History of Restoration Work of Candi Borobudur

Oblivion and Discovery

During the first hundred and fifty years of its existence, Borobudur was a magnificent Buddhist pilgrimage centre. However, with the fall of the kingdom of Mataram around 930AD, political and cultural life moved to Eastern Java, and Borobudur dropped into the background. Subsidence caused by volcanic eruptions precipitated its decay, while the overgrowth of tropical flora added to Borobudur's passing into oblivion for centuries.

It is true that in the eighteenth century it was referred to in a Javanese chronicle, the Babad Tanah Djawi. It was also mentioned in another manuscript, which described that around 1758 a Yogya prince had paid a visit to the thousand statues of Borobudur. This proves that the monument had not completely obliterated.

However, it was during the brief British administration under Sir Thomas Stamford Raffles that Borobudur was awakened from its slumber. Raffles, a great admirer of the history and culture of the country, had laid the foundation for actual archeological research. In 1815 he commissioned H. C. Cornelius an officer of the Royal Engineers, to institute investigations.

More than two hundred labourers were occupied for forty-five days felling trees, burning undergrowth and brushwood and removing the earth whereunder it was entirely buried and hidden. Only then could a start be made on reports and construction plans.

Activities were continued later on, and in 1835 the structure of Borobudur was approximately known. A German artist, A. Shaefer, made the first pictures, in photography called daguerrotypes.

Some five thousand pictures were deemed necessary for a complete documentation, an expensive process, which consequently was soon abandoned. Instead, F. C. Wilson was given the task to make drawings of all reliefs, which he carried out from 1849 to 1853, with the assistance of Schonberg Mulder.

Twenty years afterwards, in 1873, his work appeared in the first monograph on the Borobudur composed by C. Leemans, director of the Museum of Antiquities at Leyden, in co-operation with J. F. G. Brumund.

In the same year the renowned photographer I. van Kinstergen was assigned to take photographs of Borobudur. In order to perform his task as well as possible he conducted certain operations, which led to the disclosure of two hundred buried reliefs.

A surprising find was the discovery of the hidden base by J. W. IJzerman in 1885 when in partly dismantling the broad base of the monument, reliefs were laid bare. In 1890 – 1891 this concealed section was entirely disclosed, photographed by Cephas for documentary purposes, and then recovered entailing the removal and replacing of about 13.000 cubic metres of stone.

This important aspect of Borobudur, which so far has been hidden from view, reflected the sphere of Desire. The hundred and sixty panels depict the Karma, the doctrine of cause and effect of good and evil as stated in the Karmawibhangga.

These reliefs appeared to be unfinished, but the inscriptions included instructions for the sculptors and thus the period in which the temple was built could be ascertained.

The broad base dating from a later era became a contr
versial subject to scientists. It was constructed eith
to prevent sagging and shoving or to form an integ
part of the initial plan implying that the hidden sphe
of Desire would assume a more profound significance.

For the Borobudur the nineteenth century marked th
end of a prolonged silence. Its serene beauty and su
time significance attracted many men of learning, wh
made it their task of life to unveil this mystery in ston

Many works were accomplished on the subject, such a
Sir Thomas Stamford Raffles' "the History of Java"
John Crawfurd's "History of the Indian Archipelago
and the Borobudur Monograph by Dr. C. Leemans an
J. F. G. Brumund as mentioned before.

Other scientists were occupied with the interpretatio
of the reliefs. Thus S. van Oldenburg recognised in th
depictions on the balustrades, stories about the re-
carnations of Buddha after the text of the Jatakame
tales.

Thanks to C. M. Pleyte the reliefs of the upper series o
the main wall of the first gallery, have come to b
known as the life of Buddha in conformity with the te
of the Lalitavistara.

Dr. H. Kern's knowledge of the Old Javanese languag
proved to be invaluable in this work. Furthermor
A. Foucher may be mentioned for his contribution t
acquire a better insight into the nature of the whol
and the same applies to Dr. J. L. A. Brandes, the famou
archeologist, for his excellent detailed acquaintanc
with the Borobudur. But reconstruction would actu
only be contemplated at the beginning of the ne
century. (in 1870)

First Restoration

Since the condition of the Borobudur deteriorated considerably, a special committee was formed in 1900, led by J. L. A. Brandes.

A co-member of this committee, first lieutenant of the Royal Engineers, Ir. Th. van Erp, was to play a unique part in the restoration of the monument in general, and in the effort to return it to its initial form and character in particular.

Most unfortunately Dr. J. L. A. Brandes was not to witness the commencement of the restoration. He died in 1905, whilst the joint report drawn up in 1902 led to this renovation, which actually started in 1907. This ambitious work was to take four years. The eventual costs were slightly under f 100,000.- one tenth of which was spent for photographic purposes.

In 1911, even before the Archeological Service was instituted, Borobudur had risen again, in all its splendour. Half a century was to pass before special attention was again required owing to recurrent deterioration.

The restored Borobudur enticed various experts who endeavoured to fathom its secrets, to find answers to the thousand and one yet unrevealed meanings of the reliefs, the placing of the Buddhas and its interpretation.

Works of N. J. Krom and Th. van Erp brought many aspects to light, Dr. W. F. Stutterheim, the brilliant archeologist, who came to acquire a thorough knowledge of and feeling for Javanese culture owing to his personal friendship with His Highness Mangkunegara VII, disapproved the thesis accepted so far that Indian influences were predominant with Borobudur.

Mention should also be made of Dr. F. D. K. Bosch, whose intimate acquaintance with symbolism revived the interest for a receding conception of world contemplation. Dr. A. J. Bernet Kempers has emphasized the cultural-historic significance of Borobudur. In a recent publication he termed the many scenes immortalized in the reliefs "a pictorical cultural history of Ancient Javanese life and customs".

These restoration works inspired many excellent researches comparable to the accomplishments of the Dutch people. Namely those undertaken by R. Soekmono of Indonesia, J. Dumarcay of France, M. Bussagli of Italy, and D. Chihara of Japan.

Second Restoration

Two world wars, a period of enemy occupation and a revolution to secure independence went by unobtrusively, but other dangers threatened its existence. Chemical and natural processes appeared to be its most destructive foes.

At the invitation of the young Republic, two Indian archeologists conducted a research as far back as 1948. the reliefs and statues had fallen into decay, owing to the undermining influences of dampness.

An application for further expert advice was made by the Indonesian government to UNESCO. The late Prof. Paul Coremans delivered a report and stimulated the sending of a number of staff members of the Indonesian Archeological Service to study in Europe and America.

Sagging, however, was accelerating at such a rate as to threaten two sides of Borobudur with collapse. The result would have been catastrophic.

Mrs. Artati M. Soedirdjo, former Minister of Education and Culture, was responsible for measures being taken to avert this impending danger.

Under the guidance of Dr. Soekmono, head of the Archeological Service, the northern and western balustrades were partly dismantled forthwith. And again a special committee for the preservation of Borobudur was established.

Turbulent times were, however, to cause a delay at the beginning of this second largescale restoration.

To be able to ascertain the cause and nature of this subsidence, expert advice was deemed necessary, and for the second time an appeal was made to UNESCO. Prof. Dr. C. Voute, a geologist par excellence, assisted by Indonesian and other experts, submitted a report which provided impetus.

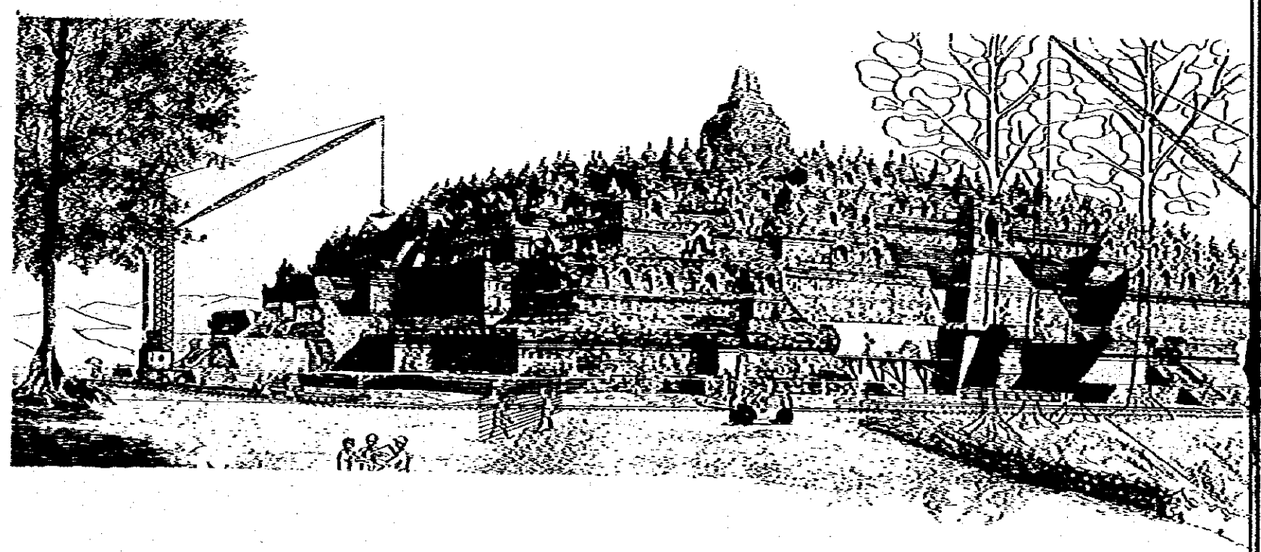
A resolution of the General Assembly of UNESCO authorised the Director General, Mr. R. Maheu to raise funds. The contributing nations were asked to support this restoration project. All over the world this plan met with approval.

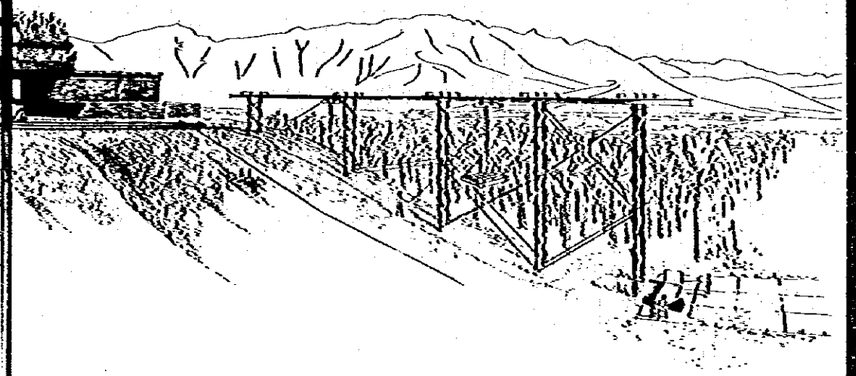
In June 1971 a body for the restoration of Borobudur, under the chairmanship of Prof. Ir. R. Roosseno was formed. A month thereafter UNESCO officially appointed Prof. C. Voute as co-ordinator.

The Netherlands Engineering Consultants (NEDECO) directed by Ir. C. C. T. de Beaufort made a very comprehensive report according to which this restoration would cost US$7,750,000.- and the time required was estimated to be at least six years.

Dr. G. Hyvert, an expert in the field of stone preservation, was invited to solve the serious problem of damage to the reliefs and statues. Special attention will, therefore, be given also to the system of drainage and an exhaustive research be conducted into the repression of stone diseases. Prof. Bernard P. Groslier, the renowned archeologist, whose name is inseparably associated with Angkor Vat in Cambodia, was consulted.

In 1973 the restoration was inaugulated. Despite all activities of restoration, visitors have been able to view the monument and continue admiring the wonderful scene of the stupa and terraces from the summit.

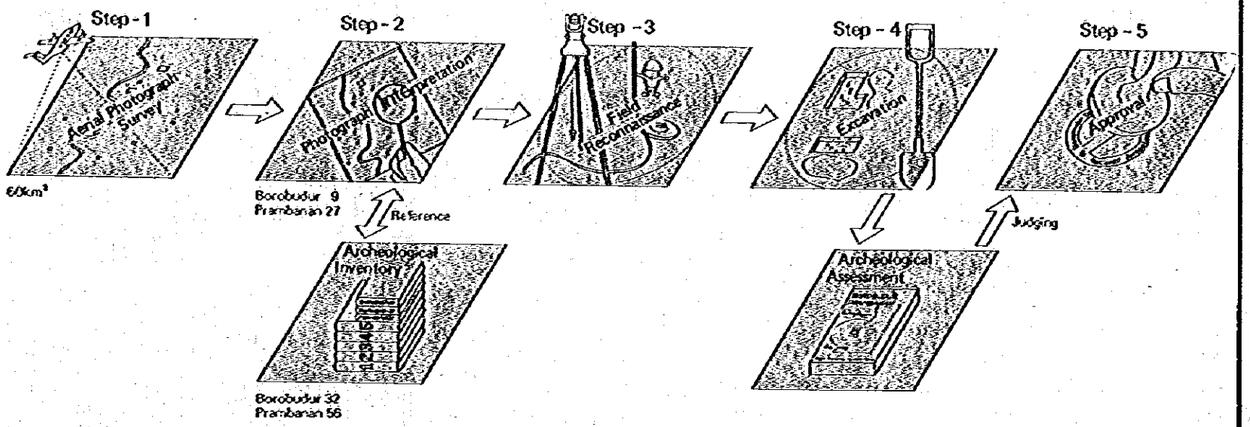




Drawing by NEDECO

Archeological Survey 1978–79

The initial archeological survey in 1978 was conducted for the assessment of the 60km² area under the plan from an archeological viewpoint. The following are the method and the results of the survey, and some points of consideration in drawing up the master plan.



Survey Methods

The initial archeological survey of the area in question was carried out jointly in July–December 1978 by the JICA and Indonesian teams. The methods employed were as follows:

- Interpretation of aerial photographs (panchromatic black-and-white, natural color, and infrared) each covering a little over 30km².
- Investigation of pertinent existing information
- Direct survey of selected areas and questioning of nearby villagers
- Experimental excavation in selected areas.

Survey Results

The above results can be summarized as follows:

The interpretation of the aerial photographs revealed irregularities at 9 places in the case of Borobudur and at 27 places in the case of Prambanan, consisting primarily of what is considered to be artificial variation in the terrain, differentials in ground water content, and distribution of vegetation.

On the basis of the above results and actual survey of the area, 5 spots were selected as candidates for test excavation in the Borobudur area and 11 in the Prambanan area, and such excavations were carried out at two of them in the former and four in the latter.

Due to the limited time allowed for the survey, the excavation was undertaken at the above-noted six spots, which were either most closely related to the master plan and demanded assessment, or most promising to find buried objects.

The main discoveries being as follows:

(1) An underground structure believed to be the original wall around Candi Sewu 30m outside the present wall as well as a large number of pieces of unglazed domestic pottery, porcelain dating from the T'ang period, fragments of animal teeth.

(2) Five ancient wells and two stone platforms around Loro Jonggrang as well as the stratigraphy of excavation points in both the Borobudur and the Prambanan areas.

(3) From the excavations at Borobudur, Loro Jonggrang, Sewu, and elsewhere, it is surmised that the lodgings for the temple guards and pilgrims were located on neighboring sites to the south or southwest of each temple.

Although there is still not sufficient archeological data available to explain the local geography and socio-economic conditions of the Shailendra dynasty, etc., the hierarchy of the different temples is known – state temples built by kings or high officials, regional (watak) temples, village (wanua) temples, temples of different families, and so on – and such different categories of religious architecture as candi, prasada, caitya, silunglung, and so on have been identified.

On the basis of past surveys 32 candi and evidence have been discovered and reported in the Borobudur area and 56 in the Prambanan area.

The 88 candis and evidences include some of the 36 spots newly discovered in this survey, which started from the analysis of aerial photographs. These 36 spots can be divided into three categories; 16 spots selected as excavation sites (of which 6 were actually excavated), those found to be archeologically irrelevant, and those that are yet undecided and left to future survey.

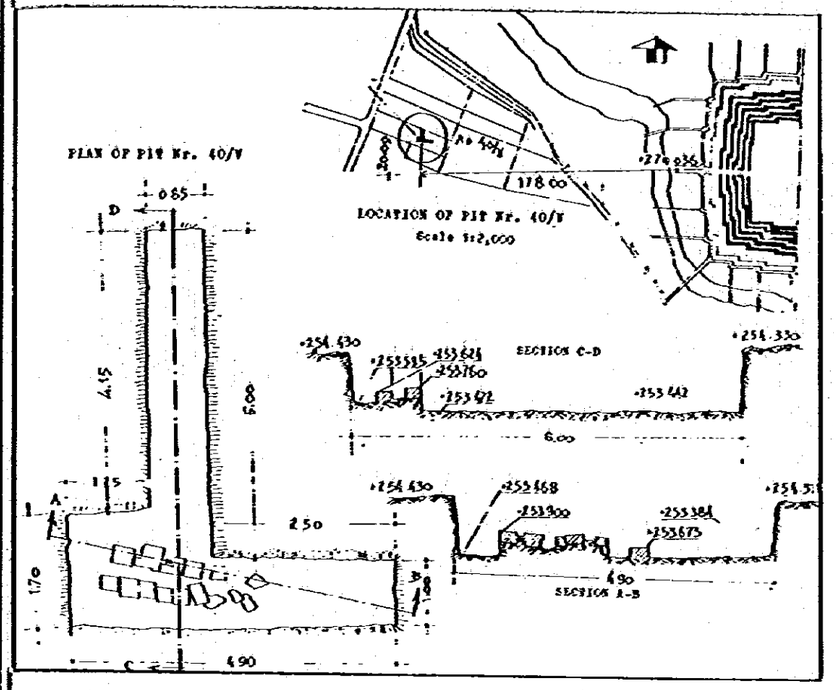
Borobudur Area

A Concaved land
B Concaved land
C Moisture differentiation of soil
D Moisture differentiation of soil
E Moisture differentiation of soil
F Moisture differentiation of soil
G Moisture differentiation of soil
H Higher land
I Higher land

Prambanan Area

A Higher land
B Higher land of different growth of plants
C Bush
D Damp pattern
E Drier land
F Moisture differentiation of soil
G Difference of moisture and growth of plants
H Lower land
I Lower land
J Lower land
K Tomb
L Pond
M Lower moisture
N Difference of moisture and growth of plants
O Lower moisture
P Flat land one meter higher
Q Terraced tomb
R Man-made flat land
S Man-made flat and leveled land
T Man-made flat and leveled land
U Terrace 2–3 meter higher
V Flat
W Flat
X Terrace
Y Land of 1–2m different height
Z Trees of straight line
Z' Man-made square land

Excavation on the West Side of Candi Borobudur



Section Diagram of 4 Sanctuaries in the Park Area

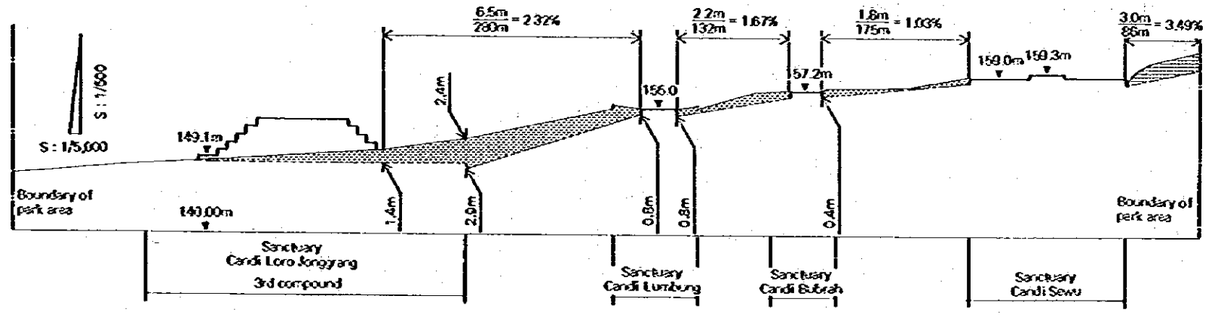


Diagram of Anticipated Thickness of Earth

Anticipation of the thickness of earth between the original ground surface on which the candi complexes were built in the 8–9 century and the surfaces of their present foundations is important in that it is one of the primary tasks of the archeological surveys relating to the present project.

On the basis of the heights of the surfaces of the foundations of the temple grounds and the results of the excavation surveys in the vicinity thereof, diagrams have been formulated which show the estimated thickness of the earth between the two surfaces. Although it is very incomplete at present because of the inadequacy of the data, it should be improved in the near future so as to be of help in planning excavation and other kinds of surveys and in estimating the state of foundations elsewhere than at the points surveyed.

The historical evidences accumulated during the past 1,200 years, if any, should be buried between the two ground surfaces. The original ground surface should contain historical evidences of the time of candi's construction and before. Accordingly, efforts to estimate its thickness was made: i) so as to be of help in planning excavation and other kinds of surveys and in estimating the state of foundations elsewhere than at the points surveyed, and ii) so as to make the landscaping and construction of the upper part of the building possible while preserving the original ground surface at the same time. Although it is very incomplete at present because of the inadequacy of the data, it should be improved in the near future.

Consideration of Master Plan

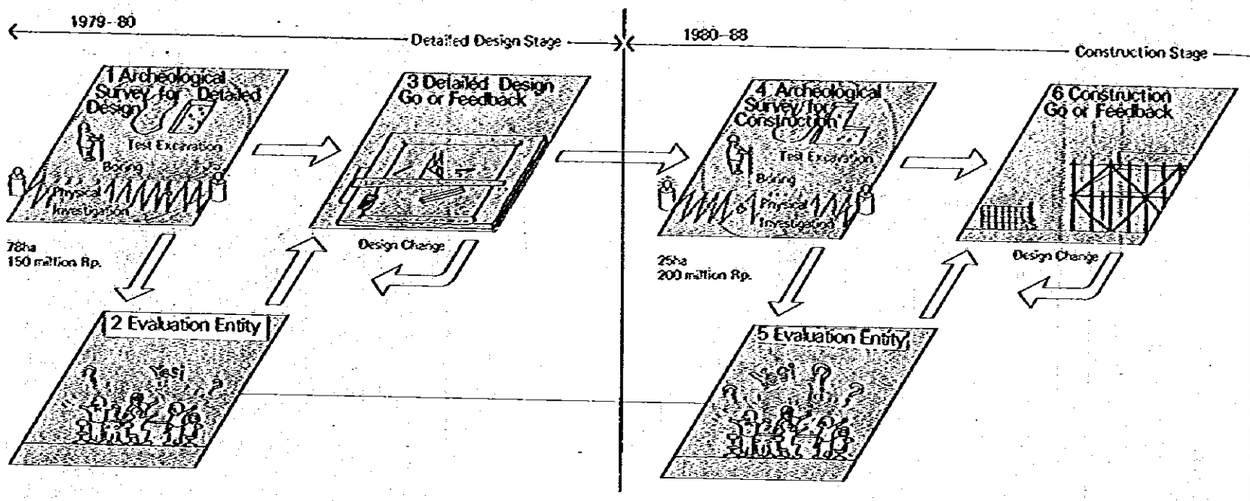
There should not be any requests for changes in the Master Plan on the basis of the initial surveys of the first stage. However, there is a very good possibility that as a result of the surveys parts of archeological monuments or other archeological objects having to do with the candi will be discovered in both areas, particularly near the candi. Since archeological evidence covering a period of a thousand years since the 8th or 9th century is doubtlessly contained in the layer of earth between the original and present surfaces of the foundations of the candi, the following two requirements should be observed in the planning and construction:

- Prior investigations at points where the construction will result in alteration of the terrain.
- Provision of an earth covering of at least 60cm in the case of construction work at the candi for the purpose of protection of the original foundation.

Archeological Assessment

Based on the archeological survey undertaken this fiscal year, more detailed archeological surveys should be conducted in parallel with the detailed designing and the construction to be carried out from now on. They play the role of environmental assessments for large-scale development projects of today, and can be titled as "archeological environmental assessment" aiming at the design and construction that do not spoil the historical value of the area.

The archeological survey plan presented here is in line with the above-noted objective, and consists of two parts; the second survey to check the adequacy of the detailed design (survey budget: 150 million Rp.), scheduled for 1979–80, and the third survey preceding the construction work (budget: 200 million Rp.) planned for sometime in and after 1980.



General

The Archeological Parks are to be arranged around Candi and monument sites, that are most provable area to find buried evidence, if any.

Assessment survey is to check the monument sites and to identify the original design elements of the building and site for the preservation and restoration.

Area and Methods

Total area of 78 ha. at Sanctuaries and Parks should be assessed by way of physical, boring and excavation survey.
For this task a little more than 200 man – months is required for 1979/80.

Justification of the Archeological Surveys

The following points are given as justification for the archeological surveys to be carried out in connection with the present project:

(1) Preconstruction surveys are necessary in view of the fact that, this area having been an important center of the kingdom that thrived in Java in the 8th to 10th centuries, the probability is very high that, besides the candi that are already known, archeological evidence will be found in the ground layers concerned that will help to elucidate the history of those times, including the history of the kingdom, historical geography, and socioeconomic history, as well as the history of the thousand years that have transpired since then.

(2) Since the parks that are to be constructed have history and archeology as their basic theme, the findings of such archeological surveys are necessary for incorporation into their planning, construction, and operation.

(3) The surveys and preservation efforts based on them can be of use to such activities as education, culture, cultural tourism, etc. as well.

Outline of the Surveys

(1) Survey II, Intensive survey, 1979/80

This survey, as indicated the table below, will employ three methods: the physical method, boring, and excavation, the first covering a total of 25ha, the second 100 units, and the third 4,000m³, at a total estimated cost of Rp. 150 million.

(2) Survey III,
Preconstruction survey, 1980 and onwards

This survey, which will cover an are of 8,000m³, will employ chiefly the excavation method and will cost an estimated Rp. 200 million.

Following figures indicate the survey points and the stages when the surveys will be carried out.

Archeological Assessment Survey Plan

Project categories	Area to be surveyed (ha)	Method and area of 1979/80 Physical (ha)	Boring (unit)	Excavation (m²)	Survey costs 1979/80 (million Rp.)	Area of excavation 1980– (m²)	Survey costs 1980– (million Rp.)	Subtotal costs (million Rp.
Borobudur:								
(1) Park project	61.2	5.0	26	720	28.0	1,000	25.0	53.0
(2) Sanctuary project	5.05	1.0	6	280	9.0	1,600	40.0	49.0
(3) Road and bridge project	9.51	1.0	8	400	12.0	1,000	25.0	37.0
(4) Substitute village project	21.58	4.0	10	400	18.0	0	0.0	18.0
Subtotal	97.34	11.0	50	1,800	67.0	3,600	90.0	157.0
Prambanan:								
(1) Park project	47.23	5.0	24	920	33.0	1,400	35.0	68.0
(2) Sanctuary project	25.73	4.0	10	560	22.0	2,400	60.0	82.0
(3) Road and bridge project	5.23	1.0	6	320	10.0	600	15.0	25.0
(4) Substitute village project	28.44	4.0	10	400	18.0	0	0.0	18.0
Subtotal	106.63	14.0	50	2,200	83.0	4,400	110.0	193.0
Borobudur + Prambanan								
(1) Park project	108.43	10.0	50	1,640	61.0	2,400	60.0	121.0
(2) Sanctuary project	30.78	5.0	16	840	31.0	4000	100.0	131.0
(3) Road and bridge project	14.74	2.0	14	720	22.0	1,600	40.0	62.0
(4) Substitute village project	50.02	8.0	20	800	36.0	0	0.0	36.0
Total	203.97	25.0	100	4,000	150.0	8,000	200.0	350.0

Survey Entities

The project body will be the entity incharge of the surveys in cooperation with the Ministry of Education and Culture, with participation in physical and other surveys by teams of foreign experts.

Survey Teams

Physical Survey (two teams, two months)		Excavation (four teams, seven months)	
Supervisor	2	Supervisors	4
Local specialists	4	Surveyors	8
Workers	12	Coordinator-administrators	4
Total persons	18	Recorders	4
		Photographers	4
		Workers	32
		Total persons	56

Evaluation Entity and Feedback

The results of the survey should be evaluated promptly, by the Archeological Committee for the time being, and be feedback to the body for the following procedure of detail design and so forth.

Possible decisions will be one of the three cases of:-

(1) no finding or minor findings of no value which will be neglected.

(2) findings of some value which can be conserved either open cut or underground.

(3) findings of extremely valuable which should reflect to the change of design.

As the present design should be flexible enough to allow such findings of medium grade of values preserved within the layout of the park and sanctuary, the above-mentioned last case is out of question, being beyond the planning capacity.

However it should be noted here and now that such the case should be decided by the Body in consultation with the committee concerned when it will happen.

The monument site will be handed over to site work for landscaping after the stones of ruins should be either arranged for restoration or put aside in order by the specialists.

Evaluation Entity

A Review Board, to be established for that purpose, will evaluate the results of the surveys on the basis of advice and guidance provided by the Ministry of Education and Culture and the existing Archeological Committee.

Methods of Survey

The archeological survey in 1979 and 1980 employs geomagnetic, boring and excavation methods. In principle, a survey should be conducted in this order – from an indirect method to a direct method – at each spot. This time, however, surveys employing different methods proceed simultaneously at several spots, since the accuracy of assumptions increased significantly after the first survey in 1978.

Geomagnetic Methods

The buried monuments and relics in the area to be surveyed are primarily made of andesite, a volcanic rock, or of bricks. Since volcanic rocks commonly have strong residual magnetism, unnatural – i.e. artificial – distribution of such rocks under the ground can be traced by measuring the strength of magnetism from the ground surface. The area will be covered with reticulate lines of 15 m intervals and geomagnetically surveyed along these lines. Accordingly, this method cannot discover small monuments located within a mesh, wooden structures or other objects, which will require the following two approaches.

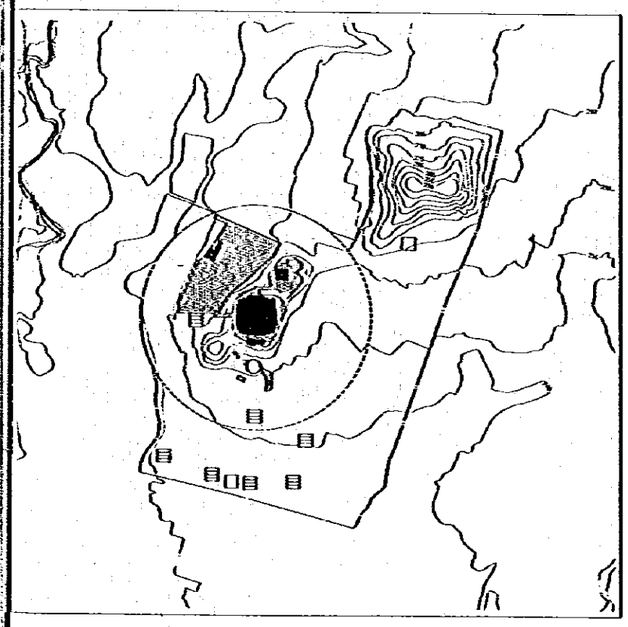
Excavation Methods

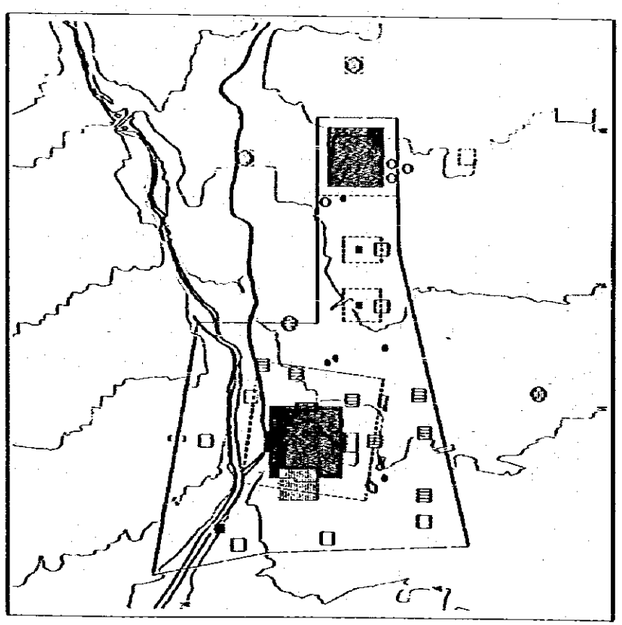
The search will be excavated down to 1.5 m from the ground surface, 10 centimeters at a time. An illustration and a record will be made at each stratum, and each time any monuments or relics are discovered. Plane figures and cross sections of excavated strata will be also recorded and photographed in natural color.

Finally, the surveyed area will be re-assessed archeologically, i.e., estimating the geological and cultural history of the surveyed area, and, if possible, drawing up a map of buried monuments estimated by the survey.

Boring Methods

In this method, undisturbed core samples of 10 cm in diameter and 6 m in depth will be collected. The profile, geology and contents of each stratum will be recorded and filed. The samples will also be illustrated, explicated and photographed in natural color. In case any monuments or relics are discovered during the process of boring, the boring will be suspended immediately to be followed by excavation.





Former survey
Survey spot, 1978
Survey plan, 1979/80
Survey plan, 1980–
Ancient well
Stone foundation
Candi

Archeological Restoration

Restoration is an important process for the protection of candis and for their academic, cultural and tourism use. Below are the explanations on the target of restoration, the restoration plan of Borobudur and the coordination with the park development plan, as well as the re-discovery of Borobudor in the 19th century and its initial reconstruction. Past records in this chapter is cited from Y. Marzuki's Namo Buddaya and the NEDECO reports.

General

Objectores of monument restoration will be:-

(1) to increase values of monument and site from aesthetic, scientific, educational and cultural turism point of view;

(2) to make an easier and orderly operation and management of the monument and site, opening them to the public cultural turism on one side and safeguarding them on the opposite side.

Historic buildings and sites will be improved after restoration.

However, restoration should not be hasten to plan and to implement though it will be an important part within the 'sanctuarization' process.

Restoration is limited to some cases of sound planning and finance with historical clarity, as it is an expensive and time consuming exercises far from accumulation of stones for pseudo-candi. Ruines are worth to enjoy until the time of restoration will come if they are arranged for visitors in that historical distance of time will be perceived there.

Experience gained at Borobudur Restoration

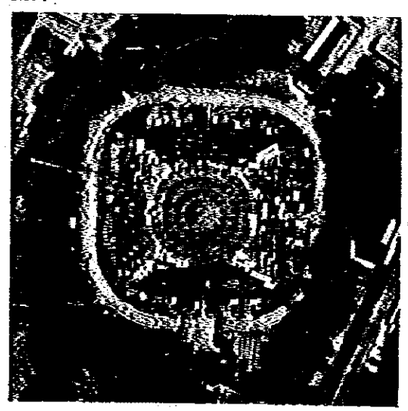
It was disclosed that deterioration of the monument was caused by the efosion of the inner hill which rain watter accelerated through the damaged drainage.
Another cause was organic materials such as fungi growing on the surface of the stones.

The above investigation of the causes disclosed that the restoration design should consist of the rainforced concrete slab installed under the stones upon the complete rain water drainage put in the stones and of dismantling, treatment and rebuilding of the carved stones.

Modern science and technology, are called for and international solidarity are mobilized. The project is used also for the Regional exchange of the specialists and the training.

Visitors are allowed to observe the work so that they learn more from the process and that the construction period is minimized.

The people of the community are recruited for the work and they, in return, proxide the lodgings to the staff.



Restoration of Candi Borobudur

Restoration Design

As shown in the chart, the restoration design consists of the following parts.

(1) The stones of the main walls, galleries and balustrades of the four-tier, square foundation will be dismantled, cleaned, have missing parts restored, and put back to the original form.

(2) Reinforced concrete slabs will be inserted into the substructure of the above noted walls and the galleries that are dismantled, and furnish stormwater drainage.

(3) The ground around the candi on top of the hill will be crowned with additional soil. Major construction materials are; 3,500 m³ of reinforced concrete for slabs, 2,500 m³ gravel and 28,500 m³ stone treatment (including 22,000 m³ of inner stones but excluding stones for repairing missing parts.

The manpower needed regularly is planned to be 500 workers, and 800 workers at the height of the construction work, i.e., total 770,000 man-days. Also machine power equivalent to 3.7 million man-days will be required.

Progress of the Restoration Project

The International Executive Board and the Consultative Committee for the project were set up in 1972, and important matters are decided annually by these organs. In 1975, in view of the work's progress, the restration expenditure was increased from US$7,750,000 to 16,100,000 and the restoration work period was extended from 6 years to 10 years. Accordingly, the completion of the restoration work will be in October 1982.

Coordination with the Park Development Project

During the next stage after drawing up the master plan of the park development, or prior to mapping out the preliminary and detailed design, it has to be decided whether the following works are a part of the restoration project or the park development project, and which project should bear the cost.

(1) Designing and finishing the end of the hill that will be capped with additional soil, and designing tree-planting which is a part of landscaping work.

(2) Design of the steps in the eastern front.

(3) The location of the stormwater drain pipe's end, and the design of the overflow. Whether or not the drain pipe is to go through the park and to be connected to the drainage outside.

(4) The method of disposing waste water after the treatment of concrete, chemicals, etc., and the design of terminal drainage from the treatment tank.

Requirements for Preliminary and Detail Design

It is necessary to draw up the preliminary and detail design of the park development plan taking into consideration the requirements from the restoration project, registered item by item, and to settle any problems that may arise due to the connection of the two projects accordingly. For designing the Borobudur Conservation Center, the Museum, the Archeological Office and other facilities, design requirements from the restoration project should also be registered and filed. The items to be stored or displayed at the museum and other facilities should be listed to help designing those facilities.

Restoration of Candi Loro Jonggrang

The purpose of restoration is primarily to protect historical monuments from natural and artificial destruction, to preserve and protect them, and to make their maintenance and management easier. The secondary aim is to improve their aesthetic value. However, as advised by ICOMOS and UNESCO in their international conventions and recommendations, the restoration should be limited to the extent that is scientifically proved, and the distinction between the original design and new additions should be explicitly stated.

Restoration of monuments requires a vast amount of money and man-power. Therefore, restoration project should be put into priority order in accordance with the reasons that necessitate restoration, and should be incorporated into a long-term plan extending over 30 to 50 years. For this purpose, the following surveys researches and plans become necessary.

(1) A survey of the monument's original stones and materials, conditions of the ground surface and underground of the plot, conditions of the neighboring ground and environment and any conceivable problems in preserving the monument.

(2) Restoration research on a chart.

(3) Planning of restoration, i.e., the method of restoration and design, the plan for conserving the monument's environment, planning of the restoration work, and plans for financing the project, taking into account the timing with the landscaping work.

The Present State of Candi Loro Jonggrang and the Need for Restoration

The candis in the Prambanan area were damaged badly by the earthquake that hit the area in 1584 A.D. or 1549 A.D. In 1733 A.D., Lors of Dutch East India Co reported the discovery of the hill-like Loro Jonggrang Complex. The restoration work that started in 193 only completed Siva Temple, the main temple of the complex, two Candi Apits of the first temple yard and the peruwaras of the two minor temples of the second temple yard during the following two decades till 1957.

At present, Candi Brahma of the first temple yard is being restored. However, the method adopted for the restoration is quite unsatisfactory in view of the aforementioned scientific principles. Other temple buildings have been destroyed to the extent of nearly 80 percent. In particular, the fourth row of peruwaras in the north have been totally destroyed. Therefore, the present stone walls, merely stacks of stone debris, are located inward the original walls. Furthermore, the Archelogical Site Office, an wooden building of 800 m², stands on the spot where peruwaras used to be. However, approximately 70 percent of the stones of the entire complex are estimated to be present.

In the third temple yard of 400 m square contains 47 houses, 7.9 ha of rice paddies and a village elementary school, and its western portion overlaps with Opak River. The stones of the third enclosing walls are very poorly preserved except for the part of the northern and southern sides. However, about 80 percent of the southern gate remains between a private house and Ramayana Theater.

The priority order of restoration would differ depending on whether the focus is laid on the preservation of the monuments or on increasing the aesthetic value of the complex. From the former point of view, the establishment of the third temple yard and its walls, now scattered and buried among private houses and farm fields, and the restoration of the walls as much as possible has priority over the restoration work within the second temple yard, which is being better supervised. And then comes the re-establishment of the second temple yard, i.e., the restoration of the enclosing walls and the peruwaras of the fourth row. From the latter viewpoint, however, the restoration of the remaining seven buildings out of eight in the first temple yard takes priority.

Together with the already completed Candi Siva, these buildings will be visible from the distance of 1 km, and will serve as an important factor in making a visitor recognize that he is in the core of the complex. Changing the location of the Archeological Site Office and the restoration of the second temple yard comes next. Although this office, located near the central part of the monuments, contributed greatly to the archeological administration of the area during the past years, the restoration of this part of the temple to the original state will recover the original grandeur of the temple to a significant extent. The revival of the ancient significance of the temple with culminate with the restoration of the third temple yard.

The restoration of Candi Loro Jonggrang complex, planned in conjunction with the Park Development Project, has a secondary aim of providing space for sightseers of candi who are anticipated to increase in the future. By restoring the entire candi complex from the first temple yard to the third temple yard, the complex will allow up to 1,000 visitors at a time, of whom 100 people can enter the first temple yard at a time.

Restoration Procedure

The following is a proposed procedure of restoration of Candi Loro Jonggrang Complex.

1) Archeological survey of the building and the site, Engineering survey of the structure, materials and soil, and cost estimation, feasibility study and financing.

2) Restoration design, measurement and recordmaking of the stones, and implementation schedule.

3) Preparation of restoration yard, workshop and machinery.

4) Dismantling and treatment of stones at the workshop.

5) Strengthening of the soil mechanism, and installation of underground drainage.

6) Supplementary archeological survey, if necessary.

7) Rebuilding of the stones.

8) Continuation to landscaping procedure.

The unit for recording all the process, evaluation and information exchange is a need. Promotional activities and training should be also planned during restoration.

Restoration Plan of the Government

The plan is a preliminary program, with many details left undecided. The outline of the plan is given below.

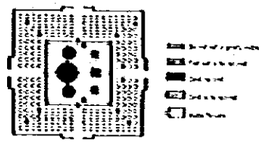
1) Range of restoration:
Restoration of all the structures in the first temple yard, enclosure walls and eight peruwaras within in the second temple yard is specified in the plan. Although not noted in the program, restoration of other peruwaras and the third temple yard is also planned.

2) Restoration design and technique:
The restoration drawings of each building is given in elevation and cross section. No explanation is given on restoration technique.

3) Materials:
Andesite, 6,830 m³; concrete (1:2:3) 950 m³; steel and other materials are cited.

4) Cost:
About 5.2 billion Rp.

5) Duration of work:
6 years. The manpower needed regularly for the work is estimated to be 400 workers.



Problems in Executing the Plan

The government plan involves various problems, as pointed out below, ranging from those concerning technology to difficulties involving social factors. Some suggestions with regard to the methods of carrying out future surveys and for improving the plan follows.

(1) The remaining stones of original structures should be registered more accurately and completely. The current restoration plan covers the west side wall and peruwaras of the second temple yard, but not the west gate. The west wall of the third temple yard is not planned, either, because it overlaps with Opak River and because the ground level is about 6 meters lower than the original level. Instead, however, archeological survey and deskwork reconstruction of the temple yard should be conducted as much as possible.

(2) It should not be overlooked that the restoration technology should serve for the protection against the destruction of monuments and other purposes of restoration. The destruction is primarily caused by earthquakes, rain and solar radiation, plants that grow on stone surfaces, and man's activity. If the fortification of the ground and the foundation against earthquakes is needed, and if archeologically admissible, insertion of R.C. Slabs may be considered. Another point of consideration against earthquakes are the consolidation of the rooftop and stupas, sikaras, antefixes and other decorations that are vulnerable to earthquake, and the fortification of the structure. However, in some instances, fixing and fortifying the structure and details in the same manner may not be desirable because it would render the substructure to bear greater impact of earthquake. In any case, a further research on methods for structural fortification is needed.

(3) The six-year work period allowed in the plan would be too short. Taking into account the extent of the area and the complexity and precision of the work (here the experience at Borobudur should be fully utilized), the work will take ten years to complete and need a substantial amount of mechanical power. Nevertheless, it should be noted that the change of the work period will also change the period of the sanctuarization plan.

The restoration work is devided into three periods; the restoration of the western half of the first and the second temple yards, followed by the restration of the eastern half and then that of the enclosing walls. In each period, the restoration work should be planned so as not to impede the park construction and the sanctuary construction works. During the period of work, an entrance for materials, machinery and personnel will be set up at the southwestern end, from which the route passes through the west of the monuments and reaches the restoration yard, which occupy 6.8 ha in the north of the third temple yard. While the work is in progress, tourists will be admitted from the southern end, and later from the eastern end when the main access to the park is completed there.

Since the restoration yard will be used for sanctuary construction work immediately after the completion of the restration work, any delay in the latter will affect the sanctuarization plan. However, starting the sanctuarization work before the completion of the restoration could raise such contradictory situation as destroying already landscaped areas for the sake of restoration. Therefore, the works should procede in accordance with the order of the original plan.

(4) The restoration and sanctuarization project needs moral support from local residents. In Loro Jonggrang alone, 11 ha of land will have to be acquired from local residents. Although financial compensations or the offer of alternative land is also necessary, people's moral support is essential.

Restoration of Other Candis

Restoration Methods

As noted before, a survey on destructive factors is necessary for deciding restoration methods. In most cases, the situation is more or less similar to the state of Loro Jonggrang, and therefore the same methods could be adopted. However, in some temples, such as Candi Sari, an external observation has revealed an imbalance between the bearing capacity of the stone structures and that of foundation, a method should be selected according to the degree of fortification required in each case. In any case, partial or total dismantling and rebuilding will be necessary, as well as the cleansing and chemical treatment of the carved stones as was done in Borobudur.

If financial difficulties compel, it may be necessary to adopt various second-best protection methods such as dismantling partially for certain period of time, or setting up a protective cover roof. Since no method is perfect, it is worth scrutiny to establish a system under which a survey and restoration is carried out every 50 years or so.

Coordination with the park Development Plan

The 15 candis selected for restoration also entail sanctuary construction. If the restoration work is to be undertaken after the construction of the sanctuary, preparations for setting up a restoration yard should be incorporated into the sanctuarization design. This case may occur since the restoration is not yet definitely set, and since restoration work takes substantial amount of time.

Points of attention in planning and executing restoration

In planning restoration works, the following points should be fully observed.

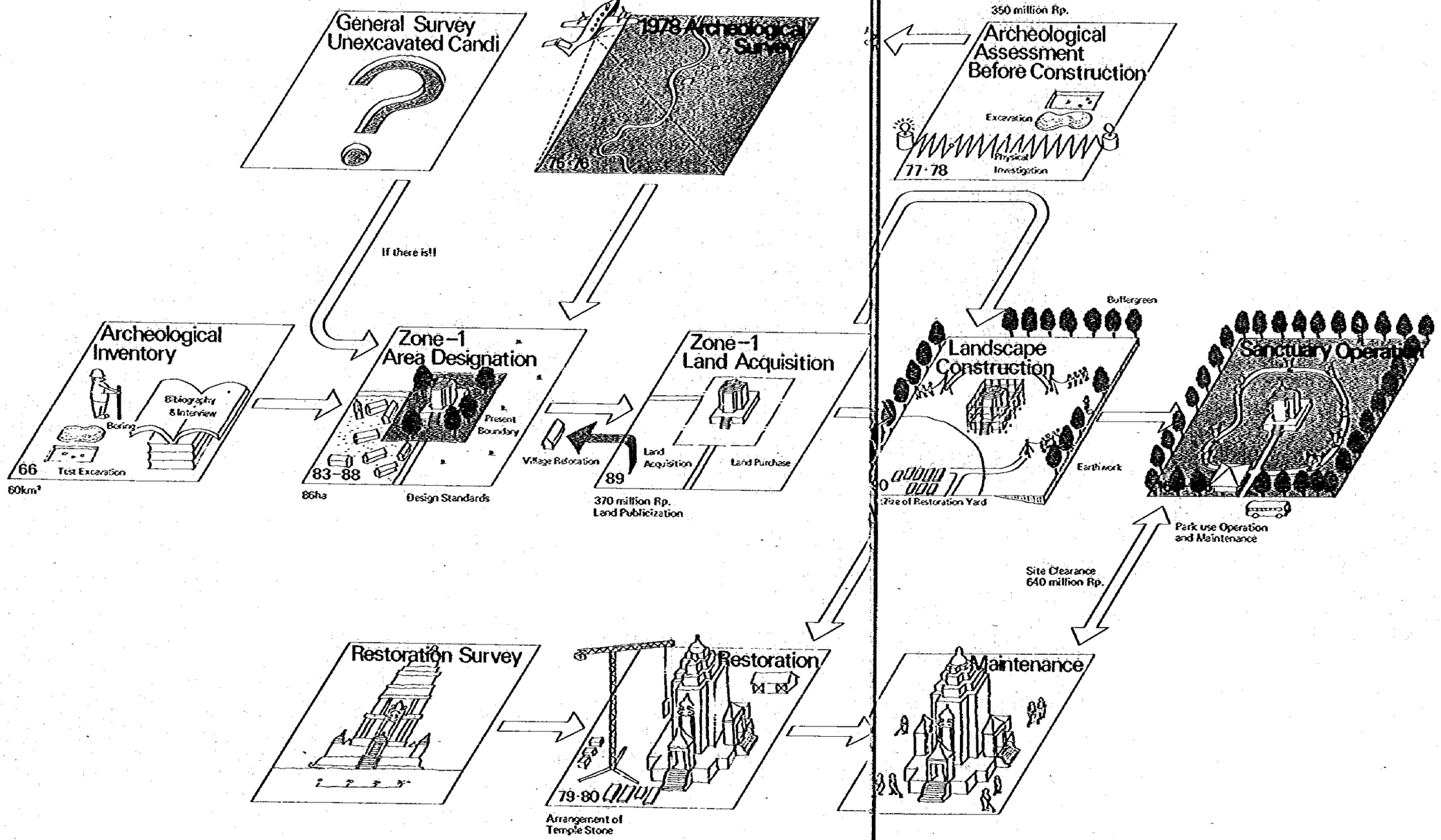
(1) As shown in the Loro Jonggrang Restoration Plan, the entire process of restoration, from archeological survey of the area to the maintenance and supervision of the restored monuments, should be included in the plan.

(2) Restoration methods should be selected on the basis of the factors that necessitate the restoration work, fully observing the scientific principle of respecting the historical facts, including materials and construction methods. Since there is no restoration method that make monuments last permanently, re-scrutiny of the adopted method and further restoration in about every 50 years should be considered.

(3) The construction work should be planned in accordance with the adopted method of restoration. Since it is desirable to accept tourist even during the work, zoning of the work areas and separating the paths of flow should be worked out, following the methods used in Borobudur. Coordinate the restoration and the landscaping works so as not to cause any complexities in the order and the areas of work.

(4) The experts, and their experiences, nurtured in the restoration of Borobudur are human assets of the country, and should be mobilized fully. These experts can train young specialists, can work for training progams in entire Asia, as proved by the precedence of SPAFA (SEAMEO) program, and can participate in various other programs aiming at exchange of experts and experiences. The restoration plans should also consider this aspect.

How is Permanent Preservation of the Archeological Monuments to Be Achieved ?



Designation Method of Sanctuary Area

The following is designation criteria for sixteen sanctuaries were decided according to the facts ascertained by current archeological investigation. Other candis whose sanctuary boundary were not ascertained archeologically at present, were decided the sanctuary boundary according to the three parameters.

The sanctuary boundary finally decided not so as to destroy the present landuse.

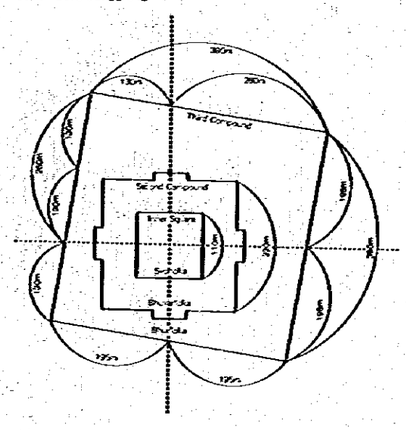
Principle of Designation Method

The monuments designated for sanctuarization are important cultural assets in both physical and spiritual terms.

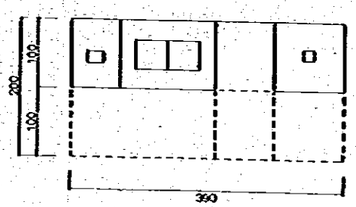
The sanctuarization program has as its goals: (1) preservation of the monuments and their surroundings in as near their original state as possible, including maintenance of surface soil and control of storm drainage and vegetation; (2) provision of sites for restoration yards and archeological surveys; (3) provision of places for appreciation of the solemn atmosphere of the archeological monuments; and (4) provision of park grounds for cultural tourism.

Accordingly, the definition of the boundary of the sanctuary area must, firstly, be decided according to the facts ascertained by current archeological investigation. Only Candi Loro Jonggrang and Candi Plaosan are applicable to this plan. Each settled boundary is as follows.

Candi Loro Jonggrang



Candi Plaosan



Designation Method for Other Candis

For the temples whose boundary were not ascertained archeologically at the time of construction, the three parameters are considered as designation criteria for the satisfaction of the purposes of sanctuarization.

(1) Considerations regarding the restoration work.
(2) Visual considerations
(3) Cultural tourism considerations

(1) Restorational approach, so as to set up the area demand of restoration work yard based on the estimate of original stone volume.

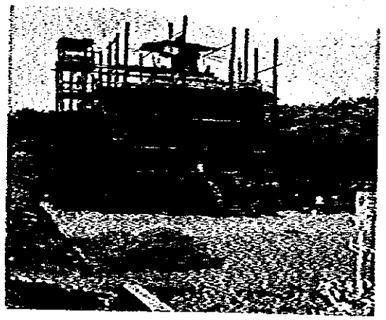
With the help of UNESCO, Candi Borobudur is now being restored in the international technical level. The relationship of the area of stone volume and that of restoration yard is in the state described below.

Furthermore the temples which are being restored in Indonesia's unique level are Candi Loro Jonggrang, Candi Sambisari and Candi Banyunibo; The relationship between stone volume and restoration is in the following state.

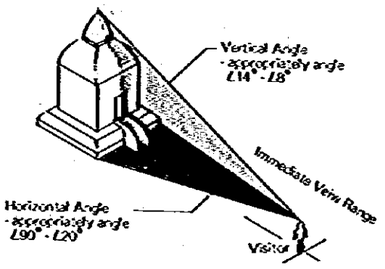
Name of Candi	Stone volume (m^3)	Restoration yard (ha)
Borobudur area:		
Borobudur	55,000	12.1
Pawon	100	–
Mendut	4,100	–
Ngawen	100	–
Prambanan area:		
Loro Jonggrang	100,800	3.9
Sewu	42,200	–
Plaosan	12,600	–
Sojiwan	600	–
Banyunibo	1,900	0.4
Sari	800	–
Kalasan	700	–
Sambisari	3,800	0.8

In this project, the temples to be restored from now are planned to be done totally in the nation's unique technical level, and the suitable width of area surrounding the remains will be gained by calculating for stone volume, necessary area for the restoration works.

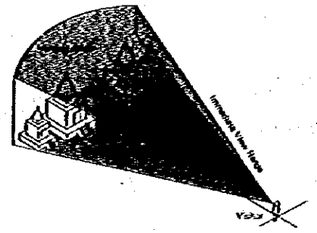
Candi Banyunibo



(2) Visual approach, so as to define the boundary of sanctuary from visual and psychological view point, such as vertical angle to the top of the monument, horizontal angle to the right and left fringes of the monument compound.



But in case that temples are located in one line such as Candi Ngawen, a horizontal angle against the whole was considered. The degrees of vertical angle and horizontal angle, were different in view of from front, side, and from back. The degrees from the front of the temple was specially considered as to have enough degrees and to gain wide area because except Candi Borobudur which has equal design from 4 angles, all temples have facade in one side, and special heed should be given to frontage of the temples especially.



Furthermore, the boundary of the area from the left, right, front and back, was made so as to have equal distance to the base of the temple.

The numeric numbers so far ascertained archeologically have been adapted to the height of the temple, and for those not ascertained, the height was inferred after consideration of the width and the breadth of the current base of other temples, and the visual analysis was made for the decision of the boundary.

(3) Tourism use approach, so as to set up the space demand of the peak number of visitors at one time to the sanctuary that is range of 25m^2 per person.

The sanctuary area is the sum total of monument area, activity area and landscaping area, and the spatial basis is the numeric value available for the calculation of activity area. The activity area is the sum total of breadth of areas of parkways, resting places and squares which are permitted to enter to take a sight of the temple.

In order not to destroy the environment of the neighboring local citizens, the boundary established according to the above-stated settling standards is to be arranged with the consideration of the site ownership, waterways, rivers, roads and other ground configurational conditions.

The sanctuary boundary finally decided satisfies all the above-stated standards and furthermore, was made so as never to destroy the present land use.

Changes in or Revision of Designation

It must be possible to make expeditious in or revisions of the designations previously made in the following cases:

(1) When a new archeological monument is discovered in the archeological assessment process and it is considered that site extension will be effective.

(2) When change in site boundaries is necessitated by the method, schedule, or other conditions of the restoration work.

(3) When site extension is considered to be a good means of solving such problems as deterioration of the environment within the sanctuary of damage to the archeological monuments as a result of the growing number of visitors.

Furthermore, in the event that value as a cultural asset should be lost or under some other special circumstances, sanctuary designation can be rescinded.

Sanctuary Area Designation : Borobudur

Point-1: L10°/Upward angle to the top of Candi Borobudur), 180m(from the center of Candi Borobudur):

An area commanding the view of the enormous Candi mainly and without any other scenic elements, makes one concentrate only on the temple.

Point-2: L15°/240m

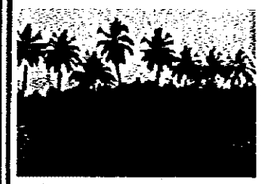
One can grasp the site situation of the temple. In addition, one can barely have a look at even the details of it.

Point-3: L15°/280m

As Point-2, commanding the situation and the details of the temple. This area, however is the limit area of such characteristics.

Point-4: L18°/140m

The foremost point of area where one can view the solemnity and sanctity of the temple.

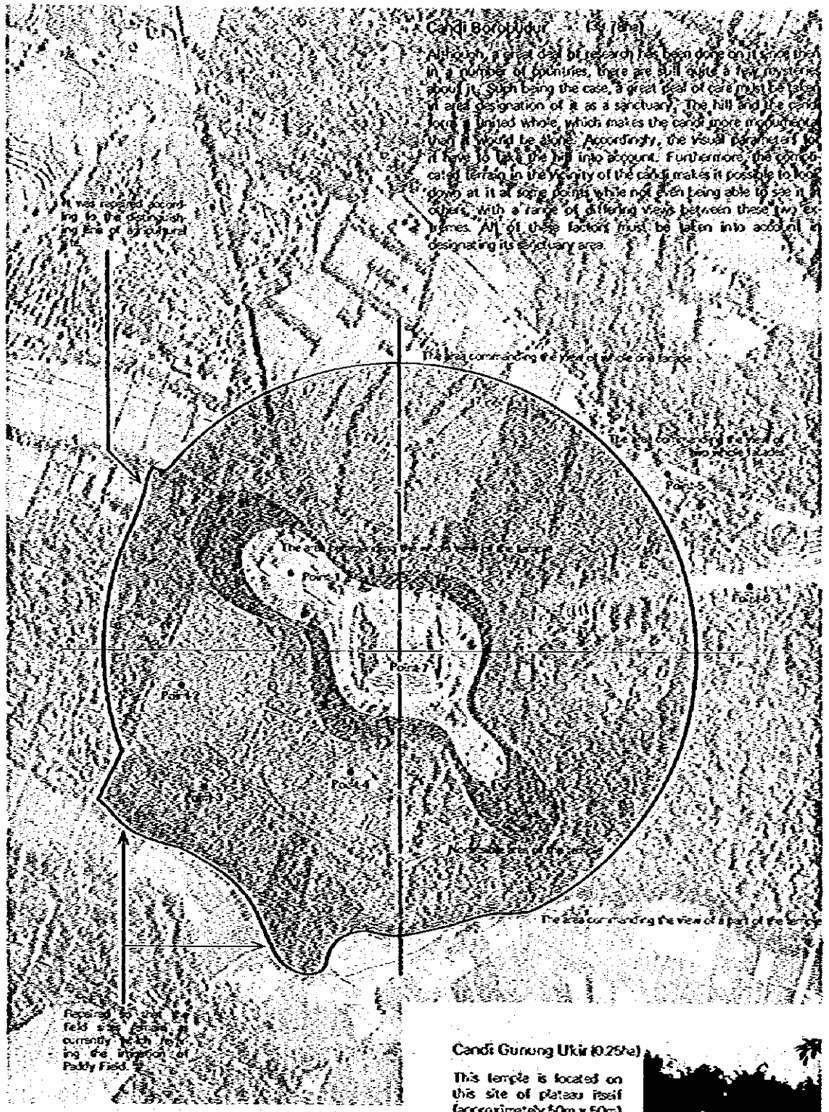


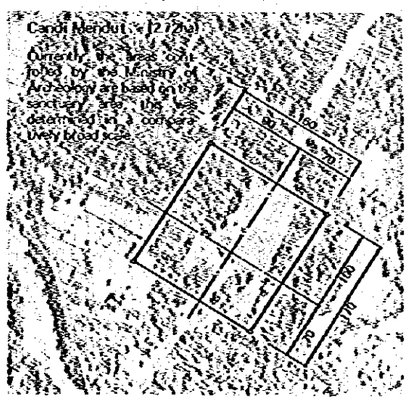
Point-5: D°/880m

The area commanding the harmony of beauty of the form and the environment.

Point-6: On the circle terrace

One can command a landscape of a line of woods and even can grasp the changing of trees and can identify the trees within the distance of 300-400m.



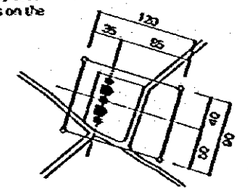


Candi Gunung Ukir (0.25ha)

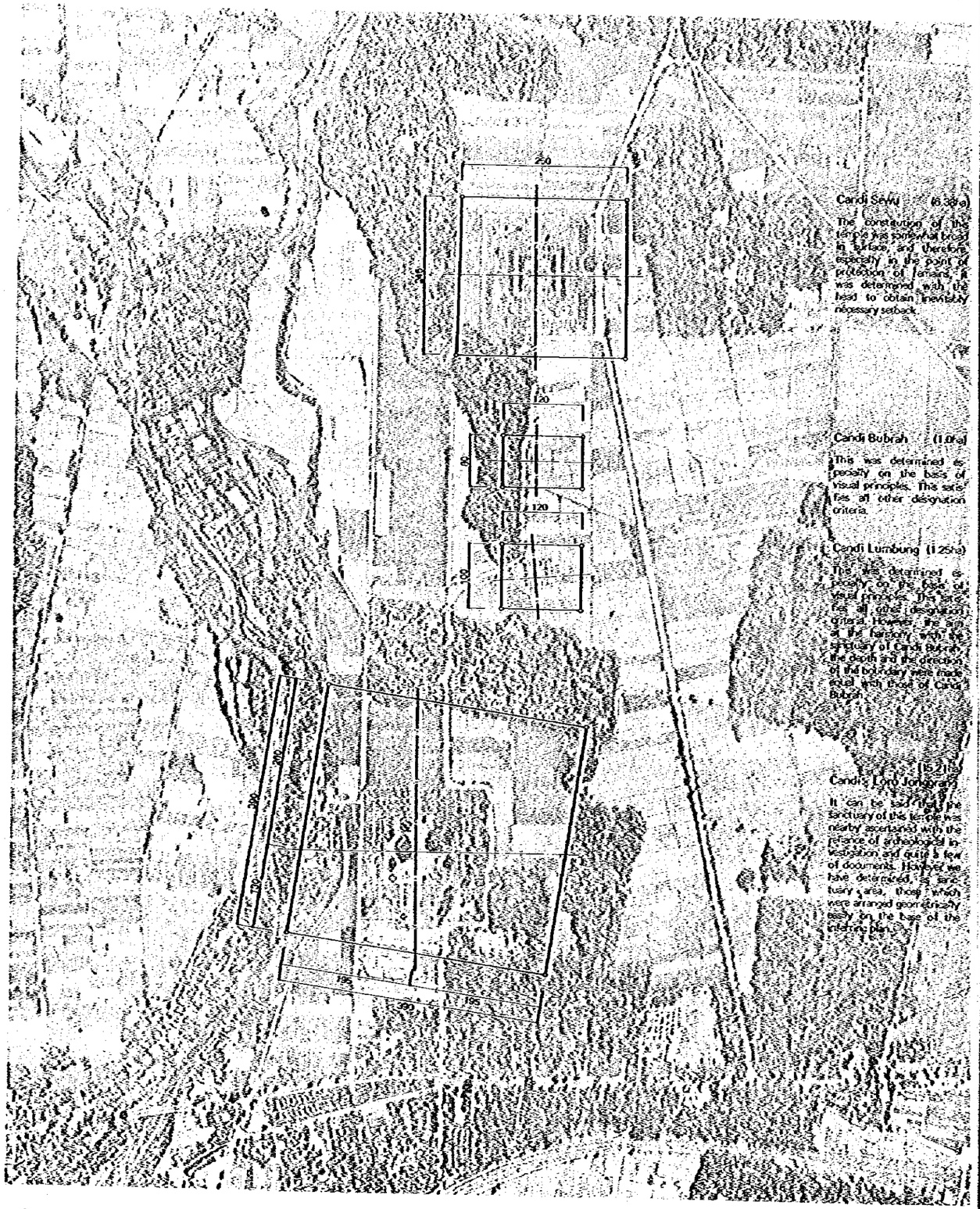
This temple is located on this site of plateau itself (approximately 50m x 50m) which is the same width of site with the temple's area itself, was determined as sanctuary area so as not to make the current circumstances change.

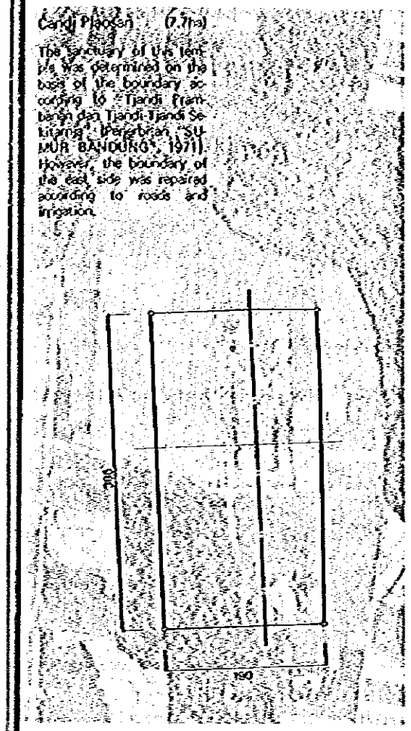
Candi Ngawen (1.06ha)

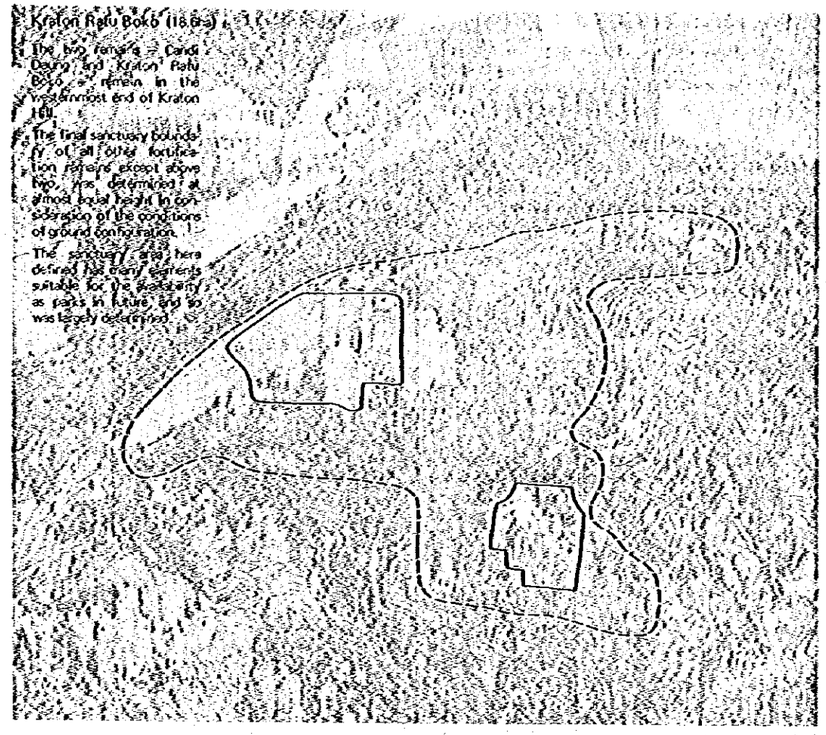
This was determined according to the visual principle. The determination, however was made without any accurate map or materials on the remains.

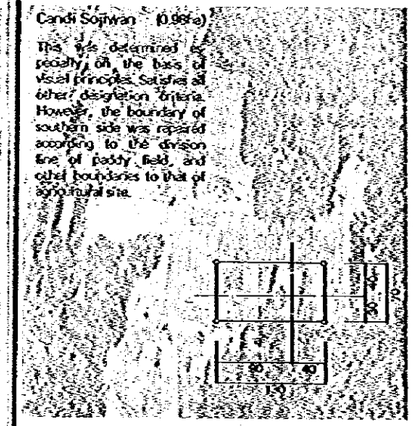


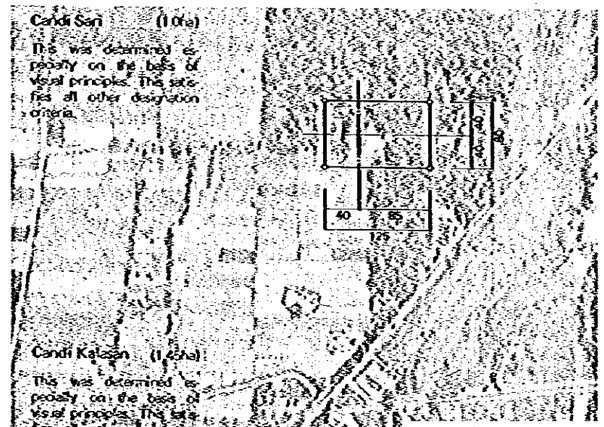
Sanctuary Area Designation : Prambanan





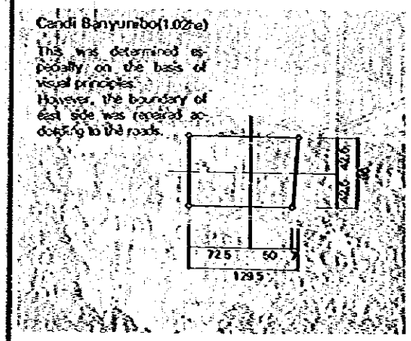


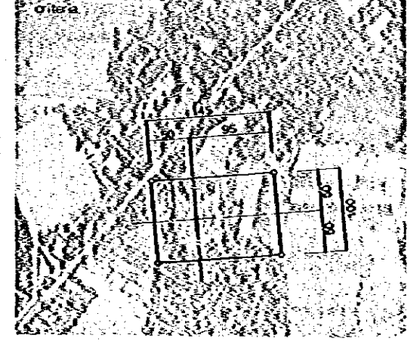




Candi Sambisari (0.5ha)

The designation criteria set this time cannot be applied to the surface of this temple because it is 6m deeper in underground than the current base surface. Accordingly, after the consideration as to include the range of area necessary for archeological investigation, to obtain the necessary site of restoration work, to protect the temple from disasters such as breakage of sand, heavy rain and to obtain the site necessary for the secure command of the temple, the sanctuary area was made 50m x 50m square form.





Sanctuary Project File

Sanctuary Project In General

In the sanctuary project, the aim of which is the permanent preservation of the major monuments in the area, the land around the monuments in question will be nationalized, their environments will be improved, and the monuments themselves will be restored as well as managed and maintained in good condition for continuing archeological research and educational use.

The master plan calls for a total investment of Rp. 1,008 million in the period covered by Pelita III and Pelita IV for five sanctuaries in the Borobudur area totalling 44.8ha and eleven sanctuaries in the Prambanan area totalling 55.1ha.

The breakdown of the sanctuaries is as follows:

	Borobudur	Prambanan	Total
Within park area	1	4	5
Outside park area	4	7	11
Total	5	11	16

Development Area

What will be the scale of new land acquisition in connection with the sanctuary project? Besides the 9.4ha already acquired by the BPCB in the Borobudur area for restoration work on Candi Borobudur, another 27ha will have to be acquired, which is about 1.5 times the amount of government owned land already available. In the Prambanan area about 3 times the amount of government owned land already available will have to be newly acquired.

government owned land already available will have to be newly acquired.

(unit: ha)

	Borobudur	Prambanan	Total
Present government owned land	17.8 (39.7)	13.7 (24.9)	31.5 (31.5)
Additional land to be acquired	27.0 (60.3)	41.4 (75.1)	68.4 (68.5)
Total	44.8	55.1	99.9

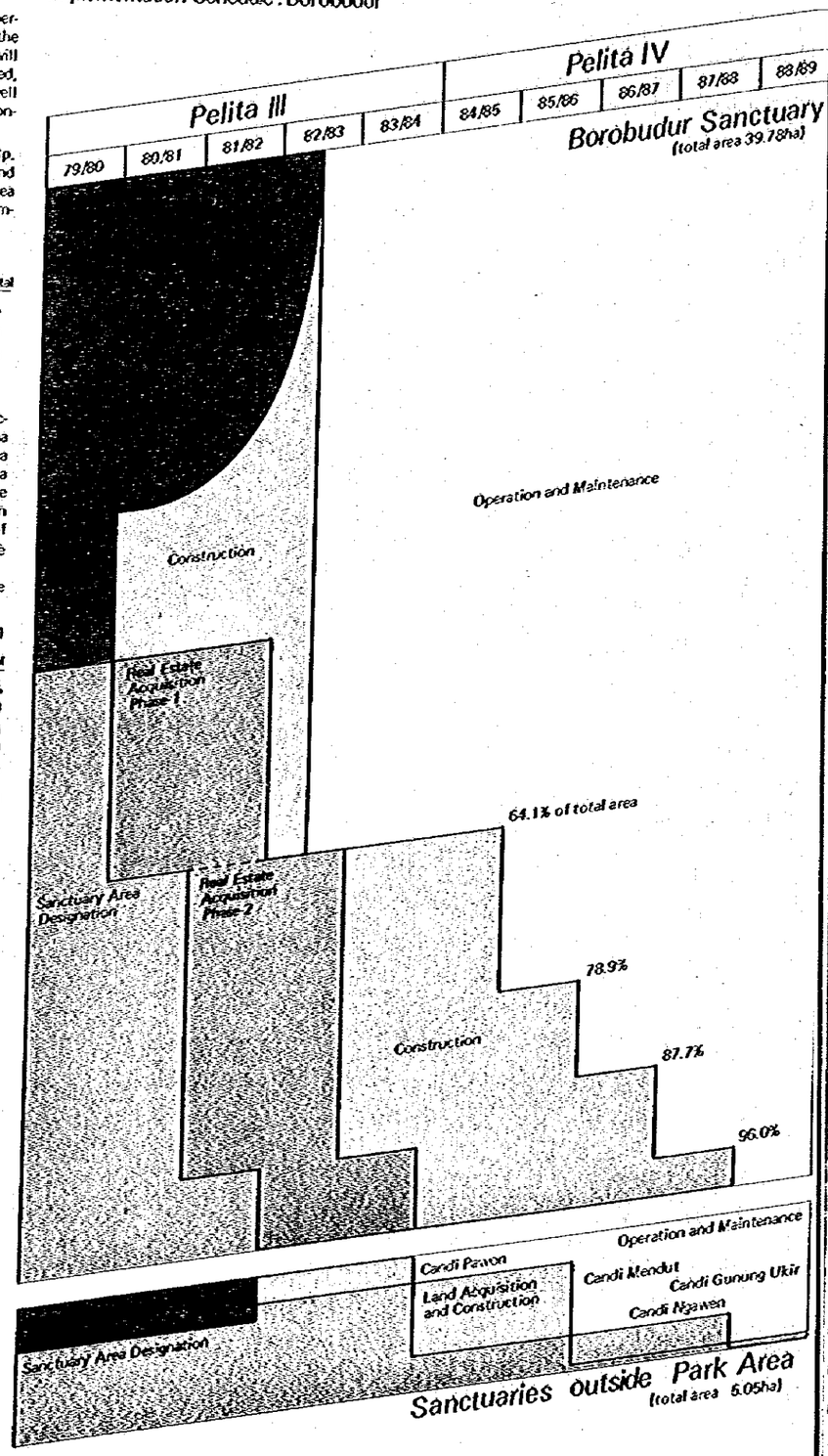
Note: The figures in the parentheses are percentages of the total area

Breakdown of Development Area by Each Sanctuary

	Designated land	Presently gov't owned land	Additional land to be acquired	
Borobudur area:				
Borobudur	3,978	1,630	2,348	
Pawon	100	10	90	
Mendut	272	97	175	
Ngawen	108	23	85	
Gunung Ukir	25	25	–	
Total	4,483	1,785	2,698	
Prambanan area:				
Loro Jonggrang	1,521	440	1,081	
Lumbung	125	30	95	
Bubrah	100	20	80	
Sewu	638	330	308	
Plaosan	770	212	374	(184)
Sojiwan	98	24	74	
Ratu Boko	1,860	180	336	(1,344)
Banyunibo	102	38	64	
Sari	100	19	81	
Kalasan	145	47	98	
Sambisari	50	25	25	
Total	5,509	1,365	2,616	(1,528)
Grand total	9,992	3,150	5,314	

Note: The figure in the parenthesis is land acquisition after 10 year

Implementation Schedule : Borobudur



Development Costs in General

The development costs for the sanctuaries outside the parks will be as per the following table, those for the sanctuaries inside the parks having been included in the figures for the park project development costs.

(unit: million Rp.)

	Borobudur	Prambanan	Total
Land purchase	13 (5.5)	155 (20.1)	168 (16.7)
Housing compensation	96 (40.3)	104 (13.5)	200 (19.8)
Construction	129 (54.2)	511 (66.4)	640 (63.5)
Total	238	70	1,008

Note: The figures in the parentheses are percentages of the total area

Breakdown of Development Costs by Each Sanctuary

(unit: million Rp.)

	Land acquisition	Construction	Total
Borobudur area:			
Borobudur	– Including park project cost –		
Pawon	30.0	25.8	55.8
Mendut	66.0	77.8	143.8
Ngawen	13.2	20.2	33.4
Gunung Ukir	–	4.9	4.9
Total	109.2	128.7	237.9
Prambanan area:			
Loro Jonggrang			
Lumbung	– Including park project cost –		
Bubrah			
Sewu			
Plaosan	145.6	165.7	311.3
Sojiwan	14.8	25.2	40.0
Ratu Boko	29.9	128.3	158.2
Banyunibo	11.0	30.6	41.6
Sari	17.0	20.3	37.3
Kalasan	35.6	41.7	77.3
Sambisari	5.0	99.5	104.5
Total	258.9	511.3	770.2
Grand total	368.1	640.0	1,008.1

Budgetary Allocation by Years

(unit: million Rp.)

Fiscal year	Borobudur	Prambanan	Total	Percentage of total
1979 – 80	–	–	–	–
80 – 81	–	5.0	5.0	0.5
81 – 82	–	117.3	117.3	11.6
82 – 83	15.0	71.9	86.9	8.6
83 – 84	25.8	158.7	184.5	18.3
1984 – 85	84.8	209.2	294.0	29.2
85 – 86	77.8	137.5	215.3	21.4
86 – 87	9.4	45.4	54.8	5.4
87 – 88	20.2	25.2	45.4	4.5
88 – 89	4.9	–	4.9	0.5
Pelita III total	40.8	352.9	393.7	39.0
Pelita IV total	197.1	417.3	614.4	61.0
Grand total	237.9	770.2	1,008.1	–

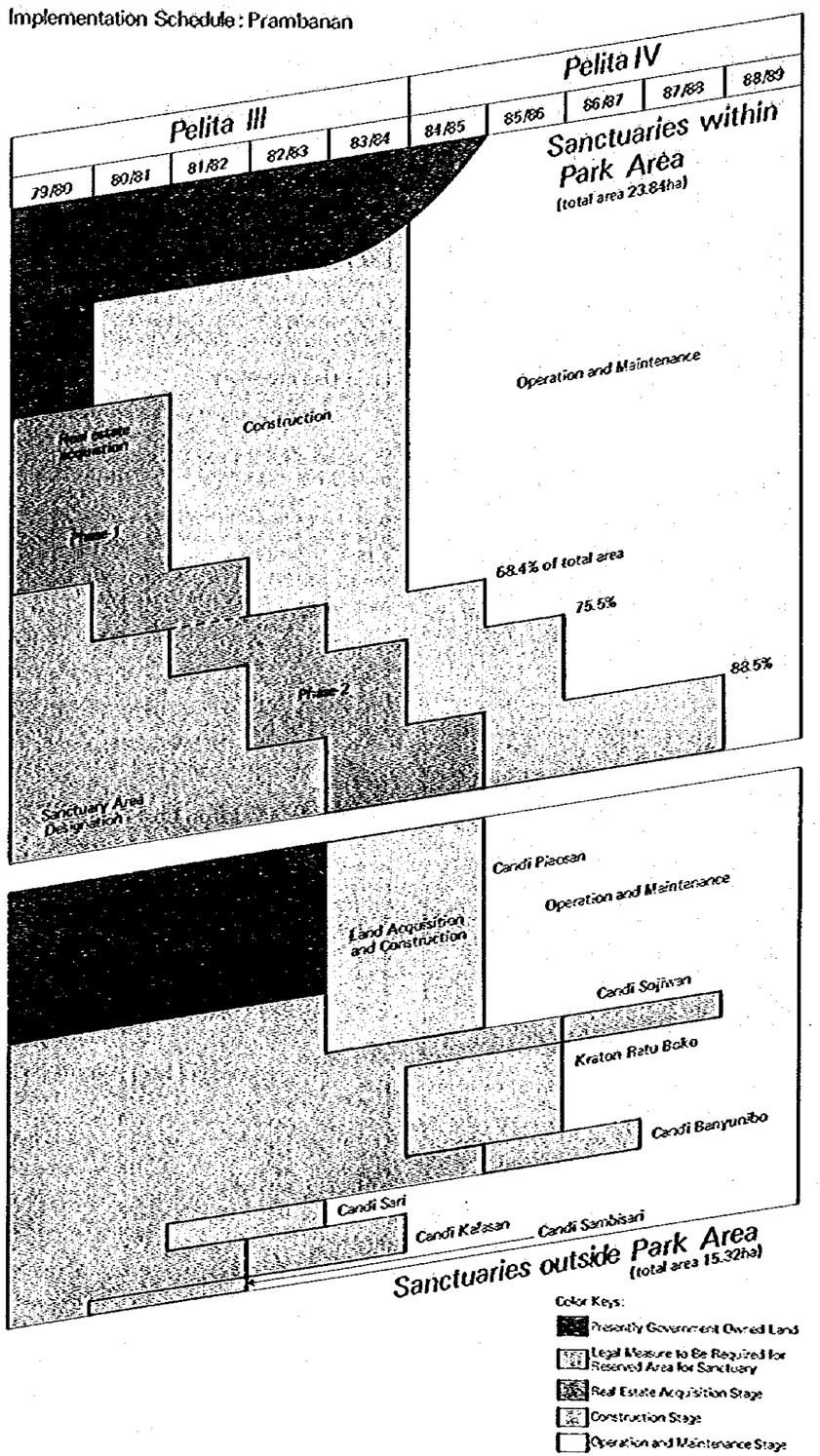
Implementation Schedule

(unit: ha)

	Borobudur	Prambanan	Total
Pelita III	26.5 (59.2)	19.8 (35.9)	46.3 (46.4)
Pelita IV	18.3 (40.8)	20.0 (36.3)	38.3 (38.3)
Pelita V	–	15.3 (27.8)	15.3 (15.3)
Total	44.8	55.1	99.9

Note: The figures in the parentheses are percentages of the total area

Implementation Schedule : Prambanan



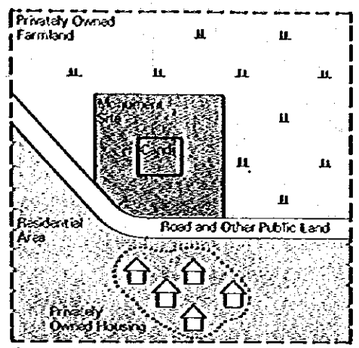
Color Keys:

- Presently Government Owned Land
- Legal Measure to Be Required for Reserved Area for Sanctuary
- Real Estate Acquisition Stage
- Construction Stage
- Operation and Maintenance Stage

Note: The figure is the development area (unit: 100m²) of each sanctuary.

Land Acquisition Manual

How to Acquired the Land for Sanctuary Area?



Zone-1 Designated Area

Key	Land title	Acquisition methods	Acquisition conditions
	Monument site	(Government owned)	–
	Privately owned farmland	Purchase by the park authority *	Unit price of land acquisition 2,000 Rp./m²
	Residential area	Substitution exchange **	Unit price of substitute land acquisition 2,000 Rp./m². Additionally 500 Rp./m² for basic sitework construction cost
	Road and other pubic use land	Transfer to the park authority	–
	Privately owned housing	Compensation of building *	Assumption (Average) One household = 100m² Unit price 20,000 Rp./m²

* Original land acquisition cost (Sanctuary project)
** Substitute land acquisition cost (Substitute village project)

Land to Be Acquired

A total of 21ha of land will be needed for the sanctuary project during Pelita III and Pelita IV. Since there is already 7ha of government owned land available, another 14ha will have to be acquired. Of this, 8.4ha is privately owned farmland, which is to be purchased, and 4.7ha is residential land, which is to be acquired by providing appropriate substitute land elsewhere in exchange. As for village road sites, agricultural waterways, and the like, they will be acquired as sanctuary land in the cases where they are needed after other similar facilities have been provided to replace them. Compensation will also be paid for the hundred houses on the residential land involved.

(unit: ha)

Items	Borobudur	Prambanan	Total
Total amount of land to be acquired	5.05	15.95	21.00
Present government owned land	1.55 (30.7)	5.45 (34.1)	7.00 (33.3)
Privately owned farmland	0.66 (13.1)	7.75 (43.6)	8.41 (40.0)
Privately owned residential area	2.38 (47.1)	2.34 (14.7)	47.72 (22.5)
Other public use land	0.46 (9.1)	0.41 (2.6)	0.87 (4.2)
No. of households	48	32	100

Note: The figures in the parentheses are percentages of the total area

Land Acquisition Costs

The total cost of land acquisition in connection with the sanctuary project will be Rp. 486 million, the breakdown being 35% for purchase of privately owned farmland, 24% for purchase of substitute residential land, and 41% for compensation for houses. The 24% for purchase of substitute residential land has been included, however, in the village improvement project instead.

(unit: million Rp.)

Acquisition types	Borobudur	Prambanan	Total
Purchase of original farmland	13.2 (7.8)	154.9 (48.8)	168.1 (34.6)
Purchase of substitute land for villagers	59.5 (35.3)	58.5 (18.4)	118.0 (24.3)
Building compensation	96.0 (56.9)	104.0 (32.8)	200.0 (41.1)
Total	168.7	317.4	486.1

Note: The figures in the parentheses are percentages of the total

Land Use Inventory

(unit: 100m²)

Code no.	Project title	Designated area	Present government owned land	Privately owned farmland	Privately owned residential area	Road and other public use land	No. of households (unit)
Borobudur area:							
B-02	Pawon	100	10	–	72	18	15
B-03	Mendut	272	97	–	158	17	33
B-04	Ngawen	108	23	66	8	11	–
B-05	Gunung Ukir	25	25	–	–	–	–
	Total	505	155	66	238	46	48
Prambanan area:							
P-06	Plaosan	770	212	408	140	10	32
P-06	Sojiwan	98	24	74	–	–	–
P-07	Ratu Boko	330	180	150	–	–	–
P-08	Banyunibo	102	38	55	–	9	–
P-09	Sari	100	19	5	64	12	8
P-10	Kalasan	145	47	58	30	10	12
P-11	Sambisari	50	25	25	–	–	–
	Total	1,595	545	775	234	41	52
Grand total		2,100	700	841	472	87	100

Real Estate Acquisition Cost Estimates

(unit: million Rp.)

Code no.	Project title	Original land acquisition	Substitute land acquisition	Building compensation	Total costs	Implementation year
Borobudur area:						
B-02	Pawon	–	18.0	30.0	48.0	1982
B-03	Mendut	–	39.5	66.0	105.5	1984
B-04	Ngawen	13.2	2.0	–	15.2	1986
B-05	Gunung Ukir	–	–	–	–	–
	Total	13.2	59.5	96.0	168.7	–
Prambanan area						
P-06	Plaosan	81.6	35.0	64.0	180.6	1983
P-06	Sojiwan	14.8	–	–	14.8	1986
P-07	Ratu Boko	29.9	–	–	29.9	1984
P-08	Banyunibo	11.0	–	–	11.0	1985
P-09	Sari	1.0	16.0	16.0	33.0	1981
P-10	Kalasan	11.6	7.5	24.0	43.1	1982
P-11	Sambisari	5.0	–	–	5.0	1980
	Total	154.9	58.5	104.0	317.4	–
Grand total		168.1	118.0	200.0	486.1	–

Sanctuary Construction Manual

Basic Site Work

Basic Considerations

The basic site work will consist of (1) ground modelling, (2) clearance of existing vegetation, and (3) demolishment of existing structures and will be for the purpose of facilitation of restoration work, landscaping, installation of service facilities, and other works.

The following matters will have to be taken into consideration in the ground modelling:

(1) Variation between the different monuments with respect to the height of their foundations at the time they were originally built and at the present time.

(2) The probable existence of many unexcavated monuments around the present candi.

(3) The basic policy, with regard to the restoration work, of reproducing the original foundation heights of the monuments.

The following will therefore be necessary in the basic site work:

(1) Level adjustment between original foundation height and present foundation height around the monuments and definition of the scope thereof.

(2) Definition of the depth and scope of cuts of the surface of the ground.

(3) Definition of storm drainage, erosion control, and other ground functions.

(4) Taking into account of asthetic and scenic considerations with respect to the above.

Relationship Between the Present Height of the Ground Surface and That at the Time the Monuments Were Originally Built

Three different cases obtain in the Borobudur and Prambanan areas in this regard:

Case-1: Practically no difference between the two: Candi Borobudur, Mendut, Pawon, Sari, Kalasan, etc.

Case-2: A substantially higher level now than originally: Candi Sambisari (the present level is higher than the original one in the case of the majority of the monuments, but not enough to be placed in this category rather that the first one).

Case-3: A lower level now than originally: only a part of the third compound of the Candi Loro Jonggrang complex.

The ground modelling will differ not only between these cases but also with respect to method between different instances of the same case, for full account must be taken of such archeological considerations as protection of the monuments, including those that have not yet been excavated, and such aspects as the existing land use and topographical conditions in the vicinity of the monuments.

Clearnace of Existing Vegetation

Trees that might have an adverse effect on the monuments should be promptly removed, and since this is a tropical rain forest zone, removal of root systems will have to be done very carefully in order to preclude resprouting. The following categories of trees, however, are to be preserved:

(1) Old trees that represent landmarks as trees that the local residents are very familiar with as a part of the historical scenery.

(2) "Religious" trees and others that are particularly dignified and/or have good shapes and beautiful flowers.

(3) Trees whose shapes blend in well with the candi in terms of form and volume and that will provide shade for visitors.

(4) Trees that do not grow very rapidly and the root systems of which are not so strong.

Demolishment of Existing Structures

Houses, public facilities, telegraph poles and the like, fences, foundations of the above, and surface paving and accessories will have to be demolished and removed, paying particular attention to the following matters:

(1) Great care must be taken in demolishing such structures at places where it is suspected that there might be unexcavated monuments.

(2) Care must be taken not to leave any portions of the surface structures or foundations or paving material's in the ground after the earthwork.

Clearance of Existing Vegetation

Trees that might have an adverse effect on the monuments should be promptly removed, and since this is a tropical rain forest zone, removal of root systems will have to be done very carefully in order to preclude resprouting. The following categories of trees, however, are to be preserved:

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(3) Trees whose shapes blend in well with the candi in terms of form and volume and that will provide shade for visitors.

(4) Trees that do not grow very rapidly and the root systems of which are not so strong.

Landscaping

Basic Policies

The landscape design will be based on the following basic policies, the existing candi being the most important constituent elements of the scenery:

(1) Emphasis on the dignity and religious solemnity of the candi.

(2) Enhancement of present-day value of the monuments while taking an archeological approach that is based on the original principles of layout.

(3) Creation of an environment that will make possible a diversity of uses of the monuments, including their use for religious, educational, scholastic, and cultural tourism purposes.

Environmental Improvements for the Protection of the Monuments and Their Sites

(1) In order to maintain the original ground level, it is necessary to protect the surface soil with vegetation as well as provide for erosion control against the elements.

(2) Where there are topographical differences between the sanctuary areas and their immediate surroundings, they are to be protected and maintained by appropriate means.

(3) Measures must be taken to protect the sanctuary areas against destructive human activities in their immediate vicinity, incursions by animals, and the like.

Environmental Improvements with Respect to Visitors

One of the most important policies with respect to visitors is that of providing them information based on historical facts and making it possible for them to imagine what the monuments were like when they were first built and appreciate their value as part of the national legacy. The following are some of the ways in which this is to be accomplished:

(1) Provision of wide expanses of lawn grass at strategic spots for enhancement of the view of the monuments.

(2) Provision of pertinent historical information on the monuments and their surroundings.

(3) Provision of such facilities as toilets, water fountains, trash baskets, benches, and shelters in quantities adequate for the anticipated number of visitors.

(4) Adoption of measures for the safety of visitors, particularly measures to prevent danger to lives.

(5) Provision of notification at appropriate spots of the kinds of activities and behavior prohibited in the sanctuary areas and with respect to the monuments.

Provision of Facilities for Operations and Maintenance

Each sanctuary area should, as a rule, have a guardhouse, unless it is deemed possible to protect the monuments under present conditions. Administrative and maintenance facilities will also have to be provided in the amount required by the number of visitors expected.

Construction Cost Indications

(unit: million Rp.)

Code no.	Project title	Construction area (100m²)	Basic site work cost	Landscape cost	Facility cost	Total costs
Borobudur area:						
B-02	Pawon	100	7.0	15.2	3.6	25.8
B-03	Mendut	272	31.2	40.6	6.0	77.8
B-04	Ngawen	108	9.1	9.9	1.2	20.2
B-05	Gunung Ukir	25	1.2	3.7	–	4.9
	Total	505	43.5	69.4	10.8	128.7
Prambanan area:						
P-06	Plaosan	770	48.0	115.3	2.4	165.7
P-06	Sojiwan	98	8.9	15.1	1.2	25.2
P-07	Ratu Boko	330	24.0	98.3	6.0	128.3
P-08	Banyunibo	102	10.8	18.6	1.2	30.6
P-09	Sari	100	4.5	14.6	1.2	20.3
P-10	Kalasan	145	9.8	29.5	2.4	41.7
P-11	Sambisari	50	1.2	97.1	1.2	99.5
	Total	1,650	107.2	388.5	15.6	511.3
Grand total		2,155	155.7	457.9	26.4	640.0

Our Theory on Environmental Planning and Design

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.

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 Parks be formulated with sufficient flexibility to allow revision and incorporation of new archeological findings.

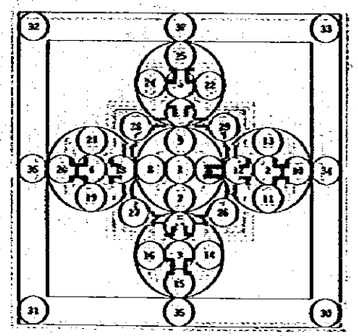
Emphasis on Axiality of Archeological Monuments

In general the axiality of archeological monuments has both a spatial nature and a religious and psychological nature. It is necessary that both of these special characteristics be incorporated as the basis of the landscape design in the overall actual 3-dimensional environment. Furthermore, it is necessary that the archeological monuments serve as the core of the planning concepts for the areas covered by the landscaping design and that the significance thereof be stressed.

The Layout of the Archeological Monuments to Serve as a Basis of Design Policy

Most of the candi were built on the Buddhist concept of the mandala, and the parts of them that are still visible are no exception. This principle must be understood as a design element and reflected in the landscape design, taking into consideration spatial harmony.

While the form of the original candi, which will be further clarified through archeological surveys, will indicate scale and position as basis structures, a conceptual method of indication by means of such media as trees and shrubs should also be considered, and this is important for both future archeological surveys and protection of unexcavated monuments.



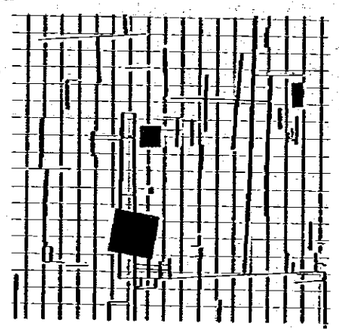
Definition of the Historic Climate

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.

Continuity of Physiognomy of the Land

It is necessary to adjust the locational conditions in the vicinity of the parks to the park development and the park environments that will be newly created. Although there is to be as little change as possible in the topography, there will have to be recovery of existing conditions from past destruction and deterioration for the creation of a better natural environment through park planning for creation of new environmental functions.



Spatial Significance

The monuments in Borobudur and Prambanan a masterpieces created by the Hindu and Mahayana Buddhist religious craftsmen, and the spaces betwee the monuments themselves are symbolic of the r ligious concept of space. Indeed, these Candis we built as the crystalization of the great Javanese cultu brought to blossom by the ancient Indonesians agains this broad natural background.

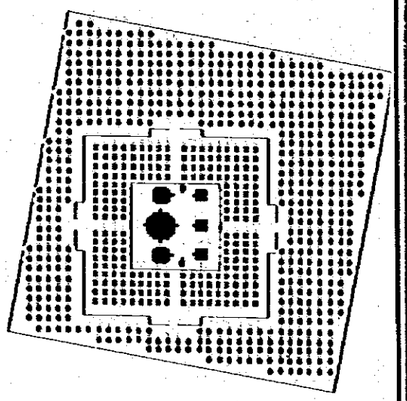
Now, looking back after many centuries, we can see i these spaces a revitalization of their religious existen and a revival of the religious meaning of the Cand complex. More than anything else, it is this religiou existence which holds the area's message for the future.

Diverse Development of Planting Design

The planting of trees, shrubs, flowers, and grass is a important item in the development of the parks, fo such vegetation will be a basic element of spatial com position for expression of the image of a new par environment.

One of the principles of planting is use of existing veg tation, particularly trees, which have helped to form th present environment in the course of time. Next, wha is necessary is the introduction of a variety of specie suitable for the purpose of composing a new environ ment of the sort desired.

In deciding what species to select, consideration must b given to their respective features, the purposes whic the planting is to serve, and aesthetic and decoratis effects. Furthermore, the planting will extend through out the parks in dot, linear, and planer form in terms o single units, rows, and clusters. If the species plante are suitable to their particular locations in terms o shape, aesthetic impression, tone, amount of foliage texture, flowers, leaf variation, etc., the overall land scape of the parks will be very much enhanced.



Observance of Principles of Perception

Maximum possibilities on the basis of general human awareness principles, particularly the principles of visual awareness are to be pursued as grounds for determination of the scenic composition of the landscape design. Among the objects of visual awareness are outlook, focal points, field of view, spatial extent, direction, scenic continuity and variation, and brightness, tone, and texture as scenic qualities as well as scenic harmony and unity and artificiality or naturalness of the scenery.

Gaining Panoramic View

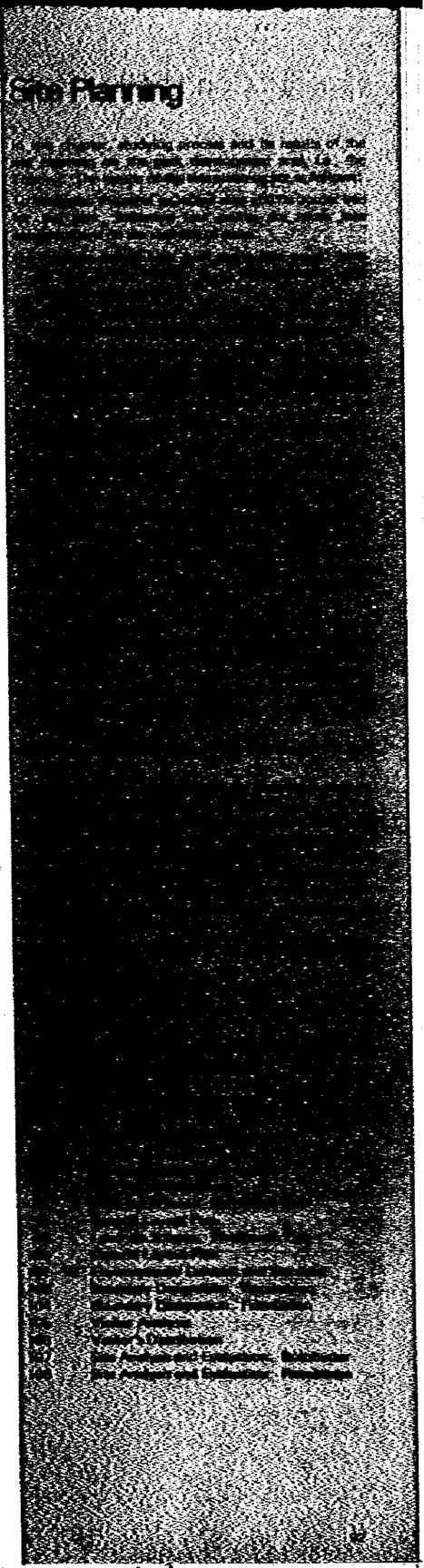
The panoramic views of the Kedu Basin from the Candi Borobudur circle terrace and of the Kewu Plain from Ratan Hill are outstanding. In fact, they are among the best that Java has to offer. It will be necessary to plan for an even more effective wide-area landscape design, paying attention to ground structures that have a major influence on the view of such natural elements as volcanic peaks and extensive forests and plains. It will be necessary to recognize the potential scenic value of places with excellent long-range views and of major objects of view and strive for a landscape design that will protect and control them together with the surrounding environment.

What has been said above concerns the control and management of the environment and scenery of areas in the two parks in which the historical climate is to be preserved. Furthermore, it presents important guidelines for creation of an historical environment rich in greenery on the part of both local residents and people throughout Indonesia.

Introduction of Sequence Design Method

Landscape design techniques for visual continuity are to be considered in terms of diversity of visual perception and angles and points of view. A factor that will have a particularly strong influence on visitors' impressions of the parks is the continuity and change in the scenery along the access roads. Furthermore, consideration must be given to the way in which archeological monuments provide visual continuity in the scenery along pedestrian routes in the parks. In other words, it will be necessary to strive for a design that will provide richly varied and harmonious continuity along pedestrian routes.

Site Planning



Present Conditions : Borobudur

Preserve the Dukuh Sabrang Rowo Area and the Southern Dry Field!

The Dukuh Sabrang Rowo Area now constitutes a beautiful forest with residential area inside, and provides an important scenic factor for the splendid view from the Candi and the Dagi hill. The specific topological conditions, especially its poor accessibility, gives no fear of future environmental destruction in this area. It is thus desirable to preserve the present land use for scenic beauty, and rather not undertake any development in this area as the Park site.

Preserve the Paddy Field Area

The paddy field area spreads in the south of Borobudur and in the northern belt shape area, which was once a river bed. These areas are most suited for farming and undoubtedly better to preserve for cultivation, rather than develop as a Park Site.

Include the Dagi hill in the Park!

The panoramic view of the Kedu Basin from the top the Dagi hill should give a rare and outstanding impression to the visitors, and it is comparable only with view from the first circle of Candi Borobudur.

The hill also provide a rare site where one can view Candi clearly from the flank.

The hill also has an interesting topography, with wild palm forest on the slope, and it provides suitable area for visitors' recreation.

In addition to those attractive features, the fact that this hill is not cultivated at present can also justify proposal to include the hill in the Archeological Pa

Include the Dukuh Nagaran Krayan in the Park!

This area is most important as a Park facade, because of its monuments and their good accessibility from the road. Like in the Dukuh Kenayan, tourist facilities here are mixed up with other basic community facilities. It is desirable therefore to undertake basic site work here at an early stage.

Increasing Sunvenir Shops !

Alongside the local road which runs at the foot of the Candi Borobudur hill, souvenior shops are increasing markedly, thus a deterioration of the surrounding environment has been developing because of their noise, refuse and other related pollution.

Develop the Northern Farm Land (Dry Field) as a Park!

Although this area provides important scenic view from the Candi Borobudur Terrace, many of the uncultivated fields in the dry season tend to spoil the beautiful scenery. On the other hand, a good panoramic view o Candi Borobudur, both close and distant, is available from this area. The gentle variety of its topography can also justify that this area is an indispensable site for the Park development.

Include the Dukuh Kenayan Area in the Park!

At the present moment, the public and commercial facilities for the local population are mixed up with tourist facilities in this area, thus it is expected to increase further pollution by tourism. In addition, the traffic noise or loud-speaker sounds are heard even from the Candi circle terrace. The 20 m local road is also becoming a main factor to spoil the panoramic view from the Terrace. This area is directly related to the access road, and is indispensable for the Park development. It is desired to start land acquisition and basic site work in this area at an early stage.

Park Area Designation

Minimum Land Acquisition for the Sanctuary!

Land acquisition and village removal are to be made the Dukuh Sabrang Rowo Area and the scenic beauty of the existing land-use should be preserved. However, in those area which is included in the Sactuary Candi Borobudur, a minimum land acquisition has to be made. Even in such area, the development should be limited to a removal or infillment inside the Dukuh.

Two Phase Development of the Dagi Hill!

The number of visitors to the Borobudur park is expected to reach average 7,000 per day at the end of Pelita IV and 10,000 at the end of Pelita V.

Those visitors will spend a whole day in the park and expect not only to see Candi, but also to enjoy various holiday recreations.

Considering such gradual increase of the number of visitors and the expected variety of their activities, the development of the Dagi hill is to be carried out by the following two steps.

During Pelita IV, the southern half of the hill (7.5 ha) to be acquired and the remaining 7.0 ha is to be acquired during Pelita V. The land acquisition will coincide with the basic site work and construction of service facilities.

Clearance and Development in the Dukuh Nagaran Krayan Area at the first phase!

All land in the Dukuh Nagaran Krayan Area is to be acquired as basic Park site in the coming ten years. The park implementation must be completed during this first phase. The development in this area includes ground-works for the theme facility and operation facility and a construction of a concourse on the eastern axis line of Candi Borobudur.

Two Phase Development of the Northern Farm Land.

The part of the area which is included in the Sanctuary should be acquired urgently to start the basic site work. The Park development in the rest of the area is to be completed by 1993. The reason to delay the land acquisition and development of this area is to minimize the social impact of such park development toward the regional community, by delaying acquisition of the farm land to a later phase.

Urgent Work at the Dukuh Kenayan Area!

At the road side area, which constitutes about the half of the Dukuh Kenayan Area, it is urgently necessary to start the land acquisition and basic site work. The work at the remaining farm area and residential area, which locates at the back of the above said area, will be started thereafter. Such division and delay is necessary to minimize the social effects of removing the existing villages.

Present Conditions : Prambanan

Include the three contiguous Sanctuaries in the Park area!

The three monuments of Candi Sewu, Bubrah and Lumbung will be sancturized and the measure for land acquisition and basic site work will be undertaken in the surrounding area. In order to utilize the area much effectively and to guarantee substantial preservation of the monuments, as well as to increase attractive and educational value of the Park, the surrounding area around these three Sanctuaries should be acquired and consolidated as a Park site.

Remove the east side road of Candi Sewu!

The present road which runs along the eastern side of the Candi Sewu cuts into the temple area and creates undesirable condition for the preservation of the monuments because of its traffic vibration and waste gas, etc. This road should be removed and re-routed as soon as possible.

Utilize the Opak River-Bed as a Park!

The Opak river and its river-bed is the only area which has a rich topographical variety in the Park. And the running water as one of the Landscape element of the Park is fairly important, because it can give a relief and coolness to the visitors in this tropical area. However, this river-bed is now left in the natural condition and is subject to a danger of overflow in the rainy seasons. It is desired to undertake the work of bank protection, etc., at the same time with the landscaping work of the Park.

Evacuate the existing structures on the monument ground!

The present Prambanan Archeological Site Office is built in the second compound of Candi Loro Jonggrang and is not desirable for the scenic view from the monument as well as for preserving and restoring buried monuments under the structure. It is urgently necessary to dismantle and remove this Office.

Remove the Ramayana theater contiguous to the Monument!

This open-air theater is contiguous to the third compound of Candi Loro Jonggrang and the ugly structures like theater-seats of lightening towers, which can be seen directly from the first compound are spoiling the scenery from the Candi in a marked degree. In addition, this area has a big possibility of buried monuments and it is desired to remove the theater for the investigation and preservation of such monuments. However, the Ramayana drama is one of the key to the Hindu culture and it is quite meaningfull to present this traditional festival's in the Park. Thus, the Ramayana theater is to be removed to a proper site inside the park and be constructed as a theme facility.

The commercial area contiguous to the monuments should be included in the Park!

This area is just contiguous to Candi Loro Jonggrang but already having pollution problems caused by noise and refuse. The rapid increase of souvenir shops for tourists in recent years has created confused amenity of both regional public and commercial facilities and tourist facilities. Furthermore, there is a plan to extend the state road in Prambanan into a 30 m ROW, then the traffic noise will further increase.

Park Area Designation

Two phase Development and Sanctuarization of the three monuments and its surrounding area!

The sanctuarization around the monuments, which should be done urgently, is to be completed in the present ten-year project. The Land acquisition and basic development of the broader area around the monuments will be undertaken subsequently to construct an education oriented field museum, in order to meet the variety of demands from increased visitors in the future.

The removal of the east-side road of Candi Sewu by Sancturization!

The eastern road, which now cuts into the monument area, should be removed 50 m to the east, to the outside of the Sanctuary boundary. A buffer greenery should be provided at the border to preserve the monument environment more effectively.

Reasons to remove the Ramayana theater to the western coast of the Opak river.

The reasons for choosing the western coast of the Opak river as a new site for the Ramayana theater are as follows:

- It is an independent area from other part of the Park and is suitable for presenting the festival's at night.
- From this area, the problem of noise does not affect the park area.
- From the first compound of Candi Loro Jonggrang the new theater is not identifiable because of the difference of ground height. Whereas from the new theater, the Candi is included in its background scenery. Thus, the area is most suitable to preserve the scenic view of Candi Loro Jonggrang.

Remove the Archeological Site Office and rebuild it as a Theme Facility!

Present Prambanan Archeological Site Office should be removed to other site in the Park and be rebuilt as a theme facility with substantial function and structure, which can correspond to the research and educational activity of the Park. An Archeological Museum is to be attached to the Office. After the removal, the existing structure should be evacuated in due order according to the Restoration Program of Candi Loro Jonggrang.

Two phase Development for the Opak river and its river-bed!

In order to keep and utilize the topological feature of the Opak river and its water element for the scenic factor in the park, and to meet various demands of ever increasing visitors, this area is to be developed as a part of the Park oriented to recreational purposes. The work of bank protection, among others, should be undertaken urgently to protect the shores.

Urgent for the Commercial Area south of Candi Loro Jonggrang!

This area is located between the monuments and the state road, and descends by a gradual slope to the Opak river-bed. It is one of the most suitable area for the Park. The ground work is to be undertaken to construct a field museum which is oriented for educational purposes, and a buffer greenery should be urgently established alongside the road, in order to prevent traffic pollution.

Landuse Scheme : Borobudur Park

The object of this article is to clarify the following four items:

- *Frame of landuse in the park.*
- *Scale, timing and the structure of the three phases of development.*
- *Location scale in the facility site.*
- *The scheme of road network in the park.*

Phase 1. (1979 – Oct. 1982)

The development was rapidly made aiming at the opening of the park immediately after the completion of the restoration of Candi Borobudur in Oct. 1982. The range of the area planned to be developped is 37.5 ha. The number of people entering the park is estimated as 1,520,000 persons annually, which means 4,165 persons a day on the average.

Phase 2. (Oct. 1982–1988)

This is the area of 28.4 ha which will be developed for the coming 10 years after the tentative opening of the park. The estimated visitors' capacity is 2,760,000 persons/year, which means 7,500 persons/day. The contents of the development are mainly the construction of the theme facilities of the park, and subsequently the BAM. BACC. Guesthouse is planned to be developed. The equipment of the sanctuary will be completed during the coming 10 years.

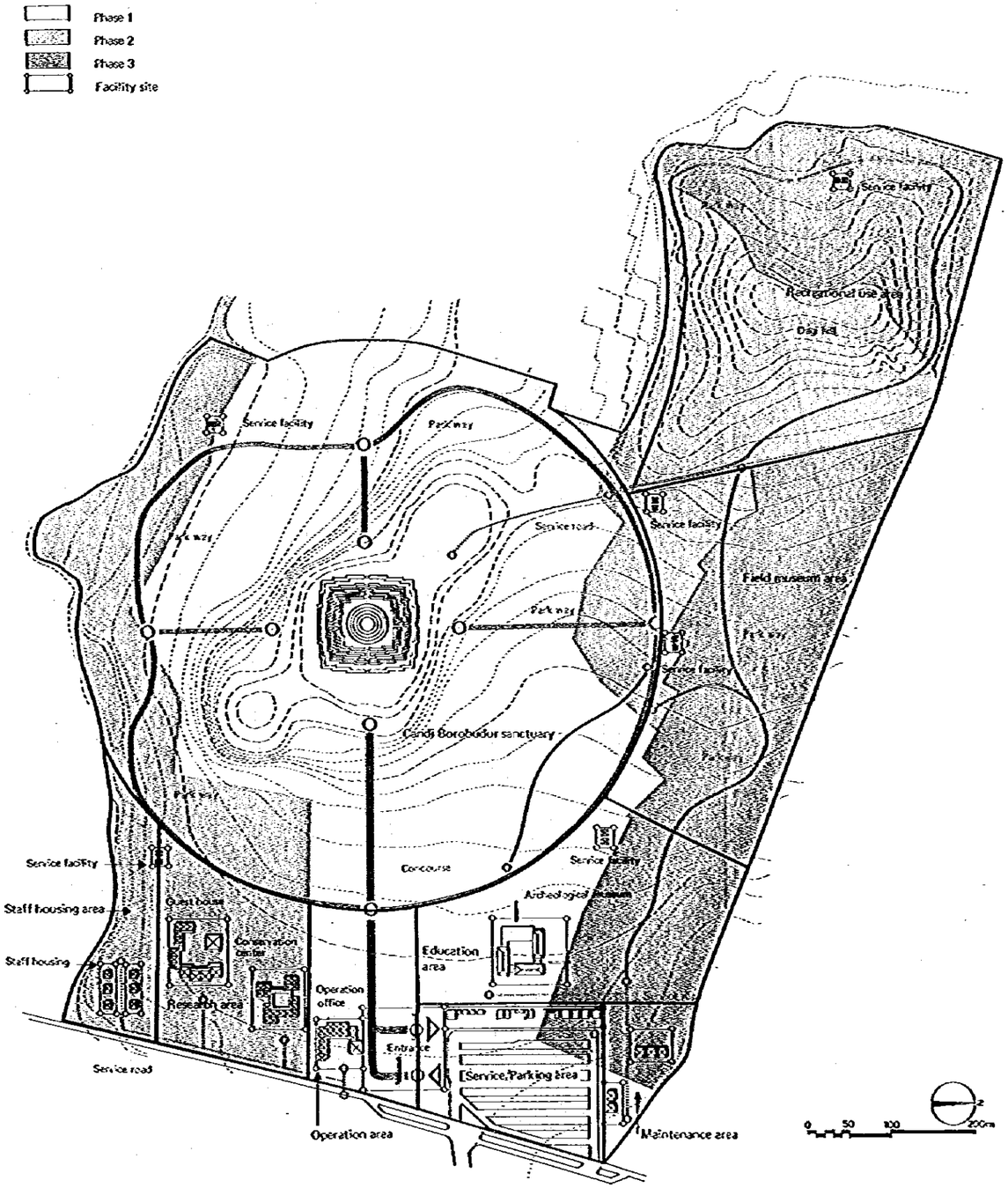
Phase 3 (1989–1993)

The remaining 21.2 ha, set aside from the developme made during the five years' development period betwe 1989–1993. The estimated visitors' capacity at the ti of completion of implementation is 3,600,000 perso yearly, which means 9,800 persons a day on the averag The contents of the development are mainly the equi ment of Field Museum and that of the rear side of t set-aside area of Dagi Hill.

Landuse Scheme of Each Parcel.

	Total area	Open space	Facility site	GFA (PLO)	Planned facilities		Visitor program 18,000 visitors
Maintenance Area This area is developed with workshop for the arrangement, maintenance of each facility, repairment, cleaning or disposal of grabage, etc., and the facilities for workers.	1.0ha (1.1%)	0.8ha (80%)	0.2ha (20%)	600m² (25%)	Maintenance shop	600m²	
Service/Parking Area The parking area covers the total area of 2.2 ha, which admits 121 buses, 201 cars and 8 bus terminals. The souvenir shops currently located around the remains will be moved to this area along the parking area for the visitors' convenience.	3.6ha (4.1%)	3.0ha (83%)	0.6ha (17%)	540m² (9.0%)	Souvenir mall Restaurant	450m² 900m²	Density 10–50m²/P Capacity 2,500
Concourse/Operation Facilities Area It is developed with the operation facilities in the park. The place where the connection with outer parts of the park is the most convenient, is selected for its location.	3.1ha 3.5% of total park area	1.7ha (55%)	1.4ha (45%)	1,200m² (8.6%)	Operation office Entrance Information center	500m² 300m² 400m²	Density 50–100m²/P Capacity 1,000
Research/Area For the purpose of study and education, and to exclude the hustle and bustle from visitors' surroundings, a composed and quiet environment is planned to be made.	4.8ha (5.0%)	3.3ha (75%)	1.1ha (25%)	2,625m² (25%)	Archeological Conservation center Guest house Service facility	1,200m² 1,350m² 75m²	100–150 Students
Staff Housing Area This is planned as the housing for the staff. An independent way from visitors' entrance is sought for a secluded environment.	1.5ha (0.9%)	1.2ha (80%)	0.3ha (20%)	600m² (20%)	Staff housing	600m²	
Education Area (Museum) An area developed with Borobudur Archaeological Museum, which is the thematic facility of this park. It is planned to be located in an area where the connection with other parts of the park is convenient.	7.5ha (8.4%)	6.8ha (90%)	0.8ha (10%)	1,955m² (25%)	Archeological museum Service facility	1,800m² 155m²	Density 50–100m²/P Capacity 2,000 Max. visitor capacity of Archeological museum 600
Field Museum Area As a facility where visitors can learn while taking a walk, it is located in an area where a nice view of Borobudur can be enjoyed and where there is a topographically smooth change.	12.0ha (13.8%)	12.0ha (100%)	0 –	186m² –	Service facilities Field museum presentation	186m²	Density 50–100m²/P Capacity 3,000
Dagi Hill Area (Recreational Use Area) An area where a topographical change is the biggest in the park area is planned as an area for taking a walk.	14.5ha (16.7%)	14.5ha 100%	0 –	156m² –	Service facilities	156m²	Density 100–200m²/P Capacity 1,500
Sanctuary Area This is the smallest area for the protection of Borobudur remains environment. The scale of this area is planned so that the boundary is within the radius of 350 m from the center of the remains taking the area for the protection of surrounding view from Borobudur, protection from noise and in addition, the topographical characteristics, etc., into consideration. Other facilities than those for the arrangement of remains and of the guarding of visitors are not planned in this area.	39.8ha (45.7%)	39.8ha 100%	0 –	180m² –	Guard box Shelter	100m² 80m²	Density 50–100m²/P Capacity 8,000 Max. visitor capacity of Candi Borobudur 500

General Layout Plan



Landuse Scheme : Prambanan Park

Phase 1 (1979–1983)

This means the 27.1 ha which will be rapidly developed aiming at the opening of the park at the completed state of the Pelita III in March 1984. The estimated visitors' capacity is 760,400 persons yearly, which is the average of 2,000 persons per days.

The contents of the development are the implementation of the operation and maintenance facilities, parking area and Pao Pam, a theme facility of the park.

Phase 2 (1984–1988)

This is the 25 ha of the developing area which will be developed during Pelita IV Period succeeding to the opening of the park.

The estimated visitors' capacity at the time of completion of this development is 1,543,000 persons a year, which is 4,200 persons per day on the average.

The contents of the development are the construction of Ramayana Theater at the western coast of Opak River and the implementation of Field Museum. The completion of four sanctuaries inside the park is also planned.

Phase 3 (1989–1993)

This means the area of 24.9 ha planned for the f years' Pelita V period from 1989. The estimated visit capacity at the time of completion of equipmen 2,054,000 persons yearly, which means the averag 5,600 persons per day. The contents of the developm are mainly the development of Field Museum wh connects Candi Sewu, Bubrah, Lumbung Sanctuar the improvement of riverside area for recreational alongside the Opak river and the construction Student Village.

Landuse Scheme of Each Parcel

	Total area	Open space	Facility site	BFA (PLO)	Planned facilities		Visitor program 10,000 visitors	
Service/Parking Area, and Maintenance Area The scale of parking area covers the total space of 1.3 ha., and the vehicles' capacity numbers 68 buses, 113 cars and for 3 bus terminals.	3.0ha (3.9%)	2.4ha (75%)	0.6ha (25%)	1,550m²	Souvenir shop Restaurant Maintenance shop	450m² 600m² 500m²	Density 10–50m²/P Capacity Service/Parking area	1,1
Concourse/Operation Facility Area It is developed with the operation facilities in the park and has the facility for the supply of visitors with information on parks. The place where the connection with outer parts of park is the most convenient, is selected for its location for the smooth operation.	3.4ha (4.4% of total area)	2.0ha (59%)	1.4ha (41%)	1,200m² (9.5%)	Operation office Entrance plaza Information center	500m² 900m² 400m²	Density 50–100m²/P Capacity	6
Research/Education Area Like Borobudur Park, the facility with archaeological office and the museum in Prambanan area, are planned as thematic facilities of this park.	5.1ha (6.6%)	4.1ha (80%)	1.0ha (20%)	2,140m² 20%	Archeological museum Archeological office Guard box Service facilities	900m² 1,000m² 80m² 160m²	Density 50–100m²/P Capacity Max. visitor capacity of mus	1,2 3
Sanctuary Area The third compound of Candi Loro Jonggrang is determined as special historic remains' safeguarding area and the site is guarded.	15.2ha (19.7%)	15.2ha 100%					Density 50–100m²/P Capacity Max. visitor capacity of its compound of Candi	3,0 5
Field Museum Area I This is planned as a facility where visitors can enjoy and learn while taking walks. This area is designed with a full consideration from archaeological and historical point of view.	9.0ha (11.7%)	8.9ha (98%)	0.1ha (2%)	215m² 25%	Service facilities (Kiosk, WC, Shelter)	215m²	Density 50–100m²/P Capacity	1,4
Ramayana Theater Area The Ramayana Theater that currently faces with Candi Loro Jonggrang is planned to move to the place along Opak River against the background of Candi Loro Jonggrang. The location is isolated from other areas so that the people can use the theater even at night.	2.7ha (3.5%)	0.9ha (33%)	1.8ha (66%)	4,500m² 25%	Ramayana theater	4,500m²	Number of seats	2,4
Riverside Area This area is topographically most changeable, and is planned as the area for taking walks alongside the river.	9.5ha (12.3%)	9.4ha (99%)	0.1ha (1%)	290m² 25%	Service facilities (Kiosk, WC, Shelter)	290m²	Density 100– m²/P Capacity	7
Sanctuaries Candi Bobrah, Lumbung and Sewu The above three special remains safeguarding areas are the ones expropriated for the protection of the surrounding environment.	8.6ha (11.2%)	8.6ha 100%			Guard box	80m²	Density 50–100m²/P Capacity	1,4
Field Museum Area 2 This is the area encircling the above three special safeguarding areas and the aim is to guard the three areas and to enhance the value of utilization by visitors. The exhibition of the remains discovered in the Central Java Area is planned.	15.3ha (19.9%)	15.3ha 99%	0.2ha 1%	420m² 21%	Guard box Service facilities	80m² 420m²	100– m²/P	6
Student Village Area The lodging facilities are planned for the students' excursions or study tours. Like Ramayana Theater Area, the location of this area is also isolated from other park areas.	5.2ha (6.8%)	4.2ha (80%)	1.0ha (20%)	1,500m² (15%)	Student village	1,600m²	Number of beds	1

General Layout Plan