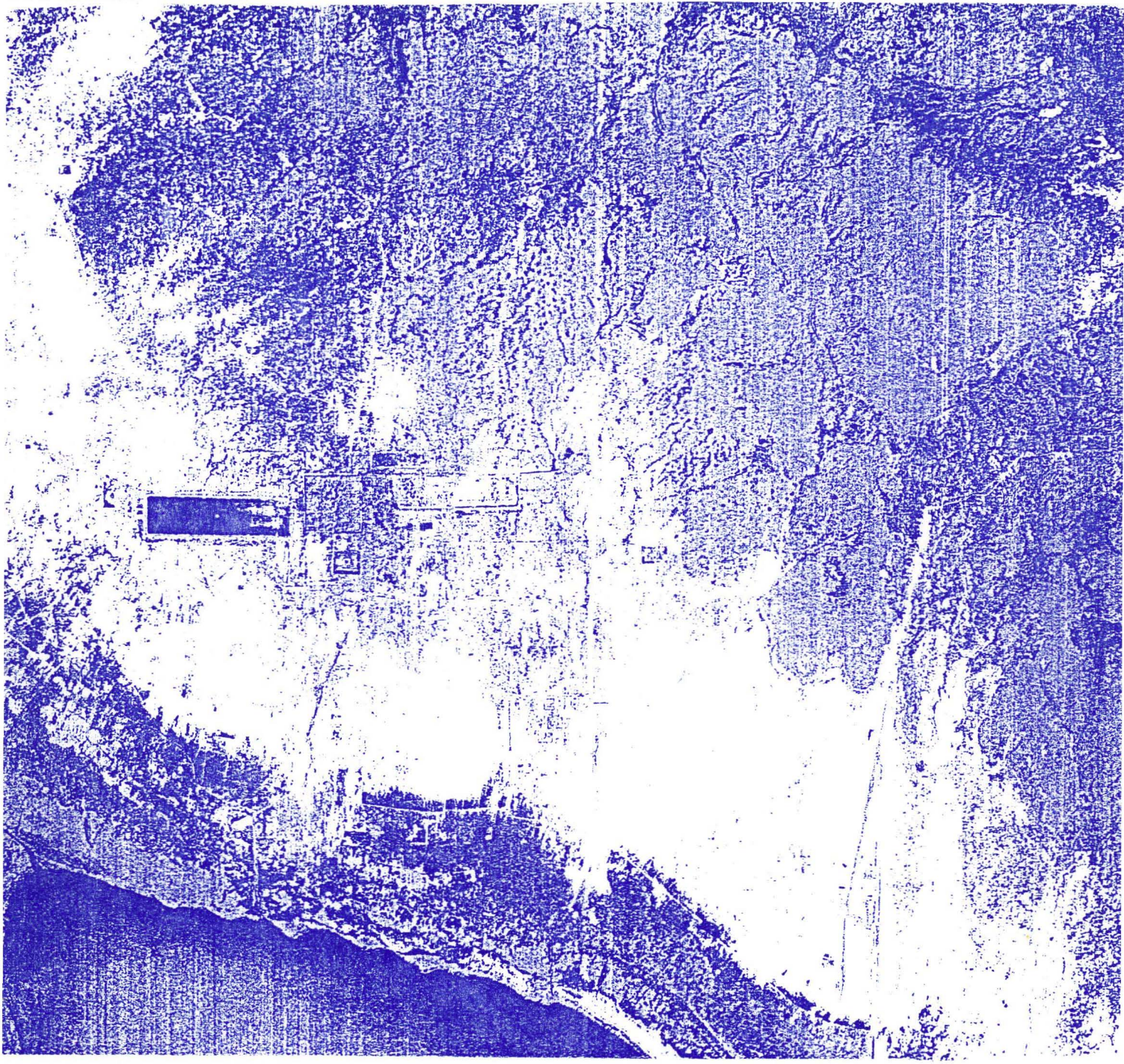

ZONING AND ENVIRONMENTAL MANAGEMENT PLAN FOR ANGKOR

PREPARED BY

ZEMP EXPERT TEAM

DISCUSSION DRAFT

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SEPTEMBER 1993

FOREWORD

This Report is the result of six month's intensive study by a team of experts to assist the Cambodian Authorities to plan and develop the future of Angkor. Present day Cambodians are inheritors of a material cultural heritage among the most outstanding in the world. Conservation of the sites is being given a high priority by the new Authorities and they deserve a high level of support from the international Community.

The wonders of Angkor have been known to the world for more than a century. For the fifty years before 1970 Angkor was an important tourist destination of the time. Ancient Khmer art and architecture are studied by leading international scholars from many countries and Angkor provides a major focus for the history of the region. As Cambodia reestablishes its place in the world, the legacy of Angkor as the capital cities of the Khmer Empire becomes once again accessible to researchers and visitors.

Over the next few years Angkor will again become a major attraction to both Cambodians and international travellers. It is a valuable national asset that must be properly understood in order that appropriate decisions are made about the conservation and protection of the sites. The costs of misuse and mismanagement are high, while the long term economic benefits from sustainable planned development can be large. The importance of finding the right solutions at Angkor is recognized and reflected in the concern of all political parties for there to be a firm legal framework and plan to control and manage development in and around the Angkor area.

This report of the Zoning and Environmental Management Plan (ZEMP) Project provides such a plan. The recommendations have been prepared to provide a basis for action by all levels of government, the international donor community and by the people who live around or visit Angkor.

Jonathan Wager ZEMP TEAM Leader/ Richard Engelhardt UNESCO Representative in Cambodia.

Cover is taken from a Landsat Image of the Angkor Region, by kind permission of the National Research Council of Thailand.

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ACRONYMS

SNC	Supreme National Council
NHPAC	National Heritage Protection Authority for Cambodia
ZEMP	Zoning and Environmental Management Plan
AP	Angkor Parks
ACR	Angkor Cultural Reserve
AAP	Angkor Archaeological Park
PKP	Phnom Kulen Park
RA	Restricted Area
SAACs	Special Areas of Archaeological Concern
PCH	Protection of Cultural Heritage
ACO	Angkor Conservation Office
TDC	Tourism Development Corporation
ASIAN	Association of South East Asian Nations
JIMA	Japanese International Cooperation Agency
NGO	Non Governmental Organizations
UNTAC	United Nations Transitional Authority for Cambodia
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
IUCN	World Conservation Union
SIDA	Swedish International Development Agency
WTO	World Tourism Organization
USA	United States of America

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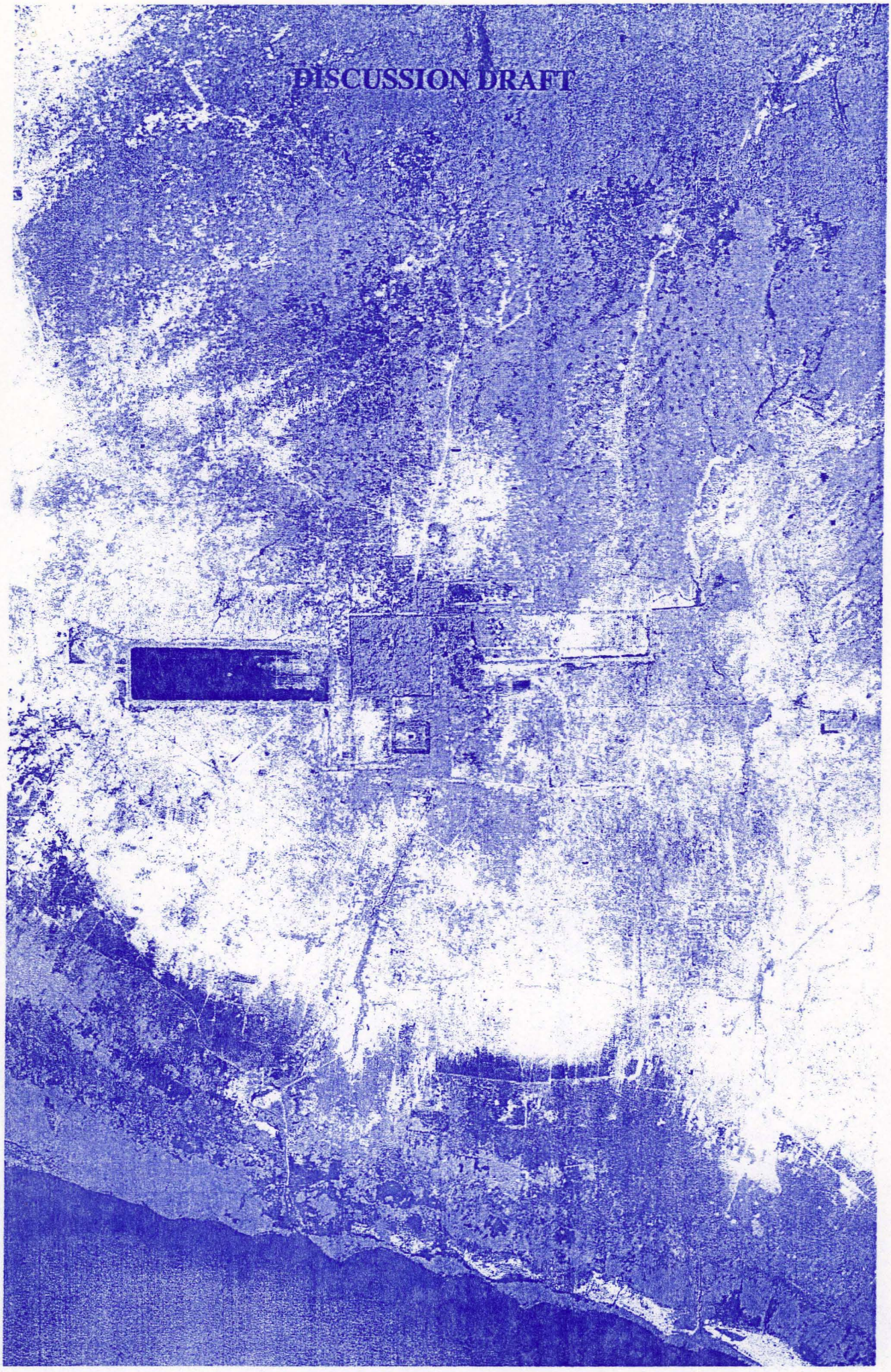

THE ANGKOR REGION

[From a Landsat Image]

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I BACKGROUND

PURPOSE AND STRUCTURE OF REPORT

The purpose of the project is to produce an integrated Zoning and Environmental Management Plan (ZEMP) for the Angkor region. Zones are needed to give protection to the cultural and natural resources while encouraging appropriate development. The report develops policies for the protection of archaeological sites and natural areas, the development of balanced tourism and ecologically sustainable agriculture and forestry activities. It considers the establishment of parks and improvements to the economy and quality of life for the people of the region while preserving an important national symbol of outstanding world significance.

The first part of the report (Chapters I - IV), develops the archaeological, environmental and social context of Angkor, which lays the groundwork of the analysis for ZEMP. The second part (Chapters V -X), presents the Zoning Plan itself and focuses on policies, zones, frameworks for authorities and regulations and a number of immediate projects needed to implement the Plan.

UNESCO's INVOLVEMENT IN SAVING ANGKOR

Present efforts towards political stability have led to a more peaceful, constructive period for Cambodians and have provided opportunities to revitalize international efforts focused on conserving Angkor, recognizing it as one of the world's greatest cultural achievements.

In 1989, the four major Cambodian parties collectively requested that UNESCO coordinate international assistance to protect the Angkor monuments. Since that time a number of countries have supported a programme to provide safeguarding and preservation assistance. UNESCO convened two international round table meetings of experts, Bangkok (1990), Paris (1991) and an expert International Consultative Committee meeting on Angkor in Siem Reap (March 1993), which led to a series of recommendations for efforts to protect Angkor. These were followed by a donor's conference on Angkor in Tokyo in October 1993. The diverse international interest underscores the need for a strong national co-ordinating mechanism and the importance of a basic strategy for management of the entire area of Angkor.

UNESCO's first task has been to assist the Supreme National Council and the statutes to establish a National Heritage Protection Authority of Cambodia (NHPAC), which were adopted in February 1993. ZEMP is the second task and fits into the statutory framework already agreed. The project initiated by UNESCO, is financed by UNDP and the Swedish International Development Agency (SIDA) with in-kind contributions of technical assistance and equipment from the Angkor Foundation of Hungary, the World Conservation Union (IUCN), Ecole Francaise d'Extreme Orient, United States National Park Service, and the Thai Fine Arts Department.

WORLD HERITAGE STATUS FOR ANGKOR

In recognition of the international significance of the Angkor monuments and associated archaeological features as representations of the great Khmer civilization, the Supreme National Council of Cambodia ratified the World Heritage Convention in 1991 and submitted the "Angkor Archaeological Park" for inscription on the World Heritage List in 1992 on the basis of the following reasons:

(i) it represents a unique artistic achievement, a masterpiece of creative genius;

(ii) it has exerted great influence over a span of time, within a cultural area of the world, on developments in architecture, monumental arts, and landscaping;

(iii) it bears a unique exceptional testimony to a civilisation which has disappeared; and

(iv) it is an outstanding example of an architectural ensemble which illustrates a significant stage in history.

The Angkor group and the neighbouring monuments which were listed exactly match the criteria defined in (i) above. This group is unique in its dimensions and its originality, and it is important to note that its value derives not only from the beauty of its monuments, but also from the achievements in civil engineering, especially hydraulic, which it contains. One can find here remains of the Seventh century and above all the numerous vestiges of the different capitals of the Khmer Empire between the Ninth and the Fifteenth century, which were all established here, except for during short periods. This means that one can follow almost throughout its history the development of Khmer religious architecture, which was to exert considerable influence on Thai art. It should finally be noted that all that is known of Khmer civil architecture is what is revealed by the bas-reliefs of these. monuments.

The area contains the largest body of temples which bear witness to the cultural greatness of the Khmer Empire. The originality of the hydraulic system of Angkor is incontestable and is an integral part of the religious landscape. The remarkable arrangement of space marked out by the canals fed by the monumental barays, would alone merit consideration for listing as a world heritage site. The temple of Angkor Wat is representative of the degree of perfection attained by Khmer architects and fully deserving of its universal fame. It does not however represent the full genius of the Khmer for the later temple of Bayon with its many figured towers and bas-reliefs, and the earlier mountain temples also show the evolution of architectural techniques and decoration. Moreover Angkor contains many religious sanctuaries spread over hundreds of square kilometres and achievements in urbanisation are no less remarkable as evidence of the extent and complexity of the ancient civilisation.

On this basis the World Heritage Committee accepted the proposal to inscribe the area of Angkor on the World Cultural Heritage List in December 1992. However recognising the enormous conservation problems facing the site, the Committee made the listing conditional upon preparing and implementing a legal framework, a management plan and establishing an authority with resources to effectively manage the entire Angkor area.

The concept of world heritage is based on the recognition that parties to the convention share responsibility for protection of sites of international value. The Convention expresses the view that the whole of humanity must act as trustee for the great landmarks of the natural and cultural history of the world; that each country may hold a part of its own territory in trust for future generations; and that each country has an obligation to support other countries in discharging this trust. Hence the involvement of the international community through UNESCO, working with Cambodia's national interest, is vital for the implementation of a long-term conservation programme.

ANGKOR UNDER THREAT

Although maintenance and some restoration has taken place on the temples since the beginning of this century, the recent gap of fifteen years has caused renewed destruction by the erosive forces of nature and man. The monuments are under threat from monsoon rains, the growth of vegetation and the changes in the water table effecting stability of structures. The potential impact of development from expansion of agriculture and increased harvesting of wood products; from the aspirations of thousands of visitors to see and clamber over the ruins and from urbanisation particularly from developers who seek to provide for and profit by the tourist, all impinge on the archaeology and the environment.

PLANNING ISSUES

The Angkor monuments are one of the world's great achievements and therefore hold great attraction for tourists. Tourism development is a two edged sword. While it can stimulate socio-economic opportunities, it can quickly degrade the archaeological monuments, natural resources and the cultural fabric of the local community if the development process is unplanned and unregulated.

The issues are how to manage and balance both touristic interests and archaeological research and restoration needs with the socio-economic needs of the Cambodian people. Although the political situation is more stable than since the 1970s, basic survival needs such as infrastructure, nutrition, literacy, land distribution, food and energy production are still inadequate as a result of the extreme degradation suffered by the people and the landscape.

As Cambodia's population grows there will be increasing pressure on agriculture, forestry and fisheries to increase production and utilize more land, adding to the already existing problem of population settlement around the monuments.

Ironically, it is the very beauty and uniqueness of Angkor's architectural features which have today created a strong demand in the international art market for artifacts, including statues, pieces of walls and carvings. The "robbing" of Angkor is destroying not only the physical character of the temples, but also depriving Cambodians of the chance to witness and benefit from the richness of their own heritage.

Although an Angkor Archaeological Park was established in 1925 as the first national park in South East Asia, the recent inadequacy of laws to protect cultural property and lack of a

management authority capable of controlling activities in the area, has lead to the need for reinvigorated institutions able to resolve conservation and development activities over a wide area.

Tourism which can be a vital force for the protection and maintenance of the temples and water features by raising awareness and providing funds, can also be the cause of erosion loss of character and demands for facilities which change or destroy sites. Tourism needs to be planned and controlled in a manner which establishes carrying capacity limits, proper guide services and interpretive exhibits as well as appropriate siting of access roads and facilities. Unsustainable types of speculative tourist development could primarily enrich a small number of foreign investors who would take the profits out of the country and exclude the majority of the people of Cambodia from receiving the full economic benefits which are needed.

Urbanisation will take place at a rapid rate around Siem Reap. This will impinge on the archaeological park and will bring about damaging changes to the environment which need to be directed and controlled.

Therefore, the development of the Angkor area must be conducted from an approach to strategic zoning and phasing that supports sustainable tourism, agriculture and forestry. The aim is to protect Angkor's cultural and natural resources and ensure the necessary equitable distribution of benefits amongst Cambodian people.

OBJECTIVES OF ZEMP:

The broad objectives of ZEMP are:

- To contribute to the socio-economic development of the country, reinforcing the potential for the development of tourism and the exploitation of renewable natural resources through the preservation of the historical monuments and archaeological material culture of the world-renown site of Angkor together with its surrounding natural environments.

- To formulate a long-term framework for sustainable and environmentally sound use of the archaeological sites and natural resources (water, land, fauna and flora) of the Angkor Region by delimiting areas as zones requiring different levels of protection and active management to meet the needs of the local people for agriculture, forestry and tourism development.

Specific objectives are:

- To identify archaeological areas including the ancient hydrological systems in need of protection and management.

- To identify natural areas for wildlife conservation.

- To determine appropriate tourist development.

- To assess the potential of agriculture, irrigation, forestry and settlement activities and impacts in relation to the conservation of archaeological sites and natural areas and the management of touristic activities.

- To develop a legal framework and institutional arrangements to manage protected areas and to ensure that guidelines are followed in the zones surrounding the conservation areas.

- To establish an authority to manage the Angkor Archaeological Park and implement conservation and development policies in the surrounding areas.

- To recommend the permanent boundaries of the site inscribed and to be managed as the World Heritage Site.

- To propose projects to build institutions, train personnel, prepare detailed plans and feasibility studies, develop infrastructure, and implement the provisions of the plan.

ZEMP PROCESS

The ZEMP team was a multi-disciplinary group of 25 experts from 11 different countries led by Dr Jonathan Wager (UK). Experts from the fields of resource mapping, GIS and data management, prehistoric and Khmer history and archaeology, architectural conservation, hydrology, ecology and wildlife conservation, agronomy, forestry and rural development, social-anthropology, tourism development, urban and transport planning, park planning and administration and legal and regulatory frameworks, worked over a period of six months with Cambodian technical counterparts from the Ministry of Culture, Department of Forestry and Wildlife, Siem Reap Provincial Authority and the Angkor Conservation Office.

The ZEMP process built on the long tradition of preservation of Angkor and assembled new information and introduced new ideas on the management of protected areas. A **study area** was established, which covers approximately 5000 km², between the northern latitudes 13°04 - 13°45 and the eastern longitudes 103°35 - 104°15, including Phnom Kulen and Siem Reap Town. The study area is shown in Plan 1. This is the area with the highest known density of important archaeological sites and also features substantial areas of critical ecological habitats.

The experts made their evaluation of land use, vegetation, hydrological features, archaeological sites, population, settlements and infrastructure using interpretation of aerial photographs and landsat satellite imagery, field base survey and bibliographic research. The data was incorporated into a Geographical Information System establish for Angkor. Experts participated in a three week workshop to generate alternative zoning strategies and to develop the zoning plan. The team was able to evaluate different cultural, natural and socio-economic resource needs and opportunities throughout the area using the GIS resulting in the integrated and holistic zoning strategies proposed for ZEMP. The reports of individual expert's have been used in the preparation of the plan and the present report.

GEOGRAPHICAL INFORMATION SYSTEM

The data collection and synthesis stages in the project were designed around the use of a Geographic Information System (GIS). A GIS is a computerized data base able to store and analyse a mass of information. The system used is Intergraph and D-BASE III which was customised for the Angkor project. Data from each of the surveys accept social-anthropology and tourism development (which were not in an appropriate form), were digitised into the Angkor GIS.

The base topographical data was taken from the 1:50,000 national topographic maps (1968) for the area. Land use and infrastructure information was derived from 1:25,000 recent stereo-aerial photographs which were available from the Land Use Mapping Office (LUMO) for about 70% of the area and from Landsat imagery at 1:100,000 available through the Mekong Secretariat. The infrastructure data was used to update the topographic information on the base maps. The land use data provide a basis for forestry and agricultural evaluations. The settlement study involved an estimate of population derived from the numbers of houses which could be compared with population data from UNTAC, and also provided other data on village facilities.

The survey of vegetation was based on land use maps and the satellite image with selective ground survey. Values for vegetation and wild life conservation potential were derived and added to the data in the system. Archaeological data was obtained from interpretation of aerial photographs and by reference to earlier inventories and some ground truthing. Information on individual sites and assessments of archaeological and touristic values were added to the GIS. A description and analysis of the ancient and modern hydrological conditions was made by the experts and forms an important component of the GIS.

The mapped information was digitised and other data added as dialogue boxes. The system contains a mass of data held in different levels. The various layers were overlaid to analyze the interaction of influences of one feature on another and to both explain and help generate models for zones.

The use of the GIS in the analysis was ambitious and greatly assisted in the presentation of maps depicting values for archaeology and ecology and to relate these to the density of population and other factors within the study area. Some of the detailed land use data is too precise to be useful at the level of a zoning plan. But this will be valuable at the stage of detailed management planning. The GIS is also a valuable tool for research and also for monitoring changes taking place in the study area. It is essential that the system be maintained and made available for future studies in the Angkor area. It would also be useful if it is linked to other data bases in the country which will enable information to be shared for the development and management of cultural and natural resources.

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ARCHAEOLOGICAL HERITAGE

INTRODUCTION

The famous temples of Angkor were mainly built between the ninth and thirteenth centuries. During this period the Khmer civilisation was at the height of its extraordinary creativity. The constructions of the Khmer empire constitute one of humankind's most magnificent architectural achievements. At its height the kings ruled from Angkor over a vast territory that extended from the tip of what is now southern Vietnam northward to south Laos and from Vietnam westward to Burma. Angkor's many temples constitute the sacred skeleton of a spectacular administrative and religious centre: houses and public buildings and palaces were constructed of wood and have long since decayed. Temples were built of brick and stone which lent permanency to the houses of the gods.

Many detailed studies have been published about Angkor, particularly the temples, since 1863. Many have focused on the architecture but some on the historic, symbolic and religious aspects. Nearly all of the research was carried out and published by the Ecole francaise d'Extreme Orient since 1898.

From these, we know that Angkor, a word meaning "the capital", is a series of at least seven cities built by a succession of Khmer kings between the 9th and 13th centuries, covering the Angkor floodplain and water catchment basin between the Kulen Mountains to the north and the Tonle Sap to the south. The whole area is approximately 5000 square kilometres of which the capital cities occupy some 300 sq km. Today one can observe throughout Siem Reap province the splendid monuments built to the gods. Each temple marked the centre of a provincial capital. Each centre also incorporates elaborate water-based structures: moats, barays and dykes. These structures were related both architecturally and spiritually with the temples. The primary purpose of the baray was to irrigate extensive areas for the production of rice.

Much current understanding of Angkorian culture focuses on 9th-13th centuries AD. However the formation of that culture began much earlier, in the prehistoric, products of stone tool makers and bronze casters. Evidence of pre-historic and continuing habitation through the pre-Angkorean period, have been found under structures of the Angkor era, many of which, were built on top of ancient ritual or habitation mounds.

The monuments and temples of the Angkor period were built for the Gods, and served as places of worship. The kings lived in elaborate wooden palaces, but no evidence of these or other aspects of daily life exists above ground. This is particularly noticeable within the urban area of Angkor. In addition it is now thought that habitation mounds scattered throughout the Siem Reap plain contain evidence of subsistence agriculture which not only supported the historical kingdoms but may provide insight into prehistoric and pre-angkorian origins of the Khmer civilization.

A Khmer capital had some standard elements. At its centre was a state temple. Palaces were normally built to the north of the state temple, but they have disappeared with all the other buildings and houses of the dignitaries that filled the area within the city boundary dikes and moat. The capital was a square enclosure of variable length, orientated to the points of the compass. At first a simple earthen levee surrounded by a moat (from which material for the dike was dug), surrounded the city. There were four gateways on the axis of the state temple and at least a fifth opening to the east of the royal palace. Demand for space for urbanisation led to the disappearance (at least of visual evidence) of many of the lesser temples and buildings.

Another important element was the baray. These large reservoirs were constructed to store irrigation water and to supply the water needs of the people. They may have had a symbolic and religious value and must have had a vital place in the life of the community.

The construction of the monuments and the barays required large labour-intensive populations and rigorous centralized control that resulted in a succession of kings, each illustrating their power through building new temples to establish their territorial claims and control the populations from revolt. It is traditionally thought that "Angkor" as a civilization died when the Khmer kings finally abandoned the area to Siamese armies in 1431. Yet Khmer traditions were kept alive by the Buddhist monks who continued to reside and maintain the Hindu temple of Angkor Wat.

During the 16th century Angkor Wat was restored by the king of that period and Spanish and Portuguese adventurers, who visited the monuments and temples, provided some references in their writings. Japanese pilgrims, at the beginning of the 17th century, left inscriptions in Angkor Wat and prepared a plan of the temple. Yet it was not until the mid-19th century when French explorers re-discovered Angkor that the world at large was made aware of these impressive structures.

ZEMP ARCHAEOLOGICAL SURVEY

During the ZEMP study a total of over 1,000 archaeological features were identified from both existing records and new studies, using aerial photography, satellite imagery, ground and helicopter field surveys. Aerial photography was used to detect temples, dikes, moats, roads and habitation mounds. This was followed by ground truthing in accessible areas. However, further work is still necessary to confirm, survey and record the archaeology of the area.

Archaeological Sites and Areas are shown on Plan 1. Archaeological values were placed by the ZEMP team on many of these sites in relation to their importance for research and to the interpretation and protection of the Khmer heritage. Plan 2 presents as a value 'surface', archaeological values over the study area. These are also represented in another form in Plan 3 in which the peaks are areas with highest archaeological value.

KHMER HISTORY

For many centuries the Khmer land was split into many small kingdoms often in dispute with each other. One such kingdom in the second half of the 7th century, led by Jayavarman I probably chose, as its capital a town located in the area under what is now the western Baray. This has been identified by some pre-Angkorian remains. In 802 AD King Jayavarman II having conquered several other Khmer kingdoms, was crowned the "king of Khmer kings" on Phnom Kulen, 40 km north of present Angkor. This marks the beginning of the "Angkor period". Several temples were built, although it was the royal consecration that is considered the most significant in the founding of the kingdom. Jayavarman II next came down from the hills to settle at an ancient town near present day Roluos. In 880 AD a successor Indravarman I built Prah Ko and then constructed the Bakong as his state temple. He also constructed to the north of this city, a baray (Lolei) measuring 3 km by 0.8 km. From rivalry between his sons, Yasovarman emerged to establish a new capital around Phnom Bakheng. This is the first known state temple at Angkor. The state temple was on the hill at the centre of a 16 km long square enclosure, some of which remains. He also laid out the Eastern Baray (7.5km by 1.8km), and other monuments including the temples on Phnom Krom and Phnom Bok. These three hills could have defined the area at the centre of the Kingdom.

Some years later, following two lesser kings, the capital of the 'king of kings' was moved from Angkor to Koh Ker the capital of Jayavarman IV, 60 Km north east of Angkor. Monumental remains at Koh Ker include an imposing state temple and a baray, and at least 30 lesser temples built by nobles. All this occurred within about 30 years. By 944 AD Rajendravarman, King of Bhavapura in central Cambodia (near present day Kampong Thom), took power and returned to the more productive landscape of Angkor. He established his state temple, palace and city around Pre Rup.

During his reign, his architect built the small baray of Sras Srang and several other works, and his leading advisor built Banteay Srei, often described as the "jewel of Khmer art", 20 km north of Angkor.

His son, Jayavarman V, abandoned the site of Pre Rup on the assassination of his father, and established a third capital around his state temple, Ta Keo which he consecrated in 1000 AD. During the next decade, two kings competed for the throne. By 1010 AD Ta Keo ceased to be the capital and the winner, Suryavarman I, built his palace and state temple, the Phimeanakas, thereby creating the fourth capital at Angkor. He also constructed the Western Baray, a much larger structure than the East Baray. His son built the Baphuon about 1050 AD. Following a change in dynasty, a later ruler, Suryavarman II, took the throne in 1113 and commenced building Angkor Wat as the centre of his capital. This temple is to the Hindu god Vishnu and faces west. Banteay Samre, and Beng Mealea 30 km east were built at about this time. The later has a plan similar to that of Angkor Wat and nearly as large.

Further struggles between kings meant that there was no major new building until Jayavarman VII took power and started to change the landscape of Angkor with his new capital Angkor Thom and at the centre a new state temple, the Bayon (1182 AD). The principal divinity of the Bayon was the Buddha marking a change from the hindu dedication of most of the other temples. Within the walls and moats of the town, he renewed the royal palace and laid out the Elephant and Leper King Terraces. He also built the Ta Prohm and Preah Khan. By the time of his death at the beginning of the 13th century, he had created the physical form of Angkor, which his successors seem not to have greatly modified. Mahayana Buddhism was replaced by Shivaism, but soon thereafter, the Khmers abandoned Mahayana Buddhism and adopted Theravada Buddhism, which is still the faith of Cambodia to day. Contrary to what is often asserted, the splendours of Angkor lived on and were noted by the Chinese Zhou Daguan at the end of the 13th century. However, the period of stone temple building was over. The extent of the Khmer Empire at its height is shown on Diagram 1 and the main Khmer sites in Cambodia are shown on Diagram 2.

EARLY HABITATION ON THE ANGKOR PLAIN

The major Angkor archaeological sites are scattered through the northern slopes of the Tonle Sap drainage basin which is bounded in the north by the Phnom Khulen mountain plateau and in the South by the Tonle Sap lake. The plateau (north of the Angkor complex) is the catchment area of the Siem Reap river. This river provides the major source of water for the ancient city, as well as for the present town of Siem reap and its immediate surroundings. The distribution of ancient sites suggests that this zone, the floodplain/terrace interface between the Kulen mountains and Tonle Sap lake shore, was highly favourable for human habitation.

DIAGRAM 1

NOT TO SCALE

● ▲ **KHMER EMPIRE**

[from Groslier. B. P. Encyclopedie d'Archacologie]

DIAGRAM 2

NOT TO SCALE

MAIN KHMER SITES IN CAMBODIA

[from George Coedes, The Indonesian States of South East Asia, 1968]

The earliest habitation dates of the Angkor plain are unknown although investigations of pre-historic settlement has been carried out in other regions of Cambodia. For example, middle Mekong River sites have revealed pottery and bronze. Laang Spean cave in Battambang has been radiocarbon dated from 4290 BC to 830 AD, and yielded a stratigraphy which consisted of pottery and stone tools. Bernard-Philippe Groslier, a long time conservator of Angkor, reported clues of prehistoric occupation in the central Angkor area. These included pottery finds and a large dwelling site of the Bronze Age that may date back to the first millennium BC. However, no systematic excavations took place, and Groslier did not publish his preliminary findings.

Analysis of aerial and satellite imagery of the Angkor area shows 68 elevated circular mounds with associated earthworks and moats. These are further indicators of the density of prehistoric habitation of the Angkor plain.

The shape of these habitation mounds is defined by vegetation encouraged by the mound's slightly elevated position above the floodplain. Generally the habitation mounds appear circular, but there is no standard form. Each has a unique shape and in some cases, remnants of encircling earthworks. The mounds are naturally occurring elevations which have been formed over time, by down cutting and diversion of rivers, as well as aeolian action.

Field surveys by ZEMP of some of the prehistoric mounds yielded stone tools as well as earthenware shards. The stone tools have a variety of shapes including: elongated rounded points with triangular section, rounded pebble type tools, rounded tools of an adze/axe type, and pointed tools of an adze/axe type. The density of sites and the amount of undisturbed material makes the study of pre-historic Angkor particularly important. This is particularly the case to the west of Angkor, where the projected population by 2000 AD poses a sever threat to the archaeological record.

Within the ZEMP study area the distribution of the habitation mounds extends from Stung Roluos in the east to the Stung Puok valley in the west. The spread reaches to the O Liep river to the north and in a few cases, slightly south of Route 6 to the south. Mound sites were field surveyed (in 1992 for ZEMP) along the Stung Puok (Stung Praveuy), the Stung Siem Reap, the O Spean Kaek (Dek), and the Stung Roluos.

The distribution outside the ZEMP study area does not appear to extend much further south, but goes substantially farther west and north into the Mun River Valley in Thailand. Mounds here are also located on the floodplain and terraces of the north-south stream valleys, showing similarities of human occupation and locational distribution between the Angkor Plain and the Mun River valley. However many differences are present, as the Mun mounds are at elevations over 100 metres, wile at Angkor most moated mounds are at elevations of about 12 metres. This has strongly influenced the development of multiple moats and

earthworks. The same technique of natural pooling around the perimeter of elevated mounds links the Mun River settlements with those at Angkor.

Further study of prehistoric conditions on the Angkor area will need to look at water management, and how it was adapted in the subsequent angular and rectangular water management methods of 9th-13th century Angkor, where the large barays and dykes were complementary features for flood control and water storage in times of drought.

KHMER SITES AND MONUMENTS

Angkor is best known for its temples. These monuments demonstrate levels of artistic quality and design that could only be achieved by a complex and technologically sophisticated civilisation. Although the temples are the most visible, the numerous traces of earthworks and regional infrastructure of roads, dikes, bridges-dams, canals and reservoirs, create an historical record of great complexity. These features provide only the skeleton of Angkor, since domestic structures have perished and only with careful archaeological excavation can these features be recreated.

Of the 900 Khmer features that were recorded in the archaeological survey, some 300 are temples and 300 others could indicate the site of temple structures. The density and quality of these archaeological features marks Angkor out as being of exceptional significance in the region.

Khmer temples were designed to idealize the Hindu cosmology of gods living in the Meru mountain containing different worlds (enclosures), seas (moats or ponds), and levels of the mountain in the form of terraces, false stores. Temples can also be in the form of a square shrine, strictly orientated, and depending upon size and importance, having built around it a series of secondary shrines, walls, galleries, moats and ponds in a geometric pattern. The use of brick and stone in ancient times was restricted to these divine constructions.

Temples are therefore of two distinct types, pyramidal and horizontal. Pyramidal temples were built on an artificial mound (except for Bakheng which shaped an existing hill) and are thought to represent the symbolic centre of the kingdom. Horizontal temples are built around an axis and have a concentric organisation. Occasionally, as at Phnom Krom and Phnom Bok, this form of temple is elevated on a hill top.

Temples are composed of elements from a very strict architectural vocabulary consisting of tower, linear or crossed vaulted building, wall, terrace, moat and basin. From these elements endless combinations have been created which give Angkor a monumental richness by the uniformity of design and diversity of solutions. This makes it a rich field of study.

From the first and largest capital at Angkor around Phnom Bakheng to the last Angkor Thom, abandoned in the middle of the 15th century, our knowledge of the cities is rather poor. This is because attention has been focused especially on temples, and not on towns. "Angkor" means town not temple, and every temple was the centre of a community. Even for Angkor Thom, we only know the principle avenues starting from the Bayon. We have little knowledge of the streets and squares and canals or the location of the houses, although the Portuguese reported at the end of the 16th century, two canals, one on each side of the avenues in Angkor Thom. If reconstructed, these canals would considerably improve the approach to the Bayon.

These cities depended upon food drawn principally from the north, where aerial photos clearly show many fossilized rice fields. Beyond Angkor the ruins of other capital cities and towns of the Empire are found at Phnom Kulen, Koh Ker, Beng Mealea and Preah Khan. There are also important temple sites at Banteay Chmar and Prah Vihear near the Thailand border, so that there is in all a cultural zone of great extent and importance to the history of the region. As mentioned earlier, this historical cultural zone is 'previewed' in the distribution of prehistoric habitation sites within northern Cambodia and north east Thailand.

ANCIENT WATER FEATURES

It is probable that there was a diversity of hydrological structures already in place before the empire emerged, which reduced reliance on seasonal water regimes. These would have been extended and enlarged during the development of the sequence of cities.

The Tonle Sap is the dominant water feature in the Angkor Plain and plays a major role in population distribution and settlement patterns with regard to water transport, annual flooding and fisheries.

The character and potential of the rivers and streams used to create the "hydraulic city" of Angkor would have been known to the local inhabitants for many generations. While water control increased immensely, the nature of water sources remained constant and the evolution was incremental rather than radical as methods expanded in response to increased expectations and technical capacity.

The uniqueness of Angkor's water features strongly suggest that a highly sophisticated identification with ancestral spirits and water prompted and sustained the repeated construction of water related structures. Separating religion and daily life is inappropriate to understanding ancient Khmer culture, so it is not adequate to assign a single functions to hydrological elements. Harmony between elements in ancient Khmer cities was not static. It centred on continual acts to constantly renew the living presence of ancestors and the spirits. Thus it may be called an 'ancestral' rather than chronological concept of time

which sustained some seven hundred years of water management constructions at Angkor.

Ancient water features consist of barays, canals, dikes and moats. The barays provided domestic and agricultural water, as well as plant and animal food. Canals channelled water as well as being avenues of transport. The dikes were both water control levees and roads and the moats could serve as sacred boundaries and further sources of domestic water and food.

Moats are found surrounding temples, monuments and inhabited areas. They may have fulfilled several functions, such as to provide fill for foundations and raising the level of the terrain for drainage and protection, and as a source of water. Many of the larger moats were fed by canals. Embankments were usually east to west in orientation, across the prevailing contours and would have been used for flood control. Access to domestic water was provided from tanks or basins dug into the water table.

Evidence suggests that it was possible for all the large barays to have been used throughout the Angkor period. Important dikes and roads offer further evidence of the continued utilisation of the Lolei, East Baray, Sras Srang, West Baray and North Baray.

The water-based structures of Angkor relate to the rivers in the area. The most important permanent streams to support the barays and moats were the Stung Siem Reap (which was diverted during the Angkor period to supply the West Baray, the North Baray and the moats of Angkor Thom and Angkor Wat), and the Stung Roluos which supplied the East Baray and Lolei. The present course of the Siem Reap river was shaped during the 16th century.

In spite of the deterioration and abandonment of the ancient features, many have the potential to be revitalized today but only after full archaeological investigations. The East Baray and Lolei should not be refilled, nor should the water level in the West Baray be raised without extensive restoration work to the dikes, and this could affect the villages on them. Even the North Baray, which is the best preserved, would need restoration work before being recommissioned. The moats around the temples are no longer filled with water, and vegetation and sedimentation needs clearing. These are issues that need to be addressed in a plan for conservation of the archaeology of Angkor.

HISTORY OF ARCHAEOLOGICAL PRESERVATION AT ANGKOR

Stimulated by the 19th century re-discovery of Angkor and the deterioration resulting from the sites being exposed to the harsh effects of the environment for centuries, the Ecole Francaise d'Extreme Orient (EFEO) began work in the area in the early 1900's. EFEO set out to document and restore the ruined monuments and expand the knowledge of Cambodia's cultural heritage. During this time "Angkor" was brought to life through museums, libraries and art schools, encouraging the expression of Khmer heritage though fine arts, oral traditions, dance,

literature and crafts. These activities continued through to the 1960s, and a greater understanding of the Angkor empire was acquired through academic studies, and by international scholars initiating the training of Cambodian scholars.

From 1908 to 1972, on-site maintenance and restoration work was conducted by the *Conservation d'Angkor*, referred to in this report as the Angkor Conservation Office (ACO). They adopted a policy for forest protection and management in 1911, which dealt with maintenance, afforestation and the opening of access roads and the clearing of vegetation around each monument. In 1925 a central area was officially designated as the Angkor Historic Park, and it was managed as such until the war in the 1970s.

Key periods of activity include:

* Beginning in 1898 and more particularly from 1908 with the arrival of the EFEO, there was clearing and emergency consolidation works at Angkor Wat, around the Bayon, the Royal Terraces Angkor Thom, Preah Khan and Ta Prohm.

* Between 1931 and 1955 numerous archaeological investigations were carried out, and anastylosis was used to solve structural and foundation problems. It was also able to recreate original architectural forms. This was applied to Bakong, Banteay Samre, Neak Pean, Bayon and Banteay Srei.

* Between 1955 and 1970 Angkor Conservation developed further its techniques of anastylosis, and began a sizable restoration programme with a staff of 1,000. It had supporting equipment and it established laboratories;

* In 1970 the Khmer Rouge invaded the Angkor area, but an agreement for ongoing work was in effect until 1972, and limited work continued until 1975;

* With the cessation of maintenance and restoration activities during the war, the monuments were once again vulnerable to the encroaching jungle and to looting.

* 1979 saw the revival of Angkor Conservation, though with minimal staff; and in 1986 Indian and Polish assistance was also made available.

* Since 1989 UNESCO has coordinated multilateral assistance for restoration of buildings at the ACO, maintenance and visitor safety at important sites, clearing moats, and with technical studies and restoration activities at selected monuments with the cooperation of institutions such as EFEO, Sophia University of Tokyo and the World Monuments Fund.

PROBLEMS OF CONSERVATION

Khmer structures present some internal weaknesses such as dry joints (leading to weight concentration and root penetration), poor bonding (causing joints to open and stone to crack), sand as an internal core (causing settlement), and corbelled vaults (causing collapse). Ground and foundation stability is affected by variation in the water table, and vegetation causes dislocation, and collapse from falling trees and decomposition of roots. The structure is further threatened by human destruction.

Approaches to preservation need to emphasise the conservation of structures as they are; rather than their restoration, which can sometimes lead to further damage and loss of archaeological evidence and value. This requires research into the conservation of materials: for instance, techniques need to be developed for saving the remaining plaster surfaces on a number of brick structures, and finding alternative methods of bonding following the removal or decomposition of the original cramps.

Experience shows that any restoration or conservation work must respond to the following parameters: stabilizing foundations, reinforcing structures, controlling run-off of rain water, conservation of materials, restoring masonry, controlling vegetation, maintenance and adequate supervision. Specific interventions have to be closely coordinated.

All the extensive documentation from previous research and restoration work should be made available locally, to avoid the "new discovery" in ignorance of past investigation. The EFEO office in Siem Reap is installing a documentation centre mainly based on EFEO archives, which have been recently made available on computer and microfiche. The Angkor Conservation office library is still housed in Phnom Penh and part of it could be duplicated in order to reconstitute this library in Siem Reap. Other documents should be brought together into a single centre and sources of new information coordinated for consistency of recording and ease of access. The experience of the past should therefore be available on site to inform the approach and a strategy for conservation of the monuments.

NEED FOR ARCHAEOLOGICAL RESEARCH

Research into the structure and conservation of monuments, and on 'underground' Angkor and prehistory in the Angkor region, is desirable to increase our knowledge of the evolution of individual sites and areas. Scientific studies of geology, soils, hydrology and ground water, and vegetation and crops, carried out for purposes of development, will also provide valuable base line information for archaeological research. Research should not only concentrate on the origins and achievements of the Angkor period but could also look at developments in Cambodian society and material culture since the decline of Angkor based Khmer Empire; for instance, the continuing use of the monuments and ethno-archaeology. A strategy for archaeological research is needed which helps coordinate and focus studies in the Angkor region by

scholars and institutions from around the world.

PROBLEMS OF MANAGEMENT

The Angkor Conservation Office has had only limited resources since its reestablishment in 1979. A new start is needed. The unique authority of the organisation over this century has produced a strong and comprehensive presentation of sites. Participants in the conservation and restoration effort will need to work within a general strategy designed to re-establish the integrity of the area. Strict guidelines and rules for involvement in the international conservation effort are an urgent necessity. These should include training of Cambodian archaeologists and workers, and making available a proportion of funds for the general maintenance and layout of the sites. The benefits of working in Angkor are enough for organisations to accept strict conditions.

The current priorities are;
- the provision of training for personnel equipped to manage and maintain this archaeological heritage,
- the carrying out of a preliminary expert appraisal of all the monuments on the site,
- the need to continue the analysis of the materials (stone, brick, stucco), in order to try and stop their decay,
- the carrying out of technical studies of the stability of the foundation of certain buildings,
- the assumption of interrupted restoration projects.

TOURISM AND THE RESTORATION OF ANGKOR

From the tourist point of view, the three most visited temples are the Angkor Wat, the Bayon and Ta Prom. Others are Banteay Srei, and Preah Khan and Bakong in the Roluos group. In the past visitors used to follow two circuits to view the monuments, the 27 km Petit Circuit and the 46 km Grand Circuit. These were laid out over 60 years ago at a time when knowledge of the chronology and development of Angkor was still in its infancy. They no longer represent the historically correct or visually most rewarding approach to the temples.

Improvements are needed in the presentation of Angkor. The basic principal is to have an appreciation of the monuments as close as possible to the ancient Khmer presentation, above all to enter the temple through the main entrance, which in the great majority of cases is the east. For instance, at Preah Khan it should be easy to reopen the splendid eastern entrance as the main visitor approach to the monument and to exit via the west. At Pre Rup because the road runs by at the foot of the temple cutting off the laterite paved causeway, the processional approach to the temple is lost. It is fortunate that because of the need for repair and renewal of the road system an opportunity for a radical reorganisation of the access to the majority of the monuments is now available.

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PHYSIOGRAPHY

The major Angkor archaeological sites are scattered through the northern slopes of the Tonle Sap drainage basin. Phnom Kulen, Kabal Spean and associated outcrops constitute the major relief within the study area attaining a maximum altitude of 498 m. The Study Area is shown in Plan 1.

Geology

The rocks of the Tonle Sap basin are largely sedimentary in origin. They consist of massive limestone beds, eroded and overlain by later sandstone massives, which form the Phnom Kulen plateau. From the dominating Kulen hills and escarpment in the north, the landscape consists of a gently sloping undulating peneplain covered by alluvial sediments over lying limestone deposits. A thin layer of recent sediment characterises the current lake bed and closely adjacent areas. Minor outcrops of sandstone and rhyolite occur on the plain and a small area of red basales occurs adjacent to the base of the south-western slopes of Phnom Kulen. Soils are sandy derived from weathering of the sandstone rocks from the Kulen hills and escarpment.

Sandstone from quarries in the Kulens provided the major material used for the Angkor structures. The alluvium is the source for laterite used as the predominant structural base of the monuments, The laterite has the characteristic of being soft in its natural state and hardens on exposure to air, which oxidizes the unstable aluminum ferrous dioxide to the very stable aluminium ferric trioxide. The source of laterite deposits is not known but may have been a contributory factor in the location of the Angkor complexes.

Tonle Sap Drainage Basin

The basic drainage pattern consists of a series of radiating streams which rise in hills to the north and east of Angkor and flow out across a series of alluvial fans to the lake. These provided the major source of water for the ancient cities and for the present town of Siem Reap. The major drainage feature is the Pouk River originating upon the plateaus of Phnom Kulen and Phnom Kabal Spean. Other minor drainage systems are those of the Siem Reap, Roluos and the O Thom rivers. The flow of the Siem Reap river was augmented by the diversion of waters from the Pouk River through a canal constructed for the purpose of increasing the amount of water available for use by Angkor during the tenth century. Originally the Siem Reap River flowed southward across the Eastern Baray and towards Roluos. Many of the streams in the areas have been modified and channelled to control the flow of water for irrigating the gently sloping agricultural land to the south.

The streams flowing across Angkor show entrenched meanders indicating considerable down cutting of the streams and a slow lowering of the base level of the drainage system caused either by a lowering of the lake level or an uplift of the land. Observations by the ZEMP team indicate that down cutting by as much as six metres below the original base of some canals has taken place in recent centuries.

Lake deposits along the Tonle Sap form clayey soils with a high moisture content. These are covered by the annual flooding of the lake and are fertile and cultivated with receding rice. Beach ridges have been formed at various stages along the lake shore which have been cleared for cropping.

The water level of Tonle Sap fluctuates, due to the influence of the much larger Mekong River system with which it is connected. During the rainy season the water level of the Mekong rises above the level of the lake and overflows into the Tonle Sap which rises 7-8m, more than trebling the size of the water surface (from 300,000 - 1,200,000 km^2) and extending the lake shore a significant distance. This gives rise to special agricultural and settlement activity along the lake.

Tonle Sap is experiencing considerable siltation which has doubled since 1960 to 4mm/year. At the entrance to the lake and at Chakdomuk navigation has become more and more difficult during the dry season.

The changes of base level, the development of beach ridges on the north shore, and the momentous seasonal changes of the lake level are the result of natural processes. This sequence of activities may have had a significant effect on the water regime of the Angkor area which could have led to the abandonment of the Angkor sites. As the water level was significantly lowered and the channels continued to down cut major maintenance of the water works would have been required to keep water in the barays throughout the dry season.

CLIMATE

The climate of the area is controlled by the tropical monsoon system which is influenced by the local topography. The sub-humid regime has high seasonal rainfall that varies between 1100-1800 (average 1500) mm/year with a peak in September. The annual temperature varies only slightly between a high of 28.5^{0}C in April to a low of 24.0^{0}C in December.

The dry season lasts for 5 months of which two March and April are especially dry. Nevertheless, due to the presence of the Kulen Mountains some rains occur even during the dry season. The particular orientation of the Kulen hills catch the rains and feeds the Siem Reap river, the only permanent stream in the region.

The highest evaporation rates are observed in March and April, when the air temperature is highest and relative humidity lowest. This is the period of sever crop stress in the region. Although normally at least one rain-fed crop can be harvested, intensive management of the surplus water can enable crops to be grown over an extended season.

Violent storms are typical, the duration of which rarely surpasses 1-2 hours. During the rainy season storms occur at predictable intervals. The average number of storm days in Siem Reap is 10 in September when the relative humidity also reaches a peak.

HYDROLOGY

The most important river in the Angkor area and the only permanent stream is the River Pouk which becomes the Siem Reap. The river has a catchment area of 670 km^2. It rises in the Kulen Mountains at an altitude of 420m, and cuts deeply into the plateau and discharges through a gorge to the plains at the base of the hills at an elevation of 50 meters. The river is joined by a number of tributaries from the north to flow south east to a diversion structure built in the reign of Rajendravarman about 950 AD at Phum Khlat. The low flows here were diverted into an artificial canal running south to the East Baray and then west to irrigate large lands.

The original ancient bed of the river continues south west to present day Pouk, where it becomes lost in the marshes of Tonle Sap. The diverted river became the mainstream to supply the Angkor area. The present day river passes through an opening cut in the 16th century in the great wall which links the north west corner of the East Baray and the north east corner of the moat of Angkor Thom. It flows over a wear built in the present century along the ancient canal to Siem Reap, where the water is backed up by the Crocodile Weir before discharging into the Lake near Phnom Krom. The total length of the river is 80km.

The second major stream in the region is River Roluos which rises from springs at the foot of the Kulen Mountains at an elevation of 70m. This river has also been canalised and directed. It flows into the marshes around the Lake near the village of Roluos.

Data on hydrology is very limited. Run off for the Siem Reap river catchment is estimated at 300-600mm/year, corresponding to an annual run off volume of 200-400 million m^3. The peak flood discharges are estimated to 100-200m^3/s for the Siem Reap river upstream of Angkor in the vicinity of the North Baray. The floods at Siem Reap town range from 20 to 30 m^3/s only. Generally floods cause no losses, and are, on the contrary, beneficial to agriculture, providing crops with water, depositing silt and creating fish breeding areas.

The ground water conditions under the Angkor Area have been explored by a well drilling programme recently. There is a quasi-artesian aquifer in the area bounded by the Kulen Mountains, Pouk and Roluos, with water levels at around 3m below ground. Recent surveys

in the surroundings of the Angkor monuments suggest a dry season water table at 1-3 m; in the rainy season it is assumed to be at ground level.

VEGETATION

The study area features examples of a substantial portion of Cambodia's low altitude and edaphic vegetation types. The northern portion generally features dense evergreen and semi-evergreen forests, a mosaic of open dry diptercarp forests and denser deciduous forests as well as secondary forests resulting from deforestation or other disturbance. Land Use is shown in Plan 5.

The freshwater flooded forests of Cambodia, and those of Tonle Sap in particular, are renowned as one of the most extensive examples of this forest type in the world. Their existence is due to the peculiarities of the hydrological regime in the Lake with a reversed flow in the Mekong filling up the basin and causing extensive flooding.

Vegetation analysis of the study area was based on landsat imagery, aerial photographs, field inspection of selected sites, interviews with Cambodians and published literature. Habitats are shown in Plan 6. Fourteen vegetation units were recognized for mapping purposes their distribution with regard to their structural features, dominant species present and extent of disturbance is shown. General descriptions are presented below which represent a progression from the lakeside areas toward the mountains and the inland plains.

On the lakeside plain flooded forests, a mosaic of shrub/grass and wetlands, and flooded ricelands dominates the southern portion of the study area. This plain is seasonally inundated by waters from the Mekong and much of the area has been converted to agricultural activities, for growing of beans, melons, lotus and rice (floating and receding).

The broad ancient alluvial plain zone extending from the lake plain to the mountain outcrops forms a broad band of cultivated land. It includes: wetlands (natural and man-made); rice paddy; disturbed and undisturbed lowland evergreen forests, - particularly the forest around Angkor Thom which has received some protection; secondary forests between the evergreen and agricultural areas, which have been subjected to logging and swidden agriculture; dense closed shrublands, which are pruned for fuelwood and sparse; and open shrublands near agricultural areas that are also collected for fuel wood and grazed.

The Kulen Mountains and the peneplain in the north-east has sub-humid and sub-dry forest formations, dominated by semi-deciduous forests and deciduous forests. The forests of the mountainous upland areas vary according to topography but include: undisturbed upland forests on the plateaus; streamside galleries and slopes and ridges; secondary upland forests in the areas with swidden agriculture; and other rocky outcrops which are subject to fuelwood collection.

Vegetation Change

The principal ecological determinants of vegetation pattern are the geology, topography and local variations in climate and soil, while the principal anthropogenic factors are land

clearing for agricultural activities and logging. Vegetation Values are shown in Plan 7. Today the landscape consists of a central populated agricultural belt flanked by natural and semi-natural landscapes which are increasingly being encroached upon. Formerly these areas were subjected to less pressure and utilised on a more sustainable basis.

By 1975 much of the Siem Reap plain was converted to rice production, slash and burn agriculture and intense timber extraction resulting in substantial forest encroachment. It is evident that many of these areas have not been able to regenerate well. These areas are now subject to heavy pressure for fuelwood collection, little of which is apparently being processed into charcoal.

A comparison of the distribution of ricefields in the 1930's and 1959 and maps from 1979, with current remote sensing data indicates that both swidden and rectangular paddy field cultivation have expanded into the secondary forest areas of the plain.

Widespread timber extraction was evident at lower altitudes by the 1970's and continues today, including current intense collection of fuelwood and some non-timber forest products. Bamboo, vines and small diameter poles are also harvested in large numbers to provide materials for the hundreds of kilometres of fencing required for the construction of fish traps at Tonle Sap lake.

WILDLIFE

Historic records include extirpated and mythical species, yet little is known about species abundance and composition. Species lists from the literature indicate 100 mammal species and 200-400 bird species in the area, with at least 50 fish species in the Tonle Sap. The area is thought to support regionally and globally significant populations of rare and endangered species (listed in the IUCN Red Data Book) including 17 mammals (mostly large game), 24 birds (primarily water birds), 2 reptiles and 2 fish species.

The Tonle Sap and the flooded forest have the highest wildlife value and are only limited by fishing and other resource harvesting activities. The waters of the Tonle Sap support a tremendously high diversity of fish and are legendary for their high productivity as one of the richest inland fishing lakes in the world. Harvests have exceeded 100,000 tonnes per annum for several decades. In addition to fisheries production, the lake and adjacent areas are important for water birds and other aquatic species.

The seasonally flooded shrub/grass/wetland mosaic inland of the continually flooded forest area is important for water birds and seasonal fish, and is currently threatened by unsustainable resource harvesting practices. The trapping of water for rice production can also create fish and water bird habitats.

Threats to the lake/flooded forest area include: increased siltation with potential of massive mortality from high temperatures in unusually dry years, and hampered annual migration from the Mekong to the lake; hydraulic mining effluent from the Pailin district; and forest to agriculture conversion. These threats are evidenced through declines in fish production and species, as well as loss of significant numbers of water birds.

The ancient terrace areas above the flooded lake region are less valuable, due to early conversion to agriculture, and are only frequented by a few mammals and birds.

Parts of the study area in the north east of the Kulens have contiguous forest with some valuable habitats and are threatened by resource harvesting.

There are many natural wetland areas in the stream courses, ponds and lakes; and also in the hills and across the plain. In addition there are the man-made moats, barays and canals which are important for water birds and fish. Pressures here are from fishing, hunting, livestock grazing and aquatic vegetation harvesting.

The Phnom Kulen forests have local, rather than national, wildlife conservation value, but contain many associated natural communities. Other areas throughout the ZEMP study area are thought to have little nature conservation value, but do contribute to wildlife habitat and species diversity.

Wildlife Uses

Fish and wildlife harvesting for subsistence and trade is a traditional activity. Elephants were used for work and ceremony from early times. Reliefs on some monuments show relationships with fish and wildlife of the Tonle Sap. Wildlife harvesting continues to form part of the subsistence economy. Trade throughout the area continues today and there is a need for management, by establishing a large area in which wildlife is protected.

Artisan fishing on Tonle Sap and in the wetlands is carried out by communities inhabiting specialised floating villages around the Lake and controlled through concessions. Subsistence fishing takes place in the man-made watercourses and flooded rice paddy, and some of the catch is sold in local markets for cash. There is potential for increased aquaculture in the region.

Hunting and trapping animals and birds is widespread throughout the forested areas by gun, net and fish hook. Many species are sold in the market for food, medicine and decoration including: water birds, doves, turtles, snakes, parts of tigers, elephants, bear, bats, porcupines and deer. In some cases the source of animals is from other areas. Cambodian wild life is also sold abroad. Frog and crocodile farming is carried out in Siem Reap and around the lake primarily for export to Thailand.

PAST AND PRESENT LANDUSES

Extensive portions of the Angkor area have been altered by humans for many centuries. There has been extensive land clearing for permanent agriculture, and less obvious degradation from the introduction of new species. The prosperity of the Angkor empires depended on the extensive hydrological structures for increased rice production, which created a broad agricultural belt across the plain. Images of fisheries activities and water birds found in the bas-reliefs of some temple walls indicate that the Tonle Sap provided the protein for the region.

Little has been written about post-Angkor Cambodia since the collapse of the waterworks. It is assumed that people became more dependent upon the natural cycles of the Tonle Sap Lake for agricultural production. There is also evidence that many populations dispersed over the northern plains, using fire as an agricultural tool, which resulted in degradation of the semi-evergreen forests. The presence of tall and moderately dense evergreen and semi-evergreen forests in the immediate vicinity of Angkor Thom indicates that large areas were left untouched until recent times. The pattern of settlement was limited and it appears likely that the current pattern of swidden agriculture was established only in the last one or two centuries.

There were flooded forests and associated grasslands throughout the Tonle Sap floodplain prior to human intervention. The area which is now part of the agricultural lands surrounding the Tonle Sap lake is believed to have once supported extensive mixed deciduous forest.

Shallow-water wet season rice cultivation has continued to be the principal land-based agricultural activity in the area, with some continued use of dykes and reservoirs, maintained and rehabilitated from the ancient systems. Rice cultivation, logging, the extraction of non-timber products, land clearing and fire have all contributed to the degradation of vegetation of the landscape that is evident today.

WATER MANAGEMENT

Water management to day is uncoordinated and wasteful, resulting in low efficiency. The Khmer water control structures in the Kulen Mountains have deteriorated completely, while the ancient Barays have all been abandoned, except for the West Baray which was restored in the 20th century.

Since the ancient reservoirs are inoperable, the dry-season flow in the rivers is insufficient to meet demand. Low flows are probably further affected by deforestation in the Kulen catchment areas. Although the ancient Khmers exploited the limited resources of the River Roluos, and turned to trapping the Siem Reap river, the resources of the latter were not exhausted. In the present situation, where the West Baray is operated with reduced volume, there is a considerable volume of water in the combined river systems waiting to be harnessed.

The dry-weather flow at Siem Reap is 1-2m^3/s which is already too low to flush out pollution and avoid eutrophication. The growth in population of the town requires a greater quantity of water to maintain river quality. Additional water for maintaining the desired flow in the dry season can be made available by increasing the storage capacity, either by building a new modern reservoir, or by restoring and expanding the capacity of the existing ancient Khmer Barays.

The area of irrigated rice within the ZEMP study area varies from year to year depending on the rains and effectiveness of water management; during the 1980s from a low of 4500 ha to a high of 8800 ha. The main irrigated areas are supplied by water from the West Baray. The idea of recommissioning the ancient irrigation system from the Baray dates back to the 1930s and implementation was completed by 1959. The scheme was designed to

irrigate 10000 ha to serve 2,500 families engaged in agriculture. Reconstruction following years of neglect is underway, however there is insufficient water to irrigate more than half the potential land.

Another irrigation scheme uses water from the Crocodile weir to irrigate some 2000 ha toe the south east and south west of Siem Reap. A further scheme is planned at Dam Kok Cahm to store the flood waters of the Siem Reap river to irrigate 2,400 ha east of the river. A new hydraulic diversion structure could be built on the river to feed both a reconstructed moat at Angkor Wat and the proposed irrigation reservoir.

Various poorly designed dams and earthworks were constructed by the Khmer Rouge for double cropping, but the main effect was to undermine the traditional system of flood water management using the ancient dykes. These disperse water to paddy fields and barays and tanks, where it is used for dry-season irrigation and provides subsistence fisheries. Flood control is unnecessary as the ancient Khmer dykes and levees serve to guide, retain and exploit the receding flood waters to good advantage.

An integrated water management "master plan" is necessary to review all these and other issues and assess the best way to manage water for the reconstruction of some of the ancient water system and moats and to develop agriculture, combatable with conservation of the archaeology.

SUMMARY OF RURAL LANDSCAPE TYPES

The land use and vegetation cover shows distinct belts approximating with the land forms. These are in varying degrees of change due to the intensity of human activities during the last century.

In the north, Phnom Khulen is still covered with evergreen forest (see Plan 5), which in recent time extended south towards the Angkor Monument areas. Much of this forest is secondary growth which has returned to cover land abandoned after the Angkor era. Some has reached a climax stage and remnants can still seen in Angkor Thom. The forest cover is rapidly receding due to the exploitation of the forest for firewood and in some degree for lumbering. On the Phnom Khulen plateau and closely adjacent areas of the plain a classical pattern of swidden agriculture is still practised. This example of rotational slash and burn agriculture consists of a carefully managed cycle of ten to twelve years of roughly circular patches of land in different stages of regrowth. The fertility of soils on the plateau is relatively poor but is maintained through the strict rotational system. An attempt should be made to preserve this agricultural system and associated forest environment.

Most of the forest areas of the plains, in contrast exhibit the rectangular paddy fields typical of much of monsoonal south-east Asia. Some slash and burn agriculture on the old alluvial areas around Angkor shows the intense human pressure on land. The forest is being removed and replaced by a landscape of degraded scrub land with patches of low yielding agriculture, in which soil fertility can only be maintained through additional inputs. Large tracts of land southeast of the Angkor complex is covered with this scrub land. It could eventually be used for agriculture by supply of water and improvement of farming methods, and thus could

support a significant population.

The landscape character of the area south and west of Angkor, consists of permanent rain-fed rice cultivation which forms the main agricultural areas. This is the major rice growing area which supported Angkor. Old field patterns are still visible under some of the new land divisions. These old fields tend to be much smaller and run at a different angle to the present land holdings. Numerous water tanks are scattered throughout this region, and remnants of old estates or temple complexes indicate dense human occupation.

The other major landscape type is the area flooded from Tonle Sap which creates a unique agricultural rice cultivation of alternate flooded rice, growing with the rising waters of the lake, and receding rice taking advantage of the moisture trapped in the soil during the dry season. Dikes were built to retain the water which is allowed to trickle down to irrigate the land below during the dry season thus in effect enabling two rice crops to be grown each year. Receding rice is planted as soon as soils are dry enough for cultivation after the retreat of the water.

The area close to the lake is cultivated with flooded or floating rice. The rice is sown in April, when the lake level is at its lowest, and the seedlings must grow to a certain height before the returning water floods the land. If the lake water level rises rapidly and the seedlings are not sufficiently tall the rice crop will fail as the plants are unable to grow fast enough to remain above water. During the heavy floods of 1991 many of the floating rice was submerged for a long time and the crop that year suffered heavy damage.

Flooded forest, grass and shrubs covers the area along the shoreline, which is permanently under water. This is the breeding ground for fish of the Lake and lower Mekong river. Beach ridges are visible along part of the lake coastal area. Most of these have been totally cleared for agriculture for many years because they dry up earlier than the surrounding flooded land and are under intensive cultivation for raising at least one crop during the period that the water has receded.

APPROACHES TO ENVIRONMENTAL MANAGEMENT

Environmental degradation continues today with encroachment of agriculture into secondary forest areas. Major non-wood forest products such as bamboo, vines and poles are becoming more difficult to obtain, and people travel greater distances for their harvest. Timber extraction also continues further to the north of the study area with as many as 20 logging trucks passing through Angkor Thom gates every day.

The pattern of rural land use and vegetation around Angkor is not discrete, but different vegetation types permeate the whole area. Even in the urban areas there are enclaves of paddy fields, vegetable gardens and orchards. Only in and around Angkor Thom is the population relatively sparse and dense forest is preserved. Most families have at least two livelihoods, including traders, artisans, hunters/gatherers, herdsmen, fishers, foresters, orchardists, and cultivators.

Given the characteristics of the Angkor inhabitants (rural, poor, young, high-birth rate,

uneducated, dependent upon subsistence forestry and agriculture) an intensive, long-term and integrated rural development program is needed within the study area to enhance the quality of life and ensure that natural and cultural resources are not degraded. This must be done in a spirit of positive support, and with acceptance by the local people: legislation and policing are not sufficient to ensure meaningful conservation and sustainable use of archaeological, wildlife and botanical resources.

The diverse wildlife in the study area should be given prominence in management strategies of the area, emphasizing conservation measures necessary for specific species and habitats as well as opportunities for nature-based tourism. Ecological values are shown with reference to vegetation values in Plan 7. An initial focus of policy should be to rationalize land use activities to minimize habitat conversion and ensure sustainable use. Inventories and monitoring will provide an improved data base on which to assess the impacts of policy. The global significance of the northwest shore of Tonle Sap and the floodplain in Battambang Province should be recognised in studies of the Lake. UNESCO is helping the Cambodian authorities determine appropriate boundaries for a natural World Heritage site which will overlap with the ZEMP study area.

Therefore a multi-purpose approach to natural resource management and rural development is necessary based on improving the sustainable utilisation of resources particularly forest and rice growing areas. Development around Angkor should give varying emphasis on the individual forms of landuse and livelihood according to the functional priorities within each area.

1

IV THE SOCIO-ECONOMIC CONTEXT

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IV THE SOCIO-ECONOMIC CONTEXT

POPULATION

Siem Reap Province has an area of 10,879 km sq., a population of 555,000 in 1992 and is divided into districts (srok, 14), communes (khum, 108) and villages (phum, 917). Administrative boundaries are shown on Plan 8. The provincial administration consists of a number of departments: executive, planning, finance, trade, communications (responsible for roads and sewage), factories, education, information-propaganda-culture, social security, social welfare, state control, women's associations, commercial union and legal affairs.

The ZEMP study area includes 8 districts with the following characteristics:

Districts	Household	Population	communes	villages
Siem Reap (PT)	11,919	70,142	10	76
Siem Reap (DC)	7,328	43,210	9	67
Angkor Thom	1,847	12,686	4	25
Angkor Chum	6,060	40,013	7	83
Banteay Srei	3,436	19,396	6	27
Puok	15,763	89,256	16	154
Sornikum	13,747	79,146	10	114
Svay Leu	na	8,218	5	21
TOTALS:	59,100	362,067	67	567

(Source: UNTAC/AEPU,1992)

Before 1975, the town of Siem Reap occupied an area of 2 square kilometres; it now extends over 24 square kilometres. The notional boundaries of the latter area lie within the defensive ring around the town. Population growth for Siem Reap is as follows:

1970	10,000 inhabitants
1979	30,000 inhabitants
1987	13,000 inhabitants
1991	68,803 inhabitants (the district of Siem Reap)
	43,520 inhabitants (the four urban districts)

The present populations and projected populations for 2005 by settlement are shown in Plan 9. The projections of population are based on an estimated growth rate for Siem Reap Municipality of 5.0% and for Siem Reap Province rural areas of 2.5%, which gives an average for the province as a whole of 2.8%.

KHMER LIFESTYLES

A social survey was undertaken amongst a sample of three different village groups, illustrating a range of environmental and socio-economic conditions throughout the Angkor area. These included the villages around the main Angkor monuments (within the area of the proposed Park), along the river banks and the floating villages of Tonle Sap. Interviews were held with village chiefs and informal conversations with the villagers regarding their way of life, resources, technical knowledge and population concerns in order to better access how the ZEMP project could support both traditional lifestyles and increased standards of living. Common demographic traits include:

a) fifty percent of the population is less than 16 years old;

b) there is a lack of children between the ages of 14-17 due to fewer births during Khmer Rouge period;

c) there are two groups of widows (those over 40 whose husbands died of natural causes or were killed in the Khmer Rouge period and those under 40 husbands have died since 1979, mostly when in the army;

d) since the population in the area was considered "old people" or "base people" by the Khmers Rouge, few men were killed, except for those working in the Angkor Conservation Office, who were considered to be "new population", and were deported.

e) during the past years of relative peace there has been a population boom and an equalization of the sex ratios among the young people.

The hamlets around Angkor are centuries old and people are proud of their land. New villages result from population expansion from the old hamlets, and not by migration from other areas. It is only through marriage that new people become part of a community. Most of the peasants of this area were considered "old people" during the Khmer Rouge time, although the nearly 1000 workers of Angkor Conservation were considered "new people". All people were sent to the fields, but the peasants adapted to the Khmer Rouge agrarian collectives better than the more urban people.

Most refugees are now returning to their original lands to cultivate rice. Khmer peasants are attached to their homeland, which consists of a group of phum. These small hamlets have not been recognised as an administrative unit, although this is now changing. Traditionally villages are of two types; those exploiting alluvium deposited by the annual river floods and those scattered across the plain and along the road networks.

In the villages near the core park areas there is a lack of suitable soil and minimal water for adequate rice production. The villagers therefore have had to seek complementary activities to purchase rice including: sugar palm, resin from dipterocarpus trees, creepers to make fishing nets and work at Angkor Conservation (until 1972). These people are very poor.

Populations along the river banks are also ancient settlements. They rely on vegetable produce from the dry river banks and dry season rice. In some places they can grow two types of floating rice. In Khum Chreav there is an irrigation system, so the villagers are able also to cultivate vegetables, which they barter with the people from the poor areas in the Park who need to buy food. These people are in much better health and are self-sufficient.

The Tonle Sap floating villages are also old settlements which revolve around the migration of the lake. Rice cultivation follows a different pattern due to the rise and fall of the lake. Fishing is continued as it has for centuries by ancient families with the catch mostly used for consumption and a little for sale. The lake villages are in great poverty.

The Khmer peasant lifestyle focused on traditional rice cultivation (paddy fields and swidden) of different varieties using traditional techniques, such as swing plough pulled by oxen or buffalo, animal fertilizers and little irrigation, with usually one rice crop per year.

Today each family is very poor with only an average of 1/2 ha. rice cultivation area, yielding an average of 800kg/ha per year. Rice and fish are the primary food sources. The introduction of irrigation for rice could provide for increased yields, but these measures should be simple in scale with small barrages and pumps. The peasants are very attached to the varieties of rice which they cultivate and to date have not accepted introduced high-yield varieties due to lack of taste. Fish farming should be encouraged.

There are no village-based silver and silk crafts industries in the area studied, but it is said that some skilled craftsmen still exist in the area. There are some opportunities for agroforestry and fishing to generate money to buy rice.

High ranking civil servants, army and businessmen are cutting oil-trees on a large scale, thus altering the landscape and affecting the peoples standard of life as well as the supply of potentially renewable natural resources.

Peasants are not involved in these activities and do not like to leave their land. Any relocation should be minimal, due to their historical and spiritual ties with their homelands. Development of the archaeological park should not exclude people.

The peasants today are worn-out primarily due to lack of food and poor nutrition. They must benefit directly from ZEMP to increase their health before they will be able to benefit from some of the training and other opportunities the park might provide. A quote from the last French conservator, B.P. Groslier as recorded in 1981;
" As is always the case, it is the women and children who suffer most... The abandonment of Angkor ... is practically nothing compared to the sufferings of the Khmer people. The most important thing is to save the people, not the monuments, for the moment the latter can wait. "
Such a comment emphasises the human dimension, without which any cultural and technical

project cannot hope to be entirely effective and profitable.

Religion and cultural values

Theravada Buddhism is the official religion, offering opportunities for the moral rejuvenation of the people through continual merit making activities, along with more ancient beliefs in governing spirits over the natural world. Relocation of people disrupts their spiritual relationship with soil/cultivation homelands. Khmer people do not wish to "lose face" They also have a desire to possess as much as their neighbour, and respect their elders. Widows and handicapped people are treated with little respect.

The will of the present population to restore and develop pagodas and monasteries expresses the desire to rekindle the religious efforts suppressed by the Khmer Rouge period, and re-endow Khmer society with a moral infrastructure which it is in the process of losing now. Just as the Khmer cannot live with out a monastery within walking distance, the latter cannot exist without the fiscal support of the nearby communities. Yet in some cases excessive pagoda building can be counter productive. The pagodas around Angkor Thom were built in the 1980s for religious and political reasons by the "Venerable" and are not perceived to benefit the local villages, who are continually asked to contribute to their cost.

International assistance projects need to better understand and incorporate Khmer culture into their efforts to gain acceptance and give benefit to the local people. Projects should not be pursued unless after careful analysis of the costs and benefits they are shown to be truly feasible.

Villagers seek many of the products of development; their society is dynamic. It is undesirable to attempt to fossilise village life and then to market the local population as an "authentic" tourist attraction. Both physical and social change must be allowed to occur. What is important is to avoid unnecessary damage to community life from the negative influences of tourism and at the same time, help villagers unwittingly or by apparent necessity, destroying the archaeology and attractive environment in which they live. The natural environment around the monuments may be preserved but the "local way of life" should be able to evolve.

Health and Education

People do not have enough rice and are malnourished from two to nine months per year due to lack of land and poor water management. There is widespread tuberculosis and malaria and no health facilities for treatment. In theory there is schooling for children from ages 5-14 years, but due to poor education, poorly paid teachers and inadequate buildings few people are educated. The children are too busy helping their parents to go to school (especially those living in the villages around the monuments). As a result many children are illiterate and few are able to become more than labourers. Schools need to be located near the villages and teachers need to be better paid to increase the quality of education. Affordable medicines are also needed because poor health is limiting the potential of the people.

Economic Characteristics

The primary economic means of livelihood are agriculture and fisheries, with limited forestry and craft activity. With rapid the population increase, basic survival will become more difficult due to limited land. Reclamation of new land by burning forest and scrub areas is risky due to mines. The affect of forest clearing in Phnom Kulen for swidden rice growing seems to be less than that for forest timber extraction. Assistance to the peasants for rice cultivation and discouragement of timber exploitation is needed.

Saw milling and brick and tile making are concentrated along the main routes. Tourism and urban services are the traditional industry in Siem Reap. Handicrafts could be revived and encouraged to support village-based industries. Traditional crafts of the area are silk weaving, silver work and basket making which could find a ready market with tourists. Local people are again interested in working in the Angkor park and in tourism jobs.

LAND TENURE

A clear analysis of land tenure is impossible under present political conditions. The legal position is complex, and current arrangements are extremely fluid, so that practice does not necessarily comply with the legal instruments that are being put in place.

The starting point is the nationalisation of land under the Khmer Rouge regime of 1975 to 1979. This erased all pre-existing private ownership, land has not reverted to previous owners. By 1979, only 10% of property documents and archives remained; and physical evidence such as boundary stones and marks had disappeared. There are cadastral documents stored in French archives, but these have not yet been made available. Upon the overthrow of the Khmer Rouge regime, the government decided not to restore pre-1975 land ownership rights. In 1989 a SOC sub-decree was issued granting ownership to families occupying *houses* at the date of the decree who could also show that they were occupying the property in 1979. The effect of the decree was to re-establish de jure private property rights that were inheritable, and transferable and to distribute those rights on the basis of possession.

Distribution of agricultural land seems to have been initiated by a set of Political Instructions issued by the SOC Council of Ministers in 1989, allowing an allocation of 2,000m^2 per family. The head of the family was given until the end of 1989 to make application to the popular committee for the village-commune-district for approval to the family's appropriation. As part of this land distribution, each locality was required to prepare a general plan providing for subdivision, and showing the streets or ways and the land reserved for the future growth of the locality.

The new (interim) Constitution of May 1989, confirmed that Cambodian citizens have full rights to own and use land and have the right to inherit land granted by the State for the purpose of living on it and exploiting it. But implementation of this is highly decentralised, and it is difficult to give a general assessment. The position varies also according to the nature of the land and the claim to it. UNTAC's legal advisers state that the practice in relation to private agricultural lands of less than 5 hectares is that:

> "[S]ome basic guidelines are followed in the processing of requests for property titles. Applicants send a request to the commune authority which gives an advice; the request is then transmitted through the district authority to the Cadastral Office at the provincial level. According to an agenda decided by the cadastral office, an investigating committee is formed including a representative from the Cadaster, the Chief of Commune, the Chief of Village, some elderly and the neighbours; the decision is taken after full discussion and consensus. The Cadaster does not deliver a property title, but a simple ''occupancy temporary permit''".

These approval requirements may provide a quick means of protecting land from development, by disallowing approval for development in prohibited zones, such as that running north from Siem Reap. But UNTAC's advice suggests that the omens are not good:

> "[The] decision is clearly vested in the Committee mentioned earlier. Relationships will depend upon the strength and personality of each member; since decisions should be taken by consensus (it is a general rule in Cambodia, in matters related to land or house property), the Cadastral representative has a veto power, but so has the village or commune chief, or an influential neighbour . . . This procedure also applies to construction works. How readily could the system be used to safeguard precious areas? It could be, as long as a participant to the Committee is dedicating himself to such an objective . . ."

For land exceeding 5 hectares the consent of the Ministry of Agriculture is necessary. Collective agricultural land has been shared out between villagers without any other intervention. For houses, the Building Department, Health Department, Public Works Service and Governor's Office are also involved.

However, few Cambodians have yet got title deeds. There is little in the way of qualified staff and no resources. In Battambang (population approximately 500,000) there have been 164,000 requests registered; 11,500 investigations have been conducted; 8,000 titles have been granted; and 500 are currently being granted each month.

One major area of concern is that the SOC Land Law is unclear as to whether foreigners are able to own land in the State. It confers ''the full right to possess and use the land'' solely on *Cambodians*, and this accords with the earlier Sub-decree of 22 April 1989: *Granting of Ownership Rights over Houses to the People of the State of Cambodia*, which forbade foreign ownership of houses. The best view is therefore that foreigners cannot at present own land in Cambodia. Joint ventures are permitted, by a Law on Foreign Investments in Cambodia adopted in 1989, which requires each joint venture to have a president who is a Cambodian citizen. Detailed legal arrangements for international investment have since been drafted and are contained in a Commercial Law Bill. Implementation of these measures will be critical to the success of the tourism zone strategy.

TOWN PLANNING AND INFRASTRUCTURE

Siem Reap is a low density town with homogenous architecture, which must be preserved as such. The primary dilemma is how to reconcile conservation and urban development in

this area. How can Siem Reap be Cambodia's tourist centre and regional development area?

Water

Water is abstracted from the Siem Reap river and is only supplied to the old central areas of the town. The treatment works is not operating because of damaged equipment and lack of chemicals. Chlorination was discontinued years ago so consumers (including hotels) are supplied with unchlorinated water directly from the river. Limited intake capacity and lack of power means the service reservoirs, elevated tanks and pipe work are either inoperable or in the case of the supply network in poor state of repair with large losses and only 40% operational. Water delivery is limited to a few hours each day. Water consumption is not metered, but is supplied at low prices to each family.

Most of the population draw water from individual dug wells (some 30m deep), streams or water tanks. There is feverish activity to drill additional wells by both the Department of Hydrology and private individuals. A new water supply system is required to serve the growing number of hotels and guesthouses and the expanding areas of the town.

An adequate supply of good-quality ground water is available in the subsoil under Siem Reap and the villages of the ZEMP study area. There are also reserves in the Kulen mountains which could be tapped. There are two water tables: a polluted water table at 6 metres, and another at 30 metres. Scattered initiatives are being carried out across the town but current drilling techniques risk contaminating the lower water table. A donation from Japan made it possible to sink fifty wells in Siem Reap and other groups are drilling in more remote villages.

Waste Water

The old town had a sewage system which discharged into a pond in the south-west of the town in Sakrom. This system has not been in use since 1970, and the manholes are used for dumping refuse. The hotels situated on the river banks use the river as a sewer. There is no sewage project currently under consideration. The installation of septic tanks for all new buildings until such time as a general sewage and drainage system is put in place.

Energy

Electricity generation is by oil powered turbines. The number of electrical connections is less than 500, primarily to hotels, restaurants and some villas but the supply is variable. Cable network installation is haphazard and needs to be renewed using buried cables. A study on the possible reuse of the weir on the Siem Reap river close to Angkor Thom for hydro power generation is being conducted by JICA.

Roads

Generally the roads are in poor condition due to lack of maintenance. Many are small, and impassable in the rainy season, but provide the only communication between villages. national highway, Route 6, runs from Kompong Thom to Sisophon and crosses the study area from east to west. This road is the backbone of the traffic between the province of Siem

Reap and the rest of the country, and is being slowly improved. But whereas in 1970, it took five hours to drive between Phnom Penh and Siem Reap, under present conditions it takes two days. Provincial roads run north-south to join Route 6. The Government envisages a 5 year programme of road repairs and improvements.

Route 6 was constructed in 1970 and varies in width between 60m in the country and 15m as it passes through the centre of Siem Reap. It needs to be redesigned for high-volume traffic. The route runs close to the south west corner of the West Baray across a zone of archaeological importance. It provides the main route and river crossing in Siem Reap passing through the historic core of the town and over a hopelessly inadequate bridge. Before 1970, alignment regulations along the route were respected, resulting in wide verges and ample green space. This is now being encroached upon by adjacent properties; ditches are filled and areas along the highway reservation used for trading, storage and car parking. A traffic management scheme is urgently needed for Siem Reap and a long-term plan to take through traffic out of the town by constructing a by-pass.

Air transport

Siem Reap airport is situated 7 km from the town to the south of the West Baray, on the edge of the main monument areas. It has a 2,500 metre runway which was enlarged in 1962 by Chinese engineers. Archaeological remains were destroyed during the course of this work. The fabric of the monuments are thought to be damaged by vibration and pollution caused by occasional overflying at landing and take off. Audible and visual intrusion by aircraft are also a major problem around the monuments.

There are currently three flights a day (type AN 24 48-seat and 60-seat aircraft), however flights can increase to meet the growth in demand. Airport facilities are relatively modern and could be expanded quite cheaply. The capability of the runway to handle larger planes is not know, and it is unlikely to be able to handle 747's; but it is likely that some expansion of passenger throughput could be accommodated at the present airport at little cost. However increased use of the airport will have serious environmental impacts on the archaeology and touristic values of the main Angkor monuments. Alternative ways of meeting future demand should be considered now before further investment is made in a location which has serious long term consequences for the protection of Angkor.

River transport

There is a small port at Phnom Krom on Tonle Sap at the mouth of the Siem Reap river. Other ports are located at the mouth of the Roluos river and the Damdek canal. River transport is used in the rainy season but is very limited in the dry season because of the low water level. If river transport from Phnom Penh to Siem Reap (presently of one night duration) is to be improved this site will have to be equipped with suitable facilities such as a landing stage and a new road link to the town, and could attract associated lake side tourist facilities.

Building Permissions

Three Departments are responsible for urban services including town planning and urban

management. They are; the Land Registration Department, the Property Administration Department and the Building Department.

The Land Registration Department was established in 1989 as a result of a decree governing property and issuing title deeds. There is a single service for the entire province. It is staffed by 15 persons.

Property Administration Department offices were established in each district in 1991. Four or five persons in each office measure land, make plans for development plots and agricultural land and prepare provisional title deeds. The main activity at these two departments is processing applications and issuing of title deeds, and also planning new urbanization projects.

The third department the Building Department checks the plans required for the building permission. It also draws most of these plans.

The State reserves right to take back land in exchange for another plot if it ever needs the land. The Ministry of Culture has frozen development near the main Angkor sites in accordance with the 1992 Resolution of the Council of Ministers for protection zones around the monuments (see Plan 4). However there have been development of new properties by the military and the Governor's office within the archaeological protection zone, seemingly not in compliance with these requirements.

Development Criteria

New building projects consist of extensions/alterations to frontages, construction of houses and hotels and renovation of pagodas. In the four main districts of Siem Reap, 60 permits were issued in 1991, and 226 in 1992. At the local level, there are no checks on compliance with building permits and a considerable amount of uncontrolled building goes on without any building permission. The larger buildings practically never comply with regulations. Furthermore, permission for large buildings is not issued by a department but handled directly by the Provincial Committee chaired by the Governor, and by the authorities in Phnom Penh. For instance, for the two pagodas built in Angkor Thom Sam Tok and Ko Tlok, neither cadastral nor building permission was sought.

New building is taking place principally along the few tarred roads and is directed towards the tourist industry. The hotels under construction show the lack of planning which could lead to the destruction of Siem Reap as a low rise, low density town with extensive green areas. Before 1970, no building was permitted on the road from the Grand Hotel to Angkor Wat. This area is now being considered for a number of major projects not related to the protection of Angkor.

New Urban Developments

There are two new large urbanized areas in Siem Reap. The first, to the north of the Grand Hotel, was created in 1991. It extends to over 300 hectares and comprises 2,700 plots measuring 30 x 40 metres each. The government has resettled there 700 displaced families from villages near Angkor Wat (Phum Veal, Phum Teak Sen, and Phum Prang Sen). The

second area is situated along the Roluos road and extends over an area of 50 hectares. It is intended for 293 refugee families: in the north at Phum Chon Kasu, and the rest in the south at Phum Kna. Each family has a plot measuring 20 x 40 metres. Amenities such as a school, an infirmary, a market and a pagoda are planned. There is no water or electricity supply.

Land use plan

Present development demonstrates a general lack of appreciation for the existing physical structure of the town:

* Building plots improperly aligned to the roads;
* The number of storeys are out of proportion to the surroundings;
* Designs incompatible with local architecture;
* Excessive building density and plot coverage;
* Lack of off street car parking within each plot;
* Insensitive development along the river banks.

There are no restrictions on the height of buildings, or the form and type of roof construction. Favouring the development of low-rise building would help to maintain the present character of Siem Reap. There are no restrictions on the construction of septic tanks which can lead to the pollution of the ground water.

There is no land use plan for Siem Reap. The Improvement Committee has proposed a simple development plan for the town, which provides for a division of activities into four development zones based on the four sectors formed by the crossing of the east-west Route 6, and the north-south highway, (Angkor Thom/Phnom Krom). The north-west zone for tourist development, the north-east for industry, the south-west for concrete houses, and the south-east for other types of building according to the funds available to individual families. The plan has been submitted to the Phnom Penh authorities but a reply has not yet been received.

The local authorities lack the resources to manage and plan the expansion of the town. There are no plans to conserve the town centre and restor the commercial area, nor to establish new public spaces, construct new roads and provide urban services. The departments lack professional staff and equipment for producing plans. Data on the state of the urban area is limited and needs to be updated.

TOURISM

Siem Reap was developed as a tourist town during the first half of the 20th Century for the many thousands of tourists who each year came to visit Angkor. Angkor is one of the greatest tourist attractions in Indochina and although for over a decade it was closed to visitors, Siem Reap could rapidly reestablish its preeminence as a tourist destination in the region. Development of tourism can bring many benefits to Siem Reap and the province, but development of tourism carries with it the seeds of its own destruction.

Opportunities

The Indochina region is Southeast Asia's fastest growing tourist destination and Cambodia is at the heart of the region. Angkor has a major appeal as a 'new' destination with a sense of mystery and legend, as it has been inaccessible for the past 20 years. Siem Reap has an airport which used to handle international flights, and it could have direct access from Thailand and Vietnam by road. Angkor and Cambodia's immediate potential is as part of a regional tourist package linked to Thailand, Laos and Vietnam. The main markets are Japan, ASEAN countries, Europe, N. America and Australia/New Zealand with the largest market from the ASEAN region, especially Thailand. (Thailand presently has 5 million international tourist per annum and perhaps 12 million Thais travel as tourists within their country and potentially abroad).

Pressures on Angkor over next 5-10 years are likely to be intense. They arise from tour operators seeking "new" destinations, quick-money hotel investors, adventure tourists and governments seeking to maximise tourism for economic benefits.

Constraints

The immediate constraint is the current political uncertainty, especially the instability in the Angkor area. Access is difficult. There are poor national roads and limited flights to Siem Reap, with connections only through Phnom Penh. Infrastructure in Siem Reap is inadequate, with poor or nonexistent roads, electricity, water and sewerage facilities. Existing tourism accommodation is limited, with poor quality facilities and services and no international standard hotels or restaurants.

The infrastructure in the Angkor park area is inadequate and ad hoc. Refreshments and souvenirs are rudimentary. There are no exhibits or interpretive facilities and no toilets. Guides are poor and lack knowledge of the sites and of languages. There is no control of tourist or local vehicles and no management of visitors in the monuments. A visit to Angkor is currently not good value in terms of quality of experience or expense.

Angkor is in a position of strong demand but weak facilities. It can therefore dictate desired tourism development strategies. The challenge is not to make maximum numbers the priority, but to seek to provide a quality tourist experience to a high spending clientele and to preserve the Angkor heritage for the future. Steady development of quality facilities, not marketing, is the central issue.

Tourist Arrivals

Diagram 3 shows key figures on tourism in Cambodia and Siem Reap. Existing data is very limited, but the General Direction of Tourism (GDT) shows an average of 20,000 arrivals per year from 1988-1991 and an increase to 87,000 in 1992. A report on tourism in Cambodia prepared by the World Tourism Organisation (WTO) in 1992 indicated that Cambodia received 59,000 tourists in 1991. The 1992 total includes a major increase in the number of official visitors and visiting friends and relatives of the United Nations Transitional Authority for Cambodia (UNTAC) personnel. There was also a considerable increase in holiday tourists.

DIAGRAM 3

ZEMP / Angkor : Key figures on Tourism in Cambodia / Siem Reap

Cambodia / Phnom Penh

Tourist arrivals at the international airport

1988	19.864	
1989	20.160	
1990	16.993	
1991	25.012	?(59.611)
1992	87.720	

Nationality 1992

1. Japan	15 %
2. France	13 %
3. Germany	12 %
4. USA	13 %
5. Italiy	6 %
others	42 %

Hotels/hotel rooms (Phnom Penh) estimation

1991	22	906
1992	60	2.000

Source : Direction of Tourism

Siem Reap

Tourist arrivals in Siem Reap (town) estimation

1988	
1989	
1990	
1991	
1992	35.000

Nationality 1992 (Grand Hotel / Angkor Tourism)

1. Japanese
2. French
3. Germany

Hotels/hotel rooms (Siem Reap)

1991		
1992		
1993	392	in operation
	147	under construction
	539	total end of 1993
1994 - 95	510	in planning

Source : Angkor Tourism/Grand Hotel/ZEMP Team

Although no data on purpose of visit is available the WTO report provides the following for 1991: official (35%), business (38%) and holiday (27%). Based on these figures, it is estimated that 35-40% or approximately 30,000 tourists were on holiday in 1992 with Angkor as primary destination. In 1992 GDT figures show the following national breakdown; Japan (15%), France (13%), Germany (12%), USA (13%), Italy (6%), other countries (42%).

Accommodation

Hotel accommodation has been growing rapidly in Phnom Penh and Siem Reap, as is shown in Diagram 3. There are 392 existing hotel rooms in Siem Reap, a further 147 rooms are under construction and 500 more planned. In addition there are an estimated 100 rooms available in guesthouses. It is estimated that by the end of 1995 there will be a total of 1,100 rooms available in Siem Reap. The Grand Hotel and Aspara together provided 16,000 room nights in 1992 which corresponded to 26,000 - 28,000 visitors.

A further 1,000 rooms in 3 hotels are in active discussion. This takes the number of hotel and guesthouse rooms expected within the next 5 years to 2000. Fourteen international hotel companies want to build in Siem Reap, some near the western Baray, others along the road between Siem Reap and Angkor Wat, as near to the temples as possible.

On the basis of certain assumptions derived from existing and anticipated occupancy levels, the following table sets out the number of tourists which would correspond to the number of rooms.

no. of rooms	capacity of tourists per anum
1000	125,000
2000	250,000
2500	312,000
3000	375,000
4000	500,000

There is an already planned capacity for almost 300,000 tourists which will cater for a four fold increase of the 1992 visitor numbers to Siem Reap and Angkor.

Tourism Guide Services

Figures for guiding tourists from Angkor Tourism travel agency are as follows :

1990	1,500
1991	5,500
1992	10,500

The nationalities of tourists in 1992 is shown in Diagram 3.

Estimates of Potential Tourist Demand

It is impossible to project trends of numbers of visitors based on present visitation to Angkor, but a useful comparison can be made with visits to other cultural sites in the region.

In 1991:	Borboudour, Indonesia	1.5 million domestic visitors 300,000 international visitors
	Sukothai, Thailand	700,000 visitors

On the basis of these figures future estimates for Angkor are:
300,000 - 700,000 international visitors
100,000 - 500,000 domestic visitors.

The number of international visitors might double to over 1 million if direct road access to Thailand were available. In conclusion it is suggested that the number of visits to Angkor could rise to be between 500,000 - 1,000,000 domestic and international visits during next 5 years as constraints on infrastructure are remedied. This is a major challenge for the managers of the Angkor sites and to those planning and developing the town.

Economic Implications

An indication of tourist income for Angkor can be derived from the following;

* The average daily tourist expenditure in the 5 years to 1992 in Indonesia, Thailand and Malaysia was US$ 85.00
* The average length of stay in Cambodia is 5 days.
* Using these figures tourist expenditure per 100,000 international visitors to Cambodia could yield US$ 450 million.
* The estimated import rate for Cambodia is 50-60% (meaning 50% of tourism receipts will stay in the country).
* Total tourist income in the country could be US$ 200 million.
* Assuming 1-2 jobs per hotel room (which varies with the quality of hotel) and jobs in restaurants and shops, each 1,000 rooms could generate 3,000 - 5,000 jobs. Therefore estimates of rooms and jobs in Siem Reap could be:
  1996 1,500 rooms = 4,500 - 7,500 jobs;
  2000 4,000 rooms = 12,000 - 20,000 jobs
  2010 8,000 rooms = 24,000 -40,00 jobs
* Average salary for a hotel employee is 40-50 dollars per month.

* Direct and indirect employment at 3-4 jobs per bed or 6-8 per room, gives a total employment effect of approximately:
  15,000 jobs in 1996
  24,000 jobs in 2000
  58,000 jobs in 2010.

Tourism can help fund archaeological conservation and support other industries, contributing to improved educational and economic opportunity. However tourism can also threaten Angkor from uncontrolled development leading to loss or damage to archaeological sites, and increased land prices and other negative impacts affecting the host community.

The main problems of Angkor and especially Siem Reap cannot be solved within the next 3 - 5 years, but hopefully within the next 5 - 10 years. The aim of tourism strategy must be planned and controlled development taking place carefully and without unnecessary speed, over the next 10-15 years.

BOX 1 PLANNING AND MANAGEMENT ZONES FOR THE ANGKOR AREA

NAME	DEFINITION	ADMINISTRATIVE & LEGAL FRAMEWORK	DUTIES & CONTROLS
ANGKOR CULTURAL RESERVE (ACR)	Area of significant archaeological heritage, corresponding to the ZEMP study area; boundaries will be reviewed after further archaeological survey in adjacent regions.	National Heritage Protection Authority of Cambodia (NHPAC) powers administered by Angkor Parks Agency (see below), via a joint Development Review Board for the ACR The "board" will consist of NHPAC and central and local government representation. ACR Development Review Board to be established between NHPAC and the central and local authorities to require notification of projects, consultation between interests and a forum for making the final decision.	i) all proposed government projects and programmes, on an approved list, require an archaeological survey and assessment of impacts on archaeological resources at feasibility and design stages; ii) all government agencies and departments are responsible for designing projects and programmes in accordance with zonal management policies and guidelines for conservation of archaeological and ecological resources and planned development of infrastructure and urban settlement which apply within the ACR. iii) NHPAC to review effects on archaeology and on the Angkor Parks of all proposals; iv) project approval from ACR Development Review Board.

NAME	DEFINITION	ADMINISTRATIVE & LEGAL FRAMEWORK	DUTIES & CONTROLS
ANGKOR PARKS (AP) - Angkor Archaeological Park - Phnom Kulen Park - Satellite Parks	Areas with greatest density of sites of archaeological importance and touristic interest, and/or importance for management of hydrological and ecological resources.	Managed by a single multi-purpose Angkor Parks Agency (Parks Agency) established as a division of NHPAC, and incorporating the Angkor Conservation Office	Responsible for; i) archaeological services in the ACR and Angkor Parks incl. coordination of surveys, research & monitoring programmes; licensing & control of restoration and archaeological excavation activities; registering archaeological sites, classifying SAACs (see bellow) and determining impact of development on SAACs in the ACR and on archaeological in the APs; ii) maintenance and restoration of the monuments within the Aps; iii) provision of archaeological interpretation of Angkor incl. archives, conservation laboratories, museum, exhibitions, and coordinating facilities for dance;

ANGKOR PARKS (AP) continued			iv) visitor management and provision of visitor facilities (incl. concessions and licences), for interpretation, transport, souvenir manufacture and sales etc; v) park planning and policy, park investment programmes, control of land use and development in the parks, assessment of impact of government projects on the parks and economic and social development of the indigenous people,; vi) training of archaeologists & field workers, restoration and maintenance technical and craft-workers, park rangers, interpreters and guides; vii) Environmental and Khmer heritage education and awareness programmes for people in the locality

NAME	DEFINITION	ADMINISTRATIVE & LEGAL FRAMEWORK	DUTIES & CONTROLS
WORLD HERITAGE AREA	Boundaries of area inscribed on the World Heritage list are those of the Angkor Parks. Angkor Archaeological Park and Banteay Srei & Phnom Krom Satellite Parks = World Heritage Cultural site (already inscribed) Phnom Kulen Park = World Heritage Mixed Site (to be inscribed) Tonle Sap Protection Zone (part only in ZEMP study area) = World heritage Natural Site (subject to further study and definition)	NHPAC powers as above administered by the Parks Agency.	as above

NAME	DEFINITION	ADMINISTRATIVE & LEGAL FRAMEWORK	DUTIES & CONTROLS
RESTRICTED AREAS (RA)	Group of cultural immoveables and supporting areas defined by decision of the SNC on advice of NHPAC (under proposed amendments to the Protection of Cultural Heritage (PCH) - Decision Feb 10.93). RAs incl. monument areas and support zones within the Aps and sites in the ACR. Ras are public property under control of NHPAC.	NHPAC powers administered by the Parks Agency.	Strict control on development and use of areas, no new settlement, existing homes and agricultural use under licence, extreme care in siting and construction of visitor facilities and structures necessary for maintenance and conservation, active forest and landscape management, charges made for visiting and funds used for conservation and management of archaeological heritage.

NAME	DEFINITION	ADMINISTRATIVE & LEGAL FRAMEWORK	DUTIES & CONTROLS
SITES AND AREAS OF ARCHAEOLOGICAL SIGNIFICANCE (SAACs)	Archaeological sites "classified" under proposed amendments to the PCH Law (amendments relate to creating a category of classified archaeological site). These are the more significant archaeological sites in public and private ownership on the register of cultural property, which are made subject to the regulations applying to SAACs in the ACR. These regulations incorporate the normal requirements to have NHPAC approval for any action which effects a SAAC.	NHPAC powers administered by the Parks Agency and the ACR Development Review Board	i) survey to determine significance and registration of archaeological sites ii) "classification" of sites adopting boundaries which include support zones, and specifying management and development guidelines; iii) Regulations will require pre-notification and approval by the APA for change of use and development, incl. activities which break ground, in SAACs. Refusal is subject to confirmation by the ACR Development Review Board for sites in the ACR.

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V. ZEMP OVERVIEW

Contents

ZONING STRATEGY AND STRUCTURE

The ZEMP Team reviewed the individual expert survey reports as well as previous zoning proposals and legislation. They also looked at the international standards and experience in each area of expertise, including the requirements of the World Heritage Convention. A plan was then developed by the team, which proposes a two tiered management strategy consisting of zones and institutions. The plan would be implemented through the establishment and effective support for authorities and by the completion of specific projects. Implementation would be monitored using the geographic information system established under ZEMP, by the National Heritage Protection Authority of Cambodia (NHPAC) and local government authorities, with advice from UNESCO and the Director General's Scientific Panel on Angkor and the International Expert Consultative Group for Angkor.

The ZEMP Team propose a number of zones, based on principles of protected area management and control of site development. These include identifying a number of areas for maximum protection which would become the primary management zones called the **Angkor Parks (AP)**. The Angkor Parks are surrounded by a support zone, the **Angkor Cultural Reserve (ACR)**, within which specific zones in addition to the parks are identified for ecological management, intensive tourism and other forms of urban development. The legal and administrative requirements and management policies, are outlined for each zone. The proposed zones balance the needs of protection of the archaeological heritage and sustainable use of natural resources with those of development to achieve the desired objectives for economic development and conservation.

The Proposed Zones are shown on Plan 10. The Angkor Archaeological Park and the Urban Development Zones are shown in more detail in Plan 11.

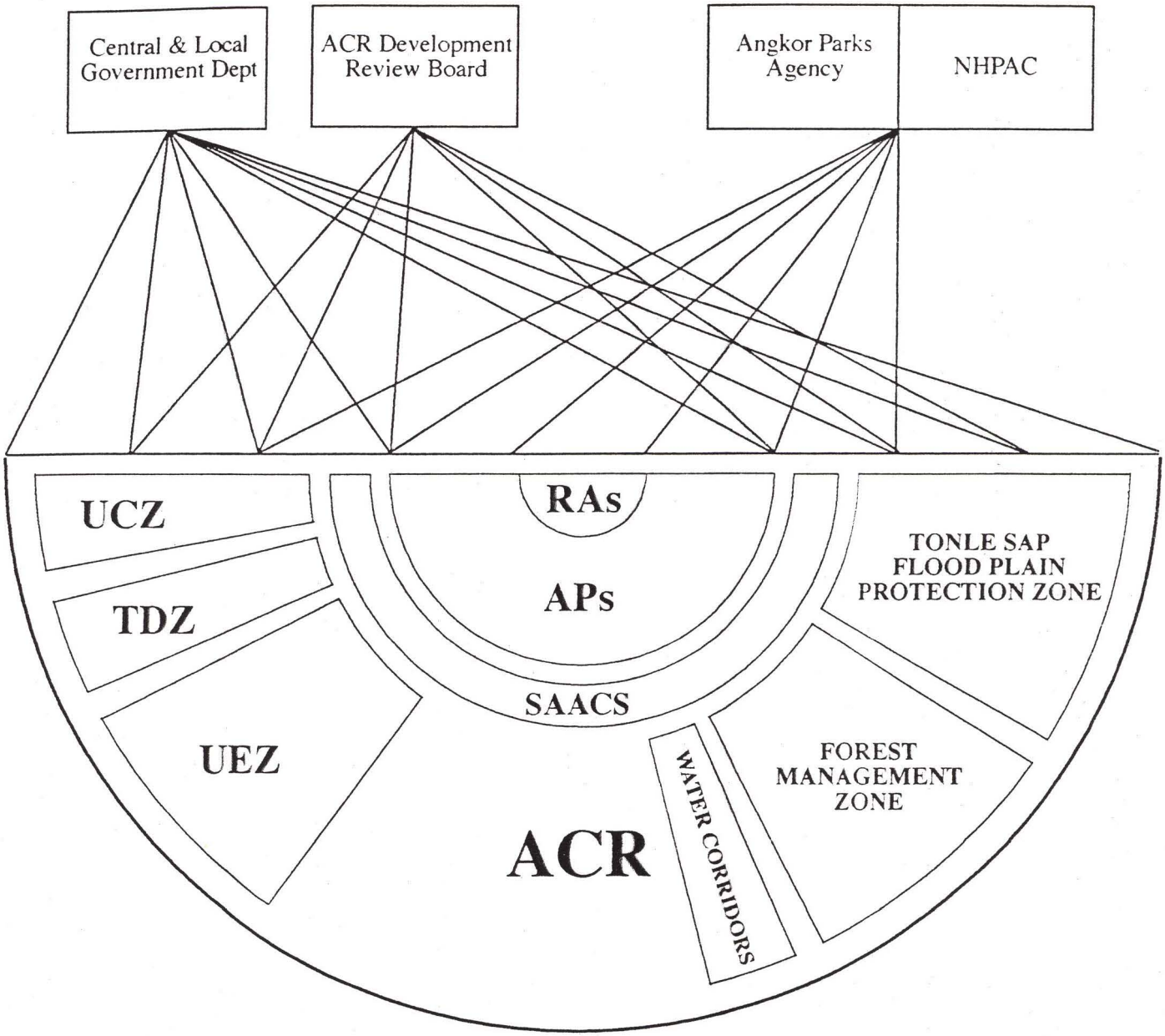
Box 1 presents in outline the proposed Planning and Management Zones for the Angkor Area.

Diagram 4 represents in sketch form the relationships between the authorities responsible for administering the area and the zones, proposed by ZEMP.

ZEMP recommends the establishment of an **Angkor Parks Agency** under the authority of NHPAC to plan, develop and administer the Angkor Parks and provide archaeological services within the region. The agency will absorb the functions and staff of the Angkor

DIAGRAM 4

AUTHORITIES



ZONES

RAs - CORE RESTRICTED AREAS
APs - ANGKOR PARKS
UEZ - URBAN EXPANSION ZONES
TDZ - TOURISM DEVELOPMENT ZONE
UCZ - URBAN CONSERVATION ZONE

RELATIONSHIP BETWEEN AUTHORITIES AND ZONES

Conservation Office. ZEMP also proposes to set up an **ACR Development Review Board** with responsibility to safeguard archaeological and natural heritage in the Angkor Cultural Reserve. The Board will have representation by central and local government and the Angkor Parks Agency and will review development proposals in the area.

The ACR includes part of Tonle Sap which is presently the subject of other studies, including a proposal to designate the Lake and wetlands around it as a World Heritage Site (Natural). ZEMP envisages a Tonle Sap Commission to co-ordinate the management of the Lake. The Angkor Parks Agency and the ACR Development Review Board would liaise with the Commission to achieve integration of policies as they effect the areas around Tonle Sap.

ANGKOR PARKS

The main focus for protection of the Angkor heritage is the proposed Angkor Parks. Two main park units are identified: the Angkor Archaeological Park and the Phnom Kulen Park. Other major outlying sites are identified as satellite parks.

The **Angkor Archaeological Park (AAP)** contains the highest density of Angkor archaeological sites, and the monuments of greatest tourist interest such as Angkor Wat, Angkor Thom, Preah Khan, Banteay Samre, the East and West Barays and the Roluos group. The original sites of five of the ancient Angkor cities lie within the boundaries of this Park. So do many of the historical hydrological structures, canals and dikes.

The area of the AAP comprises: (1) the original Angkor Park as designated in 1925 and reconfirmed with minor variations during the subsequent decades (including a resolution of the Council of Ministers of the State of Cambodia government in 1992); and (2) a buffer zone to provide maximum protection through the management of land use and development in the area surrounding the core monuments. The boundaries of the AAP include the numerous and important archaeological sites and features in an area approximately defined by the towns of Puok, Roluos and Phnom Bok.

The Phnom Kulen area also has a wealth of early Angkor archaeological sites, natural habitats and water management features. It is also an area of hydrological and ecological importance and recreation interest for which special protection is required. Therefore it is proposed to designate the **Phnom Kulen Park (PKP)** as the second major unit in the Angkor Parks. This area is defined by the base of the escarpment which rises sheer from the plain. It was proposed as a Park in the 1960s, but hostilities have prevented the park being realized until now.

The Banteay Srei monument together with Phnom Dei, and Phnom Krom are proposed as the first **satellite parks**. They will be subject to the same management authority and guidelines as other units of the Angkor Parks. Other satellite parks can be added at a later date to protect other archaeological sites, such as Beng Mealea.

The Angkor Parks contain not only major archaeological and sites, but also a large local population whose interests must be protected. Settlement will be allowed to continue, and sustainable practices of agricultural and forest management encouraged within the parks, to create authentic landscapes which preserve the Cambodian heritage.

Within the AAP, the core monument areas around Angkor Thom and Angkor Wat and the Roluos group will be further designated "Restricted Areas" under the Decision on Protection of Cultural Heritage. These areas will therefore remain in public ownership and will fall under direct management of NHPAC. Protection of archaeology and the forest environment, and the management of visitors, will have top priority in these areas. The remaining areas will be protected by the buffer zone surrounding the main monuments which forms part of the Park.

The Angkor Parks are described in Chapter VII.

Angkor Parks Agency

Given the size and complexity of the Angkor Parks and the competing management goals, a strong and multi-disciplinary management organization is required for full implementation of the plan. The most efficient method of management is the creation of a single administration. NHPAC now has responsibility for all archaeological heritage in the country. We recommend that a new body should be established by NHPAC, to be called the Angkor Parks Agency (referred to in this report as the Parks Agency). This agency will be part of NHPAC, and will represent NHPAC's interests in the management of the parks and surrounding support zone of the ACR.

The Parks Agency will have exclusive authority for the development and management of the Angkor Parks. It will work in collaboration with other government technical departments in the management of water, development of infrastructure and delivery of services to those living and working in the parks. Priority will be given to the maintenance and conservation of archaeological sites, in particular the upstanding monuments in the Angkor Parks. The Parks Agency will provide an archaeological and conservation service throughout the ACR, and will be responsible for providing visitor facilities, safety and security of artifacts, and for the creation and management of appropriate land uses and landscapes within the parks.

The Parks Agency will be led by a Director, and it will in due course establish appropriate departments, divisions, and sections to carry out specific operational functions for visitor management, management and control of archaeological survey and excavation, restoration and maintenance of monuments, enhancement of the ecology, site management and development interests of the local inhabitants of the parks. The Parks Agency will absorb the present functions and staff of the Angkor Conservation Office. The Agency is described in detail in Chapter VIII.

ANGKOR CULTURAL RESERVE

The whole ZEMP study area is rich in Angkorian and pre-historic remains and contains important sites of archaeological and natural heritage which should be subject to comprehensive policies for guiding development. Altogether more than one thousand archaeological sites and areas have been identified and need protection. It is proposed that this area which includes the Parks, be defined as the Angkor Cultural Reserve (ACR). The primary purpose of this zone is to exercise control over development activities which could potentially damage archaeological areas or the Parks, and also to promote sustainable use of

natural resources.

Protection also needs to extend to archaeological features lying below ground which are not yet recorded. It is therefore proposed to require an archaeological survey of areas likely to be affected by development proposals before projects and programmes are designed, and to include mitigation measures which safeguard significant elements of archaeological and natural heritage before projects are approved.

Zoning a large area of Siem reap province as the ACR must not hold back appropriate development. The purpose is to ensure that the wider cultural landscape of the Angkor civilization and the requirements of heritage conservation are taken into account in development programmes for the region.

Within the ACR a number of special purpose zones are identified to protect vulnerable ecological areas and to guide urban and tourist development, particularly in and around the town of Siem Reap. Sustainable use of natural resources will be promoted throughout the ACR including: management of water sources and enhancement of forest areas and other vegetation; improved management of local fish stocks; and undertaking rural community development programmes . These are described in Chapter VI.

ZEMP also proposes institutional structures by which the ACR can be managed as a multiple-use zone with a primary emphasis on economic development, archaeological protection, sustainable rural and tourist development. The proposed boundaries of the ACR are currently those of the ZEMP study area. These could be extended after further research and survey of adjacent areas so policies and procedures to conserve the archaeological heritage and to promote integrated development can apply more widely.

A special issue within the ACR is the regulation of tourist development particularly hotels and other tourist establishments in Siem Reap. A Tourist Development Zone has been identified by ZEMP in which tourist development would be channelled and assisted through the activities of a specially constituted **Tourist Development Corporation** for Siem Reap. It proposes that the corporation will acquire all land within the zone with just and proper compensation paid to existing owners on the basis of current use value at the date of expropriation. The corporation will prepare and service the zone, and dispose of sites to investors through competitive tendering.

ACR Development Review Board

Management of development within the ACR will involve a working partnership between the National Heritage Protection Authority for Cambodia (NHPAC) represented by the Angkor Parks Agency, and representatives of Ministries and Departments of central and provincial Government in the region. Approval for major development schemes, public and private, will be granted by a special project review body to be established and called the ACR Development Review Board. The Board will comprise representatives from central and provincial Government and NHPAC and will be responsible for monitoring NHPAC's statutory duties with regard to the protection of archaeology in the ACR and the granting of approval to projects within the guidelines provided by ZEMP.

The Joint Development Review Board will be notified by responsible government departments and agencies of proposed projects and programmes affecting the ACR. The Angkor Parks Agency working with the heads of other government departments in Siem Reap Province will assess proposals in the light of ZEMP management guidelines, for their impact on archaeological and ecological conservation and on the parks. Projects will be approved subject to mitigation measures to minimize adverse effects of development by the Joint Development Review Board. The system of notification, review and approval should be built into and made compatible with the national project approval processes for government and private development schemes.

SPECIAL AREAS OF ARCHAEOLOGICAL CONCERN (SAACS)

The scattered nature of Angkor's archaeology and the fact that much remains still buried or not yet fully understood, means that many sites will be in locations which are impractical for inclusion within the boundaries of the parks. Some hold great archaeological significance and must be preserved for the future, and ZEMP proposes that, after identification and evaluation of significance, they should be classified as Special Areas of Archaeological Concern (SAAC). An amendment is proposed to introduce this designation to the Cultural Heritage Law, and to introduce controls over any works which would disturb the land or otherwise affect the archaeology. Ultimately the most important of these sites will be classified as Restricted Areas and brought into public ownership and direct management.

LEGAL AND REGULATORY FRAMEWORK

The preferred approach to establishing a legal basis for the implementation of ZEMP is by building on the existing laws and institutions relating to the cultural heritage of Cambodia. The Decision relating to the Protection of the Cultural Heritage of February 10, 1993 (PCH) provides an excellent starting point, and allows ZEMP to be nested within a national framework. It is important to avoid legislation that is too detailed and too rigid. There is also a need for a package of measures that can be enacted swiftly. Amendments to the legislation should provide the statutory basis for administrative structures and decisions to protect Angkor. For instance the composition, structure and powers of the Board to oversee the ACR should be specified. Powers should enable the SNC or successor, to issue future detailed controls and guidelines. Draft legislative amendments are set out in Chapter IX.

There is also a need for strong interim measures, including an immediate ban on all unauthorized development within the Angkor Parks zone and within the proposed Siem Reap tourism development zone (pending implementation of a special scheme). These can be achieved by enacting amendments to PCH and, if necessary, on an interim basis by refusal of construction consents by the local authorities and through a moratorium on archaeological excavation.

Special legal provisions will apply to the urban zones, but elsewhere in the ACR, it is recommended that NHPAC will be given authority to issue guidelines to control activities with potential impact on archaeology and the Angkor Parks. All ministries and provincial and local governments take these into account. Enforcement will be required through the

mediation of the ACR Development Review Board. The Board could be established informally to co-ordinate the interests of the NHPAC and other government agencies. However, there are good reasons for giving the Board a formal legal authority, so that it can have power to direct that work for which permission has not been sought and approved should stop if the appropriate procedures have not been complied with. It should also have power to direct that an environmental impact assessment should be carried out in advance or a decision on a project.

RECOMMENDATION FOR WORLD HERITAGE INSCRIPTION

One of the key purposes of a zoning plan for Angkor is to recommend an appropriate boundary for the area inscribed as the World Heritage Site. Delimitation of the site depends not only on identifying areas of highest archaeological importance, but also on defining an area subject to the jurisdiction of an authority capable of delivering sound management. The ZEMP team recommend that the permanent boundaries of the World Heritage Inscription should be as follows:

* Angkor Archaeological Park and Banteay Srei and Phnom Krom Satellite Parks, to be the Angkor World Heritage Cultural Site (already inscribed).

* Phnom Kulen Park: to be proposed and inscribed as a World Heritage Mixed Site as soon as further study allowing access to the area and a proposal can be prepared.

* Tonle Sap Protection Zone (part only in the ZEMP study area): to be the subject of further study and proposals for inscription as a World Heritage Natural Site.

ZEMP considers that following detailed archaeological studies over a much larger area of Angkorian and pre-angkorian archaeological remains the Angkor Cultural Reserve may be enlarged and that the most important archaeological areas in the ACR may be appropriate for inscription as a World Heritage Cultural Landscape. This would reinforce the protection afforded to archaeological heritage in the ACR by extending world heritage status beyond the parks.

For the present the main focus will be on the Angkor Archaeological Park and also the Banteay Srei and Phnom Krom Satellite Parks. A detailed management plan is required for these World Heritage units. When Phnom Kulen Park is proposed and accepted for inscription as a mixed site, it should be the subject of a detailed management plan as access and staff resources become available, to evaluate fully the conservation needs of the archaeology, hydrology, ecology and human resources of the area.

BOX 1 PLANNING AND MANAGEMENT ZONES FOR THE ANGKOR AREA

NAME	DEFINITION	ADMINISTRATIVE & LEGAL FRAMEWORK	DUTIES & CONTROLS
ANGKOR CULTURAL RESERVE (ACR)	Area of significant archaeological heritage, corresponding to the ZEMP study area; boundaries will be reviewed after further archaeological survey in adjacent regions.	National Heritage Protection Authority of Cambodia (NHPAC) powers administered by Angkor Parks Agency (see below), via a joint Development Review Board for the ACR The "board" will consist of NHPAC and central and local government representation. ACR Development Review Board to be established between NHPAC and the central and local authorities to require notification of projects, consultation between interests and a forum for making the final decision.	i) all proposed government projects and programmes, on an approved list, require an archaeological survey and assessment of impacts on archaeological resources at feasibility and design stages; ii) all government agencies and departments are responsible for designing projects and programmes in accordance with zonal management policies and guidelines for conservation of archaeological and ecological resources and planned development of infrastructure and urban settlement which apply within the ACR. iii) NHPAC to review effects on archaeology and on the Angkor Parks of all proposals; iv) project approval from ACR Development Review Board.

NAME	DEFINITION	ADMINISTRATIVE & LEGAL FRAMEWORK	DUTIES & CONTROLS
ANGKOR PARKS (AP) - Angkor Archaeological Park - Phnom Kulen Park - Satellite Parks	Areas with greatest density of sites of archaeological importance and touristic interest, and/or importance for management of hydrological and ecological resources.	Managed by a single multi-purpose Angkor Parks Agency (Parks Agency) established as a division of NHPAC, and incorporating the Angkor Conservation Office	Responsible for; i) archaeological services in the ACR and Angkor Parks incl. coordination of surveys, research & monitoring programmes; licensing & control of restoration and archaeological excavation activities; registering archaeological sites, classifying SAACs (see bellow) and determining impact of development on SAACs in the ACR and on archaeological in the APs; ii) maintenance and restoration of the monuments within the Aps; iii) provision of archaeological interpretation of Angkor incl. archives, conservation laboratories, museum, exhibitions, and coordinating facilities for dance;

ANGKOR PARKS (AP) continued			iv) visitor management and provision of visitor facilities (incl. concessions and licences), for interpretation, transport, souvenir manufacture and sales etc; v) park planning and policy, park investment programmes, control of land use and development in the parks, assessment of impact of government projects on the parks and economic and social development of the indigenous people,; vi) training of archaeologists & field workers, restoration and maintenance technical and craft-workers, park rangers, interpreters and guides; vii) Environmental and Khmer heritage education and awareness programmes for people in the locality

NAME	DEFINITION	ADMINISTRATIVE & LEGAL FRAMEWORK	DUTIES & CONTROLS
WORLD HERITAGE AREA	Boundaries of area inscribed on the World Heritage list are those of the Angkor Parks. Angkor Archaeological Park and Banteay Srei & Phnom Krom Satellite Parks = World Heritage Cultural site (already inscribed) Phnom Kulen Park = World Heritage Mixed Site (to be inscribed) Tonle Sap Protection Zone (part only in ZEMP study area) = World heritage Natural Site (subject to further study and definition)	NHPAC powers as above administered by the Parks Agency.	as above

NAME	DEFINITION	ADMINISTRATIVE & LEGAL FRAMEWORK	DUTIES & CONTROLS
RESTRICTED AREAS (RA)	Group of cultural immoveables and supporting areas defined by decision of the SNC on advice of NHPAC (under proposed amendments to the Protection of Cultural Heritage (PCH) - Decision Feb 10.93). RAs incl. monument areas and support zones within the Aps and sites in the ACR. Ras are public property under control of NHPAC.	NHPAC powers administered by the Parks Agency.	Strict control on development and use of areas, no new settlement, existing homes and agricultural use under licence, extreme care in siting and construction of visitor facilities and structures necessary for maintenance and conservation, active forest and landscape management, charges made for visiting and funds used for conservation and management of archaeological heritage.

NAME	DEFINITION	ADMINISTRATIVE & LEGAL FRAMEWORK	DUTIES & CONTROLS
SITES AND AREAS OF ARCHAEOLOGICAL SIGNIFICANCE (SAACs)	Archaeological sites "classified" under proposed amendments to the PCH Law (amendments relate to creating a category of classified archaeological site). These are the more significant archaeological sites in public and private ownership on the register of cultural property, which are made subject to the regulations applying to SAACs in the ACR. These regulations incorporate the normal requirements to have NHPAC approval for any action which effects a SAAC.	NHPAC powers administered by the Parks Agency and the ACR Development Review Board	i) survey to determine significance and registration of archaeological sites ii) "classification" of sites adopting boundaries which include support zones, and specifying management and development guidelines; iii) Regulations will require pre-notification and approval by the APA for change of use and development, incl. activities which break ground, in SAACs. Refusal is subject to confirmation by the ACR Development Review Board for sites in the ACR.

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VI ZONING AND ENVIRONMENTAL MANAGEMENT IN THE ANGKOR AREA

CONTENTS:

ZONING AND ENVIRONMENTAL MANAGEMENT IN THE ANGKOR AREA

1. INTRODUCTION

ZEMP studies cover an area of $5,000^2$ km, considerably larger than the area of the original Angkor Archaeological Park in 1925. Much new evidence was discovered of the extent and density of the Angkor archaeological remains. Evidence was also found of extensive pre-angkorian settlement and exceptional examples of traditional swidden agriculture, forest utilization and water management. Many of the agricultural and fisheries practices used today are similar to those of the Angkor period as depicted in reliefs on the Bayon temple. In fact there is a great wealth of Cambodian heritage throughout the ZEMP study area which is important conserve. Therefore ZEMP proposes the delineation of an Angkor Cultural Reserve (ACR), which corresponds to the ZEMP study area.

The ACR contains the Angkor Parks and the World Heritage Areas. It also contains a population of some 350,000 inhabitants, the town of Siem Reap, other small towns and numerous villages. It is an area in which development and change will occur, and it is therefore important that the process of change contributes to the protection and conservation of the cultural heritage. Policies for sustainable development and use of natural and cultural resources should be adopted. Development should follow guidelines to protect archaeology and promote the development of sound economic and social conditions in the area.

This chapter sets out general and specific policies for the Angkor Cultural Reserve, identifies ecologically sensitive zones and urban development zones and sets out management guidelines through which the purposes of the ACR can be achieved.

PRINCIPLES FOR SUSTAINABLE DEVELOPMENT

The United Nations Conference on Environment and Development declaration Agenda 21, 1992, and the publication Caring for the Earth, a Strategy for Sustainable Living, 1991, have focused world development upon the principles of sustainability. The word "sustainable" is used in a number of combinations: see BOX 1.

Management through out the Angkor Cultural Reserve should follow sustainable principles. These areas are outlined in BOX 2. These principles apply to all forms of development: agriculture, forestry, fisheries regional development and tourism. They refer to the sustainable management of both ecological and cultural resources.

Sustainable principles are incorporated into development policies for the ACR and the management guidelines for the zones.

BOX 2

DEFINITIONS OF SUSTAINABILITY

* **"Sustainable development"** aims to meet the needs of the present without compromising opportunities for future generations to meet their own needs - this implies improving the quality of human life while living within the carrying capacity of the environment.

* **"Sustainable use"** applies only to renewable resources and implies their exploitation at rates which are within the carrying capacity of the supporting ecosystems.

* **A "sustainable economy"** is the product of sustainable development. It maintains its natural and cultural resource base. It can continue to develop by adaption, and through improvements in knowledge, organization, technical efficiency, and wisdom.

* **A "sustainable society"** is one that lives within its means and shares wealth equitably between members of the present generation whilst protecting the resources of future generations.

BOX 3

SUSTAINABLE DEVELOPMENT PRINCIPLES FOR THE ANGKOR CULTURAL RESERVE

* Development should not degrade the resource base upon which it depends.

* Strive to achieve maximum cultural, ecological and economic diversity.

* Maximize uniqueness and authenticity of product.

* Archaeological and environmental conservation can be tools to stimulate economic development

* Short-term benefits should not take precedence over long-term costs.

* Economic benefits must be equitably distributed.

* Development activities must be based on local value systems.

* Direct and indirect economic leakages should be minimized.

* Use of local resources should be maximized to benefit local people.

* Developers must pay for all costs of negative impacts.

* Development must be undertaken within a legal regulatory framework.

* Zoning is a tool to achieve resource compatibility.

* "Plan as you proceed" within a strategic framework and vision.

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2. ANGKOR CULTURAL RESERVE

INTRODUCTION

The Angkor Cultural Reserve is the region surrounding the Angkor Parks and containing major archaeological features and areas of valuable natural resources and urban settlement. It is shown on Plan 10. The purpose of the zone is to support archaeological conservation and sustainable development in the Angkor area. It may also demonstrate how an integrated management approach can balance economic and rural development with archaeological and ecological conservation in a sustainable manner.

The ACR contains the following areas:

- Angkor Parks;
- Ecologically Sensitive Zones including River Corridors, the Tonle Sap Floodplain Protection Zone, and Forest Management Zones;
- Urban Development Zones including Urban Expansion Zones for major settlements, a Tourism Development Zone in Siem Reap, and Urban Conservation Zones in Siem Reap, Puok and Roluos.

A large part of the ACR is not designated as specific zones. This area would be managed under general policies applying to the ACR and specific policies for archaeological conservation, ecology, tourism, urban development, transport, water management, and rural development. Policies on archaeological conservation are set out in the next chapter together with management guidelines for the Angkor Parks and Special Areas of Archaeological Concern. This chapter includes other policies and management guidelines for the ecologically sensitive zones and urban development zones.

The ACR is the area of the ZEMP study shown on Plan 10, and is delimited by grid references:

West to East = 345.000 - 420.000
South to North = 1,445.000 - 1,520.000

It is bounded by the Phnom Kulen and Kabal Spean to the north, Tonle Sap to the south, the Prek Thnal Dach to the east, and the river Stoeng Phlang to the west.

PURPOSE AND FUNCTION

The ACR will be managed as a multiple use area in which land use and development must be integrated and coordinated between sectors and between localities. The emphasis of management is on;

- archaeological protection,
- sustainable development of natural resources for water use, agriculture, forestry,
- environmental protection,
- planned urban development, and
- tourism.

The management of the ACR has the following objectives:

* to protect Angkor archaeology throughout the ACR by establishing a system of integrated management and planning including the assessment of impacts and permits for development.

* to promote economic development in the ACR through a strategy of planned, sustainable, high quality, cultural and nature-based tourism;

* to promote rural development through improvements in agriculture, forestry and water management;

* to ensure ecological processes are not degraded and are exploited only in an ecologically sustainable manner, so as to provide a continued supply of food, timber and other products for future generations of Cambodians.

* to manage the water resources of the area to improve availability of supply to the population for agriculture, irrigation and clean drinking water supply, whilst at the same time restoring and preserving ancient water management systems and hydrological structures;

* to promote programmes to improve physical health, literacy, education, and family spacing among the population;

* to provide models to the rest of Cambodia of mechanisms for achieving archaeological protection and sustainable environmental management while also achieving economic development and equitable distribution of wealth through integrated planning, zoning and management.

ADMINISTRATIVE STRUCTURE

The only effective way to accomplish these objectives is through the development of a working partnership representing local and national interests and involving the National Heritage Protection Authority of Cambodia (NHPAC), other Ministries and departments of the central Government and the Siem Reap local authorities. This partnership should support planned programmes to achieve the objectives of the area. The initiative to co-ordinate development and management within the reserve will remain with central and local government departments and with private interests. However coordination and control is to be achieved through a review process of all major development proposals by a joint committee or development review board established for the purpose.

The ACR Development Review Board would be composed of representatives of the Siem Reap Provincial government such as Chiefs of departments responsible for land management and development coordination such as Agriculture, Forestry, Education, Cadastre, Industry, Planning, Tourism, Construction, Trade and Transport, and members of the Angkor Parks Agency as representatives of NHPAC.

The Board will implement ZEMP policies through:

* Coordination of development programs in tourism, rural and urban development, transport and other infrastructure projects.

* Monitoring archaeological, ecological, landuse and socio-economic conditions within the ACR.

* Reviewing, evaluating and approving all development proposals and other land manipulation activities within the ACR in relation to impacts on archaeology, ecology, tourism and the Angkor Parks.

The Board will have power to veto any permit, license, or approval certificate. It will in fact be the arbiter of all development proposals in the ACR. This involves overseeing the issuance and implementation of guidelines prepared by the Park Agency for implementation by government agencies in the reserve. The Board therefore needs to have the power to review proposals on projects which could be a potential threat to archaeology and the Parks.

The Board will build on informal relationships at officer level, but it needs an operational structure which requires advance notification of activities likely to impact upon archaeology and the Parks. Government projects and programmes will be notified to the Park Agency who will make recommendations on the suitability of proposals to the Board. The Board would have power to veto proposals with damaging impacts or to lay down conditions. In some circumstances this may prove to be politically controversial and the Board will need powers of mediation. It is proposed therefore to make it clear, by amendment to the NHPAC statute, that decisions of the board are binding on all levels of government, and that the Board cannot be overridden. Relationships between the Park Agency and other Governmental agencies will be critical.

It is not proposed that the Board should be an executive agency. It will not have a separate employment structure, but will be given administrative and financial support by the Park Agency. Details of the proposed administrative structure for the Board is presented in Chapter VIII.

3. POLICIES

GENERAL POLICIES

The following general policies are recommended to be applied throughout the Angkor Cultural Reserve.

Promoting Sustainable Development

1. An integrated approach to the management of the resource base will be adopted and sustainable development principles will apply.

2. Emphasis will be given to sustainable economic uses of natural resources.

3. Economic development will emphasize agriculture, forestry, and fisheries activities and tourism based on Angkor Heritage.

Integrated Planning

4. Urban and regional development should be carried out according to plans prepared in accordance with the ZEMP proposals, revised in accordance with new information when available, and after taking into account the needs of local people.

5. A permanent information and monitoring system will be maintained for the ACR in which data on natural and cultural resources and on socio-economic conditions will be stored and analyzed using the Angkor GIS and made available to public and private interests for the design and evaluation of projects and development programs.

6. Guidelines placing conditions on development activities apply in all zones.

7. Large-scale urbanization will be take place in designated Urban Development Zones in order to concentrate development, provide infrastructure economically and protect the heritage.

Rural Development

8. Agricultural and rural development will be encouraged in areas not zoned for protection.

9. The management of forest and agricultural areas should be in a manner that enhances the productivity of land for food production, the quality of forest for timber and other products, and the conservation of water resources.

10. Special Areas of Archaeological Concern and other areas of valuable cultural heritage will be protected from damage caused by development activities. Agricultural improvement and settlement will be allowed in these areas only under the strictest conditions to protect the cultural heritage.

11. Resettlement of villagers will take place only in exceptional circumstances to protect the archaeological integrity of sites. Where resettlement is pursued, provision will be made to rehouse villagers, provide basic infrastructure and provide sufficient land for each family.

12. Rural development should follow a "plan as you proceed" approach to ensure rapid implementation reflecting the needs of the people affected. This means that the plan is developed with the people affected during implementation.

13. Improvements in health, welfare, education and employment will be pursued through rural community projects that focus on small scale village based activities, and emphasize equality in access to services.

14. New infrastructure (roads, reservoirs, canals, water supply, waste water treatment), will be designed and constructed to avoid damage to the environment, particularly sensitive archaeological and ecological areas.

15. Waste disposal must adopt environmentally acceptable methods. The costs will be borne by those who generate the wastes.

Phasing

16 Development should be phased to coordinate development needs of tourism, urban infrastructure and the Angkor Parks, so that these can be realized over time in a cost effective manner.

Classification of SAACs

17. Measures will be taken to identify, list, and protect important archaeological and historic sites of all periods.

Permitting Arrangements

18. Major projects in the public and private sectors affecting land use and development will be subject to previous approval of the Board. All permits, licenses, and land development activities within ACR will be reviewed by the Board. Developments which give rise to potentially significant environmental impacts or conflict with archaeological protection will not be approved.

Policy on Training

19. There is a dearth of trained personnel available for the planning and development of the region. It is vital that technical assistance to the Cambodian authorities should concentrate on education and training in relevant technologies and the establishment of effective institutions for sustainable management of resources.

SPECIFIC POLICIES

Specific policies are recommended for ecology, tourism, urban and regional development, transport and Communications, water management and rural development.

A. ECOLOGY

Particular areas of environmental importance and vulnerability are identified in order to ensure the sustainability of critical land and water resources and the maintenance of integrated ecological processes for present and future generations.

Wildlife conservation and habitat management will be integrated into the rural landscape and will recognize the dependence of local people on the use of natural resources.

Environmental values of stable and productive land-use (particularly forested areas) will be promoted.

Tree cover will be retained in selected areas to enhance landscape values.

Forest practices will be regulated to maintain and enhance native forest cover and associated degraded vegetation, to enhance biodiversity and to provide forest products for local use and related tourist-based industries.

Three ecologically sensitive zones have been identified;

a) Water Corridors
b) Tonle Sap Flooded Forest Protection Zone
c) Forest Management Zone

These zones closely correspond to the forest and ichthyological reserves gazetted in Cambodia in 1939 and subject to regulations for conservation management. Policies on the management of wildlife and habitat reserves under Forest Law and other general legislation will also apply in the ACR.

B TOURISM

DEVELOPMENT CONCEPTS

The following factors affect the development of tourism:

- fragility of the monuments
- limited capacity of the monuments
- poor tourism infrastructure in Siem Reap and the Angkor Parks;
- no capacity to manage tourism flows in the Parks.

Appreciation of the religious nature and mysterious character of the monuments necessitates

small numbers of visitors at any one time. This must limit tourism development in and around Angkor and the size and scale of the tourism industry in Siem Reap.

Planning Concepts

Calculations and estimates of carrying capacity are required. There is a need for detailed surveys and analysis of the **physical capacity** of each major monument and of the infrastructure of roads and facilities in the parks; the **environmental capacity** relating to the fragility and potential for damage of the brick and stonework and vegetation, and to methods of presentation appropriate to the monuments; and the **perceptual or psychological capacity** which measures how visitors appreciate sites, what are their expectations and how their experience is effected by crowding.

Tourism development must be considered in light of the following principles.

a) Limitations on numbers of visitors according to the carrying capacity of the Parks at various stages of development, through to when the Park is established and fully operational.

A preliminary assessment suggests that Angkor Wat has a capacity of 300-500 visitors at any one time, which gives a daily total of 1800-3000 visitors. Assuming tourists make two visits to Angkor Wat during a stay in Siem Reap, the maximum number of visitors will be 500,000 per year. Other temples have a much lower capacity. The carrying capacity of the park depends upon the method of protection and style of presentation adopted. Capacity can rise according to the intensity of management and level of intervention.

For the next few years until provision for visitors is in place, the capacity of the park will be limited to 100,000 - 150,000 international visitors. On local festivals and holidays a different approach to capacity and limit will operate for the benefit of Cambodian visitors.

b) The total number of hotel rooms in operation and under construction must be determined by the carrying capacity of the Parks and not the other way around. The number of hotel rooms should be planned against the background of the park's ability to provide for tourist visits. Hotel capacity should not increase faster than improvements in visitor facilities and management. The number of rooms required for 100,000 - 150,000 tourists is 800 - 1,200 hotel rooms, (compared with a present planned total of 1,150 by 1995 and expressions of interest to build a further 1,000 rooms). 500,000 visitors to the parks will require 4,000 hotel rooms. It is of concern that the number of hotel rooms is already heading for over capacity in the short term.

c) Tourist expenditure in small premises and at the local market, is more direct and has a greater local effect than in international hotels and resorts. Opportunities for employment for local people in medium-standard hotels and guest-houses is better than in luxury hotels, and the value of local products in the construction of medium-standard hotels and guest houses is considerably higher than for luxury hotels.

Tourist Development in Siem Reap

Siem Reap has an important role to:

- relieve pressure of tourists on the archaeological monuments;
- supplement the cultural experience;
- provide for cultural and social interchange between tourists and locals;
- increase income and tax revenues to the locality.

The historic core of Siem Reap around the old market and along the riverside, has great possibilities to become a desirable tourist attraction. It would optimally be developed for shopping, small hotels, and restaurants. Planning and development regulations are essential to ensure the historic character is preserved and enhanced.

Hotel Development

There is an increasing demand for small scale, medium quality hotels and guest houses from tourists seeking an authentic experience in accommodation in local surroundings. Demand for luxury accommodation from both international and domestic tourists is increasing. Resort style hotels should be concentrated in a special development zone in which high quality infrastructure and environment can be effectively provided.

The following strategy for hotels is proposed:

- no hotels or tourist facilities to be located in the parks;
- existing hotels in Siem Reap to be upgraded;
- existing guest-houses to be upgraded, for example by the addition of bathrooms to most rooms.
- new development of hotels and tourist facilities to be restricted and located in a special tourism development zone in Siem Reap.
- conversion of colonial and traditional houses to small hotels/guest-houses to be encouraged in older parts of the town and along the river.

Tourism Types and Markets

As the demand for visiting Angkor Parks is higher than the capacity of the monuments to accommodate tourists, policy on attracting international tourists should concentrate on a limited number of high spenders. A high quality/high price policy will maximize economic benefits and limit overall use of the parks. Domestic tourists should be encouraged by a policy of nominal charges and encouraging local-standard accommodation and facilities in the new and expanding areas of Siem Reap. Angkor as a destination is quite inappropriate for the "mass tourism" market; it is quite unlike the beaches of Thailand. Short visits by tourists from Thailand should be discouraged by a pricing policy, as they will contribute little to the local economy and use up the capacity of the parks. Marketing should emphasize the special cultural experience of visiting Angkor and discourage expectations of a popular tourist entertainment destination.

An important but difficult task is to attract the right "mix" of different types of tourists. The following groups should be targeted.

a) Special interest tourists who are highly motivated and interested in archaeology and the study of Angkor cultural heritage (arts, architecture and religion), and are willing to pay a high price for travel and entrance.
b) Tourists with a general interest in culture whose major motivation during a holiday is to see and experience the culture of other countries.
c) General interest sightseeing tourists: these form the majority of international tourists.

Diagram 5 shows the type of tourist and their motivation. Many international tour operators will be eager to incorporate Angkor in their South East Asia programmes and arrange programmes on Khmer history and Angkor. There is a market for a specialist high-quality product. Special interest and general cultural interest tourists normally travel in small groups accompanied by a qualified guide. They require comfortable but not luxurious facilities; are more sensitive and appreciative of the need for conservation and management of sites. Indeed they are interested in the process of conservation itself. This type of tourist will stay 3 - 5 days, and will make the best economic and culturally sustainable contribution to the region. General interest sightseeing tourists whose visits are 2-3 days should have lower priority. Their demands on park management are high but expenditure in the local economy limited.

The main markets for these target groups will be Europe, Japan, North America, Australia and New Zealand. Tourists from these areas will be spending a lot to visit Angkor and will be committed to help protect the culture heritage. They will be prepared to pay a high fee if they feel assured that the money is to be used for conservation and restoration. The Japanese prefer to travel in tour groups somewhat larger than the European groups. Marketing should be directed at Japan and Europe.

Entrance Fees

Two considerations in relation to charging policy are:

a) the need to generate income to conserve the archaeological heritage and manage the parks;
b) as a means to monitor and control visitor flows and the development of tourism at Angkor.

A high price policy is recommended but one that makes a clear distinction between the supply of tourist services that is transport, refreshments, guiding, and the fee for visiting the parks which is required to cover the cost protecting and presenting the monuments and developing and maintaining the infrastructure and facilities enjoyed by the tourist.

Fee policy should be designed according to;
- the amount of income required,
- the ease of collection,
- ability of visitor to pay, and
- to balance demand from visitors with capacity of the sites.

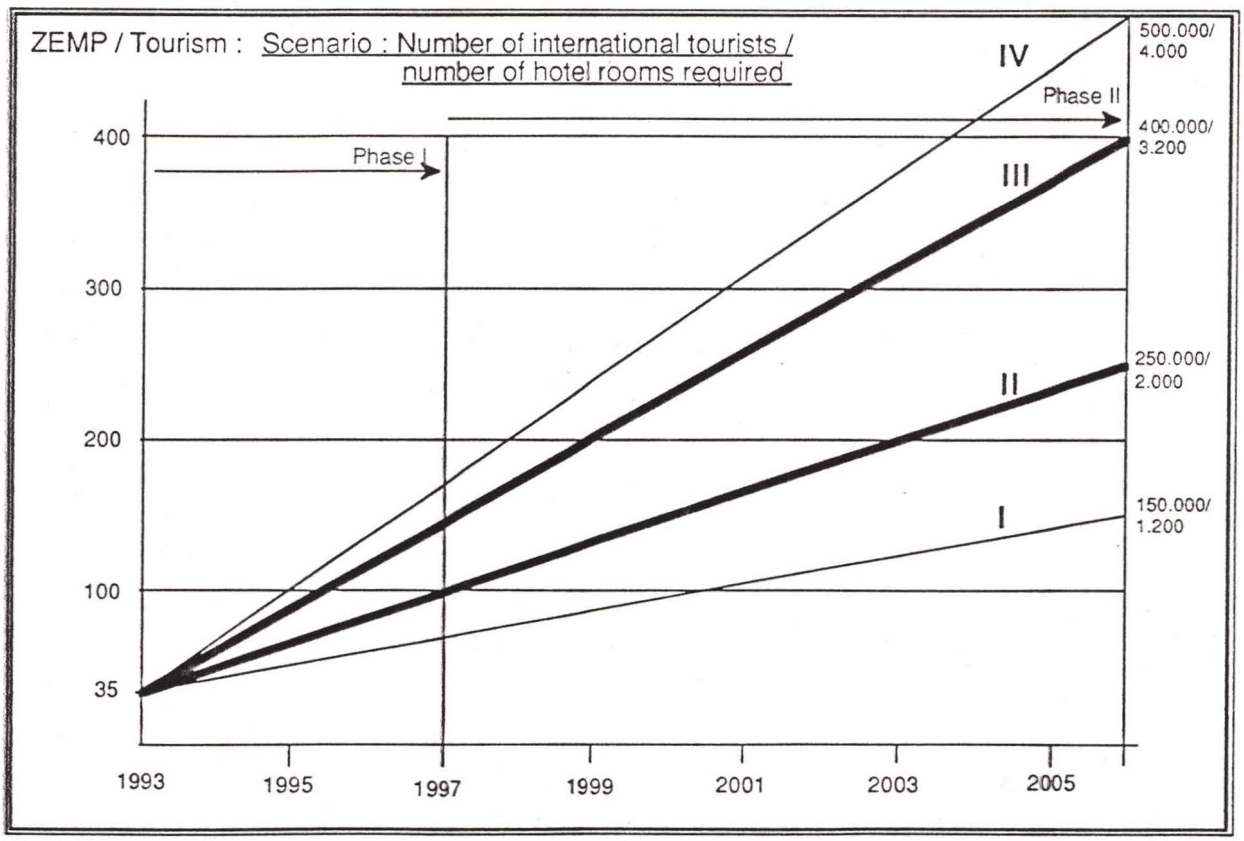
Entrance fees should be different for international and domestic visitors and in the case of international tourists should be high and incorporate a major contribution towards the funds for restoration. Domestic visitors should pay much lower fees which are set according to the

DIAGRAM 5

ZEMP / Angkor : Type of Tourists and their Motivation

Market	Type of Tourist	Motivation/Expectation	Length of stay	Remarks
International				
Japan	"Pilgrims"	Visit the temples/culture	2 - 5	individual + group
	Sightseeing	recreation/ general interest prestige	1 - 2	group
Thailand	"Pilgrims"	Visit the temples/culture	1 - 3	individual + group
	Sightseeing	general interest/travel	1 - 2	individual + group
International tourists in Thailand	Beach holiday	general interest + change + prestige	1 - 2	group
	Cultural	culture + archeology	2 - 5+	individual + group
Europe	Angkor interested	culture/see one of the last hidden treasures	3 - 6	individual + group
	Round trip "Indochina"	sightseeing + culture	1 - 3	group
America/ Australia/NZ	Angkor interested	culture/see one of the last hidden treasures	3 - 6	individual + group
	Round trip "Indochina"	sightseeing + culture	1 - 3	group
Domestic	"Pilgrims"	religion/culture	1 - 2	individual/ concentration on special occasions
	sightseeing	interest in own culture /	1 - 2	individual

DIAGRAM 6



average income in Cambodia. Visitors to Angkor should be fully aware of the level of fees and appreciate the reasons for it. High fee levels (US$50 - $100) will be better understood if it is clearly demonstrated how fee income is used. An entrance charge may be more acceptable locally if a reduced fee is collected from domestic visitors on festival days. A high policy should not be interpreted as "elitist"; its purpose is solely to protect the unique heritage to develop infrastructure, and control use. Pricing policy can be modified at a later date to encourage particular types of visitors and their needs.

Regional Tourism Organization for Siem Reap

A Siem Reap Tourism Task Force should be established to support the work of the General Direction of Tourism at the national level and the interest of local government in the province. Assistance for the Task Force should be sought from PATA or one of the neighbouring countries which have established well organized, functioning national tourist organizations. Support is desirable to overcome organizational difficulties and the lack of qualified/educated personnel and limited experience and equipment in the region.

PHASED DEVELOPMENT STRATEGY

A phased programme of tourism developments is proposed. It is important to avoid the situation in which large numbers of visitors are attracted before the Angkor Parks can provide the services and level of management control to maintain the quality or visit expected. The relationship between the number of international tourists and the number of hotel rooms required is shown in Diagram 6.

Phase I (1993 - 1996/98):

Phase I focuses on monument protection, preliminary organization of the park, preparing management and development plans. Visitor numbers should be strictly limited to protect the character of the monuments and prepare for a controlled increase in tourism flows during the following phase.

Phase I activities:

- establish the Angkor Parks agency and the Siem Reap Tourism Organization.
- maintenance and conservation works on the most visited monuments;
- establish necessary tourism infrastructure and control in the parks and at individual sites;
- prepare a detailed management plan for Angkor Archaeological Park;
- prepare a tourism master plan for Angkor and Siem Reap region;
- establish a tourism development zone in Siem Reap.
- elaborate a programme for training of guides and employees in the tourism industry;
- basic improvements to the infrastructure in Siem Reap;
- improve and upgrade existing tourism facilities in Siem Reap.
- coordinate and prioritize development assistance and international funding for Angkor.

Phase II (1996/98 - 2005/6):

Phase II follows the early operation of a basic parks management system, establishment of the tourism development zone, and preparation of an urban development plan and regulations for Siem Reap. The number of tourists may be increased but still in accordance with the carrying capacity of the Angkor Parks.

Phase II activities:

- extend infrastructure in the Angkor Parks;
- establish a Guide Academy and Hotel Training School and expand education programmes;
- improve infrastructure in Siem Reap;
- restore the historic core of Siem Reap;
- expand tourist facilities and attractions in Siem Reap;

Phase III (beyond 2005/6):

At the end of Phase II the fundamental conditions and prerequisites for controlled tourism development should be in place. In Phase III, tourism capacity of the area could be increased in accordance with the carrying capacity of the Parks and surrounding areas, and further improvements to the infrastructure and tourism plant (hotels, and other tourist facilities) can be made. The number of tourists may be increased considerably in Phase III. However, mass tourism, with all its negative consequences, should be avoided, not least with regard to the protection of the monuments and sites.

In summary, the phased programme is to allow the steady improvement of tourism infrastructure and facilities over the next 15 years with hotel capacity being restrained to avoid a mis-match between the number of visitors and the capacity of the Parks, and to develop the town of Siem Reap to cater for the needs of visitors to Angkor cultural sites in an attractive 'low key' environment.

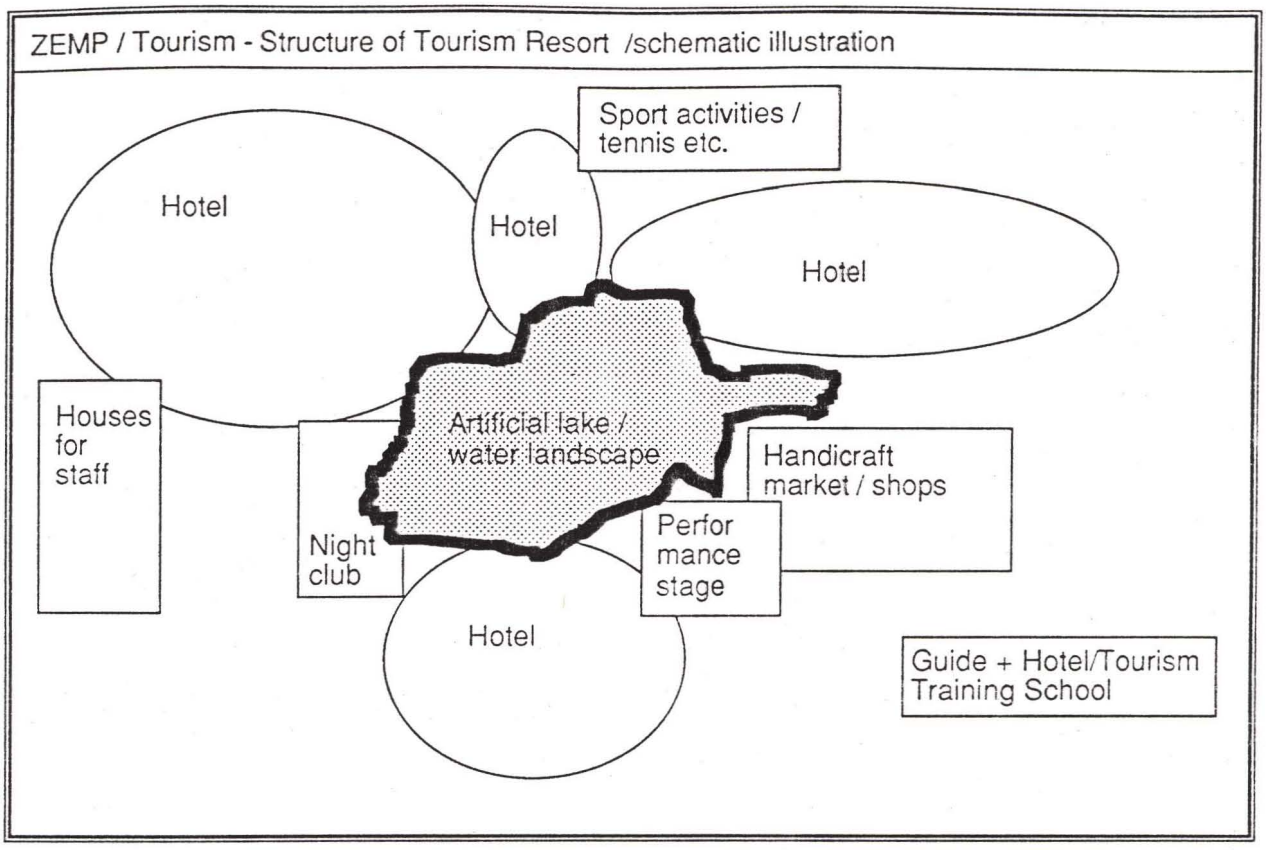
Hotel Development Strategy

The number of tourists in Phase I is 100,000 - 150,000 per year, requiring 800 - 1,200 hotel rooms. Therefore during the next 5 years it is recommended that no more hotels than those which are already planned (510 rooms, making a total of 1,050 rooms available), should be built in Seam Reap.

During Phase II 400,00 - 500,000 tourists require about 3,200-4,000 rooms. Therefore no more than 2,000 rooms should be built, for a total capacity of 4,000 hotel rooms by 2005, corresponding to a maximum of 500,000 staying tourists per year in Siem Reap and visiting the Angkor Parks.

No precise assessment can yet be made for Phase III. This should be undertaken on the basis of the capacity of the Park and the development of tourism as a whole in 10 -12 years time.

DIAGRAM 7


ZEMP / Tourism - Structure of Tourism Resort /schematic illustration
Sport activities / tennis etc.
Hotel
Hotel
Hotel
Houses for staff
Artificial lake / water landscape
Handicraft market / shops
Night club
Perfor mance stage
Hotel
Guide + Hotel/Tourism Training School

Tourism Target Groups

During Phase I when visitor numbers are limited to 100,000- 150,000 per year, Angkor is in a strong sellers' market and consequently a high-price policy, focusing on an up market/high quality image, should be pursued. Marketing should aim at specialist cultural tourism; there is no place for mass tourism given the limited capacity of the major attractions. One-day-trips should be discouraged by a policy of high entrance fees: for instance, all entrance tickets might be priced and valid for one week, so casual tourists are discouraged.

During Phase II, this policy should be maintained, but target groups may be expanded to include general interest sightseeing tourists who will make up the majority of any increase in numbers of visitors. They should however, be encouraged to stay a minimum of 3 days by providing additional cultural activities such as dance, theatre and son et lumiere.

In the first phase of tourism development, the Japanese market should be given priority. Development of tourism from Thailand (international and regional tourists) will occur but should not be encouraged. When the overland road is improved, Angkor will be only 3-4 hours from Bangkok.

TOURISM DEVELOPMENT ZONE

There will be increasing demand for luxury accommodation in new resort style hotels. These should be concentrated in a special tourism development zone in which a high level of services and facilities are available. Responsibility for planned development of infrastructure and high standards of construction and environmental controls should be given to a corporation representing the government, Angkor Parks and tourist development interests.

The tourism development zone will provide prime locations for a mix of quality tourist developments and will avoid the risk of "peppering" individual facilities around Siem Reap or near the Parks. All major hotel and resort developments should be located in this zone. The first phase of development, up to 2005, might have a capacity of between 1500 and 2000 hotel rooms and all necessary facilities such as: a performance stage, small museum, exhibition and information centre, swimming and sports facilities, medical facilities, handicraft market, tourist shops including a bookshop, car and cycle rental and staff housing, all within a landscape of water, gardens and native woodland. A schematic illustration of the structure of resort development in the tourism zone is given in Diagram 7. The zone should include different types of hotels with different standards (from guest-houses to luxury hotels) offering low-density, high-quality (3-5 star) resort style accommodation. Development would be subject to strict guidelines to ensure a high quality environment. Land not already owned by the government would be acquired by the development corporation with just and proper compensation paid to existing owners on the basis of the land's current use value at the date of expropriation. A comprehensive site development and infrastructure plan will be prepared and a programme to dispose of serviced sites to investors through competitive tendering introduced. A zone is identified in Siem Reap and delimitated on the Plan 11.

It is also recommended that a Hotel and Tourism Training School should be based in the tourism development zone close to the hotels. This has been successfully accomplished in

other similar developments.

C TRANSPORT AND COMMUNICATIONS

Transport Policies

The strategy on transport should be guided by the following realities:

* efficient external access by air, ferry, and road will facilitate tourist arrivals;
* regional transport links are needed to assist the protection of the Park by routing through vehicles away from the Parks;
* Through traffic should be removed from the historic core of Siem Reap;
* local residents, particularly those living within the Park must be provided for;
* special environmental considerations apply to visitor circulation and maintenance/servicing within the Park.
* transport systems in the Parks must be flexible to serve the different types of users/visitors, and need to include a range of comfort and the level of service.

POLICIES FOR SIEM REAP

Additional roads in and around Siem Reap are required to promote and direct the expansion of Siem Reap to the south and away from the parks.

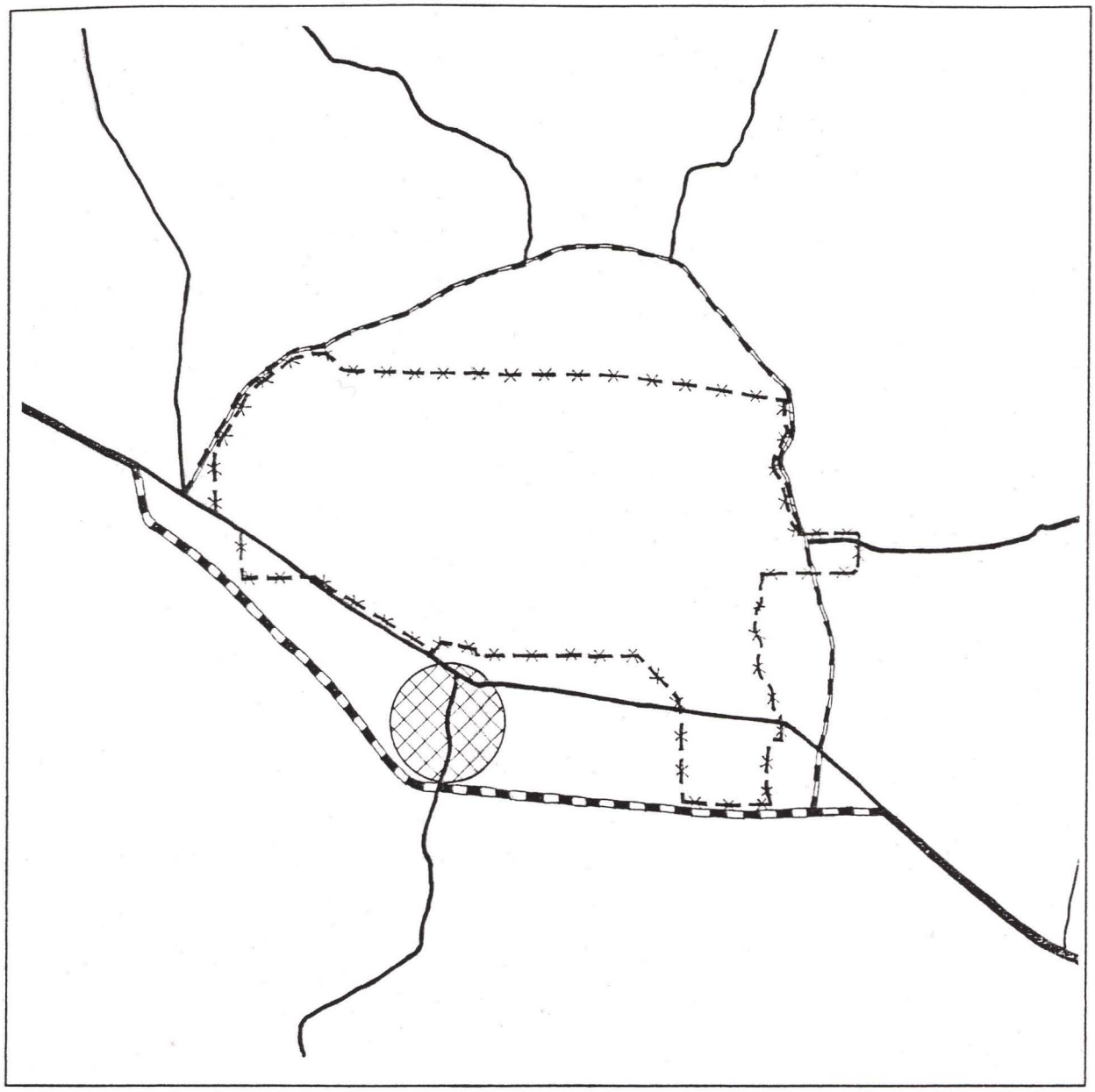
The main highway linking Siem Reap with Phnom-Penh and the Thai border via Sisophon Route 6, passes through the historic centre of the town. The prospect of a direct highway link between Thailand and Ho Chi Minh City (Saigon) via Siem Reap adds urgency to consideration of a new route to remove through traffic. An alternative route should provide a link between Puok in the west and Roluos in the east, skirting the park and possibly passing south of the town. A projected southern bypass is shown on Plans 10 and 11, which might follow the 10m contour along the edge of the Tonle Sap flooded area. It would encourage development towards the south and south-east and away from the Park. This route must be safe-guarded as a long term requirement to meet expected traffic growth.

An immediate short term solution to traffic congestion in the centre of Siem Reap is required by developing a "spur system" feeding from Route 6 within the town which will bypass the historic centre and serve proposed southern developments. Initially this may be achieved through improving and "signing" existing roads.

POLICIES AROUND THE PARKS

The road from North-east Thailand (Surin Province) via Samrong and Chongkal is currently under discussion. One of its branches will lead directly to the north of Angkor Thom. A route around the Park must be found. Traffic which passes through the park is causing damage to some of the monuments and must be rerouted to avoid the parks. A threefold approach is required:

DIAGRAM 8



NOT TO SCALE

LEGEND

- PARK BOUNDARY
- NATIONAL ROAD
- PROVINCIAL ROADS
- PROPOSED NORTHERN ROUTE CORRIDOR
- PROPOSED SOUTHERN BYPASS
- SIEM REAP

PROPOSED ROAD CORRIDORS

i) provision of alternative routes for traffic and prohibiting through traffic on roads within the park.
ii) park by-laws to permit only specified types of vehicles within certain areas.
iii) enforcement.

Strategic road improvement schemes are proposed for a north-east/north west link around the park is shown in Diagram 8 and on Plans 10 and 11. A feasibility study is required to establish the appropriate routes and costs of schemes to include:

i) The upgrading of an east-west route north of Angkor Archaeological Park to link with Route 6 and to "shield" Angkor from through traffic. This will require provision of additional bridging and general improvements to a good local standard in the route corridor selected.

ii) The improvement of a North-south route to the east of Siem Reap to divert traffic from the park.

iii) Bylaws and simple traffic-calming measures, such as speed bumps to prohibit and discourage through traffic from the Park will be developed. This requires legal powers for the Park Agency to set and enforce traffic regulations.

Transport policies for the parks are outlined in the Chapter VII.

TOURIST ACCESS TO ANGKOR

Access for tourists is by air, road and ferry. Improvements are needed in each of these areas.

Airport facilities need to be improved. Because of restrictions on overflying the monuments, the expected growth of air travel to Siem Reap and the need to provide full international flight standards, a new location for the airport is desirable and will be necessary in the long term. The immediate options are;

- temporary and limited expansion on the present site;
- early relocation of the airport to meet future growth in traffic.

Building a new airport will be costly but will provide opportunities for future growth in air traffic and create a new centre for urban and industrial development away from the Angkor Parks. A new airport could serve the whole northern region of Cambodia and therefore the wider regional polices need to be assessed. A study is required to identify potential sites and assess the costs and benefits of the various options, so that a decision can be made on how to fiance such a major investment.

National roads through the Province linking Angkor with the Thai boarder to the west and north need to be improved to cater for regional development and tourist demand. Upgrading Route 6 is urgently required.

The potential for improving limited wharfage facilities on Tonle Sap to meet local need whilst providing potential for the water borne tourist market, should be investigated. The

study should cover the feasibility of water transport (passenger and cargo) and include siting and design of port facilities. If these are on the Siem Reap river, consideration should be given to the potential for developing a lakeside and water based tourist attraction.

D URBAN AND REGIONAL DEVELOPMENT

POLICY CONTEXT

The ACR will need to accommodate concentrations of people and supporting industry, ultimately in locations planned to safeguard archaeological areas. Policies on urban and regional development must reconcile two contradictory objectives:

- the Angkor area must be conserved as the major tourist centre in the country; and
- growth of tourism will attract other forms of urban development to the area which will threaten conservation.

Planning for development of Siem Reap must reconcile conservation of an attractive urban and rural environment with the development of a modern town. The proximity of the Angkor Archaeological Park to the town is a major constraint on the direction of urban expansion. The requirements of tourism require that Siem Reap preserve its attractive, low-density, low rise, "garden city" character not found elsewhere in Cambodia.

At present Siem Reap exhibits all the problems of lack of planned development as the authorities struggle with the rapid growth of people and new development with inadequate tools at their disposal. Following two decades of limited expansion, new hotel projects and additions and alterations to existing buildings and houses as guest houses and restaurants are beginning to transform the character of the town. The result could be disastrous for the future of the tourist industry. Mistakes are being made but the authorities are virtually powerless without an adequate urban development strategy or a legal and administrative framework to plan future growth, set minimum standards and control the type and quality of development.

Present infrastructure is grossly inadequate for the needs of the town and region. New roads, water supply and sewage systems are needed to meet the increasing demands of the local population and the expected growth of visitors.

New and improved roads in the region will make it possible to end the isolation of remote villages and enable "central villages" to be established as locations for economic and social investment and community facilities to serve the surrounding areas. This will reduce pressure for rural-urban migration into Siem Reap. Four sites are recommended for development as secondary "centres" at Roluos, Puok, Banteay Srei and Damdek.

URBAN DEVELOPMENT POLICIES

The following policies are proposed to encourage appropriate development in the ACR:

- Construction of an east-west road link in the northern sector to ease the movement of heavy passenger and goods traffic and shield the park from the disruptive influences of through traffic;

- Construction of an alternative Route 6 to the south of Siem Reap;

- Improvement and strengthening of the secondary road networks;

- Re-locate the existing airport to a new development node between Siem Reap and Battambang;

- Improvement of river transport and the port near Phnom Krom;

- Develop urban infrastructure for the expansion of Siem Reap to the south and south-east of the present town.

- Establish four central villages in peripheral areas and develop appropriate community and commercial facilities while maintaining the individual character of the villages and enhancing their economic role.

- Promote Siem Reap as the centre for visiting Angkor and encourage tourism related developments;

- Prevent further development to the north of Siem Reap in the area of the Angkor Archaeological Park and establish a "green" buffer zone as either agricultural land or woodland and open space. Only allow park operational and visitor related activities near the park boundary. Direct development of the town to the south in the urban development zone.

- Designate an area on the south west side of Siem Reap for major tourist development projects.

- Conserve the present character of Siem Reap along the river and classify the historic core of the town as a protected area and establish strict control of development to conserve as a tourist attraction. Designate historic buildings and districts as conservation areas with special design and development requirements.

- Promote tourism through the development of attractive urban amenities such as; tree-lined avenues and boulevards, parks and gardens, riverside amenities, markets and shops, cultural activities, transport, public services, etc.

- Prepare an urban landuse and infrastructure development plan and development control regulations for Siem Reap as an urgent priority to include;

  * land use zone definitions
  * classification and design specification of roads
  * access design and construction requirements
  * definition of building lines and set backs

* building densities and plot development ratios
* building height controls
* controls on boundary construction
* car parking requirements
* building bylaws
* arrangements for sanitation and sewage disposal
* building preservation and demolition controls
* design guidance
* landscaping requirements
* control of advertising
* open space provision

Three types of Urban Development Zone are proposed to encourage appropriate development in Siem Reap and other centres. The zones are:

a) Urban Conservation Zones
b) Urban Expansion Zones
c) A Tourism Development Zone

These are outlined in Section 3.

E. WATER MANAGEMENT

Introduction

The planned use and management of water within the region of the Angkor Cultural Reserve is vital to the protection of the ancient water features and to support the present population. Water management within the ACR has the following objectives:

- to conserve the surface and ground water reserves by managing water catchment areas, maintaining protective vegetation cover, avoiding erosion, and preventing pollution of aquifers;

- to maintain and re-establish the ecological equilibrium in natural water bodies and water courses;

- to develop surface and underground water resources including creating surface water storage facilities and exploiting the deeper ground water strata;

- to protect ground water resources and develop a programme of abstraction for wholesome drinking water supply;

- to enhance agricultural water use in a sustainable manner;

- to protect archaeological features of hydrological importance (barays, moats,

canals, etc.), and maintain and conserve ancient water management systems;

- to reinstate and restore some of the ancient hydraulic structures of higher importance;

- to manage water resources as part of the wider cultural and natural landscape and as features of interest for tourism.

POLICIES FOR WATER MANAGEMENT

Although the hydrological studies undertaken for ZEMP have indicated the general conservation and development needs, the first priority is to prepare a water management master plan for the river catchment, to determine the available water resources, cost effective water storage facilities, and details of the allocation of water to different uses. A critical issue is to carry out a ground water exploration programme in order to define available ground water resources for drinking water supply. A project profile has been prepared for a Water Management Master Plan.

Policies for water management are set out below. Detailed water management policies in relation to archaeological features are considered in Chapter VII.

- The basic premise for the management of water resources is that water on archaeological sites is part of the archaeological value of the site. Archaeological water features will be protected from the effects of modern water management. Therefore the use and management of surface and underground water flowing across archaeological areas must take into account the conservation of archaeological features and particularly the protection of hydraulic features. Specifically the use of Khmer dikes, banks and walls as borrow pits should be prohibited (e.g. Thnal Dach), and alternative sites for clay and fill should be investigated; the construction of new roads on ancient dikes and reconstruction of ancient bridges should also be avoided; the reuse of barays, reservoirs and dikes for water storage must respect the original construction and operation and avoid damage to ancient hydraulic features.

- Water storage capacity should be greatly increased. This can be achieved by rehabilitating some of the ancient water structures (barays, dikes, moats and sluices), and by constructing new dam(s) along the water courses particularly in the Kulen Mountains.

- Minimum water flows in the Siem Reap and Roluos rivers must be increased. Increased dry season discharges from new storage facilities should ensure improved supply down stream for domestic and agricultural uses, dilution of pollution in the rivers, and to enhance the tourist attraction particularly of Siem Reap River.

- Licensing of water abstractions from rivers and ground water aquifers should be introduced to control rates of abstraction and prevent excessive use of water.

- More water must be made available for agricultural use through the development of small scale irrigation systems including the re-organization of existing irrigated areas.

- Flood control and drainage should be improved, particularly on the Siem Reap river with a multipurpose weir, diversion structures.

- Fisheries should be developed on all suitable water bodies. Fish hatching plants should be incorporated into most water management proposals to increase the fish production at family level.

- Economic and social development depends upon the provision of improved communal water facilities. It is recommended that:
  - wholesome drinking water should be provided throughout the province with priority for Siem Reap;
  - pollution of the Siem Reap river should be stopped by prohibiting sewage discharges into the river and ground water and developing a sewage treatment project for Siem Reap;
  - a rural public-health awareness programme for privy digging should be mounted;
  - land drainage using simple terrain levelling should be improved to eliminate stagnant pools and other health hazards to local people and tourists.

- Provision for solid waste disposal should be made in Siem Reap and other towns. Suitable land fill sites should be identified near each settlement. A simple waste management plan and site feasibility studies should be undertaken to determine appropriate methods and locations for waste disposal. Incineration of combustible materials at designated points, and reduction in use of plastics and recycling of metals is recommended. Strict safety standards must be set for disposal of hazardous wastes.

- A hydrological monitoring system should be established as part of an integrated regional land and resource use monitoring system. This will require establishing a programme of geological and topographic surveys to provide base line data on water resources; hydro-meteorological observation stations for climatic information; and the collection, processing and evaluation of hydrological data.

- The Department of Hydrology should be responsible for all aspects of water management in the ACR, including flood control, irrigation, water supply, sewerage treatment, pollution control, navigation, licensing, monitoring and enforcement.

- Any water resources measure, such as the digging and drilling of wells, excavation of canals, construction of reservoirs, must be subject to previous authorization from the ACR Development Review Board.

- In the Angkor Parks the Department of Hydrology responsibility is subject to the overriding policy to protect the archaeology and to the operational requirements of the Park Agency.

- Hydrological conditions in the soil and ground water in the surroundings of archaeological sites and monuments should carefully monitored by the Parks Agency and the Department of Hydrology to ensure maintenance of the required conditions for protection of underground artifacts and building foundations.

F. RURAL DEVELOPMENT

POLICIES FOR RURAL DEVELOPMENT

Rural development is needed throughout the ACR, although in the Angkor Parks and certain other zones limitations will be placed upon the range and potential forms of land use to conserve environmental values. An intensive, long-term and integrated rural development programme should be established with the aim of enhancing quality of life for inhabitants and to ensure sustainable production from natural and cultural resources. The positive support and acceptance of the local people must be obtained for the development programme.

1. A multi-disciplinary approach to rural development should be adopted with a varying emphasis on land use and means of livelihood according to the functional priorities within each area. A programme adopting a "plan-as-you-proceed" approach consisting of a number of community based development projects is recommended. The actions to be taken will be developed in conjunction with the local people to included: land survey, land titling, agricultural water management, land levelling, access roads and village water supply.

2. Food security is a critical issue for many of the rural population. Improved irrigation must be provided for paddy fields and agro-forestry (orchards and vegetable gardens) to accommodate the growing population. Agricultural practices should minimize the use of water.

3. Modern irrigation should be provided in the ACR for existing farmlands to increase productivity. Rehabilitation of the Siem Reap irrigation systems is a priority. Modern irrigation technologies may be adopted except within the Angkor Parks and SAACs, where simpler technologies such as clay lined rather then concrete lined distribution canals, and wooded rather than reinforced concrete regulating weirs, should prevail.

4. New agricultural developments should utilize water resources in the Tonle Sap through pumping, in addition to the limited surface supplies available from the Siem Reap catchment.

5. Clearing scrubland for agriculture or new settlement should be restricted to areas that are not ecologically sensitive (see description of Ecologically Sensitive Zones in Section 3). "Slash-and-burn" agriculture should give way to improved cultivation techniques on cleared land including use of organic fertilizers and tree crops.

6. The use of fertilizer should be limited and selective to avoid loss through run off of excessive amounts of phosphates and nitrates causing pollution and eutrophication of water resources.

7. Availability of pesticides and insecticides should be regulated and their use limited. Methods of application should be controlled so as not to degrade or pollute the soil and water. A policy of integrated pest management should be adopted throughout the ACR. This will preserve the cultivation of local rice varieties and ensure maintenance

of genetic diversity and local pest resistant strains. The use of chemical pesticides should be discouraged because of their short-term gains do not justify the long-term alterations in ecology and loss of productivity.

8. Primary and secondary forest areas should be brought under strict management. The following policies should apply:
   - prepare new or revised forest law and regulations;
   - trees and forests will be preserved as such and exploited only on a sustainable basis;
   - potentially erodible areas, such as slopes and stream banks, will be reforested;
   - logging and harvesting timber shall follow sustainable yield criteria and measures introduced to ensure that replacements are planted for each timber-tree felled;
   - agro-forestry (agro-silvi-pasture) landuse should be promoted. These areas can support a mix of forest uses (fuelwood, living fences, fruit, spices, livestock supplementary feeding, textile production, traditional medicine, bio-pesticide production, and bio-degradable packaging materials), interspersed with agricultural crops grown for human or animal consumption;
   - district and village tree nurseries will be established for distribution and planting by farmers throughout the agro-forestry landuse areas.

9. Fish farming and paddy field aquaculture should be promoted and form a part of all rural development and water management projects. Short rotation fish on the wet season paddy fields and construction of farm ponds for dry season production will increase protein self-sufficiency and supplement incomes.

10. Integrated rural development should encourage a wide array of income generating opportunities for the rural population to include:
   - improved water management and local small scale irrigation schemes;
   - diversification of agriculture into high-value products, such as orchards and vegetable gardens;
   - agro-forestry schemes which combine the use of tree crops with other crops, and local fuelwood lots;
   - village fish farming;
   - draught animal breeding programmes;
   - improved road access;
   - well digging and rural water supply;
   - rural electrification as an alternative source of energy;
   - small scale industrial enterprises;
   - adoption of simple technical development within the capacity of the rural economy to maintain;
   - rebirth of crafts industries such as silk weaving, woodworking and silver work, and marketing cooperatives;
   - basic training through primary education (school building programmes) and adult technical training programmes;
   - rural nature and culture-based tourism;
   - provision of appropriate waste disposal methods.

11. An agricultural Extension service should form part of the rural community development programme in the ACR. The service should include:
    - vaccination and insemination programmes to upgrade livestock health and breeding; and
    - encourage farmers to plant trees at every opportunity such as around houses and farm buildings, beside streams and roadways, on farm and field boundaries and on paddy field bunds. Local tree species should be used which support multiple-uses such as fuelwood (acacia), fruit/nut production, livestock "cut and carry" feeding (leucaena), textile (rubber, hemp), spices, traditional medicine and bio-pesticides, biodegradable packaging (banana leaf), and living fences (prickly bamboo).
    - creating a system of incentives and assistance to help farmers understand and support desirable change in land use practices for instance, in construction and management of paddy field trenches, farm ponds for fish production, and village hatcheries and on conserving, composing and recycling organic wastes, to increase their productivity per unit area.

12. Special rural credit organizations should be established to overcome the lack of lending by commercial banks. Non-commercial, low-interest, minimal collateral rural credit alternatives are needed for farmers to encourage them to take on new approaches and weather the transition phase between initial investment and the commencement of higher yield. Methods to encourage commercial banks to engage in rural credit should be sought for instance, by tax concessions on normal commercial banking operations. The Parks Agency should consider using income as the initial capital to help finance a credit scheme to assist rural development in the ACR.

13. A programme of training in rural development should be established in a new or expanded technical college in Siem Reap. The rapid modernization of the country often has the consequence of focusing education on urban based industrial and commercial potential rather than rural development which may be overlooked. This leads to a lack of effort on rural development activity and a widening of the income and education gap between rural and urban areas. In order to implement sustainable land uses a programme of farmer education and development intervention should be undertaken.

RESETTLEMENT ZONES

The rapid growth of population places severe pressure on the cultural and natural resources of the Angkor Parks and the ACR. As part of a strategy to resettle surplus population from around the Parks and to reduce pressure on SAACs and vulnerable ecological resources, rural resettlement areas are proposed. Resettlement zones will provide those who choose or wish to be helped to relocate away from archaeological sites in which restrictions are applied, areas offering more attractive opportunities for a rural livelihood by providing pre-constructed facilities on agricultural estates. Two types of scheme are proposed both: depend upon the availability of irrigation water to enhance productivity.

a) Pump-Irrigated Areas

b) Gravity Irrigated Areas

The key to locating and developing such areas is the source of irrigation water. Pump-irrigated areas will be along the lake shore close to a waterway with unimpeded access to the lake. Gravity irrigated areas will be in areas that can be fed directly from rivers, Barays or reservoirs.

Suitable areas will be:

- unused or extensive areas of under-used land;
- remote from archaeologically significant sites;
- close to existing or proposed upgraded road access;
- flood-free and reasonably level land;
- close to electricity supply;
- provide a maximum 2.0 ha per family farm sufficient for subsistence.

The identification of suitable areas for new settlement must await the outcome of a water master plan for the Siem Reap catchment area and studies of soil and agricultural potential. It is expected that suitable sites can be identified to the East of Roluos.

Two possible sites for limited resettlement exist within the Parks. The present airport site could be suitable after restoration, following relocation of the present airport, and could be irrigated from the West IV,; other areas south of the East IV might be suitable to be irrigated from a new water storage facility.

Resettlement estates outside the parks could concentrate on producing year-round fruit, vegetables and other high-value foodstuffs to supply the expanding tourist and hotel market in Siem Reap with fresh and chemical-free supplies. They could also serve as pilot and training venues for the extension of "organic farming", integrated pest-control, pond aquaculture and other intensive but non-polluting techniques in sensitive environments. Specialist agricultural extension and rural credit services should be provided.

4. ZONES AND MANAGEMENT GUIDELINES

The proposed zones are shown on Plans 10 and 11.

The Angkor Parks Zones are described in the next Chapter VII.

ECOLOGICALLY SENSITIVE ZONES

Certain important and vulnerable environments are identified in order to ensure the sustainability of critical land and water resources and the maintenance of integrated ecological processes to serve the needs of present and future generations. Three zones within the ACR are identified;

a) Water Corridors
b) Tonle Sap Floodplain protection zone
c) Forest Management zone

A. WATER CORRIDORS

Purpose and Function

The water corridor zones follow the main streams or canals (Rivers Siem Reap, Roluos, O Yippie and Canal Thnal Dach and Straight Canal). These permanent and seasonal water courses are vulnerable to bank erosion, pollution of water and disruption to flood control functions, from ill conceived developments near the banks. These lead to loss of apr habitats, productivity of fisheries and other riparian products. The purpose of the zone is to maintain environmental quality and amenity of major waterways and other stream side locations. Restrictions are placed upon stream side developments to protect their ecological and hydrological functioning without impinging upon riparian rights.

Boundary Description

Management policies on water corridors apply to two types of area:
a) an area 150m on either side of the banks of selected waterways, and canals; and
b) an area fifty meters on either side of other waterways, canals and water bodies.

Management Policies

- Government projects and programs affecting stream banks, wetlands and other land in water corridors must seek to maintain and enhance biological diversity and the proper functioning of hydrological systems by:
  - minimizing erosion of river banks;
  - conserving woodland cover along stream sides;
  - planting woodland and trees;

- converting existing paddy fields to agro-forestry and tree crops; and
- taking appropriate stream bank protection measures;
- measures will be undertaken to control the use of agricultural chemicals (Pesticides and fertilizers) to reduce the risk and level of pollution.

- Minimum discharges will be increased to revitalize main rivers in the dry season (River Siem Reap and Roluos), by using additional stored water resources.

- Appropriate measures for flood protection and control of inundation along the rivers will be taken.

- All construction activities except for rural house building, and all industrial uses will be subject to an assessment of impact on the hydrology and ecology of water corridors and where necessary will be prohibited.

- Discharges of untreated sewage into streams and lakes will be prohibited.

- Local village use of water and individual water use-rights will be protected.

B TONLE SAP FLOODPLAIN PROTECTION ZONE

Purpose and Function

A substantial portion of the flooded areas associated with Tonle Sap naturally support a form of vegetation which is exceptional in nature and has long been recognized as being of critical importance to the Tonle Sap fisheries. The flooded forest and natural grasslands of these areas have undergone considerable deforestation and transformation in recent decades and continue to do so. Biodiversity values need to be recognized, and the resources of this zone actively managed, to achieve sustainable utilization and wildlife conservation. The purpose of protecting the zone is therefore:

* to preserve ecological integrity of Tonle Sap floodplain and maintain the contribution of the floodplain to lake fisheries.

* to maintain forest cover and the productivity of fisheries through protective management, including prevention of encroachment and the maintenance of fish habitat.

It is understood that this zone may eventually be incorporated into the larger Tonle Sap ecological management area and will become subject to additional management regulations.

Boundary Description

The zone is the area within the high and low water levels along the Tonle sap lake shore, specifically to include flooded forest habitats. It includes the upper flood limit of the lake as approximated by the location of dike No. 78, which marks the boundary between dry land paddy and receding rice cultivation.

Management Policies

- Maintain water quality through regulation of agricultural and aqua-cultural pollutants and urban waste disposal to prevent water pollution reaching the flooded areas. Prevent agriculturally-based pollution by discouraging use of agricultural chemicals, and promoting "integrated pest management" including use of bio-insecticides.

- Prevent further encroachment upon the flooded forest around Tonle Sap and stabilize land use patterns.

- Regulate fuelwood collection, hunting, grazing and incidence of fire.

C. FOREST MANAGEMENT ZONE

Purpose and function

The forests of the ACR have been subjected to unsustainable land-use practices over recent decades. Logging, along with agricultural encroachment, has resulted in forest loss and degradation which continues today. Areas of secondary forests which have been subjected to degradation should be made available for agricultural uses within the context of the rural development strategy proposed by ZEMP. The maintenance of productive multiple-use forests in areas of "primary" forest requires limitations to be placed upon potential land use changes and conservation values should be enhanced through measures for habitat continuity. Appropriate management regimes should be established through land capability assessment and agricultural and forestry development carried out as an integral part of a rural development strategy. The forest management zone correlates closely with the Phnom Kulen and Beng Mealea forest reserves declared in 1939 and 1940.

The purpose of the zone is:

* to maintain environmental values and biological diversity of major forest areas.
* to stabilize land use activities to enable long term multiple-use of the forest zone in a manner compatible with nature conservation and forest productivity.

* to promote sound silvicultural practices.

* to discourage further settlement and clearing of forest areas.

Boundary Description

The boundary follows the change in habitat between the principal areas of "primary" forest and the secondary forest and scrubland formations. The zone includes all major areas of primary forest.

Management Policies

- Prevent further forest degradation and loss through regulation of logging.
- Manage, restore and regenerate native forest cover through good silvicultural practices.
- Carry out enrichment planting on sites with existing natural vegetation including scrubland areas.
- Protect and manage user rights for the harvest of minor forest products by local villagers including collection and use of rattan, fruits, vines, bamboos, and oils.
- Promote agro-forestry techniques where regeneration of native woodland is not feasible.

URBAN DEVELOPMENT ZONES

Urban development must be guided and directed to appropriate locations within the ACR. ZEMP identifies certain urban development zones around Siem Reap, Puok and Roluos and at Damdek, Banteay Srei and Angkor Chum where urban development is desirable and should be encouraged by appropriate investment programs for infrastructure, roads, water supply and regulations on the type of use, siting and design of development.

Three Urban Development Zones are proposed:

a) Urban Conservation Zones
b) Urban Expansion Zones
c) A Tourism Development Zone

REGULATORY FRAMEWORK

Planning and development control regulations are required to enable the local authority to direct the type and location of development on both public and private land. New national legislation is needed to set up planning authorities, to prepare an urban development plan, to require that development is in accordance with the plan by prior notification and approval of intent to develop, and to enforce the controls. In the absence of national planning legislation, control will be executed through the Joint Development Review Board.

New legislation on the control of development is required. This will either involve the application of national planning legislation to the ACR or additional powers to control development in the ACR under NHPACs authority. The designation of the zone requires drawing a new town boundary to the east of the town.

Additional controls are recommended over the demolition of historic buildings, including

buildings in the historic conservation area, and over the style, bulk and materials used for extensions, and replacement buildings.

Development will in due course be guided by a detailed plan to be prepared as a special project under ZEMP. This will determine infrastructure needs and prescribe detailed development guidelines. It will be implemented by the provincial and local authorities in consultation with the Parks Agency and other national and local interests. The plan should be approved by the Joint Development Review Board for the ACR. Development need not be frozen in the interim but will be regulated by the local authorities in accordance with ZEMP recommended procedures and guidelines.

A Town Planning and Development Department is needed to serve both Siem Reap Province and Siem Reap Municipality in matters of urban development.

A. URBAN CONSERVATION ZONES

Purpose and Function

The low density residential character which presently exists in major parts of Siem Reap, Puok and Roluos should be maintained. In particular a **Siem Reap Historic Conservation Area** is identified to revitalize the historic character of the old parts of Siem Reap. The **Siem Reap Urban Conservation Zone** would contain low density, high quality tourism development. The traditional character of Roluos and Puok should also be maintained through urban conservation zones. The purpose of this zone is:

* to maintain the low density traditional urban character of Siem Reap and the towns of Puok and Roluos and to preserve the appearance and ambience of the areas;

* to revitalize the historic character (early 20th century) of the old parts of Siem Reap;

* to encourage protection and enhancement of the riverside landscapes in each settlements.

Boundaries

The zones are shown on Plan 11, and comprise, in Siem Reap, the older parts of the town including the Grand Hotel, public gardens, administrative area, the old market, and residential areas on either side of the river from Angkor Conservation Office to the Crocodile Dam including small hotels and guest houses, public amenities and light commercial developments. In Puok and Roluos the zones include the older parts of town.

Management Policies

The following general policies will apply. They will be subject to revision once an urban development plan has been prepared and approved.

- Industry and large scale commercial activities will not be allowed;

- Building heights limited to ground floor + 1;

- Previous building set back and plot coverage ratio regulations to be maintained;

In Siem Reap:

- Low density, medium to high quality tourism development (small hotels and guest houses and restaurants) will be encouraged;

- Small workshop and retail uses will be encouraged, particularly in the revitalize old market for craft and other sales to tourists;

- Administrative services will continue in the town centre;

- Parks and gardens, particularly along the river corridor, will be preserved and enhanced including the tree lined streets;

- Through traffic will be discouraged by directing traffic to alternative routes and/or construction of new roads.

- Removal and re-siting the bus station.

Specific Policies for the Siem Reap Historic Conservation Area:

- Prohibition on subdivision of existing plots;

- Control of demolition and alteration of existing structures (facades, roofs, openings and arcades, loggias);

- Obligation to use traditional materials such as timber, flat tiles in natural colours;

- Controls on the addition of new decorative materials not in keeping with the character and design of the original building;

- The appearance and design of new building to be in keeping with the style and proportions of the architecture around.

B URBAN EXPANSION ZONES

Purpose and Function

New urban growth will be accommodated in planned locations which are not environmentally or archaeologically sensitive. The emphasis will be on the provision of adequate infrastructure and planned development of new residential, social and community services, administration, commercial and light industrial development, and other urban uses.

Urban Expansion Zones are proposed for Siem Reap and District administrative centres at Roluos, Damdek, Puok, Banteay Srei and Angkor Chum.

The primary purpose of designating this zone is to allow for the anticipated growth in the town due to natural increase, inward migration and tourism demand. It will ensure that all new development inappropriate to the urban conservation zone and the tourism development zone (see below) is directed to this area.

The purposes of urban expansion zones are:

* to concentrate future urban development in appropriate planned locations;

* to control the effects of urban growth and encourage cost effective forms of development in areas not in conflict with other urban and environmental polices;

* to set appropriate standards for healthy and environmentally sound development;

* to provide serviced sites (estates) to attract investment in tourism, commercial and industrial development;

* to encourage economic development to create employment and relieve the pressure of rural population on the parks and the resources of the ACR.

Around 800 hectares have been identified for urban expansion around Siem Reap. This land lies to the south and east of the present town and is easy to develop. Small scale industrial activities and transport facilities are proposed near the line of the proposed new Route 6.

Urban expansion zones are also delimited to the east of Roluos and to the south and west of Puok and at the other District centres.

Management Policies

- Prepare Urban Development Plans for urban expansion zones, followed by feasibility studies and detailed plans for priority development areas.

- Ensure that infrastructure is in place to accommodate new development adopting appropriate technologies and reflecting international standards.

- Ensure consistent zoning and energy efficient urban designs and layouts.

- Establish a programme of sites and services in which householders may obtain title to land and construct their own homes.

- Design and construct effective sewage treatment and waste water drainage systems.

- Zone and regulate pollution generating uses to control damage from discharges.

- Set up a system of solid waste collection and disposal using environmentally sound methods, eg sanitary land fill in locations with minimal environmental impact.

- Promote economic activity, and non-polluting industries appropriate to the area.

C TOURISM DEVELOPMENT ZONE

Planning Principles

An area near Siem Reap is proposed to be zoned for the exclusive development of tourism. All major tourist developments should be directed to this zone. The purpose of the tourism development zone is:

* to provide high quality sites for new tourist development;

* to involve government and tourist development interests in a partnership to plan and develop high quality tourism;

* to provide cost-effective and efficient infrastructure to international standards and to meet high environmental standards;

* to provide economies of scale in the provision of infrastructure, and in the planning of facilities;

* to create an attractive landscape within the zone;

* to provide controls on land use, siting, design and construction practices;

* to enforce operational guidelines for tourism activities to reflect local socio-economic needs and to benefit occupants.

High-density development serving a mass tourism market will be discouraged whilst low-density, high-quality resort accommodation and facilities related to the enjoyment of cultural tourism will be encouraged.

Development would be in the control of a corporation representing government and development interests which should ensure a high quality of infrastructure provision and environment.

Provision of the infrastructure will be the responsibility of the corporation in association with investors. The public sector component will be funded in the long term through the sale of land. Short term funding may come from international agencies and/or by borrowing secured against development values of the land.

Sites will be marketed either as fully serviced sites, or with a legally enforceable guarantee of servicing in accordance with the purchaser's construction programme.

A comprehensive site development and infrastructure plan will be prepared. A programme to dispose of sites to investors through competitive tendering will be introduced.

The zone consists of about 250 hectares of land with good access to the Angkor Archaeological Park and other tourism facilities in Siem Reap. The area is not environmentally sensitive but has potential for the creation of a high quality environment of trees and water, in which some infrastructure services are either already available or can easily be constructed.

Regulatory Framework

It is proposed to establish under law a Siem Reap Tourism Development Corporation (TDC) with powers to acquire land and layout sites for tourism development. The TDC would be set up as an independent board of management with powers to employ a competent management and technical team of advisers.

There will be an immediate and automatic expropriation of all privately owned land within the zone, with title vesting in the TDC, and the transfer of any publicly owned or unowned land also to the TDC. Compensation will be payable for expropriation of privately owned land. **It is essential that announcement of the establishment of the zone should be accompanied by an announcement of the expropriation proposals, so as to discourage speculation in land in the zone.** Expropriation law in Cambodia is presently undeveloped, apart from general principles asserted in the Interim Constitution, and further work is required on expropriation laws and procedures, and compensation calculation, with a view to devising a system for the Tourism Development Zone until some other reliable model is established under general law.

The mode of disposal of sites to investors depends upon what future arrangements are made in the land law for landownership by foreigners.

The Corporation's land ownership powers should provide it with complete control over the funding and timing of on-site infrastructure, and it will be in a position to enter into agreements with other agencies for improvements to the local highways, or connections to a local sewage treatment plant.

Management Policies

The following policies should apply:

- Prepare a site master plan and infrastructure development programme.

- Phase investment by sectors. Complete construction, of services, facilities and landscaping in one sector before opening up another sector. This will prevent scattered and inefficient use of land and facilities and encourage cost-effective use of common services.

- Develop infrastructure to international standards (water, sewerage, electricity).

- Limit negative influences of tourists on the local population through means of the design and operation of the zone.

- Limit height of construction to below the height of surrounding palm trees.

- Develop building styles and set design standards in keeping with the local environment.

- Make maximum use of local building technologies and materials to maximize economic benefit to the locality.

- Develop a hotel tourism training school in the area.

- Provide housing for workers.

- Maintain a high level of security within the zone.

BOX 2 PRINCIPLES FOR THE ANGKOR ARCHAEOLOGICAL PARK

PRINCI-PLE	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
DEVELOPMENT	All developments must be proceeded by an environmental assessment of alternatives, and be designed to minimize adverse impacts and enhance environmental values; detailed archaeological survey and assessment must be undertaken including rescue archaeology, before any development is approved (including tree planting); assessment of impact of government projects in the ACR on the parks.	Developments not normally acceptable in restricted areas; an exception is the siting of visitor facilities in the area between the Angkor Conservation Office and a line 2 km south of Angkor Wat.	
ARCHAEOLOGIC-AL SERVICE	Organisation and management of archaeological services (licensing and guidelines for all works effecting archaeological sites and monuments).	Strict protection of all land within the restricted areas;	Limits to the use and management of land to protect archaeological features above and below ground.

PRINCI-PLE	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
VISITOR MANAG-EMENT	No through traffic to enter park; limited and regulated access for visitors and park residents; improved/new park roads to form BOX around Angkor Group of Monuments.	Strict control of vehicle access, no tour busses, speed limits, parking restrictions.	Improvement of road access for park residents to destinations outside the park avoiding the core; locations for visitor reception areas and vehicle parking.
VISITOR FACIL-ITIES	All visitor facilities to be developed by the Park Agency either under direct works or under licence; licensing of guides.	limits on number and size of visitor groups; construction minor and essential visitor facilities to serve visitor needs at individual sites eg. food & drink stalls, footpaths, bicycle parks, minibus drop off and pick up points; Licensed vehicle parking only; facilities for view excavations & restorations.	Improved economic opportunities for local residents and minimize negative impact of tourists on local communities; viewing craft manufacture.

PRINCI-PLE	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
INTERP-RETAT-ION	Interpretation plan for archaeology, natura areas, local customs; visitor centre near Siem Reap well away form the archaeological sites.	Interpretation by tour guides and interpretive boards at individual sites.	Location of visitor facilities, craft centres, village and rural life exhibits/trails, interpret local life and special features such as, Siem Reap river, view from Phnom Bok.
QUARRY-ING	Laterite and sandstone quarries may be opened in Parks but only for stone required for use in restoration; any development subject to an environmental impact assessment; no clay and road/construction stone quarries in the park.		
WATER MANAG-EMENT	No major new irrigation works but restoration of ancient hydraulic structures and water management regimes.	Maintenance of traditional paddy fields; no new developments, strict control on design of any replacement structures.	Limited small scale irrigation developments to increase productivity of agriculture and self sufficiency of existing residents in the park.

PRINCIPLE	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
NATURAL RESOURCE MANAGEMENT	Forestry and woodland to be managed by the parks staff; major tree planting programme using indigenous species; manage vegetation cover to increase biological diversity; manage flora and fauna to conserve and increase the variety of wild life.	Restoration of native forest and woodland; Aboriculture works to maintain trees growing on some monuments and remove those damaging the fabric of other monuments; establish a botanical garden and forest trails; paddy rice and grazing to continue under strict conditions to maintain traditional land uses.	Licences to harvest tree crops; develop traditional subsistence agriculture; encourage higher value crops (orchard and vegetable growing) around settlements.
LOCAL RESIDENTS	Priority of employment for park residents; any relocation will be assisted and villagers given new land and material for building new homes and community facilities; licences/concessions to trade in the park.	No homes of local people.	Old settlements will remain; extensions to old settlement and mew settlement are prohibited; redevelopment of existing properties allowed under strict controls; assistance to develop essential community facilities for park residents; encouragement for local small scale provision of tourist and recreation facilities related to village life.

PRINCI-PLE	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
LAND-SCAPE MANAG-EMENT	Cultural landscapes in the park to be protected and conserved.	Restoration of native forest and woodland landscapes; plant amenity trees; create "authentic" interpretation of archaeology through creation of appropriate landscapes, including, use of contemporary garden and orchard trees, planting trees to mark ancient features on the ground such as a dyke or boundary of a city; create a forest buffer zone between the Angkor Conservation Office and Angkor Wat and between Siem Reap river and Phum Thmei.	Development of agriculture to be limited and controlled to improvements which enhance the landscape of the park.

PRINCI-PLE	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
PAGODA	Respect for religious associations and maintain ancient pagodas.	No new pagodas or religious developments; overnight accommodation restricted to the Monastery at Angkor Wat.	Villagers may develop new pagodas subject to strict control on siting and design.
INDUST-RY	No industrial development in the park; encouragement to small scale craft industries relevant to restoration, high quality and artistic visitor souvenirs.		Craft workshops concentrated in existing settlements or by visitor centres.
POWER LINES	No high voltage power lines through the park; local supply at low voltage.		
ENVIRON MENTAL AWARE-NESS	Programmes for local people on significance of Khmer heritage and environment.		Involve park residents in appreciating park values.
TRAIN-ING	Training for archaeologists and restoration architects; training of workers in excavation and restoration building works; training park rangers and maintenance staff.		

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VII. ARCHAEOLOGICAL CONSERVATION AREAS

CONTENTS

ARCHAEOLOGICAL CONSERVATION AREAS

INTRODUCTION

ZEMP proposals are for the designation of the most important areas of Angkorian heritage as the Angkor Parks. These will rank among the most important cultural protected areas in the world and will require dedicated and inspired management to conserve the monuments, provide for visitation and promote further study and research into the origins and achievements of the Khmer Empire. In addition to the parks the other focus for protection and management of the cultural heritage is through the designation of Special Areas of Archaeological Concern (SAACs). This chapter describes both the Angkor Parks and the SAACs and the management policies required for their protection.

Around an archaeological site is a zone of influence over which management controls need to be exercised to protect the area. The management of this zone is integral with the management of the site and gives direct control over the setting and landscape of the area to be protected. Although archaeological values are not the same in the supporting zone as for the site itself, nevertheless controls are essential over the whole area. "Support zones" are an indistinguishable part of SAACs, Restricted Areas, and units of the Angkor Parks. They are included within the defined boundaries of each area. The support zone can provide locations for visitor facilities and other uses related to the protection of the site or area. For example land between Siem Reap and Angkor Wat is included within the boundaries of the Restricted Area to be defined around the Angkor group of monuments to give maximum protection to the landscape setting of the monuments and maintain a buffer between the town and Angkor Wat.

1. THE ANGKOR PARKS

PARK UNITS

The Angkor Parks include four areas delimited for their archaeological and nature conservation values in which protection and management of archaeological sites, maintenance and restoration of monuments, control of land use and maintenance of landscape setting will be carried out. The parks are shown of the Plans 10 and 11 and described briefly below.

The Angkor Archaeological Park (AAP): is the main unit of the Parks and contains many of the major Angkor archaeological sites. At the core of the AAP lie the best known and most visited Angkor monuments. The AAP includes the ancient city sites from the Angkor period located in the Siem Reap and Roluos river catchments. All of the area is of high priority for archaeological research and possible excavation.

The AAP also incorporates the original Angkor Archaeological Park and most of the areas identified in later studies as worthy of conservation (Ministry of Culture, 1970 and 1990) see Plan 4. The core of the AAP contains the main Angkor and Roluos groups of monuments and should be given the highest level of protection. This is also an area in which visitor facilities are required.

Phnom Kulen Park (PKP): has special importance for the many archaeological sites in the mountains and as the source of high quality water in the permanent rivers flowing through Angkor. Other environmental values are the ecologically important forest habitats associated with maintaining tree cover for biological diversity, to protect the watershed and to provide opportunities for environmental education, recreation and tourism.

Banteay Srei Satellite Park: contains the Banteay Srei monument, Phnom Dei and an attractive section of the Siem Reap River. It lies apart from the two main park zones and will be managed as a "satellite park", subject to the same management authority and guidelines as the other units of the Parks.

Phnom Krom Satellite Park: is a second proposed satellite park on the edge of the Tonle

Sap Lake. It is a significant hill with a temple and the summit is an important view point. Other satellite parks may be added at a later date.

Together the Angkor Parks extend to an area of over 800 sq km. The AAP and the PKP are about 400 sq.km each. Banteay Srei is 10 sq km and Phnom Krom about 5 sq km. They have been delimited to avoid large scale settlement and most major roads. Boundaries are drawn to follow clearly identifiable features and include all the sites in the Angkor and Roluos group of monuments.

PURPOSE AND FUNCTION

The purposes of delimiting and managing the Angkor Parks are:

* To enable comprehensive management of areas of high cultural value for research, and visitation.

* To provide the highest level of protection for Angkor cultural and material heritage.

* To ensure the preservation of monuments and archaeological features, including water features for research and study through sound archaeological conservation practices including maintenance, restoration and stabilization activities.

* To provide for the continuation of traditional lifestyles for people living within the parks and priority employment opportunities in tourism and limited forestry and agricultural activities.

* To conserve and manage the archaeological heritage for tourist visitation at selected sites.

* To utilize the Angkor cultural heritage to nurture a greater understanding and appreciation of the Khmer history and culture through the provision of quality visitor interpretation activities.

* To provide on-site facilities, transport, guide services, interpretive exhibits and programmes that engender an understanding of archaeology and ensure a quality experience for visitors.

* To develop the landscapes within the parks in a manner which enhances a sense of history and Khmer culture.

* To provide a model of park management and tourism development that illustrates sound planning and the needs of visitors and local inhabitants within the limits of the carrying capacity of the area.

* To provide a wide array of training and employment opportunities for local people in park management, tourism services and archaeological conservation activities.

* To ensure that the essential biological processes are sustained to provide adequate food and timber and to protect water resources for present and future generations.

* To maintain and enhance native forest cover and associated vegetation, in a manner which enables traditional forest practices, enhances biological diversity and retains an attractive landscape.

BOUNDARY DESCRIPTIONS

The boundaries of each unit of the Angkor Parks are described below and shown on Plans 10 and 11.

Angkor Archaeological Park: The park boundary in the west includes archaeological sites between Pouk and the West Baray. The boundary follows the Pouk to Surin road for 4km, around the north perimeter of Nam Rup at map reference: 1,491.00 366.00 to 1,493.00 367.50 along a potential new highway line necessary to avoid bisecting the archaeological site.

The northern limit of the park follows the east-west dyke approximately along the line of map reference 1,493.00 to the Banteay Srei road at 1,493.00 386.00 and then around the north side of Phnom Bok to map reference 1,491.00 392.00.

The eastern boundary follows the road from Phum Sre Changhot south for 6 km where it turns east to include the site of Chau Srei Vibol (Wat Ek). This is the eastern most point of the park at 1,482.00 396.00. The boundary returns west and follows the Roluos river south as far as Roluos Village at 1,474.00 391.00.

Leaving the village on the east, the south-east boundary of the park follows the proposed line of a new Route 6 from 1,471.00 391.00 to 1.471.00 387.00 at the Khmer canal O Kaek west of Bakong. It returns north to meet the ancient dike running from the north-west corner of the Lolei Baray. The boundary then runs due west to cross the Siem Reap river at the Angkor Conservation compound. The park includes the new village of Phum Thmei created to resettle people from near Angkor Wat. It then follows the north side of Route 6 to beyond the airport road where it turns west to include the supposed site of the ancient city of Aninditapura south-west of the Baray. Here it returns to Route 6 and runs north to form the western boundary of the park described above.

Phnom Kulen Park: The boundaries form a polygon along the 100m contour around the base of the escarpment of Phnom Kulen. They included the spring line and all the upper catchment of the Siem Reap river. The boundary crosses the valley between the Phnom Kulen and the Kbal Spean Mountains following the 100m contour to include the catchment area of the north west tributary of the river.

Banteay Srei Satellite Park: is an area 4km by 2.5km containing the temple and Phnom Die.

Phnom Krom Satellite Park: the boundary runs around the base of the hill to include the ancient water features and the site of the monastery.

The most important monuments in the Parks are proposed to be designated as Restricted Areas to give added protection. The proposed boundaries of restricted areas within the AAP are described below.

Angkor Monument Group: The boundary runs around the west Baray 100m from the bottom of the dyke on the south, west and north sides. It follows 100m from the north bank of Angkor Thom moat and 100m to the west of the road by Preah Khan then north to the ancient canal running east-west around Banteay Prei, 1km north of Preah Khan. The boundary is along the canal to include the North Baray and Ta Som. The boundary then follows 100m east of the road across the East Baray around the supposed site of the city of Pre Rup and along the south side of the road to Sras Srang. The boundary runs 100m to the east and south of Sras Srang to include Prasat Kravan and south to the proposed road on the east-west axis of Angkor Wat. The Restricted Area boundary includes the area between the Angkor Conservation Office and Angkor Wat to provide a strong buffer between the Siem Reap and the monuments (see Plan 11).

Roluos Monument Group: The boundary runs along the edge of the dike of the Lolei Baray and 100m outside the moats of Prah Ko and Bakong to enclose the two temple complexes, returning to Route 6 by the Baray.

Other Restricted Areas will include the dykes of the East Baray and Lolei Baray, Banteay Samre, Phnom Bok, Chau Srei Vibol, Nam Rup, Banteay Srei, Phnom Krom and other important monuments and sites in the AAP and in the ACR, notably Wat Athvea and Wat Chedei.

The boundaries of the parks need to be surveyed and marked out on the ground using concrete or steel markers at regular intervals along the boundary. There is no need to fence the parks or provide a physical barrier which might disturb the legitimate uses of land on either side of the boundary by local farmers. "Gateways" on all public roads into the parks should be clearly marked with a distinguishing feature to make it obvious that one is entering a specially protected area.

A project to map and mark the boundaries of the AAP and the satellite parks is a priority proposal.

REGULATORY FRAMEWORK

The Angkor Parks will be designated by NHPAC under the Decision relating to the Protection of the Cultural Heritage of February 10, 1993 (PCH). Special legislation is proposed in Chapter IX to give effect to the establishment of the Angkor Parks. New Articles 13A to 13D will allow the designation of archaeological parks contemporaneous

with, or subsequent to, the designation of a restricted area. The procedures follow those for designation of Restricted Areas, with a view to the whole package being authorised together. This special legal basis for archaeological parks is necessary in order to empower NHPAC/Park Agency to exercise controls there.

A new power of expropriation is also recommended which will be an important backup power in the archaeological park to supplement the automatic expropriation in Restricted Areas. A further draft Article confers a general enforcement power, extending both to illegal construction work in the core area and to works on private land in the wider Park Area. There are also specific powers for NHPAC, under existing legislation, to make regulations such as to control traffic movement, and access to monuments etc.

Within the Restricted Areas in the park, management is based upon NHPAC's exclusive land ownership, through the Parks Agency, supplemented by criminal sanctions over adverse acts by others.

All land within the core zones once designated a Restricted Area, will become (if it is not already) State property: the designation of a Restricted Area effects a permanent expropriation of any private property rights that might exist there. There is no provision for compensation, as there is under other expropriatory provisions in the Decision. This omission might theoretically cause constitutional difficulties if the new republic's constitution were to include a property protection clause. However, there seem presently to be no private property rights in the core area; and hence the position with regard to restricted areas under the Protection of Cultural Heritage law (PCH) confirms what appears to be already the status quo, both de facto and de jure. It needs to be further established that NHPAC, and through it, the Park Agency, has full management powers in this state-owned property.

The fact that NHPAC has exclusive property rights in the Restricted Areas within the Park does not deny occupation rights to others. It is open to NHPAC to confer rights of occupation by licence, and this would be the mechanism through which the right to continue in occupation would be granted to people already using the land, perhaps pending other land being made available to them for relocation. It means that they would be denied a transferable property right in the meantime, but could be granted a period of secure occupation, such as 5 years, which would also have the effect of amortising any rights or expectations that had developed at the time of the designation of the Restricted Areas.

There is a need for strong interim measures, including an immediate ban on all unauthorized development within the Angkor Parks zone. These can also be implemented by enacting amendments to PCH and, if necessary, on an interim basis by refusal of construction consents by the local authorities and through a moratorium on archaeological excavation.

ADMINISTRATIVE STRUCTURE

The Parks Agency will have exclusive authority for development and positive management of each of the four park units. Positive management means not only enhancing the protection of the archaeology but also promoting all cultural and natural heritage within the Parks, creating opportunities for tourist visits to temples and other sites, and fostering the

continuation of traditional lifestyles of people living within the park.

Priority will be given to the maintenance and conservation of archaeological sites in particular the upstanding monuments. The Parks Agency will provide an archaeological and conservation service within the whole of the ACR including the Park zone. They will be responsible for providing visitor facilities, safety and security of artifacts and the creation and management of appropriate land uses and landscapes within the parks. The agency will work closely with other government technical departments in the management of water, development of infrastructure and delivery of services to those living and working in the parks.

The Parks Agency would be led by a Director, with appropriate departments, divisions, and sections to carry out specific operational functions for visitor management, management and control of archaeological survey and excavation, restoration and maintenance of monuments, enhancement of the ecology and landscape, site management and development interests of the local inhabitants of the parks. The Agency would absorb the present functions and staff of the Angkor Conservation Office. The administrative structure for the Parks Agency is described in detail in Chapter VIII.

2. SPECIAL AREAS OF ARCHAEOLOGICAL CONCERN

SCOPE AND PURPOSE

NHPAC has an obligation to provide for the registration and classification of Cambodia's cultural heritage. Archaeological sites which in the opinion of NHPAC form part of the national patrimony should be recorded and protected from damage or destruction. This involves a long term process in which sites are identified, classified and registered with the most important being classified for special protection.

Many sites in the ACR hold great archaeological significance and must be preserved for future research and possibly for visitation. But the scattered nature of Angkor's archaeology, and the fact that much still remains buried, also make it difficult to provide the special degree of protection that each particular location requires. Outside the parks and throughout the ACR there are approximately 500 sites of archaeological concern including monuments, hydrological features, pre-historic mounds, and below-ground sites. The Angkor Parks boundaries can not be drawn to include all the important areas. Many of these sites require protection similar to sites within the park zones. They are in-effect micro-zones of special archaeological value lying outside the park boundaries and may be in public or private ownership. Examples include the temple of Beng Mealea, the moated site south of Lovea and the prehistoric moated habitation mound under the present village of Phum Reul. These sites are to be classified as Special Areas of Archaeological Concern (SAAC) and will be protected by similar considerations to those which apply to archaeological sites within the Parks. SAACs will be subject to control over all works which would disturb the land or otherwise affect the archaeology.

All sites on the ZEMP inventory of archaeological sites are potential SAACs. Measures will be taken to survey, register and classify archaeological and historic sites of all periods. Sites which meet specified criteria for significance will be classified as SAACs. This will be an ongoing process.

Boundaries should be determined and recorded on maps. Boundaries will be drawn to include known archaeological features and surrounding areas within which archaeological evidence may be found. Support zones will be established within the designated boundaries of SAACs to protect archaeological features from the impact of inappropriate development. The boundaries will therefore be drawn to include a buffer or control zone of 50-100m in which development if not controlled, could effect the integrity of the site. As resources permit boundaries can also be marked on the ground.

REGULATORY FRAMEWORK

A new draft Article 13F will allow SAACs to be established, by decision of the SNC or its successor, for areas outside archaeological parks and restricted areas, where the presence of archaeological remains is known or suspected. SAACs remain in traditional ownership; the most important SAACs may be designated as restricted areas and will then come into public ownership. All disturbance to the ground is prohibited in SAACs without prior consent. These regulations incorporate the normal requirements to have NHPAC approval for any action which affects a SAAC. Regulations will require pre-notification and approval by the Parks Agency for change of use and development

ADMINISTRATION

SAACs will be managed for the NHPAC by the Angkor Parks Agency. Archaeological Inspectors would be appointed by NHPAC and employed by the Parks Agency to survey, record and classify SAACs, advise on their management and control activities which require permission. The inspectors will monitor sites and enforcement the regulations.

A permitting system will be established whereby any activity to be undertaken within the boundaries of a SAAC, involving change of land use, construction or any activity breaking ground is required to be notified to the Parks Agency. Procedures will be developed by the Parks Agency in conjunction with the ACR Development Review Board for the ACR. Inspectors from the Parks Agency will assess the impact of the proposed action and issue a permit with or without conditions. A decision on whether to grant or refuse permission should be made within eight weeks. Refusal of permission or setting onerous conditions could be appealed against to the ACR Development Review Board.

Classification

The first task is to start the process of classifying SAACs.
An inventory of information on sites should be developed using the GIS and the existing ZEMP records. Files should be prepared for each monument containing information from historical references, survey reports, collections, photographic records etc.

Ground surveys should be carried out to confirm the site and fill in a site record sheet. Site record sheets should be developed and pre-printed to include the following information: location, description of type of feature, historic/archaeological value, conservation status, land use and judicial contexts, education opportunities, threats and development restrictions, and management requirements and guidelines, together with visual and bibliographic documentation.

The inventory would provide a register of all archaeological sites. Sites would be placed in categories and priorities for conservation and management assessed. Not all the sites on the register would be classified as SAACs. "Classification" is a formal process under the PCH law and will be undertaken for all sites to be protected under the notification scheme.

The boundaries adopted in classifying sites will be drawn to include support zones necessary to protect the setting and integrity of the archaeological features. Criteria for evaluating impacts of proposals would be defined on the record sheet for each SAAC on the basis of the results of archaeological field survey. Regular inspection and monitoring of SAACs is essential to enforce the notification and permitting requirements and to decide if any action is required to protect sites.

In urgent cases, when a site is endangered, emergency procedures should apply. Where an archaeological site has not been surveyed and classified as a SAAC but there is a threat of use, misuse or development, the Parks Agency will notify the Authorities who will be required to give three months for a survey and emergency classification prior to following the procedures. These will be established under NHPAC regulations to enable action to be taken to safeguard the site. Archaeological inspectors from the Parks Agency will be empowered to stop the activity and require the appropriate provincial authorities to enforce an emergency stop notice until a decision of the AMA Board on the activity has been made.

Additional SAACs should be declared as the results of new surveys become available. Classification is a continuous process. Information could be made available by any competent organization to assist in the preparation of the inventory for example; archaeological institutions carrying out surveys under licence/contract from NHPAC.

The management of SAACs by the Parks Agency will demonstrate to the rest of Cambodia the means by which conservation of archaeological sites and areas can be made compatible with economic development needs of local people.

3. ARCHAEOLOGICAL AND CONSERVATION SERVICES

INTRODUCTION

Archaeological services in the ACR and Angkor Parks include maintenance and restoration of monuments, coordination of surveys, research & monitoring programmes; licensing & control of restoration and archaeological excavation activities; maintaining archives, conservation laboratories, a museum and exhibitions; registering archaeological sites,

classifying SAACs and determining impact of development on SAACs in the ACR and on archaeological in the Angkor Parks; and providing archaeological interpretation of Angkor.

Archaeological priorities for the Parks Agency are maintenance, ground survey, site inspection, urgent repairs, scientific monitoring; followed by restoration and national-level training of technicians and scientists;

ADMINISTRATION FOR ARCHAEOLOGY AND CONSERVATION

The Parks Agency will be responsible for coordination and control of all archaeological activity in the ACR and Parks. It is proposed that Departments for Archaeological Services and Architectural Conservation will be established in the Division for Archaeology and Conservation (see Chapter VIII). In the first place the Parks Agency must establish permitting procedures for archaeological research, excavation and restoration, and preparing standard guidelines on archaeological practices and recording methodology.

A first imperative is a moratorium on archaeological excavation whilst the Archaeological Services are being formed and whilst a plan for archaeological research and monitoring and architectural conservation and restoration is prepared. The plan should be drawn up by the Parks Agency to be approved by NHPAC with assistance of UNESCO and in association with national and international interests. The archaeological plan should be prepared in parallel with a park management plan.

The archaeological Service Department will set up an inventory of archaeological sites using the GIS and information from ZEMP, the documentation centre being developed by EFEO and other sources. The Department should develop standard procedures for recording and reporting new survey information and implement a system of regular monitoring of archaeological sites. They will also be responsible to set up and coordinate plans for training archaeological professionals and technicians for work in the Parks and in Cambodia.

The Architectural Conservation Department will manage monument maintenance and restoration activities, They will so some work themselves and will grant permits and contacts on behalf of NHPAC, under strict conditions to international institutions to carry out restoration work in the parks. The Department will coordinate research and experiments into methods and techniques for conservation.

As Angkor is of great interest to archaeologists and conservation architects from all over the world, the Parks Agency has an important role in coordinating international assistance for archaeology and architectural conservation at Angkor. Foreign involvement in archaeology needs to be controlled and focused and the Parks Agency must quickly move to establish licensing, monitoring and recording procedures and take the initiative under the plan to ensure that outside expertise is made to complement and contribute to a broad and focused programme designed to protect the interests of the Park.

A list of long-term research needs in the ACR should be maintained to guide future research. All plans and programmes should be reviewed periodically and a mechanism set up to

coordinate Parks Agency activities with those of other bodies. International validation of the archaeological research and architectural conservation activities of the Parks Agency through UNESCO's Scientific Advisory Panel for Angkor, should be established to give confidence in the scientific work of the Parks Agency.

MORATORIUM ON ARCHAEOLOGICAL EXCAVATION

An excavation is any research aimed at the discovery of objects of archaeological character, whether such research involves digging under the ground or systematic exploration of its surface. A moratorium on all excavation including above ground investigations on monuments, except emergency rescue work, should be implemented by NHPAC immediately. The moratorium provides an opportunity for full assessment of the varied methodologies and priorities presently applied at Angkor and for a careful evaluation of circumstances before proceeding with a focused programme of archaeological research. The length of the moratorium will be contingent on having an operational archaeological service in place. This depends upon:

- The establishment an adequately constituted and staffed Archaeological Service Department in a Angkor Parks Agency.

- A system of applications for Archaeological Permits in place. All applications for any archaeological work in the ACR including the Parks will be directed to the Park Agency who will require qualified expert advice to evaluate proposals. A small panel of international experts should be set up to provide advice on all proposals and ensure continuity of standards. This core group would be formed from the Scientific Advisory Panel for Angkor and would co-opt members on the basis of the topic of the application, from a UNESCO roster of experts. Each member of the expanded panel would return by fax an evaluation form within a specified period of time. All evaluation forms will then be collated and a consensus statement prepared by a designated officer of the Archaeological Service. Evaluation should put particular stress on well conceived research designs, a commitment to the creation of a site and research archive, clear publication planning and sensible designed post excavation projects. Successful applicants will sign a formal contract with NHPAC which clearly lays out their responsibilities and duties.

- Standard guidelines for field work and recording forms in place. The Parks Agency should formulate explicit field work standards and guidelines for all work done at Angkor. These will ensure a consistency of approach and data collection. A methodology for excavation of moats and other hydrological features is urgently needed. Standardised forms for recording in the field and in the workshops have the advantage of making site information easily accessible to other researchers and of maintaining acceptable standards of recording by trainee and non-professional personnel. They ensure that essential data is not left out and that all data is recorded in a format suitable for computerization which is vital to the efficient creation and maintenance of the inventory.

- A complete surface survey of the Angkor area is required. Survey is a valued research tool in contemporary archaeology, particularly in the study of settlement

patterns within a given area, such as Angkor. The survey would concentrate on expanding the definition of "archaeology beyond the Khmer monuments to include:

- pre-historic settlement mounds;
- complex irrigation hydrology;
- extensive non-monumental remains of Khmer urban areas which can provide enormous amounts of information concerning the economic and administrative life of Angkor, trade and commerce, transport and residential patterns;
- area of ethno-archaeological value to provide studies of living people and their material culture in order to improve understanding of the archaeological record.

A full archaeological reconnaissance-survey of the ACR will provide the data required for the Archaeological Service Department to advise on the setting of priorities for further research, excavation and preservation.

- The establishment of a Monitoring and Inspection System to ensure that all licensed excavations adhere to standards set by the authorities. Monitoring should be in the form of regular and frequent assessment visits, within the manpower limitation of the Department. Ideally a professional archaeologist from the Service should be on an excavation site at all times. The monitoring system includes monitoring and evaluation of development at SAACs.

EXCAVATION AND RESTORATION GUIDELINES

Guidelines will be drawn up for archaeological excavation and restoration of sites and monuments. Expert assistance should be sought to prepare draft guidelines. The following factors should be taken into account:

- Licenses are required for all excavation, restoration and renovation works. The credentials of experts involved should be checked.

- All documents on earlier excavations should be examined to understand the past history of the site and previous archaeological work undertaken.

- Any restoration work must incorporate all of the parameters ie. be comprehensive in approach and be coordinated with all other specific interventions on site.

- All architectural conservation proposals will include a programme design, publication plans, and post-conservation maintenance plans. All significant architectural conservation proposals should receive professional review from experts outside the AAP before permitting; and the credential of any 'experts' seeking to carry out research checked.

- A systematic surface analysis must precede all monumental renovations. Any digging to uncover temple foundations also constitutes an archaeological investigation and must be undertaken according to the guidelines.

- Renovation of archaeological features should achieve accuracy and faithfulness to the

architectural integrity of the original structure.

- A primary consequence of excavation is large quantities of artifacts needing recording, cleaning and preservation, storage, and analysis. Angkor Park Agency will maintain an artifact and archival collection at Angkor and the Curatorial, Artifact Conservation and Archives Department will establish centralised or on-site museums and laboratories.

- The archaeology of the hydraulic features such as moats, barays and canals, is extremely important. A methodology for their repair and excavation should be established and followed. This should at least contain:

  - Regularly spaced cores should be taken prior to excavation of moats and hydraulic features to determine original depth, and material of foundation layers.

  - Removal of the topsoil overburden layer which may be by casual labour followed by a systematic screening of lower layers of previously undisturbed areas. This particularly applies to the excavation of moats which can provide a valuable source of stratigraphic data.

  - It is preferable to renovate ancient hydraulic systems rather than building new structures for supply of water to fill excavated moats in keeping with the philosophy of archaeological authenticity.

  - A strategy for maintenance is required as clearance is useless unless the features have regular cleaning.

- Any person finding archaeological remains must declare them at the earliest possible date to the competent authority. Penalties for infringement are set out in the decision on the Protection of Cultural Property.

- Opportunities for visitors to observe ongoing excavation and restoration work should be developed as part of each project.

Restoration of Hydraulic Features

A number of recent studies have suggested restoration priorities for Angkor. Investigating the need for restoration and making further recommendations on priorities were not part of the ZEMP programme. However some options for restoration of water features were developed in relation to the water resources in the ACR and Parks. These are the partial restoration of the barays (West, East and North Barays) to increase the water storage capacity for enhancing the water resources and to raise their archaeological value could entail any of the following options:

- Raising the water level by one or two metres in the West Baray to obtain additional storage capacity of 15 or 30 million m3 respectively

- Partially restoring the East Baray creating a storage capacity of 30 million m3

- Restoring the North Baray to store a volume of 10 million m3 water

- Cleaning and filling the Sras Srang to enhance its archaeological value

- Restoring the moats to increase their archaeological and tourism values and to stabilize the ground water table around the monuments such as;
  i) restoration of the Angkor Wat moat including the feeder canal from the River Siem Reap,
  ii) partial or complete restoration of the Angkor Thom moat,
  iii) restoration of the Preah Khan moat,
  iv) restoration of the inner moat of Bakong and partial restoration of the outer moat,
  v) restoration of the Preah Ko moat, Roluos.

The restoration of moats and canals for tourism purposes will require considerable quantities of water which are not available unless further storage facilities are developed.

ARCHAEOLOGICAL AND MONUMENTS DOCUMENTATION

The Parks Agency should swiftly establish a document centre for technical documents and reports. This is proposed to be part of the Curatorial, Artifact Conservation and Archives Department. It will bring together the work currently being developed by EFEO to incorporate the 3000 EFEO/Angkor Conservation Office plans now on microfiche into a data base and include materials now located in Phnom Penh. This inventory will be updated as data becomes available from new surveys and field work. Previous documentation must be systematically collected and included in the Centre's archives to avoid erroneous "new discoveries" and provide a comprehensive picture of knowledge.

A publications programme for archaeological and conservation work is of great importance. The programme should include a monograph series in which work done within the Parks and in the ACR can be published in full. Other mediums such as academic journals and non-professional magazines should be used to publish information about new discoveries and work being done at Angkor.

Workers Register

One of the most effective ways to persuade local residents of the value of cultural property is to include them in the conservation process. An informal register of workers should be maintained including the nature of their experience, acquired skills, seniority etc. Basic manuals can be prepared setting principles of excavation, maintenance of monuments, and care of equipment. As new workers join these teams, more senior members will take over the role of explaining and teaching, if they themselves have received basic instruction.

Certificates

Measurers should be taken to encourage the public to notify the Archaeological service of chance discoveries and of cultural property in danger, An effective method is the public awarding of certificates to individuals in recognition of their cooperation. Financial awards are likely to lead to an increase in illicit exploration.

4. MANAGEMENT POLICIES AND GUIDELINES

PARK MANAGEMENT PLAN

Detailed policies for the Angkor Archaeological Park and the two satellite parks of Banteay Srei and Phnom Krom will be developed in a Park Management Plan. Preparation of a plan for the Phnom Kulen Park should follow at a later date. The policies set out below are general policies to guide development in all units of the Parks and provide the strategic framework for the development of the management plan.

The first priority is to define the park boundaries which will require the preparation of topographical and cadastral surveys, to precisely determine the proposed boundaries, and to mark them out on the ground. A project is described in Chapter X to define park boundaries.

The preparation of the Park Management Plan involves a multidisciplinary team from the Park Agency with assistance from other government departments of Agriculture and Forestry, Hydrology and community services. It will also be necessary to involve international expertise in park management and planning to overcome the lack of professional expertise available in Cambodia. The plan should be coordinated with the Archaeological Plan and cultural resources management guidelines which is proposed as a separate exercise (see section 3 above). A project to prepare a park management plan is outlined in Chapter X.

POLICIES FOR ANGKOR PARKS

The polices described in the following sections are relevant to all units of the Angkor Parks but have particular relevance to the Angkor Archaeological Park and Satellite Parks.

Policies for the Angkor Archaeological Park are differentiated between the following three zones:

the park as a whole,
core restricted areas, and
rest of the park outside restricted areas.

BOX 4 sets out in summary form policies for each zone.

BOX 4 POLICIES FOR THE ANGKOR ARCHAEOLOGICAL PARK

POLICY	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
DEVELOPMENT	All developments must be proceeded by an environmental assessment of alternatives, and be designed to minimize adverse impacts and enhance environmental values; detailed archaeological survey and assessment must be undertaken including rescue archaeology, before any development is approved (including tree planting); assessment of impact of government projects in the ACR on the parks.	Developments not normally acceptable in restricted areas; an exception is the siting of visitor facilities in the area between the Angkor Conservation Office and a line 2 km south of Angkor Wat.	
ARCHAEOLOGICAL SERVICE	Organisation and management of archaeological services (licensing and guidelines for all works effecting archaeological sites and monuments).	Strict protection of all land within the restricted areas;	Limits to the use and management of land to protect archaeological features above and below ground.

POLICY	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
VISITOR MANAG-EMENT	No through traffic to enter park; limited and regulated access for visitors and park residents; improved/new park roads to form BOX around Angkor Group of Monuments.	Strict control of vehicle access, no tour busses, speed limits, parking restrictions.	Improvement of road access for park residents to destinations outside the park avoiding the core; locations for visitor reception areas and vehicle parking.
VISITOR FACIL-ITIES	All visitor facilities to be developed by the Park Agency either under direct works or under licence; licensing of guides.	limits on number and size of visitor groups; construction minor and essential visitor facilities to serve visitor needs at individual sites eg. food & drink stalls, footpaths, bicycle parks, minibus drop off and pick up points; Licensed vehicle parking only; facilities for view excavations & restorations.	Improved economic opportunities for local residents and minimize negative impact of tourists on local communities; viewing craft manufacture.

POLICY	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
INTERP-RETAT-ION	Interpretation plan for archaeology, natura areas, local customs; visitor centre near Siem Reap well away form the archaeological sites.	Interpretation by tour guides and interpretive boards at individual sites.	Location of visitor facilities, craft centres, village and rural life exhibits/trails, interpret local life and special features such as, Siem Reap river, view from Phnom Bok.
QUARRY-ING	Laterite and sandstone quarries may be opened in Parks but only for stone required for use in restoration; any development subject to an environmental impact assessment; no clay and road/construction stone quarries in the park.		
WATER MANAG-EMENT	No major new irrigation works but restoration of ancient hydraulic structures and water management regimes.	Maintenance of traditional paddy fields; no new developments, strict control on design of any replacement structures.	Limited small scale irrigation developments to increase productivity of agriculture and self sufficiency of existing residents in the park.

POLICY	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
LAND-SCAPE MANAG-EMENT	Cultural landscapes in the park to be protected and conserved.	Restoration of native forest and woodland landscapes; plant amenity trees; create "authentic" interpretation of archaeology through creation of appropriate landscapes, including, use of contemporary garden and orchard trees, planting trees to mark ancient features on the ground such as a dyke or boundary of a city; create a forest buffer zone between the Angkor Conservation Office and Angkor Wat and between Siem Reap river and Phum Thmei.	Development of agriculture to be limited and controlled to improvements which enhance the landscape of the park.
NATUR-AL RES-OURCE MANAG-EMENT	Forestry and woodland to be managed by the parks staff; major tree planting programme using indigenous species; manage vegetation cover to increase biological diversity; manage flora and fauna to conserve and increase the variety of wild life.	Restoration of native forest and woodland; Aboriculture works to maintain trees growing on some monuments and remove those damaging the fabric of other monuments; establish a botanical garden and forest trails; paddy rice and grazing to continue under strict conditions to maintain traditional land uses.	Licences to harvest tree crops; develop traditional subsistence agriculture; encourage higher value crops (orchard and vegetable growing) around settlements.

POLICY	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
LOCAL RESID-ENTS	Priority of employment for park residents; any relocation will be assisted and villagers given new land and material for building new homes and community facilities; licences/concessions to trade in the park.	No homes of local people.	Old settlements will remain; extensions to old settlement and mew settlement are prohibited; redevelopment of existing properties allowed under strict controls; assistance to develop essential community facilities for park residents; encouragement for local small scale provision of tourist and recreation facilities related to village life.
PAGODA	Respect for religious associations and maintain ancient pagodas.	No new pagodas or religious developments; overnight accommodation restricted to the Monastery at Angkor Wat.	Villagers may develop new pagodas subject to strict control on siting and design.
INDUST-RY	No industrial development in the park; encouragement to small scale craft industries relevant to restoration, high quality and artistic visitor souvenirs.	—	Craft workshops concentrated in existing settlements or by visitor centres.
POWER LINES	No high voltage power lines through the park; local supply at low voltage.		

POLICY	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
ENVIRONMENTAL AWARENESS	Programmes for local people on significance of Khmer heritage and environment.		Involve park residents in appreciating park values.
TRAINING	Training for archaeologists and restoration architects; training of workers in excavation and restoration building works; training park rangers and maintenance staff.		

Policies of the Angkor Parks are detailed below.

Park Operation Funds

ZEMP recognises that the Angkor Parks Agency will receive much of its funding from funds generated by the parks. Priority for the distribution of these funds should be for the security and operations of the parks themselves. The balance should go to support projects of archaeological research and rehabilitation of monuments in the parks and to protect SAACs in the ACR. Capital funding for facilities construction and investment projects will of necessity come from central government via NHPAC and through international assistance programmes. A proportion of funds generated by Angkor may go to support archaeological protection projects throughout the country which will rise as visitor receipts increase.

The Angkor Parks Agency will generate income from several sources:

entrance fees
permit fees
license fees
franchise fees
profits from businesses

Entrance fees are discussed below under charging policy and collection of fees.

Permit fees should be charged for research, excavations, restoration projects, commercial filming and other activities conducted in the parks. They should pay a fee according to their use of park resources, their contribution to park activities and the degree of personal gain derived from the use of the parks.

License fees are an annual fee for operating or doing any business in the park. Licenses will be required for guides, stall holders and others offering services in the park, and for grazing animals and harvesting forest products in restricted areas. Standard license fees should be charged for individual activities, but larger operations should pay a fee based on the gross profits, benefits, or approximate size of the business being licensed.

Franchise fees are appropriate to businesses making an investment in the park for instance transport operators, manufacturers of certain souvenirs, publishers of maps and guides, and shop and restaurant operators (in connection with a visitor centre). The franchise fee would normally be a percentage of annual gross profits of the business.

The park may operate businesses themselves. Any profits from such activities are a source of income to the park for instance, guide book sales.

The general rule should be that all business operations in the park however small, need a permit, license or contract from the Park Agency. For example, tour operators should be required to have a license to bring visitors into the Park as well as each visitor being charged an entrance fee. Agricultural activities in the core restricted areas will require a renewable

licence. In this way all activities including the activities of park residents are monitored and can be controlled where this is desirable to protect the parks.

Concessions Management

Visitor services can be supplied either by the park employees or under license and franchise. The latter is the preferred approach since licenses and franchises would allow specific types of businesses to be added or changed when needed. It is also a more manageable way to provide a high number of jobs to local people without getting involved in the details of operating a business. There are already many people seeking to make a living from visitors to the parks. These people should be encouraged to improve the quality of their services through a licensing system. Licensing allows the Park Agency to monitor the standard of services and quality of products and provide advice and training. While there is some cost to the park in managing licenses and franchises it is not as high as operating a business.

Charging Policy

Charging policy should include a two tier entrance fee, one for foreigners and another for Cambodians. This would allow the park to bring in a substantial income to support its operations and still encourage Cambodians to visit a significant national symbol at prices they can afford. For example, foreign visitors would pay US $50-100 for say a 6 day permit, while Cambodians would pay the equivalent of 50 cents in riel at the going exchange rate, for a day pass. This fee should be set to cover the expense of collection and security in the park.

A fee of US$ 50 per person would raise income for the Park Agency as follows:

20,000 visitors per year - $1,000,000 per anum
30,000 visitors per year - $1,500,000 per anum
100,000 visitors per year - $ 5,000,000 per anum

Income will be doubled for a fee of $ 100 per person.

ZEMP recommends a high entrance fee which allows visiting to all monuments in a defined area during a number of days, for the following reasons:

- to maximise income from users of the parks;
- to raise funds for conservation work at Angkor;
- to use price to limit numbers of visitors to the capacity of the sites;
- to encourage tourists to stay for a period in Siem Reap and thereby contribute to the local economy;
- to encourage those with a deep interest in Angkor at the expense of more casual visitors;
- because Angkor is a great attraction, the market can stand a high price;
- the cost of entry to international tourists is small in relation to the total cost of a visit to Angkor;
- the present entrance fee is high and in the order of US$70.

It is anticipated that the demand for visitation will be strong even at US$ 100, the upper price recommended. It is desirable to restrict numbers during the development stages of the park

when park and Siem Reap infrastructure are being built and park institutions are being established. Lower initial visitation will allow orderly development of the park.

However, people paying a high price must know that the entrance fee is being used for maintenance of the monuments and not for other unrelated purposes. The entrance fee should not appear as a tax to support general government funds. Tourist taxes may be appropriate and can be raised directly as a bed and restaurant tax or tax on transport or purchase of goods. Any contribution to government revenues from the entry ticket should be shown separately. The negative aspect of a high fee policy is the potential for corruption: for instance, tour operators may find ways around paying the official fee.

The distribution of visitors throughout the parks can be influenced by separate and cumulative entrance fees. For instance, the standard fee could apply to the Angkor group of monuments, but an additional fee might be required to visit the Roluos group and the satellite parks, Banteay Srei and Phnom Krom. In this case, visitors would pay the basic fee of $50-100 and an additional fee of say $5-15 to visit each of the other main sites. The total cost to visit the Angkor group and two other sites would be in the range of $65-130. Individual entry fees for those wishing to visit only Banteay Srei should not be available. This may reduce visitor pressure at the site to those who were prepared to pay for the experience. This type of cumulative fee system could be extended to include any other site which may be opened to the public in the ACR. While the basic permit should allow entry to the visitor centre and park museum, a separate fee of $5-10 should be available for those who are not visiting sites in the park.

The level of fees should be set after careful evaluation of the methods of collection and control, and the income to be generated, and should be kept under regular review.

Collection of Fees

Recent attempts to improve collection and control of entry fees have not been entirely successful. This is largely because of joint administration and inconsistent implementation. Considerable thought and effort is needed in planning and administering fee collection. Most visitors will enter the park by road. Initial control points should be at proposed visitor reception centres and car parks, and for the present, at gateways on the roads leading into the park. However entry points should not be used for the sale of visitor passes. These should be sold at a central fee office in Siem Reap. Such a system would simplify handling money because only one office would deal with all sales of passes. Entry points into the park should only be used to check the validity of passes.

Visitors should be encouraged to pay their entrance fees through tour operators when they book. Tour operators would collect passes on the arrival of visitors to Siem Reap. Others who come to Angkor without a reservation would be obliged to purchase a pass at the office on arrival. Additional entrance fees for other areas would also be purchased at the office.

Ticketing can be a complex operation and one that might be franchised out. An international bank could be invited to manage all or part of the fee collection programme. This would be especially useful for those who prepay their entrance fees. The advantages are the use of preexisting electronic networks for data transmission, availability of accounting expertise, and

the opportunity to receive regular audits to monitor the system. A disadvantage could be the cost of the service.

The use of passes enables workers at entrance gates to look only at passes to ensure they are valid for the appropriate location and period. No money need be handled, which will reduce the temptation for theft and enable the employment of less educated workers as guards than might be necessary where tickets are on sales at each entry point.

Visitors should get a formal, hard to counterfeit pass, possibly with their picture on it; the pass might be in the form of a souvenir of Angkor. The colour of passes could change on a regular basis to reduce theft or counterfeiting and they should contain clearly all the necessary information, such as the name of the person to whom they are issued and the dates for which they are valid.

There is much world-wide experience of methods of charging and of appropriate technologies for collection and monitoring fees. A tourist site management organization like Walt Disney Enterprises, should be consulted about the development of a comprehensive system on the basis of the above guidelines.

Maintenance and Restoration of Sites

The key to the protection of the Angkor heritage is the quality of archaeological site maintenance and restoration. The Park Agency should build on the work and experience of the Angkor Conservation Office in the maintenance of sites. A large permanent and skilled labour force should be established representing the range of skills required, from regular clearance of vegetation to stabilization and reconstruction works. A maintenance operations plan should be prepared in which methods of working, training and other needs are developed. An operations plan will form a component of the park management plan.

Construction should be prohibited close to all archaeological sites and monuments and in the bottom of the barays. Construction on ancient dikes is undesirable and should be avoided where an alternative is available.

Transport System in the Park

Through traffic should normally be kept out of the parks. This requires action on a regional road structure to provide alternative routes which avoid passing through the parks and particularly, entering the core restricted areas. The first priority is to prohibit heavy traffic passing through Angkor Tom.

A transport system for the Angkor Archaeological Park should provide for tourist access and movement between sites and the needs of servicing and maintenance. Vehicle access should be limited by the design of traffic flow patterns that takes traffic away from the monuments, and encourages alternative transport modes such as small shuttle buses and bicycles. A feasibility study is required to determine the appropriate modes of transport and access routes. This is a key component of the park management plan.

An indicative concept plan is shown in Diagram 9. This involves a box-like route around the

Angkor group of monuments. Tour buses and private vehicles would be prohibited from entering inside the box. One or more transport interchanges would be located on the box at a distance from the monuments. Cars and large buses would be parked here and tourists would use an internal park transport system which might consist of minibuses, open covered vehicles, or motor drawn flatbed trailers following defined routes, animal drawn individual carriages for short distances, and bicycles.

Access for park residents must be provided for. Only essential traffic should be allowed into restricted areas; alternative routes for internal park circulation should be provided. Local roads and tracks servicing outlying areas should be maintained and upgraded to an all-weather capability.

Traffic regulations are required to control vehicles entering the parks. Tourist vehicle operators should be licensed. Codes of practice for tourist vehicles should be established which all licensed drivers and tour guides must follow. The impact of the current high growth of motorcycles should be limited. Power boats should be prohibited on waters in the parks.

Visitor Facilities

Siem Reap town is the proper location for built facilities to serve tourists visiting Angkor such as accommodation, restaurants and entertainment. Developments within the park should be limited to visitor support activities which are essential for the management of tourist flows provided they enhance rather than detract from the park atmosphere.

Built developments are likely to be visitor reception facilities located on main access routes within the park and consisting of coach and car parks for change to internal park transport, food and drink stalls, outlets for guidebook and souvenir sales, toilets, shelters with shaded seating and picnic areas. There should be no tourist accommodation located within the AAP, nor in the satellite parks.

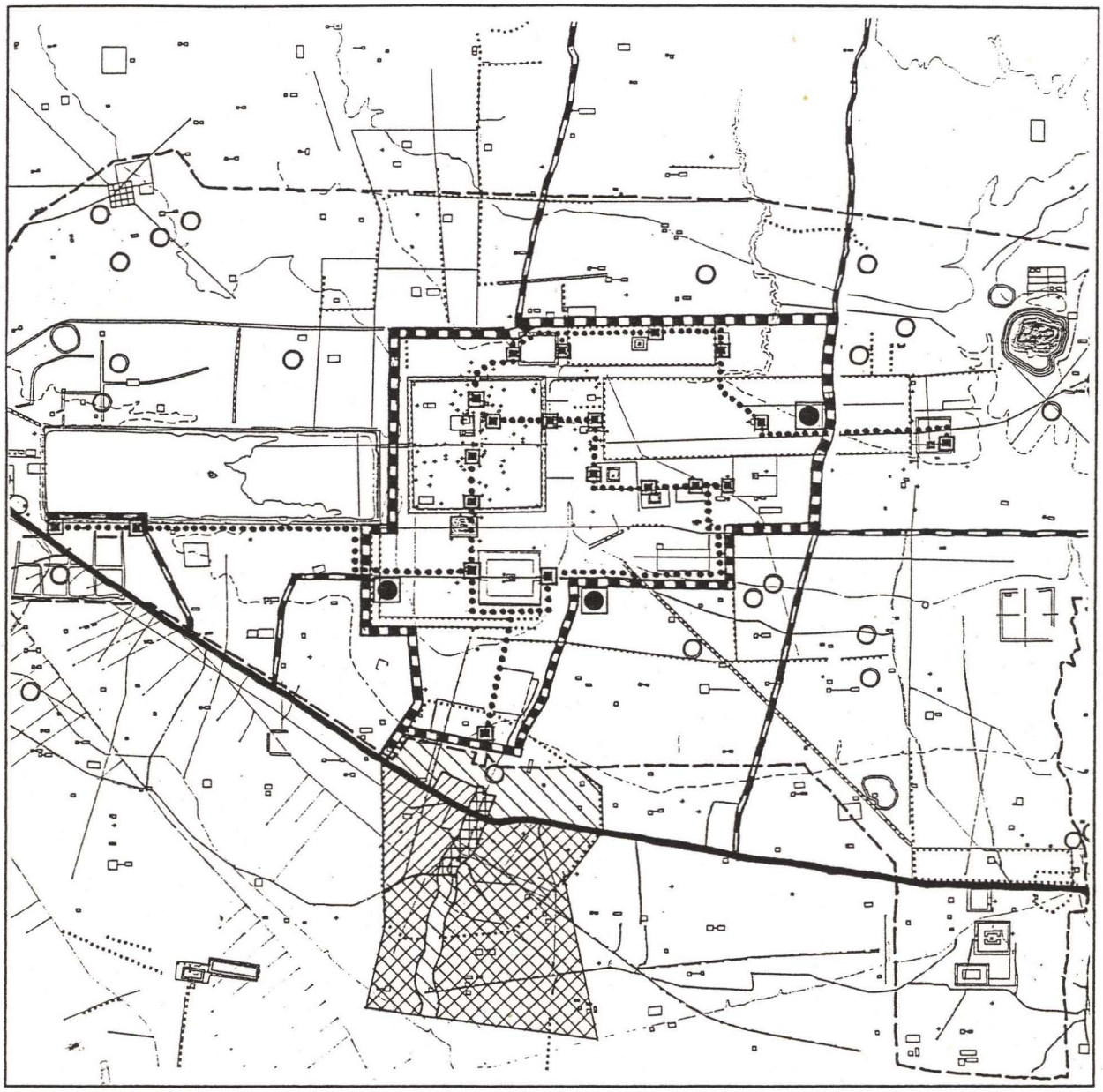
A main visitor centre consisting of information point, exhibition and interpretive facilities, museum, dance theatre and tourist book/crafts shops, should be located on the edge of the park. Purpose designed buildings could be arranged around a campus and located within walking distance of Siem Reap historic core and tourism development zone.

Individual site management plans should be prepared for each site within the framework of the park management plan. These plans should reflect the number of visitors the site can contain at any time, the demand, the historic orientation and approach to the monument and the appropriate form of presentation. Designs should control visitation to levels which do not threaten the archaeology and visitor appreciation. They should incorporate on site information and interpretation facilities and a minimum of visitor services such as a drinks stall and shaded seating.

Interpretation

Visitor appreciation of Angkor heritage can be much enhanced by carefully designed tour programmes, the use of competent guides, methods of presentation, and availability of

DIAGRAM 9



NOT TO SCALE

LEGEND

- NATIONAL ROUTE 6
- PARK MAIN ROAD
- LOCAL ROADS
- SHUTTLE BUS ROUTES
- VISITOR RECEPTION CENTRES
- BUS STOPS
- PARK BOUNDARY
- URBAN CONSERVATION ZONE
- HISTORIC CONSERVATION AREA
- URBAN EXPANSION ZONE
- TOURIST DEVELOPMENT ZONE

INDICATIVE CONCEPT PLAN OF PARK TRANSPORT SYSTEM

accurate information, exhibits and publications. Interpretation should be guided by an interpretive plan which will form a component of the park management plan.

Provision of interpretive facilities should be both on site and at an Angkor Parks visitor centre. The visitor centre should be designed to orientate and introduce visitors to Khmer history, art and architecture and the facilities of the park. Various media should be used for telling the story, including audio visual presentation, information boards with explanatory text, photographs and maps, exhibits of historic artifacts and models of sites, and publications in common languages ranging from short guides and souvenir picture books, to academic reports and papers for those with a deep interest in the subject.

In addition to the services of a guide, on-site interpretation should include explanatory boards and sign posting. Forest nature trails should be established to interpret the nature conservation values of the parks.

Guiding

All parties of visitors should be encouraged to hire a local guide. Although it should always be possible for individual visitors to explore the Angkor sites at their own pace, at certain times, guided parties may be the only appropriate way to control numbers at popular sites and all tourists should be obliged to join a guided group.

The Park Agency should establish a guide licensing scheme. Only licensed guides should take visitors into the parks. A guides organization should be developed in cooperation with the Provincial Tourism Office. This would coordinate the provision of guide services to the general public and would be the recognized guides organization for the Parks Agency to permit.

A guide training school should be established in Siem Reap with assistance from the Park Agency. Licensed guides should be required to hold a certificate from a recognised guide training course. Linguistic skills should also be required.

Landscape Conservation

Each unit of the Angkor Parks represents a unique cultural landscape. The implementation of management polices should contribute to the conservation of the particular qualities of the landscape. Assessment of landscape character and values inherent in the landscape should be made part of the park management plan. Every decision on the construction of a new element and site management prescriptions should be preceded by an assessment of the impact of the project or programme on the landscape and appropriate measures taken to conserve and enhance landscape.

Native forest and woodland contributes greatly to the landscape of the parks. Degraded woodland and scrub should be rehabilitated and restored. Agriculture and settlement also contribute to the landscape character and development of agriculture should be limited to improvements which promote the traditional landscapes.

"Authentic" archaeological landscapes should be created particularly around some of the

major sites. Several different interpretations of what constitutes an authentic landscape at Angkor can arise. It is not necessary to have the same view of authenticity over the whole park, and several different interpretations may be possible in different areas. Landscape design should bring out the vegetation and the archaeology of the parks as a collective experience. Scrub clearance and amenity tree planting should be used to enhance the touristic appreciation of individual sites. Planting trees can be used to delineate the boundary of an ancient city and mark visually a significant feature.

Symbolism in the landscape can contribute to the image and create an identity for the parks. Entrances to the parks should be clearly identified with a recognized symbol. The design of buildings should follow a park-wide theme; notice boards and signs should also have a distinctive and consistent park identity.

Careful consideration must be given to the siting of roads, power lines and other linear features so as not to disrupt the visual integrity of the landscapes in the park.

As a contribution to the clear definition of the area of the AAP, a forest buffer zone should be established between the Angkor Conservation Office and Angkor Wat, and between Siem Reap river and Phum Thmei.

Ecological and Environmental Protection

The principal environmental values of the parks are associated with the maintenance of ecological processes, the large potential for environmental education and the enhancement of the aesthetic and semi-natural landscape characterised by native plant species, wild life (birds and butterflies), and water.

Forest and woodland habitats are a particularly important component of the Angkor Parks. Traditional forest practices should be encouraged to enhance the historical landscape and to maintain biodiversity. Areas of native forest around the Angkor group of monuments, and on Phnom Bok and Phnom Die, should be brought under sustainable forest management. Areas of secondary and degraded forest and cleared lands should be replanted with native species to recreate forest cover.

The primary forests on the Kulen mountains and water catchment area in the Phnom Kulen Park unit should be conserved by prohibiting further logging and regulating forest practices by park residents to maintain forest cover and to sustain production of forest products for local use. "Slash-and-burn" agriculture should be encouraged according to traditional methods in selected areas in Phnom Kulen Park, to conserve this ancient form of land use and landscape.

Outside restricted areas, usage rights for the harvest of minor forest products by the indigenous population should be respected. Use of fire for resin tapping should be prohibited in restricted areas and alternative sources of income should be actively promoted.

Silvicultural practices must be developed that are appropriate to the maintenance and enhancement of forest habitats and to the management of trees in and around archaeological sites. An ample supply of indigenous tree transplants is required to sustain an active tree

planting programme. An expanded tree nursery should be established. Techniques in tree hazard assessment and tree surgery skills for the protection of archaeological features should be developed.

The maintenance of a consistent water table in the surroundings of the monuments is vital and must be guaranteed through the joint management (with the Hydrological Department), of water resources flowing through the parks including control of abstraction and flood prevention measures.

Strict controls on activities which lead to the pollution of water in the Phnom Kulen and along the rivers and canals in the parks, are essential to prevent polluted water effecting the ground water, moats, canals and barays.

Growing paddy rice and grazing domestic animals is part of the character of the park and should continue as an appropriate land use even in restricted areas where this is not a threat to the protection of archaeology. Agricultural improvements should not take place in the restricted areas. Intensification of agriculture and use of chemicals and pesticides should be avoided throughout the park. The park management plan should define where improved agricultural techniques may be allowed. Compensatory income generating activities should be given assistance where agricultural self sufficiency is restricted.

During the height of the Khmer Empire many orchards and gardens were cultivated with domestic plants. A Botanical garden typical of the period should be established in a small part of the AAP as a contribution to recreating an authentic archaeological landscape.

Forest habitats are suitable for conservation of indigenous fauna. Consideration should be given to establishing a wild animal park outside restricted areas but within the park. Forest trails should be developed in areas of native forest close to major visitor sites.

Local Community

People are an essential part of the character of the Angkor Parks, but habitation in the core restricted areas is inappropriate to the preservation and presentation of major archaeological sites and will be prohibited. Most houses within the area zoned as core restricted areas were removed some years ago. Any recent squatting around the monuments should be removed. However, old settlements should be allowed to continue in the rest of park and assistance should be given by the Park Agency to develop essential community facilities. Enlargement of these settlements and creation of new settlements is inappropriate and will be prohibited except in one or two designated locations for instance, the airport site. Most growth in population must be provided for in new settlements outside the parks.

Continuation of the traditional lifestyles of people living in the park, and of human activity compatible with protection of cultural heritage and the sustainable use of resources, will be encouraged. This will provide a demonstration of how suitable uses can be integrated with polices for cultural resource conservation. The experience should be applied throughout the ACR.

Although agricultural activities will be limited to the traditional use of the land for paddy-rice

and controlled grazing, extension of village based orchard and vegetable growing may be encouraged. Small handicraft based workshops will also be encouraged within villages. Some limited small scale provision of tourist and recreation facilities may also be appropriate where developed by park residents and related to village life. All developments on private land within the parks will be subject to permits issued by the Park Agency.

The Park Agency should give preference in employment to people who live within the parks. Existing traders, many of whom are park residents, should have preference over others in the issuing licences to trade within the park.

Pagodas

A number of archaeological sites have religious significance in the present day. This must be respected, but no new building or rehabilitation of existing religious structures should be allowed in the core restricted areas. Recent structures erected in the last 10 years should be removed. Where a structure had been granted permission by the Ministry of Culture, it may be given a limited licence to continue with a view to relocation outside the restricted area at a later date. Any restoration of religious structures on archaeological sites must be part of an archaeological restoration scheme for the whole site.

Elsewhere in the park the construction of a new pagoda in an old village is acceptable under strict controls on siting and design.

Quarries

A laterite quarry may be opened in the AAP for the supply of building blocks for use in rehabilitation of monuments. This should be only after exhaustive geological survey and full environmental assessment of the potential impacts of the site and operations. Quarrying should stop on Phnom Krom. Blasting should be prohibited within restricted areas.

Reopening the ancient sandstone quarries on Phnom Kulen as a source of stone for rehabilitation of monuments, may also be acceptable but only under the strictest controls to respect archaeological guidelines.

Digging clay in the vicinity of any archaeological site should be prohibited.

Irrigation

Small scale schemes to improve irrigation may be appropriate in parts of the park but not in restricted areas. Maintenance of the traditional "appearance" of irrigation systems will be required by;

- hiding control weirs, gates and drop-structures in forested areas;
- small distribution canals should be farmer-built, and clay-lined rather than concrete-lined;
- measuring and regulating weirs should be of wood, rather than of reinforced concrete.

Airport

The present airport is located within the proposed Angkor Archaeological Park. ZEMP recommends relocation of the airport to an alternative site well away from the major monuments (see the Transport Policy section in Chapter VI). The present airport site will come under the authority of the Parks Agency who should allow the airport to continue to operate under licence and subject to conditions to be agreed between the NHPAC and the Ministry of Aviation, to avoid damage to structures and disruption to the character of the AAP. The licence should be for a term of say two years and renewable. This would allow for a regular review of conditions on the use of the airport until a new site has been developed.

Power lines

High voltage power lines are an alien feature in the Angkor Parks and should be prohibited. Local supply should be underground in the vicinity of monuments. The park residents should receive an affordable electricity supply at the earliest opportunity to reduce dependence on fuel wood taken from the natural environment of the park.

Dams and Weirs

The existing dam on Siem Reap river should be made to fit into the riverine landscape of the park. The hydro-electricity station is an incompatible use in the core restricted area of the park. Reconstruction is not recommended.

Construction of dams on the river or across land in the parks should respect ancient structures and water management practices and be a component of an agreed water management master plan.

Industry

Industrial development will not be allowed in the parks. Small scale craft-based industries are acceptable in village locations were they relate to restoration activities, production of high quality artistic articles, and utilise products from the traditional landscape.

Public Awareness

The Parks Agency has a responsibility for public eduction on Khmer heritage and the environment. Local people need to be informed about the significance of Angkor material culture and to understand and take part in its conservation. The Parks Agency should run educational programmes in the locality including for its own staff. The programme could include preparation of teacher packs and simple explanatory leaflets, and running a mobile exhibition to explain the work of the park in villages and schools.

Education and Training

Cambodia lacks a pool of adequate trained and experienced archaeologists, conservation architects, park rangers, interpreters, guides, technicians and craft-workers. An education and

training programme is required at professional, and technical levels in archaeology, restoration and maintenance and various branches of park and visitor management.

An archaeological field training station should be established in the park. It would provide 'in-service' training for park and other archaeologists in coordination with the national and international partners. Programmes would consist of lectures, short courses, and student participation in excavations under professional archaeologists and associated with recognized university archaeological programs or organizations with archaeological expertise.

A similar school for architectural conservation skills might be set up in the park to train Cambodians and other national in the techniques of monumental restoration. In the short term this will necessitate substantial participation by overseas professionals to set up programmes training local professional and technical manpower.

The Angkor Parks will shortly become again the focus for the study of Khmer history and culture. The Parks Agency should encourage professional contacts throughout the Asia region, especially with Thailand and Laos. A programme of high level academic training should be instigated in an Angkor Research Centre to be located in Siem Reap with close links to the Parks Agency, Faculty of Fine Arts and foreign universities.

Technical training should be given in a technical college in the locality. The Park Agency should participate with the local authorities in establishing courses with international assistance for training workers for conservation and maintenance work in the park. Training trainers should be a priority.

Training should be an essential feature of all projects. Workers on the roster of persons available for work on restoration projects in the park should be given the opportunity to upgrade their skills through a progression of courses and on the job training assignments which could include basic literacy training.

Guidelines

Detailed guidelines need to be prepared on numerous topics relating to construction and management. They will form a body of knowledge and best practice to guide Park Agency staff. Guidelines could be developed by staff and expert advisors during training workshops. The detailed guidelines should be written and presented in one or more loose leafed manual which can be expanded and revised over time.

The following topics should be included:

Construction of

- Roads and car parks
  - sitting and design
  - provision of cycle parks away from monuments
- Maintenance and restoration
  - for stone and brick monuments and hydraulic structures
- Park and visitor buildings and structures

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  - provision of cycle parks away from monuments
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  - for stone and brick monuments and hydraulic structures
- Park and visitor buildings and structures

siting and design
- Irrigation schemes
  canals, weirs and sluices

Management of

- Silvicultural practices
  for native forests
  management of nurseries
  amenity tree planting
  trees on monuments
- Landscapes management
  maintenance of vegetation
  maintenance of paths, barriers, information and interpretive signs,
  collection of litter
- Visitor management
- Security of artifacts

BOX 4 POLICIES FOR THE ANGKOR ARCHAEOLOGICAL PARK

POLICY	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
DEVELOPMENT	All developments must be proceeded by an environmental assessment of alternatives, and be designed to minimize adverse impacts and enhance environmental values; detailed archaeological survey and assessment must be undertaken including rescue archaeology, before any development is approved (including tree planting); assessment of impact of government projects in the ACR on the parks.	Developments not normally acceptable in restricted areas; an exception is the siting of visitor facilities in the area between the Angkor Conservation Office and a line 2 km south of Angkor Wat.	
ARCHAEOLOGICAL SERVICE	Organisation and management of archaeological services (licensing and guidelines for all works effecting archaeological sites and monuments).	Strict protection of all land within the restricted areas;	Limits to the use and management of land to protect archaeological features above and below ground.
VISITOR MANAGE-MENT	No through traffic to enter park; limited and regulated access for visitors and park residents; improved/new park roads to form BOX around Angkor Group of Monuments.	Strict control of vehicle access, no tour busses, speed limits, parking restrictions.	Improvement of road access for park residents to destinations outside the park avoiding the core; locations for visitor reception areas and vehicle parking.

POLICY	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
VISITOR FACIL-ITIES	All visitor facilities to be developed by the Park Agency either under direct works or under licence; licensing of guides.	limits on number and size of visitor groups; construction minor and essential visitor facilities to serve visitor needs at individual sites eg. food & drink stalls, footpaths, bicycle parks, minibus drop off and pick up points; Licensed vehicle parking only; facilities for view excavations & restorations.	Improved economic opportunities for local residents and minimize negative impact of tourists on local communities; viewing craft manufacture.
INTERP-RETAT-ION	Interpretation plan for archaeology, natura areas, local customs; visitor centre near Siem Reap well away form the archaeological sites.	Interpretation by tour guides and interpretive boards at individual sites.	Location of visitor facilities, craft centres, village and rural life exhibits/trails, interpret local life and special features such as, Siem Reap river, view from Phnom Bok.
QUARRY - ING	Laterite and sandstone quarries may be opened in Parks but only for stone required for use in restoration; any development subject to an environmental impact assessment; no clay and road/construction stone quarries in the park.		

POLICY	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
WATER MANAG E-MENT	No major new irrigation works but restoration of ancient hydraulic structures and water management regimes.	Maintenance of traditional paddy fields; no new developments, strict control on design of any replacement structures.	Limited small scale irrigation developments to increase productivity of agriculture and self sufficiency of existing residents in the park.
LAND-SCAPE MANAG E-MENT	Cultural landscapes in the park to be protected and conserved.	Restoration of native forest and woodland landscapes; plant amenity trees; create "authentic" interpretation of archaeology through creation of appropriate landscapes, including, use of contemporary garden and orchard trees, planting trees to mark ancient features on the ground such as a dyke or boundary of a city; create a forest buffer zone between the Angkor Conservation Office and Angkor Wat and between Siem Reap river and Phum Thmei.	Development of agriculture to be limited and controlled to improvements which enhance the landscape of the park.

POLICY	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
NATURAL RESOUR-CE MANAG E-MENT	Forestry and woodland to be managed by the parks staff; major tree planting programme using indigenous species; manage vegetation cover to increase biological diversity; manage flora and fauna to conserve and increase the variety of wild life.	Restoration of native forest and woodland; Aboriculture works to maintain trees growing on some monuments and remove those damaging the fabric of other monuments; establish a botanical garden and forest trails; paddy rice and grazing to continue under strict conditions to maintain traditional land uses.	Licences to harvest tree crops; develop traditional subsistence agriculture; encourage higher value crops (orchard and vegetable growing) around settlements.
LOCAL RESID-ENTS	Priority of employment for park residents; any relocation will be assisted and villagers given new land and material for building new homes and community facilities; licences/concessions to trade in the park.	No homes of local people.	Old settlements will remain; extensions to old settlement and mew settlement are prohibited; redevelopment of existing properties allowed under strict controls; assistance to develop essential community facilities for park residents; encouragement for local small scale provision of tourist and recreation facilities related to village life.
PAGODA S	Respect for religious associations and maintain ancient pagodas.	No new pagodas or religious developments; overnight accommodation restricted to the Monastery at Angkor Wat.	Villagers may develop new pagodas subject to strict control on siting and design.

POLICY	WHOLE PARK	CORE RESTRICTED AREA	REST OF PARK
INDUST-RY	No industrial development in the park; encouragement to small scale craft industries relevant to restoration, high quality and artistic visitor souvenirs.		Craft workshops concentrated in existing settlements or by visitor centres.
POWER LINES	No high voltage power lines through the park; local supply at low voltage.		
ENVIRO NMENT AL AWARE-NESS	Programmes for local people on significance of Khmer heritage and environment.		Involve park residents in appreciating park values.
TRAIN-ING	Training for archaeologists and restoration architects; training of workers in excavation and restoration building works; training park rangers and maintenance staff.		

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VIII MANAGEMENT AUTHORITIES

Contents

MANAGEMENT AUTHORITIES

INTRODUCTION

In this chapter the organisations necessary to administer ZEMP are outlined. NHPAC has overall responsibility for cultural heritage in Cambodia. Under the authority of NHPAC, Angkor has a special place. The Area requires a structure of authorities able to focus directly on the needs of Angkor and to integrate with the local organisations of government. A simple two part management structure is proposed with an Angkor Parks Agency responsible for the Angkor Parks and a ACR Development Review Board responsible for the support zone in the Angkor Cultural Reserve.

A special development opportunity arises in Siem Reap because of the need to develop tourism to meet the demands of visitors to Angkor, and to build the economy of the city based on tourism. Managing the development of tourism requires a strong and purposeful authority to provide the level of support and assistance sought by 'blue chip' international investors and hotel managers and to attract high quality and long term investment to the area. Therefore a Siem Reap Tourist Development Corporation is proposed which will concentrate on encouraging appropriate tourist developments to the tourism development zone which is identified by ZEMP in the town.

The purpose, roles, and organisation of each of these management authorities is outlined in this chapter.

1. ANGKOR PARKS AGENCY

INTRODUCTION

The National Heritage Protection Authority of Cambodia (NHPAC) has national responsibility for archaeology throughout the country and therefore is responsible for the conservation and development of the Angkor Parks.

The national significance of the Angkor monuments in addition to their size and complexity requires commitment and involvement of those in authority at the highest level of national government. Angkor is too important as the focus of national heritage and as an asset for a sustainable tourism industry to be left in the hands of local interests. Decisions made for the parks and subsequent actions taken have national implications and economic benefits for the entire country. Central government is also in the best position, both technically and financially, to make available the resources for the preservation of the Angkor sites.

Given the scale of the area, the competing management goals, and the complexities of the situation, management of the Angkor Parks will require a large complex organization at full implementation. The most efficient method of management therefore, is the creation of a single administration, the Angkor Parks Agency. As described later in this section the Angkor Parks Agency would be a unified administrative entity, led by a single Director, with appropriate divisions, departments and sections to carry out the specific operational functions necessary for visitor visitation, archaeology, ecology, and management .

A unified management structure enables considered decisions to be made between often conflicting goals inherent in park management. The requirements of preservation and economic development need to be weighed and this is often difficult to do with competing agencies managing different functions in a park. Experience in park management throughout the world has found a single manger administrative system to work best in resolving internal park management conflicts.

In the past the Angkor Conservation Office was responsible for protecting the park, including monuments restoration, site maintenance and security, and visitor access to Angkor. Today responsibility is divided between the Ministry of Culture with assistance from Unesco, and the provincial authorities. The Ministry of Culture administers policy on the protection and restoration of sites. The Angkor Conservation office which comes under the Ministry of Culture, carries out maintenance work on the monuments. The provincial Commissioner of Police, Department of Forestry, the economic development group of the provincial authority and Angkor Tourism share responsibility for security, development control and visitor services such as providing guides and transport.

The division of authority between the centre and the locality and between those responsible for protection of the archaeology and for visitor and tourist development is ill defined and inadequate to the task. A new authority is needed to take over the management functions of the parks and to direct activities that take place in and impact on the parks. Such an authority should absorb staff currently responsible for various aspects of management from local organisations, and build on their experience to improve control and protection of Angkor.

As in the past, however, the parks management authority should be locally based and capable of working closely with the local authorities to develop local solutions to the integration of park management with the life of the community.

ZEMP proposes to bring together members of Angkor Conservation Office and parts of the other local organisations to create an Angkor Parks Agency (APA) to manage the parks. The new agency will determine priorities and prepare a detailed action plan, It may enter into agreements with state and provincial organisation to provide facilities and services within the parks. The local Authorities will continue to provide services to the people living within the parks, eg. schools. But the APA will control all the development and construction activities in the parks and will influence and fund programmes for the improvement of agriculture, irrigation and services to villagers using income generated by visitor activities.

Given the present state of Cambodia, it will take some years to develop an organisation of a scale and complexity needed to manage the parks. While the organization described below is that which will ultimately be needed, implementation will be by stages. This is described in Chapter XI Implementing ZEMP. In the beginning provision of basic functions and the development of interim facilities will be emphasized. Planning for permanent facilities will be an early task.

The initial step is to set up the Angkor Parks Agency and to incorporate existing management functions into the new organisation. Staff must be found to fill the most critical tasks. Initially one person may have to take responsibility for several functions. Because of the dearth of well qualified Cambodians, national staff recruited to the agency, will need the support of technical advisors as they build up the capacity of the organisation. Training and development of a core of middle managers and skilled workers is critical. Training in various aspects of park management is amongst the first projects identified for international technical assistance.

ROLE OF AGENCY

The **Angkor Parks Agency** (called the **Parks Agency**), would be established by NHPAC. The Parks Agency would be responsible not only for enhancing the protection of archaeology and opportunities for visiting the monuments, but also for the promotion of all forms of Cambodian cultural heritage and fostering the continuation of traditional lifestyles for people living within the park. In carrying out its role the Parks Agency needs to work closely with other organisations in central and local government and coordinate its activities when and where appropriate.

The Parks Agency should concentrate its energies on its primary mission which relates to duties and responsibilities required by the legislation creating the Angkor Parks.

It would **provide direct management in areas relating to archaeological resource management and visitor management and use** through the use of its own staff and facilities. The expertise and management capacity developed in these areas will be of value to NHPAC for use elsewhere in the authority and the Parks Agency would also be available to provide advice or services to other areas or organisations.

Other functions of Park Agency would be better administered through **agreements or contracts with appropriate central or local government departments.** For example programmes relating to the betterment of the people living within the park and programmes for agriculture, forestry, hydrology, education, etc. would be carried out as part of normal government programmes. However the Park Agency would have control over these activities to ensure consistency of approach towards the conservation of archaeological heritage. This approach will allow the Parks Agency to use the expertise and programmes of other government agencies and would also ensure compliance and consistency with national, regional and local programmes.

The advantage to the Parks Agency of using contracts or agreements for services with other government agencies is that it can detail its needs and requirements so that these are taken fully into consideration by the agencies providing services within the park. Specific management techniques can be worked out between the Parks Agency and the service agencies to achieve the needed results. These may involve modifications of techniques and approaches used by these agencies in order to preserve archaeological and ecological resources or the visitor experience.

The Parks Agency could also build into these contracts a review and approval process of proposed activities which could impact on park resources or tourism activities. This will be particularly important for activities which involve construction or major land disturbance or manipulation.

As the organisation with day to day responsibility for Angkor, the Parks Agency will advise the NHPAC Board on the **development of programmes for maintenance and restoration of the Angkor Monuments,** developing research and experiments for determining appropriate techniques in restoration and maintenance of different types of structure and site eg. brick and stone temples, earth works, dykes etc. The Park Agency will be the major Cambodian partner working with international organisations in this work and provide the focus for UNESCO and other advice and assistance to Angkor.

The Park Agency will also be **responsible for collections of artifacts and archives** that relate to Angkor and are held in Siem Reap. They will work with the museum service and other national institutions to establish and run a museum at Angkor with exhibitions and other scholarly and visitor attractions. Attached to the Agency will be an archaeological field training school, laboratories for conservation of artifacts and storage facilities. The Parks Agency would also be closely associated with other cultural activities for instance, the proposed dance school and theatre.

An important role for the Parks Agency as an arm of NHPAC in the region is to **provide archaeological services beyond the boundaries of the Parks and in particular within the Angkor Cultural Reserve.** These services include licensing archaeological surveys and excavations, classifying and establishing SAACs, reviewing and monitoring development impacts on SAACs and advising the ACR Development Review Board on granting permissions. The archaeological service will also include establishing TORs for archaeological surveys required in the context of government projects and programmes in the area, reviewing the result of surveys and assessing the impact of proposals on archaeology in the ACR.

The Parks Agency should work closely with other government Departments to **provide technical support to the ACR Development Review Board** and in advising on appropriateness of development activities in the ACR.

ORGANISATION AND FUNCTIONS

Given the values and purposes for which the Angkor Parks are established there are certain basic functions the Parks Agency must perform. These include the protection, preservation, maintenance, and research on the monuments and associated artifact collections; information and education of the visitors and the public; visitor facilities and services; programmes and services for the people who live in the park. These functions are important because they relate to the agency,s mission. The Parks Agency organization should be such that it addresses all these needs.

The most important needs should be filled first. These include management and control of archaeology, architectural conservation especially maintenance of monuments and water features; artifact and monument site security; management and protection of trees and forest areas; and the provision of basic visitor services including information and education, custodial and commercial services. Other functions can be filled slowly as the Parks Agency gains expertise and is able to expand its organization.

It is proposed that the Parks Agency has four divisions:

* Archaeology and Conservation
* Visitor Operations
* Planning, Monitoring and Coordination, and
* Administration.

Each division would be under a divisional director working directly for the Parks Agency Director.

Parks Agency Director

The Parks Agency Director (hereafter called the Director) should be the senior management official for NHPAC within the region and responsible for all activities within the Angkor Parks and NHPAC's functions within the ACR. The Director would work directly to the Director of NHPAC and would represent NHPAC on most matters that affected Angkor. The Director would be responsible for external relations between the parks and the central and local government authorities and serve on the ACR Development Review Board for the ACR. This is a very senior position within NHPAC and would require a person with education, training, and experience in large organization management, archaeology, park management, and government administration.

During the initial implementation phase of establishing the park and constructing its facilities there should be the temporary position of Assistant Director for Facilities Development working directly to the Director. This person should be a landscape architect or engineer educated in park design and construction techniques who will oversee the technical aspects of the design and construction of permanent park facilities.
Another important position in the early years is a Training Officer who would work under

the Director and co-ordinate training needs of the other divisions. Training should be made a conditions of international assistance for the study and restoration of Angkor to build up professional and technical skills in the local population.

Deputy Director for Archaeology and Conservation

The Deputy Parks Agency Director for Archaeology and Conservation will be responsible for all the scientific and technical services concerning the archaeology of the Angkor Parks and in the ACR. These include site and monument monitoring, research, conservation of sites and monuments, conservation and maintenance of archaeological collections and archival material, development of museum exhibits and other aspects of museology, maintenance of the park library, management of Special Areas of Archaeological Concern (SAAC), training of conservators, and field training of archaeologists. There will be three departments: Archaeological Services, Architectural Conservation, and Curatorial, Artifact Conservation and Archives.

Archaeological Services The Archaeological Services Department oversees all archaeological survey and research activity carried out within the ACR and the parks. While its personnel may do some research and information gathering, the department is primarily responsible for archaeological administration and will issue permits or contracts to those doing research in and around the park and monitor the work to ensure that contractual requirements are being met. Staff of the department will monitor the condition of all archaeological sites in the park and the ACR except those under the control of the Architectural Conservation Department.

A special section of the department will manage the programme for SAACs which includes evaluation and classifying sites as SAACs, monitoring and coordination of management at some sites depending on use. The section would coordinate with other park units to provide support to SAACs on site security, information and education, research, conservation, or commercial services as appropriate. The section will work closely with the ACR Technical Support Unit in determining applications to develop SAACs, set conditions, justify recommendations for refusal by the ACR Development Review Board. Professional level Archaeological Inspectors will be employed supported by technicians.

Staff will have expertise in archaeological site management and should be good at working with people both government officials and those who live around archaeological sites. Other staff will be specialised in research or conservation. The department will be responsible for an archaeological field station for research and training of archaeologists. Department personnel will work with Information and Education Department personnel to ensure the accuracy and up to date nature of the information given out to the public.

Architectural Conservation The Architectural Conservation Department manages monument maintenance and restoration activities. They would do some work themselves and would give permits or contracts to outside entities who wish to carry out restoration work on behalf of the park. The division would employ a staff to maintain and restore monuments under the guidance of archaeologists and/or architectural conservation specialists acting as a clerk of works for each scheme. The Department would harness international expertise and experience concerning methods and approaches to archaeological conservation and seek to

attract assistance for the conservation of Angkor monuments. In addition they would promote and in some cases, run train programmes for people in conservation and building skills in order to create a pool of skilled workers available for organisations to employ on their projects. A unit in the Department should maintain a roster of local workers who have developed skills in restoration of Khmer structures to provide employment and ensure high standards and competence.

Curatorial, Artifact Conservation and Archives The Curatorial, Artifact Conservation and Archives Department manages and maintains the Angkor archaeological artifact collection. It is responsible for the development of museum exhibits. The department will maintain a catalogue, conduct artifact conservation activities and maintain storage facilities, accountability, security, and all other aspects of museology. It would work with the national museum on issues relating to the distribution and use of Angkor artifacts and for training people in this field. It will maintain the park library and technical archives including historic data available on micro-fiche from the EFEO Angkor collection, and work with visiting researchers and scholars in their use of the material.

Deputy Director for Visitor Operations

The Parks Agency Deputy Director for Visitor Operations is responsible to the Director for the conduct of all day to day visitor or tourist related activities within the park. The Visitor Operations Division is responsible for the planning and conduct of visitor information and education services, security operations, facility maintenance, and commercial visitor services. Given the size of the Angkor Parks and the need to have the park operating every day of the year this Division will need to employ a large staff. Over the longer term, there should be five departments to carry out these functions.

Information and Education The Information and Education Department has duties and responsibilities both within the park, where it provides visitor information and education programs, and outside the park, where it provides educational programs in schools, villages and the media. Information services involve 'what to do and where to go' types of service to visitors while education includes presenting the facts about Angkor and building an appreciation and understanding of the site and its history. The Department will need to develop an interpretation and presentation plan for the park and design and prepare interpretive material for the visitor centre, at individual sites and for sale to the public.

Facility Maintenance The Facility Maintenance Department maintains the park buildings, utilities, roads, and trails. It also provides custodial services and grounds and forest maintenance. The division has a wide variety of duties and a large complex facility to maintain; therefore it should have several sections to work effectively. The most likely sections are a buildings and utilities section, a tree and forest management section, and a roads, trails and grounds maintenance section. The department will need to work closely with the Architectural Conservation Department in maintaining the surroundings of archaeological monuments and features.

Security The Security Department has a variety of duties relating to the orderly protection of life and property. It is responsible for the enforcement of the general laws of Cambodia and of all park rules and regulations. It also provides guards to protect sites from vandalism

and the prevention of artifact theft from sites throughout the park. In addition the division provides emergency medical services (first aid) to those in need; for the search and rescue of lost people or those in need; for traffic and parking control inside the park; and is responsible for forest and structural fire fighting within the park. The details of the level of response to fire and other threats to the park need to be worked out with the support of local communities.

Visitor Support Services The Visitor Support Services Department of the Parks Agency manages all commercial service activities within the park. The division determines what services are needed and how the service will be provided. For example, the division will determine with the Planning Division, the location, size and design of all car parks, visitor reception areas, restaurants or snack stands, souvenir shops or stands, and other commercial operations. It will license or assign permits to guides and operators of minibuses, taxis, carriages, cyclo-carts, bicycle hire schemes and other types of transportation which the park may need. It will run those facilities maintained by the park.

Fee Collection Entrance fees would be collected by the Fee Collection Department which would both collect the entrance fees and control park entrances to ensure that all those entering have paid the proper fees. Actual fees should be collected at only one location in Siem Reap and passes handed out to those entering the park (for details see Chapter VII on Charging Policy). The fee collection station would be run by the department with security provided by Security Department personnel. Entrance station personnel would then only have to check the passes given to visitors to ensure that they are the appropriate pass for the date, location and person presenting the pass. Money would only be handled at the single centrally located Fee Office. Tour operators would obtain group passes beforehand from the fee office.

Deputy Director for Planning, Monitoring & Coordination

The Deputy Parks Agency Director for Planning, Monitoring, and Coordination is responsible for policy and planning within the Angkor Parks and coordination with ministries and other governmental agencies having programmes within the parks and in the ACR. The division will give technical support to the ACR Development Review Board, monitor environmental conditions in the areas (using the Parks Agency geographic information system), and evaluate the potential impact of projects in the parks and the ACR following ZEMP management guidelines. parks.

The division would be made up of a number of specialists with training and experience in planning, architecture and/or landscape architecture, engineering, forestry, agriculture, and hydrology, community development and tourism. This is a small Division needing to maintain close integration between staff and with staff in other divisions. It should have three sections for Planning, Policy and Coordination; ACR Technical Support; and Environmental Monitoring.

Planning, Policy and Coordination The Planning, Policy and Coordination Section is responsible for the development and interpretation of policies for the Parks Agency and for the development of all park plans. The Section would work closely with local government authorities, public interest groups (NGOs), the public, the tourism industry and with other parts of the Parks Agency staff in coordinating activities as they effect the parks. It would

manage programmes of ministries of agriculture, forestry, hydrology, education etc. in the parks. The section would be responsible to prepare land use plans and commission designs for developments in the parks.

ACR Technical Support Unit This section will service the ACR Development Review Board and coordinate technical support for environmental impact analysis (EIA) review and technical aspects of proposed mitigation measures required for projects in the ACR. It will develop and refine management guidelines, monitor projects and programmes and liaise closely with ministries and departments effecting changes and developments in the ACR. The unit will be composed of 2-3 planners and clerical support.

Environmental Monitoring The Environmental Monitoring section provides technical support to the Division and also to the whole Angkor Parks Agency and within the ACR. It houses the park geographic information system (GIS) unit and coordinates the environmental monitoring programme in the parks and surrounding areas. This section will also be the centre of computer hardware support and programming for all of the park staff.

Administration Department

The Administration Department will be the responsibility of the Parks Director. It will consist of several sections:

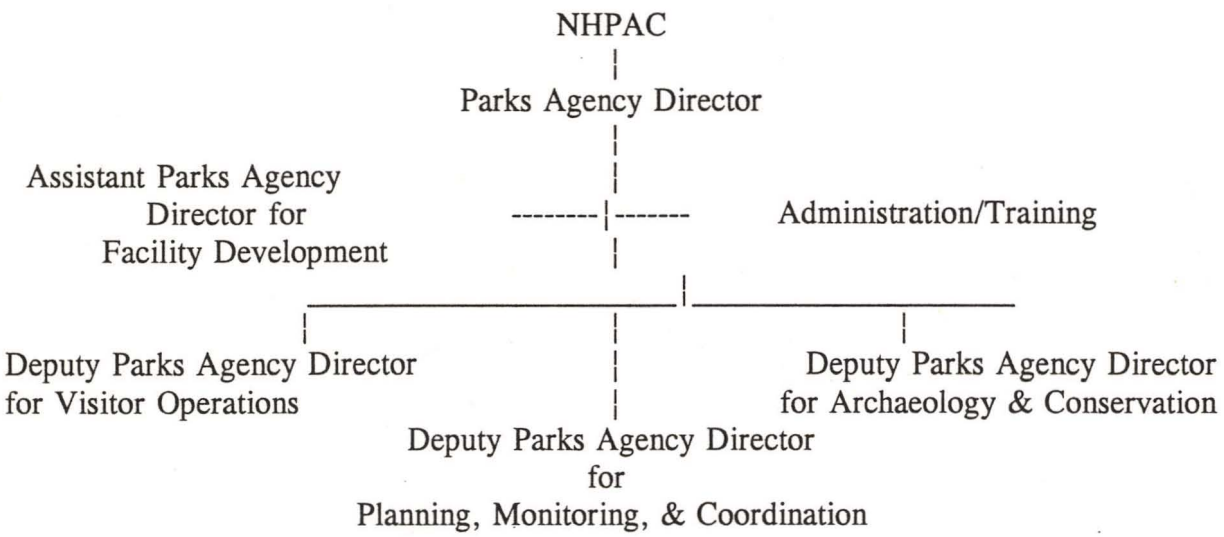
Finance and Budget The Finance and Budget Section is critically important in acquiring operating funds and the material and personnel needed to manage the park properly. The finance unit will establish the mechanisms needed to keep track of all incoming funds from all sources. The budget unit will plan the park budget and keep track of all of funds being spent. The section will also provide the payroll function. Personnel must be experienced in the fields of finance or banking, accounting and bookkeeping.

Personnel and Records The Personnel and Records Section is responsible for keeping records of the Parks Agency. It should maintain one central file which houses all correspondence, reports, and personnel matters. It will be the central time keeper, and coordinate with other departments to ensure that workers are paid properly. Personnel in this division should be trained in records management and in personnel management. The systems should be compatible with those used by NHPAC and other national systems where possible.

Purchasing and Supplies The Purchasing and Supplies Section does all the purchasing of supplies and material needed by the Parks Agency. The division would also maintain a central motor pool for use by the park. It will be composed of personnel skilled in purchasing, warehousing, and motor vehicle maintenance. Personnel for these positions can easily be trained by the park in a short period of time.

During initial implementation sections of the Administrative Department would be combined into one and would be staffed by three people and clerical support who would do the combined finance and budget, personnel administration and the purchasing and record keeping for the park. People with training or experience in general office administration and one in bookkeeping would have adequate initial qualifications for these positions.

BOX 5 **ANGKOR PARKS AGENCY ORGANIZATION CHART**



OVERVIEW OF THE PARKS AGENCY ORGANIZATION AND FUNCTIONS

Parks Agency Director

1. Public relations Division
2. Assistant Director for Facility Development
3. Training Officer
3. Administration Department
   1.. Finance and Budget Section
   2. Personnel and Records Section
   3. Purchasing and Supplies Section

Deputy Parks Agency Director for Archaeology and Conservation

1. Archaeological Services Department
2. Architectural Conservation Department
3. Curatorial, Artifact Conservation and Archives Department

Deputy Parks Agency Director for Visitor Operations

1. Information and Education Department
2. Maintenance Department
3. Security Department
4. Visitor Support Services Department
5. Fee Collection

Deputy Parks Agency Director for Planning, Monitoring, & Coordination

1. Planning, Policy and Coordination Section
2. ACR Technical Support Section
3. Environmental Monitoring Section

2 ACR DEVELOPMENT REVIEW BOARD

MANAGEMENT IN THE ACR

The Angkor Cultural Reserve has been defined to protect and manage the cultural and natural heritage surrounding the Angkor Parks and to support and protect the integrity of the parks themselves.

The boundaries of the ACR may be extended on the advice of NHPAC, following further archaeological survey of neighbouring areas. The present boundaries of the ACR include a part of the Tonle Sap in which the ecology and aquatic environment including the productivity of the fisheries and flooded forests, should be protected. It is envisaged that following further study, the government may establish a Tonle Sap Commission to co-ordinate the management of the Lake. The joint board would work closely with a commission to guide development in around the lake.

It is outside the area of the Parks Agency, yet uncontrolled development in the zone could cause damage to the interests of the Parks. Hence there needs to be control over development, through a system in which the Parks' interests can be represented.

An authority is therefore needed with responsibility to assess the impacts of proposed developments, propose mitigation measures, establish conditions and approve acceptable projects. It is proposed to establish a joint board to review all development proposals likely to affect the cultural heritage within the ACR. The board should also ensure that economic and social development is sustainable and compatible with the guidelines.

This authority should involve representatives of central and local government, NHPAC and the Angkor Parks.

PURPOSE OF THE BOARD

The ACR Development Review Board has the following purposes:

* to monitor development in the ACR;
* to review all government projects and programmes for their impact on archaeological heritage, ecology, hydrology and landscape in the ACR, and for their impacts on the integrity of the Angkor Parks and other zones identified by ZEMP;
* to protect and manage SAACs;
* to promote sustainable development within the ACR particularly in agricultural and forestry management; the use of water, energy and other

natural resources (soil, minerals, natural vegetation); construction of infrastructure and urban settlement; and economic and social development including tourism.

The Board would also have a mediation role where the Parks Agency has delegated its controls to provincial and local government in the area under proposed Article 13 B, and its is charged under Article 13 E with monitoring the implementation of NHPAC guidelines in the Angkor Cultural Reserve.

OPERATION OF THE BOARD

The Board should be composed of 8-12 members representing ministries, departments, and other organs of central and local government in the region including the following; Chairman of the Board of NHPAC, the Director of the Angkor Parks Agency, the Governor of the Province and the Mayor of Siem Reap Municipality. A representative of UNESCO might also be a member of the Board to represent international technical assistance to Angkor.

The Board would be serviced by a unit provided by the Angkor Parks Agency called the ACR Technical Support Unit. Departments and ministries of central and local government will also be required to provide the board with advice and assistance as required. These departments may also be the proposer of a project being assessed for approval by the board.

The Board should meet regularly on a monthly or bi-monthly basis at which it would receive reports on the impact of proposed projects prepared by the unit in consultation with other departments and interests, and make decisions on whether to give approval for a project.

The Board must establish administrative procedures to implement regulations (proposed in Chapter IX) on notification of projects, consideration of impacts, giving advice to proposers, resolving matters that are not agreed, monitoring implementation, and enforcing conditions.

The Board should advise NHPAC if in their view a review of the ZEMP zones and management guidelines is required.

The Board should make public its decisions, including giving information on conditions imposed on implementing projects and programmes and the reasons for withholding approval.

BOX 6

ACR - PROJECT PROPOSAL REVIEW PROCESS

PROPOSER	APA/DEPARTMENT	ACR DEVELOPMENT REVIEW BOARD
Government Projects and Programmes:		
Prepare an archaeological survey for project if on list.		
Design project in light of survey findings.		
Submit proposal to APA.	Receives proposal, determines adequacy of archaeological survey, if none and project on list, returns project to proposer for survey and resubmission.	Receives a report on the state of proposal.
[Prepares survey and modified proposal and submits to APA.]	[Receives proposal.]	[Receives report on state of proposal.]
	Assess proposal against findings of archaeological survey, ZEMP guidelines, environmental impacts and impacts on the parks.	
	Prepares a report to Board recommending approval/ refusal, or approval subject to mitigating measures.	
		Receives a report on proposal and makes a decision to approve, refuse or require mitigating measures.
Modifies proposal to reflect conditions (if any), and implements project; **OR** if refused, considers modifications and resubmission of new proposal.		

PROPOSER	APA/DEPARTMENT	ACR DEVELOPMENT REVIEW BOARD
Developments affecting SAACs:		
Submits application for change in land use or development to APA.	APA notified of proposed development. **OR** Inspectors monitoring SAACs find unacceptable change of use or development occurring and demand application to be submitted for consideration by APA.	
Application submitted or development ceases.	APA considers impact of proposal on SAAC and **specifies** mitigation required to protect the archaeological values of the site.	
Agrees to modify proposed actions and implements project. **OR** refuses and proposal determined by the ACR Development Board Review.	**OR** recommends project be refused to the ACR Development Review Board.	Determines the application and if approves specifies any mitigation measures required.
Agrees to modify proposed actions and implements project.		

BOX 7

PROJECTS REQUIRING ARCHAEOLOGICAL SURVEY AND APPROVAL BY THE ACR DEVELOPMENT REVIEW BOARD

1. All road improvements other than resurfacing.

2. Road reconstruction and new road construction, including urban and rural roads.

3. Historic canal, river bed, and reservoir improvements; for example cleaning, dredging and bank repairs.

4. Major canal, river bed and tank reconstruction and construction, requiring excavation and bank building.

5. Historic dike and dam reconstruction.

6. New dike and dam construction.

7. All pipe laying activities to carry water, sewerage, oil, gas and other substances.

8. Construction requiring clearing top soil, digging foundations and other excavations on sites over 0.25 ha or within 500m of a classified archaeological site under the PCH law, (that is one identified by ZEMP or subsequently added to the list); for example: airport, port, railway, energy generation, sewage treatment plants and other infrastructure projects; industrial, commercial, tourist, residential and religious developments; education, health and social service facilities.

9. Rural development programmes involving clearance of scrub, levelling of land, creating or remodelling rice fields, excavation and construction for water supply or sewerage networks;

10. Excavation for clay, sand, laterite, soil and other materials from the ground, and quarrying stone and minerals effecting a site of 0.25 ha or within 500m of a classified archaeological site.

3 TOURISM DEVELOPMENT CORPORATION

PLANNED TOURISM DEVELOPMENT

There will be a need to promote planned tourism development to meet the demands of international tourists and tourist development companies. Development should provide for:

* serviced sites to suit different types of development;
* adequate infrastructure of a high standard;
* cost effective and efficient service networks serving a number of developments (using robust and easily maintained, dependable technology);
* economies of scale by developing a single large zone;
* a high quality environment with extensive landscaped parks and other amenity, sporting and leisure environments;
* a mix of sites for different types of tourist facilities conveniently close to one another;
* control over siting and design to ensure good neighbour and compatible developments, (adopting low density, low rise, traditional architecture and building materials and building methods);
* type and organisation of development which encourages maximum input of locally produced products and local building craft skills to minimise imports and maximise economic and employment benefits to the Cambodian economy.

These requirements can be achieved by designating a single large area in Siem Reap for comprehensive development of tourism facilities under strict control of an agency established exclusively to coordinate development of the site.

ROLE OF TOURISM DEVELOPMENT CORPORATION

The creation of a Tourism Development Corporation would establish an organisation able to dominate the local market for development of tourism and ensure high quality and timely developments. It should also attract the best technical staff to build a strong professional team with expertise.

The objectives of the TDC are:

* to attract top international tourist developers, investors and managers of facilities with a long-term commitment to the tourism industry in Siem Reap;

* to discourage less competent and inexperienced developers and land speculators;

* to raise funds for investment in comprehensive infrastructure and site preparation;

* to determine and enforce consistent standards of development;

* to provide constant and reliable management of common services;

* to harness public and private capital for development of land and sites;

* to promote appropriate tourism development in Siem Reap to serve the Angkor Parks.

The Role of the TDC is to:

* purchase land within the tourism development zone of Siem Reap;

* establish model contractual requirements/agreements for leases of serviced sites;

* establish arrangements with committed and potential developers to fund investment in advanced infrastructure;

* prepare phased development plan for the Siem Reap tourism development zone based on studies of tourism potential, and policies on development of tourism in the Angkor Parks and Siem Reap town;

* prepare infrastructure development plans and designs;

* prepare site plans and development design standards;

* establish project appraisal criteria, and approval and enforcement procedures;

* publicise tourist development opportunities in Siem Reap and negotiate with suitable development interests;

* monitor and control development appropriate to the area.

ORGANISATION

The structure of the TDC would be a Board with a Chief Executive Officer and technical staff.

The Board should consist of 8 members, one nominated by each of the following;

NHPAC
General Direction of Tourism
Siem Reap Provincial Authority
Siem Reap Municipality
Ministry of Planning and Economic Development Investment Review Committee
Pacific and Asian Tourism Association (PATA)
Two members appointed by the President

The Corporation would have a Chief Executive assisted by the following Chief officers:

- Chief Planner/Development Officer, responsible for preparation of development plans and design controls;
- Chief Estates Officer, responsible for land purchase and site leases/sales;
- Chief Engineer, responsible for development of infrastructures and all technical matters;
- Finance Officer, responsible for budgets and accounts;
- Legal Officer.

Funds would come from project funds for investment in infrastructure and receipts from the lease of land to developers. Loans could be raised against the value of assets in land to provide additional funds for investment in creating serviced sites.

1

IX PROPOSED NEW LEGISLATION

INTRODUCTION

ZEMP proposals for a regulatory framework for establishing and managing the Angkor Cultural Reserve and the Angkor Parks and other zones are based on the existing laws and institutions relating to the cultural heritage of Cambodia. The Decision relating to the Protection of the Cultural Heritage of February 10, 1993 (PCH) allows ZEMP to be part of a national framework. This avoids the necessity for new legislation and provides a flexible legal authority that is not too detailed and too rigid. The need is for a package of measures that can be enacted swiftly.

Special legal provisions will apply to the urban zones, but elsewhere in the ACR it is proposed that NHPAC should be given authority to issue guidelines to control activities with potential impact on archaeology and the Angkor Parks. All ministries and provincial and local governments would be required to take these into account. Enforcement would be through decisions of the ACR Development Review Board. The Board therefore needs to be given formal legal authority under the PCH. It is proposed to give the Board power to direct that work for which permission has not been sought and approved, should stop if the appropriate procedures have not been complied with. The Board should also be given powers to direct that an environmental impact assessment should be carried out in advance of a decision on a project.

DRAFT AMENDMENTS TO THE DECISION ON THE PROTECTION OF THE CULTURAL HERITAGE (10 FEBRUARY 1993)

Chapter 1:

Article 4 *Cultural Property*

For the purposes of this decision, cultural property is considered to be any work produced by human agency *(including any monument, building and archaeological remains)* and any natural phenomenon of a scientific, historic, artistic or religious nature which bears witness to a certain stage in the development of a civilization or the natural world and whose protection is in the public interest.

> *Commentary*: the purpose of the amendment (underlined) is to make it clear that historic buildings as well as monuments qualify as cultural heritage. It is clumsy, and it may be unnecessary, because the wording of the provision may already be thought to be broad enough to encompass historic buildings. The need for clarification arises from the prospect that archaeology will blind NHPAC to everything else, and the need to secure an adequate legal basis for protection of individual buildings, particularly in the urban historic conservation zone.

Chapter 2, Section 2:

Article 8 *Restricted Areas*

Existing provisions:

1. New constructions are prohibited within the boundaries of restricted areas.

2. In exceptional cases, the Authority may authorize the construction of buildings necessary for the maintenance and preservation of a group of cultural immoveables.

Proposed substitute:

1. New construction is prohibited within the boundaries of restricted areas, except for such buildings as the Authority may deem necessary for the maintenance, *presentation, management, control of access to* and preservation of the cultural immoveables in the area.

Commentary: the underlined words have been taken from the NHPAC definition of functions. The amendment is intended to ensure that construction activity will be allowed in the central archaeological zone to allow for tourist facilities and service requirements, and not just buildings necessary for maintenance and preservation works. An alternative approach would be to tie this power down in some formal way, such as to authorize other types of buildings only if they were in accordance with the ZEMP or the park management plan, so as to overcome the legitimate fears of crops of ugly buildings being erected. This approach might tie it to buildings of reasonable scale, agreed location, local materials etc. But the recommendation is for broad norms in the national laws, and to introduce such safeguards by way of internal NHPAC guidelines, so as, for example to ensure that all such operations required approval of the National Management Committee or even the Board of Governors. This would secure direct UNESCO input to these decisions. No special power is needed for enforcement of this Article, except in the case of buildings constructed other than by the Authority (eg squatters): for these cases, an enforcement power has been built in to the new Article 13D.

New articles:

Article 13A *Archaeological Parks*

1. Areas containing extensive archaeological remains may be designated as archaeological parks.

2. The boundaries of such archaeological parks shall be defined by decision of the Supreme National Council on the advice of the Authority.

3. Any area within an archaeological park may also be designated a Restricted Area

under Article 8.

Commentary: the provision will allow an archaeological park to be established contemporaneously with, or subsequent to, the designation of a restricted area. It does not restrict the archaeological park to land surrounding or immediately adjacent to the restricted area, and hence would allow for the concept of "satellite parks". The procedures are deliberately modelled on those for designation of restricted areas, with a view to the whole package being authorized together. This special legal basis for archaeological parks is necessary in order to empower NHPAC (Parks Agency) to exercise controls within the designated areas.

Article 13B *Management powers within Archaeological Parks*

1. No works involving construction, excavation or other disturbance of the land, shall be carried out in an archaeological park without the prior permission of the Authority.

2. The Authority may make arrangements for such permission to be granted on its behalf by provincial and local governments in accordance with guidelines promulgated by the Authority.

3. The Authority may grant general exemptions from the requirement in paragraph 1.

Commentary: this amendment gives the Park Agency full control over construction and excavation works in the Archaeological Park zones. This should be broad enough to catch all the activities that the Park Agency would wish to control. The Article does not attempt to spell out all the types of works involved, because that would be too complex for this loose type of legislative instrument. Instead, it introduces a blanket control, then allows the Authority to spell out exceptions from time to time. The introduction of a prohibition against disturbance of the land effectively makes the whole of the Park zones similar to SAACs, but allows the Agency to dispense with that prohibition outside sensitive areas. The Article also allows the Authority to delegate the function to provincial and local government. Where it does so, the execution of the function would be mediated through the ACR Board. Enforcement is dealt with in new Article 13D, and in amendments to the criminal provisions (Article 70).

Article 13C *Expropriation in Archaeological Parks*

Land in an archaeological park may be expropriated by the Authority in the manner provided by law for expropriation in the public interest.

Commentary: a power of expropriation is an important backup power in an archaeological park. It is not required in the restricted areas because that designation effects an automatic expropriation. The draft article is based on existing Article 37, which confers a right of expropriation for registered and classified immovable cultural property. Expropriation procedures require payment in advance of just and proper

compensation (Land Law, art. 3).

Article 13D *Enforcement*

1. The Authority may take all steps to enforce the prohibitions under Articles 10 and 13B.

2. In particular, the Authority may remove or require the removal of any building erected, or works constructed, in breach of Articles 10 and 13B, and may restore or require the restoration of the land to its state prior to the execution of the works.

3. Any expenses incurred by the Authority in exercising its powers under paragraph 2 shall be recoverable by it from the person responsible for carrying out the construction or works.

Commentary: this Article confers a general enforcement power, in addition to the criminal liabilities of Article 70. The point of giving a general power in paragraph 1 is to underpin the promulgation of detailed regulations (NHPAC, art. 2) for enforcement purposes. Paragraph 2 confers a ''making good'' power, intended to return things to the status quo at the expense of the person responsible for the breach. It extends both to illegal construction work in core restricted areas (which will in any event be on State-owned property), and to works on private land in the rest of the Park Areas.

Article 13E *The Angkor Cultural Reserve*

1. There should be designated by the Authority an area to be known as the Angkor Cultural Reserve whose boundaries shall be defined by the Supreme National Council on the advice of the Authority.

2. In relation to any part of the Angkor Cultural Reserve which is not an urban area, a restricted area nor an archaeological park, NHPAC may issue guidelines in respect of activities with potential impact upon the restricted area or the archaeological park, including:

   (a) hydrology
   (b) ecology
   (c) environmental protection
   (d) community development
   (e) agricultural practices
   (f) cultural and traditional practices
   (g) highways and transportation

3. All ministries and provincial and local government shall be obliged to take account of any such guidelines in their activities in the Angkor Cultural Reserve and shall

report regularly to the ACR Development Review Board, in such form as the Board shall determine, on their performance in this respect.

4. Guidelines issued under these provisions may require that, prior to undertaking or authorizing any activity specified in the guidelines, the government unit concerned should notify the Authority. The Authority shall be empowered to require that an impact statement should be prepared, submitted and considered prior to the activity proceeding, and may further, whether or not an impact statement has been required, direct that the activity should not proceed, or should be permitted to proceed only on the basis of specified conditions.

5. Any differences about the issuance of guidelines, their observance, and requirements issued under paragraph 4 above, shall be referred to the ACR Development Review Board.

Article 13F *Special Areas of Archaeological Concern*

1 Sites of archaeological concern may be established, for areas outside archaeological parks and restricted areas, where the presence of archaeological remains is known or suspected.

2 The boundaries of such areas shall be defined by decision of the Supreme National Council on the advice of the Authority.

Article 13G *Prohibition on activities in Special Areas of Archaeological Concern*

1 All disturbance to the ground, tipping, flooding or draining is prohibited in a site of archaeological concern unless with the prior consent of the Authority, and in accordance with such conditions as the Authority may determine.

Article 13H *Tourism Development Zone*

1 Tourism Development Zones may be established where special provision is required to be made for tourist facilities in connection with the Angkor Cultural Reserve.

2 The boundaries of such areas shall be defined by decision of the Supreme National Council on the advice of the Authority.

3 The Authority shall establish a corporation to plan the development of the zone and the corporation shall have all necessary powers to promote development, to acquire and dispose of land and to enter into joint arrangements with national and international partners.

4 The decision of the supreme National Council shall effect an immediate expropriation of all land in the Zone and the prior owners shall be entitled to fair and just

compensation from the Authority, representing the value of the land in its existing lawful use at the time of expropriation.

Article 70 *Offenses and Penalties*

Add at end of para. 1:

(k) carries out without the prior permission of the Authority or in breach of any conditions imposed by them on such consent:

(i) any works of construction in a restricted area (Article 10); or

(ii) works involving construction or excavation in a support area (Article 13B); or

(iii) disturbance of the land or any flooding, tipping or draining of land in a special area of archaeological concern (Article 13G).

Article 74A *Binding extent*

This decision, and all actions taken under it, shall bind all central, provincial, local and other governments.

Commentary: unless these provisions are binding on all government agencies they will be of limited effect. This article attempts to achieve this.

DRAFT AMENDMENTS TO NATIONAL HERITAGE PROTECTION AUTHORITY OF CAMBODIA LAW

Insert new Article 5A

Article 5A *ACR Development Review Board*

A. FUNCTIONS

The ACR Development Review Board shall:

1. promote the objectives of the Angkor Cultural Reserve.

2 co-ordinate the activities of NHPAC in the Angkor Parks with the interests of national, provincial and local government in the ACR.

3 devise and implement a joint programme for the promotion of the objectives.

4 monitor the implementation of that programme.

5 issue external regulations and licenses in the implementation [subject to NHPAC approval] of the objectives of the Board.

B. COMPOSITION

1 The ACR Development Review Board shall consist of between 12 and 15 members, as follows:

1.1 6 appointed by NHPAC

1.2 2 appointed by the Provincial Governor

1.3 1 appointed by each of the districts within whose area the ACR is situated.

1.4 1 appointed by each of the national ministries exercising functions in the ACR.

1.5 others appointed by non-governmental organizations, infrastructure providers etc.

2 The Board may be convened at any time by the Chairman or the Secretary or at the request of at least three of its members and shall normally be convened at least quarterly.

3 A quorum shall consist of 8 members. The Board may invite observers to attend its meetings.

4 The Board shall elect a Chairman and shall adopt its own rules of procedure, subject to the following provisions: each member of the Board shall have one vote; decisions shall be made by a majority vote of the members present and voting.

5 The members of the Board shall not receive any payment for the services as committee members. They may, however, be reimbursed for expenses incurred in the performance of their functions, subject to the approval of the Chairman.

It is recommended that these amendments in sections 1 and 2 above are made to the legislation at the earliest opportunity and immediately after the acceptance in principle of the ZEMP report.

1

X IMPLEMENTING ZEMP

Contents

IMPLEMENTING ZEMP

1. IMPLEMENTATION STRATEGY

IMMEDIATE ACTIONS

Numerous recommendations have been made in the preceding Chapters for institutions, policies and actions needed to realise ZEMP. A number of projects and programmes have been referred to which would take forward measures to protect and implement the Angkor Parks and the ACR, and promote sustainable development throughout the area. Following discussions on this draft report, the first step is for the **Government to adopt the Zoning and Environmental Management Plan for Angkor.**

The implementation of ZEMP depends upon **first, creating the legislation to establish the legal framework** necessary to allow the administration and management of the area. Nothing can happen until the appropriate powers are available to NHPAC.

Secondly, a secure source of funding for the activities of managing Angkor Parks must be available. A major source of income is the entrance fees from visitors. NHPAC already has powers to make an entry charge and to use the income to protect and manage sites. **An urgent practical task is to organise the collection of entry fees**, and to handle and account for the monies received.

Pressure to develop land in and around the Angkor Archaeological Park is intense and competition will increase as the security situation improves. Harmful developments must be resisted absolutely. **A ban should be imposed on all development within the zones proposed for the Angkor Parks.** In particular this should protect the area between the Angkor Conservation Office on the northern edge of Siem Reap and Angkor Wat, whilst the proposed boundaries of the AAP are approved and legal controls established.

Other recommendations of ZEMP will be largely achieved through projects. **Many projects will need funding via international assistance.** NHPAC and the local authorities will have inadequate resources for capital investment and running costs particularly in the first few years. **A key requirement is for funds for training and to equip and establish effective management operations for the Parks**, and to guide development in the region.

The initial steps of the Implementation Strategy are:

- create legislation;
- ban all development within the Angkor Parks zone;
- establish the Angkor Parks Agency;
- organise the collection of entry fees;
- define on the ground the boundaries of the Parks;
- recruit and train staff for the tasks of managing and maintaining the sites, collecting entry fees, guiding and providing basic on-site interpretation, developing an archaeological protection programme and a park management plan ;
- establish the ACR Development Review Board to guide development in the region;
- establish the Tourism Development Corporation to promote planned tourism development in Siem Reap.

Technical assistance needs to be made available to the newly appointed Director of the Parks Agency in park management and planning, and archaeological protection. This could be provided by a chief technical advisor (CTA) whose duties would be to help coordinate the establishment of the Parks, and train the senior Cambodian staff. The task to oversee the implementation strategy, prioritize funding, organising contracting, and monitoring implementation of international projects, is enormous. A CTA would play an important role in support of NHPAC and the Director of the Park Agency in this work during the first two or three years of the new organisation.

The Implementation Strategy is outlined in more detail in the following subsections.

IMPLEMENTING THE ANGKOR PARKS PROPOSALS

To establish the Angkor Parks Agency and get it operational will involve the following steps:

- amend NHPAC legislation as outlined in Chapter IX;
- NHPAC to establish the Angkor Parks Agency;
- appoint the director and senior staff and absorb the Angkor Conservation Office into the Parks Agency;
- improve accommodation and facilities in the Angkor Office compound for the Parks Agency administrative offices, maintenance workshops, documentation centre, conservation laboratories and storage etc.
- appoint a chief technical advisor to the director and say, three senior advisors for the main functions of visitor operations, archaeology and architectural conservation, and facilities development (construction);
- put into operation a system to collect visitor entry fees and to charge and collect other fees for activities in the Angkor Parks;
- establish the precise boundaries of the Angkor Archaeological Park and the Satellite Parks and mark them on the ground (defining boundaries of the Phnom Kulen Park can follow at a later date);
- prepare and start implementing a training programme for park staff consisting of professional, technical and worker training courses including on-the-job-training using the services of international experts/advisors and other organisations involved at Angkor;
- work with public and private interests to establish a course for guides;
- prepare management guidelines on archaeology research and conservation, site maintenance and restoration, visitor operations, park security etc. (initial guidelines should result from training workshops and will be refined through work on the park management plan and other projects);
- set up a notification and permitting scheme for SAACs in the ACR;
- set up a workers' roster of local craftsmen and labourers for maintenance and restoration work;
- establish a project to prepare a detailed Park Management Plan. (This is an urgent task and may be contracted to a consultant team);
- in association with the park management plan, prepare an archaeological conservation and restoration plan for the Angkor Parks and the ACR;

- as part of the park management plan, carry out a feasibility study of the park transport needs;

- under the park management plan, prepare individual site management schemes;

- sustain and enhance the Angkor GIS;

- mount an environmental awareness programme amongst local people;

- establish a project to create basic facilities in the park including a temporary visitor centre for information and a small museum.

Other early projects are:

- establish an Angkor Research and Training Centre to focus on cultural resources and their management;

- promote an archaeological survey of the Parks and the area of the ACR, with a Phase 2 to extend the survey beyond the ACR;

- development of a park road system and of visitor reception facilities;

- a project to develop an Angkor Park Visitor Centre complex; the project could consist of feasibility study, designs, funding plan, arranging and supervising contracts;

- a project to improve the design and marketing of locally made tourist souvenirs;

- a project to improve the tree nursery;

- projects to implement components of the archaeological and conservation programme such as maintenance and restoration of monuments and moats, working closely with interested international institutions;

- project(s) for rural development and resettlement of park residents.

SETTING UP THE ACR DEVELOPMENT REVIEW BOARD

Once the Board is created it will need to agree arrangements for administrative support from the Parks Agency. It would establish procedures for assessment and approval of projects in the ACR and the adoption and periodic review of management guidelines to be applied.

ESTABLISHING A CAPACITY FOR PLANNED TOURISM

Immediate actions necessary are:

- central government controls by the Investment Committee and the General Direction

of Tourism on development and licensing tourism establishments will need to be agreed so that they reflect polices on the phased development of hotel accommodation and other tourism development in Siem Reap;

- the proposed Tourism Development Corporation needs to be established;

- first Phase development of the Tourism Development Zone will involve preparing a master plan and undertaking infrastructure and site preparations;

- the Town Planning Department for Siem Reap needs to be strengthened to control and regulate urban development, to prepare an urban development plan and to carry out environmental improvements in and around the town;

Other projects are:

- set up a Siem Reap Tourism Organisation as a joint public/private sector body to promote the interest of those involved in developing cultural tourism in the area;

- prepare a tourism development and marketing strategy in association with the Parks Agency;

- a project to establish a Siem Reap Tourism Training School;

PROJECTS TO PROTECT THE ANGKOR HERITAGE IN THE ACR

ZEMP calls for a number of projects which are directed to support the conservation of cultural heritage throughout the ACR but also assist development to be undertaken in a sustainable manner.
The following major projects will depend heavily on international technical assistance:

- development of a Siem Reap Technical College - to provide institutional support for a variety of training courses in park management and tourism skills as part of a general education and training programme;

- a Provincial Transport Feasibility Study;

- an Urban Development Plan for Siem Reap;

- a Water Management Master Plan for the ACR;

- a Forest inventory in the ACR including the Angkor Parks;

- a Rural Community Development Programme in the ACR, starting with districts in and around the Angkor Parks, consisting of:
  land allocation and titling,
  agricultural extension services,
  community forestry project,

fisheries Hatchery Project;
development of small income generating activities

- an Airport Relocation Study;

- Rural Resettlement Projects;

- Solid Waste Disposal Project;

- infrastructure investment projects for:
  new roads,
  water resources,
  urban development;

- first phase of Siem Reap Water Supply and Sewerage Infrastructure Project;

- Siem Reap River and Banks Improvement project.

2. THE ANGKOR PARKS AGENCY

The Angkor Parks Agency will be formed from the nucleus of staff and workers already employed by the Angkor Conservation Office, which would be incorporated into the agency, and the guards and guides working in the park.

As with all organizational development it is best to phase in operations and start with a small, more centralized administration until trained managers and staff are available. It is especially important at the beginning to have a strong and efficient core with only a few subdivisions given the lack of trained managers in Cambodia. There should be a search to locate the best qualified Cambodians as managers and staff. Simultaneously a training programme should be started to train field level personnel as guards and in maintenance and conservation, information and education work.

The first emphasis should be on becoming functionally operational and gaining control on the ground of the Angkor Parks; then phase in operations as resources and capability improve. A key step will be the development of a detailed master plan and implementation strategy for the park. This is best developed as a contracted project or projects. The Parks Agency Director and Chief Technical Advisor need to be intimately involved with the contractor in the development of the plan. The plan will be fully reviewed by NHPAC and the Cambodian government before it is approved.

Simultaneously basic interim facilities need to be developed and visitor services provided. These facilities should be intended to develop a minimum level of visitor facilities quickly to fill the first 2-5 year period during which detailed planning, construction of permanent facilities, and staff development takes place.

The capacity of the Parks Agency to provide Archaeological and conservation services is of equal importance and will draw heavily on assistance from the international community until a core of national trained archaeologists are available.

INITIAL STEPS

Consolidation of Existing Services and Organizations: The first step is to consolidate all operations in the core restricted areas under the Parks Agency. This means that the maintenance teams, monument guards, licensing of tour guides and transport, need to be made part of the Parks Agency. They need to be fitted into the organization as appropriate and supervised by the agency.

Professional Staff Recruiting: NHPAC should form a search committee to identify and recruit the best qualified professionals for the park staff. The committee will need to prepare job descriptions and specific desired job qualifications for each position to be filled.

Training Needs: Technical training of field staff should begin as soon as possible. To begin with, short courses should be held to train local people to provide basic services needed site maintenance (custodial, grounds, monuments, and equipment repair), security, information and education, fee collection, administration, and clerical. The intention should also be to provide some jobs in the local community quickly. Training of tour guides to be licensed by the park is also be a high priority.

Facilities Development: Basic facilities need to be established, including entrance stations and visitor information contact points. A small visitor centre and museum should be constructed near Siem Reap on the edge of the park possibly by the Hospital and near the proposed park offices in the present Angkor Conservation Office, which would make security of artifacts on display much easier. The centre would provide basic interpretive facility for the park until planning and construction of a permanent facility is possible.

INITIAL STRUCTURE FOR THE PARKS AGENCY

The initial structure for the Parks Agency will of necessity be simple, small and streamlined in order to start operations immediately with the resources and manpower available. The Parks Agency will form a major part of NHPAC at least in the next few years, and will need to recruit many of the most talented archaeologists and conservation architects in the country.

Parks Agency Director: This is a key position and it should be the first position filled. Since experience in park management may not be available in Cambodia, a person with leadership and management experience would have the best background to fill the position.

Training Officer: The importance of a coordinated and effective training programme for the Agency makes this an important early appointment.

Deputy Director, Archaeology and Conservation: Given the national and international significance of the Angkor archaeological sites and the technical nature of the work covered by this department the position should be filled with an experienced administrator who is an archaeologist or architect having a doctorate or masters degree and preferably specializing in Angkorean, or at least South East Asian, archaeology.

Archaeological Research Department: During the initial development phase these duties can be accomplished by the Deputy Parks Agency Director for Archaeology and Conservation with the help of an archaeological assistant. Archaeological survey will be undertaken as projects under contract or agreement with no personnel directly assigned. The Deputy Director or assistant would oversee the contracts. Listing and classifying SAACs will be an important function of the Department and one or more archaeological inspectors should be appointed and sent for training.

Architectural Conservation Department: A senior person for this department should be the first position filled in the Division. The duties require that it be filled by an archaeologist or architect trained in architectural conservation. Until a suitable staff member has been trained, the administration of maintenance and restoration projects would be overseen by the Deputy Director. Many projects will be conducted by international institutions in which the role of the Parks Agency will be to set and monitor the terms of the contract including the need to involve and train staff of the agency. The Department should recruit young graduates as they become available, to work under training on projects.

Curatorial and Archives Department: This is an important function to organise early during initial development phase. An officer with archaeological interests should be recruited to work with the EFEO and others offering international assistance, to establish the Angkor Documentation Centre. The library and archival functions of the Agency should also be established.

During the phase of planning and constructing park facilities the temporary position of Assistant Director for Facilities Development should be established. The person should be a landscape architect or engineer educated in park design and construction techniques in order to oversee the technical aspects of the design and construction of permanent park facilities. The incumbent would work directly to the Director.

Deputy Director, Visitor Operations: This is one of the first three top positions which need to be filled during the implementation of the ZEMP Plan and the creation of the Parks Agency. The person filling this position should be experienced in managing personnel and familiar with basic security functions. Visitor information, commercial services and/or custodial maintenance would be the other areas which the person will supervise immediately. It would be appropriate to incorporate one of the existing functional leaders in the area into this position.

Information and Education Department: During initial development this division needs to concentrate on providing basic visitor information out of one or two fixed information centres and on training of private tour guides who could then be licensed to work in the park. The staff should be people who are fluent in one or more languages used by visitors and able to work with visitors from other cultures, including being able to help with problems.

Facility Maintenance Department: The custodial crew should receive the highest priority. Some of this crew can be expected to do the general maintenance needed.

Security Department: During initial development the existing system of monument guards should be built upon and expanded. Additional guards should be added where needed. All guards should be trained in both policing and visitor protection services. The highest quality of personnel should be sought and strict standards of conduct should be enforced to get a disciplined, service-oriented cadre for the park.

Visitor Support Services Department: Most of the existing commercial services and structures would be maintained. Controls on new stands and new locations should be established and training to assist park residents in providing visitor needs introduced.

Deputy Director, Planning, Monitoring, and Coordination: During the initial development phase these duties would be accomplished by the Parks Agency Director or staff working immediately under the Director. Most of the planning such as the detailed Park Management Plan and associated studies would be accomplished through specific contract and technical assistance projects.
Control of the GIS system might be under the Deputy Parks Agency Director for Archaeology and Conservation during the initial period.

ACR Technical Support Unit: A planner or resource manager would be needed to provide administrative support to the ACR Development Review Board and undertake the evaluation of the impact of projects on the parks and the ACR. Project promoters will of course be expected to provide an Environmental Impact Assessment of the projects to be evaluated.

Administrative Department: During initial development of the Parks Agency the Administration Division would be staffed with three or four experienced staff who would combine finance and budget, personnel administration and the purchasing and record keeping for the park. People with training or experience in general office administration and one in bookkeeping would have the best qualifications for these positions.

TECHNICAL SUPPORT

Given that there are few qualified professional archaeologists and managers in Cambodia at the present time, it would be advisable to provide technical assistance to the Angkor Parks Agency. ZEMP recommends that the Parks Agency have access to advice in all branches by professional and technical experts. Advisors in archaeology, monumental conservation, forestry and tree care, park organisation and management would have no direct authority. They would be responsible for providing on the job training and advice to the Cambodian managers and professionals in the Parks Agency. As Cambodian staff become trained and experienced these advisory positions would be phased out.

A Chief Technical Advisor (CTA) is proposed to be responsible for advising on all aspects of park development as well as development within the ACR. The position would be for two years to assist the Parks Agency Director in rapidly creating an operational capacity for the organisation and to assist in managing the receipt of international support. The CTA might

chair a monthly meeting of government and voluntary sector interests in Angkor to offer advice to the Parks Director.

The Chief Technical Advisor would report to NHPAC. The incumbent would keep the Committee appraised of the status of progress on the development of the Parks Agency and in the ARC. He or she would also liaise over international funding for specific projects needed to implement ZEMP and the Parks Agency.

The Chief Technical Advisor would directly supervise long term Technical Advisors and would indirectly supervise short term or project advisors through the other Technical Advisors. The position would be funded through UNESCO and the Technical Advisory Committee on Angkor.

Long Term Technical Programme Advisors: Three additional long term technical programme advisors are recommended to assist the Chief Technical Advisor in areas of specific expertise needed to initiate parks agency operations. These advisors are for (1) Archaeology and Monument Maintenance, (2) Visitor Operations, and (3) Facility Development (construction).
Advisors would work with the counterpart Deputy Parks Agency Director for each area. They will also coordinate the work of short term technical advisors who will be brought on to complete specific projects.

These long term Technical Programme Advisors would be employed by UNESCO and the Technical Advisory Committee who would coordinate the funding of the positions and review their work. They would be directly supervised by the Chief Technical Advisor to ensure it fits with the Park Agency implementation goals and plans. Programme Advisors would be on 2-3 year contract with annual renewals based upon the quality of work performed.

Short Term Technical Project Advisors will be needed to assist in the implementation of specific ZEMP and Parks Agency implementation projects.

International assistance to the Parks Agency should be available through the Technical Advisory Committee on Angkor. The Committee would provide the selection and monitoring of the advisory staff under the auspices of UNESCO. The committee would vet qualified professionals, find outside funding for their support and liaise with NHPAC on their appointment. It may also give advice, identify funding and expertise, and evaluate offers of help for specific projects which assist the scientific and technical work of the Parks Agency.

As training is vital to strengthening the capacity of the Parks Agency, a long term commitment by donors to training is desirable including; funding scholarships, over seas courses and study tours to give exposure to international experience for those who will be responsible for the future of Angkor.

INITIAL STAFFING AND ANNUAL OPERATING BUDGET

The indicative estimate in the table is based on the assumption that a lot of labourer jobs should be established quickly for park residents and others in the community, as well as to implement badly needed maintenance and security functions. Amounts are in US dollars (US$) in accordance with recent practice in Cambodia. Monthly salaries are estimates based upon current standards of international agencies in Cambodia.

Initial Staffing List:

Position Title	No.	$/mo	Total/yr
Parks Agency Director	1	$500	$6,000
Dep. Dir. Archaeology & Cons.	1	£400	$4,800
Dep. Dir. Visitor Operations	1	$400	$4,800
Dep. Dir. Facility Construction	1	$400	$4,800
Training Officer	1	$300	$3,600
Architectural Conservationist	1	$300	$3,600
ACR Planner	1	$300	$3,600
Architect. Conserve. Foremen	20	$70	$16,800
Architect. Conserve. Craftsmen	60	$60	$43,200
Architect. Conserve. Labourers	500	$22	$132,000
GIS Manager	1	$300	$3,600
GIS Technicians	2	$200	$4,800
Senior Administrative Tech	1	$300	$3,600
Administrative Technicians	3	$200	$7,200
Junior Administrative Tech	7	$100	$8,400
Information & Education	50	$100	$60,000
Fee Collection & Bookkeepers	20	$100	$24,000
Security (park guards)	200	$44	$105,600
Custodial Maintenance	100	$22	$26,400
Clerical Assistants	10	$44	$5,280
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Total Personnel & Annual Cost	981		$472,080

Other staff would be employed on specific projects.

Initial Annual Park Budget

Park management practice assumes that the park will need 20% addition to its personnel costs for daily operating expenses. Therefore the estimated initial annual Parks Agency operating budget is:

Personnel Costs $472,080

Operating Costs @20% $94,416

Total Operating Budget $566,496

Rounding the figure the annual operations budget for the initial 2-3 years of the Angkor

Parks Agency could be approximately $600,000 US$ per year. This would be augmented by the resources used in the Park under specific project budgets.

Capital Expenditures

There should be additional project funds for planning, capital equipment, and facilities construction. Some of these costs are estimated under the projects concerned in the next section.

3. PROPOSED PROJECTS

The following projects are recommended by ZEMP to implement aspects of the plan. This is not an exclusive list. The form of projects will require further discussion between NHPAC, government authorities and donors.

Projects marked with a * have high priority. Twelve projects, one of which has several components, are recommended for immediate funding.

Project outlines are presented in an Annex.

In the Angkor Parks

1.* Strengthen the Capacity of the Angkor Parks Agency.

1.1 Improve accommodation and facilities in the Angkor Office compound for the Parks Agency administrative offices, maintenance workshops, documentation centre, conservation laboratories and storage.

1.2 Chief Technical Advisor and three senior advisors for the functions of visitor operations, archaeology and architectural conservation, and facilities development (construction).

1.3 A training programme for professional, technical and skilled craftsmen for the park staff. Consisting of courses and on-the-job-training using the services of international experts/advisors and other organisations involved at Angkor.

1.4 Establish an Archaeological Service of the Angkor Parks Agency

a) training in archaeological survey and excavation

b) undertaking an archaeological survey of the Parks and ACR.
Phase 2 extend the survey beyond the ACR.

c) on-site training of national archaeologists

1.4 Project to establish the precise boundaries of the Angkor Archaeological Park and the

Satellite Parks and mark them on the ground.

1.5 Environmental awareness programme for local people.

1.6 Project to Sustain and Enhance the Angkor Geographical Information System.

1.7 Project to create basic facilities in the park.
- a temporary visitor centre for information and a small museum.

2.* Detailed Management Plan for the Angkor Archaeological Park and the Satellite Parks of Banteay Srei and Phnom Krom.

2.1* Preparation of the Park Management Plan

2.2* Angkor Archaeological Park Transport Provision - feasibility study of the park transport system.

2.3 Preparation of Archaeological Conservation and Restoration Plan for the Angkor Parks and the ACR.

3. Improve Silvicultural Practices, Arboricultural Skills and Supply of Tree Nursery Stock.

4. Project to develop an Angkor Park Visitor Centre complex; consisting of feasibility study, designs, funding plan and supervising contracts.

5. Construction of a park road system and visitor reception facilities.

6. Project to Establish an Angkor Research and Training Centre.

Other tourism related projects

7. A Tourism Development and Marketing Strategy in association with the Parks Agency.

8.* First Phase Development of the Tourism Development Zone - prepare a master plan and undertake infrastructure and site preparations works.

9. Siem Reap River and Banks Improvement Project.

10. Establish Siem Reap Tourism Training School.

11. Project to improve the design and marketing of locally made tourist souvenirs.

Projects effecting the ACR

12.* Urban Development Planning in Siem Reap.

a) strengthening urban planning capacity in Siem Reap

b) preparation of an urban development plan and regulations

13.* Water Management Master Plan for the ACR.

14* Provincial Transport Feasibility Study.

15. Airport Relocation Study.

16.* Rural Community Development Programme in the ACR, with Districts in and around the Angkor Parks, consisting of;

a) land allocation and titling,

b) agricultural extension services,

c) community forestry project,

d) fisheries Hatchery Project;

e) small income generating activities

17.* Forest Inventory for the ACR (including the Angkor Parks).

Major Infrastructure Projects

18. Rural Resettlement Projects.

19. Solid Waste Disposal Project.

20.* Development of a Siem Reap Technical College.

21. First phase of Siem Reap Water Supply and Sewerage Infrastructure Project.

22. Infrastructure investment projects
for new roads, water resources, urban development;
(details of schemes will result from studies).