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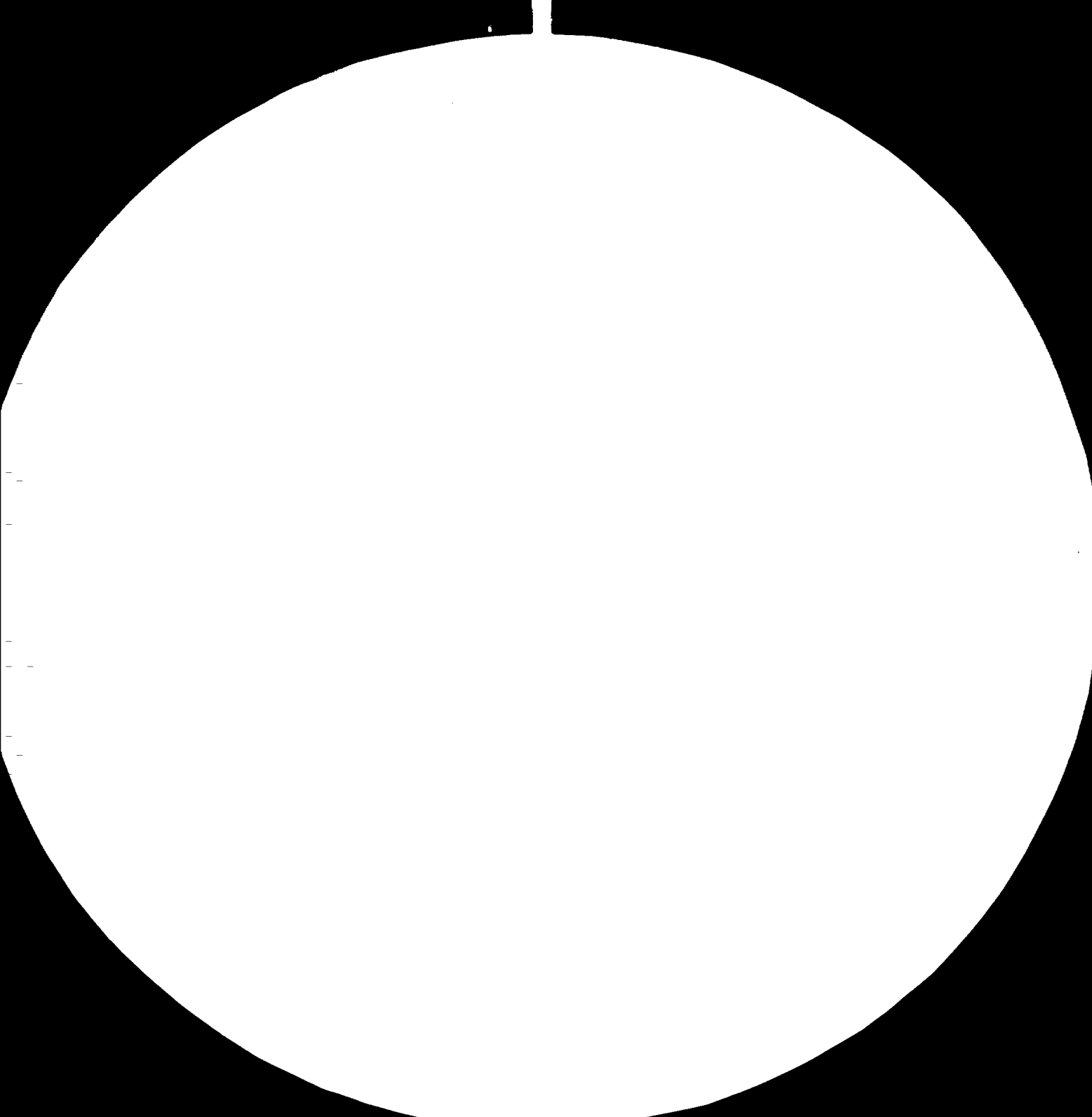
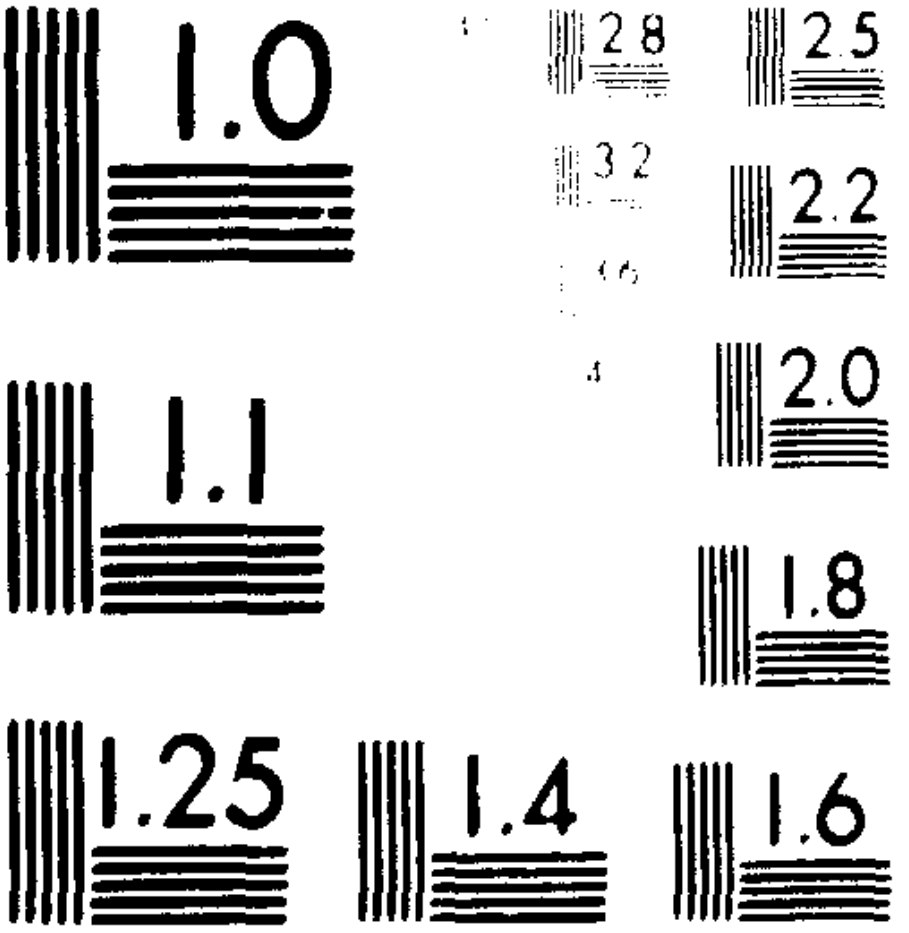
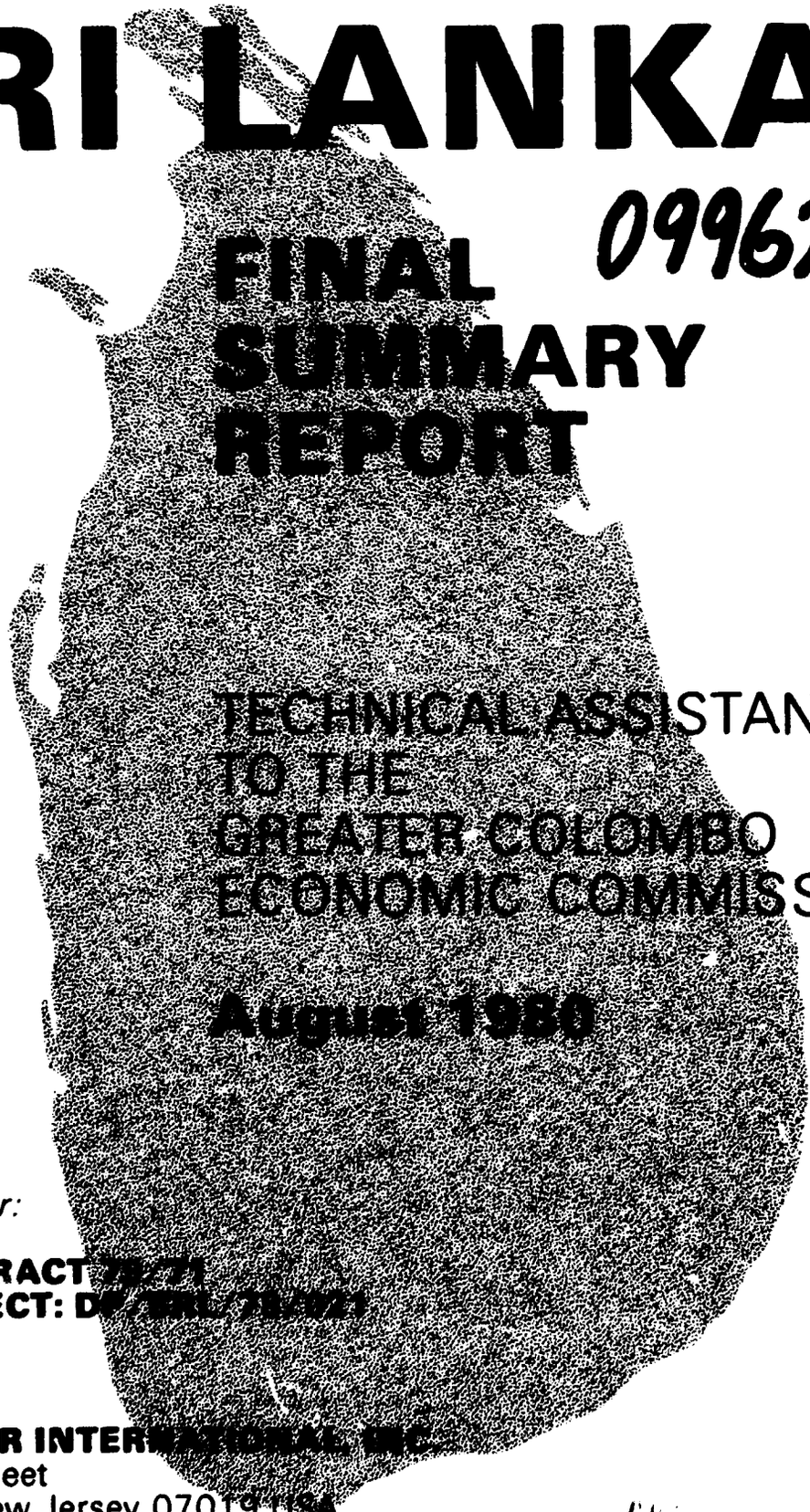




SRI LANKA

09962

FINAL SUMMARY REPORT



TECHNICAL ASSISTANCE TO THE GREATER COLOMBO ECONOMIC COMMISSION

August 1989

Submitted under:

UNIDO CONTRACT [illegible]
UNIDO PROJECT: [illegible]

Submitted by:

LOUIS BERGER INTERNATIONAL INC.
100 Halsted Street
East Orange, New Jersey 07019 USA

SRI LANKA

FINAL SUMMARY REPORT

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TECHNICAL ASSISTANCE
TO THE
GREATER COLOMBO
ECONOMIC COMMISSION

August 1980

Submitted under:

UNIDO CONTRACT 79/71
UNIDO PROJECT: DP/SRL/78/021

Submitted by:

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August 23, 1980

Mr. D.F. Mant, Chief
Purchase and Contracts
Service Section (PAC/IOD)
United Nations Industrial Development
Organization (UNIDO)
Vienna International Centre
P.O. Box 300
A-1400, Vienna, Austria

Dear Mr. Mant:

Reference: UNIDO Contract 79/71
UNIDO Project No. DP/SRL/79/021
Assistance to the Greater Colombo
Economic Commission

We are pleased to submit herewith thirty (30) copies of our final report, and five (5) copies of our foreign currency invoice No. 6, in accordance with paragraph 2.09 d) and 4.04 b) vi) of the above contract.

We were gratified to receive the complimentary results of UNIDO's review of our draft final report, and have made the editorial and typographical corrections noted to be necessary.

Yours truly,

Donald C. Marsden

Donald C. Marsden
Louis Berger International, Inc.

DCM:sj

Enclosures

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CHAPTER I

I. SUMMARY

UNIDO signed a contract on 28 May 1979 with Louis Berger International, Inc. for the provision of practical assistance in the form of advice, guidance, and management support to the Greater Colombo Economic Commission (GCEC) in planning and implementing various industrial development activities with focus on the preparation of physical plans and detailed designs for two to three industrial investment promotion zones (IPZs), including Katunayake Phase II. Other sites identified for evaluation and possible IPZ implementation include Biyagama and Welisara (subsequently dropped by GCEC due to lack of water). The work scope includes related analyses and assistance in area demarcation and micro-plans of support infrastructure as well as identification of priority projects. The contract originally called for the provision of 26 man-months field service and three man-months headquarters support over a two-year period. The contract was amended to enable field staffing to be responsive to actual work requirements and to accelerate the elapsed time for completion of detailed designs for IPZ zones within 18 months. The amendment eliminated the provision of environmental expertise under the contract and provided that such assistance would be provided by a separate UNIDO consultant.

Consultant services have been provided in conformity with the approved accelerated schedule. Delays experienced in the mobilization of GCEC counterparts, facilities, and equipment initially impeded the GCEC/Berger project team's output of detailed design drawings. However, the impact of these delays was overcome, allowing economic and industrial analyses, IPZ physical planning and detailed design, and tender documentation as well as micro-planning inputs to be completed on schedule at the end of March 1980. Assistance in the final review of plans and cost estimates was provided in the first week of April. This schedule enabled the GCEC to issue tenders for IPZ construction in April. At the beginning of April 1980, Berger had provided approximately 25 man-months of field advisory services and about 1.5 man-months of headquarters support, leaving approximately one man-month of field service and about 1.5 man-months of headquarters time for report preparation and for assistance in bid assessment, as planned. This work is expected to take place in June 1980.

Katunayake Investment Promotion Zone Phase II (KIPZ-II) is a 132-acre extension of KIPZ-I. The site is adjacent to the Katunayake airport and is about 18 miles by road from Colombo port. There is also a rail connection to the port. The master plan for KIPZ-II provides for 55 industrial plots covering 96.40 acres. The Administration Plaza, service industries,

and other services are located in the KIPZ-I. The total KIPZ site contains 129 industrial plots covering 225 acres; it will generate direct employment of 46,000 people by the end of 1982.

The Biyagama Investment Promotion Zone (BIPZ) is located 15 miles east of Colombo on the Kelani River. It will have both improved highway connections to the port and the Katunayake airport and barge service to the Colombo port. The gross site area is 451 acres made up of two blocks of adjoining land. The southern block will be terraced and graded into two levels, and the northern plot will be graded only on one level. The Biyagama Investment Promotion Zone Phase I (BIPZ-I) will be made up of 212 buildable acres in the upper terrace of the southern block and five acres on the lower terrace and in the northern block. It will contain the Administration Plaza, service industries, and other basic services for the entire BIPZ. Forty-three industrial plots covering 150 acres will generate direct employment of about 15,000 people.

BIPZ-II buildable land amounts to 171 acres made up of the lower terrace in the southern block and the northern block. It will contain 54 industrial plots covering 143 acres and will generate direct employment of about 15,000 people. The balance of the buildable land in the IPZs will be used for infrastructure. In addition, the BIPZ will have a water intake structure and pipelines offsite on the bank of the Kelani River. The BIPZ effluent pipeline will discharge seven miles downstream from known major public and private water intakes along the river.

The IPZs will have a major positive impact on the economy of the GCEC Area of Authority. Total new direct and indirect employment generated by GCEC investment, promotion, and development of supporting infrastructure is estimated conservatively to amount to 220.3 thousand by the end of 1983. This new employment exceeds the total employment of 194.4 thousand in the area in March 1979. The resultant growth in area population is estimated at 6.5% to 7.6% per year during that period. Identified and planned priority area development projects can be seen in the Development Projects Key Map (Appendix A).

Construction of KIPZ-II is expected to be completed by the end of 1980, BIPZ-I by October 1981, and BIPZ-II during 1982. Full employment in the KIPZ-II is expected to be achieved by the end of 1982, with the BIPZ reaching the 75% level by the end of 1983. The GCEC investment promotion program is expected to be at least as successful in the future as it has been to date. On this basis, a gap of up to 10 months during 1981 in availability of industrial sites for interested investors is

expected unless quick action is taken to plan, design, and construct additional smaller site(s) before the BIPZ industrial space is available. Likely candidates for these are a Phase III 40-acre expansion of the KIPZ and/or development of the potential site at Boosa, Galle District.

The estimated construction costs for the KIPZ-II and the BIPZ-I and II are summarized in Table I-1. These figures reflect both estimated actual costs and the assumed proportion that might become a GCEC budget requirement. The latter, and lower, figures are based on GCEC representatives' advice that telecommunications and electric power capital costs would be borne by the budgets of the government agencies installing those facilities and by end users. The figures also reflect area allocation of common facilities and construction phasing. Details are discussed in Chapter VI.

Table I-1

ESTIMATED IPZ CONSTRUCTION COSTS BY PHASE
(Million Rupees)

		KIPZ-II	BIPZ-I	BIPZ-II	Total BIPZ
A.	Estimated Actual				
	Sites Costs	118.0	241.3	98.9	340.2
	Common to KIPZ-I	10.5	-	-	-
	Associated Costs	-	15.2	-	15.2
	Other Costs	-	12.2	-	12.2
	Total	128.5	268.7	98.9	367.6
B.	Estimated GCEC				
	Budget Required	39.2	174.5	29.2	203.7
C.	Time Phasing (Budget)				
	1980	39.2	71.0	-	71.0
	1981	-	103.5	-	103.5
	1982	-	-	29.2	29.2

CHAPTER II

II. INTRODUCTION

A. Objectives

The objectives of this project are as follows:

"The project is aimed at promoting planned industrial development in the Area of Authority of the Greater Colombo Economic Commission (GCEC), thereby providing employment opportunities in, and technology transfer to, Sri Lanka. To promote foreign investment in Sri Lanka, foster economic development, diversify the sources of foreign exchange earnings and to increase export earnings.

To promote the establishment and further growth of the Investment Promotion (Free Trade) Zone adjacent to the Colombo Airport (Katunayake) and the setting up of light industries in this Zone. To plan, promote and assist with industrial development in zones designated for heavy industries, one such zone being situated to the south of the Area of Authority of the GCEC, adjacent to the Kelani River in the region of Biyagama.

To assist the GCEC in preparing designs and specifications for tender for the construction of all necessary infrastructure within the Area of Authority of the GCEC and to assist, as necessary, in evaluating all tender bids for the construction of the required infrastructure.

To prevent pollution and spoilage of the environment (e.g. atmosphere, water, landscape, noise) and prevent health hazards within the Area of Authority of the GCEC, by advising on all aspects of environmental and effluent control and by designing the necessary preservation schemes and treatment plants.

To develop staff capability of the Engineering Services Division of the GCEC."

B. Scope of Work

The UNIDO signed a contract on 28 May 1979 with Louis Berger International, Inc. for the provision of practical assistance in the form of advice, guidance, and management support to the GCEC in the planning of various industrial development activities identified in the terms of reference. In brief, the work scope includes assistance in the following areas:

1. Drawing up guidelines for industrial development with emphasis on the location and scale of industries, taking into account national industrial development policy and the socioeconomic and physical characteristics of the GCEC Area of Authority; examination of the feasibility of promoting industrial development using indigenous raw materials and technology and the possibility of creating employment opportunities; and listing feasible projects and/or industrial categories and profiles of those suitable for promotion. The focus of such work is to be toward the preparation of physical plans for the three industrial zones already selected (Katunayake PhaseII, Welisara, and Biyagama) and the location and scale of supporting services to these zones. In this connection, identification is to be made of suitable industries or industrial sectors to be established in the IPZs, including recommendations as to scale, manpower, and infrastructure requirements.

2. Preparation of plans for the IPZ sites and detailed plans and designs for the necessary infrastructure.

3. Examination of the need for housing, service industries, commercial areas, repair facilities, etc., in relation to the IPZs. In the case of the KIPZ-II, the proposed plans for development of Negombo would be taken into account and assistance would be given in the demarcation of areas and the preparation of a micro-plan for the location of these support facilities.

4. Estimates of costs for implementation of 2 and 3 above.

C. Contract Amendment

The contract originally provided for the services of an environmental expert. It also initially called for the provision of 26 man-months of field advisory services and three man-months of home office support over a 23-month period. The contract was amended to enable field staffing to be responsive

to actual work requirements and to accelerate the elapsed time for completion of detailed designs for IPZ sites within 18 months. The amendment eliminated the provision of environmental expertise under the contract. It provided, instead, that UNIDO would "arrange for an environment expert to provide consulting services to the GCEC to perform a detailed analysis of all relevant factors that could affect the environment as a result of industrial development within the Area of Authority of the GCEC, with a view to establishing complete environmental control within the area. The timing of the services of this expert will be phased to take place immediately after the identification of suitable industries and their scale, and to be concurrent with the development of the zoning plans and infrastructure guidelines."

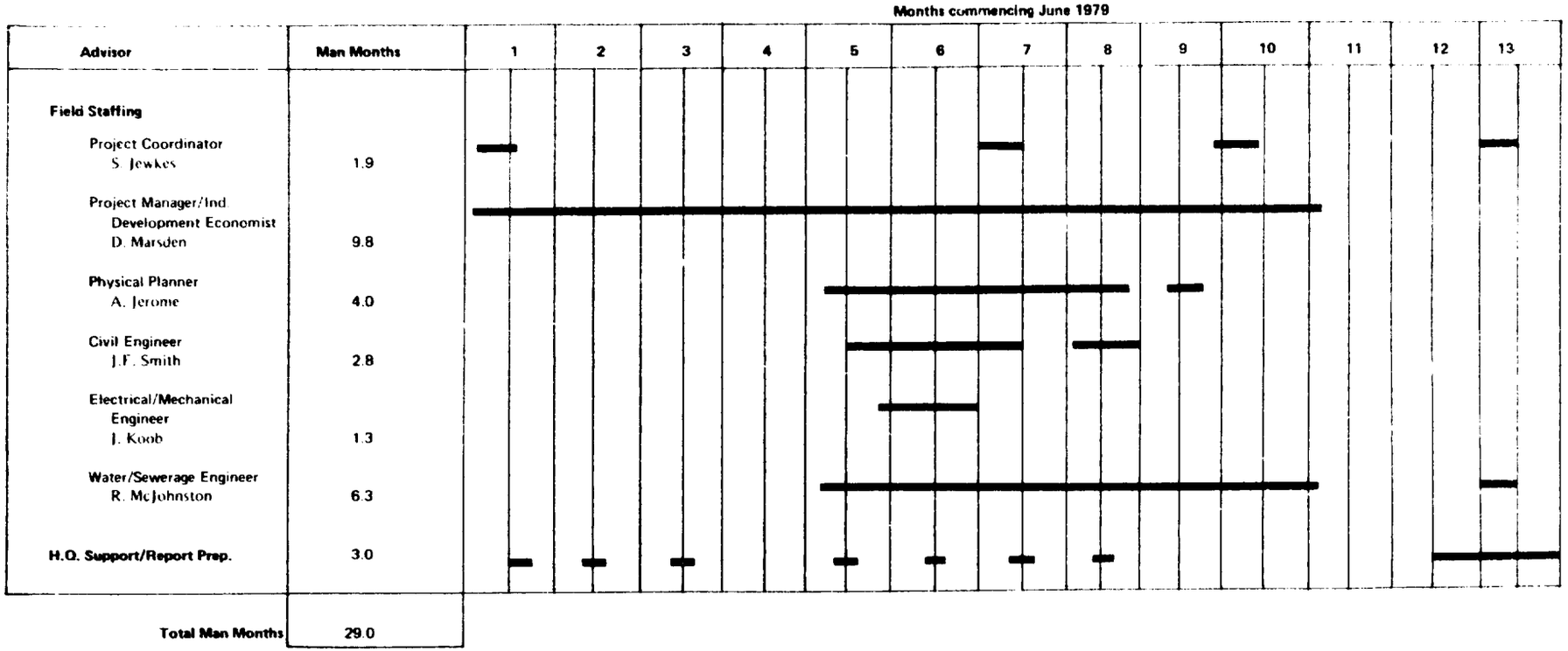
D. Staffing

Consultant services have been provided in conformity with approved schedules. The Project Team Leader and Project Coordinator arrived in Sri Lanka to start work on 7 June 1979. The balance of the Berger advisory team arrived on-site in October 1979. Some delay (three to four weeks) was experienced in the mobilization of counterpart engineers, draftsmen, and related equipment. However, overall project progress was subsequently satisfactory and the impact of these initial delays was overcome, allowing completion of IPZ physical planning, detailed design, and tender documentation to be completed on schedule at the end of March 1980, with final review completed in the first week of April. At that time, approximately 25 man-months of Berger field advisory services and about 1.5 man-months of headquarters support had been provided, leaving about one man-month of field services and 1.5 man-months of headquarters support available for assisting the GCEC in bid assessment in June 1980 as planned. A bar chart, Figure II-1, details Berger advisory staffing. GCEC counterpart staffing is shown in Figure II-2.

Professor Raman, the UNIDO environmental expert, arrived in Sri Lanka in February 1980, in time to review and confirm that the project team's plans and designs took proper account of environmental considerations.

Figure II - 1

PROJECT ADVISORS STAFFING



Note: UNIDO Environmental Consultant not shown above because not a member of Berger team, although worked in association during February March 1980 and continued separately during April and May 1980.

Figure II-2

GCEC/GOVERNMENT PROJECT PERSONNEL

Post No.	Post Description	Name of Incumbent	Full/ Part Time	Assumed Duty (Month/Year) Schedule	Actual (Est.)
	a) Project Liaison-Engineer	G.L. Perera	Part	6/79	6/79
	a) Project Liaison-Planning	G.K. Amaratunge	Part	6/79	6/79
	Project Engineer Coordinator	S.W. Gunawardena*	Part	10/79	10/79
	Project Engineer Coordinator	E.R. Siriwardena	Part	12/79	12/79
	Project Engineer Coordinator	M. Fonseka**	Part	12/79	12/79
LH	Roads Engineer	S. Sriskandapathy	Full	10/79	11/79
LW	Water/Sewerage Drainage Engineer	N. Ferdinando xxx	Full	10/79	11/79
L	Draftspeople - Planned Actual	8	Full	10/79	
		5	Full		11/79
		1	Full		12/79
		2	Full		1/80
	Quantity Take Off/Cost Estimate	N. Dharmaraiah	Part	11/79	11/79
	Field Surveys	L. Fernando xxx	Part	1/80	1/80
		G. Premaratne	Full		2/80
		L. Wijesinghe	Full		3/80
	Economic Research Assistant	S. Mataraaratchi**	Part	6/79	6/79
	Planning Assistant	Rupa K. Perera	Full	11/79	11/79
	Economist/Planning Assistant	Gamini Ranasinghe	Part	11/79	11/79
	Enivronmental Engineer	K.G.D. Bandaratillake**	Part	6/79	6/79

* Absent from project month of December, returned January 1980, full-time commencing February 1980,

** Transferred from project late December 1979, Bandaratillake returned February 1980

xxx Transferred from project March 1980

a) Senior managers, respectively, of Engineering Services Division and Local Authority/Regional Planning Division

LH On loan from Highway Department

LW On loan from National Water Supply and Drainage Board

L Five draftsmen on loan from above agencies and Mahaweli Ministry

Mr. S.W. Gunawardene also participated in actual engineering design work

E. Report Content

As specified in the UNIDO contract with Louis Berger International, Inc., the focus of Berger's work on the project is on the provision of practical assistance and help in the production of plans and detailed designs rather than on lengthy reports. In accordance, project analyses and working papers produced were for internal project team use and/or internal GCEC reports. The principal documents of this nature are indicated in the listing of major project activities/outputs in Chapter III.

This summary report contains a description of the work program and technical approach used in this project, the major project activities/outputs, industrial development and IPZ investment promotion profiles, a description of the IPZs and their estimated construction cost, and descriptions of supporting infrastructure micro-plan inputs. Certain key documents, such as IPZ site land use, industry investment, and employment generation profiles (Appendix B) and infrastructure requirements analyses, are included. The report also contains individual IPZ master plans and a GCEC Area of Authority Development Projects Key Map (Appendix A), which demarcates priority, supporting infrastructures, housing, and service industry micro-plans. A list of the plans and detailed design drawings produced is also included (Appendix C).

CHAPTER III

III. WORK PROGRAM

A. Major Tasks

The major tasks in the conduct of work under this project can be classified into seven categories. They are:

1. Review of the existing situation, work planning, and work coordination.

2. Research and analysis of required economic/industrial and engineering studies and related data collection.

3. Preparation of industrial development guidelines with focus on industrial investment promotion in the IPZs; evaluation of IPZ land use, infrastructure, and utility needs; identification of supporting infrastructure needs; and identification/definition of priority development projects.

4. Preparation of preliminary master plans, detailed site plans, and related designs for site infrastructure utilities and micro-plans for supporting infrastructure.

5. Finalization of master plans, detailed site plans, infrastructure designs, and micro-plans, taking into account necessary environmental controls and project cost analysis.

6. Preparation and issuance of tenders for infrastructure construction.

7. Evaluation of bids in response to 6 above.

Figure III-1 outlines the timing of the foregoing activities by the combined GCEC/Berger project team.

In accomplishing the foregoing, Berger team members functioned in a participatory advisory role, providing guidance, advisory inputs and support, and hands-on job training to counterparts.

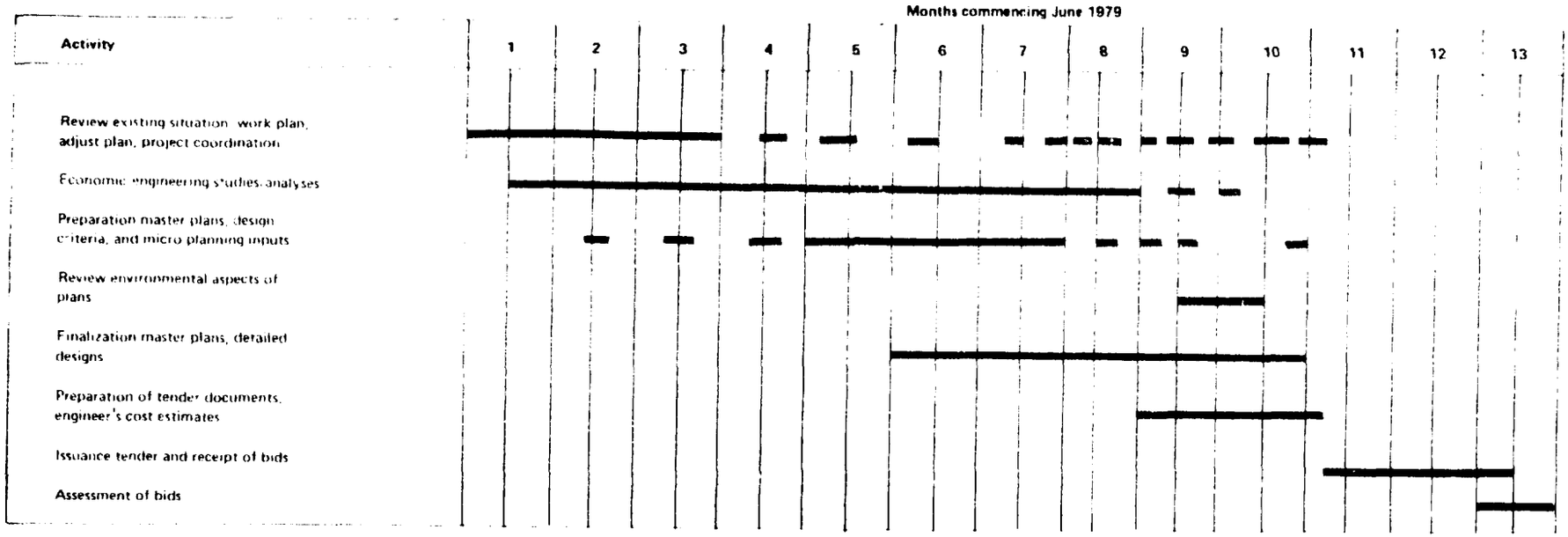
B. Technical Approach and Conduct of Work

1. Approach

The physical planning and detailed designs of IPZs must be framed in the context of the region in which they are located,

Figure III - 1

PROJECT WORK PROGRAM



the domestic resource base, and industrial development/ investment promotion policies, as well as the IPZ sites' physical conditions and engineering requirements. In this connection, account must be taken of an area's population, present employment, and potential to provide a labor force, as well as the extent of existing, proposed, and/or need for supporting infrastructure, housing, transport, and other services.

Thus, the technical approach to project work was first to carry out the foregoing examinations and analyses in order to determine the guidelines for industrial development, the preliminary industrial investment and land use requirements for each IPZ site, as well as preliminary profiles of IPZ service industry, infrastructure, and land use requirements. Next, preliminary IPZ master plans were prepared in conjunction with parallel engineering analyses of the sites' physical condition, alternative site preparation configurations, and physical plans to achieve maximum productive use of the total site areas available. The site preliminary master plans and engineering analyses were then cross-evaluated, taking into account technical infrastructure requirements, to arrive at the revised master plans that became the basis for the development of detailed site designs. As the detailed design work progressed, adjustments were made to the master plans to reflect both the sites' actual industrial space availability and their physical design requirements. The IPZs' industry sub-sector investment land use and employment generation profiles were correspondingly adjusted; and the sites' sub-division, industry zoning, and landscaping plans were prepared. These revised profiles were used as the basis for calculation of IPZ infrastructure, power, and utility requirements, which then were used as the basis for detailed engineering designs for site facilities and services.

In order to accelerate the accomplishment of project work to achieve GCEC time objectives, some elements of the foregoing process were carried out on an overlapping basis, utilizing basic engineering study data as they became available, and making necessary adjustments as more precise engineering data became available. The necessity for, and value of, such a procedure stemmed both from target project completion dates and the initial delay in the mobilization of GCEC counterpart personnel, equipment, and facilities. While this procedure resulted in a certain amount of re-work, the end results were good and timely.

The final IPZ master plans and industry sub-sector investment and employment generation profiles then were used as inputs, together with the results of separate socioeconomic studies, for area population and employment projections; for the

identification and definition of GCEC area supporting infrastructure requirements and priority development projects; and in the demarcation of development project areas and related micro-plans for service industries, housing, transport, etc.

In carrying out the foregoing, the necessary close coordination of the various elements of project work was accomplished through weekly project meetings and periodic review of work progress against detailed plans.

2. Conduct of Work

a. Situation Review, Work Planning, Data Collection, Basic Studies

Initial project work involved the collection of available socioeconomic, basic technical, and engineering data; the initiation of required basic engineering studies and socioeconomic studies; and an evaluation of the overall project work schedules and recommendations of necessary changes. These recommendations, contained in a proposed contract amendment of 17 August 1979, were approved by the UNIDO in September 1979.

b. Socioeconomic/Industrial Analysis

The socioeconomic analysis of the GCEC Area of Authority covered population and employment and included the preparation of a profile of the area's general economic and industrial structure by GCEC Local Authority. This analysis was based on Central Bank, Census Department, Labor Department, and local authorities' statistics as well as information obtained from the Ministry of Industries and Scientific Affairs, the Industrial Development Board, and the Ministry of Agriculture. Data on individual industrial plants and industry sub-sectors were obtained from the same sources as well as through analysis of investment promotion applications, licenses issued by the GCEC, and reference to UNIDO documents on industry. From the foregoing, industry and industry sector profiles were assembled. An evaluation of Sri Lanka's industrial development and investment promotion policies was made, particularly with respect to the use of domestic resources and with focus on investment promotion in the Investment Promotion Zones (IPZs). Industrial development in IPZs in other countries was reviewed. Data collected on GCEC area social welfare facilities, housing, transport and other services were also evaluated.

Based on the socioeconomic/industrial analysis and related discussions with GCEC officials and officials of other agencies concerned with industrial development, recommendations for industrial investment promotion in the IPZs were made. As

a corollary, preliminary profiles were drawn up of industry sector investment, land use, and employment generation as well as total land use, including infrastructure and services by IPZ site for use by the team's physical planner and design engineers. Recommendations for investment promotion are outlined in Chapter IV of this report. At the request of the GCEC Board, a comparative analysis of IPZ development costs and the pros and cons of potential sites at Biyagama, Welisara, and an alternative site at Katana was carried out. The Welisara site was subsequently canceled by the GCEC because of water supply problems.

The above preliminary analyses were subsequently refined and finalized following completion of the IPZ site master plans. Together with other socioeconomic survey data, the analyses were used for identification and assignment of priorities to supporting infrastructure needs, to define priority development projects, and as inputs to micro-planning.

c. Physical Planning and Designs of IPZs

Physical planning and design work was directed to achieving maximum use of available land at selected sites at a cost acceptable to the GCEC. Preliminary IPZ master plans, including industry and service area sub-divisions and infrastructure reservations, were drawn up based on the preliminary IPZ profiles, which were developed as outlined in section b above. Simultaneously, engineering analyses of alternative site preparation plans (including terracing, as in the case of Biyagama) were carried out using available contour maps to determine the least cost basis for maximum efficient land use. Infrastructure requirement analyses were carried out concurrently based on the preliminary IPZ profiles. The three sets of analyses were then cross evaluated, and the master plans were finalized. These plans were then used to adjust the IPZ industry profiles and the power, lighting, and utility requirement analyses. Detailed infrastructure designs were then carried out and adjusted to take into account more refined or additional basic engineering data generated by on-going field surveys (i.e., two-foot contour maps) and field surveys of site locations of specific ground level construction and structures. Preliminary industry zoning plans for the IPZs were prepared, as well as landscape designs.

Tender documentation for construction of the sites was prepared in the latter stages of the work. In addition, specifications for the design and construction of water and sewerage structures were also prepared for tender.

The design criterion used for site preparation (grading and terracing) was a maximum slope of 3.3%. In the case of the Katunayake IPZ Phase II (KIPZ-II), most of the site was relatively level. There is an area of about 20 acres of low-lying land that requires fill to be rentable to investors. The minimal grading of the overall site satisfies this criterion at least cost and insures proper site drainage and efficient infrastructure designs. The final grading was 0.8% maximum.

Because there can be up to a 10% error in contour maps, and some degree of error in the precision of both earthwork calculations and the actual conduct of earthworks against design, provisions for the modest surplus are contained in the grading plans, which should preclude the need for purchases of additional fill in construction. The largest potential surplus of earth is in the lower BIPZ block A terrace (BIPZ-II), and to the extent that it actually materializes it can be used to extend the buildable land area in what would otherwise be solely a drainage area.

The Biyagama site (BIPZ) is hilly, although it has large areas of relatively level ground. It requires terracing for efficient use. Four alternative approaches to the terracing and grading of the site were evaluated to select the plan with the least cost and the maximum land utilization. Site preparation provides for two terraces in block A, each with a maximum grade of 3.3%, stockpiling of sufficient topsoil for a four-inch fill over grade in areas to be landscaped, and commercial quarrying and sale of a few granite deposits in the BIPZ site prior to construction.

Internal IPZ roads and reservation areas were designed to meet site sub-division plot access requirements in an efficient manner and with the lowest road mileage possible. Normal standards for construction were used, and turning radii for trucks and container vehicles were provided. The reservation areas were sized to permit the installation of utilities, drains, street lighting, sidewalks, and driveways from individual plots to the roadway and to accommodate landscaping. Roads are on grade, except for two short roads between terraces at the BIPZ and a short BIPZ access road to the Kelani River road and barge landing. For these roads, the maximum grades are 6.0%, which is an internationally acceptable truck grade.

The number of utilities and drainage crossings of roadways was minimized, and standardized ducts are installed at intervals under the roadway for utility, power, and communication lines to reduce the possible need for road reconstruction.

The use of standardized unit designs was also applied to utilities, drainage systems, power, and lighting to facilitate construction and minimize costs.

Selection of water supply sources was based on least cost and an assessment of potential availability to meet IPZ demand with an assured acceptable supply on IPZ completion. Thus, initial supply at the KIPZ is restricted to tube wells. In the case of the BIPZ, a river intake system was selected because groundwater is limited, adequate supply from the Churchill reservoir is questionable at the time of site completion, and the cost of a pipeline from the reservoir to the site is equivalent to the cost of the river intake system. Standard water and sewerage treatment package plants are specified. In consultation with GCEC officials, the use of an effluent disposal pipeline to discharge downstream from established major public and private water intakes was decided upon for safety reasons. The IPZ sewage system requires pretreatment by industrial plants to remove dangerous nonorganic effluents. Garbage disposal is planned to be by private contractor off site.

d. Major Project Activities and Outputs

(1) Period June 1979 - December 1979

- Analyses: economic/industry sub-sector, demography, supporting infrastructure in GCEC Area of Authority, and domestic resources base.

- Comparative analysis of IPZ development costs, including pros and cons of development of possible sites at Biyagama (BIPZ), Welisara (WIPZ), and Katana.

- Assistance in identification, definition, and cost estimation of priority development projects.

- Assistance in development of preliminary micro-plans and analytical inputs and guidance with respect to IPZ supporting infrastructure and related inputs to regional plans.

- IPZ industry sector investment promotion profiles, land use, and employment generation for Katunayake, Biyagama and Welisara.

- Master plans for space utilization, including infrastructure, industry plot sub-divisions, and zoning for KIPZ-II and BIPZ.

- Definitions of utilities and other IPZ infrastructure needs and capacity requirements by site.

- Preliminary engineering designs for site grading, roads and drainage, water and sewerage, electric power, and communications for KIPZ-II and BIPZ.

- Detailed designs for KIPZ-II grading, road layout, plans and profiles, typical details, etc.

- Detailed designs for BIPZ site terracing/grading plus commencement of layout detailed designs.

(2) Period January 1980 - April 1980

(a) Socioeconomic and Engineering Studies, Analyses, and Planning

- Population and employment growth study.

- Population/employment growth projections for GCEC area.

- Socioeconomic survey of factory workers with a focus on IPZ housing and transport needs and related analysis.

- Field surveys carried out and/or initiated: KIPZ-I and II link road location; site of KIPZ-I and II link pipelines; alternative routes for BIPZ access road to river to minimize housing displacement; route of possible effluent disposal pipeline; sites for BIPZ water intake station and pipeline.

- Analyses of IPZ worker housing/transport.

- Edited report on electric power distribution, lighting, and communication for IPZ.

- Tender documents for IPZ site construction and design/construction of utility structures.

- Preparation of KIPZ-II and BIPZ bills of quantities and cost estimates.

- Preliminary landscape designs for KIPZ-II and BIPZ.

- Micro-plans for IPZ dormitories and other worker housing, including:

Prototype dormitory building plans and site plans.
Prototype site plans for workers' housing.

- Analysis of alternative designs for drainage systems.

- Preliminary designs of drainage system for KIPZ-II and BIPZ.

- Finalization of BIPZ access highway trace and improvement plan.

(b) Plans and Detailed Designs

- KIPZ-II water and sewerage system.

- BIPZ water and sewerage plans and profiles.

- BIPZ road plans and profiles and construction cross sections.

- BIPZ road typical details.

- BIPZ final designs for drainage system; plans, profiles, typical details.

- KIPZ-II final designs for drainage system; plans, profiles, typical details.

- Final KIPZ and BIPZ landscape designs based on drainage system and revised driveway layouts.

- Final adjustments to KIPZ-II and BIPZ internal road designs.

- Design plan and profiles of BIPZ river access road and RO/RO barge landing site.

Advisory assistance and guidance have been provided to the Ceylon Electricity Board and the Post and Telecommunications Department for their detailed designs and construction of the electric power, lighting, and communications systems for the IPZs. All of the physical plans, detailed designs, and tender documentation for other construction in KIPZ-II and the BIPZ have been completed, and the GCEC can proceed with reproduction of documents and drawings for use in requests for bid for the construction of the IPZs.

CHAPTER IV

IV. THE PLANNED INVESTMENT PROMOTION ZONES

A. Introduction

Sri Lanka's general industrial development policies and those applicable to the IPZs have been detailed in several recent Sri Lankan Government and UNIDO documents, including the recently produced GCEC brochure, and therefore, are not repeated herein. An overall statement of industrial policy is contained in Appendix D. In brief, Sri Lanka favors investment in industries that are export oriented, labor intensive, and when possible, resource based.

Potential resource based industries include rubber based products, graphite based products, coir based products, spice derivatives, and products based on such minerals as clay, dolomite, silica, and ilmenite. Investment projects including most of these resources have been approved, and others are under consideration. However, investment projects based on domestic resources are referred to the appropriate ministries for review prior to GCEC decision or approval. This review process takes into account the activities and interest of existing producers, including state enterprises, and the project's impact on potential tax revenues, as would be applicable in the case of rubber based production vs. sheet or block rubber exports. It also takes into account the impact of a project on domestic supplies of commodities, i.e., agricultural products such as food and fibers. Generally, investors utilizing agricultural produce or domestic fibers are expected to develop their own additional supplies or to import their raw materials (i.e., cane).

IPZ investment promotion focus is also aimed toward attracting industry with a potential for technological upgrading and international market growth, such as electronics and precision instruments. Another important foucs is on diversification of investors in the IPZs so that fluctuations in a products' world market have a reduced impact on IPZ employment. While garment producers are significant early investors in the KIPZ, the number of such investments has been kept to a minimum; this policy takes into account quota considerations. Industrial development guidelines and investment promotion policies are reflected in the IPZ industry profiles contained in Sections B and C of this chapter. Service industries recommended for the IPZs include:

warehousing; container yards and transport services; bus terminals; vehicle and other repair services; emergency medical units; banks; accounting; data processing; insurance; engineering; other business services; public telephone and

telex facilities; necessary government facilities such as the Post Office, Customs, and Police; private security organizations; and a fire station at the BIPZ.

It is recommended that investment promotion stress highly valued light weight, higher technology, labor intensive industries in the KIPZ sites, and high water using, heavier weight, and domestic resource based lower employment density industries in the BIPZ. However, the BIPZ should also contain a proportion of light and higher technology high density employment industries. These types of industries are necessary to assure space availability for such investors at an appropriate time and to provide diversification in the make up of each IPZ. It is considered particularly important since development of the Welisara site, originally intended for electronics investors, has been deferred.

The GCEC investment promotion incentives to new investors are competitive to IPZs in other countries and are considered realistic in application. They have been widely publicized, and the GCEC investment promotion program, thus far, is successful. Changes could have an adverse effect at this early stage of development; thus, no changes were recommended.

B. KIPZ-II

1. General

The KIPZ-II is a southwestern extension of the first phase development (KIPZ-I) of an investment promotion zone adjacent to the Katunayake International Airport. The site, which is gently sloping and covered with coconut trees, is adjacent to the Canada-Ceylon Friendship Highway. When developed, the site will be cleared, graded, and landscaped. The KIPZ-II will be connected to KIPZ-I by a link road crossing the baseline road, which separates the two sites and provides direct access to the highway and a rail siding. A bus terminal and security clearance center for personnel entering KIPZ-II is sited in KIPZ-I opposite the entrance to the KIPZ-II site. The water and sewage treatment plants and reservoir, Administration Plaza, and other basic services and facilities for both KIPZ-I and II will be located in the KIPZ-I. A small hotel is located on the KIPZ-II site, outside its perimeter security fence.

2. Land Use, Industrial Investment, and Employment Generation

Tables IV-1 and IV-2 detail overall site land use by type and expected industry sector investment, land use, and employment generation on a two-shift basis. These profiles were reviewed

and approved by C.E.B. officials. Copies of the site master plans (sub-division and industry zoning plan) are contained in Appendix A.

Table IV-1

THE KIPZ-II LAND USE

	Acres
Total Area	131.94
Hotel	7.72
Roads and reservations	16.48
Security corridor and provision for highway expansion	9.14
C.E.B. sub-station	1.00
Water works	1.20
Sub-total	35.54
Available for industrial use	96.40

3. Engineering Features

a. Roads, Driveways and Sidewalks, and Drainage: The major internal road is a ring road connected to the KIPZ-I-II link road. Two short, secondary dead-end roads give access to four large plots in the lower west end of the site. The major roads have a 120-foot reservation and secondary roads have a 60-foot reservation. Carriageways are 24 feet with concrete curbs, and there is a 25-foot wide paved driveway access to each plot. The roads have a rock base with asphalt paving. The road turning radius is 45 feet to accommodate trucks and container vehicles, and the roads are paralleled by 10-foot wide concrete sidewalks and concrete and masonry storm drain channels. These channels conduct drainage to the stream at the lower perimeter of the site.

b. Utilities: Water supply will come from 46 shallow tubewells on site. Boosters will deliver the raw water to a new conventional rapid sand filter and treatment plant in KIPZ-I, which will process one million gallons per day, essentially to remove iron and bacteria, for distribution to

Table IV-2

FORECAST: KIPZ INDUSTRIAL LAND USE AND EMPLOYMENT PROFILE

	TOTAL KIPZ			KIPZ I (ALLOCATED)			KIPZ II		
INDUSTRY	Firms	Empl.	Acres	Firms	Empl.	Acres	Firms	Empl.	Acres
Garments	24	15,361	46.50	24 (18)	15,361 (11,479)	46.50 (44.0)	-	-	-
Other textiles	23	12,389	53.05	13 (10)	4,628 (4,025)	20.75 (13.0)	10	7,761	32.3
Lapidary/jewelry	15	2,548	15.75	15 (2)	2,548 (576)	15.75 (1.5)	-	-	-
Electronics	7	3,220	13.25	5 (1)	1,176 (51)	6.25 (0.5)	2	2,044	7.0
Electrical	18	3,446	20.05	2 (1)	396 (275)	2.0 (1.5)	16	3,050	18.05
Metal products	2	456	11.0	2	456	11.0	-	-	-
Footwear/travelwear/ rubber/leather	5	2,966	17.0	5 (1)	2,966 (234)	17.0 (1.0)			
Pharmaceuticals/ cosmetics/toiletries	10	3,429	21.3	1	100	1.0	9	3,329	20.3
Precision/inst./equip.	16	1,049	16.65	-	-	-	16	1,049	16.65
Food	2	483	2.0	2 (2)	483 (483)	2.0 (2.0)	-	-	-
Miscellaneous	7	685	18.1	5 (5	585 585	6.0 6.0)	2	100	2.1
Total	129	46,032	224.65	74 (39)	28,699 (17,602)	128.25 (65.5)	55	17,333	96.4

Sources: Engineering Site Analysis, Physical Land Use Master Plan, GCEC Investment Promotion Policies and Investor Applications

the KIPZ complex. Total storage capacity of filtered water is to be 1.25 million gallons in above-ground rectangular concrete reservoirs (KIPZ-I). System pressure and fire protection flow are to be adequate. KIPZ-II distribution is to be an extension of that for KIPZ-I.

Sewage of KIPZ-II will be collected by gravity sewers and a lift station installed to deliver the sewage directly to the existing treatment plant in KIPZ-I, where capacity is adequate for the added flow. The plant is a mechanically aerated basin type. The end effluent will flow by way of a nearby stream to an inland waterway flowing toward a marshy area near the coast. Calculations for water demand and the resultant water and sewerage requirements are shown in Appendix C.

In regard to potential expansion of the KIPZ-I and II underground water and sewerage systems to serve additional development in adjacent IPZ space, there is room for the expansion of water filtering and storage facilities, and present waste treatment works appear adequate to process additional loads with modification and the addition of a polishing pond. There are natural waterways into which surface drainage can be directed.

c. Electric Power, Lighting, and Communications: Electric power capacity requirements in KIPZ-II are estimated at 18,000 KVA, including industry, road lighting (at 98-foot intervals), security fence lighting (at 50-foot intervals), and other uses. A total of 45,000 KVA is required when taking into account KIPZ-I. The Ceylon Electricity Board will provide a capacity of up to 60,000 MW to serve the KIPZ and its surrounding area. Adequate domestic and international telephone and telex facilities will be available to site occupants (see Appendix E for further details).

d. Security Fence and Patrol Corridor: An 8-foot, 11-strand barbed wire and concrete post perimeter fence will be installed with flood lighting every 50 feet. There will be a 20-foot wide corridor inside the fence for security patrol by jeep. There will also be a security check point at the site entrance on the link road for transport and a personnel security check adjacent to the bus terminal in KIPZ-I at the junction of the link road and the baseline road.

e. Landscaping: The 30-foot wide area between the sidewalks and the outer edges of both sides of the road reservation areas will be landscaped, which will include ornamental trees lining the sidewalks, shrubs along the outer boundaries of the reservation areas, and grass in the remaining area.

C. The BIPZ

1. General

The Biyagama site is located approximately 15 miles east of Colombo adjacent to the Kelani River. The land is hilly, but there are large relatively level areas. The site is made up of two blocks of land: block A, adjacent to the river, is approximately 372 acres, and block B, to the north of block A, is about 79 acres, for a total of 451 acres. The two blocks are separated by a road and a small residential area. This road will be improved and connected to a highway, also scheduled to be improved, that goes west to Kandy Road. It will be the main road to the BIPZ. There will also be an access road on the south end of the site, connecting to a barge landing on the Kelani River. This road crosses a road paralleling the river, which is a main bus route that will serve the IPZ as well.

The GCEC Board has directed that development of the BIPZ take place in two phases, the first of which (BIPZ-I) is to cover about 211 acres. BIPZ-I is thus planned to contain about 50% of the site's built-up area and will be located on the upper of two terraces in block A. It will also include the sites of the zone's water tower, which is in block B, and the sewage treatment plant, which is located in the lower terrace for engineering cost considerations.

2. Land Use, Industrial Investment, and Employment Generation

Tables IV-3 and IV-4 detail overall site land use by type, for both BIPZ-I and II, and planned industry sector investment, land use, and employment generation. These profiles have been reviewed and approved by GCEC officials. A copy of the site master plan (sub-division and industry zoning plan) is contained in Appendix A.

As can be seen in the master plan, BIPZ-I will contain the Administration Plaza and services complex for the entire site. As in KIPZ-I, the Plaza will also contain office space for rent by service industries. A fire station, emergency medical unit, and bus terminal will be included in the service complex area. IPZ executive and worker housing is off site, as indicated in the Development Project Key Map, also found in Appendix A. Provision for a RO/RO barge service on the Kelani River is made, as noted in that map.

Table IV-3

THE BIPZ SITE LAND USE

	ACRES		
	BIPZ-I	BIPZ-II	TOTAL
Total site area	266.70	183.93	450.63
Drainage/green areas (economically unbuildable)	49.22	15.71	64.93
Building area	217.48*	168.22	385.70
SERVICES/INFRASTRUCTURE			
Administration plaza (government, emergency medical unit, service industries)	8.05	-	8.05
Bus terminal, security check, customs	5.35[a]	2.10	8.75
Bus loading/parking area	1.30		
Container yard/warehousing	11.70	-	11.70
Maintenance/repair shops	2.90	-	2.90
Fire station	1.00	-	1.00
Roads and reservations**	26.23	24.02	50.25
Water treatment/storage	4.35	-	4.35
Water tower	.75[b]	-	.75
Sewerage treatment plant	3.50[c]	-	3.50
C.E.B. sub-stations	2.20	-	2.20
Subtotal	67.33	26.12	93.45
Available for industrial use	150.15	142.10	292.25

Notes: * Includes 5.05 acres in BIPZ-II areas, i.e.:

a) 0.8 acres lower terrace block for customs/security check at southern site entrance

b) 0.75 acres water tower, block B

c) Sewerage plant 3.50 acres lower terrace block A
The locations selected for engineering and least cost reasons, considering entire site

** Landscaped
Offsite location of water intake and ½ mile access road to barge landing not included in above

Table IV-4

FORECAST: BIPZ INDUSTRIAL LAND USE AND EMPLOYMENT PROFILE

	PHASE I			PHASE II						SUBTOTAL			TOTAL BIPZ		
				BLOCK A			BLOCK B								
INDUSTRY	PLOTS	ACRES	EMPL.	PLOTS	ACRES	EMPL.	PLOTS	ACRES	EMPL.	PLOTS	ACRES	EMPL.	PLOTS	ACRES	EMPL.
Textiles (other than garments)	4	12.40	434	-	-	-	5	16.80	592	5	16.80	592	9	29.20	1,026
Footwear, travel & leather goods	9	20.90	3,045	7	14.00	2,100	-	-	-	7	14.00	2,100	14	34.90	5,145
Rubber products	1	1.20	90	3	4.85	364	-	-	-	3	4.85	364	4	6.05	454
Food processing	4	17.55	1,053	-	-	-	1	5.80	348	1	5.80	348	5	23.35	1,401
Wood, cane and other fibre	10	30.55	1,528	-	-	-	17	34.95	1,770	17	34.95	1,770	27	65.50	3,298
Non-metallic mineral products	1	2.20	75	2	10.95	274	-	-	-	2	10.95	274	3	13.15	349
Metal products	1	29.00	435	5	15.95	399	-	-	-	5	15.95	399	6	44.95	834
Electronics	13	31.80	8,363	12	30.20	7,864	-	-	-	12	30.20	7,864	25	62.00	16,227
Miscellaneous	2	4.55	364	-	-	-	2	8.60	692	2	8.60	692	4	13.15	1,056
Total	43	150.15	15,387	29	75.95	11,001	25	66.15	3,402	54	142.10	14,453	97	292.25	29,790

Sources: Engineering Site Analysis, Physical Land Use Master Plan, GCEC Investment Promotion Policies and Investor Applications

3. Engineering Features:

a. Site Terracing and Grading: Block A is divided into two terraces each with maximum grades of 3.3%. The terraces are separated by a vertical distance of about 30 feet. The plan provides relatively level, gently sloping land for site construction and occupancy, and it ensures good drainage as well as moderate road grades. Block B is on one level, also with a maximum grade of 3.3%. Granite deposits in block A are expected to be quarried and sold commercially prior to site construction.

b. Roads, Driveways, Sidewalks, and Drainage: The internal road system is designed to efficiently serve all plots at least cost, minimizing the need for secondary roads and enabling ease of transit from either of the two site entrances. The road reservations, carriageways, driveways, sidewalks for pedestrians, and drainage systems will have the same designs as previously described for the KIPZ-II. The maximum grade of the roads will be 3.3% except in the case of two short roads between the terraces in block A, which will have a maximum grade of about 6%. The main road to the main barge landing will have a maximum grade of 5%. Drainage channels will carry run-off to undeveloped natural water courses.

c. Utilities: The water supply will be 1.8 million gallons per day (4,545 cubic meters) from an intake structure to be built on the bank of the Kelani River. From the intake structure the raw water will be pumped to the treatment plant on site. The plant will be conventional alum-lime flocculation and rapid sand filtration to remove turbidity, precipitated iron, and bacteria. Clear water storage will be two million gallons in above-ground reinforced concrete reservoirs, from which water also will be boosted to a 500,000 gallon elevated water tank on higher ground. The tank will provide the needed system pressure peak variations and emergency fire protection supply. The supply to the distribution mains is to be metered and disinfected to provide water of drinking quality for employee consumption and industrial processes.

Factory liquid wastes will be collected in sewers and drained or pumped to a conventional biological oxidation waste treatment plant located at a low elevation. The plant will be operated by the activated sludge process, using imported hardware and locally constructed reinforced concrete tanks. The liquid effluent will be piped some seven miles to a discharge point in the Kelani River downstream from all known water supply intakes.

The water mains and sewers are designed to be added on as required to accommodate staged site development.

d. Electric Power, Lighting, and Communications: BIPZ-I will have an electric power supply of 22,000 KVA and the BIPZ-II will have 18,000 KVA, for a total of 40,000 KVA for the entire site. Street lighting will be installed along the roads at 98-foot intervals. The perimeter security fence will have lights every 50 feet.

Some 800 telephones and telex lines will be available to BIPZ occupants, and provisions will be made for an additional 200 lines for area users. Public telephones and telex and postal services will be provided by the Post and Telecommunication Department. See Appendix E for a report on electric power, lighting, and communications for the IPZs.

e. Security Fence and Patrol Corridor: An 8-foot, 11-strand barbed wire and concrete post perimeter fence with flood lighting every 50 feet will be installed. There will be a 20-foot wide unpaved corridor inside this fence to be used for security patrol by jeep. This corridor will be established by a 20-foot set-back from the site's perimeter requirement on construction by plot occupants. There will also be security and customs check points at each of the two site entrances, as indicated in the site master plan (see Appendix A).

f. Landscaping: The outer 30 feet on each side of the road reservations will be landscaped. Included will be ornamental trees adjacent to the sidewalks, shrubs near the edge of the occupants' plots, and grass in between.

During site grading, the upper four inches of topsoil will be stockpiled for landscaping and for subsequent use by site occupants in landscaping their plots following building construction. In the latter case, the transport and placement of topsoil are recommended to be at the users' expense.

D. Supporting Infrastructure, Service Industry Area Demarcation, Micro-Plans, and Priority Project Identification

The Development Projects Key Map in Appendix A outlines and demarcates areas for housing, priority transport improvement needs, improved utilities services, medical and educational services, location of service industries, etc. The detailed definitions of the GCEC priority development projects are contained in an official internal GCEC document, and thus are not reproduced herein.

E. Impact of the IPZ Development on the GCEC Area of Authority

As shown earlier, employment in the KIPZ is expected to reach 46,000 people and at the BIPZ about 30,000 at full two-shift capacity. Based on the success of the GCEC investment promotion program thus far, and the probability of its continued effectiveness, KIPZ employment is expected to reach capacity by the end of 1982 and the BIPZ to reach a 75% level by the end of 1983.

Population and employment projections for the GCEC Area of Authority by sub-region were made through 31 December 1983. These projections and the data and assumptions on which they are based are detailed in summary tables in Appendix B. Essentially, the forecast growth is a direct result of GCEC investment promotion efforts for the IPZs and its impact on industrial investment and employment in the rest of the GCEC area.

In summary, the employment rate in the entire GCEC Area of Authority is expected to grow 17.3% per year from 1979 through 1983, with population growth in that period estimated at 6.5% to 7.5% per year. These figures reflect the creation of approximately 220.3 thousand new jobs. As might be expected, a large proportion of the additional employees are living in the sub-regions in which the IPZs are located (sub-regions 1 and 3). The growth in employment expected in region 1 (Negombo area) is estimated at 106,000 and in region 3 (BIPZ area), 74,000. The high rate of population growth is due principally to migration for employment reasons and principally occurs in these two sub-regions. This growth obviously strengthens the need to improve and expand the area's infrastructure transport services, housing, and social welfare facilities.

CHAPTER V

V. ESTIMATED CONSTRUCTION SCHEDULE FOR THE IPZs AND SPACE AVAILABILITY FOR INVESTORS

The following estimates are based on the GCEC's use of streamlined construction tender/award procedures, with construction carried out by a qualified, well-equipped private construction firm(s). It is also assumed that the GCEC investment promotion program will be at least as successful in the future as it has been to date.

In March 1980, the GCEC had approved a total of 94 IPZ investment projects; about 30 applications are pending. Forty-five investment agreements have been signed. Fifteen plants are in production and about 22 others are under construction. There is a planned total of 129 plots in both KIPZ-I and II. In the process of both current and future allocations of KIPZ space, some of the 129 plots will be consolidated to meet individual investor requirements.

Construction of KIPZ-II is estimated to be completed by the end of 1980. The industry space in the entire zone is expected to be fully allocated by that time and fully occupied by June 1981. The zone is expected to achieve full employment by the end of 1982.

BIPZ construction is expected to commence in July 1980, which allows three months for the tender/award process. BIPZ-I is forecast to be completed by October 1981, and industry space is expected to be fully allocated in 1982. On this basis, BIPZ-II construction could be started in mid-1982 and completed by the end of that year. Full occupancy and employment at 75% of capacity is expected to be achieved by the end of 1983.

Based on the above time estimates, available space for investors in the KIPZ-I and II should be fully allocated by January 1981, which will leave a gap in investor space availability of up to 10 months, when BIPZ-I will be completed. Conceivably, this time could be shortened by a few months by allowing occupancy in a portion of the IPZ before overall construction is complete. However, a sizeable time gap in space availability would remain, which could discourage investors who have been attracted by the investment promotion program.

A better alternative is to plan and design additional small IPZ space where construction could be completed quickly. As recommended in the past, this could include a 40-acre Phase III extension to the KIPZ and/or a possible site at Boosa. Development of an additional 40 acres adjacent to the present

KIPZ could be accomplished at low cost in minimum time, and the land area is available. While the Boosa site would be more expensive than a KIPZ-III, it appears to have the potential for quick low-cost construction. As detailed by a preliminary report on the site, detailed investigation of the Boosa site is necessary prior to development.

CHAPTER VI

VI. IPZ CONSTRUCTION COST ESTIMATES

A. General

Engineering cost estimates for IPZ site construction have been prepared based on the IPZ tender document Bills of Quantities using unit costs obtained in Sri Lanka by GCEC/Berger team members. The principal sources of these unit costs are the Highway Department, Irrigation Department, National Water Supply and Drainage Board, Ceylon Electricity Board, and Post and Telecommunications Department. The principal source for IPZ equipment cost estimates are recent quotations obtained from suppliers. Cost data contained in GCEC files related to KIPZ-I facilities and construction costs were also reviewed and utilized as appropriate. In arriving at final estimates, an inflation factor of 15% per year was applied plus a 10% contingency. The resultant figures are considered reasonable for the purposes of budget preparation and bid assessment.

Detailed cost estimates arrived at are deposited in the GCEC Engineering Services Department (ESD) files. Summaries of these costs are presented in the following manner for each IPZ: by cost category allocated by development phase area, and by site construction phase by year.

For example, telecommunication costs already budgeted for KIPZ-I include Rs. 85 million for the overseas telecommunication system and Rs. 48 million for the domestic system, which will serve both KIPZ-I and KIPZ-II and the surrounding region.* The PTT estimates that an additional Rs. 10 million will be required for KIPZ-II domestic service. Thus, while the cost allocation for KIPZ-II is

$$\text{Rs. 143 million} \times 80\% \times \frac{96.4}{224.65}$$

(relative proportion of KIPZ-II to total investor acreage), or Rs. 49.1 million, the actual additional budget requirement for 1980 is only Rs. 10 million. Further, it is understood that the PTT advised that the investment costs for the IPZ communications systems be borne within its budget and not be charged to the GCEC. Thus, while it is useful to show these costs, they do not actually represent funding requirements for the GCEC.

Similar cost allocations were made for the Administration Plaza and major common utilities.

Costs allocated by IPZ construction plans are shown in Section B and assumed GCEC budget requirements are given in Section C.

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* 80% Reserved for KIPZ.

B. IPZ Construction Cost Estimates by Area Allocation

1. KIPZ-II

Total construction costs are estimated at Rs. 128.5 million, of which only Rs. 39.2 million are estimated to be required from the GCEC budget (see Table VI-1).

2. The BIPZ

The actual construction costs on site for BIPZ-I are estimated at Rs. 241.3 million. There are an additional Rs. 15.2 million for the associated costs of a river access road and barge landing as well as an effluent disposal pipeline. Further, costs are estimated for construction of improvements to a highway leading to the main entrance to the site. The costs for preliminary site surveys and soils investigations as well as the proportional cost for environmental testing are listed in Table VI-1. The total actual cost for BIPZ-I is estimated to be Rs. 268.7 million. The actual costs for BIPZ-II total Rs. 98.9 million.

However, the GCEC total budget requirement would be only Rs. 174.5 million for BIPZ-I and Rs. 29.2 million for BIPZ-II, or a total of Rs. 203.7 million.

Table VI-1

KIPZ-II AND BIPZ CONSTRUCTION COST ESTIMATES

1. The KIPZ-II Construction Cost Estimates

1.1 Site Costs	Actual	GCEC Budget
	(million rupees)	
Land acquisition	2.6	2.6
Site preparation	1.6	1.6
Roads/ducts	1.9	1.9
Drainage	2.4	2.4
Water supply/distribution*	14.1	14.1
Sewerage system	4.4	4.4
Power	37.1	- CEB
Lighting	4.0	4.0
Telecommunications	49.1	- PTT
Landscaping	0.4	0.4
Fencing	0.4	0.4
Subtotal	118.0	31.8
1.2 KIPZ-I Costs Allocated		
Administration Plaza (proportional cost @ 42.9%)	7.3	7.3
Sewage treatment	3.1	-
Environmental test laboratory**	0.1	0.1
1.3 Total	128.5	39.2

Note: Preliminary site investigation estimates not to exceed Rs. 10,000

*Includes Rs. 8.3 million for share of KIPZ-I facility common to KIPZ-II

**Central laboratory for all IPZ sites

2. The BIPZ Construction Cost Estimates

	Actual			GCEC Budget	
2.1 Site Costs	BIPZ-I	BIPZ-II	Total	BIPZ-I	BIPZ-II
	(million rupees)				
Land acquisition	6.7	1.4	8.1	6.7	1.4
Site preparation	63.8	18.3	82.1	63.8	18.3
Roads/ducts	6.9	1.5	8.4	6.9	1.5
Drainage	1.6	1.3	2.9	1.6	1.3
Water supply/ distribution	42.3	1.1	43.4	42.3	1.1
Sewerage	23.3	2.1	25.4	23.3	2.1
Electric power	49.3	38.1	87.4	-	-
Lighting	12.3	2.7	15.0	12.3	2.7
Telecommunications	33.2	31.6	64.8	-	-
Landscaping	0.6	0.4	1.0	0.6	0.4
Fencing	1.3	+0.4	1.7	1.3	0.4
Subtotal	241.3	98.9	340.2	158.8	29.2
2.2 Associated Costs					
River access road and barge landing	0.6	-	0.6	0.6	-
Effluent pipeline	14.6	-	14.6	14.6	-
Subtotal	256.5	98.9	355.4	174.0	29.2
2.3 Other Costs					
Highway improvement	11.7	-	11.7	-	-
Preliminary site survey and soils investigation	0.3	-	0.3	0.3	-
Environmental test lab.	0.2	-	0.2	0.2	-
Total	268.7	98.9	367.6	174.5	29.2

C. Schedule of GCEC Budget Requirements for IPZ Construction

Year	KIPZ-II	BIPZ-I	BIPZ-II	Total
		(million ruppees)		
1980	39.2	71.0		110.2
1981	-	103.5		103.5
1982	-	-	29.2	29.2
Total	39.2	174.5	29.2	242.9

D. GENERAL COMMENT

The costs of electric power installation and telecommunications were not shown in the foregoing budget estimates based on the comments of GCEC-ESD staff. However, if they should become a charge against the GCEC budget, they would be incurred in a time phasing closely related to growth in industrial investor employment in the IPZs. Specific comments on this issue can be found in the detailed Berger report on electric power distribution, lighting, and communications.

For example, investment in power in KIPZ-II would be spread over 1980, 1981, 1982; in the BIPZ-I over 1980, 1981, 1982, and 1983; and in the BIPZ-II over 1982, 1983, and 1984.

We suggest that the GCEC consider raising the present level of industrial site rental charges to more closely approach the charges to investors in the IPZs in other countries. Thus, a larger contribution would be made toward repaying IPZ investment costs. In addition, the GCEC should consider investment in land development for resale in the area near the IPZs. The value of this property is expected to multiply several times with the construction of the IPZs. For example, the value of land near the KIPZ has risen from about Rs. 19,600 per acre to about Rs. 120,000 per acre since the KIPZ was acquired.

APPENDICES

APPENDIX A

PROJECT MAPS

The following Development Projects Key Map is a reproduction of a large-scale color map available with GCEC.

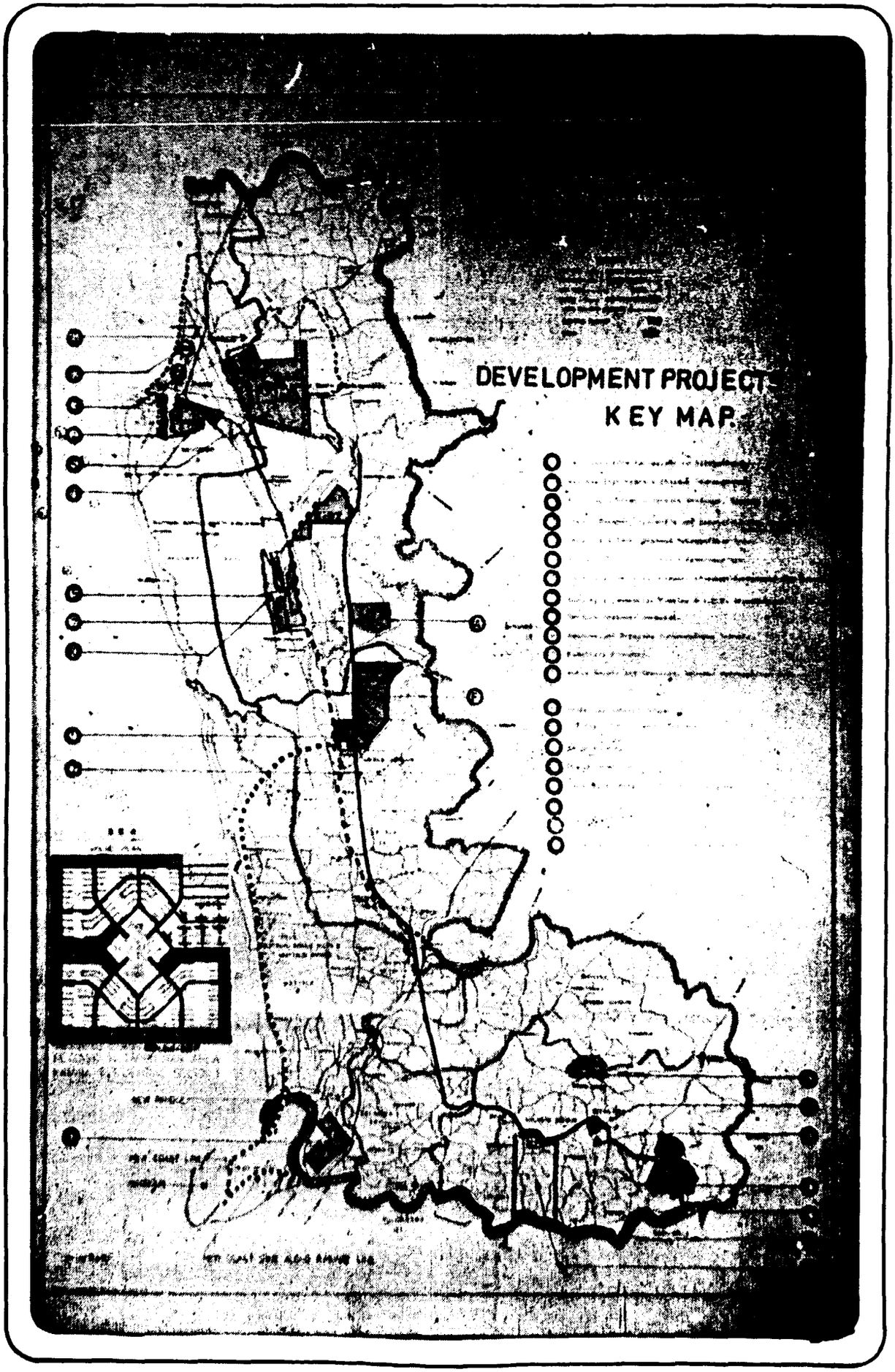
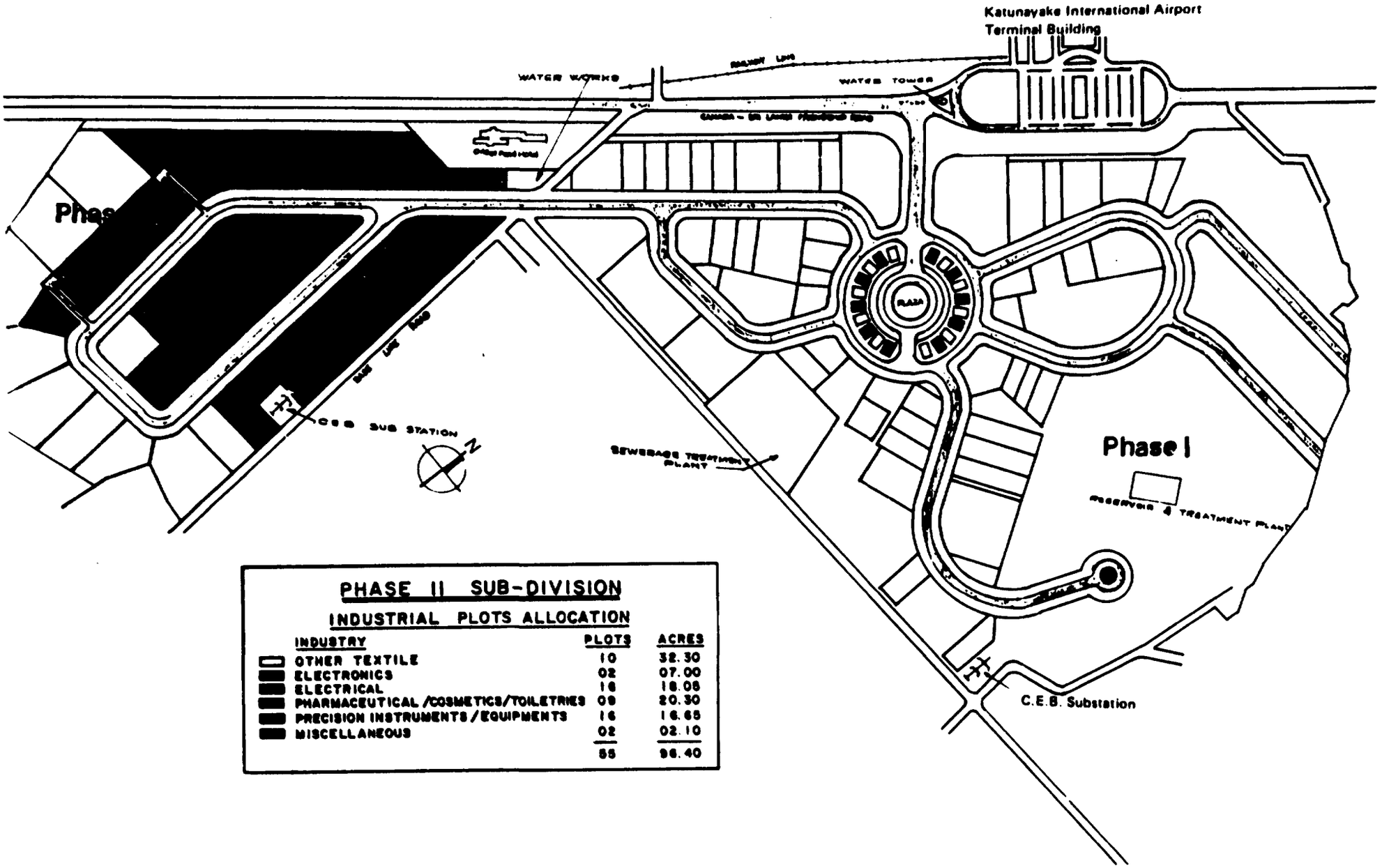

DEVELOPMENT PROJECT
KEY MAP

Figure A-2

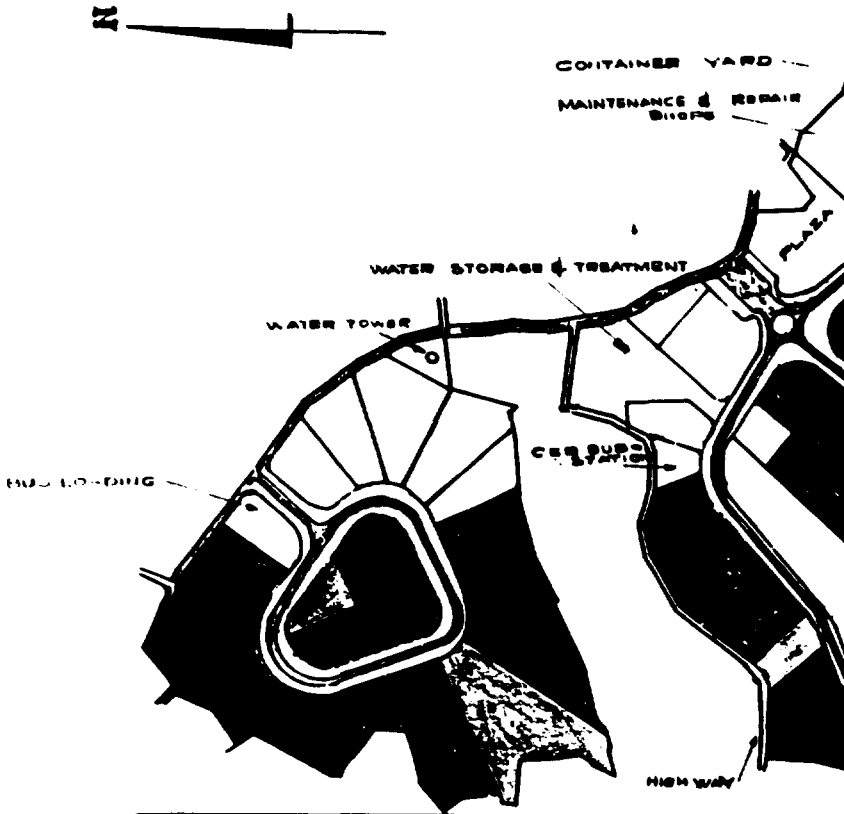
The Katunayake Investment Promotion Zone



PHASE II SUB-DIVISION

INDUSTRIAL PLOTS ALLOCATION

INDUSTRY	PLOTS	ACRES
OTHER TEXTILE	10	32.30
ELECTRONICS	02	07.00
ELECTRICAL	16	18.05
PHARMACEUTICAL /COSMETICS/TOILETRIES	09	20.30
PRECISION INSTRUMENTS / EQUIPMENTS	16	16.65
MISCELLANEOUS	02	02.10
	55	96.40



SUB - DIVISION

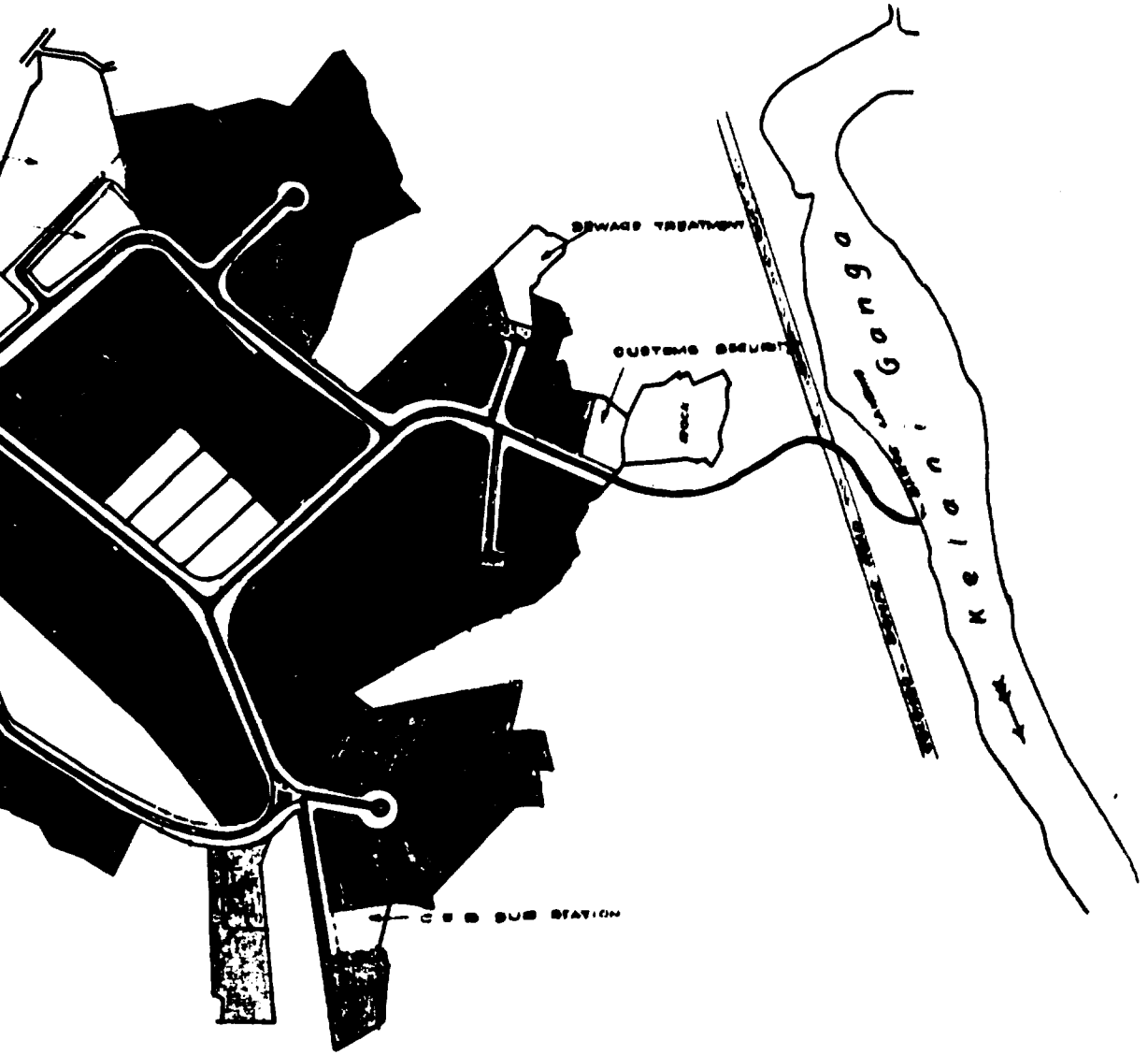
INDUSTRIAL PLOTS ALLOCATION

INDUSTRY	PLOTS	ACRES
TEXTILES	09	29.20
FOOTWEAR, TRAVEL & LEATHER GOODS	14	34.84
RUBBER PRODUCTS	04	06.05
FOOD PROCESSING	05	23.35
WOOD, CANE & OTHER FIBRE	27	65.50
NON - METALLIC MINERALS	03	13.15
METAL PRODUCTS	06	44.95
ELECTRONICS	25	62.00
MISCELLANEOUS	04	13.15
	97	226.14

Scale 1 : 12000

Figure A-3

The Biyagama Investment Promotion Zone



APPENDIX B

GCEC AREA ECONOMIC/ INDUSTRIAL STRUCTURE, POPULATION, AND EMPLOYMENT PROFILE

Table B-1

ECONOMIC ESTABISHMENTS AND EMPLOYMENT IN SRI LANKA
NATIONAL VS. SELECTED REGIONS*

SECTOR CODE	TYPE OF ESTABLISHMENT	National		Colombo District		GCEC Area of Authority	
		Estab:	Employees	Estab:	Employees	Estab:	Employees
1	AGRICULTURE & FORESTRY	2,431	566,460	157	8,572	27	452
2	Mining and quarrying	47	4,696	21	690	2	35
3	Manufacturing	3,449	202,737	1,221	108,741	234	18,639
4	Electricity, gas & water	59	9,048	18	5,450	2	502
5	Construction	298	89,372	97	19,372	15	2,876
6	Trade	2,632	116,570	1,270	59,453	81	7,550
7	Transport	342	83,952	150	47,191	15	6,072
8	Finance and business services	945	33,902	264	25,893	24	404
9	Other services	594	23,567	272	15,452	32	1,251
	T O T A L	10,797	1,130,304	3,470	209,814	432	37,781

* In establishment with five or more employees

Source: Department of Labour & Employment Survey, June 1978

Table B-2

ECONOMIC ESTABLISHMENTS AND EMPLOYMENT BY SECTOR & BY LOCAL AUTHORITY IN THE GCEC AREA OF AUTHORITY, JUNE 1978*

LOCAL AUTHORITY	1		2		3		4		5		6		7		8			
	No. of Est.	Total Emp.	No. of Est.	Total Emp.	No. of Est.	Total Emp.	No. of Est.	Total Emp.	No. of Est.	Total Emp.	No. of Est.	Total Emp.	No. of Est.	Total Emp.	No. of Est.	Total Emp.		
GCEC REG: 1 TOT:	20	335	80	5,206	1	221	3	1,054	39	2,735	3	1,436	11	195	15	245	172	11,427
Katana V.C.	17	294	45	3,131			1	30	7	1,258	1	22	2	4	2	25	75	4,764
Kochchikade T.C.			3	194									1	11	2	29	6	234
Andiambalama V.C.	2	22	12	206													14	228
Seeduwa-Katunayake			6	1,345					4	271			3	36	2	15	15	1,667
Negombo M.C.	1	19	14	330	1	221	2	1,024	27	1,089	2	1,414	5	144	8	162	60	4,403
Talahena V.C.									1	117					1	14	2	131
GCEC REG: 2 TOT:	6	107	89	4,733			6	1,354	24	2,213	9	3,267	7	110	12	321	153	12,105
Dandugamperuna	2	15	16	992					2	35			1	22			21	1,064
Ja-ela U.S.	1	64	9	409			2	333	4	436	3	2,017	2	42	3	176	24	3,477
Batuwatta V.C.	1	17	3	22					1	15							5	54
Kandana T.C.	1	5	3	185					3	27	1	12					8	229
Ragama T.C.			4	50					1	301					1	34	6	385
Pamunugama V.C.	1	6	23	849					2	48	1	56			1	6	28	965
Welisara T.C.			1	14													1	14
Hendala T.C.			7	361					1	9							8	370
Wattala U.C.			8	1,064					6	1,020			4	46	3	52	21	2,182
Peliyagoda U.C.			15	787			4	1,021	4	322	4	1,182			4	53	31	3,365
GCEC REG: 3 TOT:	1	10	2	35	65	8,700	1	281	6	468	18	2,602	3	1,369	6	99	5	685	107	14,249
Mahara V.C.	1	10	2	35	12	364			2	298	3	880	2	56	2	37	2	36	26	1,716
Naranwela V.C.									1	4	1	354			2	11			4	369
Kelaniya T.C.					27	4,286	1	281	2	113	10	1,108	1	1,313	2	51	3	649	46	7,801
Dalugama T.C.					2	840			1	53									3	893
Biyagama V.C.					24	3,210					4	260							28	3,470
GRAND TOTAL	27	452	2	35	234	18,639	2	502	15	2,876	81	7,550	15	6,072	24	404	32	1,251	432	37,781

1 Agriculture and Forestry, 2 Mining and Quarrying, 3 Manufacturing, 4 Electricity, Gas & Water, 5 Construction, 6 Trade, 7 Transport, 8 Finance and Business Services, 9 Other Services.

*In establishment with five or more employees

Source: Department of Labour & Employment Survey, June 1978

Table B-3

ECONOMIC ESTABLISHMENTS AND EMPLOYMENT IN THE GCEC AREA OF AUTHORITY BY SUB-REGION, JUNE 1978

INDUSTRY CODE	TYPE OF ECONOMIC ESTABLISHMENT	REGION 1		REGION 2		REGION 3		TOTAL	
		No. of Est.	No. of Emp.	No. of Est.	No. of Emp.	No. of Est.	No. of Emp.	No. of Est.	No. of Emp.
114	Tea estates								
115	Rubber estates	5	134	1	17	-	-	6	151
116	Coconut estates	14	187	5	90	1	10	20	287
1 (Residual)	All other activities in agriculture, hunting, forestry, fishing	1	14	-	-	-	-	1	14
2	Mining	-	-	-	-	2	35	2	35
311	Food manufacturing*	8	1,109	12	805	7	298	27	2,212
312	Food manufacturing, N.E.S.	9	615	1	87	-	-	10	702
313	Beverage industry	3	152	1	22	-	-	4	174
314	Tabacco industries	1	28	-	-	2	38	3	66
321	Manufacture of textiles	40	1,004	27	1,012	15	1,206	82	3,222
322	Garments manufacturing	1	6	1	6	3	1,984	5	1,996
323	Manufacture of leather and leather products (except footwear)	1	13	-	-	4	157	5	170
324	Manufacture of footwear (except rubber and plastic)	-	-	2	138	1	18	3	156
331	Manufacture of wood cork products (except furniture)	1	10	7	143	4	56	12	209
332	Manufacture of furniture, fixtures, etc.	-	-	-	-	-	-	-	-
341	Manufacture of paper and paper products	1	20	1	9	1	19	3	48
342	Printing, publishing, allied industries	1	26	-	-	1	20	2	46
351	Manufacture of industries chemicals	-	-	3	352	3	707	6	1,059
352, 354	Manufacture of other chemicals	3	54	5	260	4	1,051	12	1,365
355	Manufacture of rubber products	2	33	2	39	4	2,152	8	2,224
356	Manufacture of plastic products	-	-	-	-	-	-	-	-
361	Manufacture of pottery, china, earthenware	3	1,600	-	-	1	25	4	1,625
362	Manufacture of glass, glass products	-	-	-	-	2	24	2	24
369	Manufacture of non-metallic Mineral products	-	-	3	375	3	308	6	683
371	Iron and steel basic industries	1	10	1	10	-	-	2	20
372	Non-ferrous metal basic industries	-	-	2	55	-	-	2	55
381	Manufacture of fabricated metal products	1	7	10	657	8	394	19	1,058
382	Manufacture of machinery (except electrical)	-	-	1	55	-	-	1	55
383	Manufacture of electrical machinery apparatus	1	115	2	156	1	229	4	500
384	Manufacture of transport equipment	3	404	4	156	-	-	7	560
385	Manufacture of professional and scientific equipment	-	-	-	-	-	-	-	-
390	Other manufacturing industries	-	-	4	396	1	14	5	410
4	Electricity, gas, water	1	221	-	-	1	281	2	502
5	Construction	3	1,054	6	1,354	6	468	15	2,876
610	Wholesale trade	1	10	4	592	1	40	6	942
620	Retail trade	21	1,696	14	1,198	16	2,555	51	5,449
631	Restaurants, cafes, etc.	5	274	6	123	1	7	12	404
632	Hotels, rooming houses, etc.	12	755	-	-	-	-	12	755
711	Land transport (excluding railways)	3	1,436	9	3,267	3	1,369	15	6,072
712	Water transport	-	-	-	-	-	-	-	-
713	Air transport	-	-	-	-	-	-	-	-
719	Services allied transport	-	-	-	-	-	-	-	-
810	Financial institutions	8	139	6	88	6	99	20	326
820	Insurance	1	31	-	-	-	-	1	31
831	Real estate including land auctioneers	-	-	-	-	-	-	-	-
832	Business services	2	25	1	22	-	-	3	47
931	Education services	1	45	1	34	2	633	4	712
932	Research and scientific institutions	-	-	1	17	-	-	1	17
933	Medical, dental, and other health services	5	53	1	6	-	-	6	59
939	Other social and related community services	1	14	-	-	-	-	1	14
941	Motion picture and other entertainment services	3	36	5	217	2	22	10	275
949	Amusement and recreational services n.e.c.	-	-	-	-	-	-	-	-
951	Repair services not elsewhere classified	3	79	3	35	1	30	7	144
952	Laundries	-	-	-	-	-	-	-	-
959	Personal services n.e.c.	2	18	1	12	-	-	3	30
	TOTAL	172	11,427	153	12,105	107	14,249	432	37,781

* Meat slaughter, fruit and vegetable canning, manufacture of vegetable and animal oils, grain mill products, bakery products, confectionery products, etc.

Source: Department of Labour and Employment Survey, June 1978

Table B-4

POPULATION AND EMPLOYMENT IN GCEC AREA OF AUTHORITY, March 31, 1979

	POPULATION	EMPLOYMENT
	(Thousands)	
TOTAL	645.5	194.4
GCEC REGION I	179.6	57.0
NECOMBO & MINUWANGODA DIVISIONS		
Katana V.C.	55.6	20.1
Kochchikade T.C.	9.4	3.2
Andiambalama V.C.	13.7	5.1
Seeduwa-Katunayake U.C.	27.1	8.2
Negombo M.C.	58.7	16.8
Talahena V.C.	15.2	3.5
GCEC REGION 2	243.7	68.0
JA-ELA DIVISION		
Dandugamperuma V.C.	31.5	9.2
Ja-ela U.C.	28.6	9.8
Batawatta V.C.	27.3	5.1
Kandana T.C.	18.3	5.0
Ragama T.C.	14.2	3.0
WATTALA DIVISION		
Pamunugama V.C.	14.8	2.8
Welisara T.C.	23.7	6.2
Hendala T.C.	40.0	8.8
Wattala-Mabole U.C.	18.7	4.6
Peliyagoda U.C.	26.6	13.5
GCEC REGION 3	222.2	69.4
MAHARA DIVISION		
Mahara V.C.	46.2	12.4
Naranwala V.C.	30.8	8.6
KELANIYA DIVISION		
Kelaniya T.C.	33.3	12.6
Dalugama T.C.	38.7	13.0
Biyagama V.C.	73.3	22.8

Source: GCEC Area Local Authorities' Survey

Table B-5

SUMMARY OF PRELIMINARY POPULATION AND EMPLOYMENT PROJECTIONS
FOR THE GCEC AREA OF AUTHORITY BY SUB-REGIONS

(Thousands)

	9/10/71	31/3/79		31/12/83	
	Amt.	Amt.	R/g.	Amt.	R/g.
Region 1					
Population	167.4	179.6	0.94%	310.7 - 328.9	12.2 - 13.6%
Employment	45.4	57.0	3.08%	163.2	24.8%
Region 2					
Population	209.2	243.7	2.06%	267.7 - 269.3	2.0 - 2.1%
Employment	50.9	68.0	3.94%	108.1	10.3%
Region 3					
Population	208.2	222.2	0.87%	292.5 - 315.7	6.0 - 7.7%
Employment	47.2	69.4	5.27%	143.4	16.5%
Total GCEC Area of Authority					
Population	584.8	645.5	1.33%	870.9 - 913.9	6.5 - 7.6%
Employment	143.5	194.4	4.13%	414.7	17.3%

Table B-6

PRELIMINARY POPULATION AND EMPLOYMENT PROJECTION
FOR GCEC REGION 1 (Year End 1983)

		Thousands		
A.	Employment Demand			
1.	Employment 3/79	57.0		
2.	Future demand (additional) IPZ Sources			
	a. KIPZ-I & II (mfg.)	46.0		
	b. Service industries outside IPZ @ 1:1	46.0		
	Subtotal	92.0		
	Other Sources			
a.	From existing economic establishments past r/g 1971-79 of 3% empl. 3/79 = 57.0. 1983 = 65.6	8.6		
b.	New mfg. outside IPZ 12/79 est. 1,755 @ 12% annual r/g.	2.8		
c.	Service industry @ 1:1 generated by new mfg. industry	2.8		
	Subtotal	14.2		
3.	Total new employment	106.2		
4.	Estimated total employed @ 12/31/83	163.2		
5.	Est. r/g in employment	24.8%		
B.	Population and Labor Force Availability			
1.	Population 3/79	179.6		
2.	Forecast end 1983 @ natural r/g 2%/yr.	197.3		
3.	Estimated labor force in Reg. 1 based on 2 above	@ 46%	90.8	@ 40% 78.9

4.	Demand for employment from outside Region 1.		
	Total demand	163.2	163.2
	Less labor force available	90.8	78.9
	Needed	72.4	84.3
5.	Population in-migration:		
	a. 39% of workers wish to relocate	28.2	32.9
	b. Of these 60% bring families @ 6 per family (∴ .6 x 5 x workers)	84.6	98.4
	Total	112.8	131.3
6.	Forecast 1983 population (2 + 5)	310.7	328.9
7.	Estimated r/g in population 3/79 - 12/83	12.2 to 13.6%/yr.	

Note: r/g = rate of growth

Sources

1. Censuses of Population and Employment 1963, 1971. Department of Census, Sri Lanka.

2. Population and Employment Survey/Estimates for GCEC Area of Authority, by Grama Sevakas, 3/31/79.

3. Licenses issued by GCEC, file data through December 1979.

4. Industry and Employment Profile-KIPZ, by Louis Berger International, Inc., January 1980.

5. Employment Surveys of Establishments with Five or More Employees, Department of Labour, Sri Lanka. GCEC Area of Authority by Local Authority - 6/30/78 and file data for 1971-1979 for Ja-ela UC, Dehiwela-Mount Lavinia M.C., Moratuwa U.C.

6. Socioeconomic survey of factory workers in KIPZ, Ekala and Ratmalana, GCEC, November 1979.

Assumptions

1. Manufacturing investment generation at least one service industry employee per factory employee. This is the basic pattern in Sri Lanka (Mt. Lavinia/Moratuwa) as well as in IPZs in other countries.

2. Rate of growth in new industrial investment outside IPZs in GCEC Reg. 1 will be at least 12%/yr. based on promotion policies, trend in licence applications, and Mt. Lavinia example.

3. Population growth in urban industrialized areas reflects growth in employment opportunities and employment growth. This is confirmed by Mt. Lavinia/Moratuwa past history.

4. GCEC will facilitate worker access to housing in GCEC Area of Authority through land use zoning, assistance in arranging access to credit facilities, coordination with National Housing Authority, promotion of private investment in housing development, and/or other measures.

Table B-7

PRELIMINARY POPULATION AND EMPLOYMENT PROJECTION
FOR GCEC REGION 2 (December 31, 1983)

			Thousands		
A.	Employment Demand				
	1.	Employment 3/79	68.0		
	2.	Future demand (additional)			
		a. From existing economic establishments Past r/g 1977-79 = 3.9% ∴ 12/83 = 81.6	13.6		
		b. New manufacturing est. not in an IPZ	12.0		
		c. Service industry generated by b above	12.0		
		d. New warehousing establishments in Peliyagoda (transferred from Colombo)	2.5		
	3.	Total new employment	40.1		
	4.	Estimated total employment 12/31/83	108.1		
	5.	Estimated r/g in employment 3/79-12/83	10.3%		
B.	Population and Labor Force Availability				
	1.	Population 3/79	243.7		
	2.	Forecast end 1983 @ natural r/g 2%/yr	267.7		
	3.	Estimated labor force in Region 2 based on 2 above	@ 46%	123.2	@ 40% 107.1
	4.	Demand for employees from outside Region 2.			
		Total demand	108.1		108.1
		Less labor force available	123.2		107.1
		Needed	15.1		1.0

5.	Population in-migration:		
	a. 39% of workers wish to re-locate	-	0.4
	b. Of these 60% bring families (0.6 x 5 x workers)	-	1.2
	Subtotal	-	1.6
6.	Forecast 1983 population (2 + 5)	267.7	269.3
7.	Estimated r/g in population 3/79-12/83	2.0% to	2.1%

Note: r/g = rate of growth

Table B-8

PRELIMINARY POPULATION AND EMPLOYMENT PROJECTION
FOR GCEC REGION 3 (December 31, 1983)

		Thousands	
A.	Employment Demand		
1.	Employment 3/79	69.4	
2.	Future demand (additional)		
	IPZ Sources		
	a. BIPZ-Phase I	15.0	
	BIPZ-Phase II	7.5	
	Subtotal	22.5*	
	b. Service industry outside BIPZ	22.5	
	Subtotal	45.0	
	Other Sources		
	a. From existing economic establishments @ past r/g 10/71-3/79 of 5.1% = 88.0 in December 1983	18.6	
	b. New mfg. outside IPZ	5.2	
	c. Services industry generated by mfg.	5.2	
	Subtotal	29.0	
3.	Total new employment	74.0	
4.	Total employment 12/31/83	143.4	
5.	Estimated annual r/g	16.5%	
B.	Population and Labor Force Availability		
1.	Population 3/79	222.2	
2.	Forecast 12/31/83 @ natural r/g of 2%	244.1	
3.	Estimated labor force available @ 46%	112.3	@ 40% 97.6
4.	Demand for employment from outside		
	Reg. 3 demand	143.4	
	Reg. 3 supply	112.3	97.6
	Needed	31.1	45.8

5.	Population in-migration		
	a. 39% of workers wish to relocate	12.1	17.9
	b. 60% of a bring families @ 6 per family (0.6 x 5 x workers)	36.3	53.7
	Subtotal	48.4	71.6
6.	Forecast population @ 12/31/83	292.5	315.7
7.	Estimated r/g in population 3/79-12/83	6%	9.2%

* Expected to reach 30,000 in 1984

Note: r/g = rate of growth

Table B-9

PROJECTED EMPLOYMENT IN NEW MANUFACTURING PLANTS, OUTSIDE OF IPZs IN THE GCEC AREA OF AUTHORITY (December 12, 1983)

		Thousands
A. Indicated by licences issued to investors through 1/11/79		
Region 1	Initial	1.8
	Future	2.0
Region 2	Initial	4.5
	Future	8.5
Region 3	Initial	0.5
	Future	0.5
Total GCEC Area	Initial	
	Future	6.8
		11.0
B. Projected as of 12/31/83		
Region 1		2.8
Region 2		12.0
Region 3		5.2
Total GCEC Area		20.0

Source: GCEC file data on licences issued to investors

NOTES

1. Licenses issued to new investors in GCEC Area of Authority increased at the rate of about 10% per month through 1979. This high growth rate is considered to represent the initial surge in investment interest following the establishment of the GCEC and implementation of its promotional policies. In part, it reflects establishment of export oriented industries, which in the future would be increasingly located in the IPZs as space in the IPZs becomes available and as land values outside the IPZs increase. The future rate of growth outside the IPZs is expected to be substantial, but lower in percentage rate as the area's economic base enlarges.

2. The time for new plant construction and start-up after issuance of licenses will vary by type and scale of plant, but on average can be expected to take one to two years and then up to four years to reach capacity employment for domestically oriented enterprises.

3. The rate of overall growth in manufacturing employment in the GCEC Area of Authority reasonably can be expected to exceed 12% per year (the 1971-78 rate for Dehiwela-Mt. Lavinia M.C.) due to GCEC investment promotion incentives and development of supporting infrastructure.

4. The location of new manufacturing investment outside the IPZs, in the GCEC Area, is related to the availability and cost of land by location, desirability (to the investors) of relatively close proximity to population centers, and adequate existing infrastructure.

5. The GCEC can influence the future location of new manufacturing investment within its Area of Authority through: relative investment in infrastructure by region, regulation of the location of high pollutant industries, and relative issuance of licenses by region.

6. The pattern of new manufacturing employment, outside IPZs, by region, in the projections reflects investor interest as shown by license applications and by the foregoing (1-5) considerations. It accounts for both the current predominant focus of investors on Region 2 and the constraints on investment in that region because of the limited water supply until after 1983 and the decreasing availability in the region of large potential plant sites. It also takes account of GCEC interest in spreading economic development throughout its Area of Authority.

APPENDIX C

IPZ LAYOUTS AND LISTS

OF DETAILED DESIGNS

Appendix C-1

KATUNAYAKE INVESTMENT PROMOTION ZONE, PHASE II

Plans and Detailed Designs
Drawings

Planning

01/01	KIPZ Subdivision Layout, Phase II
01/02	KIPZ Zoning Plan
01/03	KIPZ Phase II Driveaway Location Landscaping Plan

Site Grading and Road Work

02/01	Regrading Plan
02/02	Road Driveway and Drainage Layout
02/03	Typical Road Details
02/04	Duct Location and Details
02/05	Construction Cross Sections Link Road No. 2
02/06	Construction Cross Sections Link Road No. 2
02/07	Construction Cross Sections Link Road No. 2
02/08	Construction Cross Sections Spur Roads 5 and 6

Site Drainage

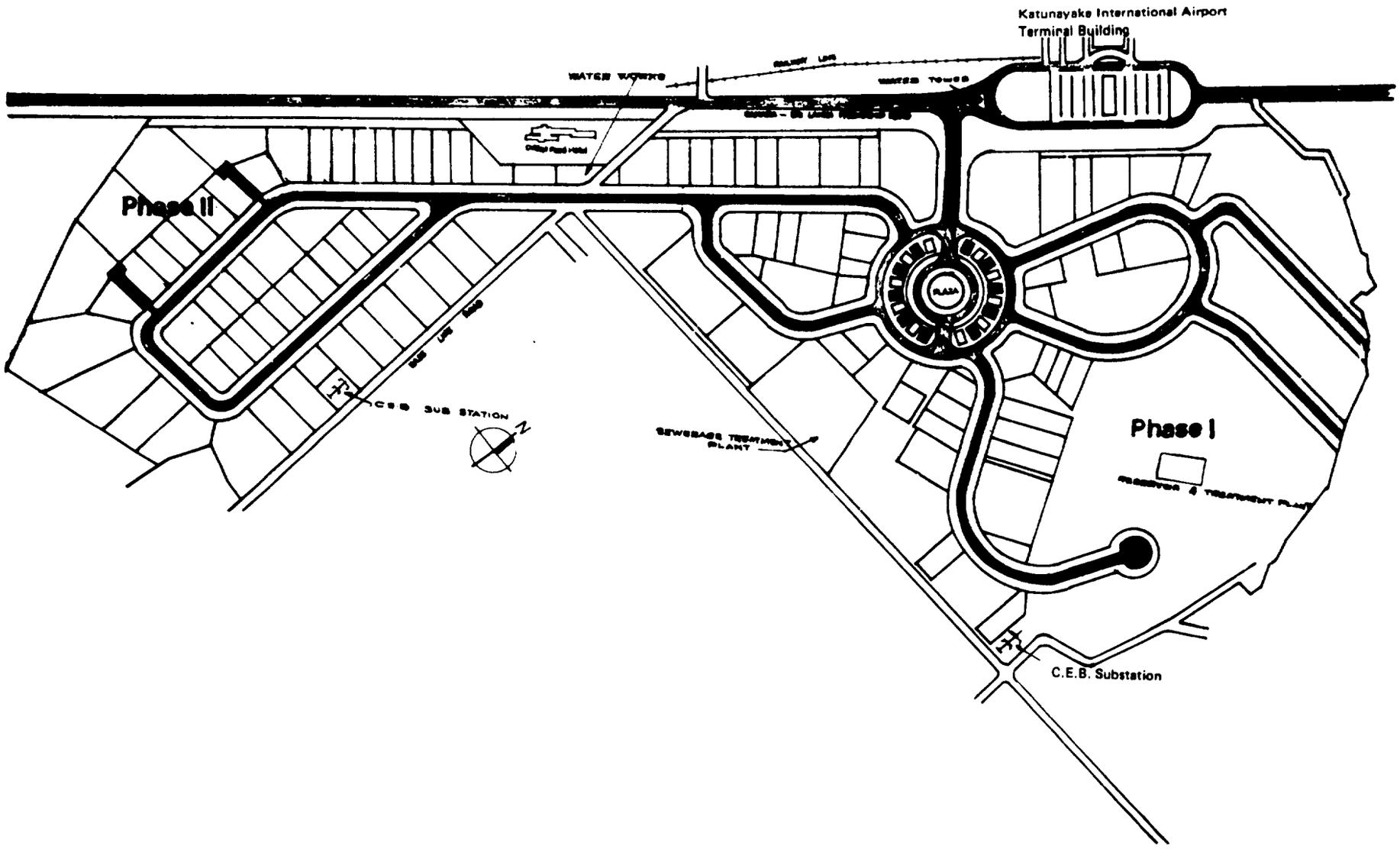
03/01	Plans and Profiles Road and Drainage Link Road No. 2 and Link Road No. 3
03/02	Plans and Profiles Road and Drainage Spur Roads Nos. 5 and 6 and Connecting Drains
03/03	Drainage Scheme Manhole and Drain Details

Water Supply

04/01	Distribution Key Plan and Details
04/02	Distribution Longitudinal Sections
04/03	Distribution Longitudinal Sections
04/04	Distribution Longitudinal Sections
04/05	Distribution Longitudinal Sections
04/06	Raw Water Pumping Main Key Plan
04/07	Raw Water Pumping Main Longitudinal Sections
04/08	Raw Water Pumping Main Longitudinal Sections
04/09	Raw Water Pumping Main Longitudinal Sections
04/10	Raw Water Sump and Pump Station Site Plan
04/11	Treatment and Storage Site Plan
04/12	Tube Well Pump Station Details

Figure C - 1

The Katunayake Investment Promotion Zone



04/13 Tube Wells and Pumping Mains Site Plan
04/14 Tube Wells and Pumping Mains Site Plan

Sewerage

05/01 Sewers Key Plan
05/02 Sewer Longitudinal Sections
05/03 Sewer Longitudinal Sections
05/04 Manhole Details
05/05 Manhole Details
05/06 Sewage Pumping Main Key Plan
05/07 Sewage Pumping Main Longitudinal Sections
05/08 Sewage Pumping Main Longitudinal Sections
05/09 Sewage Pumping Main Longitudinal Sections
05/10 Sewage Pumping Main Longitudinal Sections
05/11 Submersible Pump Station Details
05/12 Not Used
05/13 Not Used
05/14 Not Used

Electrical

06/01 Electrical Distribution Layout

For Reference Only

Miscellaneous

07/01 Dormitory Building Plan, Ground Floor
07/02 Dormitory Building Plan, First Floor
07/03 Dormitory Prototype Site Plan
07/04 Prototype Housing Site Plan

KIPZ-II

UNNUMBERED DRAWINGS OF RESERVOIR STRUCTURES COMPLETED OR PARTIALLY COMPLETED, BUT NOT USED IN DESIGN OF STRUCTURES

1. 300,000 gls. Sump - concrete details
2. 300,000 gls. Sump - wall and ladder details
3. 300,000 gls. Sump - R.C. details and base slab
4. 300,000 gls. Sump - R.C. details of roof and column

1. One million gls. reservoir - construction details
2. - do - - R.C. details of base slab
3. - do - - R.C. details of sump and column
4. - do - - R.C. details of roof slab
5. - do - - pipe details

Appendix C-2

BIYAGAMA INVESTMENT PROMOTION ZONE

Plans and Detailed Designs
Drawings

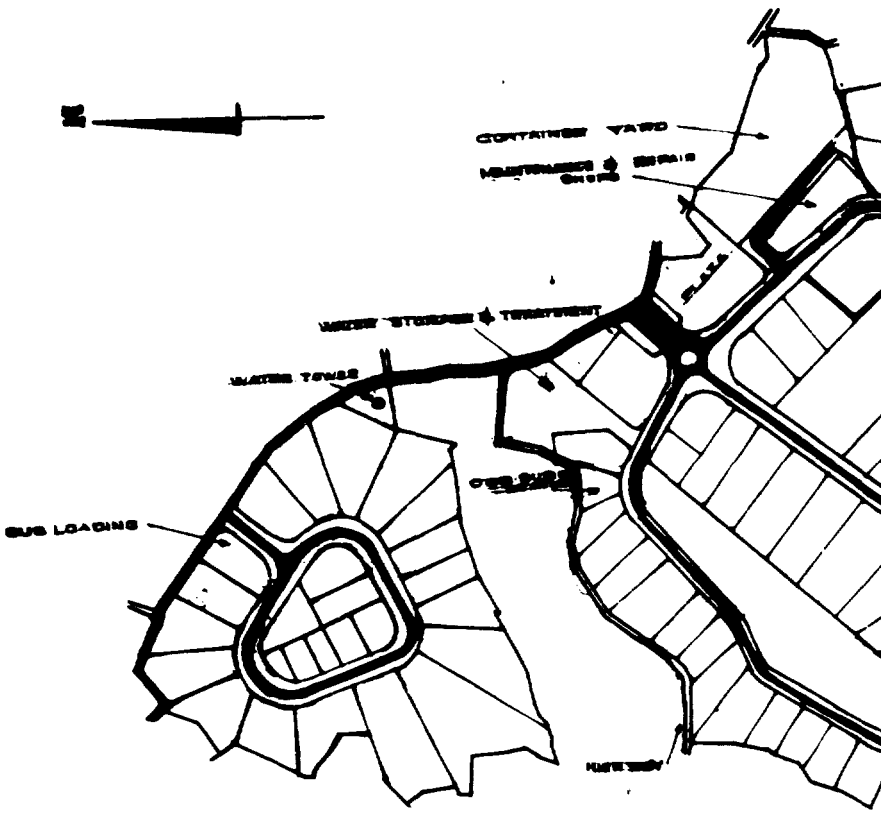
Planning

01/01	BIPZ Subdivision Layout "A" Block
01/02	BIPZ Subdivision Layout "B" Block
01/03	BIPZ Zoning Plan "A" Block
01/04	BIPZ Zoning Plan "B" Block
01/05	BIPZ Subdivision Driveway Location Landscaping
01/06	BIPZ Block "B" Division Driveway Location Landscaping

Site Grading and Road Work

02/01	Block and Parcel Acreage
02/02	Site Grading - Block "B"
02/03	Site Grading - Block "A"
02/04	Site Grading - Block "A"
02/05	Road Layout - Block "B"
02/06	Road Layout - Block "A"
02/07	Road Layout - Block "A"
02/08	Duct Location and Type Block "B"
02/09	Duct Location and Type Block "A"
02/10	Duct Location and Type Block "A"
02/11	Driveway and Drainage Layout Block "B"
02/12	Driveway and Drainage Layout Block "A"
02/13	Driveway and Drainage Layout Block "A"
02/14	Plan and Profiles Road and Drainage, Road Nos. 1, 6, and 7.
02/15	Plan and Profiles Road and Drainage, Road No. 2
02/16	Plan and Profiles Road and Drainage, Road No. 3
02/17	Plan and Profiles Road and Drainage, Road Nos. 3 and 5
02/18	Plan and Profiles Road and Drainage, Road No. 4
02/19	Plan and Profiles Road and Drainage, Road No. 4
02/20	Plan and Profiles Road and Drainage, Road No. 8
02/21	Plan and Profiles Road and Drainage, Road No. 8
02/22	Plan and Profiles Road and Drainage, Secondary Roads 1, 2, and 3
02/23	Plan and Profiles Road and Drainage, Secondary Roads 4, 5, and 6
02/24	Details of Roads and Driveway Drainage Details
02/25	Road Detail for Intersection
02/26	Plan and Profile Access Road to Kelani River
02/27	Construction Cross Sections, Access Road to Kelani River

The E



Scale 1 : 12000

Figure C - 2

Miyagawa Investment Promotion Zone

Site Drainage

03/01 Typical Details for Drains and Manholes
03/02 Profiles for Drains in Block "B" and Details for Outfalls
03/03 Profiles for Drains in Block "A"
03/04 Profiles for Drains in Block "A" and Manholes, Details of Connections

Water Supply

04/21 Distribution and Pumping Mains Key Plan
04/22 Distribution and Pumping Mains Key Plan
04/23 Water Tower Pumping Main
04/24 Distribution Main Longitudinal Section
04/25 Distribution Junction Details
04/26 to
04/30 Distribution and Pumping Mains Plan, and Details

Sewerage

05/15 Sewers and Pumping Mains Key Plan
05/16 Sewers and Pumping Mains Key Plan
05/17 to
05/30 Sewers Longitudinal Sections
05/31 Sewage Pumping Main Longitudinal Sections
05/32 Sewer and Pumping Main Longitudinal Section
05/33 Sewers Longitudinal Sections
05/34 Sewage Pumping Main
05/35 Schedule of Manholes
05/36 Raw Water Pumping Main and Effluent Pumping Main

Electrical

06/01 Electrical Distribution System

For Reference Only

Miscellaneous

07/01 Dormitory Building Plan, Ground Floor
07/02 Dormitory Building Plan, First Floor
07/03 Dormitory Prototype Site Plan
07/04 Prototype Housing Site Plan

Appendix C-3

SUMMARY COMMENT - MICRO-PLANNING INPUTS

1. Housing and Prototype Plans

In conjunction with providing advisory assistance in area demarcation and in preparing micro-plans, analyses of IPZ housing requirements were carried out and prototype structural plans for workers' dormitory buildings were prepared. Site plans for dormitories and a prototype housing development site for 2,000 units were also prepared as inputs to the GCEC regional planning.

IPZ workers' housing requirements are estimated based on the results of a socioeconomic survey of factory workers conducted by the GCEC in November 1979, which indicated that 39% of the factory workers intend to and/or would like to reside close to their place of employment. Account is also taken of GCEC policies with respect to the location of IPZ workers' housing and to possible constraints in capital and transport services. The following summarizes the specific plans prepared and their bases.

a. Prototype dormitory building plans, Drawings 07/01 and 07/02, to accommodate IPZ workers now domiciled at excessive distance from the IPZs. The floor area usage proposed in these plans is categorized in Table C-1.

b. Prototype Site Plan, Drawing 07/03, for workers' dormitories based on the building plans identified above.

c. The assumption was made that 25% of the projected 76,000 IPZ workers (i.e., 46,000 at Katunayake and 30,000 at Biyagama) would be accommodated in dormitories to be constructed at distances of two to five miles from the IPZs. The number of dormitory beds required, therefore, would be 11,500 for the KIPZ and 7,500 for the BIPZ, adding up to 19,000 beds.

The prototype dormitory building (Drawings 07/01 and 07/02) with a gross floor area of 23,546 sq. ft. would accommodate 150 beds with all necessary facilities, i.e., bathrooms, dining room, kitchen, common rooms, etc., as indicated in the plans for an average of 157 sq. ft. of gross floor area per bed.

Table C-1 shows the net floor space allocation. With construction cost estimated at Rs. 125/sq. ft., the prototype

Table C-1

PROTOTYPE DORMITORY BUILDING
NET FLOOR SPACE ALLOCATION

		Sq. Ft.	%
1.	Sleeping rooms	8,400.00	42.16
2.	Showers and toliets	1,541.74	7.73
3.	Balconies	2,307.00	11.57
4.	Lobby and Corridors	3,295.50	16.54
5.	Dining Room	1,710.10	8.58
6.	Multi-purpose room	510.00	2.55
7.	Kitchen and stores	748.00	3.75
8.	Kitchen staff rooms	180.00	.92
9.	Visitors' room	234.00	1.17
10.	Sick rooms	372.00	1.86
11.	Matrons' rooms	336.00	1.69
12.	Verandah	228.00	1.44
	Total	19,922.34	

dormitory would cost Rs. 19,625 per bed with an additional (35%) infrastructure cost of Rs. 6,868, totaling approximately Rs. 26,500 per bed. The projected construction of 19,000 dormitory beds would, therefore, cost Rs. 503.5 million. The land area required for the development of dormitories for 19,000 workers would, on the basis of the prototype site plan illustrated in Drawing 07/03, amount to approximately 160 acres (eight sites of 10 acres, twelve sites of 5 acres and eight sites of 2.5 acres, or some alternative combination depending on the availability of suitable sites).

d. Prototype Housing Development Site Plan, Drawing 07/04, for 2,000 dwelling units of the standard type B (425 sq. ft.) and type D (800 sq. ft.) is a modified design of Sri Lanka's State Engineering Corporation for the Raddaluwatte housing project currently being completed in the GCEC area.

e. To estimate the housing requirements, the assumption was made that 25% of the projected 76,000 IPZ workers would need new housing at convenient distances of two to ten miles from the IPZs. The estimated requirement would thus be of 19,000 dwelling units, 11,500 for the Katunayake IPZ and 7,500 for the Biyagama IPZ.

The prototype housing development scheme presented in Drawing 07/04 is for 2,000 dwellings; 1,640 units (82%) of the "B" type of 425 sq. ft. and 360 units (18%) of the "D" Type of 800 sq. ft. adopted for the Raddaluwatte project in the GCEC area.

The proposed land use allocation is presented numerically in Table C-2 and community facility requirements are shown in Table C-3.

At an estimated construction cost of Rs. 125 per sq. ft. for the "B" units and Rs. 150 per sq. ft. for the "D" units, the proposed scheme of 2,000 units would cost approximately Rs. 130.3 million with an additional (35%) infrastructure cost of Rs. 45.6 million. The development of 19,000 housing units would, therefore, cost Rs. 1,672 million. This total is exclusive of community facility costs for a hospital, dispensaries, schools, playgrounds, etc.

The land area required for the prototype 2,000 unit housing development scheme is 167 acres, as illustrated in Drawing 07/04. To achieve the objective of providing 19,000 new housing units would, therefore, require a total of 1,587 acres (nine sites of 167 acres and one site of 84 acres, or some alternative pattern depending on the availability of suitable sites).

Table C-2

PROTOTYPE HOUSING SCHEME:
LAND USE ALLOCATION

(2,000 Dwelling Units--167 Acres)

	Acres	%
Residential (net)	79.2	47.4
Community facilities and open space	29.0	17.3
Retail stores and service workshops	13.6	8.2
Road reservation	45.2	27.1
	167.0	100.0

Table C-3

PROTOTYPE HOUWING SCHEME: COMMUNITY FACILITIES

(2,000 Dwelling Units)

(167 Acres)

		Acres
Schools	2 primary schools	4
	2 secondary schools	6
	1 senior secondary school	3
Health	3 dispensaries	0.50
	1 maternity	1
	1 hospital (50 beds)	3
Open space and playgrounds		7.25
Community hall		1
Theatre		1
Library		0.25
Post office		0.50
Police station		0.25
Fire station		0.25
Religous places		1
	Total	29.00

2. Land Use

Our survey of land usage in the vicinity of the Biyagama IPZ has been illustrated in detail on the color-coded map LU 07/04.

3. Transportation

a. A report has been submitted summarizing our study of bus services to the IPZ at Katunayake and Biyagama.

b. Maps illustrating bus routes serving the KIPZ and BIPZ areas have been submitted.

Appendix C-4

SUMMARY WATER AND SEWERAGE DESIGN REQUIREMENTS ANALYSIS

Water and sewerage designs are based on a normal design approach of calculating sewerage requirements to be equivalent to water requirements. This approach is based on an average undischarged water consumption of 25% offset by sewerage infiltration and a safety factor. Pipe sizing is based on a peaking factor of 3.5 and on the lift station's using a factor of 2.0, with the second pump helping with peaks.

Water supply requirement estimates are based on analysis of investors' expressed requirements and on average water consumption by type of industry user as indicated in technical references and based on the consultant's and experience. Conclusions were refined to average estimated gallons per capita (employee) per day (i.e., GPCD) by industry sub-sector planned for specific locations (per master plan). As shown in the following summary tables (C-4 and C-5), the GPCD figures were multiplied by forecast site employment to determine maximum demand figures. Because the water supply and sewerage facilities in each site supply both development phases of each site, the tables are for the total demand for each site.

Table C-4

KATUNAYAKE ULTIMATE WATER DEMAND

	INDUSTRY	EMPLOYEES	GPCD	GALS/DAY
1.	Garments	15,361	15	230,400
2.	Other textiles	12,389	22	272,600
3.	Lapidary/jewelry	2,548	15	38,200
4.	Electronics	2,926	15	43,900
5.	Electrical	3,768	20	75,400
6.	Metal products	456	430	196,000
7.	Footwear/travelwear/ rubber/leather	2,966	27	80,000
8.	Pharmaceuticals/cosmetics Toiletries	3,210	25	80,200
9.	Precision inst./equip.	1,260	35	44,100
10.	Food	483	15	7,200
11.	Miscellaneous	785	15	11,800
		46,152		1,079,800

TOTAL KIPZ WATER DEMAND 1,080,000 Gallons/Day

Table C-5

BIYAGAMA IPZ ULTIMATE WATER DEMAND

INDUSTRY	EMPLOYEES	GPCD	GALS/DAY
1. Textiles*(no garments)	1,026	730	748,980
2. Footwear/travelwear/ leather goods	5,145	41	210,945
3. Rubber products	454	40	18,160
4. Food processing	1,401	65	91,065
5. Wood/cane/fiber	3,298	35	115,430
6. Non-metal minerals	349	350	122.150
7. Metal products	834	325	267,800
8. Electronics	16,227	10	162,270
9. Miscellaneous	1,056	30	31,680
Total Daily Gallons Demand	29,970		1,768,480

GPCD = gallons per employee per day

*Printing/dyeing, yarn, spinning and weaving, dry goods

APPENDIX D

MINISTRY OF INDUSTRIES AND SCIENTIFIC AFFAIRS: STATEMENT OF INDUSTRIAL POLICY

Appendix D

MINISTRY OF INDUSTRIES AND SCIENTIFIC AFFAIRS: STATEMENT OF INDUSTRIAL POLICY

The present policy is to revitalize the economy by ensuring efficiency in the public sector and by helping the small and medium investor so that each could make the maximum contribution to the development of the country. The promotion of the industrial sector will focus on the attainment of the three major objectives of increasing productivity, reducing the cost of living, and achieving full employment.

In seeking to attain these objectives the Government will:

1. Expand the scope of activities of all sectors. It will seek to create an efficient and incorrupt public sector (especially affecting public utilities), extract mineral resources, and develop areas considered strategically important. The other sectors will be given the opportunity to compete on equal, non-discriminatory terms in areas not reserved exclusively for the public sector.

2. Create an Economic Rehabilitation Area, which will operate as a Free Trade and Export Processing Zone providing all forms of international banking, such as off-shore banking.

3. Outside this area, subject to a ceiling on investments, give all facilities to small and medium industries.

4. Combine fiscal incentives with the removal of constraints, such as the uncertainty of investment and the cumbersome administrative procedures. Procedures associated with allocation and licensing will be carefully examined. Where possible they will be eliminated and where necessary they will be simplified with the cooperation of Trade Chambers in order to minimize delays and malpractices.

5. Encourage and facilitate regional development and thereby provide direct as well as indirect employment in rural and semi-urban areas. Local companies will be encouraged to promote small-scale, export-oriented industry through Industrial Centers located in each district. Preferential tax rates and fiscal incentives will be extended to regional industries. Banking, credit, and other ancillary facilities will be expanded to support such industry.

6. Establish and improve agro-based industries, adopt small-scale technology and labor intensive processes, and encourage the use of local raw materials in industry.

7. Establish training centers for craftsmen, design centers, and craft centers to facilitate export oriented industry.

8. Encourage and expand management training facilities.

9. Adopt strict measures to ensure quality control and cost control in order to facilitate successful competition abroad and to protect the interests of local consumers.

10. Invite foreign participation and encourage joint enterprises or other arrangements between local and foreign entrepreneurs. Enact legislation containing the terms and condition of foreign investment. Safeguard national interest and the interest of foreign investors concluding agreements that will ensure the rights of foreign investors and allow arbitration in disputes through an appropriate international agency.

Table D-1
GREATER COLOMBO ECONOMIC COMMISSION
ABSTRACT OF PROJECTS

No.	Title of Project	GCEC	Investment by Pvt. Investors	Other Agencies	Total Rs. in mil.	Remarks
1.	Parallel road (Negombo Colombo from Katunayake to Kiribathgoda	-	-	246.0	246.0	
2.	Railway improvement Ragama-Katunayake section	-	-	150.0	150.0	Railways.
3.	Negombo urban area - road improvements and Surface Drainage	70.0	-	-	70.0	
4.	Negombo town expansion Negombo urban area - slum clearance, slum upgrading and rehabilitation	12.0	-	8.0	20.0	Loans by banks or other financial institutions.
5.	Negombo metropolitan area - Katana New Town	105.0	620.6	-	725.6	
6.	Biyagama - housing complex at Udupila	50.0	310.3	-	360.3	
7.	Katunayake-Seeduwa New Town - housing and commercial complex for expatriates	25.2	204.8	-	230.0	
8.	Biyagama IPZ housing and commercial complex for expatriates - Siyambalape	19.3	101.9	-	121.2	
9.	Seeduwa Regional Hospital	-	37.5	-	37.5	
10.	Seeduwa & Biyagama international schools	-	13.6	-	13.6	
11.	Kadolkelle Township	107.6	184.0	-	291.6	
12.	Negombo metropolitan area water supply and sewerage	-	-	590.9	590.9	
		389.1	1,472.7	994.9	2,856.7	

APPENDIX E

ENGINEERING REPORT: ELECTRIC POWER DISTRIBUTION, LIGHTING, AND COMMUNICATIONS FOR THE INVESTMENT PROMOTION ZONES-COLUMBO, SRI LANKA

FEBRUARY 1980

APPENDIX E

I. INTRODUCTION

This report is intended to provide advice and guidance for use in the detailed design of the electric power systems, lighting, and communications facilities that will be installed to serve investors and government organizations in the Katunayake Investment Promotion Zone-Phase II (KIPZ-II), in the Biyagama Investment Promotion Zone (BIPZ), and in a possible investment promotion zone at Welisara (WIPZ) at some future date. Development of the WIPZ has been deferred to an indefinite date due to water supply problems. However, an analysis of potential requirements is included for possible future use.

The KIPZ Phase I facilities are either already installed or under construction by the Ceylon Electricity Board (electric power) and by the Post and Telecommunications Ministry (communications). Those agencies are also expected to carry out the detailed design, construction, and installation of needed facilities in the other IPZs. This report contains electric power load estimates and power capacity requirements by site, and describes the systems to be installed and their connection to area supply systems. It details the requirements for road and security lighting and for communications facilities. Sketches illustrating recommendations are attached as well as a drawing of the detailed systems for KIPZ-II, which is to be used by the Ceylon Electricity Board (CEB) as a pattern for designing the systems for the BIPZ and possibly the WIPZ. Construction cost estimates are made for budget purposes. Facilities in KIPZ-I are not commented upon, except with regard to power load estimates and to power failures, which frequently occurred in the past.

The foregoing analyses and recommendations are based on direct investigation, consultation with officials of the CEB and PTT, and a review by Mr. John Koob of the references listed in the appendix, Electrical/Mechanical Engineering Advisor, Louis Berger International, Inc. Mr. Koob carried out these investigations during the months of October and November 1979 as a member of the Berger project team providing advisory assistance, under a UNIDO contract, to the Greater Colombo Economic Commission in the site design of investment promotion zones ir its Area of Authority. This report is a revision of his preliminary findings to take account of adjustments in IPZ investment profiles and adjustments to site plans.

II. ELECTRIC POWER LOAD ESTIMATES

Electric power loads are estimated based on profiles of industry investment by type, related employment, and land use in the IPZs and IPZ site sub-division master plans, prepared by the GCEC/Berger IPZ project team, as well as the Consultants' experience. Industry load estimates are related to the type of industry and associated forecast employment, which is considered to be at maximum on a two shift basis. Road lighting and security lighting requirements are estimated based on accepted standards for illumination and road and security fencing footage. Based on this electric power capacity, estimated requirements are shown in Table E-1.

Table E-1

SUMMARY

ELECTRIC POWER CAPACITY REQUIREMENTS BY IPZ SITE

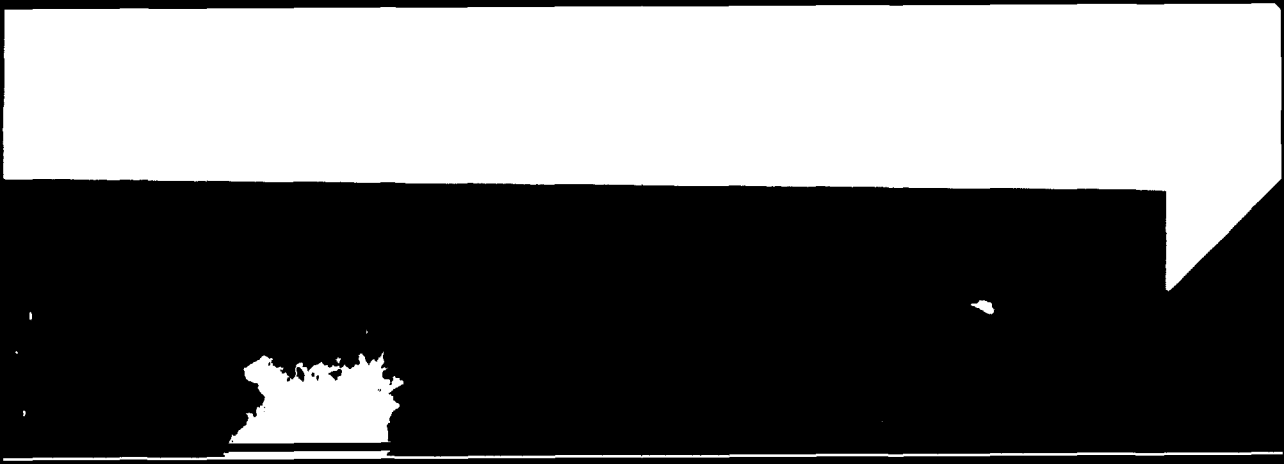
IPZ	KVA
KIPZ-I	27,000
KIPZ-II	18,000
Subtotal KIPZ	45,000
BIPZ-I	22,000
BIPZ-II	18,000
Subtotal BIPZ	40,000
WIPZ*	34,000
Total IPZs	119,000

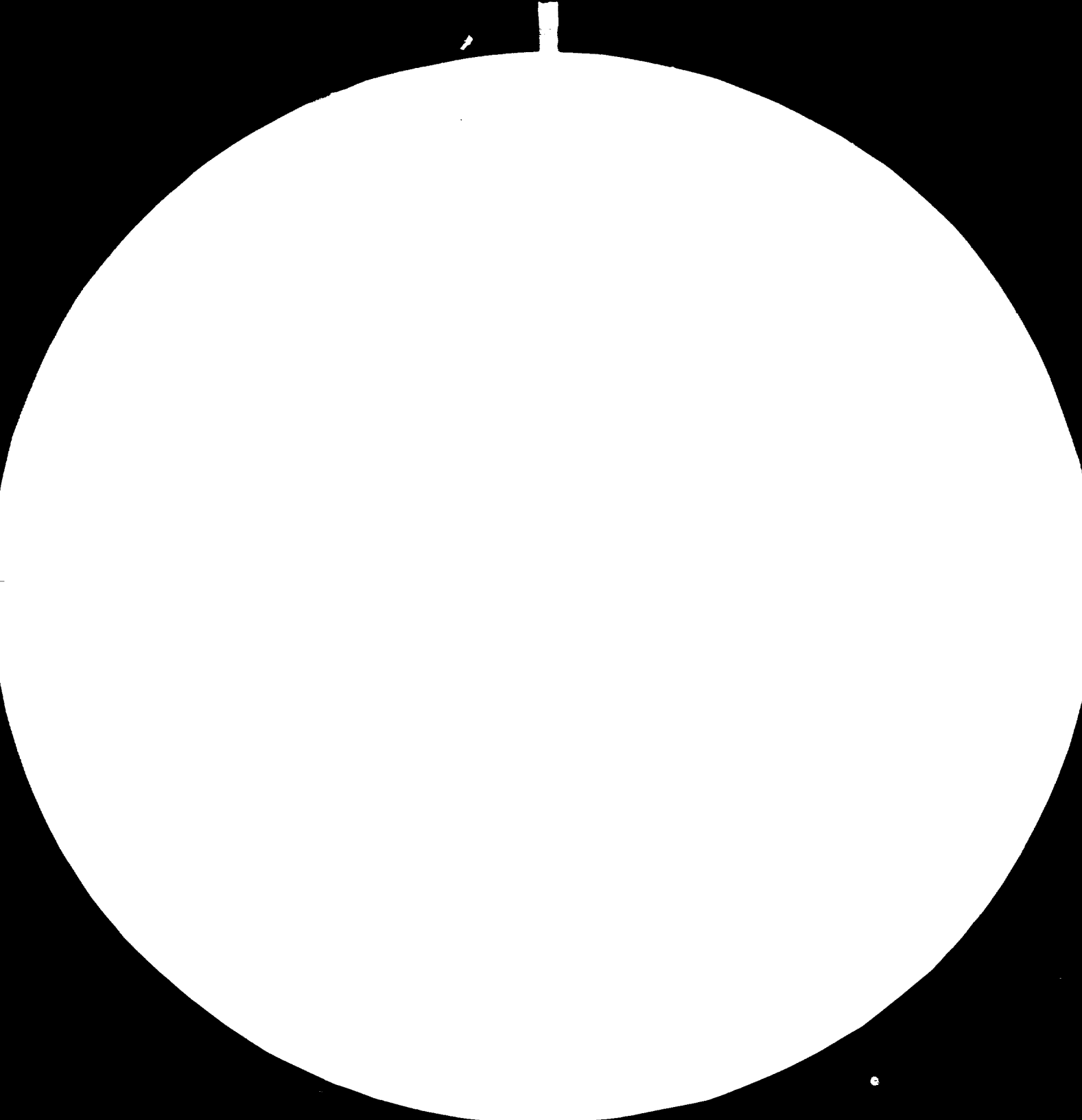
*Development of WIPZ is deferred

In subsequent tables load estimates are detailed by IPZ site. The method used in calculating maximum industry demand is as follows: Average KW per employee requirements by category of industry are arrived at by evaluation of IPZ investors' applications, and average power consumption per employee is arrived at by types of industry in IPZs in other countries as shown in UNIDO file data and reports and in other authoritative references (see attached appendix). These estimates are then factored in calculating total industry maximum demand. Demand

factors by industry type are applied to take account of variations in employee functional demand within individual plants. A diversity factor is then applied to the sum of the individual plant's demand to take into account variations in the levels of individual plant demands in arriving at maximum total industry demand.

Road lighting requirements are based on standards described in Chapter IV and a resultant design of one 400 watt (W) mercury vapour lamp plus a 35 W ballast approximately every 98 feet along IPZ internal roads. Security fence lighting design is two 250 W mercury vapour lamps plus a 25 W ballast spaced approximately every 50 feet along the security fences on the perimeter of the IPZs. Administrative Plaza building lighting requirements are estimated at 0.009 KW per square foot in office space and 0.002 KW per square foot in the lobby and stairs. Water and sewerage power demand is based on these systems specifications. In calculating total maximum demand, provision is made for distribution losses of 10% plus a 10% contingency. Resultant demand in Kilowatts (KW) is then converted to Kilovolt amperes (KVA) using a power factor of 0.85.





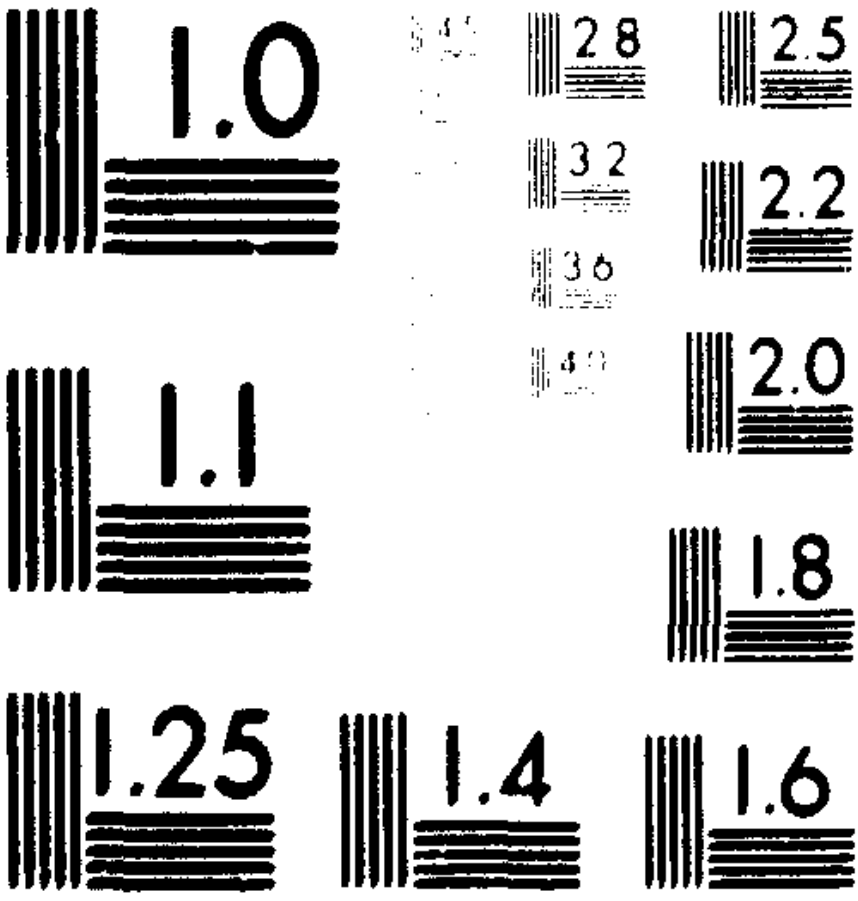


Table E-2

KIPZ-II ELECTRIC POWER LOAD ESTIMATE

A. Industry Type Industry	Number Employees	KW Per Employee	Demand Factor	Total KW
Textiles	7,761	0.98	0.9	6,845
Electronics	2,644	1.10	0.8	1,799
Electrical	3,050	2.10	0.6	3,843
Pharmaceutical and cosmetics	3,329	1.00	0.7	2,330
Precis. instruments	1,049	1.00	0.6	629
Miscellaneous	100	0.85	0.6	51
Total	17,333			15,497
Maximum demand based diversity factor of 0.8				12,398[1]
B. Road lighting[2]				29
C. Security fence lighting[3]				96
				125
D. Total power and lighting				12,523
Distribution loss provision (@ 10%)				1,252
Subtotal				13,775
Contigency - 10%				1,378
Grand total KW				15,153
OR @ power factor of 0.85				17,827 KVA
Say				18,000 KVA

[1] 0.72 KW/employee

[2] 6,830 ft. of road = 67 lamps per drawing
06.01 x 0.435 KW

[3] 0.550 KW x 8,667 feet of fence ÷ 50 ft./lamp

Table E-3

KIPZ-I AND II - ELECTRIC POWER LOAD ESTIMATES

A. Industry

Type Industry	Number Employees	KW Per Employee	Demand Factor	Total KW
Garments	15,361	0.96	0.7	10,323
Other textiles	12,389	0.98	0.9	10,927
Lapidary/jewelry	2,548	1.34	0.6	2,049
Electronics	3,220	1.10	0.8	2,833
Electrical	3,446	2.10	0.6	4,342
Metal products	456	1.50	9.6	410
Footwear/travel goods	2,966	1.43	0.7	2,969
Rubber				
Pharmaceutical/ cosmetics	3,429	1.00	0.7	2,400
Precision inst./equip.	1,049	1.00	0.6	629
Food	483	1.73	0.8	668
Miscellaneous	685	0.85	0.6	349
Total	46,032			37,901
Maximum demand @ diversity factor of 0.8				30,320[1]
B. Road lighting[2]				103
C. Security fence lighting[3]				252
D. Administrative Plaza Building -				
Office space (118,000 sq.ft. x 0.009 KW/sq.ft)				1,062
Lobby and stairs (22,000 sq.ft. x 0.002 KW/sq.ft.)				44
			Subtotal	1,106
E. Water & sewage processing				400
F. Total power & lighting				32,181
Distribution loss provision @ 10%				3,218
			Subtotal	35,399
Contingency @ 10%				3,540
			Grand total	38,939 KW
Or at power factor of 0.85				45,811 KVA
				45,000 KVA

[1] 0.66 KW per employee
[2] 0.435 KW x 23,163 ft. - 98 ft./lamp.
[3] 0.550 KW x 22,834 ft. - 50 ft./lamp.

Table E-4

BIPZ PHASE I - ELECTRIC POWER LOAD ESTIMATE

A. Industry

Type Industry	Number Employees	KW Per Employee	Demand Factor	Total Demand in KW
Textiles	434	0.98	0.90	383
Footwear	3,045	1.43	0.70	3,048
Rubber products	90	1.45	0.70	91
Food processing	1.053	1.75	0.80	1,474
Wood/other fiber	1,528	1.50	0.60	1,375
Non-metals minerals	75	2.40	0.60	108
Metal products	435	8.50	0.70	2,588
Electronics	8,363	1.10	0.80	7,359
Miscellaneous	364	1.50	0.60	328
Total	15,387			16,754
Est. peak demand @ diversity factor of 0.8				13,403[1]

B.	Road lighting[2]	62	
C.	Security fence lighting[3]	308	
D.	Administration Plaza Building[4]	1,106	
E.	Water and sewerage	250	
F.	Total power and lighting	15,129	
G.	Distribution loss provision @ 10%	1,513	
H.	Subtotal	16,642	
I.	Contigency @ 10%	1,664	
J.	Grand total	18,306	
K.	Power capacity required @ 0.85 power factor	21,536	KVA
	Say	22,000	KVA[5]

[1] 0.87 KW/employee

[2] 14,000 ft. @ 0.435 KW per .98 ft.

[3] 28,000 ft. @ 0.550 KW per 50 ft. - assumed to cover entire Block A, Phase 1

[4] Same facilities as KIPZ

[5] 50% total site load

Table E-5

TOTAL BIPZ ELECTRIC POWER LOAD ESTIMATE

A. Industry

Type Industry	Number Employees	KW Per Employee	Demand Factor	Total Demand in KW
Textiles	1,026	0.90	0.90	905
Footwear/travelwear	5,145	1.43	0.70	5,150
Rubber products	454	1.45	0.70	461
Food processing	1,401	1.75	0.80	1,961
Wood/other fiber	3,298	1.50	0.60	2,968
Minerals, non-metal.	349	2.40	0.60	490
Metal products	834	8.50	0.70	4,962
Electronics	16,227	1.10	0.80	14,280
Miscellaneous	1,056	1.50	0.60	1,267
Total	29,790			32,444
Estimated peak assuming diversity factor of 0.8				25,955[1]
B. Road lighting[2]				78
C. Security lighting[3]				399
D. Administration Plaza Building[4]				1,106
E. Water and sewerage processing				500
F. Total power and lighting				28,038
G. Distribution loss provision @ 10%				2,804
H. Sub-total				30,842
I. Contingency 10%				3,084
J. Grand total				33,926
K. Power capacity @ 0.85 power factor				39,913 KVA
			Say	40,000 KVA

[1] 0.87 KW/employee

[2] 17,500 ft. @ 0.435 KW/98 ft.

[3] 36,330 ft. @ 0.550 KW/per 50 ft.

[4] Same as KIPZ

Table E-6

WIPZ ELECTRIC POWER LOAD ESTIMATE

A.	Industry				
	Type Industry	Number Employees	KW Per Employee	Demand Factor	Total Demand in KW
	Electronics	31,928	1.10	0.80	28,097
	Estimated peak @ diversity factor of 0.8				22,477[1]
B.	Road lighting (estimated)				22,350
C.	Security fence lighting (estimated)				110
D.	Administration Plaza Building				1,100
E.	Water and sewerage processing (estimated)				100
F.	Total power and lighting				23,660
G.	Distribution loss provision @ 10%				2,366
H.	Subtotal				26,026
I.	Contingency @ 10%				2,603
J.	Grand total				28,629
K.	Power capacity @ 0.85 power factor				33,681 KVA
				Say	34,000 KVA

[1] 0.70 KW employee

III. ELECTRIC POWER SYSTEM

1. Tranmission Levels

The normal source of the electric power for the KIPZ was established by the Ceylon Electricity Board (CEB) and consists of a new 132-33 KV, 2 x 30 MVA grid sub-station. The latter taps the power off the existing 132 KV double transmission line running in the north/south direction through the GCEC Area of Authority. This transmission line forms part of the national power grid. One of the new grid s/s transformers is already in operation and is supplying power over the new 33 KV primary transmission line to the KIPZ. This line consists of four circuits: two are now serving the Phase I area, and the other two are serving the Phase II area of the KIPZ, each through one 2 x 10 MVA, 33-11 KV primary s/s.

It is recommended that similar supplies be developed for the BIPZ and WIPZ, using the same 132 KV grid transmission line for the power source. See Sketch No. 1 in the appendix.

It is also recommended that the primary sub-stations be standardized using 5 MVA and 10 MVA transformers with the necessary provisions for the future installation of transformer cooling fans to boost their capacities by, say, 15%.

2. Distribution Level, 11 KV

A sample design of the proposed 11 KV distribution system is given for the KIPZ, Phase II (see Appendix C, Drawing No. 06/01). The system recommended is primary selective. Two full capacity overhead loop feeders running the full circumference of the zone should be connected with four 11 KV breakers to the 11 KV line of the primary sub-station. The 11 KV bus should be sectionalized with each section supplied from one 10 MVA transformer. To avoid overhead lines running through the zone, the zone inner section should be supplied via two 11 KV underground feeder cables, each connected to one of the overhead loops with a fused load break switch (see Sketch No. 2 and Drawing No. 06/01 in Appendix C). Adequate numbers of sectionalizing switches should be provided in each 11 KV to facilitate the isolation of faulted portions of a loop.

3. Distribution Level 416/240 V

Load center unit sub-stations 11000-416/240 V should be provided for the downstream distribution to investors. The sub-stations should be standardized. They should be located in the center of loads, each serving several investors within a

radius not to exceed 200 meters (see Appendix C, Drawing No. 06/01). This would limit the voltage drop from the sub-station to the investor to less than 3% at 1000 KVA using two parallel feeders each 240 mm copper. The recommended transformer sizes are 2 x 750 KVA and 2 x 1000 KVA. A typical sub-station should be similar to one shown in Sketch No. 2 in the attached appendix.

4. Underground Feeders

All cables should be multiconductor, copper, cross linked polyethylene insulated and PVA jacketted, directly buried in unpaved areas and in conduit under paved areas and where crossing the roads. It would be desirable to have the cable insulation rated 600 volt, but not less then 500 volt, for the 416/240 volt service, and 15 KV, but not less than 12 KV, for the 11 KV service. The cable sizes should be standardized. It is suggested that the following sizes be used: within a radius of 200 m, 35 mm^2 for 50 KVA, 50 mm^2 for 100 KVA, 120 mm^2 for 250 KVA, 240 mm^2 for 500 KVA, and 2 x 240 mm^2 for 1000 KVA.

5. Standards and Regulations

The installation of the electrical distribution system should fully comply with applicable British Standards and CEB regulations. Where CEB regulations would conflict with British Standards, CEB regulations should have the priority.

IV. ILLUMINATION

1. Roads

All primary roads should have an illumination level of not less than 13 Lux. Side roads may have a lower illumination level, but not less than 8 Lux.

Lighting standards should be galvanized steel with galvanized steel arms, each terminated with one 400 watt mercury vapour luminaire. The luminaire should have cast aluminium housing, should be anodized, and should be equipped with high power factors ballasts.

The road lighting should be controlled by photoelectric switches. A by-pass for manual control should also be provided (see Sketch No. 3).

2. Open Area

The following are the suggested illumination levels for open areas:

- parking areas: 50 LUX
- bus stops: 25 LUX
- storage areas: 25-50 LUX
- parks: 5-8 LUX
- sports facilities: 50-200 LUX

Floodlighting should be extensively used in all large open areas.

3. Fence Lighting

Security fence lighting should be provided with 2 x 2 50 W mercury vapour luminaires mounted on poles spaced 50 feet apart. Fence lighting should be controlled similar to road lighting, as suggested in Sketch No. 3.

4. Feeders

All feeders for illumination should be installed underground. The cables should be of the same type as recommended for the power distribution.

V. COMMUNICATIONS

It is recommended that each zone have a private automatic switching station, similar to the one installed at the KIPZ, linked with Colombo either by microwave or cable. The investors should be consulted with regard to their individual requirements. A detailed questionnaire should be sent out to each investor. A telex center in the administration section should be established for utilization by all the investors in addition to individual telex facilities for investors who so desire. Some public coin operated telephones might be installed by the PTT in the Plaza.

For the KIPZ, 800 lines have been reserved (according to Posts & Telecommunications) in the new main exchange, presently under construction, to provide each investor with four direct lines and one telex line. Thus, each investor would be connected with five cable circuits to the main exchange. An additional 200 lines are reserved for users outside the KIPZ. All the design and construction is being carried out by the Posts & Telecommunications.

It is recommended that the same provisions be made for the BIPZ, that is, a reservation of 800 lines for the BIPZ itself and 200 lines for users outside the BIPZ site. The BIPZ is expected to have close to the same number of investors as the KIPZ. In addition, it is forecast that there will be between 80 and 100 new manufacturing investors located outside the BIPZ by the end of 1983.

Provision for the WIPZ can be deferred for some time due to probable delay in its development. However, if a tentative provision is to be made, the potential availability of an additional 1,000 lines from modification to the KIPZ exchange to serve at least part of the general region should be considered.

VI. CONSTRUCTION COST ESTIMATE

1. Electric Power System

1.1 KIPZ-II

The following construction costs in Sri Lanka Rupees have been estimated for the KIPZ Phase II area based on Sketch Nos. 2 and 3, Drawing 06/01, and the CEB primary sub-station consisting of 2 x 10 MVA transformers (CEB Drawing No. FIZ/D/7).

a. Primary sub-station 33-11 kv with 2 x 10 MVA transformers 2 - 33 kv primary breakers, 3 - 11 kv secondary breakers and 6 - 11 kv feeder breakers Rs. 9,300,000

b. Nine double ended sub-stations 11 kv - 416/240 V with total 18,000 KVA transformer capacity in accordance with Drawing 06/01 Rs. 19,422,000

c. Secondary cable distribution including service entrance molded case circuit breakers and meters Rs. 3,829,000

d. Overhead line, double circuit each 185 mm^2 copper, 11 kv, total length 2.4 miles Rs. 1,116,000

Total electric power system KIPZ-Phase II Rs. 33,667,000

The costs per KVA of transformer capacity, excluding the primary sub-station, are Rs. 24,367,000 ÷ 18,000 = Rs. 1,354

The above figures per KVA are used for rough estimates of the construction costs for the electric power system for Biyagama and Welisara IPZ sites.

1.2 Biyagama

The total load for the Biyagama area has been estimated at 40,000 KVA. As the occupied acreage in Biyagama is (291.95 acres, ÷ 96.4), 3.03 times the occupied acreage of the KIPZ Phase II, the above costs per KVA should be increased to reflect the increased area served. This should primarily apply to the overhead and underground distribution lines. On the other hand, the number of acres per investor is larger--(291.95 ÷ 97) = 3.01 against (96.4 ÷ 55) = 1.75--in KIPZ Phase II. Considering the above factors, the construction costs per KVA excluding the primary sub-station have been

estimated at Rs. 1,482/KVA, which amounts to a total of 40,000 x Rs. 1,482 = Rs. 59,280,000

Primary sub-stations	
One 2 x 10 MVA	9,300,000
Two 2 x 05 MVA	10,850,000
Total electric power system for Biyagama	Rs. 79,430,000

1.3 Welisara

The potential occupied acreage is estimated to be (121.4 ÷ 96.4), 1.26 times the occupied acreage in KIPZ-Phase II. The ratio of acreage per investor is estimated to be (121.4 ÷ 66) = 1.84 against 1.57 for KIPZ-Phase II. This would lead to the conclusion that the costs per KVA would be slightly increased. However, this zone will be rather densely populated, (31,978 ÷ 121.4) = 263 persons per acre against (17,333 ÷ 96.4) = 180 for KIPZ-Phase II.

Considering the above factors, the per KVA cost has been estimated at Rs. 1,294 for all the secondary distribution, amounting to a total of 34,000 x Rs. 1,294 = Rs. 43,996,000

Primary sub-station 2 x 20, 000 KVA	= Rs. 17,050,000
Total Electric Power System, Welisara	= Rs. 61,046,000

2. Road Lighting

2.1 KIPZ-Phase II: The total number of 400 W luminaires has been estimated at 67 and the average cost per luminaire at Rs. 6,200 (including the pole, pole footing, and wiring). The cost of the underground cable has been estimated at Rs. 70 per foot. The total length of roads is 6,830 feet and the length of main feeders is 785 feet.

a. Luminaires and poles 67 x Rs. 6,200 = Rs. 415,400

b. Cables: (6830 + 4000 (inside ring) + 785) x 1.1 x Rs. 70 = Rs. 894,355

Total road lighting, KIPZ-Phase II (or Rs. 192 per linear foot of roadway)	= Rs. 1,309,755
say	Rs. 1,310,000

2.2 Biyagama: Total length of roads has been estimated at 17,500 feet and the cost of road lighting at 17,500 x Rs. 192 = Rs. 3,360,000

2.3 Welisara: Total length of roads has been estimated at 9,700 feet and the cost of road lighting at 9,700 x Rs. 192 = Rs. 1,862,400
say, Rs. 1,862,000

3. Security Fence Lighting

3.1 KIPZ-Phase II: The total length of the zone security fence has been estimated at 8,667 feet and the number of light poles each with 2 x 250 W luminaires at 8,667 ÷ 50 = 174 and the cost per unit at Rs. 9,300.

a. Luminaires with poles 174 x Rs. 9,300 = Rs. 1,618,200
b. Underground cable 8,667 x 1.1 x Rs. 70 = Rs. 667,359
say, Rs. 667,400
c. Main feeders, lump sum 77,500

Total security fence lighting, KIPZ-II Rs. 2,363,100
or 2,363,100 ÷ 8,667 = Rs. 273 per linear foot of security fence.

3.2 Biyagama: The length of the security fence has been estimated at 36,330 feet and the cost of security fence lighting at 36,330 x Rs. 273 = Rs. 9,918,090

3.3 Welisara: The length of the security fence has been estimated at 14,000 feet and the cost of the security fence lighting at 14,000 x Rs. 273 = Rs. 3,822,000

4. Summary, Electric Power, and Lighting

4.1 KIPZ-Phase II	Rupees, Thousands
Electric power system	33,667
Road lighting	1,310
Security fence lighting	2,363
Contingency, 10% of above total	3,734
Total KIPZ-Phase II	Rs. 41,074

4.2 BIPZ	Rupees, Thousands
Electric power system	79,430
Road lighting	3,360
Security fence lighting	10,307
Contingency, 10% of above total	9,310
	Rs. 102,407

4.3 WIPZ

Electric power system	61,046
Road lighting	1,862
Security fence lighting	3,822
Contingency, 10% of above total	6,673
	Rs. 73,403
Total, all zones	Rs. 216,884

If 11 KV distribution cable loops were to be used instead of the overhead lines, the total cost is estimated to increase by approximately 15%

The 33 KV transmission lines and the 132-33 KV grid sub-stations were not included in the above estimate as they fall exclusively in the domain of CEB and may be used to serve other areas in the zone of the GCEC Authority.

5. COMMUNICATIONS

5.1 KIPZ: PTT representatives reported on 26 March 1980 that the total cost for the Katunayake system, which serves both KIPZ and the surrounding area, is approximately Rs. 143 million. Of this total, the international sub-system (satellite connections) amounts to about Rs. 85 million and the domestic system component to Rs. 58 million. The KIPZ-II component of this cost is estimated at approximately Rs. 10 million. It was confirmed that should the need arise, the 1,000 line reservations could be increased to 2,000 at a cost of 20% to 30% of the original investment. The PTT plans to provide initially about five telex machines and five coin operated telephones for public use in the Zone at PTT expense, and would be willing to expand this service to meet demand.

5.2 BIPZ: The communication system planned for the BIPZ and its surrounding area is the same as that for the KIPZ.

The following cost estimate for such an investment includes a provision for contingencies of approximately Rs. 10 million.

	Rs. Million
International system	21.0
Domestic system	
Central exchange	25.0
Transmission	10.0
Sub-station cable net	10.0
Switchboard, etc.)	
Peripherale for telexes)	5.0
Telexes)	
Contingency	10.0
	60.0
Grand total	81.0

5.3 WIPZ: A communication system for the WIPZ similar to that for the other IPZs can be expected to cost about 50% of that for BIPZ or Rs. 30 million plus a provision for inflation, which will be influenced by the actual date of systems procurement and installation.

6. Timing of Investment Requirements

Delivery lead time for procurement of imported electric high power equipment and major items of communication system equipment, taking into account normal tender and award procedures, is expected to be in the range of 1.5 years. It is important that this be taken into account in relation to the forecast timing of IPZ completion and occupancy. The GCEC should authorize procurement by the CEB and the PTT accordingly.

6.1 KIPZ-II: The KIPZ-II is expected to be completed in 1980, to be fully occupied in 1981, and reach full employment capacity by the end of 1982.

6.2 BIPZ: The construction of the BIPZ-I is expected to be completed by October 1981 and to reach 50% of its employment potential by the end of 1982 and 100% by the end of 1983. BIPZ-II construction is now forecast to be completed by the end of 1982 and to reach 50% of its employment potential by the end of 1983. The foregoing assumes that the effectiveness of GCEC investment promotion continues at least at the current level.

Based on the foregoing, power requirements in the BIPZ can be forecast at about 10 MVA by December 1982, 30 MVA by December 1983, and 40 MVA by December 1984. Of course, this progression could be accelerated if several very large power consuming industry investors were early investors in BIPZ-I.

VII. MISCELLANEOUS COMMENTS

1. Power Failures

The construction of the KIPZ-I zone is being carried out with limited engineering and design capacity because of the urgency to make the free trade zone space available to foreign investors. Consequently, it was not possible to properly coordinate the construction schedules of various trades, which in turn has resulted in temporary deficiencies. For example, the pole lines were erected before all obstructions had been cleared.

The temporary power distribution was installed without adequate protection and relaying, such as the 11 KV circuit breakers and sectionalizing fused switches. Therefore, a minor interference downstream would disrupt the power supply through the temporary 33 KV overhead feeder. The former equipment, requiring a long lead time, did not arrive in time to be installed when the service was needed.

Before the KIPZ-Phase I was connected to the new 132-33 KV grid sub-station, power was supplied by the existing 33 KV line serving numerous customers in the Ja-ela area. This line is heavily loaded and is subject to frequent power interruptions, which have affected the zone.

Other causes of power failures were due to the condition of the installed temporary, secondhand equipment, such as the 2 MVA, 33-11 KV transformer, which developed a fault.

The black-outs in October 1979 were caused by the debugging of the new 2 x 30 MVA, 132-33 KV grid sub-station, which is presently under construction. This sub-station is already supplying the zone.

The CEB is to be congratulated on the remarkable accomplishment of providing electric power so quickly with the use of available secondhand equipment and materials and without enough time to prepare adequate detailed engineering and design.

When all the new equipment is installed and operating it is anticipated that there will be a secure, continuous, and reliable electric power supply to serve the zone and that no major power interruptions will occur.

2. Investors' Electric Installations

It has been observed during visits to KIPZ-Phase I that some investors' internal wiring does not adhere to the British Codes and Standards. Therefore, many of the power service interruptions in the future might emanate from improperly designed internal wiring.

The following is recommended:

a. Each investor should submit detailed drawings and specifications of its internal electrical distribution and lighting to the CEB for approval prior to letting out a construction contract.

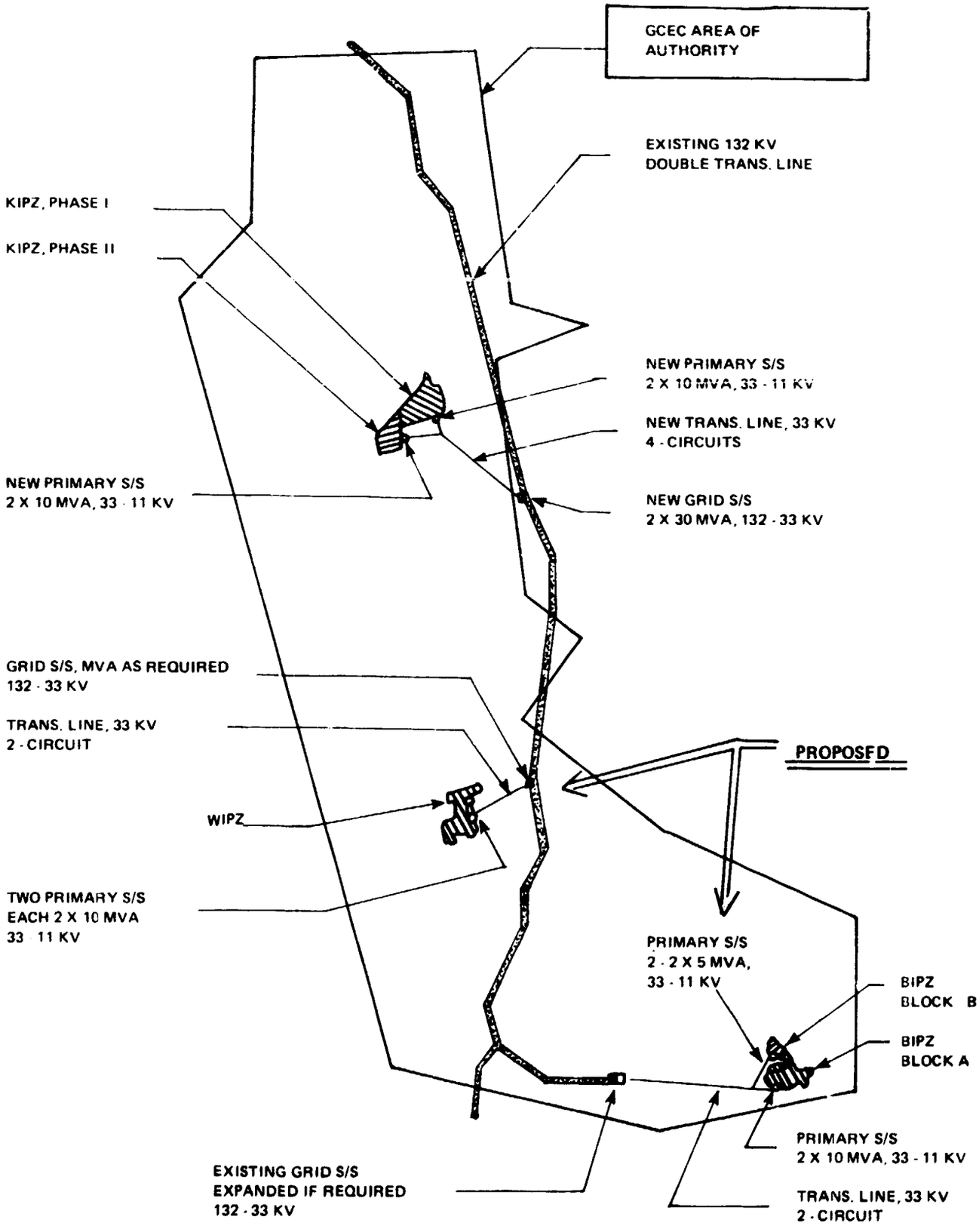
b. Each investor's completed electrical installation should be meticulously checked by the CEB with regard to adherence to codes, standards, and regulations.

3. 132-33 KV System

The two grid sub-stations, each 2 x 20 MVA, for Biyagama (extension to the existing if required) and for Welisara are estimated at Rs. 31 million, and the 33 KV transmission lines from the grid sub-stations to the respective zones are estimated at Rs. 3,875,000.

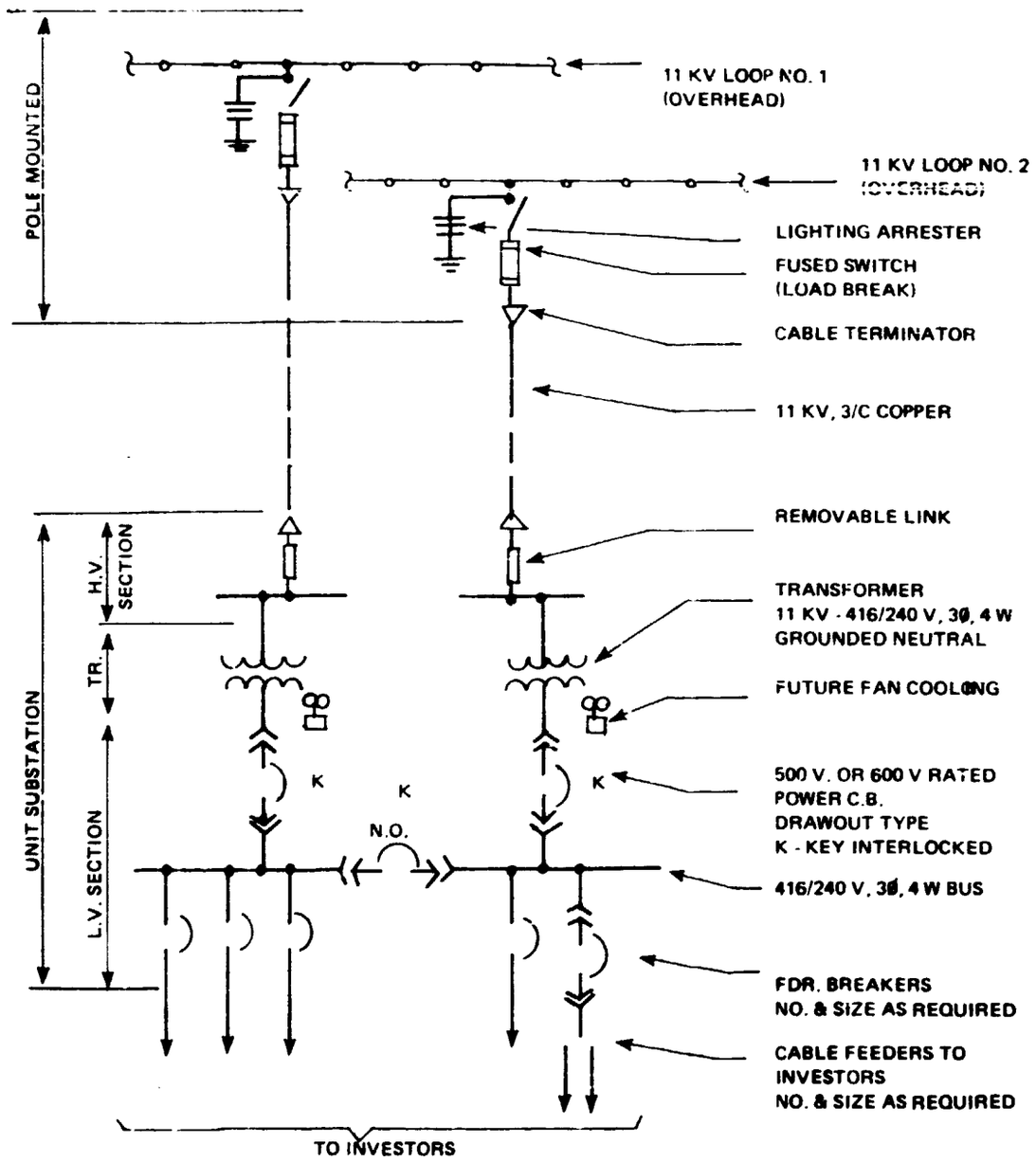
As an alternative to the above, the BIPZ could be supplied from the existing 33 KV line from Mawara Mandiya point. If the line is double, it can transmit the total projected initial maximum demand when it is properly protected against failures caused in the downstream distribution to customers outside the zone. In that case, the cost of supplying power to BIPZ would be greatly reduced to approximately Rs. 2,325,000. The cost of the grid sub-station, amounting roughly to Rs. 15,500,000, would be eliminated.

VIII. SKETCHES AND DRAWINGS



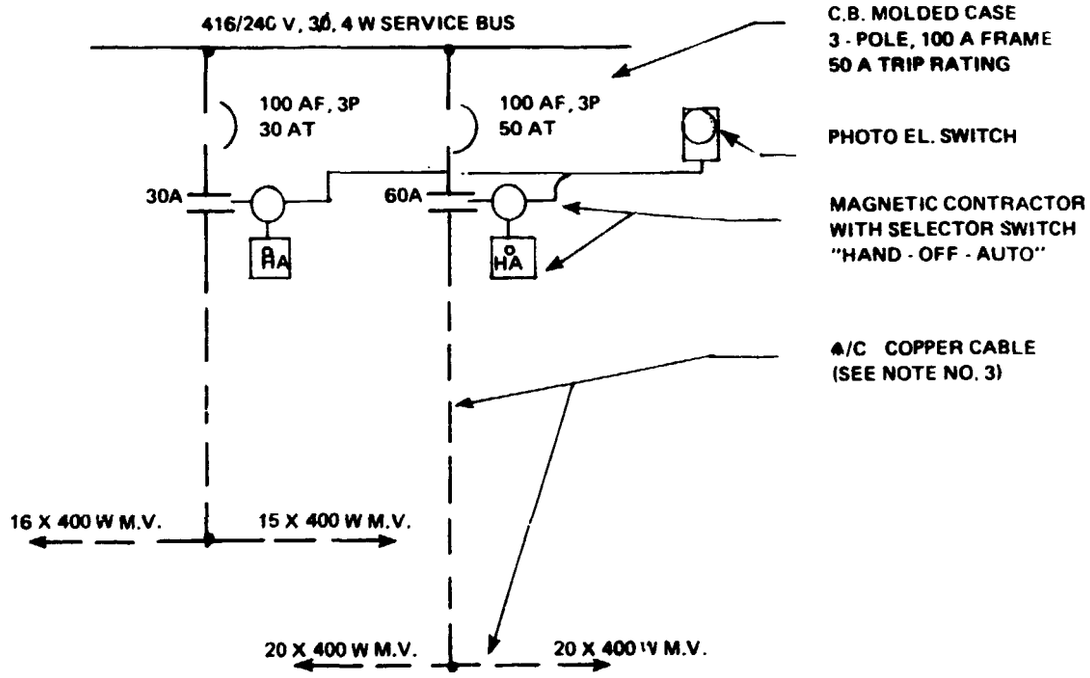
SKETCH NO. 1

PLAN
ELECTRIC POWER SUPPLY TO IPZ
1" = 3 MILES



SKETCH NO. 2

TYPICAL UNIT SUBSTATION
ONE LINE DIAGRAM



NOTES

1. ALL OUTDOOR LIGHTING SHOULD FOLLOW THE BASIC CONTROL ELEMENTS SHOWN ABOVE.
2. EACH AREA SUCH AS PARKING, SECURITY FENCE, ETC., SHOULD BE CONTROLLED BY SEPARATE PHOTO ELECTRIC SWITCHES.
3. VOLTAGE DROP SHOULD BE LIMITED TO 3% FROM THE BUS TO THE FATHEST LUMINAIRE.

SKETCH NO. 3

KIPZ - PHASE II, MAIN ROADWAY LTG
ONE LINE DIAGRAM

IX. REFERENCES

1. Correspondence file "Electricity", IPZ Mgt., GCEC.

2. Letter G.L. Perera, GCEC, to W.L. Victor, CEB, of Oct. 31, 1979.
   Letter G.L. Perera, GCEC, to H.S. Subasinghe, CEB, of Oct. 31, 1979.

3. Drawings:

   - CEB No. 172-11, General Electricity Layout, Proposed Plaza at KIPZ.

   - CEB No. 172-12, Section, Elevation, Proposed Plaza at KIPZ.

   - CEB No. DP/64/3067, Pole mounted and Plissth mounted sub-stations.

   - CEB No. FTZ/D/7 Grid sub-stations, single line diagram.

   - CEB No. CD/78/4966, 33/11 KV Primary sub-station, KIPZ.

   - Pgt No. WP 1962 Katunayake Exchange, Proposed conduits and cables.

   - GCEC No. GCEC/IPZ/K/003, Phase I, Layout, marked up by CEB showing temporary 33 KV and CEB KV distribution.

   - GCEC No. GCEC/IPZ/K/010, Phase II, Layout.

   - GCEC No. C/78/4971, Area of Authority of the GCEC with electrical transmission grid.

   - CEB, Single line diagram of H.T. Distribution System, KIPZ-Phase I, Lwg. No. C/79/5241.

4. Profiles, Estimated space utilization, Oct. 16, 1979 (as revised).

5. KIPZ, Infrastructure Facilities, Sept. 19, 1979 (as revised).

6. Investor Application Questionnaires.

7. National Electric Code, NFPA, Boston, Luan, U.S.A.

8. Industrial Power Systems Handbook, Beeman, McGraw Hill, New York, N.Y., U.S.A.

9. Lighting Handbook, Illumination Engineering Society, New York, N.Y., U.S.A.

X. MEETINGS AND SITE VISITS

Site Visits:

- KIPZ area, including Dakota Lapidary Ltd. and Gloweave Rubber Ltd. Plants.

- Kotugoda Grid Sub-Station.

- Primary (Phase I) Sub-Station.

Meetings:

Messrs. Sanjiva Senanayake (GCEC) and Jon M. Koob (LBII) have held the following meetings:

- On October 24 morning: with Mr. A. Shanmugarajah, Deputy Chief Telecommunication Engineer, at the Posts and Telecommunications Headquarters.

- On October 24 afternoon: with Messrs. C.E. Karunatilaka, Deputy General Manager (Construction), K.A. Ranaweera, Chief Engineer (D & C) - 2 and S. Welihinda, Chief Engineer, Construction Design, at the Ceylon Electricity Board Headquarters.

- On October 26: with Mr. R. Fonseka, Electrical Engineer, at the CEB office in Negombo.

- On October 29: with Mr. L.B. Kotandenma, Chief Engineer, Systems Planning, at the CEB headquarters.

- Messrs. Bandaratilleke (GCEC) and Joh M. Koob (LBII) have held a meeting with Mr. Velayuthan of CEB on 11/20/79.

- Messrs. D.C. Marsden (LBII) and Bandaratilleke (GCEC) met with Mr. A. Shanmugarajah, Deputy Chief Telecommunication Engineer, at the PTT on 26 February 1980.