEY NEW TOWN INDUSTRIAL ESTATE

into 1,500 square feet per unit; nursery factory units and standard factory units are generally included in most New Town Estates as seen in Figures 4 and 7*.

F. Flatted Factories

Flatted factories in general are not found on industrial estates; however, several New Towns have incorporated flatted factories within them or near housing developments.

The siting of industrial buildings in residential areas calls for careful consideration of road access to and fro from the factory which is likely to generate a considerable amount of traffic. A flatted factory has been incorporated adjacent to housing in Cumbernauld New Town and several industrial estates. (See figures 8 and 9.)†

It should be noted that the flatted factory is still in the experimental stage in the United Kingdom, and in practice has been confined to a limited number of schemes, generally in large towns where there are a great many small-scale firms of a special nature. The device of the flatted factory is, therefore, used

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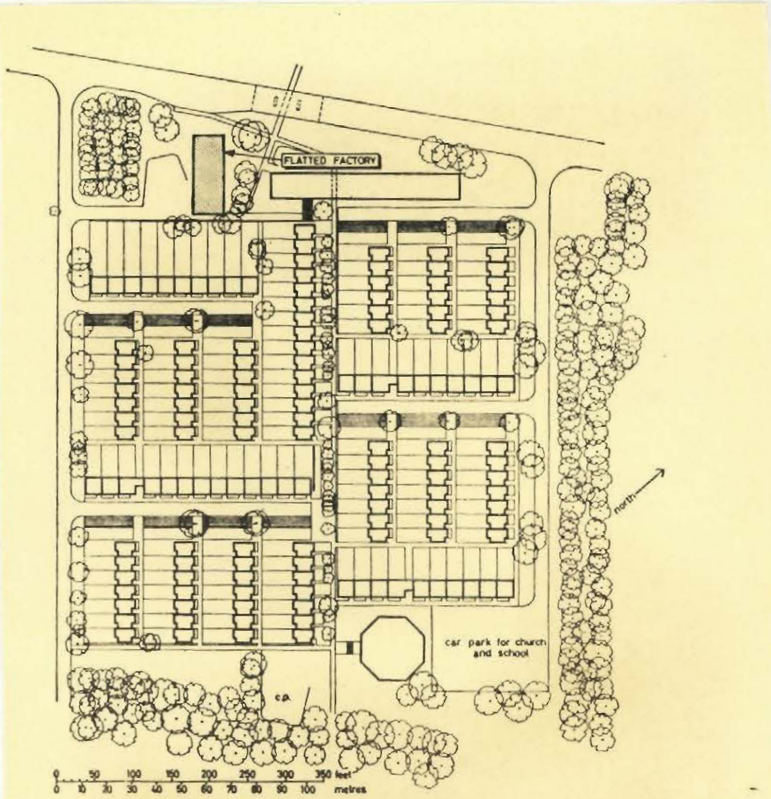
*Figure 7. Gibberd, op.cit. p.195.

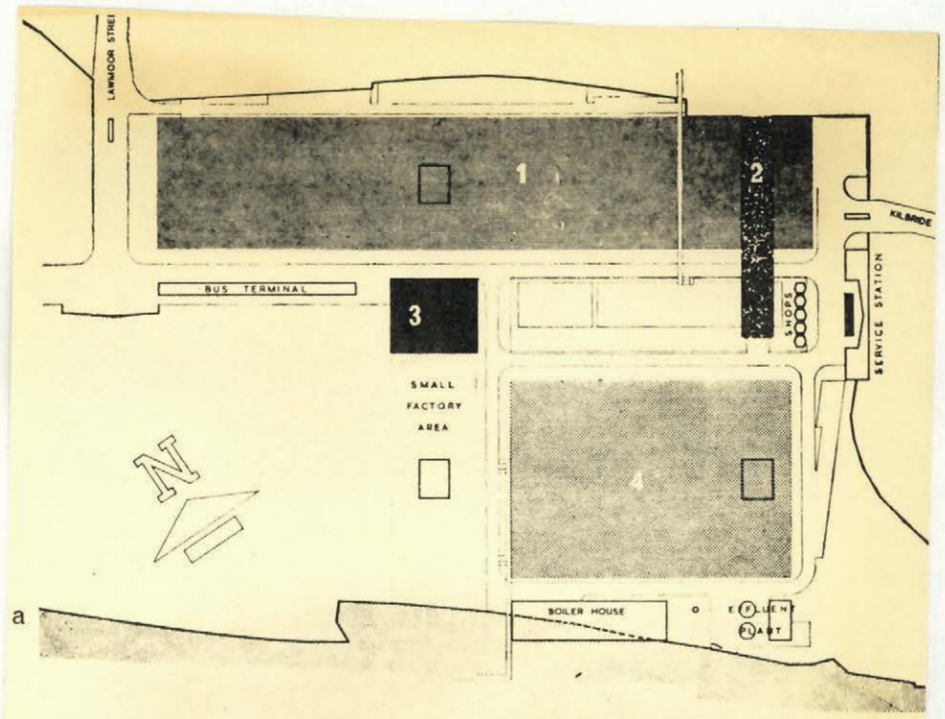
†Gross, op. cit. pp.103 & 165.

FIGURE No.8



Small three-storey flatted factory adjacent to housing with pedestrian access from the houses and vehicular access to a main road; Cumbernauld New Town

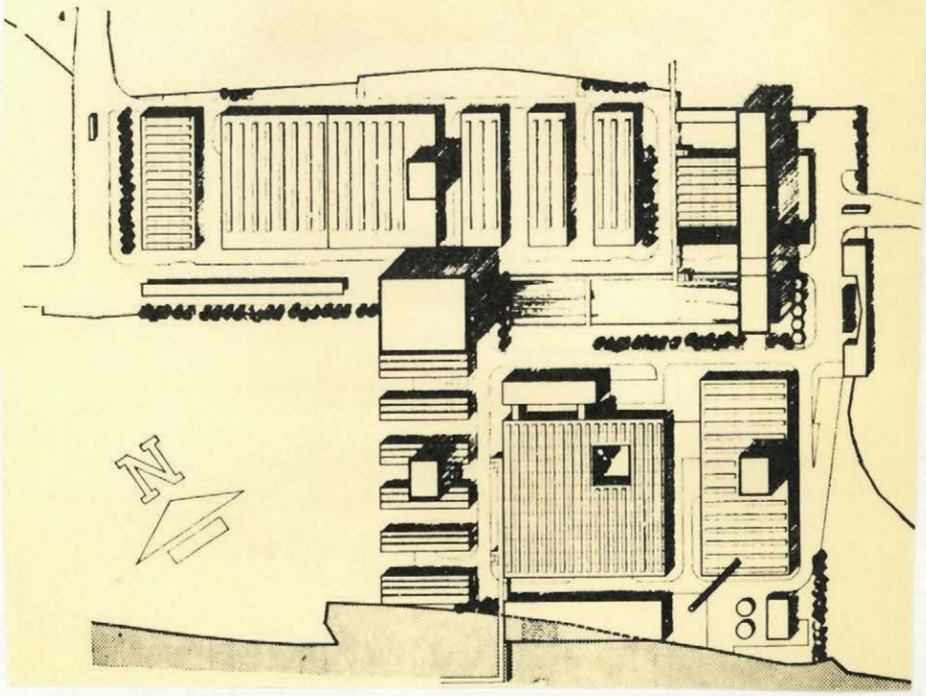
FIGURE No. 9



a

1 Medium Factory Area
2 Flatted Factory or Warehouse block
3 High Factory or Multi-Storey Car Park
4 Large Factory Area

b



FLATTED FACTORY - TAYLOR WOODROW ESTATE, GLASGOW

to concentrate and rehabilitate small specialized trades in congested and obsolete areas, usually in city centres, such as the "Jewelry trade" or the "rag trade".

G. New Towns

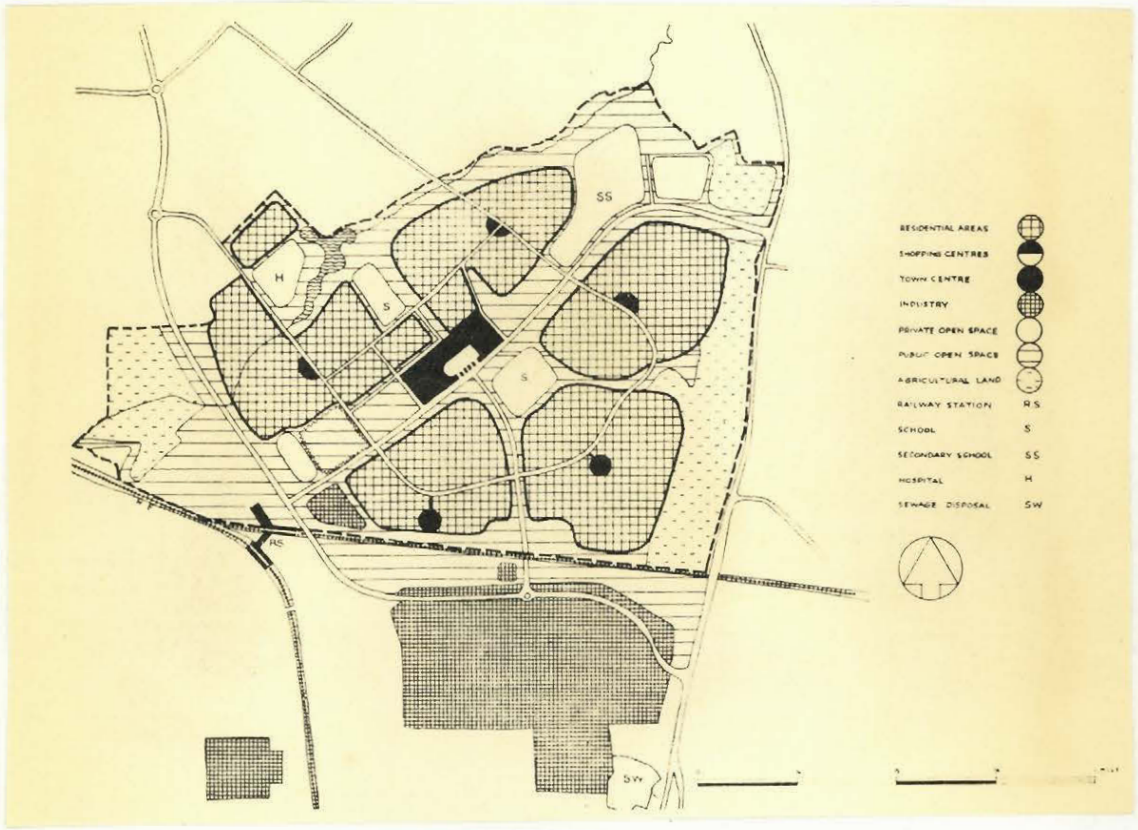
New Towns may be considered as another measure for planning industrial location, other than those directed towards the Development Areas.

The Government, under the New Towns Act 1946, designated the construction of fifteen new towns. Eight of these are round London and four elsewhere in England and Wales, and three in Scotland.

One of the decisive factors in establishing New Towns was the method of allocating housing, in the main, only to those who are assured of a job in the new town itself. Industry therefore may be considered the backbone of the new town employment and accordingly the development corporations have put particular emphasis upon suitable sites and locations for attracting industrial development and housing programmes are planned in close conjunction.

The corporations have laid out industrial estates, provided all necessary utilities, built standard factories to order and offered a house for immediate occupation to every employee of incoming firms. These

FIGURE No. 10



AYCLIFFE NEW TOWN - MASTER PLAN, CO. DURHAM

inducements have proved successful, even though the corporations do not subsidize industrialists along the lines followed in Development Areas.

The siting of industrial estates within the development pattern of the New Towns is of particular note. Sites for industrial estates are usually given land which is reasonably level, where good connections to main roads can be obtained, and in the case of obnoxious or smoke-emanating industries, planned to the leeward side of the town. Sites are chosen with the point of view of forming a clear and distinct industrial pattern, within the whole development, which can be linked to the town centre and to the region by main road systems. (See Figures 10*, 11† and 12.)

As may be observed from these illustrations, particular attention is focussed upon the total pattern in developing a master plan for a new town.

Careful consideration is given to the relationship of the development to the region as a whole; to the principal pattern, such as rivers, railways, roads and other boundaries; to housing, neighbourhood areas; to landscape, green belts and recreational

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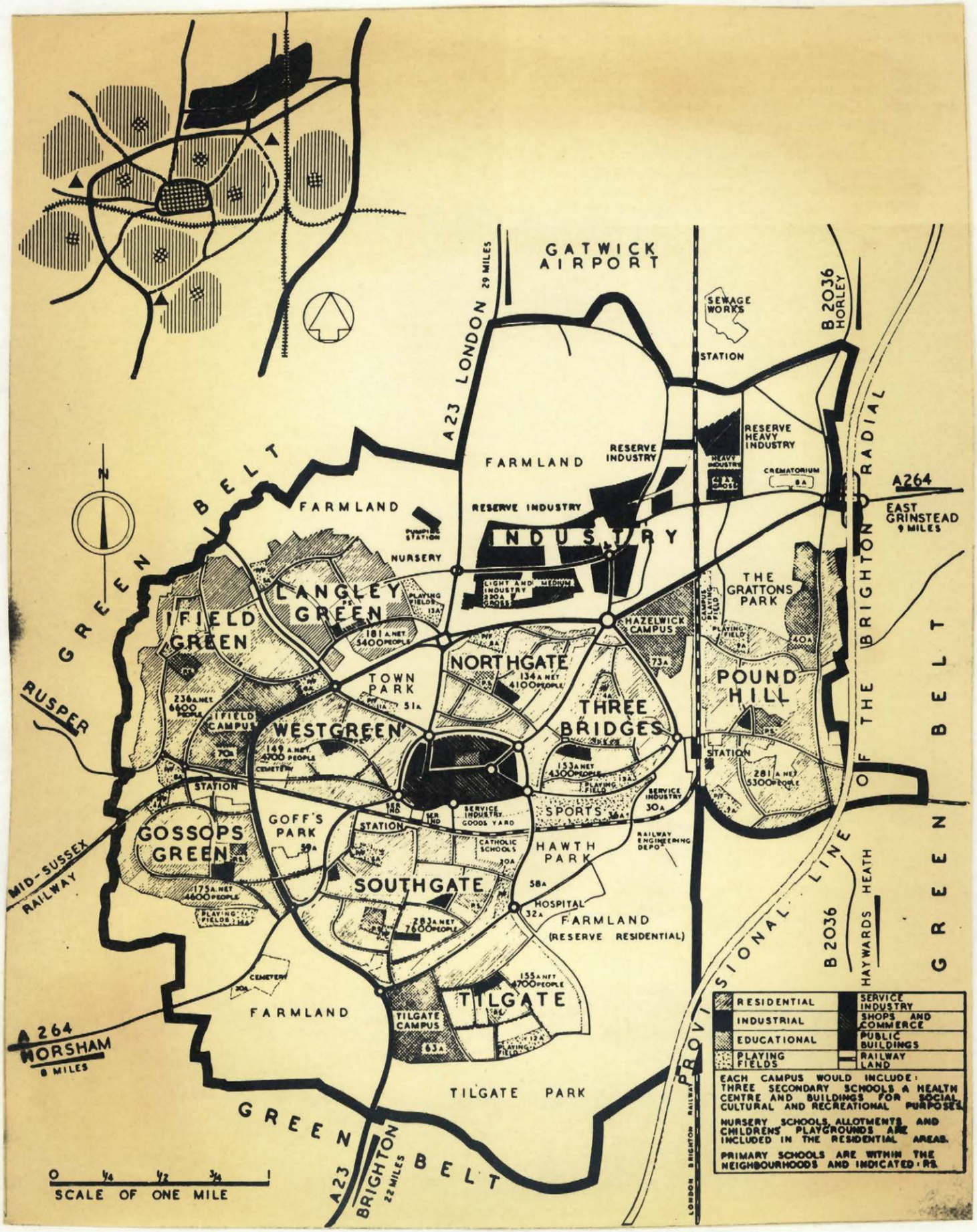
*Gibberd, op. cit. p.37.

†Gibberd, op. cit. p.45.

FIGURE No. 11



CRAWLEY NEW TOWN - MASTER PLAN

facilities; to town centre; and to circulation.

Industry is not viewed as a single entity but considered as part of the total pattern within the development. The basic land uses are clearly defined and the amount of industry allowed is calculated to determine the size of the town development and the types of industry desired, the town's social balance.

H. Team Valley Trading Estate

The Team Valley estate is important historically for it was one of the first industrial estates to be set up by the British Government to revitalize industry in "Special Areas" under the Special Areas (Development and Improvement) Act 1934. It is not, as most post-war estates, designed as an integral part of a new town development scheme. However, it may be considered as the genesis of modern industrial estates.

The estate occupies the level valley of the River Team, three miles to the south of Newcastle-on-Tyne. The main London railway line runs along its eastern boundary and further to the east is the Great North Road. The area of the estate is about 700 acres, but about 130 acres of the southern portion of the estate could not at the beginning be developed because

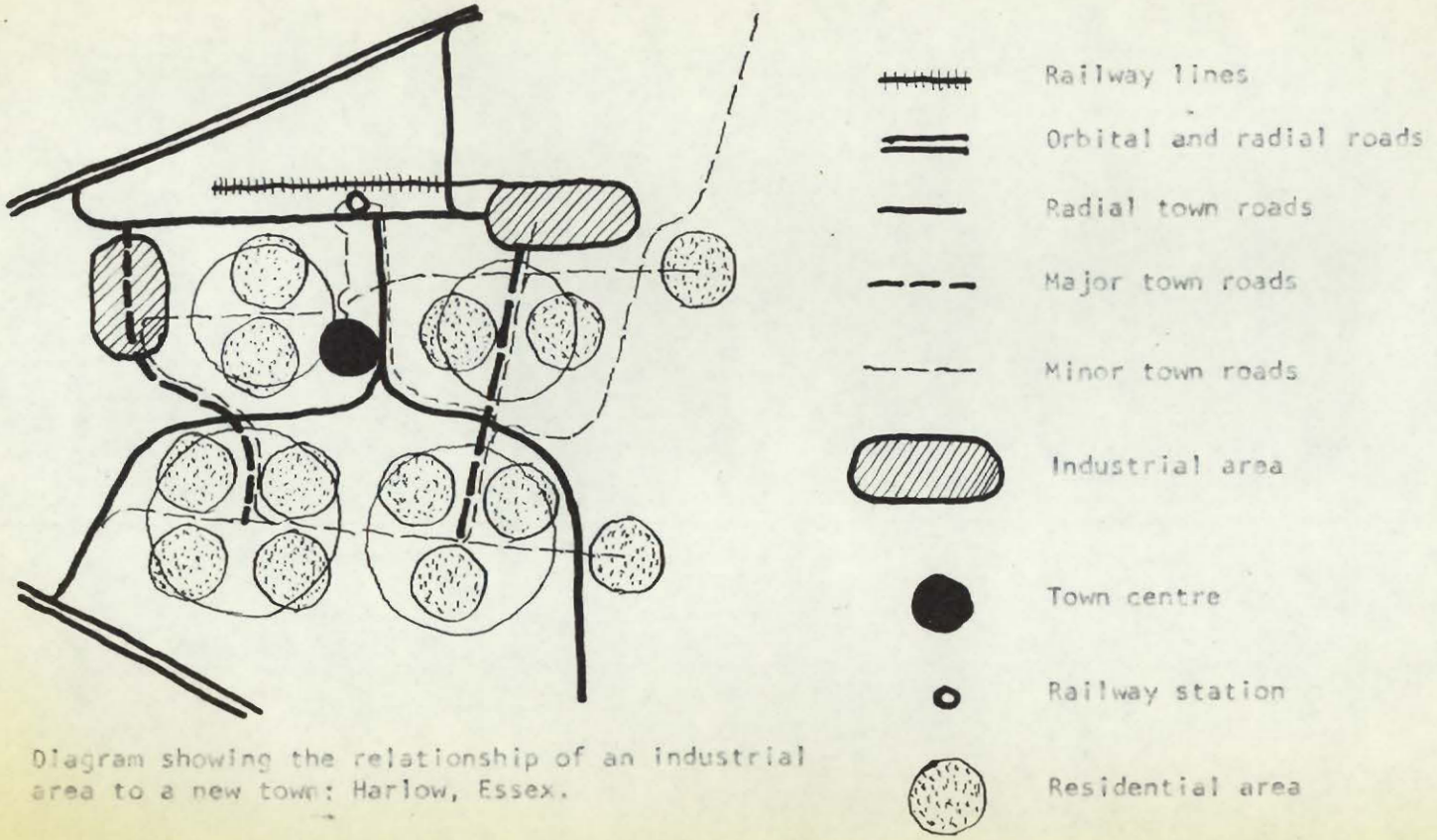


Diagram showing the relationship of an industrial area to a new town: Harlow, Essex.

Source: Mills, D. Edward. THE MODERN FACTORY
The Architectural Press, London. 1951.
p. 22.

FIGURE 12

it was liable to coal-mining subsidence.

The estate was laid out by the operating company, North Eastern Trading Estates Limited, consulting architect, Sir William Holdford. The Trading Estate company provided the roads and other services and built the major part of the factories. The site is ringed by a road and is connected to the main regional roads. Kingsway road, a 100 foot wide dual carriageway, runs longitudinally down the estate, and is bisected at right angles, through its centre, by another principal road, Eastern Avenue, giving access to the station on the eastern boundary, and dividing the estate into four. (See Figure 13*.) The roads are staggered so that the estate centre, containing central administrative buildings, restaurants, banks, etc., is on the main axis of the station.

The estate is divided up by a rectangular grid of roads into a series of super-blocks, each of which contains its own canteen, kiosks, cycle shed and car park. Factories are placed round the other perimeter of the blocks, leaving an open space in the centre for expansion. The open space also acts as an employee recreation area. The factories are so arranged that the

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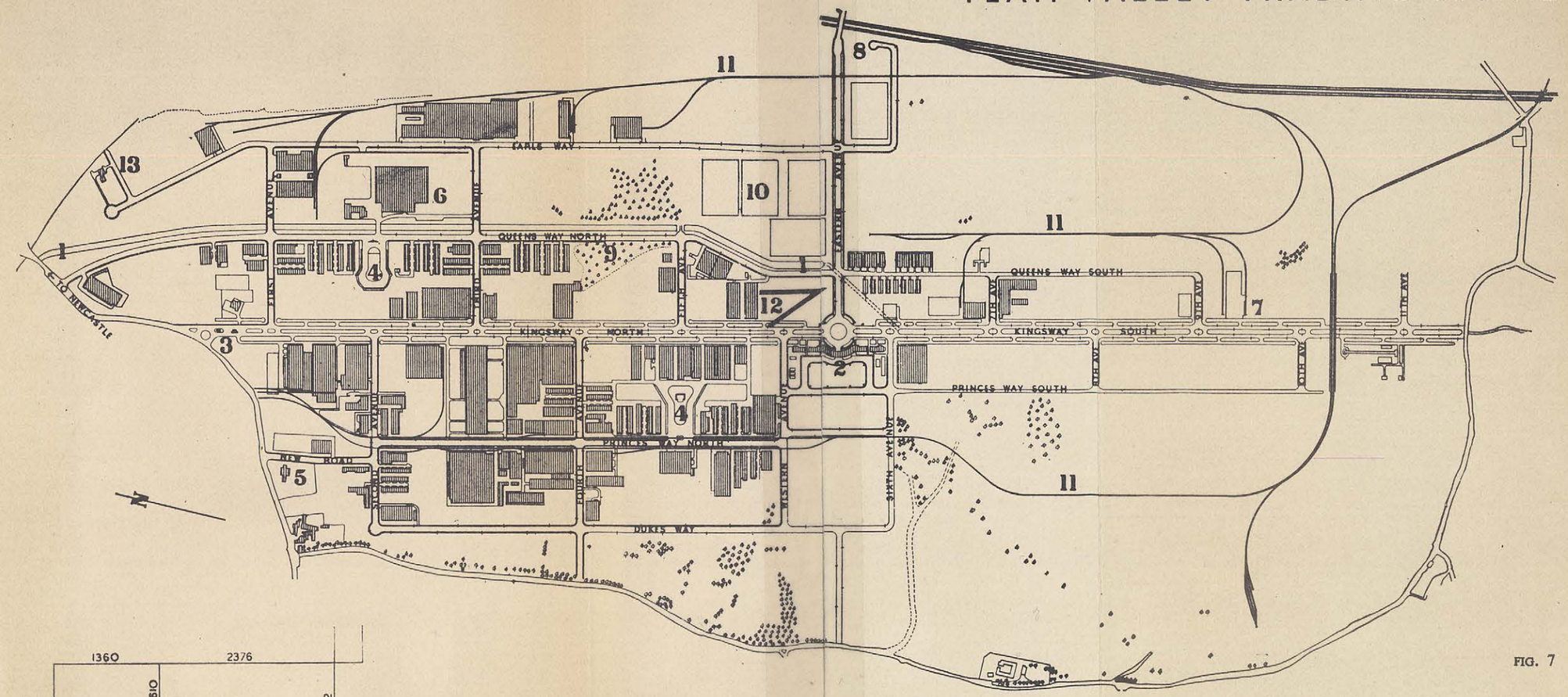
*Gordon Logie, Industry in Towns, George Allen and Unwin, London, 1952. p.49.

FIGURE No. 13

TEAM VALLEY TRADING ESTATE

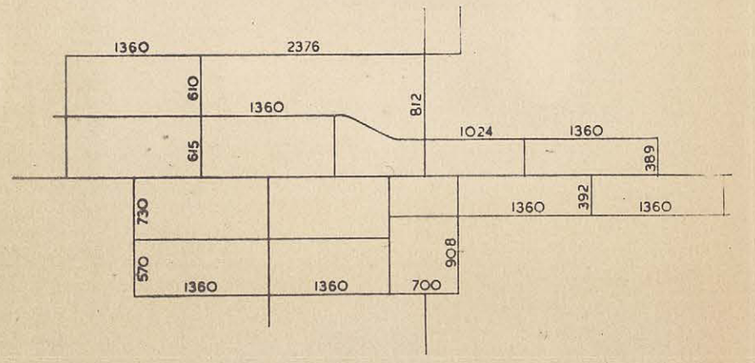


KEY

1. River Team
2. Central administrative buildings, restaurant, banks, etc.
3. Main entrance from Newcastle with porter's lodge and weighbridge
4. Bus stations
5. Hotel
6. Sigmund factory (see Figs. 3 and 4)
7. Armstrong Cork factory (see Fig. 5)
8. Railway station
9. Wood
10. Football pitches
11. Railway lines
12. Viewpoint of airview opposite
13. Refuse destructor

FIG. 7

SCALE 1 : 10,000



Size of Building Blocks in feet FIG. 8

office section faces the roads forming an office street facade which screens the workshop areas immediately behind the offices. (See Figure 3.)

The factories built by the Estate Company, and let to industries, are of three types:- nursery or sectional factories of 6,000 square feet (which can be subdivided into four) arranged in pairs at right angles to the road. The two factories are twenty-five feet apart for light and air and to act as a fire stop, and there is a thirty-five foot gap between each pair for a service road. (See 4, nursery factories, Figure 2).

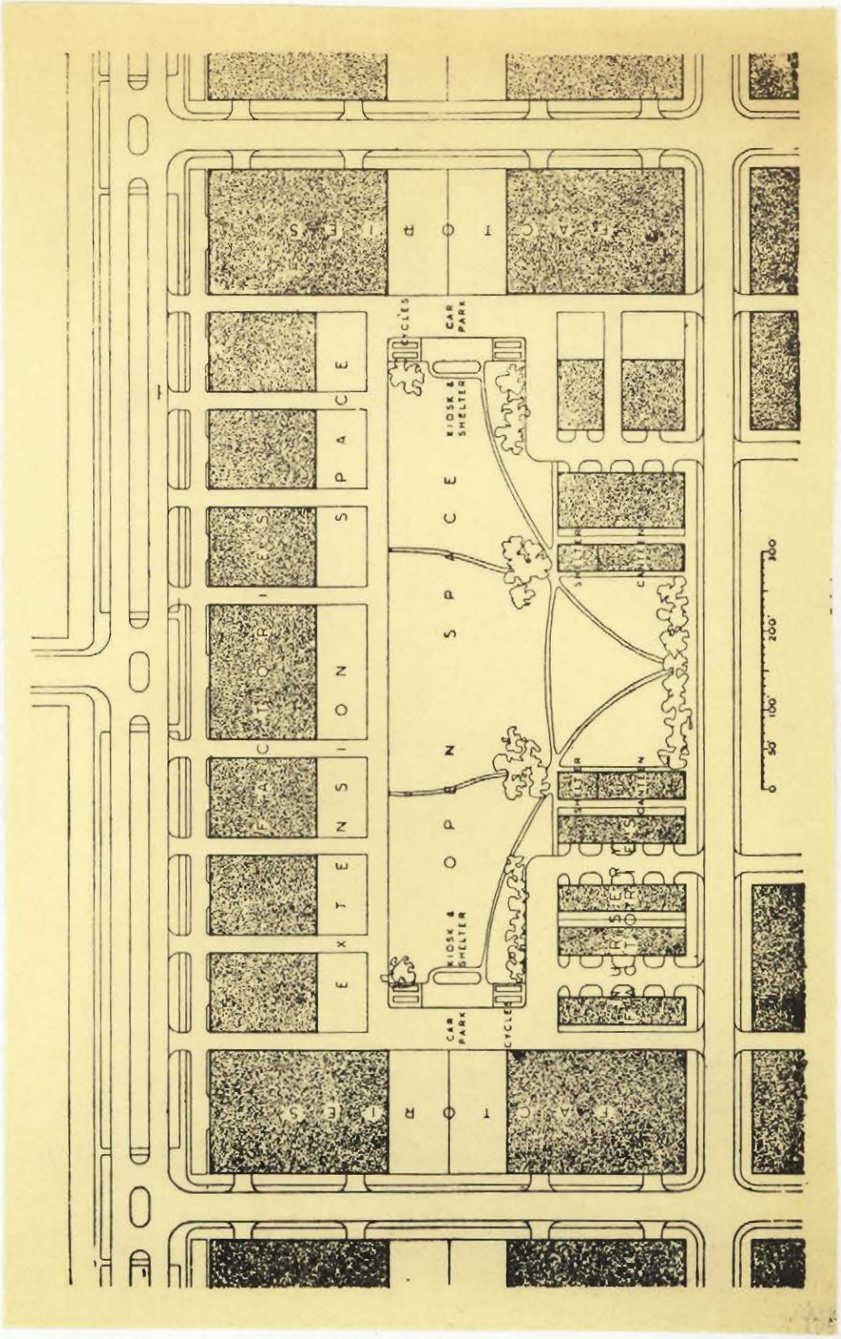
Standard factories of two sizes, 13,000 and 9,000 square feet of similar design. (See Figure 5b) with a single-storey office block.

Special factories, designed to the manufacturer's own specifications of various sizes and shapes, the largest being 150,000 square feet.

Figure 14 illustrates the original layout of the estate and shows a typical super-block of twenty acres. This plan was used as a basis for negotiation with intending factory owners, and was redesigned to meet their requirements. A comparison with this plan and the "as built" plan (Figure 13 and 2) illustrates the departures from the intended layout.

The public open spaces, such as verges and

FIGURE NO. 14



TEAM VALLEY ESTATE, AS DESIGNED.

central acres within the super-blocks, are maintained by the Estate Company.

OUTLINE

PART TWO

2. The United States

I. Introduction

II. Locational Pressures on Industry

A. Introduction

B. Space

C. Transportation

D. Wages

E. External Economies

III. General Analysis of Industrial Estates

A. Introduction

B. Central Manufacturing District, Chicago

C. Sharpstown Industrial Estate

2. The United States

I. Introduction

Industrial estate development in the United States is, on the whole, sponsored by profit-motivated private groups as a response to a market demand for industrial sites. Unlike the United Kingdom, there is no general national policy dealing with industrial location.

Table 4 indicates the finds of a survey made in 1957 of 302 industrial estates in the United States. According to this survey; 70 per cent were sponsored by private developers - industrial estate corporation (private), railroads, industrial real-estate brokers, contractors, architects and landowners; 24 per cent by non-profit community organizations - industrial foundations, chambers of commerce, redevelopment and housing authorities, development commissions; and 6 per cent by local governmental agencies - county or municipal governments and port and airport authorities.

The developers in the first group, except for railroads, generally aim at making a profit on the sale of improved land and provision of services to industrial tenants. The railroads, on the other hand, are mainly interested in setting up industrial estates for tenants which rely on rail transport and thereby

TABLE No. 4

PRINCIPAL SPONSORS OF INDUSTRIAL DISTRICTS*
UNITED STATES, 1952 AND 1957

	1957		1952	
	Number of Districts	Percent of Total	Number of Districts	Percent of Total
Private developers	124	41.1	40	32.8
Railroads	88	29.1	56	45.9
Community organizations	52	17.2	9	7.4
Community organizations and others	21	7.0	6	4.9
Governmental agencies	17	5.6	11	9.0
	302	100.0	122	100.0

*J.R. Lee and G.K.H. Wong, An Analysis of Organized Industrial Districts (Menlo Park, California: Stanford Research Institute, January 1958), p.8

ensure increased freight revenue. The railroad-owned industrial estates frequently offer special inducements, such as low purchase prices, to freight-receiving and freight-generating industrial tenants guaranteeing a minimum freight traffic. Industrial estates maintained by community organizations are mainly concerned with the direct benefits that industrialization brings to the area in the form of increased employment, payrolls, trade, services and taxes. Government operated industrial estates, likewise, aim at direct benefits brought to an area by industrial development.

Table 5 demonstrates the rapid rise of industrial estates which parallels the rapid industrial upsurge beginning with the Second World War, with the sharpest acceleration in the use of industrial estates occurring since 1950.

The rapid rise may be due to a tendency for industry to decentralize and the governmental direction, motivated by strategic considerations, to disperse new industrial establishments.

Decentralization policies of industrialists seem to aim at: 1. reduce cost and remain competitive; 2. overcome the lack of suitable manufacturing facilities at existing plant sites; 3. locate closer to markets or sources of raw materials; 4. take advantage of

TABLE No. 5

GROWTH OF ORGANIZED INDUSTRIAL DISTRICTS IN THE UNITED STATES*

Year Development Began	Number of Districts	Percent of Total Reporting
Before 1900	2	0.7
1900 - 1909	6	2.0
1910 - 1919	5	1.7
1920 - 1929	8	2.8
1930 - 1939	12	4.2
1940 - 1949	74	25.6
1950 - 1954	84	29.1
1955 - 1957	98	33.9
	289	100.0

* J.R. Lee and G.K.H. Wong, An Analysis of Organized Industrial Districts (Menlo Park, Calif.: Stanford Research Institute, January 1958), p. 5.


CANADA
PACIFIC OCEAN
ATLANTIC OCEAN
MEXICO
GULF OF MEXICO
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
ARIZONA
COLORADO
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
ILLINOIS
MICHIGAN
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
SOUTH CAROLINA
NORTH CAROLINA
VIRGINIA
WEST VIRGINIA
PENNSYLVANIA
NEW YORK
MAINE
VERMONT
N.H.
MASSACHUSETTS
CONN.
RHODE ISLAND
NEW JERSEY
DELAWARE
MARYLAND
D.C.
UNITED STATES OF AMERICA
INDUSTRIAL DISTRICTS AND PARKS
(AS OF APRIL 1960)
Industrial district or park
State boundary
0 100 200 300 400
MILES
0 100 200 300 400
KILOMETRES
The pattern of dots, in areas of concentration, is not indicative of the exact areal distribution.
MAP NO. 1236 REP UNITED NATIONS
SEPTEMBER 1962
Sources: "The Journal of Commerce" (New York) April 6, 1960.
"Industrial Development", Baltimore, Md.) October 1960.

FIGURE No. 15

improved transportation or more favourable labour situations in certain localities, particularly suburbs; and 5. obtain dispersal in case of national emergency.*

From Figure No.15 it may be seen that the areas of greatest concentration coincide, on the whole, with the old industrial regions of the country and particularly with the large industrial "conurbations" of the north-eastern Atlantic sea-board and the industrial concentrations of the middle-west.

In general, it may be stated that the rapid development of privately sponsored industrial estates in the United States is largely due to the resultant of the industrial and urban over-development of metropolitan areas. As the large cities grow larger and in-town industrial-zoned land becomes scarcer and more expensive, new industries are forced to locate in the oustkirts of metropolitan cities within reach of the required markets, labour or raw materials.

Before going on to discuss the experience of industrial estates in the United States, it is perhaps worthwhile to examine some of the locational pressures on industry in North America. These pressures, in

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*T.K. PASMA, Organized Industrial Districts in the United States, U.S. Dept. of Commerce Bulletin, June 1954, Washington. pp.5-6.

essence, apply to Canadian industries as well. As mentioned, there are no general governmental policies dealing with industrial location. Plant and factory location is usually determined by the industrialists themselves, pursuing their own particular interests. The pressures discussed below are some of the forces which have contributed to the rapid rise of industrial estate development in the United States, to overcome the pressures.

II. Locational Pressures on Industry

A. Introduction

Two books, Anatomy of a Metropolis, by E.M. Hoover and Raymond Vernon*; and Metropolis 1985, by Raymond Vernon†; published as a result of the New York Metropolitan Region Study, for the Regional Plan Association Inc.; deal very extensively with the locational pressures on manufacturing industries within the New York Metropolitan Area. The findings are of particular interest, since it is evident that in essence the underlying pressures on manufacturing industries in North America are comparable in most large metropolitan

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*Anchor Books, Doubleday & Co. Inc. New York, 1962.

†Anchor Books, Doubleday & Co. Inc. New York, 1963.

areas.

The analysis revealed that the rate of industrial expansion in the older sections of the city did not correspond with the regional rate. It was very much lower, and in some areas industry was actually shrinking.

All industrial sites, it was found, undergo some sort of test for efficiency taking into consideration the costs on such items as factory space, transportation, wages, and external economics.

B. Space

The question of space for expansion is a factor high on the list for most industrial migrations to the suburbs. In most cases the search for space is not simply the problem of more factory area for new machines as such, but rather that the existing structures themselves are no longer of the right type. As the capacities of existing structures and facilities are reached, manufacturers are confronted with the problem of dealing with obsolete factory structures located on inadequate sites.

The factors of obsolescence are somewhat different for individual industries but some common features are evident. Namely, the changes in the

factory process. Over the past three to four decades the widespread adoption of continuous material flow systems and automatic controls in processing have rendered old factory structures obsolete. For example, in food processing refrigerated tunnels and bake ovens with moving conveyors running hundreds of feet on a straight line are required; often the actual production run is longer than the normal city block.

Therefore, common practice today, when determining plant location, is to find a site which will impose the least physical restrictions possible on the shape of the factory structure.

It is usual to plan a production layout for the process and then "wrap" the building around the layout. The shape of the building is determined by the process rather than vice versa. It was found that the shape and size of city block grids, within the older industrial sections, are no longer capable of facilitating industrial expansion along these new lines.

Another feature of space for expansion observed was the special difficulties created by the zoning laws in the city areas. Industrial zones in most cities are completely built upon and hemmed in by housing developments, parks, schools, or non-industrially zoned land and industries are hopelessly handicapped

to meet expansion requirements. Also, combined with the time-consuming and risky business of assembling a site large enough to accomodate a factory extension is the tremendous cost involved of acquiring the individual sites.

C. Transportation

Developments in transportation, it was observed, favoured the outward migration of industry and would continue to favour growth in the outer portions of the metropolitan areas, as industry was pushed by the congestion, in the older sections, and pulled by the search for additional space.

Early industrial developments concentrated along the waterways, the harbours and canals of the city. However, with the advent of railway lines and the spread of spur tracks industries were freed from their water-side locations.

The railway lines opened up new territories away from initial concentrations. Advantages of this new form of assembling materials and distributing goods had a tremendous locational pull and quickly spurred the rapid growth of new industrial complexes. This in fact was the origin of the central Manufacturing District in Chicago. (See Figures 16 and 17.)*

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*Figure reference: Industrial Districts, Technical Bulletin No.44, Urban Land Institute, Washington D.C. December 1962. pp. 28 & 31.

With the development of motorized transportation, beginning about 1920, an additional force favouring new areas of location was set into motion. The truck was a quicker and more flexible means for moving goods and materials over short distances and reduced the disadvantage of settling away from railway lines and water routes.

Motor transport had a double effect in pushing industries out of the cities. Not only did it offer a new flexibility to industries in selecting a site in a more favourable area, usually outside the city limits, but it accelerated the traffic congestion within the city.

Related to transportation is the present outward shift of population from the city to the suburbs. This has greatly affected the service industries and industries which rely on local consumers, such as dry cleaners and laundries, bakeries, bottling plants and milk plants, etc. Because these industries are particularly sensitive to transportation costs, the response of these industries has been to relocate their operations closer to the new markets in the other regions.

As mentioned, the effects of transportation in metropolitan areas favour growth in the outer portions of the area. After the first stage of railway building,

the impact of later developments of spur lines and motorized transport has been to reduce the advantage which one one locality had over another. And it is foreseen, for various reasons, that any advantage will further decline in the future decades. The introduction of high-speed circumferential highways will contribute to this result. So will the growth of piggy-back rail freight - the movement of truck trailers on rail cars, to carry goods from one city to another - which will extend rail traffic advantage to any point a truck can reach. Therefore, as the search for space continues, the search will move outward to exploit the new locational freedoms which the truck, the airplane, and piggy-back freight have afforded.

D. Wages

At one time the question of wages for employees had a decisive bearing on plant location. However, the wage-differential between urban and regional workers is rapidly being equalized and for most industrial concerns wages is no longer a major deciding factor influencing plant location.

Before the Second World War many industries in the central city had a real wage incentive for locating operations outward towards the fringe of the

city or in small towns in the region where wages were considerably lower. The narrowing of the gap is not perfectly uniform but the tendency is clear, that wages are being equalized.

Table 6 below, which deals with the Manhattan area between the years 1899 and 1954, illustrates this tendency.

TABLE 6*

Average Annual Earnings of Manufacturing Production Workers in Zones of New York Metropolitan Region as a Percentage of Wages in Manhattan.

(Manhattan = 100)

	1899	1919	1929	1939	1947	1954
CORE (excluding Manhattan)	93.0	93.2	88.0	96.1	91.7	105.2
Inner Ring	88.7	90.4	88.2	96.3	96.8	120.9
Outer Ring	83.5	87.0	78.0	89.2	92.4	117.5

It was observed that earnings in industry tend to be high where industry is concentrated and lower where industry is sparse. Wage levels, therefore, seem to be a consequence rather than a cause of location.

Another wage factor may be generated by plant location which may influence an area's industrial

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*Hoover & Vernon, op. cit. page 41.

development. We have discussed that certain industries are pulled to one area or another by compelling needs which have nothing to do with wages, such as the needs for transportation or for space. The case may arise where a dominant specialized industry locates into an area and thereby influences the wage levels of other industries in the vicinity. Large specialized industries, such as aircraft manufacturers, tend to pay high wages and other plants in the area are under heavy pressure to pay high wages as well. Firms which cannot meet the high wage level of the dominant industry may therefore not locate in the area or existing industries may even move to another location in order to escape the high wage structure induced into the area.

As a locational pressure on industries, all in all, it is doubtful that wages will play a major role in the future shift or in the establishment of new industries.

E. External Economies

Another force which operates on location or rather attraction, a force which does not fall under the normal headings of space, transportation or wages - is that of external economies.

This usually applies and is one of the

characteristics of small industries or plants with little mechanization which rely heavily on outside supplies or specialized services.

Because they are unable to utilize the equipment or service needed for their operations at a high enough rate to warrant the cost of purchase, these small industries rely on a host of very specialized industries which act as processors or suppliers. Consequently the locational factor of these industries is dominantly governed by the availability of specialized services and functions necessary for their production.

In the past specialized services could only be found in the dense industrial sections of the city. This meant that the small marginal industry had very little choice for location outside the city, for it could not exist outside the range of specialized service it required.

However, there is a tendency for the spread of external economies from the older sections of the city to the smaller regional towns and the suburbs. Repairmen, subcontractors and specialized services for a considerable range of activities can now be obtained in the outer regions of the metropolitan areas. The early city monopolies - the city's ability uniquely to provide an environment in which small

plants could settle - are being broken. On the whole, therefore, small plants are now more flexible in their choice of location and are no longer compelled to locate in the older sections.

III. General Analysis of Industrial Estates

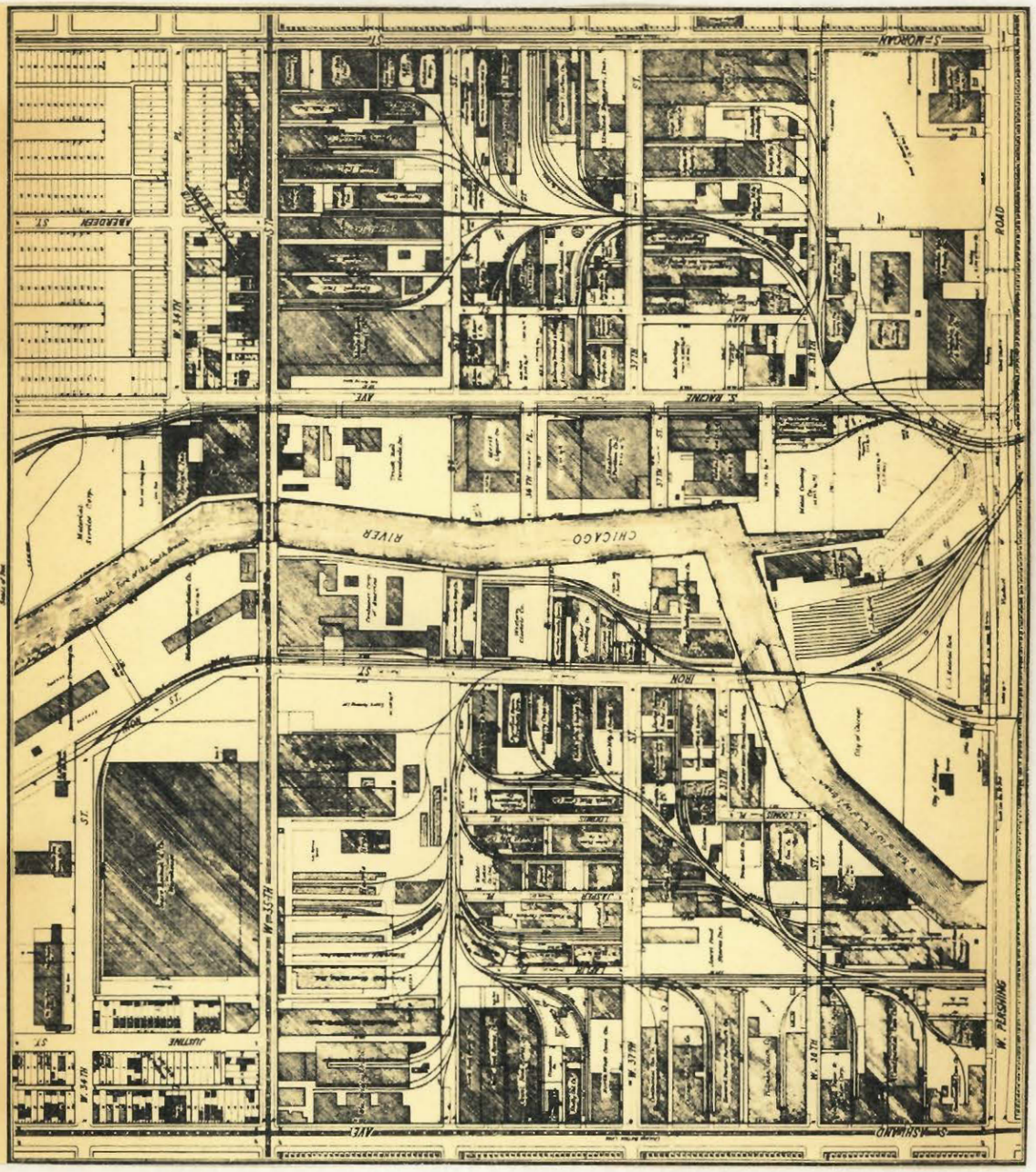
A. Introduction

The two industrial estates examined, the Central Manufacturing District, Chicago, and Sharpstown Industrial Park, may be considered American in character. Industrial estates, in America, are isolated happenings and do not fit on the whole into general programmes of industrial location or into a total concept of regional or town and country planning. They may even be considered incidental to industrial location or town planning in general. The first estate examined was a rational and efficient device to promote and concentrate rail traffic while the second is ancillary to a real estate venture to promote and sell developed and undeveloped land. The primary aim in each case is to make a profit.

Taking into account the pressures on industrial location, the industrial estate in America, with its general master plan and the restrictive

FIGURE No. 16

CENTRAL MANUFACTURING DISTRICT



covenants incorporated into deeds of sale, is a device to sell land with protection against some of the hazards the industrialist was trying to avoid in the first place - overcrowding, expansion space, incompatable mixed zoning, obnoxious neighbours, etc.

However, as may be seen from Sharpstown Community Development's master plan, within the development itself some basic town planning principles are applied; namely the segregation of land uses into residential, commercial, recreational and industrial patterns.

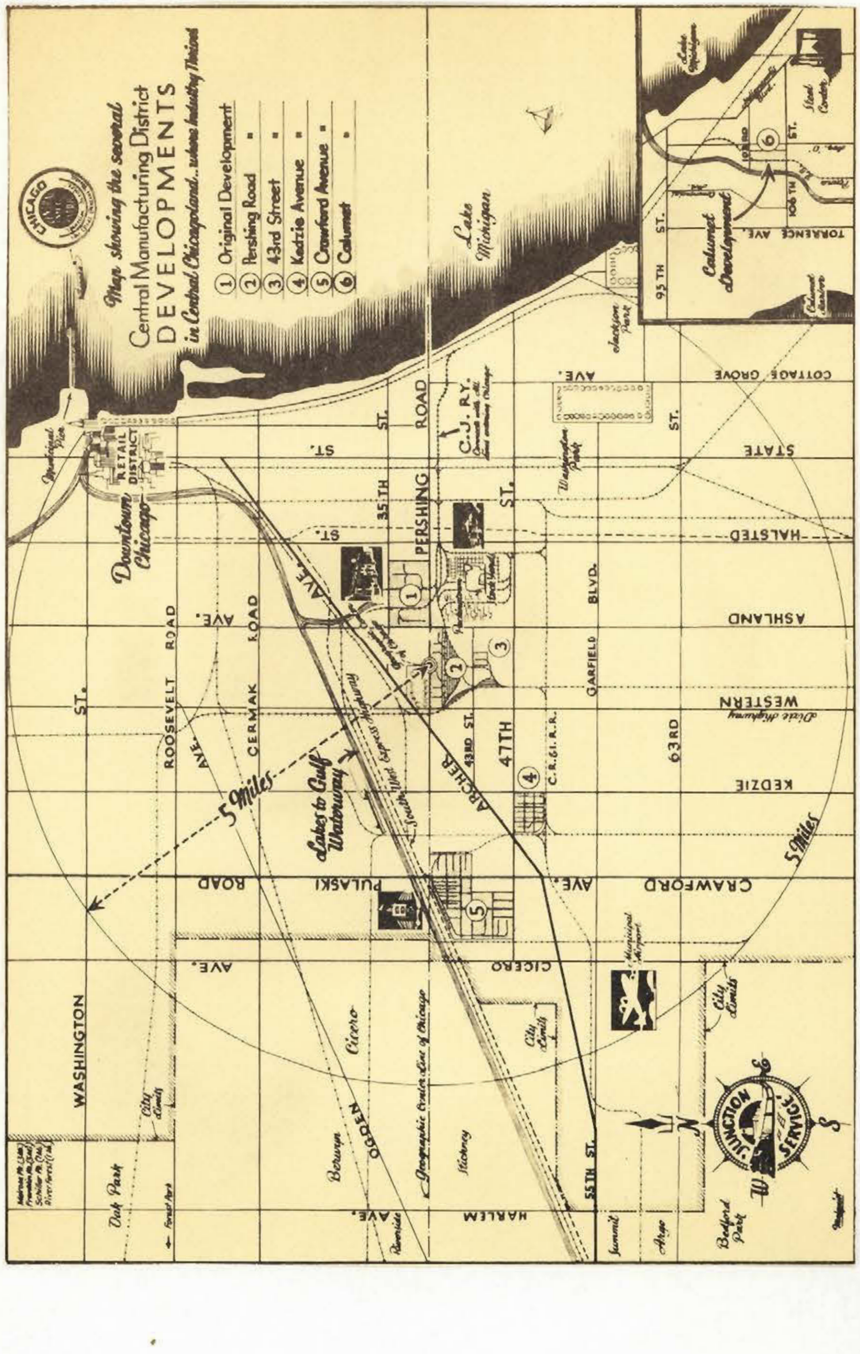
The American estates on the whole are well laid out and the spacial standards (as the buildings themselves) are high by comparison with European estates. The physical standards will be more fully discussed in Part Three.

B. Central Manufacturing District, Chacago

In the United States the early pioneer industrial estates were sponsored by either private real estate developers or railway companies. All of the early estates developed were rail-orientated.

Historically, the pioneering industrial estates emerged in Chicago near the turn of the century. Foundations for the Central Manufacturing District,

FIGURE NO. 17


Map showing the several
Central Manufacturing District
DEVELOPMENTS
in Central Chicagoland, where Industry Thrives
1 Original Development
2 Pershing Road
3 43rd Street
4 Kedzie Avenue
5 Crawford Avenue
6 Calumet
Lake Michigan
Downtown Chicago
RETAIL DISTRICT
Municipal Pier
Jackson Park
Washington Park
C. J. RY.
PERSHING ROAD
35TH ST.
43RD ST.
47TH
55TH ST.
63RD
GARFIELD BLVD.
ROOSEVELT ROAD
CERMAK ROAD
WASHINGTON ST.
ARCHER AVE.
OGDEN AVE.
HARLEM
CICERO
PULASKI ROAD
CRAWFORD AVE.
KEDZIE
WESTERN
ASHLAND
HALSTED
STATE
COTTAGE GROVE AVE.
Lakes to Gulf Waterway
5 Miles
Cicero
Berwyn
Stickney
Oak Park
Riverside
Summit
Argo
Bedford Park
Municipal Airport
City Limits
Geographic Center Line of Chicago
Calumet Development
93 TH ST.
TORRENCE AVE.
JUNCTION SERVICE

1905, began when the Chicago Union Stockyard and Transit Company and the Chicago Junction Railway developed part of the former's vacant real estate holdings to create freight revenues.

About the same time, the promoters of an unsuccessful rail classification yard in Chicago decided to convert their property into manufacturing sites, and this venture led to the formation of the Clearing Industrial District, 1909.

The Central Manufacturing District near Los Angeles was another early district, founded in 1922 by the same group of men who created the Central Manufacturing District in Chicago.

Of the early pioneer estates which developed at the turn of the century the first, the Central Manufacturing District, in Chicago, is perhaps the most typical of this type of development. All are, as mentioned, rail-orientated and compared to contemporary estates very densely occupied.

All the six major developments which go to make up the complex of the estate company are located within the city limits. As seen in Figure 17 they are all within a five mile radius and are interconnected by railway lines. The chronological listing below illustrates the development of the various sections

of the estate:

District Name	Initial develop't	District acreage	Area developed
Original East Dist.	1905	214	95%
Pershing Rd. Develop't	1916	98	80%
Kedzie Develop't	1920	66	70%
Calumet Develop't	1925	39	35%
43rd Street Develop't	1926	19	20%
Crawford Develop't	1931	349	75%

The development of the Original East District is of particular interest only because it is an example of early manufacturing and warehouse development. A number of buildings with a uniform height of four storeys were built and designed to facilitate gravity-flow production methods prevalent at the time. Private rail sidings were constructed to each building and the streets were laid out to a gridiron pattern. See Figure 16.

Perhaps the only significant conclusion one could draw from this early section of the estate is that it serves to illustrate one of the methods which were used by railway companies, during the early decades of this century, to attract and concentrate rail freight generating industries.

By contemporary standards the layout is extremely congested and of course provision for

packing could not have been anticipated in this early development. Also the lot coverage ratios have been steadily rising since this early development. (The physical standards of industrial estates in the United States will be more fully discussed in Part Three.)

C. Sharpstown Industrial Park*

According to classification Sharpstown Industrial Park comes under the general category of a

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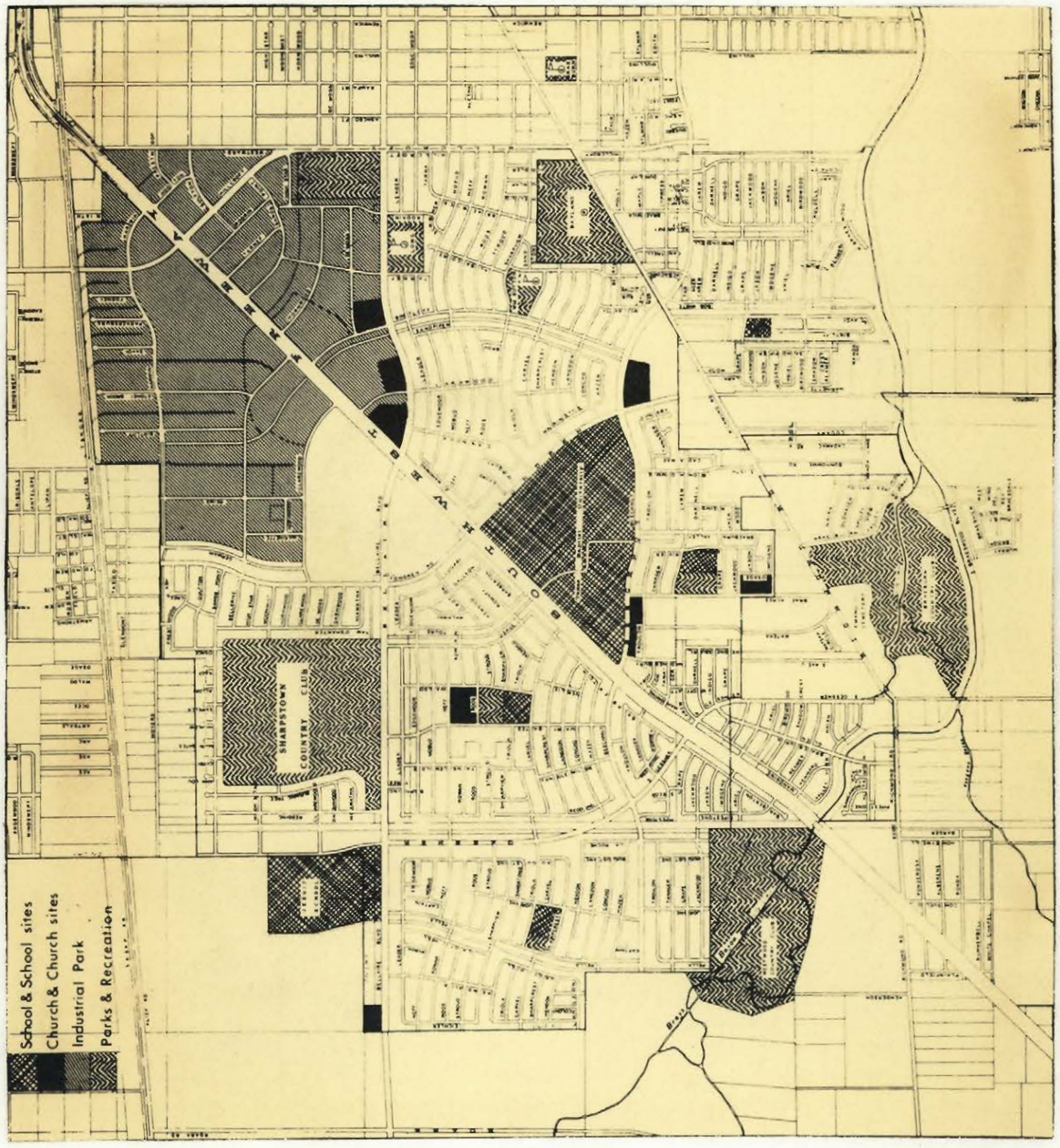
*Sharpstown, although larger in area is very similar to Don Mills, Toronto. Both are private real-estate ventures, of the balanced community type, within large metropolitan areas. For comparison purposes an outline of pertinent data is listed below:

	Sharpstown Industrial Park	Don Mills Industrial Park
Location	Houston, Texas	Don Mills, Toronto, Ont.
Initial Development	1957	1953
Sponsor	Sharpstown Realty Co.	Don Mills Development Ltd.
Sponsorship Category	Private Real Estate Developer	Private Real Estate Developer
Total District Acreage	750 acres (out of 4000 acres community development)	391 acres (out of 2127 acres community development)
Area of Rights-of-way and Easements	15% of industrial acreage	12% of industrial acreage
Acreage Sold or Leased	520 acres	391 acres
Number of Occupants	12 firms	74 firms

FIGURE No. 18



MASTER PLAN - SHARPSTOWN

balanced community or new town type of industrial estate.

It is located in an outlying section of the City of Houston, Texas. In addition to the industrial estate, the master plan for the entire Sharpstown community includes a residential area of approximately 10,000 single family dwellings and 2,000 apartments, a regional shopping centre, public and private elementary schools, a 48 acre park. (See Figure 18*) The six-square-mile project is bisected by Houston's Southwest Freeway with boulevards leading off at one mile intervals. Sharpstown Industrial Estate is located to the north-east of the development.

The developers' stated objectives were the creation of an integrated community of residence, industrial, commercial, educational and recreational facilities, according to a master plan. To ensure a harmonious development between industrial and other areas, architectural and use restrictions were attached to the sale of land, in the way of protective covenants incorporated in sale deeds, in Sharpstown Industrial Park. The responsibility for enforcing the restrictions

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*Figure reference: Technical Bulletin, No.44 op. cit.

is at first undertaken by the developer, until such times as the industrial properties have sold out; thereafter, enforcement becomes the joint responsibility of all the land owners within the estate. The City of Houston provides traffic control and enforces municipal building regulations.

The restrictions imposed by the developers, Sharpstown Realty Company, are basically those which will enhance and protect the compatability of the tenants.* Briefly these deal with the restrictions of noxious or offensive uses within the estate; minimum distances between buildings in the site and building lines; parking facilities and loading and unloading stipulations; building constructions and types of materials to be used; regulations eliminating outside storage, controls for underground fuel storage, fences, advertising and general building maintenance; and the right of the developer to regulate and control traffic on estate streets and the location or zoning of entrances and exits from properties to estate streets, until they become the legal responsibility of the City of Houston.[/]

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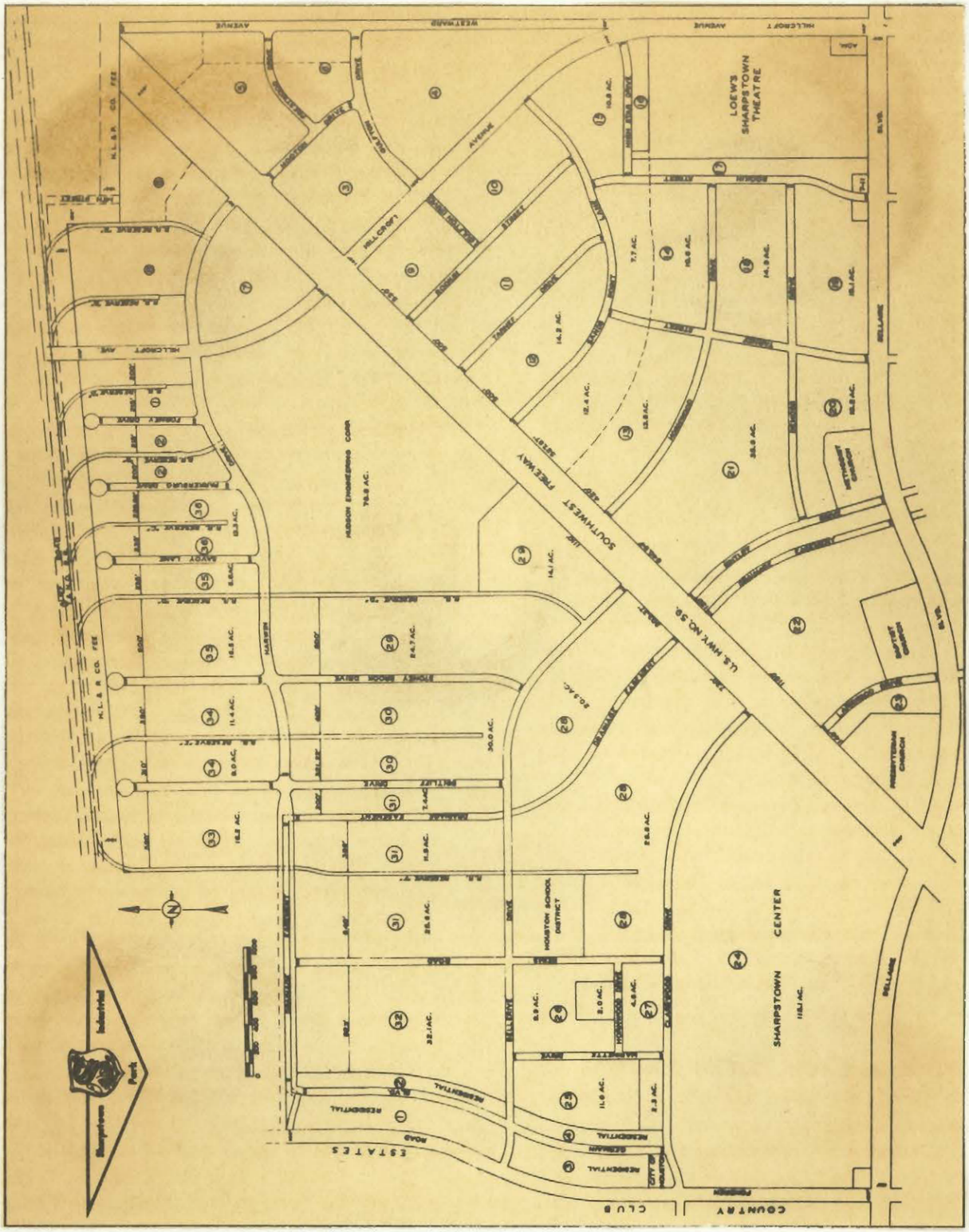
*For a full account of restrictions in deeds of covenants see Part Three, Planning an Industrial Estate, Controls Imposed in Planned Industrial Estates, below.

[/]Restrictions: Sharpstown Industrial Park, Section 10, 1960 pp. 1 - 5.

FIGURE No. 19



INDUSTRIAL PARK - SHARPSTOWN

Design Details

The street layout within the industrial estate is such that it forms large blocks. (See Figure 19,) and rail lead lines are brought into the middle of blocks on 30 foot rights-of-way. Overhead power and telephone lines are brought to the rear of plant sites in easements within the rail rights-of-way. In blocks not served with rail facilities, utilities follow a 10 foot easement through the centre of the blocks, servicing the rear of plant sites. Sites vary from 200 to 640 feet from the street line in front to the rail lines at the rear. The principal thoroughfares, Harwere Drive and Hillcroft Avenue, are boulevards with two 27-foot lanes on 80-foot rights-of-way. All other district streets have 40-foot roads on 60-foot rights-of-way.*

Closer examination of the industrial estate layout and the master plan for the community reveals that the estate has, at the fringes, several institutional and civic land uses. It is extremely difficult to comprehend why these land uses were permitted almost within the industrial estate, and one questions why a positive buffer device, such as a green strip or at least location on the other side of the road, was not employed to segregate the land uses.

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*Technical Bulletin No. 44, op. cit. pp. 194-152.

OUTLINE

PART TWO

3. Canada

I. Introduction

II. Ajax Industrial Estate

A. Introduction

B. Design Details

III. Annacis Industrial Estate

A. Introduction

B. Design Details

IV. Don Mills Industrial Estate

A. Introduction

B. Industrial Sections

C. Design Details

D. Development Controls

3. Canada

I. Introduction

In Canada, from the evidence available, the experience in industrial estate development is relatively recent, (Ajax Industrial Estate, being the first, was started in 1952), and reflects both the British and American achievements in this field.

The three estates discussed are: Ajax Industrial Estate, Ajax, Ontario; Annacis Industrial Estate, Vancouver, B.C.; and Don Mills, Toronto, Ontario. The first two were developed by British property developers. Ajax was developed by Slough Estates Ltd., of England, a company specializing in industrial estates. Annacis is the product of an international land development organization, Grosvenor Estate Ltd., England, and an international building contractor, John Laing & Sons Ltd., England. The third estate, Don Mills, was formed by a land development company, Don Mills Development Ltd., a subsidiary of Argus Corp. Ltd., a Canadian investment firm.

As in the United States, industrial estate development is mainly sponsored by profit-motivated private groups, chiefly land developers and real estate interest. In Canada, there is no Federal governmental policy for industrial location

as a whole.

However, there were competetive incentives provided by both Provincial and Municipal authorities, to attract industries, in the form of tax concessions, the selling of land at cost or lower, concessions on various service rates, etc. This was, in the past, promoted to attract industry, to communities, to expand, strengthen, and diversify the local economic base. The present trend in legislation at Provincial levels is either to declare tax concessions illegal, or to require safeguards, so as to inhibit the granting of concessions and thus minimizing abuse.* These safeguards have taken the form of limiting the amount of the reduction in taxes permissable, limiting the number of years for which a concession can be granted, requiring a special vote of council, or even requiring a vote by the local ratepayers.

The general attitude adopted by most communities, in regards to industrial development, is on attracting industry. Civic groups, local governments, Chambers of Commerce, Boards of Trade, etc., are all competetively active in industrial development for

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*Stewart Fyfe, Municipal Assistance to Location of Industry. (A Canadian study of tax concessions and other inducements.) Institute of Public Affairs of Dalhousie University, and the Canadian Federation of Mayors and Municipalities. For a complete summary of trends in legislation in Canada see Appendix of this publication.

their particular community or area. They participate by various schemes of advertising and public relations endeavours, to make known what is available to industrialists, and work hard at "selling" services and industrial sites. The emphasis, in general, is on attraction rather than location.

II. Ajax Industrial Estate*

A. Introduction

Ajax Industrial Estate is Canada's first fully planned estate. There is no information on any estate having been started prior to 1952. It is located in the town of Ajax, Ontario, approximately twenty-three miles north east of Toronto on Lake Ontario. The 3,000 acre site was still open farmland in 1941 when it was selected as the location of a large shell-filling plant.

Immediately after World War II some ninety buildings at Ajax were leased for use as a university extension for student veterans.

In 1948 the Federal Government decided

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*References:-
1. William Brado, op. cit.
2. Urban Land Institute, Technical Bulletin. 44. op. cit.
3. Brochures - The Ajax Industrial Estate - Ontario, Slough Estates (Canada) Ltd., Toronto.

to take active steps, through its agent Central Mortgage and Housing Corporation, to convert the site from a surplus war asset into a modern industrial community, with land set aside for industrial, commercial and residential development. The usable manufacturing building, existing utilities, and rail connections formed the nucleus for the design of an industrial subdivision to be developed along with the entire community in conformance with a comprehensive town plan.

The conversion called for a gradual transition from public to private ownership of land and the establishment of a municipal government. In 1951 Slough Estates (Canada) Limited purchased a 100 acre site in what was then the Ajax Improvement District, and commenced development of Ajax Industrial Estate in 1952 with the construction of two factories of 31,500 square feet each.

Ajax is suitably situated because of its proximity to Metropolitan Toronto, its excellent transportation system, and its well-planned town layout. The Estate faces both the Canadian National Railway main line from Toronto to Montreal and a four-lane divided highway (401) which connects Toronto with Detroit to the south west and Montreal to the north

east. It is also situated within the free pickup and delivery area for airway freight and express from nearby Pickering Station. The Estate is four miles from the Port of Whitby which is capable of accommodating medium sized ocean-going vessels. In addition, the Estate has access to the large and growing markets in Western Ontario by a four-lane perimeter highway around Toronto.

Ajax Industrial Estate is owned and developed by Slough Estates (Canada) Limited which is a subsidiary of Slough Estates Limited of Slough, England. As outlined previously, the parent company has specialized in the development of industrial estates for over forty years and is one of the largest industrial property owners of the United Kingdom. Slough Estates (England) owns three major estates in the U.K. and has two overseas subsidiaries: Ajax Estates in Canada and another in Australia. The scope of operation in Australia has been mainly confined to land assembly and the provision of sites for a major petro-chemical installation of Vacuum Oil Company Limited. In Canada, on the other hand, Slough Estates has concentrated on providing a full range of services in the Ajax Estate.

It has been the policy for Slough

Estates to build standard factories ahead of demand. Usually about 25,000 square feet of factory floor space is kept in stock in anticipation of future requirements. They also build factories to suit tenants' specifications but such special-purpose structures represent only about 15% of the total rental space in the Estate.

Unlike most North American Industrial Estates, property and buildings are not sold but rented from Slough Estates, thereby establishing a method of control over the form and scope of the total development by way of its position as long-term owner of the property. Control is also maintained through conditions contained in lease agreements and zoning regulations. (See Appendix No.2.)

B. Design Details

The Ajax Industrial Estate provides occupants with a complete service, including developed land and complete factory buildings which are available only on a rental basis. The company cleans, grades and levels the land, installs the streets, curbs, storm and sanitary sewers, electricity, gas and water mains, constructs the railway sidings and provides landscaping. It provides design and engineering

FIG. No. 20

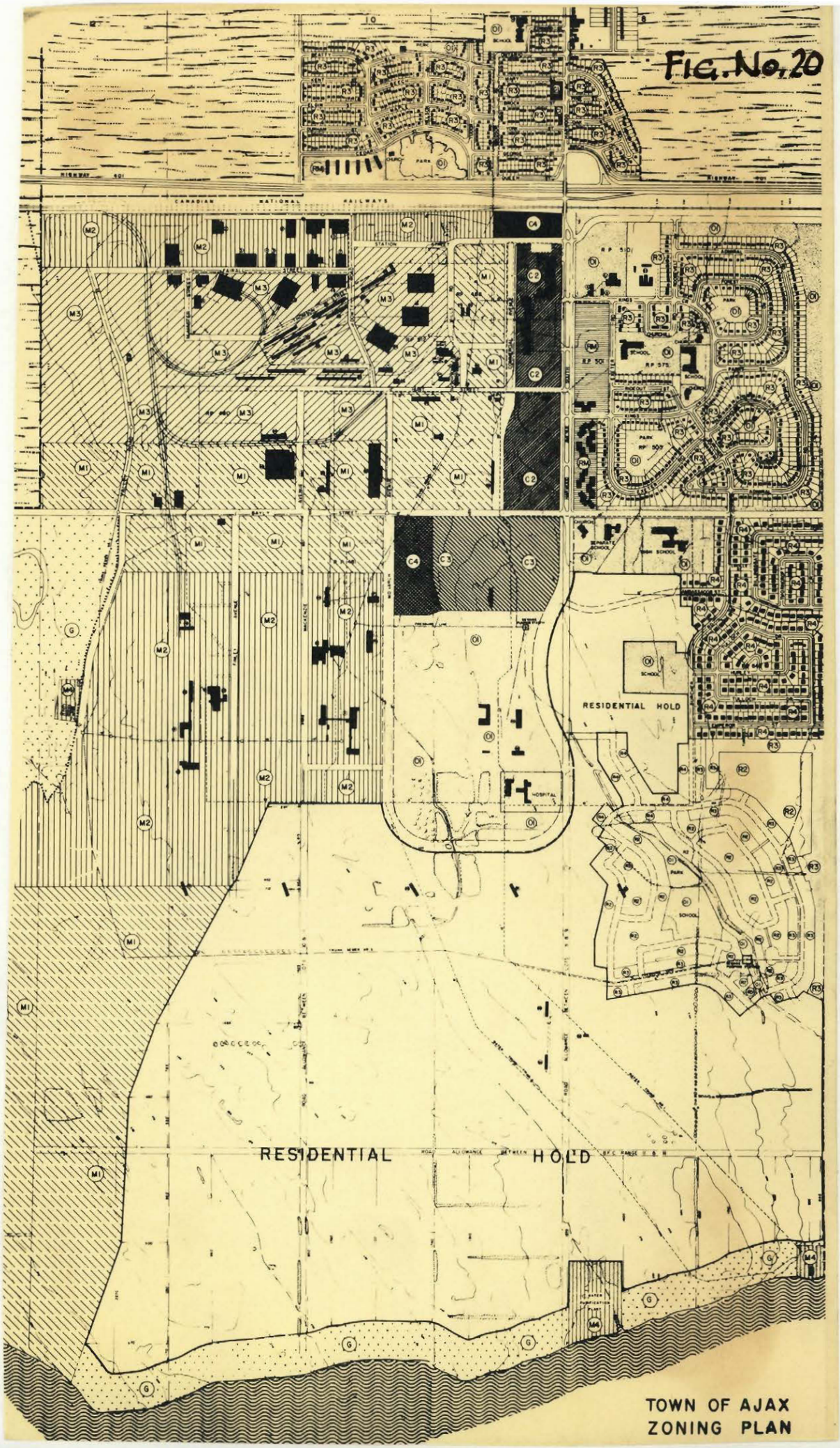
RESIDENTIAL HOLD
RESIDENTIAL HOLD
TOWN OF AJAX
ZONING PLAN

FIGURE No. 20a

LEGEND

- RESIDENTIAL
- R2 SINGLE FAMILY DWELLINGS DISTRICT
- R3 SINGLE FAMILY DWELLINGS DISTRICT
- R4 TWO FAMILY DWELLINGS DISTRICT
- RM MULTIPLE FAMILY DWELLINGS DISTRICT
- RESIDENTIAL HOLD

INDUSTRIAL

- M1 PRESTIGE INDUSTRIAL DISTRICT
- M2 SELECT INDUSTRIAL DISTRICT
- M3 SPECIAL INDUSTRIAL DISTRICT
- M4 INDUSTRIAL-PUBLIC USE DISTRICT

COMMERCIAL

- C1 NEIGHBOURHOOD SERVICE AREA
- C2 GENERAL COMMERCIAL AREA
- C3 SPECIAL SHOPPING CENTRE DISTRICT
- C4 COMMERCIAL SERVICE AREA
- O1 PUBLIC USE DISTRICT
- G PARK DISTRICT
- A AGRICULTURAL
- SWAMP
- EXISTING SPUR LINES
- BOUNDARY OF TOWN OF AJAX
- EXISTING BUILDINGS
- WOODED AREAS
- EXISTING TRUNK SEWERS
- EXISTING WATER MAINS
- CONTOUR LINES (10' INTERVALS)

KEY TO EXISTING BUILDINGS

INDUSTRIES & BUSINESS

1 DUPONT OF CAN. (1956) Ltd.
2 N&BOB FOODS LTD.
3 IBENCO OF CAN. LTD.
4 TRU-ART LTD.
5 W. L. SMITH & ASS. LTD.
6 STA-RITE PUMPS (CAN.) LTD.
7 GLEN S. WOOLLEY & CO. LTD.
8 E. F. DREW & CO. LTD.
9 GLOBE UNION
10 CENTRALAB LTD.
11 DOWTY EQUIPMENT OF CAN.
12 PERMAGLASS INC.
13 HEIN-WERNER OF CAN. LTD.
14 C. J. POWER AUTOMATIC TOOLS LTD.
15 CONTINENTAL CAN CO. LTD.
16 AJAX WAREHOUSING
17 CAMETOID LTD.
18 TRIM TRENDS CAN. LTD.
19 VISCO PETROLEUM PRODUCTS
20 GENERAL METAL PRODUCTS
21 REDIFIT CASHWAY LUMBER
22 REDIFIT WOOD SPECIALTIES LTD.
23 ROWE BROS. & CO. (CAN.) LTD.
24 STOKELEY VAN-CAMP OF CAN. LTD.
25 CWECO INDUSTRIES LTD.
26 AJAX LUMBER
27 BAYLY ENGINEERING LTD.
28 AJAX TEXTILE PROCESSING CO. LTD.
29 K. SMITH CONTRACTOR
30 V. BERRY & SONS CATERERS
31 AJAX HOTELS LTD.
32 KELVIN THOMPSON LTD.
33 CAN. AUTOMOTIVE TRIM LTD.
34 DUNNS—AUTO BODY—GORDONS RADIATOR SERVICE—HICKEY'S MEMORIALS—AJAX IRON & METAL SALES
35 AGA STEEL RADIATORS OF CAN. LTD.
36 MONARCH KNITTING
37 ELEKTRIKORDS & HARNESS LTD.
38 ATLAS TAG CO OF CAN. LTD.
39 FISHER & LUDLOW (CAN.) LTD.
40 FEDERAL PACKAGING & PARTITIONING CO. LTD.
41 STARK ELECTRONICS INSTRUMENTS LTD.
42 GEO. W. ENDRESS CO. LTD.
43 KITCHEN INSTALLATIONS LTD.
44 TEMUSS PRODUCTS LTD.
45 KOENIG KNITTING MILLS LTD.
46 ONTARIO MACHINE TOOL CO. LTD.
47 FLEDCO PIPE CO. LTD.
48 FRANK P. MARTIN CO. LTD.
49 GALVA CO. LTD.
50 H. JONES BUILDING SUPPLIES LTD.
51 MASSEY-HARRIS CO. LTD.
52 L. K. ARPELL FURNITURE
53 ALPHA ARACON RADIO CO.
54 RELIABLE TOY CO. LTD.
55 C. W. KING CONSTRUCTION
56 FABRIWELD CO.

OTHERS

A MUNICIPAL OFFICES
B FIRE HALL
C WORKS DEPARTMENT
D LIBRARY
E COMMUNITY HALL
F SALVATION ARMY
G LEGION HALL

services for prospective tenants, constructs factories and provides insurance. Fifty per cent of the cost of the utilities is supplied by the municipality. No tax incentives are available to industrialists locating in Ajax.

Ajax, as a completely planned community, is designed to ultimately accommodate a population of 25,000 people. The Industrial Estate is being carried out in accordance with an overall comprehensive master plan. The industrial area adjoins the rear of the commercial centre (see Figures 20 and 20-A)* that separates the industrial from the first residential subdivision. A planting strip screens the industrial section from the commercial development.

The layout of streets within the Estate divides the area into major blocks ranging from 10 to 60 acres. Street rights-of-way are 66 feet in width and rail is brought in on a 50 foot right-of-way. A total of 35 buildings, to date, have been constructed with a total floor area of over 500,000 square feet. Most factory units in the Estate range from 10,000 to 35,000 square feet. (See Figure 21.)[1]

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*Figure source: Brochure, op. cit.

[1] Urban Land Institute, Tech. Bulletin. 44. op. cit. p.130.

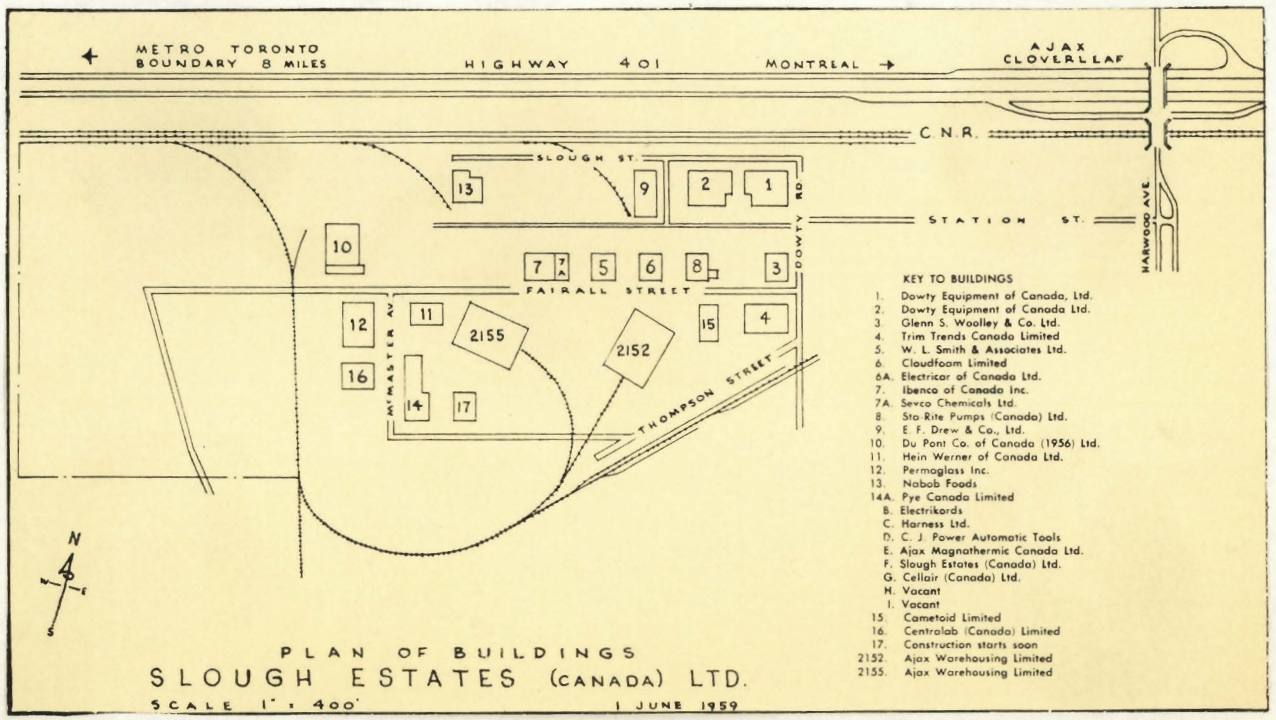
METRO TORONTO
BOUNDARY 8 MILES
HIGHWAY 401
MONTREAL
AJAX
CLOVERLEAF
C.N.R.
SLOUGH ST.
STATION ST.
DOWTY RD
HARWOOD AVE
FAIRALL STREET
MCMASTER AV
THOMPSON STREET
13
9
2
1
10
7
7A
5
6
8
3
12
11
2155
2152
15
4
16
14
17
N
KEY TO BUILDINGS
1. Dowty Equipment of Canada, Ltd.
2. Dowty Equipment of Canada Ltd.
3. Glenn S. Woolley & Co. Ltd.
4. Trim Trends Canada Limited
5. W. L. Smith & Associates Ltd.
6. Cloudfoam Limited
6A. Electricar of Canada Ltd.
7. Ibenco of Canada Inc.
7A. Sevco Chemicals Ltd.
8. Sta-Rite Pumps (Canada) Ltd.
9. E. F. Drew & Co., Ltd.
10. Du Pont Co. of Canada (1956) Ltd.
11. Hein Werner of Canada Ltd.
12. Permaglass Inc.
13. Nabob Foods
14A. Pye Canada Limited
B. Electrikards
C. Harness Ltd.
D. C. J. Power Automatic Tools
E. Ajax Magnathermic Canada Ltd.
F. Slough Estates (Canada) Ltd.
G. Cellair (Canada) Ltd.
H. Vacant
I. Vacant
15. Cametoid Limited
16. Centralab (Canada) Limited
17. Construction starts soon
2152. Ajax Warehousing Limited
2155. Ajax Warehousing Limited
PLAN OF BUILDINGS
SLOUGH ESTATES (CANADA) LTD.
SCALE 1" = 400'
1 JUNE 1959

FIGURE No. 21

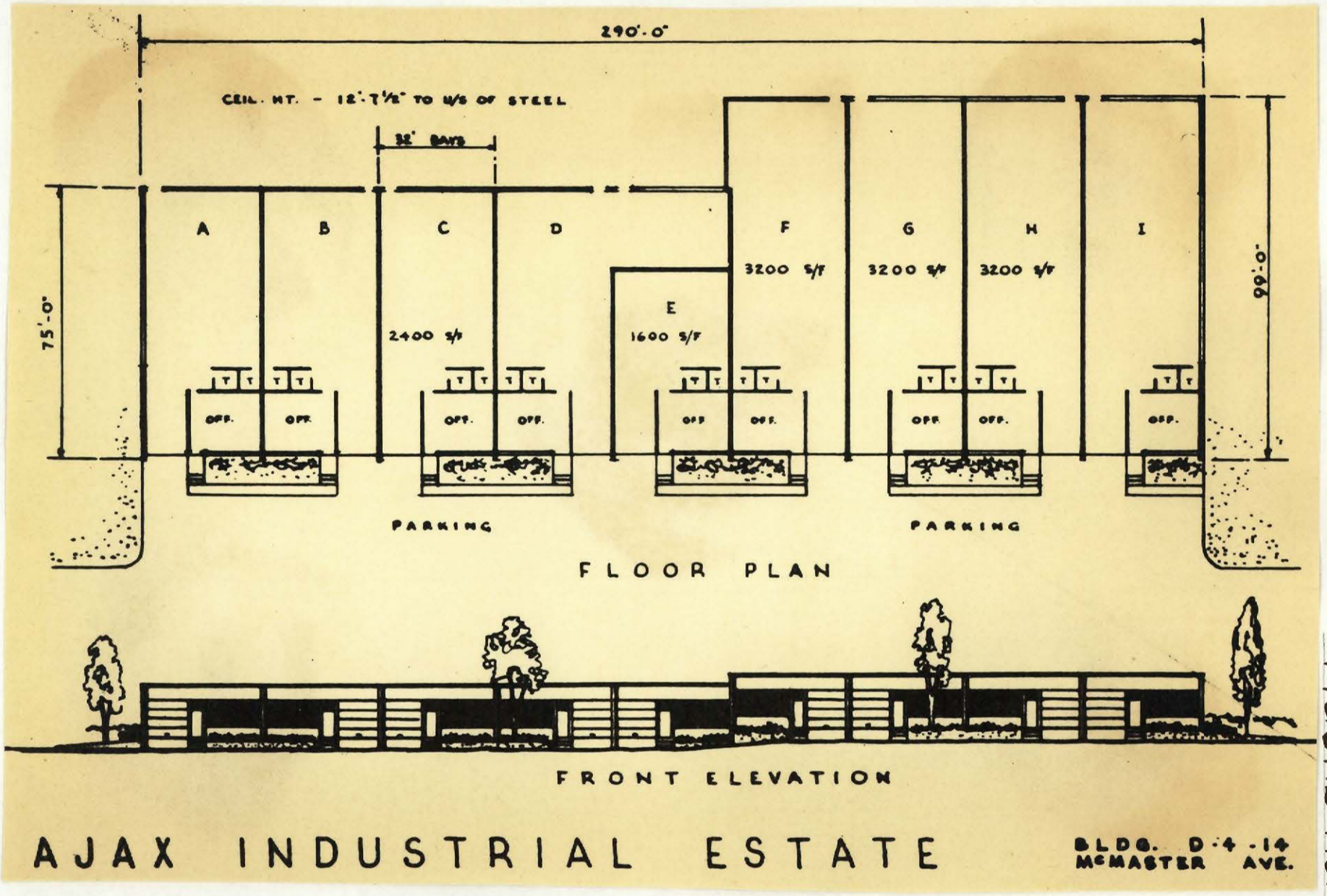
290'-0"
CEIL. HT. - 12'-7½" TO U/S OF STEEL
32' BAYS
75'-0"
66'-0"
A
B
C
D
E
F
G
H
I
2400 S/F
1600 S/F
3200 S/F
3200 S/F
3200 S/F
OFF.
PARKING
PARKING
FLOOR PLAN
FRONT ELEVATION
AJAX INDUSTRIAL ESTATE
BLDG. D
4-14 McMASTER AVE.

FIGURE NO. 22

Standard factory units are provided from 10,000 to 40,000 square feet which can be divided into units ranging from 2,400 to 7,500 square feet. These rental units are particularly designed to accommodate new, small industries with the provision of either enlarging the building or providing a larger factory on the estate and accepting the surrender of the existing lease. (See Figure 22.)*

Separate accommodation is provided for office and factory employees. Buildings are completely wired for electric lighting. A section of the building is equipped with office-type windows and convector heaters so that it can readily be converted into office space.

III. Annacis Industrial Estate[/]

A. Introduction

Annacis Industrial Estate is a 1,200 acre planned industrial development on Annacis Island, in the Fraser River, located within the Greater Vancouver

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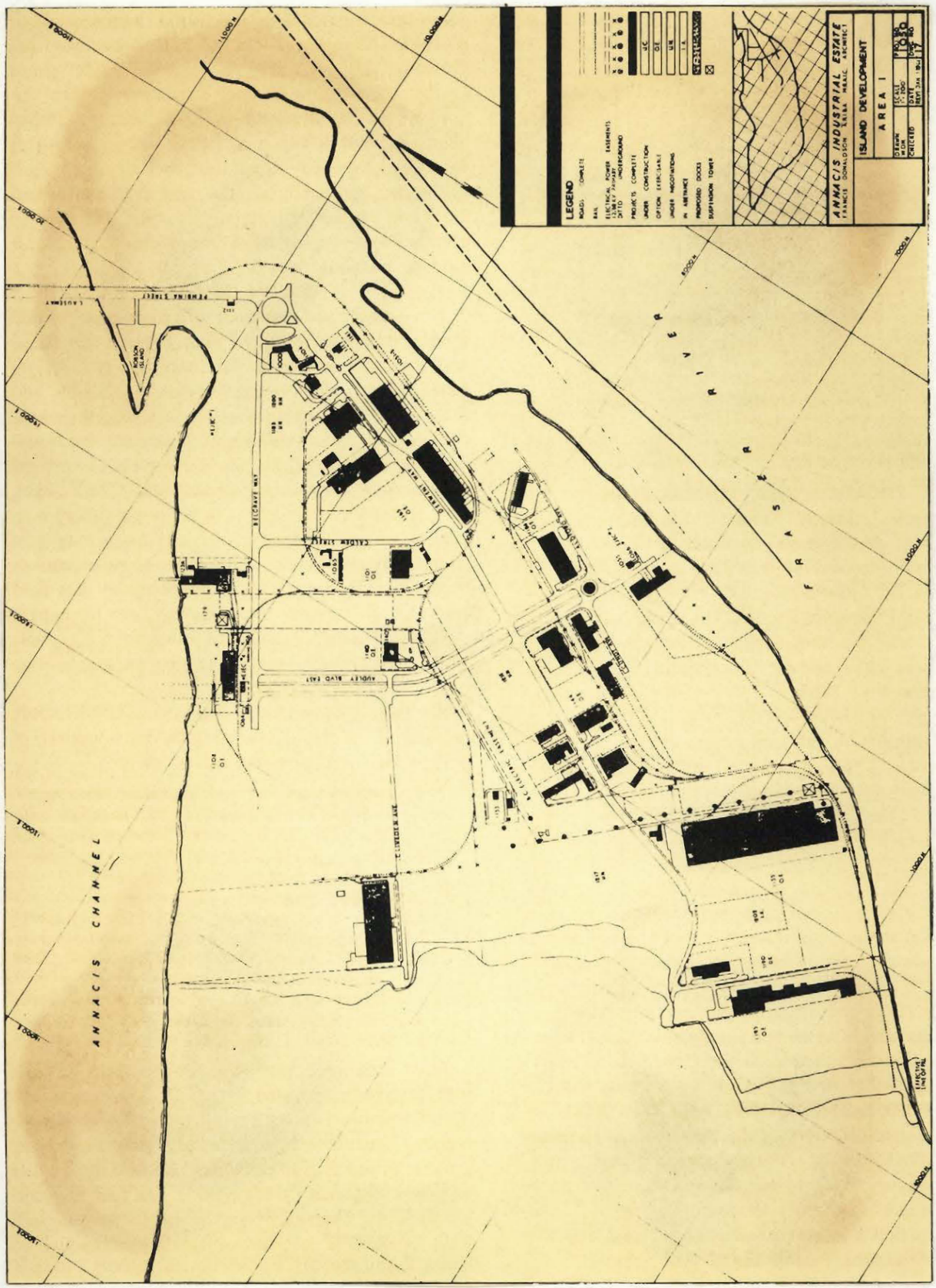
*Figure source: Brochure, op. cit.

[/]References:

1. William Bredo, op. cit.
2. Urban Land Institute, Tech. Bulletin. 44. op. cit.
3. Brochures - Annacis, British Columbia, Canada, A Planned Industrial Estate. Grosvenor - Laing (B.C.) Ltd.

FIGURE No. 23


ANNACIS INDUSTRIAL ESTATE
ISLAND DEVELOPMENT
AREA I
LEGEND
ANNACIS CHANNEL
FRASER RIVER

Metropolitan Area. Annacis Island was purchased in 1952 and development of the land was begun in 1955. The Estate is being planned for 350 industrial tenants. (See Figure 23.)*

This industrial estate is being developed by Grosvenor-Laing (B.C.) Limited, which is a partnership between the Grosvenor Estates Limited of England and John Laing & Son Limited also of England. Grosvenor Estates represents one of the world's largest land-owning and development organizations, a company which owns 600 acres in the heart of London, i.e. the Mayfair Estate and the Belgravia Estate. John Laing is a one hundred year old construction organization majoring in large international building contracts and functions as Annacis Estate contractor as John Laing & Son (Canada) Limited.

The Estate's island site is suitably located in relation to Vancouver Metropolitan area. Transportation facilities are convenient. Vancouver airport is twenty minutes away by automobile and a heliport on the Estate is planned. Rail facilities are available with direct freight routing to all the main railroads serving the Vancouver area, and competitive terminal railway rates are provided to all sites on the Estate.

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*Urban Land Institute, Tech. Bulletin. 44. op. cit. p.84.

Fresh water and deep sea docks or water front sites are available on the Fraser River which is navigable by vessels up to thirty feet.

The basic object of the Estate is to offer improved industrial sites and unique services and amenities to tenants and thereby achieve competitive advantages in its operations. A 'lease only' policy is followed and properties are available through various flexible rental arrangements.

Annacis Industrial Estates is zoned for industrial use and since it is confined to an island does not come into conflict with residential, commercial or recreational neighbourhoods. The Estate controls amenities by restrictive covenants which guard against the erection of poor structures; prevent unharmonious development of sites; enforces smoke abatement and pollution control; allows no bill-boards or advertising signs other than well-designed approved signs; and requires tenants to maintain and use the premises in keeping with their policy of high standards of modern industrial estates.

B. Design Details

The Annacis development is designed to provide a wide variety of industrial sites, large and

small, all level and with excellent foundation bearing capacities. Leasing policies are flexible and allow both for companies wishing to build their own facilities and those preferring to rent land and buildings. For the former, the site is completely improved with services, utilities and graded ready for building construction. The property can be leased either on an annual rent or on a cash payment for a long-term lease. Provision is also made for future expansion requirements. With little capital outlay a company may hold land adjacent to or near its existing plant for expansion. Industries are grouped to enable companies to be of service to one another and to benefit from mutual trade.

Industrial tenants requiring a complete factory or warehouse, Annacis Industrial Estates provides a variety of designs. There are four principal categories:

1. Buildings designed and built to custom requirements.
2. A selection of standard one-storey factory designs ranging from 10,000 sq. ft. upwards, featuring clear space, natural light, low maintenance costs, and adaptable to meet special needs of individual occupants.
3. Small factory units within a composite structure, providing for easy expansion, based on the "incubator" factory concept, and suitable for young and growing organizations, pilot plants, small branch plants, etc. These units are available on short-term leases.

4. Warehouses, bulk breaking or assembly plants, transshipment depots, etc., available under the general leasehold plan.

Building sizes vary tremendously and factory buildings have been provided up to 207,000 sq. ft. The Estate has been very successful in experimenting with the incubator factory, providing space, varying in size from a minimum of 3,000 sq. ft. of production area up to 6,000 sq. ft., which is available on short-term leases. (The Incubator or nursery factory enables a number of small companies to establish themselves, and also provides facilities for larger companies to set up pilot plants.) A tenant may expand from one unit into a second unit, comprising a total of 6,000 sq. ft. but beyond this size the Estate feels it is advisable to provide individual factories to meet the special requirements of the tenant.

Abundant power, water, natural gas, concrete roads with no rail or switching bottlenecks, and a modern drainage and sewage disposal system are available to the industrial occupant. The area is being contour-levelled to ensure sites free from flooding. Amenities include piped oxygen, community sales and sample display centres, a restaurant, warehousing, shopping facilities, banks, clubs, service stations and fire protection.

Estate streets are 44 feet wide; no alleys are provided. The building setback on the front street is a minimum of 25 ft. To provide uncongested freight and traffic movements within the estate, off-street parking and off-street loading facilities are maintained by means of public parking lots as well as planned parking on each industrial site.

Operation and Management:

To provide satisfactory and consistent service, the development is administered and maintained by a central management staff operating from an administrative building on the Estate. Zoning on the estate is based on modern industrial techniques and in accordance with performance standards. As outlined above controls are maintained by restrictive covenants between the Estate and tenants to ensure the proper use of land, surroundings and buildings.

Grosvenor-Laing maintain a permanent staff of architects specializing in industrial construction. The organization also includes a specialized staff of engineers and its own construction team. Thus, buildings can be erected quickly with control over design standards. A package management is available whereby the prospective tenant is offered land and a building designed, built and financed as a complete unit.

In addition Annacis Industrial Estate provides medical insurance, technical advisory services and facilities for recreation and tutoring. Also it can, upon request, provide legal services and supplies meeting rooms, demonstration centres and common workshop facilities.

IV. Don Mills Industrial Estate*

A. Introduction

Don Mills is situated in the north east section of Metropolitan Toronto, about eight miles from the centre of the city in two pronounced ravines (formed over the ages by the east and west branches of the Don River). The development of Don Mills was conceived and planned on the 'new town' principle (although it is not in itself a municipality), the object being to integrate the residential, commercial, recreational and industrial aspects of the development into a balanced community. It contains a central core consisting of a shopping and commercial centre, recreational amenities, office buildings, post offices, police station and library. Around this area are located the residential neighbourhoods, with the industrial development concentrated in the north west

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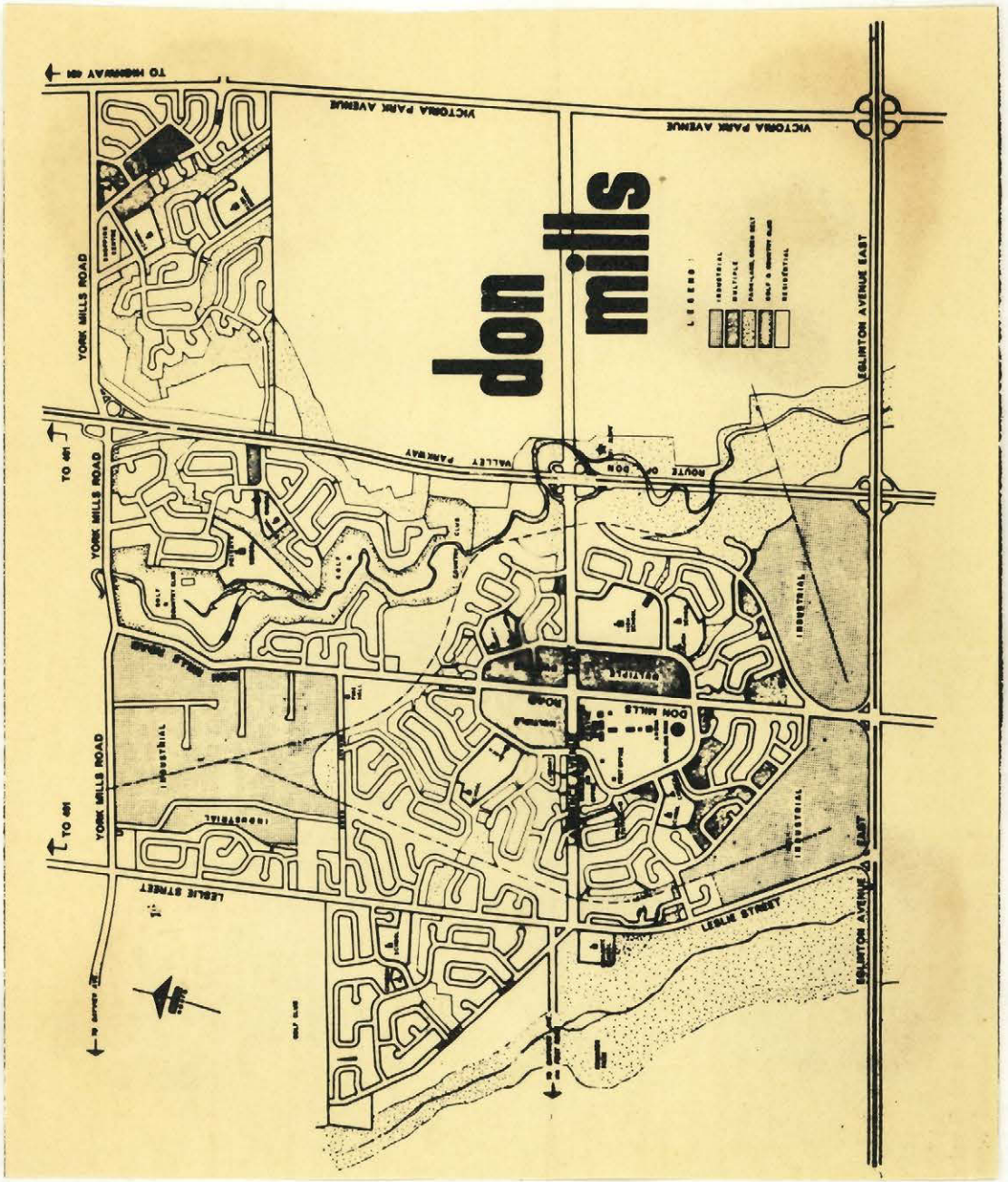
*References:

1. Urban Land Institute, Tech. Bulletin. No.44. op. cit.

FIGURE No. 24



DON MILLS MASTER PLAN

and south. (See Figure 24.)[1]

The following table illustrates the proportion of land use in the 2,127 acre development:

Residential	1,073 acres
Schools, Churches	123
Parks	226
Commercial	64
Industrial	391
Greenbelt	250

Don Mills was formed by Don Mills Development Limited, the active land development subsidiary of Argus Corporation Limited, a Canadian investment firm whose president is E.P. Taylor. Mr. Taylor is also chairman of the board of Don Mills Development Limited.

The Development began in 1953 and today the project is almost complete. There are approximately 8120 housing units consisting of single-family homes, semi-detached homes, row housing, terrace housing, both walk-up and high-rise apartments, duplexes and quadruplexes. Single-family homes were designed to sell for as low as $12,000 to as much as $50,000 on lots from 50 to 100 feet in frontage. Apartments offer a wide range of rents. More multiple residential units are contemplated

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[1] Jack Oldham, 'Don Mills, today's New Town'; Urban Land Institute, Vol.19, No.1, Jan. 1960.

and when these are complete the present population of 25,000 is expected to rise to a figure of approximately 28,500.

The residential areas in Don Mills were developed on the neighbourhood principle, with a blending of rental accommodation and houses built for sale. The focal points of each neighbourhood are the elementary school and church site. The church sites were planned in as an integral part of the development and with space alloted to each of the three leading denominations. The road system, within the neighbourhood consists of a series of winding streets, 'T' intersections, and cul-de-sacs with the elimination of through-traffic, thereby reducing traffic hazards and increasing safety. Every endeavour has been made to achieve intra-neighbourhood homogeneity by keeping adjoining contiguous homes in some form of harmony with regard to size, price, design, colour and siting, with deed restrictions relating to maximum widths setback, sideyards, fencing (no front yard fences are allowed and fencing generally is controlled), along with garage control. Residential areas are strictly zoned for residential uses only.

Although the development company is not engaged directly in construction it indirectly maintains, through its planning and architectural

departments, control over the various aspects which collectively lead to the above mentioned harmony. All home builders in Don Mills have to have their homes designed by architects, and every house designed requires the approval of the development company before construction can proceed. This control extends to the grouping, siting and colour of homes. The control exercised by the Development company, in fact, embraces all sections of the development; churches, schools and commercial and industrial buildings.

B. Industrial Sections

Three separate industrial sections make up the over-all industrial land use of Don Mills. Larger industry is located in the southern section with smaller industries situated in the south west and the northern areas.

These industrial sections are suitably located and are well served by road and rail, and are near all metropolitan area facilities such as Great Lakes and deep sea shipping and international air transportation. A mile to the north of the northern boundary of Don Mills is located the Ontario Provincial highway No. 401, a four-lane divided thoroughfare which links Detroit and Montreal. Immediately adjacent to

the south is the cross-city Eglington Avenue artery. Bordering on the east is the limited access, divided, four-lane Don Valley Parkway, and on the west Leslie Street, a local limited access road. The two national railway systems, the Canadian National and the Canadian Pacific interconnected by spur lines, also service the area.

C. Design Details

Street layout within the industrial sections is designed to provide a variety of sites ranging in size from one acre to 15 acres. In the southern section which is the largest, a lot depth of 300 feet was established; whereas in the smaller sections interior roads were spaced to provide lot depths ranging from 300 to 400 feet.

Lot frontages range from 50 to 75 per cent of the lot depth, and rail access is provided to approximately 60% of the sites. Railway rights-of-way of 30 feet (15 feet on each side of the rear lot line) were secured by easements registered in the deed of sale. No further rail facilities were provided and any further managements are left to the individual industries concerned. (It should be noted to date that of the total sites designed to be served by rail, less

than 10% of the industries located on them have made use of this facility - all rely on road transport.)

Road right-of-way widths vary from 66 ft. for interior roads to 100 ft. for access roads. Services and road improvements include sanitary and storm sewers, 12-inch water mains, and 28-foot and 32-foot 3-inch asphalt paving on 12-inch prepared base. Local utilities have provided a complete overhead electrical distribution system on poles located along the road right-of-way, as well as domestic gas installation.

D. Development Controls

Development controls within the industrial sections are maintained through covenants registered in the titles which were instituted by Don Mills to complement existing municipal by-laws.

These covenants oblige the covenantors to follow regulations relating to setbacks, sideyards, coverage, out-door storage, intensity of noise and odour, types of outdoor signs, parking requirements, building materials, site layout and other such regulations.

To achieve the aesthetic relationship between building the setbacks and side yards were varied according to site size and building mass. In general a minimum front yard setback of 100 feet was

maintained for all access roads. Interior roads were reduced to 60 feet. For large sites the side yard minimum was established at 60 feet and varying down to 300 feet minimum for smaller sites.

All buildings were designed by architects and prior to building, plans and specifications had to be approved by Don Mills. Broadly, the exterior building materials were limited to brick, stone, steel, or glass, and the use of exposed concrete block is not permitted. Also, no fencing was permitted to extend in front of any building.

Another feature of control is the limits in the use of signs. All signs must be approved by the developers and such items as roof signs and flashing neon signs are specifically barred.

Municipal off-street parking regulations were adopted as these were found to be satisfactory. These permit one parking space for each 400 square feet of plant space, up to a total of 30,000 sq. ft., and one parking space per 1000 sq. ft. of plant space for plants of more than 30,000 sq. ft.

The covenants between the developing company and industries restrict front-yard parking, except for a limited number of visitors cars, and in no case does it allow front-yard parking by employees.

The industrial sections are completely sold out. Approximately 75 industrial firms are located within these sections which employ 6,150 persons.

OUTLINE

PART TWO

4. Industrial Estates in Underdeveloped Countries

I. Introduction

II. India

- A. Objectives and Policies
- B. Summary of Programme Achievements
- C. Governmental Incentives
- D. Guindy Estate
- E. Planning Procedures and Standards

III. Puerto-Rico

IV. Summary

4. Industrial Estates in Underdeveloped Countries

I. Introduction

Several factors must be taken into consideration which make the evaluation of industrial estates in North America and under-developed countries, (and to a lesser extent in several European countries) difficult to compare.

Firstly, industrial estates in North America must be viewed against the background of local private investment. Generally, in Canada and the United States there is no national policy determining the location of industry. Industrial estates are, however, important in determining the pattern of industrial settlement at the local level, by means of localized comprehensive planning, and more recently by means of urban redevelopment.

Secondly, the evaluation of industrial estates in under-developed countries must be viewed within the framework of intensive programmes for industrialization and urbanization which are the objectives of central governments. The industrial estate is usually integrated with general development plans and programmes. In most cases, this integration occurs at the regional plan level which provides the most suitable framework for co-ordinating local development

programmes, both physical and economic, with the overall planning for national development.

The industrial estate as a rational industrial land unit may be used for various purposes according to the objectives and policies of the programme. In this regard, the industrial estate is now viewed in many countries as an instrument to divert industry from over-populated or over-industrialized areas, which are now either depressed or inaccessible, to provide industrial development throughout the country, and to raise the level of development in rural areas. Industrial estates are, therefore, utilized as part of a broader governmental policy to guide the location and development of industry in order to achieve two basic objectives: industrial development and decentralization.

Industrial development policies have used industrial estates to accelerate industrialization and employment opportunities, to encourage foreign investors to locate manufacturing plants within a particular country, to foster and modernize small and medium-sized firms and to relieve hardship in depressed areas by expanding and diversifying the industrial base.

Decentralization policies have used industrial estates to decentralize population from

large urban areas, to provide an economic base for a new town or growing suburb of a metropolitan area, to encourage the development of rural and under-developed regions within a country and to maximize the opportunities afforded by a national hydroelectric power grid.

In addition, a third and more recent policy has sought to use industrial estates as a means of revitalizing city centres, thereby widening opportunities for urban development.

Furthermore, one of the most characteristic features not found in the industrial estates of more advanced countries is the related overhead investments found in industrial estate programmes of under-developed countries. These overheads would include such things as housing, transport, schools, hospitals, canteens, recreational facilities, syllabuses for training personnel, etc. In most cases, government planning policies consider the availability or provision of a minimum of social and economic overhead facilities as a prerequisite for the establishment of an industrial estate in a given location.

The comparison of the activity in India Puerto-Rica - the two under-developed countries with the most experience, thus far, in promoting industrial

estates - reveals certain unique features which have been developed to meet particular and diversified needs.

II. India

A. Objectives and Policies

The success of industrial estates in the United Kingdom indueed Governments in other countries to explore the possibilities of undertaking such programmes for promoting the planned growth of small industries. In particular, the Government of India decided that the conditions in the country justified sponsorship of a network of industrial estates by the Government.

In India the principal objectives of the programme of industrial estates is to provide factory accommodation to small industries at suitable sites with all necessary facilities, and thereby create a proper environment for the advancement of industries. Besides, the fact that industrial estates bring together a number of different industrial units facilitates the establishment of common servicing centres, the introduction of modern techniques, collective purchase of raw materials and sale of finished goods. The grouping of industries on a common

site enables the units in the industrial estate to better use the goods and services of one another, and their activities can become interdependent and complementary.

The objectives and policies relating to the establishment of industrial estates were set forth as follows by the Planning Commission of the Government of India in the report containing its proposals for the second five-year plan, under the heading of "Small-scale industries":-

> "A provision of Rs.10 crores* has been made for setting up industrial estates in the second five-year plan with a view to providing conditions favourable to working efficiency, maintenance of uniform standards in production and economic utilization of materials and equipment. The principal objective is to enable a number of small-scale units to have the advantage of common services and other facilities, such as a good site, electricity, water, gas, steam, compressed air, railway sidings, watch and ward, etc. Being located near one another, some units may be better able to use the goods and services of others, so that they become interdependent and complementary. Two types of industrial estates, large ones costing from Rs.40 to 50 lakhs and small ones costing from Rs.20 to 25 lakhs, are expected to be established. It is proposed that the responsibility for construction and management should vest in the state Governments but that the Central Government should advance to state Governments the entire cost of the estates in the form of loans. State Governments will run the estates through corporations or such other agencies as they may decide to set up. Sites in the estates will be sold outright to industrial units or given to them on hire-purchase terms. In some cases buildings will be erected on sites and let out on a rental or rent-cum-purchase basis, or if necessary, sold outright. The Village and Small-

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*One crore = 10 million rupees; one lakh = 100,000 rupees; one rupee = $0.21 (US)

FIGURE NO. 25


U.S.S.R.
AFGHANISTAN
CHINA
JAMMU & KASHMIR
HIMACHAL PRADESH
PAKISTAN
PUNJAB
DELHI
NEPAL
RAJASTHAN
UTTAR PRADESH
BHUTAN
ASSAM
BIHAR
PAKISTAN
TRIPURA
MANIPUR
GUJARAT
WEST BENGAL
BURMA
MADHYA PRADESH
DAMAN
INDIA
ORISSA
MAHARASHTRA
ANDHRA PRADESH
BAY OF BENGAL
GOA
MYSORE
PONDICHERRY
MADRAS
KERALA
ARABIAN SEA
CEYLON
INDIA & NEPAL
INDUSTRIAL ESTATES
(AS OF 31 MARCH 1962)
Functioning
Completed but not functioning
Under construction
Planned
P Assisted private estate
State capital or main city
State or Territory boundary
L. indicates location of estates shown in an inset
0 100 200 300
MILES
0 100 200 300
KILOMETRES
The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations
The final status of Jammu and Kashmir has not yet been determined

scale industries Committee expressed the view that industrial estates should be located in such a way that they do not encourage further concentration of population in large urban centres. In deciding the location of the estates, especially the smaller estates, this consideration should be kept in view so that preferably they are developed in or near towns of comparatively small size."*

B. Summary of Programme Achievements

The Indian Government is now considering recommendations by the Planning Commission for the third five-year plan[/] which contains, among other things, a proposal to set up 300 industrial estates during the period. (See Figure 25.)[o] The following table summarizes the over-all scope and achievements of the programmes:-

	First Plan	Second Plan	Third Plan
Estates Approved (number)	10	120	300
Estates constructed (number)	1	66	
Financial Provision (Rs. million)	6	111	302
Actual Expenditure (Rs. million)	1.2	110	

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*Government of India, Planning Commission, 'Second Five-Year Plan' (New Delhi 1956) chapter XX, paragraph 45.

[/]Government of India, Planning Commission, 'Third Five-Year Plan - A Draft Outline' (New Delhi 1960).

[o]Map Reference - Establishment of Industrial Estates in Under-developed Countries. Dept. of Economic and Social Affairs, United Nations, New York, 1961.

Most of the industrial estates sanctioned during the first and second five-year plans are located in places with a population of less than 100,000:

	Number of Estates
Places with population of less than 20,000	25
Places with population ranging from 20,000 to 50,000	25
Places with population ranging from 50,000 to 100,000	21
Places with population over 100,000	48
	119

C. Governmental Incentives

With one exception, there is no special inducement for small industrialists to settle in industrial estates. The only special advantage offered to occupants of industrial estates relates to rent. In principle, they are to pay current market rents, but subsidies may be granted should such rent be found too high. The burden of subsidies is carried equally by the Central Government and the State up to a period of five years, in the course of which the subsidies are progressively reduced; rent subsidy grants are awarded only with the approval of the central government.

Nevertheless, the inherent advantages incorporated in the device of industrial estates are a compelling factor in attracting industry. To obtain a ready-built factory with modern conveniences, especially in India, is a powerful inducement for people who, in general, have no alternative but to settle in an estate or stay in crowded, inconvenient premises and unsanitary conditions. In addition, there is the advantage of most of the social and economic facilities devised by the Government to promote and assist small industry, incorporated in industrial estates in India.

D. Guindy Estate

Guindy Estate, near Madras, one of the most advanced estates in India, provides the following services: (1) foundry equipment with moulding, pattern-making and sand testing machinery supplying ferrous and non-ferrous castings and a central laboratory: (2) forging and heat-treatment shop equipped with drop hammers and pneumatic hammers for making light forgings. The shop also undertakes metal treatment, such as hardening, annealing, normalizing, tempering, case hardening, and so on: (3) tool room providing dies, jigs and fixtures for press work, forging, casting, plastic mouldings, etc.: (4) pressure die-casting unit

supplying non-ferrous castings; (5) service-cum-training centre for precision instruments assisting enterprises manufacturing surgical instruments, laboratory equipment and hand tools; (6) service centre for electrical goods supplying coated copper wire, coated enamel wire and enamel winding wire; (7) glass works manufacturing scientific and laboratory glassware, neon-signs and other items and providing training in glass making; (8) wood-working shop, including seasoning plant and testing equipment; (9) common lease shop renting out portable tools and leasing machinery to be used in the shop with the help of skilled operators. The shop leases heavy equipment such as grinders, milling machines, screw machines, punching and shearing machines, and sand-blasting equipment; (10) testing laboratory carrying out industrial testing and research on raw materials and finished products and extending technical advice and service; (11) servicing agency managing a depot for supplying iron steel and other essential raw materials to the occupants of the estate; (12) technical information centre with technical library, motion pictures and slides, which also provides printing and blue-printing facilities. The Guindy estate has also built houses at subsidized rents for the workers."*

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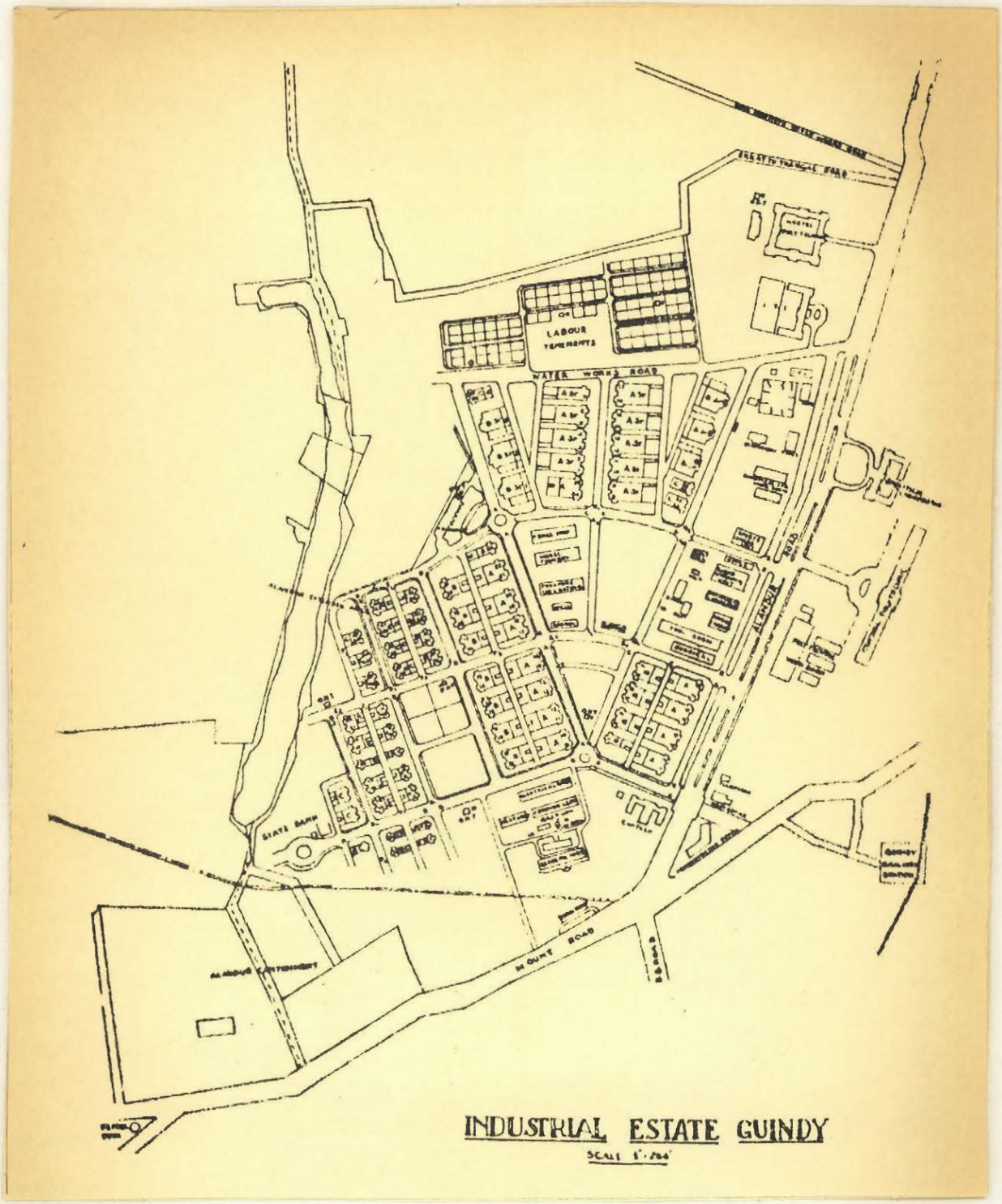
*Establishment of Industrial Estates in Under-Developed Countries - United Nations Publication New York 1961 No.60.11.B.4.

FIGURE No. 26



INDUSTRIAL ESTATE GUINDY

SCALE 1"=200'

The Industrial Estate is administered by a manager appointed by the Madras State Industries Department. A corporate Construction Branch was set up by the Department to facilitate quick construction. Construction was started in January 1957. Factories are being built in three standard sizes, consisting of A-units having 4,280 sq. ft. of covered areas and 2,000 sq. ft. of open area; B-units each with 3,044 sq. ft. covered area and 1,600 sq. ft. open area; and C-units each with 1,836 sq. ft. covered area and 900 sq. ft. of open area.

The layout of the site follows the semicircular pattern of British estates in contrast to the grid pattern of the American estates (See Figure 26.)*

Not directly associated with the Estate but located on the grounds are the Central Polytechnic and Industrial Training Institute which accommodate 900 and 400 students respectively. The location of the Estate, with its large number of industrial plants was considered ideal for the educational facilities. A number of workshops are provided, as well as hostels for the students.

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*Figure reference: Industrial Estates in Asia and the Far East; Department of Economic and Social Affairs, United Nations, New York 1962.

TABLE NO. 7

RECOMMENDED NORMS FOR FACTORIES AND PLOTS FOR SMALL AND RURAL INDUSTRIAL ESTATES - INDIA

(In Square Feet)

Factory Type	Size of Plot	Initial Covered Area	Expanded Covered Area
A----------	1,000	200	400
B----------	1,000	250	500
C----------	2,000	400	1,000
D----------	2,000	500	1,000
E----------	4,000	1,000	2,000
F----------	4,500	2,000	3,000

Source: Government of India, Ministry of Commerce and Industry, Central Small Industries Organization, INDUSTRIAL ESTATES: PROGRAMME AND PROGRESS, New Delhi, September 1960, pp. 34-35.

TABLE NO. 8

RECOMMENDED PERCENTAGES OF UTILIZATION FOR INDUSTRIAL ESTATES - INDIA

	Large	Medium	Small	Large	Medium	Small
	Central Small Industries Organization			All India Seminar		
(a) Area under factory plot	55	50	40	65	55	40
(b) Area under roads and open spaces	35	35	40	25	30	40
(c) Area under administrative and other buildings	10	15	20	10	15	20
	Selected Building Projects Team			T.S. Vedagiri		
(a) Area under factory plot	-	60 to	65	-	60 to	65
(b) Area under roads up to	-	-	20	-	Within	20
(c) Area under open space up to	-	-	10	-	Up to	10
(d) Area under administrative and other buildings	-	5 to	10	-	To about	5

Source: Government of India, Ministry of Commerce and Industry, Central Small Industries Organization, INDUSTRIAL ESTATES, PROGRAMME AND PROGRESS, New Delhi, September, 1960.

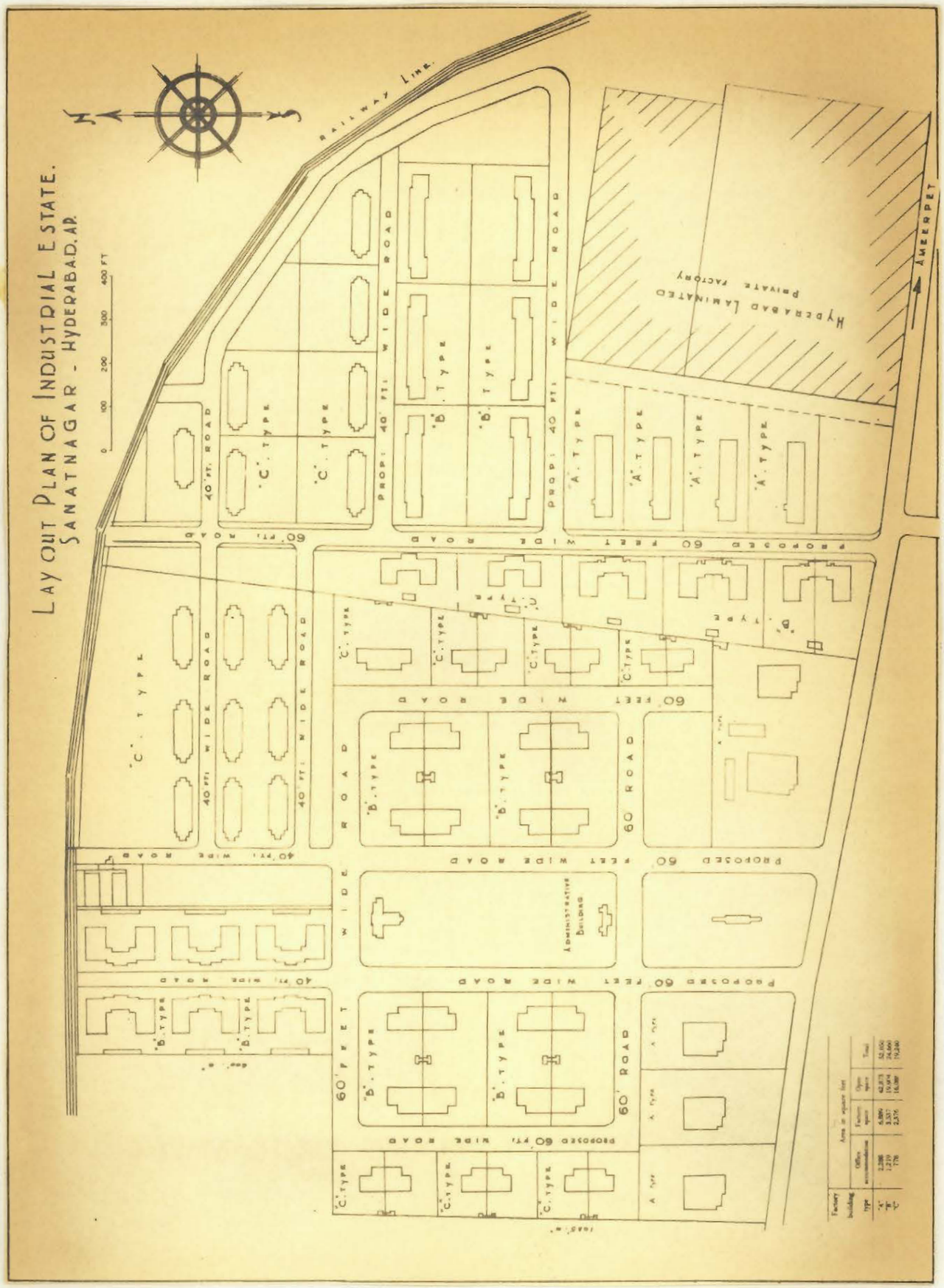
TABLE NO. 3

RECOMMENDED NORMS FOR FACTORIES AND PLOTS ON INDUSTRIAL ESTATES - INDIA

Factory Type	Size of Plot (square feet)	Initial Covered Area (square feet)	Expanded Covered Area (square feet)
A	2,000 (40' x 50')	400 (20' x 20')	1,000 (20' x 50')
B	2,000 (40' x 50')	500 (25' x 20')	1,000 (20' x 50')
C	4,000 (80' x 50')	1,000 (20' x 50')	2,000 (40' x 50')
D	4,500 (90' x 50')	2,000 (40' x 50')	3,000 (60' x 50')
E	9,000 (90' x 100')	4,500 (60' x 75')	6,000 (80' x 75')
F	11,500 (115' x 100')	5,000 (50' x 100')	7,500 (75' x 100')
G	13,500 (135' x 100')	6,000 (60' x 100')	9,000 (90' x 100')
H	15,000 (150' x 100')	8,000 (80' x 100')	10,000 (100' x 100')
I	15,000 (150' x 100')	9,000 (90' x 100')	12,000

Source: Government of India, Ministry of Commerce and Industry, Central Small Industries Organization, INDUSTRIAL ESTATES: PROGRAMME AND PROGRESS, New Delhi, September 1960, pp. 34-35.

FIGURE No. 27


LAY OUT PLAN OF INDUSTRIAL ESTATE.
SANATNAGAR - HYDERABAD. A.P.
RAILWAY LINE.
HYDERABAD LAMINATED
PRIVATE FACTORY
AMEERPET
PROPOSED 60 FEET WIDE ROAD
PROPO: 40 FT: WIDE ROAD
40 FT: WIDE ROAD
60 FEET WIDE ROAD
60' ROAD
60' FEET
'A' TYPE
'B' TYPE
'C' TYPE
Administrative Building

E. Planning Procedures and Standards

In India, the actual physical planning and procedures for industrial estates, i.e. formulation of a master plan; site location and selection; physical layout and subdivision; building and maintenance and zoning and controls are in general comparable to other countries. (Physical planning considerations are discussed in detail in Part Three.) It has been observed, however, that there are wide variations in design standard and space utilization, not only between countries but at local levels within a country, due to local customs, methods, climatic conditions and special features which must be accommodated. For example, under-developed countries and in some cases European countries (though now rapidly decreasing) the use of the bicycle as a means of mass transportation eliminates devoting large areas of land to employee parking.

Tables No.7, No.8 and No.9 serve to illustrate some of the recommended standards which are set forth by the Indian Government to be adopted in the planning of industrial estates.

Figure 27* illustrates Sanatnagar

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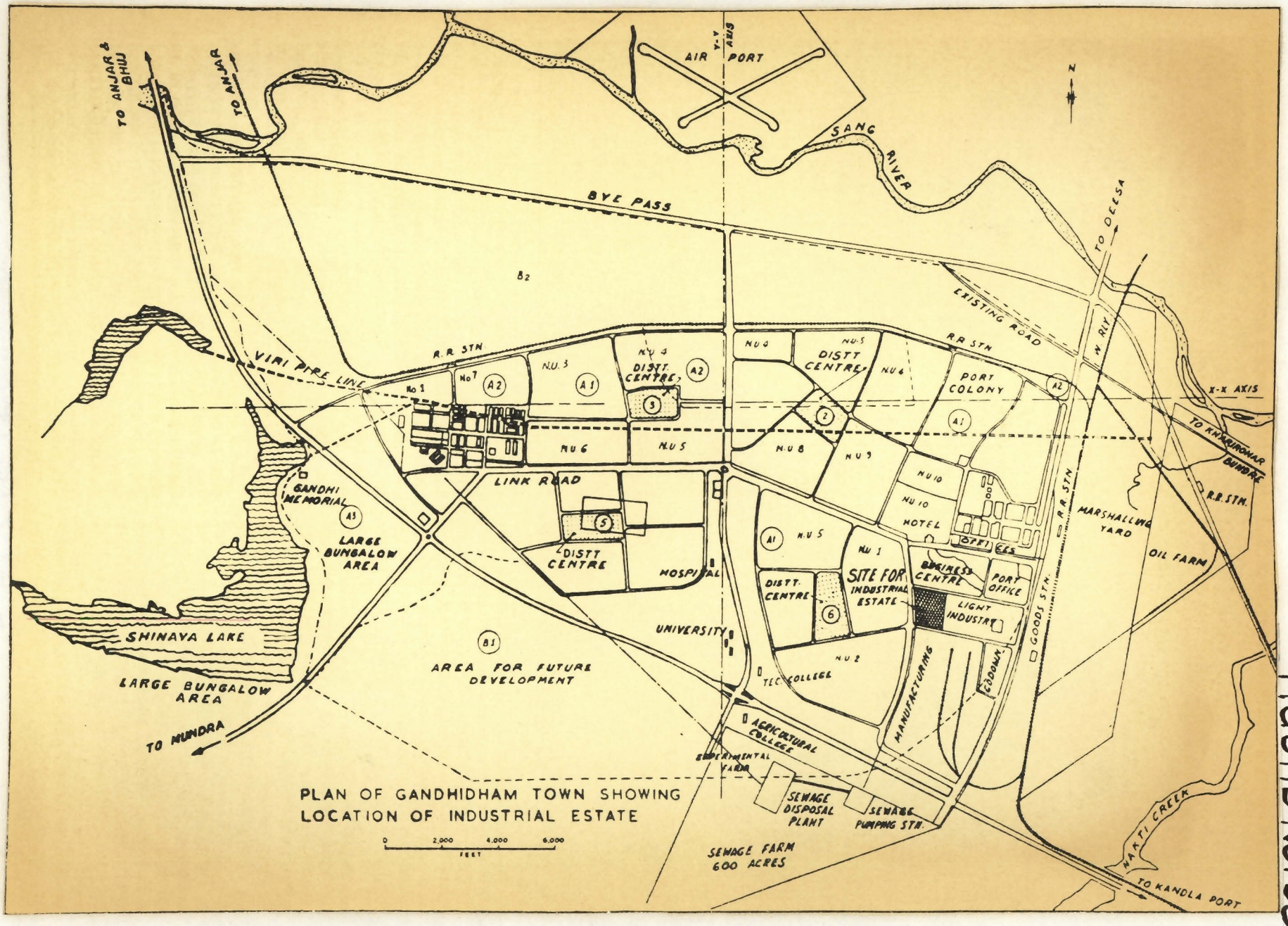
*Figure reference: Industrial Estates in Asia and the Far East; op. cit.



PLAN OF GANDHIDHAM TOWN SHOWING LOCATION OF INDUSTRIAL ESTATE

FIGURE NO. 28

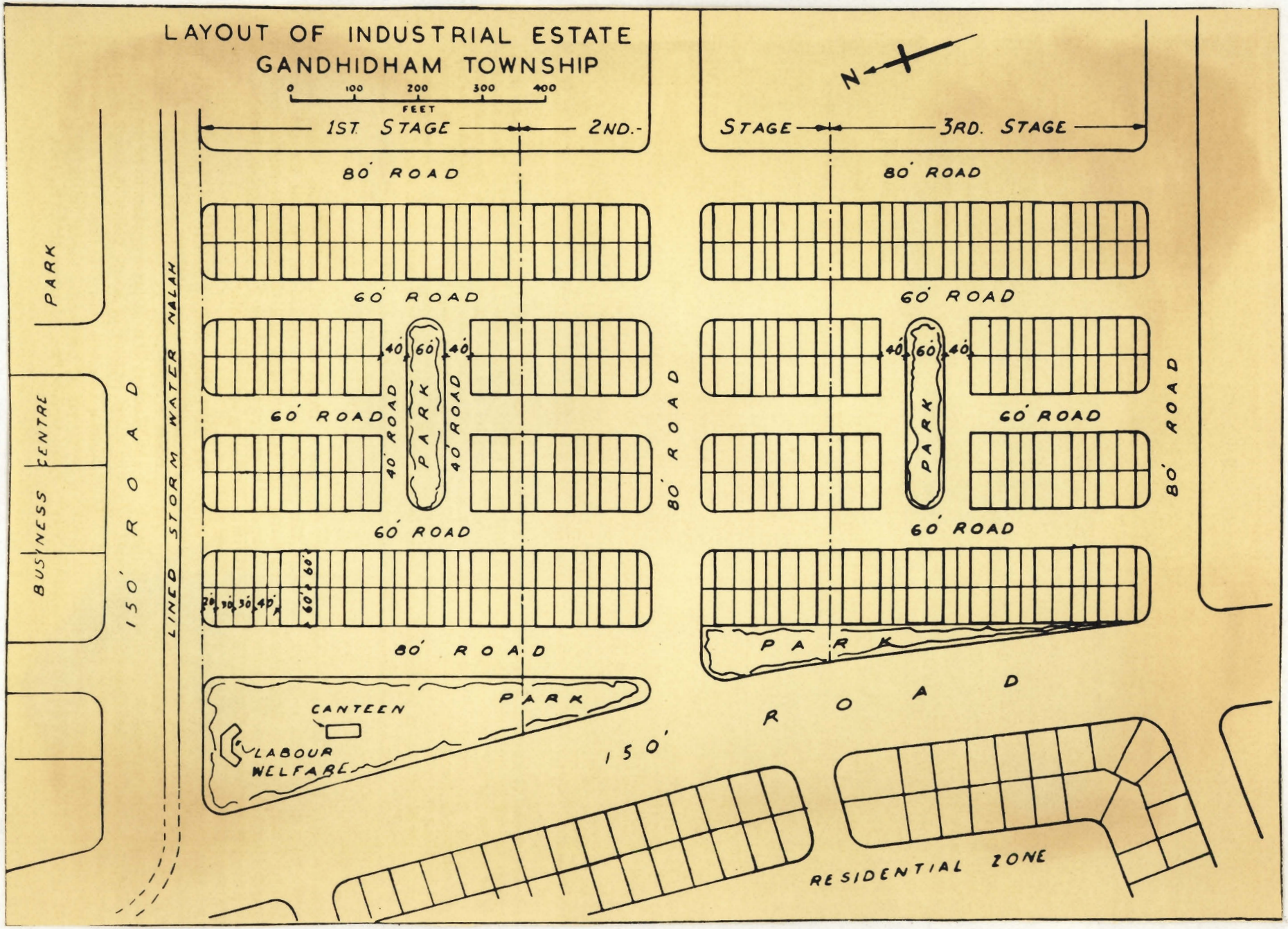

LAYOUT OF INDUSTRIAL ESTATE
GANDHIDHAM TOWNSHIP
0 100 200 300 400
FEET
N
1ST STAGE
2ND.- STAGE
3RD. STAGE
80' ROAD
60' ROAD
40' ROAD
PARK
BUSINESS CENTRE
150' ROAD
LINED STORM WATER NALAH
CANTEEN
LABOUR WELFARE
RESIDENTIAL ZONE

FIGURE NO. 29

Industrial Estate, Hyderabad, A.P., which is the second largest estate, next to Guindy. Figure 28* shows the master plan of Gaudhiham Town and the location of its industrial estate in relationship to: neighbourhood units (N.U.); district centre comprising shops, schools, offices, railway (W.R.); and the technical college (tech. college). Figure 29* shows the layout of the estate.

III. Puerto-Rico

Puerto-Rico since 1950 has based its industrial development objectives on a comprehensive system of incentives aiming primarily at attracting capital and entrepreneurship from the United States mainland and to attract industry from European and other countries.

The industrialization programme is directed and supervised by a governmental agency, the Economic Development Administration, through a number of operational units, the most important of which, relating to industrial estates, is the Puerto-Rico Industrial Development Company (PRIDCO): a semi-autonomous corporation,

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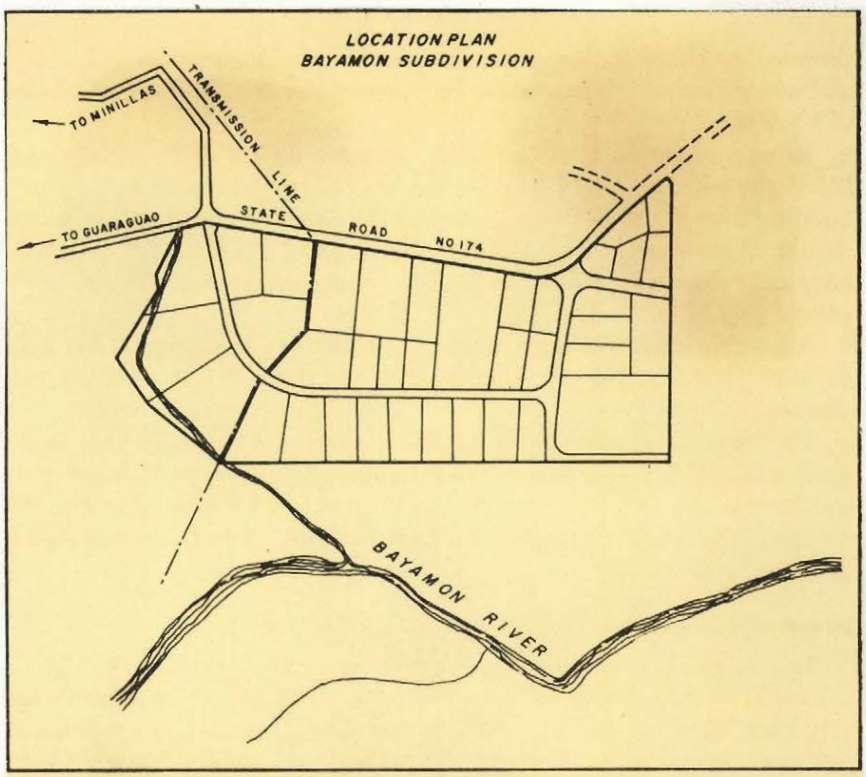
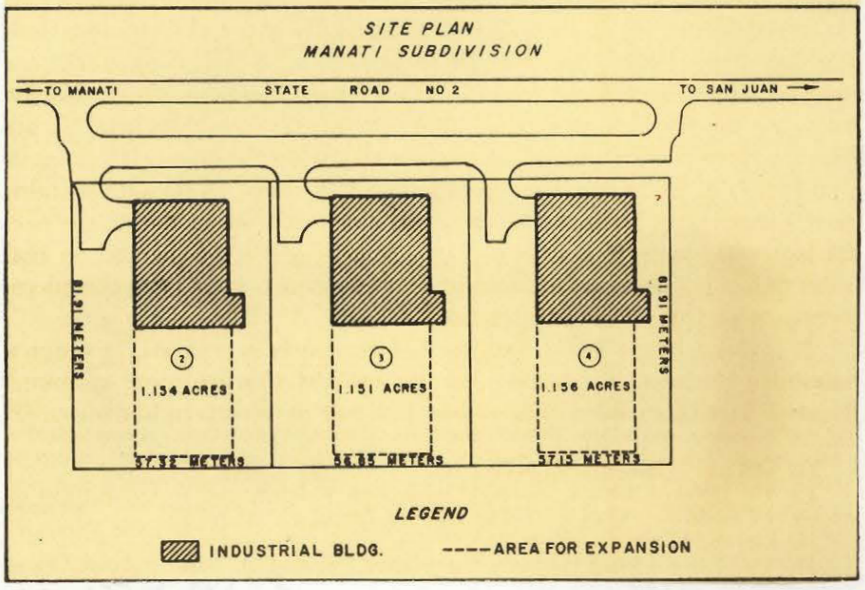
*Figure reference: The Physical Planning of Industrial Estates. Dept. of Economic and Social Affairs. United Nations, New York, 1962.

a governmental body primarily engaged in providing the physical facilities and the special financing for industrial development. The Economic Development Administration (EDA) is engaged in industrial promotion, research and services. EDA induces and helps enterprises to organize new plants in Puerto-Rico. PRIDCO helps to finance, build, sell or lease industrial facilities to these new plants. The Puerto-Rico Planning Board is a governmental agency within the office of the Governor and has wide coordinating powers, the approval of the Planning Board is required for all its acquisitions as well as for the sale or development of its properties.

There is close integration of the Puerto-Rican industrial estate programme with its land use planning programme. Industrial zoning was given a firm legal foundation in 1946 and is administered by the Planning Board, which also has complete responsibility for land use planning and zoning. The Board administers several planning regulations controlling land use, sub-division development and building construction. These regulations are applicable to government projects as well as to private projects. In addition, PRIDCO has strict development and constructional controls over its industrial subdivisions and other industrial projects.

FIGURE No. 30


LOCATION PLAN
BAYAMON SUBDIVISION
TO MINILLAS
TRANSMISSION LINE
TO GUARAGUAO
STATE ROAD NO 174
BAYAMON RIVER


SITE PLAN
MANATI SUBDIVISION
TO MANATI
STATE ROAD NO 2
TO SAN JUAN
81.91 METERS
81.91 METERS
2
1.134 ACRES
57.55 METERS
3
1.151 ACRES
56.85 METERS
4
1.156 ACRES
57.15 METERS
LEGEND
INDUSTRIAL BLDG.
----AREA FOR EXPANSION

Prior to 1950 the Puerto-Rican Government had attempted to stimulate industrial development by setting up government-owned and government-operated plants in key industries - cement, glass containers, paperboard, structural clay products and shoes - both to meet war-time shortages and to induce private industry to follow suit; the latter however did not materialize and the government turned to a policy of inducements to private investors to set up industries in Puerto-Rico. To that end, a law exempting new industries from local taxation was passed in 1947 (Revisions 1948/54/59). A broad programme setting up industrial estates was begun in the early 1950s; simultaneously, an intensive promotional campaign was launched in the United States to attract new industry.

The industrial estates are intended to bring together complementary and auxiliary industries so as to develop small industrial complexes. The sites are fully improved and the buildings are designed to meet United States specifications. Sizes considerably larger than those of the factory sheds in the Indian industrial estate are usually constructed (see Figure 30.)* In all cases, enough land is provided to permit the size of the factory to be doubled.

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*Figure reference: William Bredo, op. cit. p.95.

Since the industrial estates are relatively small - most estates accommodate less than ten industries and only a few more than twenty sites - few common services and facilities are provided to the occupants.

Between 1950 and 1959, 564 new industrial plants were set up in Puerto-Rico. Most of them are branches of American companies or new enterprises financed and controlled by mainland investors; the majority of firms are in light manufacturing and ship the bulk of their goods to the United States. It is estimated that, from the commencement of the programme to the end of 1959, about 41,500 industrial jobs have been created in Puerto-Rico.

As mentioned above, other than the requisite site planning and utilities, no additional services and facilities are ordinarily offered either to the industrialist or the employee on the industrial estate. They do provide standard, ready-built factories for sale or lease. Three types of standard one-storey concrete buildings are provided: the 6,000 sq.ft., 11,500 sq.ft. and 23,000 sq.ft. buildings on lots large enough to permit doubling of the factory size.

IV. Summary

In summing up, the basic difference revealed by reviewing the experiences of Puerto-Rico and India is the result of the objectives and policies behind their industrial estate programme.

The basic objective in India is the promotion of local entrepreneurs by providing the industrialist, working on a small scale, with sufficient well-designed factory space, together with the necessary utilities and certain inter-related services, actually on the site, which would help to foster productivity and growth.

The development policy of Puerto-Rico is largely focussed on attracting industry from the United States by the use of tax differentials; exemption from most local taxes, corporate taxes and personal taxes, and low rates of taxation applying after expiration of the exemption period.

The results are that while Puerto-Rico's industrial estates are small (most estates have less than ten industries) their factories are larger in area. The typical Puerto-Rican factory has 11,500 sq.ft. which is more than the largest Indian standard unit, the double A, which has only 8,440 sq.ft. Also, Puerto-Rican estates do not provide the services that

the Indian estates incorporate. In view of the small number of enterprises located on any one estate it is not economically feasible to provide additional services on the site, as a general rule, moreover; since the island of Puerto-Rico is relatively small, approximately a hundred miles long, it is quite feasible to provide industrial advisory and training facilities directly from a central office located in San Juan. On the other hand, the Indian estates are large and complex because they are relied upon to provide conditions favouring the achievement and maintenance of a high level of productivity in their factories. The grouping of factories makes it possible to provide assistance and, in some cases, to exercise control with a view to improving productivity. To a large extent, the success of industrial estates in India results from the fact that they incorporate all or most of the facilities devised by the Government to promote and assist small industry. The estates centralize the requests for technical assistance, training, financing, machinery, supply of raw materials, import licences, aid in marketing and the like and channel them through facilities set up on the estates.

The general orientation of Puerto-Rico's industrial estate policy does not seem to be typical

of that likely to be adopted by most under-developed countries, which would rely principally on efforts to mobilize domestic resources and only accessorily on attracting capital and entrepreneurship from overseas. However, efforts are made by most developing countries to attract foreign industry. Puerto-Rico's experience suggests that achievement of that objective may be enhanced if inducements in the form of tax differentials, are properly adapted.

OUTLINE

PART TWO

5. General Observations

5. General Observations

It is evident from the foregoing observations of industrial estates that several basic propositions are revealed. These are:

1. The tract of land used for an estate must be subdivided and developed according to a comprehensive master plan. That the plan shall include detailed provision for streets, transportation, facilities, and services. That the land shall be protected by adequate controls, such as zoning, and/or private conditions incorporated in deeds of sale or leases. That provision is made for continuing management to safeguard the intentions and interests of the estate.
2. Objectives and policies of the sponsoring agency, to a great extent, determine the nature and type of estate established. The objectives are many. In England estates are used as a means to encourage employment in depressed areas; to counterbalance population movements; to disperse industry for strategic purposes; to implement general regional policies; and to provide an industrial nucleus for new towns. In under-developed countries the objectives are mainly economic. The industrial estate is used as a device to foster industrialization and urbanization; to encourage foreign investment; to develope technological, managemental and enterpreneurial skills; to encourage small

industries by means of nursery factories; and the provision of certain social and economic facilities such as schools, housing, hospitals, central marketing services and similar facilities.

3. Industrial estates are used, notably in North America, as a device to sell land. In some instances, estates are established to sell and promote some other service, such as rail and air freight. The motive is profit orientated.
4. Industrial estates are organized and developed at local levels, in North America, for the direct benefits they bring to the community in the form of employment, payrolls, trade, services and the increased tax base.

In general, industrial estates in the United Kingdom and North America differ in that British estates generally lease their properties in contrast with the sales motive in America. The English government has enacted legislation on numerous occasions to encourage the creation of new estates and the movement of industry into special developments (Special Areas, New Towns.) Primarily, the laws have sought in the United Kingdom, to distribute industry throughout the country, particularly into specific economically depressed areas.

Hence the differences which exist between

the British and American experience may be tabulated as follows:

1. The British Government owns and operated a majority of the industrial estates and has aided in their promotion through legislation. Whereas in America estates are generally a speculative venture.
2. British estates generally lease their properties and in cases industrial buildings, while most American estates are sold by the private developer.
3. The British estates, through legislation, assist and encourage small industry, (nursery factories), while few American estates provide similar encouragement.
4. The British complexes generally contain social centres, canteens, medical stations, adult education and industrial extension facilities and other services.
5. The British have designed some of their estates with the objective of providing employment opportunities for a specific labour pool.

OUTLINE

PART THREE

Planning an Industrial Estate

I. The Proposed Project

II. Site location

A. The Region

B. The City or Metropolitan Area

1. Population

2. Local Industry

3. Local Services

C. Selecting the Site

1. Industrial Zoning

2. Size of Site

3. Slope of Land and Soil

4. Economic Transport

5. Utility Installation Costs

6. Access to Residential Areas

III. Planning the layout of the Estate

A. Factors in Planning the Layout

B. Designing Property Improvements

1. Pattern and Dimensions of Blocks

2. Lot Coverage

3. Installation of Railroad Facilities

4. Streets and Sidewalks

5. Setbacks for buildings

6. Utilities

7. Landscaping

IV. Controls Imposed in Planned Industrial Estates

A. Control of Nuisance and Hazards

B. Use of land

C. Outdoor Storage

D. Lot Coverage

E. Setback for Buildings

F. Building Construction and Design

G. Sign Control

H. Off street Parking and Truck loading

I. Other provisions

Planning an Industrial Estate

One of the most important decisions to be made in developing an industrial estate concerns the acquisition of raw land which will ultimately comprise the physical subdivision of the industrial estate. The selection of the site will be approached differently depending on the viewpoint of the developer or Government concerned. In all cases, the formation of an industrial estate represents a large investment and a great deal is at stake - the financial success of the project and that of its industrial occupants; the safety of investments; and the prevention of wastage of economical resources.

I. The Proposed Project

The main features in planning the development of an industrial estate are: 1. location of the estate; 2. selection of industrial occupants; 3. general layout, facilities and services; 4. phasing of construction; 5. organizational arrangements for construction and long-term management; and 6. methods of financing and evaluation of the feasibility of the project.

Regardless of whether a proposed project is to be established by the government or by private

investors and developers, the project should be developed in an orderly way with thorough investigation and analysis to prevent loss through undertaking an unsound project. Therefore, a comprehensive, workable project proposal for the development of the industrial estate is essential; to demonstrate that the programme is feasibly; to provide a document by which private capital or governmental budget appropriations may be obtained.

The form of the survey varies greatly according to the type of area involved, the type of development proposed, the policy to be implemented and the nature of the sponsoring authority. Such surveys can be very extensive. In general terms the scope of such an investigation would cover some or all of the following features:-

1. An estimate of what the estate will cost, including fixed and operating costs, annual expenditures projected during the construction period, and thereafter.
2. Details of financing, including sources of financing, foreign exchange required, real estate revenues and service charges expected from occupants, long-term net revenue, and the net return on the investment anticipated for the

future.

3. A description of the site proposed, including financial, economic and other aspects. The description should include a tentative layout plan for each site including the probable location of streets, access roads, rail and utility easements, building lines, etc.
4. The kind of facilities and services proposed to be offered to industrial tenants: Will factories be provided? Will they be sold or rented? Or will only architectural and construction services be offered? Will special services be provided, such as canteens, postal service, banking and credit facilities, industrial advisory services, and so on?
5. Presentation of a long-term development plan, showing the phased development of the project. This should include a detailed plan for each construction period showing the land area to be improved, the various utilities to be installed, and the facilities to be constructed for the benefits of the occupants.
6. The proposed organizational structure of the sponsoring agency, and plan of how the estate is to be managed.

7. The method proposed for controlling the estate. Details should be specific on existing and proposed zoning restrictions to be included in the covenants and on proposed ways of dealing with problems of annexation, if the estate is located outside city limits and annexation is considered necessary.
8. The methods proposed for selecting and attracting industry to the estate.
9. The features of the plan which should make it beneficial and acceptable to the community.
10. Finally, accompanying the comprehensive plan, a detailed report on alternative sites, and why the proposed site is preferred.*/

II. Site Location

As seen, the preparation required for the establishment procedure for an industrial estate is complex, irrespective of the viewpoint of the sponsoring agency - private developers of governmental bodies.

The steps in locating an industrial estate are the selection of: 1. the region, 2. the city or metropolitan area, and 3. the site itself.

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*William Bredo, op. cit. pp.64-65.

/See also: Murray D. Bryce, Industrial Development, A Guide for Accelerating Economic Growth. McGraw-Hill New York, 1960. Chapter 8, Analysing the Economic Feasibility of a Project and Ch.15 Presenting Projects for Financing.

A. The Region

The influences which determine the most suitable region is a complex problem dependent on the viewpoint of the sponsoring agency. Governmental sponsorship may be implemented to 1. create employment in new areas, 2. bring employment to designated or depressed areas, 3. develop a comprehensive industrial expansion programme, 4. decentralize for defensive purposes and/or alleviating metropolitan growth, and control population movements, and 5. attracting industry to increase municipal tax base.

Private sponsors or developers, on the other hand, promote industrial estates as a speculative venture and tend to operate within a regional area at a local level.

B. Selecting City or Metropolitan Area

Once the selection of the regional area has been established, the following basic information should be considered for determining the selection of the city or Metropolitan area:-

1. Population

Information should be obtained regarding the size and nature of the population of the City

or near-by town. The information should include a statistical break-down, i.e. population growth and district growth over the years and estimated future growth; age and sex groupings; income distribution, etc. In fact a comprehensive population report for determining the population of the community's working force and the divisions of this group into industrial workers, skilled and semi-skilled; clerical and other commercial employees; and professional and executive groups.

Labour in general may be considered under the heading of population or as a special factor. Some of the factors which may determine the location of factories and hence the location of the industrial estate are:

1. Wage rates and labour costs effected by supply and demand, quality of labour, living costs, and living conditions. These influences vary at different locations and affect the total cost of labour.
2. Travel area from which the workers are or could be drawn, the distance and the means of transport.
3. Availability of labour training facilities; if a site is so located as to be unable to conveniently attract the proper type of labour, a manufacturer is generally forced to spend a considerable amount

of time and money in training workers.

4. Character of labour (rural or urban). Wages in large cities are higher for the same class of labour than in smaller communities because the urban cost of living is higher and more competitive.
5. Names of unions presently in the area. A brief history of labour-union-management dealings for the past few years should be investigated.
6. Prevailing wage rates for various job classifications with comparison to national average, regional averages, metropolitan averages and finally the local community.

2. Local Industry

Data should be obtained concerning the characteristics of the region's local industries. In this way, the developer can ascertain the probable type of companies which might locate within the estate. A close look should also be given to firms already located in the metropolitan area especially those industries located in blighted or cramped quarters without the necessary space for expansion. In addition sales outlets should be tabulated outlining potential manufacturing concerns which may, for marketing reasons, wish to locate distributive and warehousing

facilities within the area.

3. Local Services

The developer of an industrial estate should determine in advance of land acquisition the availability of industrial services in the proposed area. Investigation into the following services should be considered: sewage disposal facilities; water; electrical energy; gas; and capital. (The question of local capital becomes very important if the developer is dependent upon local sources to finance property improvements and to carry mortgage loans for his industrial tenants.) Preliminary negotiations should be carried out with local authorities to determine the extent the above services will be provided by the community. Also, fire and police protection should be considered in conjunction with municipal services.

The above factors are some of the general, basic points which should be considered, to help in selecting the city or area, when deciding upon the location of an industrial estate. The location factors are similar to those which govern industrial location as a whole. Appendix No.3 outlines a "Community Information Questionnaire" adopted by the Edmont

Manufacturing Company,* which may serve as a useful guide when considering the location of industrial estates.

C. Selecting the Site

The final step in the location problem is to select the specific site for the industrial estate and some of the following aspects should be taken into consideration.

1. Industrial Zoning: Preferably, the land is already zoned for the anticipated types of industrial activities. The developer should be certain that he legally can develop the site as an estate.
2. Size of the Site: The property should be large enough to permit the construction and eventual expansion of several one-storey industrial plants and their parking lots.
3. Slope of Land and Soil: The subsoil should be capable of supporting the buildings and equipment of the contemplated industrial clients, and the area reasonably level and free from floor and landslide dangers.
4. Economic Transport: The property should be reasonably close to rail lines and also near traffic activities, and if the probable occupants will be using waterways

*A Case Study in Plant Location, by Dr. Karl G. Rahdert, in 'Location Factors' October, 1957.

See also: Planning Surveys, Ontario Department of Municipal Affairs, Community Planning Branch, June 1960.

and air transportation, the land should be well situated in relation to these facilities.

5. Utility Installation Costs: The site should be near enough adequate, existing utilities for their economical extension into the district.
6. Access to Residential Areas: The site should be near both residential areas and existing industry.

1. Industrial Zoning

As stated above, it will be necessary first to determine that the site in question is already zoned for industrial use or will be so zoned. Hence, the creation of a planned industrial estate requires cooperation between the developer and the local zoning authorities to ensure from the outset that the land can be used only for the purposes of an estate and that non-conforming uses are prohibited* except those which may directly support industrial activity, such as warehousing and storage facilities.

2. Size of the Site

The size of an area which will comprise

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*Urban Land Institute Technical Bulletin No.10 "The Prohibition of Residential Development in Industrial Districts", Washington, D.C., November 1948.

TABLE No. 10

DISTRICT SIZE CATEGORIES

Size Category (in acres)	Number of Districts	Per Cent of Total
5-49 acres	36	13.2
50-99	56	20.6
100-199	67	24.6
200-499	62	22.8
500-999	25	9.2
1,000-2,499	17	6.3
2,500-4,999	5	1.8
5,000-9,999	3	1.1
10,000-25,126	1	0.4
TOTAL	272	100.0%

Source:. Robert E. Boley. INDUSTRIAL DISTRICTS RESTUDIED (Washington Urban Land Institute. Technical Bulletin No. 41. April, 1961) p.37.

TABLE No. 11

INDUSTRIAL DISTRICTS BY SPONSOR AND SIZE CATEGORIES

District Sponsors	5-49 Acres No.of Dists.	50-99 Acres No.of Dists.	100-199 Acres No.of Dists.	200-499 Acres No.of Dists.	500-999 Acres No.of Dists.	100-2499 Acres No.of Dists.	2500-4999 Acres No.of Dists	5000-9999 Acres No.of Dists.	10000-25126 Acres No.of Dists	Totals
Private Real Estate Developers	16	17	25	12	9	6	2	1	0	88
Railroads	2	20	24	27	5	3	0	1	0	82
Private Local Community Groups	10	9	10	13	2	3	1	0	0	48
Government Sponsored Groups	5	6	4	6	3	3	1	1	1	30
Local Government	(1)	(4)	(2)	(5)	(2)	(3)	(0)	(0)	(0)	(17)
Federal, State (incl.Redev. Auth.) and Terr. Gov't.	(4)	(2)	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(8)
Port Authority	(0)	(0)	(0)	(1)	(1)	(0)	(1)	(1)	(1)	(5)
Joint Gov't.-Private-Local Community Groups	1	4	3	2	4	2	0	0	0	16
Other (Univ.,Util.Co.,etc.)	2	0	1	2	2	0	1	0	0	8
TOTALS:										
Number of Districts	36	56	67	62	25	17	5	3	1	272
Per Cent of Total	13.2	20.6	24.6	22.8	9.2	6.3	1.8	1.1	0.4	100.0

Source: Robert E. Boley. INDUSTRIAL DISTRICTS RESTUDIED (Washington Urban Land Institute. Technical Bulletin #41 April, 1961.) p.38.

a planned industrial estate depends upon the ease and the cost of assembling a multi-acre, contiguous front of land. The anticipated site and building requirements of the probable clients, the resulting design of the estate, the restrictive controls established by the sponsor all affect the amount of land that will be needed. It should be noted that for a well designed and planned estate, the developer should acquire a minimum of 100 acres. See Tables Nos.10 11 and 1.

In considering initial outlays, the existing use of the land affects the property's acquisition cost. Many private developers initially purchase farms in outlying regions close to metropolitan areas. They are also on the look out for airport sites, that is, private flying clubs rapidly engulfed by suburban sprawl, golf courses which the community, because of rising taxes, can no longer support, and World War II facilities.

The site should be large enough to achieve economies of scale for provision of utilities, building facilities and services; but not so large as to result in chaotic traffic jams and diseconomies due to size.

The lot size, also, needs a basic decision, when considering the tract of land, to

TABLE No. 12

EMPLOYEE DENSITY PER ACRE IN SELECTED UNITED STATES PLANTS

Employees per Acre Major Shift	No. of Plants	Percent of Total Plants
Under 5	41	18.6
5-9	25	11.4
10-14	29	13.2
15-24	35	15.9
25-49	32	14.5
50-74	26	11.8
75-99	16	7.3
100 or more	16	7.3
	220	100.0

Source: Dorothy A. Muncy. SPACE FOR INDUSTRY - AN ANALYSIS OF SITE AND LOCATION REQUIREMENTS (Washington Urban Land Institute. Technical Bulletin No.23 July 1954), p.12.

TABLE No. 13

EMPLOYEE DENSITIES IN INDUSTRIAL DISTRICTS

Number of Employees Per Net Site Acre(1)	Number of District Establishments in Different Density Groups			% of Total in Density Group
	Mfg.	Nonmfg.	Total	
0.1-9	202	232	434	37.2
10-19	122	199	321	27.6
20-29	78	93	171	14.6
30-39	39	56	95	8.2
40-49	27	24	51	4.4
50-59	11	16	27	2.3
60-69	10	9	19	1.6
70-79	6	7	13	1.1
80-89	2	4	6	0.5
90-99	0	3	3	0.2
100-199	12	12	24	2.1
200-647	2	1	3	0.2
TOTALS	511	656	1,167	100.0%

(1) Net site acres include only that land purchased or leased by district occupants.

Source: Robert E. Boley. INDUSTRIAL DISTRICTS RESTUDIED (Washington Urban Land Institute. Technical Bulletin No.41 April 1961) p.47.

TABLE NO. 14

AVERAGE NUMBER OF EMPLOYEES PER NET SITE ACRE IN INDUSTRIAL DISTRICTS

Sponsoring Groups	Employees Per Net Site Acre(1)		
	Mfg.	Nonmfg.	All
Private Real Estate Developers	13.5	14.9	14.1
Railroads	8.4	12.2	9.1
Private Local Community Groups	9.8	10.0	10.0
Government Sponsored Groups	7.3*	5.3*	6.7x
Local Government	(15.2)	(2.7)*	(8.2)*
Fed., State (incl Redev. Auth.) and Terr. Gov't.	(20.2)	(154.5)	(30.9)
Port Authority	(2.9)*	(3.1)	(3.0)*
Joint Gov't-Private Local Community Groups	13.4	6.5	11.8
Other (Univ., Until. Co., etc.)	18.9	6.1	11.7
OVER-ALL AVERAGES	8.3	9.4	8.5

(1) Net site acres include only that land purchased or leased by district occupants.

* To avoid distortion, one extremely large and atypical example was omitted in computing average site densities.

x To avoid distortion, two extremely large and atypical examples were omitted in computing average site densities.

Source: Robert E. Boley. INDUSTRIAL DISTRICTS RESTUDIED (Washington Urban Land Institute. Technical Bulletin No.41 April 1961) p.48.

determine a proper plant size to lot size ratio to prevent overcrowding and creating an industrial slum. Furthermore, adequate provision for future tenant expansion should be taken into consideration without undue overcrowding. In some cases, estates provide sufficient expansion land behind the factory, to allow doubling of the factory area.

Tables 12, 13, 14 and 2 outline employee densities per acre in various estates in the United States, and Great Britain. Some guide is needed when industrial estates are provided for a certain amount of employment which raises the problem of translating number of employees into land requirements. On the other hand, given a certain size of land how many employees or employment will a particular size of land provide for or accomodate. This information is also needed when it is necessary to translate employment into housing requirements such as an integrally planned housing estate.

3. Slope of the Land and Soil

Another feature in site selection is that the land be reasonably level and free from floods and landslides, and be able to be properly drained without heavy drainage investments. It is recommended

that the slope should be less than 10%.*

The subsoil of the land should be tested for the nature and composition of the materials, the bearing capacity of the soil, the water table, for existing sub-structures, etc., all to determine whether or not the land is capable of supporting the buildings and the equipment expected to be used within the industrial estate.

The surest way of determining the types of buildings and foundations that can be erected on a site is by the use of boreholes and trial pits; undisturbed samples are taken of cohesive soils such as clays and silts, and penetration of load tests can be made on non-cohesive soils - sands and gravels. The extent of the investigation will depend largely on what is already known about the site from local sources and the examination of nearby buildings. Local geological surveys can usually indicate the nature of underlying strata: if these are strong enough, it will only be necessary to carry boreholes into a recognizable stratum.

These investigations are usually carried out by specialist firms and should be employed very early in the process to justify whether or not the

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*Theodore K. Pasma, Organized Industrial Districts, Area Development Division, United States Department of Commerce (Washington: Government Printing Office 1954) p.43

intended site can economically support buildings without elaborate piling and expansive backfilling.*

4. Economic Transport

A planned industrial estate should be located as near as possible to main thoroughfares because of the importance of vehicular transport today. Industrial estates are no longer solely committed upon rail transportation. However, if rail facilities are required for anticipated plant owners, the estate should be located within a mile or so of a railroad in order to permit economic extension of tracks into the subdivisions. A developer anticipating heavy rail usage must choose a site near a well-travelled rail line within the switching limits, that is, the area where the spotting of freight cars is done by the railroad.

As mentioned above, vehicular transport is probably a more important factor in locating an industrial estate today than railway facilities, both from the viewpoint of raw materials - commodity movement and employee transportation. The nearness of traffic arteries becomes an important consideration in choosing

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*Planning Surveys, Ontario Dept. of Municipal Affairs, op. cit. and PENMAN, A.D.M., Sites and Foundations, Factory Building Studies No.5. Department of Scientific and Industrial Research, Building Research Station, London. H.M.S.O. 1960.

a site for the estate, since, in North America, the majority of industrial employees use motor cars as transport to reach their work. Therefore, the property should be readily accessible for truck and automobile traffic, and the pattern of traffic arteries in relation to the downtown area, residential developments, and the major highways from surrounding suburban communities must be examined.

5. Utility Installation Costs

Utility lines - water, electricity, gas and sewage disposal - should be considered in respect to closeness and adequacy since extention costs and related difficulties can be held to a minimum when lines are near property.

Many combinations of arrangements exist and vary with the situation. In some instances, utility companies have, at their own expense, extended lines to individual plants. The sponsors or developers of other industrial estates have initially paid for the extention of services and costs are gradually refunded in varying amounts, by the utility firms, depending upon consumption within the industrial estate. Other times the developers themselves bear such costs.

6. Access to Residential Areas

An ideal industrial estate should be near homes suitable for all classifications of employees. Many sponsors try to find sites as close to homes and good schools for executives and supervisory personnel so as to shorten their travel time to work. Ease of travel, attractive homes and school facilities are essential features for attracting executives, which the prospective plant owners will require for operating and maintaining their plants within the estate.

Therefore the developer must decide how far he can locate his estate from residential properties since the acquisition of rural farmlands becomes infinitely easier and a lot cheaper than the assembly of vacant urban properties. Adequate transportation is essential for shortening the travel time required to go to and from work, since the distance which a worker will travel to work varies, average travel time is an important factor in site location. This in turn is dependent upon public transport facilities, physical street conditions, traffic densities and the availability of work. Most people today will travel at least thirty minutes to reach

their jobs.*

III. Planning the Layout of the Estate

The developer, before preparing the layout of his subdivisions, should gather as much information as possible about the needs and activities of his probable clients. Once the basic requirements are established he may then proceed to design the property improvements needed to establish the industrial estate.

Appendix No.4 illustrates the type of questionnaire a development corporation may provide to prospective firms, wishing to locate within an estate, to determine usage requirements. (Site Requirement Guide by Trinidad and Tobago Industrial Development Corporation.)

A. Factors in Planning the Layout

The following check list by T.K. Pasma/ illustrates the points which should be considered:-

1. The plans for streets, trackage and utility easements should aim to minimize development costs

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*C.W. Hackett, An Analysis of Planned Industrial Districts 1956, p.17. See also Francis Bello, The City and the Car, Chapter II, "The Exploding Metropolis", Doubleday, New York, 1958.

/op. cit.

and obtain maximum efficiency of operation.

2. The layout plans should seek to minimuxe the length of tracks, length of utility lines, quantity of earth moved, and the area in streets, but with provision that street widths be adequate for moving the anticipated traffic flow efficiently through the estate.
3. The street pattern should be such that block lengths and lot depths are adequate but not excessive in keeping with the needs of prospective clients.
4. Preferably, drainage runs should coincide with the major streets.
5. Acute angles should be avoided at important intersections.
6. Streets and trackage should be laid out on contours so that parked trucks and spotted freight cars can stand on level ground.
7. The layout should permit free flow of truck traffic without interference from rail freight switching.
8. Rail curvatures should be kept at a minimum. Rail lead tracks should be sited so as to cross a minimum number of streets and reach a maximum number of sites.
9. Street intersections should be laid out so that the long dimension of buildings is not exposed to

the mid-afternoon glare of the sun and so that the best building fronts will face the streets.

10. Layout plans should show building set-back lines in accordance with approved restrictions or existing zoning ordinances.
11. Thelayout shouldkeep to a minimum the number of odd-shaped lots which cannot be sold or rented.
12. The tract layout should permit prospective tenants a choice of size, shape and type of site to meet their specific requirements.
13. The layout should permit development and construction in progressive stages, keeping in mind future needs and expansion but recognizing that the immediate demand for sites may not fill the industrial estate.
14. The layout should be flexible so that perhaps warehousing and possibly wholesaling can be attracted to the industrial estate in order to provide improved services for the manufacturing tenants.
15. A certain amount of zoning may be desirable on the estate itself to provide some segregation of different types of industry, especially where nuisances and hazards may be involved.

B. <u>Designing Property Improvements</u>

By definition, a planned industrial

estate is improved property, that is, industrially zoned land which is subdivided and developed according to a comprehensive plan. The physical improvements of the industrial estate include grading and levelling, construction of roads and streets, allowing for, or installing, railway facilities, utilities and landscaping.

The following physical aspects of designing the estate will be considered in detail, as they are some of the major improvements necessary in establishing an industrial estate.*

1. Pattern and dimensions of blocks and size lots.
2. Coverage of the lot.
3. Installation of railroad facilities.
4. Streets and sidewalks.
5. Setbacks for buildings.
6. Utilities.
7. Landscaping.

1. Pattern and Dimension of Blocks

Since industrial estate occupants vary from warehousing and distributive operations to manufacturing industries, all requiring a variety of site sizes, block planning is therefore considered more flexible than lot plotting, in laying out an

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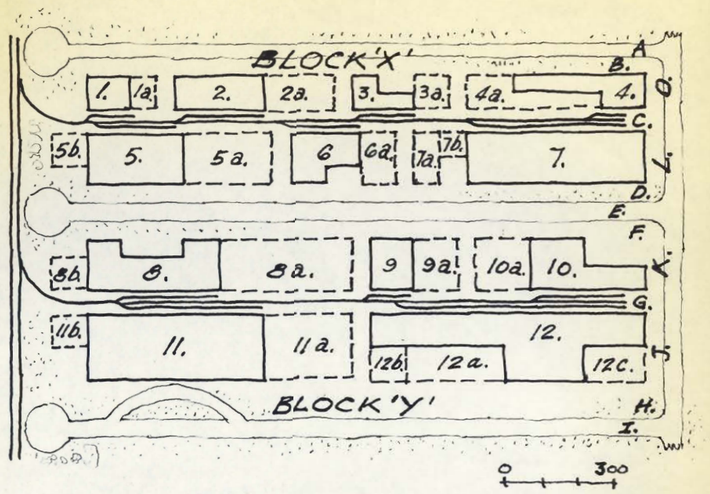
*References:-

Forth, M.L. and McKeever, J.R., Planned Industrial Districts, their Organization and Development. Urban Land Institute, Technical Bulletin No.19, Washington D.C., Oct.1952.

Muncy, D.A. Space for Industry: An Analysis of Site and Location Requirements. Urban Land Institute, Technical Bulletin No.23, Washington D.C., July 1954.

Boley, R.E., Industrial Districts Restudied: An Analysis of Characteristics. Urban Land Institute, Technical Bulletin No.41, Washington D.C., April 1961.

FIGURE No. 31



KEY TO ROAD WIDTHS, RAIL EASEMENTS, SETBACKS, LOT DEPTHS.

A. 40-foot road with cul-de-sac
B. 50-foot building setback requirement
C. 53-foot rail easement
D. 50-foot building setback requirement
E. 50-foot road with cul-de-sac
F. 50-foot building setback requirement
G. 53-foot rail easement
H. 100-foot building setback requirement
I. 50-foot road with cul-de-sac
J. 300-foot lot depth
K. 200-foot lot depth
L. 200-foot lot depth
O. 150-foot lot depth

KEY TO PLANT SIZE, PARKING, LOADING DOCKS.

1. Plant: 12,500 sq.ft.	1a. Parking: 24 cars
2. Plant: 25,000 sq.ft.	2a. Parking: 64 cars
3. Plant: 12,500 sq.ft.	3a. Parking: 32 cars
4. Plant: 25,000 sq.ft.	4a. Parking: 80 cars
5. Plant: 41,250 sq.ft.	5a. Parking: 120 cars
	5b. Loading dock and apron: 7 tractor-trailers
6. Plant: 25,000 sq.ft.	6a. Parking: 48 cars
7. Plant: 75,000 sq.ft.	7a. Parking: 36 cars
	7b. Truck Docks
8. Plant: 47,500 sq.ft.	8a. Parking: 180 cars
	8b. Truck Docks
9. Plant: 18,750 sq.ft.	9a. Parking: 60 cars
10. Plant: 35,625 sq.ft.	10a. Parking: 72 cars

continued.....

.....continued

11. Plant: 100,000 sq.ft. (warehouse)	11a. Parking: 160 cars 11b. Truck docks and apron 11c. Customer parking
12. Plant: 100,000 sq.ft.	12a. Parking: 88 cars 12b. Truck docks and apron 12c. Parking: 56 cars

BLOCK SIZES

Block 'X' (1,800 ft. by 475 ft.)
Block 'Y' (1,800 ft. by 625 ft.)

A hypothetical layout illustrating the various possibilities in building size in relation to lot depths; space requirements for off-street employee parking and truck loading docks; and building setbacks in accordance with approved restrictions or zoning ordinances.*

* Source: AREA DEVELOPMENT BULLETIN, June-July, 1957, Office of Area Development, U.S. Department of Commerce.

industrial estate. A block pattern is used to divide the estate to provide the best arrangement of facilities and improvements to obtain maximum accessibility and to allow for flexibility in lot improvement in meeting the requirements of prospective occupants.

Access streets in industrial estates are frequently spaced at irregular intervals (See Figure 31) to provide a choice of depths. This arrangement creates a variety of major block sizes and alternative site areas and frontage distances. With rail right of way in the rear and a street in the front, one lot dimensions is firmly established. By eliminating lot planning, the other dimension (lot width) can be established to the purchaser's exact requirement. This arrangement also allows for one set of street and utility improvement to serve properties (of different site depths) on both sides of the street.

There may be a wide variation in block depths, usually the short axis ranges from 25 to 60 percent of the long axis. Some authorities feel that depths of 200 to 500 feet in a planned estate are most desirable.

Development costs usually run in proportion to property depths - the shallower the site,

the greater the loss of gross area to street and rail rights-of-way (and utility easements), and the higher the cost of development. The estate, therefore, should be designed with a view to minimizing the development costs and maximizing the estate's operating efficiency. Toward this end, an estate layout plan should, to the extent possible, keep street areas, utility extensions and length of rail leads to a minimum, without affecting efficiency.*

As mentioned, flexibility is the keynote, when planning the layout. Land absorption in industrial estates is slow and apt to be erratic (one new plant every two years)✓ to prevent scattering and to prevent tremendous initial development costs, the process of <u>phasing a development</u> may be used to provide the flexibility needed in both the physical and financial sense. The layout should be designed in such a manner that utility extension, street construction, site improvements, etc. can be carried on in progressive stages on "installments".

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*Urban Land Institute, Technical Bulletin No.44 - op. cit.

✓The Do's and Dont's of Industrial Promotion, by Ontario Industrial Development Council, Financial Post, February 28, 1959.

When dividing up the blocks a rectangular shape is considered the most desirable. Angenot recommends that if one side of a rectangular lot is size A then the other dimensions should not exceed 2A*. The rectangular shape in these proportions is considered to be best for small lots, say, those ranging between 5,000 and 10,000 square feet.

2. Lot Coverage

The proportion of the lot covered by factory floor space is usually determined by the controls imposed in planned industrial estates. In the United States buildings are usually restricted to a maximum of 50% coverage. Adequate space is needed to allow for on-site parking, truck manoeuvering and loading, outside storage (if allowed) etc. Lot coverage control guards against overcrowding and determines, to a certain extent, the compatability within an estate. Lot coverage will be reviewed below as a feature of nuisance control.

3. Installation of Railroad Facilities

Earlier industrial estates were initially

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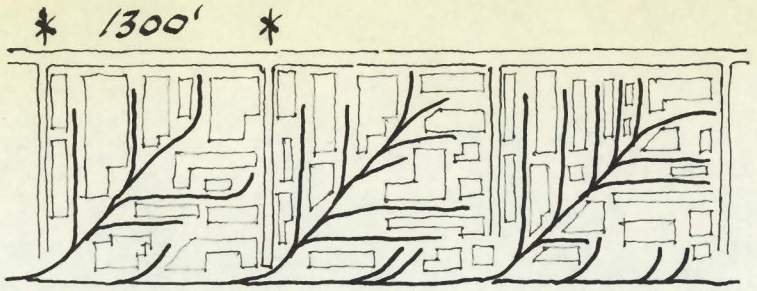
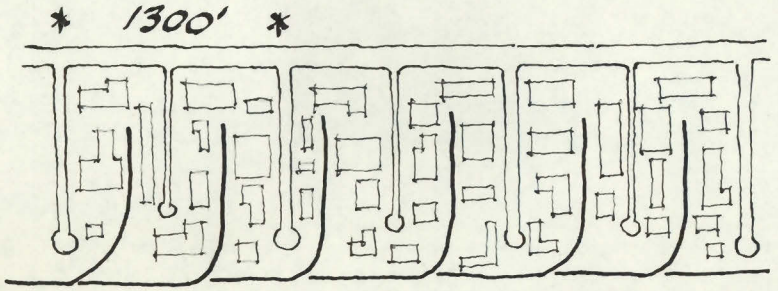
*L.H.J. Angenot, Town and Country Planning and Industry, (Amsterdam: International Congress for Housing and Town Planning, 1950) p.31



a.

Figure 32-a

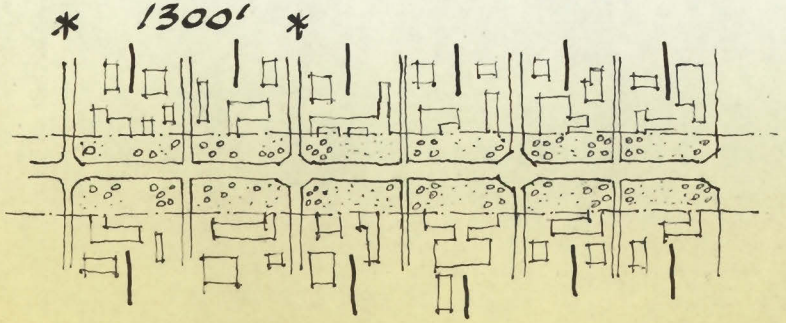
Rail-dominated estate, such as early Central Manufacturing District, Chicago, has large plants, high densities, frequently uses more than one spur track per plant and makes relatively little provision for trucking as part of the industrial process.



b.

Figure 32-b

Balanced transportation is provided in preactically all new estates. Plants in general cover less area and use both trucks and railway cars. Flow is not always from railway to truck but may be reversed or mixed.

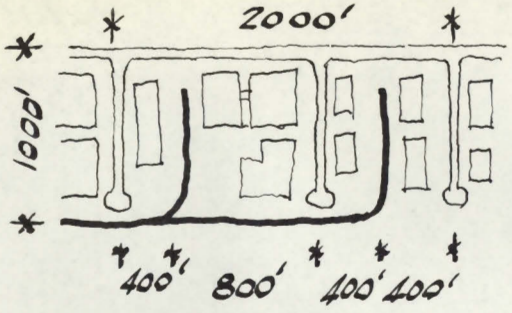


c.

Figure 32-c

Road transport-dominated estate, has some industries which do not rely on railways. Employees' parking is the dominant factor, although truck and rail transport are provided to some plants.

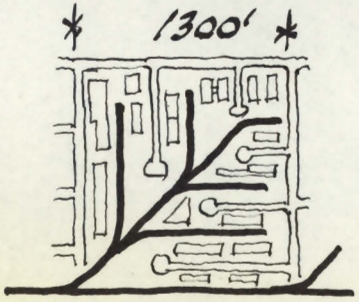
FIGURE NO. 32



a.

Figure 33-a

Interlaced facilities, railway and road transportation systems avoid crossings. Rail leads can be located off centre to give a variation in depth of lots which may be desired by purchasers.



b.

Figure 33-b

Diagonal rail lead interlaced with roads offers greater choice of lot shapes and sizes. This system has the advantage of requiring less space for rail tracks to become parallel to buildings.

SOURCE: Figures 32 and 33
"The Planned Industrial District", Architectural Forum, April, 1954.

FIGURE No. 33

laid out by the engineering departments of railway companies. Consequently, major attention was given to installing adequate rail leads and making rail service available to each individual site. Although it is no longer considered absolutely necessary that every site be rail-served, the provision for rail service within an estate is still a salient planning consideration. (See Figures 32 and 33.)

Without becoming too technically involved in standards pertaining to curvatures, minimum gradients, etc., which are usually prescribed in by-laws and performance standards of the various railway companies and interested authorities, some general aspects of layout and rights-of-way shall be considered.

Minimum easement (in the U.S.A.) of 17 feet is required for a straight section of track and 20 feet for curves. The minimum width for two tracks is 33 feet. Total space for the lead track and two industrial spurs, one each side of the lead track, varies from 50 feet to 60 feet, depending on whether the utilities are placed beside the track (if allowed by the utility companies).

Spur tracks, in some estates are

Note: A railroad lead track is the track which extends from the carrier's main line or siding through the industrial estate. Spur tracks are those which extend from the lead track to serve individual industrial occupants.

depressed 3½ feet below the building grade to bring the level of the freight-car doors flush with the building floor, or receiving dock. If the spur tracks are depressed it usually requires the construction of retaining walls.

Rail leads usually run along the rear of each plot to eliminate unsightly tracks along street frontages and to avoid traffic congestion. The spur track usually takes off from the lead track at the rear of an adjoining site, so that the spur can enter a plant area parallel with the main lead.

4. Streets and Sidewalks

Once a flexible layout plan has been established consideration must be given to design details for streets. These include: storm drainage, street grades, width of pavements and right-of-way, paving material specifications, curb and sidewalk installation (if required), location of utility easements, etc. Streets should not be used for parking or loading. Adequate space for parking, dock space and truck manoeuvering should be provided on individual plant sites.

Rights-of-way for major streets vary from 80 to 100 feet in width, and those for secondary

streets average about 60 feet. A 60-foot street with paving 40 feet wide is considered adequate for lightly travelled access roads. Major access roads probably should have 80 to 100 foot rights-of-way.

Since trucks operating within an estate are as heavy as those travelling upon highways, an estate's streets should be constructed according to highway specifications. This includes the provision of concrete curbing on all streets, or at least on major access streets. Sidewalks are not considered necessary except in areas of heavy snow or rain or in countries where the majority of employees walk or cycle to work in which case foot and cycle paths are required.

Utilities are most commonly located in easements within either the rail or streets right-of-ways and should be installed before streets are paved in order to minimize the need for tearing up paving.

Streets within an estate may be owned by the developer, who at a later date, if he so chooses, may dedicate the streets to the community. The advantages of owning the streets is that this allows the developer, in the initial stages of development, to repair, change, alter or enlarge both the streets and the utilities beneath them without obtaining a city permit for such work. Also, ownership can limit traffic to those vehicles that belong

to the estate. It is advisable that streets in an industrial estate carry only that traffic which is connected with the operations of the estate tenants. Care should be taken to prevent the creation of a street that will ultimately become a short-cut or a major arterial road for non-estate traffic through the development.

The disadvantage of private ownership of streets is that the developer must repair and maintain. Therefore, a developer may to his advantage dedicate the streets to the city or community after the estate is partially or completely developed.

5. Setbacks for Buildings

Setbacks and space for landscaping, that is buffering facilities, are distinguishing features of modern industrial estates. Building setbacks or building lines, as in the case of lot coverage, is usually determined in covenants or other forms of control.

In the United States, building setbacks from main streets vary up to 120 feet, with 50 to 100 feet being the most common; from secondary streets setbacks vary up to 70 feet, with 25 to 50 feet most common.

Loading docks are so placed that all loading and unloading is at the sides and rear of buildings. Where shipping and receiving docks are

permitted or the street side of a building a set back is usually required of sufficient size to allow loading and unloading from trucks without interfering with street traffic.

6. Utilities

The utilities serving an estate are placed either within street or rail right-of-way or both. Where possible, telephone lines and power lines are frequently brought to the rear of plant sites from easements in rail rights-of-way, thereby eliminating poles and wires along street frontages.

When water and sewer lines are located in the planting strip of the street rights-of-way, the standard practice has been to place water and gas lines on one side of the street with sanitary and storm sewers on the opposite side.

Facilities and utilities within an estate are installed to handle maximum capacities, since developers and utility companies are unable to foresee total utility needs in a given portion of a district at the time of improvement. Consequently the cost of such extensions is comparatively high and developers strive to keep utility lines to a minimum length and place them so that service is available to buildings on both sides of extended lines.

7. Landscaping

The planning layout of an industrial estate should include a basic landscaping scheme for the entire development. This will help assure the tenants a well designed setting and environment for their plants. In addition to aesthetics, landscaping services various practical functions such as preventing erosion and reducing runoff, screening storage yards and parking lots from view, controlling wind, shade and controlling sound.

Ground maintenance is usually spelled out in restrictive covenants, deed restrictions or lease agreements. Usually, developers required the tenant to maintain his site in a satisfactory manner. Some estates provide a ground maintenance service, i.e., snow removal and pass the cost on to the tenant at an agreed rate.

IV. Controls imposed in Planned Industrial Estates

The restrictive character of the industrial estates distinguishes them from other types of industrial developments. Local zoning by-laws usually only regulate the type of land use and some developers feel that zoning by-laws are inadequate in protecting future land uses within their area. Consequently, most developers go a step beyond local zoning by-laws and impose other restrictions

or limitations which they feel will enhance the estate and protect the compatability of their tenants, as well as their investment. This they achieve by their sales policies, by blanket protective covenants against the land (applying to the entire development or a specified portion) or by restrictions included in individual deeds or lease agreements, developers offer individual occupants of a planned estate the advantage of protection against nuisance created by undesirable neighbours.

In addition to legal zoning of the site as a whole for industrial purposes, the developers may divide the estate into different zones, such as industries with similar space requirements, industries with special requirements, non-industrial facilities, utility plants, and certain special facilities.

The National Industrial Zoning Committee of the United States, comprising nationwide organizations concerned with zoning problems, has prepared the following principles*:-

1. Zoning controls are basic tools in reserving space for industry, guiding industrial location into a

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*National Industrial Zoning Committee PRINCIPLES OF INDUSTRIAL ZONING. (Columbus, Ohio. 1951).

See also: "Planned Industrial District Zoning" Planning Advisory Service, American Society of Planning Officials, Information Report No. 120, March 1959.

desirable pattern, and providing the related facilities and services needed for a convenient and balanced economy.

2. Industrial use is a legitimate land use and is entitled to protection against encroachment.

3. Proper zoning can make good neighbours of industrial and residential areas.

4. Industry will continue to grow and most industries will require larger areas in the future.

5. There is a need for a reclassification of industry based on modern manufacturing processes and plant construction policy so as to determine the desirability for inclusion in a given area.

6. Industrial potentialities of lands favourably located to transportation should be recognized in the zoning process.

7. Industrial zoning and highway planning should go hand in hand.

8. Special consideration should be given to street layout in industrial areas.

9. Zoning ordinances should be permissive rather than prohibitive.

10. A good zoning ordinance should give a landowner a clear concept of what he can do with his land.

11. Industrial zoning is most effective if applied on a metropolitan basis.

A. Control of Nuisance and Hazards

The trends in local zoning ordinances and private protective covenants for industrial areas has been toward replacing outmoded listings of prohibited uses (based solely on the type of product manufactured) with specific performance standards based on measurable external nuisances. Thus, the approach is permissive rather than restrictive in that all industries that can operate within the prescribed standards are permitted in the district, whereas, the old approach prohibited various operations by name, which may have long since adopted improved technological methods and made their activities completely inoffensive and compatible with other "clean" industries.*

Appraisal of the following characteristics has been suggested for evaluating performance:-

Noise	Fire hazards
Smoke	Industrial wastes
Odor	Aesthetics
Dust and dirt	Psychological effects
Noxious gases	Transportation and traffic
Glare and heat	

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*Performance Standard Zoning - Practical Considerations. Urban Land Institute, June 1960.

See also: O'Hannor, Denise, Performance Standards in Industrial Zoning, National Industrial Zoning Committee, Columbus, Ohio.

B. Use of Land

Use of land covenants in all industrial estates prohibit residential uses, although quarters for watchmen and caretakers may be permitted.*

In some estates where developers adhere strictly to the policy of admitting only industrial establishments, there must be reliances on outside business concerns for services such as restaurants and other service facilities.

Some developers of large estates have incorporated into their land use plan provision for such facilities as banks, executive and employees clubs, medical facilities and gas stations.

C. Outdoor Storage

Adequate provision for outdoor storage of materials and equipment are embodied in covenants, leases and purchase agreements. Such storage is usually stipulated to be enclosed or screened by a wall, planting or other suitable barrier. Where unenclosed storage is permitted, limitations are imposed on the location, appearance and amount of such property use.

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*Mott, S.H. and Wehrly, M.S. The Prohibition of Residential Development in Industrial Districts, Urban Land Institute, Technical Bulletin No.10, Washington, D.C. Nov. 1948.

D. Lot Coverage

As described above, lot coverage control guards against overcrowding and determines to a certain extent the compatability within an estate. Covenants contain provisions specifying the maximum per cent of the total area of an individual site that may be covered by structures, ranging from 25 to 50%. This allows for ample reserve space to accommodate increased on-site parking demands, and to preserve a spacious and attractive setting within the development.

E. Setbacks for Buildings

The provision for adequate setbacks, as stated in covenants, achieves the following objectives:-

1) Provides ample area for attractive landscaping.
2) Provides space for off-street parking and loading. (Most estates permit only guest parking in front of buildings, with employee parking and truck loading relegated to side or rear yard areas.)
3) Permits easier building identification.
4) Encourages better traffic flow by providing drivers a clearer view down streets and intersections, and allowing trucks sufficient room to get entirely off the streets.
5) Provides additional margin of fire safety.*

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*Urban Land Institute, Technical Bulletin No.44, op. cit.

F. Building Construction and Design

Where outside contractors are permitted to build on the estate, covenants cover design and construction. On the whole, most older covenants prohibit metal clad buildings; however, with recent innovations in metal panel construction some developers have taken a second look at such restrictions. The usual practice is to require "masonry construction, its equivalent, or better" and not to prohibit specific construction materials by name.

The use of exposed concrete or cinder blocks is usually limited to the rear sections of buildings.

Building limitations vary from estate to estate. Some estates, such as research centres, have a higher standard of architectural control, for appearance, than other estates.

The developers of tracts have encouraged the construction of one-storey buildings, although there is no general building height restriction other than that contained in the local zoning by-laws. The one-storey building characteristics of most planned estates have evolved from economics in operation rather than covenants governing architecture or from restrictions controlling height of buildings. Some estates have limitations varying from 35 to 45 feet and two to three storeys. In some instances building height is allowed so long as the total

height is at no point greater than one-half the horizontal distance from the building to the nearest lot line and in no case exceeds a height of 100 feet.*

G. Sign Control

Some estates restrict signs and advertising by governing the locations, size and construction of signs identifying buildings within the estate.

H. Off-Street Parking and Truck Loading

Regulations governing the quality, adequacy, maintenance, and placement of truck loading facilities and employee parking areas are included in most restrictions or conditions of leasing. Truck berths and manoeuvering areas are sometimes required to be at the sides or rear of the buildings. Where parking space ratios are specified, they are usually based on number of employees (or largest shift or combined main and second shifts.)**

Another method is to base parking space ratio on square feet of floor plant area. Both methods have strengths and weaknesses. It is axiomatic that

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*Boley, Technical Bulletin No.41, op. cit.

**Principles of Off-Street Parking and Loading for Industry, National Industrial Zoning Committee 1961. Industrial Plant Parking, Urban Land May 1959.

employees not floor area generate parking space needs. However, a ratio based on number of employees may be satisfactory for the initial tenant but may not be adequate for subsequent tenants.

On the other hand, a parking ratio based exclusively on square feet of floor space is simpler to enforce but does not allow for the wide variation in employee densities that exist among different types of industrial activity.

Parking space is now considered an element of site use. As it has become widely recognized that off-street parking is essential to a well-planned industrial estate, the provisions for parking space have shifted from a covenant status to a requirement of plant design. Therefore developers are providing larger sites in their layout of the blocks. The following parking standards used in the Great Southwest Industrial District, U.S.A., are related both to the number of employees and size of building and may serve as an indication of space ratios used in some estates.

A. Parking in Relation to Personnel

One space for each 1½ plant employees
One space for each managerial personnel
One visitor parking space for each 10 managerial personnel

B. Parking in Relation to Floor Area (worker density)

One space for each 1000 sq.ft. of gross floor area used for warehousing and distribution.
One space for each 500 sq.ft. of gross floor area used for manufacturing.
One space for each 400 sq.ft of office floor area.

I. Other Provisions

Developers' covenants, leases and purchase contracts may embody other provisions such as industrial performance standards, traffic circulation, period of time within which the purchaser of a site must commence building construction, duration of covenants, procedure for altering and renewing restrictions, provision for enforcement of covenants, waste disposal, mineral rights, etc. are among the additional considerations carried in various industrial estate restrictions.

OUTLINE

PART FOUR

Pointe Claire, Ville d'Anjou, and Candiac.

I. Introduction.

II. Pointe Claire.

III. Ville d'Anjou.

IV. Candiac.

V. General Conclusions.

PART FOUR

Point Claire, Ville d'Anjou and Candiac.

I. Introduction

Point Claire, Ville d'Anjou and Candiac, the three industrial estates to be examined, are relatively recent developments which have occurred within the Montreal Metropolitan Region.

All three are real estate speculative ventures. As in the United States there is no regional concept for industrial location. The estates were created to meet a market demand for industrial sites.

There has been a tremendous growth in population and manufacturing industries, in Quebec, in the last two decades, most of which is concentrated on the island of Montreal. This increase is due principally to the metropolitan's influence on the region, and in particular on the suburban areas immediately surrounding the metropolitan proper.

Before going on to discuss the above estates it would be relevant to have a cursory glance at some of the factors which surged the Montreal area into the largest Canadian market.

Immediately following the Second World War, there was a demand for goods of all classifications, from complete new factories to such things as radios and other

consumer items along with housing and reconstruction. This was created by a tremendous backlog of demand caused by six years of war and the effect of the preceding period of depression.

In addition, Canada was in the favourable position, right after the War, to supply various basic raw materials and grain stuffs to a very needy world market which greatly stimulated the Canadian economy.

Internally, Canada's population increased by 50 per cent between 1945 and 1960. The total impact on the economy has been such as to induce a tremendous increase in manufacturing and services. In secondary manufacturing alone, the value added (i.e. work performed during the manufacturing process) has risen from $2.812 million in 1945 to $7.643 million in 1959.

Perhaps the most outstanding social development in post-war Canada has been the growth of urban centres and particularly the growing concentration of the population into large metropolitan areas. In 1961 about 70 per cent of the population lived in metropolitan areas. The sharp rise in urbanism is reflected in Table 15 which illustrates the decline of employment in agriculture and the very sharp increase in employment in manufacturing and services.

TABLE 15*

Employment by Industry
1911 - 1960

	1911	1921	1931	1941	1951	1960
Agriculture	934	1,042	1,132	1,084	939	675
Manufacturing	372	407	496	709	1,350	1,470
Services	810	1,133	1,518	1,722	1,576	1,722
Other	608	593	782	682	1,290	1,088
Total	2,734	3,173	3,928	4,196	5,155	5,955

The Province of Quebec is the largest in area and the second largest, next to Ontario, in population of the ten provinces in Canada. Between 1951 and 1961 Quebec experienced a 30 per cent increase in population. The urban/rural distribution in Quebec is about the same as the national average, that is, 70 per cent of the population live in urban centres and the balance in rural districts.

Categorically, the Province of Quebec is divided into four geological areas. 1) North of the St. Lawrence River, stretching all the way to the northern limits of the Province, is the Pre-Cambrian Shield which covers nine-tenths of the Province. 2) South of the St.

*W.F. Lougheed, Secondary Manufacturing Industry in the Canadian Economy. Baxter Publishing Co., Toronto, 1961, p.6.

FIGURE No. 34

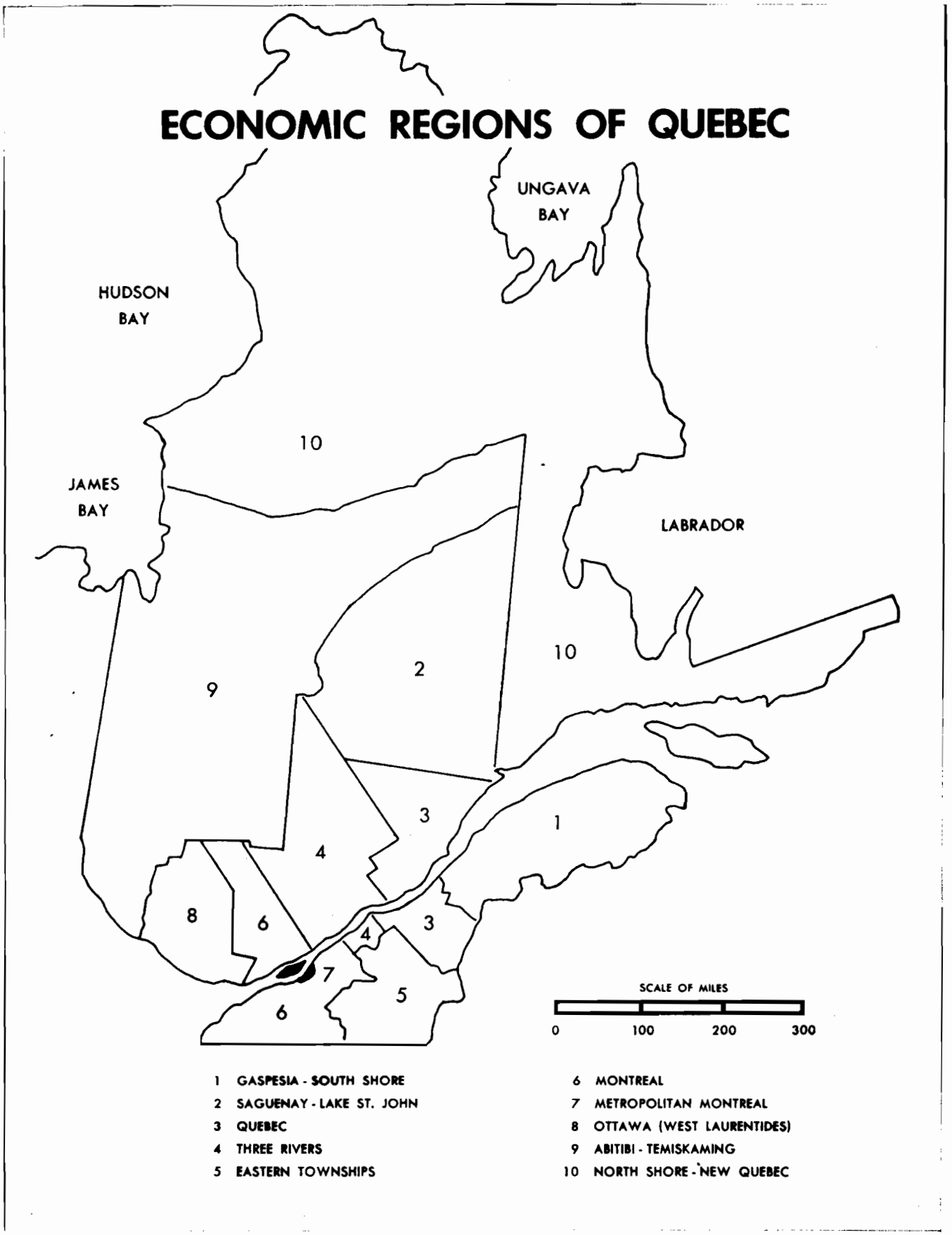
ECONOMIC REGIONS OF QUEBEC
UNGAVA BAY
HUDSON BAY
JAMES BAY
LABRADOR
10
10
9
2
3
1
4
8
6
4
3
7
5
6
SCALE OF MILES
0
100
200
300
1 GASPESIA - SOUTH SHORE
2 SAGUENAY - LAKE ST. JOHN
3 QUEBEC
4 THREE RIVERS
5 EASTERN TOWNSHIPS
6 MONTREAL
7 METROPOLITAN MONTREAL
8 OTTAWA (WEST LAURENTIDES)
9 ABITIBI - TEMISKAMING
10 NORTH SHORE - NEW QUEBEC

TABLE NO. 16

MAIN FEATURES OF ECONOMIC REGIONS IN QUEBEC
1956

REGION	AREA IN SQ. MILES	POPULATION	GROSS VALUE OF MANUFACTURING PRODUCTION (Thousands of Dollars)	FARM OPERATORS	BUILDING PERMITS (Thousands of Dollars)	RETAIL TRADE SALES 1951* (Thousands of Dollars)	PRINCIPAL INDUSTRIES
Gaspesia-South Shore	17,898	394,000	114,643	25,158	4,448	116,330	Fishing Forestry Tourism Mining—principally copper Agriculture Manufacturing—Textiles, wood, chemicals
Saguenay-Lake Saint John	41,523	235,000	424,351	5,623	18,449	89,151	Hydro-electricity Forestry Manufacturing—pulp, paper, aluminum Agriculture—dairy farming Quarrying—Granite, limestone Tourism
Quebec	12,219	588,000	406,125	18,873	27,425	264,328	Manufacturing—textiles, tobacco, wood, chemicals, food, metal, leather, rubber, transportation equipment, pulp and paper Agriculture—livestock, dairy farming
Three Rivers	15,226	283,000	445,364	9,294	20,106	123,750	Manufacturing—pulp and paper, aluminum, chemicals Hydro-electricity
Eastern Townships	7,230	432,000	476,966	19,677	19,410	191,730	Mining—asbestos, granite Agriculture Tourism Manufacturing—pulp and paper, wood, textiles
Montreal	14,742	632,000	618,664	27,885	25,954	268,688	Manufacturing—pulp, paper, and wide diversity Agriculture
Metropolitan Montreal	432	1,689,000	3,797,854	1,393	269,798	1,229,846	Manufacturing—wide diversity Smelting and refining—Copper, oil Commerce Finance Services
Ottawa	13,712	161,000	157,099	5,344	8,852	62,217	Manufacturing—pulp and paper, food, wood, textiles Forestry Hydro-electricity Mining—magnesium
Abitibi-Temiskaming	85,702	157,000	146,649	8,831	3,012	75,488	Mining—copper, zinc, lead, gold, silver, iron Smelting
North Shore-New Quebec	315,176	57,000	34,788	539	887	16,585	Manufacturing—pulp and paper, aluminum Mining—iron ore Forestry Hydro-electricity

Lawrence and east of the Richelieu River are the Appalachians which stretch from the southern part of Quebec to the Gaspe Peninsula. 3) The area around Montreal has several elevations which have been called the Monte-regions after the name of Mt. Royal. And 4) the lowlands of the St. Lawrence which follow both banks of the St. Lawrence and Ottawa Rivers.

Quebec is divided into ten regions for economic and statistical purposes.* By definition, an economic region includes all of an area which has a district economic orientation. That is, the region represents an area which from the point of view of production and manufacturing is considered as a unit.

The economic regions of Quebec are shown in Figure 34, and Table 16 outlines the principal features of square miles, population, gross value of manufacturing, farm operators, building permits, and retail sales, for each of the ten regions. It is apparent from these figures that the bulk of the population of the Province is concentrated in the south, principally in the Metropolitan Montreal, Montreal regions, Quebec region, and the Eastern Townships. It is also apparent from these figures that

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*The Economy of Quebec, by Economic Research Corporation Ltd. Citadel Publications Ltd., Montreal, 1960.

Metropolitan Montreal is the most important.

The southern part of the Province of Quebec has become a highly industrialized area in a comparatively short time - mainly since before the Second World War.

This can best be illustrated by comparing the total value of factory shipments from Quebec plants. In 1939 the total shipment value was $1,000 million and in 1956 this figure was $6,000 million, an increase of over 500 per cent in two decades.

This rapid rate of industrial advance can be attributed to the abundance of natural resources, population growth and a combination of geographical location and transportation facilities.

During the past two decades Montreal has been favoured by most of the structural changes in the Canadian economy. The completion of the St. Lawrence Seaway; the construction of the trans-Canada natural gas pipeline; the trans-Canada Highway; the gigantic growth of iron ore industry; record wheat sales; and the 'South Shore' industrial concentration; all of which has greatly increased the strategical value of the Montreal area.

Coupled with this tremendous economic activity is the natural attraction for secondary manufacturing industries to locate as close as possible to large concentrated markets.

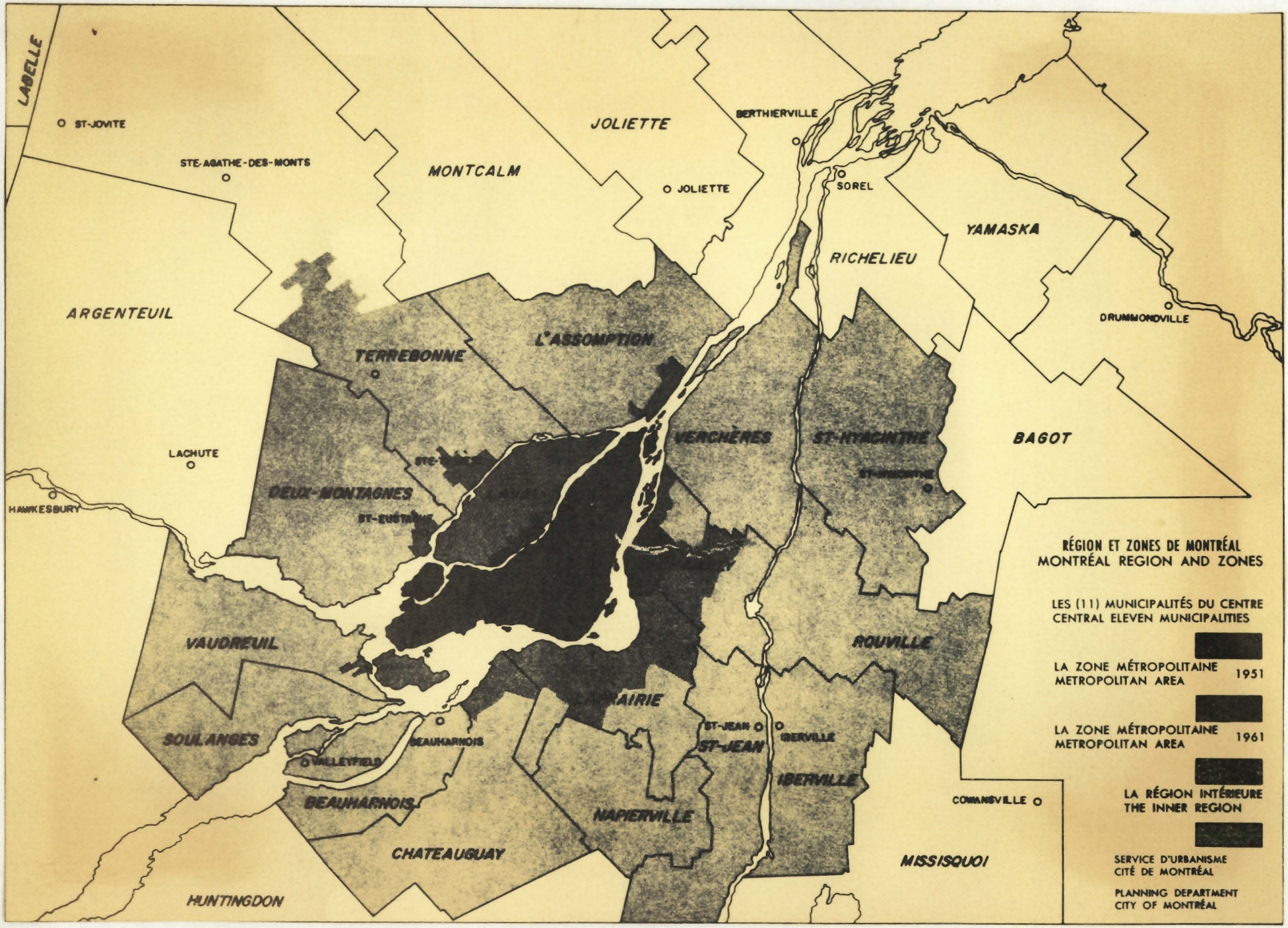

FIGURE No. 34a

To this should be added the selection of Montreal as the seat of the 1967 World's Fair, which will give an additional impetus to the development of the Montreal Metropolis.

The combined economic regions of Montreal and Metropolitan Montreal, known as the "Great Region" had a population of 2,757,000 in 1961.* This represents a population increase for the great region of about 75 per cent since 1941.*

The estimated rise in population according to the Memorandum submitted in 1956 to the Royal Commission on Canada's Economic Prospects on behalf of the City of Montreal forecasts a population of 1,455,000 for the Municipality of Montreal and 3,120,000 for the Metropolitan Area of Montreal by 1981.

Manufacturing is the most important industry in Montreal and employs about 35 per cent of the labour force. The gross value of production in the manufacturing

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*Metropole, published by the City Planning Department of Montreal, January 1963.

The "Great Region" consists of two economic zones defined by the Federal Government and the Quebec Bureau of Statistics: the "Montreal Region" together with their "Montreal Metropolitan Region". The latter consists only of Montreal Island, Ile Jesus, and Chambly County, but the 23 counties surrounding these inner 3 make up the economic zone they call the "Montreal Region".

The counties which make up these two economic zones and together form the "great region" have a total area of 15,174 sq.miles. The largest counties are Montcalm (3,849 sq.m.) Joliette (2,506 sq.m.) and La Belle (2,393 sq.m.) Terrebonne (782 sq.m.) and Argenteuil (783 sq.m.) come next in size: the others range from 93 (Laval or Ile Jesus) to 384 sq.m. (Missisquoi). See Figure 34-A.

industries grew from $2,314 million in 1950 to $3,798 million in 1956. The most important industries are the textiles, and food and beverages. With the development of mineral ores in the north of the Province heavier industries are moving into the Metropolitan area. These already include shipbuilding, oil refineries, a copper smelter, cement and steel mills. A forecast increase in the number of employees in the manufacturing industries of the City is from 177,000 in 1958 to 306,000 in 1981, and for the Metropolitan area, an increase from 235,000 to 624,000, according to the above-mentioned Memorandum to the Royal Commission.

One of the most important causes of growth in Metropolitan Montreal is the trade that is carried on through its harbour. Montreal harbour is under the jurisdiction of the National Harbours Board. Its shipping season is from April to the beginning of December. It has about 12 miles of berthing accommodation, a dry dock 600 feet long drawing 27.5 feet, grain storage capacity of over 16 million bushels and refrigeration space of 3 million cubic feet.

The completion of the St. Lawrence Seaway has meant that Montreal will not in the future act as the terminal of maritime navigation. However, economic activity in Montreal will still be stimulated by the general industrial

expansion of both the Province and Canada to which the Seaway will contribute. Secondly, developments such as mining in the north of Quebec, will give rise to transforming industries which will find advantage in locations in the Greater Region, particularly since there will be water transportation directly to the big industrial centres in the United States.

Even though the Seaway has reduced the transportational terminal advantage Montreal has had, in any estimate of the growth of industry and manufacturing of Montreal, the possibilities of winter navigation should not be discounted, which will once again stimulate economic activity in the area as a transfer junction. Winter navigation to Quebec City is now possible, and it may soon be feasible for Montreal.

Montreal is the centre of rail and trucking transportation facilities. The location of railway lines and road trucking are determined by the activities which generate freight traffic and centres of population requiring these services. The result has been a concentration of rail lines and highway routes in the southern part of the Province between Montreal and Quebec City and down to the United States border.

The three major railways which operate in the Province are: the Canadian National Railways, which is

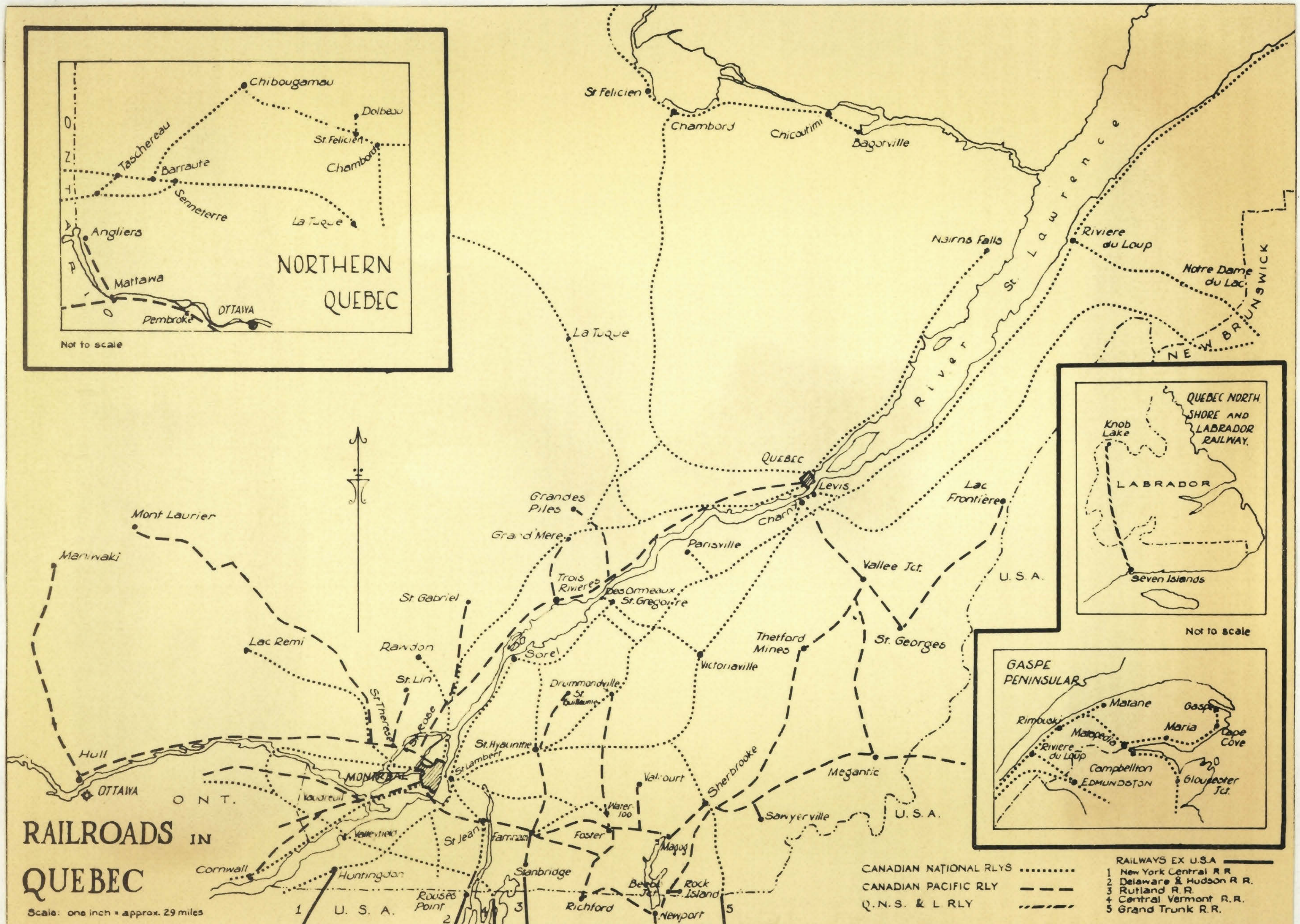
RAILROADS IN QUEBEC
Scale: one inch = approx. 29 miles
NORTHERN QUEBEC
Not to scale
Chibougamau
Dolbeau
St Felicien
Chambord
Taschereau
Barraute
Senneterre
La Tuque
Angliers
Mattawa
Pembroke
OTTAWA
St Felicien
Chambord
Chicoutimi
Bagotville
River St Lawrence
Nairns Falls
Riviere du Loup
Notre Dame du Lac
NEW BRUNSWICK
La Tuque
QUEBEC
Levis
Charny
Lac Frontiere
Grandes Piles
Grand'Mere
Mont Laurier
Maniwaki
Parisville
Vallee Jct.
Trois Rivieres
Des Ormeaux
St. Gregoire
St Gabriel
U.S.A.
Lac Remi
Rawdon
St. Lin
Sorel
Victoriaville
Thetford Mines
St. Georges
Drummondville
St Guillaume
St Therese
St. Rose
Hull
OTTAWA
ONT.
MONTREAL
Vaudreuil
St. Hyacinthe
St Lambert
Valcourt
Sherbrooke
Megantic
Sawyerville
U.S.A.
Valleyfield
Cornwall
Huntingdon
St Jean
Farnham
Foster
Waterloo
Magog
Stanbridge
Rouses Point
Richford
Beebe Jct.
Rock Island
Newport
1
2
3
4
5
U. S. A.
QUEBEC NORTH SHORE AND LABRADOR RAILWAY.
Knob Lake
LABRADOR
Seven Islands
Not to scale
GASPE PENINSULAR
Matane
Gaspe
Rimouski
Matapedia
Maria
Cape Cove
Riviere du Loup
Campbellton
EDMUNDSTON
Gloucester Jct.
CANADIAN NATIONAL RLYS
CANADIAN PACIFIC RLY
Q.N.S. & L. RLY
RAILWAYS EX U.S.A.
1 New York Central R.R.
2 Delaware & Hudson R.R.
3 Rutland R.R.
4 Central Vermont R.R.
5 Grand Trunk R.R.

FIGURE No. 35

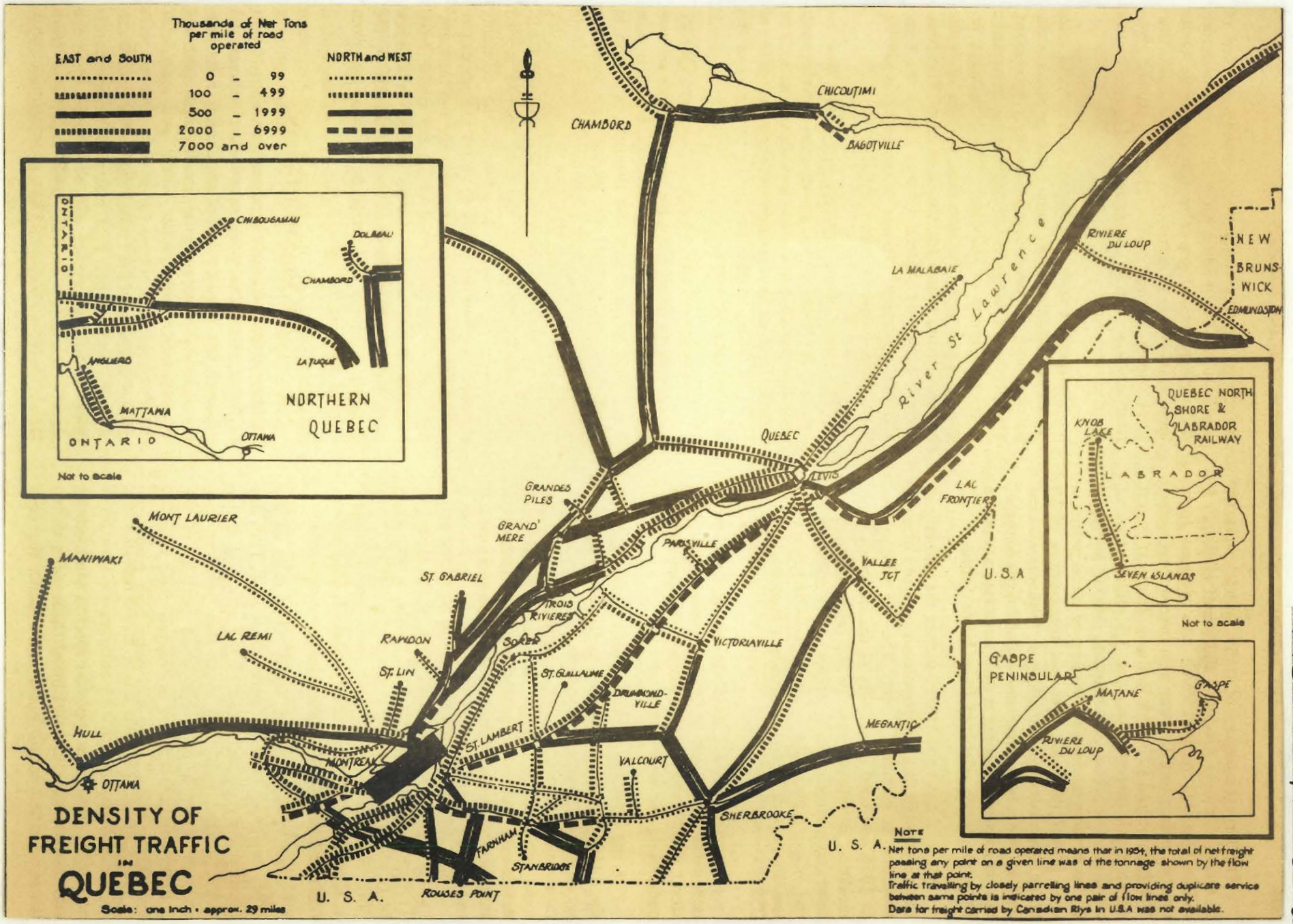

FIGURE No. 35a

fig. 36

FIGURE No. 36

ROAD SYSTEM
•••• UNDER CONSTRUCTION
==== PROPOSED
—— EXISTING
1. VILLE D'ANJOU
2. POINT CLAIRE
3. CANDIAC
13
20
2.

owned by the Government of Canada; the Canadian Pacific Railway and its subsidiary, the Quebec Central Railway; and the Quebec North Shore and Labrador Railway. In addition there are three United States railways which operate in the Province, mainly to Montreal. These are: the New York Central; the Delaware and Hudson; and the Rutland Railroad. (See Figure 35.) The density of freight traffic for the Province is illustrated in Figure 35A from which it is apparent that the southern part and in particular Montreal area is the most active.

The trucking service system in Quebec is dominated by a few large firms and these are mainly located on the Island of Montreal close to or on main highway routes. There is also a piggyback (truck trailers are loaded directly onto flat cars) system. (See Figure 36.)

It is against this vigourous growth and tremendous industrial expansion in the Montreal area, that the three industrial estates shall be examined. It should be pointed out that the locational pressures on industry; space, transportation, wages and external economies, reviewed in Part Two, the United States, are typical to most large metropolitan areas in North America and are suitably applicable to the Montreal situation.

Figure 37 illustrates the major industrial areas on Montreal Island. The older industrial areas were

fig. 37

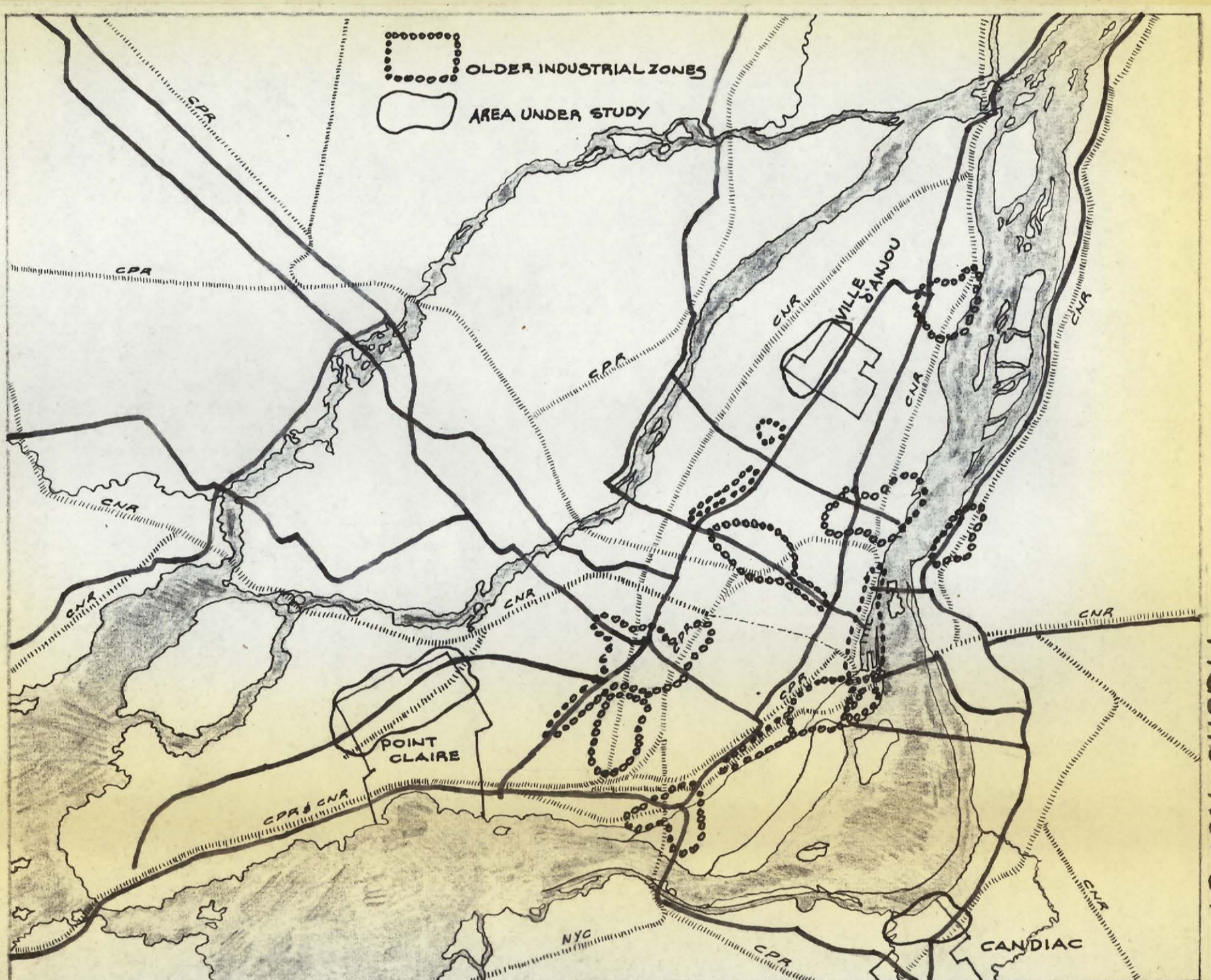
OLDER INDUSTRIAL ZONES
AREA UNDER STUDY
CPR
CNR
VILLE D'ANJOU
POINT CLAIRE
CPR & CNR
NYC
CANDIAC

FIGURE No. 37

located near the railway terminals, harbour and canal facilities to the south of the island. Gradually as the major highway networks were constructed industrial expansion developed along these arteries shifting northward and spreading both east and west into the surrounding suburbs. This was a natural process of development which took place during and immediately after the Second World War.

Point Claire and Ville d'Anjou are at the extreme ends of this east-west expansion, drawing even further out and apart the industrial spread on the island by offering large areas of undeveloped land for industrial sites. Candiac located on the south shore is located in opposition to the northward expansion of industry in the Great Region.*

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*Trends in the location of manufacturing industry. Metropole, op. cit. p.13.

II. Point Claire

Since the Second World War, Point Claire (as other communities on the Island of Montreal) underwent very rapid growth. The original village has changed from a quite rural hamlet, populated by farmers and summer residents, to a dormatory suburb of Montreal.

The first signs of settlement in Point Claire were in 1731. The population grew steadily, reaching 793 in 1911, the year the city was first incorporated. By 1954 the population had grown to 13,000 and today it is over 20,000. It has been estimated that the total population which could be housed within the city limits is approximately 85,000.*

The town is situated on the South Shore of Montreal Island, about 13 miles to the west of the City of Montreal. It is bounded on the south by Lac Saint-Louis, on the west by the Town of Beaconsfield and Ville de Kirkland, on the north by the municipality of Dollard-des-Ormeaux, and on the east by the City of Dorval.

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*Kentridge, L.R., A Survey of New Towns about Metropolitan Areas with Special Reference to Montreal. Typewritten manuscript, Architectural Thesis, McGill University, August 1961.

FIGURE No. 38

1 GRISWOLD ENGINEERING LTD.
2 F.P.LALONDE LTD.
3 SCHERING CORP.LTD.
4 PROCTER & GAMBLE CO.CAN.LTD.
5 O'KEEFE BREWERY LTD.
6 BOVRIL (CANADA) LTD.
7 ROGERS LUMBER
8 AVON PRODUCT LTD.
9 GENERAL MOTORS LTD.
10 CHRYSLER CORPORATION.
11 HANOVER-DEVEL LTD.
12 IMPERIAL OIL CO.LTD.
13 ROYAL ELECTRIC LTD.
14 MONTREAL BRONZE CO.
15 AERO MOTIVE CO.
16 CHEMICAL DEVELOPMENT LTD.
17 BELL TELEPHONE CO.
18 MARTIN BLACK WIRE ROPE
19 ALLWEATER ALUMINUM CO.
20 NORDIC BIOCHEMICAL CO.
21 STANDARD ELECTRIC CO.
22 CANADA GUNITE CO.LTD.
23 BOUCHARD GARAGE
24 WALLACE BARNES
25 CUSTOMOLD PLASTICS.
26 J.S.MITCHEL LTD.
27 HOLDEN ENTERPRISES
28 GARAGE MUNICIPAL
29 MONTREAL TERRACOTTA
30 NORMAN WADE
31 WATER TREATMENT PLANT
32 STEWART PARK
33 PULP & PAPER RESEARCH INSTITUTE OF CANADA

BANQUES BANKS
A BANK OF MONTREAL
B BANQUE DU COMMERCE
C ROYAL BANK OF CANADA
D BANQUE CANADIENNE NATIONALE
E TORONTO DOMINION BANK
F BANQUE CANADIENNE NATIONALE
G BANK OF MONTREAL
H CAISSE POPULAIRE

HOTEL DE VILLE CITY HALL
POLICE & FEU POLICE & FIRE
POST OFFICE BUREAU DE POSTE
ECOLES SCHOOLS
HOPITAL HOSPITAL SITE
EGLISES CHURCHES
PARC PARK EXISTING
PARC FUTURE FUTURE PARK
CENTRE D'ACHAT SHOPPING CENTER

CITÉ DE POINTE CLAIRE
CITY OF POINTE CLAIRE

ECHELLE SCALE IN FEET
0 425 850 1700 2550 3400

PUBLISHED BY OLIGNY PUBLISHING REG'D
Drawing By Arthur Oligny Montreal.
MARS 1961

61

It is only within recent years that the town of Point Claire adopted a planning commission. This Commission drew up the town's first master plan which divided the town into seven neighbourhood communities and designated the various land uses.

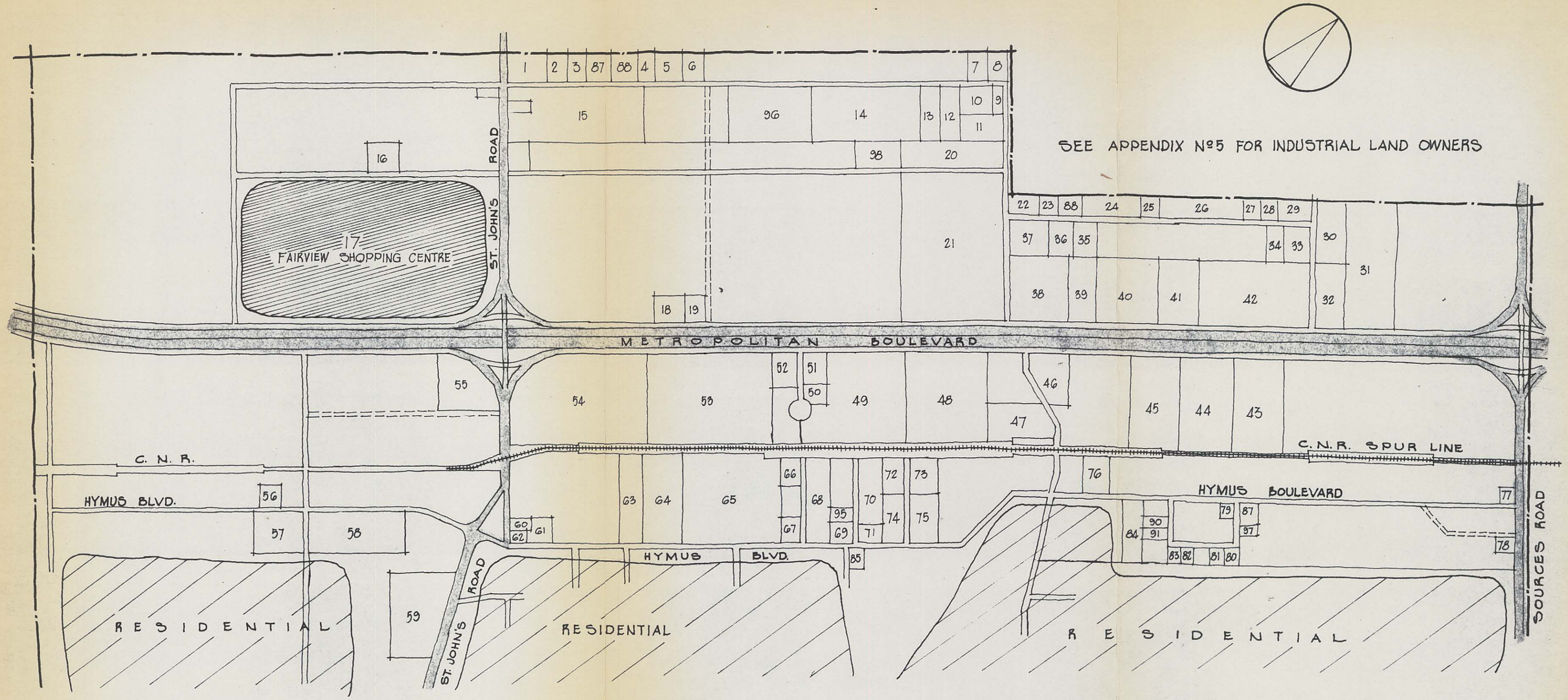
In 1955, the City of Point Claire obtained permission from the Provincial Legislation to annex the adjoining Parish, north of the city. The Parish was completely undeveloped and consisted of twenty or more long narrow farms ("cadasters") a sub-division which originated during the French regime. A zoning by-law in 1955 set aside approximately 1,450 acres of level, well drained land, 70 to 80 feet above the level of Lac Saint-Louis. This land constitutes most of the industrial area. (See master plan figure 38.)

Location

The industrial area is located in the north of the city. It extends northward from Hymns Boulevard to the city limits.

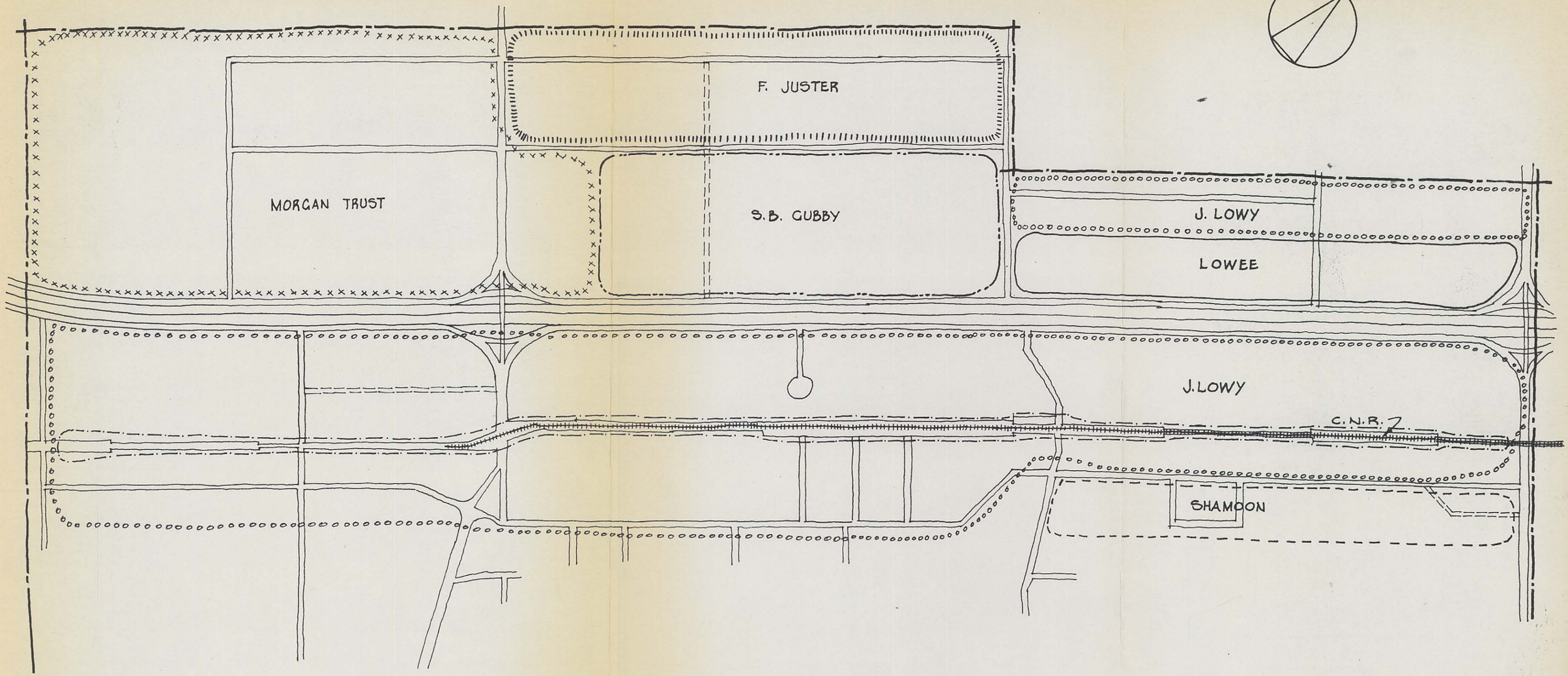
The industrial area is bisected by the new Metropolitan Boulevard which runs parallel to Hymns Boulevard and divides the area into two isolated sections. These sections are further divided by two major traffic arteries, Sources Road and St. John's

FIGURE No. 39



INDUSTRIAL AREA – POINTE CLAIRE

FIGURE 40



INDUSTRIAL AREA - POINTE CLAIRE
(land ownership)

Road, which run parallel to each other and at right angles to the New Metropolitan Boulevard. (See figure 39.)

The remaining sections are further subdivided by minor roads which form rectangular blocks of varying sizes. The roads are all constructed and services are available. The city owns and maintains all roads and installs services up to the property lines.

Land ownership

All land within the industrial area is privately owned. The city does not own, sell or develope land. The entire industrially zoned area is open for development and there is no attempt to regulate a phase development by sections. Figure 40 illustrates the land ownership pattern of the area before development in 1955.

Transportation

The industrial area is well located in relation to road transportation, straddling the New Metropolitan Boulevard, the major highway route on the island. The southern sections have potential rail facilities, provided by a Canadian National

Railways spur line, from which sidings may be drawn, if required. The area is within easy reach of air travel facilities, Montreal International Airport at Dorval being only two miles away.

Industries Established

The industrial area consists of approximately 1,450 acres of which 500 acres have been bought or developed, leaving a balance of 950 acres of unsold land. Since its annexation in 1955 approximately 98 industries have purchased land 59 of which are either in operation or under construction. (See Appendix No.5) Most of the industries have moved from the older central city locations, while the undeveloped sites are predominantly held by industries still located in the older sections of Montreal. Approximately three thousand five hundred people are employed in the area, of which less than one hundred are residents of Point Claire.

It is important to note and should be pointed out that there is commercial land use intrusion into the industrial area, which is not ancillary nor complementary to the industrial area.

The north-west corner site at the junction of St. John's Road and the New Metropolitan

Blvd., has, by special amendments to the zoning by-laws, been re-zoned to commercial land use to allow a huge shopping centre complex to be located in the middle of the industrial area.

Development Controls*

Development controls are those which are stipulated in the city's zoning by-laws. There are no further restrictions incorporated within deeds of sale by the individual land owners. The zoning by-laws outline the permissive activities allowed in the various parcels of land within the industrial area. The by-laws also limit the use of land or the building of any structure which may be offensive, noxious or dangerous by reasons of:

i. Excessive noise or vibration;

ii. The emission of objectionable gas, smoke fumes, dust or odor;

iii. The unsightly open storage of any materials or equipment;

iv. The inadequately controlled use and/or storage of combustible or explosive materials.

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*Point Claire, Zoning by-laws. No.726, chapter 13. Industrial Park.

Minimum lot sizes and street frontages stipulated in the zoning by-laws vary according to districts and the range is as follows:

i. A minimum lot of 180,000 square feet in area shall have at least 300 feet of street frontage;

ii. A minimum lot of 40,000 square feet in area shall have at least 200 feet of street frontage;

iii. And a minimum lot of 20,000 square feet in area shall have at least 100 feet of street frontage.

Lot coverage in general is not to exceed fifty per cent of the total lot area, under 40,000 square feet. For lots having areas greater than 40,000 square feet it is permissable to increase the rate of ground coverage by 1 per cent for each additional 5,000 square feet of area up to a limit of 190,000 square feet and over which may be 80% covered.

Building setbacks are as follows:

i. On Metropolitan Boulevard, 75 ft. to the street line;

ii. On St. John's and Sources Road, 100 ft to the street centre line;

iii. On Hymns Boulevard and other major service streets, 50 ft to the street lot line;

iv. And on all other streets the building line shall be 25 ft from and parallel to the property lines.

Side and rear yards are established at 25 feet.

Parking regulations are based upon

gross floor area of buildings. A paved area equivalent to one parking space is required for each 1000 square feet of gross building area up to 80,000 square feet and an additional parking space for each 1500 square feet exceeding 80,000 square feet. Parking is not allowed between the front of the building and the street line and roads in front yards are limited to 18 feet in width. In addition to the parking requirements an adequate area for parking, loading and unloading of trucks must be provided, access to which can not be through the car parking area. It is also stipulated that a paved roadway must give access to the above facilities, and shall in addition incorporate adequate area for visitor parking.

Railway spurs and sidings are limited to the side and rear yards and are not permitted to stand in either the car park or trucking areas.

There are provisions in the by-laws concerning open storage of materials and the disposal of waste. All open storage is to be concealed from the street and other property as directed by the Council and no wastes are to be deposited into the municipal sewage system without the approval of the Council.

No fences are allowed to extend between the front of the building and the street line.

Open metal fences are limited to 10 feet in height and solid walls four feet in height. All structures to conform to the city's building code and architectural control is imposed by subjecting all building designs to the city's Board of Design for approval.

Landscape and maintenance stipulations conclude the zoning by-laws which request that the area between the street line and the building be landscaped and in general the entire property is to be maintained, including the upkeep of landscaped areas and the removal of debris and unsightly objects.

Summary

Point Claire industrial area is a successful real-estate venture which has benefited from the tremendous post-war industrial expansion and the shortage of industrial sites within the older obsolete sections in Montreal.

The town itself is an unplanned dormitory suburb of Montreal which developed as a result of good transportation and successful land and housing speculation, of which the industrial area, incorporating the newly annexed land, is but the latest phase of this real-estate venture.

On the whole, the layout of the industrial

area is flexible and to a degree contains most of the physical requirements of estate planning. The individual design of some of the buildings is of a high standard and is by far the most successful aspect of the development.

The industrial area cannot be classified as an industrial estate according to definition. The land is not under single ownership nor is there any responsible body or development corporation to provide continuing estate management. The onus is on the individual industries.

Since the land is not under single ownership and the development is not phased, there is an uneven pattern of development which visually is untidy and incoherent. The large tracts of undeveloped raw land between buildings disrupt any unity the area could have. Furthermore, the industrial area, on the fringes is insufficiently segregated visually (and is irregular in definition) from the residential areas which also adds to it a spreading character.

The industrial area is not isolated from local residential traffic. The effect of the New Metropolitan Boulevard as a major traffic artery, while providing excellent transportation facilities to the industrial area, is to greatly increase the

local traffic load, which must flow through the industrial area to gain access to the Boulevard.

The over-all importance of limiting the area to only industrial land use cannot be over-stressed. There can be no doubt that the location of a large shopping centre complex will also greatly affect the flow of traffic which will permeate throughout the industrial area.

From the point of view of employment, the location and development of the area is not related in any way with housing developments in Point Claire. Industries rely mainly on the Montreal or other surrounding suburbs for their labour pools. Less than a hundred local residents are employed by the established industries.

The industrial area can only be considered as an unplanned speculative development which is not related to any over-all planning principle.

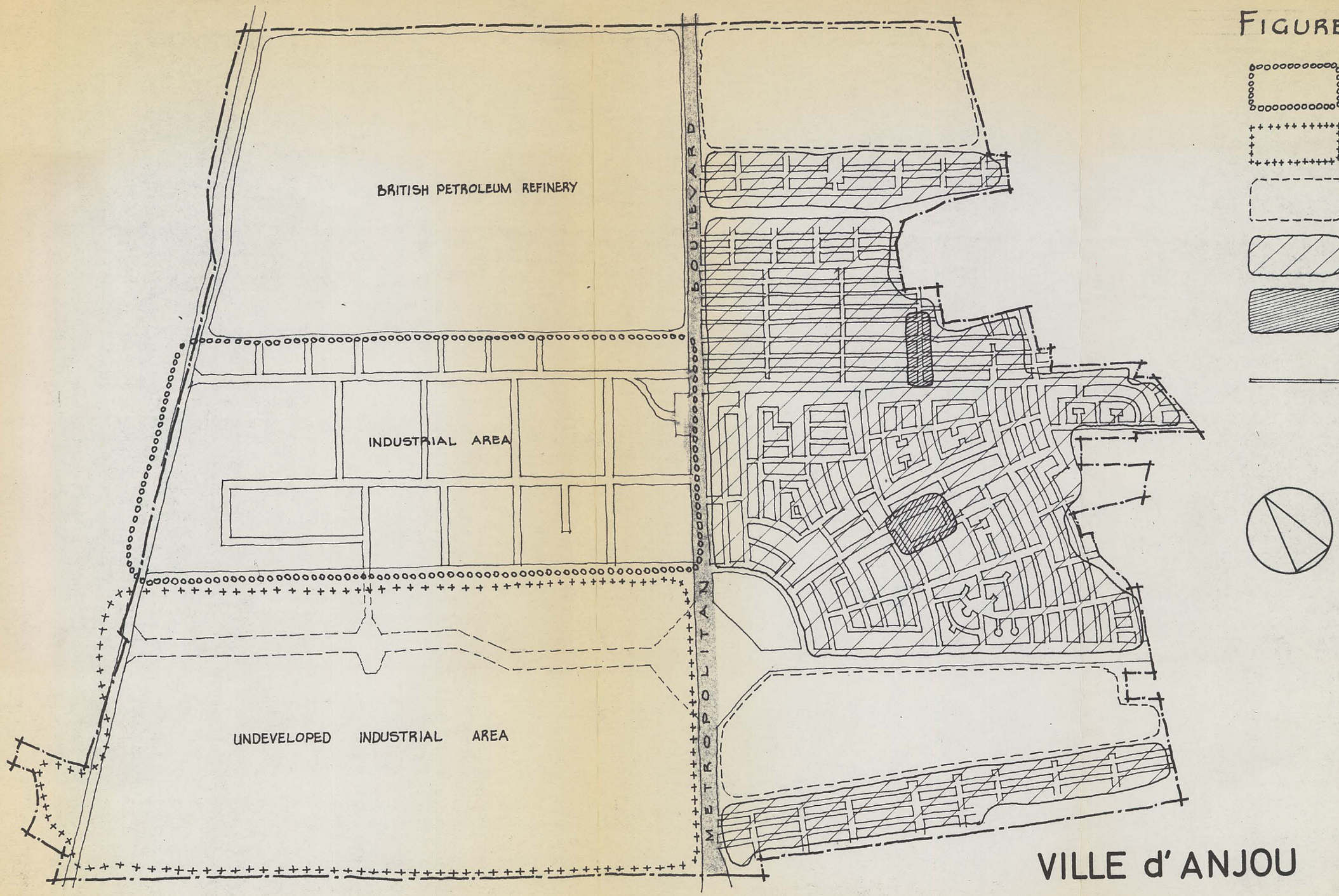
III. Ville d'Anjou

Ville d'Anjou is situated about seven and one half miles to the east of central Montreal. It is bounded on the south by the City of Montreal, on the west by Montreal and Ville de St.-Leonard-de-Port-Maurice, on the north by Riviere-des-Prairies, and on the east by Montreal East. The topography is regular and there is a slight fall from the north to the south. The town was designed by C.E. Campeau and is approximately 4,400 acres in area. The town was incorporated ten years ago and is a vigourously expanding industrial suburb. The population before incorporation was approximately 750 people and the land was used mainly for farming. The town has grown from 750 to 15,000 people within seven years. It is estimated that the eventual population would be about 35,000 when all residential areas, within the town limits, are completely built-up.

Location

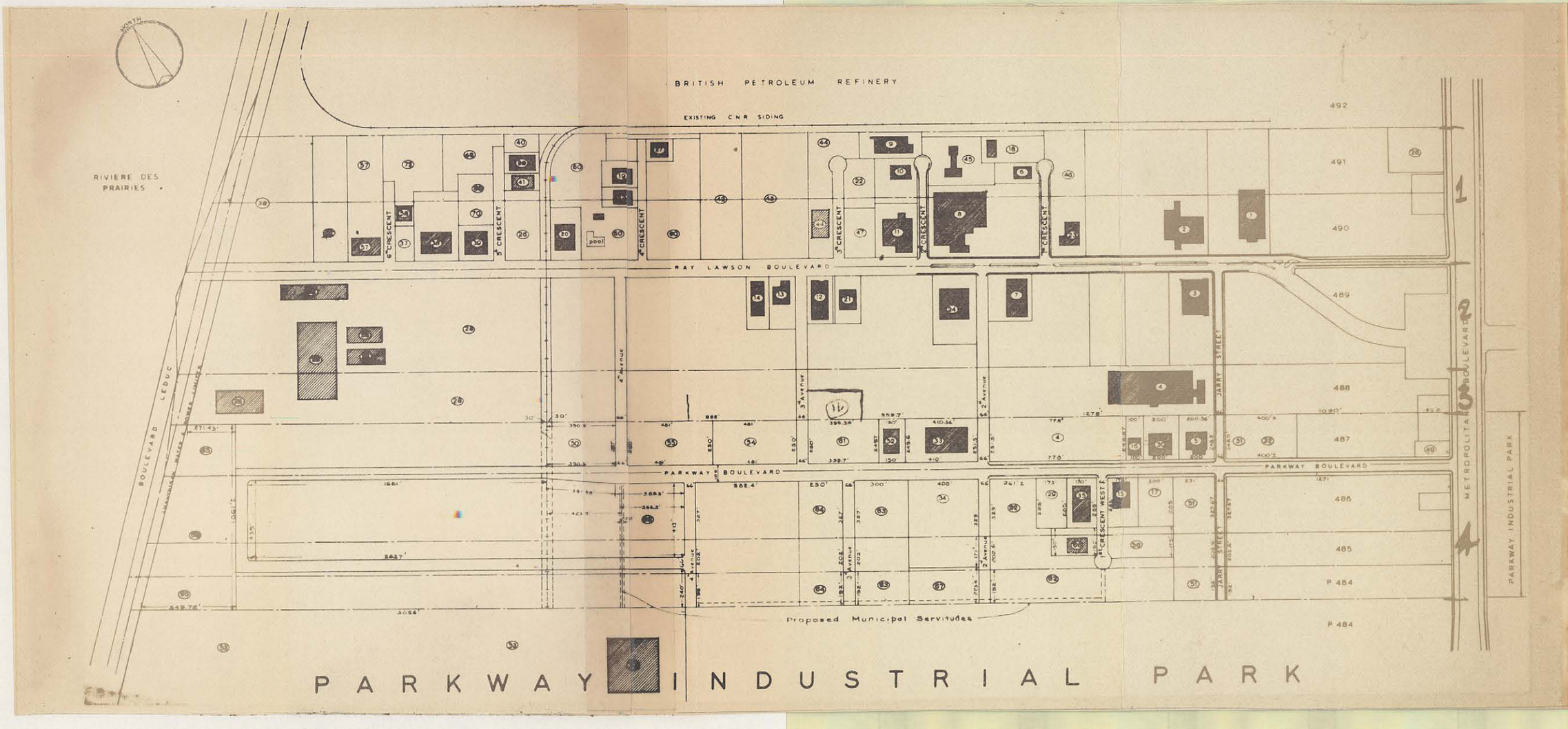
The industrial area is located to the north of Metropolitan Boulevard, which bisects the town, running east to west, and completely separates the industrial area from all other land uses. (See master plan figure 41.)

FIGURE No. 41



VILLE d' ANJOU

FIGURE No. 41a



INDUSTRIAL AREA , VILLE D'ANJOU

The industrial area currently under development lies west of British Petroleum refinery. It is a narrow strip of land running the full depth, north-south, of the industrial area, from Metropolitan Boulevard to Boulevard Leduc, which forms the northern boundary of the industrial area as well as the city limits.

The industrial development area is subdivided into large blocks of land by roads layout and constructed by the municipality of Ville d'Anjou. Ray Lawson Boulevard and Parkway Boulevard are major north-south roads which trisect the industrial area into three long narrow strips of land. These strips are, in turn, formed into blocks of land by minor roads running in an east-westerly direction. (See figure 41-A).

The roads are all in, along with all services, sewers, gas mains, and electricity. The municipality owns and maintains all roads, and installs services up to property lines. The industrial owners pay for service connections to their buildings from property lines.

Land ownership

The municipality does not own any land. All land within the development area is sold by private speculators. The land ownership further subdivides the industrial area in a most peculiar manner which does not follow the subdivision pattern of the roads. (See figure 41-A). Strip 1 is owned by Anjou Industrial Development Co., strip 2 by Metropolitan Industrial Park, strip 3 by Marissa Industrial Sites, and strip 4 by Parkway Investment Corp.

Transportation

The estate is predominantly orientated to road transport, being well located directly on the Metropolitan Boulevard. This road is the major transport route of Montreal Island and is also part of the national highway system. Some of the sites do, however, have railway facilities taken off the Canadian National Railway sidings constructed to serve the neighbouring British Petroleum Refinery.

Industries Established

The industrial area covers approximately 2,800 acres of land; 900 of which is covered by British Petroleum refinery, 800 acres is presently

under development, and the balance 1,100 acres, is for future industrial requirements. British Petroleum is the largest industry in the area. For a complete list of industries established in the industrial area or which have bought land see Appendix No.6. Three thousand people are employed in these industries, most of which come from the town of Ville d'Anjou.

Development controls*

The only controls imposed on the development of the area are those which are stated in the municipality's zoning by-laws. They are prohibitive in nature, outlining those industries which are considered to be hazardous from the point of view of health, nuisance and danger.

Building lines are set at twenty-five feet and fifty feet depending upon the street. Lateral setbacks are twenty-five feet to provide a space of fifty feet between buildings. All spaces between buildings and roads are required to be sodded and planted.

Lot coverage is not to exceed fifty per cent of the total land acreage and at least twenty-five per cent of the total is to be sodded and planted and properly maintained.

*Ville d'Anjou, zoning by-laws No.58, Chapter VII, Provisions Applicable to All the Industrial Sections.

There are also provisions for the control of signs and fences.

Parking and loading regulations are based upon road frontage units or as a percentage of the factory floor area. That is, every five feet of road frontage is equivalent to one parking and/or loading unit. For each such unit an area of 300 square feet or 30 per cent of the factory floor area, whichever is the greatest, must be provided. All loading and unloading must not be visible from the streets and the space between the building and the street is not to be used for parking or loading.

There is no specific reference to building materials or types of construction in the zoning by-laws.

Summary

Ville d'Anjou industrial area is not according to definition an industrial estate. It is an industrially zoned tract of land within the overall development pattern layed out in the master plan for Ville d'Anjou.

The town itself is a mixed development and is predominantly a dormitory town for Montreal but with an ever-increasing role as an industrial

employer in the east end of Montreal Island. The town was established as a speculative venture and the industrial area is part of this speculative development. The whole, both residential and industrial areas, has proved very successful.

The industrial area, within the total town development, is successfully located to attract industry. The Metropolitan Boulevard provides excellent road transport facilities to the industrial area and also creates a strong physical and visual break between the residential and industrial areas.

The existence of a large labour pool in the eastern section of Montreal Island is another factor which has successfully contributed to industrial attraction. Metropolitan Boulevard, which literally taps all the eastern communities, provides rapid transportation for employees to travel to work in private cars. (There is no local public transport system which serves the industrial area.)

The industrial area is an isolated real-estate development, as is the town, and cannot really be considered an industrial estate. It is a successful development within the terms of the town itself. The location of the industrial area, and the town, was governed by financial considerations and was

not planned within any inter-municipal or regional framework. It is unplanned industrial decentralization based on the choice of private speculators.

IV. Candiac

Candiac is located on the south shore of the St. Lawrence river, directly opposite the Island of Montreal. It is approximately 9 miles by road to the central business section of Montreal.

The town of Candiac is a speculative project which includes in its master plan a large tract of land for industrial development. The whole town is in the early stages of development and exists mainly on paper, with only isolated areas of the project completed.

The master plan for the project was prepared by a group of Toronto town planners, Armstronge, Kingston and Hanson, for Candiac Development Corporation, the largest landowner of the Development. The town was incorporated in 1957.

The project is also financed by the Candiac Development Corporation, which was incorporated under the Quebec Companies Act in January 1955. The equity capital was subscribed in Montreal partially by private investors and substantially by other sources. Approximately one-third of the necessary capital was received from Canadian investors through the investment houses of Gairdner & Co., Combined Estates, and Geoffrion, Robert and Gelinas. Another

third was through European interests represented by the North American Utilities Corporation. This group includes Cie. Financiere de Suez (formerly the Suez Canal Company), Schneider Company of France, the Union Europeenne Industrielle et Financiere, Anglo-Scandinavian Investment Corporation, and Sogemines Ltd. The remaining third of the capital was provided by American interests, principally through Dominick Corporation of Canada, an affiliate of Dominick and Dominick, New York.

It is optimistically estimated that the development will by 1970 reach a population of approximately 50,000 with between six to ten thousand people employed in the industrial area. There are presently 8 industrial firms established since 1957 which employ under 800 people very few of which are resident in Candiac.

Development controls*

The development controls imposed on the industrial section are only those which are incorporated in the zoning by-laws. These are permissive in nature,

*Town of Candiac, By-law No.1. A Restricted Area (Zoning) By-law, 1957. Section 13 and 14, Industrial Service and Manufacturing.

outlining the activities allowed in the various areas and excluding any which are considered to be a "noxious trade, business of manufacture, without the consent of the local Medical Officer of Health".

Building setbacks from the street lines are 75 feet and from side lot lines are equal to the height of the building at the closest point to the side line, 20 feet being the minimum. Rear building lines are a minimum of 50 feet. Building heights are unrestricted and lot coverage is 60 per cent in the case of sites of 5 acres or less.

There are no parking regulations other than "no parking shall be permitted in front of the building between the street line." There is no mention of building materials, building design or landscaping.

Summary

The industrial area in Candiac is not an industrial estate. It is even questionable whether or not Candiac will prove successful as a financial venture. This is mainly due to its location. It is not on any of the major transportation routes leading into or out of the Montreal area. In addition, of the three industrial areas investigated it is the

furthest away from any labour pool. It is also, as mentioned, located in opposition to the industrial trend to locate away from areas south of Montreal to the Montreal Island and northward.

V. General Conclusions

The object of this study was to investigate industrial estates from the point of view of town planning, as a modern land use device, firstly to meet the needs of the city as a whole, by the proper and harmonious relationship between industrial location to the surrounding areas; and secondly to meet the requirements and needs of industry and industrial development.

The rapid and unprecedented growth of the metropolitan area during the past few decades has resulted in an unbalanced movement of industrial locations from the old central parts to a scatteration of locations in surrounding suburbs. These suburban locations are mainly determined by independant decisions made by hundreds of companies and individuals with the result of a spreading and uncontrolled urban agglomeration.

The uncontrolled and unplanned decentralization of industry has concomitant aspects other than urban sprawl - for example, the lowering of the tax base of the central city; the attraction of residential developments close to the industrial area, to shorten the journey to work and thereby further depleting the central city's population and contributing

to sprawl; changes and increases in the pattern of traffic flow which are not necessarily related to highway planning; and the inefficiency and waste inherent in the competitiveness of smaller municipalities to "attract" industry.

The planned industrial estate, it may be concluded, in Canada (and in the United States), has mainly been sponsored by private enterprise in response to the deficiencies in the supply of industrial sites and to other economic and social factors. The potential contributions of the industrial estate concept to metropolitan planning have not been fully realized. For industrial estates should be related to studies of future land requirements for the metropolitan areas as an entity.

It is evident that the only means of dealing with the problems of industrial location and industrial land use planning is to put them into a national and regional setting in order to take a balanced view of the detailed town planning problems which are involved. It is also apparent that industry and town planning can only be really considered together by taking into account the wider aspects of our economic, social and political environment, of which town planning is but a part, and can only be

achieved by the implementation of a policy with a clearly stated objective.

The issues of industrial land use planning - industrial location, industrial development, and the aims of industrial expansion - are an extremely complex field, overlapping into the broader areas of social, economic and political philosophies and concerns. It embraces the problems of: balanced distribution of wealth, the equalization of employment opportunities across the country as a whole; the expected phenomenal increase in the labour force within the next two decades; the role of governmental participation in industrial development; automation and technological changes which require large scale rehabilitation of workers with new productive skills; and the problem of the formation of metropolitan governments for urban complexes, are but a few of the issues involved.

It is therefore clearly discernible that it is only by taking a balanced view of the aims of industrial land use that the industrial estate concept, in relation to town planning, can be employed to its full potential.

APPENDIX NO. 1

Division of Manufacturing Classification by Sub-Groups

Primary	Secondary	
		Foods and beverages:
x		Canning and processing
x		Dairy products
x		Grain products
x		Meat products
	x	Bakery products
	x	Beverages
	x	Other food industries
		Tobacco and tobacco products:
	x	Tobacco, cigars and cigarettes
	x	Tobacco processing and packing
		Rubber products:
	x	
		Leather products:
	x	Footwear, leather
	x	Gloves and mittens, leather
	x	Leather tanning
	x	Other leather industries
		Textile products (except clothing):
	x	Cotton goods
	x	Woollen goods
	x	Synthetic textiles and silk
	x	Other primary textiles
	x	Other textile industries
		Clothing (textile and fur):
	x	Men's, women's and children's clothing
	x	Knitted goods
	x	Miscellaneous clothing
		Wood products:
x		Saw and planing mills
	x	Furniture
	x	Other wood industries

Appendix No.1

Primary	Secondary	
		Paper products:
x		Pulp and paper
	x	Boxes and bags, paper
	x	Roofing paper
	x	Miscellaneous paper goods
		Printing, publishing and allied industries:
	x	Commercial printing
	x	Engraving, stereotyping and allied industries
	x	Printing and publishing
		Iron and steel products:
	x	Agricultural implements
	x	Boilers, tanks and platework
	x	Bridge building and structural steel
	x	Castings, iron
	x	Hardware, tools and cutlery
	x	Heating and cooking apparatus
	x	Machinery, household, office and store
	x	Machinery, industrial
	x	Machine shops
	x	Machine tools
	x	Primary iron and steel
	x	Sheet metal products
	x	Wire and wire goods
	x	Miscellaneous iron and steel products
		Transportation equipment:
	x	Aircraft and parts
	x	Bicycles and parts
	x	Boat building
	x	Carriages, wagons and sleighs
	x	Motor vehicles
	x	Motor vehicle parts
	x	Railway rolling stock
	x	Shipbuilding
		Non-ferrous metal products:
x		Non-ferrous metal smelting and refining

Appendix No. 1

Primary	Secondary	
	x	Aluminum products
	x	Brass and copper products
	x	Jewellery and silverware
	x	White metal alloys
	x	Miscellaneous non-ferrous metal products
		Electrical apparatus and supplies:
	x	Batteries
	x	Radios and radio parts
	x	Refrigerators, vacuum cleaners and appliances
	x	Machinery, heavy electrical
	x	Miscellaneous electrical apparatus and supplies

Primary	Secondary	
		Non-metallic mineral products:
x		Abrasives, artificial
x		Cement, hydraulic
	x	Salt
	x	Stone products
	x	Asbestos products
	x	Clay products from domestic clay
	x	Clay products from imported clay
	x	Concrete products
	x	Glass and glass products
	x	Gypsum products
	x	Lime
	x	Sand-lime brick
	x	Miscellaneous non-metallic mineral products
		Products of petroleum and coal:
	x	Coke and gas products
	x	Petroleum products
	x	Miscellaneous products of petroleum coal
		Chemicals and allied products:
x		Acids, alkalis and salts
x		Fertilizers
x		Primary plastics

Appendix No. 1

Primary	Secondary	
	x	Medicinal and pharmaceutical preparations
	x	Paints, varnishes and lacquers
	x	Soaps, washing compounds and cleaning preparations
	x	Toilet preparations
	x	Vegetable oils
	x	Other chemical industries
		Miscellaneous industries:
	x	Brooms brushes and mops
	x	Clocks, watches and watch cases
	x	Fountain Pens and Pencils
	x	Musical instruments
	x	Plastic products
	x	Scientific and professional equipment
	x	Sporting goods
	x	Toys and games
	x	Typewriter supplies
	x	Other miscellaneous industries

APPENDIX NO. 2

AJAX INDUSTRIAL ESTATE
AJAX, ONTARIO, CANADA

Lease Agreement

This Indenture, made the ..... day of 19..... and in pursuance of the Short Forms of Leases Act, between

Slough Estates (Canada) Limited, a Company incorporated under the laws of the Province of Ontario, having its head office at the City of Toronto, in the said Province, (hereinafter called "the lessor")

of the one part,

and

(Name of Lessee)
(hereinafter called "the lessee")

of the other part.

Witnesseth as follows:

1. THE lessor hereby demises unto the lessee ALL THAT certain parcel or tract of land and premises situate on the lessor's Trading Estate in the municipality of Ajax, in the County and Province of Ontario, on the side of a road called ..... and which said piece or parcel of land is more particularly described in Schedule "A" hereto and is delineated on the plan attached hereto and thereon coloured pink Together with the building and premises thereon erected and known as municipal number ..... (hereinafter called "the demised premises") AND TOGETHER with the fixtures set out in Schedule "B" hereto. Excepting and reserving unto the lessor and all others authorized by it the free and uninterrupted passage and running of water, soil, gas, electricity and telephone or any other service or supply from the other buildings and land of the lessor and its tenants adjoining or near the demised premises and from the land and premises of others so authorized as aforesaid through the sewers, drains, watercourses, conduits and subways which are now or may hereafter during the term hereby granted be in or over or under the demised premises To Hold unto the lessee for the term of ..... years commencing on the ..... day of ..... one thousand nine hundred and ..... and fully to be completed and

ended on the ..... day of ..... one thousand nine hundred and ..... Yielding and Paying therefor yearly during the said term hereby granted the rent of ..... Dollars (Canadian) to be paid without any deduction whatsoever by equal quarterly payments in advance on the ..... days of March, June, September and December in every year, the first payment for the period from the ..... day of ..... one thousand nine hundred and ..... to the ..... day of ..... one thousand nine hundred and ..... to be made on the ..... day of ..... one thousand nine hundred and ..... AND ALSO PAYING, as additional rent from time to time a sum or sums of money equal to the expense incurred by the lessor in effecting or maintaining the insurance of the buildings which are now or which may hereafter be erected upon the demised premises and the insurance of one year's rent against loss or damage by fire in such sums as the lessor shall decide not exceeding the full value thereof, such last mentioned additional rent to be paid without any deduction on demand and to be recoverable by distress in the same way as rent in arrear.

2. THE lessee for itself and its successors and assigns and to the intent that the obligations may continue throughout the term hereby created hereby covenants with the lessor as follows:

(1) DURING the continuance of the term hereby granted to pay the respective rents and other sums of money hereinbefore reserved and made payable at the times and in the manner in which the same are respectively hereinbefore reserved and made payable without any deductions whatsoever.

(2) TO bear, pay and discharge all existing and future rates, taxes, assessments, duties, impositions and outgoings whatsoever imposed or charged upon the demisedpremises or upon the owner or occupier in respect thereof or payable by either in respect thereof.

(3) IN every third year and in the last year of the said term, however the same may be determined, to paint the outside wood and iron work of the demised buildings and all additions thereto with two coats at least of best oil or bituminous paint where so usually painted with oil or bituminous paint in a proper and workmanlike manner.

(4) IN every seventh year and in the last year of the said term, however the same may be determined, to

paint all the inside wood and iron work usually painted of the demised buildings and all additions thereto with two coats of the best oil or bituminous paint where so usually painted with oil or bituminous paint in a proper and workmanlike manner and after every internal painting to grain, varnish, wash, distemper, point, caulk, whiten and colour all such parts as have previously been so dealt with.

(5) FROM time to time and at all times during the said term at its own cost, well and substantially to repair, cleanse, paint, maintain, amend and keep the said land, buildings and premises and the fixtures therein and the walls, fences, vaults, roads, sewers and drains in, on or under the demised premises and the appurtenances thereof with all necessary repairs, cleansings and alterations whatsoever (damage by fire, lightning or tempest, riot, insurrection, military or usurped power, civil commotion, sabotage, vandalism, acts of God and the Queen's enemies excepted) and to keep the land coloured blue on the said plan attached hereto in a clean and tidy condition and maintained as a garden and comply with all statutes, by-laws or regulations of the local authorities as to permitting oil, grease, or other deleterious matter to enter the drains and sewers serving the demised premises and to yield up quietly the demised premises so painted, repaired, cleansed, maintained, altered and kept as aforesaid at the expiration or sooner determination of the said term unto the lessor together with all additions and improvements of a permanent nature and not movable made thereto in the meantime and all fixtures of every kind in or upon the demised premises or which during the said term may be affixed or fastened to or upon the same except lessee's trade fixtures or fittings.

(6) TO permit the lessor or its agents at all times during the said term during reasonable hours in the day with or without workmen and others to enter the demised premises to view the state of repair and condition of the same and of all defects and wants of repair then and there found to give or leave on the demised premises notice in writing to the lessee and the lessee shall within the period of three months after such notice (or immediately in case of emergency) repair and make good the same according to such notice and the covenant in that behalf hereinbefore contained.

(7) TO permit the lessor and others authorized by it with workmen and others at all reasonable times to enter

upon the demised premises for the purpose of taking inventories of the lessor's fixtures therein and of doing such repairs, extensions and alterations as the lessor may deem necessary to the adjoining property of the lessor and any drains, pipes, wires, cables, apparatus or works in, through, under or over the demised premises or any adjoining premises.

(8) IF the lessee shall at any time make default in the performance of any of the covenants hereinbefore contained for or relating to the repair and decoration of the demised premises it shall be lawful for the lessor (but without prejudice to the right of re-entry under the clause hereinafter contained) to enter into and upon the demised premises and repair and decorate the same at the expense of the lessee in accordance with the covenants and provisions of these presents and the expenses of such repairs and decorations shall be repaid by the lessee to the lessor on demand.

(9) NOT at any time during the said term to set up any signboard or lettering on the demised premises without first obtaining the consent in writing of the lessor but the lessee shall within three months from the date hereof erect a sign thereon setting out the name and business of the lessee and such sign shall not be erected unless approval thereof in writing shall have been first obtained from the lessor but such last mentioned approval shall not be unreasonably withheld.

(10) NOT to use the demised premises or any part thereof as a dwelling house, place of amusement, theatre, cinematograph theatre or for the carrying on of any obnoxious or offensive trade or business nor to use the demised premises or any part thereof or permit the same to be used for any other purpose than that of ..... and operations incidental thereto.

(11) AT all times to take such precautions as shall be necessary to prevent the business carried on upon the demised premises causing in the opinion of the lessor any nuisance, damage or annoyance or inconvenience to the lessor or any of its tenants or the occupiers of any premises in the neighbourhood.

(12) NOT to do or permit anything to be done upon

the demised premises whereby any policy of insurance against damage by fire to the demised building for the time being subsisting may be invalidated or whereby the rate of premium quoted in respect of the insurance against damage by fire of any building or part of a building or the contents thereof adjoining or near the demised premises shall at any time be higher than the rate usually charged in respect of the trade carried on in such adjoining or neighbouring building.

(13) NOT at any time during the said term without the license in writing of the lessor first obtained to erect any new buildings on the demised premises or make any alterations whether structural or otherwise or any addition to the demised building or to any buildings which may be erected on the demised premises or make any excavation upon the demised premises or interfere with or by building or otherwise cause access to any pipe, wires, cables, drains, sewers, watercourses, conduits or subways which now are or at any time hereafter may be under, in or through the demised premises to be or become more difficult than the same now is or carry out development of any kind whatsoever. Any such alteration or addition shall have been approved by the Ontario Department of Labour before the lessor's permission shall be given.

(14) NOT to do or permit to be done or omit or permit to be omitted any act, matter or thing in or respecting the demised premises which by virtue of any statute, regulation, by-law or order of any duly constituted public authority should not be done or ought to be done or which shall contravene any of the provisions thereof and to indemnify and keep indemnified the lessor against all actions, proceedings, costs, expenses, claims and demands in respect of any such act, matter or thing contravening any of the said provisions as aforesaid.

(15) NOT to do or suffer to be done in or upon the demised premises any act or thing which shall or may be or become a nuisance, damage, annoyance or inconvenience to the lessor or its tenants or the occupiers of any premises in the neighbourhood and not to permit any sale by auction to be held upon the demised premises without the consent in writing of the lessor being

first obtained and at all times to observe such reasonable regulations as may from time to time be made by the lessor with regard to transport and conduct of employees.

(16) AND will not assign or sublet without leave.

(17) TO pay promptly all moneys due and payable for public utility services supplied to the demised premises and to indemnify and save harmless the lessor from any and all claims in respect thereof.

(18) TO permit the lessor or its agents at any time within three months next before the expiration or sooner determination of the said term to enter upon the demised premises and to affix upon any suitable part thereof a notice board for reletting the same and not to remove or obscure the same and to permit all persons by order in writing of the lessor and its agents to view the demised premises at reasonable times during business hours in the day-time.

(19) TO permit the lessor at any time during the said term to erect, rebuild or alter any buildings or erections facing, adjoining or near to the demised premises to any extent and in any manner it may think fit notwithstanding that the building so erected, rebuilt or altered may obstruct or interfere with right of light or air for the time being appertaining to or enjoyed with the demised premises or any part thereof or any building for the time being thereon.

(20) TO pay all costs, charges and expenses (including solicitor's costs) incurred by the lessor for the purpose of or incidental to the preparation and service of a notice requiring the lessee to remedy a breach of any of the covenants herein contained notwithstanding forfeiture for such breach shall be avoided otherwise than by relief granted by the Court.

3. (a) The said lessor covenants with the said lessee for quiet enjoyment;

(b) The lessor covenants with the lessee to insure and keep insured the building forming part of the demised premises against loss or damage by fire and supplemental risks to the extent of its full insurable value.

4. PROVIDED ALWAYS and it is hereby agreed and declared as follows:

(1) IF and whenever the said yearly rents hereby reserved or any of them or any part thereof shall be in arrear for twenty-one days after the same shall have become due (whether any legal demand therefor shall have been made or not) or if and whenever the lessee shall at any time fail or neglect to perform or observe any of the covenants, conditions or agreements herein contained and on its part to be observed and performed or if the lessee while the said premises or any part thereof shall remain vested in it shall enter into liquidation whether compulsory or voluntary not being a voluntary liquidation for the purpose of re-construction or commit any act of bankruptcy or become bankrupt or make any arrangements with his creditors then and in any such case it shall be lawful for the lessor or any person or persons duly authorized by it in that behalf into or upon the demised premises or any part thereof in the name of the whole to re-enter and the said premises peaceably to hold and enjoy thence-forth as if these presents had not been made without prejudice to any right of action or remedy of the lessor in respect of any antecedent breach of any covenants by the lessee hereinbefore contained.

(2) IF, during the term hereby granted, the demised premises are destroyed by fire, lightning or tempest, riot, insurrection, military or usurped power, civil commotion, sabotage, vandalism, acts of God and the Queen's enemies, so as to render the same wholly unfit for occupancy, and if they be so badly injured that they cannot be repaired with reasonable diligence within ninety (90) days of the happening of such injury, then this Lease shall cease and become null and void from the date of such damage or destruction and the lessee shall immediately surrender the premises and all interest therein to the lessor and the lessee shall pay rent within this term only to the time of such damage or destruction, and the lessor may re-enter and repossess the said demised premises discharged of such Lease and may remove all persons therefrom. If the demised premises shall be repairable as aforesaid within ninety (90) days after the happening of such injury then the rent shall not run or accrue after the said injury or while the process of repair is going on and the lessor shall repair the same with all reasonable speed and then the rent shall recommence immediately after the repairs shall be completed; but if the premises shall be so slightly injured by the aforesaid causes as to be partially fit for occupancy and to be repairable as aforesaid within ninety (90) days, then the lessor shall repair

the same with reasonable promptitude and the rent shall abate in part only in proportion to the extent of such damage and until such injury is fully repaired.

(3) EXCEPT where the context forbids the expression "the lessor" hereinbefore made use of shall be deemed to include the party hereto of the first part and its assigns or other the person or persons for the time being entitled to the reversion of the demised premises expectant on the determination of the term hereby granted and the expression "the lessee" hereinbefore made use of shall be deemed to include the party hereto of the second part and its assigns or other the person or persons in whom the said term of years shall for the time being be vested.

In Witness whereof the parties hereto have caused their respective corporate seals to be hereunto affixed by the hands of their proper officers authorized in that behalf the day and year first above written.

SLOUGH ESTATES (CANADA) LIMITED

APPENDIX NO. 3

EDMONT MANUFACTURING COMPANY

COMMUNITY DATA SHEET

TOWN_____

POPULATION_____

LOCATION: County_____State_____

MANUFACTURING PLANTS IN THE LABOUR MARKET (employing 20 persons and over) SHOWING NUMBER EMPLOYED AND PRODUCT MANUFACTURED_____

OTHER MAJOR EMPLOYERS IN THE LABOUR AREA, e.g. MINING,

TRANSPORTATION:

LABOUR: (Estimated available supply) Total_____Females____

Are there any who have had experience with power sewing machines?_____
If so, how many:_____
What evidence can be shown indicating productivity and industriousness of the local population:

LABOUR ORGANIZATION:
Which of the above plants are organized? By whom?_____
What has been the history of labour-management harmony?

TRANSPORTATION:
Railroads:_____Frequency of service:_____
Truck lines:_____Frequency of service:_____
Bus lines:_____Frequency of service:_____
Nearest airport:_____

UTILITIES:
Electricity:_____Rates:_____
Is natural gas available?_____Rates:_____
Water and Sewerage?_____Rates:_____

FIRE AND POLICE PROTECTION:
Number of Force: Fire_____Police_____
Insurance rating:_____

EDUCATION FACILITIES:
Schools: Elementary_____High_____Number of students 6
Number of teachers:_____Library facilities_____

HEALTH FACILITIES:
Hospitals or clinics:_____Doctors in community:_____
Dentists in community:_____

CONSTRUCTION AND REPAIR SERVICES:
Kind of establishments and number:_____

PUBLIC RECREATION FACILITIES (e.g. Park):_____

TAXES (kind and rate) ON PROPERTY AND BUSINESS OPERATIONS:
City_____
County_____
State_____
Property Assessment Rates_____
Community Indebtedness_____

COMMUNITY PLANS FOR CONSTRUCTION OF A BUILDING FOR A MANUFACTURER:
WHAT ARRANGEMENTS FOR ABOVE:
Rental:_____
Lease:_____
Land Contract Purchase:_____
Outright Sale:_____
Lease with option to buy:_____
Other:_____

WHAT OTHER CONDITIONS ARE ATTACHED TO ABOVE ARRANGEMENTS?

WHAT PLANS HAVE BEEN MADE FOR THE FUTURE OF THE COMMUNITY?

IS ANY MAJOR CONSTRUCTION PLANNED IN THE SURROUNDING AREA IN THE NEAR FUTURE?
IF SO, WHAT?_____

GIVE NAMES AND POSITIONS OF THREE COMMUNITY LEADERS:

Signed:_____

Position:_____

APPENDIX NO. 4

TRINIDAD AND TOBAGO

INDUSTRIAL DEVELOPMENT CORPORATION

SITE REQUIREMENT GUIDE

The information you are requested to furnish below is needed to provide our Industrial Estates Unit with a basis for allocating a suitable site for your project, or to help you evaluate a location tentatively selected. It is designed to protect you against any future inconvenience that may arise through faulty location and to protect other firms already established in the vicinity.

The Corporation would appreciate your being as specific as possible. Any information supplied in addition to that required whenever you deem necessary would also be of value and future needs should be covered when possible.

The form should be signed when completed to your satisfaction.

1. GENERAL INFORMATION:

   A. Proposed Local Firm's Name _____

   B. Parent Firm's Name and Address (if any) _____

   C. Name and Address of Local Representative _____

   D. Pioneer or Applied for _____

   E. Time to complete proposals : Initial and Final _____

   F. Date on which Factory construction commences _____

   G. Date on which Production is to commence _____

   H. Nationality of Applicant. If a Company, Nationality of Directors _____

II. TYPE AND ACTIVITY

   A. Basic Product _____

   B. Brief Description of Operation _____

C. List of Machinery with individual weight and area covered by base _____

III. UTILITIES

A. Electric Power requirements

1. Maximum Demand in KVA _____
2. Total power required in Horsepower _____
3. Voltage _____
4. Phases _____
5. Other Comments _____

B. Water Requirements

1. Total consumption (GPD) _____
2. Duration of this consumption (Hours/Day) _____
3. Peak rate of use (GPM) _____
4. Duration of peak use _____
5. Pressure required _____
6. Breakdown of Water uses:

A. Industrial process _____ GPD ____% of total.

B. Sanitary uses _____ GPD ____% of total.

C. Cooling purposes _____ GPD ____% of total.

D. Air conditioning _____ GPD ____% of total.

E. Steam production _____ GPD ____% of total.

F. Other _____ GPD ____% of total.

7. Special characteristics desired of water supply (purity, chemical content, temperature, salinity, etc.) _____

C. Sewer Facilities

Will your industrial plant produce any effluent other than the normal sewage from sanitary facilities?

Yes _____ No _____

If so, give details

1. Total volume of waste (GPD) _____
2. Duration of discharge (Hours/day) _____
3. Peak rate of discharge (GPM) _____
4. Duration of peak discharge _____
5. Plans for treatment of waste _____
6. Submit certified copy of physico-chemical analysis of waste originated in similar plant, including:

    A. Temperature
    B. PH (Alkalinity or Acidity)
    C. BOD (Biological oxygen demand)
    D. Total Solids concentration

        1. Suspended solids
        2. Volatile solids
        3. Settleable solids

    E. Qualitative and Quantitative analysis of waste.

IV. SITE

A. Size of Lot required _____

B. Special requirements as to location (community preference, geographic orientation, climatic conditions required, proximity to waterfront, railway, etc.).

_____

C. Subsoil conditions, indicating soil bearing capacity desired

_____

A Site Plan showing percentage coverage and use of land should be submitted with this questionnaire.

V. BUILDING

A. Floor Area _____

B. Type (Single or multi-storey, flat roof, semi-monitor, full monitor, etc.)

_____

C. Special requirements (floor bearing capacity, air conditioning, etc.)

_____

D. Projected future expansion:

1. Size _____

2. Expected date _____

E. If a special building is required, give brief description of characteristics desired

_____

Site Plan showing location of building, roads, parking facilities, land-scaping, fences, drainage, sewers, water mains, telephone and electricity inlet locations to be submitted.

Floor plans including layout (and approximate weight of machinery) and welfare facilities (e.g. recreation rooms, canteen, etc. to be submitted).

VI. CHARACTERISTICS OF PROCESS

A. Raw Materials.

1. Itemize materials _____

2. Expected source _____

3. Fire, explosion or health hazards associated with materials used

_____

4. Plans for storage facilities (raw materials and product)

_____

B. Obnoxious conditions originated in proposed operation (dust, odors, fumes, smoke, noise, vibrations, etc.)

C. Similarly, describe possible environmental factors to which operation may be peculiarly sensitive.

_____

D. Proposed special treatment, such as: smoke abatement, floor padding, air conditioning, etc.

_____

VII. LABOUR FORCE

A. Number of employees and sex distribution

1. At start of operations _____ Male _____ Female _____

2. At full production (____ months after start) _____

Male _____ Female _____

3. After anticipated expansion (___ months after start) _____

Male _____ Female _____

B. Number of work shifts anticipated

1. At start of operation _____

2. At full production _____

VIII. FINANCE

1. Financial Structure*

2. Capital Investment $_____ Initial $_____ Final

comprising:

A. Land $_____ Initial $_____ Final

B. Buildings $_____ Initial $_____ Final

C. Plant & Equipment $_____ Initial $_____ Final

D. Working capital $_____ Initial $_____ Final

3. Amount and source of foreign funds to be invested.

_____

A. Plant, Machinery & Equipment _____

B. Raw material _____

4. Character & Volume of prospective earnings

A. Soft/sterling currency _____

_____

*Submit details such as Name and Address of principal shareholders or partners, and the amount to be contributed by each.

B. Hard/dollars currency _____

5. Character & Volume of prospective expenditure

A. Soft/sterling currency _____

B. Hard/dollars currency _____

6. Markets _____

_____

(Signature)

_____

(Firm)

_____

(Title)

_____

(Date)

NOTE: Please answer only the questions that apply to your particular industry.

APPENDIX NO.5

Industries Located at Point Claire

The following list indicates the industries in operation, under construction or which have bought land in the industrial area.

* Under construction

** In operation

Numbers refer to plan of industrial area.

1. George Blanchard
*2. Vipond Automatic Sprinklers Co. Ltd.
3. Samuel Osborn (Can.) Ltd.
4. Industrial Adhesives Ltd.
5. Assti
6. G.M.B. Construction Cie. Ltee.
**7. H.G. Johnston Co. Ltd.
**8. Lakeshore Movers & Warehousing (Can.) Ltd.
**9. Montreal Reefer Service
**10. Custom-Aire Products Mfg. Co. Ltd.
11. Delmar Chemicals Ltd.
**12. Que-Mar Equipment Ltd.
13. Falcon Equipment
**14. Pentagon Construction Co. Ltd.
15. Montreal Trust Co.
16. Hart Motors Ltd.
*17. Fairview Shopping Centre
**18. Bardahl Lubricants (Canada) Ltd.
**19. Frank P. Lalonde Ltd.
20. Mowatt & Moore Ltd.
**21. Hewitt Equipment Ltd.
22. Kemeny
**23. Kal-Kar Insulation Corp.
24. H. Tritt
25. Thorburn Mill Supply Ltd.
26. Maxell Holdings Ltd.
27. Texavon Chemical Co. Ltd.
28. Canadian Standards Association
29. Square "D" Company Canada Ltd.
30. Pulp & Paper Mill Accessories Ltd. (Maase)

**31. Hunter Douglas Ltd.
32. Paco Corporation
**33. Dominion Herb Distributors Inc.
34. Ryden Ltd.
35. B.W. Deane & Co.
*36. B.W. Deane & Co.
**37. Toastess Ltd.
38. Royal Trust Co.
**39. Taggart Service Ltd.
**40. Schering Corporation Ltd.
**41. Metropolitan Stores of Canada Ltd.
*42. Electrolux (Canada) Ltd.
43. Hanover Square Development Co.
**44. Chrysler Corp. of Canada Ltd.
**45. Brown, Boveri (Canada) Ltd.
**46. Brown Boveri (Canada) Ltd.
**47. Mallinckrodt Chemical Works Ltd.
**48. General Motors Products of Can. Ltd.
**49. Avon Products of Canada Ltd.
50. Rogers Lumber Ltd.
**51. Bovril (Canada) Ltd.
**52. Pascal Realties Ltd.
53. O'Keefe Brewing Co. Ltd.
**54. Proctor & Gamble Co. of Can. Ltd.
55. Sheraton Mount Royal
**56. J. Brooke Ltd.
**57. Pharma-Research Can. Ltd.
**58. Noranda Copper & Brass Ltd.
**59. Pulp & Paper Research Institute of Canada
**60. Canadian Imp. Bank of Commerce
**61. Office Building
**62. Fina Gasoline Service Station
**63. Imperial Oil Ltd.
**64. ITT Royal Electric Co. (Que.) Ltd.
65. Montreal Bronze Ltd.
66. Chemical Development of Can. Ltd.
**67. Central Dynamics Ltd.
**68. The Bell Telephone Co. of Canada
**69. Martin Black Wire Ropes (Canada) Ltd.
**70. Standard Electric Time Ltd.
**71. Canada Gunite Co. Ltd.
72. Melody House Inc.
73. Bardahl Lubricants (Canada) Ltd.
74. Lakeshore Construction Inc.
**75. Wallace Barnes Co. Ltd.
**76. Hus-Ski Ltd.
**77. Fina Gasoline Service Station
78. Imperial Oil Ltd.

**79. Norman Wade Co. Ltd.
**80. Tri-Color Motors Ltd.
**81. Timberland-Ellicott Ltd.
**82. Lepage's Ltd.
**83. Klockner-Moeller Canada Ltd.
84. J.C. Mitchell Ltd.
**85. British Petroleum of Can. Ltd.
86. Affco Investments Corp.
*87. Rousseau Controls Ltd.
88. Lewis Shoe Company
89. Snap Mfg. Co.
90. Weather Engineering Ltd.
*91. Harling Match Ltd.
**92. Bank of Montreal
**93. Bank of Nova Scotia
**94. Radio Station C.F.O.X.
*95. Central Scientific Ltd.
96. Terry Machinery Ltd.
97. Wainbu Innes Ltd.
98. B.D. Carpenter Ltd.

APPENDIX NO.6

Industries Located at Ville d'Anjou

The following list indicates the industries already built or which have bought land in the industrial area. The numbers refer to figure 41 and the shaded block plans of buildings indicate those industries which have completed buildings in the area.

1. Recstone Corp.
2. Stuart Biscuit Co. Ltd.
3. Bell Telephone Co. of Canada
4. Electrolier Corp.
5. Metropole Lithographing Inc.
6. Eastern Sheet Metal Works Ltd.
7. Bonus Inc.
8. Sanitary Refuse Collectors Inc.
9. Reardon (Paint) Co. Ltd.
10. Kredl Roofing Corp.
11. Walker Glass Co. Ltd.
12. Bellaire Chesterfield Co.
13. Plypane Inc.
14. J.B. Lefebvre Ltee.
15. Diamond Crystal Salt of Canada Ltd.
16. Gauthier & Freres Enrg.
17. Jos. Vaillancourt Inc.
18. Capitol Ornamental Iron Works
19. F. Gendron (Furniture & Fixture Mfg.)
20. Richelieu Printing
21. Columbia Acoustic Tile & Newton Lumber Co.
22. Langelier Equipment
23. Sanitank
24. Lagin & Roselle
25. Anjou Steel
26. Union Trunk
27. Ville d'Anjou Municipal Garage
28. Pressure Pipe (Canada Iron Foundries)
29. Menuiserie des Pins Inc.
30. Westhill Industries Ltd.

31. Intercontinental Corp.
32. " "
33. Consolidated Carpet Mfg. Co.
34. Grenache Dairies Inc.
35. Norben Inc. & Small Co. of Canada
36. Canadian Liquid Air Co. Ltd.
37. O & R Asselin
38. Munico Inc.
39. Suthernaire Inc.
40. G. Lepine Inc. (Poultry)
41. F. Dario Reg'd.
42. Biltrite Furniture
43. Three Star Properties
44. G & M Construction
45. Sanivan
46. R.C.R. Products
47. J. Cote
48. British Chrome & Chemical
49. Bank of Montreal
50. Rolland Theoret Inc.
51. A. Prud'homme & Fils
52. Scandinavian Marine Industries
53. Dominion Rubber Co. Ltd.
54. Giacomo Bros. Stone Mfg. Co.
55. Salvatore Marini
56. Distribution Eclair
57. Samton Metal Equipment
58. O. Heroux
59. Cap Diamand Stone
60. Municipal Recreation Center
61. M. Pemmampede
62. J. Miller Bros.
63. Giacomo Ltee Construction
64. St. Louis Bedding Co. Ltd.
65. John N. Brocklesby Transport Ltd.
66. Regal Furniture Mfg. Co. Ltd.
67. Lunik Co. Reg'd
68. Maxel Holdings Ltd.
69. Duclos Transport
70. Beaudoin, Smith & Gratton
71. No-Sag Spring Co.
72. Geo. A. Hall Cartage Co.

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