REPUBLIC OF INDONESIA

NATIONAL ARCHEOLOGICAL PARKS

BOROBUDUR / PRAMBANAN

CENTRAL JAVA AND YOGYAKARTA AREA

MASTER ISSUE : MARCH 1976

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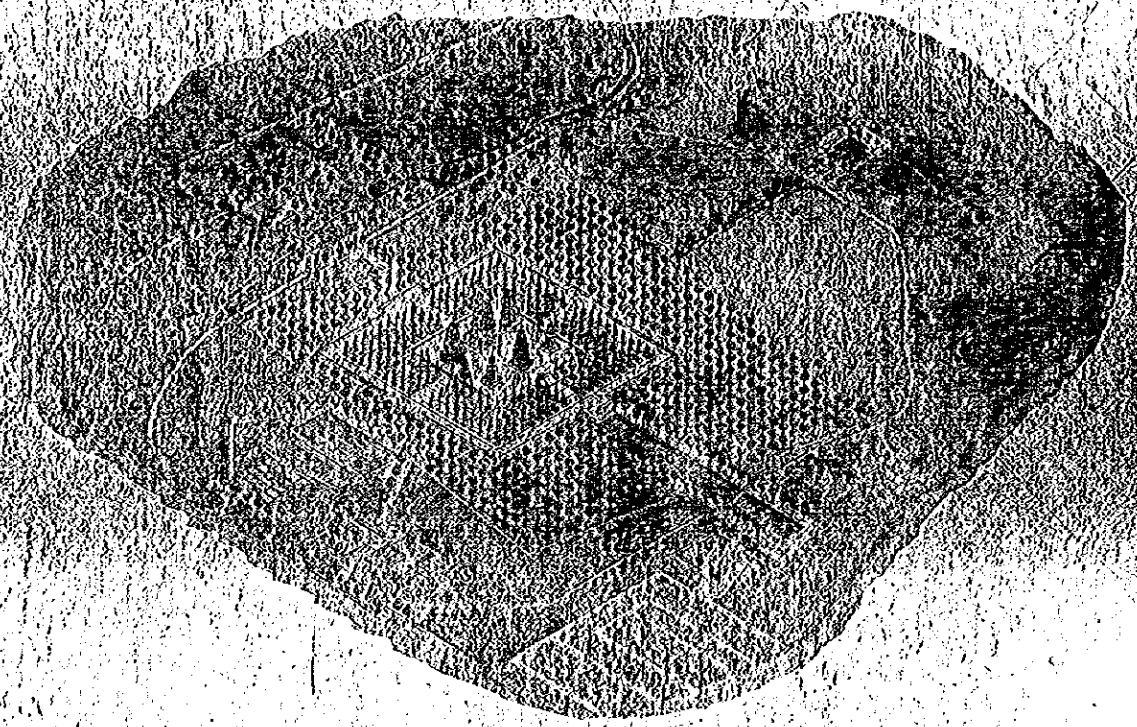

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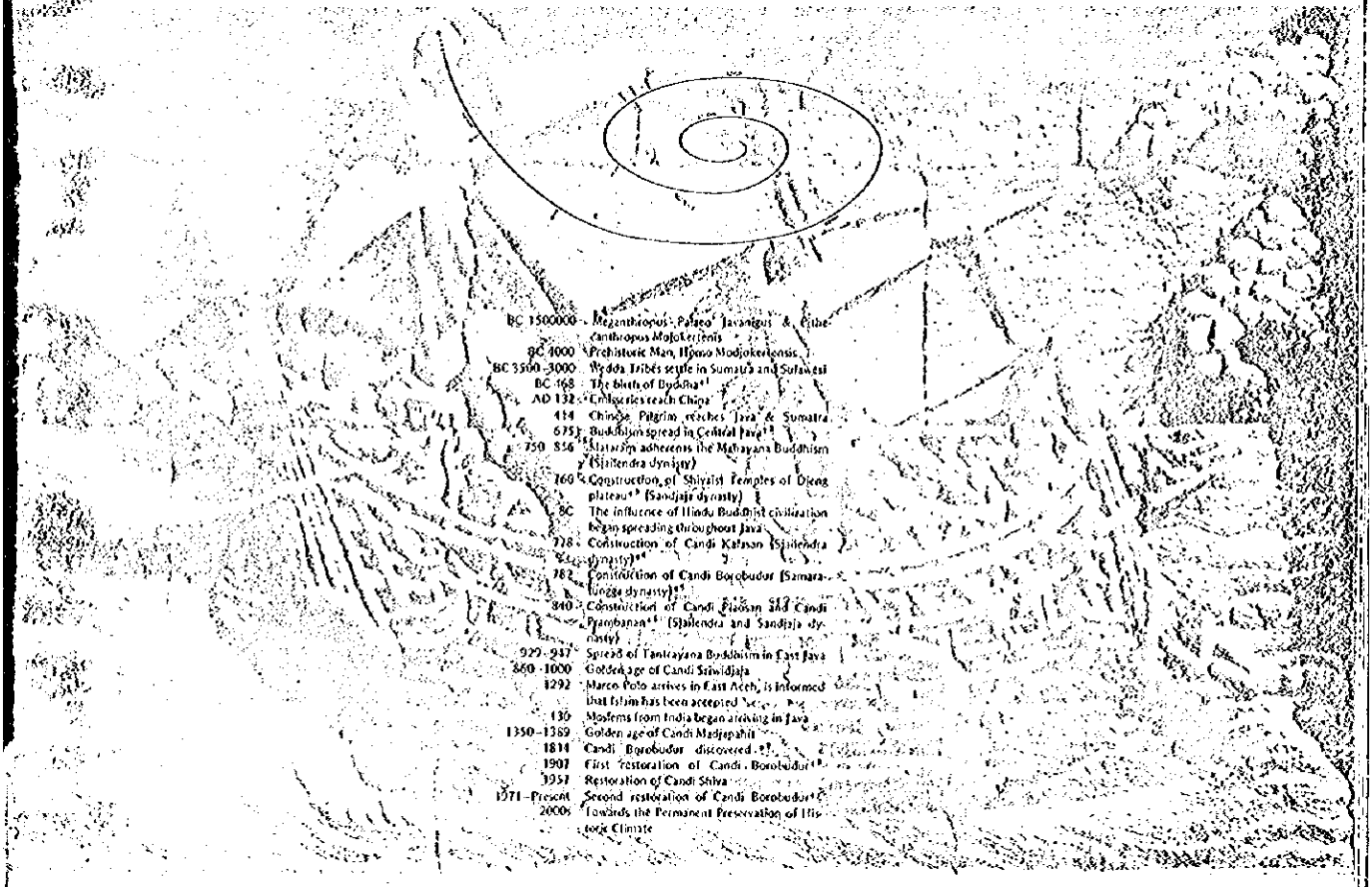
CHRONOLOGICAL TABLE



BC 1500000	Meganthropus Palaeo Javanicus & Pithecanthropus Mojokertensis
BC 4000	Prehistoric Man, Homo Modjokertensis
BC 3500–3000	Wedda Tribes settle in Sumatra and Sulawesi
BC 168	The births of Buddha[1]
AD 132	Emissaries reach China
414	Chinese Pilgrim reaches Java & Sumatra
675	Buddhism spread in Central Java[2]
750–856	Mataram adheres the Mahayana Buddhism (Sailendra dynasty)
760	Construction of Shivaist Temples of Dieng plateau[3] (Sandjaja dynasty)
BC	The influence of Hindu Buddhist civilization began spreading throughout Java
778	Construction of Candi Kalasan (Sailendra dynasty)[4]
782	Construction of Candi Borobudur (Samaratunga dynasty)[5]
840	Construction of Candi Plaosan and Candi Prambanan[6] (Sailendra and Sandjaja dynasty)
929–947	Spread of Tantrayana Buddhism in East Java
960–1000	Golden age of Candi Sriwidjaja
1292	Marco Polo arrives in East Aceh, is informed that Islam has been accepted
130	Moslems from India began arriving in Java
1350–1389	Golden age of Candi Madjapahit
1814	Candi Borobudur discovered[7]
1907	First restoration of Candi Borobudur[8]
1951	Restoration of Candi Shiva
1971–Present	Second restoration of Candi Borobudur[9]
2000s	Towards the Permanent Preservation of His toric Climate

READERS' GUIDANCE

- This final report contains virtually the entire contents of the draft final report submitted as modified to reflect the comments of the Indonesian Steering Committee.

- Cross-reference between this report and the draft final report is as follows.

Draft Final Report	Final Report: Introduction	Definition of the Park	Master Plan	Borobudur Park	Prambanan Park	Village Plan	Implementation of the Project	Economic Study	Technical Papers	Supplementary Studies
Executive Summary	•	•	•	•	•	•	•	•		
Master Issue	•	•	•	•	•	•	•			•
Project Profile							•			
Zoning Plan			•							
Landuse Plan			•							
Site Plan									•	
Transportation Plan									•	
Utility Plan									•	
Landscape Plan			•	•	•				•	
Park Facility Plan				•	•				•	
Use Program							•		•	
Village Renewal						•				
Regional Tourism Master Plan										•
Systems Analysis										•
Environmental Analysis			•							•
Social Survey						•				
Ecological Index			•							•
Archeological Index			•	•	•					•
Economic Study								•		

- The following reference works on the monuments were also consulted in the editing of this report.

  - History of Indonesia's Candi Architecture
    Dr. Daigoro Chihara; 1975
  - Indonesian Remains and Art
    Dr. Ryuichen Sawa, Dr. Daigoro Chihara, et al; 1973
  - Borobudur
    Baron Nimikawa, Dr. Daigoro Chihara, et al; 1971
  - Borobudur
    Dr. A. J. Bernet Kempers; 1973
  - Pelita Borobudur
    Drs. R. Soekmono; 1972
  - Guide to Yogyakarta and Environs
    Glen Williams; 1974
  - Wayang Purwa
    H. Ulbright; 1970

Cross-reference System

This master issue includes a wide range of planning information, and the following cross-reference system has been adopted to better convey to the reader the inter-relations among the information.

Information by *Paragraphization*

The information in each chapter is coded with the three-digit code number which appears before the chapter title. For example, paragraph 25 of Chapter 3 is given the code number of 325. However, the two exceptions to this rule are Chapter 8 Technical Papers, which uses consecutive numbering from 801 to 953 since this single chapter has 157 paragraphs, and Chapter 9 Supplementary Studies where the three-digit paragraph code numbers begin with a "0". The code number for each paragraph is to the left of its first line.

Reference Method

When two paragraphs are closely related, the code number for the reference paragraph is given to the upper right of the first line of the paragraph being read.

Because such reference are extremely numerous within the same chapter, these have been omitted in principle.

Index of Terms

This index gives the meanings of specialist vocabulary, Indonesian terminology, and abbreviations used in this report.

OVERSEAS TECHNICAL AID: 1973–75

JAPAN INTERNATIONAL COOPERATION AGENCY
Social Development Cooperation Division

CONSULTANTS:
PACIFIC CONSULTANTS INTERNATIONAL
in association with JAPAN CITY PLANNING INC.

FIRST EDITION
LIMITED COPY
number / 100

Printed in Japan by PACIFIC REPRO SERVICE

REPUBLIC OF INDONESIA

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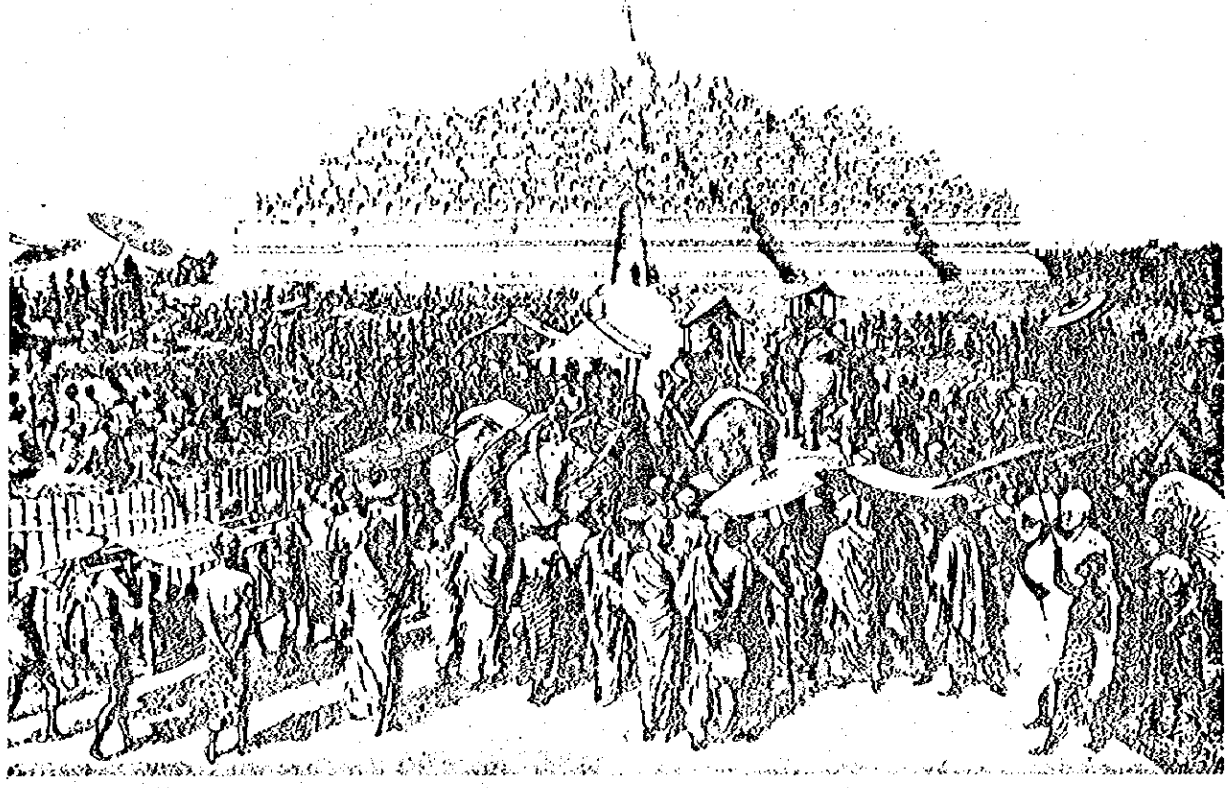
BOROBUDUR + PRAMBANAN

CENTRAL JAVA AND YOGYAKARTA AREA



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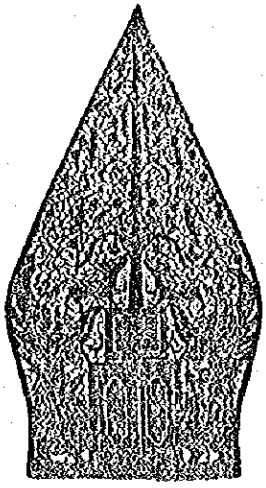


GUNUNGAN

The gunungan represents life in all its aspects. Its upper half shows the branches of the tree of life, its lower half a closed door which is flanked by two giants. The roots of the tree of life, which stand for the source of life (God), are concealed behind this door. The two giants guarding the door are supposed to represent the powers of hunger and sex. As a whole, the picture is meant to represent man as having to master his longing for food and his carnal desire before he is able to see God. Only the vanities are visible, symbolized by monkeys and birds which bustle about in the branches of the tree of life. Two sarkes and two other big animals, shown in combat with each other, demonstrate that power and strength, if uncontrolled, are a menace to peace.

PREFACE

In response to the request of the Government of the Republic of Indonesia, the Government of Japan decided to conduct a feasibility study on the Development Plan for the National Archeological Parks at Borobudur and Prambanan, choosing among the development plans which were submitted by Japan International Cooperation Agency as a result of the survey in central Java, in 1973 and 1974.
The Agency conducted this study of the plan for 14 months from February, 1975 to March 1976. Including planning specialists and advisors, a total of 24 persons participated in the study.

From February to March 1975, a field survey was conducted and an interim report was presented in April 1975. In July a supplementary field survey was made, and after careful review in Japan, a final draft was presented in December. Based on suggestions made by the Indonesian Government, that draft was revised, and this is the most up to date report.

These 1200 year-old religious monuments of Indonesia's Borobudur and Prambanan are not only the most outstanding testimony to Indonesia's rich past, but are also a treasure of Asia's cultural heritage. At the same time, this project ties in with the UNESCO plan to restore these archeological sites begun in 1971, and may be called an epochal project in establishing organizational, systematic bases for the international preservation and utilization of cultural monuments.

I sincerely hope that this report will contribute to the implementation of this project and to the promotion of friendly relations between Indonesia and Japan.

Finally, I would like to express my heartfelt gratitude to everyone who participated so ably in this study and my sincere appreciation to the people of the Republic of Indonesia.

March, 1976

Shinsaku HOGEN
President
Japan International Cooperation Agency

ACKNOWLEDGEMENTS

This Final Report, as the follow-up to the Republic of Indonesia's Tourism Development Plan for Central Java begun in 1973, was started in February of 1975 in keeping with the scope of work and based upon full on the spot field surveys by the Pacific Consultants International and associate team in an ambitious study bringing together specialists from a number of fields under the careful direction of the Work Supervision Committee to draw up a report meeting the work schedule.

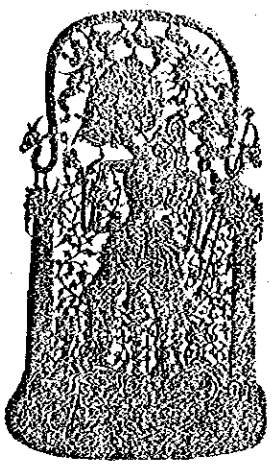
During this interval, an Interim Report was drawn up in April of 1975 and submitted to the Indonesian Steering Committee for study, with three complementary Progress Reports also submitted at the request of the Indonesian side to supplement the Interim Report. Every effort was made to incorporate the views of the Indonesian side into the compilation of the Draft Final Report in December of 1975. Finally, Indonesian comments on the Draft Final Report were considered in its revision for this Final Report.

This Report is an internationally unique and highly complicated attempt to forge diverse factors into a design for two national parks focusing upon the archeological remains at Borobudur and Prambanan in Central Java. I would like to pay my respects to the good teamwork with which the people at Pacific Consultants International brought it to fruition. I would also like to thank the members of the Work Supervision Committee for fulfilling their duties despite their busy schedules and to voice my appreciation for the arrangements and efforts made by everyone concerned at the Japan International Cooperation Agency. In addition, I must express my gratitude to Mr. Prajoto and the other members of the Indonesian Steering Committee for the full support and cooperation accorded our work.

Our efforts will be more than rewarded if this Report is adopted by the Government of Indonesia and recommendations implemented.

March, 1976

Yoshiomi ENOMOTO
Chairman
Work Supervision Committee



BETARA GURU

Betara Guru is identical with Shiva can be gathered from its being represented multi-armed, with a trident, and with the cow Andini which corresponds with Shiva's bull Nandi. He also obtains the commanding position in heaven, but he is less awe-inspiring.

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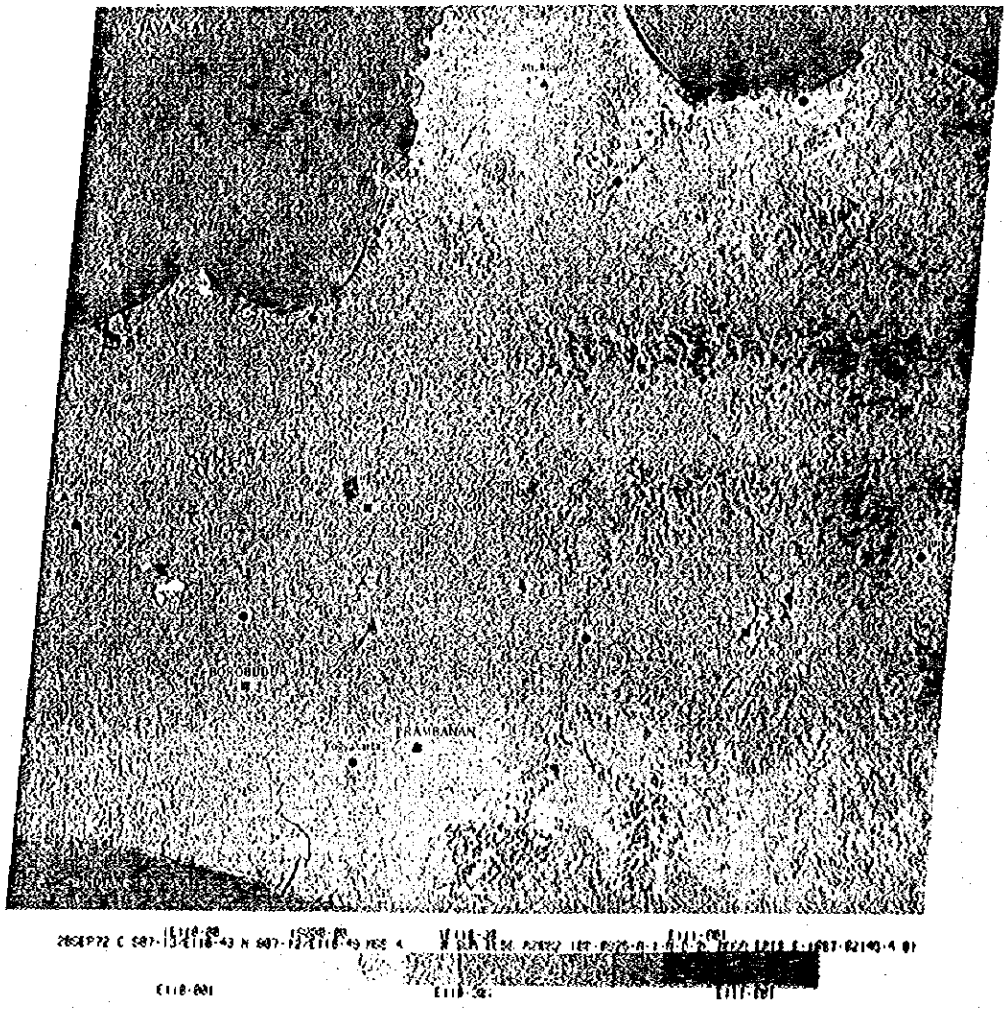
DRAWING LIST

Central Java and Yogyakarta

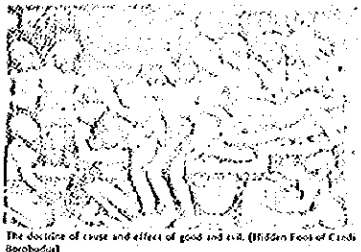
The Earth Resources Technology Satellite (ERTS) was launched on July 23, 1972, to survey the earth's resources for efficient management and to assist in solving problems of the environment. The ERTS orbit is a circular polar path about 900 kilometers up taking it once around the earth every 1 hour, 43 minutes, and 16 seconds, or approximately 14 times a day.

This photograph is a composite of four photographs taken with the ERTS Multi-Spectral Scanner (MSS). (The frequencies are 500–600 mm ("green", 600–700 mm ("red", 700–800 mm ("infra-red", and 800–1,100 mm ("infra-red".) The photographs, taken on September 28, 1972, cover an area of approximately 180 kilometers square and have been reduced to 1:1,000,000.



CONCLUSIONS AND RECOMMENDATIONS

Conclusions



The doctrine of cause and effect of good and evil. (Hidden Foot of Circle Borobudur)

Sudhana visits sage Maitreya the monk, who sits under a full-bloomed tree (Second Gallery)

Maitreya tells Sudhana to visit Manjusri and to learn the Supreme Truth of Buddha from him (Third Gallery)

Sudhana sets out on his pilgrimage to Manjusri Somewhere (Third Gallery)

This report has been compiled with the full participation of the Indonesian Government Steering Committee and the Japanese Government Supervisory Committee concerned. Our basic conclusions and recommendations have been established and agreed through step-by-step discussions with these two committees after detailed study of the project.

While these matters are covered in great detail in the body of the report, we would like to briefly summarize below these conclusions and recommendations.

As the largest, oldest and most famous historical monuments in Indonesia, Borobudur and Prambanan would, with proper development, become a focal point for the development of organized domestic tourism, especially of the cultural and educational varieties.

These monuments are already internationally famous. With the provision of adequate facilities and suitable advertising, foreign tourists can be expected to flock to these sites, bringing with them valuable hard currencies which would greatly contribute to ensuring a favorable balance of payments for Indonesia as well as boost the prosperity of the region around the archeological parks.

The greater mobility resulting from increased tourism will lead to an expansion of interregional economic and social activity and provide a further impetus to the development of the communications infrastructure.

This project will serve not only to boost the prosperity and modernize the infrastructure of the communities in the immediate locality, but, through the "ripple effect," this greater prosperity can be expected to spread in varying degrees throughout Indonesia, especially through the wide-ranging ramifications of a growing travel and tourism industry.

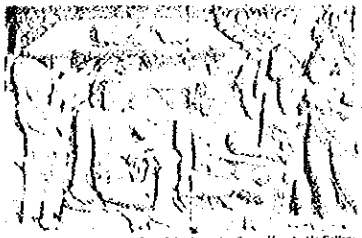
The growth of cultural tourism to these sites, notable by school and student groups, will aid the education of the Indonesian people in the glories of Indonesian civilization since many centuries, generating national pride and understanding of the country's cultural traditions. International appreciation of Indonesia's culture and civilization can also be expected to be enhanced through the development of international tourism to these sites.

Proper coordinated control of the development of tourism to these sites will help prevent deterioration of damage to these ancient relics which are such an important part of the cultural heritage of Indonesia. Active measures to preserve these relics will not only please scholars and archeologists the world over and increase Indonesia's prestige, but will also enhance their value for the tourist industry. The creation of these two archeological parks may provide a model for the setting up of environmental standards for other such parks set up later.

As well as having a direct and immediate impact, this project can be expected to have a long-lasting and continuous effect into the distant future on the broad development of Indonesia in the social, cultural and economic fields. The multiple complimentary functions of this project will aid in the development of both the physical and the nonphysical infrastructure of the nation on a more wide-ranging basis than ordinary industrial development projects.

The implementation of this project is well within the capacity of the Indonesian Government. The project is financially and economically feasible both at the construction stage and the operational stage.

Recommendations



Kidung objects to the accession of the throne by Rama (South side Gallery of Candi Shiva)

The priest celebrating Bharata's coronation (South side Gallery)

Hanuman encounters Rama and Laksmana (West side Gallery)

Hanuman speaks to Rama (East side Gallery)

Given the above listed advantages and benefits to Indonesia of this project and the fact that it is both economically and financially feasible, we would like to make the following recommendations.

- There are three prime objectives involved in this project:

  (1) The conservation and preservation of Indonesia's cultural and historical heritage

  (2) The development of archeological parks to promote the expansion of domestic and international tourism

  (3) Improvement of the existing local communities

  We believe that this project should be implemented immediately before the deterioration of the environment around the monuments becomes irreversible, taking into consideration the international interest and involvement of these monuments in the conservation. Also, since it is a national project, it would be advisable to complete the major part of the project within the current Repelita II.

- Legally, organizationally, financially and otherwise the President of the Republic of Indonesia and/or the appropriate government ministries are to make the final decision regarding the preparations for the national archeological parks.

- The President and/or the ministers are to implement the following items with all due haste as prerequisite to this national project:

  (1) Enactment of a special law concerning national archeological parks improvement and development

  (2) Designation of Borobudur and Prambanan area as National Archeological Parks and legal procedures for regional zoning and landuse regulations

  (3) Budget measures for the project

  (4) Establishment of a implementation body on legislation, financing, development and other parts of the project

- A Park Authority will be established by Presidential order for the execution of the project. A Special Council to be established by the final decision making body is to support the activities of the Park Authority. Certain subordinate organizations to the Park Authority in the different stages of the Project should also be provided.

- It is to be recommended that the government provide 100 percent of the investment required and it's recovery will be made within 30 years through taxation. It would be advisable to complete the major part of the project within the current Repelita II.

  The amount required will be approximately Rp. 9,269,590,000 for Borobudur Park and Rp.10,177,650,000 for Prambanan until 1985.

(Rp. 1,000.--)	Borobudur	Prambanan
Survey & Consultant Fee	895,150	981,040
Land Acquisition	915,000	1,021,000
Construction Cost	7,459,440	8,175,590
Total	9,269,590	10,177,560

Uncompleted relief on the old foundation (Borobudur)

- The period of the Implementation Plan will be ten years, from 1976 through 1985. The construction program will be devided into five stages, each of two years, duration.

  The figures for the area that will be involved in the development and improvement works to be carried out in the context of the 10-year Plan as follows:

	Borobudur	Prambanan
Sanctuary improvement	23.0 ha	28.0 ha
Park development	85.0 ha	75.0 ha
Village relocation	10.5 ha	18.5 ha

  The following are estimates of the area of the land to be acquired in the period of the 10-year Plan.

	Borobudur	Prambanan
Existing publicly owned land	23.4 ha	14.7 ha
Land to be acquired anew	109.8 ha	113.8 ha

- Especially the following should be done urgently:

  (1) The project is to be publicized on the national level in order to apprise as broad a segment of the population as possible of its significance.

  (2) For the purpose of unearthing archeological monuments, a detailed scientific survey should be made of the project area

  (3) As a temporary measure to cope with landuse changes, development activities, changes in the price of the land, and so on during the preparatory period, the land should be frozen

  (4) The basis for the project should be established as early as possible through public acquisition of the preservation and development sites

INTRODUCTION

JICA Study

DESCRIPTION OF THE STUDY TO DATE

At the request of the Indonesian Government, the Japanese Government has since 1973 been carrying out a 3-year technical assistance study in connection with the Central Java Tourism Development Project.

The Japan International Cooperation Agency (hereinafter JICA) is in charge of the study, and a Study Team (Pacific Consultants International and Associates) was organized to carry out the actual work of the study under the Government Work Supervision Committee. On the Indonesian side were organized a Steering Committee and Counterpart Team for close coordination.

The study is roughly divisible into the 1973/74 Pre-feasibility Study at the regional level and the 1974/75 Feasibility Study at the project level. A regional-level Master Plan was drafted in 1973, Master Plans for the two archeological park projects in 1974, and an Implementation Plan for these projects in 1975.

In the meantime, the Borobudur and Prambanan archeological park development and improvement works were designated as national projects, and the preparatory work for realization of the projects has been and is being promoted at an accelerating pace, various measures in this respect being scheduled to be taken on the basis of the results of the JICA Study as soon as they are available.

1973/74 STUDY

In 1973/74 the Pre-feasibility Study consisted of the following:

- Review of the preliminary survey that the Dutch TPC Team did in 1971/72 on the base for tourism development in the Central Java region
- Designation of tourism development special area and drafting of a 20-year long-term development plan and a 10-year mid-term plan
- Analysis of the economic and technical pre-feasibility of the mid-term plan
- Drafting of the preliminary master plans of the Borobudur, Prambanan and Dieng archeological parks

On the basis of the above, the Indonesian Government evaluated the Borobudur and Prambanan archeological parks as leading projects for the tourism development of Central Java and as social development projects based on the policy of the Second 5-year Plan (Repelita II) and requested that the Japanese Government continue the economic and technical feasibility studies on the premise of implementation of the projects as national projects.

1974/75 STUDY

Preparation of Project Master Plan

- Drafting of a comprehensive plan consisting of an archeological and historical environment preservation plan, a park use plan and development plan and infrastructural plans for village renewal
- Designation of the area of the national archeological parks and setting the scale of their development as well as drafting of a Master Plan (on a scale of 1:10,000 – 5,000) consisting of a zoning plan for environmental preservation and control, a landuse plan based on a long-range perspective, and a project plan for promotion of development and improvements
- Setting of master image of the archeological park environment and design of site plan, facility plan and other components of physical master plan (on a scale of 1:2,000)
- Compilation of village reconsolidation, arrangement, and relocation plans in accord with park development arrangements and of the plan for access roads and other related facilities
- Formulation of plans relating to the park's management and use

Drafting of 10-year Implementation Plan

- Determination of framework of works to be implemented
- Proposal of implementation program for project promotion covering development organization, classification of the works, form of operation, fiscal measures, legal measures, etc.
- Construction program and cost estimates of works
- Urgent action program to be executed by the Indonesian Government

Supplementary Studies

- Economic study, including market analysis, financial analysis and development effect analysis
- Site evaluation study with computer for the purpose of determining appropriate landuse
- Design standards (technical manuals) for continuation on to future detailed design and engineering
- Based upon the terms of reference, the following studies may be cited:
  - Review of the existing master plan for the Dieng area
  - Policies for the preservation of historical relics in Yogyakarta and Surakarta cities
  - Policies for the provision of the tourist accommodation facilities required with the development of the archeological parks

INDIVIDUAL PLANS

The individual plans involved in the national archeological park development and improvement project will cover the following periods:

- The zoning plan for the purpose of preservation of the archeological environment will be a perspective plan covering a very long period extending into the 21st century.
- The landuse plan will be a long-term plan covering a 20-year period, with revision after ten years (1985) on the basis of the state of development in the surrounding areas.
- The archeological restoration works will be carried out on the basis of a long-term plan extending to 1995.
- The park development and improvement plan will be a long-term plan covering a period of twenty years, with adjustment at the midpoint (1985) on the basis of the state of progress of development, the actual number of visitors, and so on.
- The village improvement plan will be a long-term plan covering a period of twenty years, and village renewal for the purpose improvement will be carried out on the basis of a medium-term plan covering a period of ten years, with 1985 as the target year.

The implementation plan for park development and improvement will be a medium-term plan, with 1985 as the target year. In the first half the more urgent works will be carried out, and in the latter half various works aimed at improving the parks still further will be implemented.

This implementation plan will be subdivided into the following five stages for a more detailed implementation schedule:

- Stage-1 (1976 - 77)
  Period of preparatory work for development
- Stage-2 (1978 - 79)
  Coincidence with the last year of Repelita II
  Completion of the most urgent improvement works
- Stage-3 (1980 - 81)
  Promotion of works in coordination with New 5-year Plan, continuation of village relocation and starting construction of park facilities
- Stage-4 (1982/83)
  Completion of some park facilities, commencement of park operation on the basis of tentative operational system and continuation of construction of other park facilities
- Stage-5 (1984/85)
  Completion of all works scheduled in the 10-year Plan

Study Record

STUDY PROCEDURE

The work of the first half (January 15 -- April 30) has been carried out according to the following schedule:

- Preparatory work (January 15 – February 8)
  Program design of work procedure, assessment of the contents of last year's plan, and preparation for the field work
- Field investigation and data collection (February 9 -- March 10)
  Field surveys of the Borobodur and Prambanan areas, data collection, and discussions with the Indonesian Steering Committee, in which a basic consensus was reached
- Problem finding and frame-making (March 11 -- March 28)
  Identification of the project conditions and design of the frame through a study of the whole project and a technical study involving the sorting, processing and analysis of the data collected
  Also, basic determination of the Master Plan.
- General planning (March 29 -- April 30)
  Overall adjustment of the entire study, completion of remaining work, and preparation of the report and drawings

The work of the second half (June 15 -- November 30) has been carried out according to the following schedule:

- Preparatory work (June 15 -- June 30)
  Based upon the comments of the Indonesian Steering Committee on the Interim Report, the project framework was revised and the given conditions for the detailed planning and design were consolidated.
- Additional field investigation and data collection (July 1 – July 15)
  Additional thorough, on-the-spot surveys were conducted for the detailed planning and design. Particular attention was given to confirming data on the sanctuary areas, park development areas and village relocation sites.
- Detailed planning and design (July 16 -- September 25)
  In addition to detailed planning and design for the physical plan, the implementation plan was drawn up, project cost estimates projected, and the economic study done.
- Final report work (October 1 -- November 30)
  All studies were consolidated and condensed and the draft final report, drawings, planning materials, and other information edited and compiled.

STUDY OUTPUT

In keeping with the progress made in the study, the following reports and drawings were submitted to the Government of Indonesia.

code		date submitted
001	Work Implementation Plan	Feb. 1975
002	Progress Report/1	Mar. 1975
003	Draft Interim Report	"
	Interim Report	Apr. 1975
004	Main Report	
005	Executive Summary	
006	Note on Project Execution	
007	Tourism Market and Financial Analysis	
008	Discussion Paper on Economic Feasibility	
009	Brief of Work Plan	May. 1975
	Progress Report/2	Jul. 1975
010	General Brief	
011	Explanatory Note on Tourism Market Analysis	
012	Note on Development Frame	
013	Note on Project Execution	
014	Note on Development Program	
015	Note on Financial Feasibility	
	Progress Report/3	Sep. 1975
016	General Brief	
017	Summary of the Project	
018	Implementation Plan	
019	Economic Feasibility (Financial)	
	Draft Final Report	Nov. 1975
020	Executive Summary	
021	Master Issue (Draft)	
022	Technical Manuals	
023	Graphic Issue	
024	Environmental Assessment	
025	Economic Feasibility	
026	Special Brief	Dec. 1975
	Final Report	Mar. 1976
027	Master Issue	
028	Appendices	

JOINT MEETINGS

During the course of the studies and in keeping with the project progress, seven joint meetings were held among the Indonesian Steering Committee, the Japanese Work Supervision Committee, and the Study Team.

At these joint meetings, comprehensive discussions were held regarding the policies and plans for the project, including:

- Designating a place for the project at the national planning level
- Setting basic development policy
- Determining the extent of development and details of implementation
- Formulating legal, financial, and organizational measures for the project
- Considering problems in project execution

The topics and results of the different joint meetings are shown below.

1st Meeting (February 11, 13)
The scope of work was confirmed on the basis of the items of reference exchanged between the Governments of Indonesia and Japan.

2nd Meeting (March 5, 6)
After a survey of the actual sites, opinions were exchanged and problems pointed out concerning the inventory and orientation.

3rd Meeting (May 9, 10)
The Interim Report was discussed with particular consideration to development policy, physical master plan, and economic aspects.

4th Meeting (July 1, 2, 10)
Progress Report/2 was discussed with particular consideration to the frame of the implementation plan.

5th Meeting (September 29, October 4)
Progress Report/3 was discussed with particular consideration to the implementation plan and financial feasibility.

6th Meeting (October 26 -- November 8)
Four members of the Steering Committee were invited to Japan for detailed study of the organization, financial program, and other aspects.

7th Meeting (December 22, 24)
Comprehensive discussions were held on the project as a whole based upon the draft final report.

Team Organization

JAPANESE WORK SUPERVISION COMMITTEE

Chairman	Yoshiomi ENOMOTO	Former Executive Director, Japan National Tourist Organization
Vice Chairman	Hideaki SONODA (Takeshige SASAKI)	Director, Tourist Promotion Division, Department of Tourism, Ministry of Transport
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Member	K.R.T. Soebanar KOESOESOMO-GORO	Head of the Industry office D.I. Yogyakarta
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Member	Drs. Machtanud-din SIREGAR	Head of the Bureau of Infrastructure and Communications, Bappenas
Member	Drs. Uka TJANDRA-SASMITA	Archeological Directorate, General of Tourism
Member	Ir. Salmon KODJAT	Director of City Planning and Regional Development
Member	Ir. S. ABDOEL-RACHMAN	Head of the Bureau of Planning Department of Communications
Member	Ir. ABUKASAN	Lecturer of ITB, Bandung
Member	Ir. Nordon GANDJAR	Secretary of Directorate General of Tourism
Member	Drs. H. HARTONO	Director of Tourist Development
Member	Ir. SOCHADI	Head of Planning Division, Directorate General of Tourism
Secretary	Ir. SOEPARTO	Head of Tourist Development Project, Central Java/D.I. Yogyakarta

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Member	Ir. SUJIPTO	Staff of Agriculture
Member	Ir. MONDANG	Lecturer of Architecture, Gajah Mada University
Member	Ir. SUGENG	Staff of the Bureau of Public Works and Electric Power
Member	Drs. SUNYOTO	Lecture of Socialism and Politics, Gajah Mada University
Member	SUGIRI SH	Head of General Service, Directorate General of Tourism

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Village Planner	Hiroshi MATSUO
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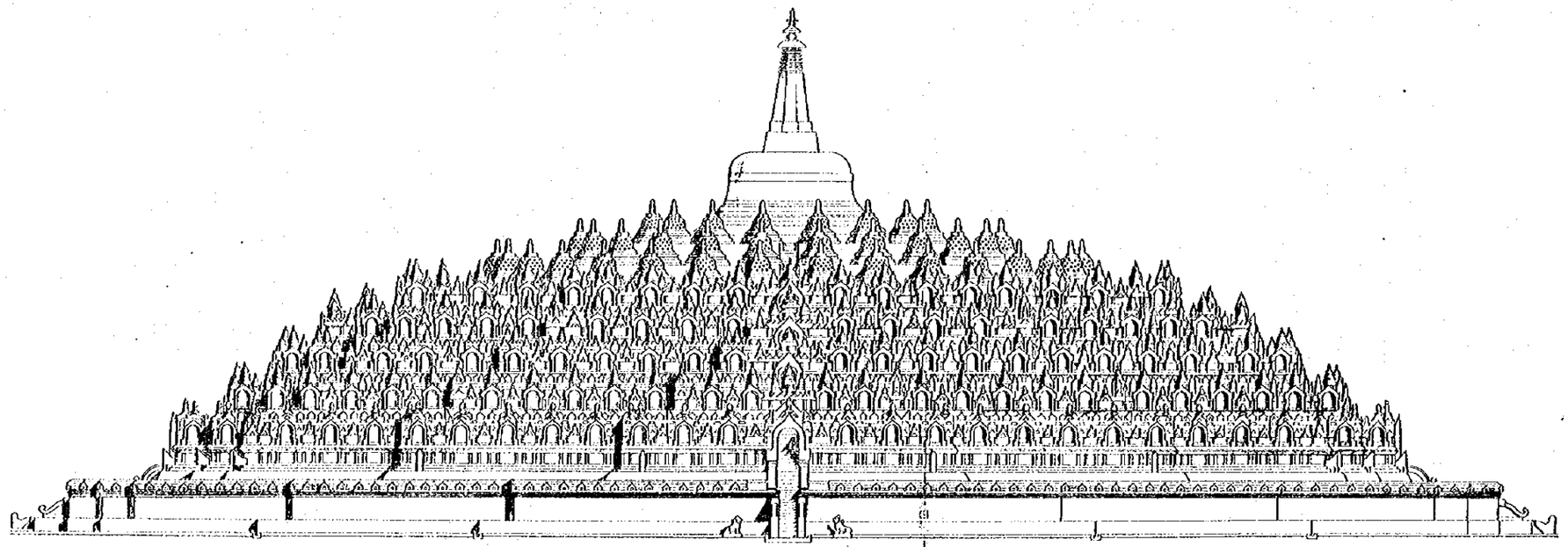
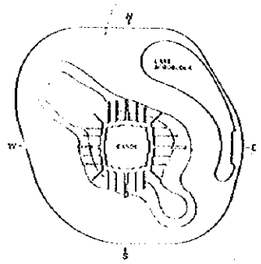
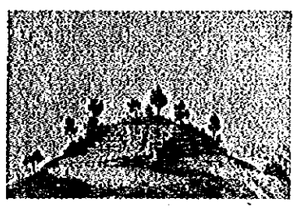
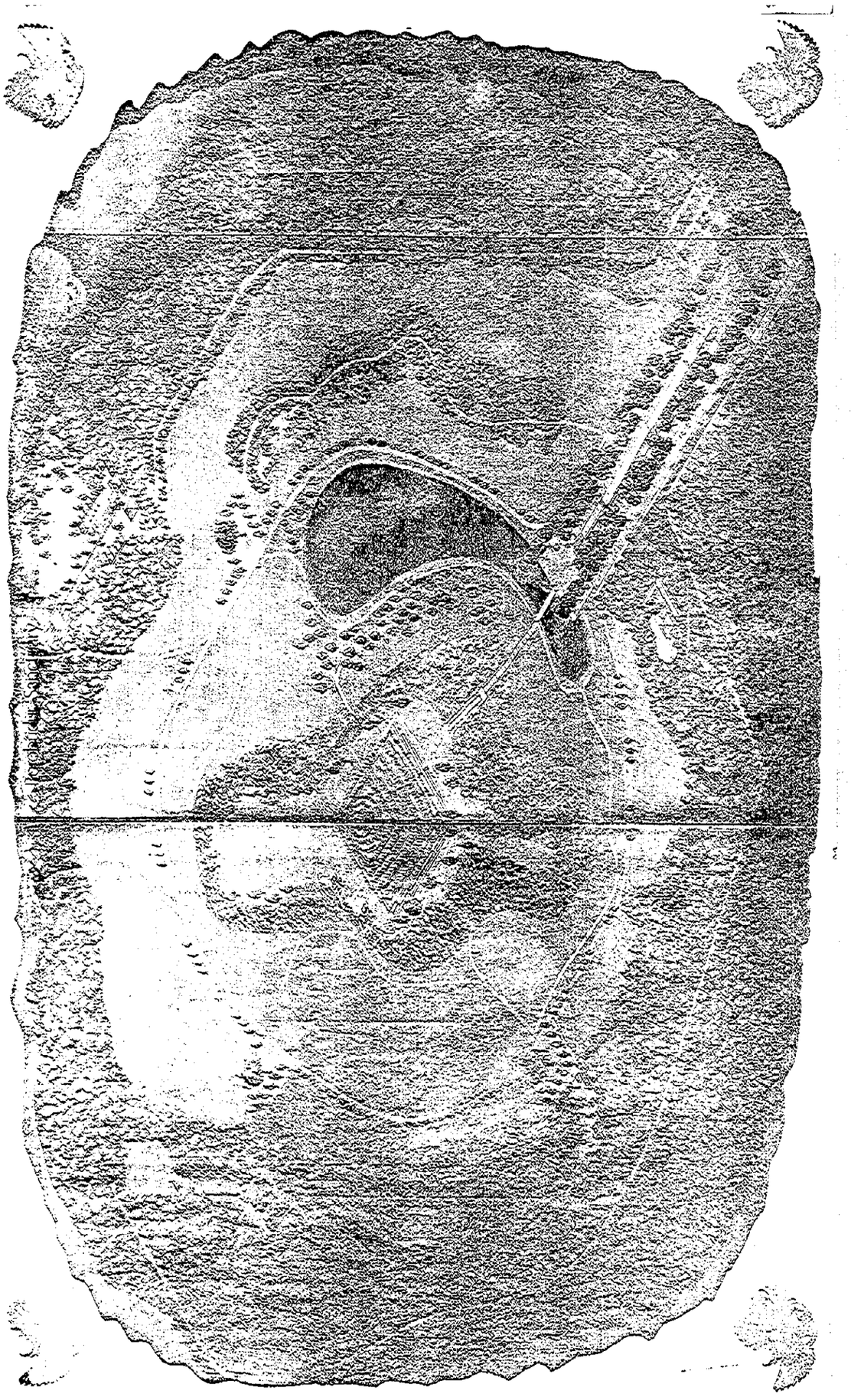
Sociologist	Dr. Shigeki MURAMATSU (Environmental Design Course, Osaka University of Arts.)

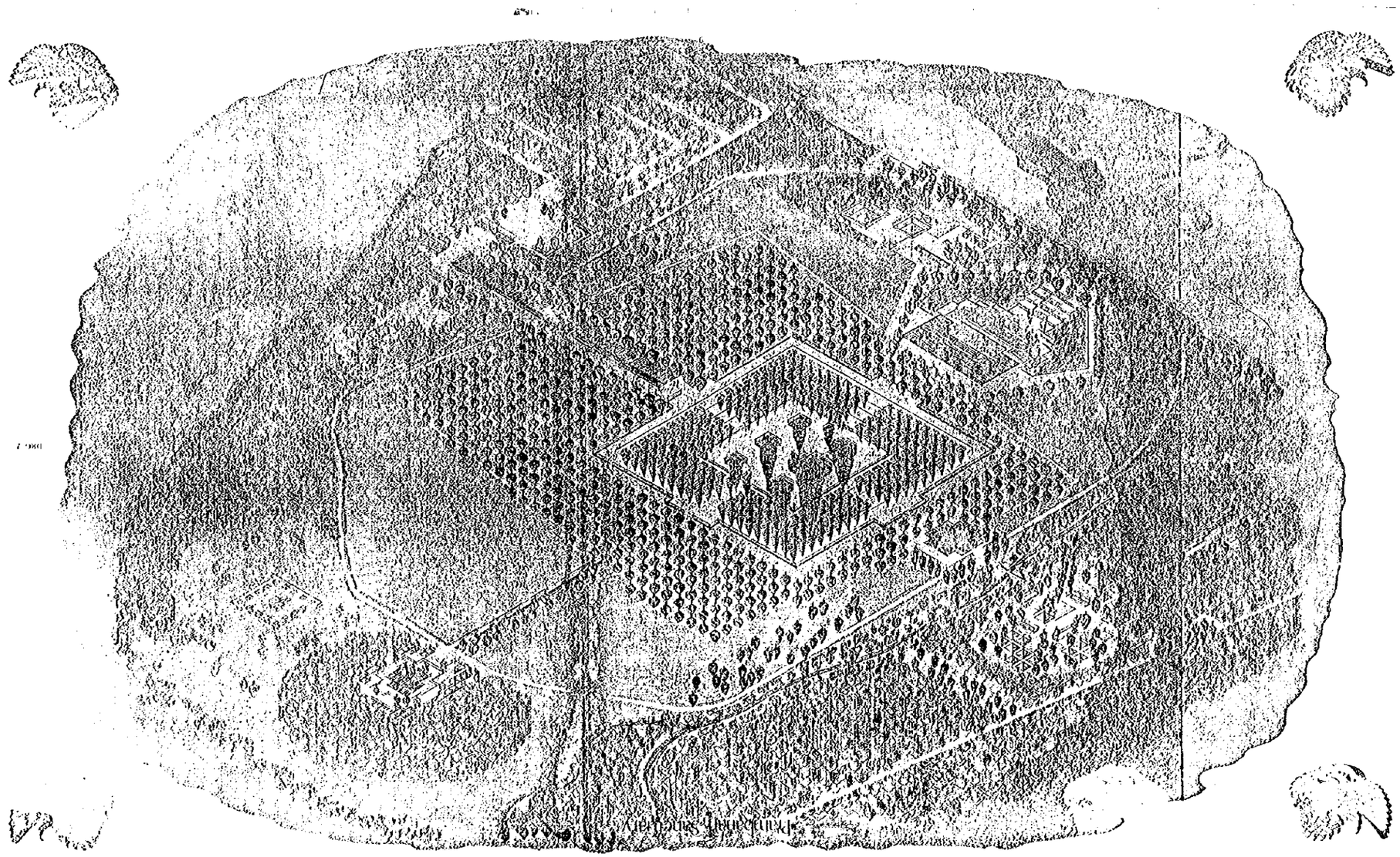
Candi Borobudur



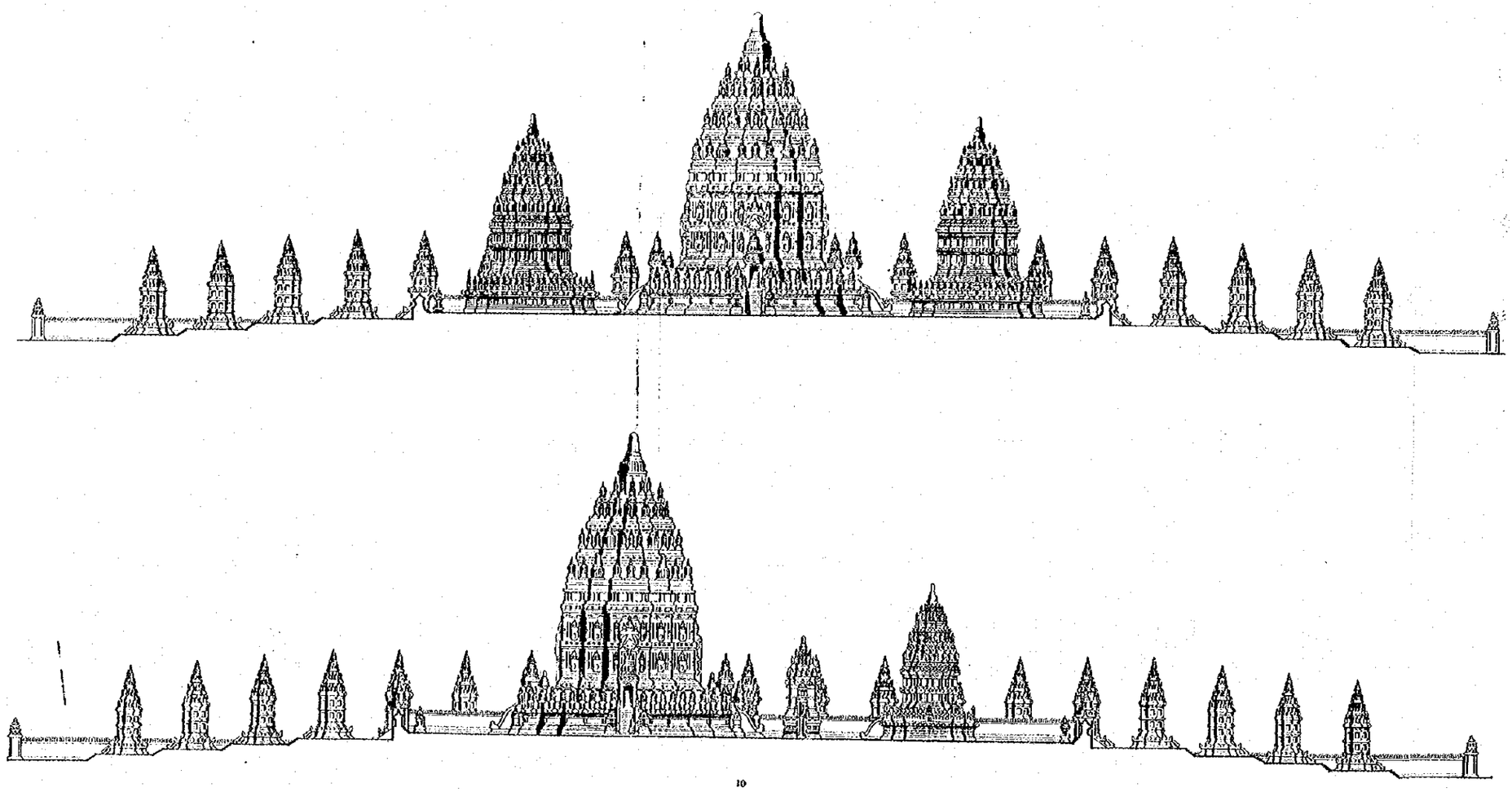


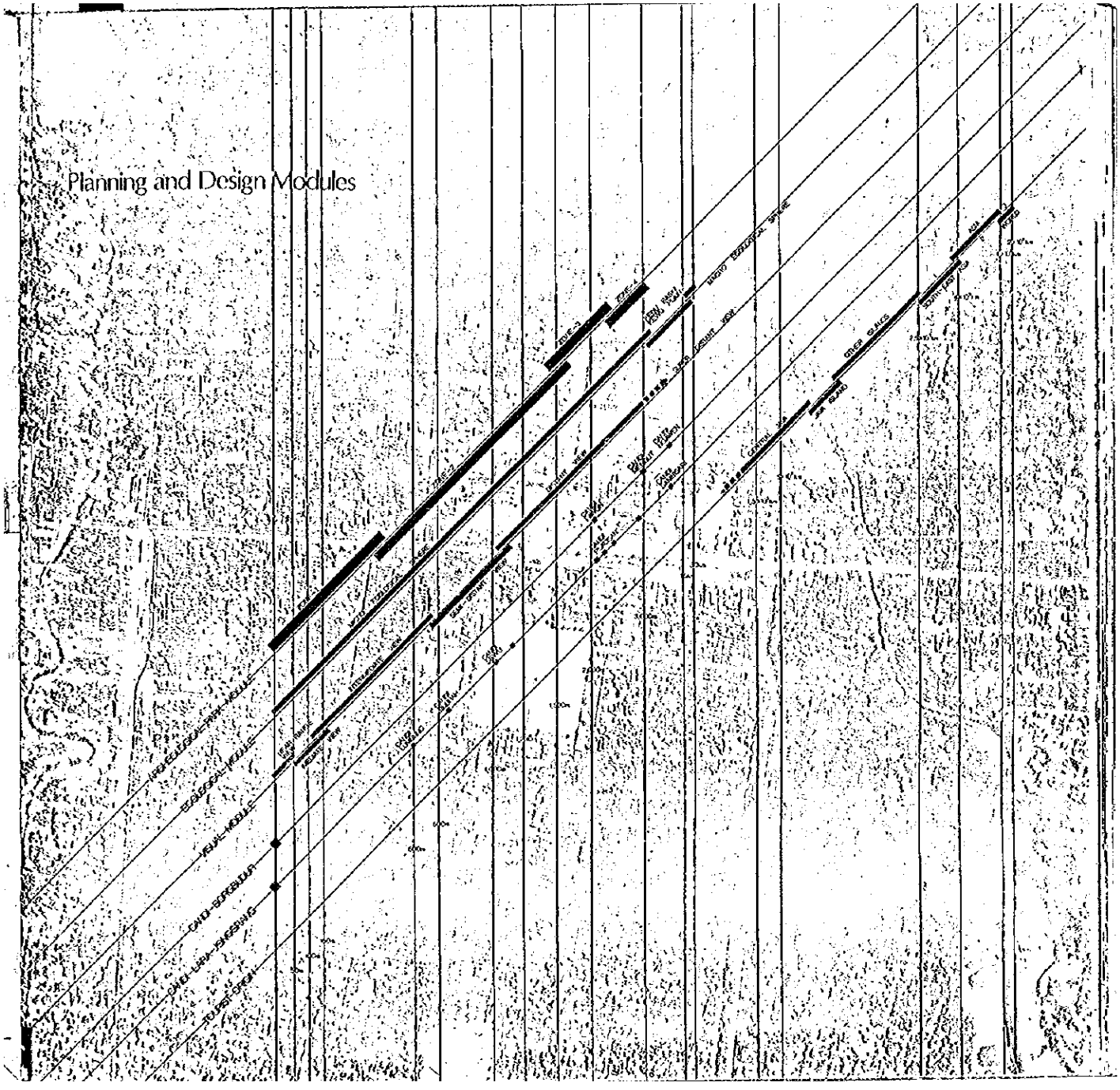






Candi Lara Jonggrang



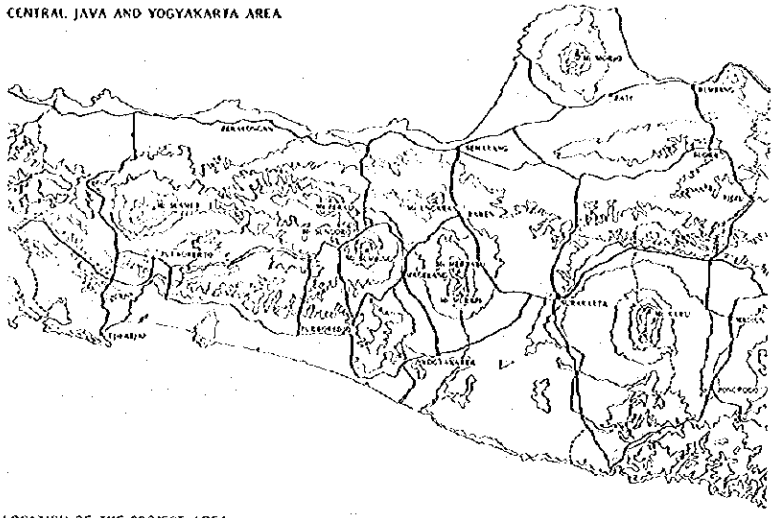

Planning and Design Modules

CHAPTER ONE

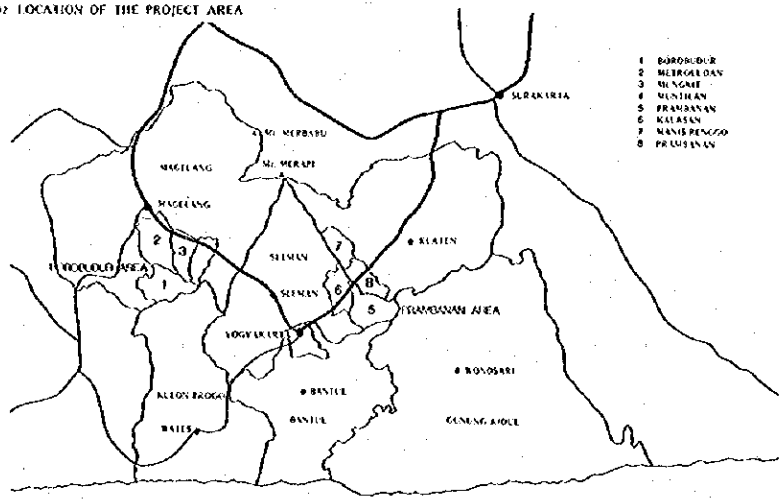
DEFINITION OF THE PROJECT

Significance of the Project

101 CENTRAL JAVA AND YOGYAKARTA AREA



102 LOCATION OF THE PROJECT AREA



103 Throughout Java there are a great number of clusters of religious monuments dating back to the period between the 6th and 10th centuries as a legacy of what is known as the Hindu-Javan Culture, in which there are both Hindu and Buddhist elements. Of these clusters of monuments, those of Borobudur and Prambanan particularly stand out in terms of both scale and representation of a period of cultural maturity.

These monuments, a precious cultural legacy of Indonesia's historical past, are of universal value from the historical, anthropological and artistic points of view; they are a legacy not only of Indonesians but of all mankind, and the present generation has the obligation to hand this legacy down to future generations in a proper form.

104 In national land planning throughout the world in which development is given the leading role, this is a time of reappraisal of the way in which such historical legacies are to be treated just as it is a time of growing concern for protection of nature. It is becoming increasingly urgent, therefore, that there be adopted legal, administrative, fiscal and artistic measures for protection of these monuments with a view to their permanent preservation, for making improvements in connection with them, for their utilization and for restoration of their functions.

Such being the case, the Indonesian Government is now engaged in an undertaking of the century of restoration of the monuments of Candi Borobudur on the basis of assistance from countries throughout the world, chiefly through UNESCO.

At the same time, the Indonesian Government is promoting it's policies of social and other development along the lines set by its Second 5-year Plan. The National Archeological Parks must therefore just not be highlights of international and national tourism but also function as a sociocultural base.

105 Accordingly, it is the mission of this project to preserve this historical cultural legacy to be passed on to future generations and to fulfill the task of giving it a proper place in the national consciousness and ensuring that it is properly utilized. In other words, the purpose of this project is (1) the permanent preservation of this cultural legacy of the world and (2) the formation of a symbol of national integration.

After more than a millennium, in the first half of the 1980's symbolic monuments of Indonesia's long history will be revived in the Kedu Basin and the Kewu Plain, known as the "Garden of Java."

Goals and Means

106 In keeping with the basic concepts of the project, the following four planning question were posed, targets set, and directions for their solution defined for optimum project plan formation.

- How is permanent preservation of the monuments to be achieved?
- How is the archeological climate to be preserved?
- How can a cultural node be formed as a symbol of national unity?
- How is social tourism to be stimulated?

How is Permanent Preservation of the Monuments to be Achieved?

107 The archeological monuments of Borobudur and Prambanan are the cultural fruit of the zenith of the Sailendra Dynasty from the middle of the 8th Century to the latter half of the 9th Century, and it is estimated that a large number of archeological monuments are still buried in the area. Government funds will have to be appropriated for the purpose of the comprehensive and organized unearthing of these yet undiscovered archeological remains.
Furthermore, it will be necessary to take early steps for the restoration and preservation of the monuments that have already been unearthed in view of the fact that most of them are in very poor condition.

Solutions:

- The carrying out of an archeological survey over a broad area in advance of park construction, the designation of cultural asset protection sites, and increasing the amount of public land
- Early restoration and maintenance and control of the monuments that are in a state of destruction
- Scientific study of the monuments, systematic arrangement of literature concerning them, and the keeping of records
- Systemization of administrative, legal and fiscal measures for such research, preservation and control activities as well as of the organization that will undertake them

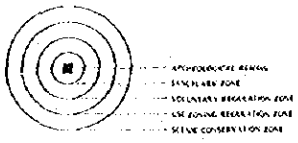
How is the Archeological Climate to be Preserved?

108 The Borobudur and Prambanan archeological monuments are located in the Kedu Basin and the Kewu Plain on the broad skirts of the volcanic Mt. Merapi, the richest grain-producing area of Java. In this same natural setting centuries ago, the ancestors of the present day Indonesians gave rise to the Hindu-Javan culture and caused their own particular art to bloom. The archeological monuments should not be preserved simply by themselves,but rather should be passed on to future generations as an historic climate in which they and the surrounding natural environment *are integrated.*

Solutions:

- *Designation of proper areas encompassing the monuments as* national archeological parks
- Application of legal regulation to such areas for the purpose of preservation of the environment
- Landscaping to make the state of the historical environment still better
- *Reorganization of the existing agricultural structure and* regional structure, drafting of landuse plans that are compatible with park utilization, and efforts for preservation and maintenance of the environment

109 Zoning Concept



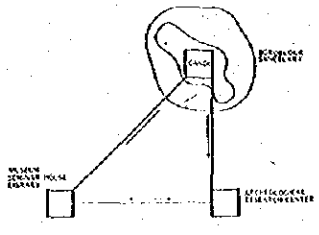
How can a Cultural Node be Formed as a Symbol of National Unity?

110 Of first importance is the need to place the national archeological parks in the consciousness of the Indonesian public at large as rising cores of historical and cultural enlightenment. It is therefore necessary to reinforce their cultural symbolicalness as national highlights and devise cultural administrative measures for their diversified utilization.

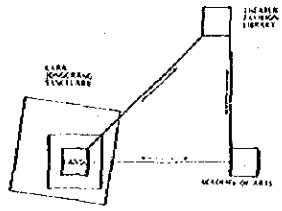
Solutions:

- Location of national cultural and educational organizations within the parks (formation of a culture center)
- Promotion of diverse activities, including history research and education and preservation and passing on of traditional culture
- Personnel exchanges with different provinces in Indonesia and *countries throughout the world, particularly in the field of* cultural and educational activities
- Publicizing of the significance of the project among the people

111 Borobudur as a Historical Education Park



112 Prambanan as a Traditional Culture Park



How is Social Tourism to be Stimulated?

113 Central Java is an area with both its own national scenic beauty and a large number of historical and cultural tourism resources, with those of Borobudur and Prambanan being particularly world famous. The area is therefore expected to develop as a well-known tourist area on the basis of the Government's policy of promotion of domestic tourism. A special feature of the tourism development of this area is that instead of just sightseeing, the *development of social tourism should be encouraged for it to be* contact on the part of the Indonesian people with their cultural origins.

Solutions:

- Encouragement and promotion of national tourism on the basis of the "Once in a Lifetime" concept
- Establishment of a system of school trips and organized introduction of study tours
- Unique programs making full use of the features of the area, including visits to archeological monuments and appreciation of traditional culture
- Establishment of the international tourism route Jakarta-Yogya-Bali

* Social tourism is defined as follows:
- Broad participation by all sectors of the population
- Not simply local tourism, but rather interregional exchanges on a nationwide scale
- Not just tourism for its own sake, but rather human exchanges through the medium of history, culture, education, and so forth

114 Expected Visitors to the Parks

Origins	Day Tripper	Weekend Tourists	Long-term Tourists	Total
Middle Java	732,916	402,735	–	1,135,651
Java and Madura	–	805,471	177,352	982,823
Other Islands	–	–	12,710	12,710
Foreign Countries	–	–	235,286	235,286
Total	732,916	1,208,206	425,348	2,366,500

Policies and Strategies

115 National Project

The Borobudur and Prambanan National Archeological Parks Project is included within the social development which is a major goal of the Second 5-year Plan of the Republic of Indonesia.

This project will have to be systemized in administrative, legal and fiscal terms so that it can become a pilot model for the future, and this will involve the early enactment of a special national law, establishment of measures for the preservation of the archeological cultural assets and establishment of a national park system.

The project should be based on public investment funds of the national government, with site acquisition and restoration of the monuments in particular being undertaken directly by it.

The project is to be publicized on the national level in order to apprise as broad a segment of the population as possible of its significance.

116 Archeological Park Special Law

A Special Law Concerning the Preservation and Development of Archeological Parks will be enacted by Presidential order. This following is an outline of what the provisions of this law will be:

- All necessary measures are to be taken to ensure that the archeological monuments of the parks can be enjoyed by all of the people and be passed on to future generations as cultural assets of the Republic of Indonesia.
- For the purpose of permanent preservation of the archeological monuments themselves and their historical setting, preservation plans shall be drafted, archeological park preservation areas shall be designated, and adequate environmental controls shall be applied.
- For the sake of making the parks convenient for use by the people, a park development and improvement plan shall be drafted on the basis of which the environment of the parks will be made adequate and facilities will be built in special development zones.
- A Park Authority directly under the Central Government shall be responsible for the preservation, construction and operation of the parks and shall assume unified control of their administrative, legal, fiscal and organizational aspects.

117 Dual Project

Borobudur and Prambanan will be the first two archeological parks of the Republic of Indonesia to be materialized on the basis of this special law.

Construction will begin at the same time for both the Borobudur and Prambanan archeological parks.

The parks will be specialized according to their particular features, Borobudur being characterized as an "Historical Education Park" and Prambanan as a "Traditional Culture Park" so that visitors to the area will be encouraged to visit both parks on the same trip.

Promotional and public relations efforts will be made to correct the disparity between the two parks in terms of the number of visitors to them.

118 Park Authority

A Park Authority will be established as the executive organization for the promotion of the project. It will be the upper-level decision-making entity in the preparatory, construction, and operation stages of the project and will have administrative, legal and fiscal authority in connection with the project's execution.

In the construction stage a Park Development Corporation will be established under the Park Authority for the purpose of undertaking the park construction as well as related public works on behalf of the central and provincial governments.

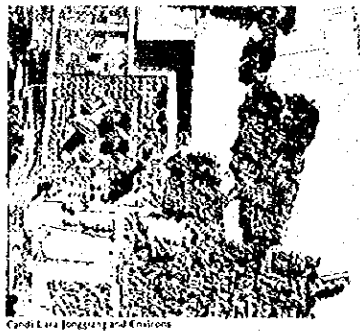
In the operational stage a Park Operation Corporation will be established under the Park Authority (or as a renamed carry-over of the Park Development Corporation with new functions) for the purpose of comprehensive operation of the parks from the standpoint of regional development.

119 Sanctuarization

The following measures are to be taken expeditiously in order to save the archeological monuments from the state of disrepair into which they have fallen over long years:

- Preparation of materials and data on the basis of archeological surveys and research for the perfect restoration of the monuments and their grounds to their original state.
- Designation of special zones for the preservation of archeological monuments (Category-1 zones) on the basis of historical and environmental studies.
- Public acquisition of land within the designated zones.
- Restoration and repair of the monuments.
- Landscaping around the monuments.
- Permanent maintenance and management by the Archeological Bureau.

Candi Borobudur and Environs



Candi Lara Jonggrang and Environs

120 Village Renewal

Relocation of villages within the park areas will be undertaken by the provincial government on the basis of subsidies from the central government.

Model villages to serve as a pilot for the national government's village modernization policy will be built on an experimental basis.

In principle, the substitute sites for village relocation are to be located within the same desa (hamlet) as the original sites, relationships involving ties with the land are to be preserved, and change in the living environment is to be kept to a minimum.

The people residing in the vicinity of the parks are to be given priority with regard to park maintenance and management and other employment opportunities.

121 Urgent Actions

A Special Law Concerning the Preservation and Development of Archeological Parks will be enacted pressingly by Presidential order.

A Park Authority will be established immediately as the executive organization for the promotion of the project.

For the purpose of unearthing archeological monuments, a detailed scientific survey will be made of the project areas before the commencement of construction work.

The zoning plan and landuse plan are to be implemented at an early date by following the necessary legal and administrative procedures.

As a temporary measure to cope with landuse changes, development activity, changes in the price of the land, and so on in the preparatory period, the land will be "frozen."

The basis for the project should be established as early as possible through public acquisition of preservation and development sites.

Planning and Design Theory

APPROACHES

130 Faced with the difficult task of creating a master image for the preservation of these internationally important historical and cultural remains, the study team has examined the optimum solution based upon the following basic understandings.

131 Premise for the Archeological Aspects

There are a number of "archeological mysteries" surrounding the Borobudur and Prambanan sites which even now await clarification by archeological surveys and studies. It is essential that the plan for the preservation and organization of the national archeological park be formulated with sufficient flexibility to allow revision and incorporation of new archeological findings.

132 Definition of the Historic Climate

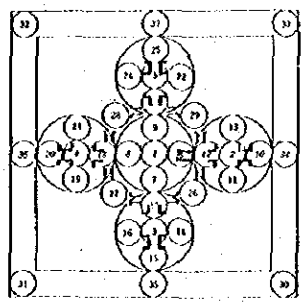
The passage of the centuries since the Candis complex was first formed, including both such natural changes as volcanic activity and changes in river flows and such manmade changes as agrarianization or urbanization, has likely meant some qualitative changes in the historic climate of the area. The task for us now in the twentieth century is ensure that this historic climate is preserved intact for future generations.

The conservation and maintenance of this historic climate requires a foolproof system of environmental regulations. Outstanding ideas are also needed for the restoration of the area.

133 Spatial Significance

The monuments in Borobudur and Prambanan are masterpieces created by the Hindu and Mahayanan Buddhism religious craftsmen, and the spaces between the monuments themselves are symbolic of the religious concept of space. Indeed, these Candis were built as the crystallization of the great Javan culture brought to blossom by the ancient Indonesians against this broad natural background.

Now, looking back after many centuries, we can see in these spaces a revitalization of their religious existence and a revival of the religious meaning of the Candi complex. More than anything else, it is this religious existence which holds the area's message for the future.



PRINCIPLES FOR PLANNING AND DESIGN

134 Anatomy of Archeological Environment

From the three perspectives of the ecological, archeological, and visual, the study team has categorized the environment surrounding the remains, as well as the remains themselves, into the following three classifications.

- Archeological remains and near surroundings
  Including the Candi, the gardens formed by cathedral placement, and the immediate vicinity, this is an archeological sanctuary with a recognizably religious atmosphere. It is this area which is to be the core of the archeological park.
- Archeological domain
  This is the area which may be supposed to have once been a cultural center, and even now there are numerous clusters of relics to be found. In the Borobudur case, this is set as having a radius of about 2.5 kilometers as proposed by the Committee Committee for the Restoration of Candi Borobudur.
- Archeological ecosphere
  This area extending for a radius of about 30 kilometers from the monuments is both the environmental sphere of the area's ecological range and encompasses the edges of the panoramic view. The preservation of this setting is essential to the historic and archeological climate.

135 Conceptual Modules

The study team has made every effort to accurately place the conditions governing the plan within the proper spatial and temporal setting. Accordingly, the following elements have been selected as composing this setting:

- Ecological module
- Historical module
- Visual module

These module groups, as well as serving as effective concepts in defining the outer garden conditions of the plan, also function as the matrices leading to planning and design solutions.

136 Hypothetical Models

Based upon the above basic understanding, the study team devised a number of hypothetical models to develop the best conceptual plan. These models were all founded upon the background ecological, archeological visual, social, psychological, and religious factors and were established as guidelines or planological system components for determining the actual solutions.

These hypothetical models included:

- Models relating to the cosmography of the archeological sphere
- Models relating to the identity of the archeological parks
- Models relating to the sanctuarization of the archeological remains

PILOT MODELS FOR THE ARCHEOLOGICAL PARKS

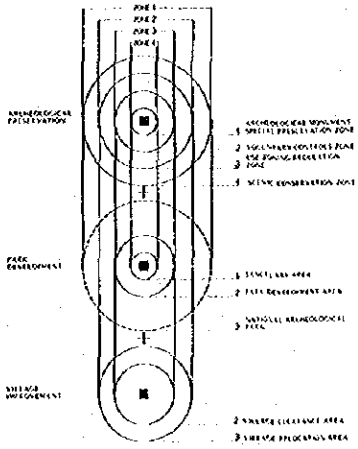
137 With the process of plan analysis using hypothetical models as described above, the plan was then synthesized according to the below methodology using pilot models. These pilot models all meet the following conditions:

- Having the nature of a model as a national project
- The model nature as national archeological parks
- As a regional development model of the concentrated development type
- As a tourism development model of the type specializing in historical assets
- As an experimental model for village modernization
- As an experimental model for regional environmental control
- As a regional redevelopment model

138 Using these, the Study Team developed the following three models for planning the national archeological park:

- Pilot model for archeological preservation
- Pilot model for park development
- Pilot model for village renewal

139 Pilot Model



140 These pilot models were then put on slides and the various problems in the plan considered three-dimensionally with these pilot models, these models also leading to the following physical plans:

- Zoning plan
- Landuse plan
- Project plan for implementation

CHAPTER TWO
MASTER PLAN

Archeological Ecosphere

HISTORIC CRIMATE STUDY

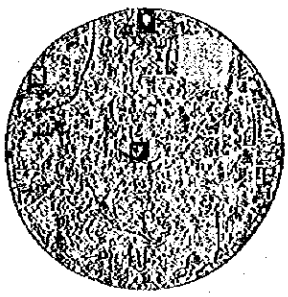
201 All visitors to Candi Borobudur are certain to be impressed with the grandeur of the remains itself and with the splendor of the natural environment around the remain. When visitors reach the Candi's circle terrace, the indescribably spectacular panoramic view opening up on all four sides is sure to make an indelible impression on them. It is our duty to recreate a new order through a correct understanding of this elemental experience.

What is this historic climate and how can it be proved in the Borobudur and Prambanan park areas. The following diverse approaches have been made in this historic climate study to answer this basic question.

- Ecological approach
- Archeological approach
- Visual approach
- Religious approach

202 In order to demonstrate the historic climate of the areas realistically and meaningfully, special drawing techniques similar to the T.O. Map* have been utilized to bring out the environmental features of the Borobudur and Prambanan areas. This involves the use of ecosphere maps (Drawings 3 and 4) depicting with geometric coefficients the topographical and anthropogeographical features, as well as a wide diversity of other regional information in areas having radii of 50 kilometers centering upon Candi Borobudur and Candi Lara JOnggrang. At the same time, a variety of visual information such as the panoramic views from the two Candis is included in the perspective analysis cosmography maps (Drawings 5 and 6).

* The T.O. Map depicts the Christian view of the world. Jerusalem is in the center and the world is divided into the three zones of Asia, Africa, and Europe. The map is drawn with east at the top and the whole is circular (O). The horizontal dividing lines are the Don River, Black Sea, Caspian Sea, Arabian Gulf, and Nile River (the top of the T). The perpendicular (vertical of the T) is the Mediterranean Sea, and the continents are surrounded with ocean in the Okeanos tradition. This was the highest achievement of that school of map making which seeks to depict the significance of places.



ECOLOGICAL APPROACH

203 When these remains were originally constructed more than a thousand years ago, there were probably even then the broad foothills of Mt. Merapi, Kedu Basin, and Kewu Plains, and it is thought that the ecological sphere seen today was already formed. The standard bearers of this earlier culture selected this naturally blessed area and created here an outstanding culture.

The ecological features of these two areas are noted below.

204 Kedu Basin (Borobudur Area)

This area, with Candi Borobudur at its center, volcanos about 3,000 m high running around it for 25 ~ 30 Km, Mt. Merapi to the east, Mt. Merbabu to the northeast, and Mt. Sumbing to the north northwest.

From Candi Borobudur, arange of 1,000 m bow-shaped mountains can be seen about 4 ~ 10 Km away stretching from the west northwest to the east southeast.

The mainstream of the Progo River flows through the center of the Borobudur area.

The Borobudur Hill and Dzgi Hill rise abruptly to the southeast to a contour line of about 250 m.

Although fields and palm groves are in the majority in the Borobudur area, the area is also characterized by a V-shaped belt of rice paddies seeming to envelop Borobudur Hill.

10 Km directly north of Candi Borobudur is Mt. Tidar, said to be the center of the island of Java.

The two rises along Muntilan's national road can be discerned from Candi Borobudur.

The edge line of the skirts of the mountain range to the south comes to within 3 km of Borobudur.

There is a contour line 500 m high an average of 15 km from Borobudur, and this marks the outer limits of the Kedu Basin area.

205 Kewu Plain (Prambanan Area)

About 25 km north-northwest of Candi Lara Jonggrang is Mt. Merapi, and about 7 km beyond that is Mt. Merbabu, the vast foothills of these mountains spreading out to create a beautiful fan-shaped topography covering the area north of the Candi.

These gentle slopes continue to about 1.5 km south of the national road to form the Kewu Plain.

There are low hills (300 m high) south of Lara Jonggrang made of tuff, and at the very edge of these hills is Pegat Hill (also known as Keraton rise).

The Opak River flows close beside Candi Lara Jonggrang, this main stream then flowing through the city of Yogyakarta and into the Indian Ocean.

East of Candi Plaosan flows the Borongan River, flowing through Surakarta to become the Solo River and empty into the Java Sea.

Accordingly, the north-south line between Mt. Merapi and Candi Plaosan is also a major watershed for the central Java region.

The area around Candi Lara Jonggrang is an average of 150 m above sea level.

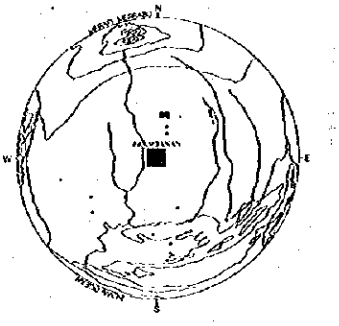
206 Conclusion

The areas centering on Candi Borobudur and Candi Lara Jonggrang and extending for a 30 km radius may be recognized as macro ecological spheres.

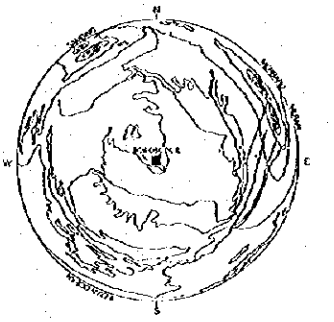
The areas extending for a radius of about 10 km constitute the Kedu Basin and Kewu Plain.

The areas extending for a radius of about 3 km are the micro ecological spheres.

207 Kedu Basin



208 Kewu Plain



ARCHEOLOGICAL REMAINS IN CENTRAL JAVA

209 Stone temples and bronze artifacts provide a record of kingdoms existing in Central Java from the 8th – 15th centuries. Piecing together inscriptions and stylistic details, archeologists have built up a picture of the civilizations spanning these seven centuries. But it is only a spotty picture. There is considerable speculation about how many kingdoms existed and what they were called. The two main kingdoms seem to have been the Mahayana Buddhist Sailendra dynasty and the Shivaite Hindu Sanjaya line. Almost all monuments in Central Java bear the imprint of Hindu-Buddhist concepts, mythology and architectural forms.

In pre-Hindu times the inhabitants of Central Java frequently buried their deceased rulers beneath a terraced stone pyramid. This tradition, which was associated with the cults of fertility, mountain gods and ancestors, continued in different forms throughout the Hindu-Buddhist era and long into the Islamic period. It re-emerged strongly in the 15th century. Even today, the cult of ancestors is very much alive in Central Java, especially at the village level.

Hindu-Buddhist monuments are nowadays referred to as Candis. Most archeologists, however, believe that the term originally meant royal burial place. At the base of every Candi a shaft was sunk which contained a stone casket carrying the ashes of a deceased monarch and various symbolic objects such as pieces of metal, precious stones, seeds and plants. An edifice above this shaft contained a statue of a Hindu or Buddhist deity which also commemorated the deceased monarch. (The word Candi is probably derived from Candika, another name for Durga, the Goddess of Death).

During his lifetime the monarch was regarded as a living God. After his death he merged with the God of whom he had been the earthly manifestation. He could, however, appear to his descendants at their request. The Candi was regarded as the most suitable place for God-King to manifest himself, and the statue was considered to be the proper receptable for his spirit. By performing certain rites people could imbue the statue with the spirit of the God-King, with whom they could then communicate directly.

The cult of ancestors, however, was not brought to Java from abroad. It is an ancient, pre-Hindu religious practice. Thus we see in the Candis a Javanized form of Hinduism; or in other words a Hindu*ized* form of the Javanese ancestor cult.

Both Mahayana Buddhism and Shivaite Hinduism were essentially court religions, not greatly affecting the beliefs of the village Javanese, who nevertheless supplied the labor to erect the sacred edifices. The villagers must have paid a terrible price to provide their rulers with royal mausoleums and places of worship. Already burdened with tasks of farming, road-building, forest-clearing and irrigation, they found themselves pressed into labor to the glory of religions in which they did not themselves believe.

210 There are five main areas of Hindu-Buddhist temple concentration in Central Java.

The oldest temples are found on the Dieng Plateau, about 130 kilometers by road northwest of Yogyakarta.

Almost as ancient as the Dieng temples is the Gedung Songo temple complex on the slopes of Mt. Ungaran, about 90 kilometers north of Yogyakarta.

There are many temples and temple ruins in the vicinity of Muntilan and Magelang; best known and best preserved is the Borobudur – Pawon – Mendut complex, about 40 kilometers north of Yogyakarta.

There is a large number on the Prambanan Plain, about 15 -20 kilometers east of Yogyakarta.

There are two 15th century temples on the western slope of Mt. Lawu, about 100 kilometers east of Yogyakarta.

ARCHEOLOGICAL APPROACH

211 Judging from the location of ruins which have been discovered and unearthed to date, it is possible to imagine the grandeur of the civilization then. Guessing then at things yet uncovered, the principles behind the ruins' placement may soon be clarified. Although the distribution of ruins lies before us "a mystery constellation," archeological studies to date have revealed the following information.

212 Candis in the Borobudur Area

The following 4 remains have been discovered so far in the Borobudur area:

- Candi Borobudur
- Candi Pawon
- Candi Mendut
- Candi Ngawen

Candi Pawon and Candi Mendut are lined up on the axis between Candi Borobudur and Mt. Merapi, about 8 degrees north of the east-west axis through Candi Borobudur. However, no roads have yet been discovered linking these three Candi. Candi Ngawen is to the south of this axis.

Measuring the straight line distances between the different groups of ruins, these are 1,750 m between Borobudur and Pawon, 1,150 m between Pawon and Mendut, and 3,000 m between Mendut and Ngawen.

213 Candis in the Prambanan Area

The following 14 remains have been discovered so far in the Prambanan area.

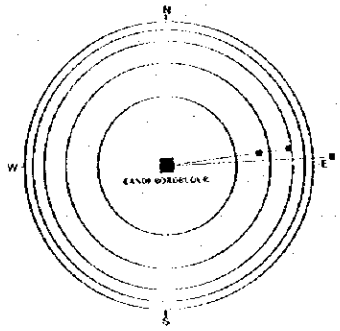
- Candi Lara Jonggrang
- Candi Lumbung
- Candi Sewu
- Candi Bubrah
- Candi Asu
- Candi Plaosan Utara
- Candi Plaosan Selatan
- Candi Sojiwan
- Candi Bawang
- Kraton Ratu Boko
- Candi Banyunibo
- Candi Sari
- Candi Kalasan
- Candi Sambisari

Almost all of these remains are within a 3 km radius of Candi Lara Jonggrang.

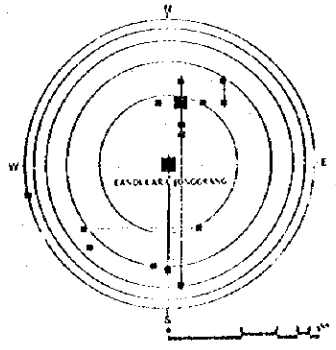
Almost all of these remains are placed neatly on a grid with magnetic north as its axis.

All of the remains except Candi Plaosan and Candi Sojiwan are groups of temples with their main entrances facing east.

214 Candis in Borobudur



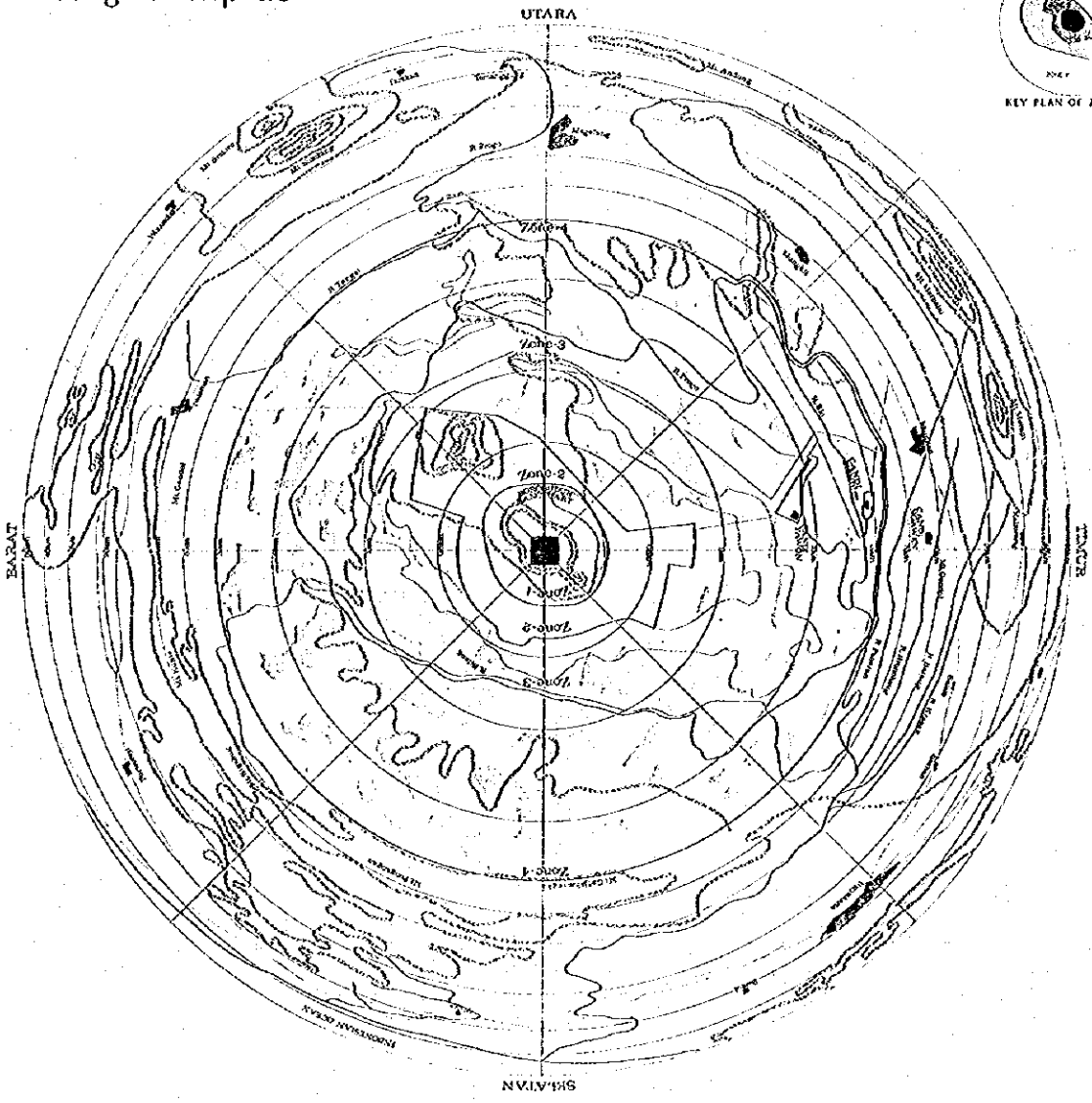
215 Candis in Prambanan



NATIONAL ARCHEOLOGICAL PARK

BOROBUDUR : KEDU BASIN

Archeological Ecosphere



KEY PLAN OF ZONING

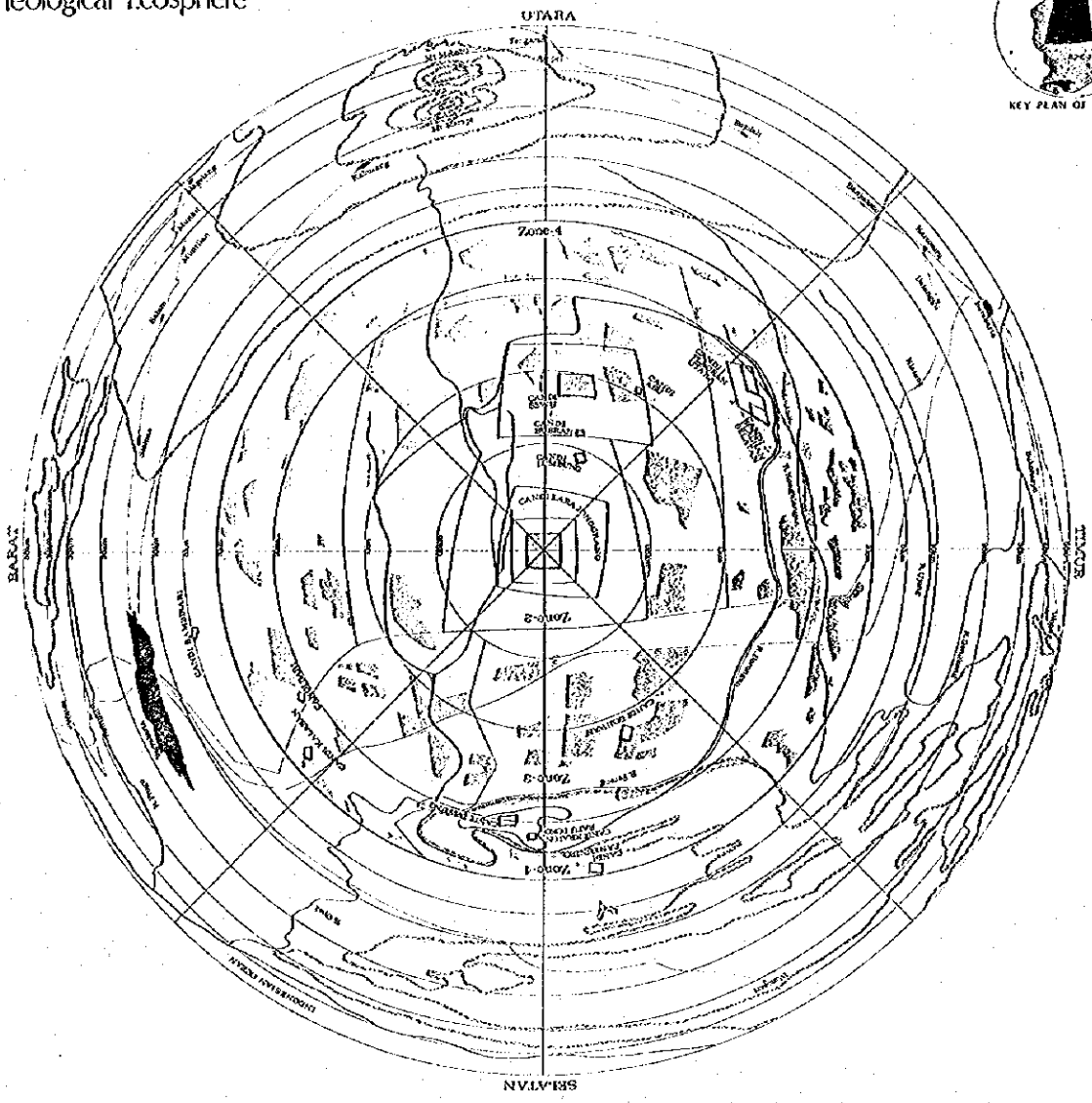
ORG. 3

NATIONAL ARCHEOLOGICAL PARK

PRAMBANAN : KEWU PLAIN

DRG. 4

Archeological Ecosphere



Cosmography of the Park

VISUAL APPROACH

216 The magnificent view from Candi Borobudur's circle terrace and from Kraton Hill is a sea of trees stretching from the surrounding volcanic mountains right to one's very feet. Hoping to correctly evaluate these panoramic views and to incorporate them into the plan based upon a visual approach, we have attempted to clarify the visual features and visual make up of the areas.

217 Landscape Inventory

The area in question is one of the most densely populated regions on the island of Java and has considerable grain farming, especially paddy cultivation. Its concentration of farming villages is higher than in many places overseas, and it boasts unique scenery seen in the broader regional perspective. The main scenic components are noted below.

Volcanic mountain landscape
Prominent among the landscape factors of the area are Merapi, Merbabu, Sumbing, and other active volcanos over 3,000 meters high.

Agricultural landscape
Located respectively in the Kedu Basin and the Kewu Plain, Borobudur and Prambanan present such wonderful scenery that they have been called the garden of Java.

Village landscape
The village structure of this region is a series of hamlets located geographically nearly equidistant from each other. At the same time, the bulk of these villages are heavily wooded and present the appearance of woods or groves standing in attractive contrast to the surrounding fields and paddies.

Archeological landscape
The most distinctive element of the Borobudur and Pramburan areas is the vast number of historic remains there. Set against a vast natural background, these archeological remains give a vivid sense of history stretching back over the millennia. This archeological landscape lays the very foundations for park development, and it is imperative that the plan be formulated and implemented with utmost attention to this area.

218 Visual Analysis

The following studies are carried out in order to analyze the visual structure of the various landscape elements constituting the environment of the monuments so as to preserve distinctive resources in the historic climate and to utilize them for the visual experience of visitors.

- Extraction of those mountainous skylines which form the visual edges of the parks.s,
- Regional thorough section study to analyze the visual positions of the parks.
- Detailed study of archeological landscape features and impact area to determine the scope of the sanctuaries.

Working through these studies, it was then possible to define qualitatively and quantitatively the visual identities of the two national archeological parks.

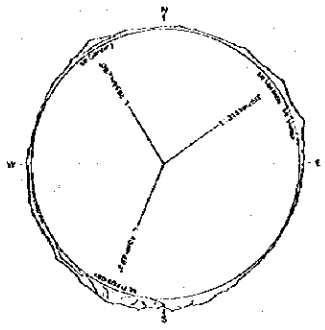
219 Panoramic View from Candi Borobudur

The outstanding focal points of the Borobudur area are Candi Borobudur's circle terrace and the top of Dagi Hill.

While the panoramic views from both of these two places have virtually the same scenery, that from Candi Borobudur is especially outstanding for its inclusion of view of the remains.

In the background is the skyline of volcanic mountains 30 km distant (Mt. Merapi, Mt. Merbabu, and Mt. Sumbing).

Drawing a straight line between Candi Pawon and Candi Mendut, this extends out to white-smoking Mt. Merapi.



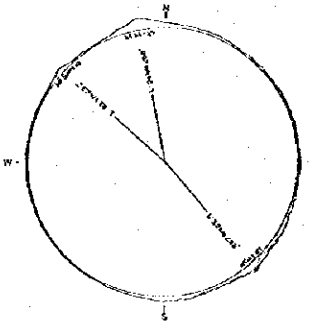
220 Panoramic View from Kraton Hill

The panoramic view from Kraton Hill is one of the most attractive features of this area.

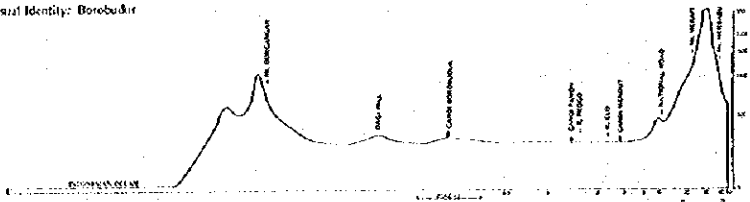
Almost directly north is the majestic spectacle of white-smoking Mt. Merapi.

Moreover, the beautiful foothills slope down to the base of Kraton Hill, contrasting with the estate groves and paddies around the villages for an extremely beautiful scene.

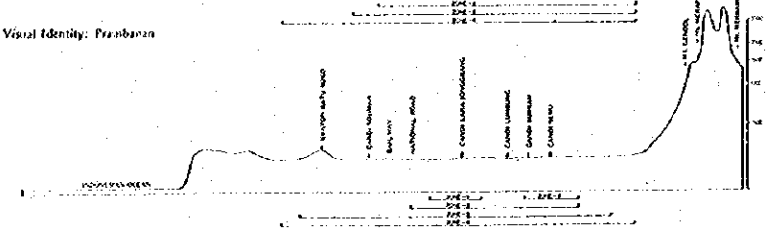
Spreading from medium range to close range is a vast sea of large trees for palm orchards and estate groves.



221 Visual Identity: Borobudur



222 Visual Identity: Prambanan



VISUAL ANALYSIS FOR DETERMINING THE SANCTUARY AREA

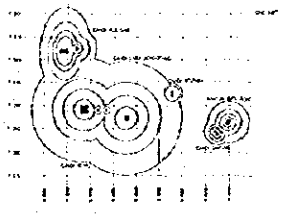
221 In determining the zoning operations to preserve permanently the sanctuary and its environs, visual analysis is utilized in order to discover the optimum boundaries.

While this was done for all archeological remains within the park areas, it is explicated here for only Candi Borobudur and Candi Lara Jonggrang to illustrate the process by which the decisions were made.

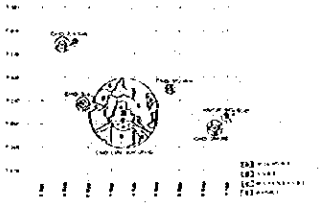
In the visual analysis for determining the sanctuary area, the following items were included:

- Analysis of physical distance from the remains
- Analysis of visibility of the remains
- Qualitative analysis of the view of the remains

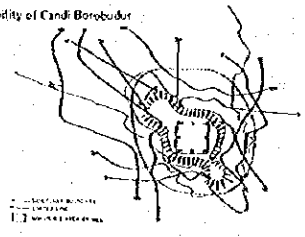
224 Distance from Each Remain



225 Visibility of Remains



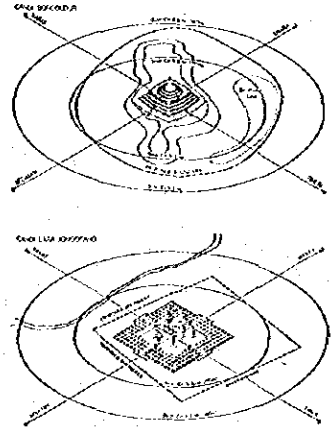
226 Legibility of Candi Borobudur



227 The sanctuary zones on which the preservation plans are to be based are to be designated on the basis of the following standards and adequate prior investigation.

- Visual Parameter
  Separation of at least 45–80m on the basis of analysis of near view. Upward viewing angle of 14–30 degrees with respect to height of archeological remains.
  A minimum visibility angle of 30–60 degrees with respect to the size of the foundation of the archeological remains.
  Also to be taken into consideration in determination of the visual parameters are correct approach to the archeological remains, axial relationships, arrangement of the remains, etc.
- Site Parameter
  Ensuring a space proportional to the size and height proportions of the foundation considering the particular volume and form of the archeological remains.
- Area Parameter
  At least 1 ha even in the case of the smaller archeological remains.
  Generally, 9–14 times the area taken up by the foundation.
- Use Parameter
  The space capacity inside the sanctuary areas will be a maximum of 200 persons/ha/hour.
- Attractiveness Parameter
  The above standard (use parameter) will be raised somewhat in the case of particularly well known archeological remains.
- Consideration of the surrounding environment
  Active utilization of terrain, vegetation, and other special natural features and exclusion of villages, farmland, irrigation waterways, etc.

228 Proposed Sanctuary Boundary

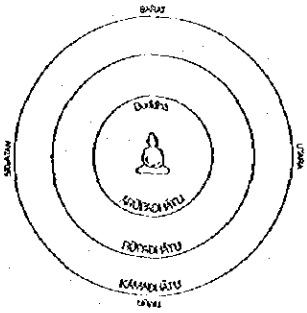


RELIGIOUS APPROACH

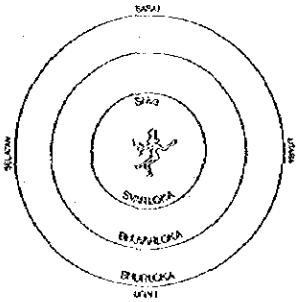
229 These groups of Candi in Central Java are spatially structured according to Buddhist and Hindu thought.

Just as Buddhism divides the world into the three spheres, Dhatu in Sanskrit, of the sphere of desire (Kamadhatu), the sphere of form (Rupadhatu), and the sphere of formlessness (Arupadhatu), so Hinduism also divides the world into three spheres; the sphere of Bhurloka, the sphere of Bhuvarloka, and the sphere of Svarloka.

230 Cosmos of Candi Borobudur



231 Cosmos of Candi Lara Jonggrang

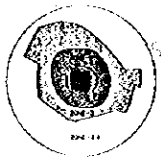


NATIONAL ARCHITOLOGICAL PARK

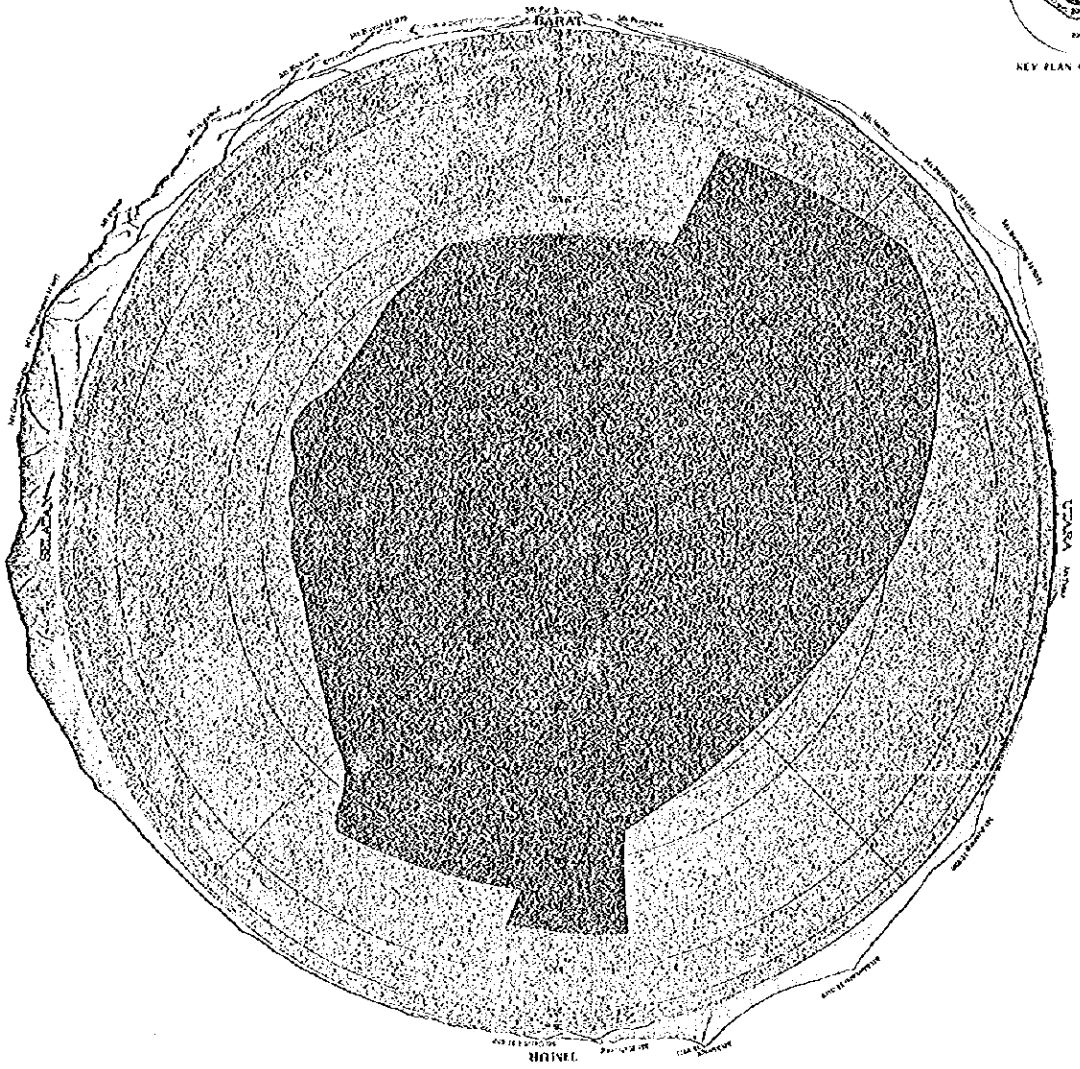
BOROBUDUR COSMOGRAPHY

DRG, 5

Panorama from Candi Borobudur



KEY PLAN OF ZONING

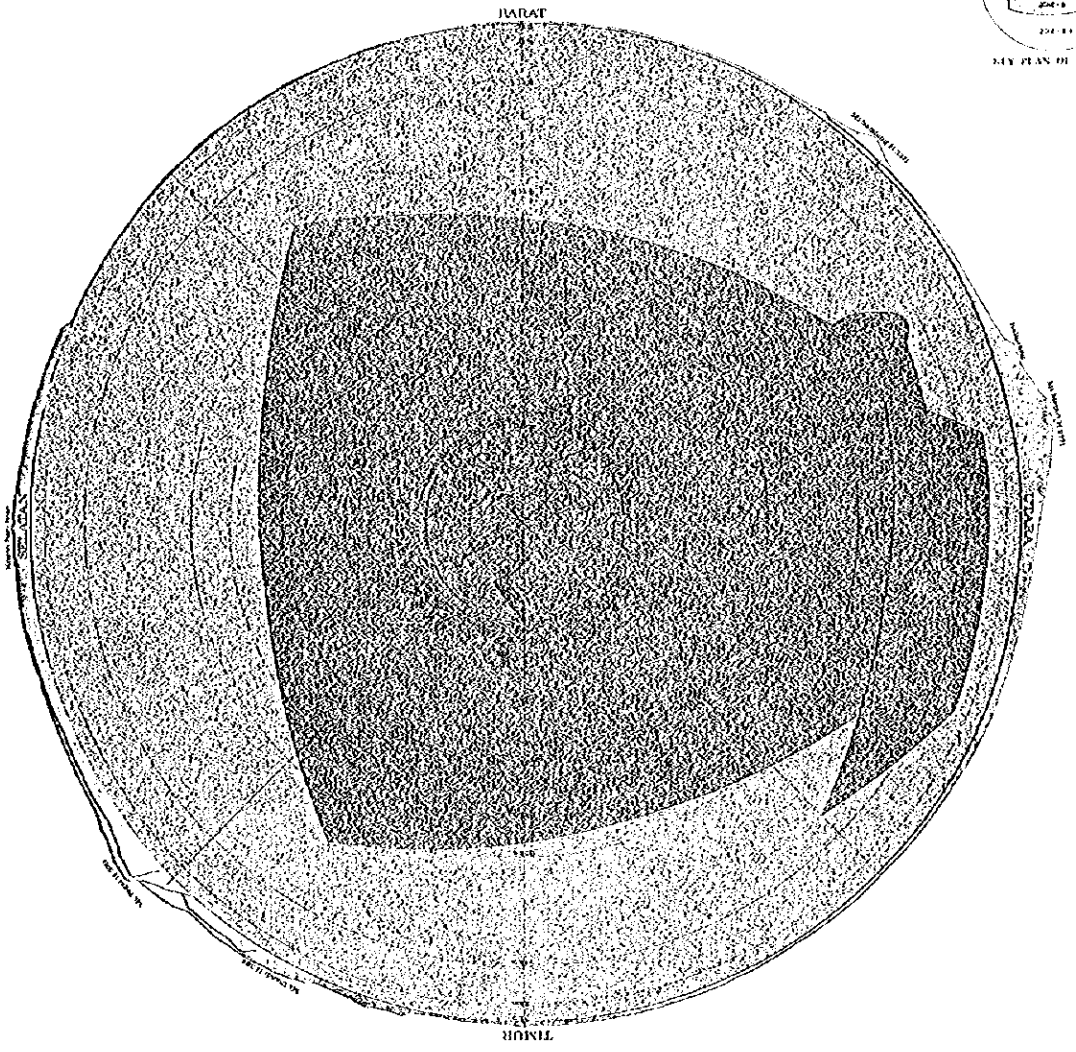


MASTER PLAN

NATIONAL ARCHEOLOGICAL PARK

PRAMBANAN COSMOGRAPHY

Panorama from Candi Lara Jonggrang



MASTER PLAN

Zoning Plan

ZONING POLICY

232 Archeological remains do not exist independently, but rather in the context of historical, social and natural conditions, and only on the basis of an integrated awareness of these conditions can one understand their essential value.

It is therefore important that there be not only provision of facilities to help in understanding and appreciating such conditions but also measures for the maintenance and preservation of the natural environment of the remains and of the surrounding land.

Herein lies the significance of environmental control not only of the archeological remains themselves but also of the surrounding area.

233 Environmental Control Objectives

Active preservation; active protection and preservation of the present state into the future.

Maintenance of the present state; prevention of activities that will bring about change.

Development within the bounds set by regulation; setting of definite criteria for keeping development in check.

234 What will be Subject to Control

The natural environment; terrain, rivers, forests and other environmental elements and the existing state of landuse.

Artificial structures; kind, shape, color, materials, etc.

Activities; commercial and other activity.

235 Methods of Environmental Control

The environmental control of the archeological parks will involve classification of the area subject to such control into different categories according to the purpose and contents of the regulation (introduction of a zoning system) and application of control techniques which are suitable to the respective categories (zones).

The relation between the control objectives and the objects of control is as follows:

- Active preservation; protection of archeological remains and of nature
- Maintenance of present state; use-zoning regulation and scenic regulation
- Development within regulation bounds; voluntary control of development, scenic regulation, business operation licensing system

ZONING SYSTEM

236 Zone Classification: Main

The zone classification of the national archeological parks will be as follows.

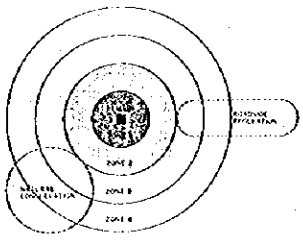
- Archeological Monument Special Preservation Zones (Category-1 zones)
  Public acquisition of the land around the archeological monuments, the making of environmental improvements thereon, and control not only of the monuments but also of cultural assets on the basis of the Cultural Assets Protection regulation.
- Voluntary Controls Zones (Category-2 zones)
  These zones will be appropriately developed on the basis of voluntary controls on the part of the development entities themselves.
- Use Zoning Regulation Zone (Zone-3)
  In this zone, which encompasses the villages living outside of the special development zones, the environment will be maintained through use-zoning regulation.
- Scenic Conservation Zone (Zone-4)
  In this zone, which represents the rest of the park designated area, the scenery will be maintained through scenic regulation.

237 Zone Classification: Minor

The following types of regulation will also be applied as supplementation of the zoning described above:

- Roadside Regulation zone
  The scenery along the access roads to the parks will be subject to this regulation.
- Natural Conservation Zone
  This type of regulation will be applied to those parts of the parks which have a particular need for protection of nature.
- Special business Licensing System
  The entire area of the parks will be subject to regulation of development activities on the basis of a special business licensing system.

238 Zone Classification Model



REGULATION CRITERIA

239 Cultural Assets (Remains) Protection Regulation

Permanent protection will be ensured through strict regulation based on the Monument Act of the Republic of Indonesia and UNESCO's survey and research criteria.

240 Voluntary Development Controls

For the sake of appropriate development activities in the park development areas (Category-2 zones), a Design Council will be established within the Park Authority to consider the following matters:

- Appropriateness of the scale, composition, position, etc. of facilities as judged on the basis of site and building codes
- Appropriateness and unity of design of facilities within the park as judged on the basis of design codes
- Appropriateness and unity of the park landscape as judged on the basis of visual codes

241 Use-Zoning Regulation

In Zone-3 a use-zoning regulation will be applied which is similar to those based on city planning laws, and landuse will be restricted on the basis of landuse plans, including restriction of building of residences on farmland and restriction of building of commercial facilities in residential areas.

242 Scenic Regulation for Park Area

Prohibition or licensing of the following activities in the areas subject to this kind of regulation:

- Construction, remodeling or expansion of buildings or other structures
- Leveling of land for residential purposes, opening up of new land for cultivation, and other changes in the shape and quality of the land
- Felling of trees and quarrying of soil and rocks
- Other activities that might work against preservation of the historical setting

There will also be regulation of development that will have an adverse effect on the scenery in areas subject to scenic protection, particularly as viewed from the top of Borobudur Temple and from Kraton in Prambanan.

243 Scenic Regulation for Roadside Area

The following will be prohibited or licensed in roadside scenic areas:

- Change of the color, shape and materials of buildings and other structures in existing villages
- Outside display of advertisements
- Construction of new buildings or structures or change in the shape of the land

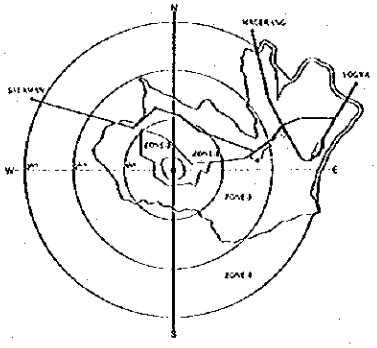
244 Nature Protection Regulation

Prohibition or licensing of, or making of recommendations concerning, development activity with regard to rivers, forests, mountains or hills, slopes, and so forth.

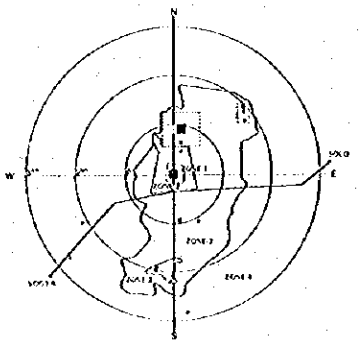
245 Special Business Licensing System

Correct guidance of new commercial activity by adoption of a licensing system for prevention of development sprawl.

246 Zone Designation: Borobudur



247 Zone Designation: Prambanan



ZONE DESIGNATION: BOROBUDUR

248 The Borobudur Park will have the following zone designation.

- The following four areas will be designated as sanctuary areas (Category-1 zones).

– Candi Borobudur Sanctuary	18.5 ha
– Candi Pawon Sanctuary	1.0 ha
– Candi Mendut Sanctuary	3.0 ha
– Candi Ngawen Sanctuary	1.0 ha

- The following two areas will be designated as park development areas (Category-2 zones)

– Borobudur Complex	75.5 ha
– Park Road	27.4 ha

- The entirety of the following four desas with the exception of those parts represented by Category-1 and Category-2 zones will be designated as a village improvement areas to which a use-zoning regulation will be applied (Zone-3).

– Desa Borobudur in Kecamatan Borobudur
– Desa Wanurejo in "
– Desa Sawitan in Kecamatan Mungkid
– Desa Mendut in "

- The area within a 3-kilometer radius of Candi Borobudur will be designated as a scenic conservation zone to which scenic regulation will be applied (Zone-4).

249 The following types of regulation, too, will be applied to the Borobudur Park.

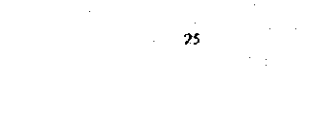
- Roadside Regulation Zone
  The area 500m on both sides of the main access road (the 4.5km length of road from the national highway to Candi Mendut) will be subject to scenic regulation.

- Natural Conservation Zone
  Natural conservation regulation will be applied to the Gandul Mountains and the Progo and Elo river basins.

- Special Business Licensing System
  The entire park area as well as the area along the access road will be subject to this regulation.

Zoning Area List

Zones	Borobudur	Prambanan
Zone 1	23ha (1%)	28ha (1%)
Zone 2	105ha (4%)	75ha (3%)
Zone 3	912ha (32%)	611ha (22%)
Zone 4	1,790ha (62%)	2,078ha (74%)
Total	2,860ha	2,875ha



ZONE DESIGNATION: PRAMBANAN

250 The Prambanan Park will have the following zone designation.

- The following ten areas will be designated as sanctuary zones (Category-1 zones).

– Candi Lara Jonggrang Sanctuary	15.2 ha
– Candi Lumbung Sanctuary	0.3 ha
– Candi Sewu Sanctuary*	50.2 ha
– Candi Plaosan Sanctuary*	11.3 ha
– Candi Sojiwan Sanctuary	1.0 ha
– Kraton Ratu Boko Sanctuary	2.5 ha
– Candi Banyunibo Sanctuary	1.0 ha
– Candi Sari Sanctuary	1.0 ha
– Candi Kalasan Sanctuary	1.0 ha
– Candi Sambisari Sanctuary	1.0 ha

*These sanctuaries will be reserved areas for future nationalization.

- The following three areas will be designated as park development areas (Category-2 zones).

– Lara Jonggrang Complex	59.4 ha
– Pegat Plateau Park	13.0 ha
– Park Road	2.8 ha

- The entirety of the following five desa with the exception of those parts represented by Category-1 and Category-2 zones will be designated as a village improvement area to which a use-zoning regulation will be applied (Zone-3).

– Desa Bugisan in Kecamatan Prambanan: Klaten
– Desa Tlogo in "
– Desa Kebondalem Kidul in "
– Desa Pereng in "
– Desa Bokoharjo in Kecamatan Prambanan: Sleman

- The areas within a 3-kilometer radius of Candi Lara Jonggrang will be designated as a scenic conservation zone to which scenic regulation will be applied (Zone-4).

255 The following types of regulation, too, will be applied to the Prambanan Park.

- Roadside Regulation Zone
  Scenic regulation will be applied to the area 100m on both sides of the 6.1km stretch of the Yogya-Solo that lies within the park area.

- Natural Conservation Zone
  Natural conservation regulation will be applied to the Pegat Hill and the Opak river basin.

- Special Business Licensing System
  This system will apply to all areas of the park other than the commercial areas.

NATIONAL ARCHEOLOGICAL PARK

BOROBUDUR PARK

Zoning Plan

NATIONAL ARCHEOLOGICAL PARK

PRAMBANAN PARK

Zoning Plan

DRG. 8

ZONE BOUNDARY
- Zone-1: Archeological Monument Special Preservation
- Zone-2: Voluntary Control
- Zone-3: Use-zoning Regulation
- Zone-4: Scenic Conservation

LANDUSE CLASSIFICATION
- Residential Area
- Community Facility Area

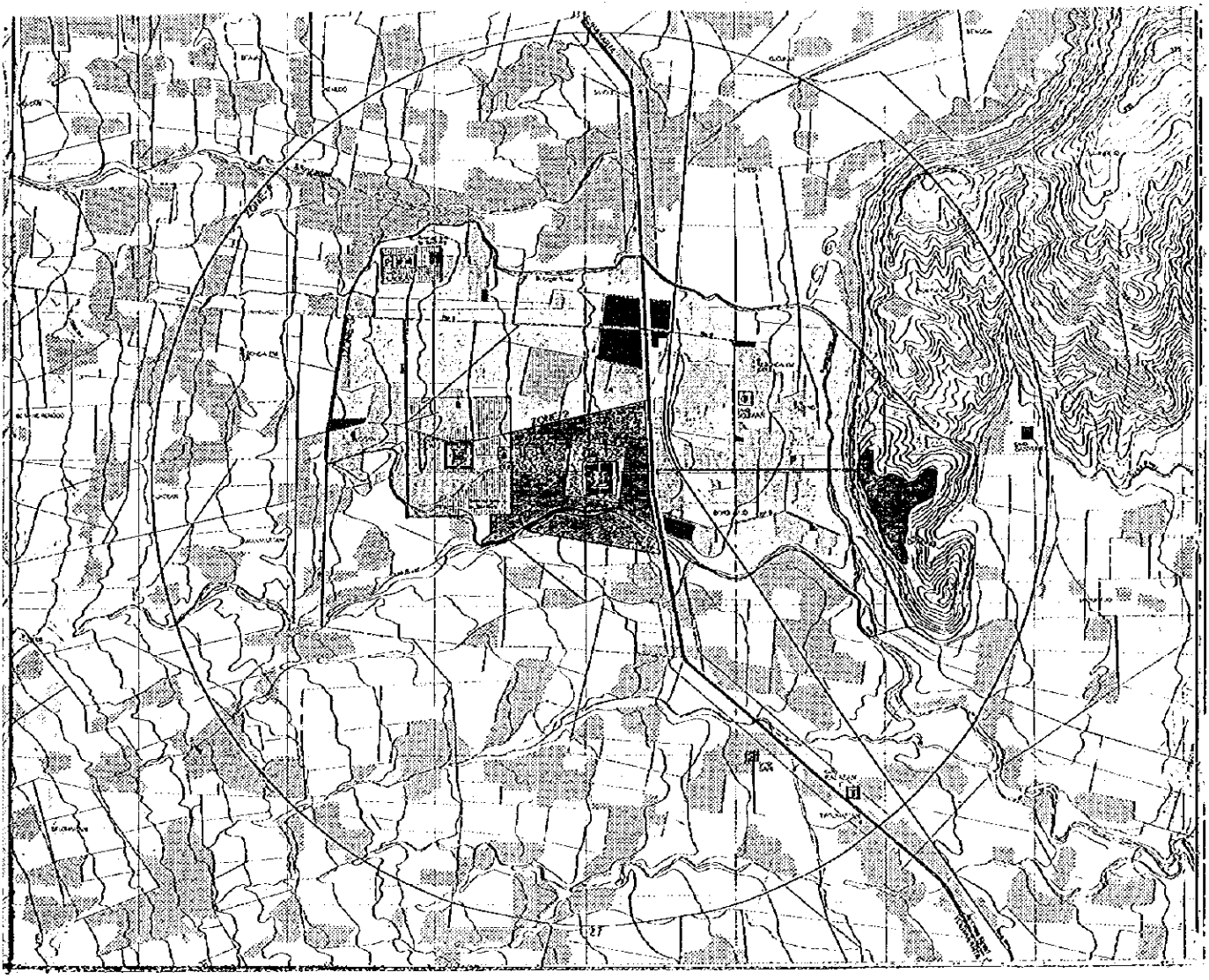
ROAD NETWORK
- Access Road
- Park Road
- Excavation Road
- Village Road: Main
- Village Road: Minor

KEY MAP

N

0 500 1000 1500m

GRAPHIC SCALE



Landuse Plan

LANDUSE POLICY

252 Problems and Findings

The plains area of Central Java has one of the densest agricultural populations in the world, with the areas around Borobudur and Prambanan being no exception.

One of the features of this area is the distribution, at approximately even intervals, of village units of different sizes called dukuh which are based on ties to the land.
The farm land consists of both paddies and dry fields, representing outstanding productive green land supported by irrigational networks. There are hardly any natural forests, the only trees being those planted around villages and groves of palm trees.

The new development must be planned in such a way as not to give rise to any environmental destruction, taking into careful account the above point, the existing ecological system — particularly agricultural ecological system and the regional social structure — and preservation of the archeological climate.

253 Accordingly, the landuse planning has been based on the following basic policies:

- A high degree of use in terms of both preservation of the archeological remains and development of a tourism oriented landuse system while at the same time maintaining the existing agricultural landuse pattern
- Provision of as large an archeological environment preservation area as possible
- Minimization of land for new development and land the use of which will changed
- Minimization of the physical influence of new development
- Very careful site selection
- Utilization of the existing agricultural scenery as a background for the park area and increasing of the amount of greenery by selective landscape improvements
- Paying careful attention to erosion and water control aspects and limiting the use of river banks, slopes, etc.
- Taking environmental pollution risks into due account

251 Plan Implementation and Management

A use-zoning regulation system is to be formulated to provide the legal framework for regulating developmental activities to preserve the environment of the archeological parks as well as to deter subdivision within the area (zone 3) stipulated as the area of the landuse plan under the Special Law for Archeological Parks.

The Park Authority is to formulate a landuse plan in keeping with the development and conservation goals of the project, to take the necessary administrative and legal steps, and to make this the legal plan. This landuse plan thus formulated shall be implemented as the basic map for landuse regulation.

Because these landuse regulations may restrict the private rights of residents within the target area, the plan shall be formulated with the popular participation of residents, including the holding of preliminary hearings and other means to obtain popular understanding and cooperation.

The target area is currently under the jurisdiction of the old Adat Law regarding landuse. In formulating the landuse plan, it is important that consideration be given to compatibility with the Adat Law and the Agrarian Law.

LANDUSE FRAME

255 Outline of Landuse Plan

With the zoning plan, areas are to be designated, landuse plans formulated for zone-3, and the foundations laid for use-zoning regulation. At the same time, the landuse plan includes a village facility planning and suggests usage patterns reflecting village renewal operations. The landuse plan seeks strict usage designations separating zones by use classification to support future orderly landuse.

The landuse plans are formulated for the following areas designated within zone-3 of the zoning plan:
- Borobudur Area: 1,020 ha
- Prambanan Area: 747 ha

The target year and effective period of the landuse plan are set at 1995 and 20 years. During this period, most of the park arrangements and village coordination are to be completed. After the 20 years are up, new land demand to meet new social requirements is to be studied.

256 Area Requirement

The present landuse patterns in the two landuse plan areas (Zones 1, 2, and 3) are as shown below.

	Borobudur	Prambanan
Residential Area	264.4 (25.7%)	185.6 (24.9%)
Agricultural Area	718.1 (67.1%)	505.0 (67.6%)
Others	87.6 (8.2%)	56.1 (7.5%)
Total	1,070.1 ha	746.7 ha

Note: Figures in parentheses are percentages of each total area.

253 New land demand for park-related projects: Borobudur

	Existing Land	New Land Needs Up to 1985	New Land Needs After 1985	Total
Sanctuary Area	15.2	6.5	0.8	22.5
Park Area	13.6	61.9	--	75.5
Road Area	16.0	12.5	15.2	43.7
Village Center	--	5.7	6.1	11.8
Relocation D.Ash	--	4.9	4.1	9.0
Total	44.8	91.5	26.2	162.5

258 New land demand for park-related projects: Prambanan

	Existing Land	New Land Needs Up to 1985	New Land Needs After 1985	Total
Sanctuary Area	12.2	17.3	1.5	31.0
Park Area	4.1	65.9	--	70.0
Road Area	18.3	7.4	16.0	41.7
Village Center	1.5	2.4	4.3	13.2
Relocation Dukuh	1.5	4.4	3.8	9.4
Total	37.6	102.4	25.1	165.3

Note: Land area are given in hectares.

259 Accordingly, landuse restructuring must be done in the following two stages:

- The following are the clearance areas for existing villages in accordance with sanctuary improvement and park development
  - Transfer areas for sanctuary development
  - Transfer areas for park development
  - Transfer areas for roadway widening and relocation
- The following substitute lands are considered for the villages transferred.
  - Substitute land for community facilities, land for public works facilities, and commercial land
  - General residential land and employee housing land

260 Landuse Classifications

The usage classifications for other existing landuse elements are as follow:

- Agricultural fields
- Community facility areas
- Residential areas
- Road areas
- River areas

261 Proposed Use-zoning Regulations

It is proposed to classify the land within the area (Zone-3) subject to use-zoning regulations into the following five categories and to impose use regulations for each.

Agricultural fields
In areas where the land title designation is that of agricultural fields, all development activities except those for agricultural production are to be prohibited (this to prevent urban sprawl).

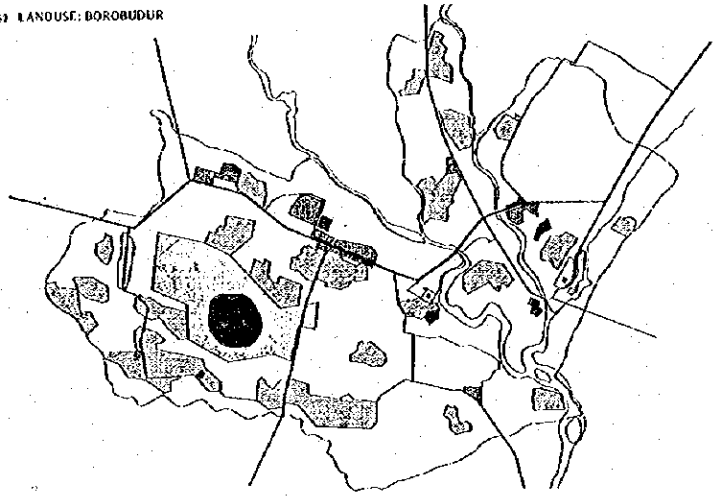
Residential areas
In the areas designated as residential, all commercial and industrial activities except those neighborhood service facilities specified by the landuse plan (Dukuh Centers, etc.) are to be prohibited. Conversion to agricultural land shall be permitted.

Community facility areas
General development activities not requiring large scale landscaping shall be permitted within this area. (Examples are public service facilities, commercial facilities, small scale industrial activites, and the like.)

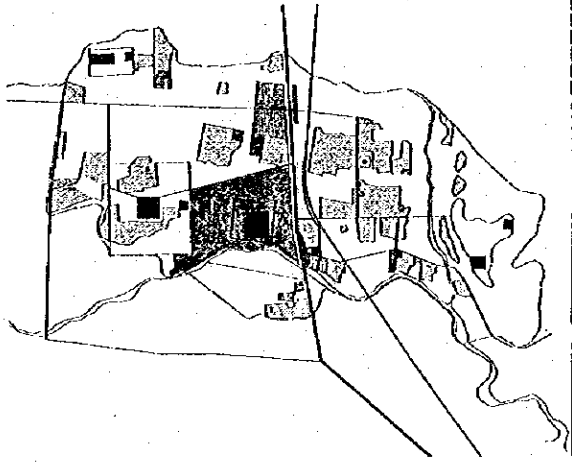
Road areas
The area for the rights of way for roads provided for under the plan shall be reserved under law.

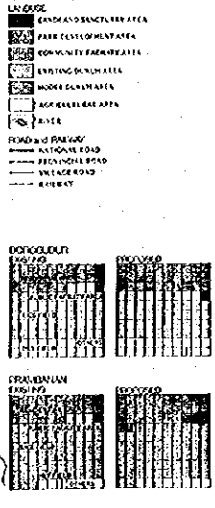
River areas
The major river areas as well as riverbank greenery areas are to be designated natural conservation areas and development activities therein prohibited.

263 LANDUSE: BOROBUDUR



263 LANDUSE: PRAMBANAN





LANDUSE SOLUTION

264 The landuse plan involves Borobudur's 4 villages (850 hectares, excluded park use area and approximately 12,500 people) and Prambanan's 5 villages (630 hectares, excluded park use area and approximately 18,000 people), both areas are based upon traditional agricultural landuse patterns. This means that 65 - 70% of the land is used for paddies or fields and that almost all of the remainder is residential land.

265 **Village Structure**
The main regional arteries are to be a newly constructed road in Borobudur and a national highway in Prambanan, traffic among desa or among dukuh being handled on main and minor village roads.
Both areas will have a village center which functions as a social center for the area's 60 - 80 thousand people, the desas also having their desa centers and 2 - 3 subcenters and the dukuhs their dukuh centers and service facilities for groups of dwellings. Other than that, the community structure is to conform to landuse patterns adapting to the present village facilities. This means that the individual dukuhs are to be spotted throughout the agricultural land as separate units of 50 - 70 dwellings.

266 **Residential Areas**
Residential areas will be established to suit the village relocation and population increases. In Borobudur, this will involve the land (11.9 hectares) for the model dukuh plus 5% more residential land than at present (29.4% of the total), while in Prambanan the model dukuh (13.4 hectares) will be the only new residential land (28.4% of the total). Population densities have been set at 14.4 people per hectare in Borobudur and 28.6 people per hectare in Prambanan postulating full use of existing residential areas.

267 **Public Facility Areas**
Under the village reorganization plan, adequate areas are to be set aside for the various community centers, 10 hectares (3%) in Borobudur and 20 hectares (3%) in Prambanan. By contrast, the existing public facility areas are now 6 hectares in Borobudur and 8 hectares in Prambanan.

268 **Agricultural Areas**
Of the existing agricultural land, 44 hectares in Boroubudur and 42 hectares in Prambanan is to be designated for other uses in accordance with village renewal and improvement.

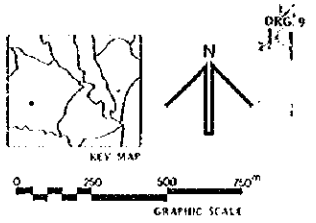
269 **Landuse Area List**

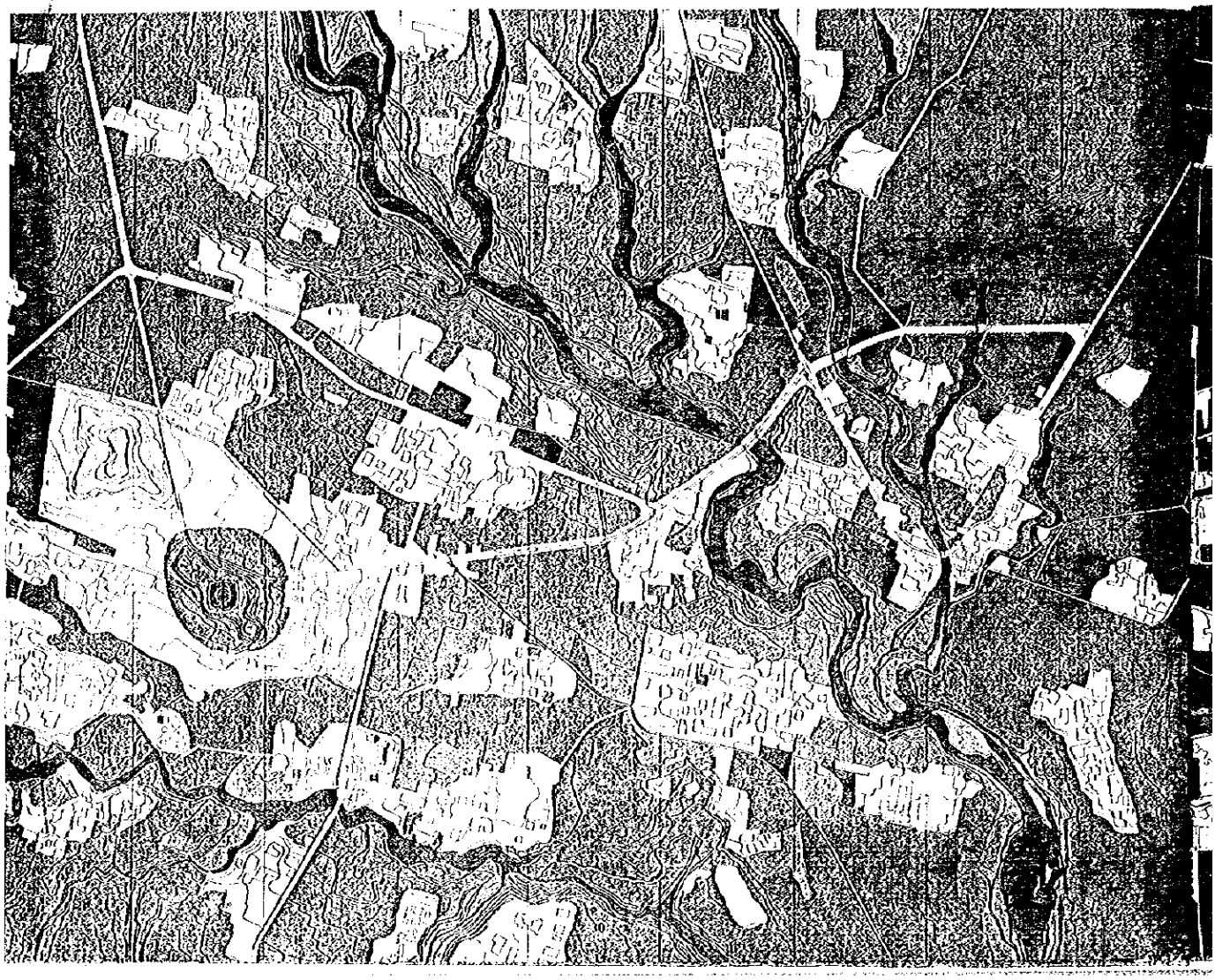
Items	Borobudur existing	Borobudur proposed	Prambanan existing	Prambanan proposed
Residential Area	258.4	258.6	196.5	178.7
Public Facility Area	6.0	8.9	8.0	18.3
Rice Field	529.6	430.6	492.3	376.5
Dry Field	193.0	158.5	18.7	14.5
Others	8.0	22.5	31.5	41.4
Total	990.0 ha	879.1 ha	750.0 ha	629.4 ha

NATIONAL ARCHEOLOGICAL PARK

BOROBUDUR PARK

Landuse Plan





NATIONAL ARCHEOLOGICAL PARK

PRAMBANAN PARK

Landuse Plan

COMMUNITY FACILITY AREA
- Proposed Area
- Existing Area

RESIDENTIAL AREA
- D.Kab. Renewal
- D.Kab. Improvement
- D.Kab. Existing

PARK DEVELOPMENT AREA
- Sanctuary Area
- Park Facility Area

AGRICULTURAL AREA
- Sawah (Rice Field)
- Tegalan (Crop Field)
- Others

ROAD NETWORK
- National/Provincial Road
- P Park Road
- E Extension Road
- RM Village Road Main
- RN Village Road Minor
- Other Road

KEY MAP

N

0 250 500 750m

GRAPHIC SCALE

DRG. 10

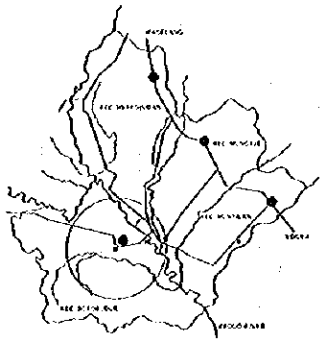
CHAPTER THREE
BOROBUDUR PARK

Outline of the Park

SUMMARY

301 Location

The Borobudur Park is situated in the Kedu Basin near Magerang City in Central Java. It is in a country area about 40 kilometers northwest of Yogyakarta City through which the main stream of the Progo River runs. It extends over four kecamatan in Kabupaten Magerang – Borobudur, Mertojudan, Mungkit and Muntilan. It has a total area of 2,860 hectares, centers on Candi Borobudur, has a radius of 3 kilometers and encompasses Candi Pawon and Candi Mendut as well as having Candi Ngawen as an outclave.



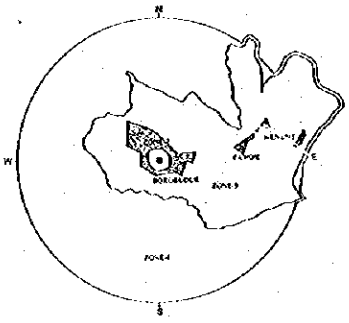
302 Topographical Condition

303 Area Designation

– Sanctuary areas (Category-1 zones)	23 ha
– Park development areas (Category-2 zones)	105 ha
– Village improvement area (Zone 3)	912 ha
– Scenic conservation area (Zone 4)	1,790 ha
Total	2,860 ha

Archeological Monuments to be Preserved

– Candi Borobudur	Buddhist	9th Century
– Candi Pawon	"	"
– Candi Mendut	"	"
– Candi Ngawen	"	"



304 Planned Number of Visitors

Year	upper target	lower target
1975	367,298	367,298
1980	932,290	658,692
1985	2,366,500	1,307,261
1990	3,060,073	1,727,433
1995	3,586,432	2,312,317

N.B. Because it is a long range outlook, both upper and lower target figures have been set.
These figures will serve as:
(1) a reference for tourism promotion activities;
(2) a basis for operational plans and tourism income and expenditure plans; and
(3) a design basis for facility plans, transportation plans, utility plans, and so forth.
For the attainment of these goals, not only tourism administration measures but also diversified promotional efforts in the fields of education and culture shall be necessary.

SKELETON OF THE PARK

305 Zone Designation.

The following four areas will be designated as sanctuary areas (Category-1 zones).

– Candi Borobudur Sanctuary	18.5 ha
– Candi Pawon Sanctuary	1.0 ha
– Candi Mendut Sanctuary	3.0 ha
– Candi Ngawen Sanctuary	1.0 ha

The following two areas will be designated as park development areas (Category-2 zones).

– Borobudur Complex	75.5 ha
– Park Road	27.4 ha

The entirety of the following four desa with the exception of those parts represented by Category-1 and Category-2 zones will be designated as a village improvement area to which a use-zoning regulation will be applied. (Zone-3)

– Desa Borobudur in Kecamatan Borobudur
– Desa Wanurejo in " "
– Desa Sawitan in Kecamatan Mungkit
– Desa Mendut in " "

The area within a 3 kilometer radius of Candi Borobudur will be designated as a scenic conservation zone to which scenic regulation will be applied (Zone-4)

The area within 0.5 kilometer on both sides of the main access road will be designated as a roadside scenic regulation zone.

306 Development Cluster

Borobudur Complex
A 52 hectare area around the Borobudur Sanctuary will serve as the core of this park and as such will have environmental improvements made and be given an intensive facility distribution.

Park Road
The 3.5 kilometer existing road linking Borobudur, Pawon and Mendut will have improvements made on it so that it can serve as a road for exclusive park use. The provincial road will be shifted to about 500 meters north of the park.

Excursion Road
The 4.2 kilometer stretch of road between Mendut and Ngawen will be improved in order to serve as an excursion road.

Access Roads
The two provincial roads from the national road to Mendut, 4.3 kilometers and 2.5 kilometers in length, respectively, will be designated as access roads and as such will have landscaping improvements made on them.

BOROBUDUR COMPLEX

307 The Borobudur Complex, which will serve as the core of this park, will have the composition shown in the following components.

308 Service Area
This area represents the entrance of the Complex. In it will be located a terminal, parking space, other gate facilities, management facilities, restaurants, kiosks, etc.

309 Borobudur Sanctuary
This is an area symbolizing the climax of this park. It covers 18.5 hectares and includes the hills on which the Candi Borobudur is located and their skirts. Improvements will be made on it so that it can be a sanctuary that can be passed on to future generations. Access to the Candi will be made by a concourse 350 meters in length that leads up to its eastern frontal side. Visitors will pass along this concourse, viewing the reflection of the Candi in the pond, and will then gradually make their way to its top by negotiating five galleries and three circular terraces in a clock-wise fashion, enjoying the artistic beauty of each in passing. From the top of the Candi they will find Mt. Merapi on the extension of the axis connecting Candi Pawon and Candi Mendut as well as be able to enjoy the grandeur of nature in the panorama enclosed by Mt. Merbabu, Mt. Sumbing and the Gandul Mountains. Next, they will descend to the base of the Candi to proceed to either the north, south or west exit gate, depending on their next destination, enjoying the grand view of the Candi itself from the shade here and there along the way.

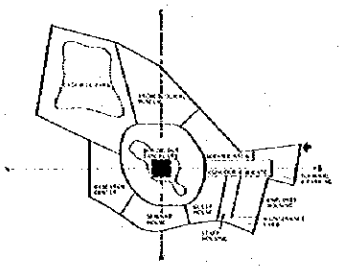
310 Archeological Museum
After viewing Candi Borobudur, visitors can proceed to the museum to hear an explanation of the archeological monuments and of the progress that is being made in the work of the century of restoration of the ruins while the impression of the Candi is still fresh in their minds as well as enjoy the site museum, where excavations from the area are on display.

311 Research Center/Seminar House/Guest House
This area will consist of a National archeological research center, a seminar house, a library, a guest house and other facilities contributing to its research, educational and conventional functions. The center will be operated not merely as an Indonesian but also as an international research organization.

312 Dagi Hill Park (Animal Sanctuary)
This hill, with a quiet forest and gently undulating lawns, will serve as a place where visitors can relax and rest along with deer, squirrels, birds and other small animals with the freedom of the grounds.

313 Inner Parkway
Andong service will be provided on this garden path winding around the sanctuary and Dagi Hill.

314 Borobudur Complex



FACILITIES IN THE PARK

315 Theme Facilities

The following four public facilities will be located in Borobudur Park.

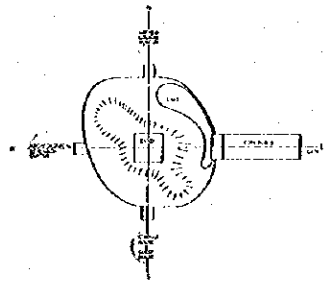
- Research Center of Archeology
  This will be a core facility for archeological research in Indonesia and will cover the following activities:
  - Surveys and excavation
  - Scholarly research
  - Research on restoration techniques
  - Records and distribution of information
  - Meetings of scholarly societies, seminars of experts, etc.
  - International research exchanges

- Borobudur Seminar House
  This will be an education facility attached to the Research Center which will attract study tourists in an organized fashion with courses lasting three days to a week, including the following:
  - Outdoor history study courses for middle school, high school and university students
  - Refresher and educational courses for teachers and intellectuals
  - Courses for students from other countries throughout the world

- Guest House
  This will be an accommodation and rest facility for state guests and archeologists, historians and other scholars from countries throughout the world.

- Archeological Museum
  A Borobudur Restoration Memorial Museum will be built for the purpose of conveying to future generations the process and the fruits of the work of the century of restoration of the archeological monuments of the park, including the use of documentary photographs and films, models and panel displays. Furthermore, archeological ruins scattered throughout the area will be collected for outdoor exhibition as a site museum.

316 Borobudur Sanctuary



317 Auxiliary Facilities

Gate Facility
Functioning as the gateway to Borobudur Park, this is to be composed of a gate plaza, traffic terminal, parking area, visitor center, and park admission offices.

Borobudur Concourse
This passage, a vast concourse 340m long and fully 80m wide, leads from the gate to Candi Borobudur and the sanctuary. The magnificent columnar trees and cascades along the route invite all visitors to the historical sanctuary area.

Service Facility
Restaurants, shop houses, kiosks, passars, and the like are to be situated along Lake Borobudur to meet the rest, refreshment, and shopping needs of visitors.

Staff and Employee Housing
It is planned to build 65 residential units to house park staff and employees and their families.

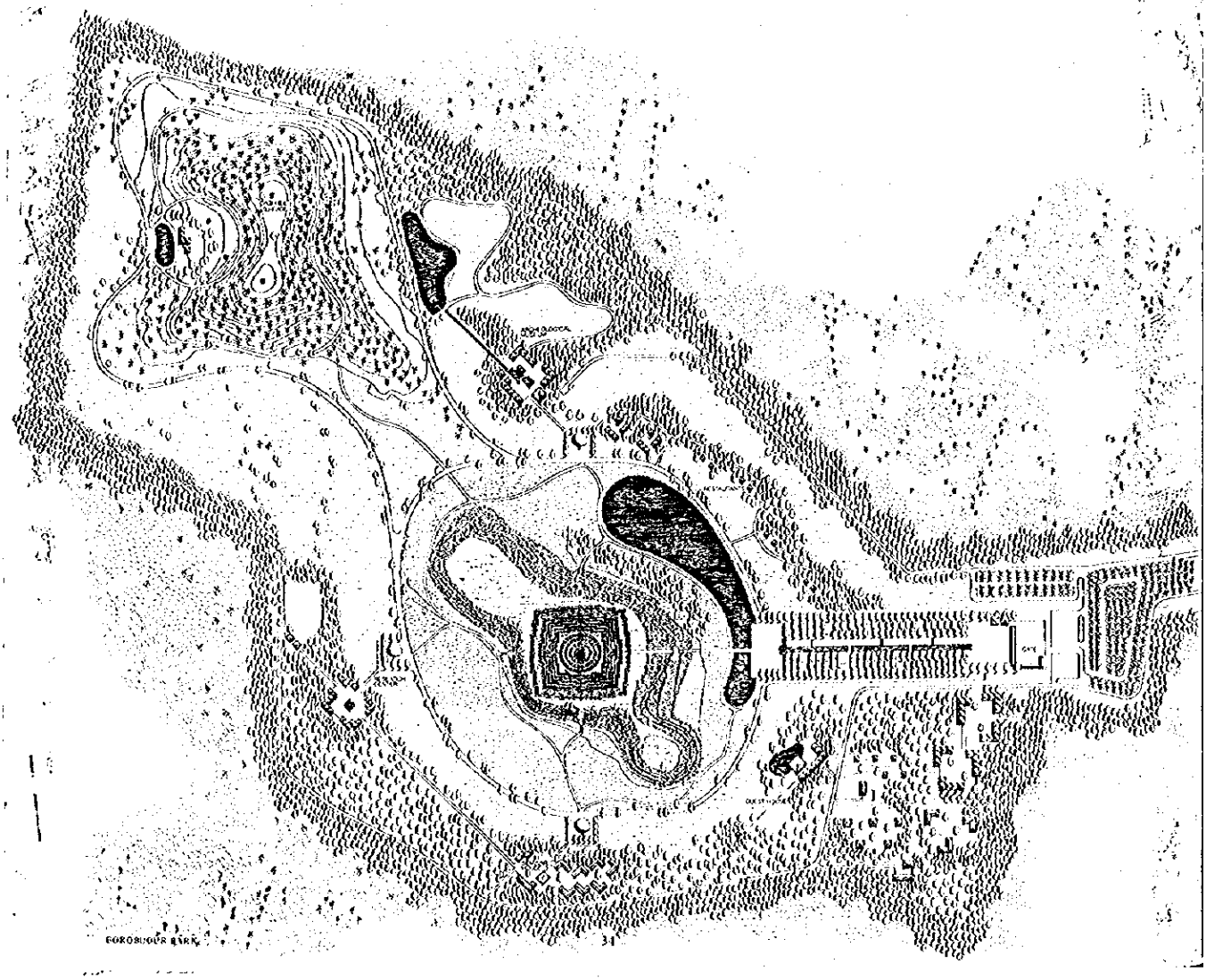
Operation Facility
The park Development Corporation office is to function as the central office for the operation and management of the park.

NATIONAL ARCHEOLOGICAL PARK

BOROBUDUR COMPLEX

Illustrative Master Plan

DRG. 11



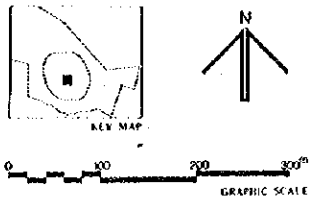
DRG. 12

BOROBUDUR AREA

Existing Condition

Data sources

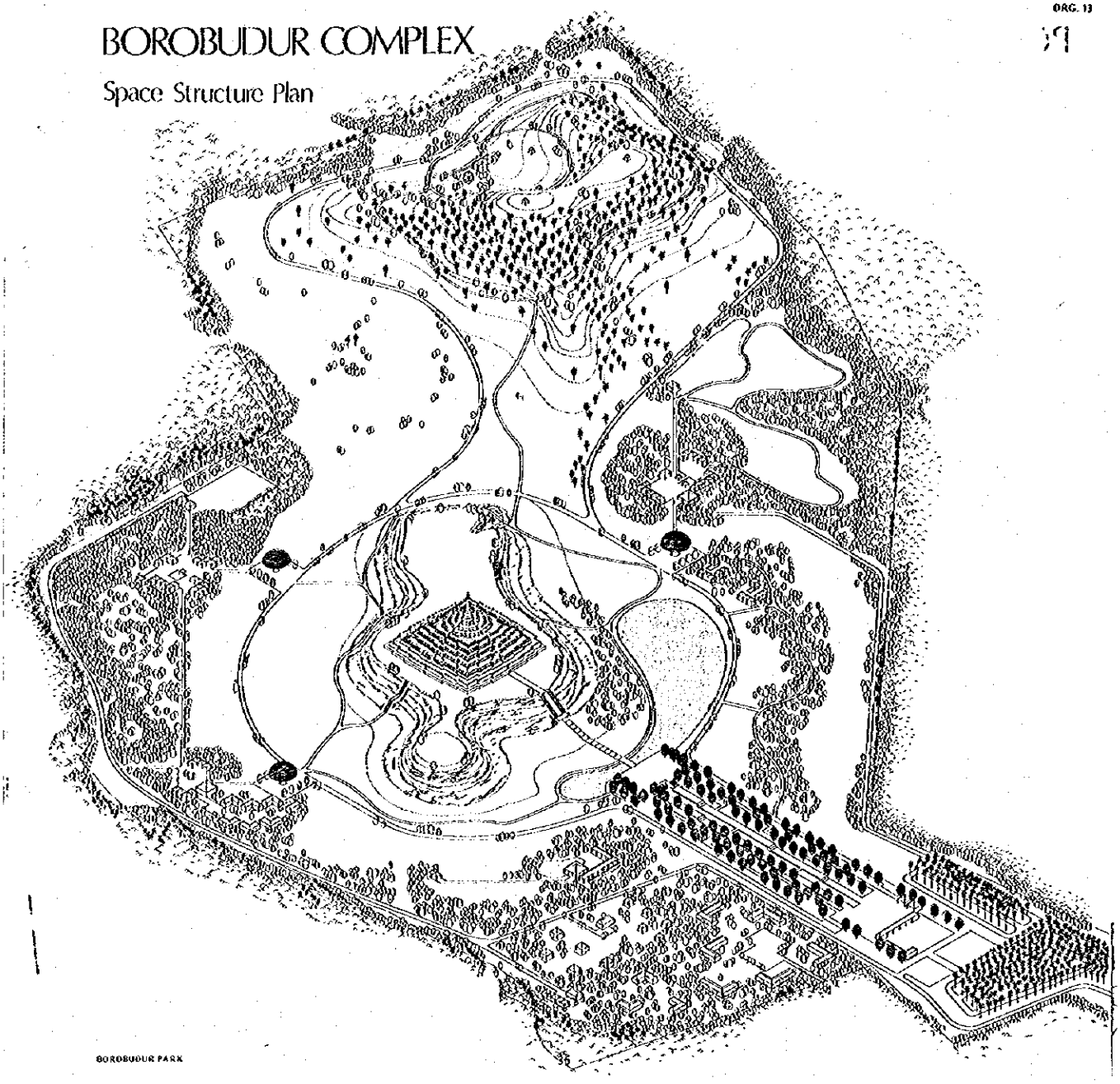
Information concerning natural conditions was derived from aerial photos (scale = 1:6,500 ~ 5,000) provided by the government of Indonesia and topographical maps (scale = 1:5,000) compiled by the JICA Study Team.



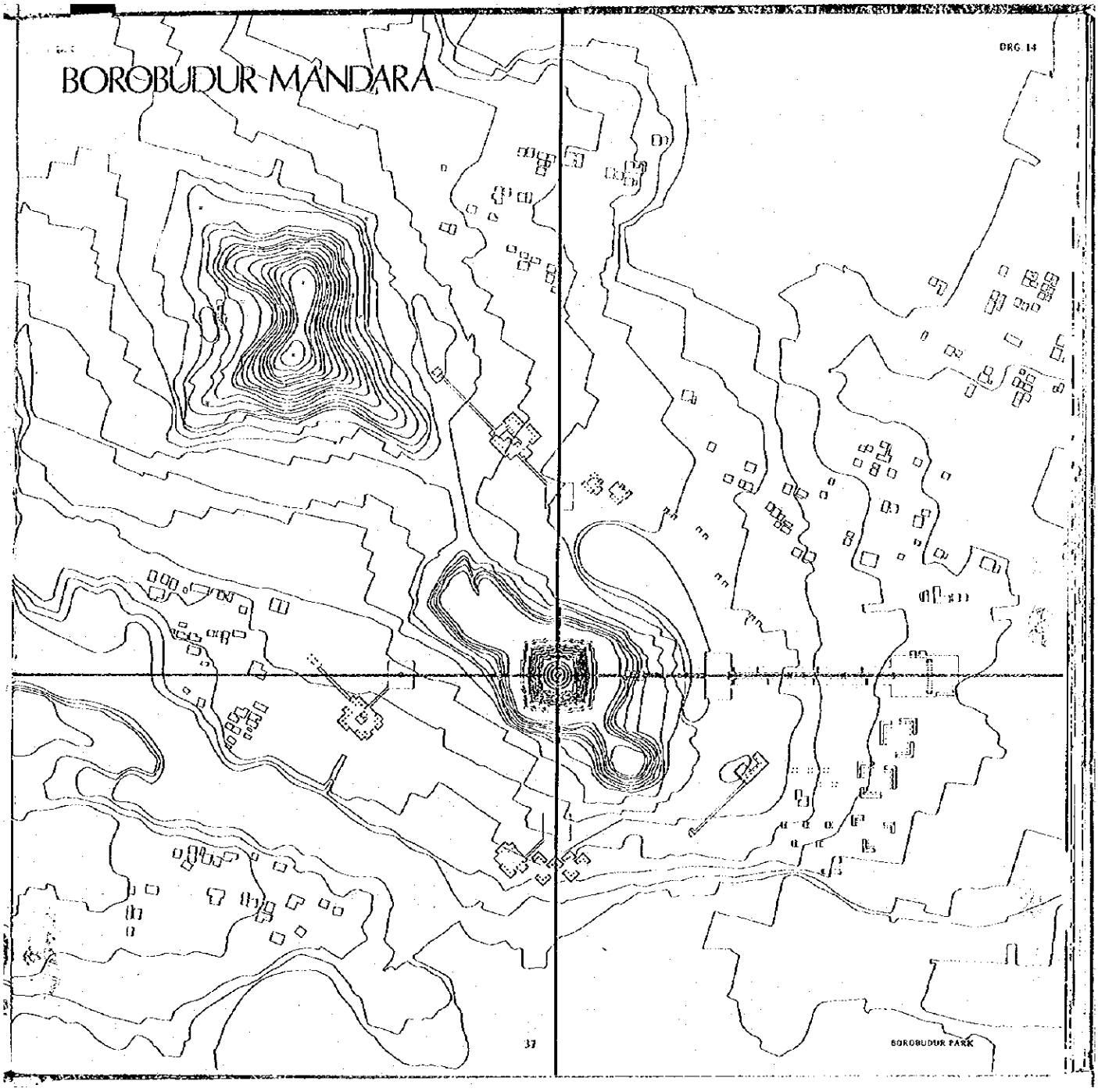
ORG. 13

BOROBUDUR COMPLEX

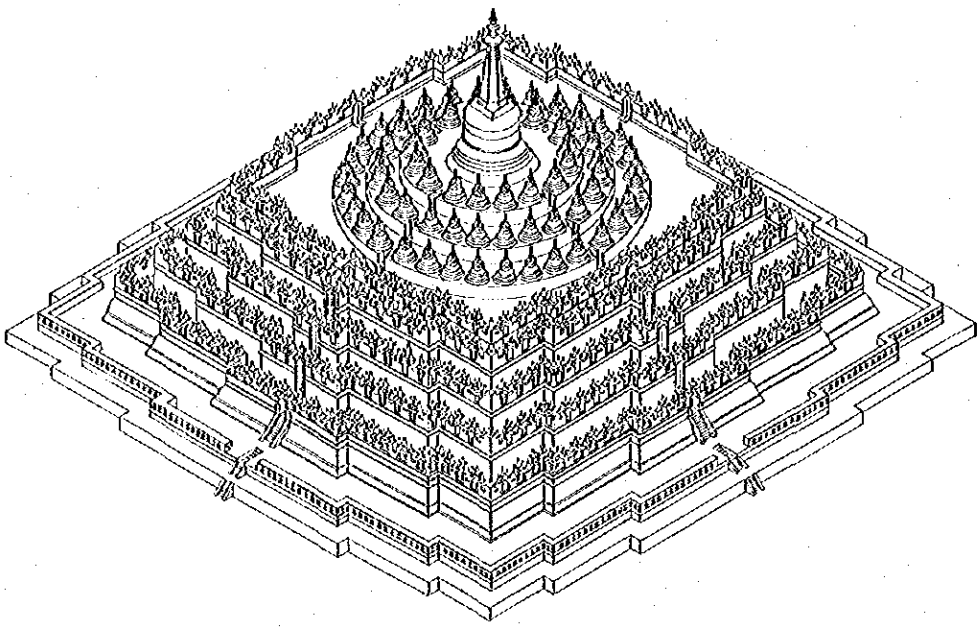
Space Structure Plan



BOROBUDUR PARK


BOROBUDUR MANDARA
BOROBUDUR PARK

CANDI BOROBUDUR



316 Details of Candi Borobudur

Borobudur, the significant Buddhistic and Hindu Javanese artistic remains, built in the late 8th century, located in the basin of Kedu, Central Java.

The monument is built up of more than 55,000 cubic meters of andesite stones standing around the top of the natural hill which was artificially enlarged using heavy soil from the immediate surroundings and forming the outlines of the monument consequently.

Borobudur, built in the form of nine storied step-pyramid, can be divided into a lower and an upper structure.

The lower structure consists of six square terraces; the foundation, some 118 x 118 meters at its bottom; the first, second, third, and fourth gallery and the plateau. Above these are three circular terraces, which are called the first, second, and third terrace respectively. So the plateau forms the transition from the square structure to the circular one.

There is a huge seated bell-shaped central stupa in the center of the third terrace. The pinnacle on its top, now lost, is supposed to rise about 42 meters above the ground level.

Arranged circularly on the upper terraces are 72 hollow, latticed and bell-shaped stupas; 32 on the first, 24 on the second, and 16 on the third terrace. Inside each of them is a stone Buddha image sitting in the Dharma cakra mudra.

All the galleries are bordered on the outside by a balustrade. The inner side wall of each gallery is called the main wall.

The balustrade of each gallery is constructed directly over the main wall of the gallery below it. That is, the upper part of the main wall of the first gallery forms the balustrade of the second gallery.

The balustrade is composed of a long series of independent architectural units called niche-temples, each having in its center a niche which contains a sitting stone Buddha image facing outward.

The total number of the niches is 432; 104 niches on the lowest level, 104 on the second lowest, 88 on the third, 72 on the fourth, and 64 on the top.

In each of the 64 top level niches is a Buddha image sitting in the Varada mudra.

All the other 368 niches can be divided into four groups by the Mudras of the Buddha images contained in them. In each of the 92 niches facing East is a Buddha image in the Bhumisparsa mudra. In each of the 92 facing South, a Buddha image sits in the Varada mudra. A Buddha image in each of the 92 facing West is in the Amitabha Sa, and the images in the 92 facing North, in the Abhaya mudra. All these images are also about 1.3 meters in height. The Buddha images of Borobudur, including those in the latticed stupas on the terraces mentioned above are six in kind and 504 in total number.

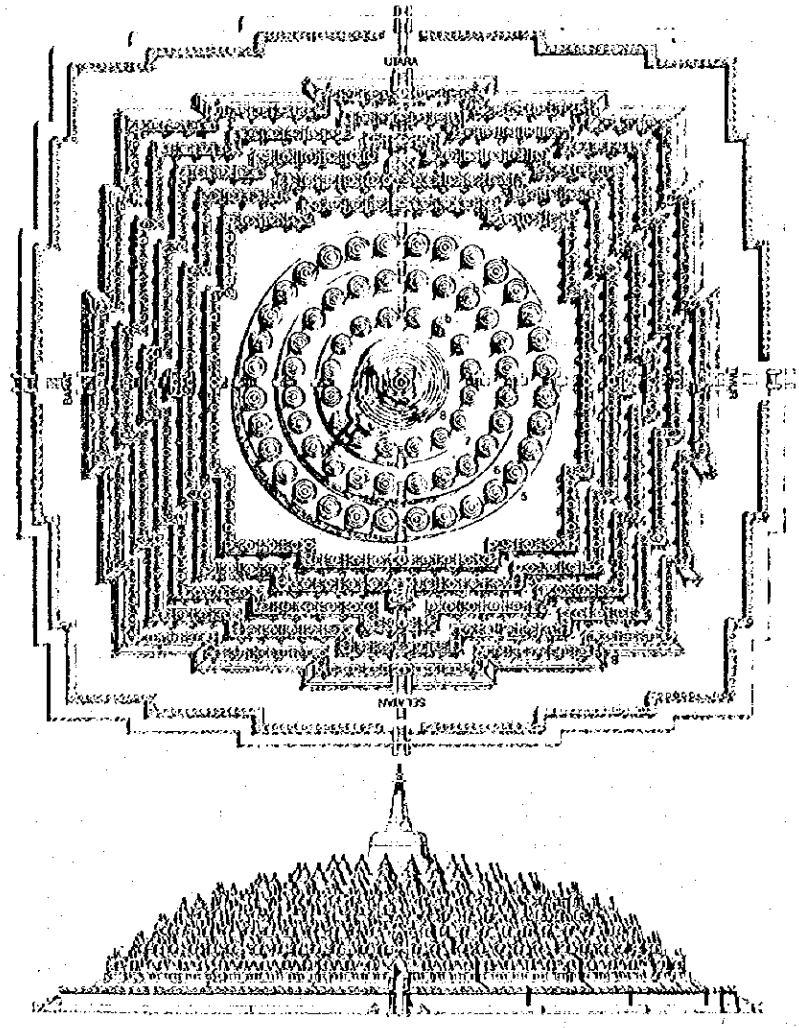
On the main wall of the foundation and the four galleries and on their balustrades is carved one of the largest ensembles bas-reliefs in the world, describing with great mastery the life of the Buddha and many other Buddhistic stories.

Including the series of partly unfinished 160 bas-reliefs on the wall of the so-called "buried foundation", which was discovered in the late 19th century and supposed to be covered with a heavy stone wall before the final completion of the monument, the extent number of the bas-reliefs narrating the Buddhistic texts is 1460 panels all told.

Ornamental carvings both religious imageries are also abundant and add to the beauty of the monument.

As for the drainage of rainwater, a total of 100 gargoyles are installed in the monument. Eighty of them are the ornamental monster heads called "Kala" and inserted in the main wall of the four galleries. Other twenty gargoyles are set up on the main wall of the foundation ornamented with another monster named "Makara" which is also one of the imageries of the Hindu-Javanese carvings.

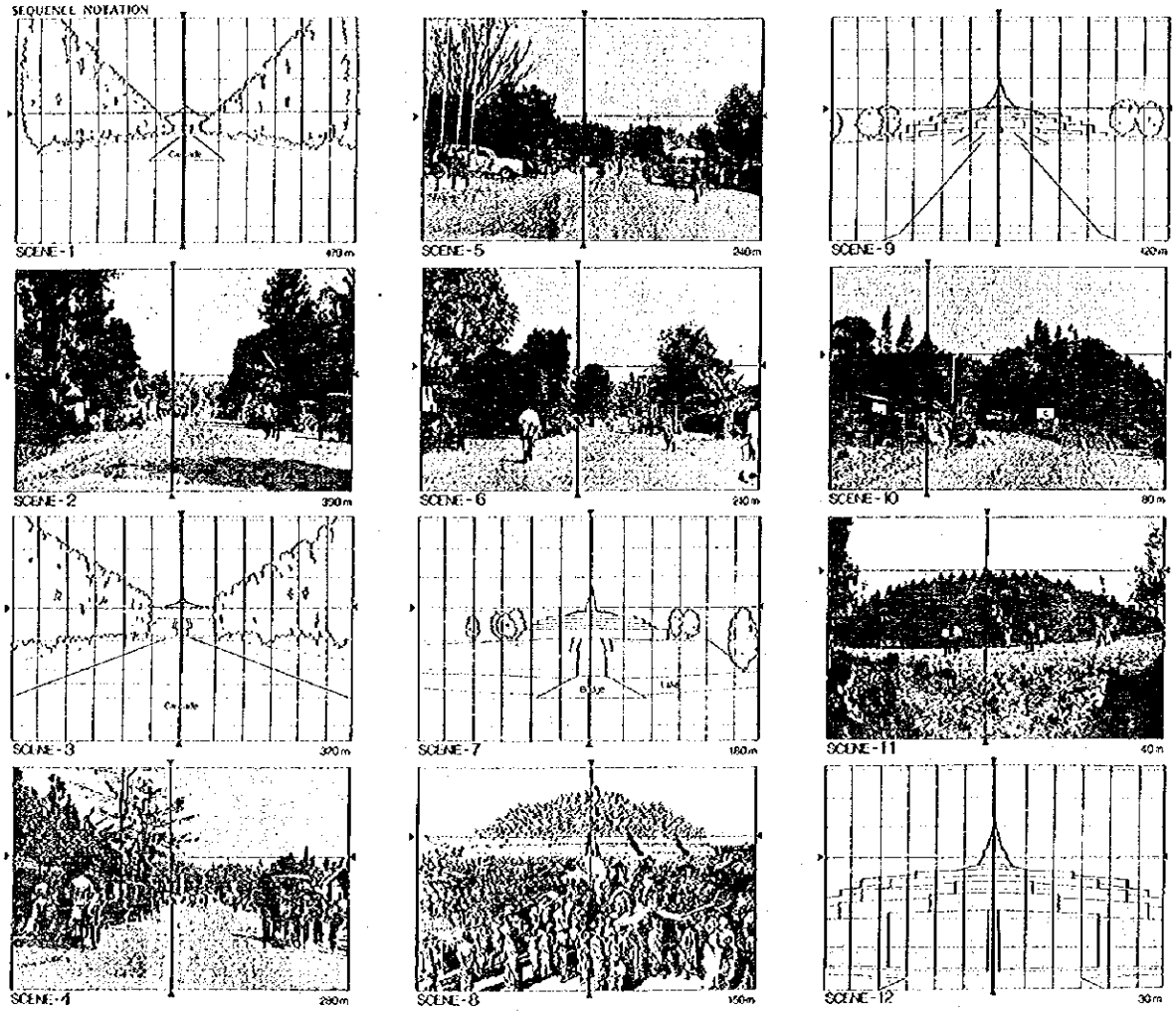
On each of the four sides of the top-pyramid runs up through its center to the top, flights of stairs and gateways framed by the "Kala Makara" ornaments, and through these gateways the visitor gradually proceeds to the higher terraces.

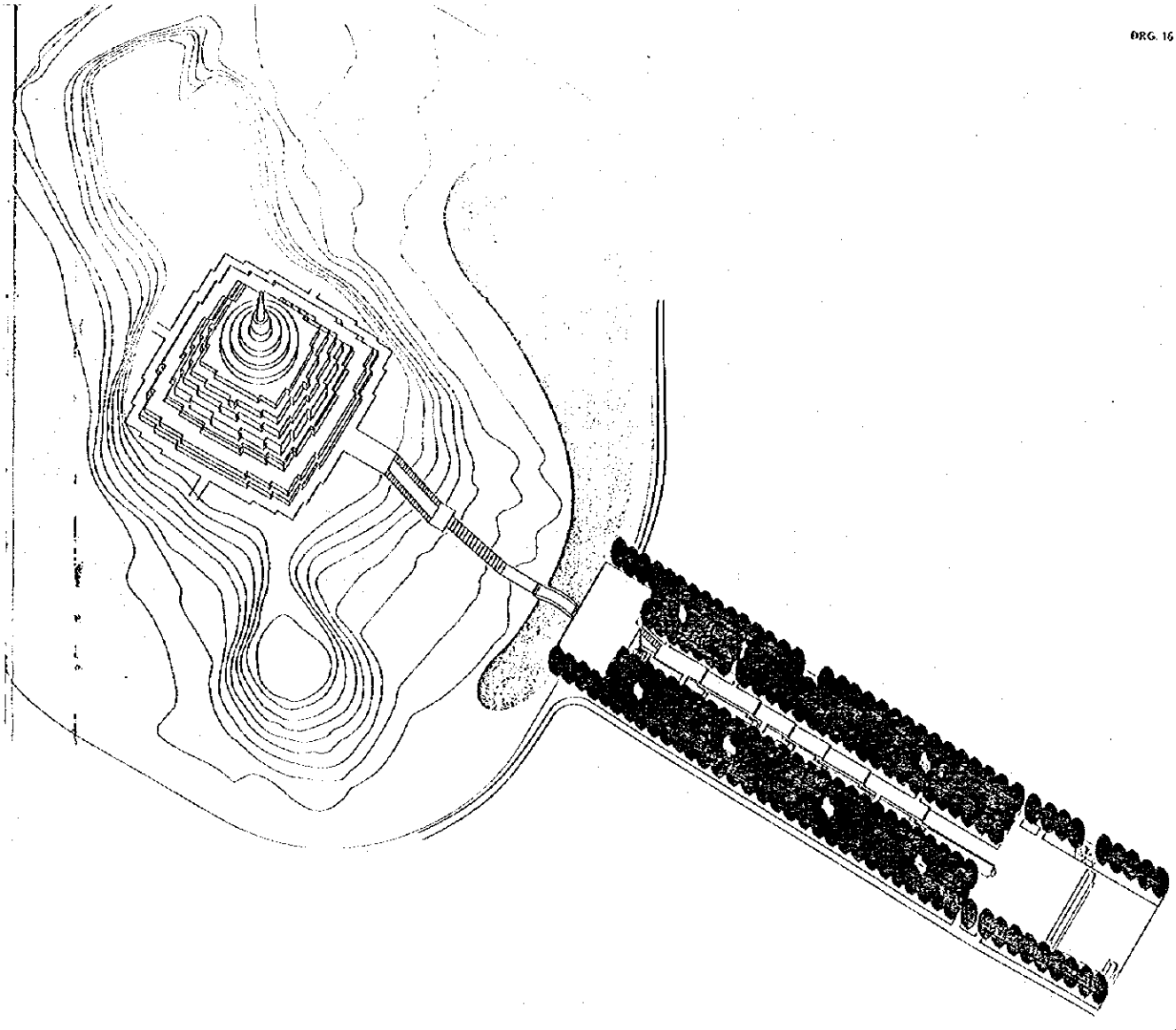


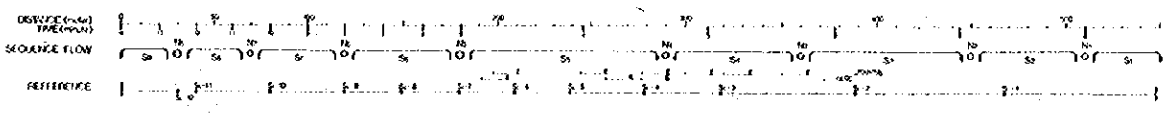
0: Foundation
1: First gallery
2: Second gallery
3: Third gallery
4: Fourth gallery
5: Plateau
6: First circular terrace
7: Second circular terrace
8: Third circular terrace
b: Bell shaped stupa
c: Central stupa

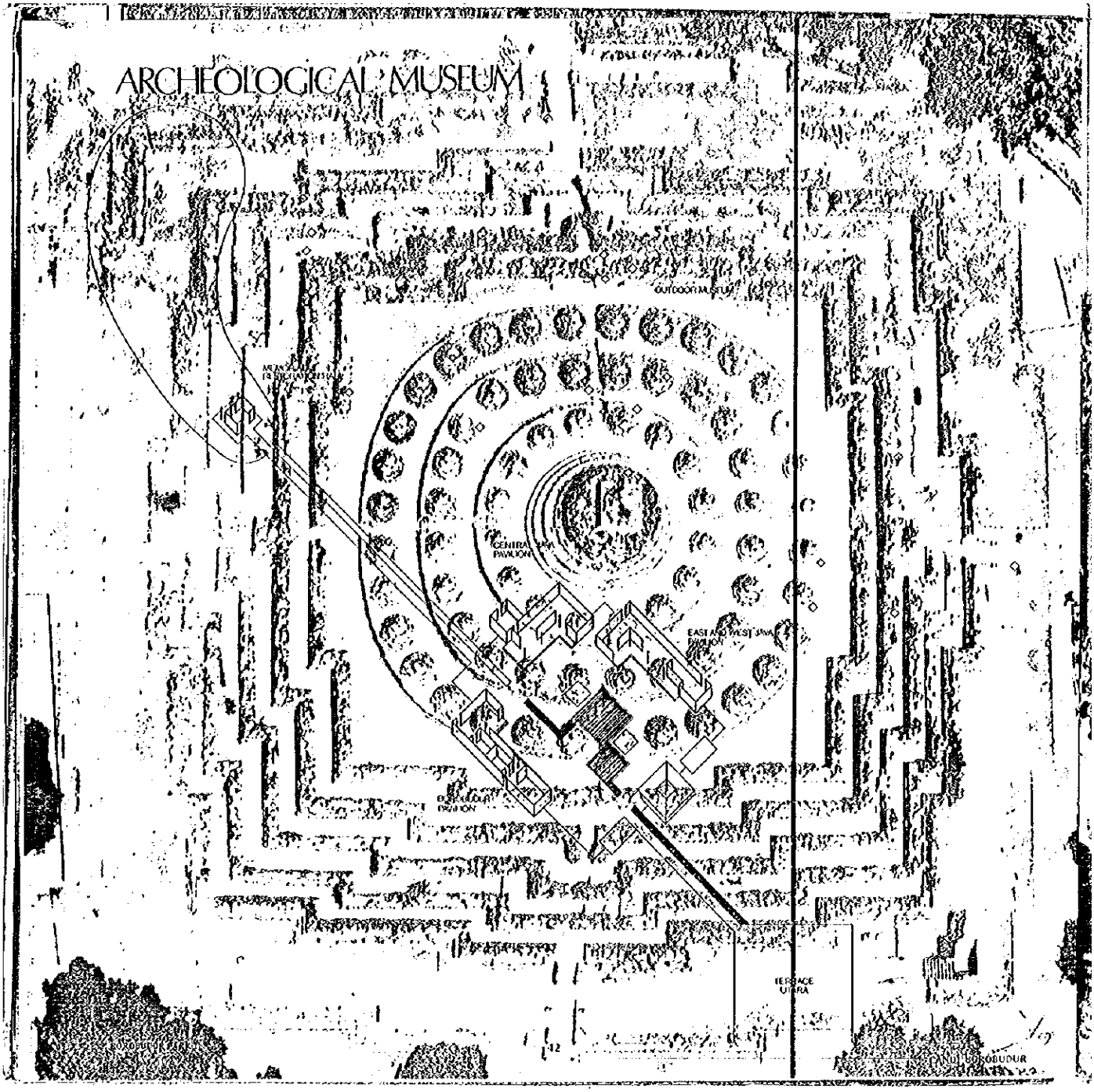
BOROBUDUR CONCOURSE

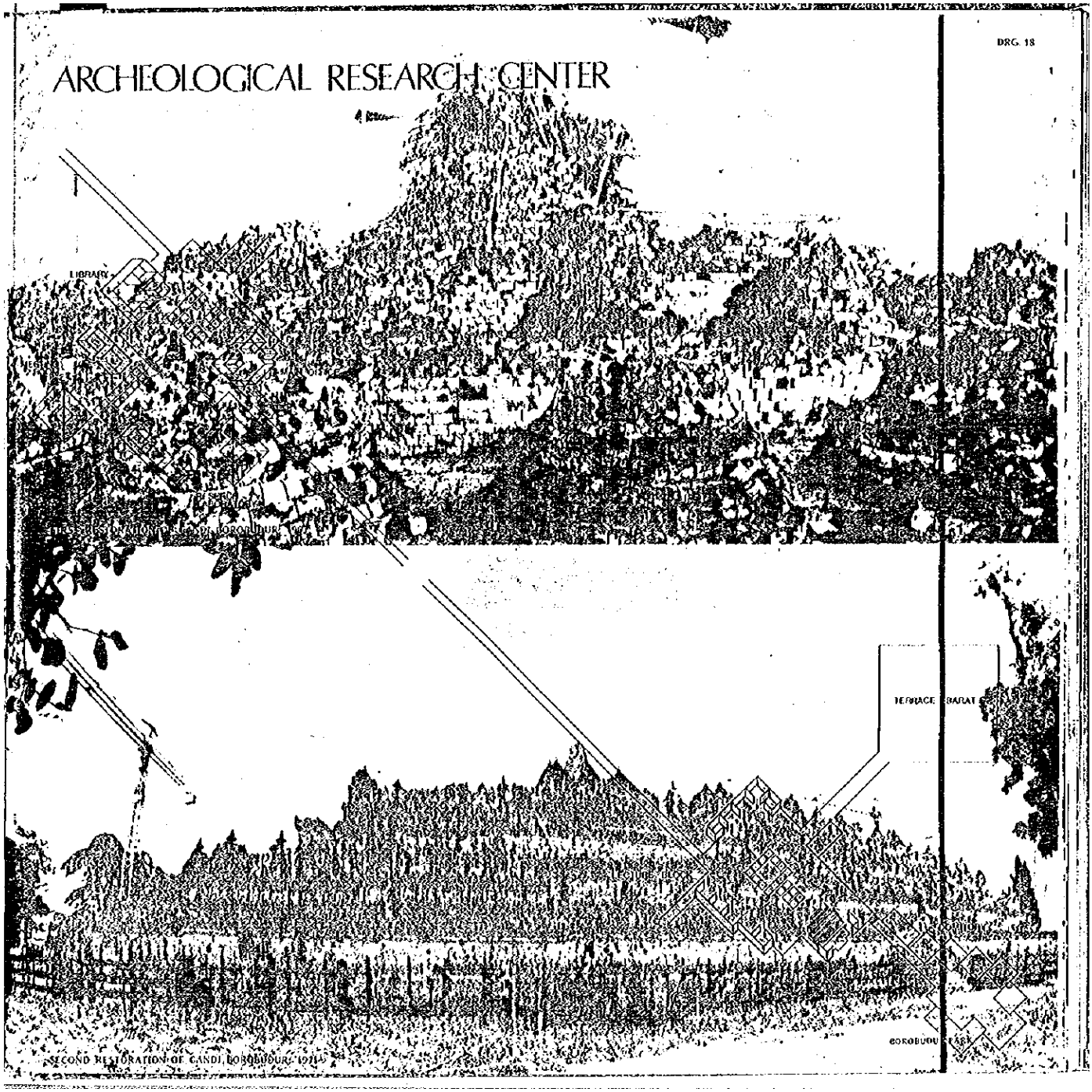
319 SEQUENCE NOTATION






OBSERVER (m/s)
TIME (min)
SEQUENCE FLOW
REFERENCE


ARCHEOLOGICAL MUSEUM
OUTDOOR MUSEUM
CENTRAL PAVILION
EAST AND WEST WING
ENTRANCE PAVILION
TERRACE
UTARA


DRG. 18
ARCHEOLOGICAL RESEARCH CENTER
LIBRARY
TERRACE BARAT
BOROBUDUR PARK
SECOND RESTORATION OF CANDI BOROBUDUR 1973

DAGI HILL PARK

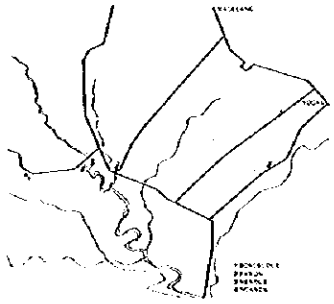
Centering on the 55 meter high Dagi hill, this is an area where visitors, especially families and elementary or middle school students, can rest and play. The park contains a natural zoo of deer, squirrels, and birds, a palm garden with all different palm varieties, and on its peak, the only observation plaza in Borobudur Park.

NATIONAL ARCHEOLOGICAL PARK
BOROBUDUR PARK

Other Sanctuaries

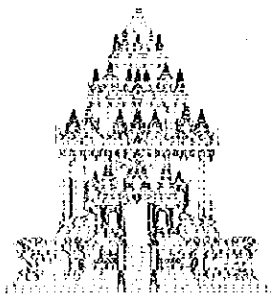
320 BOROBUDUR AND ENVIRONS

Three Buddhist temples (Borobudur, Pawon and Mendut) are situated close to each other about 10 kilometers north of Yogyakarta. They were probably built during the Sailendra dynasty in the second half of the 9th century. The three temples lie in a straight line. The Waisak ceremony is held here every year to celebrate the Buddha's birth, enlightenment and final ascension into nirvana.



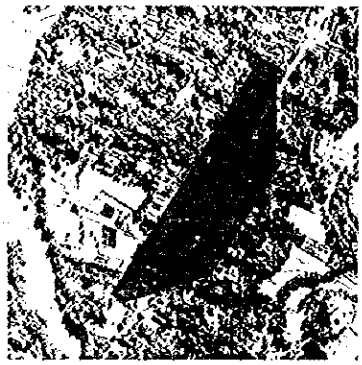
321 CANDI NGAWEN SANCTUARY

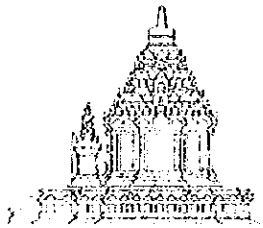
This complex, approximately five kilometers east of Candi Mendut and three kilometers south of the town of Muntilan, consists of five temple-shaped candi facing east in a single north-south line at intervals of 4.4 meters.
Like Candi Mendut, it is thought to have been built between 700 and 800 by King Indra.

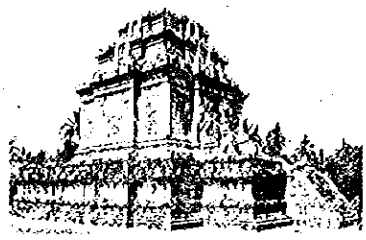


322 CANDI MENDUT SANCTUARY

The Mendut temple is located three kilometers east of Borobudur, and stands alone in an almost empty yeard. The temple is entered from the northwest. Inside the chamber is a three meter high Buddha statue, flanked on both sides by two Bodhisattvas (disciples).

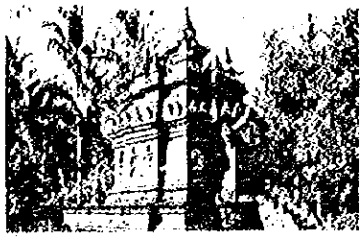






323 CANDI PAWON SANCTUARY

This small temple is located almost halfway between Mendut and Borobudur, on the western side of the Progo River. There is some speculation that it may be the burial place of King Indra of the Sailendra dynasty. The temple was restored early in the 20th century.



CHAPTER FOUR
PRAMBANAN PARK

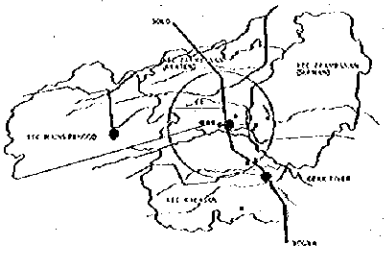
Outline of the Park

SUMMARY

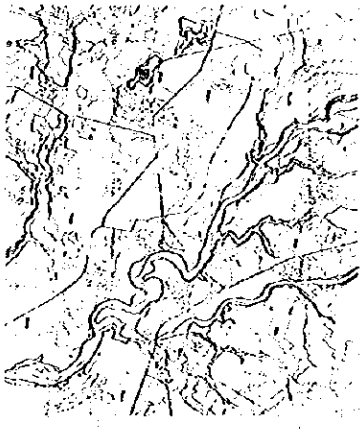
401 Location

This park is situated on the Kewu Plain in both Central Java Province and Yogyakarta Special District. This is a country area approximately 15 kilometers east of Yogyakarta City in Opak River Basin.

The park extends over two kecamatan in Kabupaten Klaten – Kecamatan Prambanan and Kecamatan Manisrenggo – and two kecamatan in Kabupaten Sleman – Kecamatan Prambanan and Kecamatan Kalasan. The designated park area covers a total area of 2,825 hectares within a radius of 3 kilometers from Candi Lara Jonggrang and encompasses fourteen clusters of archeological monuments.



402 Topographical Condition

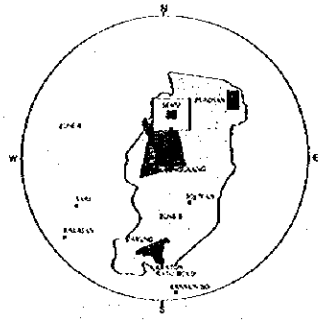


403 Area Designation

– Sanctuary areas (Category-1 zones)	28 ha
– Park development areas (Category-2 zones)	75 ha
– Village improvement area (Zone 3)	641 ha
– Scenery conservation zone (Zone 4)	2,078 ha
Total	2,825 ha

Archeological Monuments to Be Preserved

Candi Lara Jonggrang	Shivaite Hindu	9th Century
Candi Lumbung	Buddhist	9th
Candi Bubrah	"	"
Candi Sewu	"	"
Candi Asu	"	"
Candi Plaosan Utara	"	"
Candi Plaosan Selatan	"	"
Candi Sojiwan	"	"
Candi Dawung	"	"
Kraton Ratu Boko	"	"
Candi Banyunibo	"	"
Candi Sari	"	late 8th
Candi Kalasan	"	"
Candi Sambisari	Shivaite Hindu	8th – 9th



404 Planned Number of Visitors

Year	upper target	lower target
1975	223,833	223,833
1980	722,770	526,050
1985	2,360,500	1,307,761
1990	3,060,073	1,727,133
1995	3,586,132	2,312,347

SKELETON OF THE PARK

405 Zone Designation

The following ten areas will be designated as sanctuary areas (Category-1 zones).

– Candi Lara Jonggrang Sanctuary	15.2
– Candi Lumbung Sanctuary	0.3
– Candi Sewu Sanctuary[1]	50.2
– Candi Plaosan Sanctuary[1]	11.3
– Candi Sojiwan Sanctuary	1.0
– Kraton Ratu Boko Sanctuary	2.5
– Candi Banyunibo Sanctuary	1.0
– Candi Sari Sanctuary	1.0
– Candi Kalasan Sanctuary	1.0
– Candi Sambisari Sanctuary	1.0

[1] Both of these sanctuaries will be reserved areas for future annexation.

The following three areas will be designated as park-development areas (Category-2 zones).

– Lara Jonggrang Complex	59.4
– Pegat Plateau Park	13.0
– Park Road	2.8

The entirety of the following five desa with the exception of those parts represented by Category-1 and Category-2 zones will be designated as a village improvement area to which a use zoning regulation will be applied (Zone 3).

– Desa Bugisan in Kecamatan Prambanan: Klaten
– Desa Blogo in " "
– Desa Kebondalem Kidul in " "
– Desa Pereng in " "
– Desa Bokoharjo in Kecamatan Prambanan: Sleman

The areas within a 3 kilometer radius of Candi Lara Jonggrang will be designated as a scenic conservation zone to which scenic regulation will be applied (Zone 4).

406 Development Cluster

Lara Jonggrang Complex
An 44 hectare area around Candi Lara Jonggrang will serve as the core of this park and as such will have environmental improvements made and be given an intensive facility distribution.

Pegat Plateau Park (Kraton Hill)
Kraton Ratu Boko is located on the northern extreme of the Pegat Hills. From it, one can view panoramically at a distance a large number of archeological monuments centering on Lara Jonggrang as well as the majestic volcanic Mt. Merapi farther in the background. Visitors standing on this plateau will be carried back ten centuries in their imaginations to a civilization of the past. On the extension of the Merapi-Lara Jonggrang axis on this plateau will be located a terrace-shaped observation square, a festival plaza, and so on, with nighttime floodlighting of the monuments and other illumination serving as an additional attractive element. Coupled with the performances of the Ramayana Theater below, warrior dances and festivals will be held here against such magnificent background scenery.

Park Road
This road will connect the Lara Jonggrang Complex and the Pegat Plateau Park.

Excursion Routes
-- Route Timur (Sewu and Plaosan)
-- Route Selatan (Sojiwan, Ratu Boko, Banyunibo)
-- Route Barat (Sari, Kalasan, Sambisari)

Access Road
The existing national road will be improved and widened for use as an access road.

PRAMBANAN COMPLEX

Prambanan Complex, which will serve as the core of this park, will have the compositon shown in the following components.

407 Service Area
This area represents the entrance of the Complex. In it will be located a terminal, parking space, other gate facilities, management facilities, restaurants, kiosks, etc.

408 Lara Jonggrang Sanctuary
The Candi Lara Jonggrang used to have the following arrangement:

- Inner Square (110m x 100m)
- Second Compound (222m x 222m)
- Third Compound (390m x 390m)

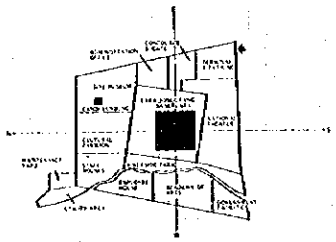
Although only the Inner Square and Scond Compound are still in existence, the Third Compound will re-emerge as a sanctuary on the basis of historical facts, and this sanctuary will serve as a symbol of the compound's past majesty. Access will be from the east frontal side by way of the water promenade. In the Third Compound sacred trees will be geometrically arranged in resemblance to candi perwara. Visitors will be gradually led to a lofty space as they watch the magnificent tower of Candi Shiva. After spending some time in the tree shade of the Inner Square, they will leave the sanctuary by way of one of the three exit gates for their next destination.

409 Ramayana Theater
The existing amphitheater will be remodelled to form a large amphitheater and a medium-sized and a small theater, which together will constitute a national theater for Ramayana and other performances and even "son et lumiere" spectacles.

410 Academy of Arts
A National Academy of Arts will be established as a research and educational facility for the preservation of traditional performing arts and cultural assets.

411 Cultural Pavilion/Site Museum
A National Pavilion will be built which will be used for a diversity of cultural activities, including public display of traditional art and industrial art products and exhibitions. Furthermore, a site museum will be set up in the vicinity of Candi Lumbung.

412 Prambanan Complex



FACILITIES IN THE PARK

413 Theme Facilities

The following public facilities will be situated in Prambanan Park.

- Archeological Institute
  This is an institute in Central Java Province attached to the General Directorate of Archeology of the Ministry of Education and Culture. It will be removed from its present location within the Lara Jonggrang site. It is in charge of survey and excavation, scholarly research, designation, preservation, maintenance and control and repair and restoration of archeological cultural assets of the area.

- Cultural Institue
  This will be a newly established local agency of the Ministry of Education and Culture for the purpose of preserving the Hindu-Javan culture and passing it on to future generations.

  It will engage in the following activities in connection with the preservation and utilization of intangible cultural assets:

  - Survey and research
  - Designation of cultural assets
  - Training of people to pass on arts in danger of passing out of existence
  - Public displays and performances
  - Records and distribution of information

  It will also engage in the following activities in connection with the preservation and utilization of tangible cultural assets:

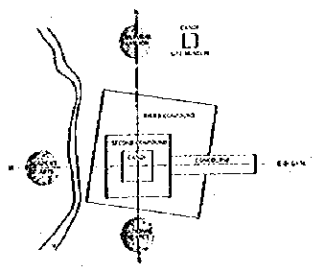
  - Survey and research
  - Designation and purchase of cultural assets
  - Preservation and control
  - Public display
  - Records and distribution of information

- Academy of Arts
  This will be an educational facility attached to the Cultural Institute for the purpose of continuation of traditional culture of the Java area. A wide range of arts will be covered, including music, theater, dance and other performing arts and fine arts and industrial arts. Efforts will be made to preserve such traditional culture through the training of persons to carry on the traditions in a proper fashion. Furthermore, this facility will serve as a core for cultural exchanges with other countries.

- Ramayana Theater
  The existing Ramayana theater will be remodelled as a facility attached to the Cultural Institute for multipurpose use, including national cultural events, regular public performances of traditional performing arts, and art festivals. This facility will contribute to the continuation of Javan culture along with the Cultural Institue and the Academy of Arts.

- Cultural Pavilion
  Also attached to the Cultural Institute, this facility will be used for a variety of cultural activities, including public exhibition exhibits and art exhibits of traditional art and industrial arts.

414 Lara Jonggrang Sanctuary



415 Auxiliary Facilities

- Gate Facility
  Functioning as the gateway to Borobudur Park, this is to be composed of a gate plaza, traffic terminal, parking area, visitor center, and park admission offices.

- Lara Jonggrang Concourse
  This is the broad passage 250m long and 60m wide stretching from the gate to the Candi Lara Jonggrang second compound. With its vast central pond reflecting the silhouette of Candi Shiva, it introduces visitors to this historical area.

- Service Facility
  Restaurants, chop-houses, kiosks, passars and the like are to be situated near the gate to meet the rest, refreshment, and shopping needs of visitors.

- Staff and Employee Housing
  It is planned to build 65 residential units to house park staff and employees and their families.

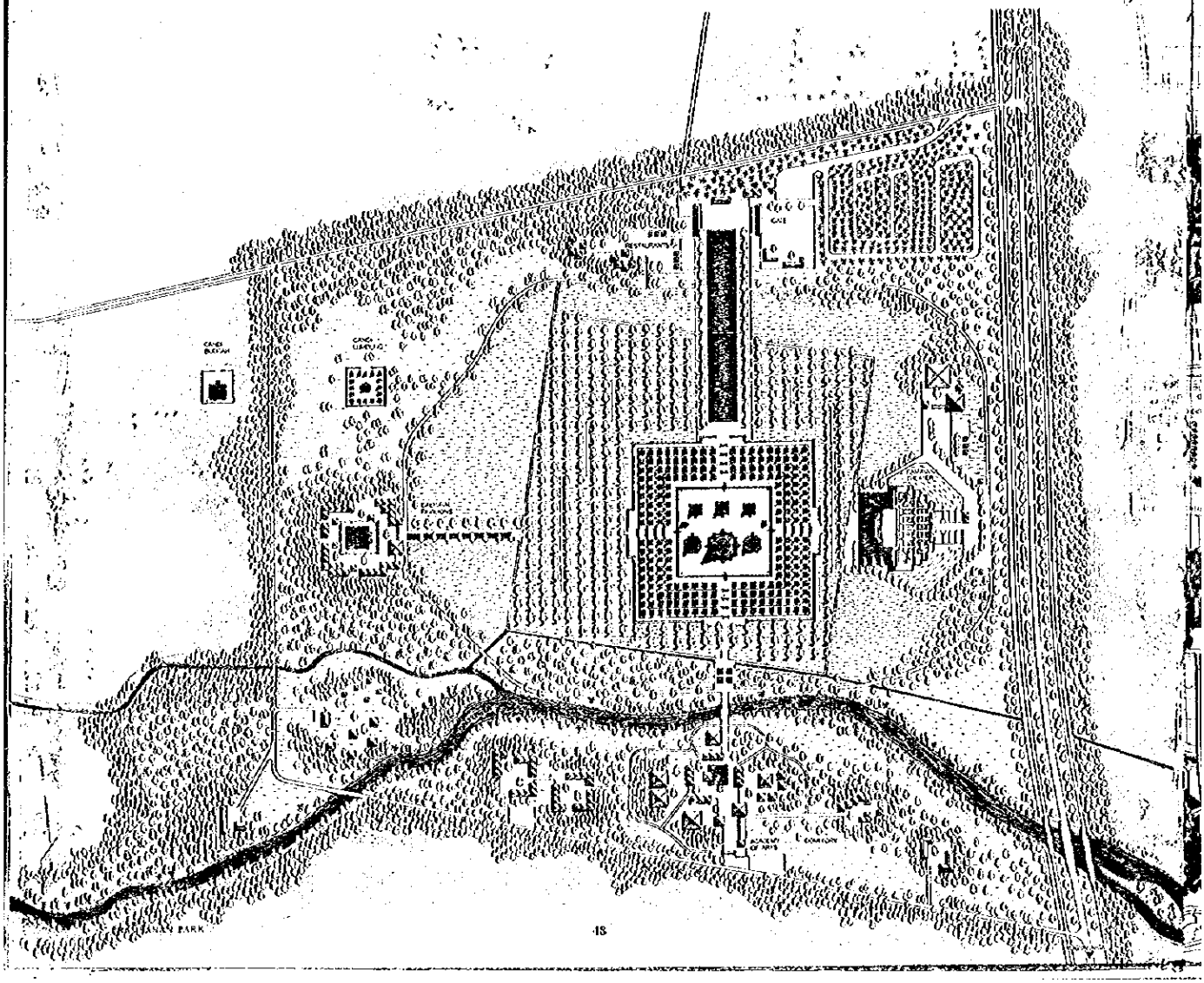
- Operation Facility
  Housing both the Park Development Corporation office and government agency offices, this is to function as the central facility for the operation and management of the park.

NATIONAL ARCHEOLOGICAL PARK

PRAMBANAN COMPLEX

DRG. 20

Illustrative Master Plan

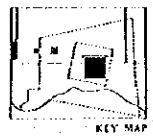


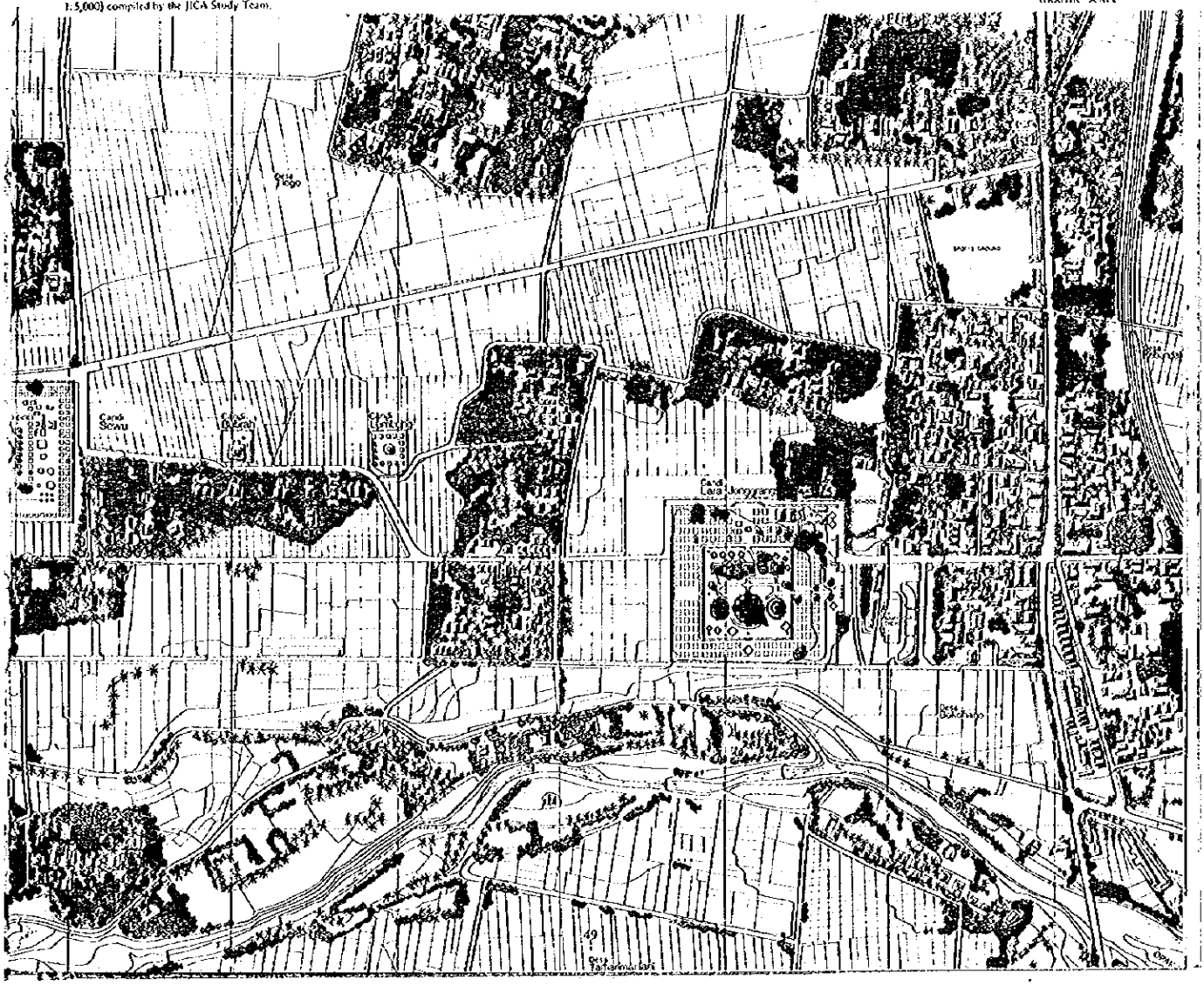
ORG. 21

PRAMBANAN AREA

Existing Condition

Data sources
Information concerning natural conditions was derived from aerial photos (scale = 1:6,500 ~ 5,000) provided by the government of Indonesia and topographical maps (scale = 1:5,000) compiled by the JICA Study Team.

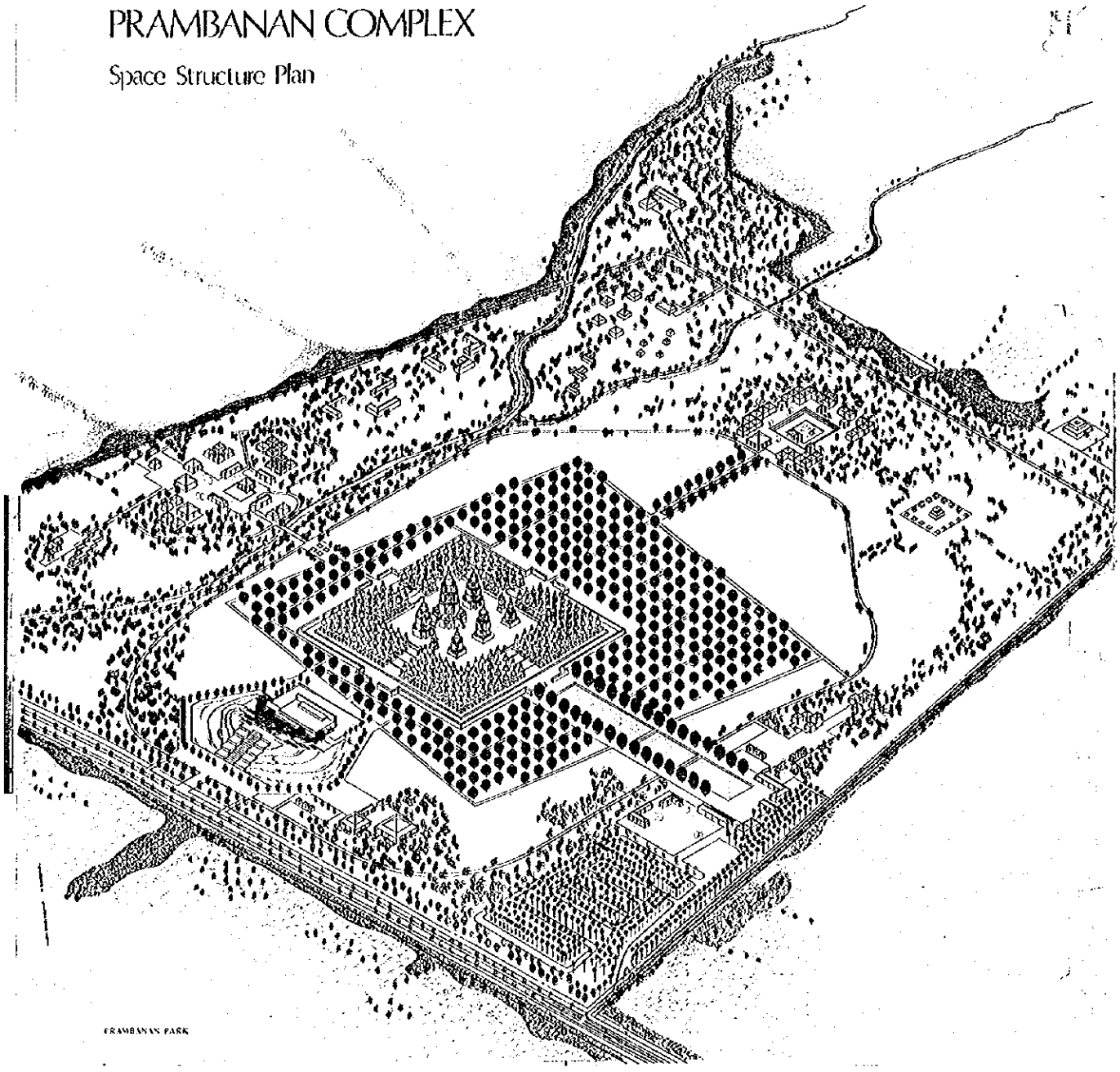




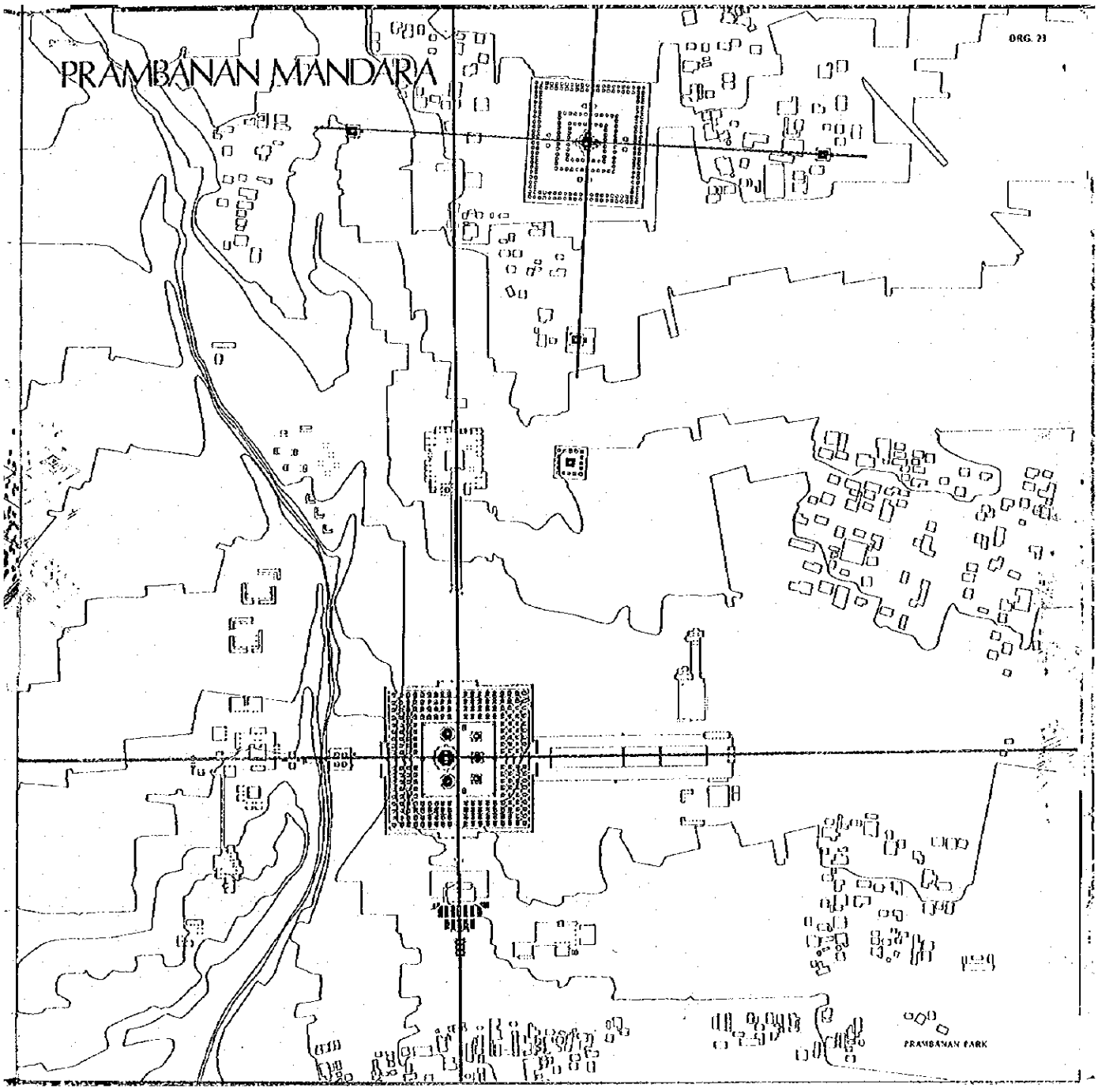
DRG. 22

PRAMBANAN COMPLEX

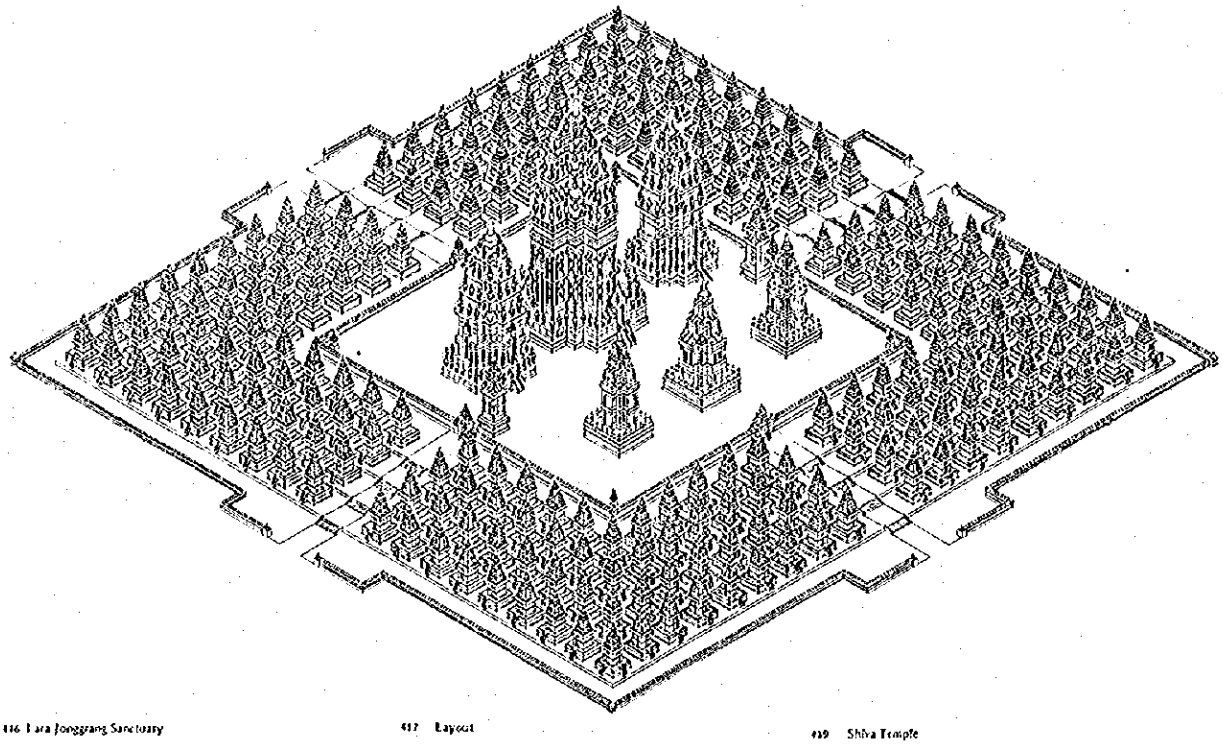
Space Structure Plan



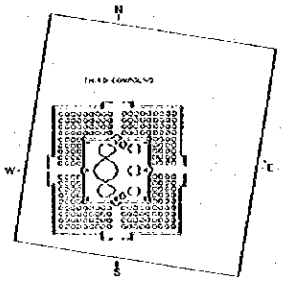
PRAMBANAN PARK


PRAMBANAN MANDARA
ORG. 23
PRAMBANAN PARK

CANDI LARA JONGGRANG



436 Lara Jonggrang Sanctuary



437 Layout

The complex was originally divided by walls into three compounds containing 240 separate temples and shrines. The inner square (110 x 100 m) contains eight main temples and eight small shrines. The second compound (272 x 222 m) is built at a lower level and bordered by walls on all sides. It now contains a massive jumble of stone blocks, the ruins of 224 minor temples (candi perwara). Only two have been restored. At one time there was a third compound (390 x 390 m) at ground level, on which stood living quarters for priests and pilgrims. These buildings were made of perishable materials and have since rotted away.

438 Inner Square

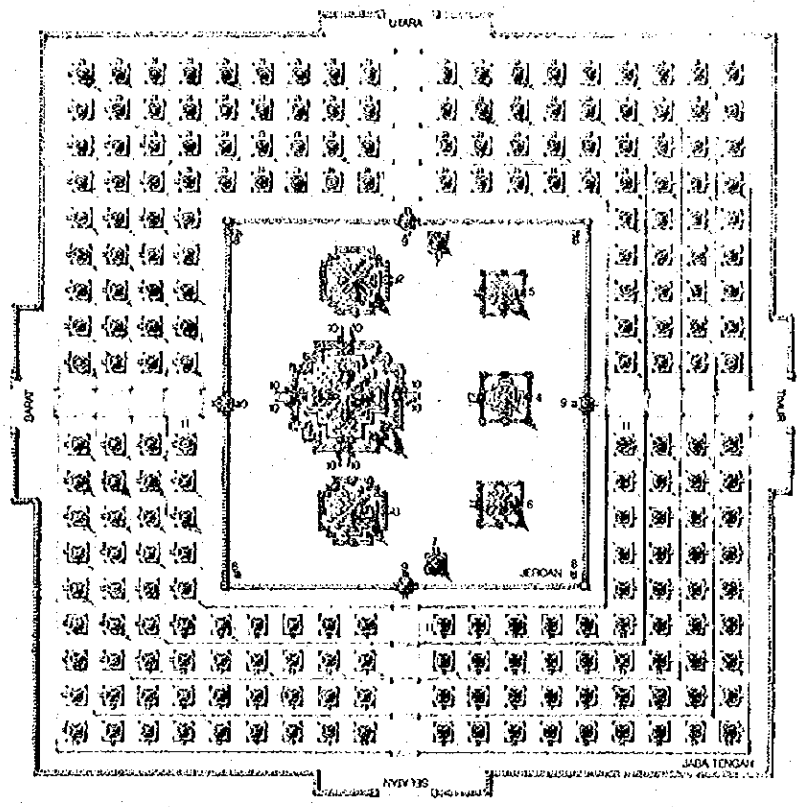
The three largest temples stand on the western side: the Shiva temple flanked on the north by the Vishnu temple and on the south by the Brahma temple. All face east. On the opposite side of the square stand three smaller temples facing west. These were previously called the Candi Wahana, but this is now believed to have been a misnomer. In fact only the center temple which contains a statue of Shiva's vehicle, the bull Nandi, fits this description. Finally there are the two Candi Apit, one at the northern and the other at the southern entrance.

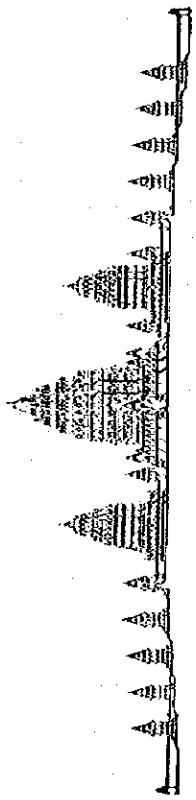
439 Shiva Temple

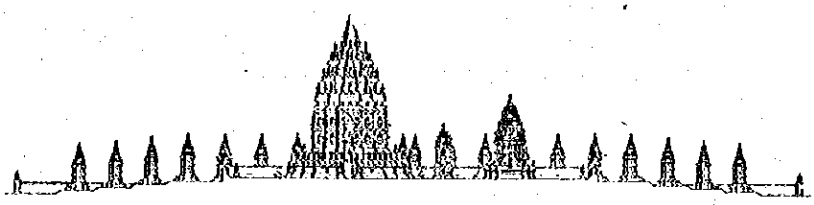
Prambanan is dominated by the mighty Shiva temple, towering almost 50 meters high. The four entrances are flanked by two small shrines called the Candi Menara Sudut. One of these contains the most sacred spot of the whole complex. It stands just south of the eastern entrance, and is unique in having an open front. The interior contains a pattern of stones on which lines have been etched indicating the sacred spot.

The main entrance is from the east. At the top of the steps a balustrade runs off to each side, framing the main body of the edifice. The walls of the balustrade are carved with 42 scenes from the Ramayana epic. A further 30 scenes are depicted on the balustrade of the Brahma temple.

The main body of the temple contains one chamber and three cells. The chamber faces east and houses a three meter high statue of Shiva in regal dress. He has four arms, and his head dress consists of a skull and a lunar crescent. In the northern cell stands a statue of the goddess Durga in the act of killing a bull demon. A popular folk-tale has given this figure a second name, that of the legendary Princess Laradjonggrang, daughter of King Ratu Boko.



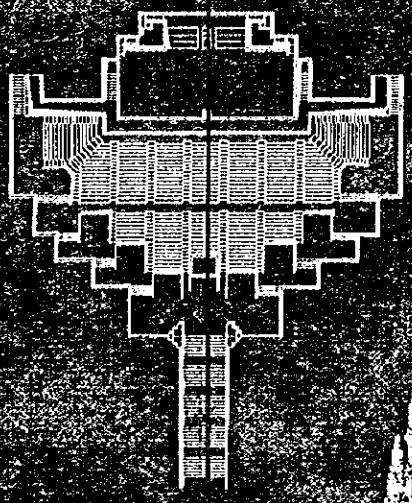


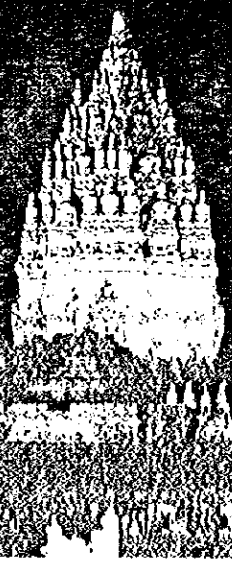


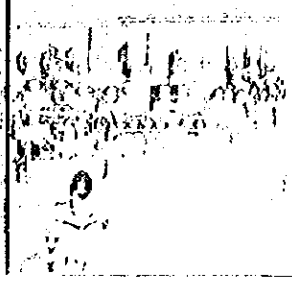
1: Siwa
2: Wisnu
3: Brahma
4: Nandi
5: A
6: U
7: Apit
8: Sudut
9: Kelir
10: Menara sudut
11: Pemara

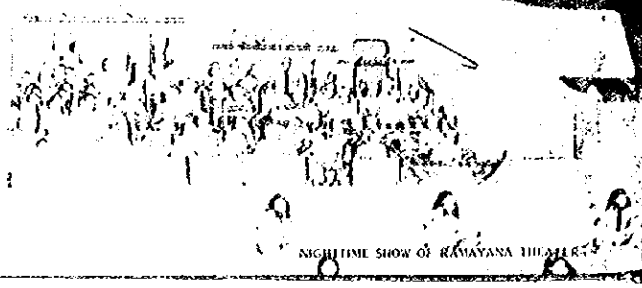
RAMAYANA THEATER

DRG. 25

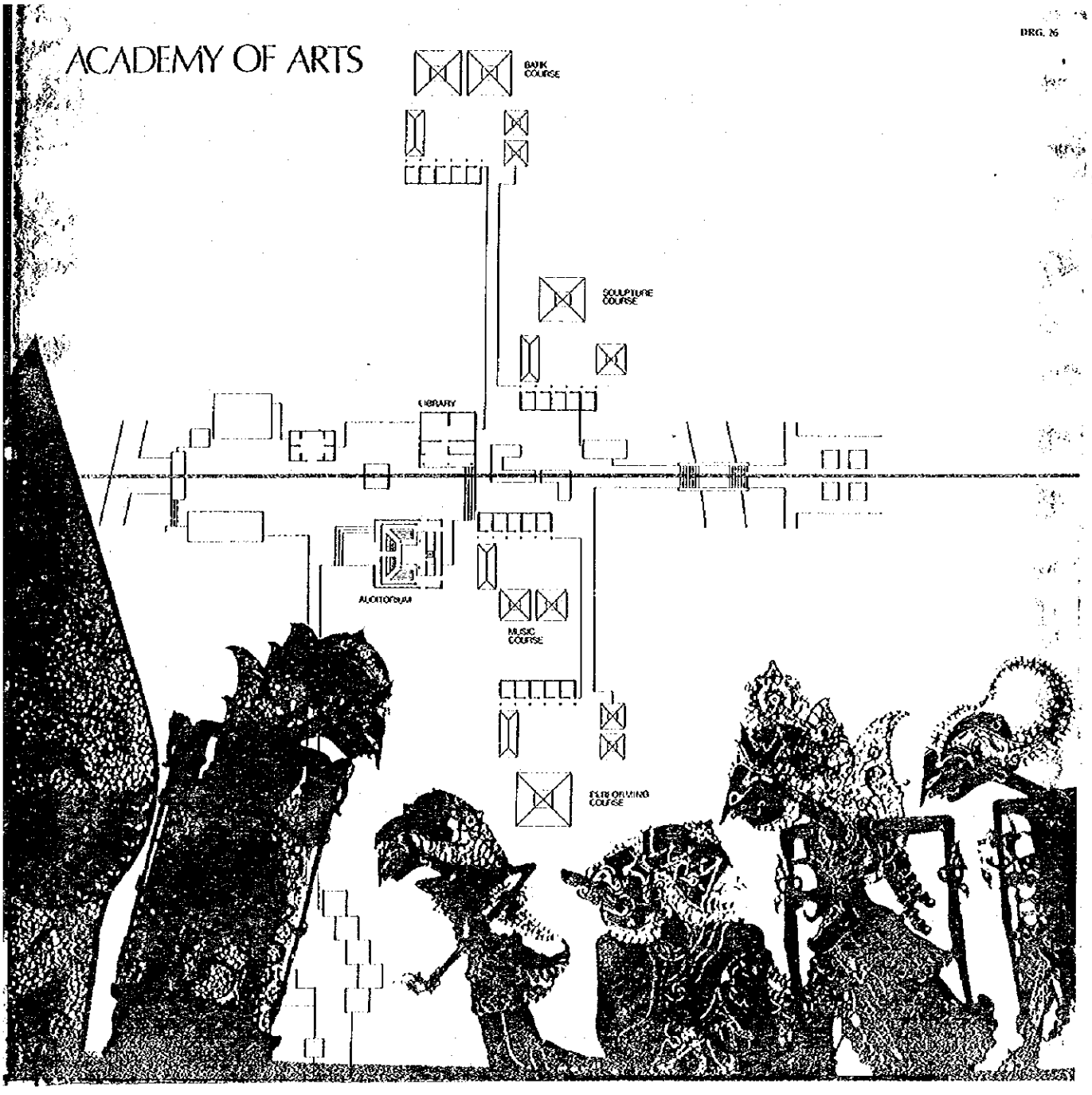








NIGHTTIME SHOW OF RAMAYANA THEATER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SCULPTURE COURSE
LIBRARY
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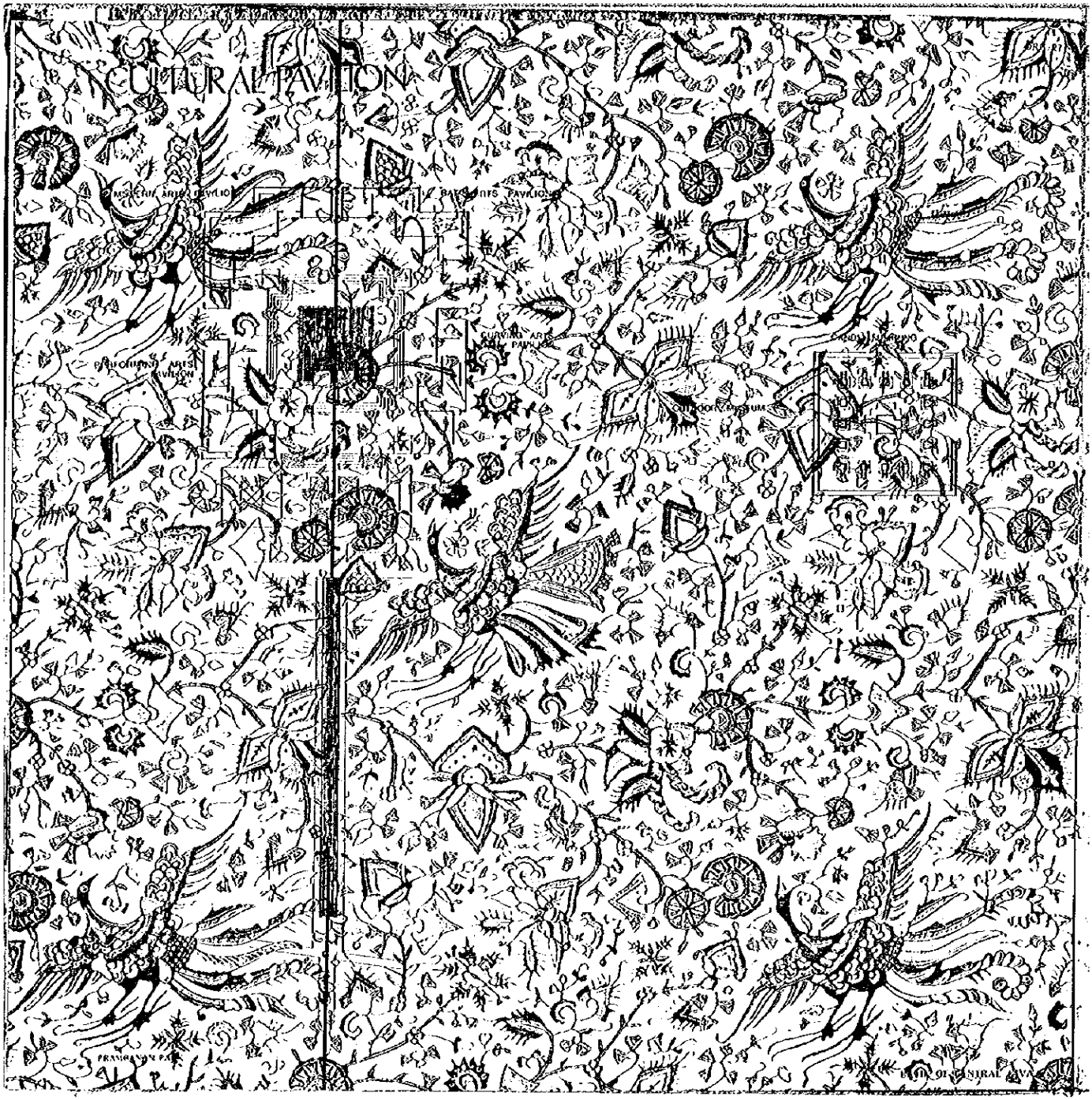
MUSIC COURSE
PUBLISHING COURSE


CULTURAL PAVILION

DRG. 28

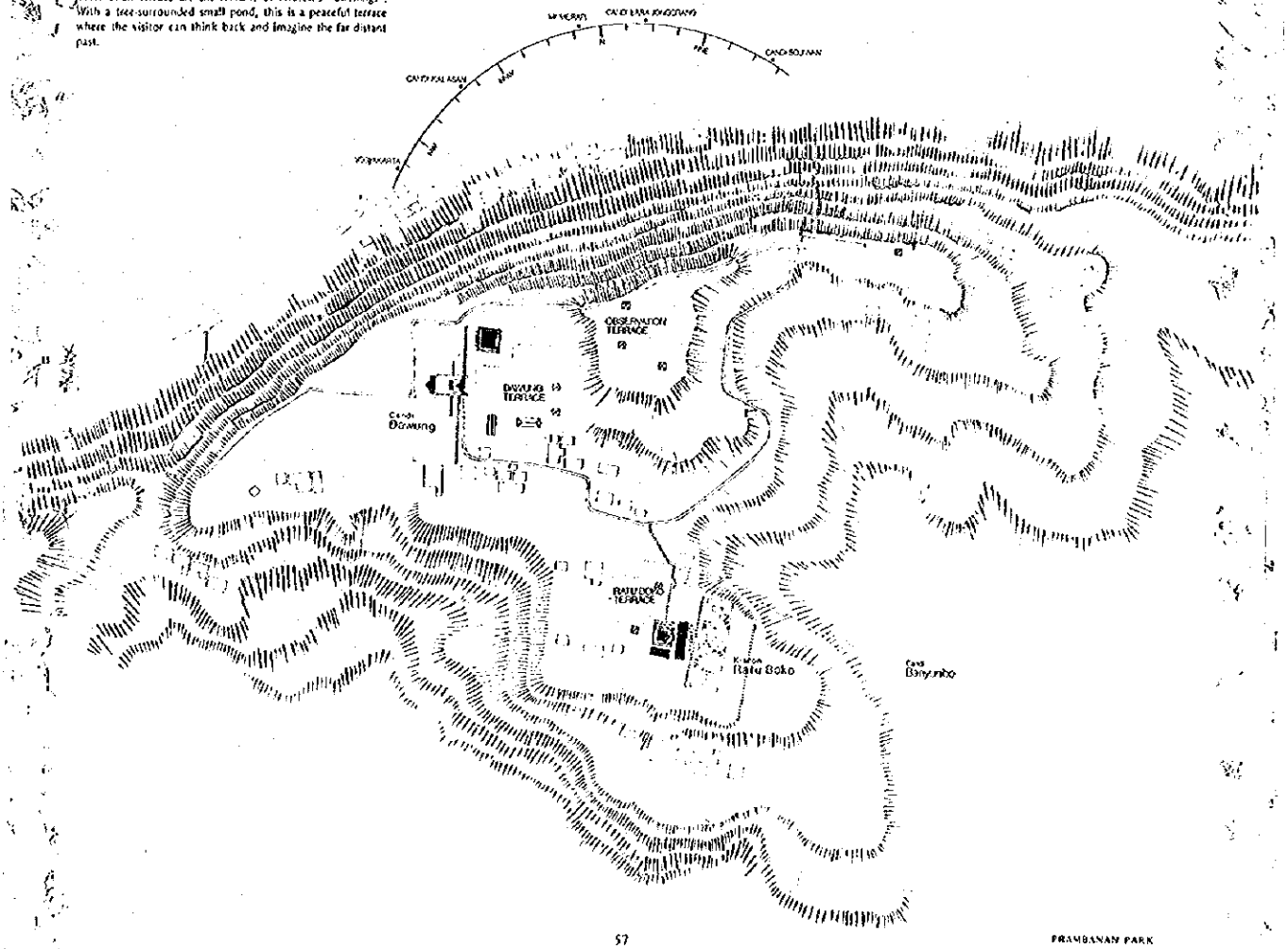
KRATON HILL PARK

This area, centering around Kraton Ratu Boko on the north side of Pegat Hill, consists of the following three terraces.

Dawung Terrace -- equivalent to the entrance to the park, this terrace includes a hall of historical materials on Kraton, chop houses, kiosks, rest rooms, summer houses, etc.

Observation Terrace -- at the peak, this terrace about 20 meter above the entrance terrace offers a panoramic view of the Kewu Plains with Mt. Merapi in the background and of the Candi Lara Jonggrang.

Ratu Boko Terrace -- down the gentle grassy slope from the observation terrace are the remains of Kraton's "dwellings". With a tree-surrounded small pond, this is a peaceful terrace where the visitor can think back and imagine the far distant past.



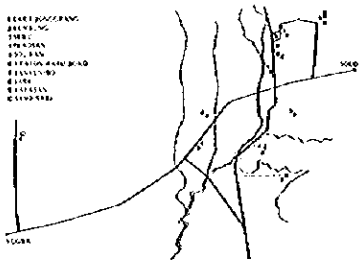
NATIONAL ARCHEOLOGICAL PARK

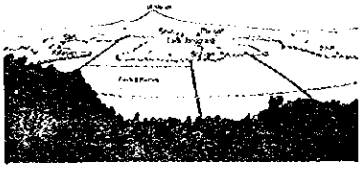
PRAMBANAN PARK

Other Sanctuaries

420 PRAMBANAN AND ENVIRONS

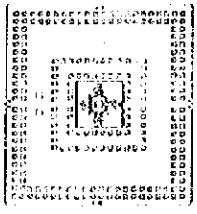
The area, which is crossed by the main road to Surakarta, lies 15 – 20 Kilometers east of Yogyakarta. The largest temple complex is Prambanan (Shivaite), surrounded by a scattering of mostly Buddhist temples date from the 8th – 9th century.

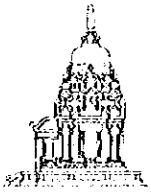




421 CANDI SEWU SANCTUARY

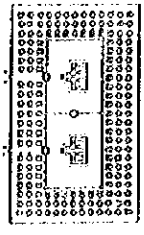
Two giant Dwarapala Demon statues guard each of the four entrances. The interior is a landscape of half-ruined temples and heaps of stone blocks. There were once 245 temples and shrines here; practically all now in ruins.

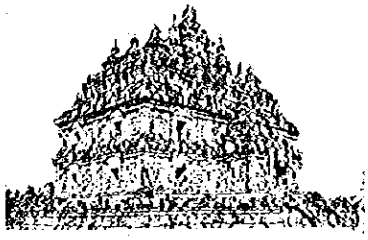




422 CANDI PLAOSAN SANCTUARY

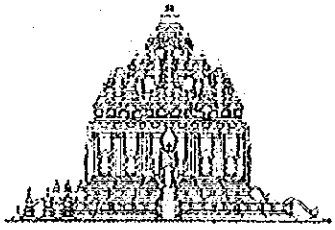
There were once 175 temples and shrines on this site. The two main temples seem to have been used as priests' living quarters. Restoration work on the southern temple was completed in 1960.

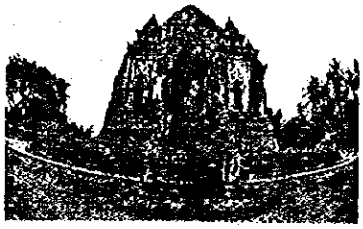




423 CANDI KALASAN SANCTUARY

There does not appear to have ever been a gravepit beneath the temple, which was probably used for purely devotional purposes. The temple's present exterior is not the original, but the result of a later renovation. Buddhist, late 8th century.



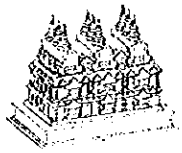


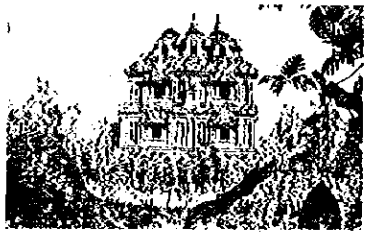
424 CANDI BANYUNIBO SANCTUARY

Access to this site is difficult. Continue on from Kraton Ratu Boko and turn left after about one kilometer. A rough road leads to the village adjoining the site. The temple, clearly visible from a distance, is slightly south of the village, on the far side of a gully. Buddhist, 9th century.

425 CANDI SARI SANCTUARY

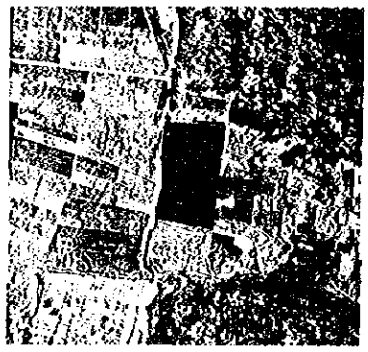
As well as serving as a place of worship, this edifice seems to have been used as a dormitory for priests. The living quarters were probably on a second level.





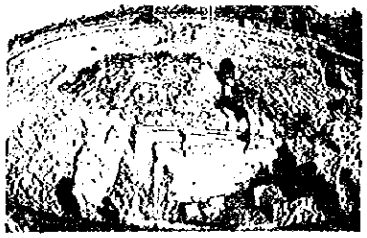
426 CANDI SOJIWAN SANCTUARY

Turn south at the signpost on the eastern outskirts of the town of Prambanan; continue for a couple of kilometers. The site is just east of the village of the same name. Buddhist, 9th century.



427 CANDI SAMBISARI SANCTUARY

The site is still being excavated. Several meters of black volcanic ash and sand have covered up the original edifices. Shivaite (?). 8th – 9th century.



CHAPTER FIVE
VILLAGE PLAN

General

501 DESCRIPTION OF THE VILLAGE STUDY

This study deals with those problems arising from park development and affecting villages within the areas designated for the two national archeological parks, concentrating on the development and ordering of the physical village environment.

Coordination of Requirements
Park development will have a major impact upon the village environment in the vicinity. Two sets of requirements must be satisfied for the creation of these national archeological parks: (1) those demanded of surrounding villages by the parks and (2) those relating to independent village improvements. The village plan policy is set harmonizing these two sets of demands.

Village Improvement Policy
The village improvement policy is established based upon mentioned above, and utilizing landuse planning methods. This is to find components relating to the long term improvement of the rural village infrastructure and to find immediate development components.

Village Renewal Plan
This includes the selection of alternative sites for public facilities, shops, housing, and other items relocated for falling within the park sanctuaries, park facility areas, or roadway improvement sites, as well as study of site planning for facilities, roadways, landscaping, and other needs.

REQUIREMENTS

502 Requirements for Park Development

Through park improvements and development, 300 hectares of village land will be converted to park land in the first ten years and 10 hectares thereafter in the case of Borobudur, and 110 hectares in the first ten years and 15 hectares thereafter in the case of Prambanan.

25% of this area is accounted for by housing, and 150 housing units will be relocated in the first ten years and 50 thereafter in the case of Borobudur, and 250 in the first ten years and 85 thereafter in the case of Prambanan. Schools, village offices, shops and other central community facilities in both Borobudur and Prambanan will also be relocated.

Suitable substitute sites will be selected for the above mentioned housing and community facilities on the basis of a study concerning reorganization of village landuse in the vicinity of the parks.

503 Requirements for Village Modernization

It is imperative that local policy be established and a directed approach taken toward the village modernization program and other plans to improve the village environment in the two villages of Borobudur and Prambanan as proposed in Repelita II.

It is imperative that this area be promoted, even as productive agricultural landuse is protected, as a model area for rural community development in Central Java to advance modernization in parallel with park development.

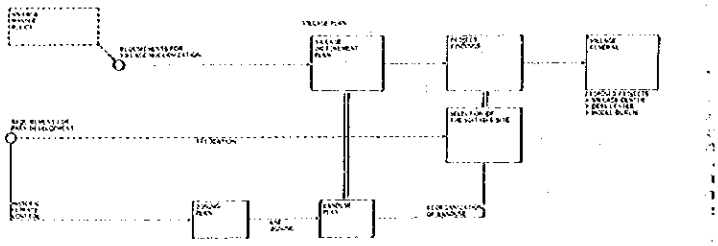
It is imperative that a gradually planned development policy be formulated and executed so that the work of relocating public facilities and housing consequent upon park development may be founded upon the above village infrastructure improvement and development.

504 PLANNING FRAME

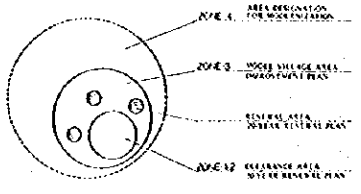
As the park development is directly linked to village relocation, landuse planning based upon the park vicinity environmental formation policy must be applied in the selection of alternative sites. At the same time, the villages also have their own independent wishes for development and it would ordinarily be necessary to conduct development and improvement as part of a comprehensive plan based upon the village master policy for each area suited to the characteristic features of the Borobudur and Prambanan areas.

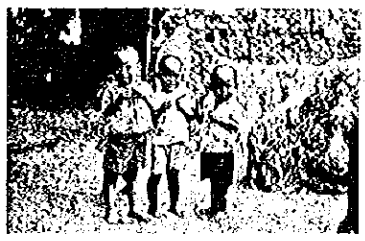
While the PMD and other outstanding development policies are not entirely clear, we are to establish a model village aiming at village modernization in the area in question (zone 3) and to plan improvements, as well as to take up relocation planning as a part of the village renewal plan considering the developmental needs of both the parks and the villages.

505 Planning Flow



506 Area Designation





507 Planning Policy

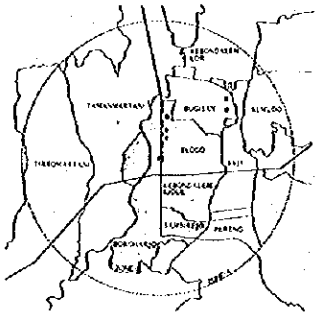
Conservation of the Agrarian Landscape
It is important to conserve the agrarian landscape formed by villages in the park vicinity, both as the historic and cultural setting and to maintain this highly productive area. As well as implementing various zoning controls to protect the landscape and to adhere basically to present landuse structures, promotional measures are to be taken to improve the agricultural infrastructure over the long run.

Village Modernization
Along with the reorganization of village landuse patterns within the designated area (zone 3), improvement plans are to be formulated aiming at the modernization of the village life environment and the creation of a model area. For villages in the park designated area (zone 4), the common scenery is to be maintained even as the above model area concept is applied.

Village Renewal
Taking the opportunity of park-related relocation, selective modernization of village facilities is to be effected based upon the above plans. Village renewal development is to be promoted with the two target stages of ten years hence and thereafter, in parallel with park development systems.

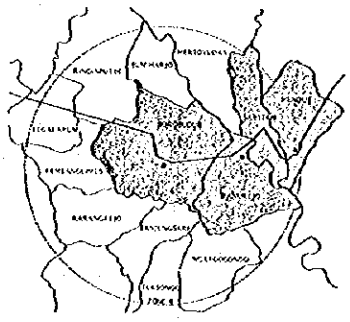
508 Model Village Area: Borobudur

Desa Borobudur	(Kec. Borobudur, Kab. Magelang)
Desa Wanurejo	(Kec. Borobudur, Kab. Magelang)
Desa Sawitan	(Kec. Mungkit, Kab. Magelang)
Desa Mendut	(Kec. Mungkit, Kab. Magelang)
Existing Area	990.0 hectare
Existing Population	10,810 persons (2,162 families)
Planning Target Year	1995 (20 years Plan)
Area Involved	873.0 hectare
Population Projection	14,777 persons (2,955 families)



509 Model Village Area: Prambanan

Desa Bugisan	(Kec. Prambanan, Kab. Klaten)
Desa Blogo	(Kec. Prambanan, Kab. Klaten)
Desa Kebondalem-Kidul	(Kec. Prambanan, Kab. Klaten)
Desa Pereng	(Kec. Prambanan, Kab. Klaten)
Desa Bokoharjo	(Kec. Prambanan, Kab. Sleman)
Existing Area	746.2 hectare
Existing Population	11,186 persons (2,237 families)
Planning Target Year	1995 (20 years Plan)
Area Involved	618.6 hectare
Population Projection	16,622 persons (3,324 families)



PROBLEMS AND FINDINGS

510 Village Community Facility

These are the central facility areas for the Borobudur and Prambanan areas, serving Kecamatan Borobudur and vicinity (52,000 people, 7,500 ha) and Kecamatan Prambanan (Klaten), Kecamatan Prambanan (Sleman) and vicinity (76,000 people, 8,000 ha).

Those facilities are located for Borobudur along the provincial road linking Salaman and Muntilan and for Prambanan along the national road linking Yogyakarta and Surakarta.

They include public facilities under Kabupaten or Kecamatan jurisdiction, those under desa jurisdiction and private commercial groupings and are built in both areas as befits the increasing population and rising standard of living.

Because the scale of facilities is inadequate to current life styles, to say nothing of future improvements and because they are arranged in an inefficient natural sprawl, they are barrier to orderly village development.

511 Dukuh

Most of the people are farmers owning an average of 800 - 1,000 m^2 per family, with an average of 30 - 40 families coming together into one unit (dukuh). Land holdings have a feel of spaciousness, containing the main house, storehouse, cattle pen, fields and work area.

As may be seen from the difference in their population densities, Borobudur having 40.2 people/ha of residential land and Prambanan 65.4 people/ha, Borobudur has more land per person, residential land accounts for a smaller percentage of total landuse, and there is more open or unused residential land.

Basically, each family has its own well which it uses for bathing, washing, drinking, etc., but there are also many families which do not have wells and work is needed to improve the water supply and to better the environmental hygiene.

Planning is also necessary to solve not only the scenic questions within the national parks but also the issue of local resident privacy and that of their living environment, including disaster-prevention, traffic, etc.

512 Village Infrastructure

The road network in the area includes both regional network roads such as national and provincial roads but also the village roads maintained by the Kecamatan or desa.

The national and provincial roads are directly related to park development and are to be improved to Bina Marga standards. The other, village roads, including both 6 - 8m wide roads between villages and 3 - 5m roads between buildings. As the network is not smooth flowing, and many places are yet unpaved, policies to meet the future automobile demand are needed.

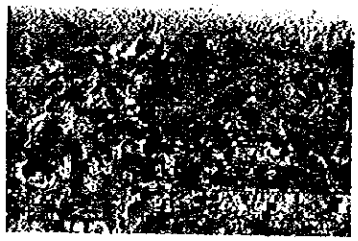
In reorganizing agricultural land, it is imperative that study for Borobodur, where irrigation water conditions are a particular problem, be done in relation to the Progo Basin River Project and other plans.

While there would seem to be no problem with the potable water supply, since underground water is plentiful and each family has its own well, it is necessary to study the future supply with an adequate and integrated system for villages falling within the park areas, as noted in the section on dukuh.

Although waste water is currently drained into irrigation ditches and left to decompose organically, policies for the future are needed here just as they are for potable water.

As there are regional level plans for supplying electricity, improvement should be done facilitating and promoting these plans.

Finally, it is also necessary to establish long-term plans for such regional infrastructure issues as waste water disposal, rivers, erosion and flooding prevention, and garbage disposal.



Village Improvement Plan

IMPROVEMENT POLICY

513 This is intended to improve the regional infrastructure environment for village modernization. In both Borobudur and Prambanan, it is imperative that plans be drawn up fully reflecting area characteristics in order to foster an orderly rural environment with the emphasis on agricultural production. The following three basic environmental improvements are to be made in both areas.

Community Centers

- Taking advantage of the village renewal works, community centers are to be built and expanded in sites central to the community.
- Village center is to be built for 40 – 60 thousand people.
- Desa center and two or three desa sub centers are to be built and improved for every 2,500 – 4,000 people.

Living Environment

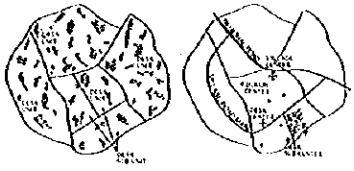
- Dwelling facilities are to be built modeled after the relocated dukuh.
- Sanitation and hygiene are to be improved with the dwelling service facilities playing a central role.
- The desertion and extreme dispersion generated by urbanization is to be avoided and an orderly rural life environment created.

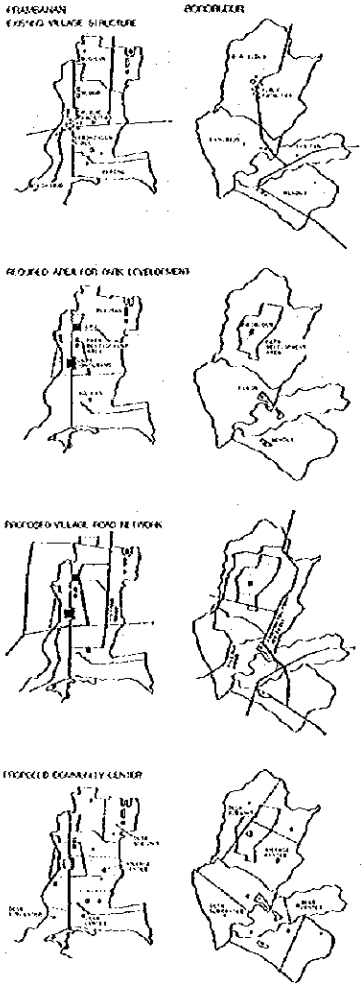
Village Infrastructure

- The agricultural village infrastructure is to be improved and measures taken to promote land rental for farming.
- The main village roads are to be widened and the network expanded.
- Regional utility facilities such as running water, sewers, and electricity are to be provided.

VILLAGE SKELETON MODEL

514 In order to link the park development generated construction of public facilities and housing relocation with village modernization, the basic village structure is to be thoroughly understood and a provisional model proposed based upon the improvement policy.





SUITABLE SITES SELECTION

516 This section deals with the selection of alternative sites, a very important planning element in the village improvement plan.

It is imperative that the loss of village land for park use be solved not apart from the present villages but rather studied for solution linked positively to environmental development plans for these villages and solving their problems on Java.

However, it is not easy to find alternative sites within the very densely utilized agricultural land and efforts must bear in mind not only existing complex landownership patterns and harmonized rights but also creating orderly landuse structures and a sound village environment for the future.

In effect, the demand on land is for a reorganization of landuse patterns aimed at modernization and is more than simple selection of alternative sites for village relocation, being also study of policies for providing the land for needed village facilities.

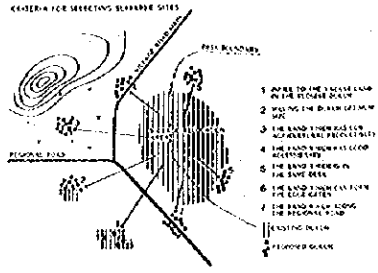
517 Policy for Selection of Suitable Sites

The following three items are to receive basic consideration in the selection of alternative sites.

Suitability to Present Landuse Structure
While a considerable area is needed for relocation sites, full advantage is to be taken of current landuse patterns, facility distribution, traffic networks and other potential and major changes in landuse patterns are to be avoided.

Promotion of Sophisticated Landuse
Discovering through environmental assessment sites suited to the different landuses, efforts are to be made to promote the use of unused or vacant sites and the more sophisticated use of current residential sites using population density studies.

Promotion of Use of Public Lands
As development is to be implemented by public agencies, efforts are to be made to use land under public administration or ownership, directly or for relocation. Efforts are also to be made to use land freed through the rationalization of ownership patterns and other means.



518 VILLAGE IMPROVEMENT PLAN: BOROBUDUR

519 Development Unit: Borobudur

Area Improvement Units

			Development area
V-1	Village center + 2 Model Dukuh	Borobudur	12.8 ha
V-2	Desa center + Model Dukuh	"	3.5 ha
V-3	Sub center + Model Dukuh	"	2.3 ha
V-4	Desa center + Model Dukuh	Wanurejo	2.2 ha
V-5	Desa center	"	0.5 ha
V-6	Desa center	Sawitan	1.0 ha
V-7	Sub center + Model Dukuh	"	1.6 ha
V-8	Desa center + Model Dukuh	Mendut	3.0 ha
V-9	Sub center	"	0.5 ha

Road Improvement units

			Improvement length
RM-1~3	Village road main	"	4.5 km
RM-1~7	Village road minor	"	9.2 km

520 VILLAGE IMPROVEMENT PLAN: PRAMBANAN

521 Development Units: Prambanan

Area Improvement Units

			Development area
V-1	Village center + 2 Model Dukuh	Kloco	15.2 ha
V-2	Sub center + Model Dukuh	"	1.3 ha
V-3	Desa center	Bugisan	2.0 ha
V-4	Sub center + Model Dukuh	"	2.5 ha
V-5	Desa center	Kebondalem Kidul	3.6 ha
V-6	Sub center + Model Dukuh	"	1.0 ha
V-7	Desa center	Petung	0.7 ha
V-8	Desa center + 2 Model Dukuhs	Gebolan	3.6 ha
V-9	Sub center + Model Dukuh	"	
V-10	2 Model Dukuhs	Taman Martani	2.0 ha

Road Improvement Units

			Improvement length
RM-1~3	Village road main	"	5.0 km
RM-1~3	Village road minor	"	5.5 km

Village Renewal Plan

VILLAGE RELOCATION

522 The following works, broadly classified into relocation of private housing and relocation of public facilities, are those that are to be undertaken as village relocation works necessitates by park construction.

523 Village sites that must be cleared for sanctuaries, park facilities and roads

Borobudur

	Sanctuary	Facilities	Road	Total
Residential & Public Area	3.5	12.8	4.7 (2.0)	21.0
Agricultural Area & Others	18.9	62.7	4.6 (3.7)	86.2
Total	22.4 ha	75.5 ha	9.3 ha (10.7)	107.2 ha

Prambanan

	Sanctuary	Facilities	Road	Total
Residential & Public Area	3.4 (5.0)	17.3 (1.8)	8.2 (0.5)	28.9 (7.3)
Agricultural Area & Others	21.6 (1.0)	52.7 (--)	3.0 (13.3)	76.4 (14.3)
Total	25.0 ha (6.0)	70.0 ha (1.8)	11.2 ha (13.8)	106.2 ha (21.4)

Note: Figures in parenthesis are to be required after 1995.

524 Amount of facilities that must be relocated for village clearance

Items	Borobudur up to 1985	Borobudur after 1985	Prambanan up to 1985	Prambanan after 1985
Farm and Town House	130	50	170	85
Shop House	20	--	80	--
Total	150	50	250	85
Public Facilities	(i)	(ii)	(iii)	--

Notes: Figures are the number of houses
(i) Desa Borobudur: Kantor Kecamatan, 5 Schools, Mosque, Passar and Bus Terminal
Desa Wanurejo: Mosque
(ii) Desa Mendut: Kantor Desa and 2 Schools
(iii) Desa Bogak: Kantor Kecamatan, 5 Schools, Kus, Post Office, Polikliuk, Dinas Pariba Kota, Gedung Seni Gona and Bus Terminal
Desa Kebondalem Kidul: Passar Hewan and Police Station
Desa Bokoharjo: Kantor Kecamatan, Passar and 3 Schools
Desa Rawamangun: Bank Shinta Daya

VILLAGE RENEWAL PLAN

525 The village renewal plan is intended to effect facility relocation directly consequent upon park development based upon the village improvement policy for the gradual yet fundamental modernization of the present village environment. As such, it contains the following three main points.

526 Village Centers Plan

This involves the construction of public facilities adequate to the populations, 50 – 70 thousand people in Borobudur and 80 – 100 thousand people in Prambanan. In addition to facilities to be relocated, this also includes a clinic and community park in Borobudur and a community park in Prambanan as the minimum additional facilities necessary to promoting community life.

At the same time, the village center also includes, agricorporation offices, religious facilities, and kindergartens as facilities necessary to the desa centers and desa sub-centers in both Borobudur and Prambanan. In both centers, the facilities will be constructed to half of target scale by 1985 and then expanded after 1985.

527 Desa Centers Plan

With relocation, centers will be provided for Desa Bokoharjo in Prambanan within ten years and for Desa Mendut in Borobudur after 1985.

Desa Center Mendut in Borobudur
A community center for the 3,386 people living in Desa Mendut (1995 estimate), it is to have the designated facilities plus a policlinic, agricorporation office, religious facility, kindergarten and village green and is to be built in the 1986 – 95 decade.

Desa Center: Bokoharjo in Prambanan
A community center for the 9,465 people living in Desa Bokoharjo (1995 estimate), it is to have the designated facilities plus an agricorporation office, kindergarten and village green and is to be built to half of target scale in the 1976 – 85 decade with later expansion after 1985.

528 Model Dukuhs Plan

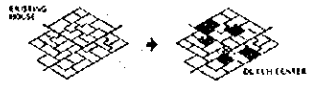
Relocated dwellings are to be divided into four classes by site and occupation and model dukuhs are to be constructed with new standards meeting all of their characteristics. There are to be five model dukuh units in Borobudur (with another two added in ten years) and eight units in Prambanan (again with another two added in ten years).

In principle, each dwelling unit is to consist of 10 – 15 dwellings and is to have the Dwelling Service Facilities (hereinafter DSF). Minimum necessary modernization is also to be conducted for each dwelling.

TYPIFICATION OF MODEL DUKUHS

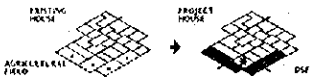
529 Type 1: Infill Dukuh

When the scale of relocation is very small and substitute sites are very difficult to find, these "infill dukuh" are to be infilled in existing dukuh with plentiful open space. These dukuh work for the fullest utilization of life spaces through minimizing landuse changes and using existing residential land to better efficiency.



530 Type 2: Annexation Dukuh

When the scale of each relocation is small but there are several to be done at the same time, they are to be placed adjacent to existing smaller-scale dukuh (20 – 40 units) to form standard-size dukuh (50 – 70 units). Through merging these new-standard homes with existing homes, the entire dukuh is to be gradually modernized. Both type 1 and type 2 are to be normal farm houses.

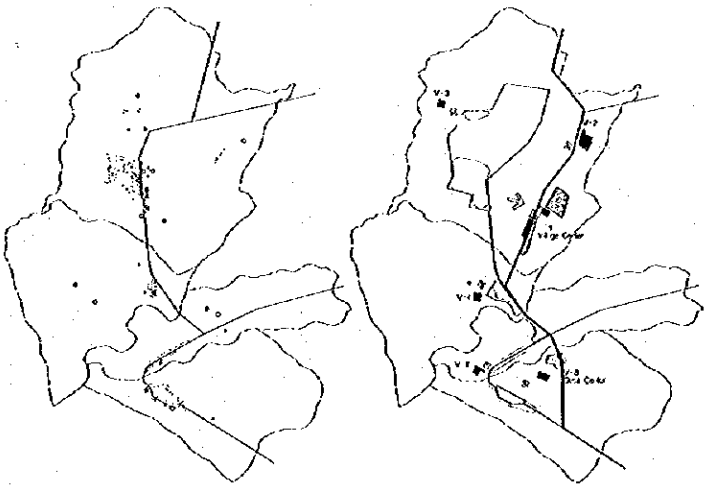


531 Type 3: New Dukuh

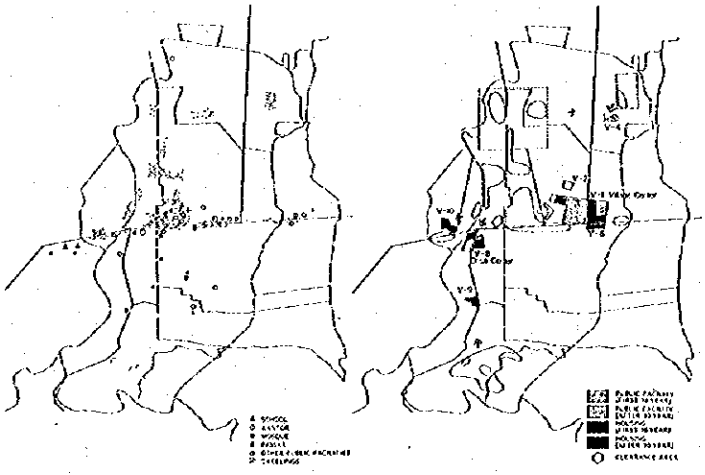
These are the non-farm houses to be concentrated in new residential land, formerly farm land, and they may be divided into the following three types depending upon the family occupation.

- Town Houses
These houses are for employees in community service and other services industries, and they are to be located adjacent to public facilities. They are new dukuh composed of grouping 20 -40 units for more efficient, more concentrated use of the life areas and built suited to urban life standards.
- Shop Houses
These are housing units where each site includes a shop floor, and they are to be located adjacent to public facilities or main regional roadways. While the construction is basically of the row type, these units form the amenity area centering upon regional facilities in consideration of cooperative development formulae.
- Employee Houses
These are houses for employees working in park services, and they are located on park land. As well as establishing environmental standards for each site, these are to be built in groups of two story units to create leisurely open spaces.

532 VILLAGE RENEWAL PLAN: BOROBUDUR



534 VILLAGE RENEWAL PLAN: PRAMBANAN



533 Project List: Borobudur

Borobudur Village Center

- Development Area: Farm land to the northeast of Desa Borobudur along the new provincial road (9.9 ha)
- Development Stage: Stages 2, 5, and 6
- Main Facilities: Schools, Kantor Kecamatan, Passar, Traffic terminal, Clinic, etc.

Mendut Desa Center

- Development Area: Paddy land to the west of Desa Mendut along the new provincial road (2.1 ha)
- Development Stage: Stage 6
- Main Facilities: Primary school, Kantor desa, Polikinik, etc.

Model Dukuh

Code number	Project name	Development area	House type	Number of units	Number of DSF	Development stage
V1	Borobudur Village Center	8.9	Town and Shop House	90	6	Stage 2, 3
V2	Borobudur-1	3.9	Farm House	25	2	Stage 2, 3
V3	Borobudur-2	3.6	Farm House	15	–	Stage 2, 3
V4	Wanurejo-1	3.7	Farm House	10	–	Stage 3, 4
V7	Sanilan-2	1.2	Farm House	15	1	Stage 6
V8	Mendut-1	0.8	Farm House	10	1	Stage 6
	Total	8.8 ha		125 units	9 units	

535 Project List: Prambanan

Prambanan Village Center

- Development Area: Paddy land and public facility land along the wide national road south of Desa Ilogo and north of Desa Kebondalem Kidul. (10.3 ha)
- Development Stage: Stages 2, 5, and 6
- Main Facilities: Schools, Kantor Kecamatan, Passar, Traffic terminal, Clinic, etc.

Bokoharjo Desa Center

- Development Area: Residential land, public land, and fields to the north of Desa Bokoharjo along the wide national road. (2.0 ha)
- Development Stage: Stages 3, 4, and 6
- Main Facilities: Primary school, Kantor desa, Polikinik, etc.

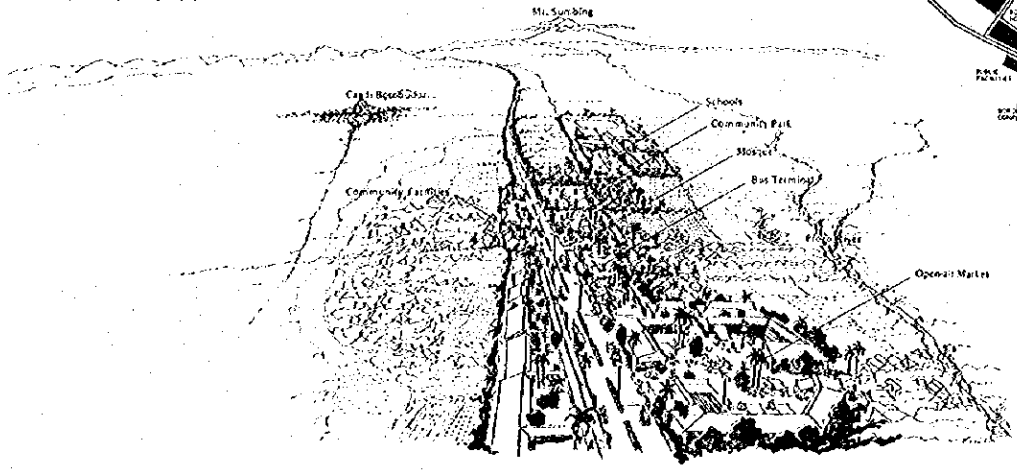
Model Dukuh

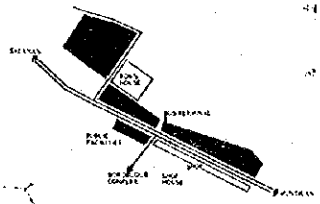
Code Number	Project name	Development area	House type	Number of units	Number of DSF	Development stage
V1	Prambanan Village Center	2.5	Town and Shop House	95	7	Stage 2, 3
V2	Ilogo	1.2	Farm House	10	–	Stage 2, 3
V1	Bokoharjo-2	1.5	Farm House	20	2	Stage 6
V6	Kebondalem Kidul-2	0.5	Shop House	15	1	Stage 4
V8	Bokoharjo-1	1.5	Town and Shop House	40	3	Stage 3, 4, 6
V9	Bokoharjo-2	1.2	Farm House	15	1	Stage 4, 6
V10	Tamanmartani	1.5	Farm and Town House	25	2	Stage 4, 6
	Total	9.9 ha		220 units	16 units	

Model Plan: Community Centers

536 **BOROBUDUR VILLAGE CENTER**

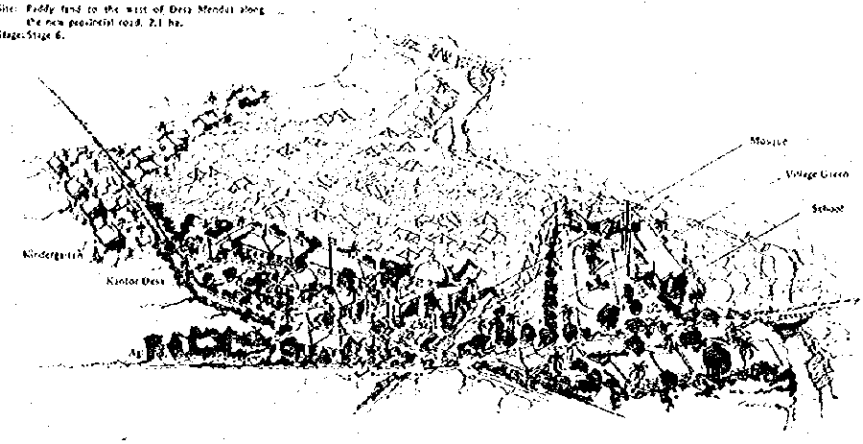
Development Site: Farm land to the northeast of Desa Borobudur along the new provincial road. 9.9 ha.
Development Stage: Stages 2, 5, and 6.

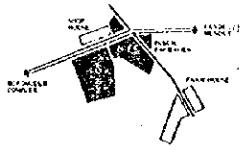




537 **SIENDUT DESA CENTER**

Development Site: Paddy land to the west of Desa Mendut along the new provincial road. 2.1 ha.
Development Stage: Stage 6.

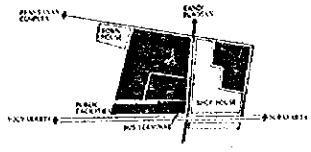


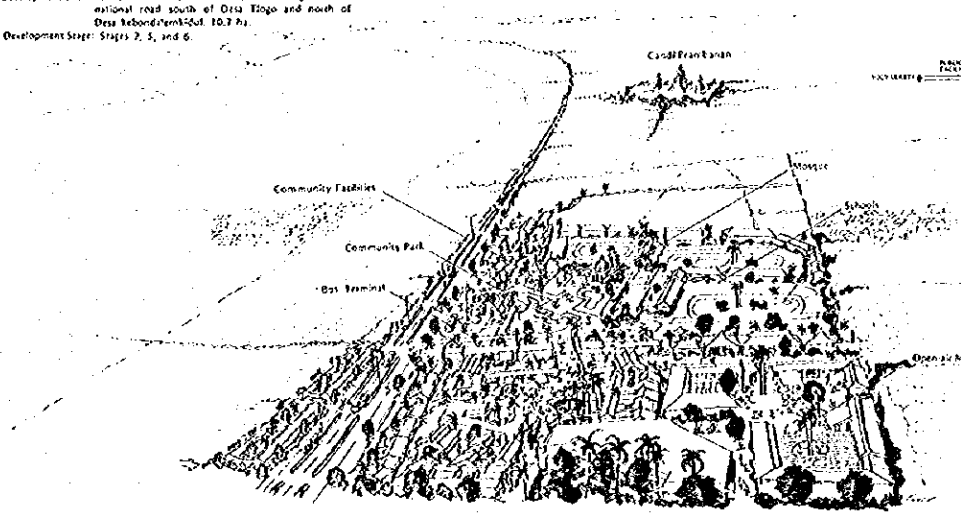


536 **PRAMBANAN VILLAGE CENTER**

Development Site: Paddy land and public facility land along the wide national road south of Desa Tlogo and north of Desa Sebondaerah-Kol. 10.7 ha.

Development Stage: Stages 2, 5, and 6.

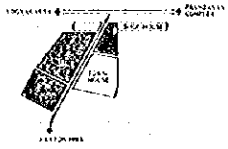


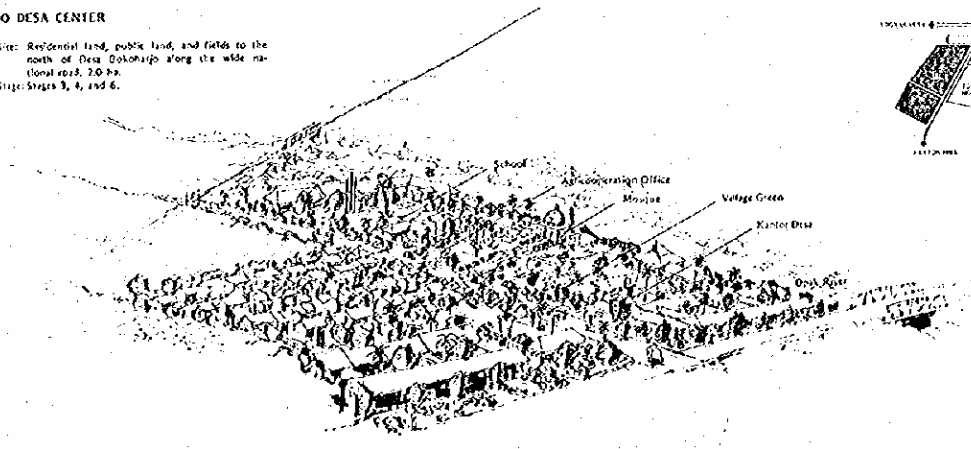


537 **BOKOHARJO DESA CENTER**

Development Site: Residential land, public land, and fields to the north of Desa Bokoharjo along the wide national road. 2.0 ha.

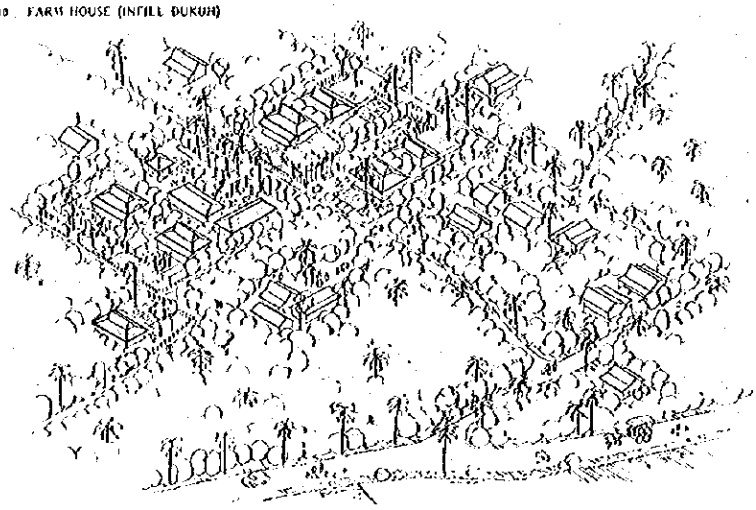
Development Stage: Stages 3, 4, and 6.



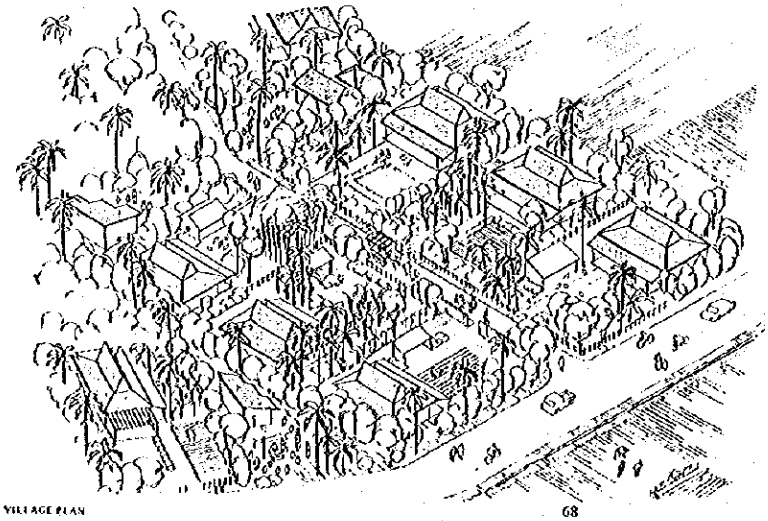


Model Plan: Dukuhs

541 FARM HOUSE (INFILL DUKUH)

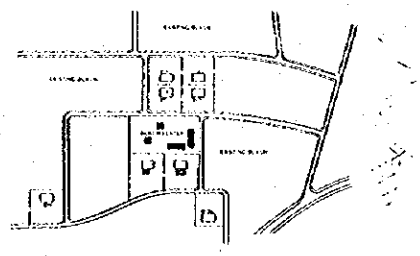


542 FARM HOUSE (ANNEXATION DUKUH)



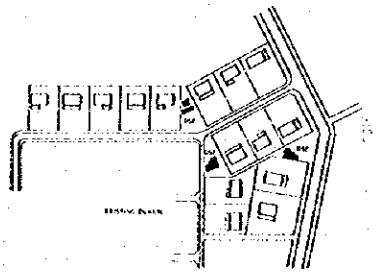
543 Desa Borobudur - 2

Number of Dwellings	:	10 units
DSF	:	
Development Area	:	1.0 ha
Development Stage	:	Stage 2.3

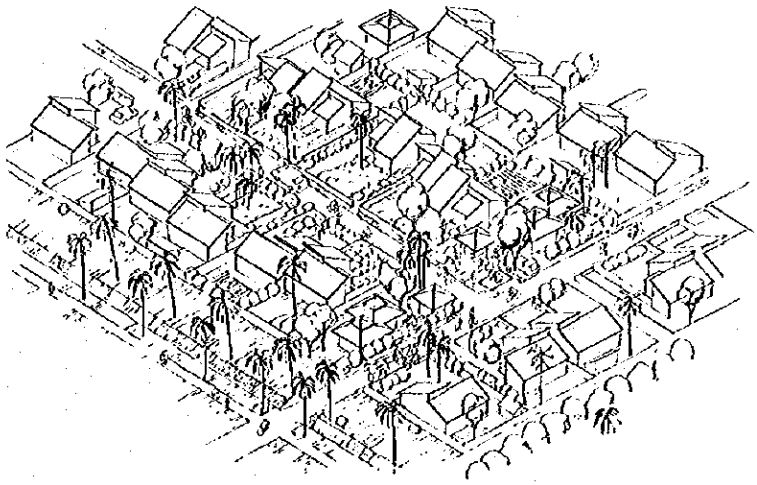


543 Desa Bokoharjo - 2

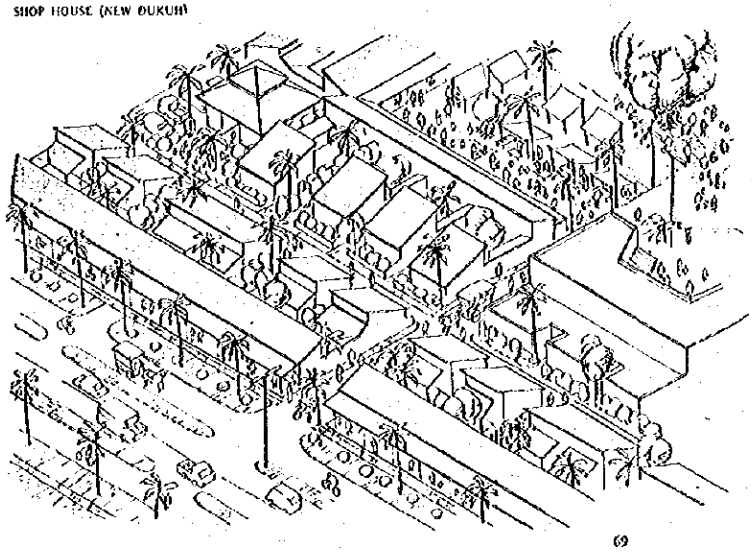
Number of Dwellings	:	15 units
DSF	:	1 unit (Type-A)
Development Area	:	1.0? ha
Development Stage	:	Stage 4.6



545 TOWN HOUSE (NEW DUKUH)

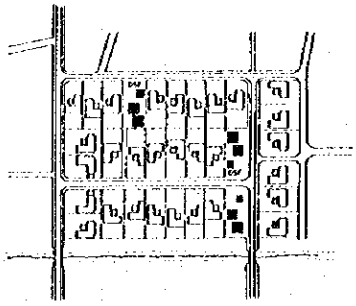


546 SHOP HOUSE (NEW DUKUH)



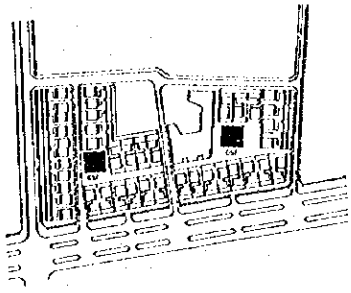
545 Desa Borobudur (Part of Borobudur Village Center)

Number of Dwellings	:	30 units
DSF	:	3 units (Type B)
Development Area	:	1.47 ha
Development Stage	:	Stage 2.3



547 Desa Tlogo (Part of Prambanan Village Center)

Number of Dwellings	:	50 units
DSF	:	4 units (Type C)
Development Area	:	4.59 ha
Development Stage	:	Stage 2.5



Planning and Design Criteria

COMMUNITY CENTER

§48 Basic Considerations

Standards for the kinds and scale of facilities each center should have are to be set to promote provision of the minimum facilities needed to guarantee the rural community in the project target year and as the village modernization model area.

While each center must be distinctively programmed in view of the conditions of use, autonomy of development management, land features, and other factors, this section indicates the basic facility arrangement and spatial structure of each center.

Model study is also conducted of the five different community center types proposed in the village improvement plan: village center, desa center, desa sub center, dukuh center, and dwelling service facility.

§49 Village Center

- Location: Center of kecamatan unit
- Area Involved: 12.0 - 15.0 ha
- Planned Population: 50,000 - 80,000 persons (10,000 - 16,000 families)

This is the focal point for regional community facilities to serve a population planned at 50,000 - 80,000 by 1995. Roughly, facilities may be divided into educational, public, commercial, housing, park, medical, religious and other facilities. (Some of these, however, are included within the desa center §53 mentioned next paragraph.)

Facilities are located so as to create four zones (school zone, public facility zone, commercial zone and residential zone), although there is also a fifth and centrally located openspace zone containing such other facilities as medical facilities, religious facilities and kindergarten.

While 40% of these facilities are to be built within ten years of relocation, approximately 5 ha are to be set aside each in Borobudur and Prambanan as reserve sites for extension of commercial facilities and future public facility needs.

The center is to be located for Borobudur in a flat field (approximately 12 ha) selected along the new provincial road and for Prambanan on residential and paddy land (approximately 15 ha) already containing some community facilities (such as Desa Hogo's Kantor Kecamatan, greens and clinic) selected along the widened national road.

§50 Desa Center

- Location: Center of desa unit
- Area Involved: 1.0 - 1.5 ha
- Planned Population: 2,500 - 4,000 persons (500 - 800 families)

This is to be the focal point for community facilities for everyday life for a population planned at 2,500 - 4,000 in 1995.

The facilities included are those already thought of as under desa jurisdiction: kantor desa, desa school (primary school), policlinic and agricooperation office. The desa sub center §54 mentioned next paragraph, on the other hand, is to include religious facilities, kindergarten and village green (for both joint agricultural production and recreational use).

The desa centers are to be located central to each desa, in areas selected along village roads, main or already having these facilities (1.0 - 1.5 ha). As a result, the location of a given center will depend upon the characteristics of the individual desa such that their site areas and arrangement systems will vary.

§51 Desa Sub center

- Location: Center of desa sub unit
- Area Involved: approximately 2,000 m²
- Planned Population: 1,000 - 1,500 persons (200 - 300 families)

This is the site for public facilities to be used by a population planned at 1,000 - 1,500 by 1995.

The facilities, in view of the needs of the people, are to be religious facilities, a kindergarten and abundant open space, primarily for use children.

As with the desa center, the sub-center must be located and arranged optimally for each desa. Rather than to collect all facilities in one place, these sub centers should be within walking distance for children and old people (200 - 250 m) and should be accessible from village minor roads. It would be well to spread these facilities out in cooperation with the dukuh centers §55 mentioned next paragraph.

§52 Dukuh Center

- Location: Center of dukuh unit
- Area Involved: approximately 1,000 m²
- Planned Population: 250 - 350 persons (50 - 80 families)

This is the site for public facilities to be used by a population planned at 250 - 350 by 1995.

The facilities here include the warung (small market), of which there are already one or two in existing dukuh and open space for communal agricultural production or recreational use.

§53 Dwelling Service Facility (DSF)

- Location: Center of dwelling unit
- Area Involved: approximately 300 m²
- Planned Population: 50 - 7 persons (10 - 15 families)

These facilities, one for every 10 - 15 families, are to be joint facilities for improving environmental hygiene. They are to be located on appropriate common property sites of about 300 m² in each dwelling unit.

The site is to contain toilet, waterstand and bathing facilities and a space for agricultural production or recreational use. As a part of the village renewal project, 9 units are to be built in Borobudur and 16 units in Prambanan.

While each dwelling unit currently has such facilities, it is expected that these can be improved, both in standards and in network systems. Although it would be well within future social development for each dwelling to possess such sanitary water facilities, they have been included in this plan at one to a dwelling unit (the smallest community unit) as an interim stage in view of the capital balance and the need to avoid excessive economic burden on residents.

MODEL DUKUH

§56 Basic Consideration

Furthering of Dwelling Communities
One dwelling community is composed of 10 - 15 families coming together. The basic design is created by devising the characteristic spatial elements of each type's unit structure and by actively seeking to introduce catalytic measures for the development of community activities.

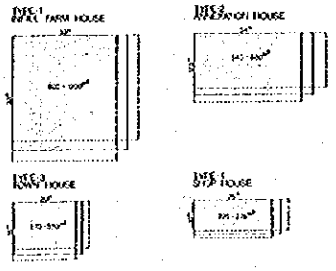
Functional Planning
Based upon landuse policy, this is to use the existing pattern of roadways, homes and fields and is to apply effective systems for lot division, road layout, and other facets of congested landuse.

Amenities for Visual and Safety Needs
As well as seeking to preserve the elegance of villages within the areas designated for the national archeological parks, this is also to seek self-restraint in landuse and buildings to create a safe and pleasant life environment and thereby to lead to the most desirable environment.

§55 Lot Area and Proportion

Lot areas and proportions have been laid out with the following points in mind to promote residential standardization and equalization.

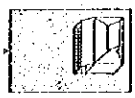
- Analysis of current patterns and reference materials formed the basis for determining lot size, which was then modified for minimization and better accommodation of the standard building and yard designs.
- These were categorized by type and the optimum lot size determined, with a 10% deviation allowance either way for area and side length.
- For type 1, however, a 20% deviation was allowed on area and proportion to meet the conditions for substitute land.



§56 Division Method and Building Cluster

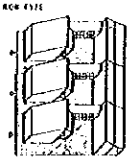
The following four types are established and criteria set for each depending upon division method and building cluster.

DETACHED TYPE

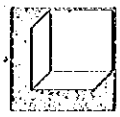


SEMI-DETACHED TYPE

ROW TYPE



COOPERATION TYPE



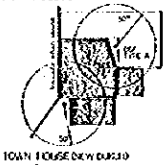
557 Road and OSF Layout

Different criteria are set depending upon the class of connecting roads to the model dukuh area, the system of inter-area roads, and the dwelling service facility location.

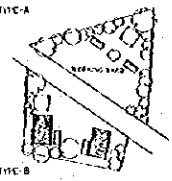
FARM HOUSE (FREE DUKUH)

TYPES OF OSF

FARM HOUSE (AGGLOMERATION DUKUH)

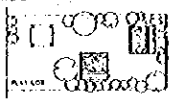


TYPE-A

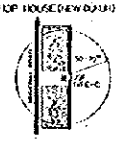


TOWN HOUSE (NEW DUKUH)

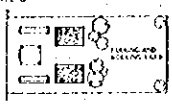
TYPE-B



SHOP HOUSE (NEW DUKUH)



TYPE-C



558 Site and Building Control

Site and building control is a sub-system to create an ordered environment for the model dukuh within the park-designated area. As well as implying self-restraints for development itself in the creation of sites and structures, it also sets standards for building expansion and landuse by residents.

Lot Division

- Front-line road restrictions: Width standards for road tangential to front lines
- Restrictions on distance from OSF: Standards for lot distances from dwelling service facilities
- Lot size: Standards for lot size and proportions

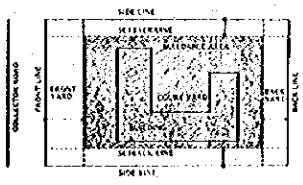
Lot Placement

- Lot coverage ratio: The ratio of building floor space to lot area, a standard for avoiding congestion, protecting privacy and promoting village-scape control
- Yard establishment regulation: The other side of second paragraph, first article, standards for the area of open space to total lot area and for its use

Building Structure

- Regulation of stories: Standards for the number of building floors, standards for visual control within model dukuh and for harmony with existing dukuh
- Expansion regulation: Regulations for area and place of building expansion within the lot (construction ratio stipulated)
- Other regulations: Needed design codes for structure, materials, colors, vegetation, attached worksheds, and other building matters

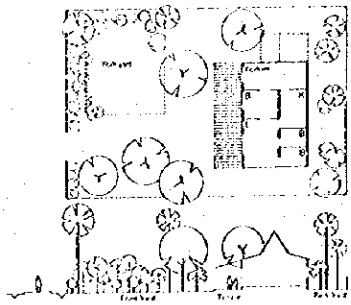
	Type-1 Farm House	Type-2 Farm House	Type-3a Town House	Type-3b Town House
Front-line road restrictions	4m-6m	6m	6m	20/40m
Restrictions on distance from OSF	–	30m	60m	50m
Lot size – Area	500–1,700m²	540–660m²	270–330m²	225–275m²
– Facade	28–35m	18–22m	11–13m	9–11m
– Depth	28–35m	29–33m	22–28m	23–27m
Lot coverage ratio	20%	20%	35%	50%
Setback – Front line		10m	5m	3m
– Side line		1.5m	0.5m	–
– Back line		3m	3m	1.5m
Yard establishment regulation		50%	35%	20%
Regulation of stories	Single	Single	2 Stories	2 Stories
Expansion regulation	–	60m² (Front Yard)	45m² (Back Yard)	35m² (Court Yard)



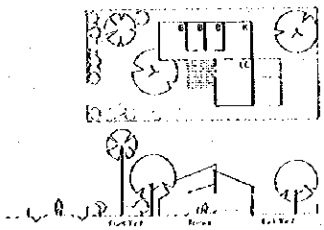
559 Typical House Plan

- Family composition are to be set as parents and three children
- Room Extention: Bed room and work room
- Clear distinctions are to be made between the public room (living/dining) and the private rooms (bed).
- Adjoining the living/dining room with the terrace, a public function space is to be created.
- The kitchen, as a working area, is to open into an open space.

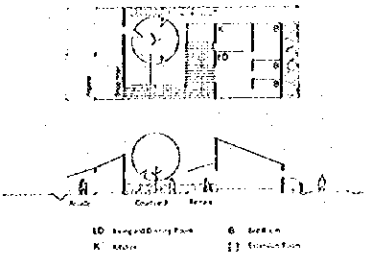
FARM HOUSE



TOWN HOUSE



SHOP HOUSE



CHAPTER SIX

IMPLEMENTATION OF THE PROJECT

Framework of the 10-year Plan: 1975-84

AREA DESIGNATION FOR WORKS

601 The following zone designation will be made on the basis of the National Archeological Parks Law (tentative name).

	Borobudur	Prambanan
Archeological monument special preservation zones (Category-1 zones)	23 ha	28 ha
Park special development zones (Category-2 zones)	110 ha	75 ha
Zoning regulation zone (Zone 3)	1,025 ha	600 ha
Scenery conservation zone (Zone 4)	1,702 ha	2,122 ha
Roadside view protection zone	400 ha	–
National archeological park designated area*(total)	2,860 ha	2,825 ha

602 The figures for the area that will be involved in the development and improvement works to be carried out in the context of the 10 year Implementation Plan are as follows:

	Borobudur	Prambanan
Sanctuary improvement	23.0 ha	28.0 ha
Park development	85.0 ha	75.0 ha
Village relocation	10.5 ha	18.5 ha

603 The area involved in the village clearance works will be as follows, the reason for clearance being indicated in each case:

	Borobudur residential	other	Prambanan residential	other
Sanctuary improvement	4.3 ha	11.2 ha	2.1 ha	7.6 ha
Park development	19.6 ha	49.8 ha	14.5 ha	55.8 ha
Widening of roads	1.2 ha	8.9 ha	5.3 ha	14.7 ha
Total	25.1 ha	69.9 ha	21.9 ha	78.1 ha

604 The following are estimates of the area of the land to be acquired in the period of the 10 year Implementation Plan:

	Borobudur	Prambanan
Existing publicly owned land	23.4 ha	14.7 ha
Land to be acquired anew	109.8 ha	113.8 ha

DEVELOPMENT PERIOD

605 The period of this Implementation Plan will be ten years, from 1976 through 1985. The construction program will be divided into five stages, each of two years' duration.

The following is an outline of the work items for the different development stages.

Stage-1 (1976/77)
Implementation of preparatory work for development
- Prior investigations
- Work plans and design
- Legislative and fiscal measures
- Land acquisition
- Preparations for village relocation

- Stage-2 (1978/79)
  Commencement of village relocation
  Mainly village center, employee housing and related infrastructure
- Stage-3 (1980/81)
  Promotion of works in coordination with New 5-year Plan, continuation of village relocation and starting construction of park facilities
- Stage-4 (1982/83)
  Completion of some park facilities, commencement of park operation on the basis of tentative operational system and continuation of construction of other park facilities
- Stage-5 (1984/85)
  Completion of all works scheduled in the 10 year Plan

PLANNED NUMBER OF VISITORS

606 The following figures have been set as the target number of visitors to each of the two parks on the basis of market analysis. Because this is a long-range outlook, both upper and lower targets have been set. Furthermore, an attempt will be made to gradually correct the disparity to date between the two parks in terms of number of visitors on the basis of the policy of twin development.

The lower and upper targets for the final year of the 10 year plan are 3.6 and 6.4 times the figure for 1975 in the case of Borobudur and 5.8 and 10.6 times the figure for 1975 in the case of Prambanan. It is to be hoped that the upper targets will be attained through diversified promotional activities.

The physical planning is based on an assumed demand of 10,000 persons a day on the average, which is the demand level that is expected to be reached in the beginning of the 1990's.

607 Expected Number of Visitors by Year

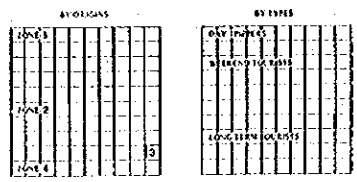
Year	Borobudur Lower Target	Borobudur Upper Target	Prambanan Lower Target	Prambanan Upper Target
1975	361,298	367,298	223,833	223,833
1976	416,151	442,510	261,789	282,728
1977	491,693	533,125	313,623	357,258
1978	534,874	642,297	371,992	455,628
1979	606,788	773,826	411,950	521,191
1980	688,692	932,290	526,060	722,730
1981	782,034	1,123,207	627,538	915,077
1982	888,484	1,353,224	750,119	1,159,242
1983	1,009,965	1,630,317	899,967	1,469,506
1984	1,148,700	1,961,226	1,082,720	1,861,118
1985	1,307,261	2,366,500	1,307,261	1,366,500

608 Origins and Types of Visitors

The estimates on the basis of the tourism market analysis are as follows by origin and type of visitors.
It represents the breakdown by origin and type of visitor on the basis of the upper target in 1985.

Origins	Day Tripper	Weekend Tourists	Long-term Tourists	Total
Zone-1 Middle Java	732,916 (31.0)	402,235 (17.0)	–	1,135,651 (48.0)
Zone-2 Java and Madura	–	805,478 (34.0)	177,352 (7.5)	982,823 (41.5)
Zone-3 Other Islands	–	–	12,240 (0.5)	12,240 (0.5)
Zone-4 Foreign Countries	–	–	235,286 (10.0)	235,286 (10.0)
Total	732,916 (31.0)	1,208,206 (51.0)	425,378 (18.0)	2,366,500 (100%)

Note: Figure in parenthesis is the percentage of total visitors.



609 APPENDIX: STATISTICS DATA

The following are figures for the annual number of visitors to Borobudur and Prambanan in past years.

Borobudur

Year	Domestic	Foreign	Total
1969	60,467	5,176	65,643
1970	75,927	7,443	83,370
1971	160,594	11,737	172,331
1972	193,319	17,240	210,589
1973	225,042	31,438	256,480
1974	263,643	35,113	298,756
1975*	487,260	44,690	531,950

* January – November

Prambanan

Year	Domestic	Foreign	Total
1969	55,992	2,529	58,521
1970	71,418	4,083	75,501
1971	100,807	6,914	107,721
1972	108,109	6,521	114,630
1973	149,735	5,083	154,818
1974	138,759	5,977	144,736

* There is no data on and after December 1974.

610 PROJECT LIST: BOROBUDUR

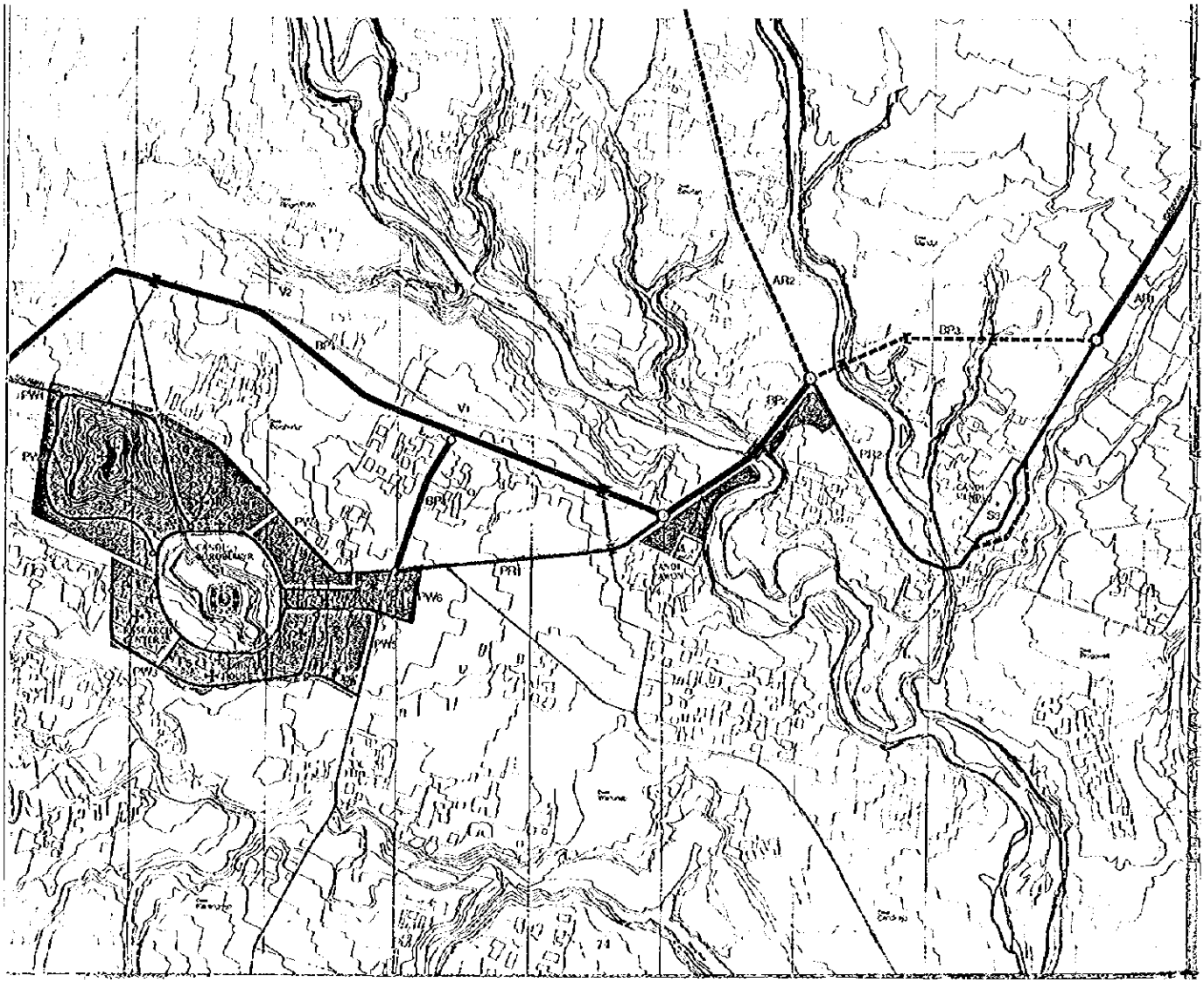
	Project	Site Area	Land Required: Public Owned	1936~1985	After 1985	Total	Development stage 1 2 3 4 5 6	Development Body C	G	P	Operation Body C	G	P
	SANCTUARY IMPROVEMENT PROJECT	(ha)	(ha)	(ha)	(ha)	(ha)							
S-1	Candi Borobudur Sanctuary	17.5	14.4	3.1	–	3.1			●	■		■	
S-2	Candi Pawon Sanctuary	1.0	0.1	0.9	–	0.9			●	■		■	
S-3	Candi Mendut Sanctuary	3.0	0.5	2.5	–	2.5			●	■		■	
S-4	Candi Ngawen Sanctuary	1.0	0.2	–	0.8	0.8			●	■		■	
	PARK DEVELOPMENT PROJECT	75.5	13.6	61.9	–	61.9							
P-1	Gate	3.4	1.5	1.9	–	1.9			●		■	■	■
P-2	Service Facilities	5.3	2.2	3.1	–	3.1			●		■	■	■
P-3	Archeological Museum	9.0	0.3	8.7	–	8.7			●	■		■	■
P-4	Archeological Research Center	6.7	2.5	4.2	–	4.2				●		■	■
P-5	Seminar House	5.6	1.9	3.7	–	3.7				●		■	■
P-6	Guest House	4.4	1.0	3.4	–	3.4			●			■	
P-7	Dagi Hill Park	24.7	–	24.7	–	24.7			●			■	
P-8	Maintenance Yard	1.0	–	1.0	–	1.0			●			■	
P-9	Staff Accommodation	4.9	0.3	4.6	–	4.6			●			■	
P-10	Utility Facilities	1.0	–	1.0	–	1.0			●			■	
P-11	Road and Traffic Facilities	9.5	3.9	5.6	–	5.6			●			■	■
	ROAD IMPROVEMENT PROJECT	43.1	16.0	12.5	15.2	27.7							
R-1	Access Road Main	6.0	4.0	2.0	–	2.0			●			■	
R-2	Access Road Minor	11.3	7.5	–	3.8	3.8			●			■	
R-3	By Pass-1	6.6	–	6.6	–	6.6			●			■	
R-4	By Pass-2	7.2	0.8	2.4	4.0	6.4			●		■	■	
R-5	By Pass-3	2.6	–	–	2.6	2.6			●			■	
R-6	By Pass-4	0.9	0.3	0.6	–	0.6			●			■	
R-7	Excursion Road-1	2.1	1.4	0.9	–	0.9			●			■	
R-8	Excursion Road-2	6.8	2.0	–	4.8	4.8			●		■	■	
	VILLAGE RENEWAL PROJECT	20.8	–	10.6	10.2	20.8							
V-1	Borobudur Village Center	11.8	–	5.7	6.1	11.8			●	■		■	■
V-2	Borobudur-1	1.8	–	1.8	–	1.8			●			■	■
V-3	Borobudur-2	1.8	–	1.8	–	1.8			●			■	■
V-4	Wanurejo-1	1.3	–	1.3	–	1.3			●			■	■
V-7	Sawitan-2	1.2	–	–	1.2	1.2			●			■	■
V-8	Mendut-1	2.9	–	–	2.9	2.9			●			■	■
	GRAND TOTAL	162.5	44.8	97.5	26.2	137.3							

N.B. • Sanctuaries of Prambanan with ● mark are set the reserved areas for sanctuaries, but the figures in this column are excluded the reserved areas, which are 56.4 ha (S-1) and 8.8 ha (S-4).
- the figures of public owned in the development area column represent the amount of nationally and publically owned land.
- Indicates the stages in which the archeological survey and restoration works will be carried out.
- For the missing numbers in the village renewal project, they are not included in this project, but included in the Village Improvement Plan.
- Development Entity
  - C = Park Development Corporation
  - G = Government (Central and Provincial)
  - P = Private Sector
- The sanctuary projects with • mark have the reserved areas, which should be developed at the time when the existence of the monuments will be proved.

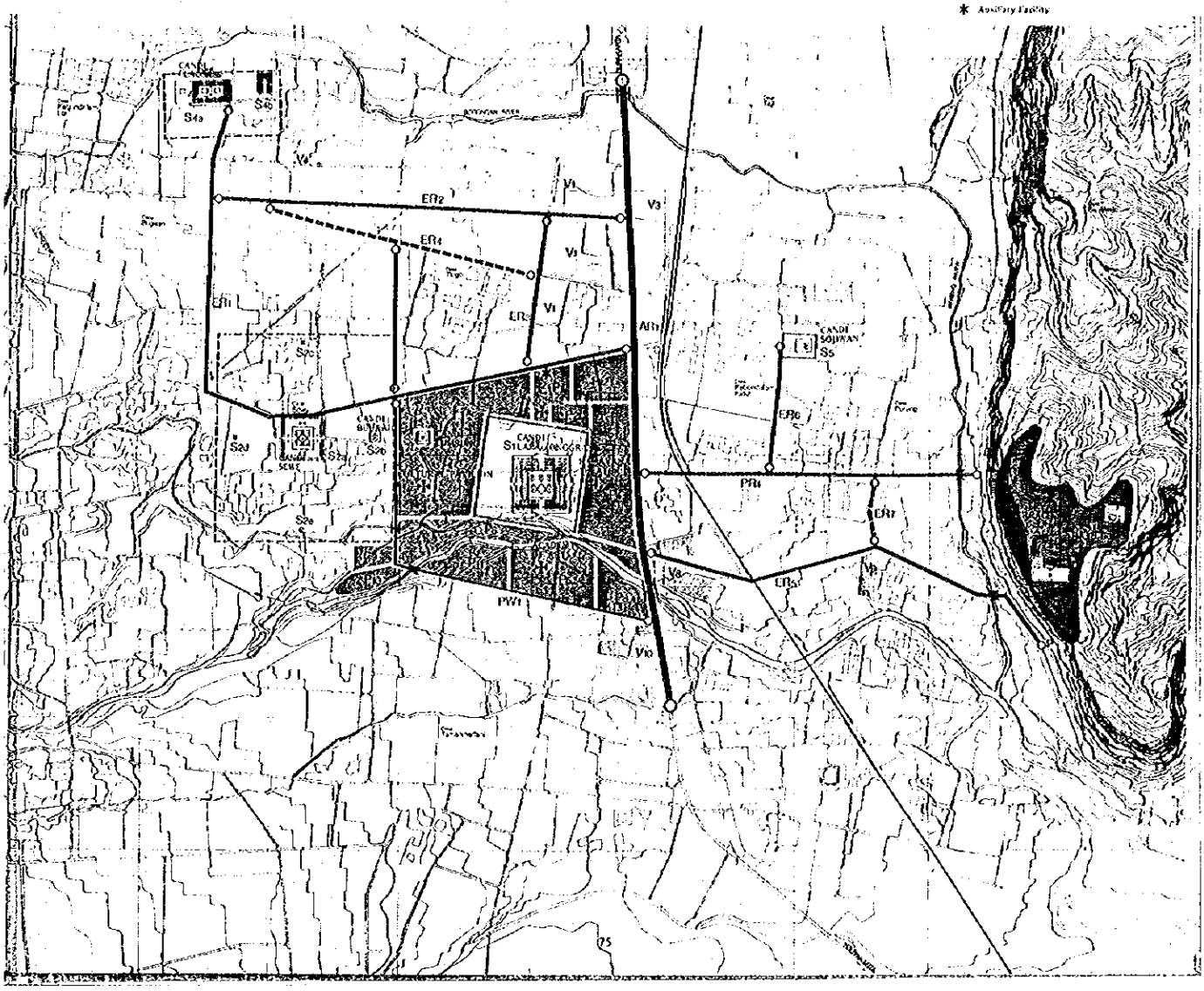
611 PROJECT LIST: PRAMBANAN

	Project	Site Area	Land Required: Public Owned	1936~1985	After 1985	Total	Development stage 1 2 3 4 5 6	Development Body C	G	P	Operation Body C	G	P
	SANCTUARY IMPROVEMENT PROJECT	(ha)	(ha)	(ha)	(ha)	(ha)							
S-1	Candi Lara Jonggrang Sanct.	31.0	12.2	17.3	1.5	18.8							
S-2	Candi Sewu Sanctuary*	15.2	5.2	10.0	–	10.0			●	■		■	
S-3	Candi Kembang Sanctuary	3.5	3.0	0.5	–	0.5			●	■		■	
S-4	Candi Plaosan Sanctuary*	0.3	0.3	–	–	–			●	■		■	
S-5	Candi Sojiwan Sanctuary	2.5	2.5	–	–	–			●	■		■	
S-6	Keraton Ratu Boko	1.0	0.2	0.8	–	0.8			●	■		■	
S-7	Candi Kalasan Sanctuary	2.5	–	2.5	–	2.5			●	■		■	
S-8	Candi Sari Sanctuary	3.0	0.4	2.6	–	2.6			●	■		■	
S-9	Candi Barabudur Sanctuary	1.0	0.1	0.9	–	0.9			●	■		■	
S-10	Candi Sambisari Sanctuary	6.0	0.2	–	0.8	0.8			●	■		■	
	PARK DEVELOPMENT PROJECT	20.0	0.3	–	0.3	0.3			●	■		■	
P-1	Gate	3.2	4.1	65.9	–	65.9							
P-2	Service Facilities	4.2	–	3.2	–	3.2			●		■	■	■
P-3	Cultural Pavillions	14.1	0.2	4.0	–	4.0			●		■	■	■
P-4	National Theatres	9.4	0.9	13.8	–	13.8			●	■		■	
P-5	Academy of Arts	6.4	2.0	7.4	–	7.4			●	■		■	
P-6	Riverside Park	5.3	0.3	6.1	–	6.1			●			■	
P-7	Pegit Plateau Park	10.3	0.1	5.2	–	5.2			●			■	
P-8	Government Offices	1.6	–	10.3	–	10.3			●	■		■	
P-9	Maintenance Yard	1.3	0.1	8.6	–	8.6			●			■	
P-10	Staff Accommodation	6.2	0.2	6.0	–	6.0			●			■	
P-11	Utility Facilities	1.8	–	1.8	–	1.8			●			■	
P-12	Road and Traffic Facilities	5.2	0.3	4.9	–	4.9			●			■	■
	ROAD IMPROVEMENT PROJECT	41.2	16.3	3.4	16.0	23.4							
R-1	Access Road	24.8	9.9	4.7	10.2	14.9			●			■	
R-2	Excursion Road-1	3.3	0.8	2.5	–	2.5			●		■	■	
R-3	Excursion Road-2	3.8	2.6	–	1.2	1.2			●		■	–	
R-4	Excursion Road-3	2.3	1.5	–	0.8	0.8			●			■	
R-5	Excursion Road-4	0.9	0.6	–	0.3	0.3			●			■	
R-6	Excursion Road-5	2.7	2.0	–	0.7	0.7			●			■	
R-7	Excursion Road-6	0.5	0.3	0.2	–	0.2			●			■	
R-8	Excursion Road-7	0.5	0.1	–	0.4	0.4			●			■	
R-9	Excursion Road-8	2.3	0.5	–	1.6	1.6			●			■	
R-10	Excursion Road-9	0.8	–	–	0.8	0.8			●			■	
	VILLAGE RENEWAL PROJECT	22.6	3.0	11.5	8.1	19.6							
V-1	Prambanan Village Center	13.2	3.5	7.4	4.3	11.7			●	■		■	■
V-2	Tlogo	1.2	–	1.2	–	1.2			●			■	■
V-4	Bugisan-2	1.5	–	–	1.5	1.5			●			■	■
V-6	Kebondalem Kidul-2	0.5	–	0.5	–	0.5			●			■	■
V-8	Bokoharjo-1	3.5	3.5	0.8	1.2	2.0			●	■		■	■
V-9	Bokoharjo-2	1.2	–	1.2	–	1.2			●			■	■
V-10	Tamanmartani	1.5	–	0.4	1.1	1.5			●			■	■
	GRAND TOTAL	165.3	33.6	102.1	25.8	127.3							

Development Components: Borobudur



Development Components: Prambanan



Development Schedule

CONSTRUCTION SCHEDULE

617 This schedule sets the construction periods for the different projects of the implementation plan in view of the park project priorities for actual construction, the conditions of the projects, and the interrelations among projects. In setting this construction schedule, the basic considerations have been as noted below.

General

- Because, in principle, site acquisition for park development has the highest priority, the relocation of existing villages is to come first.
- A high priority is also to be given to utility provision for these relocated villages.
- The construction of service facilities(parking areas, gates, and food service facilities) for the growing numbers of visitors is to be done successively. Consideration is also to be given to the utility provision project for park facilities.

Borobudur

- These are special considerations for the Borobudur park area, including the relation with the Candi Borobudur Restoration Project, both the period of restoration and the projects slated for the area now occupied for restoration.
- The relation with plans to move the provincial road (By passes I and II) and to relocate the village center.

Prambanan

- These considerations center on the relations among the restoration of Candi Lara Jonggrang, the improvement of gates and parking area, and the relocation of the village center.

618 In consideration of the above interrelations among factors, and for a balanced content and surface development of the parks, the order of construction for the major projects is as shown below in the C.P.M. network.
It is also to be noted that the items in the construction schedule are as explained below.

Borobudur

- Park development project A
  Those park development project are directly related to the Candi Borobudur Restoration Project.
- Park development project B
  Those park development project are not directly related to the Candi Borobudur Restoration Project.

Prambanan

- Park development project A
  These are park development projects located on the east side of the Opak River or its tributaries where tourist activities will be concentrated.
- Park development project B
  These are projects, primarily service facilities, on the west side of the Opak River and its tributaries.

OPERATION SCHEDULE

619 This is the study of park operation to be done during the implementation term commensurate with and in parallel to park improvement. While the construction period has been set to coincide in principle with the 1976–1985 implementation term, the feasibility of providing appropriate operations for visitors who will visit during this period is studied. From the operational perspective, the implementation term may be divided into the following stages.

- Preconstruction stage	Stages 1 – 2
Preoperation stage	Stages 3 – 4
- Tentative operation stage	Stage 5
- Operation stage	after Stage 5

620 The operations to be conducted at the various stage are outlined below.

Because there are a number of problems to entry control during construction, the present system of charging admission for each facility should be considered until land acquisition is completed and boundry control is feasible.

Preconstruction Stage

This is, as the name implies, the stage for preparatory activities prior to construction, and operational activities here include the setting of organizational and financial policies for after the park opens. Actual operations here are continuing existing operations while engaged in to construction work.

Preoperation Stage (Construction Stage)

Here, the top priority components for park development are virtually taken care of and park improvements almost all covered. Operational activities include study of organizational coordination and personnel assignment for the next stage's operation system, coordination with concerned organization and selection of participating private companies needed in the formulation of the actual program, and necessary budgeting. Operations in this stage will continue the existing operation system.

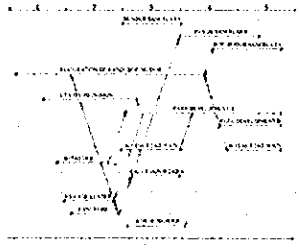
Tentative Operation Stage

Because park development to satisfy park tourist activities has been virtually completed by the previous stage, and the land area for the park site obtained, this stage is to define property lines clearly and to collect fees, moving to the new operation system.

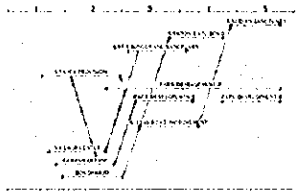
Operation Stage

Because, in principle, all projects for park completion have been finished by this stage, the park is managed with a full-fledged operational system, consideration is given to the different exhibitions and displays, and the software aspects of park development are improved.

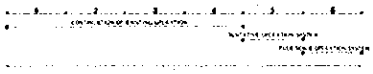
621 CPM of Borobudur



622 CPM of Prambanan

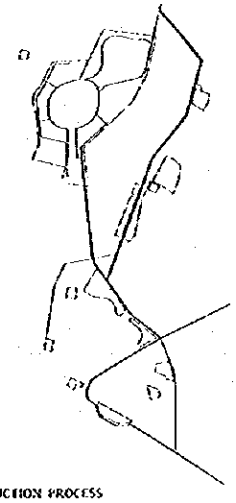


623 Operation Schedule

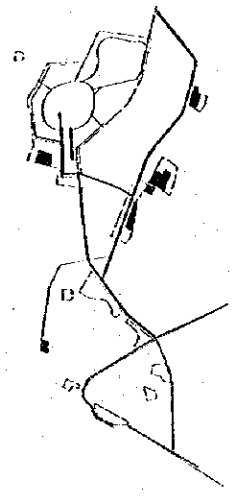


6.2.1 CONSTRUCTION PROCESS

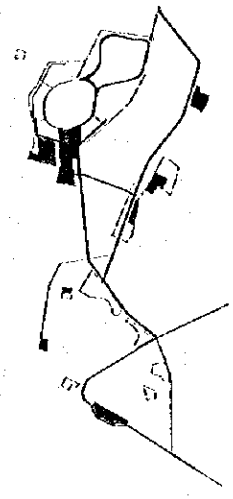
STAGE 2



STAGE 3



STAGE 4



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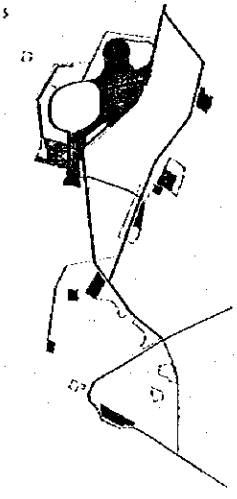
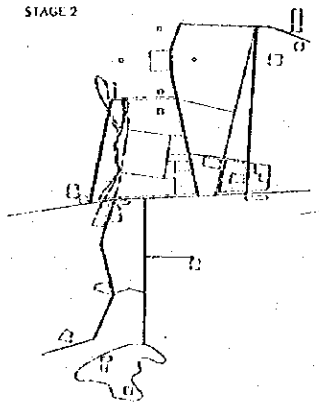


6.2.5 CONSTRUCTION PROCESS

STAGE 2



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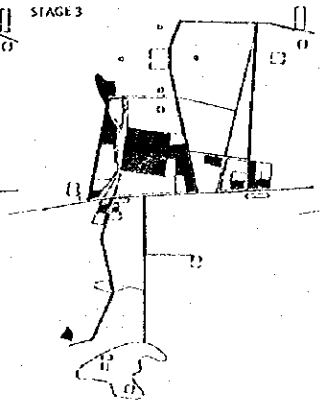

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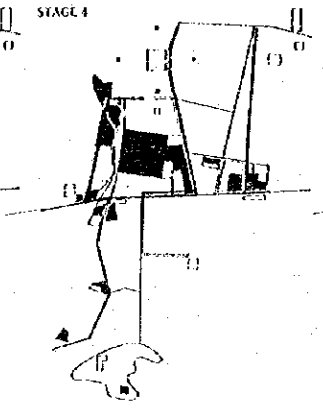

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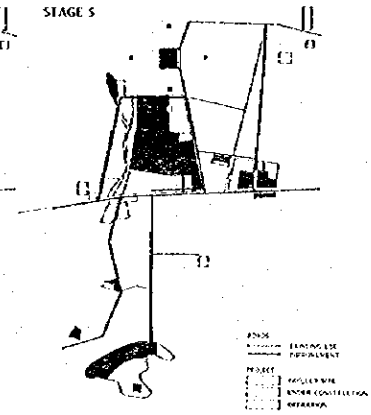


Cost Estimates

SUMMARY

626 This section gives rough cost estimates for the land acquisition costs, technical and survey costs, engineering and supervising fees, and construction costs for the various projects relating to these parks development plan. A budget for operation and maintenance costs after the parks open is also provided.
The below table gives a summary outline of costs for the different parks.

Project Costs: General

Items	Borobudur	Prambanan
Survey Costs	298,380 (3.2%)	327,020 (3.2%)
Consultant Fees	596,770 (6.4%)	654,040 (6.4%)
Land Acquisition Costs	915,000 (9.9%)	1,021,000 (10.0%)
Construction Costs	7,459,440 (80.5%)	8,175,590 (80.3%)
Total	9,269,590	10,177,650

628 Project Costs by Work

Works	Borobudur	Prambanan
Survey Costs	298,380 (3.2%)	327,020 (3.2%)
Sanctuary Improvement	846,330 (9.2%)	615,680 (6.0%)
Park Development	5,458,850 (58.9%)	6,549,330 (64.4%)
Road Improvement	1,373,270 (14.8%)	468,420 (4.6%)
Village Renewal	1,292,760 (13.9%)	2,217,200 (21.8%)
Total	9,269,590	10,177,650

629 Project Costs by Phase

Phase	Year	Borobudur	Prambanan
1	76/77	731,310 (7.9%)	738,380 (7.2%)
2	78/79	1,696,330 (18.3%)	2,205,480 (21.7%)
3	80/81	1,840,740 (19.9%)	2,601,590 (25.6%)
4	82/83	2,030,290 (21.9%)	2,253,310 (22.1%)
5	84/85	2,967,890 (32.0%)	2,378,890 (23.4%)
Total		9,269,590	10,177,650

Note: Figures in parentheses are percentages of the total cost.
(Unit: Rp. 1,000.–)

630 Operating and Maintenance Cost per Year

Items	Borobudur	Prambanan
Personnel Expense	79,200	85,200
Material Consumption	69,780	75,460
Fuel Consumption	6,890	8,400
Other Costs	15,550	16,900
Total	171,450	185,960

CONDITION OF COST ESTIMATES

631 The above cost estimates have been made on the basis of the following conditions:
- Date of estimate February 1975
- An exchange rate of Rp.415.- to the U.S. Dollar
- Estimates have been made on a unit price cost base
- All figures except for those for land acquisition cost include a 20 percent contingency addition
- The average land acquisition cost has been set at Rp.1,000.- per square meter

632 Explanation of Cost Estimates Items

Survey Cost
- These are the costs of surveys and investigations which will be needed at the next study stage. The items covered include land acquisition surveys, infrared photography archeological studies, social surveys, technical surveys, topographical surveys and mapping, water resources surveys, etc.

Land Acquisition Cost
- Of the land required for each of the development and improvement works, the following kinds of nationally and publicly owned land have been excluded: the grounds of the archeological monuments, land already acquired for restoration of Candi Borobudur, public facility sites, and existing road sites.

Consultant Fee
This is 8% of the construction costs, including the detailed planning, preliminary and detailed engineering, and the supervision.

Construction Cost
- Here the construction cost has been estimated by development unit of each project indicated in the project list. Not included, however, have been the cost of monument restoration of the sanctuary improvement project and the cost of the soneetbunniere project of the Lara Jonggrang Sanctuary.

- The work included in the construction of each project is as follows:

– Sanctuary Improvement Project
Earthwork and landscaping

– Park Development Project
Earthwork, provision of infrastructure, landscaping, building and gardening

– Road Improvement Project
Earthwork, road construction, roadside landscaping, bridge

– Village Relocation Project
Earthwork, provision of infrastructure, landscaping, building and gardening

COST ESTIMATES BY STAGE

633 These are cost calculations by stage for each stage in the development schedules set for project planning for the different parks. The following assumptions have been used in calculating costs.

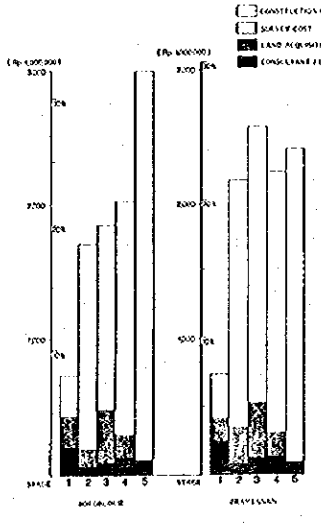
Survey Costs
In principal, these are all to be needed in stage 1.

Land Acquisition Cost
It is assumed that the land for each project will be acquired before first stage construction is undertaken.

Consultant Fees
- For detailed planning for all projects, to be done in stage 1 (2.6%)
- For detailed engineering studies for each project to be done in the previous stage of the construction stage for each project (2.2%). However, studies through stage 3 of the park improvement project and sanctuary improvement project are to be done in stage 1.
- For supervising, to be divided by construction stage (3.8%).

Construction Costs
- Included in the construction stages for the different projects

634 Cost Estimates by Stage and Work



OPERATION AND MAINTENANCE COST

635 Personnel Expenses

The personnel expenses are estimated on the basis of only consideration of the personnel belong to the Park Operation Corporation.

	Unit cost Rp./year	Borobudur persons	Prambanan persons
High Class Staff	1,800,000	15	15
Medium Class Staff	360,000	35	55
Lower Class Staff	120,000	330	320

636 Material Consumption

Material consumptions quantity is seen as 1 -- 5% of the material costs for each project. However, this is not included in government facility, road improvement project, or village renewal project estimates.

- Landscaping 3%
- Architecture 1%
- Utility 5%
- Road 5%

637 Fuel Consumption

- Diesel Generator Fuel:
  - light oil
    Borobudur: 90,000 ℓ/12 hr x 350 days = 31,500 m³
    Prambanan: 180,000 ℓ/12 hr x 350 days = 63,000 m³
  - Lube oil
    Set at 40% of above fuel costs
- Fuel for Vehicles: Gasoline
  Average mileage for all vehicles is set at 30 km/day, with the exception that the daily average for fire engines and water trucks is seen as negligible.
  - Sewage collection trucks: 5 km/ℓ 6ℓ/day
  - Others: 7.5 km/ℓ 4ℓ/day

638 Other Costs

Other miscellaneous costs have been set at 10% of the total for the above items.

These are the operation and maintenance costs for 1986 when park improvements have been completed. However, cost estimates are as of the end of February, 1975.

PROJECT COST BY PHASE: DETAIL

639 Borobudur Park

(Unit: Rp. 1,000.--)

Items	Phase-1	Phase-2	Phase-3	Phase-4	Phase-5	Total
Survey Cost	298,380	--	--	--	--	298,380
Consultant Fee	207,960	61,730	89,830	128,600	108,650	596,770
Land Acquisition Cost	228,000	126,000	388,000	168,000	--	915,000
Construction Cost						
(1) Sanctuary Improvement	--	--	56,460	52,180	614,520	723,460
(2) Park Development	--	652,680	1,162,410	1,135,960	1,525,260	4,488,310
(3) Road Improvement	--	187,320	16,190	521,810	130,420	1,855,790
(4) Village Renewal	--	668,550	127,820	18,410	280,010	1,098,850
TOTAL	734,340	1,696,330	1,840,740	2,030,290	2,967,890	9,269,590

640 Prambanan Park

Items	Phase-1	Phase-2	Phase-3	Phase-4	Phase-5	Total
Survey Cost	327,020	--	--	--	--	327,020
Consultant Fee	248,360	79,220	121,760	124,620	87,080	651,010
Land Acquisition Cost	170,000	269,000	406,000	176,000	--	1,021,000
Construction Cost						
(1) Sanctuary Improvement	--	--	246,010	88,310	75,570	409,890
(2) Park Development	--	874,120	1,435,280	1,468,220	1,676,390	5,445,010
(3) Road Improvement	--	--	--	131,130	231,080	365,210
(4) Village Renewal	--	983,140	392,510	262,030	308,770	1,946,450
TOTAL	738,380	2,205,480	2,601,590	2,253,310	2,378,890	10,177,650

641 Borobudur Park

Items	Cost
Sanctuary Improvement Project	816,330
S-1 Candi Borobudur Sanctuary	698,650
S-2 Candi Pawon Sanctuary	65,670
S-3 Candi Mendut Sanctuary	85,980
Park Development Project	5,358,550
P-1 Gate	359,200
P-2 Service Facilities	361,370
P-3 Archeological Museum	669,160
P-4 Archeological Research Center	617,920
P-5 Seminar House	303,190
P-6 Guest House	173,900
P-7 Dagi Hill Park	486,930
P-8 Maintenance Yard	178,700
P-9 Staff Accommodations	826,160
P-10 Utility Facilities	1,131,910
P-11 Road & Traffic Facilities	366,060
Road Improvement Project	1,338,270
R-1 Access Road Main	512,320
R-3 Bypass-1	268,360
R-4 Bypass-2	328,100
R-6 Bypass-4	23,450
R-7 Excursion Road-1	207,700
Village Renewal Project	1,292,760
V-1 Borobudur Village Center	1,001,500
V-2 Borobudur-1	159,230
V-3 Borobudur-2	81,900
V-4 Wanurejo-1	52,930
General (Survey Cost)	398,310
Grand Total	9,269,590

(unit: Rp. 1,000.--)

642 Prambanan Park

Items	Cost
Sanctuary Improvement Project	615,650
S-1 Candi Kalasan Jonggrang Sanctuary	365,660
S-2 Candi Sewu Sanctuary	45,350
S-3 Candi Lumbung Sanctuary	--
S-4 Candi Plaosan Sanctuary	37,920
S-5 Candi Sojiwan Sanctuary	39,650
S-6 Ratu Boko Sanctuary	57,760
S-7 Candi Kalasan Sanctuary	47,650
S-8 Candi Sari Sanctuary	30,810
Park Development Project	6,319,330
P-1 Gate	321,330
P-2 Service Facilities	309,020
P-3 Cultural Pavilions	861,910
P-4 National Theatres	933,210
P-5 Academy of Arts	669,450
P-6 River Side Park	193,630
P-7 Pegat Plateau Park	166,690
P-8 Government Offices	281,360
P-9 Maintenance Yard	186,010
P-10 Staff Accommodations	1,022,220
P-11 Utility Facilities	1,205,410
P-12 Road & Traffice Facilities	222,760
Road Improvement Project	465,420
R-1 Access Road	336,210
R-2 Excursion Road-1	101,210
R-3 Excursion Road-5	30,190
Village Renewal Project	2,242,300
V-1 Prambanan Village Center	1,562,610
V-2 Tlogo	92,450
V-6 Kebon Sari-Kidul-2	105,600
V-8 Bokoharjo-1	311,350
V-9 Bokoharjo-2	73,630
V-10 Tamanmartani	63,660
General (Survey Cost)	327,020
Grand Total	10,177,650

Development Organization

613 This section proposes the establishment of the final decision-making body needed for the realization of the national archeological parks' plan and further suggests the different organizations which should be formed and the roles they should play at each stage of preparation construction and operation.

FINAL DECISION-MAKING BODY

614 Legally, organizationally, financially, and otherwise, the President of the Republic of Indonesia and/or the appropriate Government Ministers are to make the final decisions regarding the preparations for the national archeological parks.

The President and/or Ministers are to establish a Special Council as an advisory body on legislation, financing, zoning, development and other parts of the project.

The President and/or Ministers are also to establish a Park Authority as the implementing body for the project and to entrust this Authority with the responsibility of overseeing the planning, preparation, construction, operation, and other aspects of the project.

615 The President and/or Ministers are to implement the following items with all due haste as prerequisite to this national project.

- Enactment of the Special Law Concerning National Archeological Parks Development Preparation (tentative name)
- Designation of the Borobudur and Prambanan areas as National Archeological Parks and legal procedures for regional zoning and landuse regulation
- Budget measures for the project
- Policies for nationalization of areas to be developed

SPECIAL COUNCIL

616 The Special Council to be established by the Final Decision-making Body is to support the activities of the Park Authority and is to function giving guidance and assessment as a deliberative body above the Park Authority.

The Special Council is to have the following subordinate organizations at each stage of the project's realization. The present Steering Committee is to be dissolved to provide the nucleus for the Special Council.

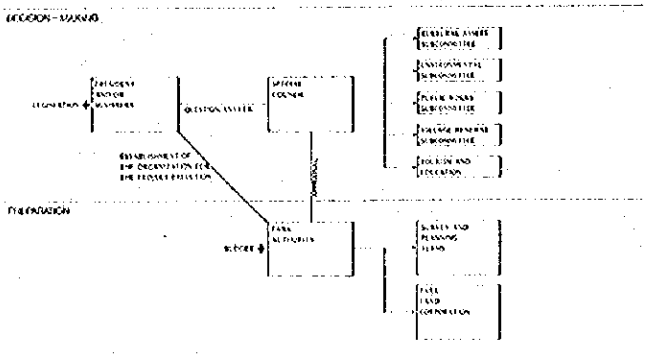
617 In the preparatory stage, the following five subcommittees are to be formed to give technical study to various aspects.

- Cultural Assets Subcommittee
  Archeological monuments and intangible cultural assets
- Tourism and Education Subcommittee
  Tourism policy and promotion of study tour
- Environment Subcommittee
  Environmental preservation and landuse and design control
- Public Works Subcommittee
  Coordination with other projects
- Village Subcommittee
  Measures to deal with the local community and efforts to have the local community share in the benefits of development

618 In the construction stage, the technical team is to support the Special Council, especially in dealing promptly with various problems which may arise in actual construction.

619 In the operation stage, appropriate operations are to be conducted under the guidance of the two Government Agencies located within the park areas (the Archeological Institute and Cultural Institute) and the Education Agency and Tourism Agency with their particularly strong ties to the parks.

650 ORGANIZATIONS FOR PREPARATORY STAGE



PARK AUTHORITY

651 A Park Authority will be established by Presidential order for the execution of the project. As the entity for promotion of the project, it will have the following subordinate organizations in the different stages of the project:

- Preparatory stage: Survey and Planning Team (SPT), and Park Land Corporation (PLC)
- Construction stage: Park Development Corporation (PDC)
- Operation stage: Park Operation Corporation (POC)

652 In the preparatory stage, the actual working groups for the Park Authority are to be: (1) the Survey and Planning Team and (2) the Park Land Corporation

653 Park Development Corporation

The Park Development Corporation will be organized under the Park Authority in the construction stage of the project. Considering the fact that national parks are involved and that the works involved are wide-ranging, it is desirable that this be a strong organization benefiting from the administrative guidance and financial backing of the central government.

High caliber personnel should be recruited for it from the various agencies of the Central Government as well as from the Provincial Governments of Central Java Province and the Yogyakarta Special District. Furthermore, it should be operated entirely with capital provided by the Central Government either free of interest or at a long term, low rate of interest.

The source of such funds will be the extra tax revenues from increased tourism income in the project region resulting from development.

Its role will be as follows:

- Improvement of the park sites and construction of park facilities
- Undertaking of public works on behalf of the central and provincial governments

654 Park Operation Corporation

The Park Operation Corporation will be organized under the Park Authority in the operation stage of the project. Consideration can be given to a carrying over of the Park Development Corporation organization to assume control of operations under this new name.

The direct income of the parks (admission fees and concession fees) will be used for their management and maintenance.

Considering the nature of the project, however such income can not be expected to amply cover other operational costs. Accordingly, it will be necessary for the Central Government to provide a subsidy.

Its role will be as follows:

- Operation of the parks and planning and public relations work
- Maintenance and management of the parks
- Control of works carried out by private entities on commission

655 The following system is proposed for park operation:

- The Park Operation Corporation (P.O.C.) is to conduct all park operation and maintenance under the direction of the Park Authority.
- Because park construction and reseration will still be continuing 10 years from now, construction and use are to coexist in full coordination with the Park Development Corporation.
- In close liaison with Governmental Agencies located within the parks, P.O.C. is to cooperate in the planning and execution of promotional activities and special cultural events.
- P.O.C. headquarters are to be located in Yogyakarta, Borobudur Park, or Prambanan Park. If these are located in Yogyakarta, branch offices are to be located in the two parks; and if headquarters are in one of the parks, the other park is to have the branch office.
- As well as promoting general administration, the branch office is to be responsible for the management of the two sections under direct administration and the two consigned sections.
- The duties of the Operation Section are to cover operation of facilities within the parks, information and guidance for visitors, and park patrols.
- The duties of the Maintenance Section are to cover the care and maintenance of utilities and facilities within the parks.
- Operations to be consigned to private operator are (1) consignment operation of restaurants, kiosks, passars and other convenience facilities and (2) consignment of guide service, andong service, bicycle rental service and other visitor services.

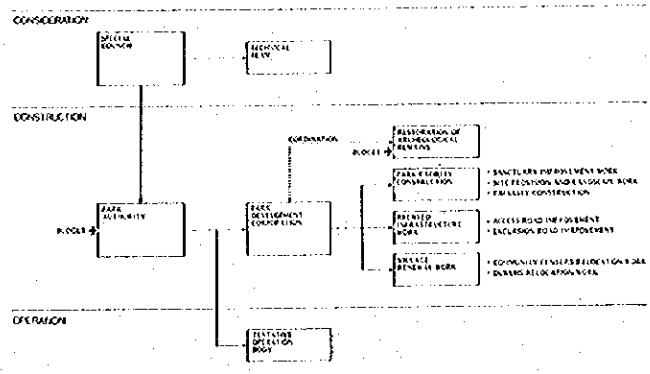
656 Similar Organizations in Japan

Council for the Protection of Cultural Properties
Based upon the Law for the Protection of Cultural Properties, the Council for the Protection of Cultural Properties, located within the Ministry of Education, responds to requests by the Minister of Education or General Director of the Agency for Cultural Affairs for surveys and deliberations on important matters regarding the preservation or use of cultural properties and, when necessary, makes proposals on such matters to the Minister of Education.

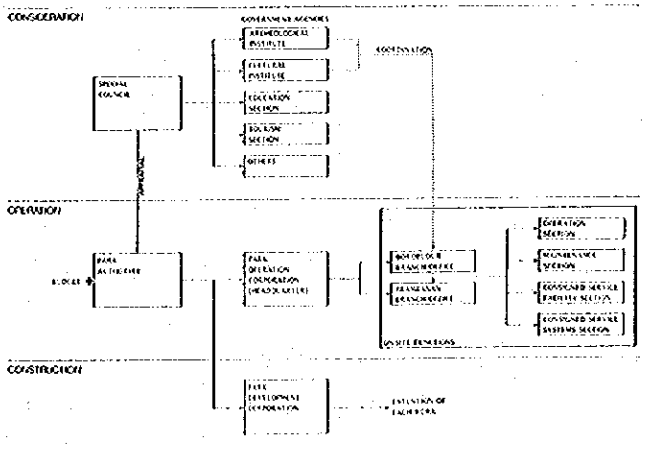
Council for Historical Features in Ancient Capitals
Based upon the Law Concerning Special Measures for the Preservation of Historical Features in Ancient Capitals, the Council for Historical Features in Ancient Capitals, located within the Prime Minister's Office, surveys and deliberates important matters relating to the protection of historical features, as well as giving opinions when the Prime Minister designates or alters historical features and conservation areas, decides or alters plans for the protection of historical features, or takes such other actions.

Tourist Policy Council
Based upon the Basic Tourist Law, the Tourist Policy Council, located within the Prime Minister's Office, gives its opinion when the government is to submit "policies to be implemented regarding tourism" to the Diet under the provisions of Article 5 of said Law, as well as containing within it an International Tourism Subcommittee to continue deliberations on international tourism.

657 ORGANIZATIONS FOR CONSTRUCTION STAGE



658 ORGANIZATIONS FOR OPERATION STAGE



Urgent Actions

EXECUTION SCHEDULE

The following order is preferable for the preparatory work prior to commencement of works.

659 Work in 1975

Review of the JICA Study by the Indonesian Steering Committee and preparatory activities to be undertaken by it in connection with project implementation.

- Comprehensive review of the contents of the JICA Study
- Consideration of compatibility with national plans, regional plans, etc. and structuring into such higher level plans
- Study of development scale and content and determination of what works to be undertaken
- Organization of a Authority and drafting of immediate action plan
- Budgetary measures for the next fiscal year

660 Work in 1976

After the work of be undertaken is determined through the proper procedure, the Park Authority will implement an immediate action plan along the following lines.

- Prior Investigations
  - Investigation of undiscovered archeological monuments throughout the region by such methods as aerial infrared photography
  - Surveying of the land throughout the development area
  - Boring tests for investigation of water resources
  - Other detailed investigations and surveying required for implementation design
  - Social survey of the project region
  - Survey of land, buildings, and rights in areas to be subject to village relocation
  - Systematic collection and filing of statistical information regarding the region
- Works Plans and Design
  - Plan for drawing boundaries for designation of preservation areas
  - Site acquisition plan
  - Monument restoration plan
  - Road construction plan and detailed design
  - Village relocation plan and detailed design
  - Plans for other public works and detailed design in connection with them
- Legislative Measure
  Drafting of a National Archeological Park Construction Special Bill and enactment of it into law.
- Fiscal Measures
  Administrative and tax measures for procurement of development funds
- Public Relations
  Wide dissemination among the people of information on the significance of construction of these National Archeological Parks as well as close liaison and coordination with the local community.
- Establishment of the Park Development Corporation

661 Work in 1977

Commencement of works by the Park Development Corporation

- Acquisition of land
- Preparation for relocation of villages
- Preparation for construction of parks

PROPOSED SCOPE OF WORK

662 General Study

Included is all of the work in terms of organizations, administration, legal systems, and finances with respect to designation of the park areas, to park development and to park operation.

663 Special Surveys

- Land Acquisition Survey
  This survey will include investigation of actual land prices and acquisition feasibility with respect to the land that is to be acquired.
- Archeological Survey
  This survey will employ infrared aerial photography and will cover a total area of 3,000 ha with respect to the two parks.
- Social Survey
  This will include an investigation of the community structure, living habits and customs, and so on of existing villages and villages to be relocated in the village relocation project and questionnaires to determine the attitudes of local residents toward the parks.

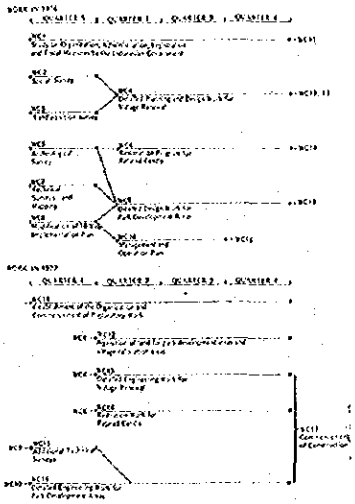
664 Technical Surveys

- Topographical surveying and mapping
  Preparation of topographical maps on the basis of the results of surveying, the total area to be covered with respect to the two parks being 800 ha
- Water resources survey
  Investigation of the amount of underground water through survey of the surface of the ground, boring tests and pumping tests and investigation of the amount of water gushing from existing springs.
- Survey of existing irrigation network
  Survey of the irrigation network in Zone-3
- Geological survey
  This survey will cover particularly the hill on which Candi Borobudur sits and the area of the Pegat Plateau
- Vegetation and soil survey
  Survey of the vegetation suited to the Borobudur and Prambanan areas and chemical survey of the top soil
- Traffic survey
  This survey, which will cover particularly national and provincial roads in the vicinity of the parks, will serve as a basis for the road improvement projects.

665 Detailed Planning and Preliminary and Detailed Engineering

This category covers all the work necessary for implementation of the various plans of the project, including their revision on the basis of the above surveys.

666 WORKING FLOWCHART OF STAGE 1



CHAPTER SEVEN
ECONOMIC STUDY

Summary of Economic Study

The following objectives were set in the economic study for the project formulation.

701 Indonesia must, as a state and as a people, continue to prosper at a high level, economically, socially, culturally, and in all aspects. At the same time, it must be able, again as a state and as a people, to have a satisfactory individuality accepted to be respected in international society.

In view of this goal, when the state plans a given project, this planning must be done with full study to the project's this planning must be done with full study to the project'ssignificance and role in this regard and the appropriate economic resources must be allocated.

Accordingly, the first goal of the economic study is to clarify the project's nature and to assess whether the project significance deserves the investment of substantial efforts and resources by the Indonesian state and people.

702 When a project is formulated as a national project, that project has two senses.

One is the sense of the project itself, in this case the sense of the project as an archeological park. In this sense, it is possible that a number of similar projects may exist, and it is possible to execute the project on a simple cost: benefit approach.

However, there is another sense of national project that implies more than simply a project undertaken by the state, and this is the sense of the national project as somehow linked to the destiny of the state and the people. In this instance, the project is not simply just another project but has an importance in how it is to be utilized for national purposes.

The physical construction of the parks is a technical problem, and how it is managed for tourist activity an administrative problem. Yet the issue of utilizing the project well for state and popular goals, while also involving construction and administration, is an issue of national ethics, an issue of statesmanship.

The second point of the economic study is the study of the role of the project. Here it is concluded that the project has full potential as a tool for the realization of statesmanship.

703 The third objective of the study is to determine the elements for the success of the project.

The first step is to decide what functions the project is to serve, and this may be called the design of functions. The first study done to this end was the marketing survey, a determination in terms of physical scale of the national or international demand to which the project must respond. As a result, the project's scale and structure of functions were determined from the demand side. Then, in consideration of the project's great significance as a national project, the design of functions was advanced with respect to the project contents and capacity. (This is the realm of physical planning, and the results were compiled in the Physical Master Plan.)

The next phase of the economic study was the question of how to realize the design of functions at the different levels.

The Financial Feasibility Preliminary Study was done and the general budget scale formulated. With this budget scale, the design of functions was converted into the physical design and the investment schedule necessary for achieving the Master Plan set accordingly.

The following economic study was to study the availability of the resources such as labor, technology, capital, and other factors based upon the investment schedule. As a result of this availability study, it was concluded that the resources are available and the study was advanced to the next stage.

704 The fourth objective of the economic study was to determine whether or not the project has the financial feasibility to be self-supporting in itself as a project.

This feasibility may be divided into the financial feasibility of the construction plan and the financial feasibility of its operation.

The financial feasibility study concluded that the project is fully feasible over a period of 30 years at a discount rate of 8.5%. However, it should be noted that this is feasible assuming the status of a government national project with the right to collect taxes, and is not to imply feasibility as a privately managed enterprise. By the same token, it is feasible according to the Master Plan. At this stage, the construction of the project in Central Java is affirmed, and it may be concluded that this project has even greater financial feasibility from the national perspective. Construction should be completed under an authority which will be controlled by national commission but operating activities shall be carried on by local authority which includes central governmental agencies.

705 The fifth objective of the economic study was to examine not simply the project itself but the effects which completion would have on the regional and national economies.

Turning first to the stock effect, two areas were examined. In the one, it was determined that the project's effect upon the national assets would be to promote the functional rehabilitation of the national assets and to preserve and accumulate the value of the assets. Here of course, the assets referred to are those of overall tangible and intangible value. In the other, a structural effect was found in that the expansion of these assets and the supplementing of their functions thereby is also the construction of means generating a variety of structural effects for the nation's economy and society. In addition to the production of intangible value such as the effects for external trust, the unity effects within the political background, and the structural effects of the cultural hierarchy, this is the generation of structural changes yielding the flow effect.

Turning then to this flow effect, this project will have an extremely diverse and multifaceted flow effect upon the national economy of the region, yet the measurements here have been made of only those which are susceptible to qualitative measurement and only those which are direct effects. Were a measurement to be attempted including all indirect effects, this would require a total assessment using the national comprehensive model. While such is not within the scope of this study, it may be said that the economic feasibility of the project is beyond question even from the direct effects alone. Moreover, it can also be said that the level of feasibility is well beyond that for any other project.

706 The sixth objective of the economic study is the issue of coordinationg this project with the regional development plan for the middle Java area.

While this question is really outside the purview of this study and is more a question for the local government administrators, several recommendations can be made from the standpoint of the plan.

In conclusion, it may also be said that the project is an indispensible main project for the balanced development of the Middle Java region. Just as no regional society can be structured entirely upon an industrial base, the worth of this project is best appreciated not in simple comparison with the economic feasibility of other projects but in the broader total assessment perspective of its complementary role in the regional development plan.

707 The seventh objective of the economic study is to formulate recommendations on how this established national project can be utilized as a means for achieving greater statesmanship. A number of possibilities come to mind:

- as the core for educational policy to achieve national unity and self consciousness of the Indonesian people within their national heritage based on modern scientific backgrounds.
- as a developmental means of centrality for inter-regional exchanges or for the promotion of regional development, especially as a mode of social stabilization forming bipolar centripetality for the duality of centrality in the political/economic direction and the cultural/recreational direction.
- as a means and central core in the two aspects of industrial urban development policy and agricultural development policy
- as a means for the systemization of various policies not for limited local development but for the people's mobility policy, and as an economic development mode to create the physical and non physical infrastructure of the project
- as a mode of external cultural policy with satellite-relay promotions and other means of creating an international convention center, etc.
- as a sales point in air policy and a sales point in external air negotiations linking international tourist activity with air policy

While this project is, of course, fully feasible as a project in and of itself, it becomes even more important when utilized for the uses of statesmanship.

Significance of the Project

TOWARD ACHIEVING UNITY OF INDONESIA AS A NATION AND AS A PEOPLE

108 Political unity

Although opinions differ on this point, according to Dr. Hariri Hady it is generally recognized that the political unity of Indonesia was achieved in 1965 as the fruit of over twenty years of effort by the people since the country attained independence.

202 Economic unity

The 2nd Five Year Plan lists economic unity as one of the most *important goals to be attained, because strong political unity and* consciousness of the nation and the people can only be substantiated and strengthened by strong economic unity. However, in view of the present circumstances in Indonesia, achievement of this goal is still far off, and many problems will have to be solved before economic unity can be attained. Cf. Dr. *Hariri Hady "Problem of Promoting Import Substitution and* Export-oriented Industries in Indonesia" Oct. 21--23, 1971, eport of the Symposium on Asian Industrial Development, Institute of Developing Economies, Tokyo.

210 Projects required to bring the nation closer to political and eco*nomic unity*

The kind of project most urgently required in Indonesia today is one that consists of strong measures to advance economic unity and at the same time creates a strong spiritual backbone for advancing economic unity and strengthening the political unity of the people. Even if such a project is not completely successful in attaining economic unity, *it should create a common basis and* lead to a strong awakening of the Indonesia people by strengthening political unity.

211 A continuing source of national pride and enduring in spiration to succeeding generations.

Though indigenous cultures and histories vary from region to region, these cultures and histories did not develop independently. They have in common cultural characteristics which have their roots in the natural features that have supported the life and history of the people of Indonesia since times when political and economic unity was still weak. The sources of these common characteristics should become all the more clear the further history is traced back to ancient times. The most ancient historical and cultural heritage of Indonesia should be honored as a continuing source of national pride of the Indonesia people, as this heritage is evidence of the common foundation of their cultural and historical existence. At the same time, this heritage *should be the pride of all Indonesians.*

212 The historical remains of Central Java, a glorious historical and cultural heritage

When an Indonesian is asked to name a symbol of national pride for all of Indonesia, he will most certainly select the historical remains in Central Java, of which Borobudur and Prambanan are representative. In the history of Indonesia, these remains once formed the heart of Indonesian civilization, whose influence extended to varying degrees to all regions of Indonesia as well as other parts of Asia.

From the above emerges the problem which may be considered the first feature of this project, i.e., "How can these remains be preserved and how can their value be enhanced".

213 A living symbol of Indonesian pride breathing into the people

Historical remains, however valuable they may be in a historical or cultural sense, will be no different from Inca ruins, for instance, unless they are well known and clearly recognized by the people of Indonesia. They may become a project for UNESCO, but they cannot qualify as an Indonesian national project.

As the Indonesian people recognize the value and take pride in these remains as their historical and cultural heritage, and feel that "it is a place that must be visited once in a lifetime", these remains are indeed the symbol of pride of the Indonesian people and the root of Indonesian culture.

From the above arises the problem which is the second feature of the project, i.e., "How can these historical remains be made known to the Indonesian people, how can this pride of Indonesia be communicated to the people of the world", in other words, "How can the value of these ruins be enhanced within the intellect and lives of the Indonesian people and the intellect of *the people of the world".*

214 Tourist activities as a means of attaining the objective

A symbol of pride can be created by disseminating education, publicity, and knowledge about these heritages. Such amassing of knowledge as a source of tourist demand will create tourist activities which *will accumulate new knowledge gained through* actual sightseeing. Knowledge further amassed through experience. Reproduction of this knowledge on an enlarged scale will strength and enhance the value of the symbol of pride. Creation of tourist activities will attain the objective of the project.

This means that the following are necessary.
(i) Dissemination of knowledge and, as a result, an increase of tourism.
(ii) For the self dissemination of knowledge, offering tourists attractions and services which exceed their expectations.
(i) As a national project which will include all governmental and private activities, education, publication, and broadcasting, what will take concrete shape in the project is (ii) namely, the ability to provide services. As the generation of tourism is a demand based on non daily experience, the whole of one trip, from departure to return, will affect the degree of satisfaction. This further depends on three factors:
(a) Services offered to reach the destination
(b) Accommodations at the destination
(c) Essential tourist services offered at the destination
Directly concerning the project are (b) and (c). (a) which refers to the improvement of transportation will have to be taken up in the framework of other activities.

The second feature of the project is at present to determine the functions (service capability) relating to (b) and (c). As a matter of course, facilities for these functions will have to be constructed. this forms the physical plan of the project.

ECONOMIC DEVELOPMENT OF INDONESIA AND ATTAINMENT OF ECONOMIC UNITY

215 Economic unity and "personal transportation flow of tourism"

The first of the functions which have to be newly created and strengthened by this project is formation of a "personal transportation flow of tourism".

Generally, economic unity follows the three stages below.

- Exchange of knowledge and information. Political unification consists of removing obstacles to communication, supported by television, telephones, other mass communication media, and the movement of people.
- The exchange of information leads to a flow of commodities and money.
  In this stage, regional and foreign trade are liberalized and transfer of regional effective demand takes place. This can be *referred to as the stage of market unification.*
- Movement of capital and labor between regions.
  A regional production network is established, as exemplified by Japan and the EEC. This is economic unity. Obviously, tourism promotes the stage i to ii, i prepares the ground for ii and iii.

216 Establishment of the infrastructure and "personal transportation flow of tourism"

The function created by tourist activities is "personal transportation flow of tourism," in other words, the creation of a network of systems covering the entire country which accommodates both foreign and domestic tourists. The 2nd Five Year Plan lists the following long-term policies for advancing the economic development of Indonesia.

- An agricultural policy for Java which aims at transforming its agriculture into one that employs capital and advanced techniques, and practices highly intensive and productive farming of high value crops. Other types of agriculture shall be moved to the outer islands.
- Emphasis on "import substitution industrialization" industries to Java.
- Emphasis on *"export substitution industrialization"* and export oriented industries to the outer islands.
- Deployment of pioneer industries to the outer islands and emigration of excess labor to these islands.

In order to carry out these policies successfully, an enormous infrastructure will have to be established, including the improvement of farm land, development of industrial land and creation of a basic transportation system. The industrial infrastructure is generally local in nature, and the government or the enterprises entering the location will undertake the greater part of construction work.

"Personal transportation flow of tourism", on the other hand, is a network of systems covering the entire country. Neither transport communication nor accommodation are local needs. Moreover, the economic cycle of tourist activities accomplishes the construction of these systems within itself. That is to say that *construction is carried out within people in tourist activities, not* aimed at the construction of infrastructure. The infrastructure is thus formed while earning.

What is even more important than the above is that, starting with the filling of the knowledge void and shortening of the psychodistance of the people by disseminating education and knowledge, which is a preliminary condition and knowledge, which is a preliminary condition for inducing a "personal transportation flow of tourism," tourist services as non-physical services will form a service network throughout the country. In other words, a non-physical infrastructure is established which covers the entire country.

Therefore the promotion of domestic tourist activities cannot be separated from economic expansion and industrial development plans, and on the contrary will become more important as the measure of integration among regions which will establish a high level of division of labor between various localities in the process of development.

312 The effect of tourist projects on the national economy

The effect of tourist projects involving construction on the national economy is brought about by the following two investment cycles.

(i) Investment in tourism → Induction of tourist demands → Investment in tourism
(ii) Increase of "personal transportation flow of tourism" → Investment in transportation → Induction of "personal transportation flow of tourism" → Investment in transportation → Induction of Production → Induction of commodity flow

Since (ii) is based on a national transportation model and requires simulation of a complete cycle analysis, it has been deleted from the present study. Limiting the discussion to direct investment only, the national income effect can be determined by multiplier analysis of investment (i). This is the direct national income effect. When (ii) is included, indirect effects will be incorporated. As a result, when tourist demands are induced, induced investment is generated in the following stage.

As described above, tourist projects are a marginal addition to the national economic cycle and their effects accumulate with repetition of the cycle. The tax revenue incurred will form the foundation for government investment in preservation of historical remains and tourist activities. The income from overseas, by complex multiplier, can be termed the foreign currency effect.

Generally, a cumulative increase not only of tourist services but also of production will occur with regard to this demand effect. This is called the production effect.

On the other hand, investment as a marginal addition to the economic cycle changes the structure of transportation and production. This is called the structural effect.

These three effects in unison bring about economic development resulting in growth in the national income and the generation of the macro-employment effect.

313 The effect of tourist projects on the regional economy

Besides the macro investment effects described above, the induction of regional demands by means of investment will create employment in the regions, and this in turn brings about an accelerated derivation of investment. The induction of "personal transportation flow of tourism" also has a demand effect and will invite investment. This will lead to an increase in the regional income through the regional income multiplier, and will be reflected in an increase in regional production, which in turn creates employment to match this increase. These changes will in turn effect changes in the economic structure of the region. In particular, they will influence the formation of the infrastructure described above.

These factors, as a matter of course, will bring about changes in provincial government revenues, and this will provide the grounds for the governments of the home provinces of the tourists to join this project.

Needless to say, this project for Central Java will have a strong effect on Java Island, where 64% of the population is concentrated.

The region which will benefit most widely will be, of course, the region where the project is located.

This is of great significance for Central Java, whose economic development lags behind other regions and is a "minus region."

319 Regional development as development policies and tourist projects

Among the effects on the regional economy, the influence of this project on the structure of this region will be especially strong. For the region in which investments will be concentrated, this project will constitute a kind of regional development and renewal project, which will replace the old functions of the region by new functions.

A careful examination of the impact which the difference between the old and the new functions has on regional economic development, and the impact of the means of construction on the same will show that it owes more to the operation of the new functions than to construction. This is because at this stage the project is not a simple tourism project, but assumes the role of a leading project in the framework of overall regional development planning.

The project must be evaluated as an overall regional re development plan for Central Java.

320 Features of the economic development effect of the Central Java tourism project

In the many regions of Indonesia there are numerous places which would be suitable as tourist resorts when significance as a symbol of national pride is not made a prerequisite. The beautiful view of Toba Lake, Bali Island where classical customs still prevail — there may be many places equal to these on the outlying islands. If the tourist resorts which each region possesses are considered local highlights, Toba Lake and Bali Island, though world famous, can still be classified as local highlights. The historical remains of Central Java, on the other hand, while being world renowned, are more a national highlight of the Indonesian people, because

- They are a symbol of national pride.
- They are situated in the most densely populated central part of Java. From the point of effectiveness in forming an infrastructure for "personal transportation flow of tourism," the best effect can be anticipated for the island as a whole.
- From the point of regional development, Central Java is a strategic area for the re development of Java Island. That is to say, by promoting the development of Central Java, the over concentration of population in the Djakarta and Surabaja regions can be diverted. For a high density economy this is an important point.

The Borobudur and Prambanan Historical Remains Park as a national highlight is the main project for the regional development of Central Java, a strategic area for the development of all of Java. Its effectiveness as a tourist project can be further enhanced by taking the following measures.

- Complex effect of tourism
  The more numerous the tourist highlights that can be included in a daily tour, the more easily will it become a mode of "personal transportation flow of tourism." If tourism is considered to be an overall service, covering the entire process from departure to return, the density of the object tourist services included in this overall service, and the efficiency of tourist activities, will be high.
- Loop effect of tourism
  When the process from departure to return of a tour is considered a single loop, the more tourist resorts are included in a loop, the larger will be the ratio of time and money spent at the resorts to time and money spent on transportation, and the objective can be obtained efficiently.

The fact that the project will be located in Central Java as a national highlight makes it easier for people coming from various areas of Indonesia to combine their tours with other local highlights and to benefit from these effects.

The project must therefore be designed so as to give full play to these effects.

PERPETUITY OF THE SYMBOL OF PRIDE AND EFFECTS ON ECONOMIC DEVELOPMENT

321 The value of the ruins as a historical and cultural heritage

The value of Borobudur and Prambanan as a historical and cultural heritage or symbols of pride goes beyond their physical existence. If it were possible, for instance, to transfer Borobudur to the Boston Art Museum and have UNESCO preserve it, it would only be a dead cultural treasure, a physical existence historically tied to the Indonesian people.

The value of this historical and cultural heritage is substantiated by the following three facts.

(i) They still exist to the present day where they were originally built, amid the same natural features and environment, exuding the feelings of the Indonesian people who labored to build them, inseparable from the lives of the surrounding villages that continue to exist to the present day.
(ii) They are implanted in the hearts and minds of all Indonesians as a heritage of their ancestors handed on from generation to generation as actual proof of the origin of their present day culture and lives.

(iii) When foreigners speak and think of Indonesia and the Indonesian people in international terms, these ruins are referred to as the symbol of or synonym for Indonesia.

(i) is related to the form in which the remains will be preserved, and (ii) and (iii) are related to the approach used in turning them into tourist attractions.

322 Preservation and special measures to enhance the value of the historical remains

In order to make the above values more widely recognized and to enhance the value as a symbol of national pride, a number of special measures will have to be taken.

- Making the management a joint duty of the surrounding villages in exchange for certain privileges may be an efficient approach.
- The natural features and environment of the surroundings and historical scenes must not be destroyed. Therefore, aside from the preservation of historical, spiritual, and cultural aspects of the ruins, the pastoral life aspects must also be preserved.
- To sustain the symbolism of the ruins, it will be necessary to convey to the people a *feeling of intimacy and at the same time* a sense of exaltation. For this purpose, it will be necessary to make structural plans and to nurture public ethics.
- It will be necessary to establish a politically and economically independent management system
- In view of the significance of the ruins to the nation and the people, *the construction methods* to be followed by the government and the project's financial basis should be clarified.

323 Establishment of basic conditions for tourist activities

As tourist demand is induced through the accumulation of knowledge, the following activities are considered highly significant.

- Implanting in the minds of the people through compulsory education a consciousness and pride of being Indonesian.
- Introduction of a study trip system for students.
- Holding national or international conventions.
- Sending government employees, teachers, and their families to Central Java for study, and construction and management of lodging houses in Central Java provinces at the responsibility of the provincial governments.
- Giving special privileges to the members of such study trips, as for instance giving them tickets to festivals which are held only once every several years, thus encouraging them to visit the ruins more than once.
- Making travel to Central Java convenient by reducing railway fares, etc.
- Establishing overseas tourist centers.

321 Establishment of tourist facilities

- Establishing information centers in all cities
- Establishing a network of accommodations
- Arranging transportation within the complex
- Promoting arrangements for loop tours and issuing coupons
- Historical and cultural remains which are worth preserving
- Tourist facilities
- Lodging facilities
- Transportation facilities and establishment of transportation enterprises

325 Management of the facilities

- Management of public facilities, toll systems
- Control of private management activities

DETERMINATION OF THE CONTENTS OF THE PROJECT (FUNCTIONAL DESIGN)

326 Estimation of Potential Demand (Marketing)

- Estimated Number of Visitors (marketing analysis)
  - Based on Repelita II
  - Some of the TDC survey findings used as assumptions
- Case-1
  - Long-term tourists from other islands of Indonesia and from abroad P/B = 1
  - Long-term and weekend tourists from Java P/B = 1
  - Day visitors from middle Java P/B = 0.6
    Prambanan/Borobudur
- Case-2
  Double for long-term, weekend tourists and day trippers the same as in Case-1.
- Estimation of Expenditures by Visitors
  - It is assumed that the long-term and weekend tourists will be in the project region two nights.
  - It is assumed that foreign visitors will spend $35 a day.
  - The expenditures per day of long-term tourists from other islands of Indonesia will vary according to their province.
  - It is assumed that the long-term tourists from Java will *spend $10 a day* and *weekend* visitors from Java will spend $5 a day.

- Notation

MJ	: Middle Java	P	: Population
W	: Labors	Y	: Income
R	: Ratio of Labor to Population by Industries of each province		
MFY	: Monthly Income per Family		
NLTT	: Number of Long-Term Tourists		
LTY	: Income Level of Long-term Tourists		
NWT	: Number of Weekend Trippers		
WTY	: Income Level of Weekend Tourists		
NDT	: Number of Day Trippers		
DTY	: Income Level of Day Trippers		
NLWT	: Number of Long Term & Weekend Tourists		
NF	: Number of Foreign Tourists		
d_i^j	: Economic and time distance from i Province to Yogya		
TNBO	: Total Tourist Number of Borobudur		
TAPR	: Total Tourist Number of Prambanan		

- Subscripts

i	: Number of Province	ε	: Number of Industry (1, 2, 3)
R	: Rural	U	: Urban
0	: Since i = 1973	s	: Breakdown of LTY

- The variables marked with a bar are based on REPELITA II.

Estimation Method

327 Estimation of Urban and Rural Income and Population of Each Province

$$\#1 \quad W_R(t) = f(P_i(t), \overline{R_R(t)})$$

$$\#2 \quad W_U(t) = \phi[W_R(t), (\frac{\Delta W_i}{W_i})_t]$$

$$\#3 \quad Y_R(t) = \psi[\overline{Y_R(t)}, (\frac{\Delta Y_i}{Y_i})_t, W_R(t)/\Sigma W_R(t)]$$

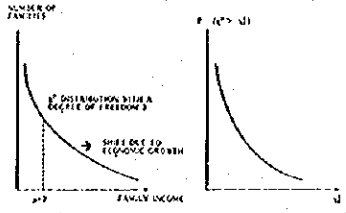
$$\#4 \quad Y_i^R(t) \cdot Y_R(t), \; Y_i^U(t) = \frac{\xi}{1-\xi} \, Y_R(t)$$

$$\#5 \quad P_i^R(t) = \theta[(\frac{P}{W})_i(t), W_R(t)]$$

$$P_i^U(t) = \epsilon[(\frac{P}{W})_i(t), W_{i2}(t), W_{i3}(t)]$$

328 Family Income Distribution and Shift

Considering the percentage of the total population of Jakarta represented by long-term trips, weekend trips and day trips as given in the TDC social survey, the family income-expenditure table for different social strata in Jakarta, and the average income thereof, we have assumed the urban family income distribution for the different provinces to be an χ^2 distribution with a degree of freedom of 2. It has also been assumed that the distribution curve will move parallelly along the vertical axis in a simple fashion in the course of economic growth since in other cities the percentage of families in high-income brackets is not considered to be as high as in the case of Jakarta. This also means the equalization of income distribution.



329 This accumulative density function of the χ^2 distribution with a degree of freedom of 2 is obtained like above by substituting the degree of freedom in the following equation.

- χ^2 distribution function with nth degree of freedom

$$f(x^2) = (x^2)^{\frac{n}{2}-1} e^{-\frac{1}{2}x^2} / 2^{\frac{n}{2}} \Gamma\left(\frac{n}{2}\right)$$

- Gamma function

$$\Gamma(m) = \int_0^\infty e^{-x} x^{m-1} dx$$

- Accumulative density function

$$P(\chi^2 > x_0^2) = \int_{x_0^2}^{\infty} f(x^2) dx^2$$

#6 $$P(\chi^2 > x_0^2) = e^{-\frac{1}{2}x_0^2}$$

330 We have estimated the income levels of 1973 for which long-term trips, weekend trips and day trips are respectively possible by substituting the percentages for each in this accumulative density function.

$$[CIY_1^U(i), WIY_1^U(i), DIY_1^U(i)]$$

The shift of the χ^2 distribution to the right along with economic growth is of the same value as a shift in the direction of the origin of the above-mentioned family income levels in the course of economic growth.

The shift of the values can be estimated by the following equation.

#7 $$\frac{\Delta MEY_1^U}{MEY_1^U}(i) = \omega\left\{\frac{Y_1^U}{P_1^U}(i), \frac{Y_1^U}{P_1^U}(t-1), \frac{P}{W}(t)\right\}$$

331 Estimation of the Number of Long-term Tourists, Weekend Tourists and Day Trippers for the Urban and Rural of Each province

#8 $$NLTT_1^U(i) = \beta\left[\exp\left[-\left[CIY_1^U(i) - \frac{\Delta MEY_1^U(i)}{MEY_1^U(i)}\right]/2\right], P_1^U(i)\right]$$

#9 $$NLTT_1^R(i) = \frac{P_1^R(i)}{P_1^U(i)} \cdot \frac{NLTT_1^U(i)}{10}$$

#10 $$NWT_1^U(i) = \beta\left[\exp\left[-\left[WIY_1^U(i) - \frac{\Delta MEY_1^U(i)}{MEY_1^U(i)}\right]/2\right], P_1^U(i)\right]$$

#11 $$NWT_1^R(i) = \frac{P_1^R(i)}{P_1^U(i)} \cdot \frac{NWT_1^U(i)}{10}$$

#12 $$NDT_1^U(i) = \eta\left[\exp\left[DIY_1^U(i) - \frac{\Delta MEY_1^U(i)}{MEY_1^U(i)}\right]/2\right], P_1^U(i)\right]$$

#13 $$NDT_1^R(i) = \frac{P_1^R(i)}{P_1^U(i)} \cdot \frac{NDT_1^U(i)}{10}$$

The TDC assumption that each tourist of the rural is 10% of that of the urban has been adopted here as well. The same applies hereinafter.

332 Estimation of the Number of Long-term Tourists, Weekend Tourists and Day Trippers of the Urban and Rural of Each Province That Will Visit Borobudur and Prambanan

#14-1 $$NLWT_1^{U,MJ}(i) = P_1^U(i)\left[\exp\left[-\frac{WIY_1^U(i)}{2}\right] - \exp\left[-\frac{WIY_1^U(i-1)}{2}\right]\right]$$

#14-2 $$NLWT_1^{R,MJ}(i) = \frac{P_1^R(i)}{P_1^U(i)} \cdot \frac{NLWT_1^{U,MJ}}{10}$$

#14-3 $$NT^{MJ}(i) = NP^{MJ}(i)\{1 + 0.25\}^t$$

$$A(i) = \frac{M}{\int_{CIY_0}^{\infty}\left[\beta\int_{CIY_0}^{\infty}\left[P_{DI}^U(i)\left[CIY_{DI}^U(i) - WIY_{DI}^U(i)\right]\right]/\int_{CIY_0}^{\infty} P_{DI}^U(i)\right] \cdot \int_{CIY_0}^{\infty} P_{DI}^U(i)/d_i^1\right]}$$

$$B(i) = \int_{i=1}^{i} \{NLWT_1^{U,MJ}(i) + NLWT_1^{R,MJ}(i)\}$$

$$C(i) = \int_{i=1}^{i} [NDT_1^U(i) + NDS_1^R(i)]$$

333 Case-1

#14 $$INBOI(i) = A(i) + B(i) + C(i) + NT^{MJ}(i)$$

#15 $$INPR1(i) = A(i) + B(i) + \frac{INPR(i)}{INBO(i)}[C(i) + NT^{MJ}(i)]$$

334 Case-2

#16 $$NIBO2(i) = A(i) + B(i) + 2C(i) + NT^{MJ}(i)$$

#17 $$INPR2(i) = A(i) + B(i) + 2\frac{INPR(i)}{INBO(i)}C(i) + \frac{INPR(i)}{INBO(i)}NT^{MJ}(i)$$

MODIFICATION OF MARKETING RESEARCH

335 The real tourist inflow to Borobudur and Prambanan in 1973 is less than predicted by the marketing analysis. It is therefore necessary to modify the forecast to fit reality for future analyses.

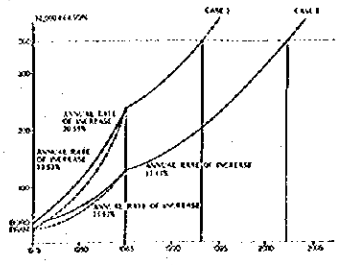
This may be modified in the following way.

- The estimate for inflows to Borobudur and Prambanan were respectively derived by applying the method of least squares and the like to the past inflow data.
- It is assumed that the inflows both to Borobudur and Prambanan will become equal and the same as market research inflow figures in 1985, and the two are forecast as one thereafter.
- The annual increasing rate of foreign tourists to Borobudur is estimated 20% from 1975 to 1985 and 10% annually after that until 2005, and for Prambanan about 35% and 10% respectively because of the above mentioned.

336 Figures for non-Javanese tourists and for Javanese LTT, WT, and DT to 1985 have been derived by multiplying the market research percentages for non-Javanese, Javanese LTT, Javanese WT, and Javanese DT by the numbers of domestic tourists anticipated from market research. For mathematical convenience, however, DT has been calculated as residual.

Case 1 estimates domestic tourists, non-Javanese, and LTT + WT from 1995 by applying trends from 1986 to 1995. Once the number of foreign plus domestic tourists reaches 3.6 million, it is anticipated that neither classification will increase.

337 Expected Tourist Inflow



238 Borobudur (Case 1)

year	total	foreign tourist	domestic tourist
1975	362,798	38,000	324,798
76	416,181	45,600	370,581
77	490,693	54,220	436,473
78	538,824	65,664	469,240
79	606,788	78,797	527,991
80	688,692	94,556	594,136
81	782,031	113,462	668,567
82	868,481	136,161	732,323
83	1,009,965	163,393	846,572
84	1,188,709	196,022	992,688
85	1,307,281	235,286	1,071,995
86	1,380,829	258,835	1,122,014
87	1,469,219	284,696	1,184,523
88	1,542,899	313,166	1,229,214
89	1,632,125	344,482	1,287,643
90	1,727,433	378,930	1,348,503
91	1,829,249	416,823	1,412,426
92	1,938,055	458,505	1,479,550
93	2,051,445	504,356	1,550,659
94	2,170,982	554,391	1,624,191
95	2,312,363	610,279	1,702,076
96	2,456,035	671,298	1,784,737
97	2,605,648	738,429	1,867,171
98	2,761,919	812,270	1,955,709
99	2,941,853	893,197	2,048,590
2000	3,128,110	982,843	2,145,463
01	3,325,267	1,081,133	2,244,336
02	3,547,873	1,189,745	2,358,628

239 Borobudur (Case 2)

year	total	foreign tourist	domestic tourist
1975	362,798	38,000	324,798
76	442,510	45,600	396,910
77	535,525	58,120	478,405
78	642,297	65,664	576,633
79	723,826	78,797	645,029
80	932,299	94,556	837,734
81	1,121,207	113,462	1,009,240
82	1,353,224	136,161	1,217,063
83	1,629,547	163,393	1,469,954
84	1,961,226	196,072	1,765,154
85	2,366,960	235,286	2,131,244
86	2,459,533	258,835	2,230,718
87	2,619,897	284,696	2,335,201
88	2,755,088	313,166	2,441,922
89	2,901,558	344,482	2,560,106
90	3,069,073	378,930	2,690,143
91	3,225,031	416,823	2,808,208
92	3,400,765	458,505	2,942,260
93	3,586,192	504,356	3,082,026

240 Prambanan (Case 1)

year	total	foreign tourist	domestic tourist
1975	223,833	9,107	214,726
76	269,189	12,603	253,382
77	313,623	17,451	296,172
78	371,992	24,157	347,835
79	491,950	33,440	458,510
80	526,060	46,290	479,770
81	677,538	64,078	563,460
82	759,469	88,701	661,768
83	899,967	122,786	777,181
84	1,082,920	169,970	912,950
85	1,307,264	235,286	1,071,978

241 Prambanan (Case 2)

year	total	foreign tourist	domestic tourist
1975	223,833	9,107	214,726
76	282,328	12,603	270,121
77	357,258	17,451	339,807
78	451,618	24,157	427,461
79	571,491	33,440	537,751
80	722,770	46,290	676,480
81	915,077	64,078	850,999
82	1,159,743	88,701	1,070,541
83	1,469,506	122,786	1,346,720
84	1,864,418	169,970	1,694,348
85	2,366,500	235,286	2,131,214

Notice: The tourist numbers from 1986 to 2002 of Prambanan are the same with the corresponding numbers of Borobudur.

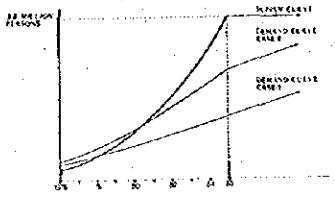
THE ROUGH OUTLOOK OF ECONOMIC FEASIBILITY OF THIS PROJECT

242 Checking the economic feasibility of this project, it is very useful to compare the supply curve with the demand curve of tourists.

It would be possible to estimate the capacity of the project in each stage from the investment schedule by looking at the ratio of cumulative investment in each stage to total investment multiplied by the maximum capacity.

The capacity in terms of tourists is, as it were considered to be supply and on the contrary expected tourist inflow demand.

The capacity in terms of tourists is derived by multiplying the percentage of capacity by 3,600,000.



CONSTRUCTION FINANCIAL PLAN

244 Premises and Feasibility Criteria

The construction financial plan has been based on the following premises decided upon in joint meetings in the Republic of Indonesia:

- The construction shall be carried out on the basis of 100 percent investment by the national government in view of the fact that it is a national project.
- The project should pay for itself within thirty years.

Furthermore, the Indonesian Government has approved an investment multiplier of 2.9 and an accelerator coefficient of 3.25.

Since in Indonesia, BAPENAS and others use a discount rate of 8.5 percent in cases where private funds are included and 5 percent in cases where only public funds are included in connection with government projects, the same percentage have been applied in this project.

Repelita II sets a national tax target of 22 percent, but in BAPENAS and other projects 10 percent of GDP is the realistic tax rate that is anticipated in the planing. In this project the case of 7 percent has also been estimated in consideration of leakage.

One can judge the construction aspect of this project to be financially feasible if the present value of the total investment to be made during the period of the project on the basis of a feasible investment plan can be surpassed within 30 years by the present value of government revenue that is expected to arise from the project.

245 Time Schedule of Investment and its Present Value

The schedule of the investment budget for the different periods of the project up to 1985 and its present value on the basis of the two discount rates are given in the following table.

Time Schedule of Investment and its Present Value Flow

Year	Investment Cost	PV of Investment 5%	PV of Investment 8.5%
1976	736,360	736,360	736,360
1977	736,360	701,295	678,673
CV.		1,437,655	1,415,033
1978	1,950,905	1,769,530	1,657,708
1979	1,950,905	1,685,267	1,527,381
CV.		3,892,452	3,509,622
1980	2,221,165	1,827,360	1,602,736
1981	2,221,165	1,740,313	1,473,126
CV.		8,460,155	7,619,534
1982	2,141,800	1,598,246	1,312,806
1983	2,141,800	1,522,139	1,209,960
CV.		10,580,510	10,202,300
1984	2,673,390	1,809,460	1,391,951
1985	2,673,390	1,723,295	1,282,907
CV.		15,113,295	12,877,368

Notes: - Project budget at each stage is equally doubled into the two years.
- PV : Present Value
- CV : Cumulative Value
- Unit: Rp. 1,000.

746 Estimation of Government Revenue and its Present Value

Analysis of the economic effects arising from this project indicates that the increase in government income due to this project will occur not only in Middle Java but throughout the national economy. Here, attention is concentrated upon the national economic effects due to this project. (For detailed regional effects, see Section 6 of this Report).

The main sources of economic effects are tourist expenditures and construction investment. But the economic effects from inter-provincial transportation expenditures and land acquisition costs are not considered here because inter-provincial transportation expenditures depend upon the national air policies, also because it is very difficult to estimate at what time and in what volume land acquisition costs will be circulated in the national economy. If those effects are included, the national economic effects are larger than those given in this study. Therefore, this financial feasibility study is rather conservative, like most financial plans. Moreover, although there will obviously be an increase in provincial tax revenues, this has been excluded from consideration of the financial feasibility of the project in view of the fact that this is a national project.

747 Model and Formula

In this project the increases can be derived by the following model and formula.

- Notation

GNP : Gross National Product
TE : Expenditures
M_t : Total Imports
CC : Construction Costs
M_2 : Imports due to this Project
OMC : Operation and Maintenance Costs
NNP : Net National Product
Y : Income
I : Investment
GR : Government Revenue
PVGR : Present Value of Government Revenue
m_0 : Propensity to Import (= 0.135, Average value for M/GNP for 1968 to 1982 as calculated from *Statistik Indonesia*, 1972/1973, PP. 434 – 435)
α : Ratio of NNP to GNP (=0.88, Average five-year value for 1968 – 1982, ibid, PP. 434 – 435)
α : Multiplier leverage (= 2.9)
β : Coefficient of Acceleration (= 3.25)
t : Time 0 = 1976, 29 = 2005
r : tax rate = 0.01 & 0.10
ρ : discount rate = 0.05 & 0.085
i : i: 1 except i = 1 Case 1, i = 2 Case 2

- Model

#1 $GNP_1(t) = TE_1(t) - M_1(t) \quad (i = 1, 2 \quad t = 0,29)$
#2 $M_1(t) = m_1 \cdot GNP_1(t)$
#3 $GNP_2(t) = CC(t) - M_2(t) + OMC(t)$
#4 $GNP_i(t) = GNP_1(t) + GNP_2(t)$
#5 $NNP_i(t) = \alpha GNP_i(t)$
#6 $Y_i(t) = \alpha NNP_i(t)$
#7 $I_i(t) = \beta [Y_i(t) - Y_i(t-1)]$
#8 $Y_i2(t) = \alpha I_i(t)$
#9 $Y_i(t) = Y_i1(t) + Y_i2(t)$
#10 $GR_{ij}(t) = r_j Y_i(t) \qquad (j = 1, 2)$
#11
$$PVGR_{ij}^{k}(t) = \frac{GR_{ij}(t)}{(1+\rho_k)^t} \qquad (k = 1,2)$$

- Formula

$$PVGR_{ij}^{k}(t) = \frac{r_j \alpha \left[\left[\frac{TC_i(t)}{1+m_0} \right] + DCI(t) \right] + \alpha\beta \left[\frac{\Delta TE_i(t)}{1-m_0} + \Delta DCI(t) \right]}{(1+\rho_k)^t}$$

$$(i, j, s = 1, 2 \quad t = 0 - 29)$$

where DCI(t) [ΔCC(t) – Ma(t)] is domestic construction investment for this project and $\Delta x(t) = x(t) - x(t-1)$.

- Combination of Cases

i = 1	ρ = 8.5%	ρ = 5%
r = 10%	Case 1 – 11	Case 1 – 21
r = 2%	Case 1 – 21	Case 1 – 22
i = 2	**ρ = 8.5%**	**ρ = 5%**
r = 10%	Case 2 – 11	Case 2 – 21
r = 2%	Case 2 – 12	Case 2 – 22

748 Overall Assessment of Construction Finances

The feasibility of the financial plan can be judged by comparing the present value of the government investment that is scheduled with the present value of the increase that is expected in government revenue. To make the matter more understandable, the "rate of return" is defined like this

where CPVGR (t) is Cumulative Present Value of Government Revenue (t) and CPVGI (t) Cumulative Present Value of government investment (t).

$$\text{Rate of Return (t)} = \frac{CPVGR(t) - CPVGI(t)}{CPVGI(t)}$$

The government investment in the project will have been refunded by the "break-even point," the point at which the rate of return turns from negative to positive, and thereafter the project will be an asset producing earnings that will assist government finances.

Conversely, assuming that the project should pay for itself in a period of thirty years, it is possible to estimate the minimum revenue required.

749 Time Table of Rate of Return

(in terms of %)

Year	RP 1–11	RP 1–21	RP 2–11	RP 2–21	RP 1–12	RP 1–22	RP 2–12	RP 2–22
1977	210	210	210	239	111	117	138	138
79	158	139	182	180	81	79	98	96
81	129	126	156	154	60	59	79	76
83	138	137	172	172	67	66	90	90
85	155	156	198	201	79	80	109	111
90	238	262	300	331	132	153	180	201
95	341	416	395	470	209	261	246	292
2000	488	604	445	551	284	353	279	336
05	523	756	476	634	336	459	300	400

Note: RP 1–11 is Rate of Return in Case 1 - 11

750 It can be concluded that the project has a great deal of leeway in its financially feasibility.

It is worth noting that, considering the problem of capacity, Case 2 is not necessarily superior to Case 1 in the thirty year financial term. This comes from the acceleration effects and it becomes more obvious the longer the project period is.

OPERATION FINANCIAL PLAN

751 Operation and Maintenance Costs

Time Table of Operation and Maintenance Costs (Rp. 1,000.-)

Year	Borobudur	Prambanan
1980	23,660	25,662
1981	23,660	25,662
1982	33,038	39,219
1983	33,038	39,219
1984	121,230	137,032
1985	121,230	137,032
1986	171,450	185,960

These figures were calculated from the Park Development Project, and it is expected that operation will be done at each stage commensurate with the percentage of construction costs to that stage to total costs. Accordingly, values are constant within any given stage and, since construction will be completed in 1985, figures are unchanging from 1986 and beyond.

Operation Revenue

Sources of operation revenue may be categorized into 3 types: admission fees, concession fees, and parking fees.

752 Admission Fees

In order to refine the analysis, the visitors have been broken into eight or nine types and admission fees set separately for each type, as shown in the table.

	Type of Visitor			Percentage	Admission Fee (Rp.)
Day Tour	LTT	#1	Domestic		100
		#2	Foreign		200
		#3	Family Tour		
			Adults	30%	100
			Children	30%	50
	WI	#4	*Youth Tour	30%	40
		#5	*Study Tour	10%	40
		#6	Family Tour		
			Adults	30%	100
			Children	30%	50
	DI	#7	*Youth Tour	27%	40
		#8	*School Trip	13%	40
Night Tour		#9	Night Tour		100 (+ α)

Notes:
- Percentages are percentages within the WI and DI groups.
- Types marked with an asterisk are group tours, and it is anticipated that groups will be given a 20% discount. While foreign groups can also be expected, such groups are not to be given the discount.
- The foreign tourist admission fee of Rp.200 is the standard admission fee of Rp.100 plus an additional fee of Rp.100 for camera permission and the like. Although it may be expected that there will be foreigners without cameras, just as there will be Indonesians with cameras, these two groups are expected to balance out such that only foreign tourists are charged the additional fee of Rp.100 here.
- Night tours are to be charged for admission and for the performance. It is this performance fee which is expressed by α, and the income from such performance fees will accrue to the performers and not to the park.

Because of the differences in the two parks, only Prambanan will have night tours, although both Borobudur and Prambanan will have day tours.

For night tours, it is anticipated that the ration will be 20% of all visitors, with no breakdown for LTT, WI, or DI. Accordingly, Prambanan day tour LTT, WI, and DI figures must be scaled down to 80%.

353 *Concession Fees (unit: Rp.)*

Items	Rental (Monthly)	Key Money
1. Restaurant A	2,000/m²,	10,000/M²
2. Restaurant B	200,000/Lot,	25,000/Lot
3. Kiosk	25,000/each,	50,000/each
4. Passar	9,000/each,	2,500/each
5. Andong (Coach)	–	50,000/each
6. Bicycle	–	2,500/each

Facilities to be Newly Provided in Each Stage

Items	Stage 3	Stage 4	Stage 5	Total
1. Restaurant A	400 m²	300 m²	300 m²	1,000 m²
2. Restaurant B	2 lots	3 lots	3 lots	8 lots
3. Kiosk	10	10	10	30
4. Passar	15		15	30
5. Andong (Borobudur)		20	30	50
(Prambanan)	10	10		20
6. Bicycle			100	

354 Parking Fees

Stages	1	2	3	4	5
1. Passenger Car	Rp. 50	Rp. 50	Rp. 50	Rp. 100	Rp. 100
2. Tourist Bus	*Rp. 200*	*Rp. 200*	*Rp. 200*	*Rp. 400*	*Rp. 400*

Notes: • Ten percent of visitors will come by passenger car, three to a car on the average.
• Forty percent of visitors will come by bus, forty to a bus on the average.
• Figures for 1936 and beyond are as shown for Stage 5.

All fees have been kept down to the minimum level at which price has no effect in order to maximize the number of visitors to the parks in line with the national nature of the project.

355 Revenue and Cost Flow of Operation

Because the formulae for deriving revenue flow from cost flow, *concession fees*, and *parking fees* are simple, these have been omitted here, and only the formula for deriving revenue flow from admission fees is given.

Legend

B_A : Borobudur Revenue from Admission Fees
P_A : Prambanan Revenue from Admission Fees
DT : Domestic Tourists
WT : Westerned Tourists
F : Foreigners
OT : Org Troposes
α_i : Weight ($\alpha_A + \alpha_C + \alpha_Y + \beta_A + \beta_{Co} + \gamma = 1$)
: Dummy variable (1976 – 83 = 0, 1984 – 6 = 1)
t : time (1976 – 2005)
i : case (i = 1, 2)
A, C, Y, ST : Subscripts (A : Adults, C: Children, Y: Youth,) (ST: Study Tour or School Trip)

Formula

$$B_A(t) = 50(1+\alpha)\{1.15(1) + 2F(t) + \alpha_A WT^A_1(t) + \beta_1 OT^A_1(t)\}$$

$$+ 25(1+\alpha)\{\alpha_C WT^C_1(t) + \beta_C OT^C_1(t)\}$$

$$+ 20(1+\alpha)\{\alpha_Y WT^Y_1(t) + \alpha_{ST} WT^{ST}_1(t) + \beta_A OT^Y_1(t) + \alpha_{ST} OT^{ST}_1(t)\}$$

$$P_A(t) = \{0.8 + 20(1+\alpha)\}\, B_A(t)$$

356 *Feasibility of Operation Financial Plan*

If we define the excess ratio as

$$\text{Excess Ratio (i)} = \frac{\text{CPVOR (i)} - \text{CPVOC (i)}}{\text{CPVOC (i)}}$$

where CPVOR is Cumulative Present Value of Operation Revenue, then the following Table may be derived.

	BOROBUDUR				PRAMBANAN			
	Case 1		Case 2		Case 1		Case 2	
	5%	8.5%	5%	8.5%	5%	8.5%	5%	8.5%
1981	350	372	432	451	195	209	249	263
83	151	161	212	223	75	81	120	126
85	107	108	168	172	55	61	113	116
90	69	65	128	121	32	39	95	93
95	65	66	128	131	44	45	105	105
2000	79	78	133	136	58	55	108	110
05	95	89	135	136	73	66	115	112

357 The conclusion can therefore be drawn that the operation financial plan for this project is quite feasible.

Economic Effect

The fifth objective of the economic study was to examine not simply the project itself but the effects which completion would have on the regional and national economies.

STOCK EFFECT

358 Turning first to the stock effect, two areas were examined. In the one, it was determined that the project's effect upon the national assets would be to promote the functional rehabilitation of the national assets and to preserve and accumulate the value of the assets. Here of course, the assets referred to are those of overall tangible and intangible value. In the other, a structural effect was found in that the expansion of these assets and the supplementing of their functions thereby is also the construction of means generating a variety of structural effects for the nation's economy and society. In addition to the production of intangible value such as the effects for external trust, the unity effects within the political background, and the structural effects of the cultural hierarchy, this is the generation of structural changes yielding the *flow effect*.

Turning then to this flow effect, this project will have an extremely diverse and multifaceted flow effect upon the national economy of the region, yet the measurements here have been made of only those which are susceptible to qualitative measurements and only those which are direct effects. Were a measurement to be attempted including all indirect effects, this would require a total assessment using the national comprehensive model. While such is not within the scope of this study, it may be said that the economic feasibility of the project is beyond question even from the direct effects alone. Moreover, it can also be said that the level of feasibility is well beyond that for any other project.

FLOW EFFECT OF THE PROJECT

359 Income Effect

The total income effect of this project is easily estimated from Government Revenue and Present Value in Table – Time Serial Government Revenue and Its Present Value – multiplied by 10, because $GR_i(t) = \epsilon \cdot V_i(t)$ and $\epsilon = 0.1$ in that table.

Cumulative Present Value of Income (unit: Rp. 1,000,000.–)

Year	Case 1 – 11	Case 1 – 21	Case 2 – 11	Case 2 – 21
1977	43,870	48,510	48,050	48,790
79	118,830	125,420	129,880	137,150
81	175,910	191,610	196,870	214,760
83	242,210	274,250	272,550	314,700
85	328,860	387,920	384,010	455,290
90	435,150	512,270	514,820	650,860
95	568,470	780,410	632,430	862,080
2000	705,780	1,063,330	696,430	983,550
05	802,410	1,291,140	735,880	1,078,720

360 Employment Effect

The employment effect of this projects divided into two parts, direct and indirect. The former is defined as employment only for this project and the latter as induced employment.

It is important to take into account two points where the employment effect is estimated: how to estimate the average wage level in 1976 and the annual rate of increase in the average wage.

The average wage level in 1976 is derived in the following way. According to REPELITA II, per-capita GDP in 1973 and 1978 are estimated about US$120 and $150, respectively. A per capita GDP of about US$135 may therefore be considered a reasonable level in 1976. If the ratio of population to labor (=2.7) and income to GDP are taken into account, RP.150,000 per-capita may be said to be a plausible level for 1976.

The annual rate of increase in the average wage is estimated using the following equation.

$$(\frac{Y}{L}) / (\frac{Y}{L}) = \frac{\dot{Y}}{Y} - \frac{\dot{L}}{L}$$

where Y and L are real income and labor respectively and $\dot{x} = dx/dt$. As REPELITA II estimates $\dot{Y}/Y$ = 7.5% and $\dot{L}/L$ = 5%, the annual rate of increase in the average wage becomes 5%.

Since the laborers for construction and operation are already given, the total employment effect equation will become as follows.

$$L_2(t) = \{Y_2(t) - [DCH(t) + OSC(t)]\} / 150{,}000(1+\pi)^t + L_1(t) + L_2(t)$$

where L_1 and L_2 are laborers for construciton and operation respectively, π the annual rate of increase in the average wage, and t the subscript for Case 1 and Case 2.

761 Employment Effect

Year	Case 1	Case 2
1976–1980	1,025,000	1,139,000
1981–1985	2,515,000	2,967,000
1986–1990	3,575,000	4,269,000
1991–1995	5,119,000	5,676,000
1996–2000	7,006,000	6,486,000
2001–2005	8,516,000	7,122,000

unit: Persons

762 Demand Effect

The demand effect of this project will be estimated in the following way.

Consumption is a function of disposable income which is income minus taxes (central and local taxes). As the propensity to consume and imports are already estimated to be 0.83 and 0.175 respectively, total consumption, domestic consumption, and imports will be 0.205S, 0.55? and 0.149 of income flow respectively in case of a 15% tax rate, and 0.664, 0.524 and 0.12 of income in case of a 20% tax rate.

A social accounting tells us S I = X - M, when S is savings, which of course includes governmental (central and local) savings, and X is exports.

If the governmental budget and the international balance of payments are balanced, the coefficient of investment to income is equal to the propensity to save, 0.17.

As the surplus in the government budget which was already analysed in the Construction Plan is not put into the economic circulations in this report, the coefficient of investment to income will be a little smaller than the propensity to save.

763 Production Effect

The production effect of this project is estimated from the income effect divided by the value-added rate, because income is equal to the product of the value-added rate times production.

According to H. Chennery's study, intermediate goods are an increasing function of income. This means that the value-added rate will decline in the course of economic development through this project.

If this is the case, the production effect flow of this project will be increasing as compared with the income flow over the course of time. In a word, the total production method will accelerate wider and deeper.

If precise production effects are required, these must be analyzed using the Input Output Table.

764 Foreign Exchange Effect

The foreign exchange effect will be divided into two parts: the direct effect and the indirect or ripple effect.

Though the induced imports may be estimated from income, the indirect exports depend mainly upon world economic conditions and it is dangerous to forecast them, especially when the time span is thirty years. Therefore, only the direct foreign exchange effects of this project are considered here.

The foreign capital inflow from this project will be brought about by foreign tourists' expenditures and the outflow by imports for the construction of this project.

The direct foreign exchange effect will be as estimated in the following equation.

$$B(t) = 4 \cdot 35 \cdot FT(t) - [CR(t) + FM(t)] / 415$$

B is the balance of payments, positive being a surplus and negative a deficit. 4 is the length of stay in days for foreign tourists to this project, and 35 is their per-day expenditures in terms of US$. FT, CF, and FM are foreign tourists, consultant fees, and foreign materials, respectively. It is in order to express the total in terms of US$ that the second term of the right hand of the equation is divided by 415. (Rp.415=US$1).

The cumulative present value of the direct foreign exchange effect for the five years below is presented in the following table.

Case 1 (unit: US$1,000.-)

	CPVB		CPV of Inflow		CPV of Outflow	
Year	5%	8.5%	5%	8.5%	5%	8.5%
1980	41,431	38,516	42,566	39,580	1,135	1,064
85	125,896	106,764	127,820	109,460	1,924	1,696
90	250,380	192,201	252,304	193,897		
95	405,936	280,109	407,860	282,496		
2000	600,058	335,274	601,982	336,970		
05	818,745	465,718	820,669	467,414		

Case 2

	CPVB		CPV of Inflow		CPV of Outflow	
Year	5%	8.5%	5%	8.5%	5%	8.5%
1980	41,431	38,516	42,566	39,580	1,135	1,064
85	125,896	106,764	127,820	107,460	1,924	1,696
90	250,380	192,201	252,304	193,897		
95	396,476	275,957	398,400	277,653		
2000	512,847	335,209	518,771	336,995		
05	612,949	324,614	614,873	326,310		

Notes: - CPV is Cumulative Present Value
- CPVB is CPV of B

765 Conclusions

Each flow effect may be said to be satisfactory from a economic standpoint.

If another project, for example new road construction, is undertaken together with this one, their compound effect may be far bigger than their mere sum.

Airplane fees and land acquisition costs are not considered here for the seasons given in the Construction Plan. However, airplane fees are among tourist expenditures and some land acquisition costs will be expended anyway. If these are put into the economic circulation, each flow effect in this section will become greater.

It is not considered here that the surplus in the government budget for this project will be recycled back into the economy. If the government takes a policy of balancing its budget, each flow effect will become greater.

If local governments levy a tax and spend it, each flow effect will become greater because of the well known balanced budget multiplier theory.

If precise figures are required for each variable, they will have to be analysed in econometric models, which is beyond the scope of this study.

National Policy Utilization

159 As has been amply demonstrated in the above chapters, this project is more than simply a plan to build a park. Rather, it is a vision of creating parks for the preservation of historic monuments and of designing parks for planned tourism. These are parks feasible as area development projects (governmental financing feasibility) and parks which will have considerable impact upon the regional economy (national economic feasibility). They are very valuable parks.

Accordingly, it may be said that the sooner this project is implemented the better. With the preceeding survey, the economic study under the Master Plan of the project is complete. However, because of the very nature of this project, one more study must be done, and this study has as its theme the issue of how the project can best be utilized as an instrument of national policy. This is needed because, as a national project, the project has a significance and usefulness transcending its simple economic usefulness, this greater meaning coming from the significance of the project as first noted.

There are six main areas in which this project can be utilized as a national policy means.

160 *As a means for establishing national dignity and cultural pride in international society*

That these internationally renowned cultural and historic remains are even today linked to Indonesian national life is a source of internal pride and a basis of global respect, both in the smaller aspect of external cultural policy and in the larger world society. The parks are a central landmark, a symbol for external cultural activities.

161 *As a core for the systemization of educational policy*

Each nation's educational policy has two sides. On the one side is its organization as a system, and on the other is its teaching of the national heritage. This facet of the national heritage is one of establishing an identity for national pride, of providing the *foundations for identification by the people with the Indonesian* state.

Whatever the modern culture, it is only when this has been systematized within the structure of national learning as a part of the nation's history and cultural traditions that it becomes a powerful force supported by the backbone of national popular spirit. *Imported culture can only be a make-shift substitute.* In this establishment and systematization of national learning, the project has an extremely important part to play as the shelter for living cultural monuments, as witness to the national cultural heritage.

Both for the establishment of the system and for the structuring of national studies, the project is most important and useful to the educational policies of the Indonesian state.

162 *As a useful tool for domestic institutions and policies*

For a nation composed of many islands such as Indonesia is, the development of the national economy is achieved through the development of regional economies and local cultures, and the importance of strengthening such initiatives for the development of the state and of the people goes without saying.

However, since this also implies a strengthening of regional forces and a possible dispersion of authority, the issue of how central authority may be strengthened and the basis of national unity reinforced is also another critical area of domestic policy. Indeed, domestic stability rests upon a balance between these two *directions of regional development* and central cohesion. This project is extremely useful as a means of developing central direction for the whole of promoting regional development and interregional exchanges.

Moreover, it will also serve to create duality within this central direction. Within the centripetality of the people, it is highly *significant in social stabilization policies in creating a bipolar* centripetality of the political/economic direction and the cultural/recreational direction. There are a number of precedents for such bipolar centripetality. One has only to think of Tokyo-Kyoto, Washington-New York, and Peking-Nanking.

163 *As a means of systematizing development strategies*

With the progress of industrialization, the issue of the dual-economy-structured society possessing both its agricultural regions and its industrialized urban regions has become common to all peoples of the world. This duality will also become more and more apparent in Indonesia as industrialization progresses.

On the one hand is the formation of *industrial* development centers and on the other the formation of agropolises for promoting rural development. Yet within this development policy straddling both fields, maximum advantage must be taken of intermediacy of such social development projects.

This project is not simply a plan for just another park. It is a regional development project, a project significant as a major national policy strategy.

164 *As means of laying the infrastructural foundations for national economic development*

This project is not localized development, either as growth pole industrialization or as rural agropolitization. Yet at first sight, the project may seem to be one of localized development, and of course it will serve such ends with distinction. However, implementation of this project will also further the transportation flow network for tourism.

Just how very significant tourist mobility is to heightening interregional understanding and solidarity has already been amply demonstrated by the histories of religious pilgrims and tourism in Japan. It is the very basis for the modernization of distribution, and the histories of Europe and Asia have all been formed against such a background.

Even as a commodity, tourism is a commodity of organization (as represented by such items as travel coupons and the like). The tourism activity generated by this project is an important self-sustaining means of creating the non-physical infrastructure for the national economy. The expanded production of organization commodities is a means for the sophistication of the economic social system, and in turn for the creation of *background systems for economic development* in the different aspects of financing, distribution, and transportation.

165 *As a critical core for transportation policies*

There is no need to elaborate here on the fact that Bali is an important sales point for Indonesian international air policy. The significance of the tourism center is great in the creation of an *external negotiating position* linking air policy and tourism. As such, this project will inevitably strengthen Indonesia's attractiveness and Indonesia's hand in international air policy.

At the same time, links with tourism centers are also important to domestic air policy as the very core of the national transportation policy. In this sense too, this project is of immense direct and *actual utility.*

Conclusions and Remarks

766 One of the prominent features of this project is that, in addition to the utility of the project itself, it is also an important tool for overall, total national policy; and the optimum utilization of this project for national policy may be termed a higher-level project in its own right. Just as the physical creation of the parks is a project at the technical and administrative level, so is their utilization for national policy a project at the very level of statesmanship. It is conspicuous that, the more success is had with the utilization of the physical project for the purposes of statesmanship, the greater are the uses and benefits of the physical project.

767 As befits a project with such uniqueness, this economic study has adopted a number of newly developed methods.

Firstly, the analysis of the project is not a simple cost-benefit analysis but also attempts to indicate the significance and position of the project within national policy.

Secondly, the project was planned not simply for park construction but for the establishment of a regional development plan structured around a core of tourism. The significance of this project will be made all the clearer if it is studied in coordination with the comprehensive plan for Central Java's regional development to be separately supported by the government of Japan.

Thirdly, methods were presented for economic surveys of this project as a national project centering upon governmental financing. Such methods have a wide range of applications, and will likely prove useful again in the future in assessing Indonesian national projects.

Fourthly, the impact of this Central Java project was shown not only in its macro economic effects but also for each of the provinces of the entire nation. Although there are similar precedents elsewhere in the world, such as the Asuka Project in Japan, it may be termed unique in having been attempted for a tourism project, which has never yet been done before.

Fifthly, this project is significant as an Indonesian and indeed worldwide prototype plan for the problems of planning the preservation of archeologically and culturally invaluable sites and for the actual physical issues in such planning. It is a point of departure for planning systematization. More than that, it is also a unique, new development success in total project systems including economic studies.

768 At the same time, this is a Japanese government international cooperation project of which both Japan and Indonesia can be proud. This is especially so because it is not the mere application to the Indonesian situation of techniques and precedents which have been developed in Japan or the other industrialized nations. Rather, based upon the best wisdom available, the planning and direction for this project were conceived and developed by Indonesia and Japan so as to best suit Indonesian needs. It is a tailor-made project, and the techniques and analytical methods developed herein have been fashioned out of Indonesia's special circumstances and not simply copied from some other national pattern.

It bodes well indeed for such international cooperation that Indonesia and Japan, working together, have succeeded in developing new project methods without precedent in the United States, Europe, or Japan. When these methods which we have jointly developed for this project are later used as the precedent for U.S., European, or Japanese planning, we of the JICA Study Team will be proud that these are methods which we developed with the Indonesian people for use in this great Indonesian national project.

REMARKS

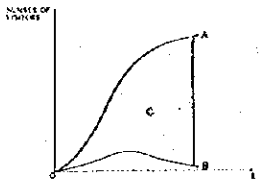
769 Finally, it should be pointed out that if the project target area already possesses significant value, the negative effects of not executing the project may be generally calculated as involving work costs approximately equivalent to the positive effects of implementation.

When evaluating the significance of this project through comparative consideration of its net effects and opportunity cost, the argument is made here assessing project significance through multifaceted consideration of that opportunity cost generated if the project is not undertaken, a cost in many ways just the reverse of net effect, since the project's essence is not something easily expressible in monetary terms but is rather in its invisible benefits to which no price can be assigned.

Looking first at that priceable flow opportunity cost incurred if the project is not undertaken, this may be broadly divided into direct effects of the project itself and indirect effects arising out of these direct effects. The direct effects are the many flow effects of governmental investment and its accompanying multiplier, accelerator mechanism process, while the indirect effects are the flow effects generated by the net increase in the number of tourists.

Although it is possible to calculate these direct effects with considerable accuracy once the schedule for governmental investment is known, there is still a major problem in deriving indirect effects even when this governmental investment schedule is known. This difficulty arises in the area of estimating the natural increment in tourism even if the project is not undertaken, this natural increment being needed to calculate the net increase attributable to the project. This problem of finding the net increase, of finding the very basis for figuring indirect effects, has been approached as follows.

The natural increment in inflow (and it must be noted here that the announcement of UNESCO restoration is a major cause of the current natural increment) will necessarily generate a sprawl phenomenon around the monuments. This will result not only in disruption of the environment in the vicinity of the monuments but also in further acceleration of that deterioration in the monuments already taking place. Such destruction must inevitably have a deleterious effect upon the cultural value of the ruins and a strongly negative impact upon tourism. Thus the inflow will very quickly reach its peak and just as quickly decline. It is obvious here that the longer the project time horizon the greater are the indirect effects of implementation.



where A = Inflow assuming project implementation
B = Inflow assuming project non-implementation
C = Net effect of project (A − B)

The above discussion has been concerned solely with those flow opportunity costs to which monetary values can be assigned, yet it is felt that most of the opportunity costs of this project's not being undertaken will fall into the following five categories.

- Lost preservation benefits to the monuments themselves from restoration
- Lost environmental conservation benefits in the vicinity of the monuments (plus the negative effects of resultant sprawl)
- Lost social benefits from the project (these benefits as noted in the section on "The Role and Significance of the Project")
- Lost regional development benefits from the complementary combination of this project with other construction projects
- Difference in execution cost (ex. land acquisition costs) between executing the project now and executing it later.

From the above deductions, it can be seen that there is a very large possibility that the opportunity cost (the cost of the lost opportunity) will far outweigh any benefits of allocating the resources for this project to other projects.

CHAPTER EIGHT
TECHNICAL PAPERS

Site Plan

GENERAL

801 Taking as given the various items as stipulated in the zoning plan and the landuse plan, this seeks to establish environmental standards for self-regulation through sub division control aiming at appropriate environmental conservation in the park development area.
This is an outline of the purposes, parameters, and other aspects of the study for the site plan.

802 Premises

While this study is of the park development area as designated in the zoning plan and landuse plan, the study includes the main sanctuaries of the Borobudor complex and the Lara Jonggrang complex which are concentrated of park facility development.

Taking the items set forth in the zoning plan and landuse plan as givens, this is a study to fully utilize the potential of the site and to improve the area, as well as to create the optimum environment for the tourist activities in the area.

803 Processes and Components

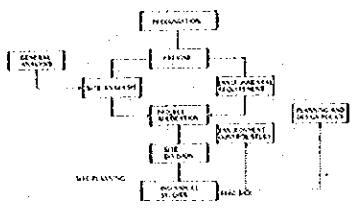
The following studies have been included here as study components.

- Analysis and ordering of the features of all components within the study area
- Ordering of topographical conditions and grouping parcels of land through study of site conditions and potentialities
- Study of matching component features with appropriate parcels of land
- Postulating and studying the environmental infrastructure through the interrelations between component features and topographical conditions
- Deciding on sites for the different components

While this study is in principle related to the forecasts and feedback of all other studies, it is particularly linked with the following

- Zoning Plan
- Landuse Plan
- Landscape Plan
- Facility Plan

804 Work Flow Chart



SITE DIVISION

805 This is an analysis of the nature of the various park development area components and a computer analysis of site conditions leading to the decision on where to locate the different components and is the study for these site decisions.

806 Parcels of Land

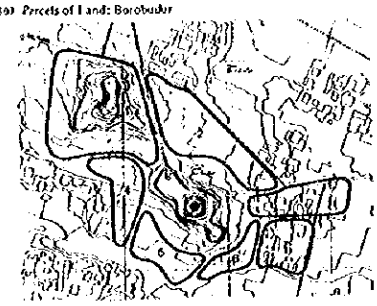
The features of each site in the park development area are analyzed based upon the legibility analysis for monuments and the computer analysis of site conditions in the park development area as set forth in the landuse plan and the zoning plan. It is based upon this analysis that parceling is to be done by characteristics and special features.

As well as having special characteristics as environmental units, each of the parcels of land, through these characteristics, provides guidelines for selection of sites suited to the different components. At the same time, it is also necessary to determine component sites so as to maintain and strengthen the environmental features of each land parcel.

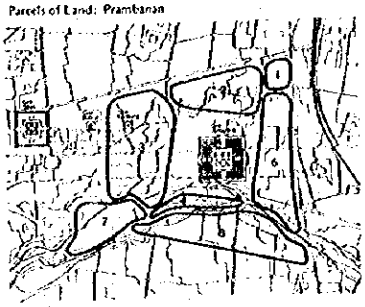
The criteria which were applied in the site analysis were:

- Locational relation to monuments
- Accessibility for tourists
- Existing landuse
- Topological conditions
- Spatial conditions

807 Parcels of Land: Borobudur



808 Parcels of Land: Prambanan



809 Character of Each parcel: Borobudur

Parcel Code	Relation to Monument	Accessibility	Existing Landuse	Topological Condition	Spatial Condition
1	Front (East)	Good	Commercial Area	1/100 to East	Could be sequence entrance to monument
2	North	Fair to Moderate	Cultivated Area	1/50 to East	Opened space
3	North West	Poor	Lawn Pavement + Coconuts Green	Hilly Area 1/1.5 Around	Hilly and greenery open space Good view, could be a landmark
4	West	Poor	Village Green	1/100 to South	Close by village green, natural
5	South	Poor	Working Yard for Borobudur Restoration	1/50 to South	Open space, artificial space
6	South East	Poor	Village Green	1/10 to South 1/10 to East	Close by village green Good living environment

810 Character of Each Parcel: Prambanan

Parcel Code	Relation to Monument	Accessibility	Existing Landuse	Topological Condition	Spatial Condition
1	South East	Good	School Area, Village Green	1/150 to South	Open space, close by green
2	East	Fair	Village Green + Cultivated Area	1/500 to South	Open space
3	North	Fair to Moderate	Village Green + Cultivated Area	1/50 to South West	Open space to Candi Sewu sanctuary, includes Candi Lumbung
4	West	Poor	Cultivated Area	1/100 to South West	River side, narrow land
5	North	Good	Residential Area	1/60 to South West	Open space
6	West	Poor	Cultivated Area	1/20 to South East	Open space, separated by river side green from Candi Lara Jonggrang
7	North West	Poor	Cultivated Area	1/35 to South East	Same as for parcel 6

Groups of Components

811 While the components to be included in the park development area have already been noted on the project list, these components can be grouped by activity as shown below:

Types	Borobudur	Prambanan
Tourist Activity Group	Gate Service Facilities Archeological Museum Dagi Hill Park Guest House	Gate Service Facilities Cultural Pavilions National Theaters Riverside Park
Research Activity Group	Research Center Seminar House	Academy of Arts Cultural & Archeological Institute
Operation & Maintenance Activity Group	Maintenance Yard Staff Accommodations Utility Facilities Parking Area	Maintenance Yard Staff Accommodations Utility Facilities Parking Area

812 These groups require the following site conditions.

- Tourist Activity Group
  This includes components where tourist activities will be concentrated. It must
  -- be easily accessible to tourists,
  -- be adjacent to the sanctuary which is the primary place visited in the park, and
  -- provide a clear line of movement for tourists.
- Education and Research Activity Group
  These components are to develop activities heightening the cultural and archeological themes which are central to the parks. They must
  -- be segregated to some extent from tourist activity,
  -- possess their own access routes, and
  -- be in easy communication with related park facilities.
- Operation and Maintenance Activity Group
  As well as supporting the above park activities, these components' activities also maintain and improve the park environment. They must
  -- be spatially segregated from the other two groups,
  -- maintain a set distance from tourist activities, and be easily accessible.

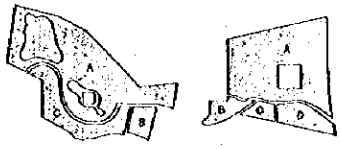
Activity Distribution

813 It is in view of the above considerations, and after examining the different activities in relation to the study of land parcels, that component site allocation is to be done. In allocation, activities are to bound adjacent areas as much as possible in order to give greater lucidity to activity landuse.

814 Borobudur Park

- Tourist Activity Zone
  This is the zone made up of parcels 1, 2 and 3. Topographically, it has a gentle slope in the direction of access to the complex and is a relatively open area, possessing considerable space open to tourists.
- Education and Research Activity Zone
  This zone, having a gentle slope to Mts. Gandul and the tourist activity zone, is closed in by Mts. Gandul and Borobudur Hill yet gives the feeling of an enclosed space with comparitively much green. Feeling like the backside of the complex, its spatial features suggest it for somewhat limited activities.
- Operation and Maintenance Activity Zone
  A village site, it has, of course, an excellent living environment. Existing green tends to hide activities and facilities suiting it for backstage activities. As no suitable utility facility area is to be found in this zone close to the complex, a distant site was prepared.

815 Activity Zoning



816 Prambanan Park

- Tourist Activity Zone
  This zone, made up of parcels 1, 2, 3, 4 and 5, is an area centering on the Lara Jonggrang Sanctuary and including its environs. It is visually separated from other activity zones by the Opak River and its tributaries.
- Education and Research Activity Zone
  This zone, including parcel 6, is an easily accessible area on the west side of the Opak River and near the park road. It is located on Candi Lara Jonggrang's east-west axis.
- Operation and Maintenance Activity Zone
  This zone is parcel 7 and part of parcel 6 bounded by the Opak River and its tributaries, and as such it is spatially and visually separated from the tourist activity zone.

Location of Components

817 The following matrices have been divised based upon the activity allocation study and in consideration of the functional characteristics of the components noted in the facility plan and consideration of facility layout policy to determine the appropriateness of each parcel.

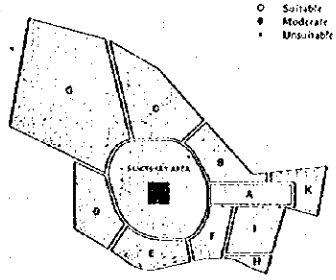
The actual component site determination is to be done through detailed consideration of site conditions based upon this component allocation and using the conditions as set in the below related studies.

These component sites correspond to the development and operation units and serve to make explicit the different zones.

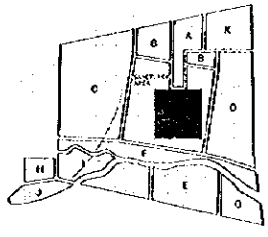
Suitable Location of Each Component

Borobudur	1	2	3	4	5	6	7
A Gate	◆	•	•	•	•	•	•
B Service Facilities	○	◆	•	•	•	•	•
C Archeological Museum	•	◆	○	•	•	•	•
D Research Center	•	•	•	◆	○	•	•
E Seminar House	•	•	•	○	◆	•	•
F Guest House	•	•	•	•	○	◆	•
G Dagi Hill Park	•	•	◆	•	•	•	•
H Maintenance Yard	•	•	•	•	•	○	◆
I Staff Accommodations	•	•	○	•	•	•	◆
J Utility Facilities	•	•	•	•	•	•	•
K Parking Area	◆	•	•	•	•	•	○

○ Suitable
◆ Moderate
• Unsuitable



Prambanan	1	2	3	4	5	6	7
A Gate	○	◆	•	•	○	•	•
B Service Facilities	•	◆	•	•	○	•	•
C Cultural Pavilions	•	•	◆	•	○	•	•
D National Theaters	•	•	•	•	◆	•	•
E Academy of Arts	•	•	•	•	•	◆	•
F Riverside Park	•	•	•	◆	•	•	•
G Government Facilities	•	•	○	•	•	◆	•
H Maintenance Yard	•	•	•	•	•	•	◆
I Staff Accommodations	•	•	•	•	•	○	◆
J Utility Facilities	•	•	•	•	•	•	◆
K Parking Area	◆	•	•	•	○	•	•



ENVIRONMENTAL CONTROL

820 Applying the subdivision control methods generally as a technique for urban planning to the park development areas, this study is done for environmental control.

821 Environment Module

For both areas covered by the study, the Borobudur complex and the Prambanan complex, the following three environment modules may be postulated.

Level – 1: Main Complex
These levels are the main sanctuaries at both complexes. While consideration is given here for comprehensive environmental control in both Borobudur complex and Prambanan complex, special study is given to harmonizing with the existing environment in the vicinity and to maintaining the the distinctness of the archeological parks' environment.

Level – 2: Component Site
These are the component sites in both complexes. It is environmental control for these component sites considering the distinct features of each site and its relation with adjacent component sites.

Level – 3: Facility Area
These are the facility sites within the component sites. Environmental control here is for the facilities within the facility sites and the tourist activities there.

822 Environmental Criteria

The following criteria are postulated for environmental control in the parks. The purposes of these criteria and the conditions for setting indices are noted below.

823 Setback
Setback is considered for the purpose of establishing zones coordinating the environmental conditions of the different activities and functions of adjacent environmental units. These setbacks indicate the distances from the site boundry to the edge of the facility site. Indices here are set with special interrelation with studies for noise control and scenic control.

824 Forest Green Coverage Ratio (GCR)
This is used to check the distribution of green areas, especially important elements in the park areas. Because of the strong sunshine and to create an archeologically sound environment, this green cover is an important factor for providing restful shadows and visual control. The present environmental standards of the village greens within the park areas are the guidelines for setting these indices.
Here those screening green, holy green, concourse green, hilly green, edge green and riverside green elements of the landscape plan are totaled and derived as ratios of the complexes' component sites.

825 Tourist Density
Appropriate regulatory values are to be postulated from an environmental standards perspective for the distribution of tourist inflow for the main activities. On this tourist inflow, the distribution at the peak time on an average day was studied. The gross density is the number of tourists over the total component site area of the tourist activity zone. The net density is the number of tourists over the tourist activity area (facility green, screening green and concourse green) where tourists will concentrate in each component site.

826 Building Height
This indicates the maximum building height in relation to the study of tree heights.

827 Percentage of Lot Occupancy (PLO)
Because the buildings for the necessary activities within the parks, and especially their artificial nature, intrude upon the archeological environment, appropriate quantitative checks are needed. Different indices are set depending upon building function, topographical conditions, and other factors. the gross percentage is the building area over the total component site area, while the net percentage is the building area over the facility green area.

828 Setting the Environmental Index
The indices are set applying the above criteria to the environment modules, and all setting is done with the environmental control study.

829 Environment Indices for Level-1
These guidelines for indices under Environment Index of Existing Condition are set through comprehensive assessment with other studies.

– Setback*	20m from zone-2 boundary	
– GCR	40% minimum	
– Tourist Density	Gross:	100 persons/ha
	Net:	200 persons/ha
– Building Height	7m maximum	
– PLO	Gross:	5% maximum
	Net:	25% maximum

* The figure for setback is uniform throughout the main complex.

830 Environment Indices for Level-2
Because each component group has its own distinct features as postulated in Group of Activity and therefore requires different environmental standards, this section sets the environmental standards for the different component groups. This is particularly so for the main sanctuaries where standards are individually set in accordance with the special characteristics.

		tourist activity	education & research activity	operation & maintenance activity	main sanctuary
Setback (m)		20 min	20 min	20 min	–
GCR (%)		30 min	40 min	50 min	20 min
Tourist density	Gross	150(200)	–	–	120
(persons/ha)	Net	300(500)	–	–	200
Building height		7	7	7	–
PLO (%)	Gross	5	10	20	–
	Net	25	30	50	–

Notes: • The setback distance is to apply only to groups of different activities and there are no setback regulations within the same activity.
• Figures in parentheses under Tourist Density are values for service facilities during the lunch hours.

831 The indices shown here are to function as guidelines for voluntary control when park development is done by a single body and as guidelines for regulating development control when this is done by a plural number of development bodies.

BASIC STUDY FOR DECIDING ON ENVIRONMENT INDICES

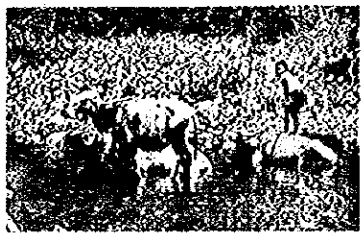
832 This outlines the particularly important points in the study relating to the setting of environment indices.

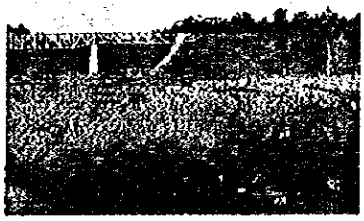
833 Environment Index of Existing Conditions

This gives the values for the existing environment within the main complexes using the criteria of this section.
These are given as the indices of the area's distinctively rural environment and are analyzed as a guide to providing a park environment at least as good as or better than at present.

Items	Borobudur	Prambanan
Area (ha)	69.4	57.2
Forest Green Area (ha)	14.3	17.2
Population (person)	510	600
House Hold (unit)	102	120
Building Area (m^2)	10,510	21,700
– House	8,160	9,600
– Public Facility	2 350	12,100
Population Density (person/ha) Gross	7.5	10.5
Net (1)	35.7	31.9
Net (2)	41.5	58.3
Percentage of Lot Occupancy (%) Gross	1.5	3.8
Net	2.3	12.6
Green Coverage Ratio (%)	20.6	30.1

Notes: Forest Green Area includes village greens, riverside greens, and rally greens.
Building Area has been calculated assuming 80m^2 per housing unit and relying upon survey data from Indonesian Counterparts for public facilities.
Population Density's Net (2) is a check of the environs including the main complex.





831 Nuisance Control Study

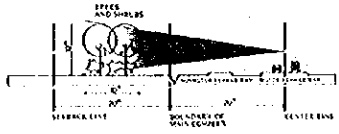
This is the study of noisance control to try to protect the archeological parks' environment from the noises generated by nearby activities on roadways, residential areas and farm lands. While legal restrictions are needed to control noise in the vicinity of the main complex, this study deals with noise-abatement policies for within the parks.

Noise Standards within the Parks
L_{10} = 65 phons
This means that the noise level during operating hours may not exceed this 65 phons limit by more than 10%. This means applying a standard generally comfortable for a residential area.

Solution
This is a consideration of noise control policies for the national road in Prambanan, thought to be the worst problem. These same policies may also be applied with maximum security to other areas and within the complexes.

While setting wide intervening distances is, in principle, the most effective way to reduce noise levels, the effort to reduce noise levels is done here with distance and trees.

Under the solution in this plan, as may be seen in the drawing, a minimum of 40m is required from the center of the national road motorway, and foliage is to be densely planted within the setback zone at least 10m height for a width of 10m.

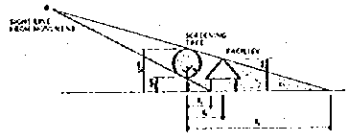


835 Visual Control Study

This section outlines the study for visual control in the main complexes, especially for the view of facilities and for accompanying activities. The basic study for visual control from the remains is explained in Facility Suitability of Environmental Analysis's Visual Study and that was the basis for this study.

Building Height
In principle, building height is not to exceed the tree heights set for facility greens and screening greens. With the heights for these trees set at 8 ~ 10m in the Landscape Plan, buildings are not to exceed 7m at their highest point.

Visual Protection from Remain
This is the study done to ensure a pleasant panoramic view, especially from the top of Candi Borobudur. This study deals particularly with the relation between building view and tree placement by visual zones as set under facility suitability. Tree height, placement and relation to facility are as shown below.



The D values for the above drawing by visual zone are:

1st Zone	10 ~ 15	12 ~ 20	40 ~ 65
2nd Zone	15 ~ 23	20 ~ 30	65 ~ 95
3rd Zone	25 ~ 35	30 ~ 45	95 ~ 145

In all zones, trees (8 ~ 10m) are needed on the sides of buildings facing the remain. When the trees are in one line the following are the considerations for the D values.

D_1 : Distance between Trees and Wall Line
The distances between the trees and the ruins – side wall line shall not be less than the values indicated.

D_2 : Distance between Trees and Highest Part of Building
These shall not exceed the above values.

d_1 : Depth of Activity Area Hidden by Trees
When there are no trees in the garden or court, the depths of the garden or court shall not exceed the above values.

Tourist Capacity Study

836 This study was done of activities developing in the main complexes from an environmental control viewpoint, and here study is done of appropriate densities for the main complex capacities for tourists, for the most dominant activity. Because there are virtually no data available for archeological parks such as proposed by this plan, environmental standards for natural parks have been used as reference.

837 Conditions of Study
The items relating to this study in the use program are as follow:

Maximum Tourist Capacity (daytime peak hour)

	Borobudur	Prambanan
Average Throughout of the Year	8,000	6,500
Average for Tourist Season	10,400	8,450
Average for Off Season	5,600	4,550
Peak Days	28,800	23,400

Percentage of Tourist Distribution

	Borobudur	Prambanan
Main Complex	82%	76%
Main Sanctuary	23%	19%
Other Tourist Activity Zone	59%	57%

Tourist Capacity in Peak Time

	Borobudur	Prambanan
Main Complex		
· Average Throughout the Year	6,560	4,960
· Average for Tourist Season	8,530	6,420
· Average for Off Season	4,590	3,460
· Peak Day	23,620	17,785
Main Sanctuary		
· Average Throughout of the Year	1,840	1,230
· Average for Tourist Season	2,390	1,600
· Average for Off Season	1,290	860
· Peak Day	6,620	4,450
Other Tourist Activity Zone		
· Average Throughout of the Year	4,720	3,730
· Average for Tourist Season	6,140	4,820
· Average for Off Season	3,300	2,600
· Peak Day	17,000	13,335

Tourist Density of the Park
The following are the tourist density fingures generally given for natural parks.

- High density area	300 persons/ha or more
- Medium density area	100 persons/ha more or less
- Low density area	30 persons/ha or fewer

These figures have been modified in light of the special characteristics of the park area and the following densities set. The items taken into consideration here are as noted in the Landuse Policy.

- Maximum density	250 persons/ha or fewer
- Optimum density	100 persons/ha or fewer
- Minimum density	20 persons/ha or fewer

838 Tourist Capacity

The spatial capacity of the tourist activity zones in the main complexes are given below.

	Borobudur	Prambanan
Tourist Activity Zone (ha)	69.4	57.2
Maximum Capacity (persons)	17,350	14,300
Optimum Capacity (persons)	6,940	5,720
Minimum Capacity (persons)	1,388	1,144

In calculating these conditions and capacities, the overall items in the main complexes were as noted below.
- Peak-time, off-season tourist capacity fully meets optimum capacity.
- Peak time tourist capacity average throughout the year meets optimum capacity.

Tourist capacities for the main sanctuaries are as shown below. However, it is to be noted that maximum capacity has been set at 200 persons/ha in light of the special nature of the sanctuaries.

	Borobudur	Lara Jonggrang
Area (ha)	17.5	15.2
Maximum Capacity (persons)	3,500	3,040
Optimum Capacity (")	1,750	1,520
Minimum Capacity (")	350	300

Tourist spatial capacities for tourist activity zones other than the main sanctuaries of the main complexes are given below. In light of the special nature of these areas, maximum density has been set at 300 persons/ha and minimum density at 30 persons/ha.

	Borobudur	Prambanan
Area (ha)	51.9	42.0
Maximum Capacity (persons)	15,500	12,600
Optimum Capacity (")	5,190	4,200
Minimum Capacity (")	1,560	1,260

839 Considerations
Judging from the above capacities and tourist inflow conditions, the following generalizations can be made.
- Peak-time, off-season tourist capacity fully meets optimum capacity.
- Peak-time tourist capacity average throughout the year meets optimum capacity.
- Peak-time tourist capacity average for the tourist season exceeds optimum capacity, the excess being 18-35% in Borobudur and 5-15% in Prambanan to meet maximum capacity standards.
- Peak-time, peak-day inflow exceeds maximum capacity.

In view of the special nature of the parks, sufficient area should be procured so that peak-time, peak-day figures do not, in principle, exceed maximum capacity. However, in view of the actual full landuse, high population density, and other factors, the area procured is considered approximately correct in this study. Nevertheless, it is still necessary to consider policies so that the average number of tourists on peak days at peak time throughout the tourist season better matches the planned capacities.

840 Activity Control Study

This is a consideration of policies to control tourist activity in the main complexes, the focus here is restricted to situations in which the tourist inflow exceeds the optimum spatial capacity as shown in above and the problems and policies for their solution are given. given.

- Problems
  - possible deterioration in archeological park environment
  - Overflow of parking area capacity
  - Need for study of utility capcity
  - Deterioration in road traffic conditions
  - Deterioration in tourist service functions
- Policies for Their Solution
  In principle, these problems are caused largely by seasonal and daily fluctuations in tourist inflow, and both physical and soft policies may be considered for their solution.
- Physical Policies
  The biggest problem is to achieve a flexibility in restaurants and other service facilities adequate to meeting the fluctuations in demand. However, in light of the high initial cost and other factors, no complete solution can be expected from purely physical policies.
- Soft Policies
  Policies to mitigate fluctuation through advertising activities. Possibilities here include encouraging groups to visit in the off-seasons, providing preferential admission rates for off-season visitors, and urging people to avoid peak times.

  Tourist flow management; Possibilities here include restricting entry, establishing one-way traffic within the parks and dispersing people to low density areas.

  These policies should be effected only after detailed study by the Park Operation Corporation fully reflecting conditions within Indonesia.

Use Program

GENERAL

841 This Technical Paper deals with the following factors that will become important after construction has been completed and the park has moved into the fully operational stage.

- Quantitative and qualitative analysis of the anticipated visitors to the park as well as an understanding of the behavior and movements peculiar to each type of visitor.
- Formulation of plans to guide each type of visitor within the park.
- Plans for special events and establishment of policies for the operational system

ANALYSIS OF VISITORS

842 Visitor Classification

The above table is a breakdown by visitor
The estimates on the basis of the tourism market analysis are as follows by origin and type of visitors.

origin	day trippers	weekend tourists	long term tourists	totals
Zone-1 Middle Java	732,916 (39.0)	402,935 (22.0)	--	1,135,851 (61.0)
Zone-2 Java and Madura	--	605,419 (34.0)	127,352 (7.5)	982,823 (41.5)
Zone-3 Other Islands	--	--	12,740 (0.5)	12,740 (0.5)
Zone-4 Foreign Countries	--	--	235,286 (10.0)	235,286 (10.0)
Totals	732,916 (31.0)	1,208,306 (51.0)	425,378 (18.0)	2,366,500 (100%)

Notes: • Middle Java excluded in zone-2
- The above table is a breakdown by visitor type and origin of the upper target figures for 1985.
- This table is based upon a composition assuming approximately 6,500 visitors averaging one day stays, and other plans below are predicted on maintaining these same ratios for 10,000 visitors.

843 Description of Each Visitor Type

Short-term: Domestic
These are long-term tourists from throughout Indonesia, except the middle Java area, who will stay in the area an average of two nights sightseeing in Yogya Solo and visiting the parks for short periods of time.

Short-term: Foreign
These are international tourists from overseas. It is expected that their routes will include such international tourist attractions as Jakarta and Bali and that they will visit this area for an average of two nights, being sure to visit the parks even if for only short periods of time.

Medium-term: Family Tours
These are the weekend family tours from Java. Because they will also visit tourist sites in the vicinity, it is anticipated that their visits to the parks will be of medium length.

Long-term: Youth Tours
These are the weekend youth tour types from Java. Composed primarily of middle school or high school students and others, their visits to the parks will also be for study.

Long-term: Study Tours
Although overlapping somewhat with the weekend youth tours from Java, these people will visit the parks in accordance with independent educational programs to study the historic culture on display there.

Long-term: Family Tours
These are recreational family tours from middle Java expected to spend an entire day on one park in leisurely schedule.

Long-term: Youth Tours
These are youth tours from middle Java.

Long-term: School Trips
These are visits made to one park by elementary, middle, or high school in middle Java in line with the school curriculum's field trip activities program to study the history or culture evidenced by the park.

Night Tours
These are visits by people staying in the area and coming to see the son et lumiere, Ramayana dance, or other nighttime operations of the Prambanan Park.

Notes: • Types 1 and 2 mix individual and group tours.
- Types 3 and 6 are individual family tours.
- Types 4, 5, 7 and 8 are student group tours.

844 Expected Activities of Each Visitor Type

type of visitors	percentage (hypothetic)	average length of stay	tourist classifications
(1) Short-stay: Domestic	8%	2.0 hrs.	LTI: Domestic
(2) Short-stay: Foreign	10%	2.5 hrs.	LTI: Foreign
(3) Medium-stay: Family Tour	30%	4.0 hrs.	MT: Domestic
(4) Long-stay: Youth Tour	16%	5.0 hrs.	WT: Domestic
(5) Long-stay: Study Tour	5%	5.0 hrs.	WT: Domestic
(6) Long-stay: Family Tour	19%	5.0 hrs.	DT: Domestic
(7) Long-stay: Youth Tour	5%	6.0 hrs.	DT: Domestic
(8) Long-stay: School Trip	4%	6.0 hrs.	DT: Domestic
(9) Night Tour	--	1.5 hrs.	

TOURIST WAVE PLAN

845 Seasonal Fluctuations

Statistics show that the seasonal tourist fluctuations for Borobudur and Prambanan are as follows.

The travelling and tourist season months in Indonesian are April, August, October–November and late December–early January. The ratio of the number of visitors during these months and off-season months is about 2:1, and about 1% of the annual number of visitors come on peak days, which is generally true of year-round tourist areas.

The daily number of visitors is expected to be as follows:

- Average throughout the year	10,000 (1.0)
- Average for tourist season months	13,000 (x 1.3)
- Average for off season	7,000 (x 0.7)
- Peak days	36,000 (x 3.6)

The figure in the parenthesis is the magnification of total annual number.

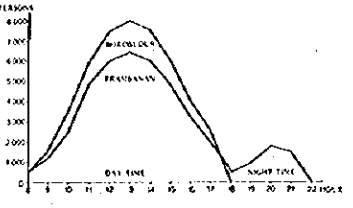
846 Plan of Fluctuation During the Day

The following is the plan for the fluctuation of the number of visitors at Borobudur and Prambanan during the day.

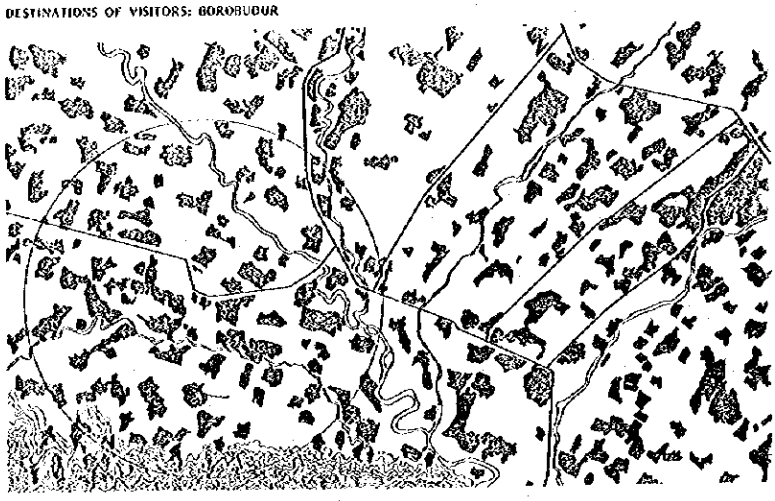
items	Borobudur daytime	Prambanan daytime	Prambanan nighttime
Average daily number of visitors	10,000	over 8,000	2,000[a]
Hours of operation	10 hours (8am 6pm)	10 hours (8am 6pm)	4 hours (6pm–10pm)
Average length of stay	4.4 hours	3.8 hours	1.5 hours
Peak percentage of total number of daily visitors in the park at one time	80% (12–13)	65% (12–13)	

Notes: • The curve representing the number of visitors coming into the park at different hours of the day is based on those of analogous parks in Japan.
- Nighttime operation has been proposed in order to make Prambanan more attractive.
- The following people may be assumed as night tour participants.
(1) Of the foreign tourists, most will be separated from the daytime.
(2) Some long-term tourists and weekend tourists staying in the vicinity.
(3) People from near-by coming for only the evening
Estimates are for 1,000 repeaters and 1,000 evening only.

847 Daily Fluctuation Graph



848 DESTINATIONS OF VISITORS: BOROBUDUR

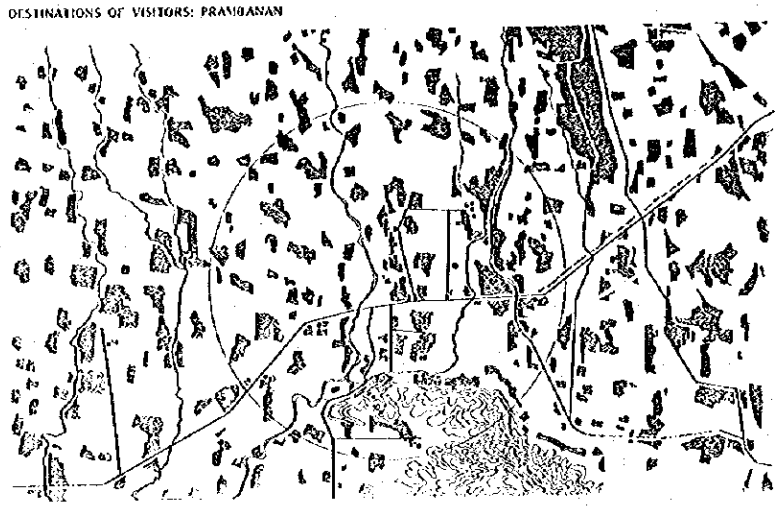


849 Distribution of Visitors : Borobudur

	Number of visitors (person)	Staying period (minute)	Travel time (minute)	Total minute spent in destinations
Type 1	800	180	59	121
Type 2	1,000	150	47	103
Type 3	3,000	240	70	170
Type 4	1,600	300	89	211
Type 5	500	300	65	235
Type 6	1,900	300	77	223
Type 7	800	360	80	280
Type 8	400	360	135	225
Average	10,000 (Total)	265	74	191

LEGEND
1 Candi Borobudur
2 Candi Pawon
3 Candi Mendut
4 Candi Kalasan

850 DESTINATIONS OF VISITORS: PRAMBANAN



851 Distribution of Visitors : Prambanan

	Number of visitors (person)	Staying period (minute)	Travel time (minute)	Total minute spent in destinations
Type 1	640	180	80	100
Type 2	800	150	45	105
Type 3	2,400	240	90	150
Type 4	1,280	300	124	176
Type 5	400	300	75	225
Type 6	1,520	300	121	179
Type 7	640	360	147	213
Type 8	320	350	95	265
Type 9	2,000	90	19	71
Average	10,000 (Total)	230	79	151

Type 9 has not been added to the average value.

LEGEND
1 Candi Lara Jonggrang
2 Candi Bubrah
3 Candi Sewu
4 Candi Asu
5 Candi Plaosan Utara
6 Candi Plaosan Selatan
7 Candi Sojiwan
8 Candi Dawung
9 Kraton Ratu Boko
10 Candi Barong
11 Candi Bubung
12 Candi Sari
13 Candi Kalasan

SPECIAL EVENTS

852 With the cooperation of governmental agencies, private educational and cultural organizations, or other like groups, the Park Operation Corporation will plan the following special events in order to facilitate optimum utilization of the archeological parks.

853 *Borobudur Park*

International Archeological Congresses
Commemorating the completion of Borobudur's restoration, it is planned to hold annual international symposia and congresses on the protection of such cultural assets.

Indonesian Academic Congresses
Academic congresses on cultural asset preservation historical research, and other subjects of interest are to be held regularly.

International Research Exchanges
Archeological research seminars and specialist conferences in the field of archeology are to be held by the Archeological Research Center.

Ties with Sister Cities Overseas
Consistent with the proposal for international sister cities, sister-city ties are to be formed with other cities overseas similarly rich in cultural assets and cultural exchanges facilitated.

Special Museum Shows
While the museum will have standing exhibitions of the historical remains uncovered in Borobudur and vicinity, special shows will also be planned from time to time. Among the themes to be considered for such special shows are the archeological findings elsewhere in the world and the remains found in Eastern or Western Java.

System of Historical Study Seminars
History lectures are to be held for study tours and school trips in an effort to impress upon visitors the significance of these remains and to make best use of the park facilities as "living" history.

Buddhist Ceremonies (Waisak)
The annual Buddhist ceremonies are to be maintained and encouraged.
This annual Buddhist ceremony commemorates the Buddha's birth, death and final ascension into nirvana. It takes the form of a procession starting from the Mendut temple, then on to Pawon and finally to Borobudur.

854 *Prambanan Park*

Ramayana Festivals (annual)
The various festivals occurring throughout the year are to be maintained and encouraged. Against the backdrop of the full moon over Mt. Merapi and facing Candi Lara Jonggrang, the traditional Ramayana dance is to be held as an all night spectacle in the amphitheater.

Ramayana Stage (monthly)
On the stage provided by the Kraton Hill terrace, the nighttime Ramayana dance and other traditional arts are to be performed regularly every month.

Ramayana Show (daily)
The daily afternoon training sessions of students at the Academy of Arts in the Lara Jonggrang Sanctuary are to be open to the public.

Son et Lumiere (evenings)
This festival of light and music is to be held every evening for about one hour in the Lara Jonggrang Sanctuary with spectators seated in the amphitheater.

Traditional Arts and Crafts Exhibitions
These are to be biannual events every spring and fall showing traditional arts and crafts.

Traditional Arts Competitions
Arts festivals are to be held annually with traditional arts from throughout the nation in competition.

International Cultural Exchanges
Sponsored by the Academy of Arts, a system of international cultural exchanges is to be established including exchanges of students and scholars.

MISCELLANEOUS IDEAS FOR OPERATION

855 Ideas Regarding Admission Fees

- Admission fees are to be collected at park gates.
- Admission fees are to be Rp. 100 for adults and Rp. 50 for students or children, with a 20% discount for groups (a group being 20 or more people entering together as a group).
- When there are special exhibitions or for nighttime events at Prambanan, admission is to be at least Rp. 200.
- Special fees are to be collected from people taking cameras into the parks.
- Parking fees are to be Rp. 100 for passenger cars and Rp. 400 for buses.

856 Ideas Regarding Visitor Services

These are services to be consigned by P.O.C. to local people and include:

- Guide Service
  This is to provide guides who have received the proper training to guide foreign or Indonesian visitors to the parks.
- Andong Service
  This is to provide horse drawn cart service on the main routes within the parks.
- Bicycle Service
  This is to make bicycles available within the parks for rental to visitors.

857 Ideas Regarding Donations

- Commemorative Plants
  Donations of sacred trees for planting within the sanctuary areas may be accepted from people visiting the parks who wish to make such a donation.
- Restoration of Remains
  Private contributions may be considered to assist governmental operations for restoring the nearly half ruined remains.

858 Ideas Regarding Private Consignment Operations

- Restaurants, kiosks, pasars and other facilities to be consigned to private operation are to be built by P.O.C. and then rented to private operators, charging them both a set "ket money" or "buying in" fee and regular rent.
- Andong services and bicycle rental services are to be licensed with the priority going to local applicants.

STAFF AND EMPLOYEE REQUIREMENTS

859 Staff and employees for the operation of both parks may be divided into the following three groups:

- Staff and employees employed by the Park Operation Corporation
- Staff and employees employed by governmental agencies
- staff and employees employed by operators performing consigned functions within the parks

The following staff and employees will be needed for full operation of the parks:

Category	Borobudur	Prambanan
P.O.C. employed	396	391
Governmental employed	139	216
Privately employed	257	722
Total	792	829

Staff and employees employed by P.O.C. or governmental agencies may be divided into three categories.
Upper class: high ranking administrative personnel
Middle class: middle ranking administrators and technicians
Lower class: lower-ranking administrators and workers

Manpower Requirement

Borobudur	Upper class	Middle class	Lower class	Total
P.O.C. employed	7	60	329	396
Governmental employed	26	43	70	139

Prambanan	Upper class	Middle class	Lower class	Total
P.O.C. employed	8	62	321	391
Governmental employed	22	70	124	216

Giving employment priority to local personnel around both parks, P.O.C. and governmental agencies are to provide employment opportunities for over 400 people. In addition, considerable employment may be expected in the private sector.

Utility Plan

GENERAL

860 This plan contains utility plan consideration from a technical perspective of the establishment of the various facilities below to be constructed to ensure the functioning of the various park facilities in the Borobudur and Prambanan park areas.

- Utility Facilities
  - Water Supply
  - Sewage
  - Electrical Supply
  - Telephone

  Miscellaneous Facilities
  - Stormwater Drainage
  - Refuse Disposal

- Operation and Maintenance System

861 Existing Conditions

As things now stand, none of these facility developments except irrigation and small-scale system for water and electrical supply have been provided for at all in the case of either of the park areas. *Nor is provision of such in present plans for the future* adequate for the purposes of this project.

862 Areas for Establishment or Improvement

The areas for establishment or improvement among the above facilities are as follow.

Park development area
This is an area of concentrated park facilities within the park area, and will be a center for tourist activities. Improvements here are to be done, in principle, in accordance with international standards.

Relocated villages,
These are the villages which must be relocated due to improvements within the park areas, and improvements are to be made here both to compensate for relocation and to raise the village level as the functioning environment of the parks and as sanitary places to live.

The works to be conducted are to be executed in consideration of the present style of life of villagers, investment balances, and other factors.

In principle, a village residents' dwelling service facility is to be established for every 10 dwellings incorporating the water supply and sewage systems.

863 Systems for Improvement

As a result of having studied the present state of provision of utility in the region and future plans therefor, we have concluded, judging from the standards, performance stability, operational problems, and so on, that it would be better to have a separate improvement system for the archeological parks than to wait for such improvements in the context of regional planning.

For the above two areas for establishment or improvement, the following systems have been considered.

- Single System
  What is meant here is a single system covering both of the above-mentioned utility provision areas.

  The following are features of such a system:
  - High degree of effective use of facilities.
  - Comparatively easy control because of concentration.
  - Small initial investment.
  - Need for adjustment of rights across boundaries of administrative units.
  - Difficulty of separation of standards between utility provision zones.

- Separate System
  What is meant here is a separate system for each of the utility provision areas.
  The following are features of such a system:
  - Decentralization of control.
  - High initial investment.
  - Utility improvement according to administrative unit (desa) is possible.

The single system has been selected in view of investment balance and other considerations. The system, however, will have to be capable of integration into regional utility planning once the level, performance and supply stability of utility infrastructure in the surrounding area improves.

864 Utility Improvement Works in 1976 – 85

The description of standards, demands, etc. are all for the 1976 – 1985 period.

Although utility improvements should be made with respect to all duties from the standpoint of environmental preservation and the living environment, we have limited them to the above out of consideration of investment balance within the framework of the archeological park project.

The reason why it has been decided to undertake adequate utility improvements with respect to the relocated villages is that such improvements will play a leading role in attaining the objective of improvement of the standard role in attaining the objective of improvement of the standard of living in rural communities set forth in the new 5-year plan as well as an incentive role with respect to the other villages.

While the provision of individual utilities is as outlined below, it will be necessary to study the different solutions anew and to adjust the planning when more detailed surveys are done and better information is available.

865 Reference Data

The data referred to in the study which follows was gotten in Yogyakarta. Other reference data are shown in Ecological Index of the Draft Final Report.

WATER SUPPLY SYSTEM

This section outlines policies to be taken for the potable water and fire-hydrant water supplies in the park development areas and relocated villages as well as the supplies of landscaping water and park irrigation water within the park development areas.

866 Conditions

Borobudur
Water for the Candi Borobudur Restoration Committee and restaurants etc. in the vicinity is currently supplied with a simple piping system from the Desa Ngrajeg Water Spring.

This water source is used because boring tests done during the Candi Borobudur restoration work (one site to a depth of 60 m) indicated that the underground water supply was salty.

Prambanan
According to data, the underground water in this area will be adequate to meet the needs envisioned by the plan.

867 *Standards and Demands*

In determining the amount of water to be supplied, the local situation, as represented by the findings of our field investigations in the project area, has been taken into account.

For the Park Development Areas and the Village Centers, the water supply has been calculated on the basis of the peak number of visitors using the facilities.

The average stay per visitor in the Park Development Area has been assumed to be 4 hours.

Planning Standards

	standards ℓ/day	planned population Borobudur	Prambanan
Park Development area			
· Visitors	45	36,000	36,000
· Staff	75	600	320
· Accommodation	200	200	300
Village Public Facilities			
· Visitors	30	3,000	3,500
· Staff*	60	900	950
Village Residents	200	500	850

Note: *Including school children

Water Supply in 1985

	Borobudur m³/day	Prambanan m³/day
Park Development Area	1,705	1,735
Village Public Facilities	145	165
Relocated Village	100	170
Total	1,950	2,070

868 Water Supply System

System
In principle, water shall be supplied to both areas by pumping it out of deep wells from depths of 60–100 m.

Sand filters and corrosion controls are to be provided for water purification.

For landscaping considerations, the use of elevated tanks is to be avoided and the water pumped from pressurized tanks instead.

The main supply pipe for the park area is to be a looppipe formation.

For the Mendut Sanctuary site within the Borobudur area, the existing network is to be utilized and the water used after desalination and purification.

869 Alternative Water Sources

This assumes the use of underground water sources for both areas, but Borobudur appears to be in a much worse position for this than Prambanan.

Full studies need to be conducted on the water quality, volume available, impact upon water for existing facilities, and other factors, and the plan revised in view of these results. Below are the possible alternatives.

Alternative 1: Desa Ngrajeg spring
This alternatives is to obtain water from the spring at Desa Ngrajeg currently used by the Candi Borobudur Restoration Committee.

This will be possible if it is clear that the spring can meet the planned demand and that its use will not adversely affect the supply of water to existing facilities. However, the long piping routes required will entail high initial costs.

Alternative 2: River water
This calls for taking water from the nearby Progo River and using it after purification.

This alternative, however, presents problems because of the high initial costs and the need to procure land for the intake and purification plants.

870 Facilities

– 60 m – 100 m Deep Well	
– Rapid Sand Filter & Corrosion Control System	1 each
– Distributive Service Pump with Pressurized Tank	2 each
– Mechanical & Office Building	100 m²
– Service Pipe Main	200 250 dia.
– Water Supply Trucks	2
– Utility Facility Area Required	1,000 m²

871 Fire Hydrant System

The plan calls for locating fire hydrants only in the Park Development Areas and in the Village Centers.

The fire hydrant system is to take advantage of the potable water system for its water source, distribution, and other aspects, with hydrants placed around the major facilities.
The hydrants' water-provision capacity is to set at 25 liter/second each.

872 Landscape Water Supply System

This includes the system for providing water to those landscape elements planned in each of the parks calling for water and for the irrigation system within the Park Development Areas.

Planning standards

	Borobudur			Prambanan		
	sites	area	capacity	sites	area	capacity
Ponds	4	28,800m²	19,800m³	3	83,800m²	9,460m³
Cascades	1	540m²	270m³	1	300m²	150m³
Fountains						
– Large	1	–	–	5	–	–
– Small	–	–	–	8	–	–

- Ponds: 12% of capacity for Borobudur and 20% for Prambanan
- Cascades: Flow volumes of 0.02m³/sec. for Borobudur and 0.05m³/sec. for Prambanan
- Fountains: 10% of the spout volumes of 200 liter/min. for large fountains and 50 liter/min. for small ones.

The differences in make up water for the ponds is because of the different pond designs in the two areas.

Amount of make up waters	Borobudur	Prambanan
Ponds	2,350 m³	1,930 m³
Cascades	720	1,410
Fountains	50	230

Supply system
Water is to be obtained in the Borobudur area from wells (30–50 m deep) bored at suitable sites within the park. For Prambanan, water is to be supplied from a deep well (60–100 m) drilled in the utility facility area yet separate from that for potable water.

873 Park Irrigation System

Planning standards
- The areas for irrigation in the two areas are as shown below:

  Borobudur: 92.0 ha x 25 % = 23.3 ha
  Prambanan: 74.9 ha x 25 % = 18.7 ha

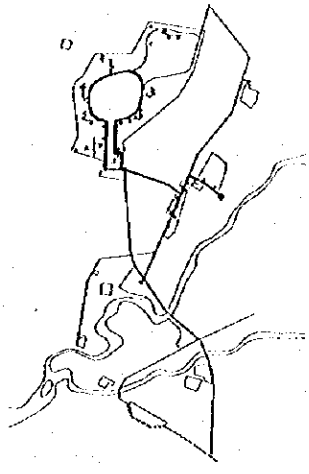
- In the Prambanan area, the Pegat Plateau has been excluded because of topographical, geological, and other considerations.
- The irrigation standard calls for 10 mm/m² day.

Amount of irrigation water

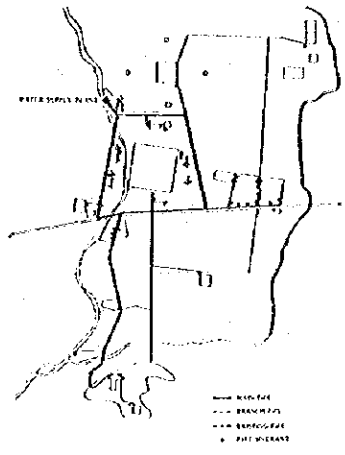
Borobudur: 23,000m² x 10mm/m²day = 2,330m³/day
Prambanan: 187,000m² x 10mm/m²day = 1,870m³/day

Supply system
Run-off from the landscape elements is to be distributed to the outlets with pressurized pumps. In principle, the irrigation is to be done manually from the irrigation outlets.
- Service pump with pressurized tank
- Irrigation outlets

874 Water Supply System: Borobudur



875 Water Supply System: Prambanan



SEWAGE SYSTEM

Outlined here is the plan for the treatment system for sanitary sewers and house sewers in the Park Development Areas and Relocated Villages.

876 Conditions

At present, sewage treatment is done in both areas by discharging waste directly into rivers or irrigation canals and leaving it to break down organically.

877 Planning Standards

The only regulations are those regarding industrial use that are now under consideration. In this project we have set a B.O.D. maximum of 90 ppm for discharge water in view of the fact that the water temperature is high in the local rivers and disintegration of organic substances is rapid.

In calculating the amounts of water discharged, the following coefficients were used in light of their different characteristics.

	sanitary sewer	house sewer
Park development area	0.35	0.65
Village public facilities	0.70	0.30
Village	0.50	0.50

878 Amount of Sewer Discharge Water in 1985

	Borobudur		Prambanan	
	sanitary	house	sanitary	house
Park development area	597	1,108	607	1,128
Village public facilities	102	43	115	50
Village residents	50	50	85	85
Total	749m³	1,201m³	807m³	1,263m³

879 Alternative Study of Sewage Systems

In formulating this plan, it is desirable to adopt highly efficient treatment processes, and the following three sewage systems were considered based upon data available at this stage. However, it will be necessary to modify these on the basis of detailed studies to be done anew.

standard	treatment method	collection method	maintenance	cost	future
60ppm	Activated sludge & trickling filtration	Collection pipes able to collect flows in buildings	Maintenance Officer needed	Per person cost 5-10 times of separate system(1)	Need for new expansion & system extension
90ppm	Septic tank + aeration tank or trickling filtration tank	Collection pipes	Periodical inspection only	Per person cost 10-20% of combined system	Switch to combined possible if extension easy
90ppm	Ceetne stabilization pond	Piping & collection cars to/from collection pit	Maintenance officer needed	Per person cost slightly less than separate system(1)	Possible to lower BOD with extension at contact zone

After a study of these three alternatives, it has been decided that separate system (2) is the best because of its low initial cost, its suitability to climatic conditions, its flexibility in not having a piping network to existing facilities, and other factors.

However, because the facility is big and there is a possible problem with odors, every care needs to be taken in site selection.

Sewage System

With the study of alternatives, separate system (2) was selected for adoption. The section below speaks to sanitary sewer and house sewer treatment systems.

880 Sanitary Sewer Treatment System

Joint collection pits are to be established for facilities and the sewage brought from the facilities by pipe.

The capacity of each collection pit is to be set at 3 days' worth of discharge effluent from its facilities.

Collection car accessibility and pipe routing are to be considered and the better method chosen.

Collection car operations within the park areas are to be done after the park closes for the day in order to avoid coinciding with tourist activities.

Mechanical stirring is to be done at the stabilization pond to promote oxidation.

Treated water is to be run through an open ditch over a gravel fill and into the rivers.

881 House Sewer Treatment System

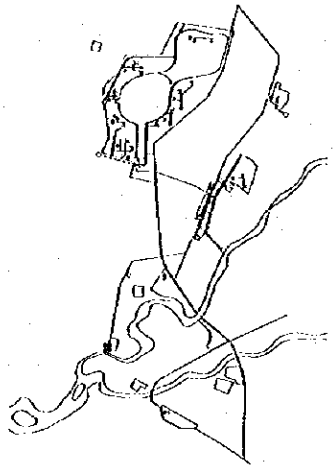
In areas with tourist activity within the Park Development Areas, this is to go through underground pipes, while in other areas, depending upon the topography, it can go through open ditches to nearby rivers or irrigation canals.

Gravel fill is to be provided where the run off empties into the rivers in order to avoid polluting the river water, the open ditches are to be swales, and efforts are to be made to promote soaking en route.

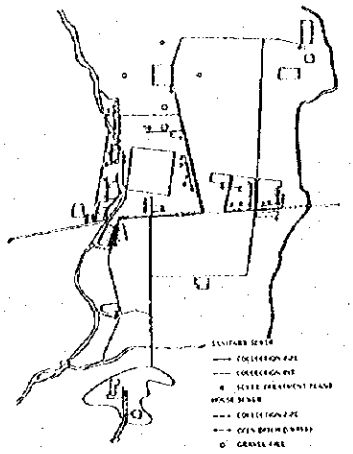
882 Facilities

• Collection pipe	5 m³ ~ 25 m³
• Collection Pit	1,000m³
• Stabilization pond & contact pond	50 m³
• Mechanical and office building	

883 Sewage System: Borobudur



884 Sewage System: Prambanan



ELECTRICAL SUPPLY SYSTEM

885 Conditions

At present, there is only a small electrical supply from generators along the park road in Prambanan Park.

Under the PLN Plan, a main line carrying 150 KV is to be strung between Yogyakarta and Surakarta, and another 150 KV line between Yogyakarta and Magelang is also planned. These are to be supplemented with a 20 KV line between Magelang and Borobudur.

Because the timing for initiation or completion of these lines is uncertain, except for the one between Yogyakarta and Surakarta, this current plan has been drawn up disregarding these indefinite plans in principle and relying upon generating equipment for electrical power.

886 Standards and Demands

The electricity demand for the Park Development Areas and the Village Centers has been calculated with respect to indoor and outdoor lighting and power consumption on the basis of the areas and use of the various facilities.

	standard			quantity	
	lighting	power	total	Borobudur	Prambanan
Park Development Area					
– Park Facilities	19w/m²	17w/m²	36w/m²	10,260m²	43,185m²
– Accommodations	120w/ea	–	120w/ea	50 houses	80 houses
– Outdoor Lighting	2kw/ha	–	2kw/ha	20 ha	34.5 ha
Village Public Facilities					
– Facilities	15w/m²	3w/m²	18w/m²	13,150m²	18,350m²
– Outdoor Lighting	2kw/ha	–	2kw/ha	2.5 ha	2.0 ha
Village					
– Shop House	210w/ea	–	210w/ea	26 houses	80 houses
– Town House	215w/ea	–	215w/ea	20 "	60 "
– Farm House	110w/ea	–	110w/ea	25 "	10 "

Amount of Electrical Supply in 1985 (Unit: KW)

	Borobudur			Prambanan		
	Lighting	Power	Total	Lighting	Power	Total
Park Development Area						
– Park	241	255	496	336	311	647
– Facilities	195	125	320	258	231	489
– Accommodations	6	–	6	9	–	9
– Other Power	–	80	80	–	80	80
– Outdoor Lighting	40	–	40	69	–	69
Village						
– Village Public	165	92	257	237	128	365
– Facilities	145	92	237	202	128	330
– Village Houses	11	–	11	6	–	6
– Outdoor Lighting	5	–	5	31	–	31
Total	406	347	753	573	439	1,012

887 Generator

Generator capacity for this demand has been calculated according to the following formula.

- Capacity = Demand x P x f_0
- Where P = Power Demand Borobudur Park Development Area 0.4
  Power Demand Borobudur Village Area 0.6
  Power Demand Prambanan Area 0.6
  f_0 = Power Factor 0.8

This was calculated taking into account the different demand times, uses, etc. in both areas.

Borobudur:	Park Development Area	159 KW = 150 KW
	Village Area	123 KW = 150 KW
Prambanan:	Park Development Area	311 KW = 300 KW
	Village Area	175 KW = 200 KW

The electricity will be supplied by diesel generators, with the three following cases being possible:

Case-1
Supply to the park and also to villages as an extension of the park -- two generators, one of which being stand by

Case-2
Supply to the park and the villages by separate system -- two generators for the park and two generators for the villages, one of which in each case being stand by.

As a result of studies on these two cases, Case-1 was chosen as the more desirable solution because of its lower initial cost, easier maintenance, and other factors.

888 Network System

A loop system will be used for the distribution lines, with 6 KV for high voltage supply and 220V/380V for low-voltage supply.

The supply lines will be underground cables in the case of the Park Development Area for considerations of the view and overhead lines in the case of other areas.

Pad mounted transformers will be located nearby each of the facilities, with secondary supply lines leading from them to the buildings and outdoor lighting facilities.

889 Outdoor Lighting

Because there are no nighttime tourist activities planned at Borobudur Park, the only need here will be for security and safety lighting. However, outdoor lighting is planned for the Borobudur Sanctuary, Guest House site, parking area, and Excursion Road-1.

In Prambanan Park, outdoor lighting facilities are planned to accommodate evening tourist activity (Lara Jonggrang Sanctuary, National Theater site, service facility site, and gate site), as is underwater lighting in the Lara Jonggrang Concourse Pond to illuminate the fountain. For the other blocks, security and safety lighting alone will suffice.

Roadside lighting is to be installed in both parks' staff housing and employee housing sites. For the Village Centers, outdoor lighting is to be provided for the provincial and national roads, including the bus terminals, community parks, and village centers.

Control of the outdoor lighting will be by photo electric relay.

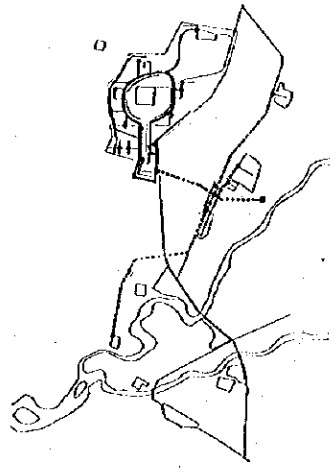
890 Facilities

Power plant facilities:
generators, automatic voltage regulator, the plant building (200 sq.m.) and engine cooling tower

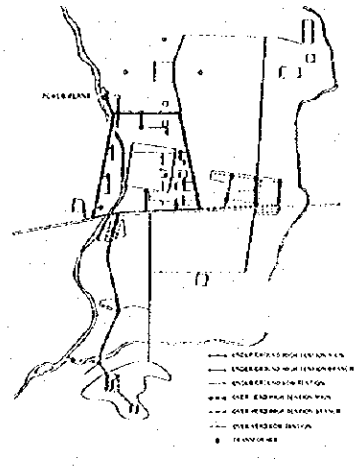
Power distribution facilities:
transformers, power line poles

Outdoor lighting fixtures:
street lighting fixtures, area lighting fixtures, archeological remains illumination fixtures, and underwater lighting fixtures

891 Electrical Supply System: Borobudur



892 Electrical Supply System: Prambanan



TELEPHONE SYSTEM

894 Conditions

Although it will be possible to link up each of the park areas with the Yogyakarta Exchange, at the present time there would seem to be some difficulties involved in the execution of the work.

895 Demand

As a rule, receivers will be installed in all facilities in the Park Development Areas except the accommodation and landscaping facilities.

The village centers will be provided with telephones in the Kantor Kecamatans. However, other facilities needing telephones (such as police stations and post offices) will have their own organizational networks.

There are no plans to include the relocated villages in the telephone network.

	park development area		village center	
	Borobudur	Prambanan	Borobudur	Prambanan
– Radio Transceiver	1	1	1	1
– Exchange	1	1	1	1
– Receivers	13	14	10	10

896 System

An appropriate system would be radio-communication between the Parks and with Yogyakarta.

Each park area will be provided with a radio transceiver and a general exchange, with a telephone line system of underground cables within the park area and overhead lines within the villages.

MISCELLANEOUS WORK

897 While not included within the general facilities, this is an outline of the stormwater drainage, agricultural irrigation, and refuse disposal systems which will be needed.

898 Stormwater Drainage System

Existing conditions and standards
Even at the time of the surveys, rivers in the area were showing erosion in a number of places and the situation was seen to be very unstable. Further surveys are needed here with special attention to landuse and environmental protection.

Neither the Borobudur nor the Prambanan area has an effective rainwater drainage system at the present time. As the annual rainfall is in excess of 4,000 mm in the vicinity of Mt. Merapi and the erosion of river dikes is considerable, comprehensive, full-fledged river control works would appear to be necessary.

Although this project, too, will have to rely on such future basic river control works, in the meantime it will be necessary for repairs within the project areas where the erosion is particularly severe.

$$r = \frac{895.69}{t + \frac{2}{3} - 3.721}$$

In designing the stormwater drainage system, the rainfall intensity calculated as 1/5 of the annual probably rainfall was used:

899 System
In the project areas the existing irrigation network will be used to a maximum extent, with change of the course of flow being avoided as far as possible.

In principle, all of the collection and drainage will be by open ditches leading to irrigation waterways or rivers. The junctions with irrigation waterways will be provided with sand sedimentation pools and distributor arrangements for control of the inflow of rainwater. A gravel fill will be provided at junctions with rivers to prevent erosion and alleviate pollution.

In building facility areas, drainage structures such as under-drains and culverts will be provided as necessary, with connection with main open ditches.

900 Tie in with present agricultural irrigation network
The agricultural irrigation plans are fully organized in both areas and efforts are to be made to provide adequate substitute irrigation canals where the Park Development Areas will cut into the existing networks to maintain the current agricultural irrigation networks.

Borobudur
This is an area with a relatively bettlike main irrigation network. The park development area is located between the network zones so as to present relatively few problems.

Prambanan
Compared to Borobudur, this area has a more loop like irrigation network. There is one main canal in particular which juts into the archeological area, and this canal is to be moved to the sanctuary boundry. Because tributaries to the Opak River, which is the stream for the main canal, also flow through the sanctuary area, some minor changes are to be made in these flow routes and locks are to be established on the irrigation canals.

Nevertheless, because it is most difficult to get data on the existing agricultural irrigation network, detailed study must await the compilation of later surveys and information.

Refuse Disposal System

901 Conditions
At present, efficient re-use is made of paper, clothing, and other articles in Indonesian daily life so that relatively small volumes of refuse are generated.

The refuse generated from this plan has been calculated using the following standards.

	standards (kg/person/day)	Borobudur Persons	Borobudur Refuse	Prambanan Persons	Prambanan Refuse
			kg		kg
Park Development Area					
– Visitors	0.1	10,000	1,000	10,000	1,000
– Staffs	0.2	600	120	220	145
– Accommodations	0.5	200	100	300	150
Village Public Facilities					
– Visitors	0.05	3,000	150	3,500	175
– Staffs	0.2	900	180	950	190
– Village	0.5	500	250	850	425
Total		15,200	1,800	16,320	2,085

902 System
Refuse collected from the trash boxes and garbage cans located in the different facility areas is to be incinerated in the diesel incinerators in the utility facilities areas.

903 Facilities

– Collection Car	1 x 4 ton truck
– Diesel Incinerator	2,500 kg/day
– Stock Yard	1,000 m²
– Area Required	2,000 m²

OPERATION AND MAINTENANCE SYSTEM

904 In principle, the necessary personnel and facilities for the operation and maintenance of all items studied in this utility plan are as shown in the table below.

	water supply	sewage	electricity supply	refuse disposal	others	total
Mechanical Engineer	1(3)	1(4)	1(1)	–	–	3(5)
Electrical Engineer	1(1)	1(1)	2(6)	–	–	4(8)
Civil Engineer	1(3)	1(2)	1(1)	–	–	3(6)
Chemist	1(1)	–	–	–	–	1(1)
Field Staff	1(30)	1(30)	–	2(5)	1(5)	5(60)
Total	5(38)	4(34)	4(8)	2(5)	1(5)	16(80)
Building (m²)	150	100	200	–	100	550
Site Area Required (ha)	0.2	0.25	0.1	0.2	–	0.75

905 Discounting overlapping among sections, operation and maintenance will require the following personnel (figures in parentheses being assistant staff).

– Mechanical Engineer	2 (3)
– Electrical Engineer	3 (7)
– Civil Engineer	2 (4)
– Chemist	1 (1)
– Field Staff	2 (35)
Total	10 (50)

Vehicles required for operation and maintenance are:

– Water Supply Trucks	2
– Patrol Cars	2
– Sewage Water Collection Trucks	10
– Refuse Collection Trucks	1
– Fire Engines	1

The figures are the same for both Borobudur and Prambanan.

Transportation Plan

GENERAL

906 This manual includes the plans for the regional traffic network for the changes that will necessarily accompany development of the archeological parks, the traffic terminal within the parks, the roadway networks within the parks themselves, and the planning criteria for these.

ROAD CLASSIFICATION

907 As well as developing the parks, it will also be necessary to reorganize the road network in the target area. While skillfully utilizing existing national, provincial, and local roads in the affected area, the following new functions must be added to this network.

- Access roads
  These roads functions to provide access to the parks.
- Excursion roads
  These are historic excursion routes linking the many valuable sites within the broader region.
- Park roads
  Those excursion roads expected to be subject to especially heavy use are to be redesignated for exclusive park use.
- Village roads
  It will be necessary to relocate some existing village roads in developing these extensive park facilities spreading over more than 100 hectares.

908 The following facilities are under consideration for the inpark traffic system.

- Traffic terminal and parking area
  As a general rule, no private vehicles will be allowed in the parks. Accordingly, a traffic terminal and parking area will have to be established near the gate to each park.
- Inner parkways
  The following types of parkways are proposed for traffic within the parks.
  - Concourse
    This is the main route from the gate to the monuments.
  - Parkways
    These are parkways linking all the major facilities within the park. Among the means of transport provided for within the park are horse-drawn buggies and bicycles.
  - Malls
    These are malls within the park for pedestrian use only.
  - Service roads
    These are roads for maintenance and distribution of materials to in park facilities.

ROADS OUTSIDE THE PARK

909 Borobudur Area

The following roads are to be built, improved, or relocated within the Borobudur area as roads outside the park.

- Access road: main
  The 4.5 kilometer provincial road branching off of the national road from Yogyakarta to Magelang to go to Mendut is to be widened and improved to be the main access road to Borobudur Park.
- Access road: minor
  The 7.5 kilometer provincial road branching off that same road to go to Sawitan is also to be designated an access road and, as well as serving as the route for visitors from Semarang, is also to be a detour during peak traffic hours.
- Park road
  The present provincial road linking Mendut, Pawon, and Borobudur is to be improved for exclusive park use and an attractive passage created to Candi Borobudur.
- Excursion road
  The 4.5 kilometer route between Mendut and Ngawen is to be designated an archeological excursion route.
- Bypass
  Moving the current 3 kilometer provincial road between Mendut and Borobudur to the north, this is to be separated from the park area. At the same time, the village center near Candi Borobudur is to be moved to front on this road and the bypass is to be made a main artery for the region.
- Village roads
  With the reorganization of the existing villages, five of the roads in Zone 3 are to be designated and improved as village roads.

910 Prambanan Area

The following roads are to be designated roads outside the Prambanan Park and widened and improved accordingly.

Access road
The 3.2 kilometer section of the present national road between Yogyakarta and Surakarta within the park-designated area is to be widened from Bina Marga Standard and special roadside improvements made to make it a suitable access route to the park. It should be noted here that widening this road will require relocating the commercial area and houses along the road.

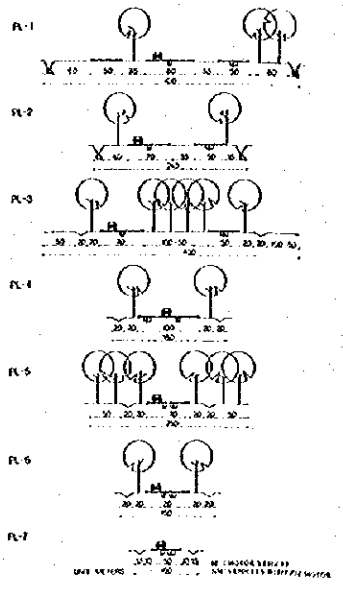
Park road
The 1.5 kilometer road linking the Prambanan Complex and Kraton Hill is to be designated and improved as a park road for exclusive use by visitors.

Excursion roads
The following three excursion routes are to be designated.

- Timur Route
  The 1.5 kilometer route from the Prambanan Complex around the eastern remains (Sewu and Plaosan).
- Sezian Route
  The 2.5 kilometer route from the Prambanan Complex around the southern remains (Sojiwan, Kraton Ratu Boko, and Banyunibo).
- Barat Route
  The 5.5 kilometer route from the Prambanan Complex around the western remains (Sari, Kalasan, and Sambisari).

Village Roads
With the reorganization of the villages, the four roads within Zone 3 are to be designated village roads and improved accordingly.

911 Typical Road Sections



912 Bridges

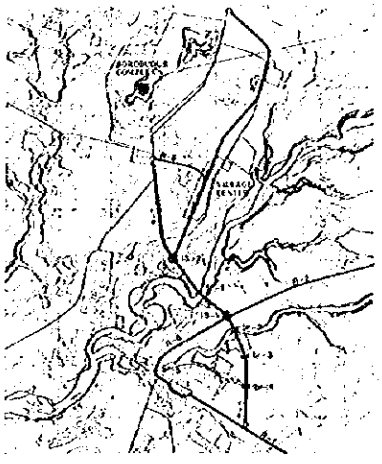
With the improvement of the road network, considerations must also be given to improving or building bridges, as follows.

Discussion of bridges over culverts is omitted here because the details of the irrigation network are not yet available.

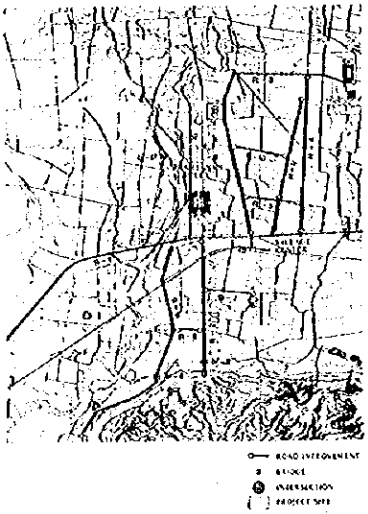
For the superstructure, particularly for long-span bridges, the prestension precast concrete so well employed for the new bridge outside Yogyakarta is to be used.

Although detailed discussion of substructures must await more information on soil conditions, these are to be abutments and piers of reinforced concrete.

913 Road Network: Borobudur



914 Road Network: Prambanan



915 Road list: Borobudur

		R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8
Area (ha)	Planned	6.0	11.3	6.6	*7.23	2.6	0.9	2.3	*6.82
	Existing	4.0	7.5	–	0.8	–	0.3	1.4	2.0
Length (m)		4,000	2,500	2,750	800	1,100	500	900	2,000
R.O.W. (m)	Planned	15.0	15.0	24.0	40.0	24.0	18.0	25.0	25.0
	Existing	10.0	10.0	–	10.0	–	6.0	15.0	10.0
Pavement Width (m)		7.0	7.0	7.0 (5.0)	7.0 (5.0)	7.0 (5.0)	10.0	7.0 (5.0)	7.0
Number of lanes (lanes)		2	2	2 (2)	2 (2)	2 (2)	2 (2)	2 (2)	2
Shoulder width (m)		2.0	2.0	3.5 (1.5)	3.5 (1.5)	3.5 (1.5)	2.0	3.5 (1.5)	2.0
Obstruction clearance (m)		3.0	3.0	1.5 (0.5)	1.5 (0.5)	1.5 (0.5)	0.5	1.5 (0.5)	1.0
Traffic		Mix	Mix	Separate	Separate	Separate	Mix	Separate	Mix
Roadway capacity (VPH)		1,010	1,010	1,420+	1,407+	1,407+	1,597	1,407+	1,010
Service volume (VPH)		520	520	563+	563+	563+	638	563+	520
Type of cross section	Planned	5	5	2	4	2	3	6	6
	Existing	4	4	–	4	–	5	4	4
Development stage		4,5	6	2	4	6	3	5	6

The figures with * include Roadside Parks.
The figures with + indicate number of motor vehicles only.

916 Road list: Prambanan

		R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-10
Area (ha)	Planned	24.8	3.3	3.8	2.3	0.9	2.7	0.5	0.5	2.1	0.8
	Existing	9.9	0.8	2.6	1.5	0.6	2.0	0.3	0.1	0.5	–
Length (m)		6,200	1,300	2,550	1,500	600	1,800	450	300	1,375	750
R.O.W. (m)	Planned	40.0	25.0	15.0	15.0	15.0	15.0	10.0	15.0	15.0	10.0
	Existing	16.0	6.0	10.0	10.0	10.0	11.0	6.0	6.0	6.0	–
Pavement width (m)		8.0 (5.0)	7.0	7.0	7.0	7.0	7.0	5.0	7.0	7.0	5.0
Number of lanes (lanes)		2 (2)	2	2	2	2	2	2	2	2	2
Shoulder width (m)		3.5 (0.0)	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	1.0
Obstruction clearance (m)		1.5 (0.5)	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0	0.5
Traffic		Separate	Mix	Mix	Mix	Mix	Mix	Mix	Mix	Mix	Mix
Roadway capacity (VPH)		1,560+	1,010	1,010	1,010	1,010	1,010	–	1,010	1,010	–
Service volume (VPH)		624+	520	520	520	520	520	–	520	520	–
Type of cross section	Planned	1	6	5	5	5	5	7	5	5	7
	Existing	2	5	4	4	4	4	5	5	5	–
Development stage		4,5,6	5	6	6	6	6	5	6	6	6

917 Village road list: Borobudur

	Code No.	Desa name	Length (m)	R.O.W. (m)	Pavement width (m)	Development stage	Remark
Village road main	RM-1	Borobudur	1,600	15	7	3, 6	R-6
	RM-2	Sawitan	1,500	15	7	6	R-2
	RM-3	Sawitan/Mendut	1,300	15	7	6	R-8
Village road minor	RN-1	Borobudur	1,000	8	4	6	
	RN-2	Borobudur	400	8	4	6	
	RN-3	Borobudur	3,000	8	4	6	
	RN-4	Borobudur/Wanurejo	1,200	8	4	6	
	RN-5	Wanurejo	2,000	8	4	6	
	RN-6	Mendut	1,000	8	4	6	R-8

918 Village road list: Prambanan

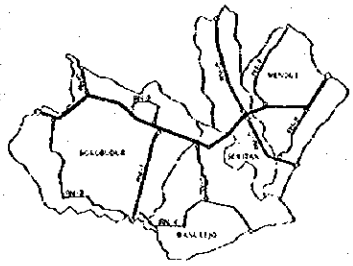
	Code No.	Desa name	Length (m)	R.O.W. (m)	Pavement width (m)	Development stage	Remark
Village road main	RM-1	Tlogo/Bugisan	2,000	15	7	6	R-4
	RM-2	Bugisan	1,000	15	7	–	–
	RM-3	Bokoharjo	2,000	15	7	6	R-6
Village road minor	RN-1	Tlogo/Bugisan	2,600	8	4	6	R-3
	RN-2	Tlogo	1,100	8	4	6	R-5
	RN-3	Kebondalem Kidul/ Pereng/Bokoharjo	2,000	8	4	5, 6	R-7, 2, 8

919 Village Road

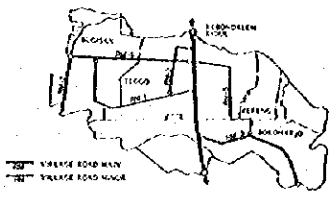
The following broad specification is recommended for the standard design of the village roads.

- Village Road: Main
  - Inter Desa Road
  - Single Carriageway
  - 2 Carriage Lanes
  - No Direct Access to Property
  - Right of Way : 15 m
- Village Road: Minor
  - Inter Dukuh and Village Center Area
  - Single Carriageway
  - 1 Carriage Lane
  - Access to Property
  - Right of Way : 8 m
- Collector
  - Inter Dukuh
  - Single Carriageway
  - 1 Carriage Lane
  - Access to Property
  - Right of Way : 6 m

920 Village Road Network: Borobudur



921 Village Road Network: Prambanan

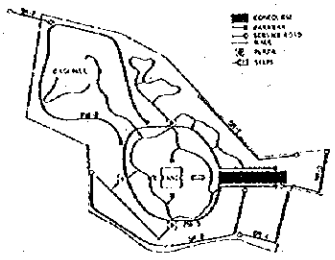


ROADS INSIDE THE PARK

922 Inner Road List: Borobudur

Type	Code	Distance	R.O.W.	Pavement Width	Pavement Surface
Concourse		360 m	60 m	5 m x 2 lanes 3 m x 2 lanes	Stone of Brick
Parkway	PW 1 PW 2	3,900 m 8,300 m	10 m	5 m	Asphalt
	SR 1 SR 2 SR 3 SR 4 SR 5	660 m 1,200 m 500 m 500 m 300 m	10 m	5 m	Asphalt
Malls			8 m	3 m	Entourages

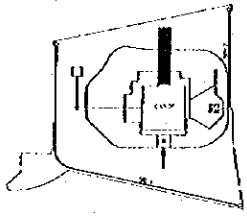
Inner Road Network: Borobudur



Inner Road List: Prambanan

Type	Code	Distance	R.O.W.	Pavement Width	Pavement Surface
Concourse		200 m	60 m	11.5 m x 2 lanes	Stone of Brick
Service Road	SR 1 SR 2	1,600 m 500 m	10 m	5 m	Asphalt
Malls			3 m	3 m	Entourages

925 Inner Road Network: Prambanan



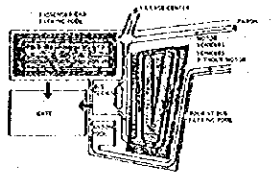
TRAFFIC TERMINAL AND PARKING AREA

926 In principle, visitors will note be allowed to come into the gate area in motor vehicles. From the traffic terminal at the entrance to the park they are to change to secondary means of transportation or walk.

In the case of the Borobudur Park, there will be traffic terminals and parking space at the main gate and other two sub gates, and in the case of the Prambanan Park, there will be traffic terminals and parking space at the main gate and at the Kraton gate.

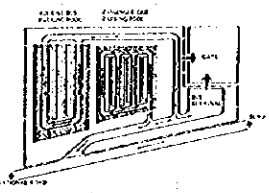
927 Traffic Terminal and Parking Area: Borobudur

location	area	capacity	
		buses	cars
Main Gate	13,400 m²	65	132
Pawon Gate	390 m²	2	3
Mendut Gate	600 m²	3	6



28 Traffic Terminal and Parking Area: Prambanan

location	area	capacity	
		buses	cars
Main Gate	11,400 m²	55	96
Kraton Gate	610 m²	3	5



929 Buggy Service

For the convenience of visitors, buggy pools and stops will be located no farther than 200 meters from each of the major facilities.
For the Borobudur area, this means eight locations around the 8-shaped parkway. Each buggy pool and stop should be capable of accommodating five to ten andong horse drawn buggies.
In the Prambanan area, there is no in park buggy service, but buggy pool is to be established near the gate for use in excursions to Sewu, Plaosan, Sojiwan, Kraton, etc.

Landscape Plan

GENERAL

930 This Manual contains the concepts and solutions to the landscape questions seen as a most important factor in the environmental planning and design of the archeological parks. Based upon the concepts and stipulations for the park environment, a number of landscape techniques are proposed aiming at creating an historic atmosphere.

931 Design Objectives

Quality
It is planned to create a national park environmental quality preserving the grandeur of those archeological remains which are the greatest resource of the target area plus the addition of attractive scenic elements (such as water, signs, symbols, and the like).

Harmony
A surrounding environment is to be fostered as a fitting enclosure for the spatial concept implied by the archeological remains themselves.

Identity
This is to be done with adroit use of the surrounding agrarian environment to create a landscape clearly identifying the park.

Maintenance-free
The park is designed with full consideration to the longterm, labor-saving perspective in the maintenance and management of its vast area.

The following items have been given special attention in the formation of the landscape design.

- Introduction of the water element
- Tropical gardening
- Recovery of greenery with a commemorative tree planting system
- Nighttime illumination of the archeological remains
- Active utilization of panorama views from focal points
- Giving the park area identity by emphasizing visual axialness
- Creation of an excursion route through sequence design
- Creation of spatial integration through sign and symbol distribution

DESIGN POLICY

In order to make best use of the resource-rich environment and to create a fit environment for the national archeological parks, the following design techniques are to be used in an attempt to fashion an attractive space.

931 Emphasis on the Axiality of the Archeological Monument

Virtually all of the monuments face east and lie perpendicular to magnetic north. This religious and spatial axiality is to be made more explicit in the landscape design. For example, it is to be provided for in the roads to the main monuments and in the placement of major facilities.

932 Simulation of the Candi's Cathedral Placement Design Theory

Most of the Candi are built on spatial principles following Buddhist Mandara thought. The Candi Lara Jonggrang second compound is typical. The landscape design for the Lara Jonggrang Sanctuary is an attempt to redelineate with trees the placement of the Candi Perwara groups in the second compound and thus to enhance the sacred space.

933 Continuity of Physiognomy of the Land

Each age has carved its own pattern of use into the land. With the changes in use accompanying park development, it is planned to utilize the land physiognomy as much as possible in the new environment and to attempt temporal continuity in the land.

Special efforts are to be made to minimize changes in topography, soil, surface water patterns, and vegetation and to creatively adapt these to suit new needs.

934 Observance of Principles of Perception

The general rules of theories on perception are to be adopted as the decisive theory of landscape design. Especially the rules of visual perspective and field of vision principles are to be built into modules, focal points established, facilities located, and other efforts made to discover optimum solutions.

935 Gaining a Panoramic View

The excellent views of Kedu Basin from Candi Borobodur's circle terrace or of Kewu Plain from Kraton Hill are two of the most outstanding resources of the parks.

In order to make the aerial view surrounded by volcanic mountains and a sea of trees even more beautiful, care is to be taken in the creation of ground spaces.

Using this bird's eye view design method in the park area (zone 2), the water elements are to be interest points, the facilities hidden among screening trees, and the axiality to Mt. Merapi reinforced. It will be necessary here to adopt sophisticated landscaping techniques.

936 Introduction of Sequence Design Method

In designing the access roads to the parks and the different paths within the parks, sequence design methods are to be used based upon the visitor analysis.

Vegetation and water elements are especially to be used to create dramatic approaches to the candi.

937 Diverse Development of Plantation Design

Design methods are to be developed taking fullest advantage possible of the plantations which are a major factor in the park landscape. By utilizing the vegetation that is already there and supplementing it with new vegetation to be planted, an even more three dimensional scene is to be created.

The following two methods are to be used in this attempt to create a richer view.

- Meaningful use of trees is to be made based upon analysis of their functions and effects (for example, in providing shade, screening objects, cutting noise, preventing erosion, etc.).
- Design development is to be attempted analyzing the essential beauty of the tree shapes and considering their grouping patterns.

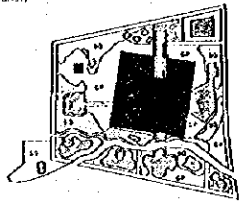
LANDSCAPE CONSTRUCTION

938 Landscape construction works can be divided into the following categories:

- Plantation Work for Sanctuary Area: Holly Green
- Gardening Work: (Facility Green)
- Plantation Work for Facility Area: (Screening Green)
- Plantation Work for Concourse Area: (Concourse Green)
- Plantation Work for Roadside Area: (Roadside Green)
- Plantation Work for Buffer Zone: (Edge Green)
- Plantation Work for Hilly Area: (Hilly Green)
- Plantation Work for Riverside Area: (Riverside Green)
- Lawn: (Green Pavement)
- Pavement Construction Work: (Hard Surface)
- Pond Construction Work: (Water Surface)

Borobodur

Prambanan



939 Area List of Landscape Works

Works	Borobudur	Prambanan
Holly Green	320	917
Facility Green	1,305	1,168
Screening Green	1,073	1,720
Concourse Green	131	88
Roadside Green	373	90
Edge Green	1,257	1,691
Hilly Green	1,126	
Riverside Green	–	295
Green Pavement	2,656	1,931
Hard Surface	939	552
Water Surface	297	141
(Unit: 100M²)		

DESIGN CRITERIA

940 Points Common to Both Parks

Gardening Work for Facility Area
Front yards, inner courts, and other areas in the facilities to be visited by tourists are to be planted with a variety of tropical plants to create an attractive appearance.

Flowers, trimmed areas, ponds, and other effects are to be artistically located under the shade trees around facilities to make places where visitors can rest pleasantly.

Plantation Work for Facility Areas
The basic planting around facilities calls for tall trees for their shade and screening benefits.

As for types of trees, broad leaves trees are to be chosen with large crowns and full lower branches, these planted in groves of at least 3 – 5 rows.

These should be about 10 m high to top the facility roofs.

Plantation Work for Roadside Areas
In keeping with the principles of sequence design, trees are to be planted along roadsides for their visual and shade benefits.

Along the roadways which the horse-drawn carts will travel, trees with large crowns but no lower branches are to be selected and planted at random.

Shade trees along pedestrian malls are to be supplemented with shrubs and flowers for variety. Variety is also to be used in the creative deployment of columnar trees emphasizing the sense of direction, large crown trees providing shade and tunnels, and bush series for guide lines to facilities.

Plantation Work for Buffer Zone
Along the borders of the park (zone 2) tall trees are to be planted in 3 – 5 rows supplemented with densely planted bushes and shrubs to serve as a fence for the area and to act as a buffer against noise.

Tree selection is to be most carefully done to serve visual identification of the park area.

Lawn
Virtually the entire area within the parks is to be planted with grass to create an ever-green visual effect and to hold down dust.

Pavement Construction Work
Plazas, inner courtyards, and other facility areas are to be covered with stones or bricks.

Parking areas, roads for horse-drawn carts, and other such areas are to be paved with asphalt.

941 Borobudur Park

Plantation Work for Borobudur Sanctuary
Vegetation on the slopes of Borobudur Hill is to be supplemented with additional plating for erosion control, visual effect, safety, and other reasons.

Existing vegetation is to be critically evaluated from the perspective of visual effect and trees which hinder viewing of the candi are to be cut down or trimmed.

Rest areas are to be established within the sanctuary and planted with shade trees.

Plantation Work for Concourse Area
The concourse to Candi Borobudur is to have cascades running down its center and three rows of columnar trees on each side to give a strong sense of axiality and direction.

The rows of trees are to be tall trees (about 15 m) of a single species in a straight line with an overall geometric sequence to create a visual corridor and give a dramatic view of the candi's splendor.

Plantation Work for Dagi Hill
Taking advantage of the palm trees that are already there, two or three more palm varieties are to be added in additional planting to create a palm forest where visitors can rest.

At the same time, flowering trees, shrubs, and other plants are to be densely planted as appropriate on the gentle undulation for variety.

Near the top, growth is to be somewhat restrained to allow visitors a panoramic view.

Pond Construction Work
The following water elements are to be introduced at important places throughout the park to enrich the landscape.

- Borobudur Pond
  This is to be in a crescent-moon shape around Borobudur Hill to create a feeling for the religious atmosphere of the Borobudur sanctuary and to reflect the monument on its surface.
  Concourse Cascade
  This is to create a water guideline leading to Candi Borobudur.
  Guest House and Museum
  At the base of Dagi Hill, each is to be fitted with its own small pool.

942 Prambanan Park

Plantation Work for Lara Jonggrang Sanctuary
A species having a large crown and the feeling of a sacred tree is to be carefully selected and planted on a 12 m grid.

Their height is to be 6 m to allow a good view of the candi from within the sanctuary.

Plantation Work for Riverside Areas
Trees and bushes are to planted on the banks of the Opak River as it flows through the park to prevent erosion and to keep visitors away from the river itself.

This will also create a riverside park for visitors to relax in.

Pond Construction Work
The following water elements are to be introduced at important places throughout the park to enrich the landscape.

- Lara Jonggrang Pond
  A geometrical surface 230m x 35m, this creates a space leading dramatically to the candi and reflecting the candi's splendor on its surface.
- Ramayana Theater Pond
  A pond is also to be created behind the Ramayana theater to reflect the candi's profile, whether by day or illuminated by night.
- Others
  Geometrical ponds are also to be located in the inner courtyard of the cultural pavilion and in the riverside terrace.

MAINTENANCE PROGRAM

943 Area Classification for Maintenance

Park maintenance is to be divided into three types depending upon the degree of need. Those areas where the most visitors will congregate and where there are considerable landscape factors will require intensive maintenance. Those areas which tourists will visit but where the landscape factors require relatively less care will receive moderate maintenance. Finally, those areas which very few people will visit and where the landscape factor is maintenance-free will receive minimal care.

Maintenance policies and the areas falling into each of these three categories are given below.

- Class A Maintenance Area
  Most intensive care is necessary here. Maintenance crew will go around twice a week for general cleaning up and care of plants.
  – Sanctuary area
  – Gate and Concourse
  – Main Facility area
- Class B Maintenance Area
  Maintenance work is to be done once a week for cleaning up and care of plant.
  – The areas where activities of visitors are expected.
- Class C Maintenance Area
  Maintenance crew will take care of this section every other week.
  – Surrounding areas of the above and green pavement.

944 Maintenance Staff Required

Both parks will require the following maintenance staffs.
Current thinking calls for manning these staffs almost entirely with local farmers.

– Supervisor	4
– Mowing staff	32
– General maintenance staff	30
– Cleaning staff	20
– Facility maintenance staff	5
– Others	9
Total	100 persons

Appendix: Nursery

In order to supply park construction with the necessary trees, shrubs, flowers, and other landscape materials, consideration was given to establishing a nursery within or near the parks but it was decided for the following reasons that such nursery establishment would be uneconomical.

- Such materials are readily available from the vast supply bases in eastern Java.
- The long time required for park construction makes it possible to plant young trees and allow them to grow in place.
- It would be difficult to procure a site for the nursery, and the costs of nursery construction would also be considerable.

Facility Plan

GENERAL

945 This manual is a compilation of an analysis of problems to be considered in selecting facilities, points regarding the layout and design of facilities, information on the standards and methods for facility layout, and items regarding the spatial nature, composition, equipping, etc. for important facilities.

DESIGN POLICY

946 Climate and Construction
Java is characterized by a broad flat expanse dotted with palm, banana, and other groves interspersed with fields and paddies. It is a simple landscape with the trees serving to break the harsh sun and rain. These are climatic considerations also account for the sharply sloping roofs, deep eaves, high ceilings, thick brick walls, cold tile floors, and other features of Javanese architecture. At the same time, the architecture uses locally available natural materials fashioned with simple methods.

947 Space and Design in Javanese Architecture
The traditional wooden architecture uses straight-line, symmetrical spaces, and the prototype may be found in Kraton Palace. These same sensibilities are also applied to the placement of buildings, courts, plazas, and other outdoor spaces. While virtually all of the buildings are block surrounded by walls or block pillars and roofs alone for an open structure, these latter are spaces unique to festivals, ceremonies, assemblies, meetings, and other diverse activities fundamental to local social life. The most characteristic design is to have a crested roof, with the design of the roof varying widely depending upon the size and shape of the building.

948 The following design policy can be derived based upon the above considerations.

The special environment of the archeological park demands a sophisticated harmony between the natural environment and the human environment. In this sense, the buildings should avoid large-scale, monumental structures and be based upon groupings of low-rise, smaller buildings to blend in better with the natural environment.

The facilities plan within this environment of preserving the historical remains should utilize modern techniques for convenience and functionality but must at the same time, or even more importantly, reflect Javanese history and tradition.

From a technical aspect, this facilities plan must consider the natural conditions on Java, and especially the need for mitigating glare, insulating from heat, providing drainage, etc. Every effort is to be made to use locally produced materials. It is also important to shun mechanical means and to instead put the priority on employing local residents.

The facility must be planned with the ability to handle the vast waves of people utilizing them each year, and must be such as to facilitate later expansion as the number of tourists increases.

949 Local Construction Conditions
The following problems should be considered:

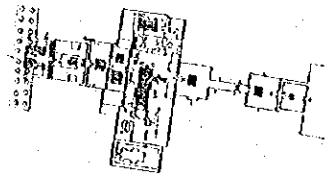
- The low productivity of building materials
- The small amount of standardized building materials on account of the backward industrialization of Java
- The difficulty of importing building materials and construction equipment on account of the lack of improved docks.
- The restricted number of types of usable structure.
- Few actual examples of large framed buildings.
- The short supply of labor equipped with knowledge of modern construction techniques
- The application of Javanese artists and craftsmen in this construction.

950 Construction and Structure System
All structures are to be one-story buildings built of pillars and beams (except the two story employee housing).
By type and scale, structures may be broadly divided into (1) RC structure, brick walls, and wooden roofs and (2) wooden structure and wooden roofs. Main materials are Javanese red tile for roofs, bricks and plaster for walls, plywood for partitions, and tile for floors.

PRINCIPLES OF FACILITY PLANNING

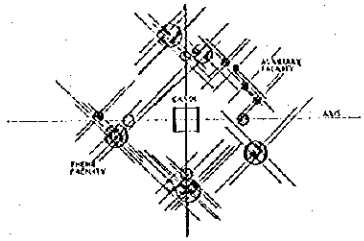
951 Building Unit
Facilities are composed of groups of building units, this to avoid each facility's emphasizing its own shape and to give a sense of oneness and harmony to the whole.

952 Courtyard
Building units are to be located surrounding a central courtyard, each courtyard having a pond, trees, grass, flowers, and other natural effects and each expressing the individuality of its facilities.



953 Dispersion
Building each development component within a long-term program, expansion is to made easy and facilities dispersed to avoid excessive concentrations of people.

954 Axis Orientation
As Candi Borobudur and Candi Lara Jonggrang have entrances placed cathedral like in the four directions of north, south, east, and west, main facilities are to be located on these axes and the religious axiality emphasized. And also other facilities are to be located on a central axis (45° from the ruins' axis in Borobudur and 90° in Prambanan) to give a sence of identity and direction.



955 Greenery
Although trees will be planted around the facilities to protect them from direct sunlight, care will also be taken to locate facilities within groves so that they are not directly visible from the ruins. The plaza and other facilities will be places as shown below for observation of the monument.

956 Visual Character
All facilities are to be located in one of the following three zones for optimum perspective on the monument, with additional consideration given to gaining the characteristic scenery of the monument.

Zone 1:
This gives an especially heightened feeling of presence in the sanctuary area.
Zone 2:
From here, it is easiest to grasp the scale of the monument.

Zone 3:
This is the maximum distance allowing recognition of the monument as the dominant element in the landscape.

DESCRIPTION OF FACILITIES

953 By function, the facilities are divided into the following three categories.

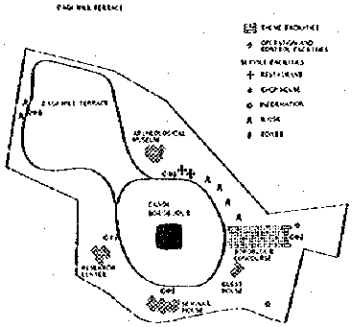
Theme Facilities
These are facilities reflecting the development characteristics of the park, and main facilities for visitor activities.

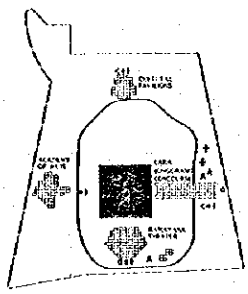
Service Facilities
These facilities are for the support of visitor activities. Included in this category are restaurants, chop houses, kiosks, visitor center, service stations (Service for information, telephone, and those are also guarding station), toilet, souvenir and gift shops and so on.

Most of them will be located in optimum place in dispersed fashion.

Operation and Control Facilities
These facilities will functions as the operation and control of the park, those will be located in a concentrated fashion.

954 Facility Location: Borobudur





960 Facility list: Borobudur

Facilities	Bldg. floor area (m²)	Facility site area (m²)	Location		Development stage	Development body	Operation body	Remarks
THEME FACILITIES								
Gate Plaza	–	6,000	P-1		3	C	C	Gate, Visitor Center, Pasar, Kiosk
Concourse	–	19,700	P-1		3	C	C	Cascade (250m x 8m)
Archeological Museum	3,500	48,200	P-3		3	C	C	Admini. Office, Museum, Site Museum
Archeological Research Center	1,500	7,000	P-4		5	C, G	G	Admini. Office, Research Labo, Library
Seminar House	1,550	6,200	P-5		5, 6	C, G	G	Admini. Office, Seminar Room
Guest House	400	2,000	P-6		4	C	C	Reception Hall, Living Rm. Bed Rm.
Dagi Hill Park	–	247,000	P-7		5	C	C	Observation Terrace, Palm Garden, Park
Temple Gate Terrace	–	1600 x 4.	P-1,3,4,5		4, 5	C	C	Service Station, Kiosk, Lavatory
SERVICE FACILITIES								
Restaurant	1,000	4,000	P-2		3, 4, 5	C	P	With Kitchen, 200 Seats
Chop House	800	5,000	P-2		3, 4, 5	C	P	8 Houses, 320 Seats
Kiosk	150	–	P-1237	S-2, 3	3, 4, 5	C	P	5 m²/1 Kiosk
Passar	150	1,000	P-1		3, 5	C	P	5m²/1 Passar
Summer House	240	–	P-13457	S-2, 3	3, 4, 5	C	C	20 m²/1 Summer House
Public Toilet	270	–	P-1237	S-2, 3	3, 4, 5	C	C	30 m²/1 Toilet
OPERATION FACILITIES								
Gate	350	–	P-1		3	C	C	
Visitor Center	250	1,000	P-1		3	C	C	Information Center, First Aid Station,
Park Development Corporation Office	200	800	P-1		2	C	C	Admini. Office, Conference Rm.
Maintenance Shop	1,350	5,350	P-8		3, 4	C	C	Work Shop, Employee Dining Rm.
Staff Housing	1,500	6,000	P-9		3, 5	C	C	Family-10
Employee Housing	6,750	26,300	P-9		2	C	C	50 Units, Common Room
Utility Facility	1,000	4,000	P-10		3, 4	C, G	C, G	Generator House, Pump Houses,

N.B. Development and Operation Entity
C – Park Development or Operation Corporation
G – Central or Provincial Government
P – Private Sector

961 Facility list: Prambanan

Facilities	Bldg. floor area (m²)	Facility site area (m²)	Location	Development stage	Development body	Operation body	Remarks
THEME FACILITIES							
Gate Plaza			P-1	3	C	C	Gate Visitor Center, Pasar, Kiosk, Toilet
Concourse			P-2	3	C	C	Pond
Cultural Pavilions	1,260	4,200	P-3	3	C	C	Admini. Office, Cultural Pavilions Court
National Theaters	7,800	20,200	P-4	4	C, G	C, G	Ramayana Theater, Sub Theater
Academy of Arts	3,800	11,350	P-5	5	C	G	Admini. Office, Seminar Rm. Lecture Rm.
Site Museum	–		P-3	4	C	C, G	Ca. Lumbung Sanctuary, Summer House
Riverside Park Terrace	–		P-6	4	C	C	Souvenir House, Kiosk, Public Toilet
Pegat Plateau Park	–	139,000	P-7	4, 5	C	C	Panoramic View Terrace, Gate Terrace
SERVICE FACILITIES							
Restaurant	600	2,400	P-2, 4	3, 4, 5	C	P	With Kitchen, 120 seats
Chop House	50	3,825	P-2, 4, 3	3, 4, 5	C	P	5 Houses, 200 seats
Kiosk	125	–	P-123467 S-2, 4	3, 4, 5	C	P	
Passar	125	600	P-1	3, 5	C	P	5 m²/1 Passar
Summer House	360	–	P-123467 S-2, 4	3, 4, 5	C	C	20 m²/1 Summer House
Public Toilet	300	–	P-123467 S-2, 4	3, 4, 5	C	C	30 m²/1 Public Toilet
OPERATION FACILITIES							
Gate	350	–	P-1	3	C	C	
Visitor Center	250	1,000	P-1	3	C	C	Information Center, First Aid Station,
Park Development Corporation Office	200	800	P-1	2	C	C	Admini. Office, Conference Rm
Governmnet Agency Office	1,000	4,000	P-6	3, 5	G	G	Office, Work Shop, Work Yard
Maintenance Shop	1,150	5,150	P-9	3, 4	C	C	Work Shop, Employee Dining Rm.
Staff Housing	1,550	–	P-10	3, 5	C	C	Family 10 Units, Bachelor 5 Units
Employee Housing	14,670	33,000	P-10	2	C	C	80 Units, Common Room
Utility Facilities	1,000	4,000	P-11	2, 3, 4	C, G	C, G	General House, Pump Houses

VISUAL STUDY FOR DETERMINING FACILITIES' ARRANGEMENT

962 Consideration of all facilities within the parks was done from the visual perspective and this was used as one point of reference in determining the placement and facilities' arrangement plan.

963 Location Features of Facilities

From the natures of the different facilities, they were divided into three types as shown below for their location features.

Type 1: Monument-direction facilities
Because of the desire to create the most intimate relation between the monuments and the theme or other such facilities, these were placed as close to the sanctuary area as feasible.

Type 2: Natural condition directed facilities
These are facilities which will be used by visitors and which are pre-determined in their location by the natural conditions. (Examples here are Dagi Hill Park, Riverside Park, gate facilities, etc.)

Type 3. Others
These are other facilities which visitors will want to use.

964 Zone Classification

The sanctuary areas aside, the park area can be roughly divided into the following three zones depending upon the degree each is influenced by monument.

Zone A:
This is the zone adjacent to the sanctuary area.
While it allows direct viewing of the monument, the utmost care should be exercised in locating facilities in this zone.

Zone B:
This is the zone between zones A and C.
The monument is visible from this zone.

Zone C:
This is the zone adjacent to the park area boundary.
Here, there is little direct impact from the monument or awareness of its presence.

The visual measurement standards for the different zones may be set as shown below.

	Zone A	Zone B	Zone C
Borobudur	220 - 330m	330 - 425m	425 - 630m
Prambanan	195 - 310m	310 - 395m	395 - 655m

965 Standards for Setting Zones

Vertical Angle Standards

	Zone A	Zone B	Zone C
Vertical Angle	14° - 9.5°	9.5° - 7°	7° - 4.5°
Candi Borobudur	200 - 310m	310 - 450m	450 - 600m
Candi Lara Jonggrang	200 - 320m	320 - 420m	420 - 700m

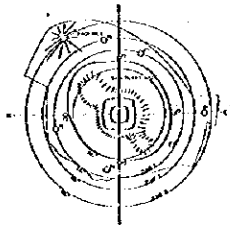
Notes: • The Candi Borobudur platform is 120m square and the Candi Lara Jonggrang platform 220m square.
• The lower sets of figures indicate distance from the monument.

Horizontal Angle Standards

	Zone A	Zone B	Zone C
Horizontal Angle	45° - 25°	25° - 20°	20° - 13°
Candi Borobudur	200 - 320m	320 - 400m	400 - 600m
Candi Lara Jonggrang	190 - 300m	300 - 370m	370 - 610m

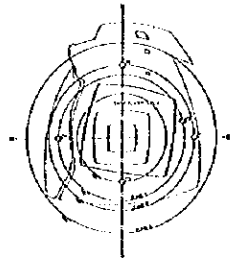
Notes: • The vertical angle is the angle from the point of viewing to the monument height.
• The height of Candi Borobudur has been calculated adding its 32m to the surrounding 16m.
• The height of Candi Lara Jonggrang is taken as 45m.

966 Location Suitability: Borobudur

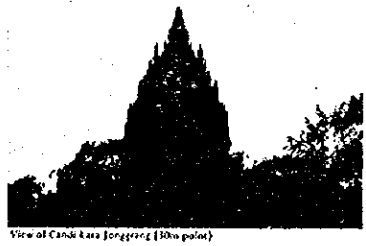


Relationship	Zone A	Zone B	Zone C
Dominantory	F_1: Terrace	F_6: Museum	--
	F_4: Restaurant	--	--
Secondary	F_3: Guest House	F_8: Research Center	F_9: Gate Plaza
	F_5: Seminar House	--	--

967 Location Suitability: Prambanan

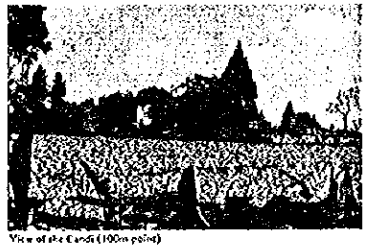


Relationship	Zone A	Zone B	Zone C
Dominantory	F_2: Ramayana Theater	F_7: Gate Plaza	F_{10}: Cultural Pavilion
		F_4: Restaurant	--
Secondary	F_6: Academy of Arts	--	--

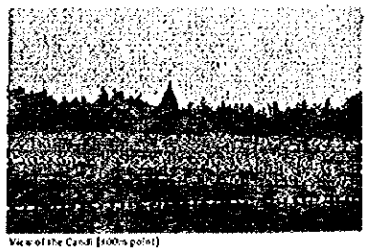


View of Candi Lara Jonggrang (30m point)

View of the Candi (80m point)



View of the Candi (100m point)



View of the Candi (160m point)

CHAPTER NINE

SUPPLEMENTARY STUDIES

Related Studies

MEASURES FOR PROTECTION OF HISTORICAL ASSETS IN YOGYAKARTA AND SURAKARTA CITIES

001 Findings

Reflecting the long history of Indonesia, historical and cultural remains are to be found throughout the cities of Yogyakarta and Surakarta.

There are a number of these sites which visitors to Borobudur and Prambanan parks may be expected to want to see, prominent among them being Hamengku Buwono Palace, Yogyakarta Palace, and Taman Sari Water Castle in Yogyakarta and Mangkunegaran Palace and Solo Palace in Surakarta.

Yet with the developing urbanization and renovation in these cities, it may be anticipated that there will be a qualitative change in the environment and historic atmosphere of these old cities. Legal, financial, and administrative measures are needed to preserve effectively these historic sites and their environment.

At the same time, steps must also be taken to facilitate the convenience of visitors to the areas. These archeological parks and ancient cities are located within the beautiful mid-Java setting of volcanic ranges and agrarian fields, making the area fully capable of moving the hearts of future sightseers and ensuring the area's future in tourism.

Recommendations

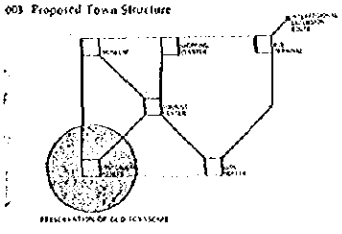
That the Central and Provincial governments provide financial assistance for the preservation and maintenance of these historically important structures.

That a Law Concerning Special Measures for Old City Preservation be passed and ordinances established, that the area be designated a preservation area, and that regulations be enforced to protect the environment around these historic structures.

That public relations activities be conducted to make more people better aware of the importance of these historic structures That efforts to promote tourism in these old cities be accompanied by the provision of parking lots, information booths, and other needed facilities

That efforts to promote tourism in these old cities be accompanied by the provision of parking lots, information booths, and other needed facilities

003 Proposed Town Structure



MEASURES FOR IMPROVEMENT OF TOURIST ACCOMMODATION FACILITIES IN THE REGION

001 Inventory

It is imperative that lodging facilities be built to accommodate the weekend and long-term tourists whom the development of the Borobudur and Prambanan Parks will attract from throughout Indonesia and overseas.

From the numbers of park visitors anticipated, it may be estimated that the following accommodations will be needed.

	Indonesian		Foreigner
	lower estimate	upper estimate	
1975	1,186		208
1980	2,141	3,012	518
1985	3,866	7,662	1,289

Notes: - Figures are in numbers of beds.
- Figures are on a per-day basis assuming each visitor stays an average of two nights.

At present, most visitors to the area stay in hotels, guest houses, and other accommodations in Yogyakarta and Surakarta, and the supply and demand situation appears to be in balance.

Accordingly, it may be estimated that the new demand for accommodations with the parks will be as shown below.

	Indonesian		Foreigner
	lower estimate	upper estimate	
up to 1980	1,000	1,500	300
up to 1985	2,700	6,500	1,100

Note: Figures are in numbers of beds.

005 Recommendations

It is recommended that the following facilities be constructed to meet the demand for tourist accommodations arising from the development of the archeological parks.

- Construction of a new cluster of international hotels is recommended. Hotels of international appeal, such as the Ambarrukmo Palace Hotel in Yogyakarta should be constructed to provide 300 beds by 1980 and an additional 800 beds by 1985.
- Massive construction of economy-class hotels, guest houses, and other facilities is needed for the weekend and long-term tourist visitors from throughout Indonesia. Lower estimates of the additional facilities needed call for 1,000 beds by 1980 and another 1,700 beds by 1985. Upper estimates call for 1,500 beds by 1980 and another 4,700 beds by 1985.
- To accommodate the youth tourism, it is suggested that the Central Government and Provincial Governments build a school excursion center (simple lodging facility) as a part of the educational complex.
- Institution of a home visit system* is also recommended.

For further details on the administrative and financial aspects of implementing these recommendations, it is felt that the proposal of the IDC Team for a Java and Madura Tourism Study (February 1975) is both valid and effective.

RELATED PLANS AND STUDIES

The following are upper-echelon plans relating to the project and other plans and studies relating to it. They are important in the design of the frame for development and improvement of the archeological parks.

006 Java and Madura Tourism Study

This study, which was undertaken in 1974-1975 Netherlands Institute of Tourism Development Consultants and Investors' and Development Consultants, Ltd., resulted in a 15-year long-term development master plan and a 5-year implementation program for 1976-81. It has governed the demand conditions (estimate of the number of domestic and international tourists) and the wide tourism area frame for this project.

007 Feasibility Study of Infrastructure for Tourism Development of Central Java and Yogyakarta

This study in 1971-1972 was also undertaken by a IDC Team.

008 Repelita II (Second National 5-year Plan: 1974-1979)

This plan, which involves five central development projects in the Central Java Area and provides the guidelines for regional comprehensive development planning, has determined the basic position of this project on the basis of social development policy.

009 Village Modernization Program

This program, which is now under consideration by PMD (Ministry of Social Affairs) as a program for improvement of regional infrastructure nationwide, forms the background for the village improvements in this project.

010 Kali Progo Basin Study

This study, which was undertaken by Sir M. Macdonald & Partners and Hunting Technical Services, Ltd., in 1973-1974, consisted of a survey of the water system of the Progo and Opak rivers and the preparation of a comprehensive plan for improvement of the agricultural base.

011 Restoration Program by Indonesian Government and UNESCO

This 2-year program, which started in 1973, involves comprehensive survey and restoration works for the Borobudur Temple on the basis of international assistance. It is necessary that there be full compatibility between this program and the present project in view of the fact that they overlap in terms of both content and time with respect to such aspects as the scientific position of the archeological assets, investigation of the surrounding region, the yearly restoration program, and so on.

012 Community, Environmental and Spatial Planning of Borobudur

This study, which was undertaken in 1973 by the Research Center of Architecture of Gajah Mada University, is being taken into full account in this project as a study on the same level.

Tourism Regional Master Plan

GENERAL

013 This brief is a summation of the Tourism Development Study of Central Java and Yogyakarta Area conducted by the JICA Study Team in 1973 and 1974.

The reasons for repeating it here are (1) to reaffirm the Borobudur and Prambanan archeological parks as part of the broader regional development plan for tourism and (2) to provide reference in regional infrastructure improvement accompanying development of the two archeological parks.

TOURISM BLOCK PLAN

014 This plan calls for five tourism blocks within the tourism region and three outside of it. The tourism blocks within the tourism region will cover the principal tourism resources of the area; i.e., three archeological parks and such major tourist cities as Yogyakarta and Surakarta. This plan also calls for two nature conservation zones in the mountains within the boundaries of the tourism region and one along the shore outside of the tourism region.

Tourism blocks are areas with tourism attractions that are designated as developmental units for specialization in tourism in the framework of regional development planning. They comprise the following three types:

Type A
Core areas within the tourism region which embrace a comprehensive range of service industries and personnel essential to tourist activities.

Type B
Major tourism areas for domestic and international tourists.

Type C
Tourism areas to be subsequently developed to accommodate domestic tourists and local recreation that are expected in the future.

015 Yogyakarta-Prambanan Tourism Block
Because of its centralized location, this block will be developed as an overall center for tourist activities in the tourism region.

Components: Archeological park (Prambanan)
Core town (Yogyakarta City)
Airport (Yogyakarta)
Tourist accommodation center

016 Surakarta Tourism Block
This block will center on Surakarta City, an overland gateway from East Java and — like Yogyakarta City — a tourist objective in itself.

Components: Core town (Surakarta City)
Prehistoric park (Sangiran)
Sukuh Temple

017 Borobudur Tourism Block
This block has the temple complex with the highest potential in the tourism region.

Components: Archeological park (Borobudur)
Subcore town (Magelang City)

018 Dieng Tourism Block
Like the Borobudur block, Dieng is a temple complex.

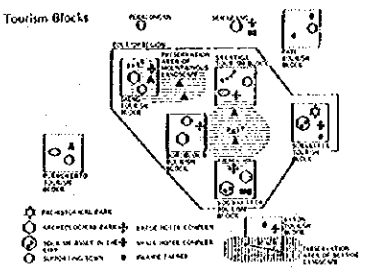
Components: Archeological park (Dieng)
Subcore town (Wonosobo)
Natural landscape (volcanic scene)

019 Other Tourism Blocks
Other tourism blocks in the tourism region are the Salatiga block to the north, which serves as a gateway from the direction of West Java, Semarang and includes Kopeng and Rawa Pening Lake, and the following three blocks which will specialize mainly in domestic and local tourism activity: The Pati-Kudus-Demak block, noted for its temples at Kudus and Demak, which are a legacy of the first Islamic Kingdom in Indonesia.

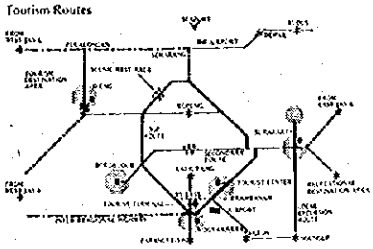
The Baron block, the only one providing seaside recreation. The Purwokerto block, located at the western end of the study region, specializing in local resort tourism with a mountain, lake, and other natural assets.

020 Skeleton of the Tourism Region

Tourism Blocks



Tourism Routes



TOURISM ROUTE PLAN

021 The tourism routes can be roughly classified into two categories:

- Air, sea, and railway gateways and road routes over which visitors will arrive.
- Excursion routes within the area.

International tourists are expected to arrive by air. Domestic tourists will have the choice of a variety of transportation means (air, train, bus, and private car). Basically, existing national and provincial roads will be used as excursion routes within the area. Routes which will have to be newly built include a by-pass road linking Yogyakarta Airport and the tourist accommodation center.

022 Main Gateways

- Air gate for international arrivals; Yogyakarta Airport.
- Air gates for domestic arrivals; Yogyakarta Airport and Semarang Airport.
- Sea gates for possible cruises; Semarang Harbor and Cilacap Harbor.
- Railway gates; Yogyakarta, Semarang, and Surakarata.

023 Road Routes for Entering the Area

- From West Java; Jakarta-Cirebon-Semarang route, Cilacap-Yogyakarta route
- From East Java; Surabaya-Surakarta route

When the Trans-Java Highway is completed, access will be more convenient from both directions.

024 Excursion Routes

Loop route
This route, consisting of existing national roads between the cities of Yogyakarta, Magelang, Salatiga, and Surakarta, will connect the major tourism blocks in the tourism region.

Secondary routes
These roads, national, provincial, and otherwise, will serve as straight, direct links between the major tourism blocks in the tourism region:

- Kaliurang route
- Salatiga-Selo route
- Mungkid-Selo-Bojolali route
- Setjang-Wonosobo-Dieng route

Local excursion routes
These existing routes, with some new road construction, will connect the major cities in the tourism region with local tourism assets:

- Yogyakarta-Purwokerto-Cilacap route
- Yogyakarta-Parang Teritis route
- Surakarta-Sarangbutong route
- Surakarta-Sukuh route
- Surakarta-Sangiran route
- Semarang-Pati route
- Dieng-Pekalongan route*

* This last route is covered by a plan of the Tourist Board of the Province of Central Java.

CORE TOWNS

025 Various tourist attractions are inherent to the existing cities. These cities provide many different complex services that involve, among other things, the flow of people and goods.

The following three cities should be designated as core towns:

- Yogyakarta City (Yogya - Prambanan block)
- Surakarta City (Surakarta block)
- Semarang City (between Magelang and Demak-Kudus-Pati blocks).

The following are subcore towns:

- Magelang City (Borobudur block)
- Wonosobo Town (Dieng block)
- Salatiga City (Salatiga block)

TOURIST FACILITY NETWORK

026 Dealt with here is a proposed tourist information network and tourist accommodation network as basic facilities for supporting the tourism activities in the area. More specifically, these networks will provide guidance and control for tourism activities over a wide area. The tourist information network will consist of a chain of tourist centers, and the tourist accommodation network will consist of the tourist accommodation center, hotels, and rest-houses located throughout the area.

027 Tourist Centers
Functions of the tourist centers will be to furnish tourist information to tourists and to conduct administrative activities for the blocks in which they are located. There should be one such center in each block, with a "tourist terminal" in one block to collect, control, and redistribute information from all of the blocks and also to provide an interregional information linkage with Bali, Jakarta, Sumatra, and other tourism areas.

028 Tourist Accommodation
Here the JICA Study Team has proposed a network of accommodation facilities to serve as a base for tourist activities. Since the activities of international tourists generally follow fixed patterns, it is desirable that they are controlled in a centralized manner with a large scale tourist accommodation center. Domestic tourists, however, are expected to follow more diversified patterns of activity, which implies that they will need a broader range of choice as to the type of accommodation facility and its location. Thus, consideration should be given to local-standard accommodations in main existing cities and towns, and to rest-houses, motels, drive-ins, and accommodations for touring school children in more widely distributed locations.

DEVELOPMENT PROGRAM

029 Development Phases
This project has two planning phases – that of a 20 year long-term perspective plan (1975 -1991) and that of a 10 year action plan (1975 -1984). The 10 year action plan is subdivided into two additional phases: Phase 1 (1975--1979) and Phase 2 (1980 -1984).

030 Development Area
In this project, a tourism potential analysis was made to designate areas with a particularly good tourism potential. These areas are designated as "Tourism Regions." Development within the context of the 10 year action plan will be limited to these "Tourism Regions."

031 Work to Be Done During 1975 - 1979
During this period (Phase-I), projects will be carefully selected and implemented. These projects will be mainly concerned with the archeological parks and construction of the tourist accommodation center and the by-pass road.

Zoning regulations will be made for the three archeological parks. Internal roads, tourist facilities, and landscaping of the Borobudur and Prambanan parks will be improved.

In Stage-I (1975 -84), infrastructural work will have to be undertaken to keep pace with hotel construction at the tourist accommodation center.

An access road between Yogyakarta Airport and the tourist accommodation center will have to be constructed. It will be approximately 7 kilometers long.

The Kaliurang road will undergo repairs in order to connect the tourist accommodation center with Yogyakarta City.

Major city tourism attractions in Yogyakarta and Surakarta will be improved by building for them parking areas, reception facilities, and other conveniences.

Living quarters will be built for hotel employees.

Necessary improvements will be made on villages affected by the tourism development program. This includes a resettlement program as well as electrical and landscape improvements.

032 Work to Be Done During 1980 - 1984
During this period (Phase-II), projects will be continued from Phase-I and new development projects will be undertaken.

In the framework of the archeological park projects, major new road networks will be built, basic tourism facilities will be expanded in Borobudur and Prambanan Parks, and work will begin on Dieng Park.

The Merapi road will be repaired as an excursion route between Mungkid and Boyolali, with certain new road construction.

Roadside parks will be constructed alongside some of the excursion routes with particularly fine scenic environment.

The village improvements begun in Phase-I will be continued, with particular emphasis placed on schools, local market places, and other basic facilities necessary for daily existence.

033 Work to Be Done During 1985 -1991
During this period (Phase-II), further accommodation will be provided for an increasing number of international tourists, and improvement and extension of tourism assets, tourism routes, and active development of accommodation facilities will be undertaken for the benefit of domestic tourists.

In all three of the archeological parks, the sites themselves will be further restored and the park facilities will be completed.

Another hundred rooms will be added to the capacity of the tourist accommodation center.

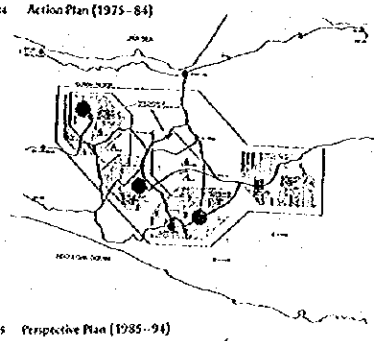
A rest house will be built in each tourism block to provide accommodations mainly for domestic tourists.

Excursion routes throughout the area will continue to be repaired, and certain new ones will be built.

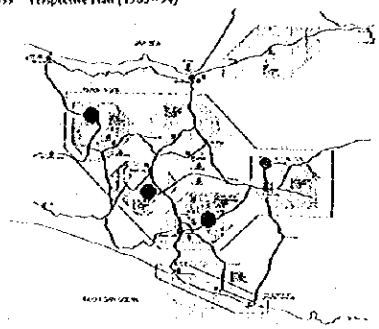
Various measures will be taken for further modernization of villages in the area.

Tourism-related industry will be encouraged in the core towns, and their supporting functions will be strengthened.

034 Action Plan (1975 - 84)



035 Perspective Plan (1985 - 91)



Review of the Existing Master Plan of Dieng Area

OUTLINE

034 At the first Joint Meeting (February 11, 1975), the Indonesian side requested a review of the tourism development plan for the Dieng area.

This plan was commissioned to Nusa Consultants by Central Java Province in 1972 and they were asked to draw up a master plan report for promoting tourism in the Dieng Plateau and vicinity. At the same time, the JICA Study Team formulated a preliminary master plan for the Dieng area along with those for the Borobudur and Prambanan areas in its 1973/74 study. (See the April 1974 report entitled Central Java and Yogyakarta Area Tourism Development). While these reports embody basically the same concepts, the JICA report places a greater emphasis upon the integration of the three park areas.

With this as background the purposes and range of our review has been determined as applying to the Dieng area the zoning procedures developed for preserving the historic environment of Borobudur and Prambanan and restudying existing plans from the perspective of formulating comprehensive conservation plans.

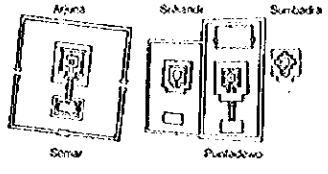
032 Candis in Dieng Plateau

Dieng, a volcanic plateau some 2,000 metres above sealevel, is the site of a number of 8th century Shivaite Hindu temple groups. The rim of the volcano apparently collapsed many ages ago, forming a marshy plain over the old crater. Here the temples stand, not far from placid lakes, bubbling geysers and pungent sulphur fumes pouring out of the earth. The plain was once drained by an underground tunnel (the remains of which can still be seen) and seems to have been the site of a temple city whose population consisted mainly of priests, temple attendants and visiting pilgrims.

All the standing temples have been named after the Pandawa heroes of the Hindu Mahabarata epic. Scholars generally assume that these names were given to the temples by the local people several centuries after they had been erected. The temples are smaller and simpler in ornamentation than those in southern Central Java. Eight temples, perhaps a third of the original number, have been partially restored. Of special note are the Bima temple in the south and the group in the centre: Semar, Arjuna, Srikandi, Puntadewa and Sembadra. The group on the western side of the plateau has also been partially restored.

Traces of a palace can be seen near the centre of the plain, east of the Semar and Arjuna temples. Further to the west, but now covered by a mushroom plantation, are the ruins of a monastery.

Candi Arjuna Group



DEVELOPMENT POLICY ALTERNATIVES

038 The following two development policies may be considered for the Dieng area taking into account its geographical and resource differences from the Borobudur and Prambanan areas.

Alternative 1 (Nusa Consultants)
This plan guarantees diverse tourism needs aiming toward the development of a vast mountaneous area. The archeological remains included within this development are to be protected by putting them within a sanctuary.

Alternative 2 (JICA Study Team)
This calls for a development project similar to those at Borobudur and Prambanan aiming for the development of a national or provincial archeological park.

It is very difficult to assess the relative merits of these two plans, and the choice must finally be made by the principals involved. In either case, it is essential that development be advanced with the utmost priority on preserving the historic remains.

PROPOSED ZONING PLAN

039 Sanctuary zone

As with Borobudur and Prambanan, special sanctuary zones are to be established to protect the archeological remains. In light of the natural, social, and visual factors, the following three areas are to be designated sanctuary zones.

- The total 60 hectare area including the Candi complex (Semar, Arjuna, Puntadeqa, Srikandi, and Sumbadra) as well as Candi Gatutkaca.
- The 1 hectare area including Candi Dwarawati north of the Candi complex.
- The 1 hectare area including Candi Bima south of the Candi complex.

040 Scenic conservation zone

These scenic regulations are more important than simply regulating landuse out of consideration for the area's peculiar features. As in Borobudur and Prambanan, the Dieng area is to have a scenic conservation zone with a radius of 3 kilometers from the Candi complex, with the zoning boundaries touching the peaks of surrounding mountains, especially the Prau, Pakuwaya, and Bisma mountains running from west to south.

041 Nature conservation zone

As with Borobudur and Prambanan, it is imperative that work be done with the main priority on preserving the historical climate and conserving the mountainous resources.

REMARKS

042 Natural conservation
In conserving the mountainous natural environment, it is essential that the natural resource values be ranked and conservation policies pursued in stages. It is important that, as well as conducting technical and ecological surveys of the area around Mt. Prau, Mt. Sundoro, and Mt. Sambing, one of the most beautiful mountain ranges anywhere in the world, policies be implemented for natural conservation.

043 Tourist facilities
Because the Dieng Archeological Park is a focus for efforts to conserve the surrounding mountainous regions, planning of the park must include consideration of the minimum tourist facilities needed for the archeological park from among those facilities to further mountain recreational activities. The location of these facilities must be decided with every consideration to conservation of the historic remains and the natural scenic environment.

044 Villages
As well as minimizing relocation of existing villages to accommodate park development, it is also intended to alter qualitatively some of these villages into supporting villages for tourism in keeping with the home visit system.

For the villages within the scenic conservation zone, buffer trees and other scenic barriers are to be provided to maintain conditions around the sanctuary even as an effort is to be made to improve living conditions in these villages.

045 Access road
The currently existing road between Wonosobo and Batur is to be used. However, this road must be improved to serve as a scenic corridor and a main regional artery. Regulations are also needed to prohibit roadside activities which would conspicuously mar the natural beauty of the area (such as putting up billboards, building substandard structures, and felling trees).

046 Location Map

DIENG AREA

Zoning and Landuse Plan

ZONE BOUNDARY
Zone I : Archeological Monument Special Preservation
Zone II : Scenic Conservation
LANDUSE CLASSIFICATION
Sanctuary Area
Potential Area for Park Facility
Residential Area
ROAD NETWORK
Access Road
Park Road
Village Road

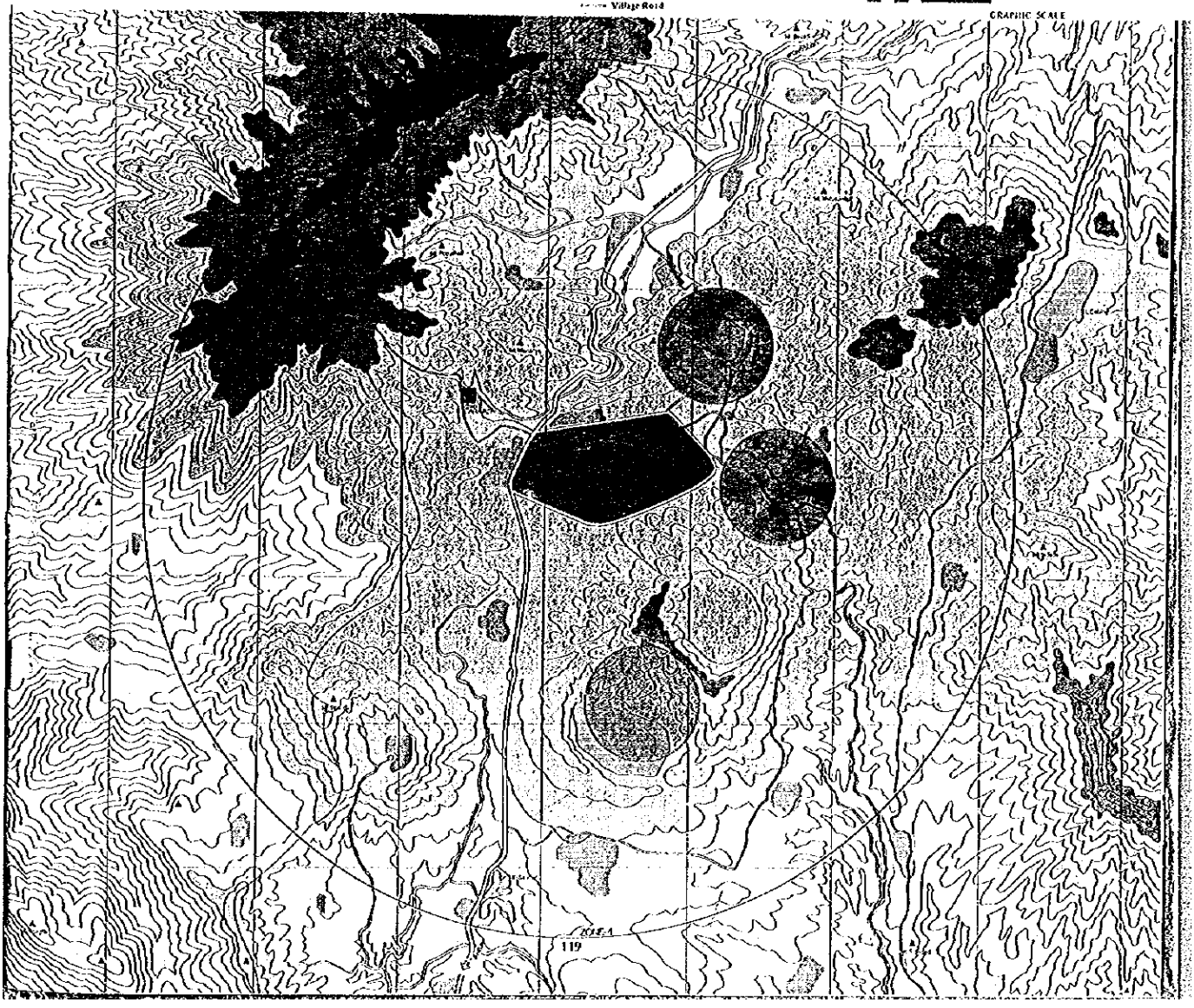
KEY MAP

N

0 500 1000 1500m
GRAPHIC SCALE

ORG. 29

1



Systems Analysis for Land Evaluation

OBJECTIVES OF THE STUDY

050 The JICA Study Team adopted the computer-process systems analysis method in drawing up the plan and especially in assessing land values in the plan-affected areas for the following reasons.

- Because this plan encompasses a wide range of issues, including social development, area development, archeological preservation, tourism development, and the like, it was imperative that the given conditions for the plan and the plan-related information be coordinated and analyzed systematically.
- In order to find the optimum solution, a process of optimization was called for using scientific planning methods and approaches such as formulation of alternative plans, comparative analysis of alternative plans, and selection of optimum plans.
- At the same time, it was necessary to scientifically qualify and quantify the planning and design concept developed through the image approach and to check the compatibility of the development concepts and policies.

051 Study process

The process for the land evaluation study was as follows.

- Collection, processing, and banking of regional data
  Information on natural conditions, social conditions, and other factors within the affected areas was systematically collected, given primary processing as computer initial data, and banked.
- Site analysis
  Site characteristics were qualitatively and quantitively analyzed with a secondary processing model.
- Land evaluation
  Site potential and suitability were diagnosed with a tertiary processing model.
- Application to physical planning
  Information based upon the results of the above processes was then used as evaluation material in physical planning.

052 Study goals

The final goal of the land evaluation study was to have the scientifically processed analytical data serve the formulation of plans and designs. Special consideration was given in the study to facilitating its application for the following four goals.

- Setting final zoning boundaries
- Discovering optimum patterns of landuse
- Selecting optimum sites for village relocation
- Deciding on the environmental design, and especially the landscape design solution

053 Land evaluation

In drawing up the physical planning and designs, it is first necessary to quantify and assess the characteristics and potential of land in the affected area. Especially with the Borobudur and Prambanan areas both having natural ecologies in a climax stage, there is delicate balance maintained between the natural conditions and social conditions.

In developing these areas, and especially in altering landuse patterns, it is imperative that the execution be done with utmost care to preserve their ecosystems and the characteristic features of the archeological environment.

Accordingly, it is necessary to correctly evaluate the features of the natural conditions and of present landuse patterns, to discern the problems therein, and to calculate the range of land reform.

054 Data sources

Information concerning natural conditions was derived from aerial photos (scale = 1:6,000 ~ 5,000) provided by the government of Indonesia and topographical maps (scale = 1:5,000) compiled by the JICA Study Team.

Information concerning landuse was derived from data on administrative jurisdictions, agricultural data, landownership data, and landuse data provided by Central Java Province and the Yogyakarta Special District agrarian office.

Information on population, dwellings, and other social conditions was derived from statistics provided by the affected villages and towns.

All of the above data were supplemented by information on landuse conditions, visual surveys of remains, and other on site studies conducted by the JICA Study Team.

SYSTEMS ANALYSIS METHOD

055 Analysis Area

The selected analyzed area is 3km by 5km (15km²) of the area which is considered to include the proposed park development area both in Borobudur and Prambanan.

056 Grid Program

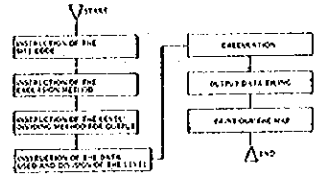
JICA Study Team employed the grid program which provide a highly efficient means for graphic display of large quantities of information collected on the basis of a rectangular cordinate grid.

The program requires two sets of data input, (1) the data values associated with a spacial grid, and (2) a series of instruction to the program about the particular procedure and forms that are used for analysis and display. Each data value is assumed to be associated with a cell on the grid.

The program accepts the data in the order in which it prints the map. Therefore, processing the data in correct order is essential. By the standardized printing process, the program starts at the top of the map and processes the data horizontally, row by row, and from left to right in each row.

Before printing the spatial diagram, the actual data values are generalized into groups, each group having a unique graphic symbol associated with it. Using options, the user can specify the number of levels, the maximum value of the data, the minimum value of the data, and the relative size of each of the levels in the range of the data.

057 Flow chart of the program is shown below.



058 Data Fillings

Information corrected in Indonesia and from interpretation of the airphoto are punched on the card as the initial 24 data.

Natural, social, visual and identification data for one mesh are punched on the certain column of a card. Therefore 6,000 of punched cards are provided for one area, and after checked with the punched data, it is filed on the disk filing system as an initial data.

The data required for calculation is called from the disk and substituted with the formula.

059 Model Building

The models used in planning analysis can be distinguished as mathematical programing models (analytic models) and digital simulation models used for optimization (simulation models).

However, the analytic models depend upon the theoretical limits of formal mathematics. Therefore they are often restricted to modeling only the simplest relationships. For instance, non-linear relationships are difficult to handle by these methods.

Simulation models on the other hand are "non algorithmic". One must create for oneself the logical relationships, which in this case are not restricted to formal mathematics but can include all formal linguistic relationships. It is difficult to construct an optimizing algorithm from such logic. Therefore the thrust of most simulation is discriptive rather than optimizing.

Thus the JICA Study Team employed the simulation method and had man-machine analysis system. In another word, each model have different programs according to the model requirements and objectives.

060 Print Out

Initial data which is used for the modes are called from the disk file, and substituted into the formula. After the calculation the output data stored to the each mesh address. Then according to the user's deciding of the dividing level, the output data is printed out by line printer and makes a map.

The printed map will be used as discussion material for each planning and design staff, and after the discussion, the conclusion that comes out from it will be used as feedback data and data input for further analysis. These model building and discussion processes will be employed to lead to the optimum solution.

061 AGRICULTURAL POTENTIALITY

Serving the agricultural production potentiality of the land is the most essential factor of making the decision of the park location and the reorganization the villages. This analysis is aimed to find the area where is a high potential of agricultural land development and also a low area.

062 CONSERVATION SUITABILITY

This analysis is aimed at finding the land stability concerning the land development.
The conservation suitable area represents areas that should not be developed intensively, because of hazard to life and health, or possess important social values that are ecological, scientific, educational, historic or visual.

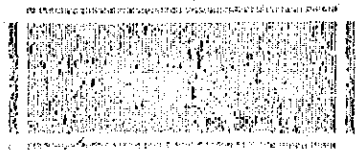
063 AGRICULTURAL LANDUSE PATTERN

Find out the real potential of agricultural land development. And simulate the influence of the development to the potentiality.

Step-1 To take out the existing dukuh area from the land which is available for agricultural land make adjustments by assuming park development area. This output express the formula. After the cutculation the

Step-2 Adjustment will be done to indicate the landuse pattern which will be lead by maximum agricultural land development.

Step-3 Adjustment to indicate the maximum potential of agricultural land development potential incase of the park development and the other reconstruction work will be implemented.



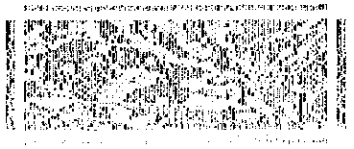
064 RESIDENTIAL SUITABILITY

Find out the real potential of residential development. And simulate the new dukuh development area.

Step-1 Find out the restricted area for land development. Natural and social values to be a constrain of the development. The land which have the condition of shown below to be classified as a poor development suitability area.

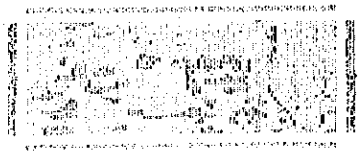
River
Existing Dukuh
Slope over 20%
Area of riverside trees are planted
The distance from remains is inside the Zone-2

Step-2 Scoring the potentiality.



065 INFILL-TYPE DUKUH AVAILABILITY

Infill-type development which develop the existing village for the people who have been living in the proposed park development area, rather than develop new village on the different site, is considered and simulated it's possibility and potential. On this analysis model the Study Team simulate the existing village's potential of infill-type development. And the result was examined by each desa, because of the social structural consideration. It is printed out the statistic output.



066 VISUAL COMPLEXITY

Find out how many visual elements can be seen from the observer in the distance of 100 – 150m. Number of elements can be seen is another element of landscape design and conservation consideration factor. In this analysis the land form is also important analysis factor.

Step-1 Count the number of elements in the analyzed unit (250 x 250m).

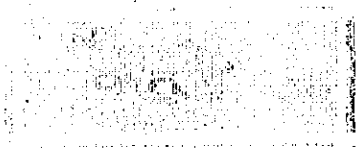
Step-2 Adjustment by landform.

067 IMPACT OF REMAINS

Visual and social influence of remains are analyzed. This analysis is applied for setting the boundaries of sanctuary area and park development area.

Step-1 Visual impact and spacial impact is multiplied, and it is to be the indicator of the impact of remains.

Step-2 Adjustment factors of each remains are assumed and adjust the indicator.



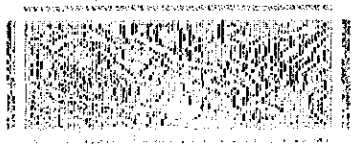
068 VISUAL RESOURCES

In the post park development period, the natural area or conservations which will remain is an essential landscape element. Simulate and find out such areas, then, use as the consideration factor of landscape plan.

Step-1 Identify the area which has a high potentiality of conservation in natural and social.

Step-2 Identify the area which has a high visual complexity.

Step-3 Synthesizing both potentialities which identified above analysis. Each scores are added up and the average potential is printed out.



Index of Terms

CANDI
Buddhism and Hinduism temple. The word candi is probably derived from Candika, another name for Durga, the Goddess of Death.

COSMOGRAPHY
The science that deals with the general appearance and structure of the universe. Cosmography includes astronomy, geography, and geology.

COSMOSPHERE
An apparatus for showing the position of the earth at any given time with respect to the fixed stars.

D. I. Y.
Special Region of Yogyakarta (Daerah Istimewa Yogyakarta).
D.I.Y. consists of the city (kotamadya) of Yogyakarta and four regencies (kabupaten). The regencies are divided into subdistricts (kecamatan), villages (kelurahans or desas) and hamlets (dukuhs).

ECOSYSTEM
The system of ecological relationships upon which the life of any particular living organism is based. An ecosystem includes such factors as food supply, weather, and natural enemies.

INFRASTRUCTURE
The essential elements of a system or structure. In this report it includes transportation network and utilities network such as water supply, sewage, electricity and telecommunication systems.

J. I. C. A.
Japan International Cooperation Agency

KEJAWEN
Underlying all Javanese life, but especially marked in village communities, are indigenous Javanese beliefs coloured with Hindu Buddhist and Islamic elements. This is known as the kejawen religious tradition.

MANDALA
The symbol of contemplation or meditation in Buddhism and Hinduism.

P.M.D. PROGRAM
The program for improvement of regional infrastructure nationwide by P.M.D. (Ministry of Social Affairs).

RAMAYANA
The second of the two great ancient epics of Hinduism with Ramachandra as its hero, written in Sanskrit probably early in the Christian era.

REPELITA II
The Second National Five-year Plan: 1974–79.

SANCTUARY
A sacred place; holy spot; place where sacred things are kept.

SYNCRETISM
A process in the growth of religions in which the religious doctrines, rituals, deities, etc., of one creed or belief are adopted, adapted, or identified with its own by another, which thus gains coherents from the first. A unique form of Javanese spiritualism.

T. D. C.
Netherlands Institute of Tourism Development Consultants

WAYANG KURUWA
The Wayang Purwa, literally meaning 'Shadow of the Past', is the traditional Javanese shadow play, thought to have originated in ancestor worship.

ZONE
An area or district in a town or city that is restricted by law to homes or businesses, or to other specific purposes.

Note on Spelling

Spelling Reform

A spelling reform was introduced throughout Indonesia in 1973. It involved the following changes:

dj	– j	nj	– ny
tj	– c	sj	– sy
j	– y	ch	– kh

The reformed system is used in this report except for certain proper names, for which the government regulation allows the retention of the old system.

Plurals

We have used the convention, now widely employed in English-language publications, of forming plurals of Indonesian nouns by the addition of "s".

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