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United Nations Industrial Development Organisation

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STUDIES for WEST LAGUNA INDUSTRIAL ESTATE THE PHILIPPINES

ca.
P. 100

FINAL REPORT

S/F IND. ESTATE
C/F PHILIPPINES

April, 1974

W. D. Scott International Ltd.

WDS

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1. INTRODUCTION

1.1 Objectives of the Study

The aim of this study was to:

- review the studies carried out by the Laguna Lake Development Authority (LLDA);
- assist the LLDA in the preparation of the final report arising therefrom; and
- prepare a summary appraisal report.

The summary appraisal report was to be submitted to the United Nations Industrial Development Organisation (UNIDO) in Vienna by 28 February, 1974.

1.2 Background to the Study

The Laguna Lake Development Authority was empowered by the Government of the Philippines to promote and accelerate regional development. An industrial estate has been assigned high priority, subject to first demonstrating its feasibility. The first steps towards this objective were taken in 1972 with the establishment of an LLDA study team to carry out pre-feasibility studies for the project.

There have been a number of subsequent developments which have influenced the content and the programme of these feasibility studies. The most significant was the creation, in September 1973, of a Task Force for Human Settlement* charged, among other duties, with the development of a master plan for the Greater Manila area, including future industrial development.

Coordination of the activities of the Task Force with those of other government agencies is still proceeding together with some amalgamation and reorganisation. Regulations for the control of future development and standards based on environmental and social criteria have not yet been published. The LLDA team is working in close liaison with the Task Force to ensure so far as possible that its recommendations will harmonise with future plans.

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* Now the National Commission for Zoning and Human Settlement.

In order to achieve this close liaison and cooperation the LLDA team and the Task Force have been sharing the same offices.

LLDA first approached UNIDO for technical assistance in evaluating the feasibility of a reclamation site on the western shore of Laguna Lake in 1971. Agreement to provide the assistance in the form of a study by independent consultants was reached in 1972 but implementation was delayed for a combination of reasons until November 1973. By that date the studies by the LLDA team were well advanced and the nature of the consultants' contribution was consequently changed.

The original feasibility study in two phases was replaced by a review and advice phase to be followed by a phase of technical assistance to the LLDA team in preparing their reports and a summary report by the consultants to UNIDO. This report was intended to appraise the project on the basis of the data gathered and processed by the LLDA team.

The study area was defined as the provinces of Manila, Rizal, Laguna, Cavite, Bulacan, part Pampanga and Bataan. The area is larger than was first envisaged in order to make the study compatible with other studies to be carried out by the Task Force on Human Settlement.

The study area has been divided into 13 zones which together include all land lying within a 50 kilometre radius of Manila City. The zones are indicated on Figure 1.1 at the end of this chapter and scheduled in Appendix A.

1.3 Summary of Recommendations

It is recommended that:

1.3.1 An industrial estate of initial area about 100 hectares, capable of future development in stages to 450 hectares, should be established as soon as possible to encourage the development of small and medium sized industries. The estimated initial investment is 43 million pesos and the gross internal rate of return (before tax) over a period of 20 years is 19.5% (Table 7.9).

1.3.2 A site for the estate should be acquired in the area south of Manila International Airport and east of Paranaque Municipality, on land above flood levels and sloping towards Manila Bay.

1.3.3 A corporation should be established to develop, manage and maintain the estate. This corporation should in the first instance be a wholly owned subsidiary of the Laguna Lake Development Authority. Provision should be made for subsequent participation in its ownership and management by industrial tenants of the estate.

1.3.4 The physical planning and design of the estate, including layout, design of infrastructure and supervision of construction, should be carried out by a firm of Philippines consultants working under the direction of the principal consultants.

1.3.5 Principal consultants should be appointed who, in addition to planning and supervising the programme of works to be carried out as recommended in 1.3.4 above, should be commissioned to detail the management systems and procedures necessary to enable the recommended organisation to manage and control the project and to assist the organisation in the recruiting and training of staff and in the implementation of the recommendations.

1.4 Programme for Development of the Industrial Estate

The draft final report was submitted to UNIDO Headquarters by 28 February, 1974. By the same date copies were provided to LLDA in Manila.

UNIDO comments on this (W.D. Scott) report were received by 30 March, 1974 and this Final Report will be printed by 30 April, 1974.

The Philippines Government will have the draft report by mid-March and UNIDO comments by early April. It is planned that Government review of the project be completed by 15 June, 1974. Subject to that review being favourable the project should then be submitted to an international lending agency for appraisal and acceptance for financing.

Concurrently with this appraisal LLDA, with the assistance of the Public Works Department and other government agencies, should develop Terms of Reference for engineering design and supervision by Philippines consulting engineers working under the direction of the principal consultants as project managers and coordinators. A short list of suitable firms should be prepared and submitted to the international lending agency for conditional approval. As soon as project approval is given, planned for 31 December 1974, the project design phase can commence.

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It may not be possible to complete the project appraisal and acceptance in 6 months. Any extension of this period will mean a corresponding slip in the date for first access to the site and subsequent milestone dates.

If it is necessary to take tender action before appointing principal consultants, then a further six months must be added to the time estimated to permit the submission of detailed proposals and the appointment of principal consultants. This time can possibly coincide with the period provided for project appraisal and financing. The alternative course of action would be to authorise Phase 2 of the original Terms of Reference.

Land acquisition should be commenced as early as possible, preferably before the publication of the reports. If direct purchase is not possible because of difficulties in providing funds the options on the whole area of 450 hectares required for the estate should be negotiated as soon as possible. Purchase for the first 100 hectares should follow in 1975 and for the remainder as the growth of the estate demands.

Project design, including physical layout of the site, design of roads and services and management procedures, plans for implementation and training will require at least 8 months. At the end of this period contract documents for the construction work will be available and tenders can be called from either local or international firms. The work is straightforward and a tendering period of 60 days is ample.

The award of the construction contract should follow as quickly as possible. A further period of 60 days has been allowed. This period may also have to be extended if there are qualifications or close competition in the tenders. Any increase will again be reflected in later completion dates. The contract will be for Phase I comprising approximately 100 hectares.

Construction of roads, drains, water supply and waste water treatment plants and buildings for the first phase of the estate will occupy two years commencing on 1 January, 1976. After the first six months of this period the first industrial sites should be accessible by road although the full range of services will not be available. The first standard factory buildings, subdivided into units of 1000 square metres or more, should be available for installation of equipment by 1 January, 1977. Production from the estate should commence not later than 1 January, 1978.

The programme is set out in Diagram 1.2 at the end of this chapter and should be regarded as a target programme for establishment of Phase I of the estate. The remaining three phases, each approximately equal in area to the first, can be programmed to suit the rate of occupation of industrial sites.

1.5 Outline of Report Contents

This report consists of eleven chapters and three appendices. This is the penultimate section of the introductory chapter. The remaining section will compare the findings of this report with those currently being prepared by the LLDA team. The next four chapters deal with the requirement for industrial land in the Greater Manila area over the period 1979-85 and the types of industry desirable for a new industrial estate.

Chapters Six and Seven describe the potential sites and the costs associated with their development, while Chapters Eight to Ten are concerned with the legal, organisational and management aspects of industrial estate planning and development. Chapter Eleven sums up the results of the study and sets out the recommendations.

The four appendices contain a brief description of the study area; the study team and the method of approach adopted; the results of the industrial survey carried out by the LLDA team; the report of the foundations and soils engineer on the four sites selected for evaluation; and the detailed discussion of a selection of suitable firms for estate locations.

1.6 Comparison with LLDA Findings

The findings set out in this report are identical with those of the LLDA Study Team, although there are some minor variations in the setting out of the cash flow calculations.

The additional detailed information referred to in Section 5.5 of this report has been included in a new Appendix D in order to make this report a complete record of work carried out by the joint teams.

It must be emphasised that the production of this report by the consultants within the time allowed was only made possible by the detailed inputs provided by the LLDA team and by their wholehearted cooperation with the consultants' group.

Certain subjects, such as the establishment of basic parameters for environmental planning, require urgent attention but were excluded from the present study as not being strictly a part of the feasibility studies. It is suggested that early steps should be taken by the Commission for Planning and Human Settlements to put the necessary investigations in hand.

Similarly other subjects such as the social and environmental impact of the estate on the community cannot be considered in depth until the Commission has established acceptable standards. Briefly, the estate has been planned to meet anticipated demands for industrial space as described in Chapters Two and Three. It has been located south of the main built-up area to encourage growth in that direction. Discussions with planners in Manila, including members of the Task Force, indicated that such growth should be encouraged.

Its growth in this area will not demand excessive investment in new housing estates or other community requirements since residential development in the area is already proceeding quite rapidly. It will however provide an environmentally acceptable work place for workers from these new residential areas.

Similarly its demand for services such as water, sewage treatment and power are not expected to be disruptive to the community. It will be self-contained for water and related services and its power and telephone requirements can readily be met from existing companies.

The matters referred to in the above paragraphs will be more thoroughly dealt with by the new Commission on Human Settlements who have the responsibility to establish standards and to recommend land use to meet those standards. The implementation phase of the estate development must take account of all such standards and recommendations.

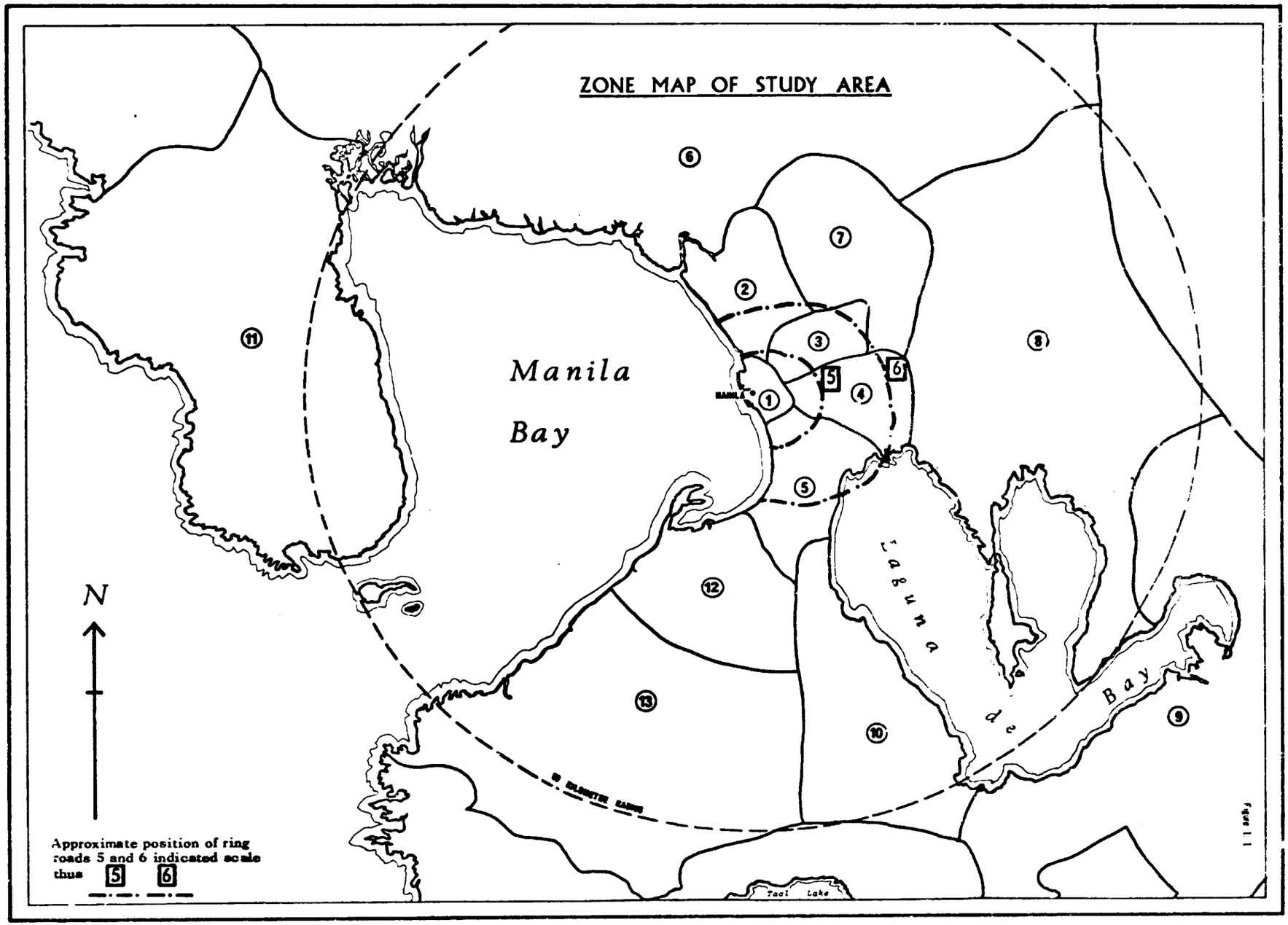
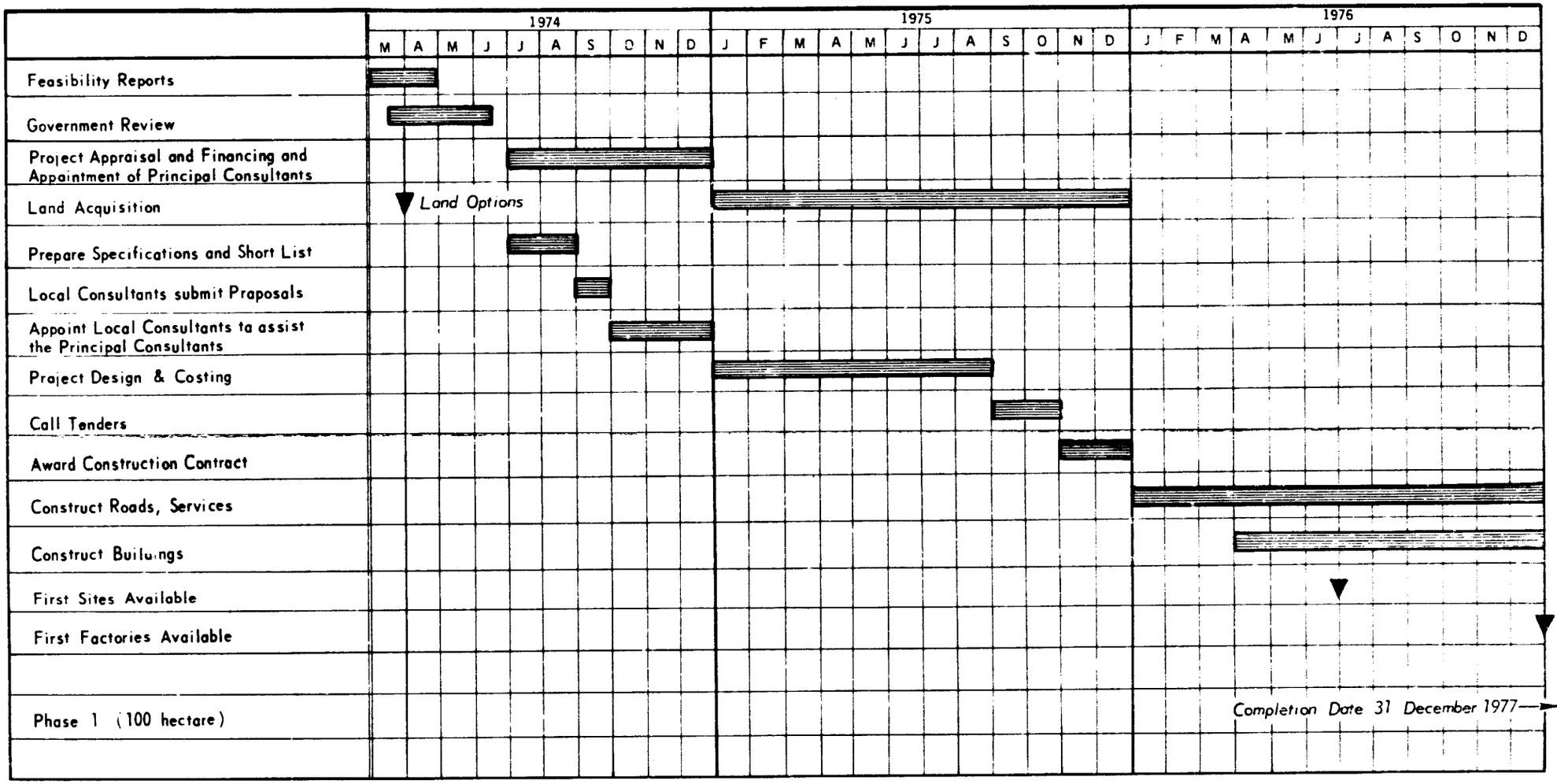

ZONE MAP OF STUDY AREA
Manila
Bay
Laguna de
Bay
Taal Lake
N
Approximate position of ring roads 5 and 6 indicated scale thus
5
6

Diagram 1.2

PROGRAMME FOR DEVELOPMENT OF INDUSTRIAL ESTATE



2. THE REQUIREMENT FOR INDUSTRIAL L ND

2.1 The Methodology Used to Forecast Industrial Land Requirements

Three possible methods of estimating future demand for industrial land in the Greater Manila area were considered. They are indicated on Figure 2.1 at the end of this chapter.

The historical growth method was rejected on the grounds that it makes no allowance for changes in the rate of growth arising from increased development activity or industrial promotion. The use of industry growth/land use ratios applied to forecast industry growth proved difficult because of the lack of suitable regional statistics.

It was therefore decided to make use of the existing population forecast as the base data, to calculate from this base future work force, employment and manufacturing employment by zones and finally to apply worker: area ratios to estimate industrial land requirements at five year intervals.

2.2 Population Growth and Distribution

The population data used in this report are based on the census conducted by the Bureau of Census and Statistics in 1970. The data on population growth and distribution are drawn from the Interim Report* of the Manila Bay region study group. This group prepared high, medium and low estimates based on the best available demographic information and on present plans for resettlement and growth.

Some of the basic assumptions on distribution of population may change as a result of the work of the Task Force on Human Settlement, but these changes are not expected to have significant impact on the findings of this study.

The results of the forecasts are set out in the Interim Report by municipalities and provinces. In this report data has been summed for each of the zones described in Section 1.2.

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* Interim Report No. 6, 1973 of Manila Bay Region Strategic Plan (NEDA-DPWTC-UPIP-UNDP)

The population projections by zones for five year intervals from 1970 to 1985 are set out in Table 2.1 overleaf. The high and low projections are given in the same table for convenience of reference. The high projection is based on constant fertility and a slow decline in mortality; the low projection assumes a very rapid decline in fertility (5.96 in 1965-1970 to 4.31 in 1995-2000) and a slow decline in mortality. The tables in the Interim Report cover the period 1970-2000. For the purposes of this report forecasts for the period 1970 to 1985 are considered sufficient.

2.3 Labour Force

The 1970 census results indicate a regional labour force of 1,674,000 derived from a regional population of 4,840,000 in the Laguna Lake region. Since this region covers the most densely populated sections of the study area the derived percentage of 34.6% has been used as the base by which to calculate the labour force in the study area in 1970. The 1970 rate of unemployment was estimated to be 7%.

Some recent reports have suggested that the percentage of population in the labour force will fall between 1970-2000 owing to the increasing proportion of young people in the population. It is the view of the study team that this trend will be compensated by the increase in the proportion of the female population who will enter the work force as employment opportunities become more varied and as the standard and costs of living rise. The assumption has therefore been made that the labour force will continue to be approximately 34.6% of the population over the period 1970-1985.

The distribution of the labour force by major industrial group as revealed by the census is set out in the following table:

	Number ('000s)	Percent
Services	579	34.6
Manufacturing	361	21.5
Commerce	223	13.3
Transportation, Communication and Storage	150	8.9
Agriculture, Forestry and Fishing	135	8.1
Construction	104	6.2
Electricity Gas and Water	12	0.7
Mining and Quarrying	6	0.4
Not included above	37	2.2
First jobseekers	67	4.0
	1674	100.0

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TABLE 2.1

POPULATION PROJECTIONS

(a) High

ZONE	1970	1975	1980	1985
Zone I	1,330,788	1,323,469	1,783,264	2,120,548
Zone II	691,958	925,324	1,230,776	1,361,100
Zone III	754,452	1,003,447	1,333,270	1,419,712
Zone IV	523,858	767,093	1,114,546	1,290,554
Zone V	694,902	948,267	1,295,101	1,429,191
Zone VI	1,532,265	1,838,725	2,203,068	2,481,415
Zone VII	68,175	99,942	143,687	169,684
Zone VIII	257,737	329,649	425,648	443,938
Zone IX	452,289	542,669	649,580	720,301
Zone X	331,547	459,547	629,457	763,431
Zone XI	216,210	262,602	318,729	366,763
Zone XII	248,489	307,455	379,048	444,343
Zone XIII	251,568	286,960	328,536	355,812
TOTAL	7,354,238	9,295,149	11,837,712	13,366,792

(b) Low

ZONE	1970	1975	1980	1985
Zone I	1,330,788	1,426,526	1,604,028	1,828,501
Zone II	691,949	864,862	1,104,764	1,180,128
Zone III	754,452	937,913	1,195,720	1,228,931
Zone IV	529,858	716,994	999,560	1,117,129
Zone V	694,872	886,337	1,164,178	1,237,137
Zone VI	1,532,265	1,722,035	1,989,072	2,163,878
Zone VII	68,769	93,413	128,961	147,075
Zone VIII	257,173	308,119	381,737	384,281
Zone IX	452,289	508,515	586,647	628,507
Zone X	332,627	430,317	567,352	664,624
Zone XI	216,210	247,007	290,577	321,914
Zone XII	248,637	287,544	341,140	385,514
Zone XIII	251,420	268,696	297,273	312,230
TOTAL	7,355,309	8,698,278	10,651,009	11,599,849

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Over the next decade or more it is expected that the industrialisation of the Philippines will accelerate and that the proportion of the labour force in the manufacturing sector will increase. As almost 70% (69.4) of the total labour force is already employed in the service, manufacturing and commerce sectors, the increase in manufacturing as a percentage of total labour force will be slow. Hopefully it will also absorb some of the unemployed 7% of the labour force. For this report a conservative assumption of 0.5% increase in the percentage employed in the manufacturing sector for each five year interval has been made.

The projections for labour force and for manufacturing work force are set out in Tables 2.2 and 2.3 overleaf. As in the case of population, the high and low projections are given in the same tables.

The 1970 unemployment rate in the study area was approximately seven per cent of the labour force. In this study the demand for manufacturing jobs is to be used as an indicator of the area of industrial land required. While it is hoped that the unemployment rate will fall during the period under review, the conservative assumption has been made that the unemployment rate will remain constant at 7%. The effect of this assumption is to underestimate the possible demand for industrial land.

The statistics for manufacturing employment demand by zone by five year interval are set out in Table 2.4 overleaf.

The demand for manufacturing jobs in Zone 1, the Manila City area, is expected to rise from 99,000 in 1970 to 116,000 by 1975 and 139,000 by 1980. (Table 2.3.) Even if the present unemployment rate of 7% is maintained, there will be a demand for 16,000 industrial jobs from the population of Manila City between 1970 and 1975 and a further 21,000 by 1980. (Deduced from line 1 of Table 2.4) The above figures are derived from the high projections which appear most likely in the short term. The low projections indicate a minimum demand, assuming 7% unemployment, for 9,000 industrial jobs between 1970 and 1975 and a further 15,000 by 1980.

There is relatively no available land for industrial development in Zone 1, although re-development of some land in the immediate vicinity of the port could provide opportunities. This land however is potentially of considerable value for high rise residential or commercial development. The alternative is for the industrial job seekers to travel into other zones, as in fact happens now to an appreciable extent.

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TABLE 2.2

PROJECTED LABOUR FORCE

Persons

(a) High

ZONE	1970	1975	1980	1985
Zone I	460,453	527,120	617,009	733,710
Zone II	240,415	320,160	425,848	470,940
Zone III	261,040	347,193	461,311	491,220
Zone IV	181,245	265,414	385,633	446,532
Zone V	240,436	328,101	449,143	494,500
Zone VI	530,163	636,198	762,262	858,570
Zone VII	23,589	35,080	49,717	58,711
Zone VIII	89,051	114,058	147,274	153,602
Zone IX	156,492	187,763	224,755	249,224
Zone X	115,088	159,002	218,881	264,148
Zone XI	74,809	90,860	110,280	126,900
Zone XII	85,978	106,379	131,150	153,743
Zone XIII	87,042	99,288	113,673	123,111
TOTAL	2,545,801	3,216,616	4,096,936	4,624,911

(b) Low

ZONE	1970	1975	1980	1985
Zone I	460,453	493,578	554,994	632,661
Zone II	239,415	299,241	382,248	408,326
Zone III	261,040	324,518	413,719	425,210
Zone IV	181,254	248,080	345,847	386,527
Zone V	240,426	306,672	402,806	428,050
Zone VI	530,164	595,824	688,219	748,702
Zone VII	23,794	32,321	44,620	50,889
Zone VIII	88,982	106,609	132,081	132,961
Zone IX	156,492	175,946	202,980	217,463
Zone X	115,089	148,890	196,305	229,960
Zone XI	74,809	85,464	100,540	111,382
Zone XII	86,029	99,489	118,035	133,387
Zone XIII	86,991	92,969	102,856	108,032
TOTAL	2,544,938	3,009,601	3,685,250	4,013,550

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TABLE 2.3

MANUFACTURING WORK FORCE

Persons

(a) High

ZONE	1970	1975	1980	1985
Zone I	98,997	115,966	138,827	168,753
Zone II	51,690	70,435	95,816	108,315
Zone III	56,124	76,382	103,795	112,981
Zone IV	38,969	58,391	86,767	102,701
Zone V	51,692	72,182	100,054	113,736
Zone VI	113,985	139,964	171,508	197,471
Zone VII	5,071	7,718	11,186	13,503
Zone VIII	19,146	25,093	33,137	35,602
Zone IX	33,646	41,308	50,570	57,321
Zone X	24,314	34,980	49,248	60,754
Zone XI	16,084	19,989	24,813	29,187
Zone XII	18,485	23,403	29,508	35,361
Zone XIII	18,714	21,843	25,576	28,315
TOTAL	546,917	707,654	920,808	1,064,000

(b) Low

ZONE	1970	1975	1980	1985
Zone I	98,997	108,587	124,874	145,512
Zone II	51,474	65,833	86,006	93,915
Zone III	56,124	71,394	93,087	97,798
Zone IV	38,970	54,578	77,816	88,901
Zone V	51,692	67,468	90,631	98,452
Zone VI	113,985	131,081	154,849	172,201
Zone VII	5,116	7,111	10,040	11,704
Zone VIII	19,131	23,454	29,718	30,581
Zone IX	33,646	38,708	45,671	50,016
Zone X	24,744	32,756	44,169	52,891
Zone XI	16,084	18,802	22,622	25,618
Zone XII	18,496	21,888	26,558	30,679
Zone XIII	18,703	20,453	23,143	24,847
TOTAL	547,162	662,113	829,184	923,115

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TABLE 2.4

MANUFACTURING EMPLOYMENT

Persons

(a) High

ZONE	1970	1975	1980	1985
Zone I	92,067	107,848	129,109	156,940
Zone II	48,072	65,505	89,109	100,733
Zone III	52,195	71,035	96,529	105,072
Zone IV	36,241	54,304	80,693	95,512
Zone V	48,074	67,129	93,053	105,775
Zone VI	106,006	130,166	159,502	183,648
Zone VII	4,716	7,177	10,403	12,558
Zone VIII	17,806	23,337	30,817	33,110
Zone IX	31,291	38,416	47,030	53,308
Zone X	22,612	32,531	45,801	56,501
Zone XI	14,958	18,590	23,070	27,144
Zone XII	17,191	21,764	27,442	32,886
Zone XIII	17,404	20,314	23,786	26,333
TOTAL	508,633	658,116	856,350	989,520

(b) Low

ZONE	1970	1975	1980	1985
Zone I	92,067	100,986	116,133	135,326
Zone II	47,871	61,225	79,986	87,341
Zone III	52,195	66,396	86,571	90,952
Zone IV	36,242	50,758	72,369	82,678
Zone V	48,074	62,745	84,287	91,560
Zone VI	106,006	121,905	144,010	160,147
Zone VII	4,758	6,613	9,337	10,885
Zone VIII	17,792	21,812	27,638	28,440
Zone IX	31,291	35,998	42,474	46,515
Zone X	23,012	30,463	41,077	49,189
Zone XI	14,958	17,486	21,038	23,825
Zone XII	17,201	20,356	24,699	28,531
Zone XIII	17,394	19,021	21,523	23,108
TOTAL	508,861	615,764	771,142	858,497

The demand for industrial jobs in Zones 2 to 5, forming the inner ring of zones around the central core Zone 1, is estimated to lie between 74,000 (high projection) and 58,000 (low projection) for the period 1970 to 1975 and between 102,000 (high projection) and 83,000 (low projection) between 1975 and 1980.

The total demand for industrial jobs in the inner five zones is therefore summarised as follows:

	High projection	Low projection
1970-1975	90,000	66,000
1975-1980	123,000	98,000
1980-1985	75,000	46,000

The bulge in 1975-1980 is due to the shape of the age-sex distribution in the study area, particularly in these five inner zones. The average demand in each of the three 5 year periods lies between 70,000 and 100,000 new industrial jobs.

In the outer ring of zones, Zones 6, 9, 11 and 13 are too far from Manila to have much influence on the location of industrial estates to serve the main centre of population. For the remaining Zones 7, 8, 10 and 12 the estimated demand for industrial jobs derived from Table 2.4 is as follows:

	High projection	Low projection
1970-1975	23,000	17,000
1975-1980	29,000	22,000
1980-1985	21,000	17,000

The average demand for each five year period for these four zones therefore lies between 20,000 and 25,000 new industrial jobs. Since these amount only to about 25% of the total they will not have major effects on location.

2.4 The Estimation of Industrial Land Requirements

The LLDA study team carried out a sample survey of existing industrial establishments in 1973. The data gathered in this survey is presented in summary form in Appendix B. The following table has been extracted from the original interview forms and shows the area of industrial land occupied by industries in each sector and the total number of workers. The land is that actually occupied by the enterprise and does not include any allowance for roads and services or other necessary facilities outside the factory boundary.

Industry Type	Hectares Occupied	Employees
Beverage	11.71	3,266
Tobacco	6.80	2,160
Textiles	12.74	3,632
Apparel	12.18	11,265
Lumber	6.44	626
Furniture and Fixtures	11.11	933
Metal	40.72	5,262
Machinery except electrical	3.05	471
Electrical machinery	51.38	5,799
Transport	2.25	530
TOTAL	158.37	34,380

Average 217 employees per hectare

Applying this ratio to the demand for industrial employment estimated in Section 2.3 above the total demand for industrial sites in each five year period from 1970 to 1985 will lie between 400 and 520 hectares. Since provision must be made for roads and services etc. the total requirement for land for industrial use will lie between 570 and 750 hectares (assuming that 70% of the area is occupied by factory sites and the remaining 30% by roads and services). The zone by zone requirements are set out in Table 2.5.

This land must all be located north, east or south of Manila since the Manila Bay lies to the west. The survey results indicate a strong preference for sites either north or south of Manila. This is logical since much of the land to the east of the city is already being developed and the hilly terrain will discourage industrial expansion in this direction.

It is reasonable to assume that there will be a demand for at least 250 hectares of industrial land south of Manila between 1970 and 1975 and a further 250 hectares between 1975 and 1980. Much of this land will lie along the South Super Highway and other access roads, but land is already scarce and expensive in these areas.

An industrial estate of 100 hectares initial size would accommodate approximately 10% of the total demand between 1970 and 1980 or 20% of the demand for industrial land south of Manila in the same period.

Since no decision has yet been made to establish an industrial estate it is unrealistic to consider demand arising in the period 1970-1975 except to the extent that such demand remains unsatisfied.

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TABLE 2.5

INDUSTRIAL LAND REQUIREMENTS*

Hectares

(a) High

ZONE	1970	1975	1980	1985
Zone I	423	496	594	722
Zone II	221	301	410	463
Zone III	240	327	444	483
Zone IV	167	250	371	439
Zone V	221	309	428	486
Zone VI	488	599	734	845
Zone VII	22	33	48	58
Zone VIII	82	107	142	152
Zone IX	144	177	213	245
Zone X	104	150	211	260
Zone XI	69	85	106	125
Zone XII	79	100	126	151
Zone XIII	80	93	109	121
TOTAL	2,340	3,027	3,939	4,550

(b) Low

ZONE	1970	1975	1980	1985
Zone I	424	465	534	622
Zone II	220	282	368	402
Zone III	240	305	398	418
Zone IV	167	233	333	380
Zone V	221	289	388	421
Zone VI	488	561	662	737
Zone VII	22	30	43	50
Zone VIII	82	100	127	131
Zone IX	144	166	195	214
Zone X	106	140	189	226
Zone XI	69	80	97	110
Zone XII	79	94	114	131
Zone XIII	80	87	99	106
TOTAL	2,342	2,732	3,547	3,948

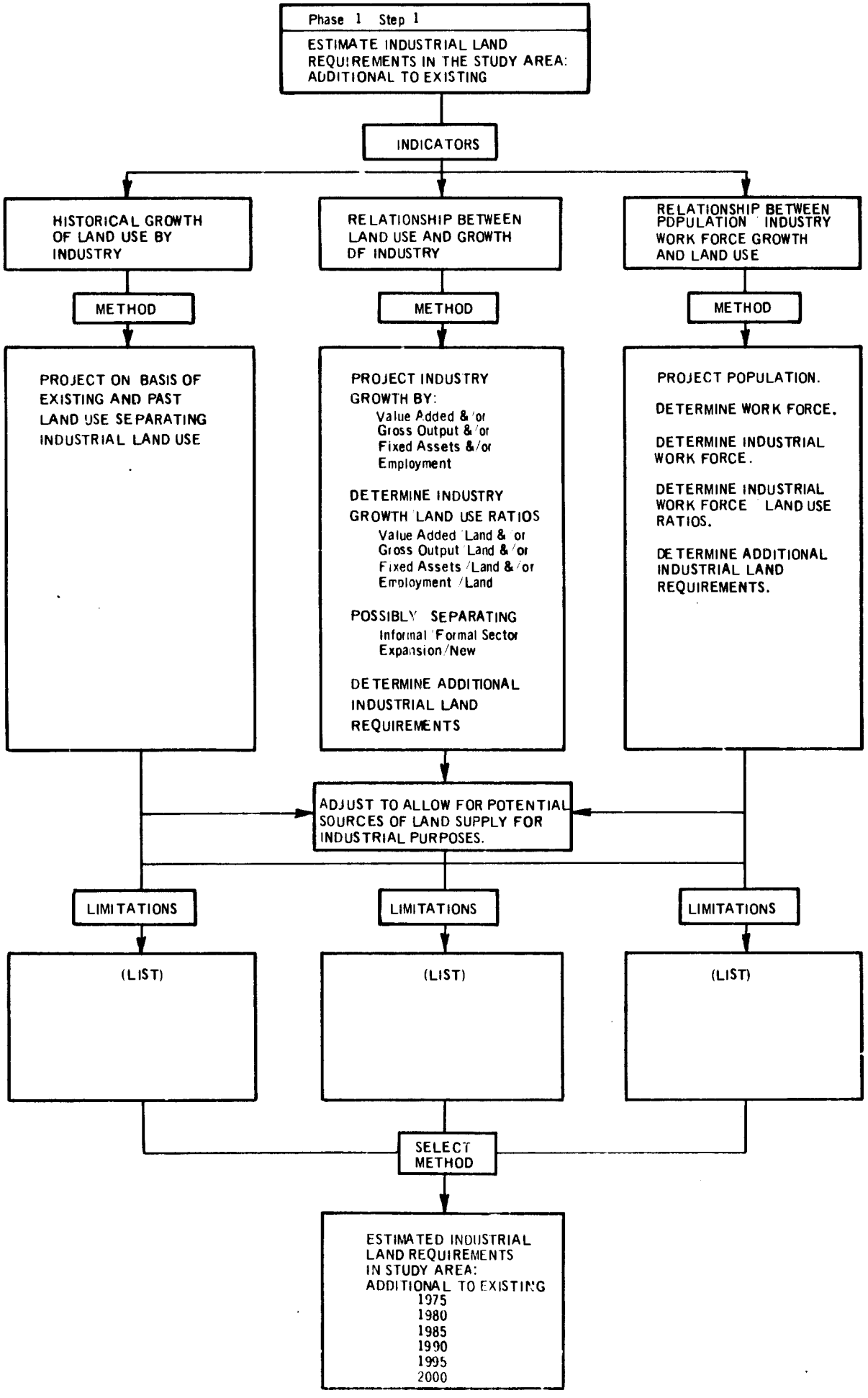
* based on 217 employees per hectare

It appears clearly in the sample survey that many firms are currently considering relocation south of Manila and it therefore seems reasonable to allow some of the current demand to be met on a new industrial estate available about 1977.

2.5 The Phasing of the Development of Industrial Land

Industrial development to the north and east of Manila is proceeding rapidly, although somewhat scattered and uncoordinated at present. Industrial development to the south has been less rapid and the stimulus provided by an industrial estate with sites available for immediate occupation may be desirable. From the estimates in Section 2.4 the aim should be to develop up to 250 hectares in the southern zones in each five year period from 1975 onwards.

Of this amount it is suggested that 50 - 100 hectares could be located on an industrial estate to provide opportunities for small and medium sized industrial plants to be set up quickly and with minimal pre-production costs. Relocation of existing industries will result in some transfer of workers from existing industries and some new industrial jobs. This will result in some additional demand for land, not included in the estimates above.


Phase 1 Step 1
ESTIMATE INDUSTRIAL LAND REQUIREMENTS IN THE STUDY AREA: ADDITIONAL TO EXISTING
INDICATORS
HISTORICAL GROWTH OF LAND USE BY INDUSTRY
RELATIONSHIP BETWEEN LAND USE AND GROWTH DF INDUSTRY
RELATIONSHIP BETWEEN PDPULATION INDUSTRY WORK FORCE GROWTH AND LAND USE
METHOD
METHOD
METHOD
PROJECT ON BASIS OF EXISTING AND PAST LAND USE SEPARATING INDUSTRIAL LAND USE
PROJECT INDUSTRY GROWTH BY:
Value Added &/or
Gross Output &/or
Fixed Assets &/or
Employment
DETERMINE INDUSTRY GROWTH LAND USE RATIOS
Value Added Land &/or
Gross Output Land &/or
Fixed Assets /Land &/or
Employment /Land
POSSIBLY SEPARATING
Informal Formal Sector
Expansion/New
DETERMINE ADDITIONAL INDUSTRIAL LAND REQUIREMENTS
PROJECT POPULATION.
DETERMINE WORK FORCE.
DETERMINE INDUSTRIAL WORK FORCE.
DETERMINE INDUSTRIAL WORK FORCE LAND USE RATIOS.
DETERMINE ADDITIONAL INDUSTRIAL LAND REQUIREMENTS.
ADJUST TO ALLOW FOR POTENTIAL SOURCES OF LAND SUPPLY FOR INDUSTRIAL PURPOSES.
LIMITATIONS
LIMITATIONS
LIMITATIONS
(LIST)
(LIST)
(LIST)
SELECT METHOD
ESTIMATED INDUSTRIAL LAND REQUIREMENTS IN STUDY AREA: ADDITIONAL TO EXISTING
1975
1980
1985
1990
1995
2000

3. THE NEED FOR INDUSTRIAL ESTATES

3.1 Potential Sources of Industrial Land

Land for new industrial development can be provided from four basic sources:

- undeveloped or vacant land;
- land currently used by other industries;
- residential land;
- agricultural land.

These four categories are briefly discussed in the following sub-sections.

3.1.1 Undeveloped Land

The areas of undeveloped land in the inner five zones of the study area are in general either Government land reserved for use as training areas, camps and bases for the Armed Services or land prone to regular flooding along the course of streams and rivers. Most of the latter is not really undeveloped since annual crops are taken from it in the dry seasons. Developers have so far shied away from these low lying areas because of the high costs of development, but the pattern of increasing settlement and more intensive land use in and around Manila will cause closer examination of their potential. The proposed reclamation area near Muntinglupa, described in Section 6.4 of this report, is indicative of the development costs likely to be associated with such areas. The possibility of release for industrial use of lands currently occupied by the Armed Services is, if judged by experience in Australia and other countries, remote in terms of short term planning. Even if the Government wishes to change the land use in these areas, administrative delays could continue over long periods.

3.1.2 Land Zoned for Industrial Use

Throughout the Greater Manila area there are large and small parcels of land available for industrial development. In general these are too small for estate development singly, and amalgamation of two or more such areas would require the concurrent purchase and redevelopment of areas already developed for residential, commercial or industrial use.

The redevelopment of some older industrial or commercial areas would also be feasible from the technical point of view. Such areas however lie relatively close to the inner city and would offer better returns for high-rise commercial or residential development. Land prices in such areas would be too high to permit viable industrial estate development, while delays in land acquisition and removal by existing owners and tenants would inhibit the early establishment of a new venture.

3.1.3 Residential Land

For reasons of completeness this source must be discussed although it suffers even more from the disadvantages just mentioned. Developed residential land in all parts of the Greater Manila region is priced at 50 pesos per square metre or more and it is unrealistic to consider its use for industrial estates. Similar arguments would apply to the redevelopment of commercial areas for industrial purposes.

Where redevelopment of sub-standard residential areas is planned there may be some scope for the establishment of small industrial estates, but the demand for institutional land for schools, hospitals and other essential services and the need for additonal open spaces in such redeveloped areas would reduce the area of land available for industrial purposes. The price of such land would be high because of the competing alternative uses.

3.1.4 Agricultural Land

Agricultural land, when considered for conversion to industrial use, can be categorised as land used for perennial crops such as fruit, coffee and grape vines, land used for annual crops but not irrigated and finally irrigated land. The agricultural land offering least return in its present use is the marginal land which produces one crop per year and that one crop heavily dependent on current weather conditions. This type of agricultural land is the most suitable for conversion to another use for two reasons: firstly, the penalty in the form of lost production is small, and secondly, the costs of development are minimised since land with perennial crops requires more clearing and irrigated land will almost certainly require greater expenditure on drainage and/or filling.

3.2 Why Industrial Estates?

Industrial estate development is not new to the study area. Private industrial estates have been successfully developed in the environs of Manila since the mid-1950's. The largest and best known are the Ayala and the three Ortigas estates. These estates have offered fully developed industrial land with varying lot sizes, particularly to suit medium size industrial plants (with average land requirements around 1 hectare). The Ayala and Ortigas experience is indicated in LLDA Industrial Estate Staff Studies of 1973 Part III. Therein, details are noted of the degree of development, number and types of inhabitant industries and conditions of tenure. Unfortunately, it was not possible for LLDA Study staff to obtain information about either the costs of development (compared with other industrial land being developed at the same time in smaller parcels) or the profitability of the estates. However, these estates are generally spoken of as successful; and Ortigas developed three estates. As of 1972, all four estates were full or almost full.

In addition to these private industrial estates, some 70-80 hectares of land per annum has been developed for industry in the study area by private developers.

The Bataan Export Processing Zone (in Bataan province) is a recent, special purpose industrial area established and operated by an authority of the Office of the President of the Philippines. It is in its early stages and limits participating industries not only to export oriented industry, but also light industry. Nevertheless the plants already set up in the zone also help to illustrate that ongoing industrial expansion in the study area continues to contain estate elements.

Despite previous successes, the LLDA study staff are not aware of any firm plans for new large private industrial estates of a general purpose nature in the study area. Given the absence of such plans, the establishment and relocation of plants is largely being catered for by parcel development of industrial land (at a rate of about 100 hectares p.a.) either by the plant owners in some cases, or by the industrial land developers in other cases.

In the absence of industrial estate development in the future, expansion needs of industry in the study area will continue to be met by these means, without real hindrance. As is shown elsewhere in this report there is plenty of agricultural and unused land in the study area for future industrial purposes, and there exist the means for developing it as the need arises.

In these circumstances, the creation of industrial estates will not be likely to yield large direct benefits (either regional or national benefits) in the way of net increases in employment, income and industrial investment expenditures. Almost all of the industry that could become estate residents will arise or expand irrespective of the presence of estates.

However, there are several types of national economic benefits which can be expected to be derived only if industrial estates are created. And there are other benefits to be expected in addition, which should only become available if some industrial land development (either estate development or industrial area development) is sponsored by the public sector.

3.2.1 Benefits Associated with the Nature of Industrial Estates

Industrial estates not only provide the environmental conditions sought by industry, they provide these conditions demonstrably, convincingly and attractively in a manner not easily achievable by piecemeal development. From the viewpoint of the industrialist the estate beckons, in that it removes a good part of the headaches, delays and entrepreneurial effort involved in the setting up of a new industrial plant. It allows him to concentrate upon capital equipment, raw material, transportation, finance and marketing aspects of his expansion project, especially if the estate management organisation will handle factory building and provide indications of sources of suitable labour. In general the availability of estate industrial land can be reckoned to reduce the sense of risk attaching to a new industrial venture.

The result can be that some plants in the study area will get started earlier than they otherwise would have done.

In the aggregate this can mean a temporary acceleration in the rate of establishment and expansion of industry - a ramp effect, eating into the latent industrial growth potential by lowering thresholds to change.

This type of one-time benefit can be fairly confidently expected for the study area, especially if the estate management organisation very actively markets its location and services in competition with the private land developer industry. The more that active competition is generated between the alternative providers of new industrial land the surer is this type of benefit irrespective of whether the estate or the competitors win out in the case of individual industrialised projects.

Secondly, industrial estates can reduce the proportion of overseas capital inflow devoted to land acquisition, raising the chance that a larger amount of inflow can be devoted to imports of capital equipment to be used directly in production. Irrespective of local land ownership laws some foreign capital, entering the country for industrial projects, probably ends up being used to acquire land. While this may be necessary, in some cases, for the individual project being constructed on an individual parcel of land, it is quite unnecessary with industrial estate development. The same benefit would flow from industrial area developments of a large scale nature.

3.2.2 Benefits Associated with a Slight Acceleration of Industrial Development

Acceleration of industrial development will not only confer the one-time benefit of added employment, income and investment generation. Multiplier effects will yield additional indirect benefits. The general income multiplier for the Philippines appears to be about 2.50. The reciprocal of the propensity to save plus the propensity to import has behaved as follows recently - 1967, 2.36 - 1968, 2.47 - 1969, 2.72 - 1970, 2.48 - 1971, 2.53 and 1972, 2.75 (National Income Accounts, 1967 to 1972 - NEDA). And the employment multiplier could be about 1.85 (i.e. 1.85 persons employed in Commerce, Transport, Communication, Storage and Services for each person employed in Manufacturing, Construction, Electricity, Gas and Water - Yearbook of Labour Statistics - I.L.O. Geneva 1969).

Also to the extent that the process of industrial development is import replacing, acceleration of development gives a potential import saving benefit equal to the local content of increased production less import content of any induced production less import content of the extra capital equipment required for the primary increase in production.

3.2.3 Benefits Associated with Public Investment in Industrial Land Development

In addition to the above benefits, a publicly owned industrial estate could reduce the capital resource cost per hectare of developing industrial land in the study area, and therefore reduce capital investment per plant of estate inhabitants. It could further reduce capital investment per plant by reducing profit margins of developer enterprise. An example will illustrate these types of benefits.

The present (1974) private resource costs of developing industrial land in the study area are estimated as follows:

			Pesos per m^2
Cost of acquisition of raw land in areas comparable to those being considered for industrial estates			5
Direct costs of site improvement including roads			15
Direct costs of installation of services including water, sewerage, sewerage treatment, power and communications terminals etc.			15
Administrative and other indirect costs including selling expenses			2
Sub-total			37
Assume that the land is ready for sale or lease two years after acquisition of raw land. Then			
Interest costs @ 18% p.a. equals			
on P*7 for two years	2.52		
on P15 for 1½ years	4.05		
on P15 for one year	2.70	say,	10
Total			47
The present selling prices are P90 - 100 per m^2		say	90
Therefore mark-up equals			43 or 91%

It should be possible to reduce the resource cost of development, i.e. P (47-5) = P42 per square metre, and it should also be possible to reduce the mark-up (P43 per m^2).

A public industrial estate development organisation could reduce the actual resource costs of development through its larger scale of operations and by improving efficiency. The opportunities for efficiencies probably come mostly with scale, although some would be available to the financial developers. There seems little doubt that present development methods are inefficient, particularly in the areas of project control and coordination, purchasing, and handling of the labour force.

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* P = Pesos (Philippines' unit of currency)

A public industrial estate development organisation could also acquire, develop and sell or rent land for below present market price. Such a strategy would not only help to fill the estate quickly and provide direct national benefits accruing to estate occupants, but it would probably also serve to reduce market price to all industrial land users in a major part of the study area.

The national benefits arise from the transfer of investable funds from rentier groups to industrialist groups who are more likely to utilise them to increase gross product. These benefits can arise either in the form of capital savings or annual rental savings to industrial land occupants.

A pricing strategy of P65 - P70 per m^2 (or its rental equivalent) in the first five years of the estate could produce substantial national benefits.

3.2.4 Other Benefits

Other benefits are intangible but nevertheless support proposals for industrial estates. They include:

- opportunities to upgrade the condition, profitability and growth prospects of small industry;
- greater public control over the location of industry in the study area;
- opportunities to set better standards, by demonstration, for industry in relation to its environment;
- ensuring that industrial land will remain in plentiful supply, etc.

3.2.5 Problems of Industrial Estates

Few if any of the major problems with industrial estates seem to apply in the study area at this stage of the growth of the industrial sector of the Philippines and of the study area.

Estates will not lack suitable candidates for occupancy; they should be sufficiently attractive to prospective occupants, compared with the offerings of piecemeal developers and industrial areas, for the chances of a 'white elephant' development to be slim (unless located most unwisely and managed most ineptly); and not only is the demand for industrial sites growing in the study area, there is an adequate supply of industrial labour, particularly for unskilled and semi-skilled occupations.

The point is that industrial estates will not be called upon to perform key industrial development functions in the study area so the risks of their failure and the scale of conferred benefits are thereby both reduced.

3.3 Possible Locations for Industrial Estates

In studying possible locations for industrial estates in the Greater Manila area the important factors to keep in mind are:

- the directions of growth of the conurbation;
- proximity to resources, including labour and markets;
- accessibility.

The relative importance of these factors is open to debate, but all three must be considered. In the earlier studies carried out by the LLDA team in 1971-72 a total of fifteen possible sites were identified, largely by map and aerial photo mosaic studies and knowledge of future transport planning. For convenience the fifteen sites have been scheduled according to location as

- within the orbit of the proposed circumferential road C5;
- between the proposed circumferential roads C5 and C6;
- outside the proposed circumferential road C6.

The circumferential roads C5 and C6 are planned to lie about 8 kilometres and 13 kilometres respectively from the centre of Manila. They are indicated on Figure 1.1.

The sites identified are listed in Table 3.1 opposite.

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TABLE 3.1

LIST OF POTENTIAL INDUSTRIAL ESTATE SITES

Site No.	Zone No.	Description	Approximate Size in Hectares
		Within C5	
1	2	Between Bagbaguin and Paso de Blas, near the north diversion road (Valenzuela)	150
2	3	Between Republic Ave. and Tandang Sora Ave. and Visayas Ave. (Quezon City)	200
3	4	Near Ortigas Ave. (Pasig) and the Pasig River (Pasig)	300
4	5	At the Military Reserve of Fort Bonifacio (Taguig)	400
5	5	Between Sucat Ave. and the International Airport of Manila (Paranaque)	400
		SUB-TOTAL	1,450
		Between C5 and C6	
6	2	Between Lawang Bato and Llanon Bignay (Valenzuela)	400
7	3	West of the Novaliches watershed (Quezon City)	300
8	7	Southeast of Novaliches watershed and reserve (San Mateo)	400
9	4	Between Calumpang and Rosario and Bulao Ave. (Marikina/Pasig)	550
10	5	Between Sucat Road and Alabang Road (Las Pinas/Muntinglupa)	200
11	5	North east and south west of Napindan River (Pasig/Cainta/Taguig) a flood prone area	2,400
		SUB-TOTAL	4,250
		Beyond C6	
12	5	Between San Nicholas and Bay area and Las Pinas (Las Pinas)	200
13	10	West Laguna de Bay reclamation area (Muntinglupa/San Pedro)	400
		In Pansol area	
14	10	Between Alligator Lake and the main road to Los Banos (Calamba/Los Banos)	70
15	2	Between Tabing Ilog and Iba; near the Northern Diversion Road (Marilao)	200

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3.4 Other Activities or Developments Located or Linked with Industrial Estates

These activities or developments are connected with:

- the requirements of the plant population;
- the requirements of the labour force; and
- the relationship of the estate to its region.

3.4.1 Requirements of the Plant Population

The operating plants of an estate or any other type of industrial complex chiefly require raw materials, transport and communication services, and services to maintain capital equipment (as well as the basic services required by all enterprises).

For a predominantly metalworking estate a metal merchant and engineering supplies merchant enterprise become possibilities to assist with raw material requirements. Also importer and customs agent businesses could be sited on or near the estate if handy to a port.

Vehicle maintenance and repair, machine maintenance and repair, toolmaking, draughting, printing, foundries, etc. are also possibilities (unless included in the primary classification of estate occupant industry).

The actual viability of these support industries is almost impossible to establish in advance as it depends upon the minutiae of the plant mix characteristics as well as the size of the estate. Some plants prefer to do as much as they can in plant: others buy in components and services very freely. The choice is often determined by the preferences of individual managements rather than by the type of product and process involved, or the scale of production.

The plant mix of an estate is sufficiently unpredictable for it to be profitless for the planner to do more than provide generally and conservatively for support industry and support service establishments.

Estates with nursery components are able to deal with this planning problem by including support enterprise amorphously in the nursery component. Support enterprises are normally very small space users. The exceptions are metal merchants who need large yards, and commercial motor vehicle maintenance and repair businesses.

3.4.2 Requirements of the Labour Force

These requirements can be myriad, and many investment opportunities can arise. The principal determinants of the range of opportunities are:

- the size of the labour force and dependent populations within the trading area of which the estate is the centre, and
- estate location.

Estates situated well away from urban concentrations and employing 15,000 workers will generate an immediate dependent population of about 100,000. Such an estate would need to be paralleled by a housing estate, and investment opportunities would be limited to neighbourhood and convenience type of enterprise.

Estates bordering on large urban concentrations tend to be marginal additions to growth at the urban frontier (whatever the size of the estate). Special provisions for worker housing are less necessary and investment opportunities in service industry (over and above neighbourhood/convenience types) may not be strongly influenced by the process of estate development.

3.4.3 Relationship of the Estate to its Region

The above activities or developments associated with requirements of the labour force are functions of the relationship of the estate to its region. Other possibilities are·

- the estate may help stimulate infrastructural development quite apart from its own requirements;
- the estate may inhibit other industrial land development in its immediate neighbourhood, especially if the estate land is distinctly below the typical price or rented rate in existence before estate development: this could give opportunity to acquire tracts close by for industrial area development, thus giving the large industrial establishment some of the benefits conferred by the estate on medium to small industrial land users.

Estates need to be very large and quite remote for any substantial worker education projects to be contemplated. The very fact of this type of opportunity may signal a danger that the estate concept or location is faulty. Some form of on-site training in particular skills may nevertheless be justified where such skills are lacking in the potential workforce.

4. INDUSTRIAL DEVELOPMENT IN THE STUDY AREA

4.1 Introduction

As for most countries, it is difficult to obtain data of any depth of detail regarding manufacturing industry in specific regions. Activity in each of the types of manufacturing are measured and published at the national level. Most of the statistics for regions (provinces) apply only to manufacturing industry as a whole.

On this level, Table 4.1 overleaf shows for a recent year that large industry is concentrated in the study area, with 75% of the establishments, 71% of the employment, 69% of materials usage, 69% of value added, and 68% of the book value of fixed assets being located there.

The table also shows that it is important to examine types of industry separately at the regional level, because the statistics imply that the average size of plant (measured by employment, output, materials usage, value added or fixed assets) is larger outside the study area than within it.

This is so for industries such as sugar milling, timber processing and iron and steel basic shapes, but not so for much of what is regarded as the everyday range of manufacturing.

4.2 The Structure and Growth of Existing Industry in the Study Area

Data on manufacturing by type by region is limited to years of Economic Censuses (e.g. 1961, 1967) and to the periodic listings of establishments, the last one of which was for 1972. The LLDA staff based their analysis of concentration of industry in the study area on the fuller 1967 data and used the 1972 data as a check on the stability of the patterns shown. The check suggested only modest structural changes.

Table 4.2 overleaf show that, when all manufacturing enterprises are taken into account, average employment per enterprise is higher in the study area than outside it. This means that enterprises with less than 20 employees are concentrated outside the study area.

The table also shows that average size of enterprise is larger in the study area than outside it in Beverages, Tobacco, Textiles, Clothing and Footwear, Furniture, Chemicals, Rubber, Non-Metallic Minerals, Petroleum and Coal, Miscellaneous Manufactured Goods and all Capital Goods.

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TABLE 4.1

GENERAL STATISTICS FOR MANUFACTURING 1969 - BY PROVINCE

(Large manufacturing establishments with 20 or more workers)

Province	Establishments No.	Establishments % of Total	Employment '000	Employment % of Total	Materials used Pesos mills.	Materials used % of Total	Value Added Pesos mills.	Value Added % of Total	Value of Fixed Assets Pesos mills.	Value of Fixed Assets % of Total
Manila	282	13.0	44.35	13.4	703.9	12.0	603.9	13.1	281.8	6.7
Rizal	1137	52.4	161.86	48.8	2793.3	47.7	2071.0	44.8	1767.6	42.1
Laguna	24	1.1	6.29	1.9	86.2	1.5	73.1	1.6	60.8	1.4
Sub-total	1443	66.5	212.50	64.0	3583.4	61.2	2748.0	59.5	2110.2	50.2
Pampanga	25	1.2	3.84	1.2	39.1	0.7	61.7	1.3	64.7	1.5
Bataan	5	0.2	1.76	0.5	171.9	2.9	63.3	1.4	318.7	7.6
Bulacan	143	6.6	14.80	4.5	218.9	3.7	279.5	6.0	301.1	7.2
Cavite	7	0.3	2.47	0.7	50.1	0.9	39.4	0.9	75.8	1.8
Sub-total	180	8.3	22.87	6.9	480.0	8.2	443.9	9.6	760.3	18.1
Study area	1623	74.8	235.37	70.9	4063.4	69.4	3191.9	69.1	2870.5	68.3
Rest of RP	547	25.2	96.47	29.1	1795.3	30.6	1426.9	30.9	1330.9	31.7
TOTAL	2170	100.0	331.84	100.0	5858.7	100.0	4618.8	100.0	4201.4	100.0

Source: Annual Survey of Manufactures 1969, BCS.

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TABLE 4.2

ALL MANUFACTURING FIRMS, BY PRODUCT GROUP, BY PROVINCE, 1967

	Firms (number)			Employment[a] ('000)			Employment per Firm (persons)	
	(b) Study Area	Philippines	% in Study Area	(b) Study Area	Philippines	% in Study Area	(b) Study Area	Philippines
Food	470	969	48.5	19.6	50.2	39.0	42	52
Beverages	38	84	45.2	21.3	26.3	81.0	561	313
Tobacco	30	47	63.8	17.6	18.8	93.6	587	400
Textiles	104	119	87.4	35.1	36.3	96.7	338	305
Clothing & footwear	455	586	77.6	29.0	31.4	92.4	64	54
Furniture	122	148	82.4	8.4	9.0	93.3	69	61
Printing	223	274	81.4	10.8	11.8	91.5	48	43
Leather	21	33	63.6	1.6	n.a.	n.a.	8	n.a.
Total Consumer goods	1463	2260	64.7	143.3	185.7	77.2	98	82
Wood	109	350	31.1	9.4	36.7	25.6	86	105
Paper	74	84	88.1	5.8	6.6	87.9	78	79
Chemicals	202	236	85.6	20.5	22.9	89.5	101	97
Rubber	38	49	77.6	6.0	6.4	93.8	158	131
Non-metallic minerals	110	166	66.3	8.9	11.4	78.1	81	69
Basic metals	96	124	77.4	7.9	10.4	76.0	82	84
Metal products	196	205	95.6	11.0	11.9	92.4	56	58
Petroleum & coal	10	25	40.0	0.8	0.9	88.9	80	36
Misc. manufactures	182	193	94.3	9.8	9.9	99.0	54	51
Total Intermediate goods	1017	1432	71.0	79.6	116.8	68.2	78	82
Machinery (except) electrical	141	190	74.2	11.4	11.4	100.0	81	60
Electrical machinery	127	142	89.4	36.3	36.7	98.9	286	258
Transport equipment	199	239	83.3	10.9	12.4	87.9	55	52
Total capital goods	467	571	81.8	58.5	60.5	96.7	125	106
TOTAL	2947	4263	69.1	281.4	363.0	77.5	95	85

(a) Totals may not add because of rounding

(b) Study area composed of the provinces of Manila, Rizal, Laguna, Pampanga, Bataan, Bulacan and Cavite

n.a. not available

Source: Manufacturing Census 1967, BCS.

Industries with the highest degrees of concentration in the study area (measured by employment) are Tobacco, Textiles, Clothing and Footwear, Furniture, Printing, Rubber, Metal Products, Miscellaneous Manufactures, and Machinery. However, it is only in Food and Wood industries that the concentration in the study area falls below 76% of total Philippines employment. Thus, the national data for growth in manufacturing activity can be used, with due allowances, to gain an impression of the rate of growth in manufacturing in the study area. This is given in Table 4.3 overleaf.

As concentration of heavy industry would be higher than light industry in the study area, the rates of growth between 1956-8 and 1969-71 would have been:

Establishments: over 1% p.a.
Paid employees: between 5% and 8% p.a.
Value added: between 13% and 15% p.a. at current prices
New capital expenditure: between 14% and 22% p.a. at current prices
Payrolls for paid employees: between 10% and 13% p.a. at current prices, and
Gross operating surplus: between 14% and 16% p.a. at current prices.

Wholesale prices rose by about $5\frac{1}{2}$% p.a. over the same period.

Table 4.2 also amply demonstrates the wide scope and mature structure of the industrial base of the study area. Table 4.4 overleaf calculates a simple location quotient which highlights the relative importance of the study area as a location for manufacture of Tobacco, Textiles, Rubber, Machinery, and Miscellaneous Manufactures.

The LLDA Industrial Survey of 1973 also provides information about industry in the study area. However, since its sample was drawn on the basis of known scale and structure of present industry, its findings are not of particular relevance at this point. Nevertheless it is worth noting that the survey concentrated on larger manufacturing enterprises, see Table 4.5 overleaf. Average plant size for the study area was 145 persons in 1969 for plants employing 20 or more persons (compared with 125 persons for all plants in 1967 in Table 4.5). Employees per plant was growing at about 5% p.a. (Table 4.3) so average plant size for the study area in 1973 could be established as $125 \times 1.05^6 = 168$ workers for all plants and $\frac{145}{125} \times 168 = 195$ workers for plants employing 20 or more workers. This compares with an average of 337 persons for the survey as a whole and with 250 persons for the survey less its Textiles, Footwear and Clothing components.

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TABLE 4.3

PHILIPPINES - GROWTH OF ACTIVITY IN MANUFACTURING INDUSTRY[a] 1956 - 1958 to 1969 - 1971 (% p.a.)

	Heavy Industry	Light Industry	All Establishments[a]
Number of establishments	+ 4.8	- 0.9	+ 0.7
Paid employees	+ 8.0	+ 4.9	+ 5.6
Payrolls for paid employees	+13.5	+ 9.9	+11.1
Gross operating surplus[b]	+15.9	+13.8	+14.6
Census value added	+15.3	+12.7	+13.8
Book value of fixed assets	+18.9	+14.0	+15.9
New capital expenditure	+22.2	+14.3	+17.8
Employee per establishment	+ 3.0	+ 5.7	+ 5.0
Payroll per paid employee	+ 5.0	+ 4.8	+ 5.0

(a) Establishments with 20 or more workers

(b) Census value added less Payrolls for Paid Employees

Source: Annual Surveys of Manufactures, BCS.

WDS

TABLE 4.4

MANUFACTURING EMPLOYMENT BY PRODUCT GROUP BY REGION - 1967

	Employment(a) in Study Area ('000)	% of Total	Employment(a) in Philippines ('000)	% of Total	Study Area % Philippines %
Food	19.6	6.97	50.2	13.83	0.50
Beverages	21.3	7.57	26.3	7.25	1.04
Tobacco	17.6	6.25	18.8	5.18	1.21
Textiles	35.1	12.47	36.3	10.00	1.25
Clothing & Footwear	29.0	10.31	31.4	8.65	1.19
Furniture	8.4	2.98	9.0	2.48	1.20
Printing	10.8	3.84	11.8	3.25	1.18
Leather	1.6	0.57	n.a.	n.a.	n.a.
Total Consumer goods	143.3	50.92	185.7	51.16	1.00
Wood	9.4	3.34	36.7	10.11	0.33
Paper	5.8	2.06	6.6	1.82	1.13
Chemicals	20.5	7.28	22.9	6.31	1.15
Rubber	6.0	2.13	6.4	1.76	1.21
Non-metallic minerals	8.9	3.16	11.4	3.14	1.01
Basic metals	7.9	2.81	10.4	2.87	0.98
Metal products	11.0	3.91	11.9	3.28	1.19
Petroleum & coal	0.8	0.28	0.9	0.25	1.12
Misc. manufactures	9.8	3.48	9.9	2.73	1.27
Total Intermediate goods	79.6	28.29	116.8	32.18	0.88
Machinery (except electrical)	11.4	4.05	11.4	3.14	1.29
Electrical machinery	36.3	12.90	36.7	10.11	1.28
Transport equipment	10.9	3.87	12.4	3.42	1.13
Total Capital goods	58.5	20.79	60.5	16.67	1.25
TOTAL	281.4	100.00	363.0	100.00	1.00

n.a. not available

(a) Totals may not add due to rounding

Source: Table 4.2

WDS

TABLE 4.5

STUDY AREA - AVERAGE EMPLOYMENT PER FIRM
(persons)

Industry Group	Manufacturing Census 1967	LLDA Industrial Survey 1973
Beverages	561	363
Tobacco	587	309
Textiles	338	609
Footwear & Clothing	64	626
Wood	86	125
Furniture	69	104
Metal Products	56	271
Machinery (except electrical)	81	94
Electrical Machinery	286	387
Transport Equipment	55	76
Metal to Transport inclusive	105	260
Total of above industries	125	337

Source: Table 4.2, LLDA Industrial Survey Q4, 7

WDS

4.3 Constraints to Future Development

Some doubts surround the outlook for manufacturing industry development in the future in South East Asian countries including the Philippines. The chief problems often referred to are:

- import substitution has gone so far that little further opportunities for growth are left in this direction;
- export prospects are clouded by the practical difficulty of obtaining access to the markets of the developed world and because many developing countries are in fierce competition for the attainable markets;
- access to the capital and technology required for further industrialisation has undesirable strings attached in the form of foreign participation, control, exploitation, etc.

However the growth prospect contained in the growth of local demand for manufactured goods tends to be overlooked - it is considerable - and the extent of the past import substitutions tends to be exaggerated and therefore future prospects in import substitution become underestimated.

After subjecting these factors to quantitative analysis in an earlier study, W. D. Scott economists projected that in the 1970 - 1990 period in the Philippines:

- gross domestic product originating in manufacturing will grow by just over 9% p.a. at constant prices (i.e. slightly faster than over the 1956 to 1971 period, which was about 14% p.a. at current prices - Table 4.3 - and 8½% p.a. at constant prices);
- demand for the growth of output will come, 85% from growth in the local market, 10% from growth in export markets and 5% from import substitution.

See "Southeast Asian Regional Transport Survey" - Asian Development Bank, Book Three, Part One.

These projections required the assumption of substantial foreign investment in manufacturing industry, which appears not only likely but increasingly available on terms entirely acceptable to the Government of the Philippines.

In addition, the above projections suggested that the proportion of total manufacturing output represented by intermediate and capital goods should increase over time.

When the projections were re-examined in the light of 1974 conditions and outlook, revisions, if any, appeared more likely to be upward rather than downward. See below, Section 4.4.

Thus future development of industry in the Philippines appears unlikely to be subject to major constraints such as those flowing from a substantial slowdown in the industrialisation process, which currently has considerable momentum behind it.

Regional growth policy, or problems of urban location for industry could impose some restraint upon industrial growth in the study area. On examination these possible restraints seem likely to have a minor braking power only. Export industry will be actively encouraged (to site at Mariveles in Bataan). Pollutant industry and industry nominated under the regional dispersion programme will be discouraged in the study area; but even adopting optimistic assumptions of the effectiveness of such planning it can be expected that only about 20% of what would have been the unrestrained growth of these types of industries will actually be prevented from locating in the study area. On the other hand intermediate and capital goods manufacturing which should be the faster growing sectors of manufacturing are not only now displaying considerable concentration in the study area, they should continue to be attracted to it because of availability of markets, labour, materials, ancillary services etc.

The problems of urban congestion and growth affect a manufacturer principally through increased transportation costs and labour availability, when journeys to work lengthen unduly. Manila has particularly congested transport routes to and from the port, but particularly uncongested transport routes within and between its industrial areas, and between the urban area as a whole and its agricultural and natural resource hinterland. Residential growth is taking place in close proximity to present and future industrial sites, and natural increase of the local population plus the drift to the city is strong enough that future industrial labour availability must be classed as excellent.

Improvement in urban standards in the future will present added costs to society representing work to be done to control industrial emissions, recycle water etc.; these costs will initially be borne by manufacturers but necessarily then reflected in the prices of the products they produce.

There seems little reason for expecting that industrial growth in the study area will be either slower in the future than in the past or slower than in the rest of the Philippines. This prospect must not be seen as flying in the face of regional decentralisation policy nor as dashing the high hopes of the urban planners. Progress toward decentralisation will be achieved, and urban standards lifted, but the achievable rates of progress are likely to leave considerable room for strong progress also in industrialisation in the region.

WDS

4.4 Future Industrial Development and Estate Potential

Despite recent disruption to world trade and economic growth, the long term development prospects for the Philippines remain bright. They could have even been enhanced by the 1973/74 energy scare and the Arab oil diplomacy associated with it. Commodity producing nations should benefit from what appear to be permanently higher commodity prices. Developing countries have and will be very much less affected by energy and raw material shortages than the highly developed nations of North America, Western Europe and Japan. To the extent that they are so affected they will tend to club together and serve themselves first; and for those materials they do not produce supply will be obtained as a result of resources diplomacy applied to those they do produce. Moreover, all nations will have a more self-reliant outlook toward their economic futures in the interests of security of supply. This means greater attention towards natural resource exploration and exploitation, and greater attraction in import replacement and export replacement manufacturing even at some economic costs.

Amongst other things all this means that acceleration in manufacturing investment and output is likely in store for the Philippines, i.e. the projections mentioned in Section 4.2 could be bettered.

Table 4.6 overleaf suggests that the acceleration will be quite strong. The projections of output in the table are consistent with the national development plan (to 1978) and other projections such as NEDA's and the Task Force for Human Settlements', and also with prior W.D. Scott projections (see the ADB's South East Asian Regional Transport Survey, Book Three, Part One).

The table also shows that heavy industry has not only been growing faster than light industry (due to greater emphasis upon heavy industry in national priorities and incentives to businessmen since the mid-sixties) but is expected to continue to do so. The reasons for this are not confined to the stimuli now being successfully given to base metal, motor vehicle, engineering and ship building industries. The general trend to what is called backward integration in the Philippines, i.e. growth of import replacing industry in producer intermediate goods is in full swing after a later start than in Singapore and Thailand, and will probably not lose impetus before the early 1980's.

As discussed elsewhere in this report, the types of industry which are apparently most suitable for industrial estate location in the Manila area prominently include metal manufactures, and metal and electrical machinery supplies. These are all components of heavy industry. So much of what has just been said of heavy industry applies also to the group of industries of great interest for this project, (called the Interest Group).

WDS

TABLE 4.6

MANUFACTURING ESTABLISHMENTS WITH 20 OR MORE WORKERS - PHILIPPINES

(Growth rates - % p.a.)

	Current Value Added		Paid Employees	Employees per Establishment	No. of Establishments
	Current Prices	Constant Prices[a]			
1956 - 8 to 1969 - 71					
Heavy Industry [b]	15.3	9.8	8.0	3.0	5.0
Light Industry [c]	12.7	7.2	4.9	5.7	-0.8
All Establishments	13.8	8.3	5.6	5.0	0.6
1969 - 71 to 1982 (Estimated)					
Heavy Industry	n.a.	12.0	9.5	4.0	5.5
Light Industry	n.a.	9.0	7.0	5.0	2.0
All Establishments	n.a.	10.0	7.9	4.7	3.2

(a) Using the Wholesale Price Index as a deflator

(b) PSIC groups 27 and 31-38

(c) PSIC groups 20-26, 28-30 and 39

n.a. not applicable

Sources: Annual Surveys of Manufactures of BCS, WDS projections.

Both the heavy industry category of the BCS and the Interest groups contains PSIC categories 35-38. The heavy industry group also contains categories 27 and 31-34; whilst the Interest group also includes 39.

For the Interest group itself, growth of output, employment and establishments has been and is expected to be faster than for heavy industry as a whole (compare Table 4.7 with Table 4.6). Note that three-quarters of the growth in employment (and activity) in the Interest group comes from new establishments, and one-quarter from increase in the size of establishments.

Based on the trends of Table 4.7, Table 4.8 develops estimates that about 53 new plants a year should be establishing in the Interest group in the Study Area at 1978. 1978 is taken to be the first year in which an industrial estate in the Study Area could be leased to operating industrial plants. By 1982, the number of new plants per year is estimated to grow to about 64.

The industrial survey, conducted by LLDA in 1973, suggested that about 40% of establishments in the Interest group would need to relocate because of expansion in the next five years. If a similar proportion of the 890 plants (estimated to exist in the Study Area at 1978) is taken as representing existing industry to make a move in the 1978-82 period, there would be about 356 additional industrial estate candidates.

However, the estate will not be able to regard the whole of the 356 as real potential simply because its location will not appeal to all appropriate relocating industry. Analysis of the LLDA Industrial Survey shows broadly that new locations north and south of Manila are preferred most by plants who say they will relocate in the next five years, significantly more than preferences for new locations east of Manila. Allowing for different interpretations of what is north, south, and east, the unknown strength or weakness of the stated preference, and the fact that respondents had not had the temptation of a first class industrial estate put to them, it is not warranted at this stage to do more than give equal weight to each of the three zones. In fact east may draw more readily from north and south, than south (north) could draw from north (south) in addition to the contiguous east. On this basis the 356 additional industrial estate candidates has been divided by 3.

Thus the potential plant population from which an estate could draw in the 1978-1982 five years could be as follows:

Interest Group of Industry		
New Plants Setting Up	290	$\left[5 \times \sqrt{53 \times 64}\right]$
Existing Plants Relocating	119	
Total	409	

TABLE 4.7

MANUFACTURING ESTABLISHMENTS WITH 20 OR MORE WORKERS
PHILIPPINES PSIC CATEGORIES 35 - 39 (Growth Rates - % p.a.)
(INTEREST GROUP)

	Census Value Added			Employees per Establishment	No. of Establishments
	Current Prices	Constant Prices	Paid Employees		
1956-58 to 1969-71			8.2	2.0	6.2
1969-71 to 1982 (est.)	n.a.	11.5	9.0	3.0	6.0

Sources: Annual Surveys of Manufactures BCS, WDS projections

n.a.: not applicable.

TABLE 4.8

MANUFACTURING ESTABLISHMENTS WITH 20 OR MORE WORKERS
PSIC CATEGORIES 35 - 39
(INTEREST GROUP)

	No. of Establishments - Philippines	(a) % in Study Area	No. of Establishments - Study Area	Increase p.a. (No.)	(b) Workers per Establishment - Study Area	No. of Workers - Study Area	Increase p.a. (No.)
1956-58 av.	252	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1968-69 av.	515	94 e	484 e	29	115	55660	4560
1978 Est.	978	91 e	890 e	53	152	135280	12175
1982 Est.	1235	87 e	1074 e	64	171	183650	16530

Sources: Annual Surveys of Manufactures BCS, WDS projections

(a) % in Study Area for PSIC 35 - 39 was 1.26 times the % for all firms on Table 4.2; this factor was applied to the 74.8% of Table 4.1 to obtain 94% at 1969. The figure was reduced slightly with time to reflect some regional dispersion.

(b) Figures of Table 4.2 adjusted upward for larger firms in the light of Table 4.1.

n.a. not available

e estimate

WDS

TABLE 4.9

MANUFACTURING ESTABLISHMENTS WITH 20 OR MORE WORKERS - NOT PSIC 35-39

		1978 Estimated		
	1968-9 Av.	Unconstrained	Optimistic Planning Assumption	
No. of Establishments - Philippines	1,655	2,000	2,000	(+2% p.a.)
% in Study Area	69	67	65	
No. in Study Area	1,139	1,340 →	1,300	
No. of New Plants per annum	23 (2% of 1,139)		26	(2% of 1,300)
% of Existing Plants likely to relocate			40	
No. of Existing Plants likely to relocate in 1978-82 period			520	

Sources: 1968-9 data obtained by subtraction from Tables 4.1 and 4.8; the 2% p.a. growth factor for plants comes from Table 4.6. The optimistic planning assumption case is derived by taking 80% of the increase from 1,139 to 1,340 in the unconstrained case.

In addition there is potential outside the Interest group. The scope of the potential in this group is limited because some of the types of such plants are much more appropriately located outside the Manila region within the present and projected framework of industrial planning in the Philippines. Incentives will be used, and sometimes zoning, to impel industry (particularly new industry) toward some locations and away from others. Even assuming that this planning is effective the number of potential estate plants belonging to types outside the Interest group remains substantial. Table 4.9 overleaf gives the basis for estimating the potential plant population from which an estate could draw in the 1978-1982 five years from outside the Interest group. The potential could be as follows:

Industry Outside the Interest Group of Industry

New Plants setting up	140	(26 plants p.a. at 1978 increased by 2% p.a.)
Existing Plants Relocating	173	(520 of Table 4.9 ÷ 3)
TOTAL	313	

Further potential also exists in establishments employing less than 20 and at least 5 workers, which typically occupy $\frac{1}{20}$ to $\frac{1}{10}$ th hectare per plant.

There were about 1,270 such establishments in the study area in 1969, 1,900 establishments in 1978, with an annual increase of around 100 plants at that time (or nearly 575 new plants in the five years 1978-1982). Unfortunately there is no available guidance from experience as to the rate at which small plants relocate for the purposes of expansion and there is no data on location preferences of these relocating plants. In these circumstances the % relocating was held at 40, and $\frac{1}{3}$ rd of those were regarded as attractable to an estate.

Potential could also come from pure relocation of existing plants for purposes other than growth. This potential has not been included as the purpose of this project is to enquire into the feasibility of an industrial estate to assist or cater for industrial development in the study area. Some actual estate occupants could turn out, however, to be straight relocation.

Potential is subject to reduction because some of the plants with 20 or more workers will be too large to be attracted by industrial estate services and features (e.g. those using more than $5\frac{1}{2}$ hectares). The LLDA Industrial Survey suggests that about 6% of existing plants are in this category. The above potentials were therefore reduced by 6% (even though the LLDA survey may have overestimated the actual percentage).

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In summary the plant population from which an estate could draw, in its first five years of life is then estimated as:

	20 and over workers			
	From Interest Group	From Outside Interest Group	Total	Nursery Size 5 to 20 workers
New Plants setting up	273	132	405	575
Existing Plants Relocating for Expansion	112	163	275	253
TOTAL	385	295	680	828

From a total regional viewpoint there is double counting in the above estimates by virtue of space vacated by relocating industry; but there is no double counting from an estate viewpoint.

An estate can capture only a small part of the estimated potential. The Ortegas and Ayala estates were largely developed over the fifteen years between 1955 and 1970. During this period an increase of about 600 plants took place in the 20 and over worker category of plant in the study area. At the same time plants were relocating and business mortalities would have provided some additional potential over and above relocation potential. The Ortegas and Ayala estates attracted about 180 plants during the development period gaining probably between 15 and 25 per cent of the potential.

This study has adopted 20% as a reasonable target market share for the estate development organisation to aim at. This is based not only on the experience of Ortegas and Ayala development but also on the study team judgement that 20% is attainable by normal marketing means provided that the estate has marked marketable features of which the most important will be standard of development, location, price of rental or acquisition, availability of semi and skilled labour, and speed and reliability of keeping promises. Even given those things it would be difficult, in the team's opinion, for a higher market share to be obtained without official "muscle" behind the development (either in the form of special incentives or controls on industrial development outside the estate).

The above applies to the large plant section of the potential. In the nursery size plant section it is possible to aim at a much larger market share, because the competition will come from very small developers and because the estate organisation will be able to create its own market (in the sense that it can encourage completely new industrial entrepreneurs to commence production and thus pre-empt some of the 828 potential plants to itself). A market share of about 25% has been used here for nursery industry.

The resultant rough first five year estate profile is as follows:

	20 and over workers			
	From Interest Group	From Outside Interest Group	Total	Nursery Size 5 to 20 Workers *
New Plants setting up	55	26	81	140
Existing Plants Relocating for expansion	22	33	55	63
	77	59	136	203

* Average 16 workers per plant and 200 workers per hectare.

The above profile assumes that the postulated market share targets are obtained in each market segment, which would be extraordinary, so it is indicative only and chiefly relevant in respect of the totals shown.

This section has concentrated upon establishment measures. Issues of the size distribution of plants (in terms of employment, output, land usage, etc.) are taken up in later sections. What has been shown here is that, for the case of typical size distribution, industrial estate development targets for the first five years in the region should be attainable if limited to about 77 plants in the Interest Group, 60 plants outside the Interest Group, and 200 nursery size plants. Anything much over these targets could be either too ambitious or require special official assistance for success.

WDS

5. INDUSTRIES SUITABLE FOR ESTATE LOCATION

5.1 General

It was necessary to identify the types of growing industry that would be of suitable plant size for industrial estate location, and suitable to the region in which the estate would be situated. The intention of this identification effort was to show whether or not sufficient suitable types of industry are likely for the 1977-1982 period for industrial estate development to be examined further; and also to show the resource and infrastructural requirements of such industry.

Plant size was suitable if it was neither so small nor so large that services offered by estate development would not attract the enterprise.

Location in the general region was suitable if the plant type was not earmarked for other regions, not restricted by policy and/or planning provisions, and otherwise likely to link to or agglomerate with existing industry of the general region.

The identification process was limited to cases of growing industry because industrial estates are being studied as aids to development rather than for relocation of industry. The method of approach was to examine industry type before plant size, although types of industry associated with very large minimum plant sizes were given early attention (exclusion).

5.1.1 Industry Types

The identification adopted was the PSIC categories 201-399. Thus all types of manufacturing were included. Consideration of service industry establishments was reserved for later treatment; such establishments, if any, would function as support to the core manufacturing industry mix.

Various criteria for non-suitability were applied with the intention of regarding the surviving types as a population from which industry mixes of varying degrees of suitability could be drawn. Within the surviving types of industry specific plant type cases were identified, viz

- new industry in which future growth will prominently involve the establishment of new firms or new manufacturing units (from IPP-6 of BOI, and a few from consultants' suggestions), and

- existing industry of the region which will need to relocate to cater for expansion anticipated in the next five years (from LLDA's survey of selected industry July-October 1973).

This bundle of specific plant types was investigated for -

- backward and forward linkages (the pattern being one of weak intra-bundle linkages, few and fairly common supplying industries, and many also fairly common purchasing industries; and significant but not high dependence upon imports of inputs, plus low dependence on export sales)

- relationships with existing industry (the bundle being right in the path of likely future development of existing industry of the region in the relevant PSIC classes)

- transportation dependence (the pattern being one of high enough unit value of production by the bundle for transportation cost to be such a low proportion of total cost for industry mix to be broadly insensitive to estate location within the region)

- labour requirements (the pattern being one of high and medium labour intensity).

From these investigations it appeared that differences in degrees of suitability within the bundle could be minor, so this issue was reserved for later consideration.

The bundle was then utilised to produce a first estate industry mix on the assumptions that -

(a) new industry would not normally take up more than 25% of the BOI's estimated measured capacity (or potential for import replacement as otherwise calculated)

(b) expanding existing industry would increase capacity by at least 50% when it relocated for expansion purposes

(c) that expanding existing industry would relocate to an estate, in about 20% of cases, and

(d) that individual plant capacities for new industry would conform to the BOI's estimated economic plant size.

When the characteristics of this first mix were inspected it was evident that, given a realistic share of industrial expansion in the general region during the next five years, the mix provided at least 50% and probably much more of the future industry suitable for estate location. Therefore, analysis of industry type happened also to yield preliminary indications of the feasible scale of estate development.

The first mix displayed great variation in labour per plant, hectare per plant, and labour per hectare. So it would have been possible to obtain very different estate land sizes, and direct employment generation effects from minor changes in the mix. Variability was reduced and confidence in ability to attract plants to estates was increased, by eliminating the largest 25% of plants (in terms of labour/land required) in the new industry component of the first mix.

This second mix which resulted could be regarded as conservative in both its demands upon share of available industry and on resources and infrastructure. It was employed to indicate approximate physical requirements for the estate as a whole, and was then adjusted to increase plant size for certain types of production. A third mix was also explored. This mix was representative of existing industry in the study area of types initially regarded as unsuitable.

The LLDA staff who conducted this analysis have reported on its conduct in Appendix D. Therefore the discussion here is limited to a summary, key results and comments on method and findings.

5.2 Potential Industries for Industrial Estate Location

The search for potential industries for estate location was basically aimed at seeing whether there are apparently a sufficient number of suitable size for estate location in the study area. The search was not aimed at predicting the precise make-up of the industries inhabiting the estate or estates.

The search commenced by excluding the following -

- industries which would pose particular pollutant problems when located in or near the Manila metropolitan area;
- industries which are mainly export oriented; it was assumed that these industries would be attracted to the Bataan Export Processing Zone;

- industries which are raw material oriented and could be expected to locate near or on their source of raw material supply;

- industries with special site requirements (e.g. those requiring large tracts of land, very copious supplies of water, power etc.);

- industries nominated in the government's regional dispersal programme for decentralised locations;

- industries suitable for backyard location (which are either too small for estate location or could be catered for, en bloc, in the nursery section of any estate).

These six screens were applied to the industries listed in the Sixth Investment Priorities Plan of the Philippines Board of Investments, as representing new industry types, and to the types of expanding existing industry contained in the LLDA industrial survey.

Each remaining industry type could be regarded as representative of suitable types of industry. As noted above, types of industry which were caught by the screens were not discarded entirely. They played a later role in the analysis as representative of types of industry, outside the interest group, that will be establishing or expanding in the study area even if an optimistic planning assumption is adopted.

5.3 Relative Merits of Particular Industries

The group of apparently suitable types of industry was then examined to see if some types could be preferred over others. Preference would be given to those types which -

(a) would be desirable from the viewpoint of the national objective of generating employment opportunities (i.e. by labour intensive types), and

(b) would be highly likely to locate in the study area, and therefore be readily attracted to an estate.

As it turned out, all the surviving types of industries were medium to high labour intensity industry (variation on labour requirement per plant being principally because of variation in scale of production).

And almost all of the survivors were palpably attracted to the study area as being market (and labour) oriented, presently important in the area, and compatible with other present and future industry in the area.

Some cases were encountered of industry types which might be expected to link to either other survivors or to other industry of the area, but agglomerative forces were apparently to be much more prominent and powerful than linkage forces.

Thus it did not appear fruitful to force distinctions between the relative merits of the apparently suitable types of industries, and the analysis proceeded as if all types were equally attractive.

There were a few industry types (in the survivor list) which were of a sufficiently specialised nature that they could have been assigned a low preference rating. This would have been because of type of product, such as tomato paste, which could also be readily locatable outside the study area; or because of very small scale of production. These types had been left on the list to avoid influencing the analysis with too much subjectivity too early, and in the interests of realism. Since a full preference ranking was not undertaken, and because the downgradable cases were so few, no preference ratings at all were established.

5.4 Suitable Industries for Estate Location

The list of suitable industry types was then augmented by a few plant types akin to items in the list and for which import replacement opportunity appeared good after examination of the annual bulletin of foreign trade of the Philippines.

Next, each item on the list was assigned an annual production rate. For this purpose the measured capacity estimates of the Board of Investment were used in the case of items drawn from IPP-6, annual import volumes were used in the case of extra items suggested by the study team and 150% of 1973 production was used in the case of items of existing industry in the study area which expected to have to relocate within the next five years because of expansion needs. It was assumed that relocating plants would increase their capacity by at least 50%.

Twenty per cent of each annual production rate was then taken as the output of that type of production which could be considered likely to occur on an industrial estate or estates.

The next step was to convert estimated estate output to number of plants with certain labour, land and other requirements. For this purpose the characteristics of economic size plants (as estimated by the BOI) were utilised in the case of new plants, and LLDA industrial survey data were used for the case of existing expanding plants.

The above procedure yielded a schedule of suitable possible individual plants. This schedule was then adjusted in several ways, viz:

- very large plants (i.e. those requiring land in excess of $5\frac{1}{2}$ hectares) were eliminated as too large for estate occupancy to have much appeal; such plants are large enough to develop their own land efficiently and would tend to look more toward industrial area locations; the retention of these plants would also have increased the variability of possible land and labour requirements depending upon whether they were to be actually captured or not by the estate;

- scales of economic plant size were reviewed and enlarged in several cases where supported by present practice and opportunities for scale economies;

- labour requirement estimates were also reviewed and adjusted in a few cases.

As a result, the schedule then contained 67 plants (roughly of the order of magnitude of the number that might be expected to be capturable by industrial estates in the first five years - see above Section 4.3) needing about 80 hectares of land (roughly of the order of magnitude of the amount of industrial land that might be expected to be developable as industrial estates in a five year period - see above Section 2). This excluded the nursery section; and also excluded industries outside the interest group.

5.5 Profiles of Suitable Industries

This resultant industry type schedule is shown in Table 5.1 opposite. It was regarded as the final selected industry mix, and was employed to estimate land and labour requirements on an estate. This was an important aim of the analysis of suitable industry, i.e. to see what a schedule of plant types (representative of a plausible estate plant population) might reveal in the form of the amount of land to be occupied, and the amount of labour to be employed.

TABLE 5.1

FINAL SELECTED INDUSTRY MIX

(Primarily from the Interest Group of Industries - and excluding almost all nursery size plants)

PSIC Category[b]	Description	No. of Plants: This Type	No. of Plants: Cumulative	Per Plant: Labour (No.)	Per Plant: Hectare (a)	Requirement: Labour	Requirement: Hectare	Labour Force per Hectare
	A. Potential or New Industries							
203	Fruit/vegetable processing	1	1	516	2.01	516	2.01	257
203	Tomato paste	1	2	13	.05	13	.05	260
231	Ramie Fibre	1	3	1316	4.59	1316	4.59	287
311	Polyvinylalcohol Resins	1	4	33	1.00	33	1.00	33
315	Chemical Gypsum	1	5	29	.13	29	.13	222
315	Antibiotics	1	6	82	3.04	82	3.04	27
351	Logging Blocks of Alloy Steel	1	7	150	.99	150	.99	152
351	High Carbon Steel Wire	2	9	60	.43	120	.86	140
351	Alloy Steel	2	11	189	1.35	378	2.70	140
353	Steam Boilers	4	15	51	.36	204	1.46	140
363	Shapers	2	17	163	1.05	326	2.10	155
363	Lathes	1	18	160	1.03	160	1.03	155
363	Drill Presses	2	20	61	.39	122	.79	155
363	Carbide Tipped Tools	2	22	90	.58	180	1.16	155
363	Shaft Bearings & Products	2	24	31	.20	62	.40	155
363	Speed Reducers, etc.	2	26	795	5.13	1590	10.26	155
363	Globe, Gate & Check Valves	2	28	72	.46	144	.93	155
364	Hoists, Cranes, etc.	2	30	223	1.44	446	2.88	155
369	Milling, etc. machines	1	31	160	1.03	160	1.03	155
371	Switchgear & Panelboards	3	34	36	.32	108	.96	113
371	Circuit Breakers	1	35	191	1.68	191	1.68	114
371	Magnetos & Transformers	1	36	82	.34	82	.34	241
371	Elec. Motors (Auto. use)	1	37	71	.61	71	.61	116
379	Electrical Tape	1	38	39	.35	39	.35	111
383	Gauges & Instruments (Auto)	1	39	82	.35	82	.35	234
383	Shock Absorbers	1	40	193	.82	193	.82	235
383	Automotive Clutches	1	41	40	.17	40	.17	235
383	High HP Diesel Engines	2	43	740	4.78	1480	9.55	155
383	Small Gasoline Engines	1	44	286	1.85	286	1.85	155
391	KWH Meters	1	45	38	.34	38	.34	112

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TABLE 5.1
FINAL SELECTED INDUSTRY MIX
(Primarily from the Interest Group of Industries - and excluding almost all nursery size plants)

PSIC Category (b)	Description	No. of Plants: This Type	No. of Plants: Cumulative	Per Plant: Labour (No.)	Per Plant: Hectare (a)	Requirement: Labour	Requirement: Hectare	Labour Force per Hectare
	B. Expanding Industries							
351	Metal Cans	1	46	90	.15	90	.15	600
351	Metal Barrels, Drums etc.	1	47	189	1.29	189	1.29	147
351	Safes and Vaults	1	48	45	.90	45	.90	50
351	Boilers, Tanks etc.	1	49	30	.18	30	.18	167
351	Collapsible Tubes	1	50	750	3.51	750	3.51	214
355	Wire Nails, Brads., Spikes etc.	1	51	406	5.13	406	5.13	79
357	Wire and Rod Products	1	52	319	1.95	319	1.95	164
357	Structural Steel Fabricated Products	1	53	1800	4.20	1800	4.20	429
359	Other Metal Products	1	54	45	.10	45	.10	450
359	Hospital & Medical Equip.	1	55	135	.17	135	.17	794
359	Architectural Metal Work	2	57	82	.10	165	.20	825
362	Rice Mills, Corn Grinders etc.	1	58	24	.08	24	.08	300
362	Tractor Parts, Eng. Prods.	1	59	450	.68	450	.68	662
364	Handling Gear for Sugar Mills	1	60	225	.18	225	.18	1250
364	Sewing Machines, etc.	1	61	351	.11	351	.11	3191
371	Electric Wire & Wiring	2	63	187	2.48	375	4.97	75
376	Household Elec. Appliances	2	65	274	.44	548	.88	623
381	Ind. & Marine Transport Products	1	66	750	2.02	750	2.02	371
383	Motor Vehicles, Parts & Bodies	1	67	319	.21	319	.21	1519
	TOTAL			234	1.21	15657	81.34	192

Notes: (a) Area actually used for plant operation including all uses not just production use
(b) Under revision

Source: LLDA Staff Analysis

Table 5.1 displays a great range of variation due to differences in scale of output of the various plants and to differences in type of product, product mixes, and types of production processes. Labour requirements per plant vary from under 50 people to nearly 2,000 people; area requirements per plant vary from under $\frac{1}{4}$ hectare to more than 5 hectare; and labour force per hectare varies from under 100 to over 3,000 persons.

Average labour requirement per plant (234) is higher than the average plant size from the Manufacturing Census of 1967 (125) and lower than that of the LLDA industrial survey (337) - see Table 4.5.

The industry mix is more forward linked (market oriented) than backward linked, and amongst the back linkages industries of similar type are prominent. This is broadly illustrated in Table 5.2 overleaf. The graph is a summary of an analysis performed at the three digit PSIC level. It applies only to the industries of section A of Table 5.1, but the impression it gives could probably be safely extended to industries of section B. It is clear from the graph that purchasing industries are much more numerous than supplying industries.

This picture is consistent with the Philippines Input-Output transactions table of 1965 (BCS). The table shows that inter-industry sales of industries 54, 56-58, and 60-71 (roughly equivalent to the Interest group of industry of this study)* were spread over a much greater range of industries than were inter-industry purchases. The 10 most important supplying industries were responsible for 77% of total purchases of industries 54, 56-58 and 60-71, whilst the 10 most important industries for sales accounted for 56% of total sales.

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* viz.
- 54 - Tin and aluminium wares
- 56 - Structural and architectural metal products
- 57 - General hardware
- 58 - Other metal products
- 60 - Industrial machinery and parts
- 61 - Household and Other Machinery (excl. Electrical)
- 62 - Radios, TV sets, Transistors
- 63 - Refrigerators and Air Conditioners
- 64 - Electrical machinery, equipment and parts
- 65 - Householed and Electrical Appliances
- 66 - Other Electrical Machinery and Appliances
- 67 - Shipbuilding
- 68 - Motor Vehicles and parts
- 69 - Other transport equipment and parts
- 70 - Professional, scientific equipment and parts
- 71 - Other manufactured products

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TABLE 5.2
GRAPH OF PRINCIPAL BACKWARD AND FORWARD LINKAGES (IN MATERIALS) OF THE NEW INDUSTRY COMPONENT OF THE FINAL SELECTED MIX (x indicates a linkage)

Buy From	PSIC	Sell To	Buy From	PSIC	Sell To	Buy From	PSIC	Sell To
x	01	x	x	34	x		67	
x	02	x	x	35	x		68	
	03	x		36	x		69	
	04	x	x	37	x		70	
	05	x		38	x		71	x
	06	x	x	39	x		72	
	07			40			73	x
	08			41	x		74	
	09			42	x		75	x
	10	x		43			76	
	11	x		44			77	
	12	x		45			78	
	13	x		46			79	
	14	x		47			80	
	15	x		48			81	x
	16	x		49			82	
	17	x		50			83	
	18	x		51	x		84	
	19	x		52	x		85	
x	20	x		53	x		86	
	21	x		54			87	
	22	x		55			88	
x	23	x		56			89	
	24	x		57			90	
x	25	x		58			91	
	26	x		59			92	
x	27	x		60			93	
x	28	x		61	x		94	
	29	x		62			95	
x	30	x		63	x		96	
x	31	x		64	x		97	
x	32	x		65			98	
x	33	x		66			99	

Buy — Source of Supply
Sell — Purchaser of Output
PSIC — Philippines Standard Industrial Classification

Note: x 01 x shows that purchases are made from PSIC industry 01, and also sales made to that industry
22 x shows that sales are made to industry 22 but significant purchases are not made

Source: WDS Estimates

The products to be produced by the mix of industry of Table 5.1 are generally of a high value per ton compared with average value per ton of all manufactured goods. For example, the following may be computed from the "Foreign Trade of the Philippines 1972" (BCS).

SITC No.	1972 Imported Commodity (Short Title)	$US per tonne (F.O.B.)
715 - 01.02	Parts for metalworking machine tools	$3,961.5
716 - 02.02	Parts for Industrial Trucks	$4,264.6
716 - 03.04	Parts for Materials Handling Machinery	$1,847.4
716 - 15.01	Taps, Cocks and Valves	$3,104.5
716 - 15.02	Gearboxes, Clutches, etc. for machinery	$2,284.3
716 - 15.19	Machine Parts and Accessories	$2,562.5
721 - 07.02	Electrical gear for Motor Vehicles	$1,951.6
721 - 08.04	Electrical Safety Equipment and Parts	$2.940.0
721 - 13.00	Insulated Cables and Wires	$1,479.5

These average values compare with about $US 450 per tonne for manufactured goods in general (excluding timber, petroleum and coal products) - see Regional Transport Survey of South East Asia (ADB).

High value per ton at the factory gate for both outputs and material inputs means that the type of plants in the final selected industry mix can be expected to be insensitive to transportation cost and to changes in transportation costs. Therefore, the selected mix can be regarded as applicable to any particular site for an industrial estate in the study area.

The principal raw materials required by the selected mix will be metals, rubber, chemicals, timber, and processed metal products (with some food and fibre products). These materials will be mainly needed in non-bulky forms and quantities. This means that the load to be imposed by the mix on the transport infrastructure of the study area will be light. Even peak demands, such as during factory construction and machinery installation, will not require many hauls either into or out of an estate exceeding 20 tons at a time.

LLDA staff also estimated the capital investment required by plant owners. The results show that private sector capital requirements will be a very small percentage of likely national capital investment in manufacturing industry.

A comparative analysis of apparent profitability of the Interest group of industries versus other industries also suggested that one could expect that the required private sector investment expenditure will be made. The analysis was somewhat tentative but showed that apparent profitability in the Interest group was above average. It relied upon the calculation of marginal return on capital. Change in 'Census Value Added less Payrolls for Employees' was used as a measure of gross marginal return. Both 'New Capital Expenditure' and 'Change in Book Value of Fixed Assets' were tried as measures of gross marginal capital expenditure. Despite the deficiencies in these available measures, it was felt that the cross-sectional nature of the analysis enabled some inter-industry comparisons to be made.

5.6 The Purpose of the Industrial Estate

The types of industry, which have been selected and discussed above, characterise an industrial estate which would be neither special purpose in the narrow sense nor thoroughly general purpose. It would be composed of industries which share things in common (such as customers, suppliers and labour force) rather than buy from and sell to each other. These industries could be expected to establish or expand in the study area and be fairly flexible in their attitude to site location. The purpose of the estate would then be seen as selectively assisting the development of manufacturing in the region by:

- anticipating the growth needs of suitable growth industry, and
- accelerating the growth of such industry,

with good chances of success and deriving national economic benefits in the process.

The estate management would exercise selection powers through the direction of its marketing efforts and the ultimate ability to refuse entry to particular industries.

Questions which then arise are:

- "Suppose the estate is developed and the main types of plants which are interested in locating there are outside the Interest Group?", and
- "Even if the estate population is successfully limited to the interest group, what would be the effects of the plant mix being actually substantially different from that shown in Table 5.1?"

The next section includes specific answers to these questions.

5.7 Possible Mixes of Industry

It is assumed that the estate will play its part in discouraging industry outside the Interest group from expanding quickly in the study area. However, the scope of the Interest group could change if policies or perceived planning needs change. In any case, the practical pressures on the management of the estate are difficult to assess. It is easy to imagine that the target of filling up the estate could result in strong temptation to the management to relax its rules on selectivity from time to time.

For these reasons it appears appropriate to record some estimates of the profile of industries from outside the Interest group, and of a size considered compatible with estate location. The LLDA industrial survey sample contains such cases and provides data for profiling their labour and land requirements. The profiles are shown in Table 5.3 overleaf.

The number of plants in this mix (59) is, by coincidence, the same as that estimated in Section 4.4 as the number of plants from outside the Interest group that probably could be attracted to an industrial estate in the first five year period.

Table 5.3 does not itemise the products to be produced by the plants in the mix; the product groups, however, are beverages, tobacco, textiles, footwear and clothing, wood, furniture and fixtures.

The table indicates that, as for the Interest group mix, the variation in labour and land requirements per plant would be quite large; that average per plant labour requirements would be much the same as for the Interest group; and that land requirements would be distinctly less per plant than in the case of the Interest group.

Table 5.3 reflects present usage patterns in the study area, and overcrowding of premises could affect the land requirement figures; this comment also applies to the expanding industry component of Figure 5.1. However, the profiles of Tables 5.1 and 5.3 are sufficiently close to encourage the view that even if the specifications of the types of plants for the estate changed considerably the effect on land usage and employment opportunities might be minor.

Variability in the size mix of plants seems potentially more unsettling for the planner than variability in the type mix of plants.

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TABLE 5.3

PROFILE OF ESTATE-SUITABLE PLANTS (NON-INTEREST-GROUP)

A. LAND REQUIREMENTS (ha.)

Hectare Per Plant Class	No. of Plants	Hectares Required: In this Class	Hectares Required: Per Plant in this Class
0.00-0.20	23	2.4241	.105
0.21-0.40	9	2.6793	.298
0.41-0.60	5	2.6197	.524
0.61-0.80	4	2.5856	.646
0.81-1.00	3	2.8126	.938
1.01-1.50	5	6.1742	1.235
1.51-2.00	2	3.5091	1.755
2.01-3.00	4	10.3800	2.595
3.01-4.50	4	15.5260	3.132
TOTAL	59	48.7106	.826
Total of Table 5.1	67	81.34	1.21

B. LABOUR REQUIREMENTS (persons)

Labour Per Plant Class	No. of Plants	Labour Required: In this Class	Labour Required: Per Plant in this Class
<31	10	217	22
31- 39	2	71	36
40- 51	5	248	50
52- 62	3	172	57
63- 81	1	81	81
82-107	6	585	98
108-149	4	502	126
150-188	3	482	161
189-224	5	1027	205
225-449	10	3264	326
450 and over	9	7243	805
TOTAL	58	13892	240
Total of Table 5.1	67	15657	234

Source: LLDA Industrial Survey

Plant numbers, labour force and total area developed at any time can and will vary from any industrial mix that is proposed in advance. For physical and financial planning it is important to reduce the possible variation in estimates of total area occupied to a minimum, and to be as precise as possible about the number of plants and the size distribution of their unit land requirements; from a national economic viewpoint it is necessary to have as little variation as possible (particularly downward variation) from the estimated labour force.

The labour force of the estate will vary with the number of plants and with labour per plant. In addition to these two variables total area of the estate will be subject to the variable of hectare per person in the labour force.

By keeping the number of plants constant (i.e., assuming the estate's overall market share target expressed in number of occupants is attained), and by keeping the variation in size of the plants in terms of labour per plant to one standard deviation (i.e., assuming that the market share target is attained for all sizes of plant) the labour force can be expected to vary by $\pm$ 13% (see Table 5.4 overleaf). Hectare required then varies by $\pm$ 17% (because of the additional effect of changes in labour per hectare). Analysis of covariation between labour per plant and labour per hectare showed the covariance term to be small and negative.

The area of the estate will vary with the number of plants, and with the area required per plant. In addition, total labour force will vary with labour per hectare.

By keeping the number of plants constant, and by keeping the variation in size of the plants in terms of hectare per plant to one standard deviation, the total area can be expected to vary by $\pm$ 15%. Labour required then varies by $\pm$ 19%.

If a $\pm$ 10% variation is then introduced in the number of plants, hectare could vary $\pm$ 29% from that estimated (and then labour could vary by $\pm$ 31%). This variation of about $\pm$ 30% is taken up in this study as possible variation in the time required to achieve the first five year target. Thus, this period could be as short as 3.5 years or as long as 6.5 years.

This leaves the question of variation in the size distribution of plants. As long as such variation is compensating so as to have either total labour requirement or total area requirement much the same, that is acceptable. As long as such variation increases the average land or labour requirement per plant, it will assist the commercial feasibility of the estate development (but tend to clash with the socio-economic objective of catering for small to medium plants).

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TABLE 5.4

ESTIMATION OF VARIATION IN LAND AND LABOUR REQUIREMENTS

(Estimation performed on a mix of 66 plants similar to the final selected mix of Table 5.1, using 11 strata of 6 plants each)

	HECTARE			LABOUR (persons)		
Stratum	Total	Mean	Variance	Total	Mean	Variance
1	29.3300	4.8883	.2411	6263	1044	238927
2	17.4000	2.9000	.7614	1935	323	5683
3	9.1200	1.5200	.0417	1211	202	271
4	6.4500	1.0750	.0114	968	161	637
5	4.8400	.8067	.0127	771	128	354
6	3.1700	.5283	.0061	542	90	116
7	2.2700	.3783	.0013	416	69	26
8	2.0000	.3333	.0002	340	57	23
9	1.3100	.2183	.0026	283	47	21
10	.9800	.1633	.0004	213	36	9
11	.4900	.0817	.0017	142	24	62
	77.3600	1.1721		13084	198	

Pooled Variance

Var_p	$\frac{\Sigma\ Var}{11}$	.0982 ha.	22375 persons	
	$\sqrt{Var_p}$	.3134 ha.	149.6 persons	

Coefficient of Variation

$\frac{\sqrt{Var_p}}{1.1721}$	.2674	$\frac{\sqrt{Var_p}}{198}$	.7556

These variations are too large to accept. Presumably the strata could be rearranged to eliminate the variation coming from the most variable stratum. Therefore:

Second Pooled Variance

Var_{p2}	$\frac{\Sigma\ Var}{10}$	.0319 ha.	720.2 persons	
	$\sqrt{Var_{p2}}$	.1788 ha.	26.8 persons	
	$\frac{\sqrt{Var_{p2}}}{1.1721}$	.1526	$\frac{\sqrt{Var_{p2}}}{198}$	.1355

Given a chance situation, one might set limits of two coefficients of variation; but given that the management of the estate will have influence on the variability of the estate mix, one coefficient of variation limits have been set.

However, if such variation reduces average unit land or labour requirements substantially, the scale effects could be large (and therefore the time required for the first five year target lengthened considerably). This cannot be left to chance. It is essential that the larger plants in the industrial mix be obtained. There is no reason why they will not be, but the necessity of obtaining them must be pointed out.

It is not necessary for the size distribution of a proposed mix to be observed through time. Flexibility elements in the estate layout take care of almost any order of appearance of plants. It is the final configuration which counts. However, from all points of view it is desirable to get the larger plants of the mix as early as possible, subject only to the proviso that a reasonable inflow of smaller and medium plants be obtained at the same time.

Could an estate be planned to contain only smaller and medium plants? The answer is 'Yes' providing plants outside the Interest group are included. However, the discussion refers to larger, smaller and medium plants in relative terms specific to a given industrial mix. The remarks made above would then apply to the larger of those plants left in the new mix. This is because the range of plant size is so great - see Table 5.1.

In summary, the land and labour requirements of an industrial estate can be stated as follows:

From Interest group (Table 5.1)	67 plants	81.34 hectare	15,657 employees
Plus nursery size plants	203 plants	16.24 hectare	3,248 employees
TOTAL	270 plants	97.58 hectare	18,905 employees

If industries outside the Interest group were to be accepted, there would be available in addition - 59 plants 48.71 hectare 13,892 employees.

5.8 Quantification of Economic Benefits

In Section 3.4 several types of economic benefit were identified as attaching to industrial estate development, given that scope existed for estates. It has been shown that scope does exist, and this section turns to the question of the size of the economic benefits of an industrial estate. Attention is limited to the first five years (1978 - 1982). Benefits obtainable by public sector action by other than industrial estate development have been attributed to the estate (because it is one means by which these benefits can be obtained, and the only means to be considered within the scope of this report).

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The types of benefit to be considered here are:

- slight acceleration in industrial development in the Philippines
- increased amount of capital inflow to be devoted to import of capital equipment
- reduction in the resource cost of industrial land development
- reduction in the market price of developed industrial land.

Only national dimensions, as distinct from regional dimensions, of benefits are considered.

5.8.1 Slight Acceleration in Industrial Development in the Philippines

This is expected to yield benefits in the form of increased income and employment and reduced imports in the current account of the balance of payments.

The degree of acceleration to be obtained is very difficult to quantify in advance, or to test ex post. In the consultants' opinion, an average of 6 months' gain in the establishment or expansion of all plants to occupy the estate can be considered as a possible degree of acceleration, but that is purely a judgement. On the basis of 6 months, the acceleration benefits may be estimated as follows:

Census Value added in heavy industry 1969-71 (P. mills.)		2,409
Employees (Paid)		101,820
Value Added per Employee 1969-71 (P)		23,660
Growth Rate in Value Added per Employee 1956-8 to 1969-71		7.76% p.a.
- at constant prices		3.12% p.a.
Value Added per Employee 1980 (midway through first 5 years of the estate)	=	$23,660 \times 1.0312^{10}$
	=	32,169 pesos
No. of Estate Employees (inc. nursery plants) ÷ 10	=	1,890 persons
Value Added Benefit	=	32,169 x 1,890 pesos
	=	P. mills. 60.8

Assuming the above is distributed as incomes to factors of production the general income multiplier (2.50) can be applied to it.

P. mills 55.6 x 2.50 = P. mills 139.0 = Total Net Income Benefit

For the purposes of this calculation it is also assumed that unemployed labour and capital resources are brought into employment by the acceleration process.

This benefit can be expressed in employment terms as follows:

Increased employment		1728 persons
x employment multiplier	1.85 =	3197 persons

The current balance of payments benefit will be equal to:

Local content of increased production

Less Import content of induced production

Less Import content of extra capital equipment required for the primary increase in production.

Using the 1965 Input-Output tables, local content of increased production is equal to 52% of value added = P. mills. 28.9;
import content of induced production equals 31% = .31 x 83.4
= P. mills. 26.0

It is virtually impossible to estimate the extra capital equipment required for the primary increase in production. However, even if the capital to output ratio was as low as unity, one would expect that the current account benefit would be negative; and the overall balance of payments movements negative, unless all import content of the capital goods concerned was balanced by capital inflow in the capital account of the balance of payments.

5.8.2 Increased Amount of Capital Inflow to be Devoted to Import of Capital Equipment

This benefit should be equal to:

% of Estate Land occupied by Foreign Interests
times Capital Cost to Occupiers of the Land of the Estate
less Reduction in Capital Inflow as a result of the Estate.

Given that up to 20% of the estate land could be seen as occupied by foreign interests and with a total capital cost to occupiers of the land that could be occupied by foreign interests, i.e. about 81 hectares, of 81 x 10,000 x P 65 per m^2 or P. mills. 52.6, the top value for this benefit comes out at P. mills 10.5. This assumes zero reduction in capital inflow as a result of the estate. The actual benefit should be only a fraction of the P. mills. 10.5, perhaps about P. mills 2.0.

5.8.3 Reduction in the Resource Cost of Industrial Land Development

In section 3.4 an amount of P 30 per m^2 was estimated as representing the current direct costs of industrial land development in the study area which are associated with site improvement and installation of services. Given a normal breakdown of costs for this type of work, the costs of labour and the services of capital goods used up could be about 50% of total cost, and savings of 20% in that 50% could be viewed as a potential benefit (achievable by an estate development and unlikely to be achieved by the piecemeal development that would be most likely to take place in the absence of an estate). Thus resource cost savings of about P 3 per m^2 over 98.4 ha. (89.46 ha. to be occupied x 1.1) to be developed could come out at 3 x 98.4 x 10,000 = P. mills. 2.95.

5.8.4 Reduction in the Market Price of Developed Industrial Land

If the pricing strategy of the estate management body enables the estate land to sell against piecemeal developed land in the ratio of $\frac{65}{90}$ or 38% less than the market, a transfer of investible funds will take place from private land developers to industrial land occupiers.

This transfer will apply not only to the estate occupiers but also to occupiers of other industrial land if the estate operations in the industrial land market of the study area reduced price of other land below what it otherwise would have been. In this study it is not possible to quantify this secondary effect; calculations are confined to estate occupants.

At 1974 prices the benefit becomes

P 25 per m^2 x 89.46 ha. x 10,000 = P. mills. 22.4

less % of P. mills. 22.4 which would have been invested in production by the transferors (i.e., private developers). As this % cannot be quantified here, the value of the direct benefit can be only put between 0 and P. mills. 22.4.

5.8.5 Summary

The above types of benefits can be summed up as:

A.	Acceleration benefits	- P. mills. 152 of income at 1970 prices OR - extra employment of 3496 persons AND - negative balance of payments benefits
B.	Increased Investment in Industry from Capital Inflow	- 0 to P. mills. 10.5
C.	Reduction in Resource Cost of Industrial Land Development	- P. mills. 3.2
D.	Reduction in the Market Price of Industrial Land	- 0 to P. mills. 24.4

Taking a capital to output ratio of 3.8 (estimated from the National Income Accounts, 1967 to 1972 - NEDA), also assuming all of the above investment benefits are utilised to produce extra output, and taking a low value for benefits B and D, the above benefits can be brought together and summed.

		(1974 Prices) Benefits Expressed as Income Benefits P. mills.	
A.	P. mills. 152 at 1970 prices plus 37% increase in prices 1970-1974		208
B.	P. mills. 2 ÷ 3.8 x 2.5	1.3	
C.	P. mills. 3 ÷ 3.8 x 2.5	2.0	
D.	P. mills. 4 ÷ 3.8 x 2.5	2.6	6
	Total		214 ($US. m. 32.1)

This total ignores possible negative balance of payments benefits, and also ignores that benefits A and D could be substantially understated. It is to be regarded as a one-time benefit.

The acceleration benefit is by far the largest; we will confine further discussion to it.

If the acceleration process is to draw entirely upon unemployed labour and capital resources (which was assumed above - p. 5-19 - and could easily largely be the case), the benefit arising is not only completely net, it could also be regarded as an infinite return because of lack of other productive uses for the resources concerned.

As labour will be in ample supply, there seems little difficulty with the assumption that unemployed labour resources could be drawn upon. Attempts to reduce unemployment in the Manila area may merely increase the in-migration rate.

With regard to capital, capital formation takes place in advance of expenditure on fixed capital; and the reasons for expecting an acceleration in investment (i.e., reduction in investor uncertainty) support the notion that some capital resources, earmarked for use in industry, will be idle for a shorter period.

If the interest which would have been earned on that capital is regarded as the alternative to the acceleration benefit, we have the following

Capital to be invested in fixed production facilities (at 1974 prices)	P.m. 600 (a)
Interest obtainable for six months @ 18% p.a.	P.m. 54

Therefore, Total Net Benefit = 214 - 54 = P.m. 160

$$\text{Benefit as a ratio of interest foregone} = \frac{214}{54} =$$

almost exactly 4.

(a) Includes direct investment in estate plants and indirect investment via the income multiplier; based on a national capital to output ratio of 3 - see ADB's Regional Transport Survey Book Three Part One.

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6. RANKING OF POTENTIAL SITES

6.1 The Selection of Potential Sites

After identification of the 15 potential sites for an industrial estate (Section 3.3) the first selection criterion of size was applied. The available area measured from the map had to be checked against the actual situation and condition.

For this purpose site surveys were performed during August and September of 1973. Aerial photographs taken in July 1973 have also been made available. Through these surveys and aerial photographs it was found that several potential sites were already partly subdivided into residential areas. The remaining areas on these sites were then so scattered or of such an irregular shape, that it was not feasible to consider an industrial estate of a reasonable size there. After this first screen 8 out of the original 15 sites were eliminated, leaving 7 sites for further investigation. They are listed in the following table.

Site No.	Zone No.	Description	Approximate Size in Hectares
4	5	Army Reservation of Fort Bonifacio (Taguig)	400
5	5	Between Sucat Road and the international airport of Manila (Paranaque)	450
9	4	Between Calumpang and Rosario and Bulao Avenue (Marikina)	450
11	8	North east and southwest of Napindan River (Pasig, Cainta, Taguig)	2,600
13	10	West Laguna de Bay reclamation project (Muntinglupa)	450
14	9,10	Pansol near Alligator Lake (Calumpang/Los Banos)	70
15	2	Between Tabing Ilog and Iba (Marilao)	200

Site number 14 Pansol is only 70 HA which is smaller than the other potential sites. This site is probably too small for a major industrial estate. It has been included in the ranking because it is a site located beyond the 50 km radius around Manila, which merits special attention in view of the recent Presidential Statement restricting industrial development inside a 50 km radius from Manila. In the analysis due allowance has been made for the disparity in size when assessing the results.

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6.2 The Ranking of Sites in Relation to Physical Factors

The physical characteristics and locations of the seven sites remaining after the initial screening have been examined in more detail. The particular factors studied were size and shape, slope, present land use, location relative to existing industries and residential areas, accessibility to major transport modes and public utilities, liability to flooding and foundation conditions and geology.

Taking all these factors into consideration and allocating weights proportional to their relative importance resulted in the following ranking of the sites for physical factors.

Site No.	Zone No.	Description	Rank
4	5	Taguig	2
5	5	Paranaque	3
9	4	Marikina	1
11	5	Napindan River	5
13	10	Muntinglupa	4
14	9, 10	Pansol	7
15	2	Marilao	6

6.3 The Ranking of Sites in Relation to Costs

Before undertaking the detailed cost analysis the seven sites were subjected to a broad analysis of acquisition, development and operating costs. The major influences were the cost of raw land, the cost incurred in developing raw land to the state in which roads and structures could be built and the costs incurred off the actual site in bringing roads and services to the estate. Costs incurred on the estate in detailed development and operating and maintaining the infrastructure were deemed to be constant for the purposes of this ranking.

The result of the cost ranking was as follows:

Site No.	Zone No.	Description	Rank
4	5	Taguig	7
5	5	Paranaque	1
9	9	Marikina	2
11	8	Napindan River	4
13	10	Muntinglupa	3
14	9,10	Pansol	5
15	2	Marilao	6

6.4 The Choice of Sites for Detailed Evaluation

The rankings in terms of physical characteristics, location and cost lead to the choice of Marikina and Paranaque as the two sites which at this point in the analysis appear most attractive. The reclamation site at Muntinglupa has been added to provide the comparison between a reclaimed site and one located on dry land. The Pansol site has also been included to permit an assessment of the relative merits of a site outside the 50 kilometre radius mentioned in the terms of reference for the commission on Zoning and Human Settlement.

Each of the above four potential sites will be briefly described. For the geological and foundation characteristics see Appendix C. For map locations see Figure C.2.

Paranaque Site

This site is approximately 12 kilometres from central Manila. In the north it borders on the international airport of Manila, in the west it borders on flood prone land which is used mostly for fish ponds or salt recovery, in the south it approaches Sucat Avenue and the existing subdivisions along this road. Finally in the east it extends towards the residential and other subdivisions along the southern expressway. The whole area has a moderate slope downwards from the east to the west, while three east-west running rivers create minor slopes in north-south directions towards these natural drainage systems. The land is at present used for dry rice crops.

To use the site for an industrial estate requires all weather drained land. Surface draining will be required for this site. Access can be provided by connections to the existing Sucat Avenue or even better to existing interchanges on the southern expressway.

The major drains can be easily connected to the existing east-west flowing rivers although improvements to the latter will have to be costed. The sewage treatment plant could be located in the north-west corner of the site where its effluent will only have to be partially treated before pumping it to the bay. The river in the northwest corner is the shortest route to the bay and may eventually be studied for possible barge transport. The water supply can be obtained from deep wells under the estate; the power supply will come from the existing Gardner power station approximately 5 km away from the site.

Marikina Site

This site is approximately 15 kilometres from Manila. In the north it borders on the existing subdivisions and developments along the Marikina Infanta road. In the west it borders on existing industrial and residential developments along the road from Calumpang to Rosario. In the south the border is formed by the developments along the Ortigas Avenue. Going to the east existing subdivisions are met near Bulao. The whole area has a moderate slope downwards in a southerly direction, minor slopes in the east-west direction exist towards natural drainage rivers. The present use of the land is for dry rice crops. Major surface drains will have to be provided to create an all weather dry estate. Special attention is required to flooding in the northwest corner due to run-off from the Bayan-Bayanan Concepcion area. The major drains can be connected to existing rivers, but major improvements to these rivers are required extending beyond Ortigas Avenue to ensure proper drainage of the area. The majority of the surface water will be drained through a river west of the Sapang Baho river, the remainder through the Sapang Baho river itself.

In this way the Cainta area will be less affected. Access to the site can be obtained from the Marikina-Infanta road in the north. Some road diversion is required in the southwest corner of the estate site in order to provide a compact and regular shaped estate. The sewage treatment plant can be located on the south side. This plant should provide a high level of treatment because the effluent will ultimately go into Laguna Lake.

The water supply will come from deep wells under the estate. The power supply will come from the Gardner Power Plant which is approximately 18 kms. away.

Muntinglupa

This is the site of the West Laguna reclamation estate. This site has been covered already by several studies. It lies between Alabang and Muntinglupa along the western lakeside. Using hydraulic fill of the proper quality will make surface drains superfluous.

Access can be obtained from the southern highway. Water supplies can be obtained from deep wells or from treated lake water depending upon further studies and results of the pilot treatment project near Santa Cruz. The power supply will come from the Gardner plant which is approximately 6 kilometres away.

The sewer plant will discharge its effluent into the lake and therefore should provide high level of treatment for waste water before discharging it.

Cost details from the West Laguna de Bay studies (June 1971) have been used for the evaluation of the four potential sites.

Pansol

This site is only 70 HA, it is located just outside the 50 km radius from the centre of Manila. On the northern side Alligator Lake and the railroad lie between the estate site and the Laguna de Bay. To the west and east, higher lands border this swampy area, on the south the main road to Los Banos and its hot spring resorts form the estate boundary. Because of its swampy nature, some hydraulic fill will be required to provide a safe and dry estate site. Detailed geological studies are required for this site to determine the nature and source of its surface water. Road and railroad accessibility are good, but the distance to the central Manila area is over 50 kilometres.

Water supply can be obtained locally from wells or from the lake after treatment. All sewage must be fully treated before discharging it to the lake. Some improvement is required for the off-site drainage along an existing river. Power supply is assumed to be available from the Caliraya Power Plant which is approximately 30 kilometres away.

The major disadvantages of this site are the high cost of providing power supplies from existing power stations, the uncertain nature of the foundations in a known volcanic (hot springs) area and the remoteness from potential labour force and markets.

7. FINANCIAL ANALYSIS OF THE SELECTED SITES

7.1 Investment Costs

Investment costs have been considered under three main headings, viz:

- Acquisition and Development Costs
- On Site Improvements
- Off Site Improvements

The investment costs associated with each of the four sites selected for further evaluation (Section 6.4 above) are summarised in Table 7.1 overleaf. All costs are at 1972 prices since these were the most up-to-date complete set of prices available. The individual components have been extracted from Tables 7.2 to 7.6 which, together with the relevant discussion, provide the remaining part of this section of the report.

7.1.1 Acquisition and Development Costs

The details of this category of investment costs are contained in Table 7.2 overleaf. The land costs used for the four areas were based on information obtained from the Rizal Provincial Assessor's Office in Pasig, Rizal. They were checked by team enquiries from industrialists and other land users. The costs set out in the first line of the table are average values from ranges established from owners' declarations. It was not possible to check the costs by direct enquiry from land owners, but property advertisements in the Manila press confirm their adequacy.

The items for revetments and hydraulic fill apply only to those sites subject to total or partial flooding, that is the two lakeside sites. Drainage canals will be required at three of the four sites. Clearing will be necessary only at two of the sites where some small trees and farm buildings will have to be removed and a limited amount of site levelling carried out. The bridges costed in the penultimate item in the table are required to cross internal roads on the estate. External bridges are costed in Table 7.6.

The cost of engineering design and supervision is substantially higher for the reclamation site because this site will require more extensive foundation and soil investigations than the others and also supervision of the reclamation operation itself, extending over a number of years.

The cost per square metre of the initial acquisition and development costs varies from 7.0 pesos on the cheapest site to 15 pesos on the most expensive. Development costs in this section of the analysis are limited to those necessary to provide land suitable for the construction of infrastructure and buildings.

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TABLE 7.1

SUMMARY OF CAPITAL COSTS
(in 1, 000 P)

Item	Area 5 Paranaque 443 HA	Area 9 Marikina 443 HA	Area 13 Muntinglupa 437 HA	Area 14 Pansol 70 HA
1. Acquisition/Development unit costs P/m^2	7. 1	10. 2	15. 0	7. 0
Sub total	31, 729	45, 019	65, 763	4, 920
2. On site improvements				
a) unit costs 1, 000P/m^2	170. 2	170. 2	172. 4	172. 4
units per estate	96	96	96	15
total costs for lots	16, 339	16, 339	16, 550	2, 586
b) estate improvements	13, 990	13, 990	14, 124	2, 200
c) estate services	50, 500	50, 500	50, 500	10, 700
Sub total	80, 829	80, 829	81, 174	15, 486
3. Off site improvements				
Sub total	7, 987	20, 277	2, 587	7, 386
4. Contingencies				
10%	12, 054	14, 612	14, 712	2, 779
GRAND TOTAL	132, 598	160, 737	161, 827	30, 571

TABLE 7.2

DETAILED CAPITAL COSTS
(in 1,000 P)

Acquisition and Development Costs

Items	Area 5 Paranaque 443 HA	Area 9 Marikina 443 HA	Area 13 Muntinglupa 437 HA	Area 14 Pansol 70 HA
Acquisition				
unit costs (P/m^2)	5.0	8.0	-	2.0
quantity (m^2)	4,430,000	4,430,000	4,410,000	700,000
Sub total	22,150	35,440	-	1,400
Development				
Revetments				
Sub total			7,000	400
Hydraulic Fill				
unit costs (P/m^3)			2	2
quantity (m^3)			25,000,000	1,400,000
Sub total			50,000	2,800
Drainage Canal				
unit costs (P/m)	2,600	2,600		
quantity (m)	2,065	2,065		
Sub total	5,369	5,369	2,404	
Clearing, etc.				
unit costs (P/m^2)	.5	.5		
quantity (m)	4,430,000	4,430,000		
Sub total	2,215	2,215		
Interior Bridges				
10 x 12 m 7 bridges	525	525		
10 x 5 m 24 bridges	600	600		
Sub total	1,125	1,125	360	
Engineering/Supervision 10% of development	870	870	5,978	320
GRAND TOTAL	31,729	45,019	65,763	4,920
SAY =	31.7 millP	45.1 millP	65.7 millP	4.9 millP
or per m^2	7.1 P/m^2	10.2 P/m^2	15.0 P/m^2	7.0 P/m^2

Source: Rizal Provincial Assessors Office, Pasig, Rizal, 1973

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7.1.2 On Site Improvements

On site improvements have been divided, for costing purposes, into three groups, namely those applicable to particular industrial sites, those such as perimeter roads and main sewers not readily allocated to specific sites, and finally the individual plants and buildings required by the Authority for the efficient management and maintenance of the estate and its essential services.

The first group of costs, estimated in terms of costs per 4 hectare block (see Diagram 9.1 in Chapter 9), is set out in Table 7.3 overleaf. They are constant for all sites and are based on unit costs provided by the Department of Public Works. The cost per square metre for these improvements is 4.25 pesos per square metre.

The second group of costs, scheduled as estate improvement costs, is set out in Table 7.4 following this page. They vary only in respect of surface drainage costs for the three large sites. There is a significant difference for the Pansol site because of its very much smaller area. Unit costs were again obtained from the Department of Public Works. The cost per square metre for estate improvements, expressed in terms of the 443 hectare total area, is 3.16 pesos per square metre.

The third group of costs, covering such items as administration building, car parks, maintenance areas and utilities plants is scheduled in Table 7.5 overleaf. Land costs are not included since total acquisition costs for the site are included in Table 7.2. The costs of standard buildings and nursery factories have also been excluded as these are to be recovered through a separate account.

The cost per square metre for these items, again expressed in terms of the total estate of 443 hectares, is 10.93 pesos per square metre. The assumptions made in order to determine the daily requirements for water, power and other services are set out in Section 7.2 of this report.

7.1.3 Off Site Improvements

In addition to the investment necessary to acquire and develop the estate site it will be necessary to provide additional infrastructure off site in order to provide adequate access, drainage and other services.

The costs of providing this infrastructure at each of the four sites are summarised in Table 7.6. Unit costs were obtained from the Department of Public Works, the electricity supply company and from earlier and current studies conducted by LLDA.

TABLE 7.3

DETAILED CAPITAL COSTS

Improvement Costs Per Unit of 2 Lots of 2 HA each Plus Infrastructure

Item	Unit	Unit Costs	With Surface Drains Qnty.	With Surface Drains Costs	With Piped Drains Qnty.	With Piped Drains Costs
Concrete Roads 2m thick 10m wide	m	500 P	127	63,500	125	62,500
Concrete Curb/ Gutter - T-8	m	15 P	254	3,810	250	3,750
Curb-inlet	each	200 P	6	1,200	-	-
Surface Drains						
2m x .5m excavation	m	12 P	325	3,900	-	-
2.5m x 8m excavation	m	24 P	254	6,096	-	-
2m wide concrete liner	m	50 P	325	16,250	-	-
2.5m wide concrete liner	m	100 P	254	25,400	-	-
Stormsewer						
36" dia. RC Pipe	m	125 P	-	-	250	31,250
crb.inlet manholes T-4	each	400 P	-	-	6	2,400
18" RC Pipes	m	70 P	325	-	-	22,750
Sanitary Sewer						
15" RC Pipe	m	50 P	254	12,700	250	12,500
manholes	each	400 P	2	800	2	800
Water Supply Line						
12" Pipe	m	160 P	127	20,320	125	20,000
manholes	each	400 P	1	400	1	400
Base Course (Roads) .2m thick 11m wide	m	30 P	127	381	125	375
Power/Telephone Covered elsewhere						
Sub Total				154,757		156,725
Engineering/ Supervision 10%				15,476		15,673
GRAND TOTAL				170,233		172,396

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TABLE 7.4

DETAILED CAPITAL COSTS

Estate Improvement Costs

Item	Unit	Unit Costs	With Surface Drains Quantity	With Surface Drains Costs	Without Surface Drains Quantity	Without Surface Drains Costs
Circulation Roads						
.2m thick - 10m wide	m	500 P	8,120	4,060	8,120	4,060
.2m thick - 15m wide	m	750 P	4,167	3,125	4,135	3,101
Base Course						
.2m thick - 11m wide	m	30 P	8,120	244	8,120	244
.2m thick - 16m wide	m	45 P	4,167	188	4,135	186
Surface Drains						
2 x .50m excavation	m	12 P	7,800	94	-	-
2 x .50 lining	m	50 P	7,800	390	-	-
4 x 2m excavation	m	50 P	4,060	203	4,060	203
4 x 2m concrete lining reinforced	m	750 P	4,060	3,045	4,060	3,045
Curb Inlets	each	200 P	96	19	-	-
Concrete Curb/ Gutter	m	15 P	12,287	184	12,255	184
Storm Sewer						
24" dia. RC Pipe	m	85 P	-	-	7,800	663
Curb inlet/manholes	each	400 P	-	-	96	38
Sanitary Sewer						
21" RC Pipes	m	110 P	4,060	447	4,060	447
Manholes	each	400 P	24	10	24	10
Water Supply						
12" Line	m	160 P	4,060	699	4,060	649
Manholes	each	400 P	24	10	24	10
Sub Total				12,718		12,840
Engineering/ Supervision 10%				1,272		1,284
GRAND TOTAL				13,990		14,124

TABLE 7.5

DETAILED CAPITAL COSTS
(in 1,000 P)

Estate Service Costs

Item	440 HA Estate Reserved Lots	440 HA Estate Costs	70 HA Estate Reserved Lots	70 HA Estate Costs
Sewer Treatment Plant				
Treatment plant for 25,000 m^3/day fully treated	3.0	10,000	1.0	2,000
Pumping stations, sewage pumps	-	1,000	-	-
Water Supply/Treatment Plant				
Treatment storage for 30,000 m^3/day (6.0 MGD)	1.5	8,500	.5	1,700
15 deep-wells producing 2,000 m^3/day each (350 G/minute/well)	-	2,500	-	500
Power Supply	.5		.1	
Substation/switchyear transformers, etc.		12,600		2,500
Distribution system	-	7,000	-	1,400
Telephone System				
Equipment, etc. (located in central office, 500 lines)	-	2,000	-	400
Underground distribution system	-	1,200	-	250
Solid Waste Disposal	.5		.1	
Transport equipment		3,000		600
Miscellaneous	3.5		.8	
Lighting - Fire protection		100		20
Public/sporting facilities)		500		100
Landscaping)				
Carried Forward	9.0	48,400	2.5	9,470

TABLE 7.5 (Continued)

DETAILED CAPITAL COSTS
(in 1,000 P)

Item	440 HA Estate Reserved Lots	440 HA Estate Costs	70 HA Estate Reserved Lots	70 HA Estate Costs
Brought Forward	9.0	48,400	2.5	9,470
General Administrative Office/Parking/Entrance	1.0	700	.2	140
Office building ($2,500 m^3$)				
Equipment/transport	-	400	-	90
Maintenance/Repair Shop	.5		.2	
Stores				
Building	-	500	-	200
Equipment/transport	-	500	-	200
Pilot Plant/General * Training Facilities	1.0	(2,000)	.2	(400)
Building	-	-	-	-
Equipment	-	-	-	-
General Warehouse * and Storage Facilities	2.0	(5,000)	.4	(1,000)
Building $10,000 m^1$	-	-	-	-
Equipment & $500 P/m^2$	-	-	-	-
TOTAL	13.5	50,500	3.5	10,100

* Note:

Pilot plant, general training facilities, general warehouse and storage facilities will require ultimately some space in the estate. These units should be treated like any other industry in the estate and should only come in when the estate nears its completion.

Therefore, space has been reserved, but no costs brought into the calculations.

TABLE 7.6

DETAILED CAPITAL COSTS
(in 1,000 P)

Off-Site Improvements Costs

Item	Unit	Unit Costs in P	Area 5 Paranaque 443 HA		Area 9 Marikina 443 HA		Area 13 Muntinglupa 437 HA		Area 14 Pansol 70 HA	
			Qty.	Costs	Qty.	Costs	Qty.	Costs	Qty.	Costs
Access Road										
Concrete 20m wide) .20m thick)	m	1,000	3,000	3,000	2,000	2,000	500	500	500	500
Curb/Gutter T-8	m	15	3,000	45	2,000	30	500	7.5	500	7.5
Surface drains	m	3	3,000	9	2,000	6	500	1.5	500	1.5
Curb inlet (every 50m)	m	8	3,000	24	2,000	16	500	4	500	4.0
Base course - 21m wide) .2m thick)	m	58	3,000	174	2,000	116	500	29	500	29
Sub Total	m	1,084	3,000	3,252	2,000	2,168	500	542	500	542
Acquisition (40m wide)	m	varies	200P/M	600	320P/M	640	200P/M	50	80P/M	40
Sub Total				3,852		2,808		592		582
Main Drainage Canals										
Acquisition < 10m	m	80	-	-	1,500	120	-	-	500	40
Acquisition < 20m	m	160	500	80	2,000	320	-	-	-	-
4 x 2m excavation	m	50	-	-	1,500	75	-	-	500	25
4 x 2m concrete lining	m	750	-	-	1,500	1,125	-	-	500	375
10 x 2m excavation	m	125	500	625	2,000	250	-	-	-	-
10 x 2m RC liner	m	2,475	500	1,237	2,000	4,950	-	-	-	-
Sub Total				1,942		6,840		-		440
Carried Forward				5,794		9,648		592		1,022

TABLE 7.6 (Continued)

DETAILED CAPITAL COSTS

Item	Unit	Unit Costs in P	Area 5 Paranaque 443 HA		Area 9 Marikina 443 HA		Area 13 Muntinglupa 437 HA		Area 14 Pansol 70 HA	
			Qty.	Costs	Qty.	Costs	Qty.	Costs	Qty.	Costs
Brought Forward				5,794		9,648		592		1,022
Road Diversion										
Concrete 7.5m wide) .2m thick)	m	375	-	-	2,000	750				
Curb/Gutter T-8	m	15	-	-	2,000	30				
Curb inlets (every 50m)	m	8	-	-	2,000	16				
Surface drains	m	3	-	-	2,000	6				
Base Course 8m wide) .2m thick)	m	22	-	-	2,000	44				
Acquisition (10m wide)	m	80	-	-	2,000	160				
Exterior Bridges		-	-	-	-	100				
Sub Total						1,106				
Sanitary Sewer 2 x 26" pressure line	m	1,200	-	-	2,000	2,400	-	-	1,000	1,200
Power Lines 115 KV High Tension transportation lines	km	146,700	10	1,467	36	5,280	12	1,760	60	4,402
Engineering and Supervision 10%				726		1,843		235		762
GRAND TOTAL				7,987		20,277		2,587		7,386

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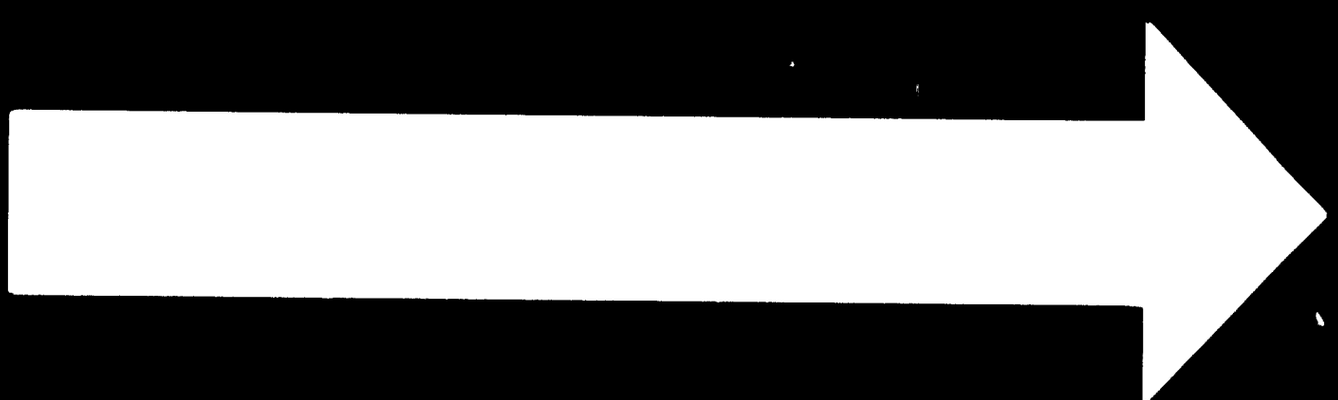

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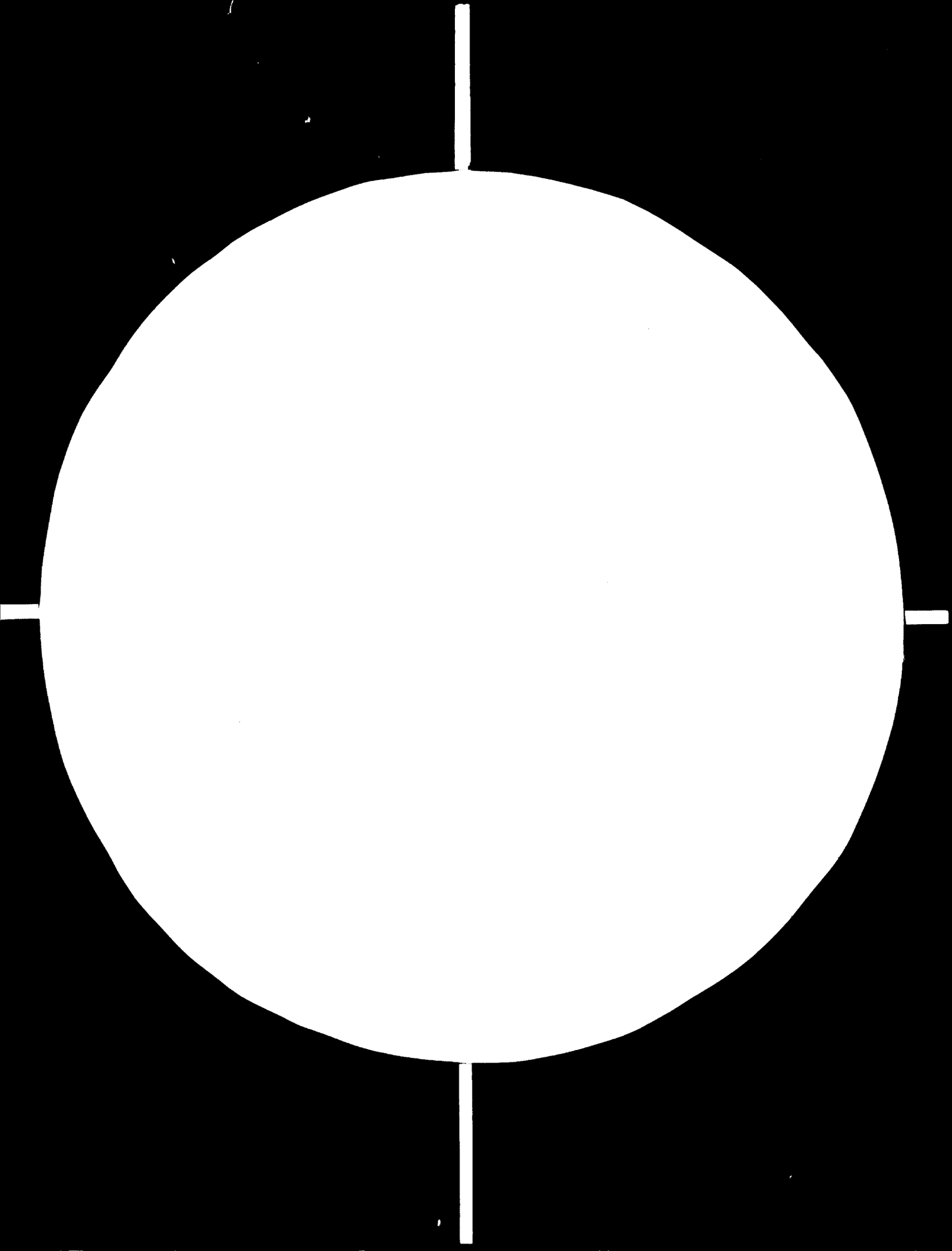

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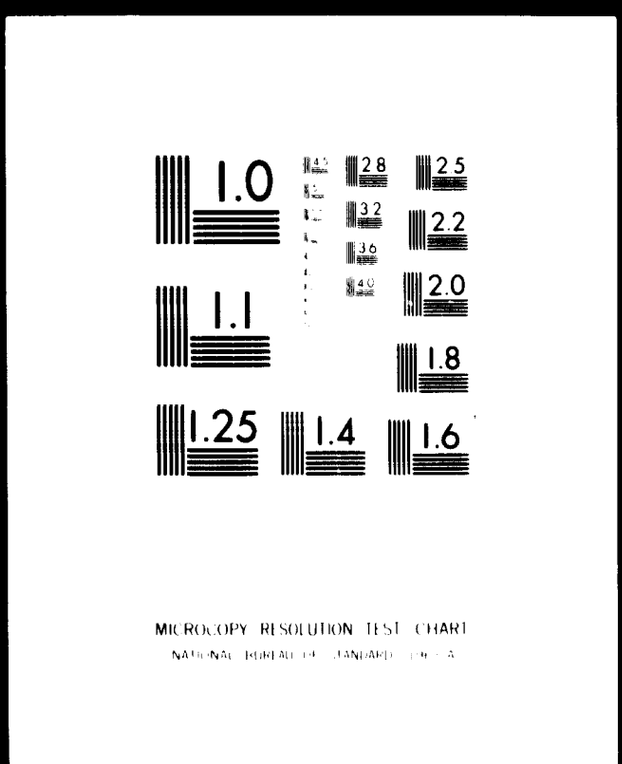

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7.2 Estimation of Requirements for Water, Electricity and Other Services

In calculating the investment costs it was necessary to estimate the daily consumption of water and power on the site, the likely volume of effluents to be treated and the demand for other services such as telephones. Certain assumptions were made in order to quantify the estimates and these are discussed in sub-sections 7.2.1 to 7.2.4 following this paragraph.

7.2.1 Water Supply

From the water quality studies currently being carried out for LLDA, it appears that reasonable consumption figures for treated water are 100 litres per person per day for domestic purposes and 500 litres per employee per day for industrial use. The estimated estate worker population lies between 40, 000 and 45, 000.

The final daily requirements are estimated as $\frac{600 \times 43000}{1000}$ cubic metres per day. This is probably an over-estimate since part of the domestic consumption will take place off the estate site, but in view of the possibility of shift work etc., the estimate has been accepted. Since losses may amount to 17%, although this figure again may be on the high side for a new installation, the daily requirement could reach 30, 000 cubic metres (6, 000, 000 gallons per day).

Other studies by LLDA consultants indicate that the area between Manila Bay and Laguna Lake should produce 300 gallons per minute from 4" to 6" deep wells drilled to a depth of 300 feet or 100 metres. Supply of 30, 000 cubic metres per day would therefore require about 15 deep wells. These can be located within the estate limits at about 500 metres cross centres or at such closer spacing as tests prove feasible.

Although the costs of the water supply installation have been included in the comparative costs (Table 7.5), when calculating cash flows and other financial tables these costs, together with the costs of operating and maintaining the installation, have been omitted. The intention is to treat the supply of each service to industrial tenants as a separate cost entity and to make the appropriate charges to the consumers so that each service is financially viable. Only the services consumed by the Estate Authority have been included in the detailed financial statements in Section 7.5.

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7.2.2 Sewage Treatment

It is assumed that with the exception of the allowance for losses (17%), all water consumed on the estate will pass through the waste water treatment plant. This is again a conservative assumption so far as plant capacity is concerned since there are likely to be additional losses from spillage, evaporation and escape to surface drains.

The total quantity to be treated is therefore of the order of 5 million gallons per day. Comparison with recently completed sewage treatment plants in the Manila area indicates a probable investment cost of 10 million pesos for the installation and a further one million pesos for pumps and a pumping station.

The costs of sewer pipes are already included in the on site improvement costs.

These costs have again been used in Table 7.5 for comparative purposes. In the cash flow and succeeding sections (Section 7.5 et sequentia) these costs are omitted as mentioned in 7.2.1 above. The costs of providing sewage collection and treatment will be billed separately to individual tenants. In the case of the Marikina and Pansol sites provision is made in the comparative costs for effluent disposal mains to avoid the risk of local pollution.

7.2.3 Solid Waste Collection and Disposal

The estimate is based on the assumption that the Estate Authority will collect all solid waste in a fleet of trucks and remove it from the estate to the most convenient waste disposal site. The service envisaged will provide daily or twice-daily collection, depending on volumes, and will require a fleet of 20 trucks with drivers and support crews. The costs will again be separately collected and appropriate charges made to users of the service.

7.2.4 Power Supply

It is anticipated that the estate will not establish its own power source, but will become a major customer for the local power supply company. Total estate requirements are estimated at 8.5 million kwh units per day.

It is assumed that new transmission lines will be erected from the power station to the estate with a transformer and distribution station located on the estate land. Two substations will be required for the final estate, each occupying 5,000 square metres of land. The estimated cost of each substation is 6.3 million pesos.

The total electrical installation other than customer's wiring on his own premises will be provided by the power company. All power supplies will be negotiated by the power company with individual consumers.

The Estate Regulations will require all services, including electric power and telephone distribution networks, to be laid underground. This will achieve two objectives, firstly to avoid unsightly poles and conductors and secondly, to avoid damage during typhoons or other severe wind storms.

7.2.5 Telephone Services

These services are analagous in many respects with power services. Provision has been made for space for a telephone exchange to serve the estate. All investment costs will be borne by the telephone company and appropriate charges will be negotiated by them with consumers.

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7.3 Comparison of the Selected Sites

Total investment costs as summarised in the Grand Total line of Table 7.1 (following Section 7.1) divided by saleable or leasable area provides one standard of comparison for the four selected sites. The relevant figures are set out in the table below:

	Site			
Item	Paranaque	Marikina	Muntinglupa	Pansol
Area (hectares)	443	443	443	70
Investment Cost (million pesos)	132.6	160.7	161.8	30.6
Saleable Lots (2 hectare)	178.5	178.5	178.5	26
Capital Cost ('000s pesos per hectare of saleable land)	371	450	453	588

By this criterion the Paranaque site has a clear advantage. It must be remembered that the Pansol site is much smaller in area and may therefore be penalised by this criterion. On the other hand, to obtain 440 hectares of relatively flat land in the Pansol area would require the purchase of prime agricultural land which is densely settled and heavily cultivated. The additional costs, both financial and economic, would outweigh the bias in the above simplified comparison.

The Paranaque site is also by far the most suitable from the point of view of foundation suitability and hence the least expensive for the individual tenant to develop his own building and infrastructure. The Marikina site has somewhat doubtful foundation conditions but it is certain that rock does not exist at one to three metres depth as is the case at Paranaque.

The sites at Muntinglupa and Pansol both require dredged filling. It has not been established to the consultants' satisfaction that suitable filling material is available in adequate quantities in the Laguna Lake in close proximity to the sites. Furthermore the foundation conditions under the sites are still unexplored. These aspects are not considered in the cost comparison set out at the head of this section of the report but add substantially to the disadvantages of these two sites.

The Paranaque site is located on the seaward side of the ridge dividing Laguna Lake from Manila Bay and cannot therefore under any circumstances cause pollution of the lake water. This advantage is not shared by any of the other three sites considered and may become even more important when final decisions as to the use of Laguna Lake and its water are made.

The Paranaque site is located very near to the Manila International Airport and may therefore have particular advantages to those industries using or producing high value low weight materials and products.

The Pansol site, despite its relatively small size, would have to be supported by the development of a housing estate which would demand even more land. Expansion of the Pansol site to a size comparable with the other three sites would require even larger inroads into prime agricultural areas. These are disadvantages in terms of immediate investment needs, although the site may have some advantages from the long term development aspect.

Its major drawbacks in the present evaluation are the added time needed to develop its infrastructure and its relatively remote position in relation to the port, the market and the utility supplies. Its foundation conditions are the clinching argument in rejecting this site for early development.

The Marikina site is located closer to the present centres of industrial activity than the other sites considered. As stated previously, however, industrial development south of Manila should be encouraged and recent announcements such as the establishment of a joint Australian/ Philippines garment factory at Paranaque indicate that this area is gaining popularity, possibly because of lower land prices and ample supply of labour.

Thus it appears that for financial and engineering reasons the Paranaque site enjoys advantages over the three other sites considered in this section.

The detailed cash flow and other financial calculations in the remaining three sections of this chapter have, therefore, been carried out for the Paranaque site.

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7.4 Estimation of Rental Rates for Paranaque Site

Calculations based on the investment costs set out in Table 7.1 indicate that the average cost for fully developed land, including the provision of all services to the extent indicated in Section 7.2, over the complete development of 443 hectares, is 20.2 pesos per square metre. The details are set out in Table 7.7 overleaf.

The annual amount necessary to recover this sum over a period of 25 years at 22% (18% interest plus 4% amortisation) is 6.6 pesos per square metre. Adding to this the estimated charges for estate management and maintenance of 0.8 pesos per square metre gives an estimated rental charge of 8 pesos per square metre. Such a rental, however, would result in very slow recovery of the original investment since the estate will not be fully occupied until 15-20 years after its opening date.

Actual rentals currently charged for leased fully developed land in the vicinity of the proposed site range from one to two pesos per square metre per month. The lower end of the range, one peso per square metre per month or 12 pesos per square metre per annum, has been used in the cash flow and other tables in the following sections of this chapter as a reasonable rental rate for developed industrial sites.

7.5 Cash Flow and Internal Rate of Return for Paranaque Site

The cash inflows and outflows for the Paranaque site as estimated by the study team are set out in Table 7.8 overleaf. From this table the investment costs (lines 8 and 9), operating costs (sub-total operations) and income (lines 4 and 5) have been abstracted and set out in Table 7.9 to facilitate the calculation of the internal rate of return of the project before tax. Differences between the two tables are due to rounding. The gross internal rate of return of the project is 19.5% over a period of 20 years from the year of first investment.

Tables 7.10 and 7.11 show the effects of including interest payments and receipts at 12% and 18%.

7.6 Financing of the Paranaque Industrial Estate

The initial investment cost, incurred in the first two years of the life of the project, is estimated to be 43 million pesos. Of this total sum approximately 13 million pesos is required for land purchase and the balance of 30 million pesos for development of the site.

TABLE 7.7

COST OF LAND (Excluding Utility Services)
(in 1,000 P)

Items	1st Phase 50 lots of 2HA	2nd Phase 46 lots of 2HA	3rd Phase 48 lots of 2HA	4th Phase 48 lots of 2HA
Acquisition plus initial development	17,617	-	14,083	-
Improvements for standard units of 2 lots	4,255	3,915	4,085	4,085
Estate improvements	5,623	2,284	4,711	1,372
Off-site improvements	7,987	-	-	-
Estate service costs	25	225	225	125
Contingency 10%	4,769	642	1,092	558
Total Costs	40,276	7,066	24,196	6,140
Cumulative Costs	40,276	47,342	71,538	77,678
Chargeable m^2	1 mill. m^2	.92 mill. m^2	.96 mill. m^2	.96 mill. m^2
Cost/charg. m^2	40.28 P/m^2	7.68 P/m^2	25.20 P/m^2	6.40 P/m^2
Cumulative charg. m^2	1 mill. m^2	1.92 mill. m^2	2.88 mill. m^2	3.64 mill. m^2
Cost/cumulative charg. m^2	40.28 P/m^2	24.66 P/m^2	24.84 P/m^2	20.22 P/m^2

Average - over 4 phases (purchase + develop.) 20.2 P/m^2

TABLE 7.8

PARANAQUE SITE - CASH FLOWS - 1975-1990

Cash Flow (in 1,000 P)	1975	1976	1977	1978	1979	1980
INFLOWS						
Share Capital	14,000	5,000	-	-	-	1,000
Long Term Loans	-	25,500	-	-	-	-
Medium Term Loans	-	-	1,000	-	-	-
Site Rentals	-	900	4,500	6,300	8,100	9,900
Raw Land Rentals	-	90	90	90	90	-
Interests	-	-	-	-	-	360
Total Inflows	14,000	31,490	5,590	6,390	8,190	11,260
OUTFLOWS						
Estate Investments	12,791	28,094	-	-	-	7,066
Buildings, Equipment, Furnishings etc.	-	2,100	-	-	-	-
Salaries, Wages, Benefits	434	575	700	825	925	950
Matrls, Stationary etc.	150	200	230	240	245	250
Utilities, Services	13	20	27	33	38	40
10% Contingency	60	79	96	110	121	124
Sub Total Operations	657	874	1,053	1,208	1,329	1,364
Interest Payments on Loans	-	-	4,590	4,770	4,770	4,770
Repaid Loans	-	-	-	-	-	-
Other	-	-	-	-	-	-
Tax	-	-	-	-	-	199
Dividends	-	-	-	-	-	-
Total Outflows	13,448	31,068	5,643	5,978	6,099	13,399
NET FLOWS	552	422	(53)	412	2,091	(2,139)
NET FUNDS	552	974	921	1,333	3,424	1,285

TABLE 7.8

PARANAQUE SITE - CASH FLOWS - 1975-1990

Cash Flow (in 1,000 P)	1981	1982	1983	1984	1985
INFLOWS					
Share Capital	-	-	-	-	-
Long Term Loans	-	-	-	-	-
Medium Term Loans	-	-	-	-	3,000
Site Rentals	11,700	13,680	15,600	17,520	19,440
Raw Land Rentals	-	-	-	-	100
Interest	-	630	1,620	2,160	1,080
Total Inflows	11,700	14,310	17,220	19,680	23,620
OUTFLOWS					
Estate Investments	-	-	-	12,183	12,013
Buildings, Equipment, Furnishings, etc.	-	-	-	-	-
Salaries, Wages, Benefits	975	1,000	1,100	1,200	1,318
Materials, Stationery etc.	260	270	280	290	300
Utilities, Services	42	45	50	55	60
10% Contingency	128	131	143	155	168
Sub-Total Operations	1,405	1,446	1,573	1,700	1,846
Interest Payments on Loans	4,770	4,540	4,302	4,063	3,825
Repaid Loans	1,275	1,325	1,325	1,325	1,325
Other	-	-	-	-	-
Tax	566	1,381	2,730	4,321	4,682
Dividends	-	-	4,000	2,000	-
Total Outflows	8,016	8,692	13,930	25,592	23,691
NET FLOWS	3,684	5,618	3,290	(5,912)	(71)
NET FUNDS	4,969	10,587	13,877	7,965	7,894

TABLE 7.8

PARANAQUE SITE - CASH FLOWS - 1975-1990

Cash Flow (in 1,000 P)	1986	1987	1988	1989	1990
INFLOWS					
Share Capital	-	-	-	-	-
Long Term Loans	-	-	-	-	-
Medium Term Loans	-	-	-	-	-
Site Rentals	21,480	23,640	25,800	27,960	30,120
Raw Land Rentals	100	100	100	-	-
Interests	1,080	2,160	3,060	3,960	4,320
Total Inflows	22,660	25,900	28,960	31,920	34,440
OUTFLOWS					
Estate Investments	-	-	-	-	6,140
Buildings, Equipment, Furnishings, etc.	-	-	-	-	-
Salaries, Wages, Benefits	1,318	1,318	1,318	1,318	1,318
Materials, Stationery etc.	300	300	300	300	300
Utilities, Services	60	60	60	60	60
10% Contingency	168	168	168	168	168
Sub-Total Operations	1,846	1,846	1,846	1,846	1,846
Interest Payments on Loans	4,126	3,708	2,700	1,800	900
Repaid Loans	2,325	5,600	5,000	5,000	5,000
Other	-	-	-	-	-
Tax	5,123	6,403	7,827	9,178	10,315
Dividends	4,000	4,000	8,000	12,000	10,000
Total Outflows	17,420	21,557	25,373	29,824	34,261
NET FLOWS	5,240	4,343	3,587	2,096	179
NET FUNDS	13,134	17,477	21,064	23,160	23,339

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TABLE 7.9

GROSS INTERNAL RATE OF RETURN

(Rental Rate 12 Pesos per sq. metre per annum)
Excluding Interest Payments and Receipts

'000 pesos

YEAR	INVESTMENT	OPERATING COST	INCOME	CASH FLOW	DISCOUNT AT 18%	DISCOUNT AT 20%
1975	12,791	657	-	-13,448	-13,448	-13,448
1976	30,194	874	990	-30,058	-25,459	-25,038
1977		1,053	4,590	3,537	2,540	2,455
1978		1,208	6,390	5,182	3,156	3,000
1979		1,329	8,190	6,861	3,540	3,307
1980	7,066	1,364	9,090	660		
1981		1,405	11,700	10,295	3,809	3,449
1982		1,446	13,680	12,234	3,841	3,413
1983		1,573	15,600	14,027	3,731	3,268
1984	12,183	1,700	17,520	3,637	818	706
1985	12,103	1,846	19,540	5,591	1,068	906
1986		1,846	21,580	19,734	3,197	2,664
1987		1,846	23,740	21,894	2,999	2,452
1988		1,846	25,900	24,054	2,790	2,237
1989		1,846	27,960	26,114	2,585	2,037
1990	6,140	1,846	30,120	22,134	1,859	1,439
1991		1,846	32,280	30,434	2,161	1,643
1992		1,846	34,440	32,594	1,956	1,450
1993		1,846	36,600	34,754	1,772	1,321
1994		1,846	38,760	36,914	1,587	1,144
1995		1,846	40,920	39,074	1,448	1,016

Internal Rate of Return is 19.5% over a period of 20 years from first investment.

TABLE 7.9

NET INTERNAL RATE OF RETURN BEFORE TAX
(Including Interest Paid and Received at 12%)

Year	Investment	Loan Interest	Operating Cost	Rental Income	Interest Received	Cash Flow	Discount at 17%
1975	12,791		657			-13,448	-13,448
1976	30,194		874	990		-30,058	-25,700
1977		3,060	1,053	4,590		477	349
1978		3,180	1,208	6,390		2,002	1,249
1979		3,180	1,329	8,190		3,681	1,966
1980	7,066	3,180	1,364	9,090	240	- 2,280	- 1,040
1981		3,180	1,405	11,700		7,115	2,775
1982		3,027	1,446	13,680	420	9,627	3,206
1983		2,868	1,573	15,600	1,080	12,239	3,488
1984	12,183	2,709	1,700	17,520	1,440	2,368	575
1985	12,103	2,550	1,846	19,540	720	3,761	782
1986		2,751	1,846	21,580	720	17,703	3,151
1987		2,472	1,846	23,740	1,440	20,862	3,171
1988		1,800	1,846	25,900	2,040	24,294	3,158
1989		1,200	1,846	27,960	2,640	27,554	3,058
1990	6,140	600	1,846	30,120	2,880	24,414	2,319
1991			1,846	32,280	2,880	33,314	2,698
1992			1,846	34,440	2,880	35,474	2,478
1993			1,846	36,600	2,880	37,634	2,220
1994			1,846	38,760	2,880	39,794	2,029
1995			1,846	40,920	2,880	41,954	1,804

Internal Rate of Return is 17%

TABLE 7.9

NET INTERNAL RATE OF RETURN BEFORE TAX

(Including Interest Paid and Received at 18%)

Year	Invest-ment	Loan Interest Paid	Operating Cost	Income	Interest Received	Cash Flow	Discount at 10%	Discount at 15%
1975	12,791		657	-		-13,448	-13,448	-13,448
1976	30,194		874	990		-30,058	-27,323	-26,150
1977		4,590	1,053	4,590		- 1,053	- 870	- 796
1978		4,770	1,208	6,390		412	309	271
1979		4,770	1,329	8,190		2,091	1,428	1,196
1980	7,066	4,770	1,364	9,090	360	- 3,750	- 2,329	- 1,864
1981		4,770	1,405	11,700		5,525	3,116	2,387
1982		4,540	1,446	13,680	630	8,324	4,270	3,130
1983		4,302	1,573	15,600	1,620	11,345	5,298	3,710
1984	12,183	4,063	1,700	17,520	2,160	1,734	735	492
1985	12,103	3,825	1,846	19,540	1,080	2,846	1,099	703
1986		4,126	1,846	21,580	1,080	16,688	5,841	3,588
1987		3,708	1,846	23,740	2,160	20,346	6,490	3,805
1988		2,700	1,846	25,900	3,060	24,414	7,080	3,979
1989		1,800	1,846	27,960	3,960	28,274	7,436	3,987
1990	6,140	900	1,846	30,120	4,320	25,554	6,107	3,143
1991			1,846	32,280	4,320	34,754	7,323	3,719
1992			1,846	34,440	4,320	36,914	7,309	3,433
1993			1,846	36,600	4,320	39,074	7,033	3,165
1994			1,846	38,760	4,320	41,234	6,762	2,886
1995			1,846	40,920	4,320	43,394	6,466	2,647

Internal Rate of Return 15%

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The financial calculations are based on the assumption that the industrial estate will be established, developed and managed by some form of company or corporation (Chapter 10 contains the discussion on the organisation structure). It is further assumed that share capital, provided by Government or non-Government members of the company, will amount to 19 million pesos in the second year of development and that long term loans will be negotiated for the remaining 25 million pesos. The final assumption necessary to permit the construction of Profit and Loss accounts and Balance Sheets is that the appropriate interest rate for the Manila area is 18% for the risk and other conditions applicable to this venture.

The Profit and Loss Statements for the first fifteen years from commencement of the project are set out in Table 7.10 opposite. These accounts exclude the costs of maintaining and operating site utilities and services as explained earlier. These costs and revenues will be separately accounted for and will result in small additional profits to the Estate Authority.

It can be seen that the first real profits arise in the fifth year of development and that profits are realised in every succeeding year, despite the heavy loan interest at 18%.

The Balance Sheets for the same period, developed concurrently with the Profit and Loss Statements, are set out in Table 7.11; they reveal that the initial loan of 25.5 million pesos can be fully repaid in 14 years after allowing a grace period of 5 years before commencing capital repayments. Straight line depreciation has been allowed at 6% per annum on buildings and 4% per annum on infrastructure. The allocation of liquid assets between marketable securities, short term money and cash on hand is somewhat arbitrary and in the later years could be varied. The interest and dividends received have both been calculated at 18% so re-distribution between these items has no effect on the Balance Sheet.

Additional funds are raised in years 3 and 11 by medium term loans and in year 6 by a slight increase in share capital from 19 million to 20 million pesos. All calculations have been carried out in terms of constant prices and interest rates. No credit has been taken for potential increase in the real value of land nor for the effects of inflation.

The maximum gearing occurs in year 6 at 1.325 and by year 16 all loan capital has been repaid. In year 16, despite the investment of over 6 million pesos in further infrastructure for Phase 4 of the estate, liquid assets amount to over 33 million pesos, or over 1.5 times the share capital. At this point 25% of the estate land is still to be leased although all investment costs have been charged. The project, therefore appears extremely attractive as a long-term venture.

TABLE 7.10

PARANAQUE SITE

PROFIT & LOSS STATEMENTS - 1975-1990

Profit/Loss (In 1,000 P)	1975	1976	1977	1978	1979	1980
INCOME						
Site Rentals	-	900	4,500	6,300	8,100	9,900
Raw Land Rentals	-	90	90	90	90	-
Interests/Dividends Received	-	-	-	-	-	360
Other	-	-	-	-	-	-
Total Income	-	990	4,590	6,390	8,190	10,260
EXPENSES						
Operations	657	874	1,053	1,208	1,329	1,364
Building etc. Depreciation	-	-	136	136	136	136
Estate Impr. Depreciation	-	-	1,124	1,124	1,124	1,124
Interests on Loans	-	-	4,590	4,770	4,770	4,770
Other	-	-	-	-	-	-
Total Expenses	657	874	6,903	7,238	7,359	7,394
Profit or (Loss)	(657)	116	(2,313)	(848)	831	2,866
Tax	-	-	-	-	-	199
Dividends	-	-	-	-	-	-
Net Profit/(Loss)	(657)	116	(2,313)	(848)	831	2,667

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TABLE 7.10

PARANAQUE SITE

PROFIT & LOSS STATEMENTS - 1975-1990

Profit/Loss (in 1,000 P)	1981	1982	1983	1984	1985
INCOME					
Site Rentals	11,700	13,680	15,600	17,520	19,440
Raw Land Rentals	-	-	-	-	100
Interests/Dividends Received	-	630	1,620	2,160	1,080
Other	-	-	-	-	-
Total Income	11,700	14,310	17,220	19,680	20,620
EXPENSES					
Operations	1,405	1,446	1,573	1,700	1,846
Building etc. Depreciation	136	136	136	136	136
Estate Impr. Depreciation	1,406	1,406	1,406	1,406	1,406
Interests on Loans	4,770	4,540	4,302	4,063	3,825
Other	-	-	-	-	-
Total Expenses	7,717	7,528	7,417	7,305	7,213
Profit or (Loss)	3,983	6,782	9,803	12,375	13,407
Tax	566	1,444	2,730	4,321	4,682
Dividends	-	-	4,000 (20%)	2,000 (10%)	-
Net Profit/(Loss)	3,417	5,338	3,073	6,054	8,725

PARANAQUE SITE
PROFIT & LOSS STATEMENTS - 1975-1990

Profit/Loss (in 1,000 P)	1986	1987	1988	1989	1990
INCOME					
Site Rentals	21,480	23,640	25,800	27,960	30,120
Raw Land Rentals	100	100	100	-	-
Interests/Dividends Received	1,080	2,160	3,060	3,960	4,320
Other	-	-	-	-	-
Total Income	22,660	25,900	28,960	31,920	34,440
EXPENSES					
Operations	1,846	1,846	1,846	1,846	1,846
Building etc. Depreciation	136	136	136	136	136
Estate Impr. Depreciation	1,887	1,887	1,887	1,887	1,887
Interests on Loans	4,126	3,708	2,700	1,800	900
Other	-	-	-	-	-
Total Expenses	7,995	7,577	6,569	5,669	4,769
Profit or (Loss)	14,665	18,323	22,391	26,251	29,671
Tax	5,123	6,403	7,827	9,178	10,375
Dividends	4,000 (20%)	4,000 (20%)	8,000 (40%)	12,000 (60%)	10,000 (50%)
Net Profit/(Loss)	5,542	7,920	6,564	5,073	9,296

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TABLE 7.11 Page 1 of 3

PARANAQUE SITE - BALANCE SHEETS - 1975-1990

Balance (in 1,000 P)	1975	1976	1977	1978	1979	1980
LIABILITIES						
Share Capital	14,000	19,000	19,000	19,000	19,000	20,000
Long Term Loans	-	25,500	25,500	25,500	25,500	25,500
Medium Term Loans	-	-	1,000	1,000	1,000	1,000
Reserves	-	-	-	-	-	-
Retained Earnings	(657)	(541)	(2,854)	(3,702)	(2,871)	(204)
Balance Total	13,343	43,959	42,646	41,798	42,629	46,296
ASSETS						
Land	12,791	12,791	12,791	12,791	12,791	12,791
Improvements	-	28,094	28,094	28,094	28,094	35,160
Less Depreciation	-	-	1,124	2,248	3,372	4,496
	-	28,094	26,970	25,846	24,722	30,664
Buildings, Plant, etc.	-	2,100	2,100	2,100	2,100	2,100
Less Depreciation	-	-	136	272	408	544
	-	2,100	1,964	1,828	1,692	1,556
Marketable Securities	-	-	-	-	2,000	-
Cash on Hand	552	974	921	1,333	1,424	1,285
Short Term Money	-	-	-	-	-	-
Balance Total	13,343	43,959	42,646	41,798	42,629	46,296

TABLE 7.11

PARANAQUE SITE - BALANCE SHEETS - 1975-1990

Balance (in 1,000P)	1981	1982	1983	1984	1985
LIABILITIES					
Share Capital	20,000	20,000	20,000	20,000	20,000
Long Term Loans	24,225	22,950	21,675	20,400	19,125
Medium Term Loans	1,000	950	900	850	3,800
Reserves	2,500	6,000	6,000	6,000	6,000
Retained Earnings	713	2,551	5,624	11,678	20,403
Balance Total	43,438	52,451	54,199	58,928	69,328
ASSETS					
Land	12,791	12,791	12,791	24,974	24,974
Improvements	35,160	35,160	35,160	35,160	47,173
Less Depreciation	5,902	7,308	8,714	10,120	12,007
	29,258	27,852	26,446	25,040	35,166
Buildings, Plant etc.	2,100	2,100	2,100	2,100	2,100
Less Depreciation	680	816	952	1,088	1,224
	1,420	1,284	1,148	1,012	876
Marketable Securities	2,500	6,000	6,000	6,000	6,000
Cash on Hand	1,469	1,524	1,814	1,902	2,312
Short Term Money	1,000	3,000	6,000	-	-
Balance Total	43,438	52,451	54,199	58,928	69,328

TABLE 7.11

PARANAQUE SITE - BALANCE SHEETS - 1975-1990

Balance (in 1,000 P)	1986	1987	1988	1989	1990
LIABILITIES					
Share Capital	20,000	20,000	20,000	20,000	20,000
Long Term Loans	17,850	15,000	10,000	5,000	-
Medium Term Loans	2,750	-	-	-	-
Reserves	8,000	9,000	10,000	10,000	12,000
Retained Earnings	23,945	31,865	38,429	43,502	52,798
Balance Total	72,545	75,865	78,429	78,502	84,798
ASSETS					
Land	24,974	24,974	24,974	24,974	24,974
Improvements	47,173	47,173	47,173	47,173	53,313
Less Depreciation	13,894	15,781	17,668	19,555	21,442
	33,279	31,392	29,505	27,618	31,871
Buildings, Plant etc.	2,100	2,100	2,100	2,100	2,100
Less Depreciation	1,360	1,495	1,632	1,760	1,904
	740	605	468	340	196
Marketable Securities	8,000	9,000	10,000	10,000	12,000
Cash on Hand	1,552	1,894	1,482	1,570	7,757
Short Term Money	4,000	8,000	12,000	14,000	14,000
Balance Total	72,545	75,865	78,429	78,502	84,798

The financial estimates are based on development and occupation of the 443 hectare estate over a period of twenty years. It is possible that this period could be substantially less, particularly if the range of industries admitted to the estate is widened or if the pace of industrial development quickens. Such changes would bring marked improvements in financial return and could justify a lower annual rental charge.

7.7 Foreign and Domestic Content of Investment Costs

Detailed calculation of foreign and domestic currency content of the investment costs have not been carried out at this stage because of the broad nature of the estimates. Approximations to these two elements of cost can be readily made.

Acquisition costs, amounting to 13 million pesos, will clearly be domestic currency. Initial improvement costs amounting to 30 million pesos will have a foreign currency : domestic currency ratio of 1 : 1 derived as follows:

		foreign	domestic
materials	40%	20	20
plant	25%	20	5
labour	20%	-	20
overheads	15%	10	5
		50	50

In addition to these items from the Balance Sheet provision must be made for the foreign currency content in sewage treatment plant, water supply installation and other facilities not included in the Balance Sheet Summary for reasons set out earlier in the report (Section 7.2).

Extracting costs from Table 7.5 indicates that the total investment in site services could be:

	Pesos x 10^6
Sewage treatment plant and pumps	11
Water supply	11
Solid waste disposal	3
Miscellaneous items	0.6
	25.6

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Finally, a sum of 20 million pesos should be provided for the initial investment in standard buildings.

Using the same ratio for foreign domestic currency content of 1 : 1 (although the ratio in this case could easily be higher) leads to the following summary of initial foreign exchange requirements:

	US Dollars Millions
Land	Nil
Site improvements	0.76
Site services	0.65
Standard buildings	0.51
	1.92
	Say, $US 2 millions

7.8 The Effect of International Loan Funds

The financial analysis has been conducted on the assumption that all loan funds are borrowed at the market interest rate of 18% per annum. If all or part of the loan funds (Pesos 25.5 millions) can be obtained from an international lending agency at a lower interest rate there is an obvious benefit to the estate.

This benefit can be used either to repay the loan over a shorter period or to reduce the rental chargeable to estate tenants. In the first case the community will benefit as the funds will be available for further estate development. In the second case the tenants will benefit and indirectly the estate may benefit since the lower rentals will probably attract more entrepreneurs, thus filling up the estate more rapidly and possibly improving the cash flows.

It should be borne in mind that the loan funds quoted above include only development and improvement costs and exclude the cost of service installations. The total cost of acquisition, development and installation of all services for the 450 hectare estate is estimated to be 133 million pesos (Table 7.1). Of this sum, 21 million pesos is required for power supply and 3.2 million pesos for telephone services which will be financed by the respective supply companies.

The total loan commitments of the Estate Authority for Phase I, assuming that share capital of 20 million pesos is provided, will be of the order of 32 million pesos, the additional 6.5 million pesos being required for the first phase of the sewage treatment and water supply installations and the initial fleet of garbage disposal vehicles.

8. THE LEGAL ENVIRONMENT

8.1 The Power of the LLDA to Establish an Industrial Estate

Under Section 4(c) of Republic Act No. 4850, otherwise known as the Laguna Lake Development Authority Act, the LLDA can "engage in agriculture, industry, commerce or other activities within the region which may be necessary or directly contributory to the socio-economic development of the region, and, for this purpose whether by itself or in cooperation with private persons or in cooperation with private persons and entities, to acquire, finance, invest in, and operate subsidiary corporations; Provided, that the Authority shall engage only, unless public interest requires otherwise, in those activities as are in the nature of new ventures or are clearly beyond the scope, capacity or interest of private enterprise due to considerations of geography, technical or capital requirements, returns on investment and risk."

An industrial estate project as envisaged in this report is a new venture for the Philippines. It will provide opportunities for small industries to be established on sites where all public utility and other services are already provided and the entrepreneur need only provide the equipment and plant specific to his requirement. His investment needs will be reduced since the land, and the factory premises if he so desires, are available on an annual rental. His risk is thereby reduced also, providing a greater chance of surviving the critical early years of production. The socio-economic advantages of the estate arise from the provision of additional employment at an earlier date and the opportunity for entrepreneurs to enter industry with smaller initial capital. For these reasons an industrial estate development falls within the powers of the LLDA as defined in the Act.

8.2 Modes of Land Acquisition

There are four possible modes of land acquisition which should be considered. They are:

Direct Purchase
Reservation of Public Land
Reclamation
Resumption by the Government

Direct purchase of land by LLDA is authorised under Section 5(f) of R.A. 4850 mentioned above. LLDA is also authorised under the same section to sell, lease or otherwise dispose of such land.

Reservation of public land for the establishment of an industrial estate is theoretically practical by Presidential Proclamation. Suitable public land does not appear to be available within the inner group of zones and this method is therefore not further considered.

Reclamation from Laguna Lake by hydraulic fill behind a bank has been included for one site in the analysis described in Chapter 6 above. Section 4(i) of R. A. 4850 authorises LLDA to undertake such reclamation "from the lake as may be necessary to accomplish the aims and purpose of the Authority".

Resumption by the Government of private land with payment of appropriate compensation is legally permissible only where such resumption is in the public interest and this procedure is usually confined to public works such as roads. The views of the Government are currently being sought by LLDA on the application of resumption procedures to land for industrial estate development.

If this opinion proves favourable LLDA could commence negotiations for direct purchase of the land in the knowledge that any delaying or obstructionist attitudes could be countered by the use of the resumption procedure.

8.3 Incentives and Constraints on Industrial Expansion

The incentives to establish new industries are listed in Board of Investment publications and will be the same for industrial estates as for other locations. There can be a further incentive for industrial estate location for a particular enterprise arising directly from the taxation laws. Section 12 of R. A. 4850 exempts LLDA from all taxes incidental to its operations. This exemption extends to its subsidiary corporations as follows:

full exemption in year	1 to 5
20% of all said taxes payable in year	6
40% " " " " " " "	7
60% " " " " " " "	8
80% " " " " " " "	9
100% " " " " " " "	10 and thereafter

These exemptions apply only to the operations of LLDA and its subsidiary corporations. The benefit to the individual enterprise is that LLDA or the subsidiary corporations, because of the tax concessions, can charge a lower rental for industrial sites than would otherwise be necessary.

The major constraints on industrial development are firstly its effect on the environment, covered by BOI requirements for new industry and the standards set by the National Pollution Control Commission. These effects have been taken into account when screening the list of potential industries as described in Chapter 5.

The second major constraint to industrial development in the study area is the Presidential Instruction dated 17 December 1973 to expand the Task Force on Human Settlement into a Commission for Zoning and Human Settlement charged among other things to ensure that

(1) there shall be no more factories, plants industries and the like to be established within a 50 kilometre radius of Manila;

(2) there should be a classification of factories into

  (a) pollutants and non-pollutants

  (b) hazardous and non-hazardous or combustible and non-combustible;

(3) factories plants and industries conforming to the requirements of the Commission shall be the only ones accorded infrastructure support.

While the need for such a prohibition on industrial expansion within the 50 kilometre radius of Manila during the current short-term period of establishment and implementation of the Commission is clear, such a prohibition could have long term detrimental effects on the economy of the region and on the well being of its population.

There is a growing need for the creation of growth centres outside the immediate zone of influence of Manila in order to reduce the dominance of the capital in financial, industrial and commercial sectors. This need is not unique to Manila and applies to most of the major cities in the world. Completely satisfactory solutions to the problems of controlling city growth and achieving acceptable living standards and costs for both urban and rural populations are still being sought. In the meantime, growth continues, housing, education and employment must be provided. Because of the time needed to establish new centres some industrial growth close to the existing city must be permitted or unemployment will grow to unacceptable levels.

Such growth can be best controlled if it is confined to a few defined zones. Each of the selected zones can be defined as one or more industrial estates on which certain types of industrial development will be permitted. Thus the planning policies of the Government can best be implemented by the inclusion of industrial estates in the future Master Plan for the development of Greater Manila. The aim of this report is to establish the feasibility of one such estate.

9. THE PLANNING OF THE INDUSTRIAL ESTATE

9.1 Support Facilities to be Provided

In order to encourage the establishment of small and medium sized plants on the industrial estate it is necessary to provide an environment within which the entrepreneur can set up his factory and commence production in the shortest possible time. Essential services such as water supply, electricity, telephones and refuse collection and disposal must be provided. Adequate drainage and treatment for industrial and domestic liquid wastes must be installed prior to the first production on industrial sites. Access roads to each site must be completed to a standard adequate for the heaviest vehicles likely to be used by each enterprise. Site security should also be established before occupation of premises.

Some standard factory buildings should be provided for the use of both very small plants with limited capital resources and also for those who wish to develop a pilot enterprise before embarking on major expenditure. These buildings will be so designed that areas of 1,000 square metres or more can be provided by moving internal partitions to the appropriate points.

Essential support industries such as jobbing workshops, printing and reproduction centres, toolshops etc. can also be established in sections of these standard buildings either by private enterprise or by the Estate Authority.

The Estate Authority will have its own administrative building, workshop and stores, gatehouse and security checkpoints.

Space must be provided for an electricity substation, water storage tanks, waste water treatment plants and possibly a telephone exchange. Ample width must be provided in road reserves for drains, pipes, sewers and cables for the various services. All services should be laid underground to avoid damage during typhoons and other violent storms. Underground services are also less prone to damage by vehicles or other accidents and do not create undesirable visual impact.

9.2 Service Networks and Plants

Each industrial site on the estate will be provided with telephone, water, electricity and sewer connections, surface drainage and road access. Sets of ducts will be provided at regular intervals under all roads to permit ready access for every site to telephone and power cables which will be located on opposite sides of the access roads.

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Main sewer pipes will be provided on both sides of all access roads to avoid any risk of having to excavate the pavement to clear blocked or broken pipes. Where road crossings are unavoidable the pipes will be cased in concrete for some distance either side of and under the pavement to reduce the risk of breakage.

The main water supply pipes will run along the rear boundary of the industrial sites in order to minimise the risk of contamination from sewer pipes or other services in the event of breakage or failure of a joint or pipe.

Surface drainage will in general be carried in open channels to minimise the risk of blockage and flooding and to reduce the cost of maintenance. Surface drainage channels will be located on both sides of all access roads and feeder channels will in general run along the boundary between adjacent industrial sites. All open surface drainage channels will be maintained by the Estate Authority and appropriate charges will be made to tenants to recover the cost.

A water supply plant comprising deep wells, pumps and storage tanks will be provided for Phase I of the estate. As Phases 2, 3 and 4 are developed the decision to continue this system or to take bulk supplies from another source can be made in the light of experience to date and of the conditions then existing.

A waste water and sewage treatment plant with provision for primary and secondary treatment will be provided as part of the Phase I infrastructure and extended for Phase 3. The plant will be designed so that its effluent will meet the standards established from time to time by the National Pollution Control Commission.

The provision, operation and maintenance of water supply and waste water treatment services will be separately costed and charged to tenants by the Estate Authority.

Space for an electricity transformer and substation is provided in the layout. The provision of the necessary equipment, overhead lines and cables will be the responsibility of the electricity supply company who will have individual agreements with tenants. Similarly, the telephone service will be provided by an outside supply company who will charge the tenants directly. Provision for telephone and electricity cables has been made in the road reserve width. Other services which may be provided by the Estate Authority include standard buildings, workshops support etc. Each service will be individually costed and charged to users. Some of the support services may be set up by commercial operators rather than by the Estate Authority, subject to the Authority approving the proposal and granting a site to the operator.

9.3 The Physical Layout of the Estate

The estate layout is based on a rectangular grid of blocks approximately 500 metres by 320 metres. This grid is set out in Diagram 9.1 at the end of this chapter. It allows the development of industrial sites varying from 2 hectares to 16 hectares in area without varying the basic layout. To develop $\frac{1}{2}$ hectare and 1 hectare sites one additional road must be provided as indicated on the diagram. Diagrams 9.2 and 9.3 show cross sections and other details of the proposed layout.

Areas have been set aside for the Estate Authority administration building, workshop and maintenance area, treatment plant and service areas, parks and some recreational facilities. Road reserves are ten metres wider than pavements to provide ample space for pipes, manholes, cables and drainage channels.

The total site of 450 hectares is to be developed in four phases of approximately 100 hectares each. The 400 hectares estate is surrounded by a perimeter road 15 metres wide. Six intermediate roads ten metres wide are provided for access to sites. These roads are located at 340 metres centres. Additional roads at 170 metres centres must be provided where sites smaller than 2 hectares in area are required.

Cross-access roads at right angles to intermediate roads are provided at 500 metre intervals to provide easier access between sites for delivery and collection vehicles.

Water mains in general are located at 340 metres centres parallel with and midway between intermediate roads. Sewer mains are located in intermediate road reserves on both sides of the pavement. Electricity and telephone cables are also located in intermediate road reserves on alternate sides of the pavement. All services mains and cables are connected as ring mains to minimise interruptions to supply.

The water supply wells and storage tanks are located near the centre of the 400 hectares estate to minimise the size of distribution mains. The waste water treatment plant is located at the lowest point of the site to take maximum advantage of natural drainage and to minimise the risk of pollution.

All industrial plants and establishments requiring $\frac{1}{2}$ hectare of space or less will be located in standard buildings to be provided by the Estate Authority. These buildings will be rented to tenants on an annual basis with security of tenure subject to prompt payment of rent and proper care of the structure. The annual rental will be designed to recover the cost of provision and maintenance of the buildings.

Larger plants will be given the option of erecting their own buildings after obtaining Estate Authority approval of plans and specifications or of entering into agreements under which the Authority will construct buildings for them at a reasonable agreed price.

Lease or rental agreements with security of tenure and safeguards for the Authority can also be negotiated for these larger buildings.

In allocating space to tenants the larger plants should be located near the perimeter of the estate as this will result in less interference with planned distribution main locations. The smallest industries will be located near the administration building to facilitate the higher level of supervision and assistance which will probably be required by these tenants.

Despite this qualification the layout as planned is very flexible and can accommodate any practical combination of plants in the $\frac{1}{2}$ hectare to 4 hectare area range. Plants larger than 4 hectares should not be encouraged as they will have relatively little difficulty in finding suitable locations elsewhere. Some such plants may, however, be desirable because of possible linkage benefits. Each case can be considered on its merits.

9.4 The Phasing of Development

As outlined earlier in the report (Section 2.5) there is a need for approximately 100 hectares of industrial estate land by 1980. The estate has been planned for a final size of about 450 hectares (Section 9.3 above). The first section comprising 89 hectares of leasable industrial sites together with all the necessary supporting services can be available for occupation in 1977.

The financial analysis and cash flow calculations in Chapter 7 of this report are based on a programme to provide 89 hectares of leasable land by 1977, a further 83 hectares by 1980, 91 hectares by 1985 and the final 94 hectares to complete the planned estate by 1990. The programme can be accelerated or delayed to meet the actual rate of occupation of sites and demand for the ensuing quarter or half year, since the service networks for the 100 hectares can be constructed within one year.

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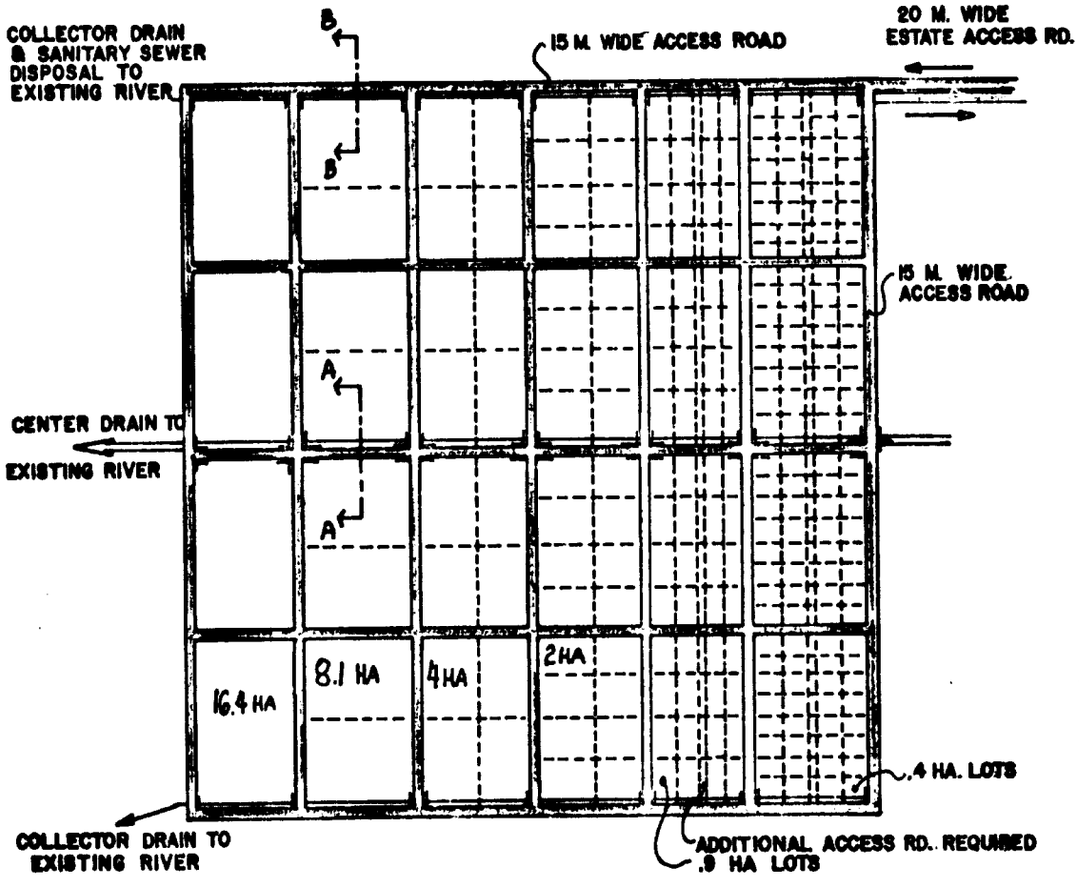
9.5 Regulations to Control the Development of Individual Plots

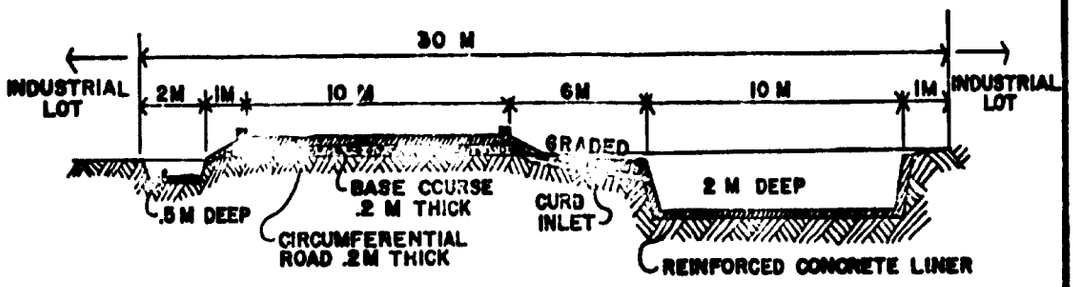
In order to control the dimensions, quality of construction, clearance from adjacent properties, appearance and compatibility of all works and buildings constructed by tenants on leased industrial plots the Estate Authority must include control regulations in all draft leases and contracts. These regulations should also include standards for effluent quality, smoke emission, noise level and other environmental factors. Appropriate penalties should be provided for breaches of these regulations ranging from reimbursement of damages suffered by the Authority, neighbouring tenants or other third parties for minor breaches up to expulsion from the estate together with compensation for persistent or deliberate breach of the regulations.

The regulations should be drafted by technically competent persons either on the Estate Authority staff or contracted from outside, and should be approved by a competent legal adviser before inclusion in contracts or leases.

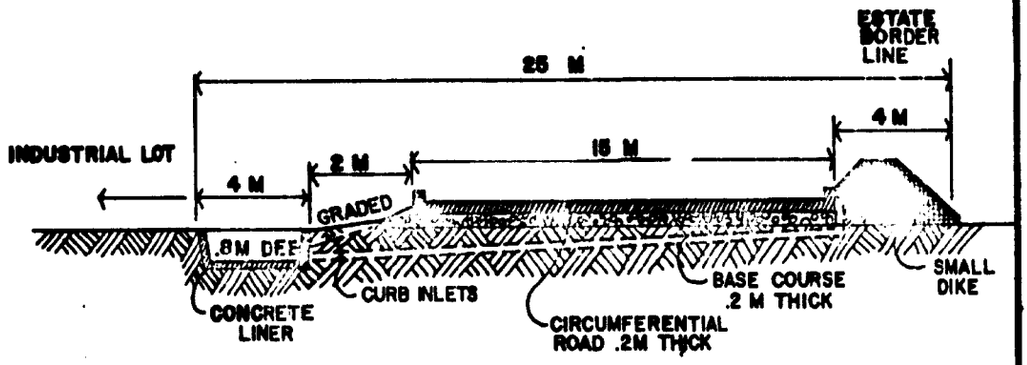


TYPICAL ESTATE LAYOUT

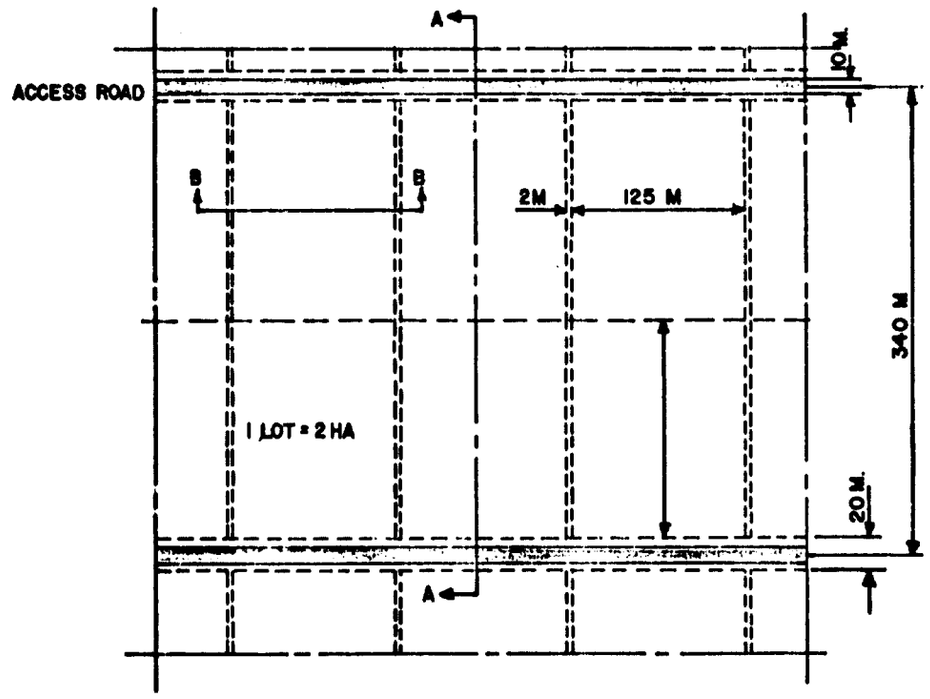
WITH POSSIBLE SUBDIVISIONS
ESTATE DIMENSIONS 2,140 M X 2,065 M OR 443 HA..



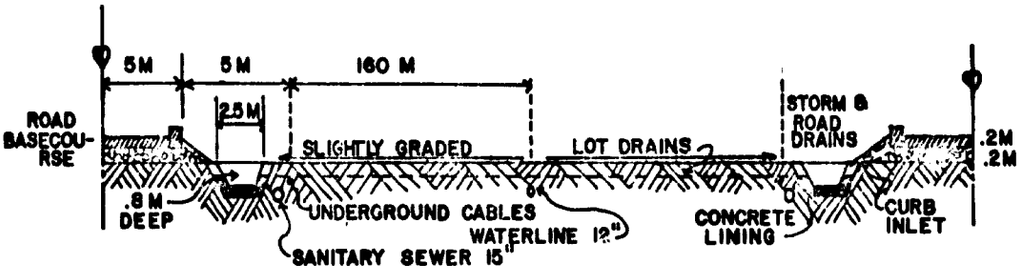
TYPICAL CROSS SECTION A



TYPICAL CROSS SECTION B



TYPICAL LAYOUT OF STANDARD UNIT OF 2 STANDARD LOTS OF 2HA EACH, PLUS INFRASTRUCTURE.
DIMENSIONS OF STANDARD UNIT 127 M. BY 340 M..



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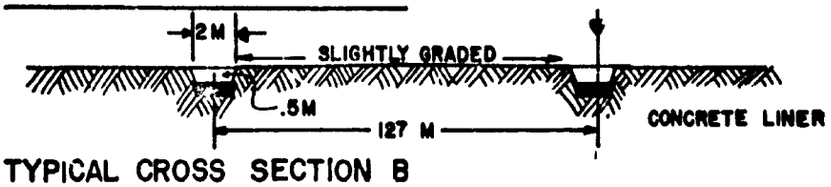

TYPICAL CROSS SECTION B

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10. ORGANISATION AND MANAGEMENT

10.1 Types of Organisation

There are many possible organisations for the development and operation of an industrial estate. Some of the more likely ones are listed below and discussed in detail in following paragraphs.

The first and most obvious in this study is a division of a Government Department or Agency. The organisation could be established as a division of the LLDA with a chief executive responsible through the General Manager to the LLDA Board of Directors.

The advantage of this type of organisation is that it could be established quickly with a minimum requirement for additional legislation or other government action. It would share all the taxation and other fiscal benefits of LLDA. Its main disadvantage would be the lack of commercial incentive in the administration and management of the estate, the lack of direct involvement by industrial firms occupying the individual sites on the estate and the long-term commitment of senior LLDA staff to routine administration and operations.

The second type of organisation would be some form of cooperative on which LLDA, other interested government agencies and the firms occupying the estate would be represented.

The advantages of this type over the first are that it offers direct participation in the management of the estate to those who will benefit from that management. It has disadvantages in the fiscal and financial areas where special legislation may be required. It lacks the profit incentive which leads towards effective management. The initial finance, as in the first case, would have to come from the Government. The lines of authority and responsibility would have to be clearly defined.

The third type of organisation which should be considered is a private company. Stock could be issued to government, LLDA, other agencies and to some or all of the industrial enterprises occupying the estate. The legal framework for the establishment of such a company already exists but some special legislation may be required to permit government participation and to ensure a government majority holding if that is considered desirable.

The advantages of this type of organisation are that it has an established and recognisable form; it offers flexibility of ownership and participation to most interested parties; and it requires little, if any, special legislation before setting up the organisation.

The fourth and last type of organisation to be examined is the public company. Such a company could be wholly owned in the early stages of development by the Government or one or more of its agencies such as LLDA.

At suitable times in the development shares could be offered to industrialists with factories either planned or already built on the estate, or for sale to the public. It may be possible to combine this type of organisation with one or more of those discussed above in a phased development of the organisation.

The advantage of this type of organisation, in addition to those of a private company, are that it offers the opportunity to the general public to participate in the future development and prosperity of Greater Manila. It would also permit the Government and its agencies, if policy so dictates, to withdraw completely from the management of the estate at some convenient future date.

Its disadvantage might lie in the loss of the fiscal benefits applicable to LLDA enterprises. This could possibly be overcome by maintaining total LLDA ownership until these benefits are exhausted.

The organisation structure from the chief executive level downward will be the same irrespective of the type of organisation selected. It is discussed in detail in the next three sections of this chapter.

10.2 Functions to be Performed

The functions to be performed by the new organisation can be summarised under the headings planning, purchasing, maintenance and administration. The listing is not in terms of importance but rather of priority in time.

The essential early function is planning, ranging from the selection of a suitable site to the engineering investigations and design for the estate and the physical planning of the facilities. Other aspects of planning will be the selection of suitable industries, the promotion of the services offered by the estate and the allocation of sites to specific uses. It will also include financial management and control.

The purchasing function will include the acquisition of the site, the preparation of contracts and leases and possibly the bulk purchase of water electricity and other services where economies would result. The maintenance function will include the maintenance of all the infrastructure provided by the organisation for the use and convenience of the tenants. It will include a wide range of tasks from refuse collection and disposal to the repair and maintenance workshop, and the operation of water supply and waste water treatment plants.

The administration function embraces a wide range of activities. Some of the more important are accounting, office administration and procedures, public relations and security. Personnel management may also be considered as part of the administration function but this will be further discussed in a later section.

10.3 Key Posts and Tasks

The most important post in the organisation will be that of Estate Manager. He will be responsible to the General Manager (LLDA), or the Board of the Industrial Estate Authority for the efficient management and operation of all the facilities and infrastructure comprising the estate. He must be a capable administrator, preferably with experience in the commercial sector. He must possess qualities of leadership and be able to make quick and competent decisions within the powers delegated to him.

In the long term, that is when the estate is approaching its final planned size of 400 hectares, there will be three key staff posts reporting to and assisting the Estate Manager. They are the Controller, the Legal Adviser and the Planner.

The Controller will be responsible for financial management and control including supervision of the preparation of annual budgets, assessment of capital needs and fixing of site and factory rentals. He will ensure that sound financial practices are observed throughout the organisation and provide financial advice as required to the Estate Manager. He should be professionally qualified and widely experienced in accounting practice. In the early stages of development this post can be combined with that of Estate Manager or Commercial Manager.

The Legal Adviser will be responsible to the Estate Manager for the legal aspects of land acquisition transactions, contracts and leases and agreements for bulk purchases. He will prepare legal drafts of regulations to control the development of individual sites and to establish the rights and responsibilities of the Estate Authority and individual tenants. This need not be a full-time salaried post but will require considerable time.

The Planner should preferably be professionally qualified in Architecture or Engineering supported by a planning qualification. He will assist in the development of the estate site to provide a congenial and efficient working environment for the tenants and their staffs. He will draft technical sections of regulations and contracts for the approval of the Legal Adviser. He will assist in the allocation of sites and in the planned subdivision of the site. In the early stages of development it may be possible to combine this post with that of Services Manager discussed below.

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In addition to the three key posts just described, forming with the Estate Manager the planning cell of the organisation, there will be four principal key posts in the operations section of the organisation. These are the Commercial Manager, the Purchasing and Contracts Officer, the Personnel Manager and the Services Manager. No provision is made in the organisation structure for the engineering design and the supervision and execution of civil engineering work. These tasks are better performed by consultants given specific contracts for their tasks. They in turn would prepare designs and contracts for the execution of the work.

The Commercial Manager will be responsible for office management and procedures, efficient accounting, including the prompt billing of tenants, public relations and promotion and the security of the estate site. He will be assisted by an Office Manager, an Accountant, a Public Relations Officer and a Security Officer. These officers and their staffs will be added to the organisation as it develops. The Commercial Manager will probably combine the duties of Office Manager and Accountant until the first phase of the site is ready for occupation. The Public Relations Officer and Security Officer will be appointed earlier and their staffs will be augmented as the estate expands.

The Purchasing and Contracts Officer will be responsible for the preparation, negotiation and signing of all contracts, leases and agreements to purchase. He will also be responsible for the administrative aspects of supervision of the performance of these contracts. He will have two assistants, one responsible for the Contracts Section and the other for Purchases. They will be added to the organisation as the work demand requires.

The Personnel Manager will be responsible for all aspects of personnel from advertising and recruitment to training, social welfare and guidance and finally to retirement benefits. He will also carry out job evaluation and enrichment studies and advise the Estate Manager on all aspects of staff selection, training and welfare. When the estate expands sufficiently to justify the establishment of a training school this will also come under his control. In the long term his staff will include officers in charge of recruitment, records, selection and training but some or all of these posts will be combined in the early stages. The Public Relations Officer will assist him in the drafting and placing of advertisements. The Personnel Manager function has been separated from administration in accordance with current practice.

The Services Manager must be a professionally qualified engineer with considerable experience in the maintenance and operation of public utilities, preferably gained in a municipal or industrial environment. He will be assisted in the long term by two assistant engineers, one mechanical and the other civil. His responsibilities will include the maintenance of all roads and drains on the estate, the operation, maintenance and repair of water and sewerage pipe networks and plants, the repair and maintenance workshop for vehicles and machines. He will also supervise the collection and disposal of all solid waste from the estate.

10.4 The Organisation Structure and its Phased Development

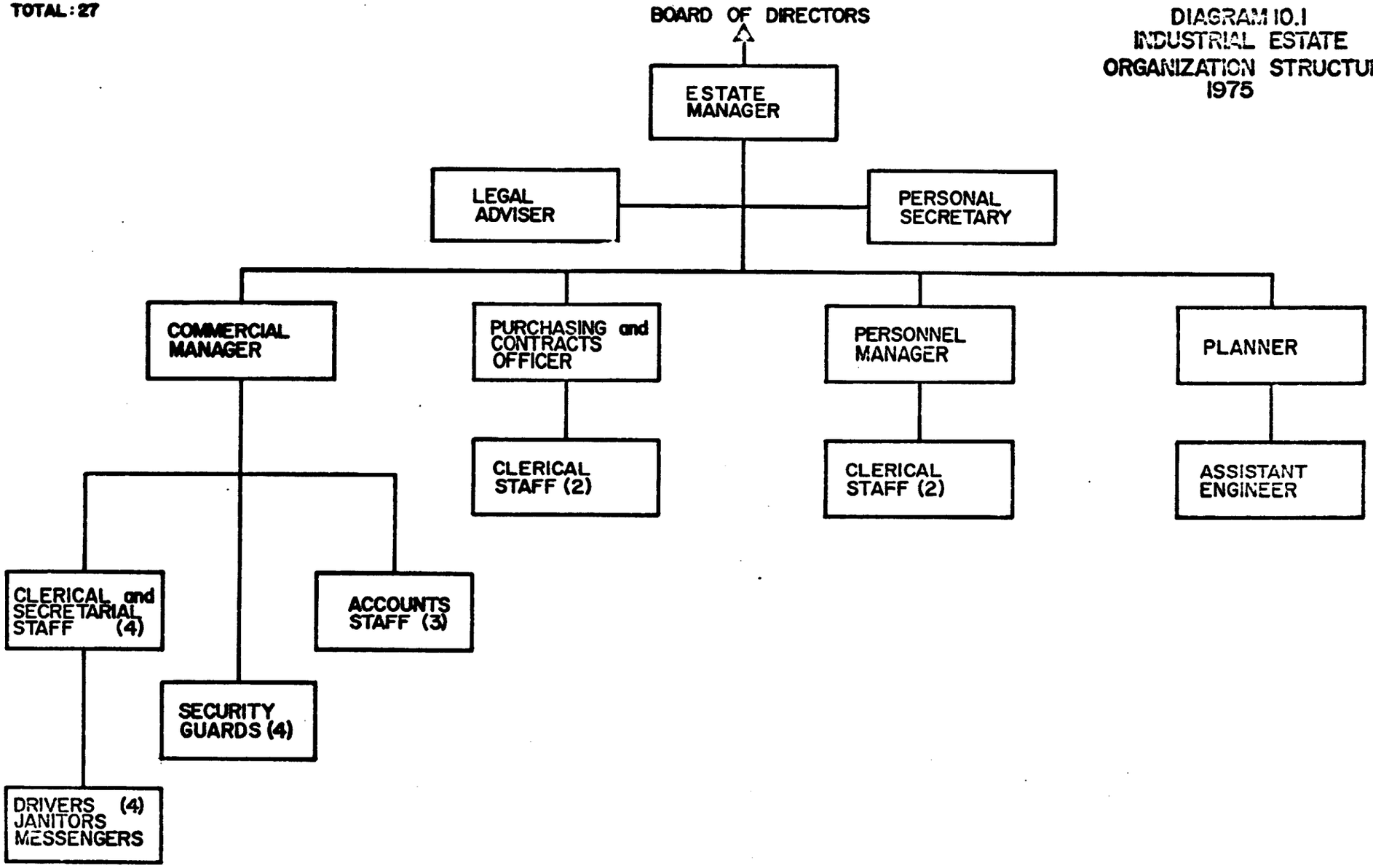
The final organisation structure envisaged for the estate is set out in Diagram 10.1 at the end of this chapter. The key posts are shown as described in Section 10.2 and approximate numbers of staff indicated in each working section.

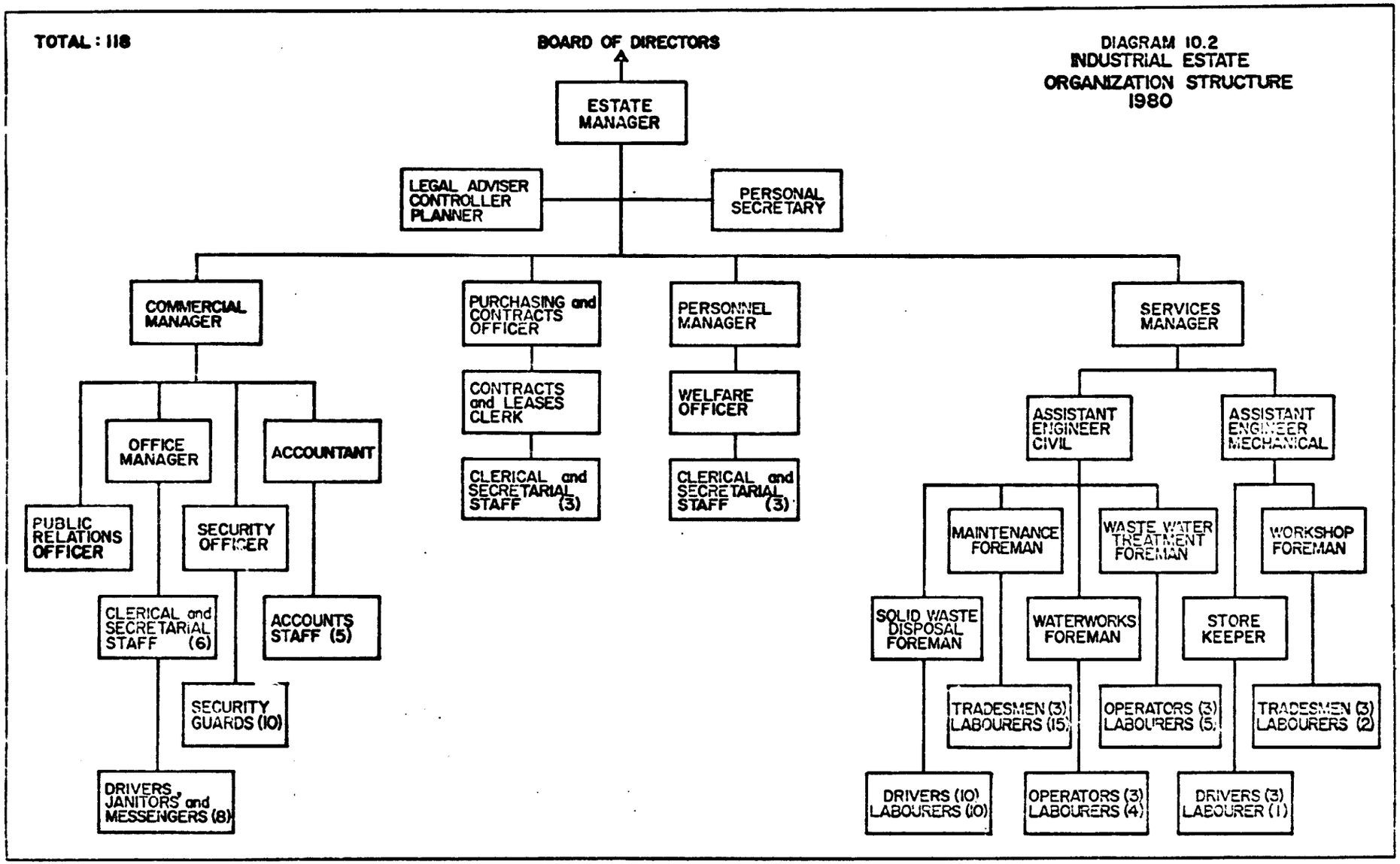
The initial organisation will be small, comprising a planning team of perhaps four or five key posts with the necessary supporting staff. The posts finally filled by this initial group will depend to some extent on the qualifications and experience of the individuals available, but it should include the Estate Manager, either the Controller or Commercial Manager, the Planner or Services Manager and the Personnel Manager and Purchasing Officer as soon as suitable candidates are available.

The other posts can be added gradually as the development proceeds. It is assumed that the Legal Adviser will be available on a part-time basis from the very early stages to advise on legal implications of land acquisition, etc. (see Diagram 10.2). By the opening of the estate for industrial tenants, tentatively planned for year 3, the organisation structure should be approximately as indicated on Diagram 10.3. Expansion from this structure to that given on Diagram 10.1 will be phased to meet the development in extent of the estate.

TOTAL : 27

DIAGRAM 10.1
INDUSTRIAL ESTATE
ORGANIZATION STRUCTURE
1975

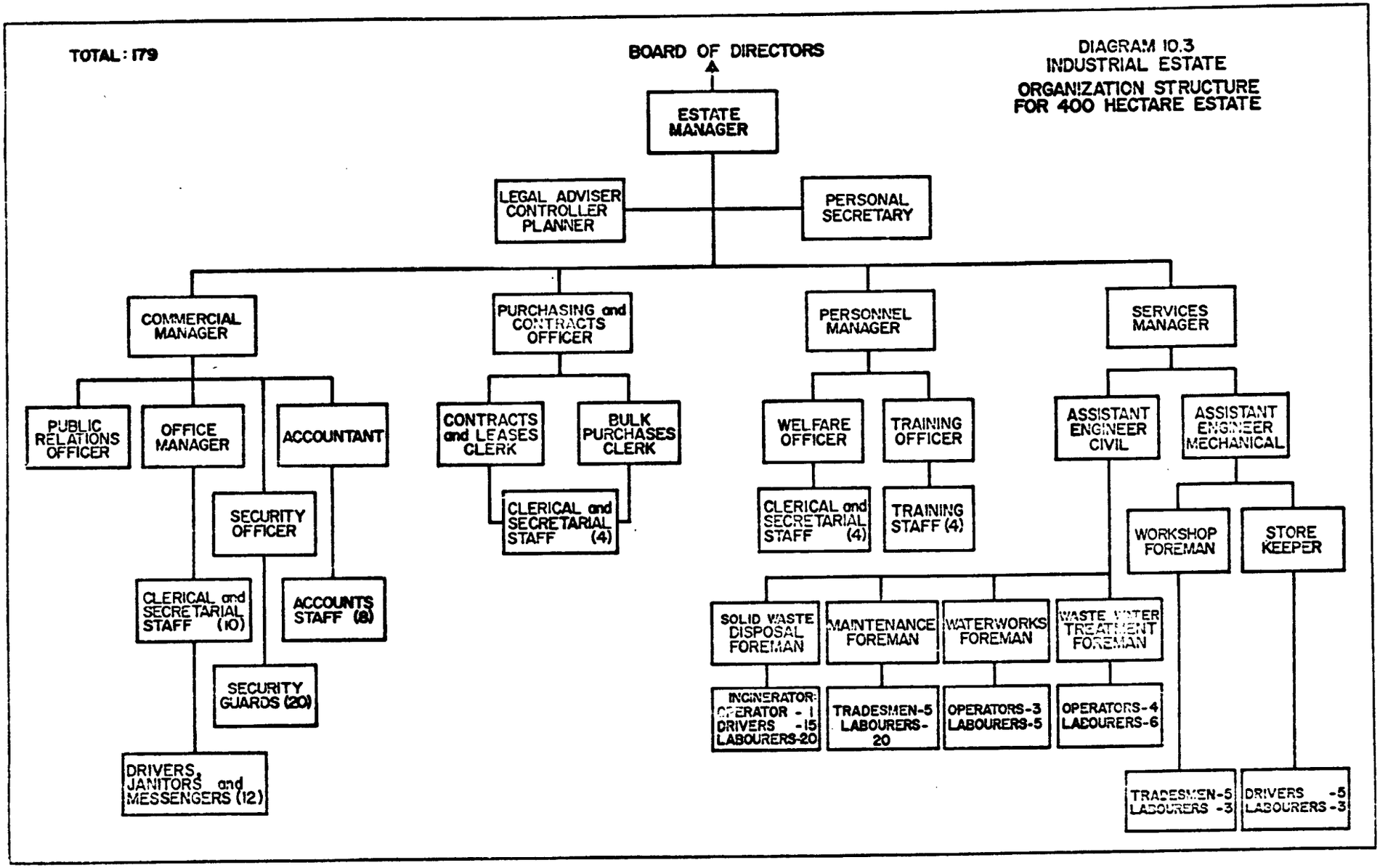



TOTAL : 118
BOARD OF DIRECTORS
DIAGRAM 10.2
INDUSTRIAL ESTATE
ORGANIZATION STRUCTURE
1980
ESTATE MANAGER
LEGAL ADVISER CONTROLLER PLANNER
PERSONAL SECRETARY
COMMERCIAL MANAGER
PURCHASING and CONTRACTS OFFICER
PERSONNEL MANAGER
SERVICES MANAGER
OFFICE MANAGER
ACCOUNTANT
CONTRACTS and LEASES CLERK
WELFARE OFFICER
ASSISTANT ENGINEER CIVIL
ASSISTANT ENGINEER MECHANICAL
PUBLIC RELATIONS OFFICER
SECURITY OFFICER
CLERICAL and SECRETARIAL STAFF (3)
CLERICAL and SECRETARIAL STAFF (3)
MAINTENANCE FOREMAN
WASTE WATER TREATMENT FOREMAN
WORKSHOP FOREMAN
CLERICAL and SECRETARIAL STAFF (6)
ACCOUNTS STAFF (5)
SOLID WASTE DISPOSAL FOREMAN
WATERWORKS FOREMAN
STORE KEEPER
SECURITY GUARDS (10)
TRADESMEN (3) LABOURERS (15)
OPERATORS (3) LABOURERS (5)
TRADESMEN (3) LABOURERS (2)
DRIVERS, JANITORS and MESSENGERS (8)
DRIVERS (10) LABOURERS (10)
OPERATORS (3) LABOURERS (4)
DRIVERS (3) LABOURER (1)

TOTAL : 179

BOARD OF DIRECTORS

DIAGRAM 10.3
INDUSTRIAL ESTATE
ORGANIZATION STRUCTURE
FOR 400 HECTARE ESTATE



11. CONCLUSIONS AND RECOMMENDATIONS

11.1 The Requirement for and Supply of Industrial Land

Population projections and the associated labour force and employment forecasts described in Chapter Two indicate that the requirements for industrial land within a 20 to 25 kilometre radius from the centre of Manila total between 500 and 750 hectares for each five year period from 1970 to 1985. Early in the study period the requirement will probably lie closer to the lower figure, but as time proceeds it will approach and perhaps even exceed the upper limit suggested.

The supply of land for future industrial use within the same boundary is severely constrained by the rapid division of the remaining areas of vacant land for residential development, the needs of the Armed Forces for large areas for accommodation and training and the need to preserve some open spaces for future parks, playing fields and institutional use.

The quantity of land available increases with distance from Manila, but existing or potential agricultural or residential use may offer more advantage to the national economy than the piecemeal industrial development so common in the past. Only seven potential industrial estate sites of adequate area were left after the initial screening for size and existing land use. The inference is clear that some early decisions about location and land acquisition procedures must be taken before the remaining sites are similarly broken up by uncontrolled development.

While this report concentrates on the selection of a single industrial estate site there will be strong demands for other such areas in the future. These demands will be reinforced by the success of the initial estate development.

11.2 The Functions of an Industrial Estate in the Study Area

The principal advantage of an industrial estate of the nature envisaged in this report is the establishment of small industrial enterprises which would otherwise be inhibited by the high pre-production costs and the lack of adequate capital.

The function of the industrial estate is to provide the potential entrepreneur with land and services fully developed so that he can concentrate on the problems specific to his own venture such as raw materials, the plant to be installed and the market for his goods. At the same time his capital needs are reduced since he can acquire land and services on an annual rental basis. The estate is also expected to attract those

enterprises which involve a relatively high risk until production reaches a certain level. Such ventures can be established with minimal capital investment in one of the standard factory units and move to a larger site when commercial viability has been proved. Many such plants will offer substantial benefits to associated industries already established and to the national economy.

The other function which can be performed by the industrial estate is to demonstrate to industry and to the community at large that pollution and other undesirable effects associated with industrialisation, including its social impact in developing countries, can be best controlled and countered on a well-managed estate where such matters are the specific responsibility of an Authority other than the plant or enterprise creating the problem.

11.3 The Availability of Sites Suitable for Industrial Estates

This study has identified seven possible sites for industrial estates and has ranked four of them in relation to one another (Chapter Six of this report).

Two of the four sites, namely those at Paranaque and Marikina are clearly suitable for industrial estate development. The other two require additional foundation investigations before a firm answer can be given.

The detailed financial analysis of the Paranaque site indicates that approximately 400 hectares of saleable lots can be developed there at a cost of about 20 - 25 pesos per square metre. The only element of this cost likely to vary substantially is the initial cost of raw or undeveloped land.

Since the selling price of developed land varies from 50 pesos per square metre to 100 pesos per square metre, depending on location and demand it is clear that the raw land price could be appreciably higher without prejudicing the commercial viability of the project. Any increase in this price would probably be reflected in the price of undeveloped land at the other sites since it would be due to an increase in the demand for land. It would therefore not affect the ranking of the sites in the evaluation.

A substantial increase in raw land prices might improve the competitive position of the reclamation site at Muntinglupa but the problems of filling, settlement and possible pollution at this site keep it low on the priority list.

Other sites can probably be found, particularly in the north, with development costs not dissimilar to those associated with Paranaque and Marikina. For the reasons stated in Chapter Six, however, the two sites heading the evaluation are considered the best currently available. Investigation of further sites should follow concurrently with the development of the first estate so that the planned industrial development can continue on a controlled basis.

11.4 Management and Development of the Industrial Estate

The management, development, operation and maintenance of an industrial estate comprise a major commercial task. The establishment of an independent corporate body to carry out this task, as suggested in Chapter Ten, would allow its executives to concentrate on the performance of this one task. It would also permit the use of the best commercial management techniques guided by the profit motive which has been proved in most countries to be the strongest driving force towards efficient management.

The tax advantages available to LLDA and the advantages to be gained from its already established organisation make it an attractive parent body. The future benefits to be gained from active participation in the management of the estate by industrial tenants make the private or public company the most attractive long term choice for the type of organisation to manage the estate.

11.5 Recommendations

After consideration of all the factors described in this report the study team recommends that:

11.5.1 An industrial estate of initial size about 100 hectares should be established as soon as possible to encourage the development of small and medium sized industries in the Greater Manila area. Provision should be made for the subsequent expansion of the estate to a total area of 450 hectares. The timing of development of the extension phases should be matched to the demand for additional sites on the estate.

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11.5.2 Land for the development of the estate should be acquired in the area south of Manila International Airport, lying between Manila Bay to the west and Laguna Lake to the east. In order to avoid pollution problems the site should be located on the seaward side of the ridge dividing Laguna Lake from the sea. The major attractions of the recommended site are:

- its position relative to the South Super Highway, the Manila International Airport and the creeks flowing into Manila Bay;
- the excellent foundation conditions which render the tasks of foundation and infrastructure design relatively simple and quick when compared with other sites investigated;
- the elimination of the risk of polluting the water of Laguna Lake for which water quality studies are already well advanced;
- the lower unit cost of undeveloped land when compared to sites north and east of Manila.

The estimated cost of acquiring and developing the initial 100 hectare estate is 43 million pesos. The foreign exchange content is estimated to be $US 4 millions. The gross internal rate of return of the project over a twenty year period from the date of first investment is 19.5% (Table 7.9).

11.5.3 A private company should be established to develop, manage and maintain the industrial estate. The company should initially be a wholly owned subsidiary of the Laguna Lake Development Authority. When the estate has been established on a sound financial basis and the financial benefits associated with LLDA ownership have been exhausted (five years after commencement) representatives of industrial tenants should be invited to participate in both the ownership and the top level management of the estate. Still later in the life of the company it may prove desirable to convert the company to a public company so that individual members of the public may share its ownership and benefits. The recommended organisation structure for the management of the estate is set out on Diagrams 10.1 to 10.3 at the end of Chapter Ten of this report.

11.5.4 The physical detailed planning of the estate layout and the civil engineering design of the infrastructure and buildings should be carried out by a firm of Philippines consultants with experience of local conditions, skills and materials. In order to commission the estate at the earliest possible date immediate steps should be taken to establish Terms of Reference for this task and to provide a short list of acceptable firms.

11.5.5 In order to coordinate the work of the Philippines consultants on physical planning and design with the concurrent tasks of planning the staffing, management and control of the project, it is recommended that Phase II of the original Terms of Reference with the prime consultants be implemented, subject to the necessary adjustments to work content and costs to meet current requirements. This procedure will save some six months in elapsed time to the availability of the first industrial sites on the estate.

11.6 Acknowledgements

The study team wish to record their appreciation of the cooperation and help received from Mr. Vicente Lavides Jnr., General Manager of the Laguna Lake Development Authority and from all those members of his staff with whom the team worked.

In particular they wish to thank Mr. Benito Estachio and his LLDA Study Team for their wholehearted support and willing approach to a complex and sometimes arduous task of data collection and analysis.

The completion of the consultants' task within time and budget limits was greatly aided by Mr. Robert Gedney, the UNDP Adviser to LLDA and Mr. William Jones, Senior Industrial Development Field Adviser (UNIDO) in Manila. To them both and to the United Nations Development Programme Resident Representative and his staff the team is most grateful.

Finally, the study team wishes to thank Dr. Benitez and his Task Force staff and all the representatives of Government, industry and commerce who willingly provided the data upon which this report is based. The task was both interesting and challenging and the team appreciated the opportunity to work in the Philippines in close liaison with the groups mentioned above.

It is hoped that the study results, expressed in this report, will prove helpful in promoting further industrial development in the Philippines.

APPENDIX A

THE STUDY AREA, THE STUDY TEAM AND THE METHOD OF APPROACH

A1. The Study Area

The study area was designed to cover the 50 kilometre radius circle centred on Manila, being the area of interest to the Metropolitan Manila group of the Commission on Zoning and Human Settlement. In order to make optimum use of existing data the zone boundaries wherever possible follow provincial or municipal boundaries. Some areas outside the 50 kilometre radius circle were included to avoid the need to disaggregate provincial statistics.

The study area is indicated on Figure 1.1. in Chapter 1 of this report.

The principal cities and municipalities included in each zone are listed below:

STUDY AREA

Zone 1

Manila

Zone 2

Valenzuela	-	Bulacan
Meycauayan	-	Bulacan
Malabon	-	Rizal
Caloocan City	-	Rizal
Navotas	-	Rizal
Obando	-	Bulacan
Marilao	-	Bulacan

Zone 3

Quezon City	-	Rizal

Zone 4

Marikina	-	Rizal
San Juan	-	Rizal
Mandaluyong	-	Rizal
Pasig	-	Rizal

Zone 5

Pateros	-	Rizal
Pasay City	-	Rizal
Taguig	-	Rizal
Makati	-	Rizal
Las Pinas	-	Rizal
Paranaque	-	Rizal

Zone 6

Rest of Bulacan Province
Pampanga Province

Zone 7

Montalban	-	Rizal
San Mateo	-	Rizal
San Jose	-	Bulacan

Zone 8

Rest of Rizal Province

Zone 9

Rest of Laguna Province

Zone 10

Muntinglupa	-	Rizal
Carmona	-	Cavite
San Pedo	-	Laguna
Binan	-	Laguna
Sta. Rosa	-	Laguna
Cabuyao	-	Laguna
Calamba	-	Laguna

Zone 11

Bataan Province

Zone 12

Bacoor	-	Cavite
Imus	-	Cavite
Kawit	-	Cavite
Cavite City	-	Cavite
Noveleta	-	Cavite
Rosario	-	Cavite
Dasmarinas	-	Cavite

Zone 13

Rest of Cavite Province

A2. The Study Team

The consultants study team comprised the following individuals -

K. A. McKechnie — Engineer/Economist, Project Leader
(W. D. Scott and Company)

J. B. Donovan — Regional Economist
(W. D. Scott and Company)

T. W. Allen — Industrial Economist
(W. D. Scott and Company)

E. Schepers — Civil Engineer
(W. D. Scott and Company)

G. Spencer — Soils Engineer
(Coffey and Hollingsworth)

The initial visit in November/December 1973 was made by Messrs. McKechnie and Allen, who reviewed the work done by the LLDA team under the leadership of Mr. Benito Estachio Jnr. and structured the work to be carried out by 31 January by the combined consultants/ LLDA team.

The second visit to Manila in January/February 1974 was made by Messrs. McKechnie, Donovan, Schepers and Spencer, with a brief visit by Mr. Allen early in the period.

A3. The Method of Approach

The programme of future work agreed with the LLDA team during the first visit to Manila is set out in diagrams A1, A2, A3 and A4 following this sub-section. In practice some of the intermediate steps proved redundant or impractical because of lack of data, but the general programme remained unaltered.

The major change in emphasis arose from the detailed study of four sites and the failure of the West Laguna reclamation site to match the advantages of some alternatives. Shortage of time prevented the full exploration of some of the steps on the diagram but in every case sufficient time was allocated to ensure that no significant effects were overlooked.

The study concentrated on -

- establishing the requirements for additional industrial land in the Greater Manila Area
- defining the industries most suitable for estate location
- establishing the resource and infrastructure needs for typical industry mixes
- ranking the available sites in respect of physical characteristics, accessibility and cost of development, and
- making recommendations for the acquisition, development, management and control of a financially viable and economically desirable industrial estate.

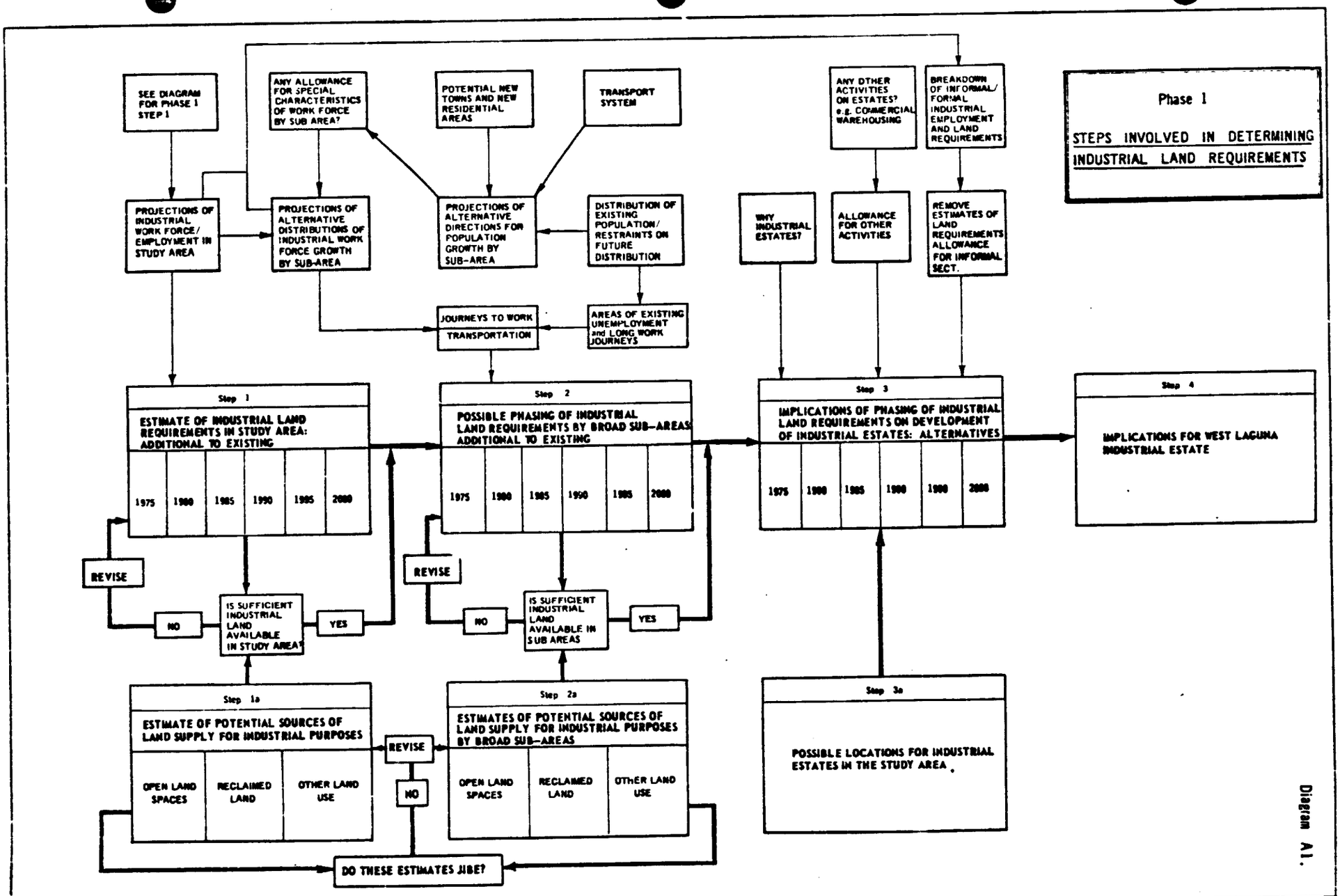
SEE DIAGRAM FOR PHASE 1 STEP 1
ANY ALLOWANCE FOR SPECIAL CHARACTERISTICS OF WORK FORCE BY SUB AREA?
POTENTIAL NEW TOWNS AND NEW RESIDENTIAL AREAS
TRANSPORT SYSTEM
ANY OTHER ACTIVITIES ON ESTATES? e.g. COMMERCIAL WAREHOUSING
BREAKDOWN OF INFORMAL/ FORMAL INDUSTRIAL EMPLOYMENT AND LAND REQUIREMENTS
Phase 1
STEPS INVOLVED IN DETERMINING INDUSTRIAL LAND REQUIREMENTS
PROJECTIONS OF INDUSTRIAL WORK FORCE/ EMPLOYMENT IN STUDY AREA
PROJECTIONS OF ALTERNATIVE DISTRIBUTIONS OF INDUSTRIAL WORK FORCE GROWTH BY SUB-AREA
PROJECTIONS OF ALTERNATIVE DIRECTIONS FOR POPULATION GROWTH BY SUB-AREA
DISTRIBUTION OF EXISTING POPULATION/ RESTRAINTS ON FUTURE DISTRIBUTION
WHY INDUSTRIAL ESTATES?
ALLOWANCE FOR OTHER ACTIVITIES
REMOVE ESTIMATES OF LAND REQUIREMENTS ALLOWANCE FOR INFORMAL SECT.
JOURNEYS TO WORK
TRANSPORTATION
AREAS OF EXISTING UNEMPLOYMENT and LONG WORK JOURNEYS
Step 1
ESTIMATE OF INDUSTRIAL LAND REQUIREMENTS IN STUDY AREA: ADDITIONAL TO EXISTING
1975 1980 1985 1990 1995 2000
Step 2
POSSIBLE PHASING OF INDUSTRIAL LAND REQUIREMENTS BY BROAD SUB-AREAS ADDITIONAL TO EXISTING
1975 1980 1985 1990 1995 2000
Step 3
IMPLICATIONS OF PHASING OF INDUSTRIAL LAND REQUIREMENTS ON DEVELOPMENT OF INDUSTRIAL ESTATES: ALTERNATIVES
1975 1980 1985 1990 1995 2000
Step 4
IMPLICATIONS FOR WEST LAGUNA INDUSTRIAL ESTATE
REVISE
NO
IS SUFFICIENT INDUSTRIAL LAND AVAILABLE IN STUDY AREA?
YES
REVISE
NO
IS SUFFICIENT INDUSTRIAL LAND AVAILABLE IN SUB AREAS
YES
Step 1a
ESTIMATE OF POTENTIAL SOURCES OF LAND SUPPLY FOR INDUSTRIAL PURPOSES
OPEN LAND SPACES
RECLAIMED LAND
OTHER LAND USE
REVISE
NO
Step 2a
ESTIMATES OF POTENTIAL SOURCES OF LAND SUPPLY FOR INDUSTRIAL PURPOSES BY BROAD SUB-AREAS
OPEN LAND SPACES
RECLAIMED LAND
OTHER LAND USE
Step 3a
POSSIBLE LOCATIONS FOR INDUSTRIAL ESTATES IN THE STUDY AREA
DO THESE ESTIMATES JIBE?

Diagram A1.

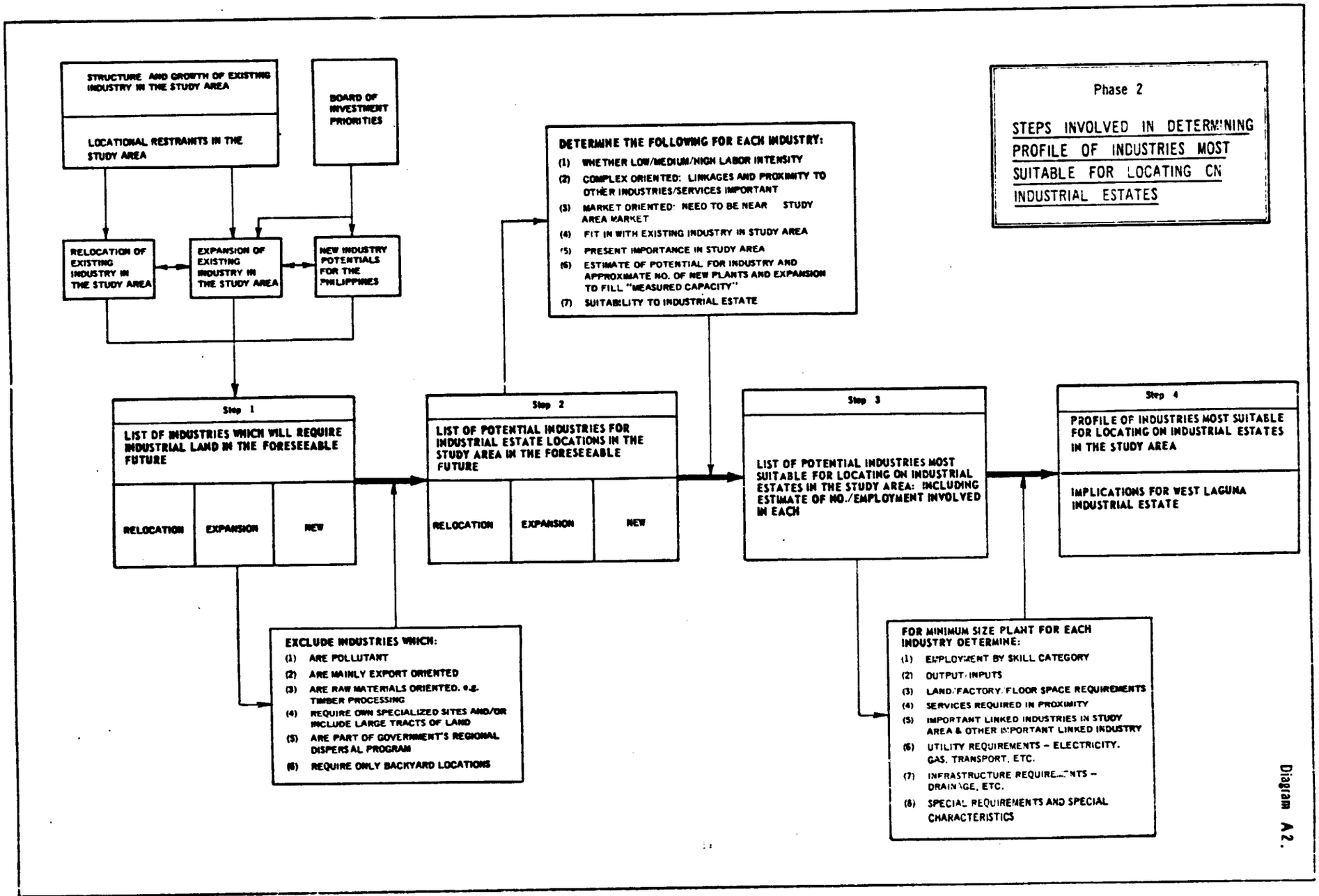
STRUCTURE AND GROWTH OF EXISTING INDUSTRY IN THE STUDY AREA
LOCATIONAL RESTRAINTS IN THE STUDY AREA
BOARD OF INVESTMENT PRIORITIES
RELOCATION OF EXISTING INDUSTRY IN THE STUDY AREA
EXPANSION OF EXISTING INDUSTRY IN THE STUDY AREA
NEW INDUSTRY POTENTIALS FOR THE PHILIPPINES
Phase 2
STEPS INVOLVED IN DETERMINING PROFILE OF INDUSTRIES MOST SUITABLE FOR LOCATING ON INDUSTRIAL ESTATES
DETERMINE THE FOLLOWING FOR EACH INDUSTRY:
(1) WHETHER LOW/MEDIUM/HIGH LABOR INTENSITY
(2) COMPLEX ORIENTED: LINKAGES AND PROXIMITY TO OTHER INDUSTRIES/SERVICES IMPORTANT
(3) MARKET ORIENTED: NEED TO BE NEAR STUDY AREA MARKET
(4) FIT IN WITH EXISTING INDUSTRY IN STUDY AREA
(5) PRESENT IMPORTANCE IN STUDY AREA
(6) ESTIMATE OF POTENTIAL FOR INDUSTRY AND APPROXIMATE NO. OF NEW PLANTS AND EXPANSION TO FILL "MEASURED CAPACITY"
(7) SUITABILITY TO INDUSTRIAL ESTATE
Step 1
LIST OF INDUSTRIES WHICH WILL REQUIRE INDUSTRIAL LAND IN THE FORESEEABLE FUTURE
RELOCATION
EXPANSION
NEW
Step 2
LIST OF POTENTIAL INDUSTRIES FOR INDUSTRIAL ESTATE LOCATIONS IN THE STUDY AREA IN THE FORESEEABLE FUTURE
RELOCATION
EXPANSION
NEW
Step 3
LIST OF POTENTIAL INDUSTRIES MOST SUITABLE FOR LOCATING ON INDUSTRIAL ESTATES IN THE STUDY AREA: INCLUDING ESTIMATE OF NO./EMPLOYMENT INVOLVED IN EACH
Step 4
PROFILE OF INDUSTRIES MOST SUITABLE FOR LOCATING ON INDUSTRIAL ESTATES IN THE STUDY AREA
IMPLICATIONS FOR WEST LAGUNA INDUSTRIAL ESTATE
EXCLUDE INDUSTRIES WHICH:
(1) ARE POLLUTANT
(2) ARE MAINLY EXPORT ORIENTED
(3) ARE RAW MATERIALS ORIENTED. e.g. TIMBER PROCESSING
(4) REQUIRE OWN SPECIALIZED SITES AND/OR INCLUDE LARGE TRACTS OF LAND
(5) ARE PART OF GOVERNMENT'S REGIONAL DISPERSAL PROGRAM
(6) REQUIRE ONLY BACKYARD LOCATIONS
FOR MINIMUM SIZE PLANT FOR EACH INDUSTRY DETERMINE:
(1) EMPLOYMENT BY SKILL CATEGORY
(2) OUTPUT/INPUTS
(3) LAND/FACTORY FLOOR SPACE REQUIREMENTS
(4) SERVICES REQUIRED IN PROXIMITY
(5) IMPORTANT LINKED INDUSTRIES IN STUDY AREA & OTHER IMPORTANT LINKED INDUSTRY
(6) UTILITY REQUIREMENTS – ELECTRICITY, GAS, TRANSPORT, ETC.
(7) INFRASTRUCTURE REQUIREMENTS – DRAINAGE, ETC.
(8) SPECIAL REQUIREMENTS AND SPECIAL CHARACTERISTICS

Diagram A2.

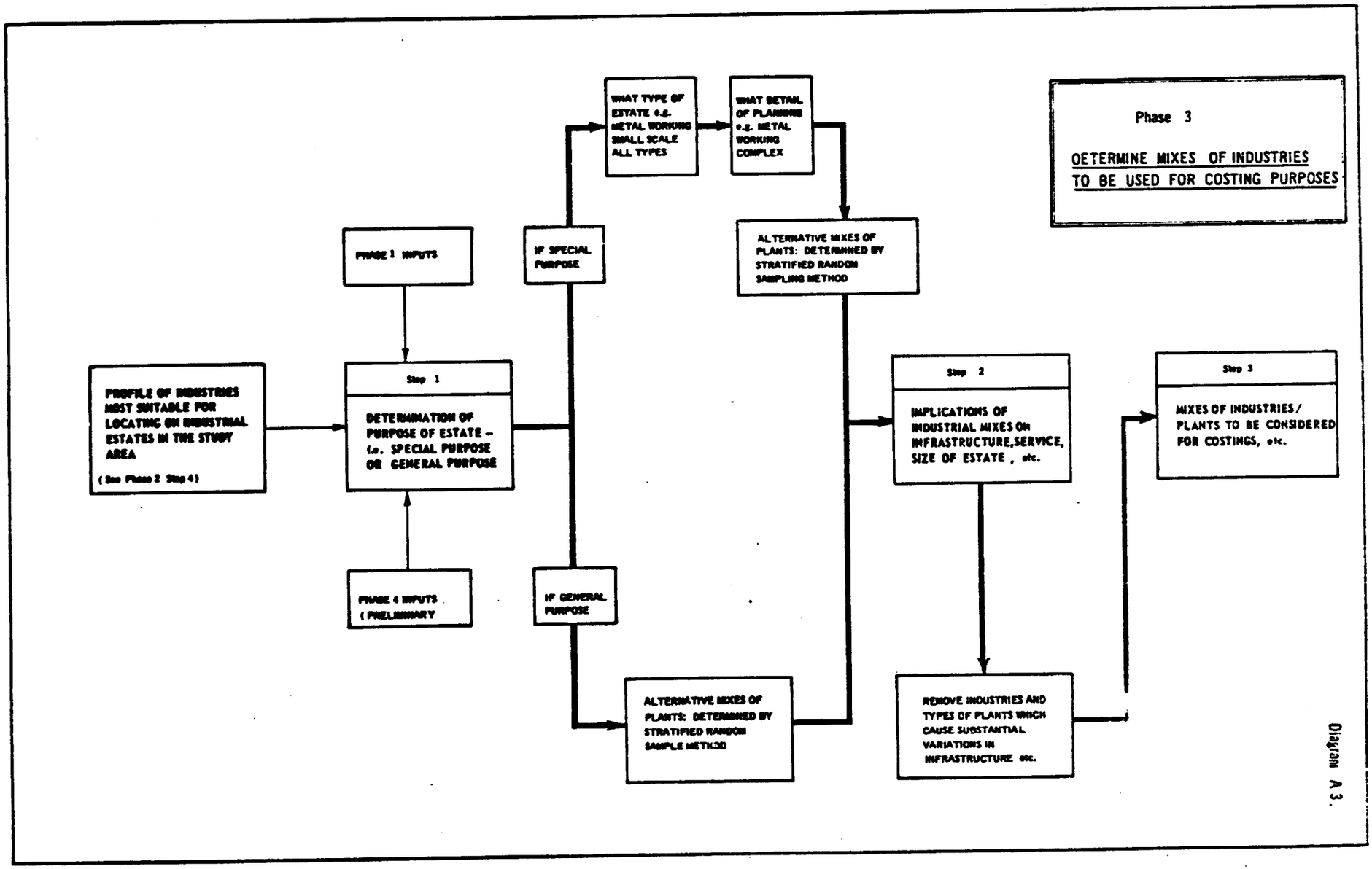
Phase 3
OETERMINE MIXES OF INDUSTRIES TO BE USED FOR COSTING PURPOSES
PROFILE OF INDUSTRIES MOST SUITABLE FOR LOCATING ON INDUSTRIAL ESTATES IN THE STUDY AREA
(See Phase 2 Step 4)
PHASE 1 INPUTS
PHASE 4 INPUTS (PRELIMINARY
Step 1
DETERMINATION OF PURPOSE OF ESTATE – (a. SPECIAL PURPOSE OR GENERAL PURPOSE
IF SPECIAL PURPOSE
IF GENERAL PURPOSE
WHAT TYPE OF ESTATE e.g. METAL WORKING SMALL SCALE ALL TYPES
WHAT DETAIL OF PLANNING e.g. METAL WORKING COMPLEX
ALTERNATIVE MIXES OF PLANTS: DETERMINED BY STRATIFIED RANDOM SAMPLING METHOD
ALTERNATIVE MIXES OF PLANTS: DETERMINED BY STRATIFIED RANDOM SAMPLE METHOD
Step 2
IMPLICATIONS OF INDUSTRIAL MIXES ON INFRASTRUCTURE, SERVICE, SIZE OF ESTATE , etc.
REMOVE INDUSTRIES AND TYPES OF PLANTS WHICH CAUSE SUBSTANTIAL VARIATIONS IN INFRASTRUCTURE etc.
Step 3
MIXES OF INDUSTRIES/ PLANTS TO BE CONSIDERED FOR COSTINGS, etc.

Diagram A 3.

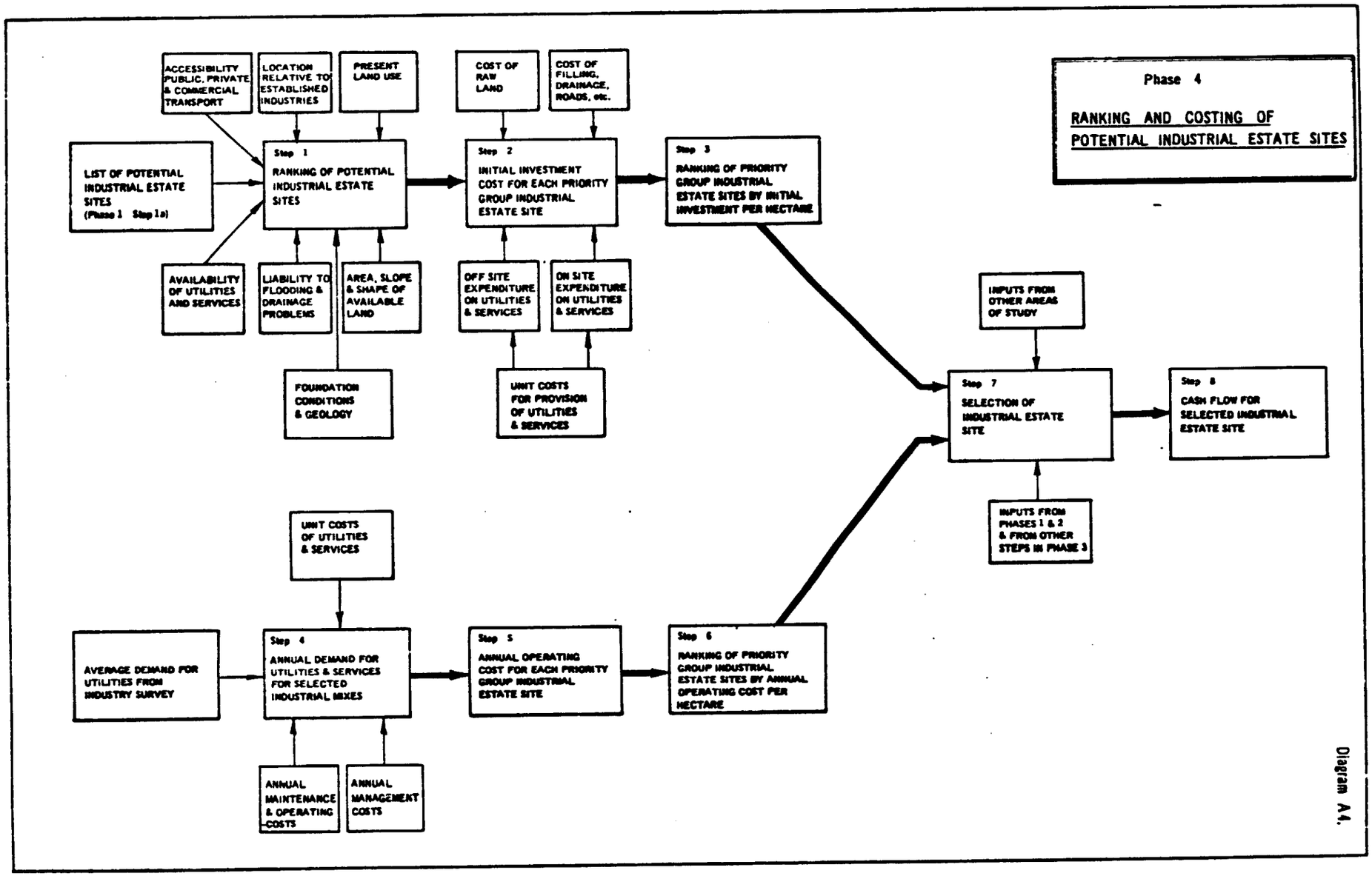
Phase 4
RANKING AND COSTING OF POTENTIAL INDUSTRIAL ESTATE SITES
ACCESSIBILITY PUBLIC, PRIVATE & COMMERCIAL TRANSPORT
LOCATION RELATIVE TO ESTABLISHED INDUSTRIES
PRESENT LAND USE
COST OF RAW LAND
COST OF FILLING, DRAINAGE, ROADS, etc.
LIST OF POTENTIAL INDUSTRIAL ESTATE SITES (Phase 1 Step 1a)
Step 1
RANKING OF POTENTIAL INDUSTRIAL ESTATE SITES
Step 2
INITIAL INVESTMENT COST FOR EACH PRIORITY GROUP INDUSTRIAL ESTATE SITE
Step 3
RANKING OF PRIORITY GROUP INDUSTRIAL ESTATE SITES BY INITIAL INVESTMENT PER HECTARE
AVAILABILITY OF UTILITIES AND SERVICES
LIABILITY TO FLOODING & DRAINAGE PROBLEMS
AREA, SLOPE & SHAPE OF AVAILABLE LAND
OFF SITE EXPENDITURE ON UTILITIES & SERVICES
ON SITE EXPENDITURE ON UTILITIES & SERVICES
FOUNDATION CONDITIONS & GEOLOGY
UNIT COSTS FOR PROVISION OF UTILITIES & SERVICES
INPUTS FROM OTHER AREAS OF STUDY
Step 7
SELECTION OF INDUSTRIAL ESTATE SITE
Step 8
CASH FLOW FOR SELECTED INDUSTRIAL ESTATE SITE
INPUTS FROM PHASES 1 & 2 & FROM OTHER STEPS IN PHASE 3
UNIT COSTS OF UTILITIES & SERVICES
AVERAGE DEMAND FOR UTILITIES FROM INDUSTRY SURVEY
Step 4
ANNUAL DEMAND FOR UTILITIES & SERVICES FOR SELECTED INDUSTRIAL MIXES
Step 5
ANNUAL OPERATING COST FOR EACH PRIORITY GROUP INDUSTRIAL ESTATE SITE
Step 6
RANKING OF PRIORITY GROUP INDUSTRIAL ESTATE SITES BY ANNUAL OPERATING COST PER HECTARE
ANNUAL MAINTENANCE & OPERATING COSTS
ANNUAL MANAGEMENT COSTS

Diagram A4.

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APPENDIX B

INDUSTRIAL SURVEY

The industrial survey was undertaken with the objective of determining the requirements of industries for relocation on an adequate site. The frame of the survey included manufacturing firms located within the Greater Manila area* considered to be presently occupying sites not suitable for future plant expansion and likewise environmentally compatible with the proposed industrial estate area. These firms were stratified according to the manufacturing industry type of each as based on the Bureau of Census and Statistics standard classification for the manufacturing industry.

From the original eighteen manufacturing strata of the Bureau of Census and Statistics, only ten were finally considered for the survey after each type was screened to suit the above objectives and definitions. They were beverages, tobacco, textiles, apparel, lumber, furniture and fixtures, metal machinery except electrical, electrical machinery and transport.

The portions of Greater Manila which were covered were Manila, Quezon City, Makati, San Juan, Caloocan City, Marikina, Mandaluyong, Paranaque, Pasay, Pasig, Malabon, Muntinglupa, Taytay, and Las Pinas. A total of 671 firms were listed and from these 200 samples or 30% were surveyed. Stratified random sampling with proportional allocation was used. The following table shows the original population sizes, sample sizes, and actual number of respondents for each stratum.

Stratum	Population	Samples	Actual No. of Respondents**
Beverage	22	7	10
Tobacco	22	7	7
Textiles	32	10	10
Apparel	112	34	22
Lumber	22	7	6
Furniture and Fixtures	102	30	10
Metals	169	51	22
Non-electric Machinery	41	12	9
Electrical	88	24	18
Transport	61	18	7
	671	200	121

A pre-test was run for two weeks (July 1 - 15) to check the validity of the questions. After a review of the responses, a revised questionnaire was made. The survey proper started July 16 and ended October 31 with 2 teams of two researchers sent out to distribute the questionnaires. Completed questionnaires were either returned by mail or were followed up personally by the teams. An average of 3 phone calls and 4 visits were made for each firm. However, about 20% of the firms were prompt. in responding and immediately sent back the questionnaires through the mail or called back for pick-up.

Problems encountered were the lack of co-operation or interest among the firms, firms with wrong addresses, defunct firms and those who had relocated. The first problem was resolved through persuasion and constant follow-up. The rest of the problems were solved by updating the list as the survey went along. After three months the survey ended with a total of 121 accomplished questionnaires or a return of 61 percent. The industry data from the survey were then coded and tabulated for interpretation and analysis.

A copy of the questionnaire form is included in this Appendix, followed by the summary tables prepared by the LLDA team.

* Greater Manila area as defined by DPWTC-UP studies includes 23 municipalities and cities in Rizal, 5 municipalities in Bulacan, 5 municipalities in Laguna and 4 cities and municipalities in Cavite.

** The latest available list of existing industries was a 1967 listing by the Bureau of Census and Statistics. This list had to be updated causing an increase in the size of some strata as in beverages and a decrease in the others as in metals and electrical machinery. Consequently a corresponding change in allocation of samples was done in the duration of the survey.

WDS

If there are other locational factors than those mentioned above which you consider to be important, please specify:

_____
_____
_____
_____
_____

13. Considering the extent of urban agglomeration in the Manila Area, what distance from the City of Manila (consider Rizal's monument in Lunata as point of origin) would you consider to be ideal for industrial location: (Check)

A. Desired Radius:

( ) 5 kilometers or less
( ) 6 - 10
( ) 11 - 15
( ) 16 - 20
( ) 21 - 30
( ) 31 and above

B. Location:

( ) North of Manila
( ) East of Manila
( ) South of Manila

14. Nature of Industrial Operations:

_____
_____
_____
_____

15. Communication Facilities Required: (Check)

( ) Telephone
( ) Telex
( ) Post Office
( ) Others: (specify)

_____
_____
_____
_____

16. Volume of Water Used for Industrial Operations:
(Cubic meters per day)

A. Cooling _____
B. Processing _____

WDS

17. Daily Power Requirement:

A.

Length of Daily Operations	No. of Kilowatts

B. Maximum or Peak Load in Kilowatts: _____
Duration: _____
Daily Occurrence: _____

18. Quality and Treatment of Effluents:

A. Industrial wastes

1. Have the industrial wastes been analysed?
( ) Yes (Please attach analysis)
( ) No

If not, where can samples be obtained? _____
_____

2. Is there any treatment of wastes?
( ) Yes (Please attach analysis of effluents after treatment)
( ) No

B. What is the cooling water temperature at outlet? _____
State treatment, if any.

_____
_____
_____

C. Is there any treatment of domestic waste?
( ) Yes
( ) No
If yes, please describe briefly:

_____
_____
_____
_____

WDS

19. Sewerage and Waste Data

	Volume	Point of Discharge
A. Liquid Waste 1. Industrial waste		
2. Domestic		
B. Total Solid Waste		

20. Additional Comments:

Please specify if there are any special requirements or desires of the industry with respect to facilities or siting.

Note:

Please include name, address and telephone number of a responsible official who could be contacted if any questions arise regarding the report.

WDS

TABLE B.1

OFFICE LOCATION BY INDUSTRY GROUP

Number of Respondents

Location Description	INDUSTRY GROUP											
	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Manila	7	2	2	5	4	4	6	3	2	2	13	37
Quezon City		1	2	4	1	3	8	2	2	1	13	24
Makati	2	1	1		1	2	3	2	1	1	7	14
San Juan							1		1		2	2
Caloocan City		1		5		1	2		2	3	7	14
Mandaluyong		1	1	4			1	1	6		8	14
Paranaque				1					3		3	4
Pasay City		1	1				1		1		2	4
Pasig			3	3				1			1	1
Malabon	1											1
No applicable response	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	10	7	10	22	6	10	22	9	18	7	56	121

Source: Q 2, 4

Note: Source refers to question reference on original survey questionnaire

TABLE B.2

PLANT LOCATION BY INDUSTRY GROUP

Number of Respondents

Location Description	INDUSTRY GROUP											
	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Quezon City		1	3	4	1	3	10	2	2	2	16	28
Makati	1				1	1	1	2			3	6
Manila	6	3		4	4	3	4	2	1		7	27
Mandaluyong		1	1	4			2	2	6		10	16
Taytay						1			1		1	2
Muntinglupa	1											1
San Juan	1								1		1	2
Caloocan		1		5		1	2		2	3	7	14
Pasay		1	1				1				1	3
Marikina				1					1		1	2
Pasig			4	3		1	2	1	1		4	12
Paranaque				1					3		3	4
Malabon	1											1
Bulacan										1	1	1
Las Pinas										1	1	1
No applicable response	0	0	1	0	0	0	0	0	0	0	0	1
TOTAL	10	7	9	22	6	10	22	9	18	7	56	121

Source: Q 3, 4

WDS

TABLE B.3

TYPE OF OCCUPANCY OF PLANT SITE BY INDUSTRY GROUP

Number of Respondents

Type of Occupancy	INDUSTRY GROUP											
	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Owned	6	3	8	14	5	3	14	7	11	6	38	77
Rented	4	4	2	8	1	6	7	2	6		15	40
Owned & Rented							1		1		2	2
No applicable response						1				1	1	2
TOTAL	10	7	10	22	6	10	22	9	18	7	56	121

Source: Q 3, 4

WD8

TABLE B.4

TOTAL LAND AREA, LAND IN USE AND PERCENTAGE LAND IN USE BY INDUSTRY GROUP

Hectares

Land Area Occupied	Beverage	Tobacco	Textile	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Total Land Area	11.1	6.8	35.4	11.0	5.9	11.1	39.1	4.5	12.7	2.1	58.5	139.9
Land In Use	9.6	6.5	15.6	9.8	3.4	2.4	25.5	3.6	9.0	1.8	39.8	87.2
Percentage land in use to total land area	86.5	95.2	44.0	88.8	57.6	21.9	65.1	78.9	70.8	83.5	68.1	62.3

Note: Data represents firms with complete breakdown of land area

Source: Q 3,4

Total Land Area	1.2		.14	2.4	3.0	.1	1.6		39.4	.13	41.1	47.9

Note: Data represents firms with incomplete breakdown

Source: Q 3,4

WDS

TABLE B.5

LOCATION OF MAJOR MARKETS BY INDUSTRY GROUP

Number of Respondents

Location Description	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
	INDUSTRY GROUP											
Luzon and Metro Manila	3	6	7	8	6	8	14	1	8	5	28	66
Rest of the Philippines	6	1	3	6			3	7	8	1	19	35
No applicable response	1			8		2	5	1	2	1	9	20
TOTAL	10	7	10	22	6	10	22	9	18	7	56	121
Abroad	1	2	7	11	4	3	2	4	5	0	11	39

Source: Q 5,4

TABLE B.6

TOTAL LABOUR FORCE AND AVERAGE LABOUR FORCE BY INDUSTRY GROUP

Employees

Labour Force	INDUSTRY GROUP											
	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Total Labour Force	3266	2160	3652	11265	626	933	5632	471	5799	530	12482	34384
No. of respondents	9	7	6	18	5	9	21	5	15	7	48	102
Average Labour Force	363	309	609	626	125	104	271	94	387	76	260	337

Source: Q 4, 7

WDS

TABLE B.7

SOURCE OF RAW MATERIALS BY INDUSTRY GROUP

Number of Respondents

Location Description	INDUSTRY GROUP											
	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Luzon and Metro Manila	6	6	4	13	6	6	15	6	12	3	36	77
Rest of the Philippines	2	1		3		4	3		2		5	15
No applicable response	2		6	6			4	3	4	4	15	29
TOTAL	10	7	10	22	6	10	22	9	18	7	56	121
Abroad	6	3	8	17	1	2	10	2	11	4	27	64

Source: Q 8,4

WDS

TABLE B.8

SHIPPING CHARACTERISTICS OF RAW MATERIALS BY INDUSTRY GROUP

Number of Respondents

Shipping Characteristic	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
	INDUSTRY GROUP											
Bulk	1	4		4	3	2	5	1	1	1	8	22
Package	2	1	4	11	2	1	10	3	6	5	24	45
Containerised	2		2				2				2	6
Bulk and Package	4	1		2		2		3	3	1	7	16
Package and containerised	1		2	3		1			2		2	9
Bulk, package and containerised			2	1					3		3	6
No applicable response		1		1	1	4	5	2	3		10	17
TOTAL	10	7	10	22	6	10	22	9	18	7	56	121

Source: Q 4, 9

WDS

TABLE B.9

FACILITIES INADEQUATE AT PRESENT LOCATION BY INDUSTRY GROUP

Number of Respondents

	INDUSTRY GROUP											
Facilities	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Parking	6		2	11	2	5	7	4	5	3	19	45
Storage Area	4	2	2	7	3	3	7	2	6	3	18	39
Security			2	1	1	1	3	1		1	5	10
Water Supply	1	3	5	4		1	7	3	3	3	16	30
Sewerage	2	1	3	2	1	2	4	1		1	6	17
Power			2	2	1			2	1		3	8
Communication	1	1	3	3		3	1	4	4	2	11	22
Access	2		1				1		4		5	8
Others							3	1	1		5	5
No. of Respondents	10	7	10	22	6	10	22	9	18	7	56	121

WDS

TABLE B.10

POTENTIAL FOR SITE EXPANSION WITHIN NEXT FIVE YEARS BY INDUSTRY GROUP

Number of Respondents

	INDUSTRY GROUP											
Response	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Yes	2	2	9	11	3	8	6	3	12	5	26	61
No	7	4		9	3	2	11	6	5	1	23	48
No response	1	1	1	2			5		1	1	7	12
TOTAL	10	7	10	22	6	10	22	9	18	7	56	121

Source: Q 4,11

TABLE B.11

POTENTIAL FOR SITE EXPANSION WITHIN NEXT TEN YEARS BY INDUSTRY GROUP

Number of Respondents

Yes	1	1	2	9	1	4	7	3	8	3	21	39
No	7	1	4	6	2	4	12	6	4	2	24	48
No response	2	5	4	7	3	2	3		6	2	11	34
TOTAL	10	7	10	22	6	10	22	9	18	7	56	121

Source: Q 4,11

WDS

TABLE B.12

PREFERRED LOCATION FOR EXPANSION BY INDUSTRY GROUP

Number of Respondents

Location Description	INDUSTRY GROUP											
	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Within Manila	2	1		3				1	2		3	9
North of Manila				1			3		2	1	6	7
South of Manila	1	1	1	3	2		4	4	2		10	18
East of Manila				2		1					0	3
Outside Manila	1	1	1		1	1					0	5
Same Location		1	1	1					1	2	3	6
No applicable response	6	3	7	12	3	8	15	4	11	4	34	73
TOTAL	10	7	10	22	6	10	22	9	18	7	56	121

Source: Q 4, 11

TABLE B.13

LOCATIONAL FACTORS CONSIDERED FOR EXPANSION BY INDUSTRY GROUP

Number of Respondents

INDUSTRY GROUP

Factors	Beverage			Tobacco			Textile			Apparel			Furniture & Fixtures			Lumber			Metal			Non-elec. machinery			Electrical machinery			Transportation		
	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T
1	1	7	2	2	3	2	8	2		19	1	2	7	2	1	1	3	2	10	9	3	4	3	2	11	5	2	4		3
2	6	2	2	2	3	2	7	2	1	13	5	4	5	3	2	5		1	15	4	3	7	1	1	12	4	2	4	1	2
3	6	1	3	2	3	2	5	4	1	12	7	3	7	2	1	5		1	16	3	3	8		1	14	3	1	2	2	3
4		7	3	2	4	1	2	8		4	13	5	2	5	3	1	3	2	5	12	5	3	2	4	3	11	4		3	4
5		7	3		4	3	2	5	3	6	6	10	2	3	5	1	2	3	4	10	8	2	2	5	6	7	5	1	1	5
6	7	1	2	7			10			17	3	2	8		2	5		1	19	1	2	8		1	12	4	2	3		4
7	3	2	5	1	3	3	1	5	4	4	9	9	1	5	4	1	3	2	3	10	9	3	4	2	6	5	7	2		5
8	3	3	4	1	2	4	4	2	4	12	5	5	2	4	4	4	1	1	8	6	8	5	1	3	5	8	5	3		4
9		5	5		3	4	3	2	5	7	8	7	2	3	5		4	2	2	10	10	2	4	3	5	8	5		3	4
10	8		2	6	1		8	1	1	16	3	3	5	2	3	4	1	1	15	4	3	7		2	13	3	2	3		4
11	8		2	4	2	1	9		1	19	1	2	7	1	2	5		1	16	3	3	7		2	15	2	1	3		4
12	7		3	4	3		7	2	1	8	9	5	3	5	2	2	2	2	8	8	6	3	2	4	8	8	2	2	2	3
13	7	1	2	5	2		8	1	1	17	3	2	7		3	3	1	2	12	7	3	5	3	1	12	3	3	3		4
14	5	3	2	3	4		9		1	14	5	3	8	1	1	2	2	2	14	5	3	6		3	11	6	1	4		3
15	6	2	.2	4	2	1	7	2	1	8	9	5	5	3	2	4		2	13	6	3	6	1	2	10	6	2	2	1	4
16	8		2	6	1		8	1	1	13	6	3	6	3	1	5		1	17	3	2	6	1	2	10	6	2	1	3	3

Source: Q 4, 12

P = Primary S = Secondary T = Tertiary (not important)

For descriptions of factors see Table B.14

TABLE B.14

LOCATIONAL FACTORS CONSIDERED FOR EXPANSION BY RATE AND PERCENTAGE

Number of Respondents

		Primary	% Primary	Secondary	% Secondary	No response or not applicable	% no response or not applicable	% Primary - % Secondary
1.	Availability of skilled and semi-skilled labour	67	55	35	29	19	16	26
2.	Proximity to market	76	63	25	21	20	17	42
3.	Proximity to available stores of raw materials	77	64	25	21	19	16	43
4.	Proximity to other industries	22	18	68	56	31	26	- 38
5.	Proximity of the parent company	24	20	47	39	50	41	- 19
6.	Access to good transportation facilities: Highway	96	79	9	7	16	13	72
7.	Access to good transportation facilities: Railroad	25	21	46	38	50	41	- 17
8.	Access to good transportation facilities: Water	47	39	32	26	42	35	12
9.	Access to good transportation facilities: Air	21	17	50	41	50	41	- 24
10.	Adequate water supply	85	70	15	12	21	17	58
11.	Adequate power supply	93	77	9	7	19	16	69
12.	Adequate waste disposal	52	43	41	34	28	23	9
13.	Lower labour costs	79	65	21	17	21	17	48
14.	Incentives offered by Government authority	76	63	26	21	19	16	41
15.	Local cooperation	65	54	32	26	24	20	27
16.	Peace and order situation	80	66	24	20	17	14	46
	TOTAL	985	51	505	26	446	23	25

TABLE B.15

DESIRED RADIUS FOR INDUSTRIAL LOCATION BY INDUSTRY GROUP

Number of Respondents

Desired Radius (Reference - Rizal's Monument in Luneta)	INDUSTRY GROUP											
	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
5 kilometres or less	2	1		8		1	3	2	3	1	9	21
6-10 km.	1	1	2	6	1	1	4		2	1	7	19
11-15 km.	1	1	1	1	1	1	4	4	1	2	11	17
16-20 km.	1	2	3	3	2	3	2	2	3		7	21
21-30 km.			2	3		3	3	1	5	1	10	18
30 and above	4	2	1	1	1		2		1		3	12
No applicable response	1		1		1	1	4		3	2	9	13
TOTAL	10	7	10	22	6	10	22	9	18	7	56	121

Source: Q 4, 13

WDS

TABLE B.16

DESIRED INDUSTRIAL LOCATION BY INDUSTRY GROUP

Number of Respondents

Location Description	INDUSTRY GROUPS											
	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
North of Manila	3	2	2	9	1	3	8	3	5	4	20	40
East of Manila	1	1	2	6	1	3	3	3	4	1	11	24
South of Manila	4	2	5	5	3	3	8	3	5		16	39
Any of the above	1	1		2			1				1	5
No applicable response	1	1	1		1	1	2		4	2	8	13
TOTAL	10	7	10	22	6	10	22	9	18	7	56	121

Source: Q 4, 13

WDS

TABLE B.17

COMMUNICATION FACILITIES REQUIRED BY INDUSTRY GROUP

Number of Respondents

Communication Facilities	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
	INDUSTRY GROUPS											
Telephone	10	7	10	21	6	9	21	8	16	6	51	114
Telex	3	3	6	10	2	1	3	5	10	3	21	46
Post Office	8	5	9	13	4	4	11	6	13	21	32	75
Messengerial services			2	1				1	1		2	5
Others		1		1					1		1	3
No. of respondents	10	7	10	22	6	10	22	9	18	7	56	121

Source: Q 4, 15

WDS

TABLE B.18

ANALYSIS OF INDUSTRIAL WASTES BY INDUSTRY GROUP

Number of Respondents

	INDUSTRY GROUP											
Response	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Yes	4	6	2	2	2		2		1		3	19
No	3		6	15	3	4	11	5	8	4	28	59
No applicable response	3	1	2	5	5	2	9	4	9	3	25	43
TOTAL	10	7	10	22	10	6	22	9	18	7	56	121

Source: Q 4, 18A-1

TABLE B.19

SOURCE OF SAMPLES OF INDUSTRIAL WASTES BY INDUSTRY GROUP

Number of Respondents

Location Description												
Factory or Plant	3	4	4	7		2	3	2	4	1	10	30
Outlet or Drainage				1			1	1	2		4	5
No applicable response	7	3	6	14	10	4	18	6	12	6	42	86
TOTAL	10	7	10	22	10	6	22	9	18	7	56	121

Source: Q 4, 18A-1

TABLE B.20

TREATMENT OF INDUSTRIAL WASTES BY INDUSTRY GROUP

Number of Respondents

INDUSTRY GROUP

Response	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Yes	3		2	3		2	1			2	3	13
No	3	5	6	13	4	3	13	4	9	2	28	62
No applicable response	4	2	2	6	6	1	8	5	9	3	15	46
TOTAL	10	7	10	22	10	6	22	9	18	7	56	121

Source: Q 4, 18A-2

TABLE B.21

TREATMENT OF DOMESTIC WASTES BY INDUSTRY GROUP

Number of Respondents

Yes	2			2	1		2		2	2	6	11
No	3	5	6	15	3	2	13	4	8	3	28	62
No applicable response	5	2	4	5	6	4	7	5	8	2	22	48
TOTAL	10	7	10	22	10	6	22	9	18	7	56	121

Source: Q 4, 18C

WDS

TABLE B.22

POINT OF DISCHARGE OF INDUSTRIAL WASTES BY INDUSTRY GROUP

Number of Respondents

Location Description	INDUSTRY GROUP											
	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Sewerage system	3			1			1	1			2	6
River/creek	1		4		1		1		2		3	9
Drainage system		1							1		1	2
Garbage		1							1		1	2
No applicable response	6	5	6	21	5	10	20	8	14	7	49	102
TOTAL	10	7	10	22	6	10	22	9	18	7	56	121

Source: Q 4, 19-A1

TABLE B.23

POINT OF DISCHARGE OF DOMESTIC WASTES BY INDUSTRY GROUP

Number of Respondents

Septic Tank	2	1	3	1		1	3		2		5	13
Sewerage system				1					3		3	4
Others		1			1		1	1			2	4
No applicable response	8	5	7	20	5	9	18	8	13	7	46	100
TOTAL	10	7	10	22	6	10	22	9	18	7	56	121

Source: Q 4, 19-A2

WDS

TABLE B.24

POINT OF DISCHARGE OF TOTAL SOLID WASTES BY INDUSTRY GROUP

Number of Respondents

	INDUSTRY GROUP											
Response	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Garbage	1	2	1	6			1	1	2		4	14
River	1						1				1	2
Sold or re-used		1	1		1		1	1	1		3	6
No response	8	4	8	16	5	10	19	7	15	7	48	99
Total	10	7	10	22	6	10	22	9	18	7	56	121

Source: Q 4,19B

WDS

TABLE B.25

PRESENT PLANT LOCATION VERSUS DESIRED INDUSTRIAL LOCATION FOR ALL INDUSTRY GROUPS

Number of Respondents

Present Plant Location (Reference Point - Luneta*)	DESIRED INDUSTRIAL LOCATION (Reference Point - Luneta) North of Manila	East of Manila	South of Manila	North, East or South of Manila	No applicable response	TOTAL
North	34	7	12	2	8	63
East	2	3	11	1		17
South	5	14	15	2	5	41
TOTAL	41	24	38	5	13	121

Source: Q 3, 13B

* Reference Line for MLA - Pasig River

TABLE B.26

VOLUME OF WATER USED FOR INDUSTRIAL OPERATIONS BY INDUSTRY GROUP

Cubic Metres per Day

	INDUSTRY GROUP											
Volume of Water	Beverage	Tobacco	Textiles	Apparel	Lumber	Furniture & Fixtures	Metal	Non-elec. machinery	Electrical machinery	Transport	Sub-total Metals-Trpt.	TOTAL
Total (Cooling and Processing)	4799	40	13482	373	445	30	23349	81	3416	616	27462	76631
No. of respondents	8	3	5	8	4	1	7	3	6	4	20	49
Water consumption per Industry Group	600	13	2696	47	111	30	3336	27	569	154	1373	952

Source: Q4, 16

TABLE B.27

DAILY POWER REQUIREMENT BY INDUSTRY GROUP

Kilowatt per Hour

Power Requirement												
Total power consumption	36632	2568	328324	203283	15860	16475	338251	6720	179158	2421	526550	1129692
No. of respondents	5	3	7	15	4	4	14	4	13	3	34	72
Power consumption/ Industry Group	7326	856	46903	13552	3965	4119	24161	1680	13781	807	15487	15690

Source: Q4, 17

WDS

APPENDIX C

SOILS INVESTIGATION FOR SELECTED SITES

C1. Introduction

This Appendix presents a review of the results of an offshore soils investigation along the western shores of Laguna de Bay. The investigation extended from Napindan to San Pedro, and was carried out jointly by the UNDP and the LLDA during October 1971. The review has been confined to examining the investigation results from the vicinity of the potential industrial estate at Muntinglupa (Site 13).

In addition to this review, the soil and geological conditions occurring at three alternative sites for the industrial estate are discussed in general terms. These alternative sites are located:

(a) south of the Manila International Airport (Site 5);

(b) in the Pasig and Marikina areas to the east of Manila City (Site 9); and

(c) at Pansol near the southern shores of Laguna de Bay (Site 14).

The soil and geological conditions at the alternative sites have been determined from a study of the existing geological maps of the areas and a field reconnaissance of the sites during January, 1974. The locations of the selected sites are shown on Figure C.1 at the end of this chapter.

In the following sections of this Appendix, the subsurface conditions at the various sites are discussed in relation to the proposed industrial development.

C2. Review of Soils Investigation at Muntinglupa (Site 13)

This review has been based on the general results of a soils investigation carried out along the western shores of Laguna de Bay.

C2.1 Field Investigation

The field investigation in the vicinity of the Muntinglupa site consisted of drilling two boreholes to depths of 3 and 9m below the lake bed, and carrying out four cone penetration tests to depths of between 3 and 13m. The locations of the boreholes and penetration tests are shown on Figure C.2 included with the borehole logs and penetration test results at the end of this Appendix. Laboratory testing of soil samples recovered during field work was not carried out during the 1971 study.

WDS

C2.2 General Site Conditions

The west shores of Laguna de Bay have a gentle slope, and the development of a 400 hectare site by land reclamation would consist of placing up to 5m of dredged fill over the lake bed to obtain the final site level.

The results of the soils investigation indicate that the subsurface conditions in the general area consist of alluvial deposits overlying a fine grained tuff bedrock containing interbeds of lapilli and tuffaceous sandstone. The tuff was not encountered in the boreholes drilled near the site, however the results of the penetration tests suggest that the tuff is at least 2.5m below the lake bed over the majority of the site. The depth to the tuff bedrock probably increases to at least 8m over the northern portion of the site.

The alluvial deposits over the reclamation site probably consist of:

(a) dark yellow and grey, very soft, silty clay to a depth of about 1m, underlain by

(b) yellow-brown, very soft to soft, organic silty clay containing shell fragments, overlying

(c) soft to firm sandy clays and medium dense to dense clayey sands, sands and gravels.

The average depth of the very soft to soft clay deposits is probably about 3m over the majority of the site, but could increase to approximately 8m over the northern portion of the site. The depth of these clay deposits may also increase toward the offshore boundary.

The depth of water at the reclamation site is approximately 2m.

C2.3 Assessment of Stability and Settlement

The strength and consolidation characteristics of the alluvial clay deposits were not determined during the soils investigation. Thus the behaviour of the clay deposits with respect to settlement and stability after reclamation can only be approximately assessed.

C2.3.1 Stability

During the soils investigation, the silty clay deposits were described as being in a very soft to soft condition. It is expected that the unconfined compressive strength of these deposits could range from 10 to 70 kPa. Thus, the insitu strength of these clay deposits would be very low and special consideration should be given to the stability of the revetments, especially during construction of the rockfill toe dam at the initial stage of reclamation.

It is anticipated that displacement of the very soft silty clay forming the lake bed will occur as construction of the rockfill toe dam and revetments proceeds. Also, further displacement of these deposits may occur during placement of the hydraulic fill.

Lightly loaded structures could probably be founded within the fill, provided the structures were designed to tolerate differential settlements. Major structures may have to be supported on piles, founding within the dense sands and gravels. On grade slab floors and other footings would need to be separate from the portion of the structure supported on piles to allow for differential movements.

C2.3.2 Settlement

In view of the limited information available on the strength and consolidation characteristics of the soft clay deposits at the site, it has been assumed that the deposits are normally consolidated.

The soft clay deposits have been described as being of low plasticity on the borehole logs, and hence an upper value of the Liquid Limit of 50% has been adopted for assessing consolidation parameters. In addition to primary consolidation, secondary consolidation of these deposits resulting in long term settlements will occur, particularly if the soft clays are plastic and contain organic matter. The major assumptions relating to the consolidation characteristics of the soft clay deposits are outlined in Table C.1.

On the basis of these assumptions, it is estimated that primary and secondary consolidation of the soft clay deposits at the site could result in settlements of 0.5 to 2m due to the proposed reclamation. Over the majority of the site where the depth of these deposits is about 3m, settlements should be limited to 0.8m. Toward the northern end of the site where the depth of the soft clay deposits increases, the long term settlements could be up to 2m. These estimates of settlement are considered to be typical for the site conditions, but could vary by as much as 0.5m depending on the actual soil properties.

The conventional methods of predicting the time for completion of primary consolidation can underestimate the rate of consolidation, especially if clay deposits contain thin seams of more permeable silt and sand which permit rapid drainage. It is expected that the majority of settlement will occur within 1 to 2 years over the portions of the site where the depth of the soft clay deposits is minimal. Over the northern portion of the site where the depth of these deposits increases, the majority of settlement may take up to 5 years to occur. These estimates of time for completion of primary consolidation could be considerably shorter, depending on the presence of more permeable layers and seams within the soft clay deposits. Following the completion of primary consolidation, further settlements of up to 0.5m could occur in the long term.

C3. Alternative Site South of Manila International Airport (Site 5)

The site near the airport is located approximately 12 km south of Manila City. The general area is presently under cultivation, with yearly crops, although irrigation of the land has not been adopted.

C3.1 Topography

The site slopes gently from the east toward the west, and surface drainage over the general area is provided by a series of shallow creeks which flow in an east-west direction toward Manila Bay. Gentle ground slopes also occur in a north-south direction toward these creeks. A series of paddies have been formed on a rectangular pattern over the entire site by the construction of low earth embankments. The natural surface drainage over the site is generally poor owing to the relatively flat surface gradients and the low earth embankments.

C3.2 General Site Conditions

The soil and rock conditions existing over the site were assessed by inspecting the profiles exposed in the banks of the shallow creeks which cross the area. The exposed subsurface conditions consisted of:

(a) dark grey, stiff, clay soils of high plasticity to depths of 1 to 1.5m, underlain by

(b) dark grey-black, highly weathered, weak to moderately strong, tuff.

The clay soils contain surface cracks which extend to depths of up to 0.2m and are up to 20mm wide. This surface cracking indicates that these soils are probably susceptable to swelling-shrinking movements resulting from seasonal moisture changes in the soils.

C3.3 Discussion of Site Development

The major problems during development of the site are expected to be limited to:

(a) the flat ground surface gradients resulting in poor surface drainage, and

(b) the swelling clay soils over the area, which could affect the performance and design of foundations and road pavements located on these soils.

Rock excavation to shallow depths is not expected to be a problem, although deeper rock excavations could be difficult, depending on the depth of weathering and fracture pattern of the tuff.

Th flat surface gradients and presence of clay soils at the ground surface could result in flooding of the site after heavy rain, since water infiltration and run-off would be slow. However, this problem could be reduced by providing an extensive surface drainage system and minor regrading of individual sites over the estate.

Swelling-shrinking movements of up to 100mm could occur within the clay soils due to seasonal moisture changes. To eliminate the effects of these movements and prevent cracking of buildings, footings could be located on the tuff bedrock, with any on grade slab floors isolated from the structure. If footings and slab floors are placed within the clay soils, measures should be taken to reduce seasonal moisture variations beneath the building and the structures designed to tolerate the expected movements.

It is anticipated that the clay soils will form a poor subgrade for the proposed concrete pavements over the site. To reduce the effects of pumping and swelling-shrinking movements in the subgrade soils, sub-base and basecourse layers of crushed rock or gravel may have to be placed over the subgrade prior to constructing the pavement.

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C4. Alternative Site at Pasig and Marikina (Site 9)

The site is located approximately 15 km east of Manila City and is presently under cultivation with yearly crops. Irrigation of the land is not being carried out and watering of crops is limited to ponding of water after rain in a series of paddies.

C4.1 Topography

The natural drainage over the general area is provided by a series of shallow creeks which flow in a north-south direction toward Laguna de Bay. The site slopes are gentle, being toward the creeks and to the south. Owing to the relatively flat surface gradients and low earth embankments forming the paddy system, the natural surface drainage over the site is generally poor.

C4.2 General Site Conditions

The subsurface conditions over the site were assessed from the available geological maps of the area and the results of a soils investigation carried out for the Mangahan Floodway. The site is located within the Marikina Valley and the soils over the site would be of alluvial origin. The alluvium probably extends to a considerable depth and is underlain by a tuff bedrock.

The upper soils profile over the site is expected to consist of:

(a) grey and brown, firm to stiff, clay soils of high plasticity, underlain by

(b) sandy silt, clayey sand and silty sand.

The groundwater levels over the site probably occur at depths of 2 to 3m below the ground surface.

C4.3 Discussion of Site Development

The development problems at this site are expected to be similar to those outlined previously in Section C3.3 for the site to the south of the airport. The flat surface gradients and presence of clay soils at the ground surface will necessitate an extensive surface drainage system to be provided to reduce flooding of the site after development. Special consideration should be given to the design of the concrete pavements since welling clay soils could exist over the area. Also, all shallow footings and on grade slab floors of the various buildings should be designed to resist any soil movements or measures taken to reduce the movements.

The additional problems which could be encountered during development of this site are:

(a) the present of high ground water levels which could hinder construction of deep excavations or boring of pier excavations, and

(b) the absence of suitable foundation soils close to the ground surface for the support of heavily loaded footings and bases.

The extent of these problems can only be determined after carrying out a soils investigation over the site.

C5. Alternative Site at Pansol (Site 14)

The site at Pansol is located on the southern shores of Laguna de Bay, adjacent to Alligator Lake. The site is approximately 55 km from Manila City.

C5.1 Topography

The site has not been used for agriculture probably due to the extremely poor drainage condition existing over the area. It is understood that springs in the underlying bedrock continually recharge the area with groundwater, resulting in swamp conditions over the majority of the site. The existing surface drainage is provided by a creek system which flows toward the north-east to Laguna de Bay. In general, ground surface slopes are relatively flat and the natural surface drainage is extremely poor.

C5.2 General Site Conditions

On the basis of the available geological maps of the area, the bedrock over the site consists of tuff which possibly occurs at a relatively shallow depth. The soils overlying the tuff probably consist of clay soils which may only be in a firm to stiff condition. The groundwater levels in the area would be close to the ground surface.

C5.3 Discussion of Site Development

The major problems envisaged in developing this site are related to providing adequate surface and subsurface drainage for the area. In view of the high groundwater levels, which is understood to be the result of springs in the bedrock, raising of the present site levels by the placement of suitable fill material and the installation of an extensive subsurface drainage system may be required. The drainage system and reclamation would have to be designed to control the groundwater levels.

Provided a suitable fill material was used for the land reclamation and adequate surface drainage provided, no major problems are expected for building foundations and road pavements located within the fill. However, the settlements resulting from the reclamation would have to be examined in detail. Heavy foundation loads could be supported on bored piers or piles founding on the tuff bedrock, depending on the depth to the rock. Problems associated with groundwater inflows could occur during construction of deep excavations, including boring of pier excavations.

C6. Conclusions

The conclusions in this Appendix are based on the results of preliminary soils investigations, a brief field reconnaisance, and a study of the available geological maps covering the selected sites. The collation of this information has allowed the problems in developing the various sites to be assessed, and from this information a preferred site for the proposed industrial development is suggested.

Major soils problems are expected during development of the sites at Muntinglupa (Site 13) and Pansol (Site 14). Severe settlements and extensive drainage problems may be encountered at these sites, and detailed soils investigations would be required to determine the extent of these problems and the necessary remedial measures. Development of the sites south of the Manila International Airport (Site 5) and in the Pasig and Marikina areas (Site 9) are expected to involve fewer soils problems.

The sites near the airport and at Marikina would probably involve similar development problems. The surface drainage conditions would have to be improved and measures taken to limit the effects of swelling clay soils on foundations and road pavements. However, the surface drainage requirements at the airport site would not be as extensive as the Marikina site. Also, the general foundation and groundwater conditions over the airport site are expected to be favourable, owing to the shallow depth to bedrock. In view of these expected site conditions, the site south of the airport (Site 5), appears to be preferable for development as an industrial estate.

WDS

TABLE C.1

LIST OF ASSUMPTIONS FOR ASSESSING SETTLEMENTS-MUNTINGLUPA (SITE 13)

The estimates of settlement presented in this Appendix have been based on the following assumptions:

(a) the depth of the soft clay deposits varies from 3 to 10m, and are underlain by sands and gravels;

(b) these deposits are normally consolidated and are of low to medium plasticity (Liquid Limit less than 50%).

(c) the ratio $\frac{C_c}{1 + e_o}$ ranges from 0.2 to 0.25 for the soft clays,

where

C_c = compression index

e_o = initial void ratio

(d) the coefficient of secondary compression, C_{oc} of these deposits varies from 0.005 to 0.01, and

(e) the coefficient of consolidation, C_v ranges from 0.001 to 0.005 cm^2/sec.

WDS

LOG OF SOIL SAMPLING TEST HOLES [1]

West Bay

Note: Measurement of depths are referred from surface of lake bed.

Hole No. S - 3: Location: Alabang; Lake bed elevation: 9.0 mts.

0 - 3'	MUD: yellowish grey; contains about 15% silt.
3' - 7'	SILTY CLAY: yellowish brown; contain about 15% silt or non-plastic fines, 5% fine sand and 10% fresh water shell fragments (maximum size of 2 cm); very soft in place.
7' - 8'	SANDY CLAY: greenish grey to yellowish brown, sand silt mixture about 15%; slightly compacted; low plasticity (CL).
8' - 10'	CLAYEY SAND: yellowish brown; clay content about 15%; sand particles are generally fine to medium grained and compose mostly about 10% fresh water shell fragments; slightly plastic, moderately compacted (SC).

1 : Borehold logs extracted from LLDA, May 1972 Report

LOG OF SOIL SAMPLING TEST HOLES [1]

West Bay

Note: Measurement of depths are referred from surface of lake bed.

Hole No. S - 4:	Location: Alabang; Lade bed elevation: 7. 9 mts.
0 - 4'	MUD: dark yellowish grey; contains about 10% silt or non-plastic fines.
4' - 12'	SILTY CLAY: yellowish brown; contains about 10% silt; fresh water shell fragments about 20%; fine to medium grained sand about 5%; very soft in place; medium dry strength; low plasticity (CL).
12' - 30'	No sample (presumably same as 4' - 12') Note: Loose sand and gravel (GP) compose of pumiceous material, may be expected at depth between 30 and 40 feet below lake bed.

1 : Borehole logs extracted from LLDA, May 1972 Report

WDS

CONE PENETRATION TEST [1]

(Field Data)

West Bay

Weight of drive hammer	-	15 kgs (33 lbs.)
Height of fall	-	30 inches
Height of Aw rod	-	3.4 lbs/ft.
Weight of guide rod	-	17 lbs.
Weight of collar	-	5 lbs.

Hole No. PR - 7

Date: October 13, 1971
Depth of Water - 10 feet

Location - N 21.5° W of Meralco Stack
S 60.5° E of Mt. Susong Dalaga

Depth (ft.)	No. of Blows per foot
0 - 31	wt. of 45' Aw rod (4 of 10' + 1 of 5') + 33 lbs. hammer + guide (sampling rod) + collar
31 - 32	55
32 - 33	42
33 - 34	40
34 - 35	27
35 - 36	28
36 - 37	30
37 - 38	101 (Note: we had a rest of about 15 minutes)
38 - 39	53
39 - 40	56
40 - 41	55
41 - 42	95
42 - 42½	100

Rods Used:

(4 pcs. of 10' + 3 pcs. of 5')

1 : Cone penetration test results extracted from LLDA, May 1972 Report

WDS

CONE PENETRATION TEST [1]

(Field Data)

West Bay

Weight of drive hammer	-	15 kgs (33 lbs.)
Height of fall	-	30 inches
Height of Aw rod	-	3.4 lbs/ft.
Weight of guide rod	-	17 lbs.
Weight of collar	-	5 lbs.

Hole No. PR - 8

Date: October 14, 1971
Depth of Water - 8½ feet

Location: N 8° W of Meralco Stack
S 65° E of Mt. Susong Dalaga

Depth (ft.)	No. of Blows per foot
0 - 13.5	wt. of 25' Aw rods + guide + collar
13.5 - 15.0	6
15.0 - 16.0	39
16.0 - 17.0	54
17.0 - 18.0	18
18.0 - 19.0	23
19.0 - 20.0	87
20.0 - 21.0	19
21.0 - 22.0	18
22.0 - 24.0	9
24.0 - 25.0	23
25.0 - 26.0	117
26.0 - 26.4	115 (refusal)

Rods Used:

(2 pcs. of 10' and 5 pcs. of 5')

1 : Cone penetration test results extracted from LLDA, May 1972 Report

WDS

CONE PENETRATION TEST [1]

(Field Data)

West Bay

Weight of drive hammer	-	15 kgs (33 lbs.)
Height of fall	-	30 inches
Height of Aw rod	-	3.4 lbs/ft.
Weight of guide rod	-	17 lbs.
Weight of collar	-	5 lbs.

Hole No. PR - 9

Date: October 19, 1971
Depth of Water - 8½ feet

Location: N 4° W to Meralco Stack
S 71° E to Mt. Susong Dalaga

Depth (ft.)	No. of Blows per foot
0 - 5½	wt. of 20' Aw rods, guide, collar and 33 lbs. hammer
5½ - 6½	31
6½ - 7½	70
7½ - 8½	103
8½ - 9½	208 (refusal)

Rods Used:

(1 pc. of 10' and 3 pcs. of 5')

1 : Cone penetration test results extracted from LLDA, May 1972 Report

CONE PENETRATION TEST [1]

(Field Data)

West Bay

Weight of drive hammer	-	15 kgs (33 lbs.)
Height of fall	-	30 inches
Height of Aw rod	-	3.4 lbs/ft.
Weight of guide rod	-	17 lbs.
Weight of collar	-	5 lbs.

Hole No. PR - 10

Date: October 15, 1971
Depth of Water - 8 feet

Location: N 5.5° W of Meralco Stack
S 75.5° E of Mt. Susong Dalaga

Depth (ft.)	No. of Blows per foot
0 - 7	wt. of 25' Aw rods + guide + collar + 33 lbs. hammer
7 - 8	77
8 - 9	130
9 - 9'8"	201 (refusal)

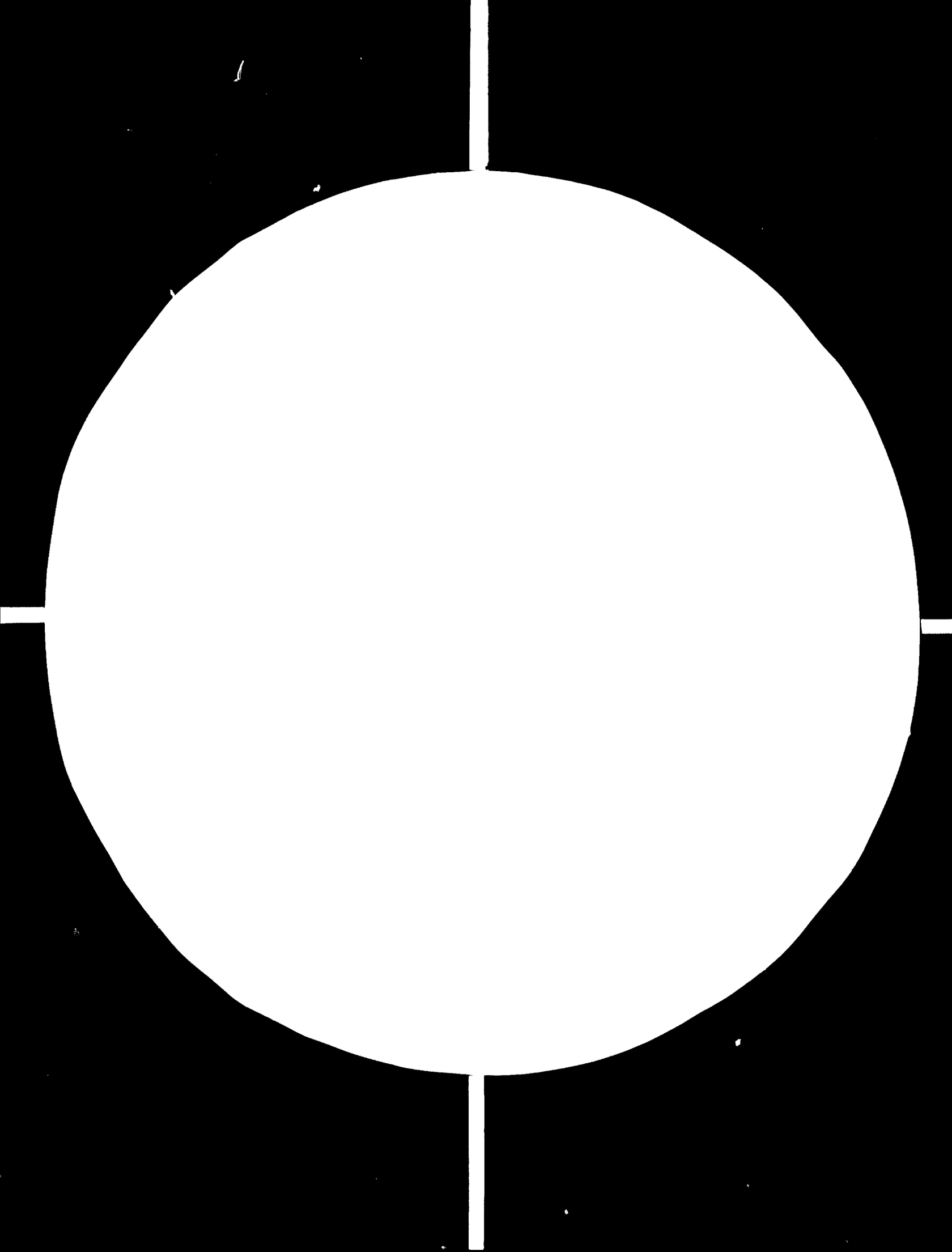
Rods Used:

(1 pc. of 10' and 3 pcs. of 5')

1 : Cone penetration test results extracted from LLDA, May 1972 Report

C-384

77.11.16



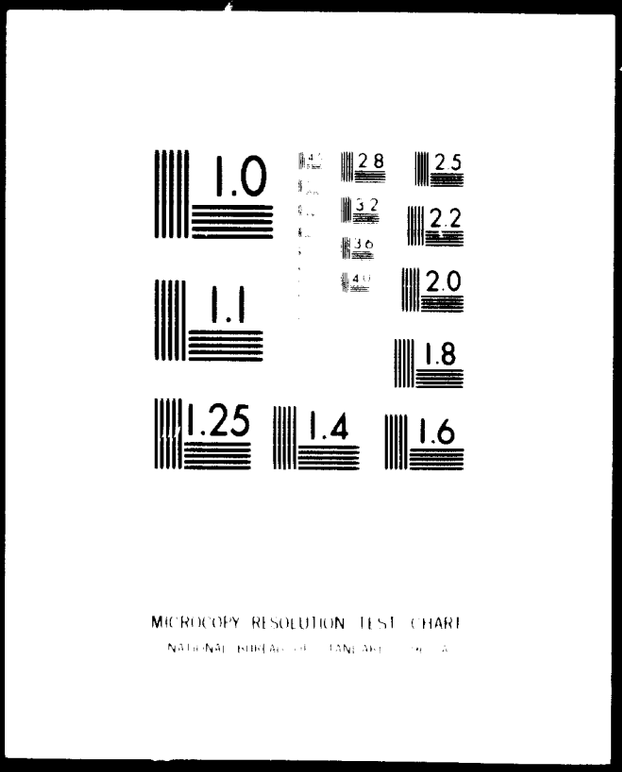
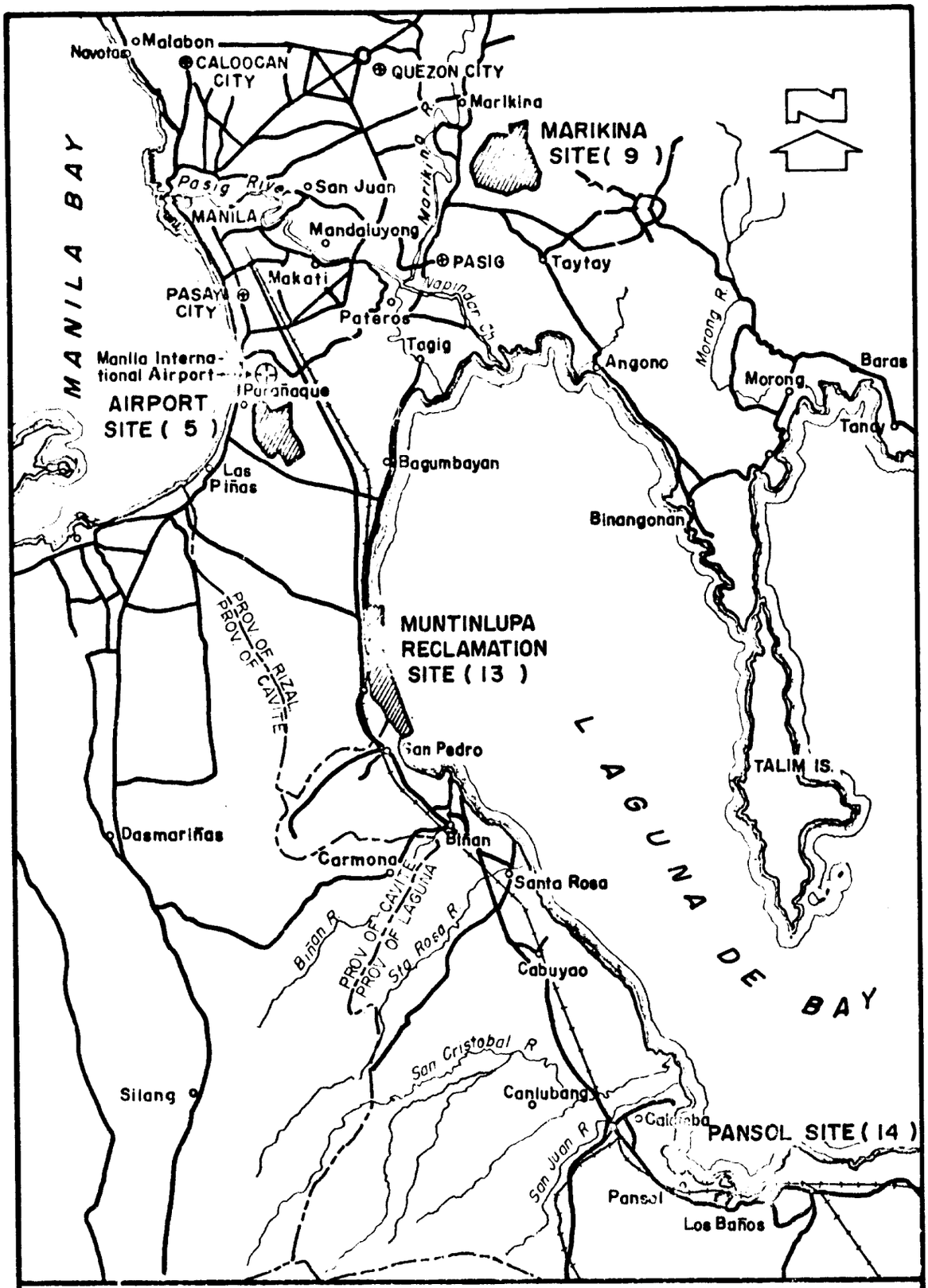


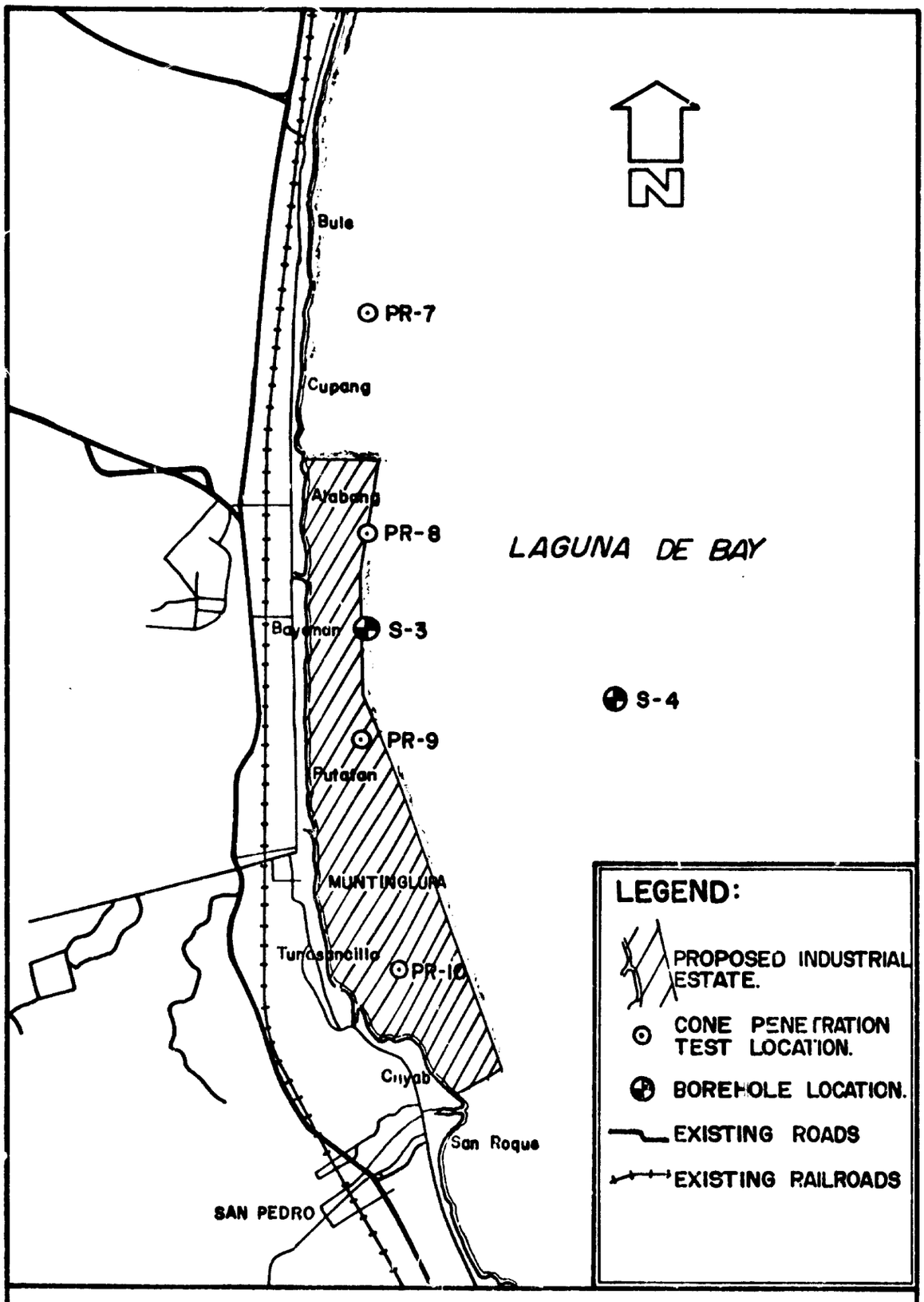
Figure C1



LOCATION OF SELECTED SITES

Scale 1: 250,000

Figure C.2



MUNTINGLUPA INDUSTRIAL ESTATE

PRELIMINARY SOILS INVESTIGATION

Scale 1: 50,000

WDS

APPENDIX D

THE SELECTION OF INDUSTRIES FOR ESTATE LOCATION

D1 New Industry Potentials

The 6th Investment Priorities Plan of the Board of Investment has provided a list of industries which are 'pioneer' in their respective fields. There was a total of 96 industries listed under the PSIC classifications: 13, 18, 19, 20, 23, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 61.

However, after a rigid and thorough consideration of the types of industries suitable to our Industrial Estate, this list was reduced to 36 industry potentials under the PSIC numbers 20, 23, 31, 34, 35, 36, 37, 38.

D2 New Industry Potentials for Industrial Estate Location

D2.1 Criteria for Exclusion

The BOI list of 96 industries went through a sieving process whereby the following criteria for exclusion were applied:

(a) Pollution (whether atmospheric or water)

Pollutant industries were excluded outright since they pose environmental hazards. They are those which in the process of manufacture, emit or produce certain waste materials (gas, fluids and solids) in such amounts that their ill-effects cannot be easily counteracted or tolerated by nature.

Most chemical manufacturing industries are pollutants and therefore were eliminated. These industries were the High and Low Density Polyethylene, Polypropylene, Cellophane, Pulp, Pulp and Paper.

(b) Export Oriented

Industries are considered mainly export oriented when the greater percentage of their revenues are generated through sales of products to foreign countries. Industries of this type were deleted to conform with government regulations which provide a specific location for industries under this

heading. Export oriented industries are encouraged to locate at the Export Processing Zone in Mariveles, Bataan to avail of the incentives granted to such industries by the EPZA.

(c) Raw Material Oriented

Industries that are raw materials oriented were excluded from the list of new potentials simply because it is more logical to locate them near their sources of raw materials. Industries that were excluded because of this criterion were Salt, High and Low Density Polyethylene, Polypropylene, Cellophane, Agricultural Lime, Asbestos, Perlite, Foundry Coke, Clay Refractories, Rock Aggregates, Timber products, Plywood, Veneer, Grain processing, Processed Seaweed, Coconut Oil, Palm Oil, Feed Yeast, Processed Fish, Iron Ore, Chromite Ore, Copper Ore, Copper Metal, Nickel Metal and Alloys, Gold Mining and Processing and Gold Refining.

(d) Special Site Requirements

Industries that require special sites or very large tracts of land were also excluded from the list. If such industries were allowed, fewer firms could take advantage of the benefits to be offered by the estate. This situation would to some extent defeat the government's aim of encouraging small and medium size industries through establishment of the estate.

Industries eliminated were Barges and Tugboats, Fishing Boats, Inter-Island and Ocean-going Ships, Salt, Cellophane, Agricultural Lime, Clay, Refractories, Rock Aggregates, Tree Farming, Crop production, Livestock and fishing (Commercial Deep Sea and Inland), Iron Ore, Chromite Ore, Copper Ore, Primary Steel.

(e) Government Regional Dispersal Programme

Industries that form part of the government's regional dispersal programme were also deleted. As a matter of government policy, some industries like the textile industry were excluded to restrict the setting up of more textile plants in the greater Manila area and encourage dispersion to other places.

Under this criterion the following industries were eliminated: Farm Machinery Equipment, Barges and Tugboats, Fishing Boats, Inter-Island and Ocean-going Ships, Textiles, Grain Processing, Coconut Oil, Palm Oil, Processed Meat.

(f) Backyard Location Requirement

Industries that require backyard locations were also deleted. These industries are usually the very small ones, and therefore, not likely to seek location in the Industrial Estate. Some of them however may choose to locate in the 'nursery section' to be provided in the Industrial Estate.

Some industries under the BOI list have been eliminated also on the basis of their present capacities. These industries were the following: Ferro-Alloys, Nylon Fibre, Dumps, Motorcycles and Regulators and Adaptors and Pressure Reducing Valves for LPG Appliances.

After the 'sieving' or exclusion process a total of 36 industry types were obtained as potential industries for location in the Industrial Estate.

Table D. 1 shows the list of the preliminary list of new industry potentials with their PSIC classifications and corresponding estimated capacities.

D3 Labour Requirements

The thirty six potential industry types (Table D. 1) were further analysed as to whether they are High, Medium or Low labour Intensive. Labour Intensity has been formulated as the ratio of imported capital assets to actual project employment in each full year of operation.

From the figures obtained from the BOI the following ranges were computed to describe the High, Medium and/or Low Labour intensive industries.

$6,000 and below	=	Labour Intensive
$3,000 and below	=	High Labour Intensive
$3,001 to $6,000	=	Medium Labour Intensive
Over $6,000	=	Low Labour Intensive

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TABLE D.1

PSIC	List of Potential Industries	Measured Capacity Local	Export
203	Fruit & Vegetable Processing	14,650 MT	Variable
203	Tomato Paste	1,000 MT	-
231	Ramie Fibre	10M sq. yds.	-
309	Rubber Belts	250,000 kgs.	-
311	Polyvinylalcohol Resins	2,590 MT	-
314	Gum Resin & Gum Turpentine	8,000 MT	Variable
315	Chemical Gypsum	105,000 MT	-
315	Antibiotics	30,000 kgs.	-
329	Petroleum wax	16,000 MT	Variable
341	High Carbon Steel Wire	17,150	-
341	Alloy Steel		
	a) Ingots	12,160	-
	b) Castings	Variable	-
341	Logging Blocks of Alloy Steel	3,300 units	-
352	Files	116,500 doz.	-
353	Steam Boilers	1,200 units	-
363	Shapers	2,700 units	-
363	Lathes	8,900 units	-
363	Drill Presses	6,800 units	-
363	Carbide-Tipped Tools	1.9M units	-
363	Shaft-Bearing Products	745,000 units	-
363	Speed Reducers	42,300 units	-
363	Globe, Gate & Check Valves	720 MT	-
371	Power Transformers	145,000 KVA	-
371	Electric Motors for Automotive Use	65,000 units	Variable
371	Electrical Controls		
	a) Circuit Breakers	736,900 poles	-
	b) Magnetic Starters	36,000 units	Variable
372	Transceivers	1,190 units	-
374	Flashlights	1,710,000 units	Variable
379	Electrical Tapes	7.3M units	-
383	Automotive Gauges & Instruments	56,000 units	Variable
383	Vehicle Shock Absorbers	600,000 units	Variable
383	Automotive Rear Axles	30,000 units	Variable
383	Automotive Propeller Shafts	30,000 units	Variable
383	Automotive Clutches	30,000 units	Variable
383	High HP Diesel Engine	5,400 units	
383	Small Gasoline Engine	68,000 units	
391	KWH Meters	109,100 units	

TABLE D. 2

SUMMARY OF LABOUR INTENSITY ANALYSIS

Labour Intensity	Number of Industries	Percentage
Low	4	11
Medium	14	39
High	17	47
Undetermined	1	3
Total	36	100

From the above table it can be seen that 47% and 39% of the selected industries are high and medium labour intensive, respectively. This indicates that appreciable employment will be generated by these industries.

D4 Additional Industries

In addition to the above 36 potential industries, the Consultants suggested three additional industries which are analogous as to characteristics and requirements to the Lathes, Small Gas Engine and Circuit Breakers and Power Transformer industries respectively. They are the following:

(a) Milling, Grinding and Spinning Machines

(b) Hoists, Cranes, Conveyors, Forklifts and Store Trucks

(c) Switchgear and Panelboards

These additions have been made in consideration to import replacement opportunities within the whole group of industry.

With these three suggested additional types of industries the total potential or new industry group becomes 39. These are types of industry representative of all types of industry that cannot be identified as unsuitable.

After comparing the measured capacities and the annual capacities of the recommended economic size plants, the number of plants required for each industry and the number of plants suitable for the industry mix were estimated.

The estimated number of economic size plants required summed up to 215 plants. About 20% of this total (or 45 plants) were considered as the number of plants in the industry mix. Table D3 shows the plant requirement of different types of potential industry together with their corresponding labour and land requirements.

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TABLE D.3

SELECTED MIX FROM THE INTEREST GROUP OF INDUSTRIES (POTENTIAL NEW INDUSTRIES)

PSIC Category	List of New Industries	No. of Plants	Labour Requirements	Labour per Hectare	Hectares Required
203	Fruit & Vegetable Processing	1	576	279	2.06
203	Tomato Paste	1	13	279	.05
231	Ramie Fibre	1	1,316	287	4.59
311	Polyvinylalcohol Resins	1	33	33	1.00
315	Chemical Gypsum	1	29	222	.13
315	Antibiotics	1	82	27	3.04
341	Logging Blocks of Alloy Steel	1	150	155	.97
341	High Carbon Steel Wire	2	120	140	.86
341	Alloy Steel	2	378	140	2.70
353	Steam Boilers	4	204	140	1.46
363	Shapers	2	326	155	2.10
363	Lathes	1	160	155	1.03
363	Drill Presses	2	122	155	.79
363	Carbide-Tipped Tools	2	180	155	1.16
363	Shaft-Bearing Products	2	62	155	.40
363	Speed Reducers	2	1,590	155	10.26
363	Globe, Gate & Check Valves	2	144	155	.93
364	Hoists, Cranes, Conveyors, Forklifts & Store Trucks	2	446	155	2.88
369	Milling, Grinding & Spinning Machines	1	160	155	1.03
371	Electrical Controls	1	191	113	1.69
371	Switchgear & Panelboards	3	108	113	.96
371	Power Transformer	1	82	113	.34
371	Electric Motor for Automotive Use	1	71	113	.63
379	Electrical Tape	1	39	113	.35
383	Automotive Groups & Instruments	1	82	235	.35
383	Vehicle Shock Absorber	1	193	235	.82
383	Automotive Clutches	1	40	235	.17
383	High HP Diesel Engines	2	1,480	155	9.55
383	Small Gasoline Engine	1	286	155	1.85
391	KWH Motors	1	38	113	.34
Total		45	8,701		54.49

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TABLE D.4

LIST OF EXISTING INDUSTRIES CONSIDERING EXPANSION WITHIN FIVE YEARS (PRESENT STRUCTURAL LEVELS)

PSIC Category	List of Expanding Industries	No. of Plants	Present Labour	Present Land Area	Present Actual Annual Capacity
351	Metal Cans	1	60	.1025	13,800 units
351	Metal Shipping Barrels	1	125	.8630	P 5 M
351	Safes & Vaults	1	30	.06	-
351	Boilers, Tanks, Sheet Works	1	20	.12	-
351	Collapsible Tubes	1	500	2.34	17 M Gross 180 M Pieces
355	Wire Nails, Brads & Spikes	1	744	9.3930	68,100 tons
355	Wire Nails, Brads & Spikes, Bolts, Nuts, Rivets, Screws & Springs	1	215	1.300	4,269 tons
357	Fabricated Structural Iron & Steel	1	1,200	7.00	12,000 units
359	Other Fabricated Structural	1	27	.06	2,000 units
359	Hospital & Medical Equipment	1	90	.1150	P750,000
359	Architectural & Ornamental Metal Work	1	10	..012	-
362	Rice Mills, Corn Grinders	1	16	.05	-
362	Tractor Parts & Eng'g. Projects	1	300	.4500	8 tons
364	Conveyors, Handling Equipment Sugar Mills	1	150	.1200	-
367	Sewing Machines, Textile Parts, Agro-Industrial Machinery	1	234	.0750	-
371	Electric Wires &	1	50	3.1175	5 M lbs.
	Wiring Devices	1	200	.2	5,000 lbs.
376	Other household	1	65	.08	-
	electrical	1	300	.5	-
381	Industrial & Marine Machineries	1	500	1.3593	40 per week
383	Motor Vehicle Engines, Parts & Bodies	1	115	.14	1,000 units
		21	5,051	27.53	

It should be noted that in Table D1 there were 36 industry types listed while in Table D3 industry types selected were reduced to 30 including the three suggested additional industries. Exclusions from the first list were made on the basis of the sizes of the plants. The very small ones were either eliminated or linked or agglomerated with the industry of next use.

D5 Expanding Industries

From the LLDA Industrial Survey conducted from July to October, 1973, we have also selected 19 existing industries under the PSIC categories 35, 36, 37 and 38. These industries are those that are contemplating expansion activities in the next five years.

Table D4 shows the list of existing industries selected with their present structure of labour, land and actual annual capacity.

The potential expanding industries have 22 plants in operation and present labour force of 5,051. Present land occupancy is 27.53 hectares. In view of the anticipated expansion, labour requirements were estimated to increase by 50% to 7,016.

Because of the better usage of land possible on a planned industrial estate the actual area of land required for the increased production is not significantly higher.

D6 Summary of New Plants Required

In summary, therefore, an industry mix was obtained comprising 67 plants with estimated labour and land requirements of 15,717 and 80.88 hectares, respectively.

Table D5 presents the industry mix selected from the Interest Group of Industries.

TABLE D. 5

FINAL SELECTED MIX SHOWING NUMBER OF PLANTS, LAND AND LABOUR REQUIRED (FOR LOCATION IN THE INDUSTRIAL ESTATE)

Industry Mix Selected from Interest Group	No. of Industry Types	No. of Plants in Industry Mix	Total Labour Requirement	Total Land Requirement
New or Potential Industries	30	45	8,701	54.07
Existing Expanding Industries	19	22	7,016	26.81
TOTAL	49	67	15,717	80.88

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