

## 2.7.3 DETAILED COST AND IMPLEMENTATION SCHEDULE

### 1) INFRASTRUCTURE PROJECTS a. airport

PROJECT CODE NUMBER:  
**PHT/W-430**

1. NAME OF PROJECT :	Phuket Airport Development				
2. LOCATION :	Phuket North				
3. PHASE I / II / III / IV :	PHASE I / PHASE II / PHASE III / PHASE IV				
4. DEVELOPMENT COSTS :	PHASE I	PHASE II	PHASE III	PHASE IV	TOTAL
1) TOTAL CAPITAL COST (,000 B)	6,100	167,000	38,700	16,000	227,800
2) ANNUAL OPERATION COST	-	-	-	-	-
5. DEVELOPMENT BODY :	Airport Authority of Thailand AAT				
6. OPERATION BODY :	Airport Authority of Thailand AAT				

PROJECT CODE NUMBER:  
**KRB/W 430**

1. NAME OF PROJECT :	Krabi Airport Development				
2. LOCATION :	Krabi				
3. PHASE I / II / III / IV :	PHASE II / PHASE IV				
4. DEVELOPMENT COSTS :	PHASE I	PHASE II	PHASE III	PHASE IV	TOTAL
1) TOTAL CAPITAL COST (,000 B)	-	15,100	-	6,000	21,100
2) ANNUAL OPERATION COST	-	-	-	-	-
5. DEVELOPMENT BODY :	Airport Authority of Thailand AAT				
6. OPERATION BODY :	Airport Authority of Thailand AAT				

#### BRIEF DESCRIPTIONS

#### PHUKET AIRPORT IMPROVEMENT PROJECT

##### PRELIMINARY FINANCIAL EVALUATION

Based on the recommended scope of the Phuket International Airport improvement project, an financial evaluation of the project was made with of view. The following are the results.

##### 1) PREMISES

###### a. PROJECT COMPONENTS AND COSTS

The project consists of:

- Development a parallel taxiway;
- Expansion of the runway strip;
- Installation of a MLS facility; and
- Related Civil Works such as replanting trees, landscaping and replacing of the access road.

The costs for the above projects and the investment schedule are as shown in the preceding section. The project is assumed to be commenced in 1990, and the project life is assumed to be 25 years from 1988.

###### b. REVENUE

Revenue is assumed to be accrued from two sources:

- landing and parking charge for aircraft; and
- passengers' airport fee.(50 bahts for domestic, and 150 bahts for international passengers);

Aircraft charges (bahts/aircraft) are as shown in below:

	<u>Landing Charge</u>	<u>Parking Charge</u>
Class A (B747):	35,460	1,910
Class B (A310, A300B4):	14,250	1,100
Class C (B737):	4,250	500
Class D (Short 360):	1,020	120

###### c. FINANCIAL SOURCE

A concessional long-term loan (OECF Loan) is assumed with the following loan conditions:

- Interest rate : 2.90%;
- Repayment Term: 25 years; and
- Grace Period : 7 years.

For annual deficit, a short-term credit with a 10% interest rate is applied.

## 2) EVALUATION RESULTS

The financial internal rate of return (FIRR) is computed to be as much as 26.8%, and the debt service cover ratio (DSCR) is 4.30. These figures means that this project is quite feasible and will have no difficulties repaying the loan. The other financial indicators are:

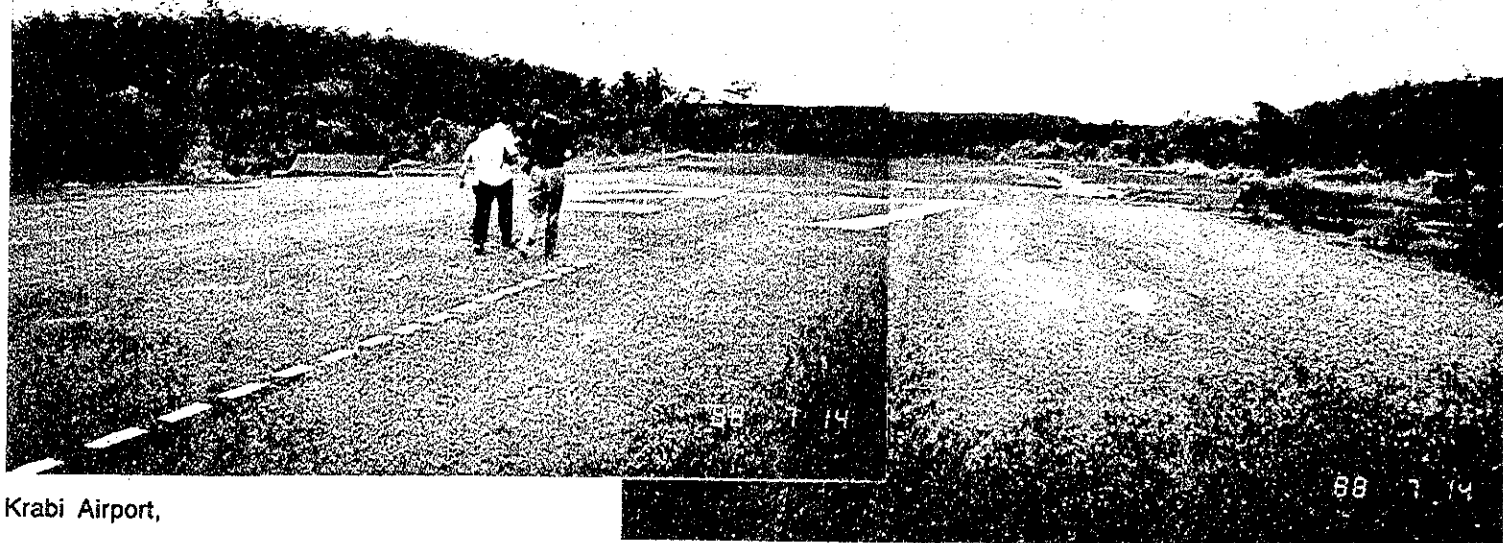
- Max. Cumulative Deficit: 10.5 million bahts at 1988 prices;
- Years necessary from start up of operation to wipe out the cumulative deficit: 4 years (1997).

**TABLE 2-7-16 IMPLEMENTATION SCHEDULE AND COSTS-PHUKET AIRPORT**

PROJECT IMPLEMENTATION SCHEDULE AND COSTS (PHUKET AIRPORT)																			
YEAR	PHASE-I				PHASE-II				PHASE-III				PHASE-IV				Unit: Million Bahts		
1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total	
1. Development of Parallel Taxiway		1.40	2.60	98.60	34.40									1.00	15.00				123.00
2. Expansion of Runway Strip		0.70	1.30	39.30	19.70														61.00
Sub-Total	0.00	2.10	3.90	107.90	54.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	15.00	0.00	0.00	0.00	184.00	
3. Installation of MLS																			36.00
4. Replantation of Trees																			0.70
Sub-Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38.70
5. Replacement of Access Road			0.10	2.20	1.00														3.30
6. Landscaping				1.20	0.60														1.80
Sub-Total	0.00	3.00	0.10	3.40	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.10
Grand Total	0	2.1	4	111.3	55.7	0	0	0	0	0	38.7	0	1	15	0	0	0	0	227.8
NOTE: Engineering Service	*****																		
Construction	*****																		

**TABLE 2-7-17 IMPLEMENTATION SCHEDULE AND COSTS-KRABI AIRPORT**

PROJECT IMPLEMENTATION SCHEDULE AND COSTS (KRABI AIRPORT)																			
YEAR	PHASE-I				PHASE-II				PHASE-III				PHASE-IV				Unit: Million Bahts		
1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total	
1. Runway Widening and Overlay			0.20	1.30	2.40	1.30													5.60
2. Expansion of Runway Strip			0.30	1.80	3.90	1.80													8.20
3. Terminal and Access Road			0.10	0.50	1.00	0.50													2.10
Total			0.60	3.60	7.30	3.60	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	21.10
NOTE: Engineering Service	*****																		
Construction	*****																		



Krabi Airport,

b. Water supply

PROJECT CODE NUMBER:  
**PHT/W 410**

1. NAME OF PROJECT :	Phuket Water Supply				
2. LOCATION :	Phuket				
3. PHASE I / II / III / IV :	PHASE I / PHASE II / PHASE III				
4. DEVELOPMENT COSTS :	PHASE I	PHASE II	PHASE III	PHASE IV	TOTAL
1) TOTAL CAPITAL COST (,000 B)	177,822	1,799,416	276,723	-	2,253,961
2) ANNUAL OPERATION COST	-	-	-	-	-
5. DEVELOPMENT BODY :	Provincial Waterworks Authority PWA				
6. OPERATION BODY :	Provincial Waterworks Authority PWA				

PROJECT CODE NUMBER:  
**PNG/W-T 261**

1. NAME OF PROJECT :	Phang Nga West - Thai Muang Water Supply Management				
2. LOCATION :	Phang Nga West - Thai Muang				
3. PHASE I / II / III / IV :	PHASE II / PHASE III				
4. DEVELOPMENT COSTS :	PHASE I	PHASE II	PHASE III	PHASE IV	TOTAL
1) TOTAL CAPITAL COST (,000 B)	-	140,800	84,500	-	225,300
2) ANNUAL OPERATION COST	-	-	-	-	-
5. DEVELOPMENT BODY :	Provincial Waterworks Authority PWA				
6. OPERATION BODY :	Provincial Waterworks Authority PWA				

BRIEF DESCRIPTIONS

**PHUKET WATER SUPPLY SYSTEM DEVELOPMENT**

**PRELIMINARY FINANCIAL EVALUATION**

Based on the recommended scope of the project, an financial evaluation was made which shows that since this water supply projects involves three dams each of which requires a huge amount of investment, the financial conditions are not promising. A self-sustaining scheme would be difficult because the water charge to make the projected financially viable would be more than the people's ability to pay. There fore, government subsidy is needed to make this project feasible. The following is a summary of this analysis.

**1) PREMISES**

**a. PROJECT COMPONENTS AND COSTS**

The project consists of:

- Three dams;
- Two purification plants;
- Distribution pipe-lines.

Total cost is estimated to be 2,192 million bahts at 1988 price. The construction schedule is the same as proposed in the preceding section: the engineering study will commence in 1989. The first system will be open for service in 1996 and the last one, in 1998. The project life is assumed to be 35 years from 1989.

**b. REVENUE**

Revenue is in the from of a water charge collected from customers such as households and enterprises. The basic minimum fare charge is assumed to be 7 baht per cubic. meter (c.b.c.m.)

**c. FINANCIAL SOURCES**

A concessional long-term loan (OECF Loan) with the following loan conditions is assumed :

- Interest Rate : 2.90% ;
- Repayment Term : 25 year;
- Grace Period : 7 years.

To cover the anticipated annual deficit, a short-term credit with a 10% interest rate is applied and a government subsidy is assumed.

## 2) EVALUATION RESULTS

It is found out that this marginally feasible at best of a unit charge of 7 baht is assumed without any governmental subsidy. In this case, the net revenue does not cover the amount of the loan repayment during the project life, i.e., the debt service cover ratio (DSCR) is negative.

Given a governmental subsidy equivalent to half of the construction costs and a 7 baht unit charge, the financial internal rate of return (FIRR) is computed to be 5.64%. In this case, the DSCR is around 0.1.

The following table shows the result of several case studies in terms of FIRR:

Changes in FIRR (%) in Several Cases

	Unit Charge (bahts/cbc.m)		
	7	10	15
A: No Subsidy		3.7	7.0
B: Subsidy: 1/3 of Const. Costs	3.6	6.7	10.5
C: Subsidy: 1/2 of Const. Costs	5.6	9.0	13.4

TABLE 2-7-18 COST ESTIMATION FOR PHUKET WATER SUPPLY

	Unit: million Baht at 1988 price		
	Phuket Northern Area	Phuket Southern Area	Grand Total
Basic Construction Cost	1,066.2	908.9	1,975.1
Engineering Fee (4%)	42.6	36.4	79.0
Contingencies (7%)	74.6	63.8	138.2
Estimated Construction Cost	1,183.4	1,008.9	2,192.3

As seen from the above table, the conditions required to make this project financially feasible are:

- a government subsidy equivalent to half of the construction costs; and
- a unit charge of 15 bahts per cbc. m.

The second condition, however, seems to be impossible, given the local people's income levels and limited ability to pay.

In conclusion's it is assessed that this project is hardly justified from a solely financial point of view, despite that it is critical for the success of Phuket tourism development. Therefore "Another view-point is needed to justify this project. As shown in Chapter 4, it its importance to the tourism investment a package of for all projects in Greater Phuket including this project may make it feasible from an economic point of view. This is thought to be an important finding.

TABLE 2-7-19 IMPLEMENTATION SCHEDULE AND COSTS-PHUKET WATER SUPPLY

PROJECT IMPLEMENTATION SCHEDULE AND COSTS (PHUKET WATER SUPPLY)		PHASE-I							PHASE-II		PHASE-III		Total
YEAR	Scale	1989	1990	1991	1992	1993	1994	1995	1996	1997	Unit: Million Bahts		
<b>NORTHERN AREA</b>													
1. Dam #5	4.43 M cbm/y H = 40 m L = 1,200 m			93.00	92.70	92.70	92.70	99.40	99.40	99.40		569.30	
							Temporary Impounding Basin						
2. Treatment Plant	20,000 cbm/d				8.50	163.80	0.00	0.00	3.50	47.00		222.80	
					1 st. (10,000 cbm/d)		2 nd. (10,000 cbm/d)						
3. Transmission Pipe	L = 82.8 km				76	35.4	18.8	15.9	0	0		146.10	
					31.7 km	24.8 km	14.4 km	11.9 km					
4. Reservoir	5 Places				13.3	14.7	0	0	0	0		28.00	
					2 Places	3 Places							
<b>Sub-Total</b>				93	150.5	306.6	111.5	115.3	102.9	146.4		1,066.20	
<b>SOUTHERN AREA</b>													
5. Dam #7	2.69 M cbm/y H = 40 m L = 600 m			67.2	66.8	66.8	71.9	72	0	0		344.70	
6. Dam #4	2.01 M cbm/y H = 30 m L = 450 m						20	39.7	39.7	44		143.40	
7. Driving Pump	3,600 cbm									11.9		11.90	
8. Driving Pipe	Ø 300 L = 13.3 km				24.6	0	0	0	0	0		24.60	
					13.3 km								
9. Treatment Plant	20,000 cbm				8.5	163.8	0	0	3.5	47		222.80	
					1 st. (10,000 cbm/d)		2 nd. (10,000 cbm/d)						
10. Transmission Pipe	L = 71.9 km				39.7	25.9	43.2	8.3	0	0		117.10	
					21.8 km	20.2 km	22.5 km	7.4 km					
11. Reservoir	7 Places				38.8	5.6	0	0	0	0		44.40	
					5 Places	2 Places							
<b>Sub-Total</b>				67.2	178.4	262.1	135.1	120	43.2	102.9		908.90	
<b>Grand Total</b>				160.2	368.9	568.7	246.6	235.3	146.1	249.3		1,975.10	
Note:	Engineering Design	*****											
	Construction	*****											

c. Land Transport

TABLE 2-7-20 RECOMMENDED HIGHWAYS DEVELOPMENT IN GREATER PHUKET

	Length (km)	Unit Cost (MB/km)	Const. Cost (Mil. B)	Eng. & Admini. (Mil. B)	Total Maintenance (Annual expenditure)				
					Total	Total Personnel	Materials	Operation	
Total	349.1		1,051.0	2.6	1,053.6	52.8	15.8	26.4	10.6
A. PHASE I (1987-1991)									
1) NATIONAL AND REGIONAL ROADS	301.7	3.2	968.1	1.8	969.9	48.5	14.5	24.2	9.7
a. Committed	296.7		952.1	0.0	952.1	47.6	14.3	23.8	9.5
b. Rt. 4028 (Airport access)	5.0	3.2	16.0	1.8	17.8	0.9	0.3	0.4	0.2
2) LOCAL ROADS	47.4	1.7	82.9	0.9	83.8	4.3	1.3	2.1	0.9
a. Committed	46.7	1.7	79.4	0.9	80.3	4.0	1.2	2.0	0.8
b. New Road in Patong	0.7		3.5	0.0	3.5	0.3	0.1	0.1	0.1
Total	195.0		776.6	85.4	862.0	43.1	12.9	21.6	8.6
B. PHASE II (1992-1996)									
1) NATIONAL AND REGIONAL ROADS	145.0	55.4	691.6	76.1	767.7	38.4	11.5	19.2	7.7
a. E-W Link Rt. 402 Imprv. New Bridge	38.0	3.2	121.6	13.4	135.0	6.7	2.0	3.4	1.3
b. Other Links	7.0	50.0	350.0	38.5	388.5	19.4	5.8	9.7	3.9
b. Other Links	100.0	2.2	220.0	24.2	244.2	12.2	3.7	6.1	2.4
2) LOCAL ROADS	50.0	1.7	85.0	9.4	94.4	4.7	1.4	2.4	0.9
Total		63.9	1,184.0	59.2	1,243.2	62.2	18.6	31.1	12.4
C. PHASE III (1997-2001)									
1) NATIONAL AND REGIONAL ROADS	155.1	62.2	1,099.0	55.0	1,154.0	57.7	17.3	28.8	11.5
a. E-W Link New Bridge 401 By-Pass	8.2	50.0	410.0	20.5	430.5	21.5	6.5	10.8	4.3
b. Other Links	46.9	10.0	469.0	23.5	492.5	24.6	7.4	12.3	4.9
b. Other Links	100.0	2.2	220.0	11.0	231.0	11.6	3.5	5.8	2.3
2) LOCAL ROADS	50.0	1.7	85.0	4.3	89.3	4.5	1.3	2.2	0.9
	205.1								

Note: Unit: Million Baht at 1988 price

d. Sea Transport

TABLE 2-7-21 COST ESTIMATION OF SECONDARY PORT, 3 LOCATIONS

	UNIT	DESCRIPTION	COST IN BAHTS
<b>A. CONSTRUCTION COSTS</b>			<b>114,855,000</b>
1) PIER CONSTRUCTION	3 Units	15 mill. B/Unit	45,000,000
2) TERMINAL BUILDING	3 Units x 0.1 ha	4,000 tsd/sq.m.	12,000,000
3) WORKSHOP	3 Units x 500 sq.m.	3,000 tsd/sq.m.	4,500,000
4) RELATED INFRASTRUCTURES		30% of sum 1)-3)	18,450,000
5) LANDSCAPING	3 Units x 2 ha	0.1 mill. B/ha	600,000
6) CONCRETE WORKS	3 Units x 1 ha	2.6 mill. B/ha	7,800,000
7) ADMINISTRATION AND OTHERS		30% of sum 1)-6)	26,505,000
8) ENGINEERING AND SUPERVISION		11% of sum 1)-6)	12,634,050
<b>B. ANNUAL MAINTENANCE COSTS</b>			<b>15,396,450</b>
<b>1. ADMINISTRATION COSTS</b>			<b>7,356,600</b>
1) MANAGERIAL	1 person/Unit	202,900 B/d	608,700
2) CLERICAL	2 persons/Unit	78,100 B/d	468,600
3) SERVICE WORKERS	5 persons/Unit	44,800 B/d	672,000
4) MECHANICS	3 persons/Unit	78,100 B/d	702,900
6) OVERHEAD		200% of sum 1)-5)	4,904,400
<b>2. REPAIR AND FACILITY MAINTENANCE</b>			<b>8,039,850</b>
		7% of Construction Costs	

TABLE 2-7-22 COST ESTIMATION OF STOP-OVER PORT, 15 LOCATIONS

	UNIT	DESCRIPTION	COST IN BAHTS
<b>A. CONSTRUCTION COSTS</b>			<b>114,855,000</b>
1) PIER CONSTRUCTION	15 Units	5 mill. B/Unit	75,000,000
2) TERMINAL BUILDING	15 Units x 200 sq.m.	3,000 tsd/sq.m.	9,000,000
3) RELATED INFRASTRUCTURES		30% of sum 1)-2)	25,200,000
4) LANDSCAPING	15 Units x 1 ha	0.1 mill. B/ha	1,500,000
5) ADMINISTRATION AND OTHERS		30% of sum 1)-4)	33,210,000
7) ENGINEERING AND SUPERVISION		11% of sum 1)-5)	15,830,100
<b>B. ANNUAL MAINTENANCE COSTS</b>			<b>14,087,850</b>
<b>1. ADMINISTRATION COSTS</b>			<b>6,048,000</b>
1) SERVICE WORKERS	3 persons/Unit	44,800 B/d	2,016,000
2) OVERHEAD		200% of 1)	4,032,000
<b>2. REPAIR AND FACILITY MAINTENANCE</b>			<b>8,039,850</b>
		7% of Construction Costs	

e. Solid Waste

TABLE 2-7-23 PROJECT COST ESTIMATION

	Year				Total
	1996	2001	2016	2011	
A. Total investment cost (a)+(b)+(c)	712	18	534	18	1,282
A-1 Construction					
1) Landfill site	496 *1	-	252 *2	-	
2) Leachate treatment plant	78 *3	-	174 *4	-	
Sub-Total (a)	574		426		1,000
3) Engineering fee (a X 0.04)	23	-	17	-	
4) Supervision (a X 0.07)	40	-	30	-	
5) Contingency (a X 0.1)	57	-	43	-	
Sub-Total (b)	120	-	90	-	210
Construction cost : (a)+(b)	694	-	516	-	1,210
A-2 Purchase					
1) Compactor truck (1.5mil.B/unit)	15	15	15	15	
2) Bulldozer (1.5 mil.B/unit)	3	3	3	3	
Sub-Total (c)	18	18	18	18	72
Total operation cost	47	51	53	57	
B. Maintenance/operation					
1) Repair and power (aX0.02)	11	11	11	11	
2) Material (aX0.01)	6	6	6	6	
3) Personnel *5	1	1	1	1	
4) Collection *6	15	17	18	20	
5) Landfill (150B/t)	14	16	17	19	

Notes: Unit : Million Bahts

\*1 200(B/cbc.m) X 2,480,000 (cbc.m., capacity until 2006) = 496 mil.B.

\*2 200(B/cbc.m) X (3,740,000) = 252 mil. B.

\*3 200,000 (B/cbc.m.(water volume)/day) X 30 cbc.m/ha/day X 13 ha = 78 mil.B.

\*4 200,000 X 30 X (42-13) = 174 mil.B.

\*5 200,000 (B/cap/year) X 5 personnel

\*6 160 (B/t) X (Annual amount of waste)

f. Utilities

TABLE 2-7-24 PROJECT COST ESTIMATION FOR ELECTRICAL WORKS

Name of projects	Construction Costs (1,000 Baht)			Remarks
	Phase II	Phase III	Total	
(THAI MUANG DEV'T AREA)				
A. THAI MUANG SUB-STATION				
-Equipments	83,150	62,200	145,350	---(A)
-Administration and Others	24,945	18,660	43,605	30% OF (A)--(B)
-Design and Supervision	11,890	8,895	20,785	11% OF (A)&(B)
Sub-Total	119,985	89,755	209,740	
B. FIVE DISTRIBUTION STATIONS				
-Equipments	45,066	41,965	87,031	---(A)
-Administration and Others	13,520	12,590	26,110	30% OF (A)--(B)
-Design and Supervision	6,445	6,001	12,446	11% OF (A)&(B)
Sub-Total	65,031	60,556	125,587	
C. STREET LIGHTING				
-Equipments	26,207	65,445	91,652	---(A)
-Administration and Others	7,862	19,634	27,496	30% OF (A)--(B)
-Design and Supervision	3,748	9,359	13,107	11% OF (A)&(B)
Sub-Total	37,817	94,438	132,255	
Grand Total	222,833	244,749	467,582	
(KHOK KLOI DEV'T AREA)				
D. KHOK KLOI DISTRIBUTION STATION				
-Equipments	14,130	26,400	40,530	---(A)
-Administration and Others	4,239	7,920	12,159	30% OF (A)--(B)
-Design and Supervision	2,021	3,775	5,796	11% OF (A)&(B)
Sub-Total	20,390	38,095	58,485	
E. STREET LIGHTING				
-Equipments	17,274	19,076	36,350	---(A)
-Administration and Others	5,182	5,723	10,905	30% OF (A)--(B)
-Design and Supervision	2,470	2,728	5,198	11% OF (A)&(B)
Sub-Total	24,926	27,527	52,453	
Grand Total	45,316	65,622	110,938	
F. PHUKET MARINE CENTRE DISTRIBUTION STATION				
-Equipments	20,020	-	20,020	---(A)
-Administration and Others	6,006	-	6,006	30% OF (A)--(B)
-Design and Supervision	2,863	-	2,863	11% OF (A)&(B)
Total	28,889	0	28,889	

2) CULTURAL TOURISM PROJECTS

a. Town Tourism

TABLE 2-7-25 COST OF PHUKET TOWN TOURISM DEVELOPMENT PROJECT (PHASE

Number Programs/Facilities	(Million Baht)
1 Facade Restoration for Buildings along Thepkasattri and Thalang	52.00
2 New Pavements and Landscape Improvement	6.00
3 New Infrastructure Development	11.40
4 New Public Parking	1.08
5 Information center	2.50
<b>Total</b>	<b>72.98</b>

b. Tourism Village

TABLE 2-7-26 COST ESTIMATION OF PANYEE OCEANIC TOURISM VILLAGE-PANG NGA BAY

	UNIT	DESCRIPTION	COST (Bahts)
<b>A. CONSTRUCTION COSTS</b>			<b>80,288,520</b>
<b>1. LAND ARRANGEMENT AND INFRASTRUCTURE</b>			
1) New Deck(including landing pier)	7,000 sq.m.	5,500 Bahts/sq.m.	72,222,150
2) Related Infrastructure		30 % of 1)	38,500,000
3) Administration and Others		30 % of sum 1)+2)	11,550,000
4) Engineering and Supervision		30 % of sum 1)+2)+3)	15,015,000
<b>2. SUPERSTRUCTURES</b>			
1) Restaurant(theater style)	500 sq.m.	4,000 Bahts/sq.m.	8,066,370
2) Restaurant(sea food market style)	400 sq.m.	3,000 Bahts/sq.m.	2,000,000
3) Handicraft Center	150 sq.m.	2,000 Bahts/sq.m.	1,200,000
4) Souvenir Shops	400 sq.m.	2,000 Bahts/sq.m.	300,000
5) Shelter and Others	300 sq.m.	1,000 Bahts/sq.m.	800,000
6) Landscaping	5,300 sq.m.	300 Bahts/sq.m.	300,000
3) Administration and Others		30 % of sum 1)-6)	1,590,000
4) Engineering and Supervision		30 % of sum 1)-3)	1,077,000
<b>B. ANNUAL MAINTENANCE COSTS</b>			
<b>1. ADMINISTRATION COSTS</b>			<b>20,892,000</b>
1) Managerial	2 persons	200,000 B/p	400,000
2) Clerical	3 persons	78,000 B/p	234,000
3) Service & Sale workers	80 persons	45,000 B/p	3,600,000
4) Performance Artists	30 persons	65,000 B/p	1,950,000
5) Technical Workers	10 persons	78,000 B/p	780,000
6) Overhead		200 % of sum 1)-5)	13,928,000
<b>2. REPAIR AND FACILITIES MAINTENANCE</b>			<b>4,014,426</b>
		5% of Construction Costs	
<b>3. UTILITIES</b>			<b>2,408,656</b>
		3% of Construction Costs	

TABLE 2-7-27 COST ESTIMATION OF PHARA WOODY TOURISM VILLAGE

	UNIT	DESCRIPTION	COST
<b>A. CONSTRUCTION COSTS</b>			<b>28,062,490</b>
<b>1. LAND ARRANGEMENT AND INFRASTRUCTURE</b>			
1) Land Acquisition	15,000 sq.m.	440 Bahts/sq.m.	20,822,490
2) Land Arrangement	15,000 sq.m.	300 Bahts/sq.m.	6,600,000
3) Related Infrastructure		30 % of sum 1)+2)	4,500,000
3) Administration and Others		30 % of sum 1)-3)	3,330,000
4) Engineering and Supervision		11 % of sum 1)-4)	4,329,000
<b>2. SUPERSTRUCTURES</b>			
1) Restaurant(theater style)	200 sq.m.	3,500 Bahts/sq.m.	7,240,000
2) Coffee and Souvenir Shops	150 sq.m.	2,000 Bahts/sq.m.	700,000
3) Museum(including exhibition materials)	250 sq.m.	8,000 Bahts/sq.m.	300,000
4) Miscellaneous Buildings	100 sq.m.	1,500 Bahts/sq.m.	2,000,000
5) Landscaping and Car Parking	5,000 sq.m.	500 Bahts/sq.m.	150,000
6) Landscaping	5,300 sq.m.	300 Bahts/sq.m.	2,500,000
<b>B. ANNUAL MAINTENANCE COSTS</b>			
<b>1. ADMINISTRATION COSTS</b>			<b>9,513,000</b>
1) Managerial	2 persons	200,000 Bahts/p	400,000
2) Clerical	2 persons	78,000 Bahts/p	156,000
3) Service & Sale workers	35 persons	45,000 Bahts/p	1,575,000
4) Handicraft Demonstrators	10 persons	65,000 Bahts/p	650,000
5) Technical Workers	5 persons	78,000 Bahts/p	390,000
6) Overhead		200 % of sum 1)-5)	390,000
<b>2. REPAIR AND FACILITIES MAINTENANCE</b>			<b>1,403,125</b>
		5% of Construction Costs	
<b>3. UTILITIES</b>			<b>841,875</b>
		3% of Construction Costs	

c. Historical Sites

TABLE 2-7-28 COST ESTIMATION OF PHUKET, PHK/N/O-311, 312, 313 AND 321

	Category	Owner	Area (sq.m.)	Cost in Bahts
<b>PHK/N/O-311(PHASE-I)</b>			<b>18,400</b>	<b>30,000,000</b>
<b>1. THALANG NATIONAL MUSEUM</b>	<i>Architecture</i>	<i>Government</i>	18,400	30,000,000
1) New Museum Addition				30,000,000
<b>PHK/N/O-321(PHASE-I)</b>			<b>20,800</b>	<b>2,882,000</b>
<b>1. WAT PHRA THONG</b>	<i>Architecture</i>	<i>Religion Dept.</i>	6,400	434,000
1) Landscape Improvement				384,000
2) Signs and Information Boards				50,000
<b>2. THALANG PILLAR SHRINE at TARUE</b>	<i>Architecture</i>	<i>Government</i>	4,800	508,000
1) Landscape Improvement				448,000
2) Signs and Information Boards				60,000
<b>3. BAN PHRAYA WICHITSONGKRAM ARCHEOLOGICAL SITE</b>	<i>Habitation Site</i>	<i>Government</i>	9,600	1,940,000
1) Parking and Landscape Improvement				1,440,000
2) Restroom, Guard's booth and Salas				400,000
3) Signs and Information Boards				100,000
<b>PHK/S/O-312(PHASE-I)</b>			<b>12,800</b>	<b>1,390,000</b>
<b>1. WAT CHALONG</b>	<i>Architecture</i>	<i>Religion Dept.</i>	12,800	1,390,000
1) Landscape Improvement				1,240,000
2) Signs and Information Boards				150,000
<b>PHK/S/O-313(PHASE-II)</b>			<b>5,000</b>	<b>17,500,000</b>
<b>1. OLD BUILDINGS at SAPANHIN</b>	<i>Architecture</i>	<i>Private</i>	5,000	17,500,000
1) Facade Restoration				17,500,000
<b>TOTAL</b>			<b>57,000</b>	<b>51,772,000</b>

TABLE 2-7-29 COST ESTIMATION OF PHANG NGA, PNG/B-311, 321, 322 AND 323

	Category	Owner	Area (sq.m.)	Cost in Bahts
<b>PNG/B-311(PHASE-II)</b>			<b>32,000</b>	<b>42,630,000</b>
<b>1. TAKUAPA OLD TOWN</b>	<i>Architecture</i>	<i>Private</i>	32,000	42,630,000
1) Facade Restoration				34,000,000
2) Infrastructure and Landscape Improvement				7,280,000
3) Restoration of Old City Wall				1,200,000
4) Signs and Information Boards				150,000
<b>PNG/B-321(PHASE-I)</b>			<b>40,010</b>	<b>7,341,800</b>
<b>1. WAT SUWANKUHA</b>	<i>Architecture</i>	<i>Government</i>	8,000	900,000
1) Landscape Improvement				800,000
2) Signs and Information Boards				100,000
<b>2. KHAO CHANG</b>	<i>Habitation Site</i>	<i>Government</i>	4,000	430,000
1) Cleaning and Preserving the Site				80,000
2) Landscape Improvement				250,000
3) Signs and Information Boards				100,000
<b>3. THAM RHU SI</b>	<i>Habitation Site</i>	<i>Government</i>	50	65,000
1) Protection Line/Fence				15,000
2) Signs and Information Boards				50,000
<b>4. KHAO KHIAN ISLAND</b>	<i>Rock Painting Site</i>	<i>Government</i>	960	1,480,000
1) Cave Wall Cleaning and Preservation				70,000
2) Protection Line/Fence				160,000
3) Walkway				600,000
4) Landings				300,000
5) Signs and Information Boards				350,000
<b>5. KHAO RAYA ISLAND</b>	<i>Rock Painting Site</i>	<i>Government</i>	20,000	2,206,800
1) Dredging the Canal (1 km)				2,100,000
2) Cleaning and Preserving the Site				56,800
3) Signs and Information Boards				50,000
<b>6. THAM NAGA</b>	<i>Rock Painting Site</i>	<i>Government</i>	4,000	1,290,000
1) Cleaning and Preserving the Site				20,000
2) Landscape Improvement				120,000
3) Signs and Information Boards				100,000
4) Dredging the Canal (500 m)				1,050,000
<b>7. PHRA at THAO ISLAND</b>	<i>Rock Painting Site</i>	<i>Government</i>	3,000	970,000
1) Cleaning and Preserving the Site				150,000
2) Landscape Improvement				340,000
3) Landing				280,000
4) Cleaning and Preserving the Site				200,000
<b>PNG/B-322(PHASE-II)</b>			<b>19,600</b>	<b>8,434,000</b>
<b>1. KHAO THAO</b>	<i>Habitation Site</i>	<i>Government</i>	9,600	7,460,000
1) Site Museum Building and Tourist Facilities				5,000,000
2) Parking and Landscape Improvement				960,000
3) Exhibitions				1,500,000
<b>2. KHAO PHANG</b>	<i>Habitation Site</i>	<i>Government</i>	3,000	480,000
1) Landing				150,000
2) Signs, Information Boards and Displays				150,000
3) Walkway and Landscape Improvement				180,000
<b>3. THAM SAM</b>	<i>Rock Painting Site</i>	<i>Government</i>	7,000	494,000
1) Signs and Information Boards				100,000
2) Walkways				90,000
3) Parking				24,000
4) Landscape Improvement				280,000



PNG/B-323(PHASE-III)			53,500	2,090,000
<b>1. KHAO WANG MO KHUANG</b>	<i>Habitation Site</i>	<i>Government</i>	11,000	1,450,000
1) Parking and Facilities				600,000
2) Signs and Information Boards				250,000
3) Landscaping and Walkways				600,000
<b>2. KHAO NGAM</b>	<i>Habitation Site</i>	<i>Government</i>	2,500	260,000
1) Signs and Information Boards				50,000
2) Protection Line/Fence				60,000
3) Walkway and Landscape Improvement				150,000
<b>3. KO KHAO ISLAND</b>	<i>Habitation Site</i>	<i>Private and Government</i>	40,000	380,000
1) Signs and Information Boards				200,000
2) Landing				150,000
3) Walkway				30,000
<b>TOTAL</b>			<b>145,110</b>	<b>60,495,800</b>

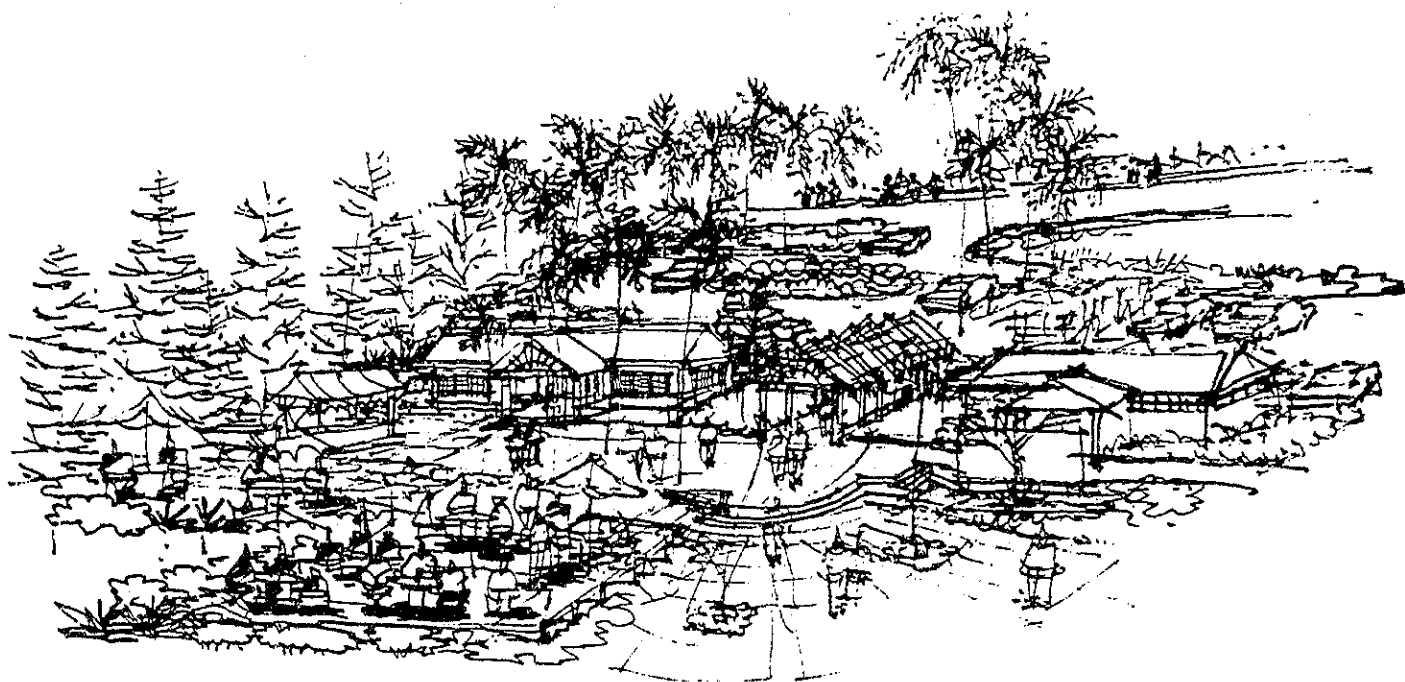
TABLE 2-7-30 COST ESTIMATION OF KRABI, KRB-3212, 322 AND 323

	Category	Owner	Area (sq.m.)	Cost in Bahts
<b>KRB-321(PHASE-I)</b>			<b>25,320</b>	<b>7,366,000</b>
<b>1. THAM SRA YUAN THONG</b>	<i>Habitation Site</i>	<i>Government</i>	800	310,000
1) Signs and Information Boards				150,000
2) Landscape and Walkways				160,000
<b>2. THAM PEE HUA TO</b>	<i>Rock Painting Site</i>	<i>Government</i>	16,000	6,060,000
1) Resurfacing the Road from the Main Road to the Site (2 km)				2,500,000
2) New Pier to Replace the Old One & Parking Lot				2,000,000
3) Cleaning and Preserving the Cave				360,000
4) Walkways (180 km)				540,000
5) Signs and Information Boards				300,000
6) Protection Line/Fence				210,000
7) Landind at the Site				150,000
<b>3. THAM CHAO LE SHELTER</b>	<i>Rock Painting Site</i>	<i>Government</i>	80	362,000
1) Cleaning and Preserving the Site				32,000
2) Walkway, Ladder and Landing				200,000
3) Protection Line/Fence				80,000
4) Signs and Information Boards				50,000
<b>4. LAEM CHAO LE SHELTER</b>	<i>Rock Painting Site</i>	<i>Government</i>	20	74,000
1) Cleaning and Preserving the Site				24,000
2) Signs and Information Boards				50,000
<b>5. LAEM FAI MAI</b>	<i>Rock Painting Site</i>	<i>Government</i>	400	98,000
1) Cleaning and Preserving the Site				48,000
2) Signs and Information Boards				50,000
<b>6. LAEM THAI RAET SHELTER</b>	<i>Rock Painting Site</i>	<i>Government</i>	20	82,000
1) Cleaning and Preserving the Site				32,000
2) Signs and Information Boards				50,000
<b>7. PRAYANAGA CAVE (VIKING CAVE)</b>	<i>Rock Painting Site</i>	<i>Government</i>	8,000	380,000
1) Cleaning and Preserving the Site				80,000
2) Signs and Information Boards				100,000
3) Landing and Ladder				200,000
<b>KRB-322(PHASE-II)</b>			<b>41,700</b>	<b>14,510,000</b>
<b>1. KLONGTOM</b>	<i>Habitation Site</i>	<i>Private</i>	32,000	12,000,000
1) Road to the Site (1 km)				1,500,000
2) Preserving the Site				1,000,000
3) Site Museum				5,000,000
4) Exhibitions				1,000,000
5) Landscape Improvement, Tourist Facilities, Signs and Information Boards				3,000,000
6) Improvement of the Existing Small Museum in Klontom Temple				500,000
<b>2. SAI THAI CAVE</b>	<i>Habitation Site</i>	<i>Government</i>	200	130,000
1) Signs and Information Boards				50,000
2) Landscape Improvement				80,000
<b>3. THAM KHAO PHRA</b>	<i>Habitation Site</i>	<i>Government</i>	3,000	150,000
1) Cleaning and Preserving the Site				100,000
2) Signs and Information Boards				50,000
<b>4. THAM KHAO RANG</b>	<i>Habitation Site</i>	<i>Government</i>	2,500	250,000
1) Signs and Information Boards				50,000
2) Landscape improvement & Walkways				200,000
<b>5. THAM WANG LONG CAVE</b>	<i>Rock Painting Site</i>	<i>Government</i>	4,000	1,980,000
1) Staire (32 meters high)				250,000
2) Walkways				350,000
3) Electrical System				300,000
4) Signs and Information Boards				400,000
5) Landscaping and Tourist Facilities				500,000
6) Transportation Cost (10 % of Sum)				180,000
<b>KRB-323(PHASE-III)</b>			<b>1,900</b>	<b>390,000</b>
<b>1. THAM PETCH</b>	<i>Habitation Site</i>	<i>Government</i>	1,300	50,000
1) Signs and Information Boards				50,000
<b>2. BAN TAP PRIK</b>	<i>Habitation Site</i>	<i>Government</i>	600	340,000
1) Signs and Information Boards				100,000
2) Trail (1,200 m)				240,000
<b>TOTAL</b>			<b>68,920</b>	<b>22,266,000</b>

### 3) NATIONAL PARK PROJECTS

TABLE 2-7-31 COST ESTIMATION OF NATIONAL PARK IMPROVEMENT PROJECTS

Project No.	Name of National Park	Facilities/Programs	Cost (Million Baht)		
			Phase-I	Phase-II	Total
PHT/N-H311	Hat Nai Yang	1) Recreation and Services	6.460	0.000	6.460
		2) Resources Management	5.500	2.500	8.000
		3) General Park Management	4.200	0.000	4.200
		<b>Total</b>	<b>16.160</b>	<b>2.500</b>	<b>18.660</b>
PNG/B 312	Ao Phang Nga	1) Recreation and Services	10.260	0.900	11.160
		2) Resources Management	0.000	0.000	0.000
		3) General Park Management	8.600	8.000	16.600
		<b>Total</b>	<b>18.860</b>	<b>8.900</b>	<b>27.760</b>
PNG/W-T 311	Khao Lampi -Hat Thai Muang	1) Recreation and Services	2.900	52.820	55.720
		2) Resources Management	0.000	12.475	12.475
		3) General Park Management	0.000	1.000	1.000
		<b>Total</b>	<b>2.900</b>	<b>66.295</b>	<b>69.195</b>
PNG/W-T 312	Mu Ko Similan	1) Recreation and Services	10.400	0.000	10.400
		2) Resources Management	12.200	0.000	12.200
		3) General Park Management	1.000	2.300	3.300
		<b>Total</b>	<b>23.600</b>	<b>2.300</b>	<b>25.900</b>
KRB-311	Hat Nopparat Thara -Mu Ko Phi Phi	1) Recreation and Services	17.215	0.000	17.215
		2) Resources Management	2.450	0.000	2.450
		3) General Park Management	17.640	0.000	17.640
		<b>Total</b>	<b>37.305</b>	<b>0.000</b>	<b>37.305</b>
		<b>Sub-Total</b>	<b>98.825</b>	<b>79.995</b>	<b>178.820</b>
PHT/N-H312	National Marine Park Training Center (Hat Nai Yang)	1) Office	1.440	0.000	1.440
		2) Auditorium	4.725	0.000	4.725
		3) Dormitory	3.600	0.000	3.600
		4) Bungalow	2.700	0.000	2.700
		5) Cafeteria		0.000	0.000
		6) Garage and Repair Shop	1.600	0.000	1.600
		7) Sports Section	3.000	0.000	3.000
		8) Waste Control System	0.600	0.000	0.600
		9) Nursery and Maintenance	1.500	0.000	1.500
		<b>Total</b>	<b>19.165</b>	<b>0.000</b>	<b>19.165</b>
		<b>Grand Total</b>	<b>117.990</b>	<b>79.995</b>	<b>197.985</b>



Development Image of the Tourist Plaza in the Hat Nai Yang National Park



Hiking Trail

## **CHAPTER 3 STUDY OF SELECTED TOURISM DEVELOPMENT**

### **3.1 THAI MUANG RESORT DEVELOPMENT PROJECT**

- 3.1.1 GENERAL CONTEXT**
- 3.1.2 LAND USE PLAN**
- 3.1.3 FACILITY PLAN**
- 3.1.4 TRANSPORTATION PLAN**
- 3.1.5 UTILITIES PLAN**
- 3.1.6 ENVIRONMENTAL/LANDSCAPE PLAN**

### **3.2 SEA NETWORK DEVELOPMENT PROJECT-PHUKET MARINE CENTER**

- 3.2.1 GENERAL CONTEXT**
- 3.2.2 PHUKET MARINE CENTER**
- 3.2.3 FACILITY PLAN**

### **3.3 INSTITUTIONAL ARRANGEMENTS**

- 3.3.1 PUBLIC AND PRIVATE COORDINATION**
- 3.3.2 ORGANIZATION**

### 3.1 THAI MUANG RESORT DEVELOPMENT PROJECT

#### 3.1.1 GENERAL CONTEXT

##### 1) EXISTING CONDITIONS

###### ● The Site Condition

a. The proposed site both the water and sand is superior, and the width of the beach is also acceptable for beach resort development. The immediate area behind the beach and the hinterland consists of a flat delta with small rubber plantations, paddy fields and other agricultural land as well as a number of former tin mines yet to be rehabilitated, lagoons, rivers and green open land. Further behind the area are mountains on all sides, with some parts being relatively near the beach. With these conditions, the Thai Muang area is ideal for resort development.

###### ● Utilization of Water Surface of Ex-Tin Mining Ponds

b. Utilization of potential natural resource  
Morphological features of the expanded water surface-distribution and continuity-definitely characterize the quality of the new resort area development, playing a significant role in the whole development scheme for this area. While the new resort development scheme has distinctive functions to create excellent resort environments through diversified water elements, it features a more flexible approach to the utilization of natural resources. A variety of plans can be made through minor changes in the current state. Comprehensive planning can make the area into an unique resort of a new type. Planning of hotels, villas, convention hall, schools, theme parks, gardens, amenities, etc. suited to the new resort concept can realize a superior relaxation environment.

##### 2) PROJECT DEVELOPMENT OBJECTIVES

The proposed project is an unique and challenging development in Phuket area having the following objectives;

###### ● Integrate Resort Complex as a New Development Center

a. Creation of a new resort center in the south-west coast of Phang Nga Province where is not developed yet to have a tourism development core in the north part of the greater Phuket to stimulate the private investors and realize an integrated resort complex.

###### ● Resort for Both International and Domestic Tourists

b. The Two development areas are proposed:

- Thai Muang International Resort Complex Development Area, Accommodating 4,500 high class hotel rooms and other related resort facilities mainly for international tourists.
- Khok Kloi Public Beach Development Area; Accommodating 900 economy class hotel rooms and other related resort facilities mainly for domestic and budget tourists.

###### ● "Public Tourism Corporation" to be Established

c. The execution and management of the project are responsible of the proposed organization of "Public Tourism Corporation" composed of TAT, Ministry of Interior and local government. The major functions of the organization are:

- Formulation and implementation of land use and zoning policies
- Construction of Infrastructure and public facilities in the sites
- Provision of hotel and commercial sites
- Promotion to encourage hotel investors and tourists
- Provision of safety and security

#### 3.1.2 DEVELOPMENT CONCEPT OF THE RESORT DEVELOPMENT

The following are the development concept for the resort development of the Thai Muang Beach.

##### 1) INTEGRATION OF TOURISM AND REGIONAL DEVELOPMENT

###### ● Region-Wide Infrastructure Development

a. The project involves region-wide infrastructure development not only for tourism purposes, but also for regional development purposes. The major components being water resources and water supply, regional secondary roads, a jetty for a coastal sea network and a heliport for emergency use.

###### ● Community Development of Neighbouring Areas

b. The project also involves the community development of neighboring areas to upgrade the living standards of the local residents and improve tourist service facilities. The major components would be service town development in Thai Muang and Khok Kloi, and the improvement of small villages nearby.

###### ● Rationalization of Land Use

c. The project contributes to the regional development of the coastal areas in Phang Nga Province where exhausted tin mining lands have been left idle and require re-utilization for other economic activities.

## 2) CONSTRUCTION OF LARGE-SCALE RESORT COMPLEXES

- a. "A tourist paradise all year round" in the tropical Andaman Sea describes the Thai Muang resort in an advertising catchphrase which appeals to tourists by offering year round beach and marine activities as well as inland and indoor recreation. This large scale resort complex operation will offer well programed activities and services throughout the year even during the monsoon season.

● "A Tourist Paradise All Year Round"

The major components for this complex are as follows:

- Convention Hall
- Golf Course
- Shopping Center
- Amusement Park
- Highland Amenity Development
- Lakeside Park
- Indoor Gymnasium

- b. Another advertising catchphrase could be "The most prestigious and exclusive resort in East Asia" which suggests a high standard of services and facilities that will be able to provide for all the needs of the guests perfectly. The component facilities would include excellent communications, medical, safety and security, transportation and business services 24 hours a day.

● "The Most Prestigious and Exclusive Resort In East Asia"

- c. The resort also offers various types of condominiums and villas for long term guests who want to have kitchens, bigger sitting rooms and perhaps a garden for relaxing. This will require cooperation with real estate developers and professionals.

● Condominiums and Villas for Long-Term Guests

## 3) INTRODUCTION OF AN ENVIRONMENTALLY SOUND DEVELOPMENT APPROACH

It is essential that the natural beauty and environment of the Thai Muang Beach be protected and not spoiled by development activities. It is essential that specific developments be based on proper land use planning; that waste water and the dumping of trash be controlled; that erosion controls and other conservation measures be applied; that the architecture and landscaping be in harmony with nature, etc.

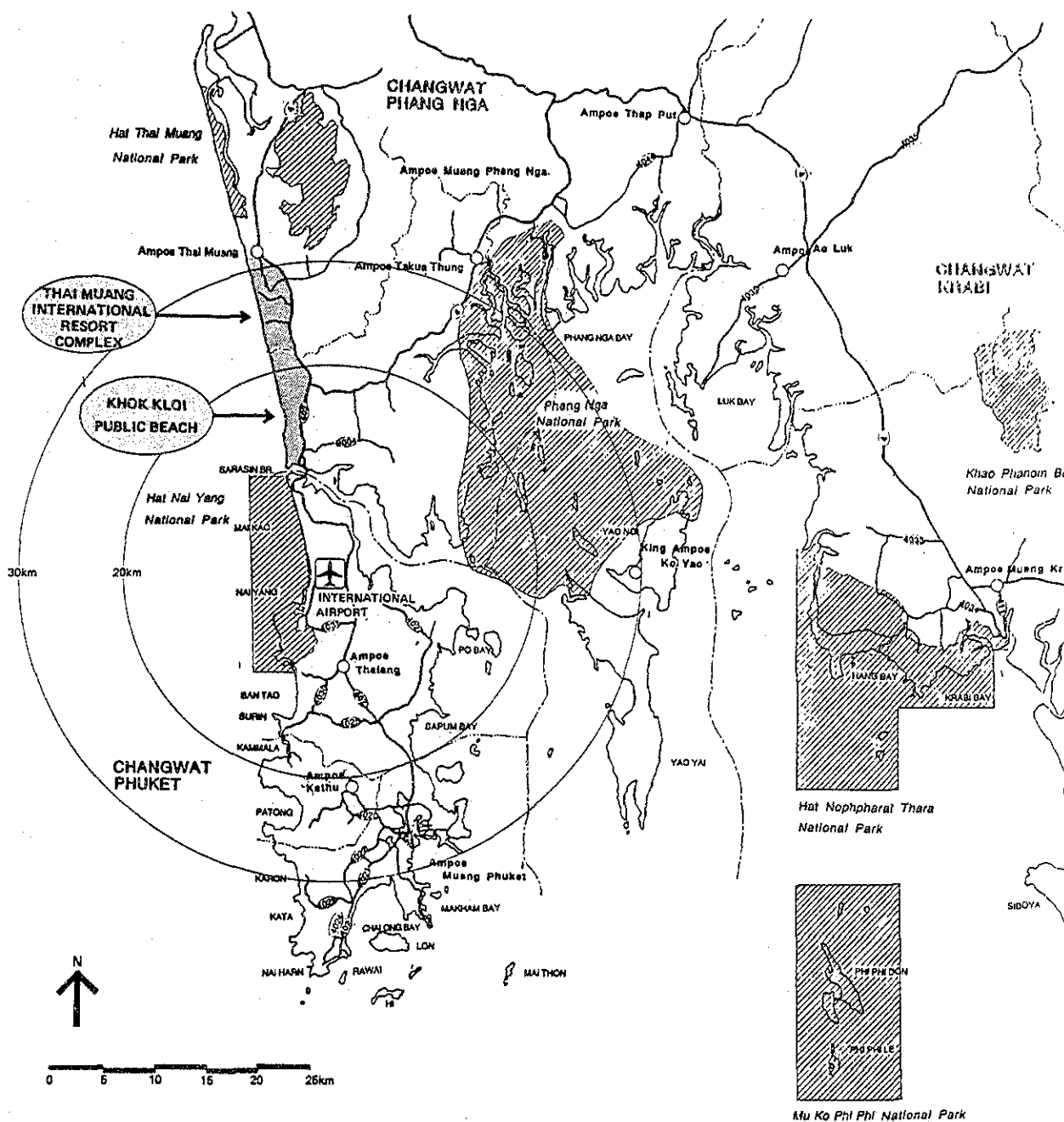
● Harmony with Nature

In this regard, the specific physical design standards to be applied to the project are proposed as follows:

● Physical Design Standard

- a. Zoning and building regulations
- b. Development guidelines and policies for architectural and landscaping designs
- c. Environmental guidelines
- d. Infrastructure standards.

FIG. 3-1-1 SITE LOCATION MAP



### 3.1.2 LAND USE PLAN

#### 1) BOUNDARY OF THE PROPOSED DEVELOPMENT AREA

● 25 km From the Sarasin Bridge

● 1,500 sq. km.

● Khok Kloi, Na Tuay and Thai Muang

The proposed resort development area is extended about 25 km north from Sarasin bridge in the south to the southern boundary of Hat Thai Muang National Park in the north and around 1 km from the shoreline up to the existing local road in the east.

The area is approximately 1,500 sq.km. and covers the western part of the three villages(Tambon), namely Khok Kloi in Ampho Takua Thung, Na Tuay and Thai Muang in Ampho Thai Muang. The proposed integrated international resort tourism development project is located in the northern part of the area in Ampho Thai Muang and the proposed public beach development project is located in the southern part of the area in Ampho Takua Thung.

#### 2) LAND USE PLANNING REQUIREMENT

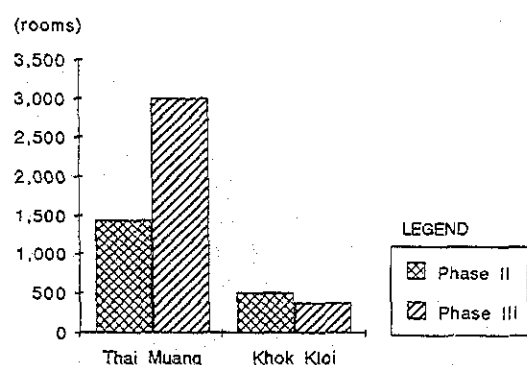
The land use plan is formulated on the basis of an analysis of the present conditions in the proposed development area including the following;

- The market framework for hotel accommodations and other tourist facilities
- Land use area requirement study
- Zoning and building regulations study
- Architecture, landscaping, environmental and infrastructure development guidelines
- Local community

##### a. The Market Framework for Hotel Accommodations

- The Table 3-1-1 shows the projected hotel rooms requirement for the south-west coast of Phang Nga and distribution of those hotel rooms between the Thai Muang and Khok Kloi beaches, and the Table 3-1-2 shows the number of assumed visitors in the resort area on an average and a peak day.

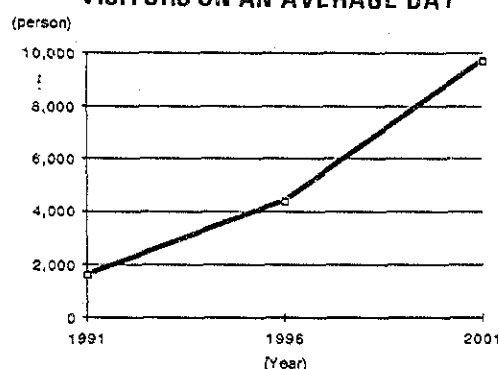
**HOTEL ROOMS DISTRIBUTION**



**TABLE 3-1-1 HOTEL ROOMS DISTRIBUTION**

	Unit: Room								
	Phase II (1991-1996)			Phase III (1996-2001)			Total (1991-2001)		
	High	Low	Total	High	Low	Total	High	Low	Total
Thai Muang	1,460	0	1,460	3,008	0	3,008	4,468	0	4,468
Khok Kloi	0	506	506	347	47	394	347	553	900
<b>Total</b>	<b>1,460</b>	<b>506</b>	<b>1,966</b>	<b>3,355</b>	<b>47</b>	<b>3,402</b>	<b>4,815</b>	<b>553</b>	<b>5,368</b>

**VISITORS ON AN AVERAGE DAY**



**TABLE 3-1-2 NUMBER OF ASSUMED VISITORS IN THAI MUANG/KHOK KLOI ON AN AVERAGE/PEAK DAY**

	Unit: Person							
	1991		1996		2001		2006	
	Av.	Pk.	Av.	Pk.	Av.	Pk.	Av.	Pk.
Guests (High)	0	0	1,577	2,628	5,200	8,667	5,200	8,667
Guests (Low)	0	0	546	911	597	995	597	995
Tourist Visitors	116	193	586	1,324	1,055	1,759	1,055	1,759
Local Visitors	69	174	77	195	83	212	89	226
Neighbouring Visitors	1,428	2,346	1,599	2,627	2,817	2,982	3,015	3,117
<b>Total Visitors</b>	<b>1,613</b>	<b>2,713</b>	<b>4,365</b>	<b>7,685</b>	<b>9,752</b>	<b>14,615</b>	<b>9,956</b>	<b>14,764</b>

Note : Av. - Average Day  
Pk. - Peak Day

##### b. Land Use Area Requirement Study

The Table 3-1-3 shows the summary conclusion of the land use area requirement study;

**TABLE 3-1-3 LAND USE AREA REQUIREMENT**

THAI MUANG (AVERAGE DAY)					KHOK KLOI (AVERAGE DAY)				
	1991	1996	2001	2006		1991	1996	2001	2006
	sq.m.	sq.m.	sq.m.	sq.m.		sq.m.	sq.m.	sq.m.	sq.m.
ACCOMMODATION	0	365,000	1,117,000	1,117,000	ACCOMMODATION	0	126,500	225,000	225,000
COMMERCIAL	810	7,096	18,575	18,525	COMMERCIAL	1,669	3,142	4,715	4,854
BEACH	1,065	48,229	138,516	135,766	BEACH	922	922	18,978	19,053
RECREATION	977	24,047	66,155	65,893	RECREATION	1,120	11,893	17,757	18,130
PUBLIC/ADMINISTRATION	159	1,804	4,382	4,369	PUBLIC/ADMINISTRATION	355	852	1,244	1,274
PUBLIC PARKING	1,717	6,697	18,783	18,792	PUBLIC PARKING	1,644	2,719	3,619	3,753
<b>TOTAL</b>	<b>4,728</b>	<b>452,673</b>	<b>1,381,411</b>	<b>1,380,348</b>	<b>TOTAL</b>	<b>5,709</b>	<b>148,029</b>	<b>271,314</b>	<b>272,064</b>

THAI MUANG (PEAK DAY)					KHOK KLOI (PEAK DAY)				
	1991	1996	2001	2006		1991	1996	2001	2006
	sq.m.	sq.m.	sq.m.	sq.m.		sq.m.	sq.m.	sq.m.	sq.m.
ACCOMMODATION	0	365,000	1,117,000	1,117,000	ACCOMMODATION	0	126,500	225,000	225,000
COMMERCIAL	2,170	13,718	31,954	32,002	COMMERCIAL	6,070	9,020	11,851	12,361
BEACH	2,628	48,838	134,100	134,222	BEACH	3,197	13,169	20,768	21,025
RECREATION	2,101	39,869	107,267	107,377	RECREATION	3,765	15,603	24,920	25,229
PUBLIC/ADMINISTRATION	422	2,974	7,494	7,524	PUBLIC/ADMINISTRATION	1,224	2,141	2,841	2,944
PUBLIC PARKING	3,865	18,524	32,524	32,719	PUBLIC PARKING	5,586	7,917	9,488	10,559
<b>TOTAL</b>	<b>11,184</b>	<b>489,920</b>	<b>1,430,388</b>	<b>1,430,930</b>	<b>TOTAL</b>	<b>19,762</b>	<b>174,551</b>	<b>294,866</b>	<b>297,119</b>

c. Zoning and Building Regulations

The following specific zoning and building regulations are proposed for application to this area in addition to introducing the present zoning regulations to the in Phuket Coastal Zone,.

- Accommodation Zone:
- Tourist Service Zone:
- Public Building zone:
- Building free Zone:
- Camping Ground Zone:
- Tourism Development Control Zone:
- Tourism Forest Zone:
- Tourist Excursion Zone:
- Tourist Stop-over Zone:
- Marine Zone:

FIG. 3-1-2 ZONING SYSTEM TO ADOPT IN THE PROPOSED DEVELOPMENT AREA

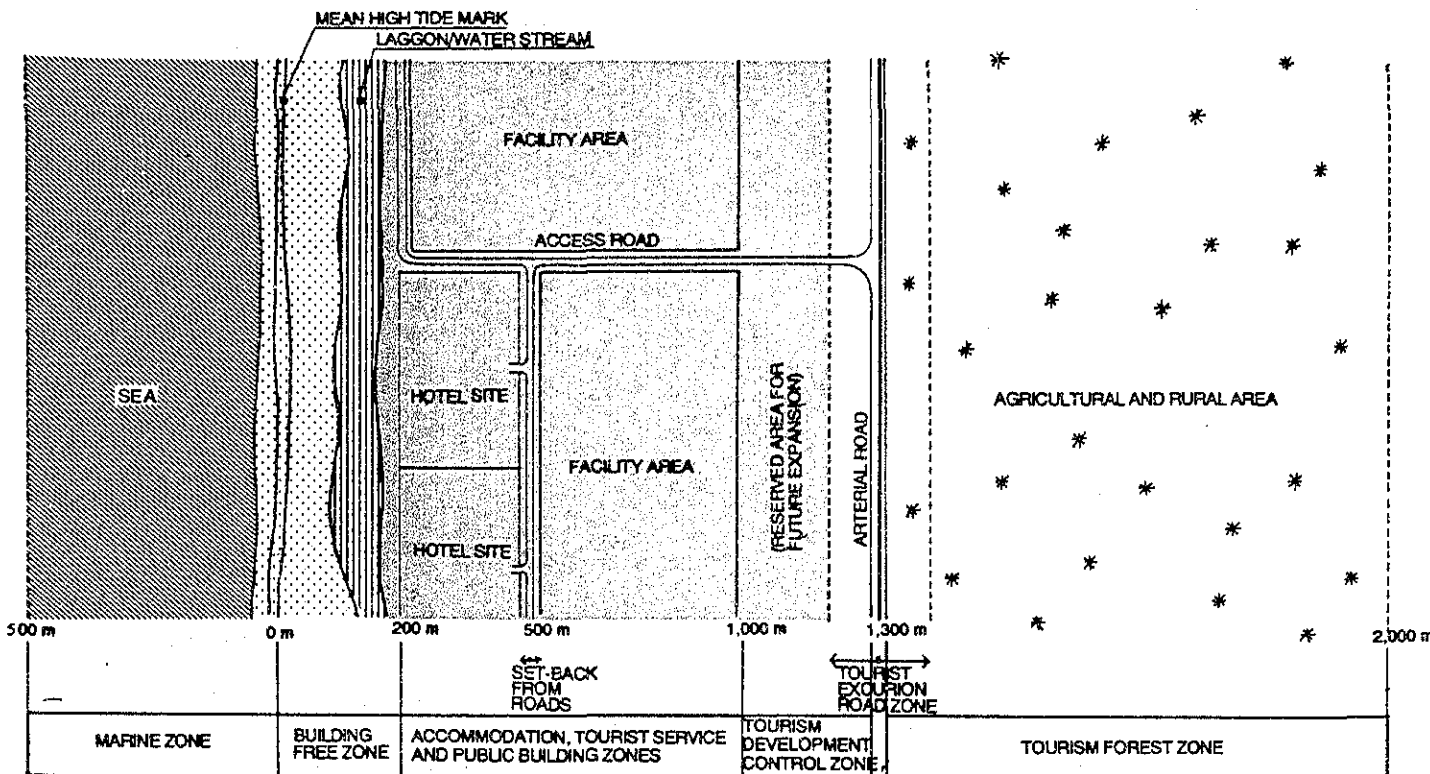


TABLE 3-1-4 BRIEF DESCRIPTION OF ZONING AND BUILDING REGULATIONS

Zone	Permitted use	Limit of Zone	Major building regulations
Accommodation	hotels, bungalow and related facilities	200m-1,000m from the shore line	<ul style="list-style-type: none"> <li>• Building density less than 40 rooms/ha</li> <li>• 25% of floor area ratio</li> <li>• Height control less than 4 stores or 15 meters</li> </ul>
Tourist services	Commercial and other related private facilities	Designated in the proposed land use plan	<ul style="list-style-type: none"> <li>• Floor area ratio 25%</li> <li>• Height control less than 2 stories or 15 meters</li> </ul>
Public Building	Administration and other related public facilities	Designated in the proposed land use plan	<ul style="list-style-type: none"> <li>• 25% of floor area ratio</li> <li>• Height control less than 4 stories or 15 meter</li> </ul>
Building Free	Beach parasols, shelters and temporary uses structures	0m -200m from the shore-line	
Camping Ground	Campsites and other related facilities	As designated in the proposed land use plan	
Tourism Development Control Zone	Residence, agriculture and forest	1,000m-1,300m as described in the land use plan	<ul style="list-style-type: none"> <li>• 50% of floor area ratio</li> <li>• Height control less than 2 stories or 15 meters</li> </ul>
Tourism Forest	Residence agricultural forest and minor recreation facilities	As described in land use plan	
Tourist Excursion Roan		100m of the center line of the arterial road	<ul style="list-style-type: none"> <li>• 5% of floor area ratio</li> <li>• Height control less than 2 stories or 15 meters</li> </ul>
Tourist Stopover		Appropriate location	<ul style="list-style-type: none"> <li>• 50% of floor area ratio</li> <li>• Height control less than 2 stories or 15 meters</li> </ul>
Marine Zone	Public pier, beach recreational activities	500m seaward from the shore line (mean high tide mark)	

d. Development Guidelines for Architecture, Landscaping, Environment and Infrastructure  
 These guidelines can be proposed as a general solutions to apply in the resort development in Phuket Cluster. (See Appendices)

### 3) PROPOSED LAND USE PLAN

#### a Khok Kloi Public Beach Development Area

The area is divided in to 4 sub-blocks centering around (1) public park, transportation center and multi-purpose ground and provides 2 sub-blocks for hotel accommodations arterial and 1 for a recreational area.

#### b. Thai Muang Integrated Tourism Development Area

The area is divided into 5 blocks with the tourist amenity core in the central block and provides 4 blocks having different character resort complexes to the both side of the area as shown in the Fig. 3-1-4;

The areas of land is shown in the Table 3-1-4.

### 4) DEVELOPMENT PRIORITY

After the provision of the infrastructure especially regional roads and water supply project, the development of the blocks is scheduled as follows;

#### a. Phase-II Development blocks

The following blocks will be firstly developed in this phase.

- Block-N2: Hotel Accommodations with Golf Course and Water Recreation Park
- Block-N1: Hotel Accommodations with Convention Park
- Block-OO: Thai Muang Tourist Amenity Core
- Block-XY: Khok Kloi Public Beach

#### b. Phase-III Development blocks

In the above blocks, the following blocks will be developed.

- Block S1: Hotel Accommodation with Indoor/Outdoor Sports Complex.
- Block S2: Hotel Accommodations with Championship Golf Course.

#### c. Development beyond Phase III

As increasing the tourist demands for hotel accommodations and other tourist facilities, the designated development control areas can be used for three requirement. The arch-type hotel in this phase will be assumed to be a high-rized building to get a panoramic view to the sea from the hotel. The future building skyline of the resort area will be U-shape as show in the sketch-Conceptual(see concept scheme of Thai Muang International Resort Complex) At the same time a variety of tourist facilities will be developed to meet the future tourist's demand.

TABLE 3-1-5 SUMMARY OF LAND USE TABLE THAI MUANG RESORT

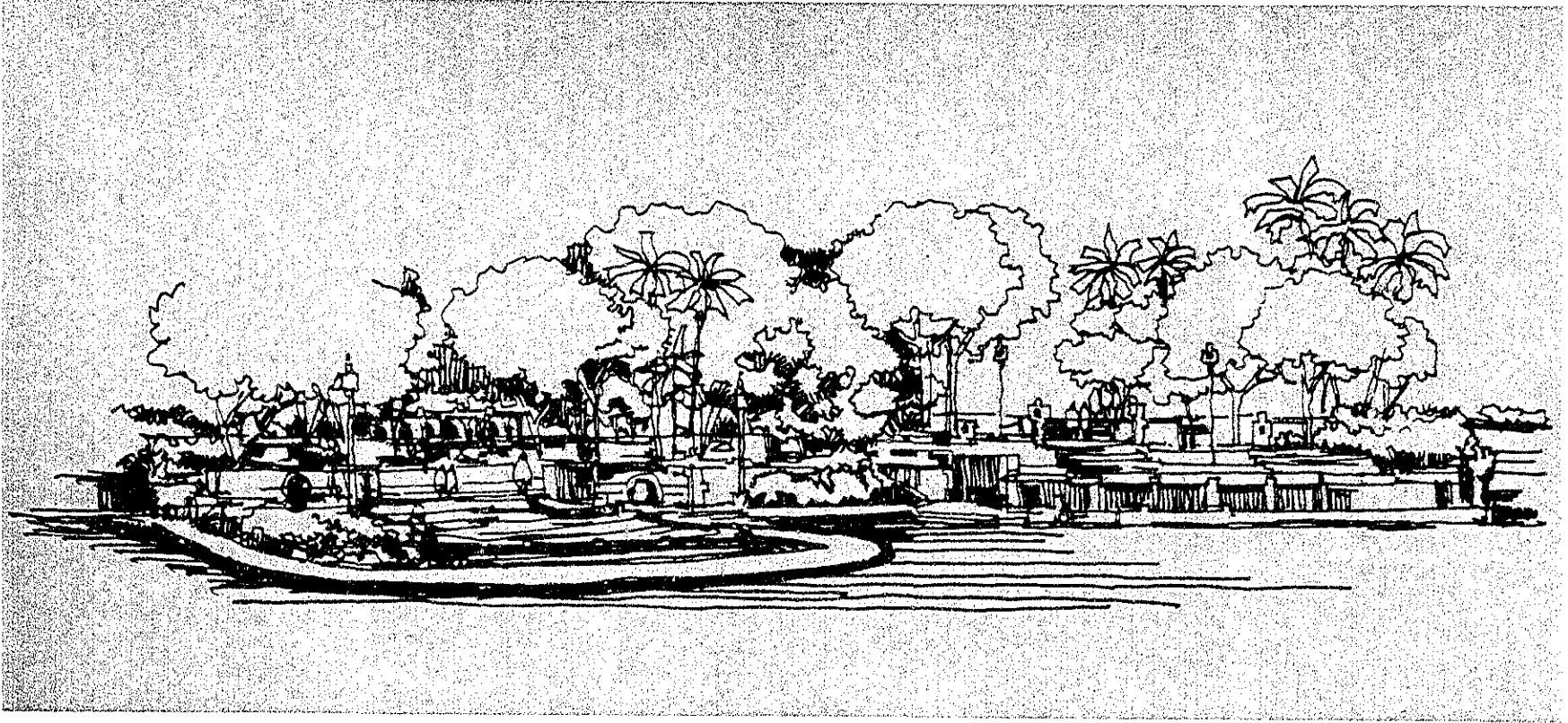
BLOCK	N2	N1	OO	S1	S2	TOTAL
ACCOMMODATION	25.60	50.10	0.00	53.70	49.40	178.80
FACILITIES AREA	88.64	14.23	7.28	7.10	141.60	258.85
OPENSACES(LAND)	0.00	50.49	1.23	12.33	10.06	74.11
OPENSACES(WATER)	0.00	31.60	4.80	14.40	35.60	86.40
BEACHES	13.05	21.85	4.45	18.45	37.10	94.90
ROADS	5.75	12.53	3.24	6.02	6.24	33.78
RESERVED AREA	18.96	60.20	6.00	0.00	0.00	85.16
						0.00
<b>TOTAL AREA</b>	<b>152.00</b>	<b>241.00</b>	<b>27.00</b>	<b>112.00</b>	<b>280.00</b>	<b>812.00</b>

TABLE 3-1-6 LAND USE AREA LIST OF THAI MUANG RESORT DEVELOPMENT AREA

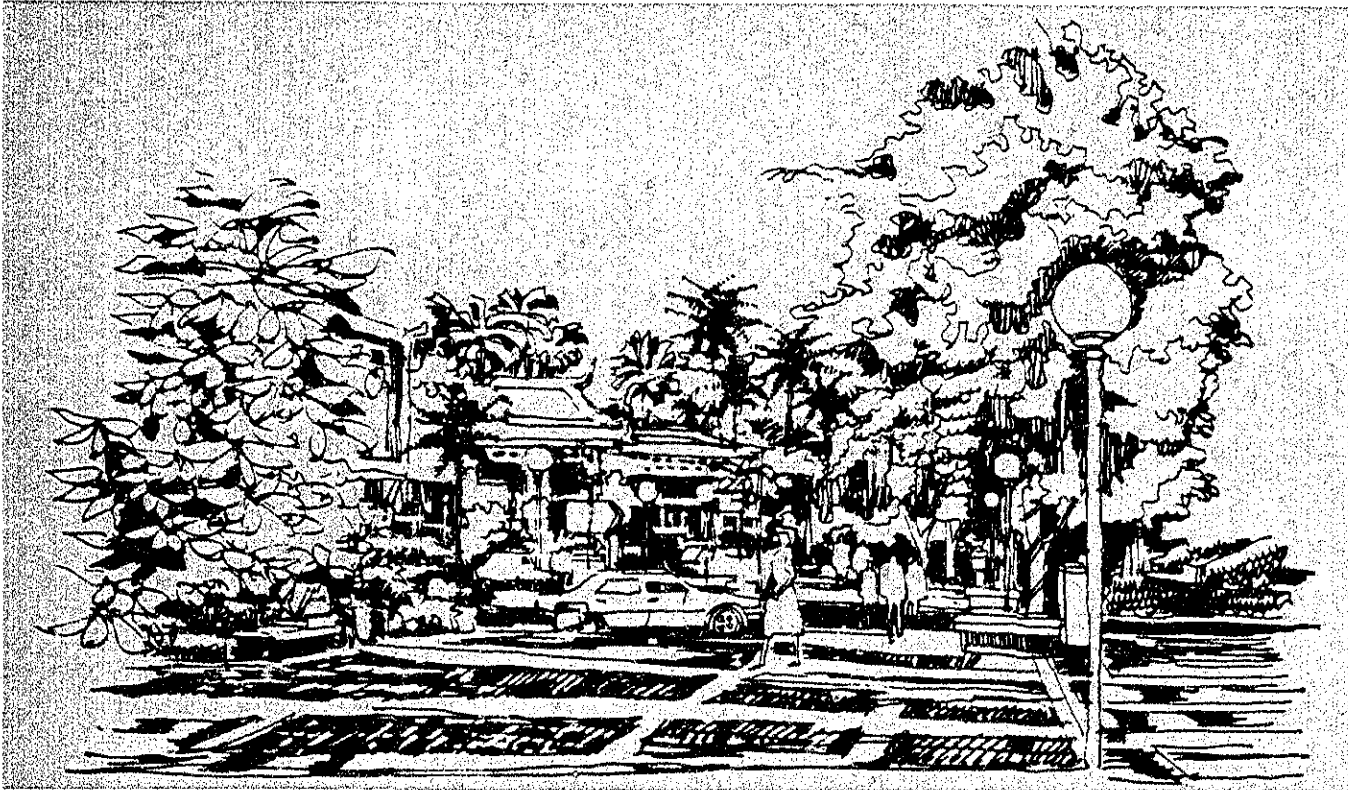
BLOCK	N2	(ha)	N1	(ha)	OO	(ha)	S1	(ha)	S2	(ha)	TOTAL(ha)
ACCOMMODATION	25.60		50.10		0.00		53.70		49.40		178.80
(PHASE-II)	25.60		19.88		0.00		0.00		0.00		0.00
(PHASE-III)	0.00		30.22		0.00		53.70		49.40		178.80
1. HOTEL SITES	LOT-1**	4.80	LOT-2****	50.10	0.00		34.30		19.80		109.90
		4.80	LOT-3****	6.81			7.70		9.80		
			LOT-4****	7.62			LOT-10****	7.50	LOT-14****	10.00	
			LOT-5****	6.67			LOT-11****	9.80			
			LOT-6****	9.12			LOT-12****	8.50			
			LOT-7****	5.69							
			LOT-8****	7.18							
			LOT-8****	7.01							
2. VILLA SITES	VILLA-1**	20.80					VILLA-2	19.40	VILLA-3	29.60	69.80
FACILITIES AREA	88.64		14.23		7.28		7.10		141.60		258.85
(PHASE-II)	88.64		14.23		6.94		0.00		0.00		109.81
(PHASE-III)	0.00		0.00		0.34		7.10		141.60		149.04
SITE NUMBER	311**	67.20	311**	4.25	311**	1.61	311****	5.40	311****	140.00	
	312**	19.20	312**	2.98	312****	0.34	312****	1.70	312****	1.60	
	313**	1.60	313**	2.00	313****	2.52					
	314**	0.64	314**	5.00	314****	1.42					
					315****	-0.24					
					316****	1.15					
OPENSACES	0.00		82.09		6.03		26.73		45.66		160.51
1. LAND	0.00		50.49		1.23		12.33		10.06		74.11
2. WATER	0.00		31.60		4.80		14.40		35.60		86.40
(PHASE-III)	0.00		46.30		6.03		26.73		55.66		134.72
1. LAND	0.00		36.66		1.23		12.33		15.06		65.48
2. WATER	0.00		9.44		4.80		14.40		40.60		69.24
(PHASE-II)	0.00		35.79		0.00		0.00		0.00		0.00
1. LAND	0.00		13.93		0.00		0.00		0.00		0.00
2. WATER	0.00		22.18		0.00		0.00		0.00		0.00
BEACHES	13.05		21.85		4.45		18.45		37.10		94.90
(PHASE-II)	13.05		8.30		2.45		0.00		0.00		23.80
(PHASE-III)	0.00		13.55		2.00		18.45		37.10		71.10
ROADS	5.75		12.53		3.24		6.02		6.24		33.78
(PHASE-II)	5.75		3.07		2.04		0.00		0.00		10.86
(PHASE-III)	0.00		9.46		1.20		6.02		6.24		22.92
RESERVED AREA	18.96		60.20		6.00		0.00		0.00		85.16
<b>TOTAL AREA</b>	<b>152.00</b>		<b>241.00</b>		<b>27.00</b>		<b>112.00</b>		<b>280.00</b>		<b>812.00</b>



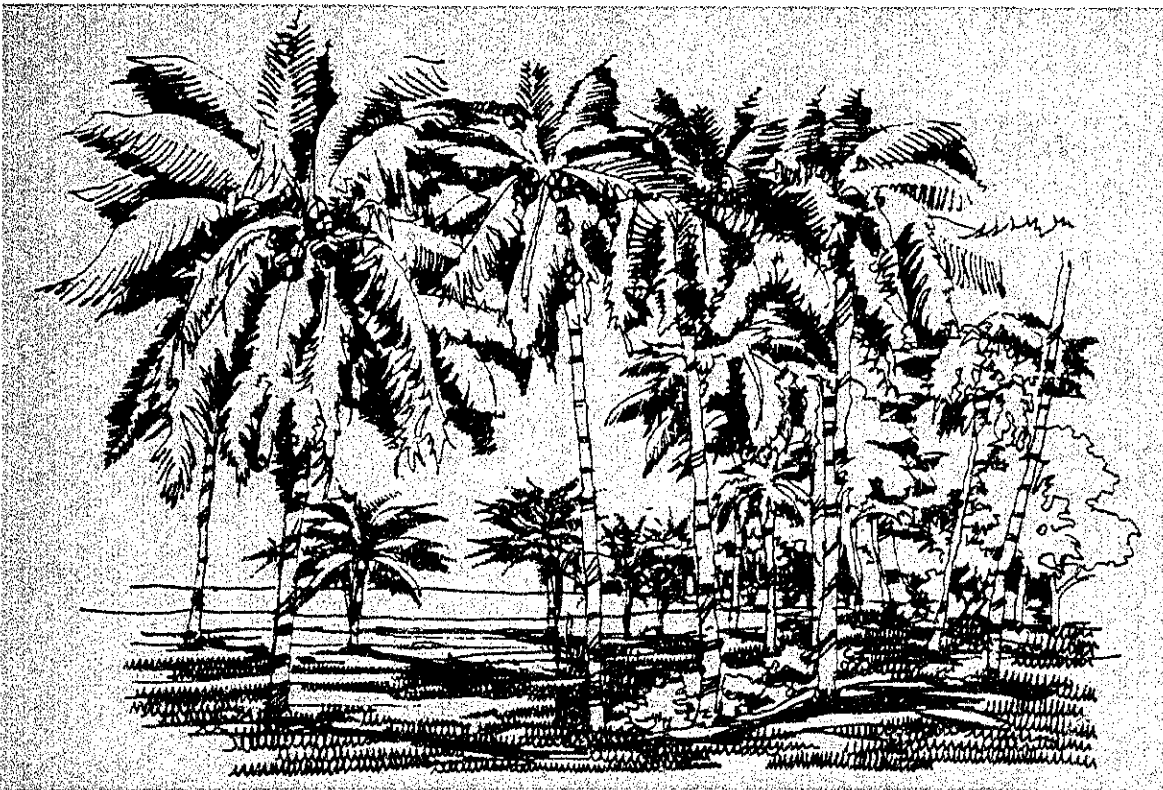
Solid-type water front landscaping creates more dynamic resort environment.



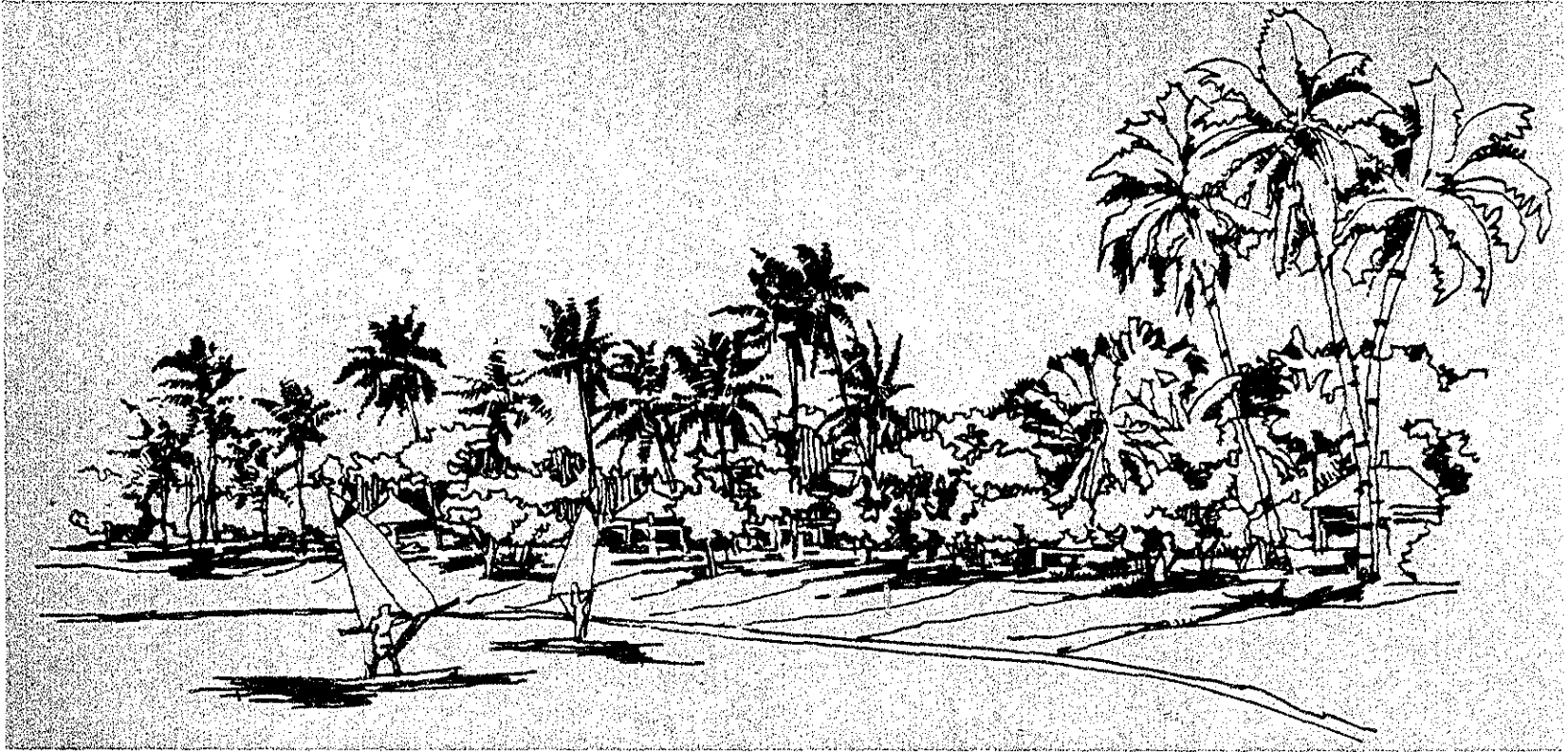
Landscaping of amenity core and atmosphere of plaza.



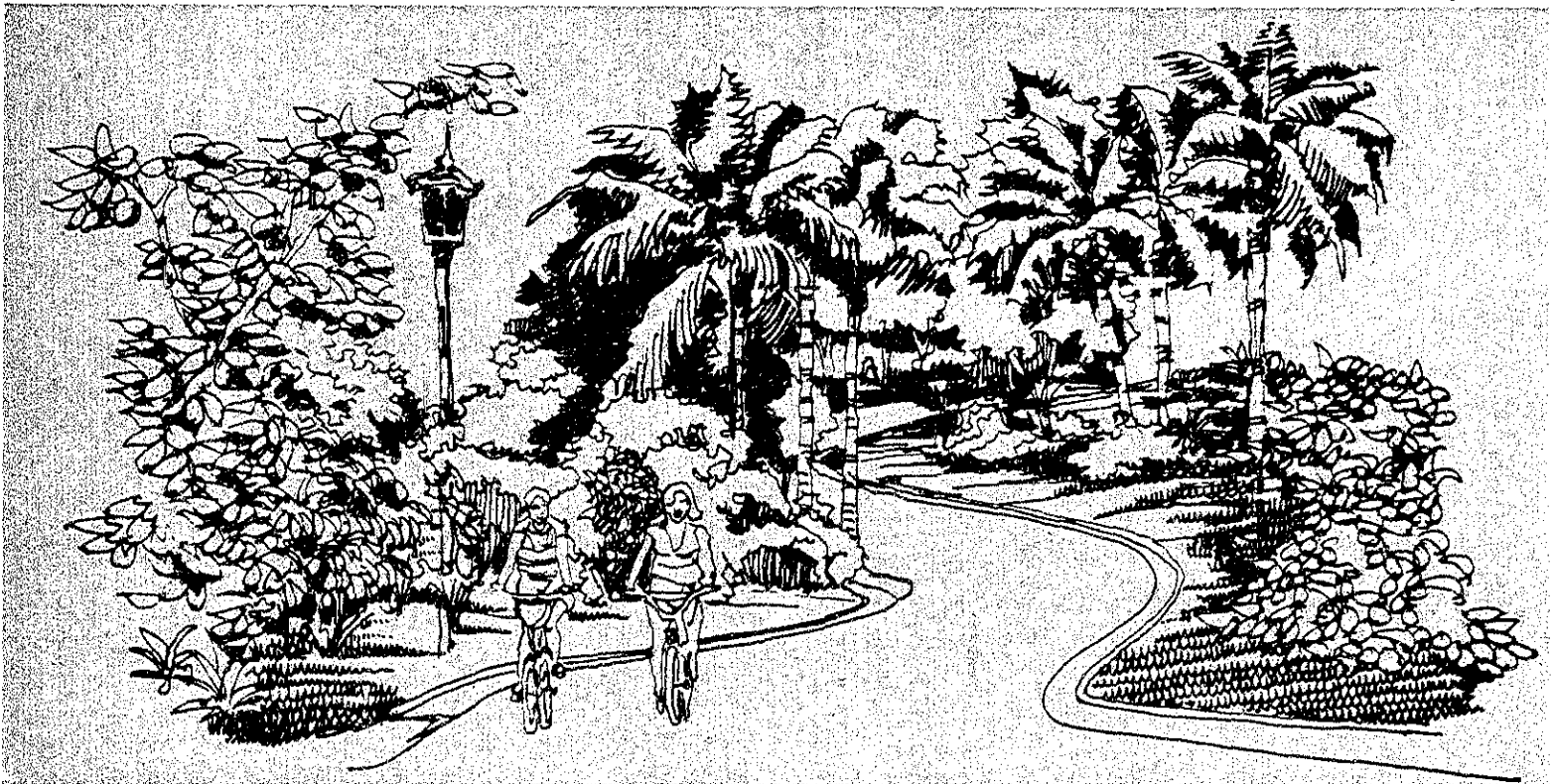
Supplemental planting to enhance beach environment.



Environmental continuity with harmonized resort facilities along the beach area.



Pedestrian-bikeway within tropical fragrances.



Gateway road side landscaping with Pedestrian side walk.

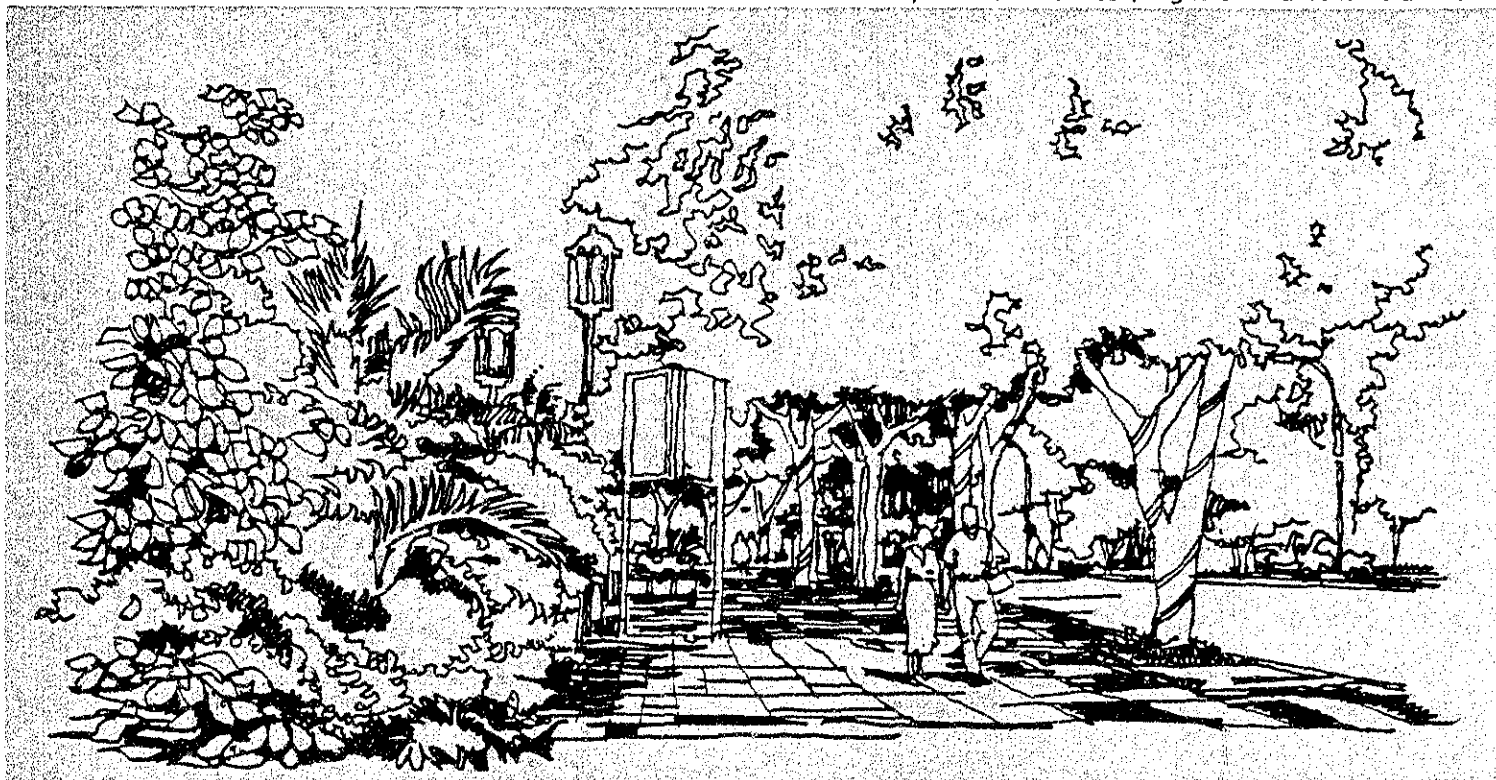
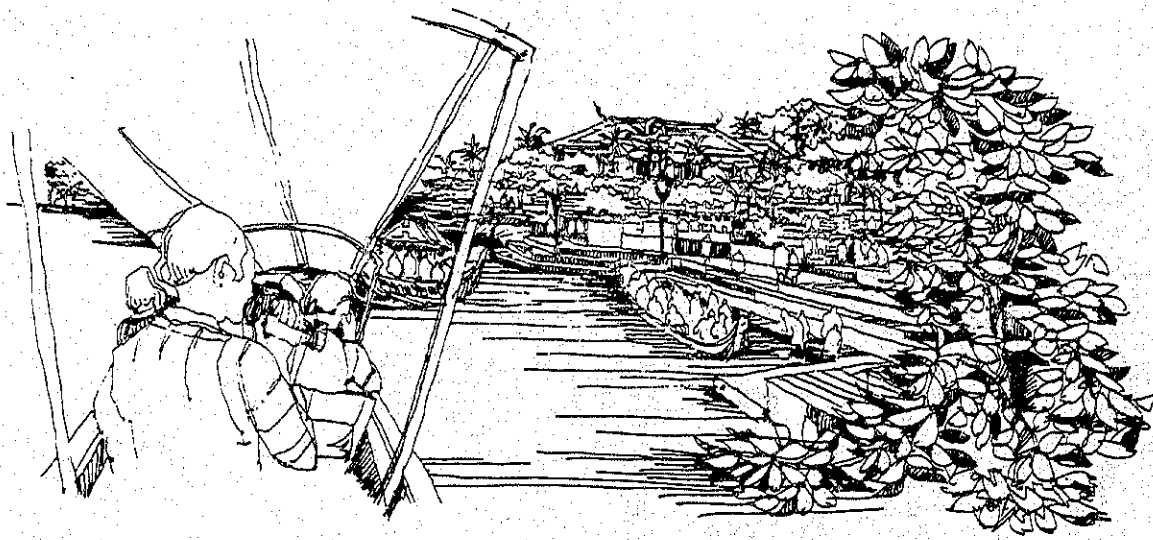


FIG. 3-1-3 IMAGE SECTION OF THAI MUANG INTER



# Thai Muang International Resort Complex

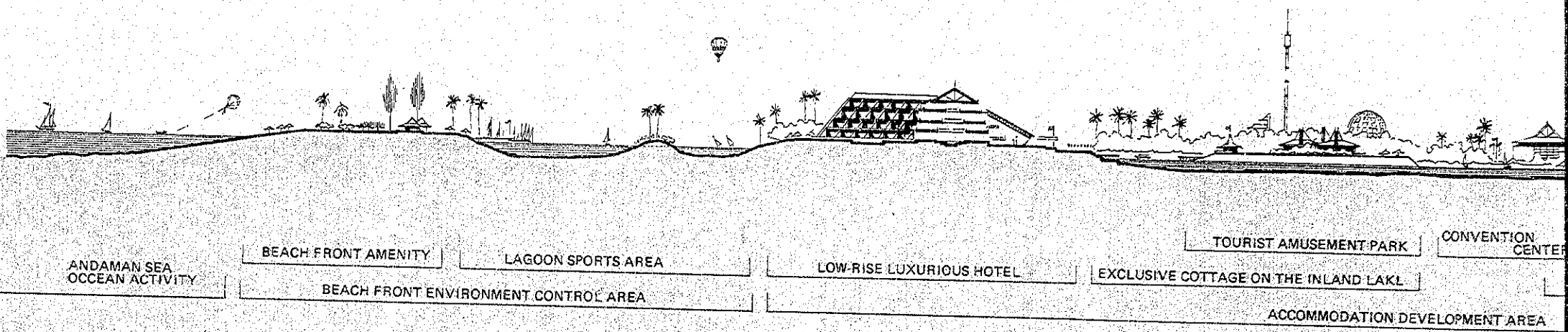
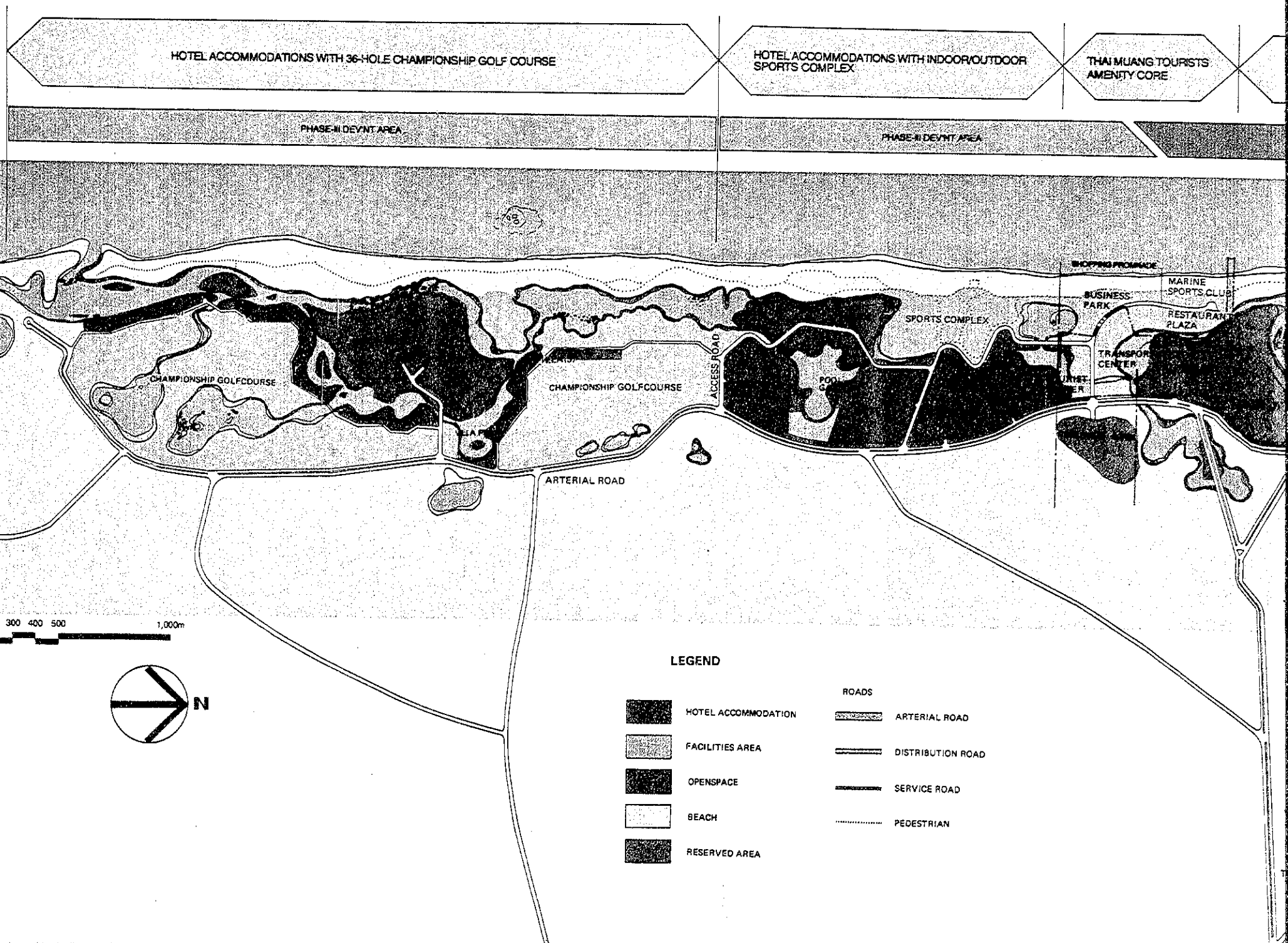
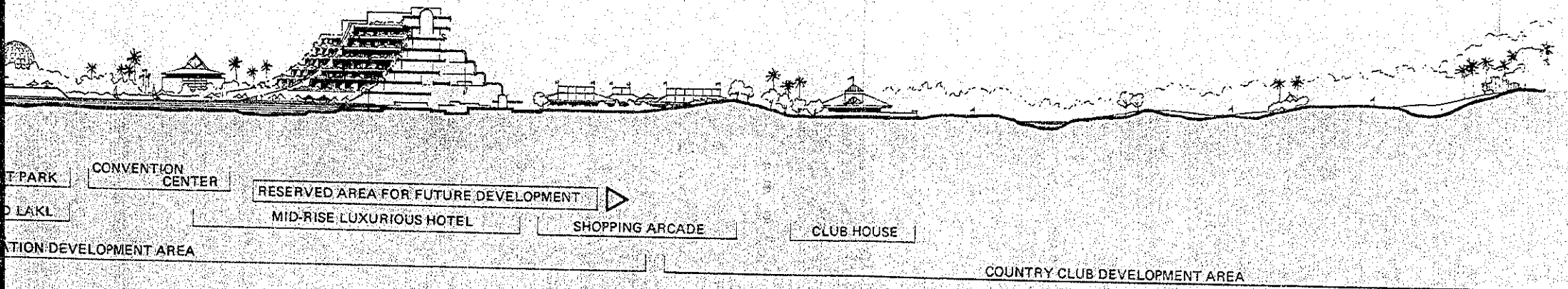
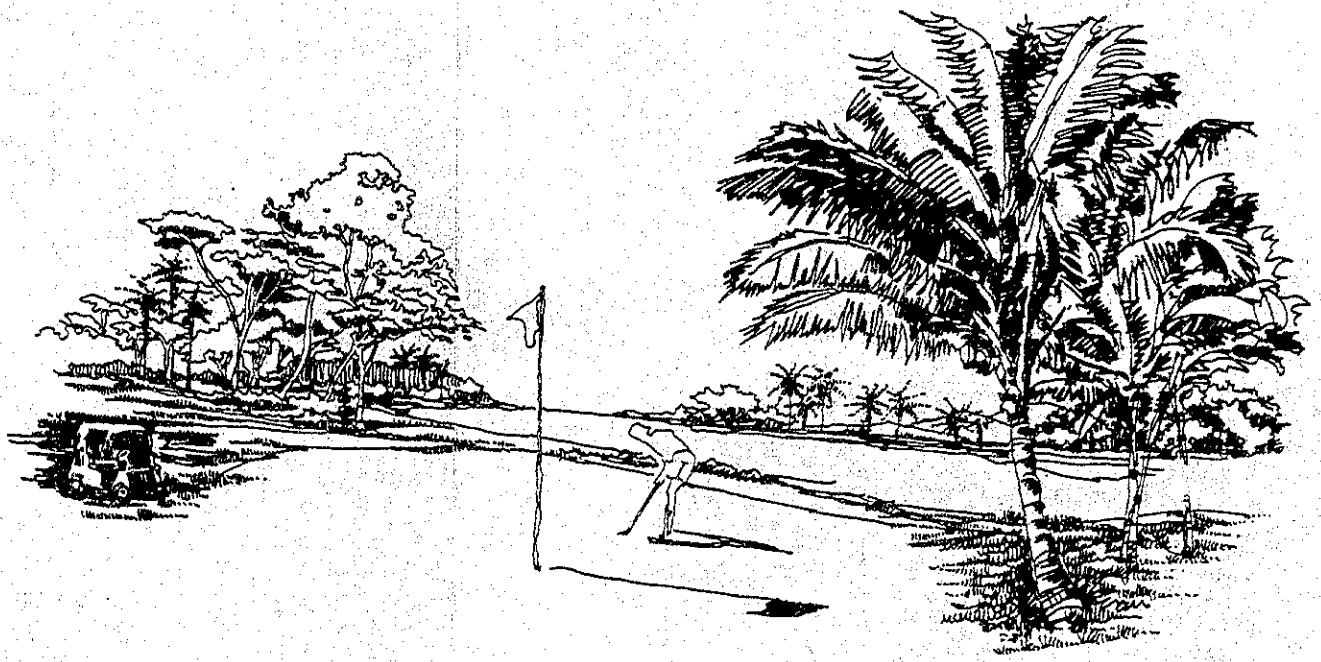


FIG. 3-1-4 LAND USE PLAN



# Thai Muang International Resort Complex



## 3-1-4 LAND USE PLAN

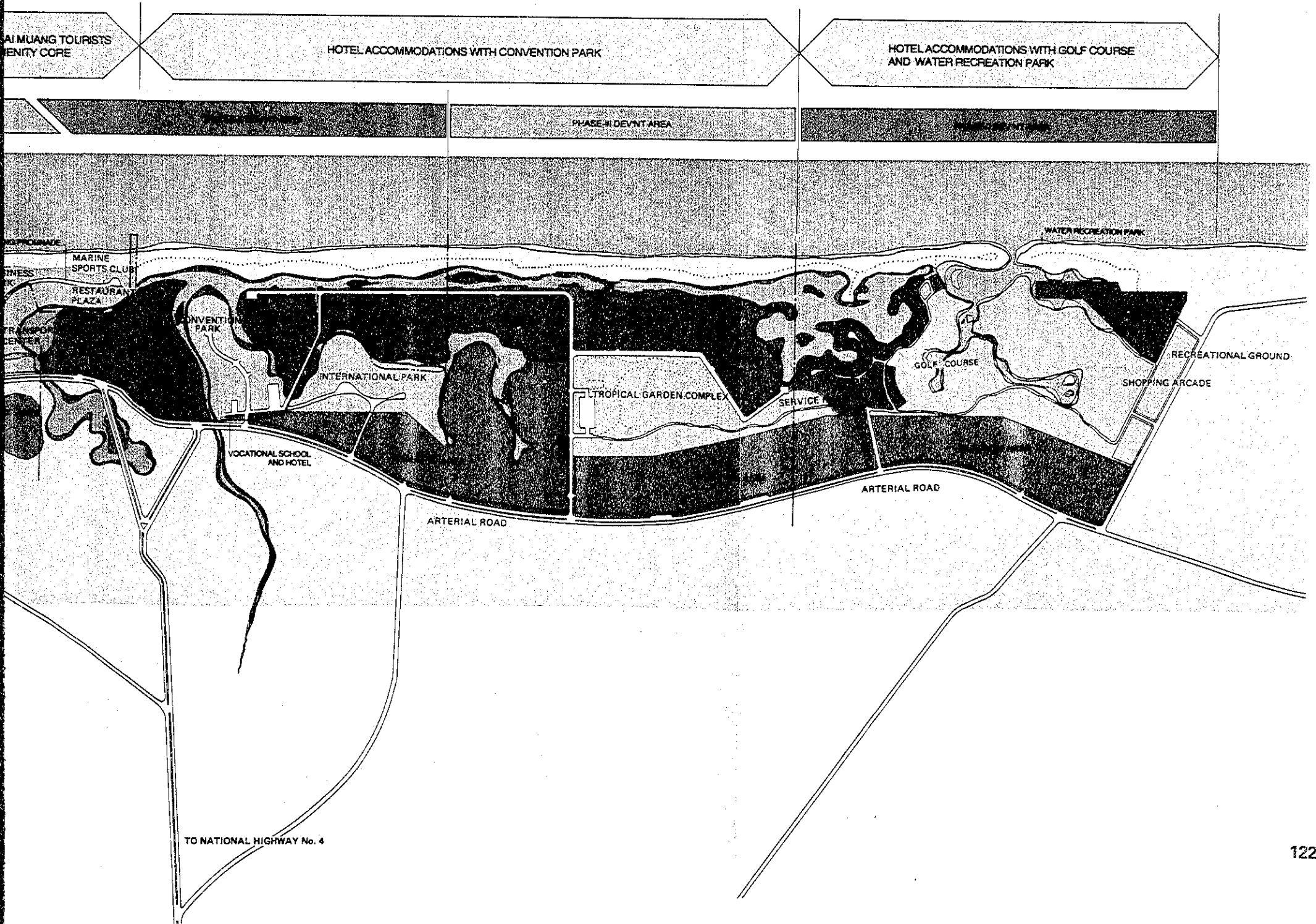


FIG. 3-1-5 WATER SUPPLY SYSTEM DEVELOPMENT PLAN

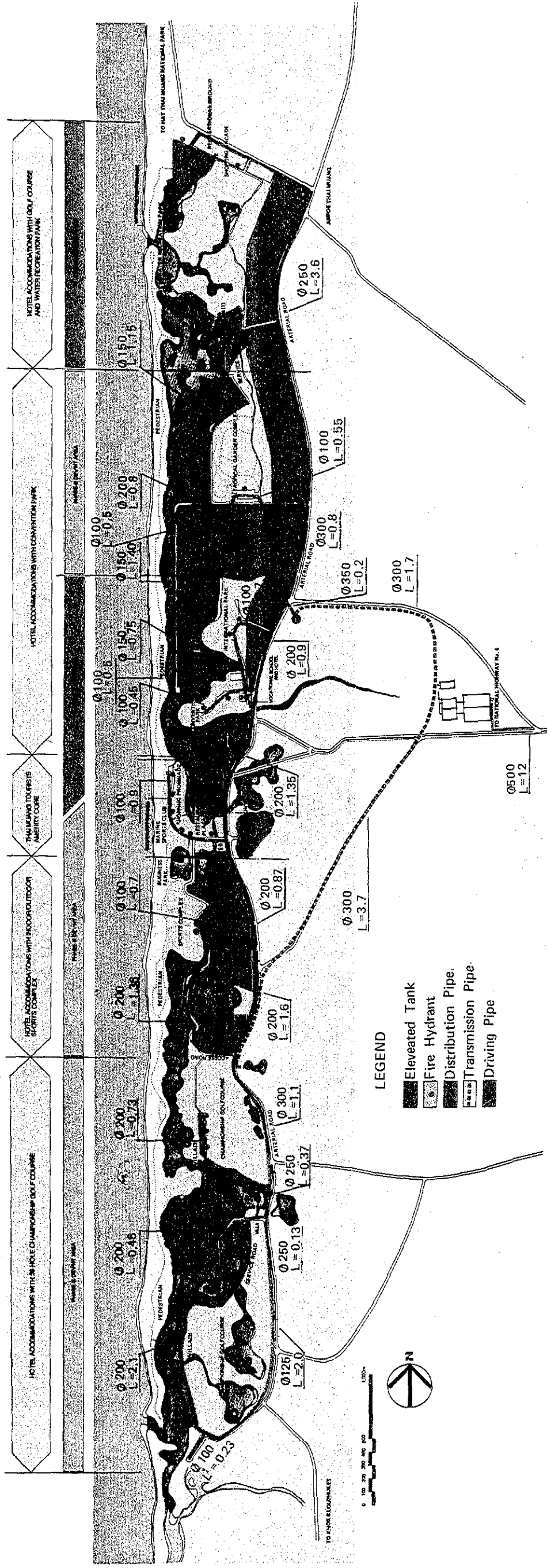


FIG. 3-1-6 SEWAGE TREATMENT SYSTEM DEVELOPMENT PLAN

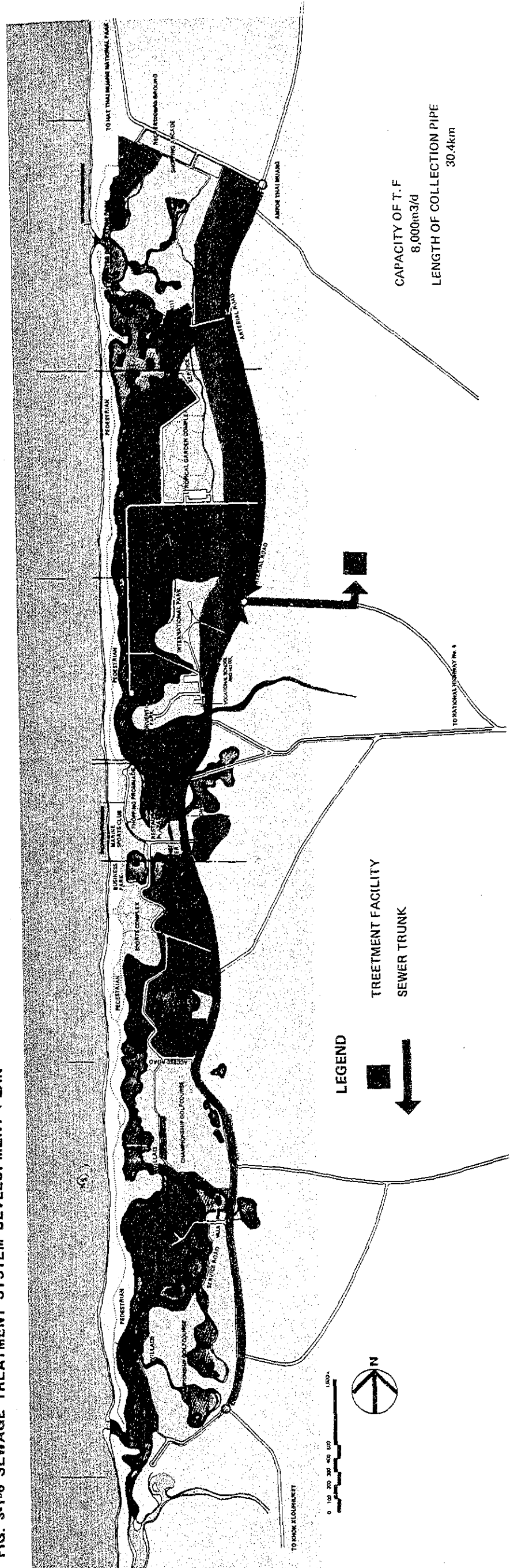


FIG. 3-1-7 ELECTRIC DISTRIBUTION FOR THAI MUANG RESORT

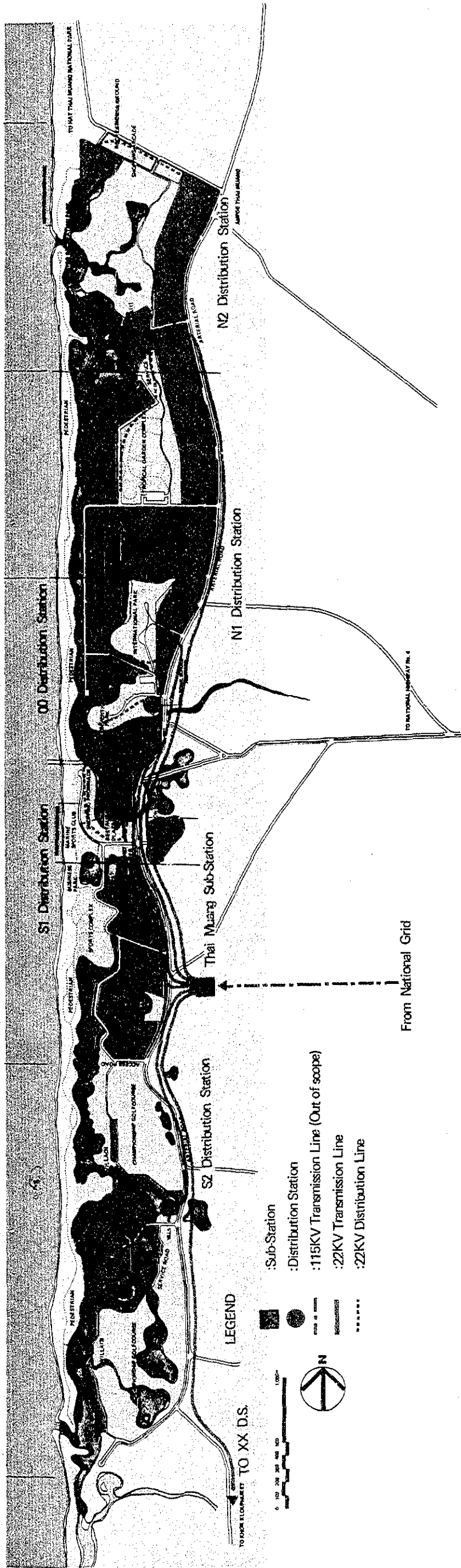


FIG. 3-1-8 ELECTRIC DISTRIBUTION, KHOK KLO/THAI MUANG

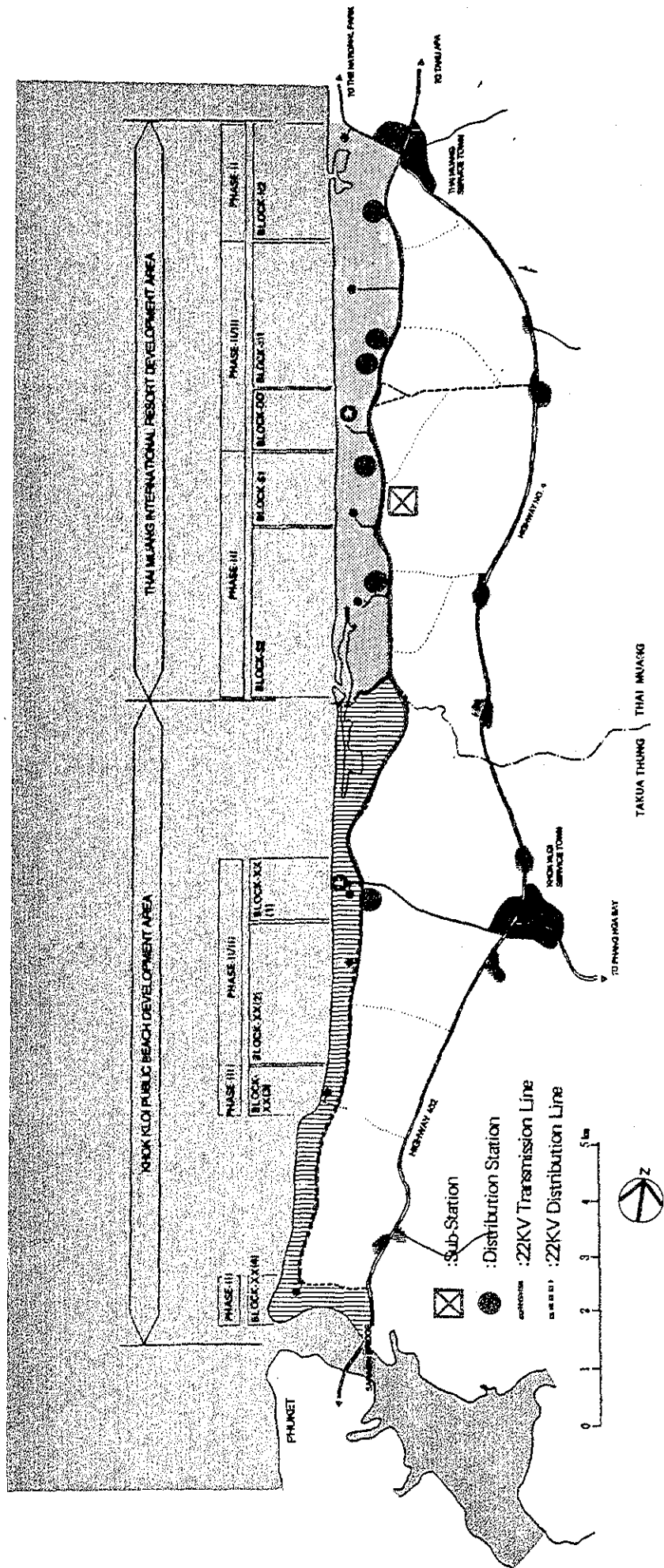


FIG. 3-1-9 DEVELOPMENT PHASING

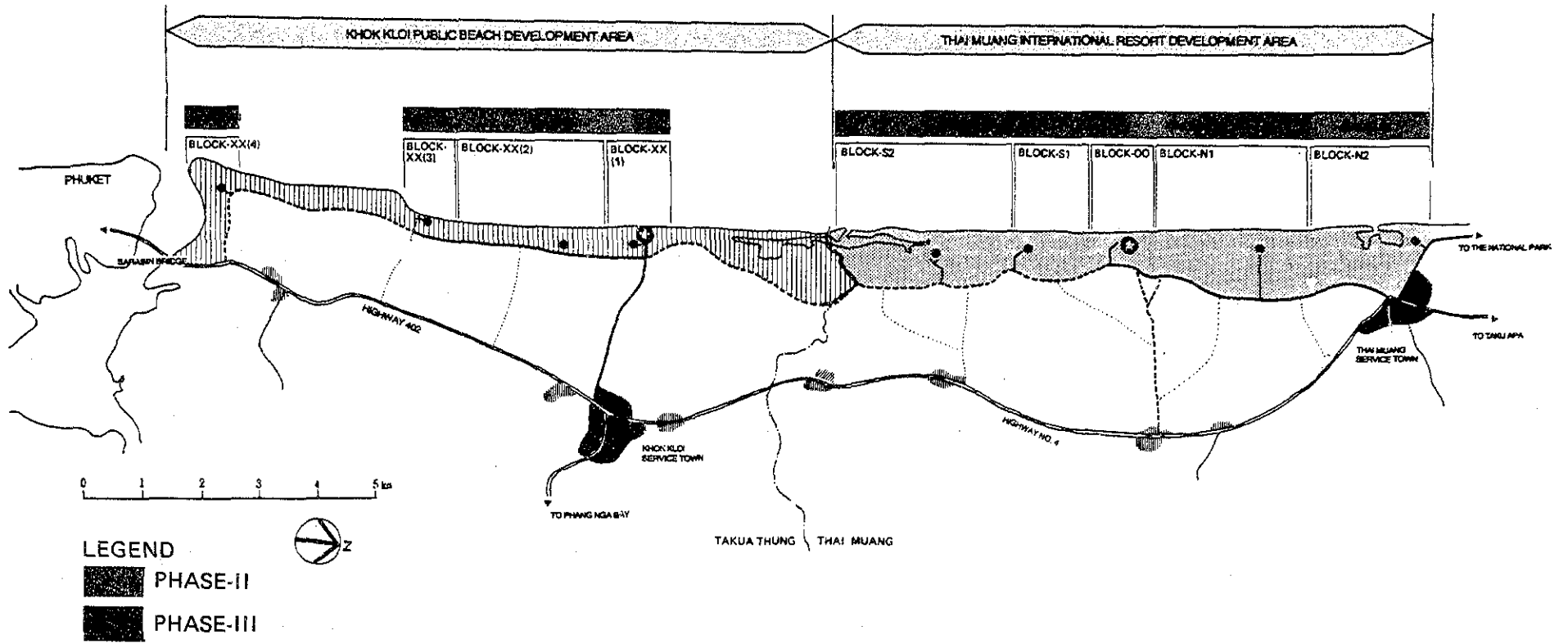


FIG. 3-1-10 PHASE II AREA IN THE THAI MUANG RESORT

