THE POTENTIAL ROLE OF SUBURBAN MINI INDUSTRIAL ESTATES:
A CASE STUDY OF THE COQUITLAM AREA

by

ROY JAMES MUTTER
B.Sc., University of Alberta, 1957

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE
in the School
of
COMMUNITY AND REGIONAL PLANNING

We accept this thesis as conforming to the
required standard

THE UNIVERSITY OF BRITISH COLUMBIA
August, 1969
ABSTRACT

Mini industrial estates and the potential role they can play in hastening the rate of industrial development in suburban areas is the subject of this study.

Industrial development in the Vancouver Metropolitan Area is proceeding at a slower rate than had previously been anticipated in 1961 by the planners of the Lower Mainland Regional Planning Board. The five year forecast for 1966, for occupied industrial land, was optimistically high as shown by a comparison with the 1966 Industrial Survey figures.

However, the private industrial estates of Annacis Island, Delta and Lake City, Burnaby are developing at a faster rate than is the total industrial picture. One other industrial estate, Brighouse, in Richmond commenced operation during the five year period, and thus was not included in the figures of the original 1961 Industrial Survey.

Because of the success of the industrial estates in the Vancouver Metropolitan Area, the author considers in Chapter I, small industries as possible starters for a small scale mini industrial estate. Chapter II investigates industrial estates with specific reference to the historical development of estates and the latter's reasons for growth. Secondly, mini industrial estates come under consideration with emphasis on the advantages and disadvantages of a mini industrial estate locating in a suburban area.
To investigate the concept of mini industrial estates in a Metropolitan Area, the author in Chapter III, analyzes an extensive Industrial Survey which was undertaken in 1966 by the staff of the Lower Mainland Regional Planning Board. From the data, nineteen mini industrial estates were selected for a preliminary investigation; the main criteria for selection being that each estate should have five or more small firms occupying one site. A more intensive questionnaire survey was then prepared for six mini industrial estates selected from the original nineteen estates. The answers to the questionnaires coupled with library research related in Chapters I and II, were instrumental in isolating three pertinent factors regarding the location of a mini industrial estate. These three factors are: complementarity; transportation; and investment, both by the municipality and a large industrial firm.

Finally, in Chapter IV, the Coquitlam Area is selected for a case study to investigate the future role of mini industrial estates.

This study proposes that the potential of the mini industrial estate will provide one solution to the problem of slow industrial development within the suburban areas of Greater Vancouver. The implementation of this concept should be a municipal responsibility, and the guidelines selected in this study will be of value to the
suburban municipalities regarding the location and administration of
a mini industrial estate.

Approved:
In presenting this thesis in partial fulfilment of the requirements for an advanced degree at the University of British Columbia, I agree that the Library shall make it freely available for reference and study. I further agree that permission for extensive copying of this thesis for scholarly purposes may be granted by the Head of my Department or by his representatives. It is understood that copying or publication of this thesis for financial gain shall not be allowed without my written permission.

Department of \underline{Community and Regional Planning}

The University of British Columbia, Vancouver 8, Canada.

Date \underline{September 2, 1969}
ACKNOWLEDGMENTS

While working at the Lower Mainland Regional Planning Board on the Industrial Survey - 1966, I became particularly interested in industrial development, and from this interest evolved the thesis topic. Mr. V. J. Parker, Executive Director of the Lower Mainland Regional Planning Board, deserves thanks for assigning me the first phase of the Survey.

To those who were willing to discuss the concept of mini industrial estates, I would also like to thank the following: Mr. W.S. Jones, W.T. Rainford and Co. Ltd.; Mr. T.A. Steeves, Thomas A. Steeves Ltd.; Mr. W. Kerr, Industrial Commissioner, Corporation of the Township of Richmond; Mr. W.T. Hutchinson and Mr. A.E. Davidson, Grosvenor-Laing (B.C.) Ltd., Annacis Industrial Estate; Mr. Thomas, Northern Building Supply Ltd.; Mr. Brookes, B. & M. Equipment Ltd.; Mr. D. Buchanan, Planner, Municipality of Coquitlam; Mr. D. O'Gorman, Planner, Lower Mainland Regional Planning Board; Mr. J. McEwan, Greater Vancouver Industrial Development Commission.

I am also indebted to Dr. Peter H. Oberlander for giving me this opportunity to complete my master's degree, and to Dr. Craig Davis, thesis supervisor, for his valued assistance.
TABLE OF CONTENTS

ABSTRACT ........................................ i
ACKNOWLEDGMENTS .............................. v
LIST OF TABLES ................................. vii
LIST OF ILLUSTRATIONS ....................... viii
INTRODUCTION ................................ ix

CHAPTER

I. MODERN SMALL INDUSTRY IN A SUBURBAN AREA .................................. 1
   Definitions of Small Industry .......... 1
   How Important is Small Industry? .... 3
   Small Industry which is Suitable for a Suburban Area ............... 9

II. THE CASE FOR THE MINI INDUSTRIAL ESTATE ................................. 18
   The Industrial Estate ................. 18
   The Mini Industrial Estate .......... 26

III. MINI INDUSTRIAL ESTATES IN THE VANCOUVER METROPOLITAN AREA .......... 33
   Extensive Survey ....................... 33
   Intensive Questionnaire Survey ...... 34

IV. A CASE STUDY OF A MINI INDUSTRIAL ESTATE IN THE COQUITLAM AREA ....... 60
   Professional Opinions Regarding Present Industrial Development in the Coquitlam Area .... 78
Questionnaire Survey with Specific Reference to the Coquitlam Area

An Examination of Mini Industrial Estate Sites in the Coquitlam Area

V. SUMMARY

BIBLIOGRAPHY

APPENDIX
LIST OF TABLES

Table

1. Land Absorption by Municipal Industrial Districts, 1961 - 1966  xi

II. Role of Manufacturing Establishments Having Fewer than 100 Employees  5

III. Importance of Small Factories in Selected Countries  6

IV. Status of the Preliminary Mini Industrial Estates  35

V. Selected Mini Industrial Estates  39

VI. Size of Municipalities in the Coquitlam Area  65

VII. Coquitlam Area Population 1966 - 1986  67

VIII. The Amount of Industrial Land in the Coquitlam Area  71

IX. Industrial Firms in the Coquitlam Area  72

X. Classification Criteria  74

XI. Large Industrial Firms in the Coquitlam Area  74

XII. Medium Industrial Firms in the Coquitlam Area  76

XIII. Small Industrial Firms in the Coquitlam Area  77
# LIST OF ILLUSTRATIONS

## Maps

<table>
<thead>
<tr>
<th>Map</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Map 1.</td>
<td>The Greater Vancouver Area Showing Location of Preliminary and Selected Mini Industrial Estates.</td>
<td>52</td>
</tr>
<tr>
<td>Map 2.</td>
<td>The Coquitlam Area Showing Present Industrial Firms and Location of Proposed Mini Industrial Estates</td>
<td>82</td>
</tr>
</tbody>
</table>

## Photographs

- 1000 Parker Street, Vancouver 40
- 1610 Kent Avenue East, Vancouver 42
- 7342 Government Street, Burnaby 44
- 502 - 20th Street, New Westminster 46
- 400 Ewen Avenue, New Westminster 48
- Derwent Way, Delta 50
INTRODUCTION

Statement of the Problem. This thesis investigates the problem of slow industrial growth in the suburban municipalities of the Vancouver Metropolitan Area and proposes as its concept that small industries, when grouped together as small publicly owned industrial estates, would hasten planned industrial development.

Importance of the Study. During 1966 while on the staff of the Lower Mainland Regional Planning Board, the author was instructed to carry out a comprehensive industrial survey designed to forecast the amount of land occupied by industry, a follow-up of an industrial survey conducted in 1961. The latter was the forerunner of "Industrial Land Prospects", 1961 and "The Dynamics of Industrial Land Settlement", 1961, two pertinent reports prepared by the Board's staff. The Chairman of the Board at that time stated in his letter of introduction to "The Dynamics of Industrial Land Settlement" that the planners had evolved, "a rational method by which industrial land settlement can be forecast, as opposed to earlier arbitrary methods". 1

The survey and subsequent reports in 1961 added significantly to the scarce amount of factual information known about industrial land settlement in the Vancouver Metropolitan Area. One feature of the 1961 work was an estimate of 1966, 1971 and 1976 industrial land use totals. The projections for 1966, the first of the five year series, could now be checked by comparing the estimates and the true
figures. A large discrepancy occurred which indicated that industrial growth had been much slower than anticipated. A comparison of these data is presented in Table I, page xi.

One of the ideas that was focussed upon by the planners when comparing the 1961 and 1966 figures was the recommendation regarding public industrial estates. The text of "Industrial Land Prospects" anticipated the reception the public industrial estates would get:

Clearly this proposal will not bring joy to the hearts of those who live on a percentage of every sale made, but there is no doubt that it could do a great deal for prospects of this region and for the average taxpayer.  

In 1962 the Board gathered together the public reactions to "Industrial Land Prospects", and specifically to the question, "Should public industrial estates be organized on a cooperative metropolitan or regional basis?" Including those who were opposed to the idea of public industrial estates were the private industrial estates of Grosvenor-Laing (B.C.) in Delta and Webb and Knapp (Canada) Ltd. in Burnaby, who together with others made three major points:  

1) They stress the principle that government should not enter directly into business activity unless it is absolutely essential for public welfare. 

2) They would object to public estates being subsidized from public revenues.
<table>
<thead>
<tr>
<th>Municipality</th>
<th>Forecast Acres</th>
<th>Actual Acres</th>
<th>Difference Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancouver</td>
<td>138.10</td>
<td>97.80</td>
<td>-40.30</td>
</tr>
<tr>
<td>Burnaby</td>
<td>486.15</td>
<td>182.86</td>
<td>-303.29</td>
</tr>
<tr>
<td>New Westminster</td>
<td>69.10</td>
<td>23.25</td>
<td>-45.85</td>
</tr>
<tr>
<td>Coquitlam</td>
<td></td>
<td>0.2</td>
<td>+0.2</td>
</tr>
<tr>
<td>Coquitlam, Port Moody</td>
<td></td>
<td>29.95</td>
<td>+2.17</td>
</tr>
<tr>
<td>Port Coquitlam</td>
<td></td>
<td>32.12</td>
<td></td>
</tr>
<tr>
<td>Richmond</td>
<td>698.80</td>
<td>301.73</td>
<td>-397.07</td>
</tr>
<tr>
<td>North Vancouver City</td>
<td>104.45</td>
<td>150.15</td>
<td>+45.70</td>
</tr>
<tr>
<td>North Vancouver District</td>
<td>513.05</td>
<td>136.82</td>
<td>-376.23</td>
</tr>
<tr>
<td>Delta</td>
<td>134.25</td>
<td>3.0</td>
<td>-131.25</td>
</tr>
<tr>
<td>Surrey</td>
<td>151.00</td>
<td>61.83</td>
<td>-89.47</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,324.85</strong></td>
<td><strong>989.86</strong></td>
<td><strong>-1,741.09</strong></td>
</tr>
</tbody>
</table>

Source: Lower Mainland Regional Planning Board "1966 Industrial Survey" (mimeographed)
3) They fear the effect of public estates on private investment in industrial land in the region.

When a large scale public industrial estate is mooted, the private industrial estates are strong in their protest regarding public versus private industry. The above three points were discussed, and the point of departure came when the private estates considered tracts of land that would form a six hundred to twelve hundred acre public industrial estate. If the private industrial estates had been considering a ten to fifteen acre size, it is doubtful if they would have taken issue with the idea. Unfortunately this factor was missed at the public hearing.

The crux of the author's study of industrial estates is size. Instead of a regular industrial estate, a mini industrial estate is under investigation. That is to say, small firms, occupying small accommodation, small enough so that they will not be in competition with private industrial estates, but large enough to be attractive to the municipalities so that the latter enter the public industrial estate field.

**Scope of the Study.** Obviously the idea of mini industrial estates includes more than planning as a solution. It could include financing or economics as the starting point. However, for the purpose of this study, land use planning will be the initial discipline and the following indicators will be taken into consideration:
1) Public and private investment - The difference between public and private investment is recognized by the existing mini industrial estates that were questioned as part of the interview section of this thesis. One conclusion that can be drawn is that the smaller size of the mini industrial estate could move the dividing line between public and private investment in such a way that the public investment would be more readily available to small industry.

2) Municipal responsibility - The municipality would be the landholder and would be responsible for the administration of the mini industrial estate. This is necessary because of the long term view required.

These mini industrial estates were broken down into small businesses and industrial estates for library research. The concept of a small industrial estate, which had its origins in the economics of the industrialized west, was introduced to India where the government has a policy of more dispersed industrial development. The concept was then brought back to Canada and tested in the fringes of the metropolitan regions. The concept that was applied overseas first and brought back to a much more economically advanced country seems the reverse of what is normally expected.

Plan of the Thesis. The thesis is divided into two unequal parts, the first treating the subject by dividing it into two chapters;
small industry and small industrial estates. The second part of
the thesis is a study of the Vancouver Metropolitan Area to find the
mini industrial estates that the Lower Mainland Regional Planning
Board had on the card file from their Industrial Survey - 1966. A
case study of the Metropolitan Area breaks down into four Areas,
the Central Area, the North Shore, the Coquitlam Area and the South
Shore. Of these, the Coquitlam Area, including all the Metropolitan
Area east of Burnaby and New Westminster and north of the Fraser River
to the Pitt River was chosen for a case study. This area was
selected, firstly, because it lacks the industrial estates that
are present in the other areas and secondly, there are no provincial
railroads within the area. Singly or combined these two elements,
the industrial estates and the provincial railways, provide the
impetus for starting or maintaining industrial growth already there.
Another solution will have to be sought.

This thesis will endeavour to validate the concept of mini
industrial estates as applied to the suburban areas of a metropolitan
type region. It is hoped that the concept of "small" will make the
estate seem more of a municipality responsibility and less of a
private investment concern.
FOOTNOTES


"Small" when used with "industry" appears on the surface to be a very simple term, but it has a myriad of meanings which reach into every facet of industry. The term "small", of course, is only a valid description when used as a comparison.

Functional Definition. Wildgen, for example, offers the following list of qualitative attributes of small business:

a) the controlling owners are usually the managers;

b) few, if any, specialized professional staff members are available to execute separate management functions;

c) research facilities are lacking;

d) the business is not among the "dominant firms" in its industry;

e) the business is self-dependent (which is not entirely synonymous with independent);

f) its demands for external financing are, in terms of amounts required at any one time, insufficient to bear the minimum costs of floating a securities issue on the organized capital markets.¹

Statistical Definition. Small can mean less than one hundred employees,² or one whose estimated gross annual revenue for the fiscal year did not exceed $500,000.³ In the United States, a
manufacturing firm is officially a small business in connection with government procurement orders if it is not dominant in its field of operation and has fewer than five hundred employees. In India small industry has been officially defined for administrative purposes as industrial establishments having fewer than fifty employees (if power equipment is used) or fewer than one hundred (if no power is used) and having less than Rs. 500,000 (about U.S. $105,000.) of fixed capital. Taking a world view of this, one reference goes on to say that small industry is defined in many ways. This is not surprising, for a factory that is relatively small in a country of advanced industrial development with large markets would seem relatively large in a country where modern industry is just starting and markets are small.

**Financial Definition.** Financially the small industry in Canada should take the definition that is in the Small Business Loan's Act. A small business enterprise, including industry, i.e. one whose estimated gross annual revenue for the fiscal year which an application for a loan was made, did not exceed $500,000.

**Employee Definition.** In a small industrial firm, the number of employees is limited because of the small scale area concerned. The minimum would be one employee, the owner-operator working solely by himself, and the maximum would be ten employees per firm. The figure ten, as selected by the author, to describe
the maximum number of employees per firm compared with the figure ten as used by the Industrial Survey - 1961 to describe the minimum number of employees per firm of those firms studied. This illustrates that "forgotten" segment of small industry i.e. under ten employees.

II. HOW IMPORTANT IS SMALL INDUSTRY?

India, Pakistan and Puerto Rico, countries which are termed underdeveloped, and Canada which is called a developed country, are all interested in economic growth. However, the objectives for attaining economic growth are different. In India the prime objective is to encourage small industries to take advantage of common services and other facilities such as good sites, electricity, gas and water.⁶ Pakistan, on the other hand, felt that its principle objective was to help the large numbers of refugees who had entered Pakistan after Partition.⁹ Puerto Rico found that its foremost objective was simply a comprehensive system of incentives aimed primarily at attracting capital and entrepreneurship from the United States mainland.¹⁰ Canada, or at least Vancouver, has as its prime objective to find a solution to the slowness with which secondary industry has been attracted to the Metropolitan Area. While these aforementioned countries are developing small industry they are not, on the other hand, against large industry. Small industry has the notorious habit of growing up.
In the United States small industries use the United States Bureau of the Census under-one-hundred-employees definition to distinguish themselves from medium or large industry. Table II, page 5, illustrates that in 1958 in the United States, 91% of all the manufacturing establishments had fewer than one hundred employees, these establishments employed 27% of all manufacturing employees and produced 23% of all manufacturing output. Later, in Table III, page 6, the United States in the five-nine employee group had 2.2% of the total factory employees. This compares with New Zealand which has 10.1% and Japan which has 7.2%. Although the five-nine employee group in relative terms in the United States is comparatively small, introducing per capita value added by manufacturing in 1953, places the United States in its proper position as the leader in the industrial field. One conclusion it does indicate is that firms of small industry in highly industrialized economies are very different from those in traditional economies. Machines rather than hand labour are the critical factor.

The following technical and business forces favouring small industry moderate the trend towards medium and large sized firms, and give the competitive advantage, in some circumstances, to small industries.

1. Physical and Engineering Relationships. Products which are light, small, requiring only moderate precision, are frequently made on light equipment or by relatively simple assembly operations for which the principle of multiples is achieved at a low volume of output.
### TABLE II

**ROLE OF MANUFACTURING ESTABLISHMENTS HAVING FEWER THAN 100 EMPLOYEES**

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>% of all manufacturing establishments</th>
<th>% of all manufacturing employees*</th>
<th>% of all manufacturing output+</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>1958</td>
<td>91</td>
<td>27</td>
<td>23</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1961</td>
<td>92</td>
<td>26</td>
<td>n.a.</td>
</tr>
<tr>
<td>West Germany</td>
<td>1953</td>
<td>89</td>
<td>27</td>
<td>23</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1959-1960</td>
<td>97</td>
<td>62</td>
<td>55</td>
</tr>
<tr>
<td>Argentina</td>
<td>1954</td>
<td>98</td>
<td>52</td>
<td>39</td>
</tr>
<tr>
<td>Japan</td>
<td>1959</td>
<td>98</td>
<td>56</td>
<td>34</td>
</tr>
</tbody>
</table>

n.a. - not available

* United Kingdom and Argentina, workers; New Zealand, persons engaged

+ United States, New Zealand and Japan: value added by manufacture; West Germany: turnover excluding goods purchased and resold without processing; Argentina: estimated production.

### TABLE III

**IMPORTANCE OF SMALL FACTORIES IN SELECTED COUNTRIES**

<table>
<thead>
<tr>
<th>Country</th>
<th>Per capita value added by manufacturing in 1953, $</th>
<th>Year</th>
<th>% of total factory employment* in establishments with:</th>
<th>% contributed by establishments with 5-99 employees to total factory:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>5-9 employees</td>
<td>10-49 employees</td>
</tr>
<tr>
<td>United States</td>
<td>362</td>
<td>1958</td>
<td>2.2</td>
<td>13.8</td>
</tr>
<tr>
<td>Australiab</td>
<td>321</td>
<td>1958-1959</td>
<td>8.9</td>
<td>25.2</td>
</tr>
<tr>
<td>Swedenb</td>
<td>309</td>
<td>1958</td>
<td>6.3</td>
<td>21.2</td>
</tr>
<tr>
<td>New Zealandc</td>
<td>202</td>
<td>1959-1960</td>
<td>10.1</td>
<td>35.8</td>
</tr>
<tr>
<td>Chiled</td>
<td>77</td>
<td>1957</td>
<td>7.0</td>
<td>25.8</td>
</tr>
<tr>
<td>Japane</td>
<td>60</td>
<td>1959</td>
<td>7.2</td>
<td>31.6</td>
</tr>
<tr>
<td>Colombiaf</td>
<td>50</td>
<td>1959</td>
<td>12.4</td>
<td>25.6</td>
</tr>
<tr>
<td>Brazil</td>
<td>42</td>
<td>1958</td>
<td>7.9</td>
<td>20.6</td>
</tr>
<tr>
<td>Lebanon</td>
<td>35</td>
<td>1955</td>
<td>19.7</td>
<td>37.6</td>
</tr>
<tr>
<td>El Salvador</td>
<td>17</td>
<td>1956</td>
<td>23.9</td>
<td>30.8</td>
</tr>
<tr>
<td>Iraq</td>
<td>10</td>
<td>1954</td>
<td>19.1</td>
<td>17.7</td>
</tr>
</tbody>
</table>

---

* Total factory employment refers to establishments with 5 or more employees.

b Australia and Sweden: Classes represent 5-10, 11-50, 51-100 and 5-100 employees, respectively.

c New Zealand: Data represents 6 or more persons engaged, in classes of 6-10, 11-50, 51-100, and 6-100 respectively.

d Chile: Data represents persons engaged.

e Japan: Data represents 4 or more employees, classes 4-9 and 4-99.

f Colombia: Data represents persons engaged, and include establishments with 1-4 persons engaged but having minimum annual output of 24,000 pesos.

g Brazil: Value of production.

---

2. **Products in which Skilled Labour or High Precision are critical.** The president of one small company is quoted as saying, "It is remarkable how competition drops out on the short side of two ten-thousandths of an inch."

3. **Mass Production of Specialized Components or End Items.** Division of tasks permits specialized small firms to concentrate on high-volume production of components for several large firms, no one of which requires a volume sufficient to sustain a specialized production facility of its own.

4. **Products Made in Small Lots and Short Runs.** Many products cannot be standardized or are varied to suit the tastes of different consumers. Other products have small total markets and cannot bear their share of large firm overheads.

5. **Locational Factors and Transfer Costs.** Scale of plant tends to be limited for products whose high transfer costs confine them to a local or regional market, and for the processing of resources which are widely scattered and difficult to concentrate in unprocessed form because of perishability or high transfer costs.

6. **Technical Excellence in Design or Innovation in Specialized Products.** Engineers well versed in marketing and in tailoring product development to specialized customer needs are prominent among the founders of many of the small United States electronics companies which have had remarkable success and growth histories.

7. **Personal Relations in the Small Firm.** Close manager-worker relations are frequently cited as the basis for low labor turnover and high productivity, while close-knit management teams often achieve more effective and detailed collaboration than is common in larger, more formalized organizations.

8. **Selling Services.** Special attention, extra quality, speed, provision of technical knowledge along with a sales contract: these are key ingredients of many successful small manufacturing enterprises. Extra executive attention can quickly be focussed on important requests or opportunities, to which the top talent of the small firm is often better attuned than delegated decision-makers in a division or branch of a large company.
9. Rapid Response to Growth Opportunities. Dynamically changing product patterns open many gaps which the small manufacturer, with speed of decision and execution, can meet ahead of a large competitor. "The familiarity or 'feel' for an industry acquired by the management team of an aggressive small enterprise enables the executives to spot and appraise these competitive opportunities." Small firms thereby often initiate new products with major growth potential.11

The author has endeavoured to illustrate the significant role played by small industry within the framework of the whole industrial complex. All too often, though, small industry is underestimated. Staley has this to say about underestimation:

Underestimation of the potential contribution of small manufacturing units may come from the glamor which surrounds large undertakings, from exaggerated notions about the scope and size of scale economies in manufacturing, from failure to recognize certain offsetting factors to scale economies, and from the greater convenience to planners of thinking in terms of a few large units instead of hundreds of small units.

In countries where private enterprise in manufacturing is important, a reason for underestimation of the potential of small units may be lack or effective associations and spokesmen for putting small industry's case.12

In conclusion, small industry fits into the following description of the stages of industrial development. There is a period when large industrial firms stand at the first stage of industrialization and the middle range of small industry may be less well represented at this point. There tends to be a hollow area in the highly industrialized size structure, an excluded middle, until indigenous local enterprise turns to modern type manufacturing. Until this happens the efficiency of the whole industrial complex suffers.13
III. SMALL INDUSTRY WHICH IS SUITABLE
FOR A SUBURBAN AREA

There are several types of small industry that can be judged as suitable for a suburban area. The logical sources to look for small industry coming into the Vancouver Metropolitan Area would be Eastern Canada, the Western United States and Japan. However, this does not happen to the degree one would expect for the reasons related below.

Eastern Canada. Eastern Canada is a heavily industrialized trading area. Most of Canada's basic industry centres around steel mills and it follows that most manufacturing takes place in the East. Manufactured goods are transported some three thousand miles from their eastern plant to the west coast. That distance for regular railway shipping is well within the distance for a branch industrial plant in British Columbia. However, the branch factories are relatively few and may be accounted for by such wide reasons as the small population of British Columbia and the natural geography of the Rocky Mountains lying between eastern Canada and the western coast. The Canadian Government has set railway freight rates that make Calgary and Edmonton competitors with the Vancouver Metropolitan Area for industry from the East wanting to establish a new site.

The Western United States. A firm from the Western United States will often register the company in Canada and build an
industrial plant in the Vancouver Area to solve problems of border
duty. Because the firm has had experience with industrial estates
in the United States, it can come to Vancouver and secure similar
sites and utilities. Results of the intensive questionnaire re-
vealed that of the six mini industrial estates which contained over
ninety-nine small firms, not one of the firms was American. The
American firms were, however, in the large industrial estates, e.g.
International Business Machines Co. Ltd. at Annacis Industrial
Estate and Ford Motor Co. at Lake City Industrial Estate. The
American firms were much larger when judged from the point of view
of floor space, and as such were not found in any of the mini
industrial estates.

Japan. Vancouver, on the west coast, is in a fortunate
position regarding Canada's trade with the Pacific Rim Countries,
particularly with Japan. At present Canada's export trade to
Japan is dominated by minerals, grain and timber products. With
the exception of the latter, little manufacturing or other processing
is performed on the raw materials. Canada imports from Japan such
finished goods as automobiles, radios and other electrical equipment
which does not require any further processing or assembling. Perhaps
in the future the Japanese will finance industry right in Vancouver,
and at the same time bring ideas with them of their experience with
small industry.
Eastern Canada, the Western United States and Japan comprise the strong industrial backbone from which small industry may emerge. If not now, then perhaps in the future they will be useful as sources of small industry for the Vancouver Area.

Vancouver Metropolitan Area. From the analysis of the Industrial Survey - 1966, a question was raised asking what was unique about the Vancouver Metropolitan Area and the industry within it. Vancouver is not a great manufacturing centre. Eastern Canada, the United States and Japan make Vancouver a receiving centre for imported goods. The Vancouver Area, as an exporting centre as well, is the focus of wood products, sawmills and pulp and paper making enterprises. These are the large industrial plants which give this field good coverage. The dominance of the wood products industry suggests that small industries "fill the cracks" between the standard mass production item, which is building materials turned out by large factories, by emphasizing those lines where small industries have a competitive advantage over large ones. A typical example might be the gluelam beam industry which has already started a small factory within the Crown Zellerbach plant. This small factory utilizes a new process which involves the making of glue laminated wood beams, a completely new type of product. This could be called direct complementarity, a relation between manufacturing firms in which one systematically uses the product of another. In this case,
wood products, the output of one firm, is used as input into the manufacturing process of the second firm. The interest which was warranted in this small plant by the larger wood products firm, was the promoting of widespread and more effective use of wood products.

The Industrial Survey - 1966 suggested further that there was something about climate and location that influenced the type of industry that could be satisfactory for a small industrial firm. This recognition of the Vancouver Area as a coastal resort area with a mild climate makes it unique for small industry. Boat building and truck campers are two lines of manufacturing which fit well with the situation. Boat building, meaning of course the building of small pleasure craft, has been the perogative of the small operator in a small firm. Distant manufacturers are able to bring their boats to Vancouver in much the same way as automobiles are shipped piggy-back on trains. This means there is shipment of a large end-product from a far-off plant site which is set up in competition against the local small industries. Local small industries would be hard pressed to combat this competition alone, but if a mini industrial estate which specialized in boat building were to consider the problems, there would be strength through numbers with possibly a satisfactory answer. This mini industrial estate which specialized in boats would have units which produced boats of wood, aluminum, plastic and ferroconcrete, and this range would be small cartop boats, speedboats, sailing boats, twin hulled catamarans and even houseboats.
Campers, i.e. the type used on one or two ton trucks, are a business which is bound to be successful in the Vancouver Area according to the Industrial Survey - 1966. There are many small firms, a few of which have grown larger in size, that are producing a product for the local market of approximately four hundred cubic feet in size. This size barrier would not permit it to be sold outside the province. By again offering the small firms a chance to occupy a mini industrial estate, the small firms by exerting their voice collectively instead of individually, may induce the railroads to start a piggy-back service to the prairie provinces.

The Owner-Operated Small Industry. As previously noted, from data collected on the Industrial Survey - 1966, the local, single owner-operator emerged as the ideal starter in the mini industrial estate. A small owner-operated industry would have no reason to locate outside of his own municipality unless it was more profitable to do so, providing the industry was footloose and did not depend upon being near the centre of the downtown area or close to a large industrial factory. Assuming the owner-operator has a growth industry that after a year or two becomes large enough to move out of the mini industrial grouping, at this time the second phase would start in relocating the larger firm in the municipality. It is while it is in the small state that it is of interest here.
Without the concept of mini industrial estates as a focus, an owner-operator would be forced to look for either vacant premises in his own municipality or something similar in another municipality. These sites would be either industrially or commercially zoned. It is unlikely that an owner-operator would be looking for property alone to buy. Instead he would be looking for vacant accommodation. There are strong possibilities that a vacant space would not be in the right area and the traffic circulation and utilities would offer difficulty. Such a poor start for a small industry would be overcome if in the first place a mini industrial estate were formed.

The Municipality Looks at Small Industry. Now consider the municipality as trying to find suitable small industry. Perhaps it should be said that small firms should mix together in such a way that they depend upon one another. Direct complementarity is the result when the small industry uses products of a large one as the basis of its activity. The interest of the large-scale manufacturer in promoting widespread and effective use of his product by other manufacturers often leads him to provide technical advice, to perform research and disseminate the results to his customers, and even to offer business counsel and sometimes loans to enable a new firm to start or an old one to expand. By initiating this direct complementarity to existing industry in the area, the municipality as sponsor of the mini industrial estate, works with the large firms. Similarly, with subcontracting, the small firms
serve more than one industry and have a considerable degree of true independence of action.

Conclusion. In locating small factories as well as large, definite account must be taken of resource requirements, market requirements and the relative transfer costs of the inputs as compared with the outputs.¹⁵

Sometimes it seems to be assumed that while technical and economic factors must be given due weight in locating large scale industry, small scale industry can be fostered almost anywhere. This assumption is wrong. Small scale manufacturing does have definite locational requirements which vary with specific products, type and level of technology and other factors. Small factories cannot take root, grow and provide jobs and products unless there is either a sufficient local market for their output or good communications and transport and organized distributions to more distant markets. There must also be local materials, good facilities for inshipment of material, trained labour supply and persons with entrepreneurial drive, technical knowledge and managerial skills.¹⁶

In short to establish modern industry in a new area and make it an integral part of the area's economy and culture, neither small industry or large industry alone is adequate, a combination is
As an example, the Coquitlam Area has a total of 1,300 acres of industrial land in use. (See Table IX, Page 72). Of these 1,300 acres, 1,134 acres are occupied by seven large-sized firms (see Table XI, Page 74), leaving 166 acres for fourteen medium and small sized firms. The concept of the mini industrial estate would help to bring about a more balanced combination of large and small industry within the Coquitlam Area.
FOOTNOTES


6 Ibid., p.3.

7 Department of Industry, op. cit., p. 19.


9 United Nations, op. cit., p. 29.

10 United Nations, op. cit., p. 25.


12 Morse, op. cit., p. 229.

13 Morse, op. cit., p. 22.

14 Morse, op. cit., p. 252.

15 Morse, op. cit., p. 307.

16 Morse, op. cit., p. 306.

17 Morse, op. cit., p. 309.
CHAPTER II

THE CASE FOR THE MINI INDUSTRIAL ESTATE

I. THE INDUSTRIAL ESTATE

Dr. Bredo's analysis shows that industrial estates, if properly planned and managed, can provide important assistance and encouragement to industrialists, especially small industrialists.¹

An industrial estate is a tract of land which is subdivided and developed according to a comprehensive plan for the use of a community of industrial enterprises. The plan must make detailed provision for streets and roads, transportation facilities, and installation of utilities. The plan may provide for the erection of factory buildings in advance of sale or lease to occupants.

The plan must insure adequate control of the site and buildings through zoning, through private restrictions incorporated as legal requirements in deeds of sale or leases, and through the provision of continuing management, all with a view to protecting the investments of both the developer of the estate and the tenants.²

This definition of an industrial estate has no need to be subdivided into functional and statistical definitions at the present time because size is not involved.

An Historical Outline of the Industrial Estate. Pioneering in the development of industrial estates took place in England and the United States. Trafford Park Estates Limited, often called the "Mother of Industrial Estates", was organized at Manchester, England in 1896. In the United States it was the Clearing In-
Industrial District which started operations in Chicago in 1899. The idea caught on very slowly. In Britain the concept developed in areas where the economic depression of the thirties caused the government to initiate a large industrial estate program. In the United States private investment has predominated in this field.

In Canada the industrial estate appeared about 1952 when properties were acquired for industrial estates in Toronto and Vancouver. These were subsidiaries of long established estate companies in Britain. Their method of organizing the estate was fully packaged complete with factory rental.

In general, the industrial estate has been greeted by specialists in industrial growth. P.H. Gloeckner in his book "Industrial Estates" has this to say:

The industrial estate has proved to be a very useful device for helping small and medium industry to obtain better working space at reasonable cost. It is also an effective and comparatively safe way of helping small industrialists financially; the opportunity to rent suitable quarters or buy on hire-purchase is as good as a loan to a small industrialist who would otherwise have to finance his own factory building. The industrial estate also relieves the small industrialist of the often arduous task of getting title to land, planning and constructing a suitable building, arranging for electricity connections, and the like. It provides an excellent location for representatives of an industrial advisory service and for various common facilities and specialized services useful to a group of industrial establishments. It can serve also as an important tool for city planning and the control of urban growth.
William J. Kennedy also comments about the planned industrial district in the foreward to his thesis:

The planned industrial district serves the community because it concentrates a desirable type of industry in a desirable location, minimizes traffic interference, promotes the economical use of services and utilities, eliminates the worst industrial nuisances, enhances the visual appearance of the community, provides better working conditions and strengthens the tax base. All this it will do provided it is properly planned. The conclusion is that Canadian municipalities should promote the use of planned industrial districts to achieve efficient community development. 4

Highlights of a Survey of Industrial Estates. These are some of the highlights of the survey which appeared in "Industrial Districts Restudied" 5, an industrial survey which took place in the United States in 1961:

1. The most frequently occurring size category for industrial districts is the one hundred to two hundred acre district and over two-thirds of the districts studied were between fifty to five hundred acres. Comparing them with Vancouver, there is a three hundred acre site being developed by the Township of Richmond, a six hundred acre development by Webb and Knapp Limited in Burnaby and a twelve hundred acre estate which Grosvenor-Laing (B.C.) Limited have underway at present on Annacis Island, Delta Municipality.

2. The development of an industrial district requires a long term outlook with land absorption averaging between ten
to fifteen acres per year. Originally at Annacis Island Estate it was anticipated that a shorter length of time than twenty to twenty-five years would be required for land absorption. However, the growth pattern appears to be slower than expected.

3. Five major groups sponsor industrial districts.

In order of importance they are: private real estate developers, railroads, private local community groups, government sponsored groups and joint government-private local community groups. Again, to take the sponsors of the Vancouver Estates, it would be two private real estate developers and one government (local municipality) group.

4. The most frequently recurring occupants of industrial districts are distribution facilities and light manufacturing and assembly plants requiring sites of one-half to five acres and buildings of 10,000 to 25,000 square feet.

5. Coverage of individual sites by buildings is relatively low, usually ranging from twenty to fifty percent in contemporary districts and ultimate coverage infrequently exceeds sixty per cent.

6. Employment per establishment and employee densities in planned industrial districts are low especially when compared to those obtained in older unplanned industrial areas. Approximately
two-thirds of the district occupants for whom data was collected employed fewer than fifty workers per establishment and exhibited densities of less than twenty persons per site acre.

Industrial Estates have grown with the suburbanization of industry gaining momentum each year. The reasons for growth are as follows:

1) accelerated demand for industrial land brought about by post war expansion and dispersion of light assembling and distribution facilities;

2) lack of suitably industrially zoned land in older central cities;

3) blight, traffic congestion and cramped conditions in older industrial areas;

4) change in plant designs allowing horizontal line production techniques;

5) improved production techniques which eliminated or reduced industrial nuisances making industry acceptable where otherwise it might not have been so;

6) increased use of the automobile for the trip to work making it necessary for ample parking space for employees;

7) increased truck transport;

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;

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 bringing in all the necessary utilities and services, preparing (grading and filling) the plant site have all been taken care of in advance by a development and management organization.6

Government Agencies Sponsoring Industrial Estates. In review, there are five main types of sponsoring organizations, i.e. private real estate developers, railroads, private local community groups, government agencies and joint government-private local community groups. Government agencies have been selected for further investigation because of their relation to the author's concept of a municipally administrated industrial estate.

Outside India and Puerto Rico, there have been few other under-developed countries that have used industrial estates to encourage industrial growth. In both these instances, the estates have been organized by government agencies. One reason can be attributed to the fact that there is a shortage of investment funds, both domestic and foreign, within these countries; thus the respective central governments have taken the responsibility to organize industrial estates.

Common amongst Western European countries is the fact that local municipal governments purchase industrial land and install utilities. "The great advantage of this is that the use of land is projected in accordance with future requirements.
The municipality benefits from the capital gain of increasing land values. The municipality, however, faces two disadvantages from the purchasing of land. Firstly, there is the tying up of funds derived from taxation and bonding and secondly, the municipality risks making errors of judgment regarding future expansion of the community.

Selling or Leasing Industrial Land. Leasing on an indefinite basis will provide the lowest financial barrier to entering business. However, there is one main disadvantage to leasing. Since the industry has no equity invested in the property, a lease will make it easier for the lessee to move from the estate unless safeguards are provided to prevent irresponsible action. Some lease agreements are drawn up to last for several years before a break is allowed. In other cases, a lease agreement is terminated if the industrial firm fails.

Leasing of the property allows the estate owner the opportunity to revise future rents, keeping them within the level of competitive rentals. Also, if the land is leased on a continuing basis the owner, i.e. the municipality for the purpose of this study, will take a long term interest in the development.

One of the major arguments in favour of selling industrial land is that a rapid turnover of funds is then permitted. A policy of selling properties requires a small governmental investment in
the industrial estate's program.\textsuperscript{12}

The Puerto Rico Industrial Development Company has decided to shift to a policy of selling properties. The experience of PRIDCO with leasing has been that too much capital has been tied up in land. This has led the Company to drop the lease with option to buy because this policy tended to perpetuate leasing. Selling properties releases more funds for further industrial development.\textsuperscript{13}

Another example of government policy is as follows:

In the Indian Industrial Estate's Program, prospective occupants are given the option of taking the land and buildings on the "hire-purchase" system, on a rental basis, or on an outright purchase. Those taking sites on a rental basis are to be encouraged to change over to the hire-purchase system in the course of time.\textsuperscript{14}

In government sponsored industrial estate's programs, subsidization may be used to induce industrial firms to settle on an industrial estate in view of their newness as a device to assist industry. Subsidization might also encourage rapid industrialization by making entry into manufacturing easier and more economical.\textsuperscript{15}
II. THE MINI INDUSTRIAL ESTATE

The author submits the following as a definition of a mini industrial estate: a set of firms each sufficiently small that the collective whole will not be in competition with large private industrial estates, but yet large enough to attract the municipalities into the public industrial estate field.

The statistical definition which defines a mini industrial estate is related to the area the estate owns. In Britain the small estate is one of the categories marked as being up to fifty acres and in India, because of the smaller estates necessary, a small estate is one less than ten acres.\(^{16}\)

In the questionnaire that formed part of this study, question \(\#8\), "Give the total acreage of the site", the replies were as follows: six acres, six acres and fifteen acres. The average was nine acres. The average found in the questionnaire survey and the definition used in India agrees at approximately ten acres for a small industrial estate, or to use the term that has been selected, a mini industrial estate.

Ten acres for a mini industrial estate contrasts with three hundred acres, six hundred acres and twelve hundred acres as sizes of existing industrial estates in the Vancouver Metropolitan Area.
Advantages of a Mini Industrial Estate to a Suburban Municipality.

1. In planning, the development of industry is important. The Canadian National Railways has completed a recent study of nine Central Canadian communities. They have equated one hundred additional manufacturing workers to four hundred and twenty-seven more people, one hundred and seventeen more workers employed other than manufacturing, three more retail establishments and one hundred and thirty-one more households. The interpretation of the data collected illustrates the growth that would take place if one hundred additional manufacturing workers were introduced to any of the communities studied. This is one reason why it is necessary for a planner to watch the development of industry.17

2. Calling the industrial group an industrial estate means there is thought given to the estate and to its management. It becomes very obvious that a municipality would be the choice as an owner-manager rather than some form of private ownership. In this case it would compete with other public ownership such as the provincial railways.

3. Taxes on fully serviced industrial land, taxes on the building, taxes on machinery, business tax and local improvement tax together make up the tax base with which an industry must comply. It is true that if a small firm enters into renting space in a mini
industrial estate, the small firm will find that the rent is calculated according to the rate of taxation. Over and above this is the cost of municipal public works. If the public works tax is rising and there is no industry to accept its share, it becomes a heavy financial burden which falls on the shoulders of the residents of the municipality.

4. By investing in mini industrial estates, the municipality could then provide accommodation for local small industry. The estate could be placed with respect to traffic, probably on a main truck route. It could also be located in a large area of industrially zoned land that is still vacant. If the initial mini industrial estate succeeds, then the experience gained by the municipality would be used for the development of succeeding estates.

5. If one took a regular "type" industrial estate and condensed it so that the overall size was small and the firms occupying the sites were small, the author believes the concept of mini industrial estates would appear more attractive to the decision makers at the municipal level.

6. The Industrial Development Commission of Greater Vancouver, a combined private industry and municipally sponsored organization for the promotion and development of new industry and expansion of existing industries, would be one organization that would note with favour the appearance of these suburban mini
industrial estates. At present, using the Lower Mainland Regional Planning Board survey data, the Coquitlam Area has approximately twenty-one large, medium and small industries within its borders. These are contained within 4,865 acres of developing industrial land. If Coquitlam had a mini industrial estate to arouse the interest of prospective entrepreneurs, the Industrial Development Commission would then show more interest. The mini industrial estate could be used as a model to show persons or concerns interested in locating new industry. Presently the Commission's interest in the Coquitlam Area is in proportion to the amount of industry already there.

Disadvantages of a Mini Industrial Estate to a Suburban Municipality.

1. The largest disadvantage would be the cost of the land, the building and the services that would be involved. It's obvious that a municipality would not have enough money to finance the cost directly. However, this problem can be solved by using borrowed money. In the United States for example, non-profit community districts are exempt from federal corporate income tax and may be financed at very low interest rates through the issue of the tax exempt municipal bonds.18

2. The hiring of extra staff for the mini industrial estate by the municipality could constitute a disadvantage because of the added expense involved. However, these persons will be
actively employed with the promotion of industry, thus getting away from the idea of the municipality waiting for industry to come to it. The "salesmen" will probably be persons in the engineering or planning office.

The Reasons for Growth of a Mini Industrial Estate. A fringe municipality that has accepted this idea of industrial estates will have to look for approximately ten acres in a position that is indicated as being industrial in the regional plan. Site indicators would probably be transportation and services. For transportation, stress should be laid on truck transportation with perhaps rail as a second means of transportation. If the second phase of expansion is already being considered, the rail would be necessary. That is if the mini industrial estate was to be expanded into a full fledged industrial park. Any industries which are in complementarity with larger ones in the area obviously should be considered first.

The timing is important for a municipality - too early trying to establish mini industrial estates will miss having labour and possibly transportation. By leaving it until much later, the price of land will be much higher, perhaps too high to make the scheme profitable. A medium or large scale firm could take advantage of a ten acre estate, but from the municipality's point of view it would be too expensive.
Another thought is making complete "blue-prints" for certain industrial activities which might be prepared to stimulate the interest of entrepreneurs and investor facilities, and to accelerate occupancy. An effective means of overcoming the structural weaknesses of small industries is to group them into co-operative organizations for production, procurement or marketing on a local or regional level.

Since new factories do not usually call for large expansion in urban services, they may attract ancillary services to further broaden the tax base.
FOOTNOTES

6 Arthur D. Little Inc., Tampa Industrial Park, Report to the Committee of 100, Greater Tampa Chamber of Commerce), p. 24-25.
7 Bredo, op. cit., p. 51.
8 Bredo, op. cit., p. 54.
9 Ibid.
10 Bredo, op. cit., p. 156.
12 Ibid.
13 Ibid.
14 Bredo, op. cit., p. 159.
15 Bredo, op. cit., p. 162.
16 Gloeckner, op. cit., p. 19.
CHAPTER III

MINI INDUSTRIAL ESTATES IN THE
VANCOUVER METROPOLITAN AREA

I. EXTENSIVE SURVEY

In 1961 and 1966 the Lower Mainland Regional Planning Board carried out two separate, but similar, Industrial Surveys. These surveys were extensive in their coverage, spreading out over ninety three industrial districts in the Vancouver Metropolitan Area. From the original 1961 calculations, an estimate was made of the projected industrial growth for the years 1966, 1971 and 1976 for the Metropolitan Area. In doing the 1966 survey, the first estimate was checked, and it was concluded that for the Vancouver Metropolitan Area, the industrial growth was slower than had been anticipated. Again, taking the 1961-66 survey results, it was possible to group those industrial firms located in industrial parks, industrial estates or industrial subdivisions. The immediate conclusion was that industrial growth in these aforementioned places was more rapid than the industrial development in the industrial districts of the Vancouver Metropolitan Area as a whole. This conclusion of the industrial growth taking place in the industrial estates was made from the preliminary 1966 estimates. Recent statistics from the Lower Mainland Regional Planning Board, however, suggest that the rate of growth within the industrial estates is not proceeding at a faster rate than the Van-
couver Metropolitan Area, e.g. one comparison shows that in the Van-
couver Metropolitan Area, 0.56 firms per acre established over a five
year period between 1961-66, while for the same period, only 0.35 firms
per acre established in the Lake City and Annacis Island industrial
Estates. The author feels, however, that the significance of class-
ification must be taken into account as the latter could influence
the interpretation of the statistics. The number of firms listed
for the Vancouver Metropolitan Area include wholesaling, while the
author has excluded wholesaling as a classification within his study
and considers only those firms involved with manufacturing industry
within the mini industrial estates.

Having these survey results, it is possible to follow a
research direction, i.e. for the fringe municipalities - will they
consider a publicly owned industrial estate? The size of an
industrial estate in the Vancouver Metropolitan Area would be in
the order of three hundred acres. This would be prohibitive for
the fringe municipalities to support. Therefore, why not concentrate
research on a "mini" or small industrial estate to prove whether or
not the concept is applicable.

II. INTENSIVE SURVEY

A reinvestigation of the Lower Mainland Regional Planning
Board's industrial card file for the Vancouver Metropolitan Area started
<table>
<thead>
<tr>
<th>Location</th>
<th>Industrial firms</th>
<th>Non-Industrial firms</th>
<th>Firms not listed</th>
<th>Total no. of firms</th>
<th>Area in acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1000 Parker Street Vancouver</td>
<td>8</td>
<td>5</td>
<td>7</td>
<td>20</td>
<td>3.38</td>
</tr>
<tr>
<td>2. 1636 Franklin Street Vancouver</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>8</td>
<td>0.38</td>
</tr>
<tr>
<td>3. 1610 Kent Avenue East Vancouver</td>
<td>29</td>
<td>5</td>
<td>0</td>
<td>34</td>
<td>6.00</td>
</tr>
<tr>
<td>4. 7170 Antrim Avenue Burnaby</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>8</td>
<td>1.06</td>
</tr>
<tr>
<td>5. 7342 Government Street Burnaby</td>
<td>7</td>
<td>3</td>
<td>2</td>
<td>12</td>
<td>9.57</td>
</tr>
<tr>
<td>6. 3765 - 1st Avenue East Burnaby</td>
<td>1</td>
<td>13</td>
<td>0</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>7. 2727 Lake City Way Lake City Industrial Estate, Burnaby</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>8. Express Street Lake City Industrial Estate, Burnaby</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>9. 3170 Lake City Way Lake City Industrial Estate, Burnaby</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>10. 8040 Enterprise Lake City Industrial Estate, Burnaby</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>11. 502 - 20th Street New Westminster</td>
<td>12</td>
<td>1</td>
<td>0</td>
<td>13</td>
<td>3.00</td>
</tr>
<tr>
<td>12. 400 Ewen Avenue New Westminster</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>10</td>
<td>12.50</td>
</tr>
<tr>
<td>Location</td>
<td>Industrial firms</td>
<td>Non-Industrial firms</td>
<td>Firms not listed</td>
<td>Total no. of firms</td>
<td>Area in Acres</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>------------------</td>
<td>----------------------</td>
<td>------------------</td>
<td>--------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>13. 1430 River Road Richmond</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>5.30</td>
</tr>
<tr>
<td>14. 809 Capstan Way Richmond</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>5</td>
<td>0.94</td>
</tr>
<tr>
<td>15. Derwent Way</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>10</td>
<td>6.00</td>
</tr>
<tr>
<td>Derwent Way Annacis Industrial Estate, Delta</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>10</td>
<td>6.00</td>
</tr>
<tr>
<td>16. 1440 Rupert Street North Vancouver</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>17. 246 East Esplanade North Vancouver City 5</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td>0.38</td>
<td></td>
</tr>
<tr>
<td>18. 270 East Esplanade North Vancouver City 5</td>
<td>2</td>
<td>0</td>
<td>7</td>
<td>0.44</td>
<td></td>
</tr>
<tr>
<td>19. 362 B Esplanade East North Vancouver City 5</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>0.56</td>
<td></td>
</tr>
</tbody>
</table>
the intensive survey. From these cards, nineteen preliminary mini industrial estates were selected, using the criteria that they must contain five or more firms on one site.

The preliminary mini industrial estates were visited personally, pictures were taken and the author talked with the owner if he was present. A comprehensive list was made of all the small firms that rented space in each estate, and using the Standard Industrial Classification Manual of the Dominion Bureau of Statistics, each of the firms were categorized. Industry was taken to mean the manufacturing, construction, truck and water transportation and storage, but not wholesale trade. By eliminating this wholesale trade, the listing under industrial firms was made more meaningful. In Table IV, page 35 the status of the preliminary mini industrial estates is shown by the following breakdown:

- Industrial Firms
- Non-Industrial Firms
- Firms not Listed

These three groups were then totalled together to indicate the number of industrial firms within each preliminary mini industrial estate.
By examining the list for the largest number of firms each mini industrial estate contained, those firms chosen were numbers 1, 3, 5, 6, 11, 12, and 15 corresponding to Table IV, page 35. Then looking over the industrial firms contained in each of these groups, number 6 was eliminated because the latter had only one industrial firm. Therefore, the selected mini industrial estates, Table V, page 39 gives the name, address, number of industrial firms and total number of firms contained in each of the mini industrial estates.

Secondly, a check was made on the areas of the six selected mini industrial estates. By comparing each mini industrial estate, it turned out that the six originally selected had the largest areas of the preliminary list. By adding the areas and taking the average, the average site was 6.7 acres.

The six selected estates are shown in the following pictures, together with lists of the small firms each contains.

The Questionnaire Survey. The questionnaire survey as shown in the appendix was a series of selected questions regarding the operation of an industrial estate. The answers and comments from the three personal interviews conducted follow.
### TABLE V

**SELECTED MINI INDUSTRIAL ESTATES**

<table>
<thead>
<tr>
<th>Location</th>
<th>No. of industrial firms</th>
<th>Total no. of firms</th>
<th>Area in Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1000 Parket Street Vancouver</td>
<td>8</td>
<td>20</td>
<td>3.38</td>
</tr>
<tr>
<td>3. 1610 Kent Avenue East Vancouver</td>
<td>29</td>
<td>34</td>
<td>6.00</td>
</tr>
<tr>
<td>5. 7342 Government Street Burnaby</td>
<td>7</td>
<td>12</td>
<td>9.57</td>
</tr>
<tr>
<td>11. 502 - 20th Street New Westminster</td>
<td>12</td>
<td>13</td>
<td>3.00</td>
</tr>
<tr>
<td>12. 400 Ewen Avenue New Westminster</td>
<td>8</td>
<td>10</td>
<td>12.50</td>
</tr>
<tr>
<td>15. Derwent Way Annacis Industrial Estate, Delta</td>
<td>7</td>
<td>10</td>
<td>6.00</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>71</strong></td>
<td><strong>99</strong></td>
<td><strong>40.45</strong></td>
</tr>
<tr>
<td><strong>Average of total acreage</strong></td>
<td></td>
<td></td>
<td><strong>6.74</strong></td>
</tr>
</tbody>
</table>

Numbers preceding "Location" correspond to Table IV and Map I.
1. 1000 Parker Street, Vancouver

Note:
- building situated in the middle of the lot
- partially fenced
- four storey
- rail access on the site
1. 1000 Parker Street, Vancouver

<table>
<thead>
<tr>
<th>Industrial firms</th>
<th>S.I.C. Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fullerton Pattern Shop</td>
<td>399</td>
</tr>
<tr>
<td>Hamilton and Spill Mfg.</td>
<td>286</td>
</tr>
<tr>
<td>Haroldson Industries</td>
<td>286</td>
</tr>
<tr>
<td>Johnston Terminals</td>
<td>517</td>
</tr>
<tr>
<td>Modern Die and Stamping Ltd.</td>
<td>317</td>
</tr>
<tr>
<td>P. and S. Engineering Ltd.</td>
<td>322</td>
</tr>
<tr>
<td>Specialty Packaging Co.</td>
<td>329</td>
</tr>
<tr>
<td>Spectrum Production</td>
<td>399</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Industrial firms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovril (Canada) Ltd.</td>
<td>729</td>
</tr>
<tr>
<td>McKenzie Stephson (Western) Ltd.</td>
<td>729</td>
</tr>
<tr>
<td>Nomu Lites Canada</td>
<td>729</td>
</tr>
<tr>
<td>Vanglass Distributors</td>
<td>729</td>
</tr>
<tr>
<td>Roma Distributors</td>
<td>729</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Firms not listed</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>J. Hungerford Smith Co. Ltd.</td>
<td>-</td>
</tr>
<tr>
<td>Mel Maxwell Agencies</td>
<td>-</td>
</tr>
<tr>
<td>J. Ray Anderson</td>
<td>-</td>
</tr>
<tr>
<td>Stan Maddison Brokerage Ltd.</td>
<td>-</td>
</tr>
<tr>
<td>Custom Card of Canada Ltd.</td>
<td>-</td>
</tr>
<tr>
<td>MacKenzie Sales Co.</td>
<td>-</td>
</tr>
<tr>
<td>R.M. Alexander (Agency) Ltd.</td>
<td>-</td>
</tr>
</tbody>
</table>
3. 1610 Kent Avenue East, Vancouver

Note:

- Northern Building Supply is the name of the business owned by the owner-operator of this estate
- fenced
- coffee shop on the second floor
- additions added as needed
- a few blocks from Marine Drive
- water frontage on Fraser River rented out to another firm
### Industrial firms

<table>
<thead>
<tr>
<th></th>
<th>S.I.C. Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stevenson Construction</td>
<td>404</td>
</tr>
<tr>
<td>L.W. Thompson</td>
<td>333</td>
</tr>
<tr>
<td>North West Kitchens</td>
<td>286</td>
</tr>
<tr>
<td>Finn Wood Cabinets</td>
<td>286</td>
</tr>
<tr>
<td>Knute Moen</td>
<td>317</td>
</tr>
<tr>
<td>Unique Woodworks</td>
<td>283</td>
</tr>
<tr>
<td>B.G. General Iron Works</td>
<td>329</td>
</tr>
<tr>
<td>R.J. Felch Cabinets</td>
<td>286</td>
</tr>
<tr>
<td>Industrial Fire Protection Ltd.</td>
<td>324</td>
</tr>
<tr>
<td>Superior Grinding</td>
<td>2--</td>
</tr>
<tr>
<td>Sauna Heater Mfgs.</td>
<td>329</td>
</tr>
<tr>
<td>C.J. Oliver Ltd.</td>
<td>404</td>
</tr>
<tr>
<td>Roberts Metalcraft</td>
<td>329</td>
</tr>
<tr>
<td>Intrusion Prepakt Co. Ltd.</td>
<td>326</td>
</tr>
<tr>
<td>Triad Tire Ltd.</td>
<td>239</td>
</tr>
<tr>
<td>Martin Body</td>
<td>2--</td>
</tr>
<tr>
<td>Pandorfe Cabinets</td>
<td>286</td>
</tr>
<tr>
<td>G.M. Products Ltd.</td>
<td>200</td>
</tr>
<tr>
<td>Acorn Industries Ltd.</td>
<td>324</td>
</tr>
<tr>
<td>Ace Incinerators</td>
<td>409</td>
</tr>
<tr>
<td>Starr Electric</td>
<td>359</td>
</tr>
<tr>
<td>Trailer Construction</td>
<td>2--</td>
</tr>
<tr>
<td>Simpsons Sears</td>
<td>399</td>
</tr>
<tr>
<td>Custom Sawing</td>
<td>285</td>
</tr>
<tr>
<td>Canadian Centennial Mfg.</td>
<td>406</td>
</tr>
<tr>
<td>Easy Build Products Ltd.</td>
<td>286</td>
</tr>
<tr>
<td>Dixon Furniture</td>
<td>286</td>
</tr>
<tr>
<td>Northern Building Supply</td>
<td>527</td>
</tr>
<tr>
<td>Sign Painting</td>
<td>399</td>
</tr>
</tbody>
</table>

### Non-Industrial firms

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mrs. Banks Standard Imports</td>
<td>727</td>
</tr>
<tr>
<td>Winter Green Band</td>
<td>9--</td>
</tr>
<tr>
<td>Memorial Crafts Ltd.</td>
<td>949</td>
</tr>
<tr>
<td>Hooper Products</td>
<td>-</td>
</tr>
<tr>
<td>Cafe</td>
<td>-</td>
</tr>
</tbody>
</table>
5. 7342 Government Street, Burnaby

Note:

- considerable separate office space
- abundant space for parking in the front of the building
- one large area in the building presently used by British Columbia Institute of Technology for teaching purposes
- no rail access
5. 7342 Government Street, Burnaby

<table>
<thead>
<tr>
<th>Industrial firms</th>
<th>S.I.C. Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Coast Cartage Co. Ltd.</td>
<td>514</td>
</tr>
<tr>
<td>Owl Lite</td>
<td>506</td>
</tr>
<tr>
<td>Argo Tachograph Division of Ruhl H. Machinery Co. Ltd.</td>
<td>395</td>
</tr>
<tr>
<td>Dunlop Tire</td>
<td>239</td>
</tr>
<tr>
<td>Richardson Cabinet Ltd.</td>
<td>396</td>
</tr>
<tr>
<td>Plasticast Industries Ltd.</td>
<td>399</td>
</tr>
<tr>
<td>Coast Steel Fabricators Ltd.</td>
<td>404</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Industrial firms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pitpar Building Ltd.</td>
<td>809</td>
</tr>
<tr>
<td>Pitpar Factors Ltd.</td>
<td>804</td>
</tr>
<tr>
<td>Swan Agencies Ltd.</td>
<td>729</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Firms not listed</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cessco</td>
<td></td>
</tr>
<tr>
<td>Repco Ltd.</td>
<td></td>
</tr>
</tbody>
</table>
11. 502 - 20th Street, New Westminster

Note:

- rail access
- parking not a problem
- most of the firms have entrances of their own
11. 502 - 20th Street, New Westminster

<table>
<thead>
<tr>
<th>Industrial firms</th>
<th>S.I.C. Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambridge Construction Ltd.</td>
<td>344</td>
</tr>
<tr>
<td>B.C. Machine Works Ltd.</td>
<td>324</td>
</tr>
<tr>
<td>Western Wood Products Mfg.</td>
<td>289</td>
</tr>
<tr>
<td>B.C. Mill Maintenance Ltd.</td>
<td>324</td>
</tr>
<tr>
<td>Harry Dyer Marine Woodworking Co. Ltd.</td>
<td>289</td>
</tr>
<tr>
<td>Armstrong Chase Pattern Works Ltd.</td>
<td>399</td>
</tr>
<tr>
<td>The Alaskan Camper</td>
<td>334</td>
</tr>
<tr>
<td>Larsen Furniture Mfg. Ltd.</td>
<td>286</td>
</tr>
<tr>
<td>Davis and Carson Woodwork</td>
<td>289</td>
</tr>
<tr>
<td>Mainland Furniture Ltd.</td>
<td>286</td>
</tr>
<tr>
<td>Cambridge Coaches Mfg. Ltd.</td>
<td>334</td>
</tr>
<tr>
<td>Industrial Piping and Mechanical Contractors Ltd.</td>
<td>404</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Industrial firms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accurate Pre-Hung Door Co. Ltd.</td>
<td>721</td>
</tr>
</tbody>
</table>
12. 400 Ewen Avenue, New Westminster

Note:

- building was formerly used as a seaplane hanger

- fenced property

- rail access

- space for lumber storage
12. 400 Ewen Avenue, New Westminster

<table>
<thead>
<tr>
<th>Industrial firms</th>
<th>S.I.C. Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontierman Fibre Glass Products Ltd.</td>
<td>333</td>
</tr>
<tr>
<td>Paul Maure Welding</td>
<td>317</td>
</tr>
<tr>
<td>South Burnaby Boat Works</td>
<td>333</td>
</tr>
<tr>
<td>Brittain Steel Fabricators Ltd.</td>
<td>315</td>
</tr>
<tr>
<td>Alberta Universal Plastics Ltd.</td>
<td>286</td>
</tr>
<tr>
<td>B.C. Wedge Co. Ltd.</td>
<td>289</td>
</tr>
<tr>
<td>Belkin Paper Box Ltd.</td>
<td>292</td>
</tr>
<tr>
<td>General Mobile Accommodation</td>
<td>339</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Industrial firms</th>
<th>S.I.C. Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. and M. Equipment Ltd.</td>
<td>939</td>
</tr>
<tr>
<td>Belwood Lumber Co. Ltd.</td>
<td>721</td>
</tr>
</tbody>
</table>
15. Derwent Way, Delta

Note:

- Annacis Industrial Estate own these Terrace Bay Units
- rail siding access
- hot water heating from a separate service building
- space at one end for enlargement of the mini industrial estate
15. Derwent Way, Delta

<table>
<thead>
<tr>
<th>Industrial firms</th>
<th>S.I.C. Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.I.L. Films Unit Plastics Division</td>
<td>392</td>
</tr>
<tr>
<td>Thomas A. Steeves Ltd.</td>
<td>228</td>
</tr>
<tr>
<td>Allied Steel Fabricators Ltd.</td>
<td>315</td>
</tr>
<tr>
<td>Cramco Machinery Ltd.</td>
<td>324</td>
</tr>
<tr>
<td>Delfts Displays and Designs</td>
<td>399</td>
</tr>
<tr>
<td>Seaforth Candy Co. Ltd.</td>
<td>228</td>
</tr>
<tr>
<td>Richmond Plastics Ltd.</td>
<td>392</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Industrial firms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>American Motors (Canada) Ltd.</td>
<td>723</td>
</tr>
<tr>
<td>A.P. Green Refractories Ltd.</td>
<td>7--</td>
</tr>
<tr>
<td>Marrs Marine Ltd.</td>
<td>7--</td>
</tr>
</tbody>
</table>
LOCATION OF THE PRELIMINARY AND SELECTED MINI INDUSTRIAL ESTATES
The three firms successfully contacted were located at Kent Avenue East, Vancouver; Derwent Way, Delta; and Ewen Avenue, New Westminster. Kent Avenue East is a private owner-operated firm and, in the author's opinion, appeared to possess the most potential of the mini industrial estates visited because of the layout of the firms and the variety of industries. There were approximately forty firms in space for seventy. The one drawback of the estate was the rundown condition of the buildings. Expansion had taken place without thought given to an overall plan. The owner-operator, as well as managing the mini industrial estate, owned a building supply firm on the estate site. When asked, "How important was this building supply firm to the operation of the mini industrial estate?", according to Mr. Thomas, the owner-operator, he felt the two could be separated; that they did not help the other in any way.

The mini industrial estate on Derwent Way is a series of accommodations for small firms which Grosvenor-Laing terms as their embryonic Terrace Bay Units. The latter have built these units noting the growth factor of small firms. An entrepreneur can rent small space, then use it for a time until he can assess the market. If good, he can then move into a separate custom built factory. The building, although large for a mini industrial estate, was well designed. The large amount of space which the Terrace Bay Units had for indoor storage was noted.
The third estate at 400 Ewen Avenue, New Westminster had been a mini industrial estate for only part of its existence. Earlier the building was a seaplane hanger and following this was rented to large firms. The present owner-operator explained that since he had taken over the property in 1965, he had met with success in renting to small firms. However, should a buyer approach with the proper amount, he would sell the entire mini industrial estate. Future plans for the industrial estate were not his concern.

The answers to the questionnaire survey are not given in the same sequence as the firms introduced above to avoid disclosing information of a personal nature.

The first three questions had to do with the name, mailing address and location of the industrial estate. The following three questions related to the respondent by asking if he was the owner-operator of the estate mentioned in the first instance. Two stated they were owners and one was employed as a manager. To the question, "Have you the total responsibility for the signing of a new small firm to a lease with the mini industrial estate?", three "yes" answers were given. Then questions #6 and #7, "How long have you been in your present position with the mini industrial estate?" and "What was the date the mini industrial estate was opened for occupancy?", produced the answers 20 years - 1949, 4 years - 1965 and $2\frac{1}{2}$ years - 1957.
Questions #8 to #36 tried to establish the characteristics of small industrial estates.

**Question #8** "Total acreage of the site".

a) 6 acres  
   b) 15 acres  
   c) 6 acres  
   Average: 9 acres

**Question #9** "What is the square footage of the ground floor of the building ?"

a) 100,000 sq. ft.  
   b) 85,000 sq. ft.  
   c) 124,000 sq. ft.  
   Average: 103,000 sq. ft.

**Question #10** "Is it a one, two or three storied building ?"

a) 1 & 2 stories  
   b) 1 storey  
   c) 1 storey  
   Average: 1 storey

**Question #11** "Of what material is the building constructed ?"

a) Frame/concrete block  
   b) Frame  
   c) Frame/concrete block  
   Average: Frame/concrete block

**Question #12** "Was the building used as a mini industrial estate originally ?"

a) Yes  
   b) No  
   c) Yes
Question #13  "What is the size of floor area that you rent to a small industrial firm ?"

a) Low - 500 sq. ft.  b) Low - 4,000 sq. ft.  c) Low - 3,000 sq.ft.  
Average - 2,000 sq. ft. Average - 20,000 " Average - not given  
High - 10,000 sq. ft.  High - 30,000 sq. ft. High - 6,000 sq.ft.

Question #14  "What limitations do you place on square footage rented to the industrial firm ?"

a) Min. - 500 sq. ft.  b) Not  c) Min. - 3,000 sq.ft. 
Max. - 10,000 sq. ft.  Given  Max. - 18,000 sq.ft.

Question #15  "Was there some module of size used in construction ? If so, how many square feet ?"

a) No  b) Yes -20,000 sq. ft.  c) Yes - 1,000 sq. ft.

Question #16  "How much of the mini industrial estate site is reserved for car parking ?"

a) 1 Space for every 1,000 sq. ft.  b) Not a problem yet  c) 25' x 50' per bay

Question #17  "How many cars are required to park off the lot ?"

a) 30 Cars  b) None  c) 8 per bay

Question #18  "Total number of small firms at present."

a) 70  b) 10  c) 10

Question #19  "Total number of vacancies at present."

a) 3  b) 1  c) None
Question #20  "What percentage of the total number of small firms would you say were:

<table>
<thead>
<tr>
<th>Category</th>
<th>a)</th>
<th>b)</th>
<th>c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing firms</td>
<td>40%</td>
<td>74%</td>
<td>70%</td>
</tr>
<tr>
<td>Construction firms</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Transportation, Storage &amp; Communication firms</td>
<td>10%</td>
<td>13%</td>
<td>0%</td>
</tr>
<tr>
<td>Wholesale &amp; Trade firms</td>
<td>20%</td>
<td>0%</td>
<td>30%</td>
</tr>
<tr>
<td>Other firms</td>
<td>10%</td>
<td>13%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Question #21  "Is there a reason for this distribution, or is it by chance?"

a), b), and c) all answered "chance"

Question #22  "Total number of small firms who signed a lease with you for the first time in 1968."

a) 5   b) None  c) 1

Question #23  "Total number who became too large during 1968 and moved out."

a) 4   b) None  c) None

Question #24  "Total number who terminated business during 1968 and moved out."

a) 2   b) 1   c) 2

Question #25  "Is there rail access on the site?"

a), b), and c) all answered "yes"

Question #26  "Do any of the firms use it for loading or unloading?"

a) No   b) Yes  c) Yes

primarily wood
Question #27  "A small firm initiates the search for a site and starts negotiating. What do you investigate regarding the firm before signing a lease?"

Collective comments were:

- past business history
- banking facilities
- reputable
- nature of business
- nuisance the business might create
- make sure it is the only one in that line
- financial strength
- performance record
- their future plans

Question #28  "Do you have any function besides leasing space?"

Collective comments were:

- building supply yard
- coffee shop
- property maintenance

Question #29  "What is the annual/monthly rental per square foot of floor space?"

a) $1.20  b) $1.25  c) Not Given

Question #30  "Which of the following services have been provided already? Indicate which ones are included in the rent."

<table>
<thead>
<tr>
<th>Services Provided</th>
<th>Included in Rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>a) yes b) yes c) yes</td>
</tr>
<tr>
<td>Gas</td>
<td>a) yes b) yes c) yes</td>
</tr>
<tr>
<td>Heat</td>
<td>a) yes b) no c) yes</td>
</tr>
<tr>
<td>Oil</td>
<td>a) no b) no c) no</td>
</tr>
<tr>
<td>Water</td>
<td>a) yes b) yes c) yes</td>
</tr>
<tr>
<td>Public Sanitary</td>
<td>a) yes b) yes c) yes</td>
</tr>
<tr>
<td>Sewer</td>
<td>a) no b) no c) yes</td>
</tr>
<tr>
<td>Surfaced Streets</td>
<td>a) yes b) yes c) yes</td>
</tr>
<tr>
<td>Rail Sidings</td>
<td>a) no b) yes c) no</td>
</tr>
</tbody>
</table>
Question #31  "Does the city impose too many restrictions on your business ?"
   a) No   b) Fire Inspector   c) No

Question #32  "Has the mini industrial estate business been good over the past five years ?"
   a), b) and c) answered "yes"

Question #33  "Are there any problems in relation to administrating this mini industrial estate ?"
   a) No   b) No   c) None insurmountable

Question #34  "What is the total number employed in all the small firms ?"
   a) 250   b) 110   c) Not Given

Question #35  "What is the total number of women employed ?"
   a) 30   b) 8   c) Not Given

Question #36  "Where are the washrooms located ?"
   a) 1 each   b) -   c) Male & Female space in office space

Questions #37 to #45 all pertain to the Coquitlam Area and are shown in Chapter IV.

Questions #46 and #47 were included to establish the number of firms and their classification in each estate.
CHAPTER IV

A CASE STUDY OF A MINI INDUSTRIAL ESTATE
IN THE COQUITLAM AREA

Introduction. All suburban municipalities interested in promoting industrial development could use the mini industrial estate as an effective tool for planned industrial development. But for comparison, consider in general terms other means for achieving the same goal.

Firstly the present way of developing industrial land is by means of selling a parcel of municipal land to an industrialist. For the suburban municipality this is the simplest and least costly method. This method, however, means that the municipality waits until approached by the industrialist, who in turn compares the municipal property with available sites nearer the business centre. Usually the suburban land remains vacant.

Secondly, a suburban municipality will sometimes offer financial inducements such as, provision of utility extensions and access road at no extra cost to the industry, and temporary tax exemptions to name a few. This move to provide the prospective industrialist with capital on favourable terms is a lever which a suburban municipality can use. This would require a policy directive
by the municipality and a senior staff member to carry out the policy.

Thirdly, a suburban municipality interested in industrial development can promote the establishment of an industrial estate. This tool for industrial development, however, is more practical for development by private capital rather than by a suburban municipality. A concept that is worth investigating as an alternative is the mini industrial estate.

Joining together more than one suburban municipality to form an area for the purpose of attracting industry would make the promotion of industrial development more economically feasible. After forming the area the suburban municipalities would then appoint an area industrial planner whose primary tasks would be to:

1. Draft a policy dealing with industrial development.

2. Help develop a positive community attitude towards industry.

3. Assemble municipal land.

4. Conduct an industrial site survey.

5. Form a mini industrial estate by acquiring a small acreage in the most favourable site available in the suburban area, then seek small industrial firms as tenants.


7. Prepare brochures.

8. Contact the Industrial Development Commission.
By reviewing the industrial planner's work, it is possible to see where the mini industrial estate can help with the promotion of industry.

Since the concept of neighbourhoods have modernized residential developments and shopping centres have modernized the commercial sphere, then why not the mini industrial estate being the effective organizer for small industrial development?

A Case Study. In the following case study the author has chosen the Coquitlam Area, one of four areas of the Vancouver Metropolitan Area, to investigate the concept of a mini industrial estate. The Coquitlam Area is that part of the Vancouver Metropolitan Area east of Burnaby and New Westminster, north of the Fraser River and west of the Pitt River as shown in Map 1, page 52. This area includes Coquitlam Municipality, Fraser Mills Municipality, the cities of Port Moody and Port Coquitlam and the Unorganized Territory around Buntzen Lake.

There are three primary reasons for the selection of the Coquitlam Area for study. Firstly, there are no private industrial estates at present in this area which would serve to attract potential industrialists. Secondly, the absence of the British Columbia Hydro and Power Railway in the Coquitlam Area means the elimination of this source of industrial land development. This provincially owned railway has as a subsidiary function, the allocation of industrial land which it owns. The Municipalities of Surrey and Burnaby both have these
railway lines and have large acreages that have been set aside for industrial development. However, this is not the case in the Coquitlam Area. Thirdly, the three suburban municipal governments of Coquitlam Municipality, Port Moody and Port Coquitlam have placed top priority on residential development and have not been able to put into effect, as yet, a positive approach towards industrial development.

Because these three factors which would serve to attract industry to the Coquitlam Area are absent, an alternative solution to this problem is the establishment of a mini industrial estate.

The advantages of using the mini industrial estate as a planning tool to stimulate industrial development in the Coquitlam Area are as follows:

1. With the municipalities' focus on residential development, the portion of the budget available for industrial development is necessarily small at the present time. Working on the premise that the municipalities would be responsible for the establishment and administration of a mini industrial estate, the investment would be minimal if:

   a) the industrial estate is located on municipally owned land.

   b) an industrial foundation loans the necessary funds for the construction of the premises.

   c) the municipality is responsible for the servicing and administration of the industrial estate.
2. A mini industrial estate does not require a large acreage. As noted in Chapter III, a workable size is ten acres. This allows for more flexibility as far as the location of sites is concerned.

3. A mini industrial estate has some of the benefits of a larger industrial estate. For example, most industrial plants will increase local revenue without a proportionate increase in the population of the area - particularly the schoolage group - or in the consumption of municipal services.2

4. A mini industrial estate will bring to the Coquitlam Area increased employment and payrolls. These are direct benefits that come with industrial development.

5. Small sized industrial units would offer to the Coquitlam Area the advantage of diversity of manufacturing processes.

6. The expansion of a small firm to a medium sized firm, which remains in the same area, further adds to industrial development.

7. The mini industrial estate would serve as a stimulant for secondary industry which uses raw materials that have already gone through a stage of processing.

8. The units available for a reasonable rent in the mini industrial estate would provide an opportunity for the local owner-operator to become established.
9. Firms employing women as well as men would have a large local labour force to draw upon.

Size. The size of the Coquitlam Area is ninety-four square miles. This area is well defined by natural physical features with the Pitt River to the east, the Fraser River to the south, Indian Arm following the western boundary of the area down to Port Moody and the coastal mountains to the north. The lower half of the western boundary forms the straight north and south boundary between Burnaby and the Coquitlam Area.

**TABLE VI**

**SIZE OF MUNICIPALITIES IN THE COQUITLAM AREA**

<table>
<thead>
<tr>
<th>Municipality - or Unorganized Area</th>
<th>Total Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraser Mills</td>
<td>560</td>
</tr>
<tr>
<td>Coquitlam</td>
<td>31,420</td>
</tr>
<tr>
<td>Port Coquitlam</td>
<td>7,650</td>
</tr>
<tr>
<td>Port Moody</td>
<td>4,090</td>
</tr>
<tr>
<td>Buntzen *</td>
<td>16,360</td>
</tr>
<tr>
<td><strong>Total Coquitlam Area</strong></td>
<td><strong>60,080</strong></td>
</tr>
</tbody>
</table>

Source: Mimeo 1967, Lower Mainland Regional Planning Board
**Topography.**  The topography of the Coquitlam Area is mountainous with approximately forty five square miles that cover the northern half of the area leading downward to Burrard Inlet. There are two hills of significance, the 500 foot high Coquitlam Hill in Coquitlam Municipality and the 200 foot high Mary Hill in Port Coquitlam. This leaves the flat land to the south of the Burrard Inlet, the river valley alongside the Fraser River and the six square miles of flat land to the east of Port Coquitlam as potential industrial land.

**The Coquitlam Area is Suburban.**  It can be stated that the four municipalities in the Coquitlam Area are each a suburban municipality looking towards Vancouver as the centre of the metropolitan area. That section of the Coquitlam Area which is nearest to central downtown Vancouver is the border between Burnaby and Port Moody-Coquitlam, and the distance would measure approximately ten miles. The furthest point in the area from downtown Vancouver is a seventeen mile distance to the Pitt River Bridge. The suburbs of the Coquitlam Area are very accessible because they do not have either a harbour or river separating them from the downtown Vancouver centre.

**Population.**  The present population and projected population to 1986 of the municipalities and unorganized territory in the Coquitlam Area is as follows:
### TABLE VII

**COQUITLAM AREA POPULATION 1966 - 1986**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraser Mills</td>
<td>164</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coquitlam</td>
<td>40,916</td>
<td>50,000 60,000</td>
<td>70,000</td>
<td>80,000</td>
<td></td>
</tr>
<tr>
<td>Port Coquitlam</td>
<td>11,121</td>
<td>15,000 19,000</td>
<td>22,500</td>
<td>26,000</td>
<td></td>
</tr>
<tr>
<td>Port Moody</td>
<td>7,021</td>
<td>10,000 13,000</td>
<td>16,000</td>
<td>20,000</td>
<td></td>
</tr>
<tr>
<td>Buntzen</td>
<td>669</td>
<td>800 1,000</td>
<td>1,200</td>
<td>1,400</td>
<td></td>
</tr>
<tr>
<td><strong>Total Coquitlam Area</strong></td>
<td><strong>59,891</strong></td>
<td><strong>75,900 93,000</strong></td>
<td><strong>109,700</strong></td>
<td><strong>127,400</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Population Trends in the Lower Mainland, 1921 - 1986
Lower Mainland Regional Planning Board.

This means that the population of the Coquitlam Area is over 60,000 now, and this figure will double by 1986 assuming the basis of projection is valid for that date.

**Transportation.** Air transportation is increasingly becoming more important. At present light float planes can use Burrard Inlet and the Fraser and Pitt Rivers, and small land planes can use the Pitt Meadows Airport which is four miles to the east of the Pitt River Bridge.

In Burrard Inlet it is common to see tankers and deep sea freighters loading oil products, fertilizer, coal and sulphur. Deep sea freighters travel up the Fraser River as far as Fraser Mills to pick
up lumber for overseas markets. Barges loaded with crushed aggregate travel down the Pitt and Fraser Rivers, and logs moving by floating boom are also noted travelling both up and downstream.

The Coquitlam Area is joined to Vancouver's market centre by three roads, the Barnet Highway which crosses into Port Moody next to Burrard Inlet, the Lougheed Highway, the older central arterial highway along which industry has established itself in Burnaby, and the 401 Freeway with two interchanges in the Coquitlam Area - the Brunette Street and Cape Horn Interchanges - before the freeway crosses the Fraser River at Port Mann. The north-south roads include the North Road which travels along the Burnaby-Coquitlam boundary in the west, and the northern swing of the Lougheed Highway in the east. The latter road meets the Barnet Highway, then travels east through Port Coquitlam and across the Pitt River.

The Coquitlam Area is crossed in an east-west direction by one mainline railway, the Canadian Pacific Railway. The C.P.R. crosses the Pitt River two miles upstream from its confluence with the Fraser River. The C.P.R. then runs in a north-easterly direction for two miles across Port Coquitlam, mainly through the marshalling yards for the Vancouver Area. The railway then crosses Coquitlam for one and one half miles, and during this portion of right-of-way serves no industry. The C.P.R. then crosses into Port Moody where the railway skirts the perimeter of Burrard Inlet for a mile before leaving the Coquitlam Area,
Although the B.A. Oil Refinery itself is situated in the Coquitlam Area, the railway loading and docking facilities are in Burnaby.

The Canadian Pacific Railway also has a branch line which leaves the mainline at the western boundary of Port Coquitlam. This branch line travels south then west following the Lougheed Highway and serving two large industries, Crown Zellerbach and Domtar Chemicals Ltd. The C.P.R. then leaves the Coquitlam Area at New Westminster where it is an important line serving the Westminster wharves.

The Canadian National Railway in combination with the Great Northern Railroad follow their shared mainline to the north-west, just cutting off the south-west corner of the District of Coquitlam. This length is three quarters of a mile and serves one large-scale industry, Canadian Potteries, within that distance.

Complementarity. A desirable feature of industry is complementarity between all sizes of firms. Relations between small and large industries remain, in part, competitive but they can also become complementary and even directly co-operative.

One type, indirect complementarity, is the interrelation of small and large industry without an actual agreement being drawn up. Small industry can exist financially by manufacturing products which are not suited to mass production and by manufacturing products which have a cost advantage over those manufactured in a large firm.
Another aspect, direct complementarity, can be broken down into two groups. Further manufacturing occurs when the small firm uses the product of a large firm as an input into its own manufacturing operation. Subcontracting occurs when a small firm manufactures components or supplies for a large firm.\(^3\)

It's a mistake to think of small and large industry as antagonistic in the sense that one tends to eliminate the other. Development planners and large and small industrialists should find ways to build on complementarity.

As yet there is no evidence of complementarity in the Coquitlam Area aside from one firm which was previously noted, i.e. the small gluelem industry within the Crown Zellerbach organization.

**Land Available for Industry.** With the adoption of the Official Regional Plan for the Lower Mainland Planning Area, 4,865 acres in the Coquitlam Area were designated as Industrial - 1 land denoting a developing industrial area which is established or currently developing, and where there is existing or imminent industrial services and strategic proximity to regional transportation facilities.\(^4\) The distinction should be noted here between the designation of industrial land within the Regional Plan, and the actual zoning of industrial land in accordance with the zoning maps of each municipality. The total acreage of land actually zoned in each municipality is less than the
total acreage of Industrial - 1 designated land. The updating of each zoning map will depend upon the rate of industrial development within each of the municipalities.

TABLE VIII

THE AMOUNT OF INDUSTRIAL LAND IN THE COQUITLAM AREA

<table>
<thead>
<tr>
<th>Municipality or Unorganized Territory</th>
<th>Industrial - 1 Area in Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buntzen</td>
<td>865</td>
</tr>
<tr>
<td>Port Moody</td>
<td>1,060</td>
</tr>
<tr>
<td>Fraser Mills</td>
<td>225</td>
</tr>
<tr>
<td>Coquitlam</td>
<td>1,070</td>
</tr>
<tr>
<td>Port Coquitlam</td>
<td>1,645</td>
</tr>
<tr>
<td><strong>Total Coquitlam Area</strong></td>
<td><strong>4,865</strong></td>
</tr>
</tbody>
</table>

The above total acreage represents industrial land which is occupied or vacant.

*Land Utilized by Industry.* Coming under consideration now are those areas which are at present utilized by industry. A complete list of industrial firms in the Coquitlam Area as listed in Table IX, pages 72 and 73 was compiled as part of the Lower Mainland Regional Planning Board's Industrial Survey - 1966 and the earlier survey in 1961. The "Standard Industrial Classification Number" was assigned
### TABLE IX

**INDUSTRIAL FIRMS IN THE COQUITLAM AREA**

<table>
<thead>
<tr>
<th>Name and Location</th>
<th>S.I.C. No.</th>
<th>No. of Acres</th>
<th>No. of Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Municipality of Fraser Mills</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Crown Zellerbach</td>
<td>285</td>
<td>200.00</td>
<td>1094</td>
</tr>
<tr>
<td>King Edward Avenue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Municipality of Coquitlam</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Domtar Chemicals Ltd.</td>
<td>289</td>
<td>143.3</td>
<td>90</td>
</tr>
<tr>
<td>Canada Creosoting Division</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ft. of Braid Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Canadian Potteries (B.C. Division of Crane Canada Ltd.)</td>
<td>364</td>
<td>27.1</td>
<td>110</td>
</tr>
<tr>
<td>225 North Road</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Leeder's Pacific Ltd.</td>
<td>319</td>
<td>100.00</td>
<td>-</td>
</tr>
<tr>
<td>Leeder Street</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Kencraft Plastics Ltd.</td>
<td>333</td>
<td>1.25</td>
<td>-</td>
</tr>
<tr>
<td>1095 Lansdowne Street</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>City of Port Moody</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. B.A. Port Moody Refinery</td>
<td>375</td>
<td>336.00</td>
<td>88</td>
</tr>
<tr>
<td>1112 Glenayre Drive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Reichold Chemicals Ltd.</td>
<td>388</td>
<td>7.75</td>
<td>52</td>
</tr>
<tr>
<td>Douglas Street</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Cascade Electronics Ltd.</td>
<td>359</td>
<td>2.00</td>
<td>40</td>
</tr>
<tr>
<td>Electronics Avenue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Canadian Western Pipe Mills Ltd.</td>
<td>325</td>
<td>74.50</td>
<td>142</td>
</tr>
<tr>
<td>3190 Murray Street</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Flavelle Cedar Div. of Weldwood of Canada Ltd.</td>
<td>285</td>
<td>33.21</td>
<td>396</td>
</tr>
<tr>
<td>Murray Street</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name and Location</td>
<td>S.I.C. No.</td>
<td>No. of Acres</td>
<td>No. of Employees</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------</td>
<td>--------------</td>
<td>-----------------</td>
</tr>
</tbody>
</table>
| 11. Andres Wines Ltd.  
   2120 Vintner Street | 224 | 2.87 | 26 |
| **Unorganized Territory around Buntzen Lake** | | | |
| 12. Imperial Oil Co.  
   1425 Ioco Road | 375 | 320.00 | 254 |
| **City of Port Coquitlam** | | | |
| 13. Macro (Div. of Kennametal Inc)  
   1515 Kingsway | 347 | 18.00 | 63 |
| 14. Steel-Bilt Contractors Ltd.  
   1835 Kingsway | 315 | 9.13 | 52 |
| 15. Esco Ltd.  
   1855 Kingsway | 320 | 9.13 | - |
| 16. Pitt Timber Products Ltd.  
   Kingsway | - | 9.00 | - |
   1840 Broadway | 324 | 0.94 | - |
| 18. Wright Mfg. Sheet Metal Works  
   1789 McLean Avenue | 333 | 1.00 | - |
| 19. Sportcraft Plastics Ltd.  
   2620 Bedford Street | 333 | 0.50 | - |
   3060 Lougheed Highway | 334 | 1.25 | - |
| 21. Hunting Rubber Mills of Canada Ltd.  
   Davies Avenue | 239 | 3.00 | 35 |

Total No. of Acres  
1299.93

Source: Lower Mainland Regional Planning Board  
Card File for Industrial Survey - 1966
to each firm in accordance with the survey results. The "Number of
Acres" for each firm was calculated from industrial maps, scale 1":200',
using an acreometer and planimeter, while the "Number of Employees" was
taken from the 1961 Survey Card File of industrial firms with over ten
employees.

The twenty-one industrial firms in the Coquitlam Area were
classified into large, medium and small industrial firms using acreage
range and employee range as the criteria.

**TABLE X**
CLASSIFICATION CRITERIA

<table>
<thead>
<tr>
<th>Industrial Firm</th>
<th>Acreage Range</th>
<th>Employee Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large</td>
<td>20 and over</td>
<td>101 and over</td>
</tr>
<tr>
<td>Medium</td>
<td>2 - 19</td>
<td>11 - 100</td>
</tr>
<tr>
<td>Small</td>
<td>Under 2</td>
<td>Under 10</td>
</tr>
</tbody>
</table>

**TABLE XI**
LARGE INDUSTRIAL FIRMS IN THE COQUITLAM AREA

<table>
<thead>
<tr>
<th>Name of Firm</th>
<th>Municipality or Unorganized Terr.</th>
<th>S.I.C. No.</th>
<th>No. of Acres</th>
<th>No. of Employees 1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crown Zellerbach</td>
<td>Fraser Mills</td>
<td>285</td>
<td>200</td>
<td>1094</td>
</tr>
<tr>
<td>Domtar Chemicals Ltd.</td>
<td>Coquitlam</td>
<td>289</td>
<td>143</td>
<td>90</td>
</tr>
<tr>
<td>Canadian Creosoting Div.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canadian Potteries (B.C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division of Crane Canada Ltd.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Of these large firms, Crown Zellerbach Building Materials Ltd. and Flavelle Cedar Division of Weldwood of Canada Ltd. are resource based industries utilizing timber from the British Columbia coast and the interior. The prime location factor for these firms is shallow water for the transportation of logs. A second pair of industries, the refineries of B.A. and Imperial Oil Enterprises Ltd., required at the time of their locating, nearness to deep water for tankers delivering crude oil. This, however, does not apply with the same urgency today since a pipeline from Alberta transports the crude oil. The pipeline terminus is on Burnaby Mountain. The other three large industries, Domtar Chemicals Ltd., Canadian Creosoting Division; Canadian Potteries B.C. Division of Crane of Canada Ltd.; and Canada Western Pipe Mill, were located near rail transportation.
### TABLE XII

**MEDIUM INDUSTRIAL FIRMS IN THE COQUITLAM AREA**

<table>
<thead>
<tr>
<th>Name of Firm</th>
<th>Municipality or Unorganized Terr.</th>
<th>S.I.C. No.</th>
<th>No. of Acres</th>
<th>No. of Employees 1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leeder's Pacific Ltd.</td>
<td>Coquitlam</td>
<td>319</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>Reichold Chemicals Ltd.</td>
<td>Port Moody</td>
<td>388</td>
<td>8</td>
<td>52</td>
</tr>
<tr>
<td>Cascade Electronics Ltd.</td>
<td>Port Moody</td>
<td>359</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>Andres Wines Ltd.</td>
<td>Port Moody</td>
<td>224</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>Macro (Div. of Kennametal Inc.)</td>
<td>Port Coquitlam</td>
<td>347</td>
<td>18</td>
<td>63</td>
</tr>
<tr>
<td>Steel-Bilt Contractors Ltd.</td>
<td>Port Coquitlam</td>
<td>315</td>
<td>9</td>
<td>63</td>
</tr>
<tr>
<td>Esco Ltd.</td>
<td>Port Coquitlam</td>
<td>320</td>
<td>9</td>
<td>52</td>
</tr>
<tr>
<td>Hunting Rubber Mills of Canada Ltd.</td>
<td>Port Coquitlam</td>
<td>239</td>
<td>3</td>
<td>35</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td></td>
<td><strong>152</strong></td>
<td><strong>331</strong></td>
<td></td>
</tr>
</tbody>
</table>

The most important location factor for all the medium sized firms is proximity to a railway line. The above firms have access to the Canadian Pacific Railway.
### TABLE XIII
SMALL INDUSTRIAL FIRMS IN THE COQUITLAM AREA

<table>
<thead>
<tr>
<th>Name of Firm</th>
<th>Municipality or Unorganized Terr.</th>
<th>S.I.C. No.</th>
<th>No. of Acres</th>
<th>No. of Employees 1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kencraft Plastics Ltd.</td>
<td>Coquitlam</td>
<td>333</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Nafco Mfg. Co. Ltd.</td>
<td>Port Coq.</td>
<td>324</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Wright Mfg. Ltd.</td>
<td>Port Coq.</td>
<td>333</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Sportcraft Plastics Ltd.</td>
<td>Port Coq.</td>
<td>333</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Huskey Campers Mfg. Co. Ltd.</td>
<td>Port Coq.</td>
<td>334</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>5</strong></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

The above small industries are not dependent upon rail or water access. Rather, access to road transportation is the main location factor. It should be noted, too, that all but one of the firms in this list are located in Port Coquitlam. Kencraft Plastics Ltd. is located in Coquitlam adjacent to the Coquitlam-Port Coquitlam border.

Comparing the acreages for industrial occupied land, 1,300 acres, and the total designated Industrial - 1 land, 4,865 acres, the balance is 3,565 acres still vacant, pointing out the large amount of land still available for industrial development.
Coquitlam Municipality Community Planner. Coquitlam Municipality is the only municipality within the Coquitlam Area that has a planner on the staff. Port Moody and Port Coquitlam both hire the services of a planning consultant. The Coquitlam planner views the suburban municipality as placing top priority on residential development for the present time. There is still much housing construction and related utilities to consider for this fast growing community. As evidenced by the 1961-66 population figures, Coquitlam was exceeded in numerical growth only by Vancouver and Burnaby, mainly due to the municipality's aggressive servicing program. The planner feels that it will be a few more years before a more positive approach can be taken by council regarding industrial development. At that time a definite policy would have to be set regarding industrial land in the municipality.

At the present time there are problems with regard to developing what is now designated as Industrial - 1 land. A few examples would be: Lack of utilities, particularly lack of a trunk sewer draining all the area to the north and east of the municipality, eliminates prospective industrial development taking place in that area; The prime area between Fraser Mills and east along the Fraser River to Leeder Road is owned by one company, Crown Zellerbach, making it difficult
to get water access for other water using industries; Also, the industrial land along the Barnet Highway is misused because of the location of trailer parks. The council is now preventing the location of further parks in this area.

The municipal council is more than eager to find entrepreneurs wanting factory space in the community. At present all they have, however, is zoned land to show prospective industrialists. Also, there is no one within the Coquitlam Municipal Council, except the community planner, who has the responsibility for meeting with prospective industrialists. There is no special sub-committee on council and only a small Chamber of Commerce committee which has as its role, industrial development.

The Greater Vancouver Industrial Commission. The Greater Vancouver Industrial Commission is the organization which operates as a Vancouver focus through which industrialists can obtain the necessary information and aid regarding the location of new industry in the Greater Vancouver District. The municipalities in the Coquitlam Area subscribe to this source of help for potential industrialists. During a discussion with the Industrial Commissioner of the G.V.I.C., he stated that in comparison the Coquitlam Area does not offer better prospects for the establishment of industry than other municipalities and, therefore, the Commission does not usually bring prospective
industrialists on a tour of the Coquitlam Area. In his opinion the thrust of industry moving to the suburbs had been across the Pattullo Bridge and into Surrey. When showing prospective industrialists through the metropolitan region by car, he concentrated on the heavily industrialized areas of Annacis Island Industrial Estate, New Westminster industrial area, and then followed North Road to the intersection of the Lougheed Highway to Lake City Industrial Estate situated in Burnaby. His impression was that the Coquitlam Area should concentrate its efforts of industrialization in the south-west corner of the Coquitlam Municipality. He also stated that there was a decided lack of small secondary manufacturing firms in the Greater Vancouver Area as a whole.

In the Industrial Commissioner's opinion, Richmond Municipality stands out as a suburban municipality that has a very real and positive attitude towards industrial development. There, the council has an Industrial Commissioner and three hundred acres of industrial land that it has turned into an industrial estate. Richmond has flat topography with a system of dykes to prevent flooding. Because Richmond owns so much industrial land, 300 acres, it is possible to attract small, medium and large scale industries, putting the Richmond Municipality in a better position than the Coquitlam Area when compared to land available.
II. QUESTIONNAIRE SURVEY WITH SPECIFIC REFERENCE TO THE COQUITLAM AREA

A personal interview was conducted with three administrators of industrial estates in the Metropolitan Area using a questionnaire devised by the author (see Appendix). Highlights of these interviews which pertained to the desirability of the Coquitlam Area as a possible site choice are as follows:

In response to question 37, "Have you recently thought of expanding your business, say during the past five years?", the answers were positive. The question, "Would it be by enlarging the present site by buying neighbouring property?", again produced three positive answers. One owner-operator had already markedly enlarged his premises by buying a site next to the one he owned.

However when asked in question 40, "Would you move to an industrial area further out?", two negative replies were received. One owner was just in the process of expanding to an adjacent site, while the other person stated that the present site was large enough. The third person said he would consider the Coquitlam Area, although he had six acres of property on the South Shore Area.

In answering question 41 concerning the location factors which are important to a mini industrial estate, one person left the space blank and the other two brought out interesting points. There
LOCATION OF THE PRESENT INDUSTRIAL FIRMS AND THE PROPOSED MINI INDUSTRIAL ESTATE SITES FOR THE COQUITLAM AREA

MAP 2

AREA DESIGNATED INDUSTRIAL IN THE OFFICIAL REGIONAL PLAN

PROVINCIAL GOVERNMENT BASE MAP
was no doubt that "transportation" was the most critical factor listed, it rated top priority from both of them. "Services" were second, i.e. water, power, fire protection etc. "Parking" was critical with one person who stated that their estate had to park thirty employee cars on the street. "Adequate population" was considered a main factor by one and a secondary item by the other. "Other industry" was agreed by both as not important. This seems to indicate that firms even in the mini industrial estates are "footloose". There would be little thought of going into the estate other than renting, in fact in question 28, "Do you have any other function besides leasing space?", the only answers which were given were a building supply yard and property maintenance.

III. AN EXAMINATION OF MINI INDUSTRIAL ESTATE SITES IN THE COQUITLAM AREA

Industrial sites chosen by persons interviewed and the author will be considered for their suitability to a mini industrial estate development.

a) Lougheed Highway between Brunette Street and the Fraser Mills boundary.

This industrial site is satisfactory from the view point of size, i.e. more than ten acres. Present road transport would be adequate if the site were located near the Lougheed Highway; however,
if the site were located closer to the freeway, accessibility would be
difficult. In addition the rush hour traffic at the intersection of
Brunette Street and the Lougheed Highway causes a great deal of traffic
congestion. The site is generally well located with respect to the
Brunette Street freeway interchange and also the commercial area
located nearby. Other large industrial firms in the vicinity are
Domtar Chemicals Ltd. and Canadian Potteries Ltd. This site was
suggested by the Industrial Commissioner of the Greater Vancouver
Industrial Commission. He mentioned that industry located on the
south-west corner of the Coquitlam Area would fall within the present
direction of industrial growth in the Metropolitan Area.

b) Schoolhouse Street between Brunette Street and the
Lougheed Highway.

Again this site is satisfactory because it is a deep set
lot with a narrow frontage. The surrounding commercial establishments
such as lumber and junked car parts have taken up most of the available
industrial land. This site would be excellent for truck traffic on
the Lougheed Highway. There is one large firm, Crown Zellerbach,
already located on this site which could be advantageous to small
firms.

c) Leeder Road between the freeway and the Fraser River.

This is one site of fifteen acres, owned by the Munici-
pality of Coquitlam, which is immediately available. Previously,
two adjoining lots were sold. The site's land value is approximately
$5,000 per acre. The site requires fill, but if brought in from the Fraser River should pose no problem. Road transport would not be difficult as truckers could use the Leeder Road turnoff at the Cape Horn Interchange. Canadian Pacific Railways passes a short distance from the front of the site. Servicing is no problem.

d) The Lougheed Highway and the Canadian Pacific Railway in front of Riverview Hospital.

This was one site selected from the questionnaire which did not turn out to be suitable when checked against Coquitlam Municipality's zoning map. This area is presently zoned for recreational use. Also, there does not appear to be enough space between the Canadian Pacific Railway tracks and the Lougheed Highway to construct an estate.

e) Lougheed Highway between Dominion Street and the Pitt River Bridge.

A ten acre mini industrial estate site could easily be located here. Trucks could service the area with ease. Macro and Steel-Bilt Construction Ltd. are located nearby, however, direct communication would be hindered by the Canadian Pacific Railway tracks which pass between the established site and the one under consideration.
f) Barnet Highway between Pheasant Street and Ioco Road.

On either side of Barnet Highway stretches vacant industrial land. There are several ten acre sites available for locating a mini industrial estate. One site between twenty acres and twenty-five acres is municipally owned property. Road transportation travelling east and west is adjacent to the sites fronting on Barnet Highway. There is also proximity to the Canadian Pacific Railway on the south side of the Barnet Highway for those sites which abut the railway. Years ago a spur line crossed the Barnet Highway from the C.P.R. mainline to a gravel pit to the north, but has long since been closed. The rails were removed, but the right of way still remains. This means that the Greater Vancouver Sewerage and Drainage Board, who owns the right of way, could authorize the C.P.R. to lay the tracks into the northern part of the new industrial area. Nearby firms are those of Cascade Electronics Ltd. and Flavelle Cedar situated in Port Moody. This proposed site should be located as closely as possible to the site as outlined in g) for the promotion of complementarity.

g) Murray Street opposite the end of Electronic Avenue next to Burrard Inlet.

This is another site that is larger than ten acres. It is situated between the Burrard Inlet and the main road of Murray Street which permits access by truck but not by train.
In conclusion, sites b), f) and g) are desirable because of their proximity to the truck transportation routes of the Lougheed and Barnet Highways. The sites of b), e), f) and g) might offer complementarity with the nearby medium and large industries.

The location factor of complementarity rates high in the author's estimation and determined the selection of site f) as most suitable for the development of a mini industrial estate. The additional location factors that make this site desirable are rail transportation, truck transportation and site servicing. A site could be chosen from a series of blocks of land of which twenty to twenty-five acres is now owned by the Coquitlam Municipality, and the remaining land is for sale. (See Map 2, 82 for the location of the above mentioned sites).

Conclusions. The assessment of the Coquitlam Area in this chapter has produced the conclusions that the present industrial picture favours the establishment of a mini industrial estate. As pointed out earlier, the Industrial - 1 land available in the Coquitlam Area is approximately 73% of the total of 4,865 acres of unoccupied industrial - 1 land or 3,565 acres. Another consideration, transportation routes, show us that the modes including those of road, rail, water and air are satisfactory for industrial development. Road and rail transport are in proximity to the proposed Industrial - 1 areas because of the preferred flat topography. However, the Municipal Councils have placed top priority on residential development, and
expenses incurred servicing the residential areas leaves only a small budget for the promotion of industry.

Keeping these points in mind, the mini industrial estate has been proposed as a solution to stimulate industrial growth. Working with the concept that the municipality is responsible for the establishment and administration of the industrial estate, the investment is minimal if the site selected is owned by the municipality, and an industrial foundation is available for the loaning of funds for the construction of the buildings. This then just leaves the municipality responsible for the expense of servicing and administrating the mini industrial estate.

The establishment of a mini industrial estate would have many effects on the industrial growth sphere of the Coquitlam Area as it would focus the Area on the small secondary industrial field. Also this step towards planned industrial growth benefits not only the industrial estate itself, but the community as a whole.
FOOTNOTES


CHAPTER V
SUMMARY

A brief recapitulation of the study's concept, methodology and resulting conclusions will now come under consideration.

Concept. The starting point for the thesis topic began taking form three years ago while the author was employed as a research assistant with the Lower Mainland Regional Planning Board on a survey of industry in the Vancouver Metropolitan Area. The survey involved investigating industrial sites, and the small industrial estates visited, appeared unique for the Metropolitan Area.

The possibility then arose that the concept of a small, or mini, industrial estate could be investigated with relation to its potential role in the suburban areas. One significant factor would be the involvement of the municipality with the administration of such a scheme.

Methodology. For background research, the 1966 industrial survey was important because it provided two conclusions which were used as a basis for this study. Firstly, as confirmed by the Lower Mainland Regional Planning Board's Industrial Survey - 1966 results compared with the Industrial Survey - 1961 results, industrial growth in the Vancouver Metropolitan Area is proceeding at a much slower rate than was originally anticipated. Secondly, the large industrial
estates of the Vancouver Metropolitan Area are growing faster than the total industrial picture.

Library research provided the author with background information regarding small firms and industrial estates. The Stanford Research Institute offered an excellent source of material, particularly for their research conducted in India regarding the latter's successful organization of small industrial estates.

Finally, a questionnaire survey was prepared by the author, for the purpose of interviewing the owner-operators of selected mini industrial estates. The questions were designed to investigate the characteristics of small industrial estates within the Vancouver Metropolitan Area. The selection of the mini industrial estates contained within this study came about from an investigation of the 1966 Industrial Survey cards which catalogued all industry within the Metropolitan Area.

Coquitlam Area was selected for a case study. The Industrial cards referred to above were again used to list all industry within the area. Industrial property was then selected for potential sites for the development of a mini industrial estate.

**Resulting Conclusions:** Investigation while preparing this thesis revealed prime factors which affect the rate of industrial growth in the Vancouver Metropolitan Area.
1. There is a lack of secondary industry which can be attributed in part to Vancouver's distance from the manufacturing centre in Eastern Canada. A lack of small industrial firms is another related factor that must be investigated and solved in the future.

2. Industrial development in British Columbia is specifically a responsibility at the provincial government level. There is the Department of Trade and Industry and the landholding arm of the British Columbia Hydro and Power Authority who together have the legislation of the provincial government behind them. The specific land area that is owned by the government that is pertinent to this thesis lies alongside the railway in Surrey and outside the Metropolitan Area in Langley City. On receiving inquiries about industry looking for a site, the provincial government will naturally offer its own sites before trying further afield. This produces a lineal type of growth.

3. The industrial estates of Annacis Island, Lake City and Brighouse are developing more rapidly than the overall industrial growth which indicates the value of planned industrial development.

Specifically, the lack of industry in the Coquitlam Area coupled with the fact that the industrial development potential is good, served as a prime reason for the selection of this area to test
the thesis concept of a mini industrial estate. The mini industrial estate approach is not just the construction of multi occupancy buildings and the entering into the real estate business. Such a scheme would be advantageous from a profit making point of view, but it would hardly be applying the principles of planning.

The author's concept of a mini industrial estate—a site approximately ten acres in size with the small industrial firms each having a median of ten employees—can only be implemented by the municipality taking responsibility for the purchase of the site and administration of the estate. The site would be serviced for water, sewerage and roads if necessary. Because of restrictions in the Municipal Act of British Columbia prohibiting a municipality the "giving or lending money or other security, or giving the use of ownership of any immovable"¹ the financing and construction of the mini estate building would have to be undertaken by a private concern or financed through an industrial foundation.

If the financial responsibility was undertaken by a private concern, the author recommends a large industrial firm located nearby the proposed site as the ideal investor. The large firm would hold the title to the building for fifteen years until it was completely amortized, then the title would revert back to the municipality. In return for the financial undertaking, the large firm would have the choice of selecting two or three tenants that manufactured products
advantageous to the large firm. This, of course, involves the promotion of complementarity.

An alternative would be financing through an industrial foundation. This foundation could be started within the Coquitlam Area and there are two accepted methods of raising funds. These are either a general campaign soliciting funds from the entire Coquitlam Area, or a limited campaign dealing directly with the business community. A general campaign is more difficult to manage, but the end results are often good. The prospective industrialists realize that the whole community has a sense of participation if they have shown interest by their investment of funds.

The municipality must keep in mind, when making the choice of tenants for the estate, that the local owner-operator would benefit most from the services offered. The municipality should also take into account that only those industries which fit into the municipality should be picked;

- where employment is concerned, those industries which employ women as well should be taken;
- that financially stable industries offer the best prospects for full employment;
- that highly skilled workers when paid appropriate rates will take the responsibility of buying homes in the municipality;
- that healthy industry operated by local people and financed by local capital has a more direct interest in local affairs and will respond sooner to changing local needs and conditions;

- that small sized units do offer the advantages of diversity to a municipality.

A municipality should expect industry to be stable and consistent in its policy and permanent in nature.

Since there is a great deal of pre-project planning involved in this concept of a mini industrial estate, the author recommends that the four municipalities should hire an industrial planner. It would come within the realm of his job to forecast the probable effect of an industrial estate on the municipality. Data would be collected on the probable school population, the number of housing units that would be needed and the number of industrial jobs that would be available in the mini industrial estate. Also, a study would be made to find out which of the firms in the municipalities would be amenable to complementarity with the larger firms nearby.

It is essential from the engineering and economic point of view that these aspects of developing and operating industrial estates should be planned first. Such advance planning would have the effect of orderly construction and would avoid the costly pitfalls at
the various stages of industrial development.

While the responsibilities of the industrial planner with regard to the mini industrial estate are being stressed by the author for the purpose of this thesis, the planner would, of course, be involved with the overall development of industry within the four municipalities.

In review this thesis has investigated the problem of slow industrial growth in the Vancouver Metropolitan Area. Its concept, that small industries when grouped together as small publicly owned industrial estates would hasten planned industrial growth, was applied to the Coquitlam Area as a test case. The results were favourable and brought to the fore three factors regarding the establishment of a mini industrial estate that would assure its success; that of the investment of a large industrial firm in the estate's building in combination with the investment of the municipality in the land, the promotion of complementarity between the estate and nearby firms, and good transportation facilities.

The author proposes that the practical application of this concept of mini industrial estates would be suitable for any metropolitan area.

SELECTED BIBLIOGRAPHY

A. BOOKS


**B. PUBLICATIONS OF THE GOVERNMENT, LEARNED SOCIETIES, AND OTHER ORGANIZATIONS**


---


---


---


---


---


---


---


---


---


---


---


---


C. PERIODICALS


D. UNPUBLISHED MATERIALS


APPENDIX
All data will be treated confidentially in mass tabulations only. Identification of names with other data will not be permitted. If you cannot or prefer not to answer certain questions, the space can just be left blank.

1. Name of the mini industrial estate you represent.

2. Mailing Address

3. Location (if different from mailing address)

4. Are you the owner-operator of this mini industrial estate?
   YES .... NO .... EXPLAIN ....

5. Have you the total responsibility for the signing of a new small firm to a lease with the mini industrial estate?
   YES .... NO .... EXPLAIN ....

6. How long have you been in your present position with the mini industrial estate?

7. What was the date the mini industrial estate was opened for occupancy?
8. Total acreage of the site.

9. What is the square footage of the ground floor of the building?

10. Is it a one, two or three storied building?

11. Of what material is the building constructed?

12. Was the building used as a mini industrial estate originally?
   YES ...... NO ...... EXPLAIN ....

13. What is the size of floor area that you rent to a small industrial firm?
    Low .............. square feet
    Average ............ square feet
    High .............. square feet

14. What limitations do you place on the square footage rented to the industrial firms?
    Minimum ............ square feet
    Maximum ............ square feet

15. Was there some module size used in construction? If so, how many square feet?
    .................... square feet

16. How much of the mini industrial estate site is reserved for car parking?
    ............................
17. How many cars are required to park off the lot?

18. Total number of small firms at present.

19. Total number of vacancies at present.

20. What percentage of the total number of small firms would you say were:

- Manufacturing firms
- Construction firms
- Transportation, Storage & Communication firms
- Wholesale & Trade firms
- Other firms

21. Is there a reason for this distribution, or is it by chance?

22. Total number of small firms who signed a lease with you for the first time in 1968.

23. Total number who became too large during 1968 and moved out.

24. Total number who terminated business during 1968 and moved out.

25. Is there rail access on the site?

YES ...... NO ...... EXPLAIN ......
26. Do any of the firms use it for loading or unloading?

YES ...... NO ...... EXPLAIN ....

27. A small firm initiates the search for a site and starts negotiating. What do you investigate regarding the firm before signing a lease?

28. Do you have any function besides leasing space?

i.e. a) Make Loans .........................

b) Advisor .................................

c) Management guidance ..................

d) Office assistance .......................  

e) Other .................................

29. What is the annual/monthly rental per square foot of floor space?

Low rental ................. per ........ years/months

High rental ................. per ........ years/months

Average rental ................. per ........ years/months

30. Which of the following services have you provided already? Indicate which ones are included in the rent.

<table>
<thead>
<tr>
<th>Services Provided</th>
<th>Included in Rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>..................</td>
</tr>
<tr>
<td>Gas</td>
<td>..................</td>
</tr>
<tr>
<td>Heat</td>
<td>..................</td>
</tr>
<tr>
<td>Oil</td>
<td>..................</td>
</tr>
</tbody>
</table>
30. Cont'd Services Provided Included in Rent

Public Water
Public sanitary sewer
Surfaced streets
Rail sidings

31. Does the city impose too many restrictions on your business?

32. Has the mini industrial estate business been good over the past five years?
YES ...... NO ......

33. Are there any problems in relation to administrating this mini industrial estate?

34. What is the total number employed in all the small firms?

35. What is the total number of women employed?

36. Where are the washrooms located?

37. Have you recently thought of expanding your business, say during the past five years?
Yes ...... NO ...... EXPLAIN ..


38. Would it be by enlarging the present site by buying neighbouring property?

YES ...... NO ...... EXPLAIN ....

39. In addition to keeping the present site, would you move to another location equally as near to the central business district?

YES ...... NO ...... EXPLAIN ....

40. Would you move to an industrial area further out?

North Shore
Burnaby
Coquitlam Area
South Shore

41. Which of the following factors are important to you in the location of a mini industrial estate? Number them in order of importance.

...... Transportation (trucks, rail sidings)
...... Parking (off the street)
...... Other industry (mutually beneficial to one another)
...... Services (water, power, fire protection etc.)
...... Taxes (concessions)
...... Adequate population (for labour)

42. What would be the effect on your business if the municipality, say in the Coquitlam Area, were to provide you with a site at low cost and allow you to construct your own building?
43. What would be the effect on your business if the municipality were to offer tax concessions?

44. Where would you desire this site to be in the Coquitlam Area?

45. How large should this site be?

46. Would you look over this list to see if I have included all the small firms in your mini industrial estate.

47. Would you look over this list and indicate the manufacturing industrial firms.