2.4 Oceanography

2.4.1 General

The following oceanographical surveys were carried out in the area between the estuary and Tanjung Manis.

- tidal level observation
- tidal current observation
- wave observation

The locations of each survey are shown in **Figure-2.4.1.1**, and schedule of the surveys is shown in **Figure-2.4.1.2.**

All survey instruments were supplied by Jurukur Perintis, K.L., Malaysia, a local contractor.

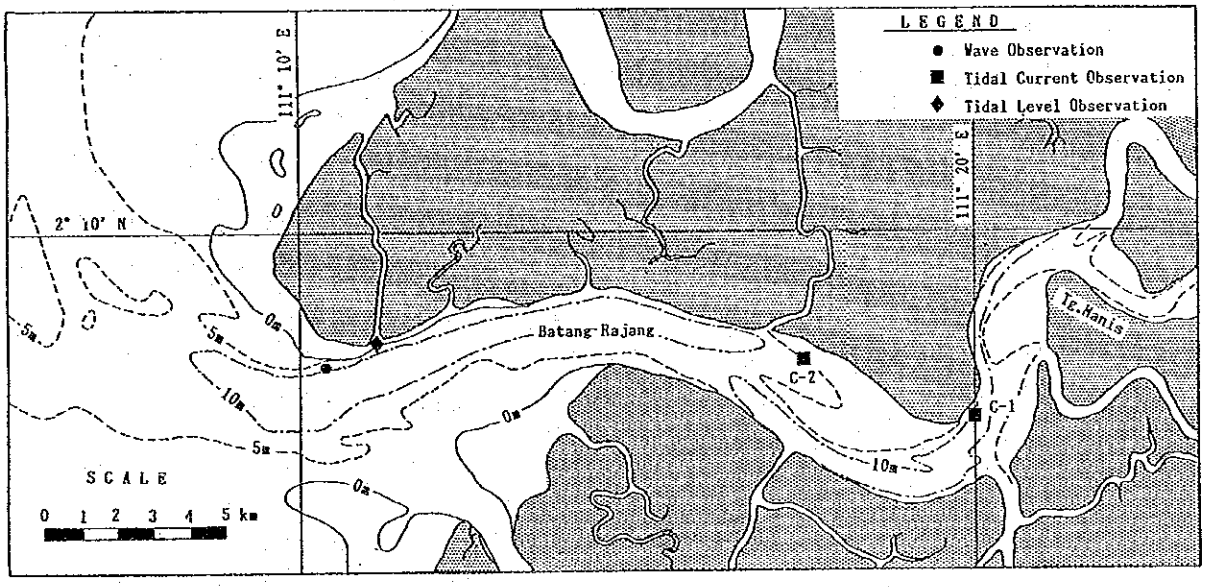


Figure-2.4.1.1 Location of Oceanographical Survey

[Note] Water depth: C-1 -10m below C.D.
C-2 -5m below C.D.

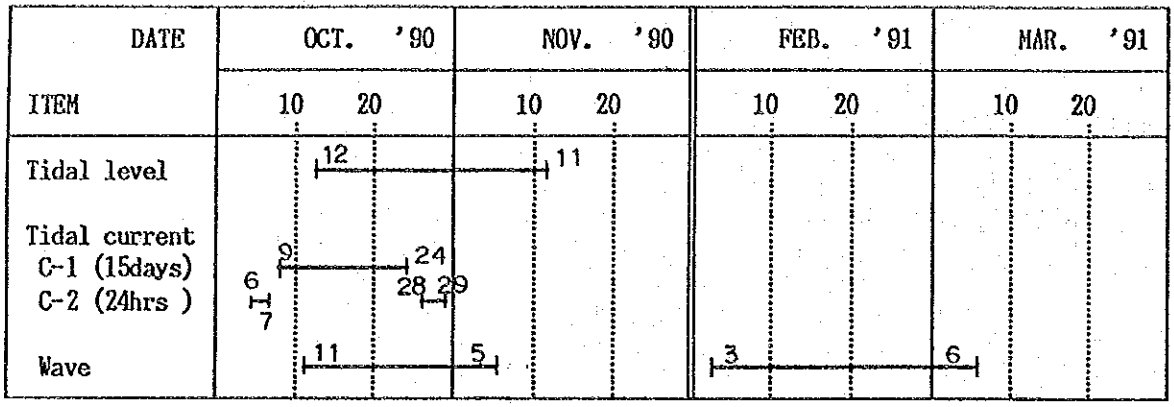


Figure-2.4.2.1 Oceanographical Survey Schedule

2.4.2 Tidal Level

A set of tidal gauge had been installed at Kuala Rajang (Tg. Jerijeh) to obtain tidal characteristics and tidal levels for 30 days from the middle of October, 1990.

The maximum and minimum tidal level observed during the period were :

Max. tidal level : 2.34m above L & S Precise Levelling Datum (4/11/90)
Min. tidal level : 2.62m below L & S Precise Levelling Datum (3/11/90)

Tidal harmonic analysis is made based on the results of the said survey with the factors shown in **Table-2.4.2.1.** The results of the analysis are shown in **Table-2.4.2.2.**

Table-2.4.2.2 Tidal Level at Tanjung Jerijeh

Description \ Datum Level	L&S Precise Levelling Datum	Assume C.D. LAT = 0.00
Highest Astronomical Tide (HAT)	+ 2.50 metres	+ 5.30 metres
Mean Higher High Water (MHHW)	+ 1.63 metres	+ 4.43 metres
Mean Lower High Water (MLHW)	+ 1.20 metres	+ 4.00 metres
Mean Sea Level (MSL)	- 0.076 metres	+ 2.742 metres
Mean Higher Low Water (MHLW)	- 1.07 metres	+ 1.73 metres
Mean Lower Low Water (MLLW)	- 1.92 metres	+ 0.88 metres
Lowest Astronomical Tide (LAT)	- 2.80 metres	± 0.00 metres

Table-2.4.2.1 Result of Tidal Harmonic Analysis

Station ; Tanjung Jerijeh (Lat. 02°08' N, Long. 111°11' E)

Time zone; -8000

Duration ; for 30 days (12 Oct. 90 - 11 Nov. 90)

No.	Name	Sigma	H(metres)	G(degrees)
1	M2	28.9841042	1.4232	120.4897
2	S2	30.0000000	.4118	177.0095
3	N2	28.4397295	.2824	95.5608
4	K2	30.0821373	.1120	177.0095
5	K1	15.0410686	.3565	328.8487
6	O1	13.9430356	.3028	287.1562
7	P1	14.9589314	.1182	328.8487
8	M4	57.9682084	.0278	56.1525
9	MS4	58.9841042	.0432	221.6445
10	Q1	13.3986609	.0698	267.5886
11	M1	14.4920521	.0766	321.1078
12	J1	15.5854433	.0653	36.0192
13	NEU2	29.5125831	.0536	95.5608
14	MEU2	27.9682084	.0468	35.1103
15	L2	29.5284789	.0953	146.7673
16	T2	29.9589333	.0243	177.0095
17	2N2	27.8953548	.0373	95.5608
18	Mm	.5443747	.0916	48.4637
19	Mf	1.0980331	.0564	52.3639
20	MN4	57.4238337	.0083	55.2925
21	SN4	58.4397295	.0328	299.1767
22	2Q1	12.8542862	.0345	1.1656
23	S1	15.0000000	.0040	328.8487
24	OO1	16.1391017	.0255	78.1720
25	MNS2	27.4238337	.0445	29.2128
26	LAMDA2	29.4556253	.0256	146.7673
27	MSN2	30.5443747	.0213	72.9067
28	2SM2	31.0158958	.0449	81.8805
29	MO3	42.9271398	.0499	45.3635
30	M3	43.4761563	.0086	256.0156
31	MK3	44.0251729	.0719	99.6081
32	SK3	45.0410686	.0531	210.4736
33	SK4	60.0821373	.0253	42.6901
34	2MN6	86.4079380	.0142	10.4290
35	M6	86.9523127	.0091	9.3897
36	MSN6	87.4238337	.0082	245.9362
37	2MS6	87.9682084	.0079	114.1979
38	2SM6	88.9841042	.0136	323.8588

It is difficult, however, to prepare a standard tidal diagram, since tide observation period for 30 days is not enough.

Table-2.1.4.2 shows the tide tables of the neighbouring ports prepared by the Hydrographer, Royal Malaysian Navy. (The levels are same as shown in **Figure-2.1.5.2** in Volume I)

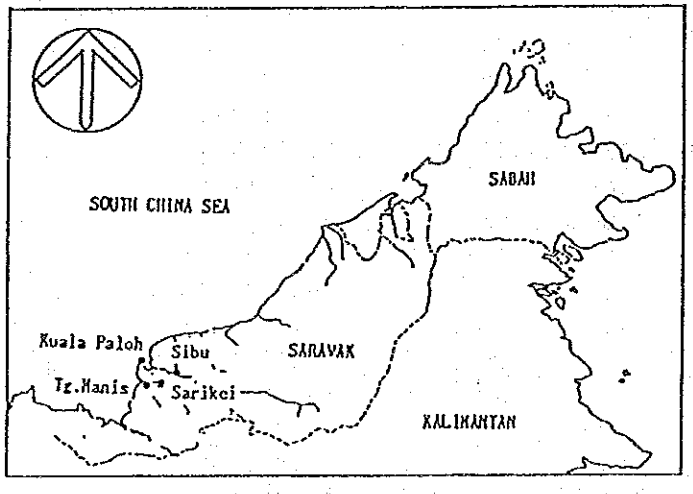
Table-2.4.2.3 Tidal level at Several Locations Concerned

unit ; metre

Port	Lowest Astronomical Tide	Mean Lower Low Water	Mean Higher Low Water	Mean Sea Level	Mean Lower High Water	Mean Higher High Water	Highest Astronomical Tide
Sibu	0.5	1.4	2.0	2.4	2.9	3.3	3.9
Sarikei	0.0	0.9	2.1	2.9	4.2	4.5	5.5
Tanjung Manis	0.0	1.1	2.2	3.4	4.5	4.9	5.8
Kuala Paloh	0.2	1.0	2.1	2.7	3.6	3.8	4.3

source ; Tide Table, 1990

Location Map



The levels obtained by the analysis are between those of the Time Table at Tg.Manis and the same at Kuala Paloh in levels above mean sea level. Because the survey site (Tg.Jerijeh) is located at the mouth of Rajang river.

The proposed port development site is located at east shore or opposit side of Tg. Sebubal, and closed to Tg. Manis. The tidal level at Tg. Manis shown below is apllied for the port planning.

Highest Astronomical Tide	: 5.8 m
Mean Higher High Water	: 4.9 m
Mean Sea Level	: 3.4 m
Mean Lower Low Water	: 1.1 m
Lowest Astronomical Tide	: 0.0 m

Heights are expressed relatively to Chart Datum.

2.4.3 Tidal Current

In order to obtain tidal current characteristics in the Tanjung Manis area, current observation was conducted at two locations as shown in **Figure-2.4.1.1.**

From an engineering point of view, a desirable location for current measurement should be at the center of the river. However, the center of the river is a busy navigational passage. The locations were selected after discussion with Marine Department, Sarikei, who is responsible for the navigational safety of the route.

Current velocity and direction were measured by self-recording type current meter for 15 days at C-1 point, and for 24 hours in spring and neap tide at C-2 point.

Measuring depth was 2m below water surface.

Generally, the direction of tidal current is parallel to the river channel, upwards in flood tide and downwards in ebb tide. The maximum current velocity during the observation period was 1.42m/sec (2.8 knots) as shown in **Table-2.4.3.1.**

Table-2.4.3.1 Daily Maximum Current Velocity by JICA

Date	Local time	Direction (Degree)	Velocity (m/sec)	Location	Tide (m)
06/Oct./90	23:40	129	1.34	C - 2	1.4
07/Oct./90	12:40	307	1.42	C - 2	0.6
09/Oct./90	21:00	221	1.23	C - 1	5.1
10/Oct./90	21:40	213	1.11	C - 1	4.9
11/Oct./90	22:20	211	0.90	C - 1	4.6
12/Oct./90	23:40	212	0.83	C - 1	4.4
13/Oct./90	00:00	209	0.79	C - 1	4.5
14/Oct./90	01:00	211	0.94	C - 1	4.6
15/Oct./90	02:20	210	1.11	C - 1	4.7
16/Oct./90	02:20	212	1.22	C - 1	4.7
17/Oct./90	03:00	223	1.24	C - 1	4.7
18/Oct./90	16:00	221	1.41	C - 1	4.9
19/Oct./90	04:00	221	1.35	C - 1	4.7
20/Oct./90	12:40	217	1.42	C - 1	1.2
21/Oct./90	03:20	213	1.11	C - 1	3.6
22/Oct./90	09:40	030	1.11	C - 1	2.6
23/Oct./90	21:00	041	1.23	C - 1	4.8
24/Oct./90	07:00	219	1.03	C - 1	4.3
28/Oct./90	12:00	109	1.09	C - 2	3.4
29/Oct./90	10:20	301	0.94	C - 2	3.4

[Note] 1) Location:See Figure-2.4.1.1 2) Tide:above C.D.

There is little difference between current speeds at the center of the river and measuring point. Current speed at the center of the river can be estimated from the measured data.

The maximum current velocity at river center is estimated 2.8 to 3.1 knots by calculation using factors of current length and period in stream lines, while that was 2.8 knots during the observation period. In addition, the figure is similar to past current record as shown in **Figure-2.4.3.1.**

The result of current harmonic analysis based on the observed data are shown in **Table-2.4.3.2** for reference.

Table-2.4.3.2 Result of Tidal Current Harmonic Analysis

Station ; C-1 (Lat. 02°07'16" N, Long. 111°19'55" E)
Time zone; -8.00H
Layer ; 2.0 m
Duration ; 15 days (09/OCT/1990 - 23/OCT/1990)

*** HARMONIC CONSTANTS ***

	M2	S2	K2	N2	K1	O1	P1	Q1	M4	MS4	CONSTANT
N-C											
V	0.074	0.055	0.015	0.079	0.100	0.045	0.033	0.044	0.008	0.011	0.044
K	75.5	232.1	232.1	179.7	31.6	355.8	31.6	109.2	28.1	267.5	
E-C											
V	0.101	0.030	0.008	0.084	0.061	0.023	0.020	0.041	0.046	0.013	0.078
K	105.3	244.3	244.3	185.2	16.4	34.0	16.4	75.6	282.6	229.0	
Main dir. - 36.8											
V	0.116	0.061	0.017	0.113	0.116	0.047	0.039	0.058	0.027	0.015	0.082
K	90.5	235.6	235.6	182.1	26.9	6.2	26.9	95.5	295.6	249.3	

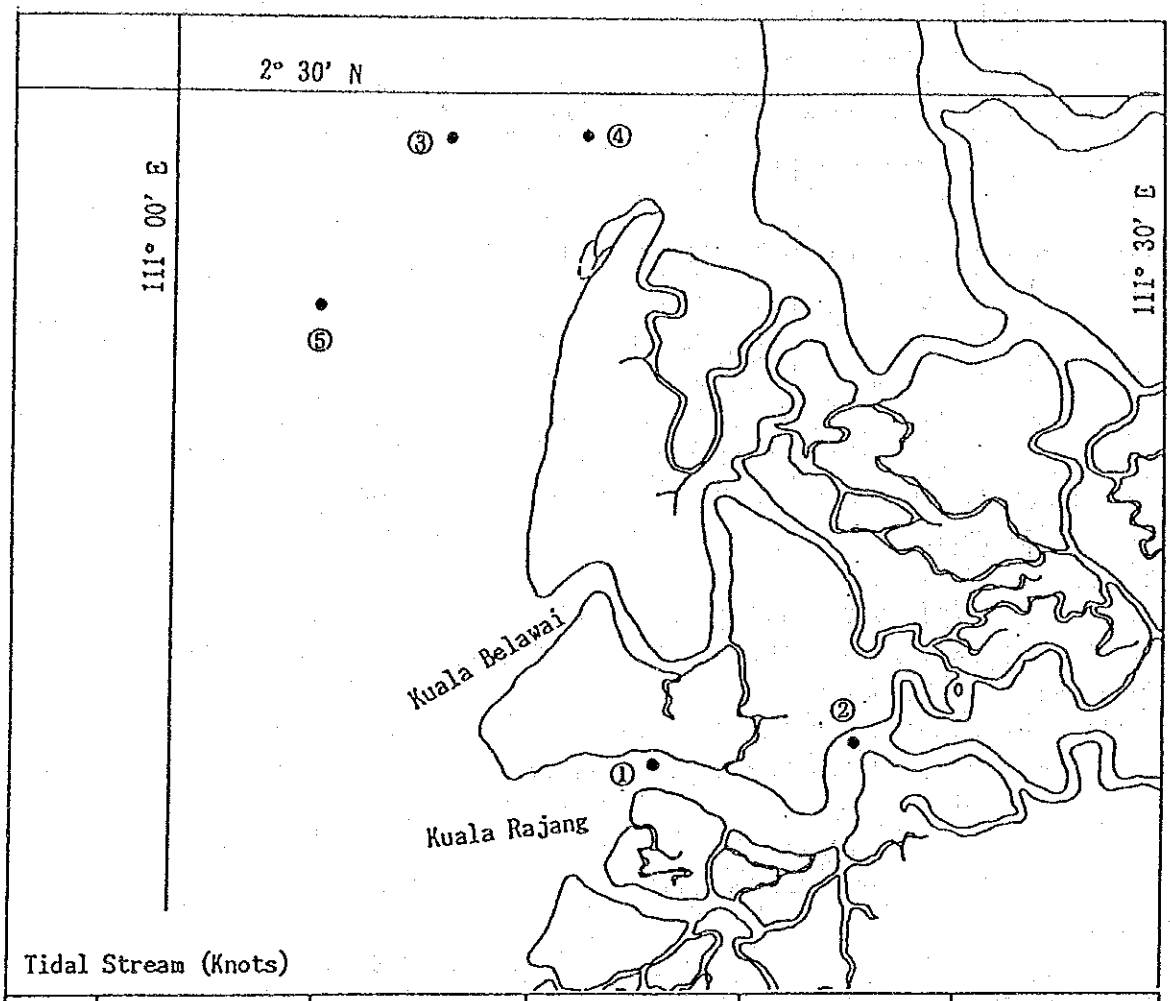
*** ELEMENTS OF TIDAL STREAMS ELLIPSE ***

	M2	S2	K2	N2	K1	O1	P1	Q1	M4	MS4	CONSTANT
DL	54.8	28.0	28.0	46.8	31.0	24.1	31.0	42.6	272.6	51.9	60.4
VL	0.121	0.062	0.017	0.115	0.116	0.049	0.039	0.058	0.046	0.016	0.090
KL	95.2	234.8	234.8	182.6	27.5	2.7	27.5	93.7	102.2	244.0	
DS	144.8	118.0	118.0	136.8	121.0	114.1	121.0	132.6	2.6	141.9	
VS	0.031	0.006	0.002	0.006	0.014	0.013	0.005	0.017	0.008	0.005	
KS	185.1	324.8	324.8	272.6	297.5	92.7	297.5	3.7	12.2	154.0	

*** NON-HARMONIC CONSTANTS ***

1. VM+VS	2. VM-VS	3. VK+VO	4. VM-VS/VM+VS	5. VK+VO/VM+VS
0.177	0.054	0.163	0.307	0.920

1. KS-KM	2. K1-KO	3. KM/29	4. K1+KO/2/15	5. 4 - 3
145.1	20.7	3.12	1.10	- 2.02



Tidal Stream (Knots)

		① 2° 08' 9N 111° 14' 6E		② 2° 09' 6N 111° 21' 0E		③ 2° 29' 0N 111° 08' 4E		④ 2° 28' 2N 111° 12' 8E		⑤ 2° 23' 3N 111° 09' 2E	
		Dir.	Sp. Np.	Dir.	Sp. Np.	Dir.	Sp. Np.	Dir.	Sp. Np.	Dir.	Sp. Np.
Before H.W	-6	276	0.5 0.2	060	0.2 0.1	036	1.4 0.8	032	0.7 0.4	005	0.4 0.2
	-5	276	2.3 1.0	243	0.4 0.2	025	1.7 1.0	328	1.3 0.8	003	0.6 0.2
	-4	273	2.7 1.1	242	1.3 0.5	007	1.7 1.0	314	1.9 1.1	345	0.8 0.3
	-3	272	2.6 1.1	248	1.3 0.6	334	1.1 0.7	301	2.3 1.4	337	0.8 0.3
	-2	270	2.2 0.9	251	1.2 0.5	300	0.8 0.5	300	1.7 1.0	318	0.4 0.2
	-1	265	1.0 0.4	254	1.1 0.5	243	0.7 0.4	291	0.7 0.4	288	0.2 0.1
H.W	0	120	0.4 0.2	278	0.3 0.1	200	1.1 0.7	155	0.5 0.3	197	0.4 0.2
After H.W	+1	103	1.9 0.8	077	0.6 0.3	185	1.3 0.8	139	1.2 0.7	166	0.9 0.4
	+2	095	2.9 1.2	075	1.2 0.5	179	1.2 0.7	133	1.8 1.1	161	1.0 0.4
	+3	087	2.6 1.1	075	1.3 0.6	170	0.9 0.6	129	1.8 1.1	152	0.7 0.3
	+4	083	2.1 0.9	066	1.2 0.5	150	0.5 0.3	126	1.4 0.9	143	0.3 0.1
	+5	080	1.4 0.6	061	0.9 0.4	130	0.4 0.2	121	0.7 0.4	013	0.1 0.0
	+6	—	slack	061	0.4 0.2	045	1.0 0.6	050	0.5 0.3	005	0.3 0.1

source ; Marine Chart

Figure-2.4.3.1 Existing Current Data

2.4.4 Wave

Following is the information obtained from fishermen, pilots and other related persons;

- The maximum waves occur during the North-east monsoon. The maximum height of waves off the estuary of Rajang River is 2 to 3 metres.
- The maximum height of waves recorded off Tanjung Kidurong, Bintulu Port, which is exposed to ocean waves generated in South China Sea, is 3.4m (quote; National Ports Plan)
- Basin inside the Rajang River is always calm, and choppy waves occasionally occur.

Wave observation was carried out to confirm the above information in Oct. 1990 and Feb. 1991 at the estuary of Rajang River where the depth of water is about 10m.

A pressure type wave recorder was installed at the estuary of Rajang River where the depth of water is about 10m.

Height and period of waves were recorded by the wave recorder every three hours and direction of waves were recorded by visual observation twice a day.

(1) Result of site survey

The wave conditions obtained from the field survey are summarized as follows;

1) Wave height and period

The sea is generally very calm, and the wave heights of less than 5cm were counted 72% in the first observation and 65% in the second one. The maximum wave height during the observation period was 74cm.

(See **Appendix-I.2.4.1**)

Wave period of 3-7 seconds was predominated.

Table-2.4.4.1 shows the relation of the wave height and the wave period.

2) Wave direction

The predominant wave direction was distinguished as from the west (270°-280°) in the first and the second observation period.

Figure-2.4.4.1 shows the distribution of wave direction.

Table-2.4.4.1 Frequency Distribution of Wave

T_z(sec.) \ H_s	Less than 5 cm	5 ~ 9 cm	10 ~ 19 cm	20 ~ 29 cm	30 ~ 39 cm	Total (%)
———	72.06 64.90 (68.48)					72.06 64.90 (68.48)
3.00 ~ 3.99		1.47 0.41 (0.94)	2.94 0.82 (1.88)	0.49 ——— (0.24)	——— ——— (———)	4.90 1.23 (3.06)
4.00 ~ 4.99		7.84 4.90 (6.37)	9.32 3.27 (6.30)	3.92 ——— (1.96)	0.49 ——— (0.24)	21.57 8.17 (14.87)
5.00 ~ 5.99		1.47 3.67 (2.57)	——— 2.04 (1.02)	——— ——— (———)	——— ——— (———)	1.47 5.71 (3.59)
6.00 ~ 6.99		——— 3.67 (1.84)	——— 7.76 (3.88)	——— ——— (———)	——— ——— (———)	——— 11.43 (5.72)
7.00 ~ 8.99		——— ——— (———)	——— 8.56 (4.28)	——— ——— (———)	——— ——— (———)	——— 8.56 (4.28)
Total (%)	72.06 64.90 (68.48)	10.78 12.65 (11.72)	12.26 22.45 (17.36)	4.41 ——— (2.20)	0.49 ——— (0.24)	100.00 100.00 (100.00)

* Remarks , Upper ; 11-OCT-90~05-NOV-90
Middle; 03-FEB-91~06-MAR-91
Lower ; Average

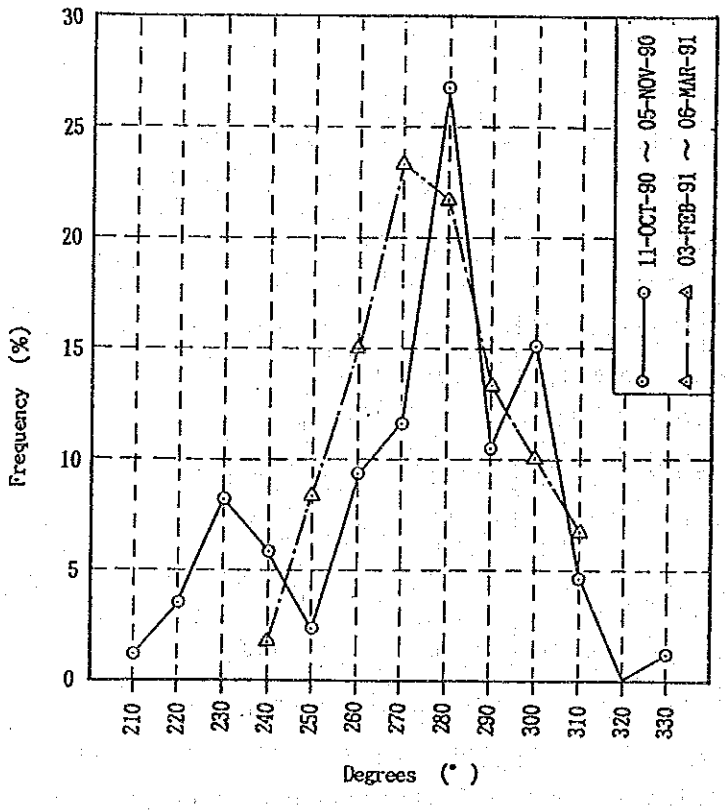


Figure-2.4.4.1 Wave Direction

To judge wave height from the viewpoint of port operation, it is necessary to know allowable wave height for cargo handling and safe anchorage. Table-2.4.4.2 and Table-2.4.4.3 show allowable wave height for efficient port operation in Japanese Technical Standards.

Table-2.4.4.2 Allowable Wave Height for Cargo Handling
(Between Vessels and Wharves)

Vessel Size	Allowable Wave Height
~ 500 GT	0.3 m
500 GT ~ 50,000 GT	0.5 m
50,000 GT ~	0.7 ~ 1.5 m

Table-2.4.4.3 Allowable Wave Height and Wind Speed for Safe Anchorage

	Vessel Size (GT)	Mooring Condition		
		along a wharf	buoy	ship's anchor
Wave Height	500 ~ 1,000	0.7 m	1.0 m	1.0 m
	1,000 ~ 5,000	0.7 m	1.0 m	1.5 m
	5,000 ~ 10,000	1.0 m	1.5 m	1.5 m
Wind Speed	500 ~ 10,000	15 ~ 20 m/s	15 ~ 20 m/s	20 ~ 30 m/s

(2) Wave forecasting

Wave characteristics are essential for designing the port facilities. It is necessary to supplement the results of the wave observation by wave forecasting.

The wave at deep water off the river mouth is forecasted as

H = 3.0m

T = 6.6sec. (by S-M-B method): (see **Appendix-I.2.4.4**)

The above forecasting is based on the following wind conditions;

- Wind velocity at open sea: 16m/sec

  According to the wind data prepared by Meteorological Dept., occurrence of strong winds in Sarawak is very rare.

  Maximum wind velocity at Sibu observatory is 8m/s, but this is the data in inland. Therefore, wind velocity at open sea should be converted from that of inland.

- Wind duration: 9 Hours

(Source; Sibu 1990 wind data including allowance)

The estimated value seems to be adequate in comparison with the informations from fishermen, pilots and others as introduced in Section 2.1.4(3).

(3) Conclusion

The new port facilities will be located in the very calm area, at 20-30km upstream from the river mouth, but the examination of the wave characteristics are important in planning the new facilities.

As waves propagate into river water area, wave height changes due to wave refraction, diffraction, shoaling, reflection and dissipation, breaking, bottom friction, etc..

In consideration of wave attenuation due to bottom friction alone, forecast wave of 3m high off the river mouth decrease to 1.0-1.5m when arriving at the proposed site of the facilities. (see **Appendix-I.2.4.5**) Furthermore, wave height decreases due to breaking, etc..

It is, therefore, concluded that the wave height at the proposed site will be 1 meter or less with rare occurence.

2.5 Mineral Resources

2.5.1 General

Figure-2.5.1.1 shows location of mineral resource deposits in Sarawak. The major resources are oil, gas, coal, silica sand, clay and gold. Oil and gas area pumped out offshore Miri and Bintulu as shown in Figure-2.5.1.2. Coal deposits in Malaysia, illustrated in Figure-2.5.1.3, are all located in Central Sarawak. Silica sand can be mined in Binttulu are and exported through Bintulu port (Figure-2.5.1.4). Ball clay and kaolinitic clay are mined in Kuching, Sibu and Sarikei areas and used for white wares, pottery, etc (Figure-2.5.1.5 and 2.5.1.6). Deposits of gold are not large. The most hopeful mineral resource in the Rjang River region and the surroundings is coal.

2.5.2 Coal at Merit Pila

Merit Pila coal mine (**Figure-2.5.2.1**), which is located near Kapit, has been established since 1988. The measured deposit is about 88 million tons and the largest in Malaysia. The present average capacity of mining is 10,000 tons per month and the maximum capacity is 30,000 - 40,000 tons per month, but expansion of the capacity is possible. The quality is High Volatile Bituminous C or Subbutiminous A with low sulphur and the gross calorific value is 6,000 kcal/kg.

Table-2.5.2.1 Coal Deposit in Sarawak

Mine	Deposit(million tons)	
	Measured	Indicated
Silantek	12.5	15.9
Merit Pila	88.0	76.0
Mukah Balingian	43.6	8.3

(Source: Geological Survey of Malaysia)

Currently, the coal is transported from mine to a loading site established on the Rajang River (**Figure-2.5.2.2**) by trucks and carried onto barges with capacity of 1,000 - 1,500 tons to ocean-going vessels anchoring at Tg. Manis.

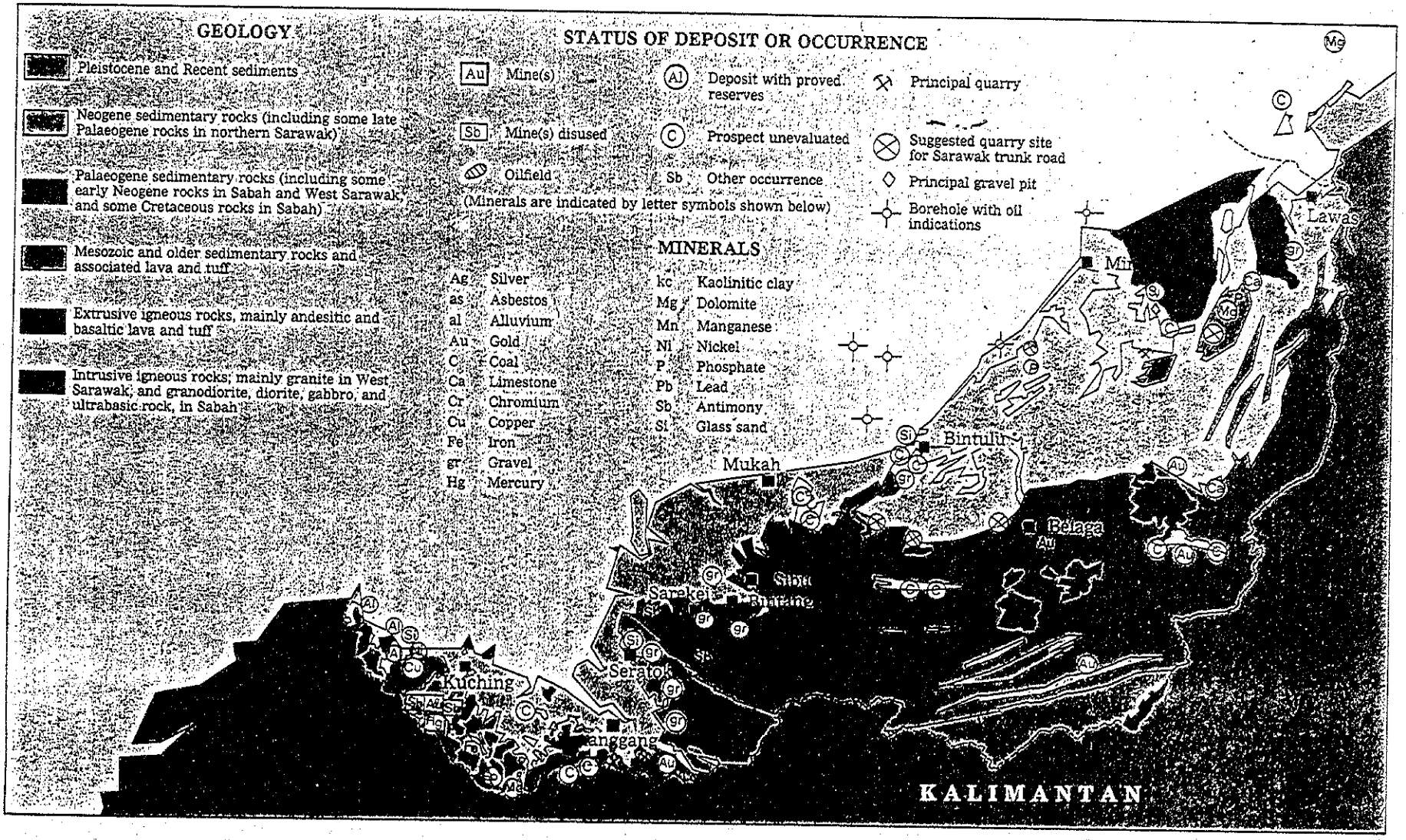


Figure-2.5.1.1 MINERAL RESOURCES OF SARAWAK

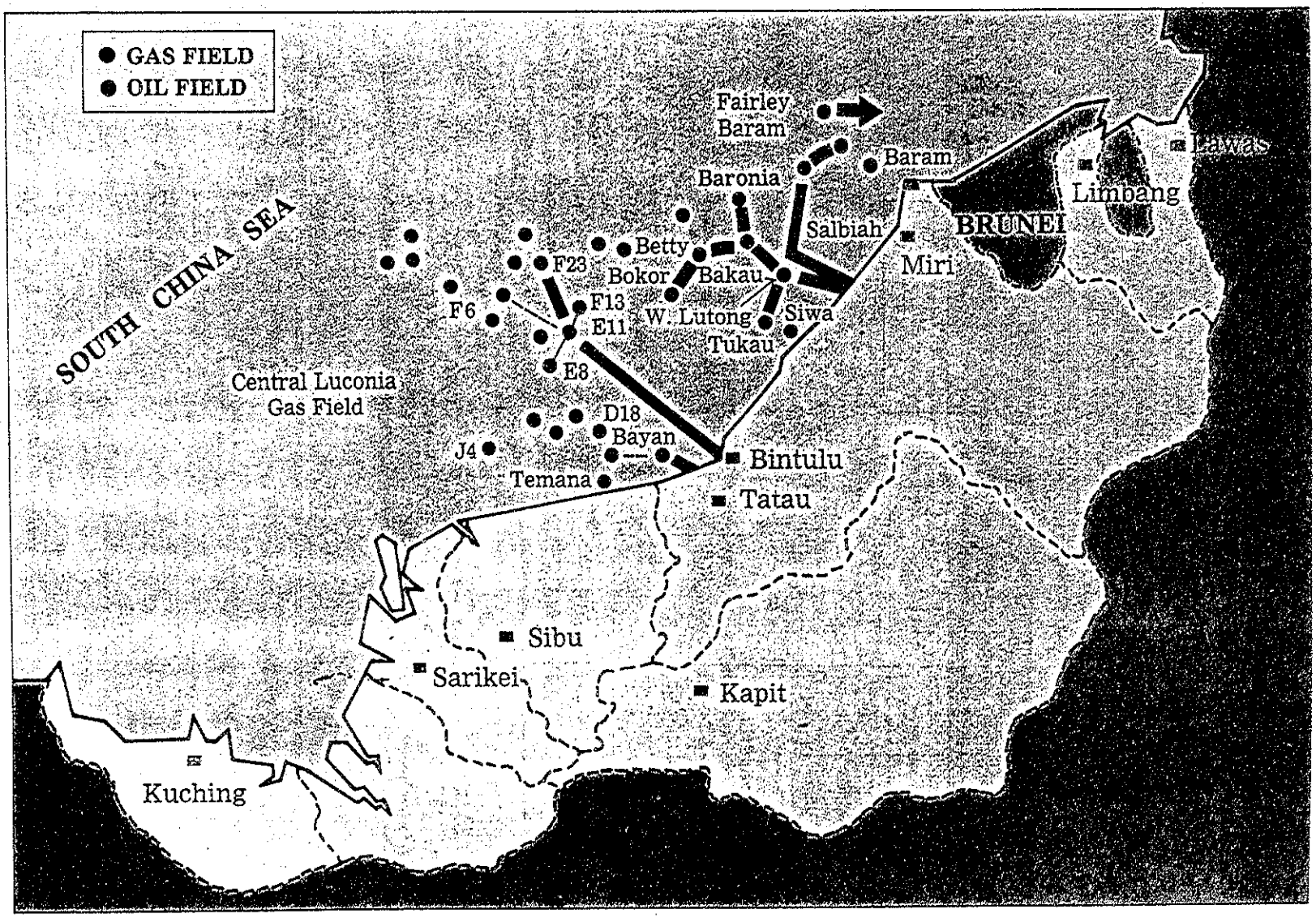
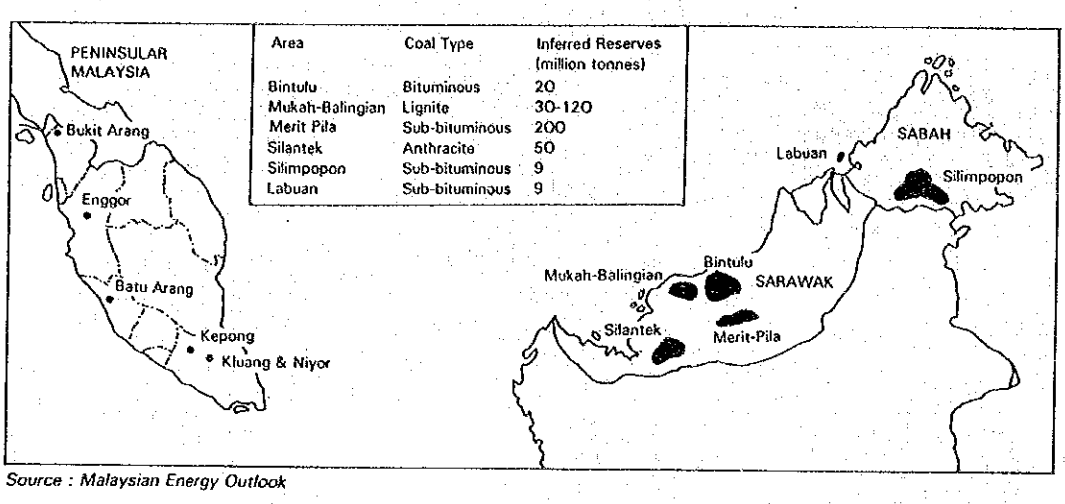
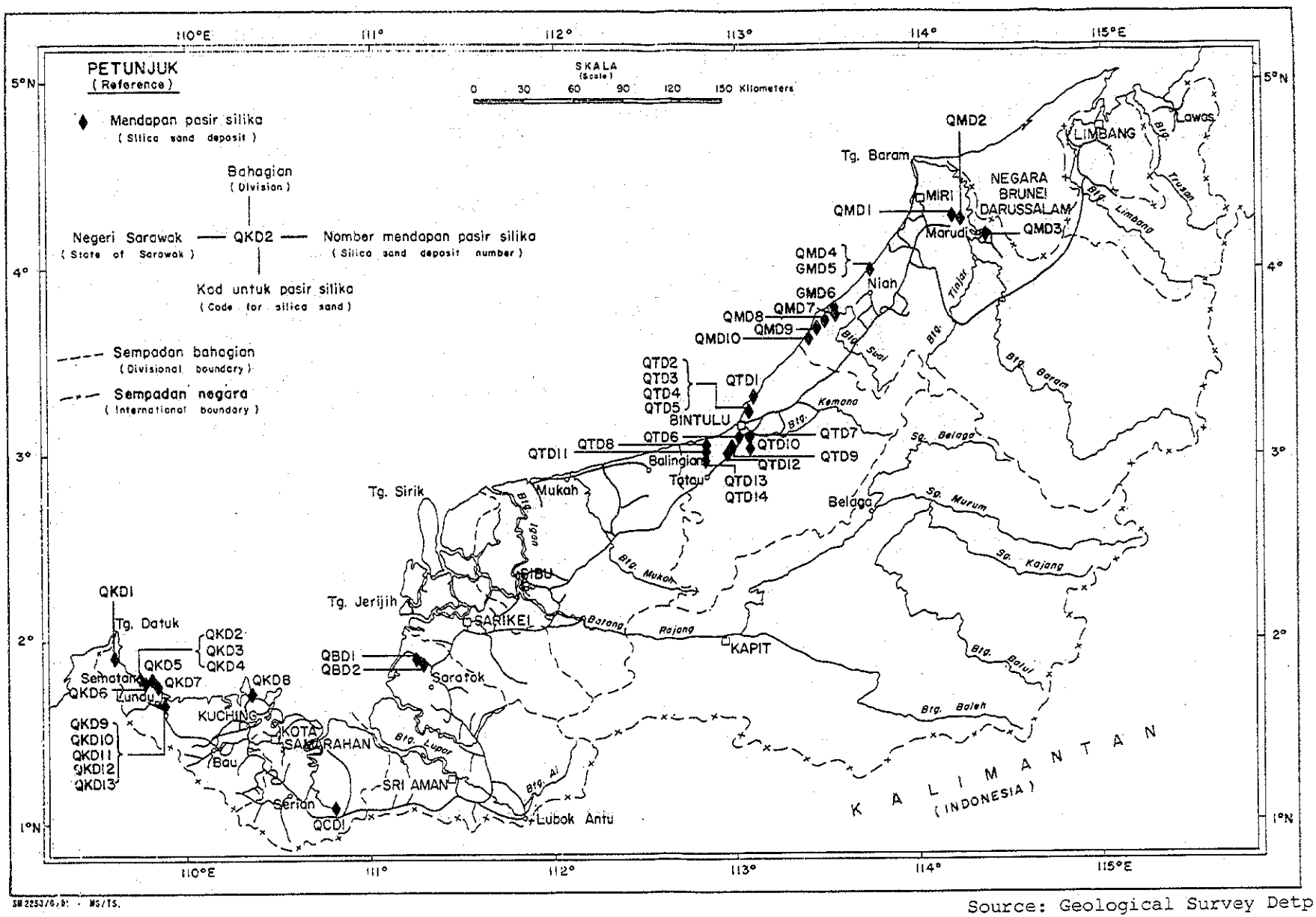


Figure-2.5.1.2 SARAWAK'S OIL AND GAS FIELDS



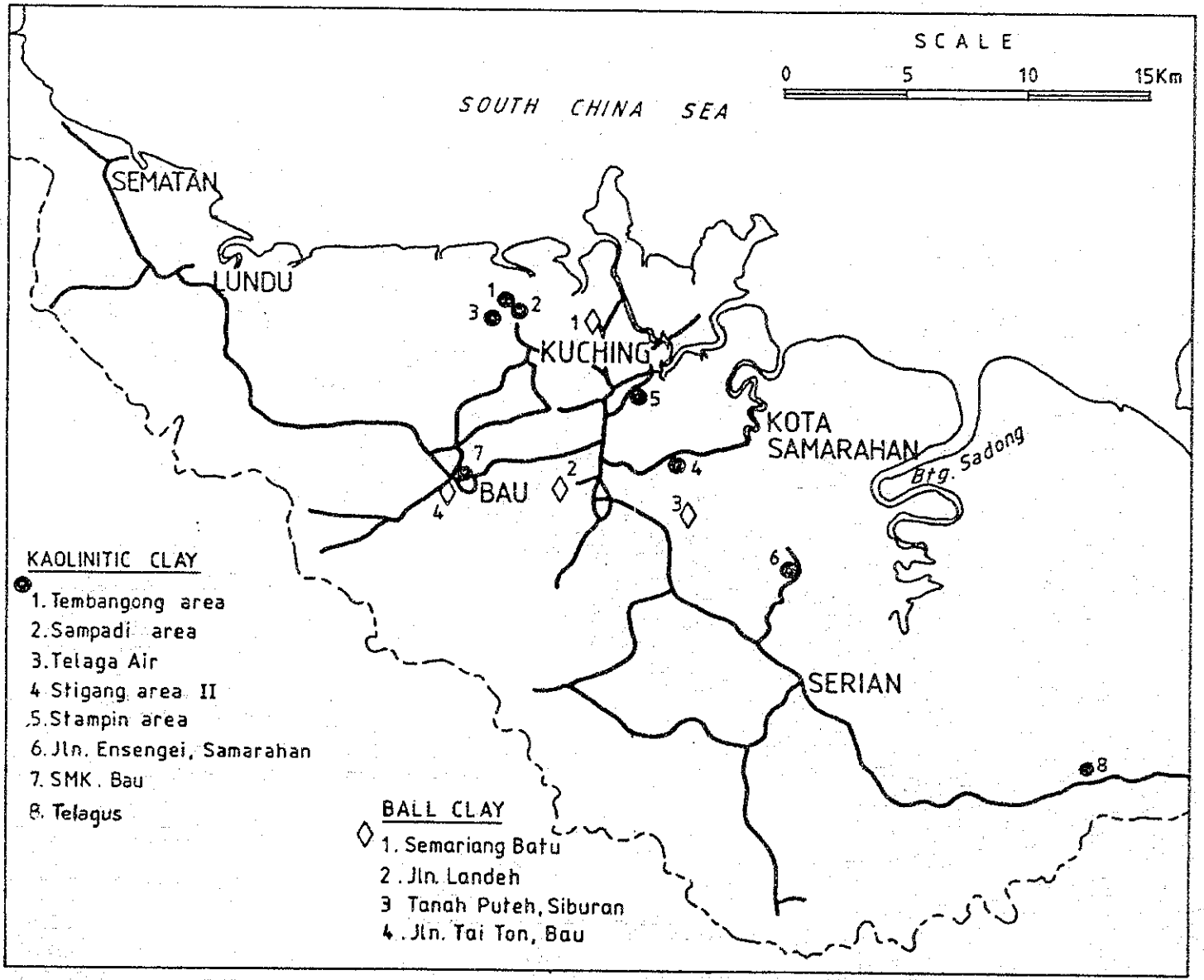
Source : Malaysian Energy Outlook

Figure-2.5.1.3 Coal Deposit in Malaysia



Source: Geological Survey Detp.

Figure-2.5.1.4 Silica Sand Deposits in Sarawak



Source: Geological Survey Detp.

Figure-2.5.1.5 Location of Clay Deposits in Kuching Area

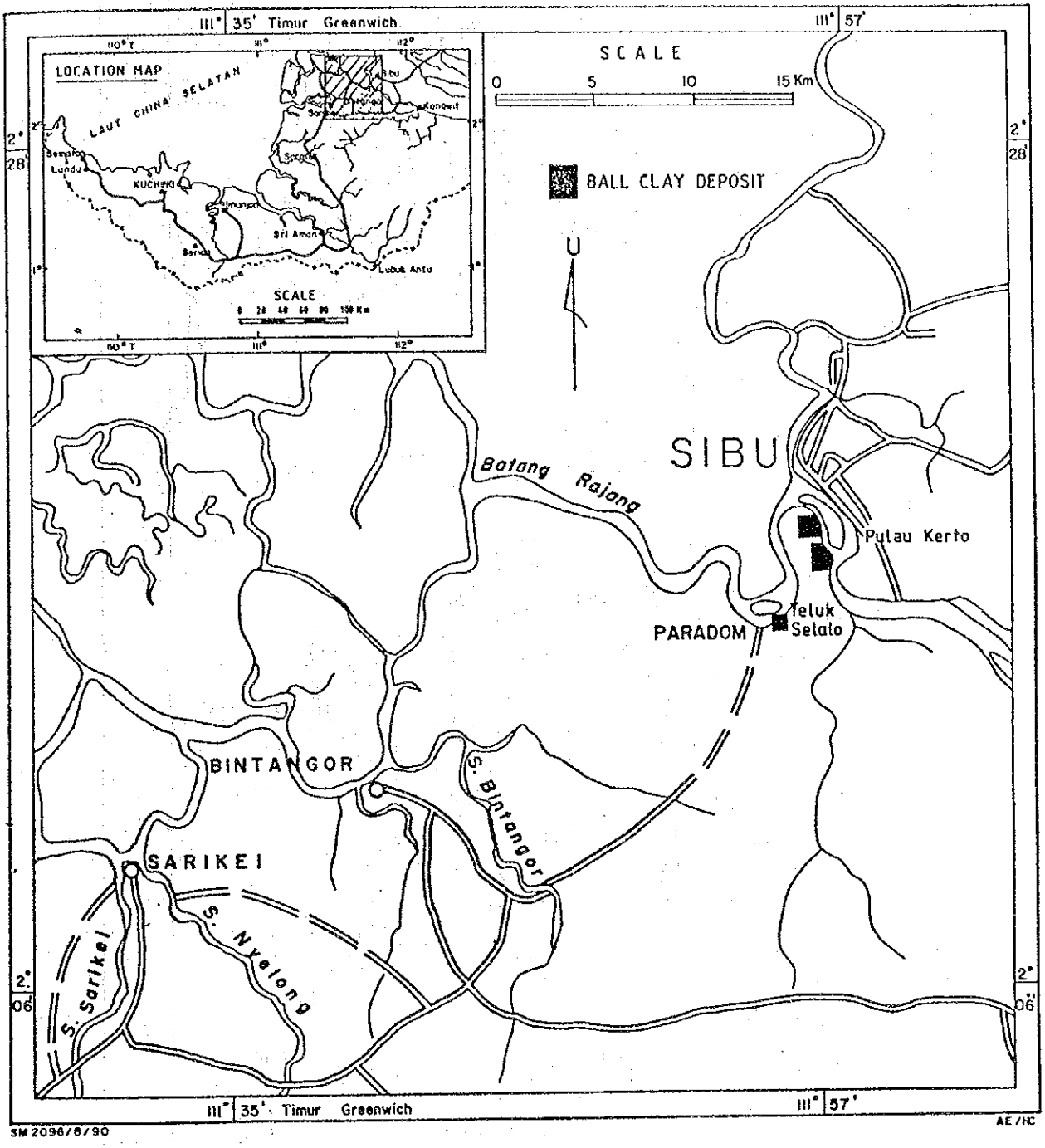


Figure-2.5.1.6 Location of Ball Clay Deposits in Sibu Area

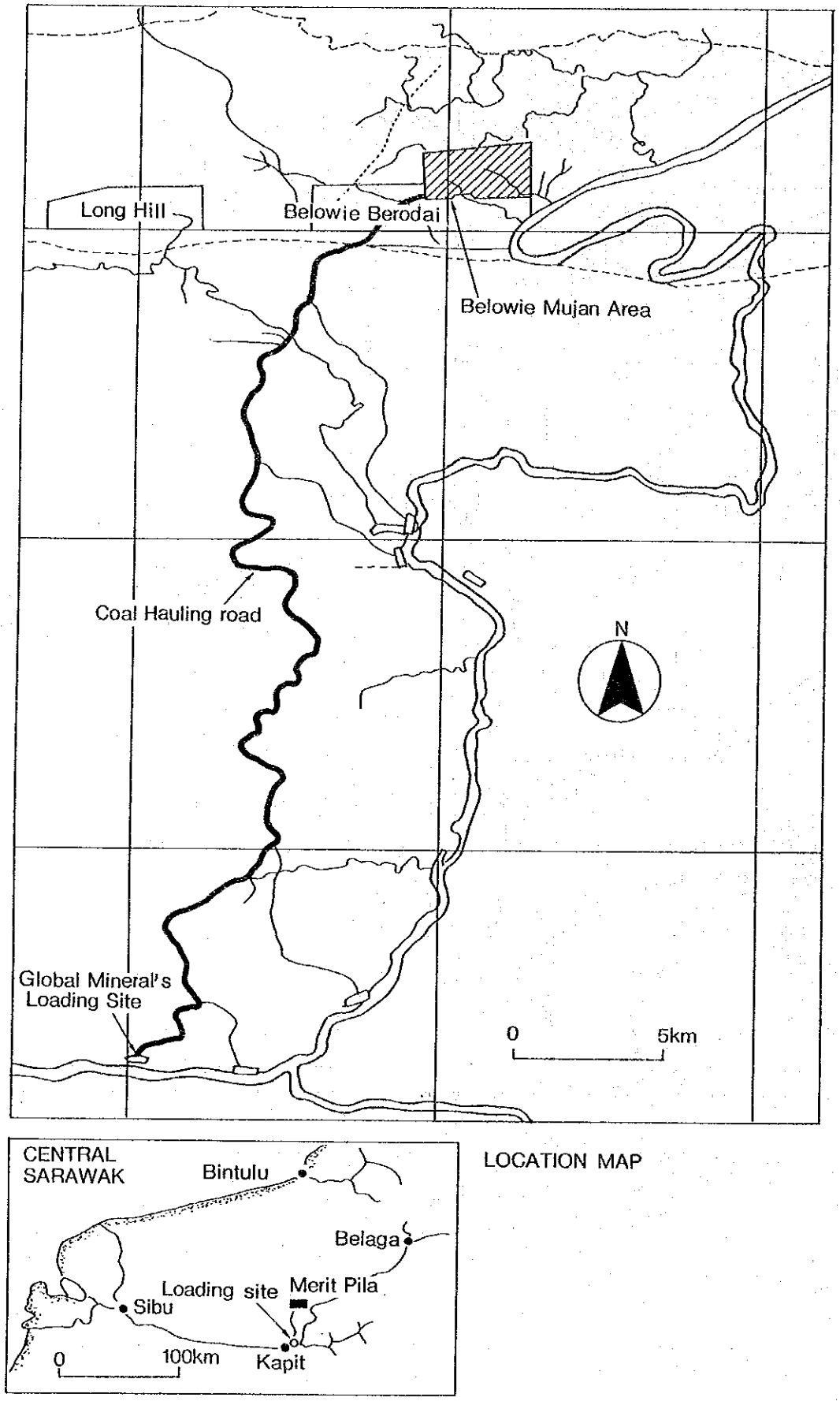


Figure-2.5.2.1 Merit Pila Coal Mine

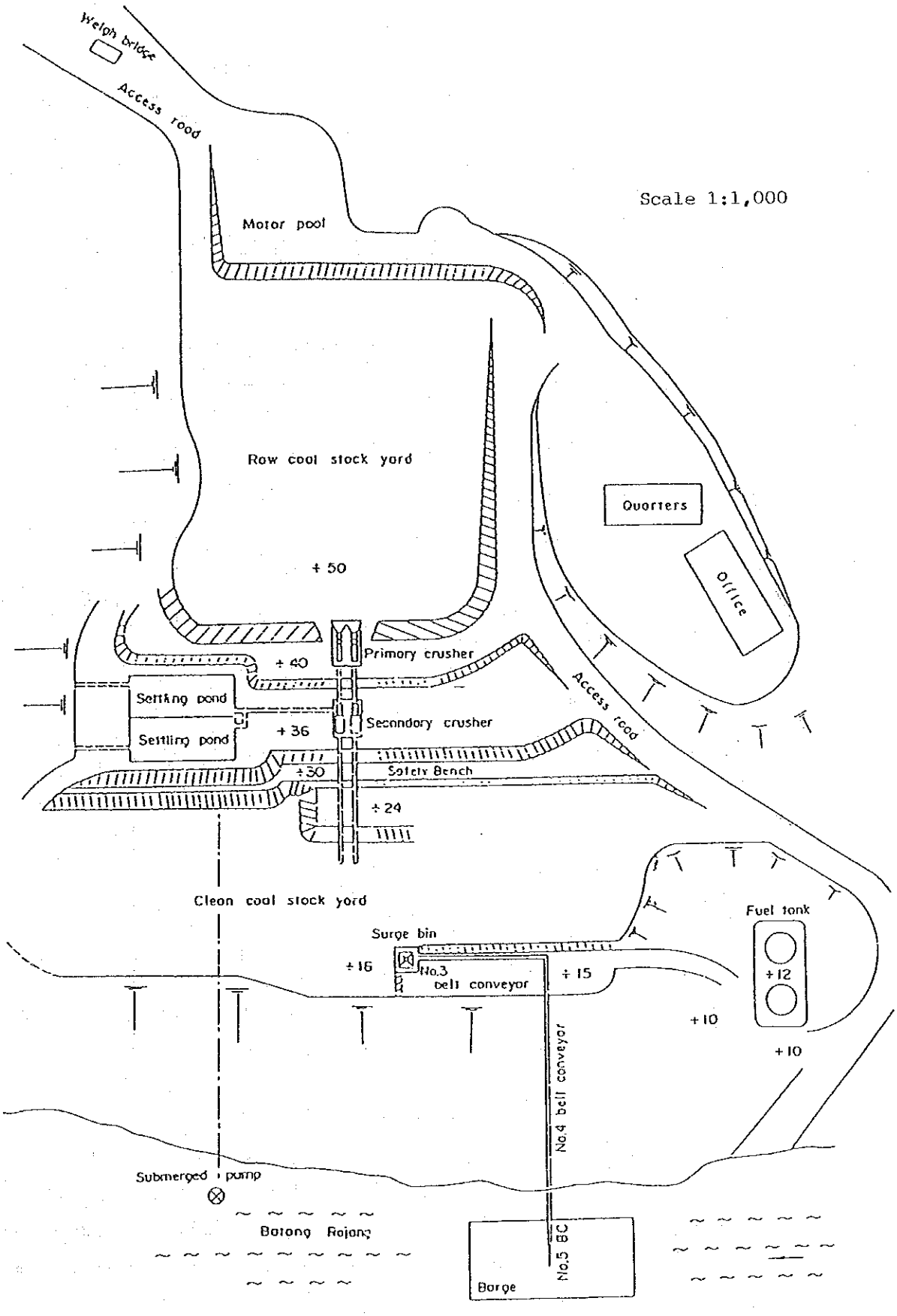


Figure-2.5.2.2 Layout of Plant and Facilities of Loading Site

3. SOCIOECONOMIC CONDITION

3.1 Population

3.1.1 Population of Sarawak

Population of Sarawak has grown as shown in **Table-3.1.1.1** and **Figure-3.1.1.1.**

Table-3.1.1.1 Population and Annual Growth Rate of Sarawak

Year	Population	Growth Rate per Annum
1947	546,000	
1960	745,000	2.8%
1970	976,000	3.1%
1980	1,308,000	3.4%
1984	1,442,000	2.5%
1985	1,477,000	2.4%
1986	1,515,000	2.5%
1987	1,553,000	2.5%
1988	1,593,000	2.7%

(Source: The Annual Statistical Bulletin of Sarawak)

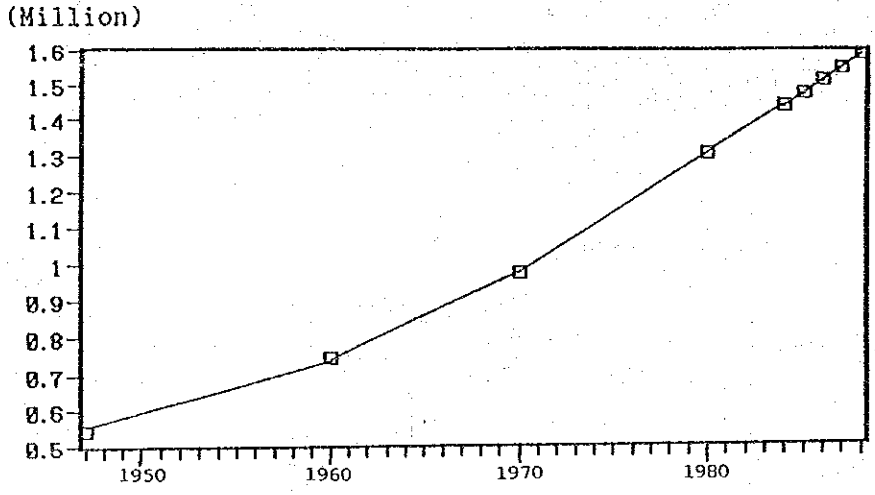


Figure-3.1.1.1 Population in Sarawak

The population growth rate from 1960 to 1980 was 3.1% to 3.4% per annum, and 2.4%, 2.5% and 2.7% during from 1984 to 1988. Their average is 2.5%.

The Iban community has the largest population in Sarawak, followed by Chinese, Malay, Bidayuh, Melanau, and "others" by order. The rate of population increase for Malays was 3.5% per annum during 1980 to 1988. The rates of increase population of other communities were under 3%. **Table-3.1.1.2** shows population by community in Sarawak.

Table-3.1.1.2 Population by Community in Sarawak

(,000)

Year	Malays	Melanau	Iban	Bidayuh	Other Ind.	Chinese	Other	Total
1960	129	45	238	58	38	229	8	745
1970	181	53	303	84	51	294	10	976
1980	258	75	396	108	69	385	17	1308
1988	330	92	471	133	86	463	18	1593

(Source: Annual Statistical Bulletin 1988 Sarawak)

Growth Rate per Annum

1960-1970	4.0	1.8	2.7	4.5	3.4	2.8	2.5
1970-1980	4.3	4.2	3.1	2.9	3.5	3.1	7.0
1980-1988	3.5	2.8	2.4	2.9	3.1	2.5	0.7

3.1.2 Population of the hinterland

In this paragraph, population of the hinterland is described. The hinterland of Rajang Port consists of Sibu, Sarikei, Kapit divisions and a part of Sri Aman division named Saratok and Betong districts (See 1.7).

The hinterland's population statistics and annual growth rates are shown in **Table-3.1.2.1** and **Table-3.1.2.2.**

Table-3.1.2.1 Population of Hinterland

Year	Sibu Division	Sarikei Division	Kapit Division	Saratok & Betong Districts	Total
1947	98,000	66,000	32,000	46,000	242,000
1960	137,000	82,000	42,000	53,000	314,000
1970	171,000	95,000	51,000	65,000	382,000
1980	226,000	119,000	67,000	75,000	487,000

(Source: 1960 Sarawak Report on the Census of Population
1988 Annual Statistical Bulletin Sarawak)

Table-3.1.2.2 Rate of increase of population in hinterland (per annum)

Year	Sibu Division	Sarikei Division	Kapit Division	Saratok & Betong Districts	Total
1947-1960	3.1%	1.9%	2.4%	1.2%	2.3%
1960-1970	2.5%	1.6%	2.1%	2.3%	2.2%
1970-1980	3.2%	2.5%	3.1%	1.5%	2.7%

3.1.3 Condition of population by age at Sarawak

Table-3.1.3.1 shows population by age group from 1984 to 1988 in Sarawak.

Population Distribution by age group is shown in **Figure-3.1.3.1.**

Table-3.1.3.1 Population by Age in Sarawak ('000)

Age	1984	1985	1986	1987	1988
0-4	184	192	197	201	208
5-9	185	180	181	181	183
10-14	194	195	193	191	187
15-19	167	170	178	184	189
20-24	141	146	153	157	162
25-29	113	117	120	127	134
30-34	98	101	106	108	111
35-39	76	80	82	88	91
40-44	66	66	69	70	73
45-49	50	53	55	59	62
50-54	48	46	47	46	48
55-59	34	39	40	43	44
60-64	34	31	31	31	32
65 and above	52	61	63	67	69
Total	1442	1477	1515	1553	1593

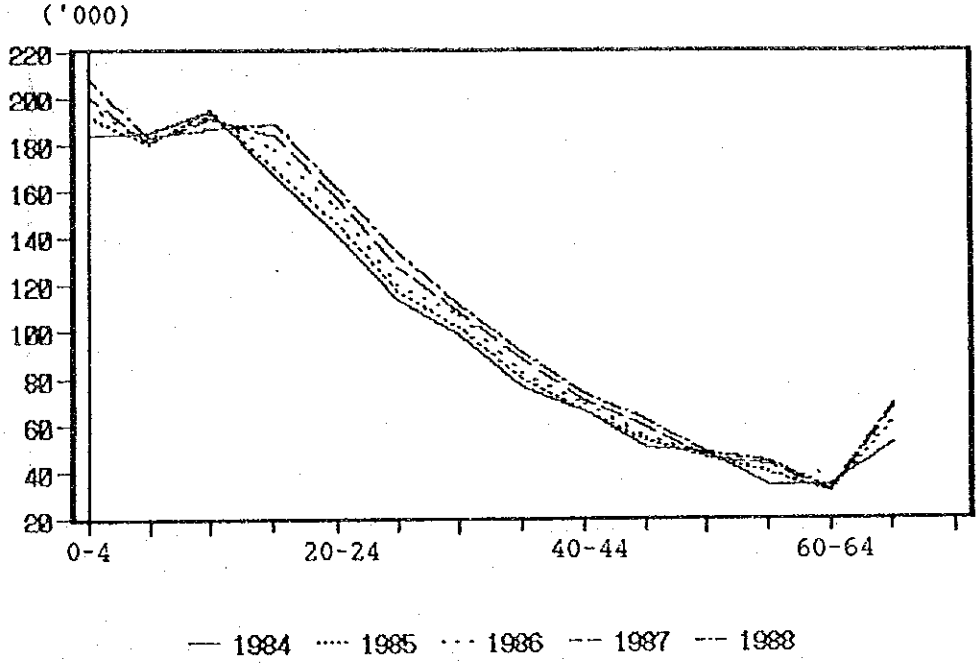


Figure-3.1.3.1 Population by Age Group in Sarawak

3.1.4 Crude birth and death rate

Table-3.1.4.1 and **Figure-3.1.4.1** show the crude birth and death rates from 1984 to 1988 in Sarawak. From these figure, it can be seen that the birth rate has increased slightly while the death rate has decreased little by little.

Table-3.1.4.1 Natural Increase, Crude Birth and Death Rates in Sarawak (persons per 1000)

Rate	1984	1985	1986	1987	1988
Natural increase	23.7	24.9	24.2	25.1	25.9
Crude Birth Rate	27.6	28.7	27.7	28.4	29.3
Crude Death Rate	3.9	3.8	3.6	3.3	3.5

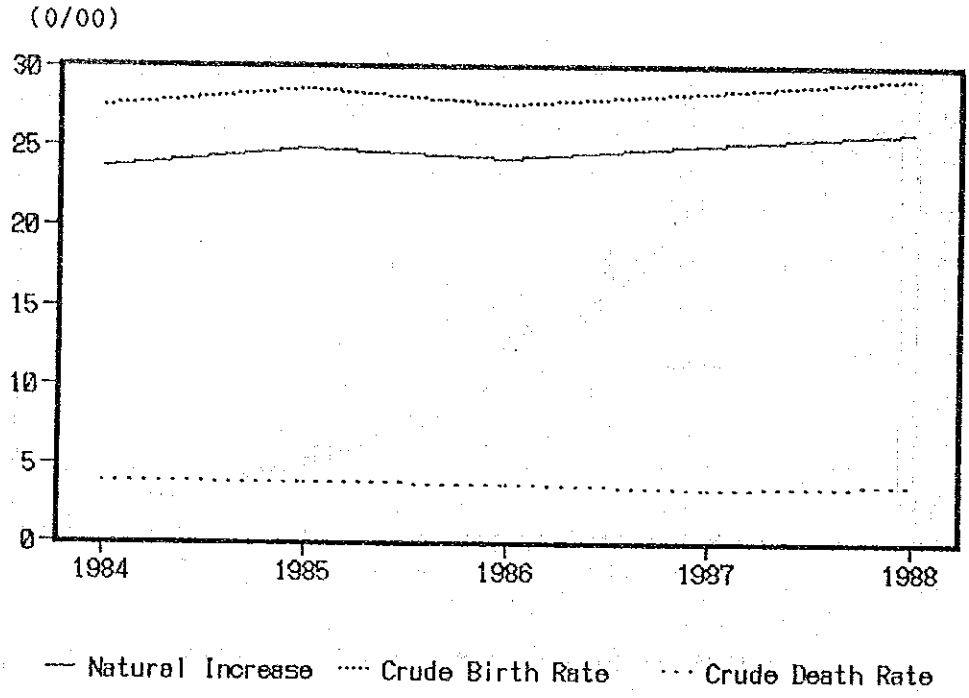


Figure-3.1.4.1 Natural Increase, Birth, Death Rate in Sarawak.pa

3.2 Gross Domestic Product

3.2.1 Gross domestic products of Malaysia

Gross domestic product ;GDP (in terms of purchasers' value) in Malaysia increased from 1980 to 1988. The average annual growth rate was 5.8% from 1980 to 1985, and 5% from 1986 to 1988. However growth rates fell in 1985 and 1986, to 2.8% and 1.2%, respectively.

Table-3.2.1.1 and **Figure-3.2.1.1** shown both actual GDP and targets of the Fourth and Fifth Malaysia Plan by industrial sector.

These show that GDP had grown as planned from 1980 to 1984. Whereas actual GDP deviate a bit planned GDP from 1985 to 1988. **Figures-3.2.1.2** to **3.2.1.5** the actual GDP by industrial sector. These figures also indicate that GDPs of every sector except the case of construction sector had grown. Construction sector reduced its GDP rapidly from 1985 to 1987.

Table-3.2.1.1 MALAYSIA: Actual and Estimated GDP by Industrial Sector in the Fourth and Fifth Malaysia Plan

(million ringgit in 1978 prices)

Industry	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
ACTUAL											
Agriculture	10189	10684	11375	11302	11623	12046	12528	13455	14087		
Mining	4487	4289	4617	5337	6046	6006	6456	6463	6889		
Manufacturing	8932	9343	9694	10488	11703	11357	12209	13771	16250		
Construction	2066	2367	2598	2867	2899	3048	2621	2312	2370		
GDP purchasers	44702	47790	50456	53636	57706	59344	60056	63179	68676		
Growth rate		6.9	5.6	6.3	7.6	2.8	1.2	5.2	8.7		
ESTIMATED											
Agriculture		10617	11063	11527	12012	12516	12842	13175	13518	13869	14230
Mining		4832	5205	5605	6037	6502	6703	6911	7125	7346	7574
Manufacturing		9468	10036	10638	11276	11953	12718	13532	14398	15319	16300
Construction		2306	2573	2872	3205	3576	3777	3988	4212	4447	4696
GDP purchasers		47563	50607	53846	57292	60959	64007	67207	70567	74096	77800

Plan: 1981-1985: the Fourth Malaysia Plan
1986-1990: the Fifth Malaysia Plan

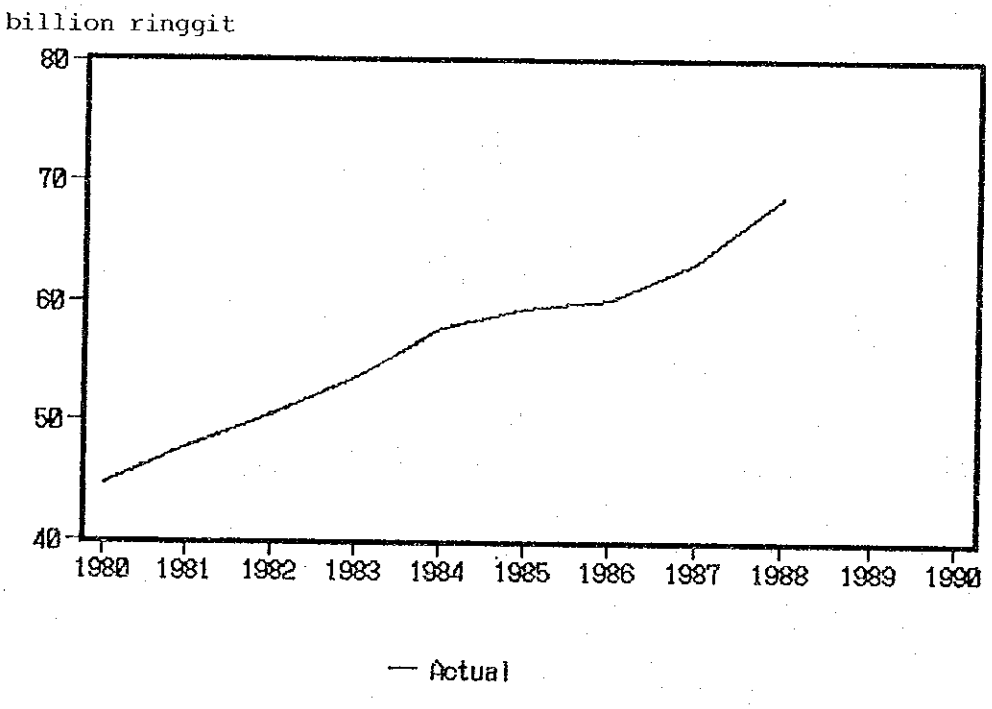


Figure-3.2.1.1 Actual GDP at Purchasers' Value in Malaysia

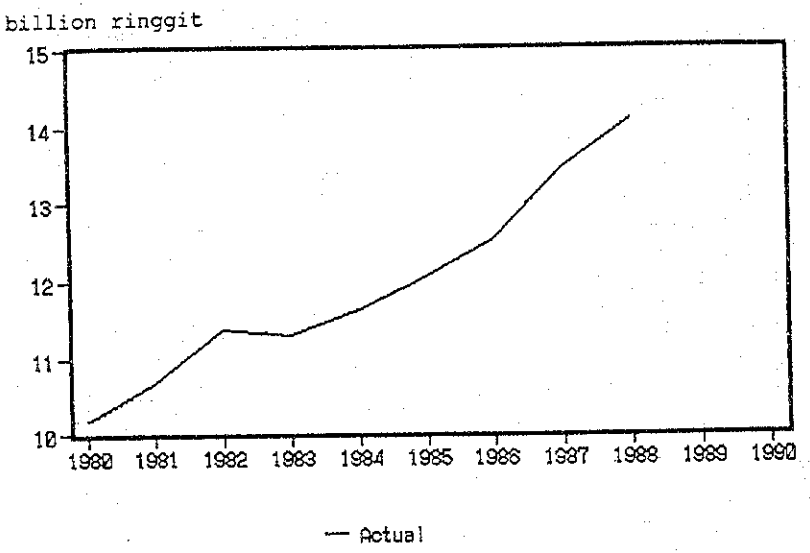


Figure-3.2.1.2 GDP (Agriculture) in Malaysia

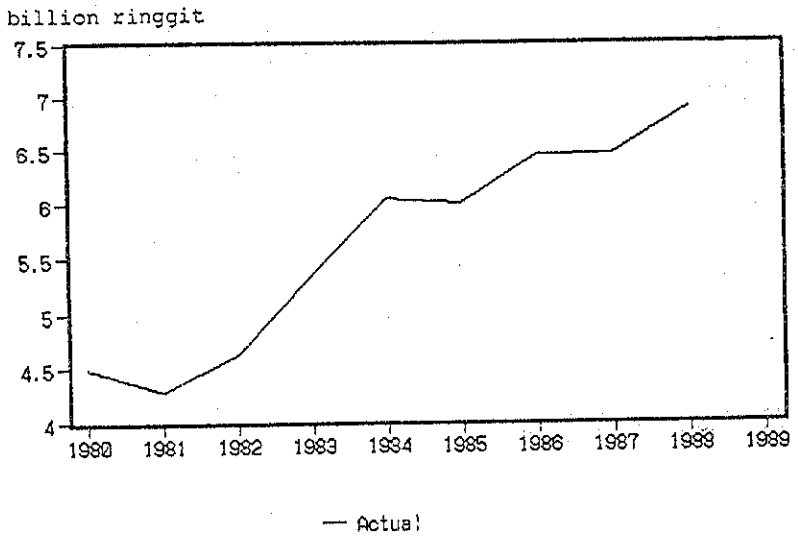


Figure-3.2.1.3 GDP (Mining) in Malaysia

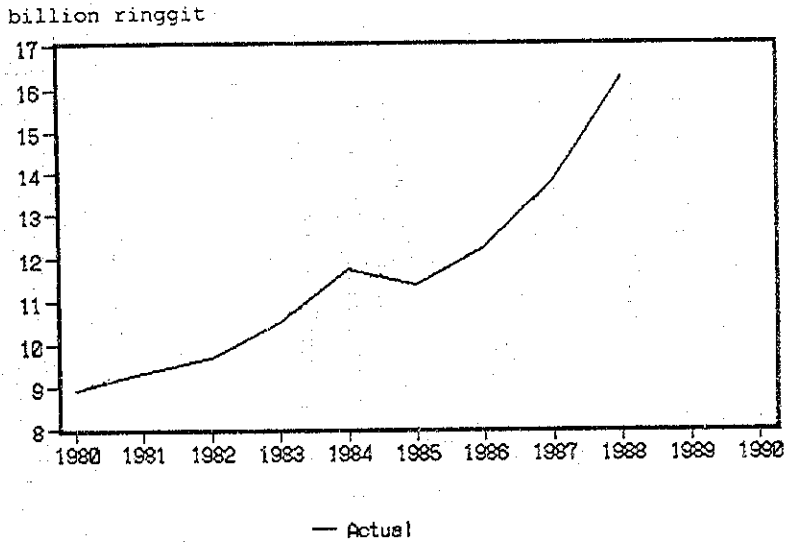


Figure-3.2.1.4 GDP (Manufacturing) in Malaysia

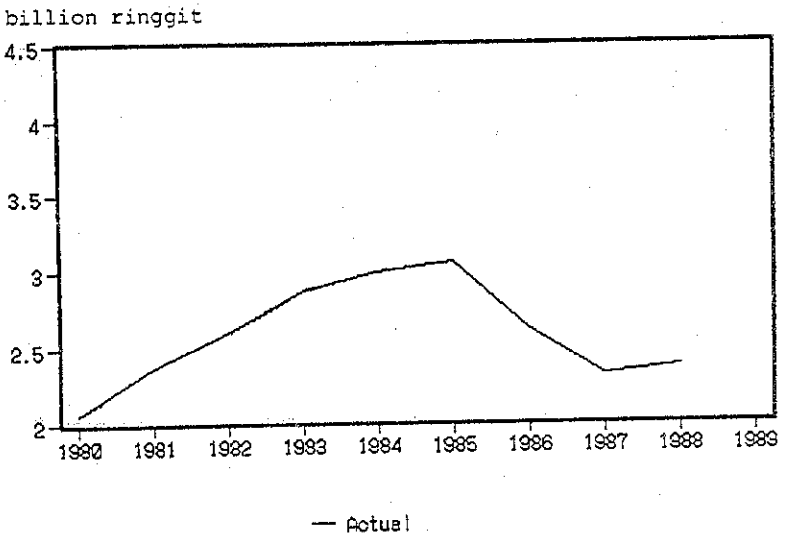


Figure-3.2.1.5 GDP (Construction) in Malaysia

3.2.2 Gross domestic product in Sarawak

GDP by industrial sector in Sarawak is shown in Table-3.2.2.1 and Figure-3.2.2.1. The mining sector had the biggest share, 31.7% in 1988, followed by "services", "manufacturing" and "forestry" which had shares of 14.2%, 14.0% and 13.2% in 1988, respectively. Figure-3.2.2.2 shows the changes in annual growth rate against the previous year of GDP in Sarawak form 1980 to 1988. According to this figure, the growth rate fell after recording its peak level in 1983.

Figure-3.2.2.3 to Figure-3.2.2.8 show GDP of each respective sector. It is possible to derive from these figures that "agriculture," "forestry," "manufacturing" and "transport" grew, while "mining" leveled off and "construction" declined.

Table-3.2.2.1 GDP by Industry Sector in Sarawak

(million ringgit)

year	agriculture	Forestry	Mining	Manufactur	Constraction	Transport	Services	buchasers' value
1980	516	459	1064	231	164	117	526	3488
1981	472	476	1089	239	216	138	569	3679
1982	465	620	1174	252	228	148	616	3991
1983	482	657	1543	384	225	171	659	4599
1984	475	623	1799	548	234	193	711	5090
1985	502	656	1805	622	260	214	760	5291
1986	520	629	1899	691	229	239	732	5397
1987	540	714	1798	751	204	250	761	5483
1988	598	752	1804	794	193	268	806	5685

livestock and fishing sectors included in "agriculture". (Source: Sarawak Report 88)

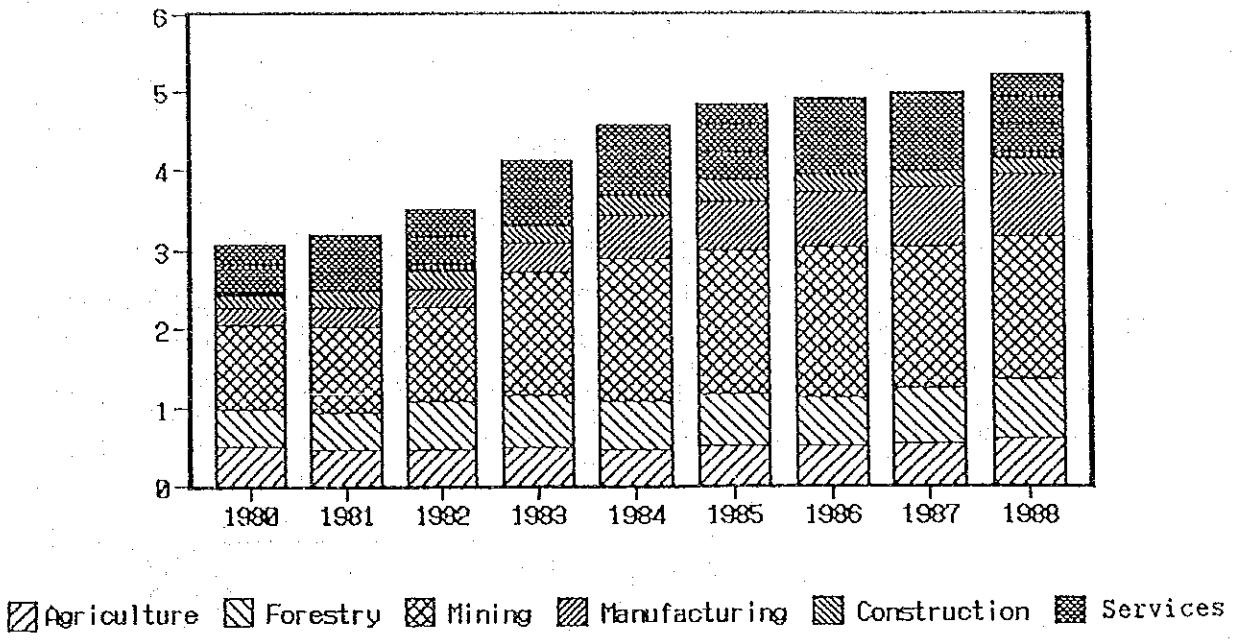


Figure-3.2.2.1 GDP by Industry in Sarawak
(Billion Ringgit)

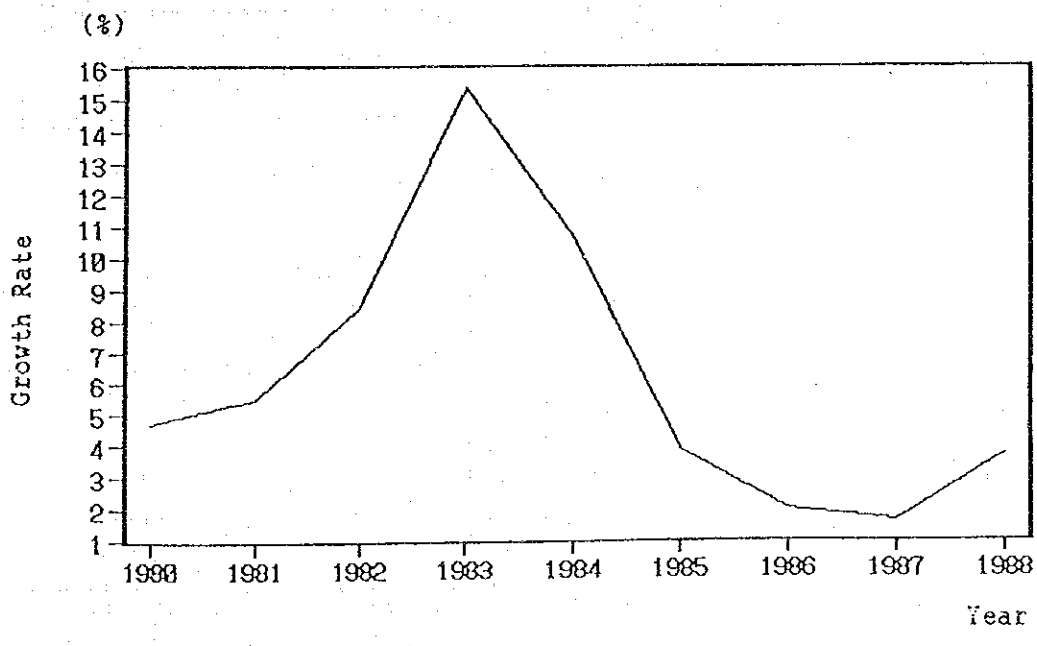


Figure-3.2.2.2 Growth Rate of GDP in
Purchasers Value in Sarawak

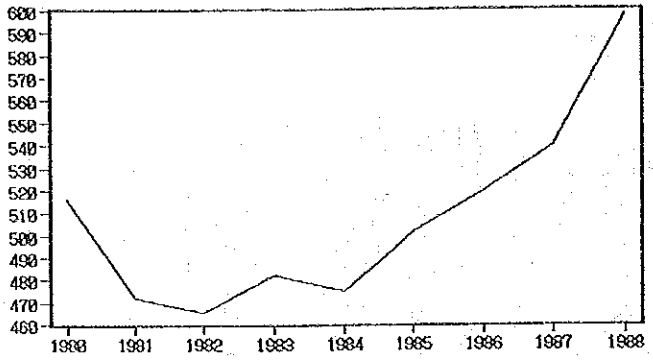


Figure-3.2.2.3
GDP of Agricultural Sector
in Sarawak (Million Ringgit)

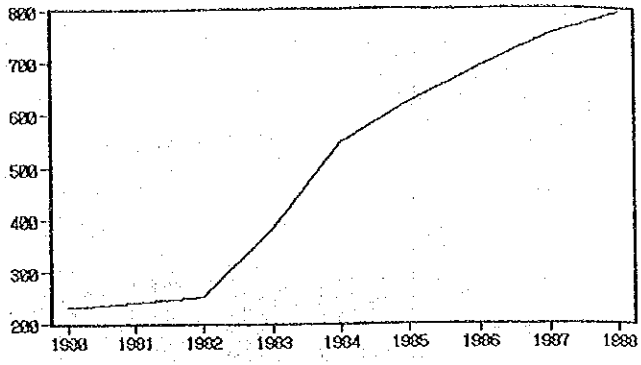


Figure-3.2.2.6
GDP of Manufacturing Sector
in Sarawak (Million Ringgit)

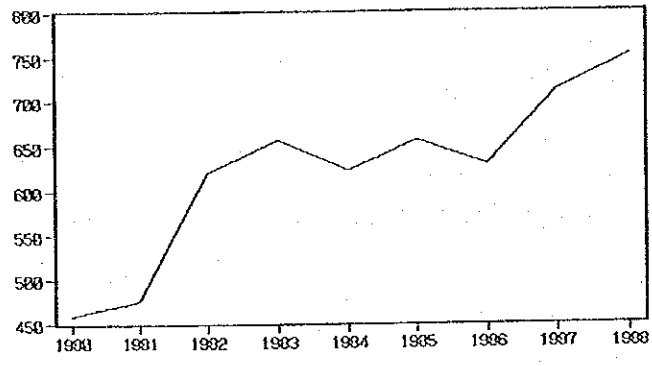


Figure-3.2.2.4
GDP of Forestry Sector
in Sarawak (Million Ringgit)

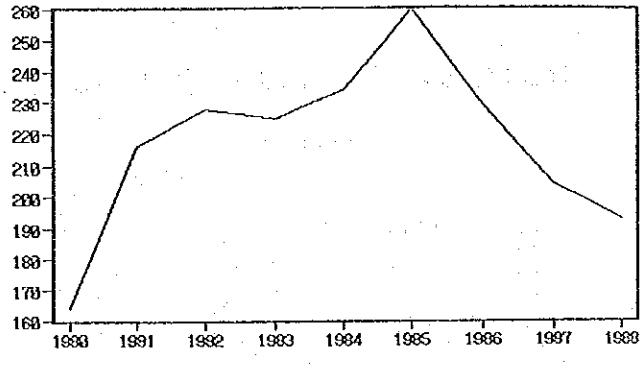


Figure-3.2.2.7
GDP of Construction Sector
in Sarawak (Million Ringgit)

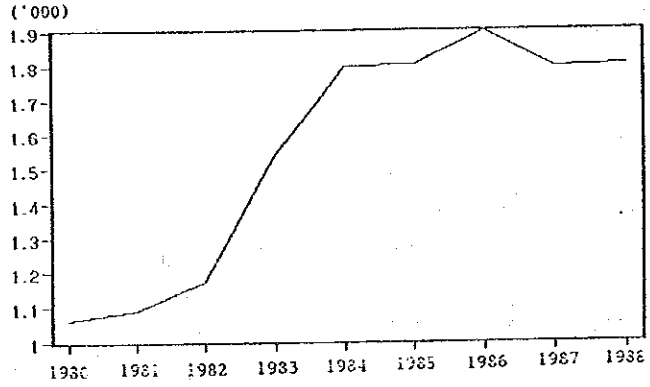


Figure-3.2.2.5
GDP of Mining Sector
in Sarawak (Million Ringgit)

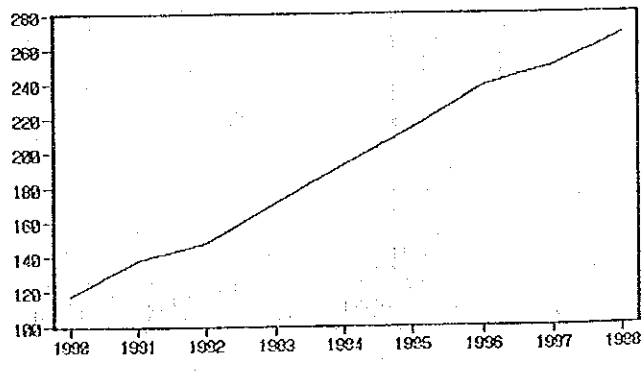


Figure-3.2.2.8
GDP of Transport Sector
in Sarawak (Million Ringgit)

3.3 Transportation

Transportation facilities in Sarawak are shown in **Figure-3.3.0.1.**

3.3.1 Air transportation

Air routes in Malaysia are shown in **Figure-3.3.1.1, Table-3.3.1.1** shows the frequency of the service in Sarawak.

There are 4 main airports in Sarawak: Kuching, Sibu, Bintulu and Miri between which the Malaysian Airlines System (MAS) operates domestic services. Kuching and Miri airports can accommodate larger planes, such as Air bus 300; this type of aircraft is operated on the Kuching-Miri route as well as on international routes.

The routes among the cities such as kuching, Sibu, Bintula and Miri are served by Fokker 50s, which have a seating capacity of 50. The demand on the Kuching-Sibu route is particularly high, resulting in 93 flights per week.

There are 11 smaller airfields; Mukah, Marudi, Limbang, Lawas, Kapit, Belaga and etc. Other airstrips are located in the remote areas of Marudi and Lawas Districts (Bario, Long Semado, etc.). The Rural Air Service of the MAS operates Twin Otters with capacities of 19 seats between these smaller towns.

Table-3.3.1.1 Trip Frequencies Air Transport / Per Week

		- To -									
		1	2	3	4	5	6	7	8	9	10
- From -	1-Kuching	-	93	3	0	0	50	79	0	0	0
	2-Sibu	93	-	17	2	0	34	49	3	0	0
	3-Mukah	3	17	-	0	0	2	7	0	0	0
	4-Kapit	0	2	0	-	2	0	0	0	0	0
	5-Belaga	0	2	0	2	-	0	0	0	0	0
	6-Bintilu	50	34	2	0	0	-	23	0	0	0
	7-Miri	70	48	7	0	0	16	-	23	43	27
	8-Marudi	0	3	0	0	0	0	23	-	0	0
	9-Limbang	0	0	0	0	0	0	42	0	-	9
	10-Lawas	0	0	0	0	0	0	26	0	8	-

Soure: ABC World Airways Guide - January 1991

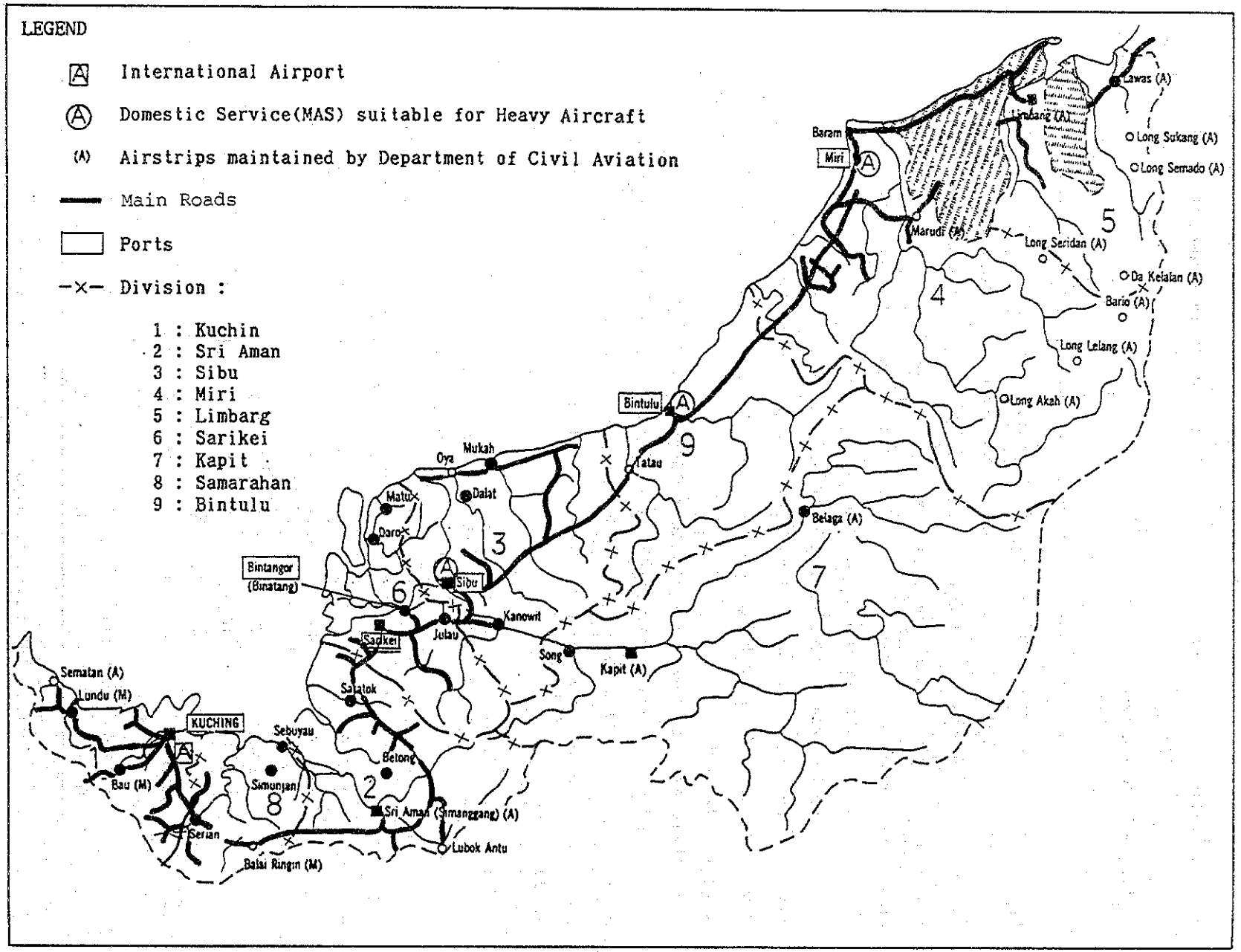


Figure-3.3.0.1 Transportation Facilities in Sarawak

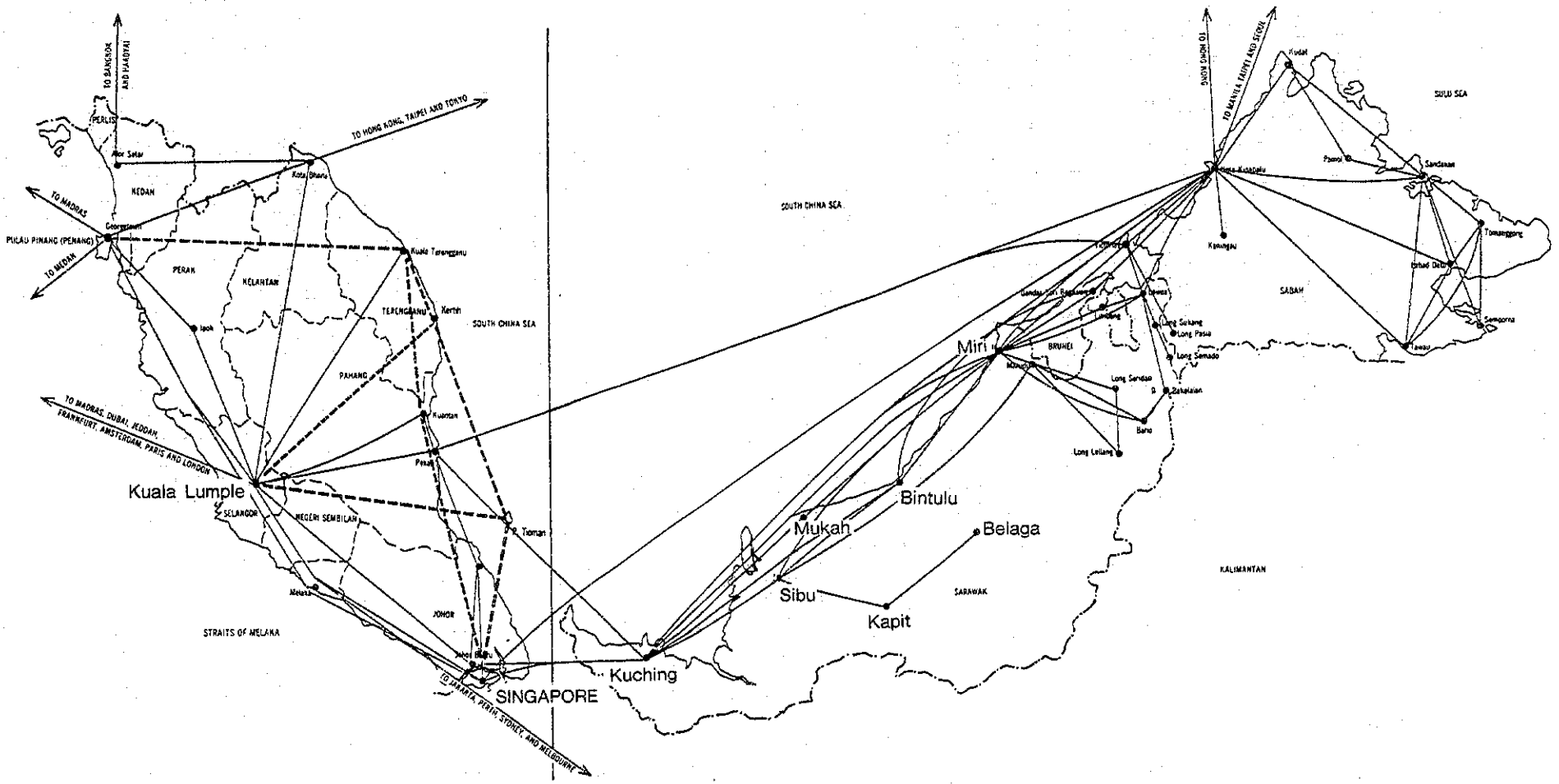


Figure-3.3.1.1 Air Routes in Sarawak

3.3.2 Land transportation

(1) Road network in the lower Rajang River area

Generally, the road network in the Rajang Valley is not well developed. Existing and proposed roads are shown in **Figure-3.3.2.1.** There are only a few bitumen roads. About half of the trunk road (kuching-Sibu-Bintulu-Miri) is not yet sealed with bitumen and there is no bridge over the Rajang River. Almost all sections of the road from Labas village to the ferry dock at the Rajang River are only gravel-surfaced, but are now being reconstructed. However, various road construction plans have been proposed for other areas in the valley. A road from Sarikei to Tg. Manis has been proposed, for example. The road from Belawai to Rajang Village has already been constructed and gravel-surfaced. Inaddition, a road is under construction from Rajang Village to Tg. Sebubal and a bridge across Sg. Selmit (near Rajang Village) on the road will be constructed soon.

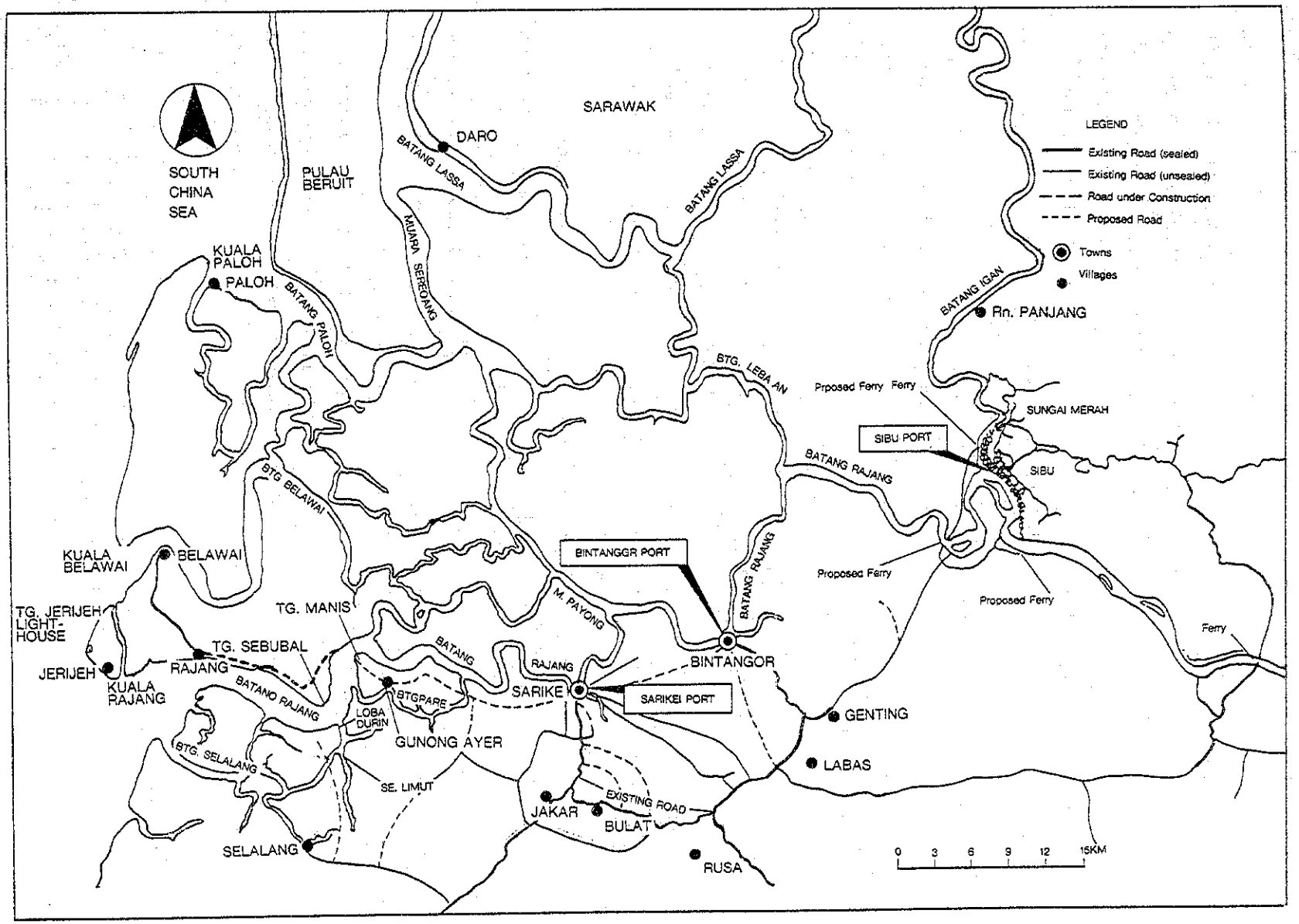


Figure-3.3.2.1 Road Network in the Lower Rajang River Area

3.3.3 Water transportation

As for coastal and riverine transportation in Sarawak, a detailed study, "Master Plan Study for Coastal and Riverine Transportation in Sarawak," 1990, has been already conducted by the Sarawak State Government. A detailed view of water transportation can be obtained from the study report. In addition, the State Government has set up a new organization for water transportation and has already started improving the infrastructures according to recommendations in the study.

(1) Passenger boat service

The scheduled passenger boat services and routes are shown in **Figure-3.3.3.1.** Passenger boat routes from Sibu are summarized in the **Table-3.3.3.1,** based on a survey carried out on 26 and 27 September 1990.

Service between Sibu and Kuching is provided by coastal passenger boats. Passengers from Kuching are transferred to smaller express boats on their arrival at Sarikei. From there the express boats take the passengers to Sibu. Passengers traveling from Sibu to Kuching are handled in the same way, i.e., they transfer from an express boat to a larger coastal passenger boat at Sarikei. The reason is that coastal passenger boats, larger than express boats, being used between Kuching and Sarikei are not permitted to travel upstream from Sarikei because of prevention of bank erosion.

Apart from the scheduled services listed in **Table-3.3.3.1,** there are regular local services for small villages such as Paradom, factories, schools, etc. along the river within a 10 km distance from the town of Sibu. These services are at 30-minute intervals during peak hours and hourly otherwise. They pick up or discharge passengers when requested at any jetty on the way. There are not more than 10 vessels providing such service, and the number of passengers is at least a few hundreds per day.

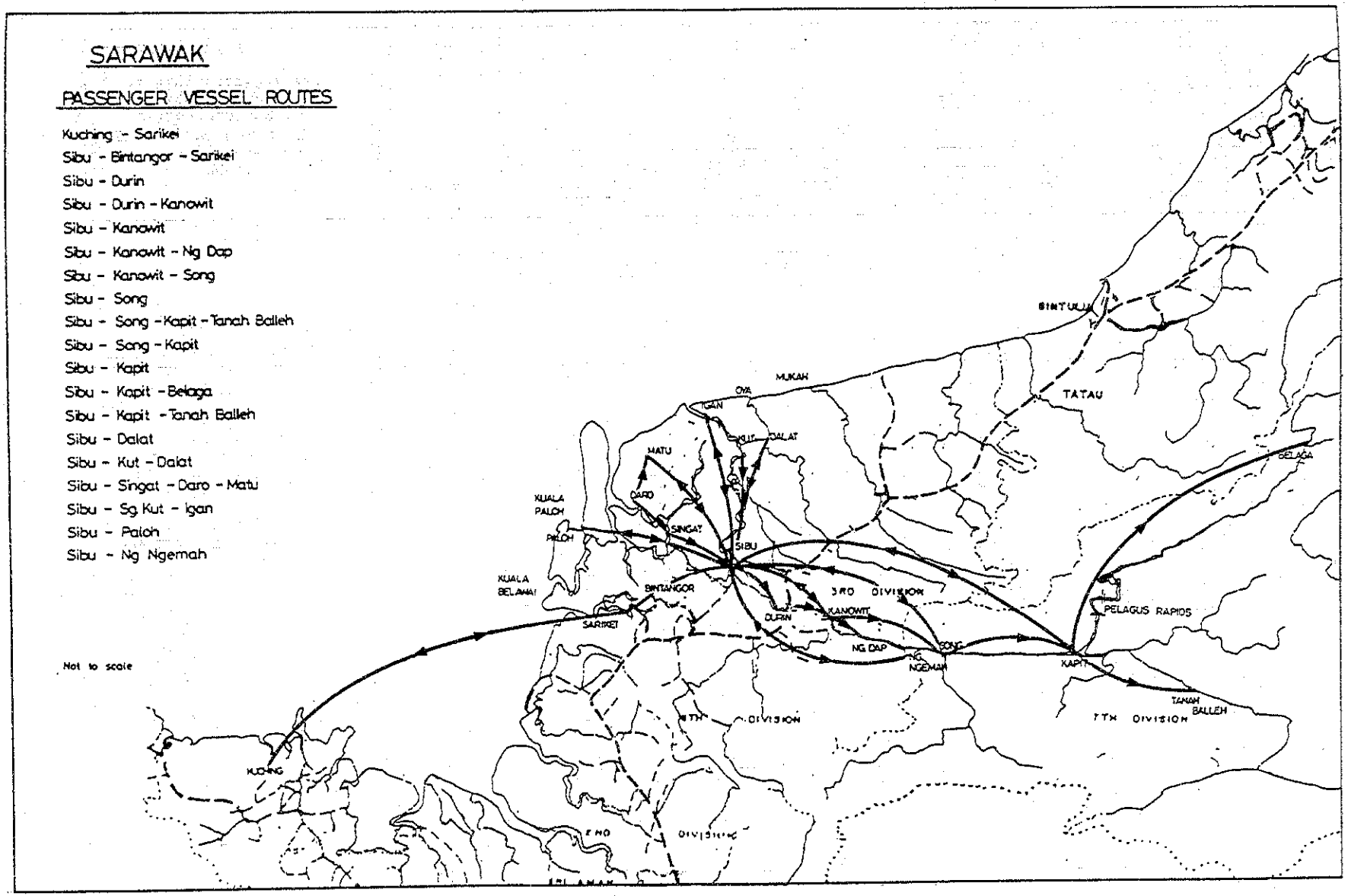


Figure-3.3.3.1 Passenger Vessel Routes

Table-3.3.3.1 Passenger Boat Services

ROUTE	DISTANCE (km)	Schedule			Result of Survey (26 and 27 September 1990)			
		FREQUENCY TRIP/DAY OUTWARD	RETURN	TOTAL NOS OF BOAT ON ROUTE	OUTWARD TRIP FREQUENCY TRIP/DAY	NOS OF PASSENGER	RETURN TRIP FREQUENCY TRIP/DAY	NOS OF PASSENGER
Sibu-Durin	20	11	11	8	11	230	11	250
Sibu-Durin-Kanowit	50	5	5	4	5	91	5	86
Sibu-Kanowit	50	5	5	4	5	80	5	68
Sibu-Kanowit-Ng Dap	70	4	4	4	4	71	4	60
Sibu-Kanowit-Song	100	2	2	2	2	23	2	22
Sibu-Song	100	1	1	1	1	10	1	10
Sibu-Song-Kapit-Tanah Balleh		1	1	1	1	35	1	34
Sibu-Song-Kapit	150	4	4	5	4	100	4	113
Sibu-Kapit	150	5	5	8	5	84	5	92
Sibu-Kapit-Belaga	310	1	0*	1	1	2	1*	11
Sibu-Kapit-Belaga-Bakun		1	1	2	1	19	1	19
Sibu-Kapit-Mawai		1	1	1	1	26	1	10
Sibu-Kapit-Tanah Balleh		1	1#	1	1#	40	1#	33
Sibu-Kapit-Putai	250	1	0*	1	1	7	1*	16
Sibu-Dalat	100	1	0*	1	1	12	1*	10
Sibu-Kuit-Dalat	100	1	0*	1	1	8	1*	12
Sibu-Singat-Daro-Kuit-Matu	110	1	0*	1	1	9	1*	9
Sibu-Penasu-Semah-Semop		1	0*	1	1	20	1*	50
Sibu-Sg.Kuit-Igan	80	1	1	2	1	23	1	33
Sibu-Paloh		1	0*	1	1	30	1*	20
Sibu-Ng Ngemah	80	1	1#	1	1#	20	1#	30

NOTE: * Return trip on following day

\# Alternate day

SCHEDULED PASSENGER SERVICES AT SARIKEI WHARF

ROUTE	DISTANCE (km)	FREQUENCY TRIP/DAY OUTWARD	RETURN	TOTAL NOS OF BOAT ON ROUTE	OUTWARD TRIP FREQUENCY TRIP/DAY	NOS OF PASSENGER	RETURN TRIP FREQUENCY TRIP/DAY	NOS OF PASSENGER
SIBU-BINTANGOR-SARIKEI	65	21	17	28	21		17	
1. Sibu-Bintangor						150		133
2. Sibu-Sarikei						626		586
3. Bintangor-Sarikei						111		110
SARIKEI-KUCHING	180	2	2	4	2	228	2	191

(2) Coastal and riverine cargo transportation

Most coastal and riverine cargo vessels are operated on fixed routes but not on fixed schedules, except for three vessels, namely, Rajah Mas, Soon Bee II and Hong Lee, which are operated on the Kuching-Sarikei-Bintangor-Sibu route. The private companies, some of which are sole proprietors, who own one or more vessels, determine the routes and times of trips themselves. Most of the vessels do not have fixed schedules because they sail only if there is sufficient cargo or if there is awaiting cargo at the destinated port of call.

Generally coastal cargo vessels have GRTs ranging from 250 to 890 tons. Their overall lengths range from about 35m to 58m and the breadth from 7m to 13m. The draft range is from 2m to 3.4m.

Most of the general cargo vessels adhere to their fixed routes although sometimes some of them occasionally depart from their fixed routes when the need arises. These fixed routes are indicated in **Figure-3.3.3.2** and-**3.3.3.3** and are explained below:

KUCHING-SARIKEI-BINTANGOR-SIBU

There are three vessels carrying cargos on this route. These three vessels also keep fixed schedules, as shown in **Table-3.3.3.2.**

Table-3.3.3.2 Vessel schedule of Kuching-Sarikei-Bintangor-Sibu

VESSEL	SIBU-SAREKEI-KUCHING	KUCHING-SAREKEI-SIBU
M.V. RAJAH MAS	Wednesday 12:00 Hrs Saturday 12:00 Hrs	Monday 18:00 Hrs Thursday 18:00 Hrs
M.V. HONG LEE	Monday 11:00 Hrs Friday 11:00 Hrs	Wednesday 18:00 Hrs Saturday 18:00 Hrs
M.V. SOON BEE II	Monday 11:00 Hrs Thursday 11:00 Hrs	Tuesday 18:00 Hrs Saturday 18:00 Hrs

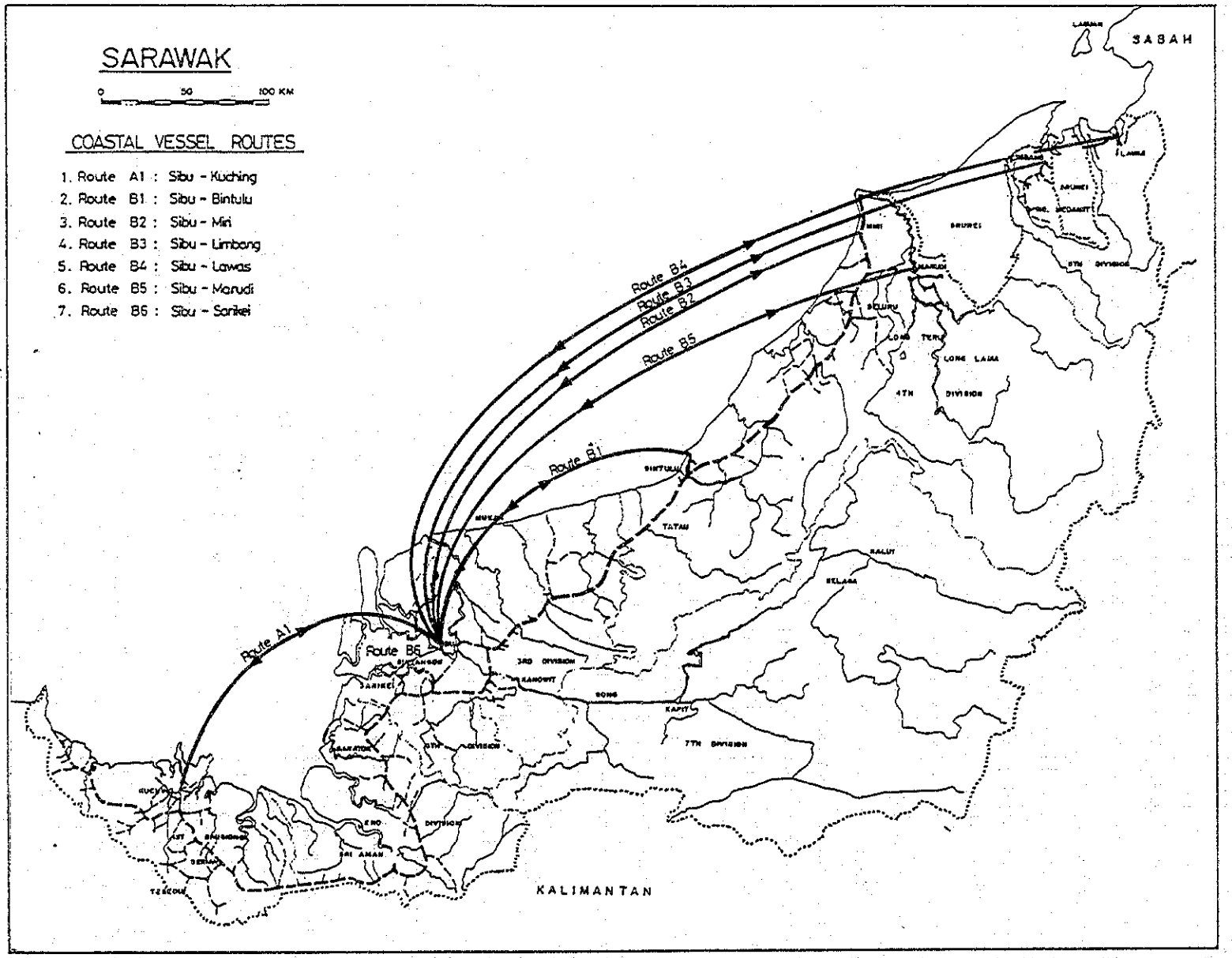


Figure-3.3.3.2 Coastal Vessel Routes

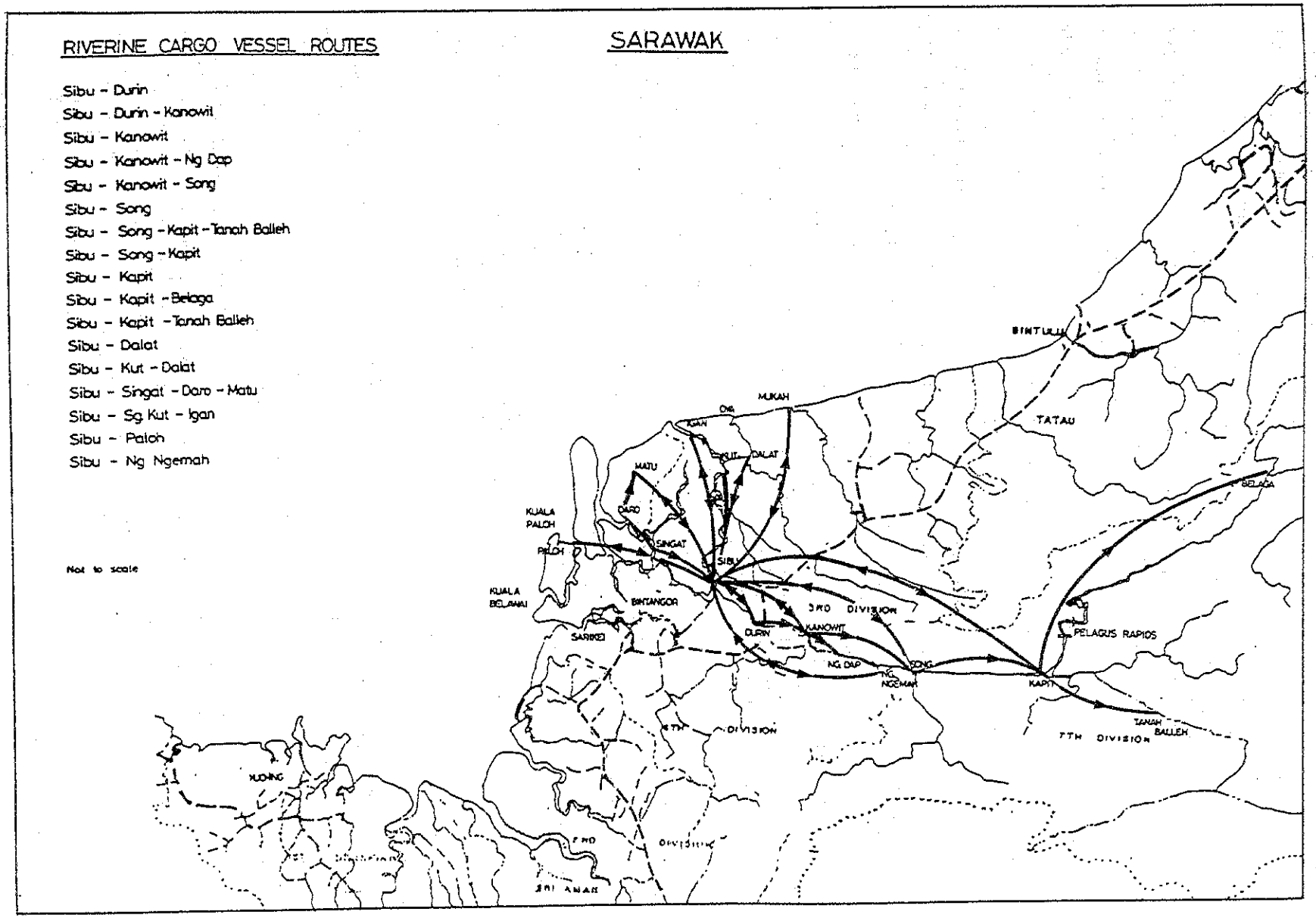


Figure-3.3.3.3 Riverine Cargo Vessel Routes

The above schedule is daily advertised in the local papers. Although the port of Bintangor is not mentioned in the schedules, the vessel may call there if there is cargo to be discharged or collected. If, however, there is no cargo, then the vessels will not call at Bintangor. On the average, each of these three vessels makes a total of 98 trips per year. Sarikei is an intermediate port of call. Depending on the cargo to be discharged, the vessels may call at Sarikei once or in both directions. However, the usual stay in the Port of Sarikei seldom exceeds three hours. In Sibu or Kuching, the vessels usually stay for less than 24 hours.

All three of these vessels shown in **Tabale-3.3.3.3** call at private wharves in Sibu and also in Kuching. In Sarikei, these vessels use the Sri Sarikei Private Wharf and the Sarikei Government Wharf.

In contrast to the above-mentioned three vessels, which use only private wharves at Sibu, vessels carrying general cargo on the following routes all use the Government wharves at Sibu.

SIBU-BINTULU

Four vessels are on this route. These are the Rakiah, Soon Huat, Soon Ming and Me Kwong I. Apart from general cargo, they carry sand and gravel, construction materials, etc.

SIBU-MIRI

Four vessels are on this route, namely, the Sung Hai Kee, Wan Nieng No. 2 and Man King.

SIBU-LIMBANG

The two vessels on this route are the Man King (22 sailings per year) and Soon Hai Aik (48 sailings per year).

SIBU-LAWAS

The four vessels on this route are the Man King (22 sailings per year), Gedong Djaya (5 sailings per year), Soon Hai Aik (48 sailings per year) and Siong Kheng No. 2.

SIBU-MARUDI

The Tuong King does 24 sailings per year on this route.

OTHERS

There are other vessels, particularly barges, which do not operate on fixed routes and the destinations are solely dependent on the cargo. These vessels or barges are operated on charter or hire basis or on contract very ofen. Crushed stones, sand and gravel, rice and cement are usually transported on a contract basis. The contracts are signed between the ship owners and the trading companies, manufacturers or organizations such as the Padi Board.

3.4 Port Facilities of Rajang Port

The present condition of the main port facilities of Rajang Port is described below.

3.4.1 Wharf facilities

(1) General

There are three types of wharf facilities. One is the RPA's, second is the State Government's and third is private sector's.

The RPA has wharves at Sibu, Sarikei, Bintangor and Sungai Merah under its control. State Government wharves are basically under the jurisdiction of the Marine Department, although they are constructed by the JKR. And there are many private wharves. Most of them are used exclusively by their owners, whilst others are for general use with charges. The private wharves are usually related to specific traffic such as timber products, sand and gravel, etc.

(2) The RPA wharves

A brief description of the wharf facilities of the RPA is shown in **Table-3.4.1.1.**

1) Sibu

Sibu is the main port of the RPA. The location map and wharf facilities are shown in **Figures-3.4.1.1** and **3.4.1.2.**

The total length of the wharf is 443.6 metres and the wharf can provide 5 berths. The wharf consists of two sections:the old wharf of 148 metres length with an apron 8.5 metres wide, and a new wharf of 295.6 metres length with an apron of 18.3 metres wide. The berthing lines of the new and old wharves are in a straight line.

The facilities handle general cargo, and the new wharf also handles containers.

2) Sarikei

Sarikei wharf is on the left bank of the Rajang River, about 48 km from the entrance of the river. The location map and wharf facilities are shown in **Figures-3.4.1.3** and **3.4.1.4.**

Table-3.4.1.1 Present Mooring Facilities of the RPA

Centre	Type of Berth	No.of Berth	Length (metres)	Depth (metres)	Width (metres)	Year of Build	Structure	Maximum Vessel Size
Sibu	General Cargo	3	148	8.5	8.5	1933/ 1954	Reinforced Concrete	6.000 DWT
	General Cargo/ Container	2	295.6	8.5	18.3	1977	Reinforced Concrete with Prestressed Concrete Piles	12,500 DWT
Sarikei	General Cargo	1	60.4	7.6	9.1	1971	Reinforced Concrete	3.000 DWT
Bintangor	General Cargo	1	48.5	4.6	6.1	1989	Reinforced Concrete	
Sungai Merah	Bulk oil	1	48.8	4.6	8.2	1986	Reinforced Concrete	74.7m LOA

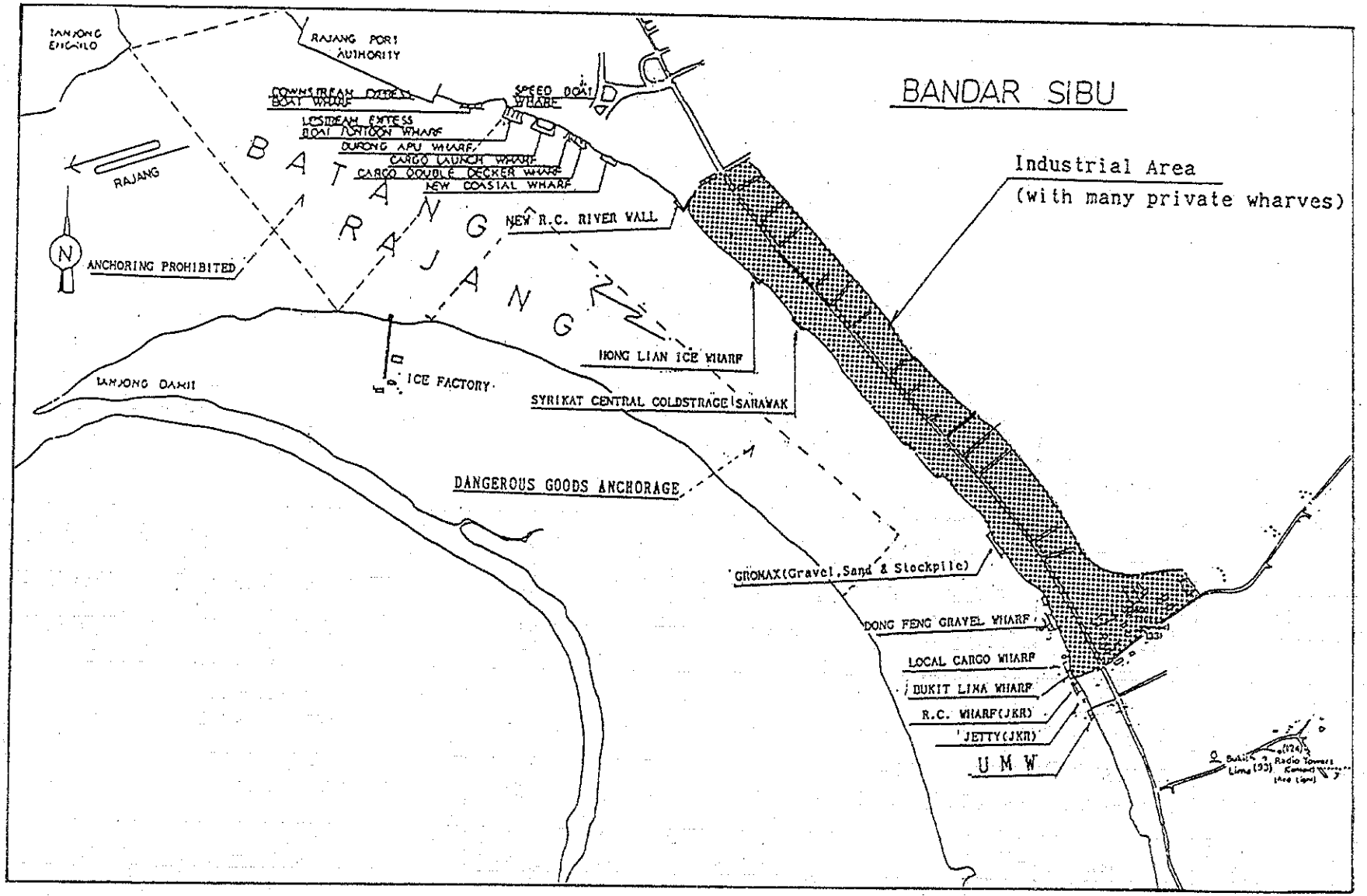


Figure-3.4.1.1 Wharves in Sibu Area (Location Map)

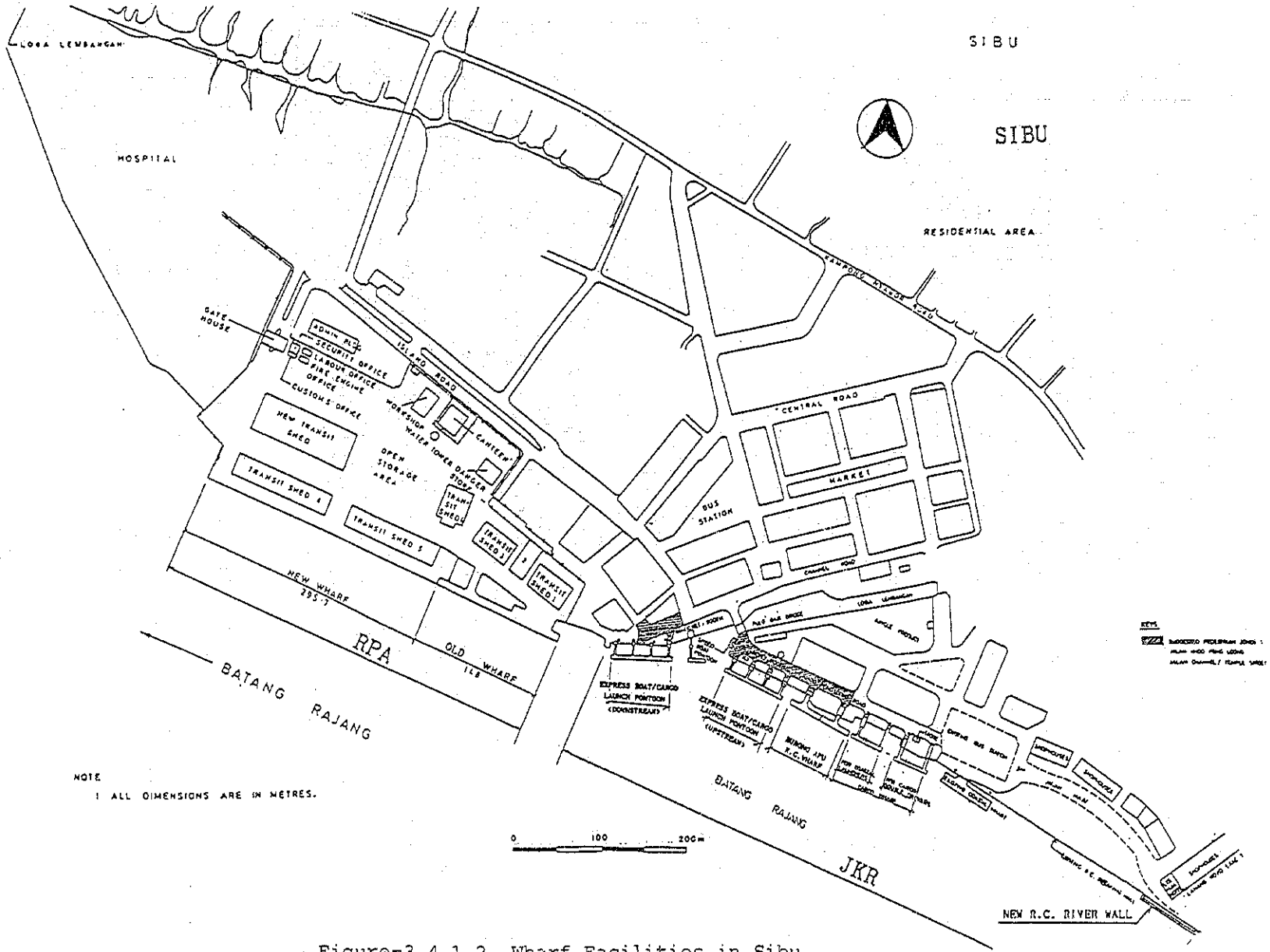
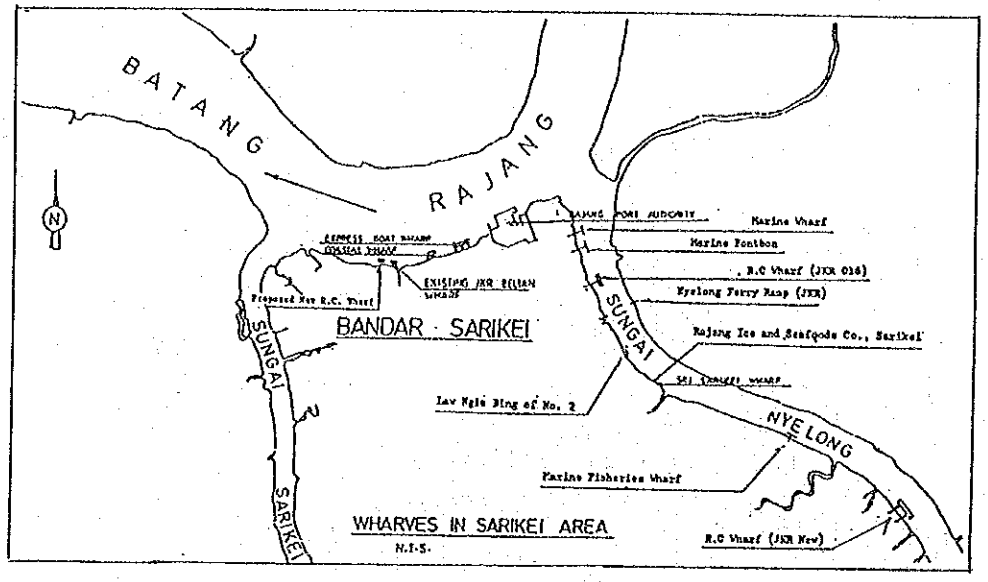


Figure-3.4.1.2 Wharf Facilities in Sibu



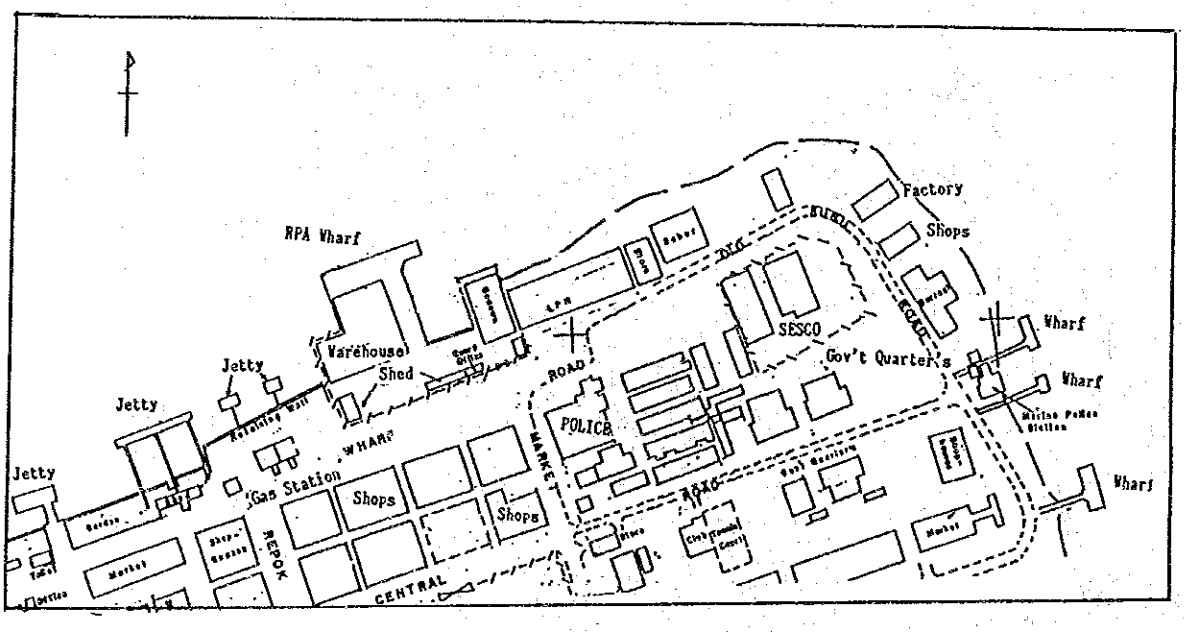


Figure-3.4.1.3 Wharves in Sarikei Area (Location Map)

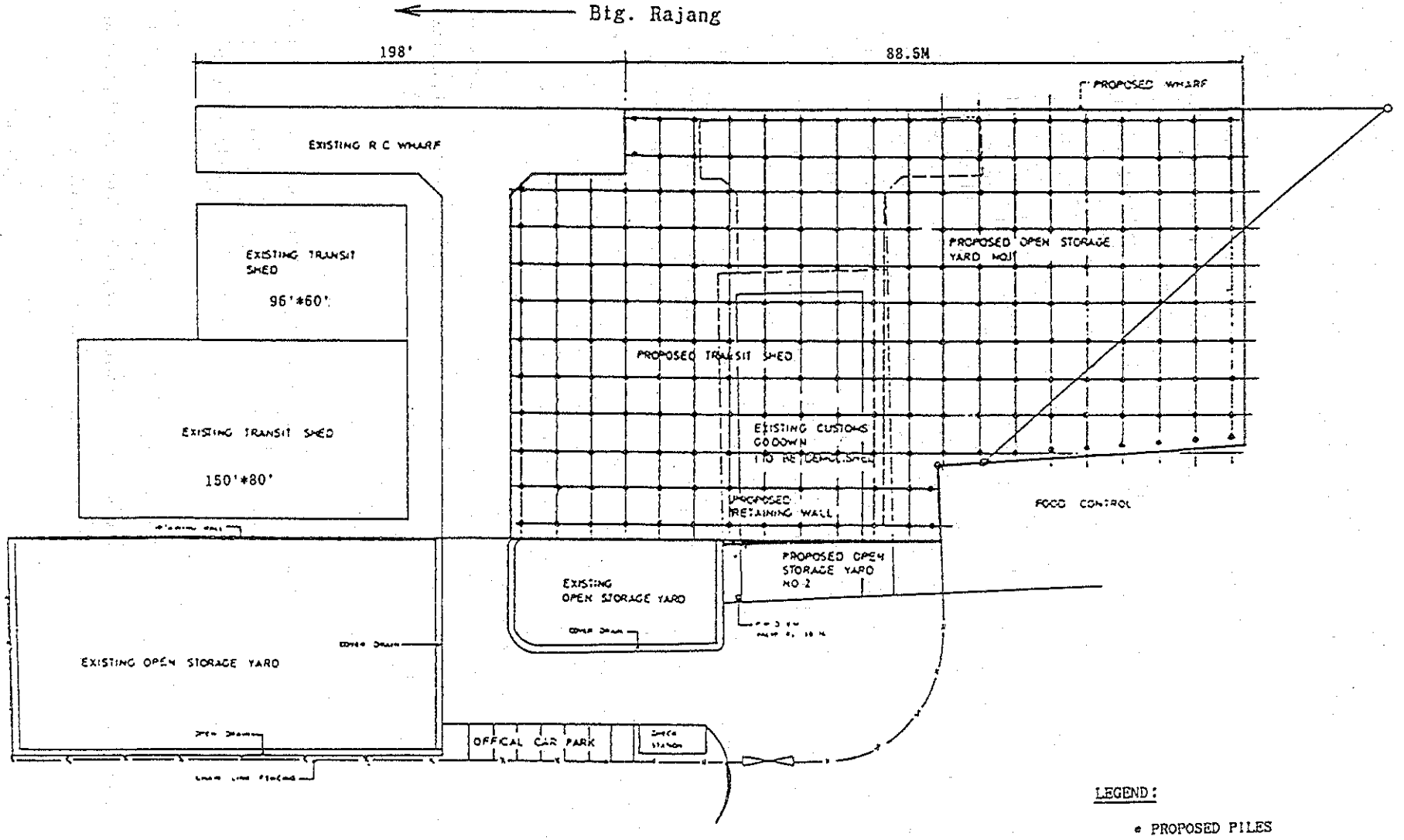


Figure-3.4.1.4 RPA Wharf Facilities in Sarikei

The length of the wharf is 60.4 metres with an apron 9.1 metres wide. It can provide one single berth and handles general cargo.

3) Bintangor

Bintangor wharf is situated 66 km above the Rajang River mouth. The location map and the wharf facilities are shown in **Figures-3.4.1.5** and **3.4.1.6.** The length of the wharf is 48.5 metres with an apron 6.1 metres wide. It can provide one single berth and handles general cargo.

4) Sungai Merah

Sungai Merah wharf is situated on the eastern bank of the Igan River, about 4.8km downstream of the junction with the Rajang River. The location map and the wharf facility are shown in **Figures-3.4.1.7** and **3.4.1.8.**

The length of the wharf is 48.8 metres with an apron 8.2 metres wide. It can provide one single berth. It handles bulk oil and is used by 2 petroleum companies, which have adjacent storage and distribution depots.

(3) State Government wharves

There are several State Government wharves which are used extensively by all types of coastal and inland waterway vessels for cargo as well as for passengers. None of the Government wharves are provided with storage facilities, and consequently all cargo is handled in direct delivery. Moreover, none of the Government wharves are provided with water and fuel supply lines.

A brief description of the wharf facilities of the State Government are shown in **Table-3.4.1.2** and the layout plans are shown from **Appendix-I.3.4.1** to **I.3.4.5.**

(4) Private wharves

There are many private wharves in Rajang Port. In particular, there are many private wharves in Sibu. Most of them are used exclusively by their owners and they are related to specific traffic such as timber products, sand and gravel, etc.

There are 3 wharves in Sibu and 1 wharf in Sarikei which are used by general cargo vessels. These are shown in **Table-3.4.1.3.** The location map of the main private wharves in Sibu is shown in **Appendix-I.3.4.6.**

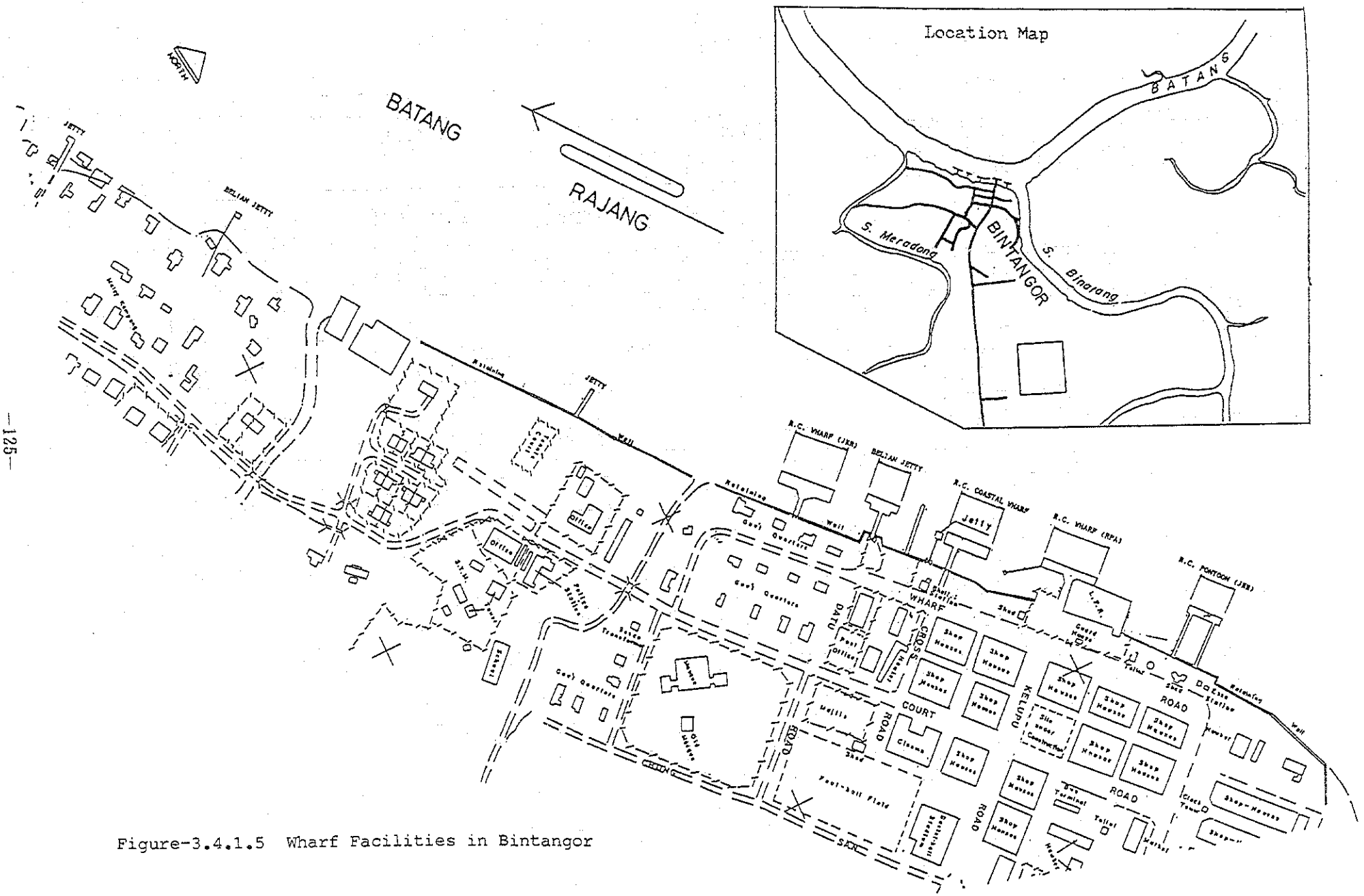


Figure-3.4.1.5 Wharf Facilities in Bintangor

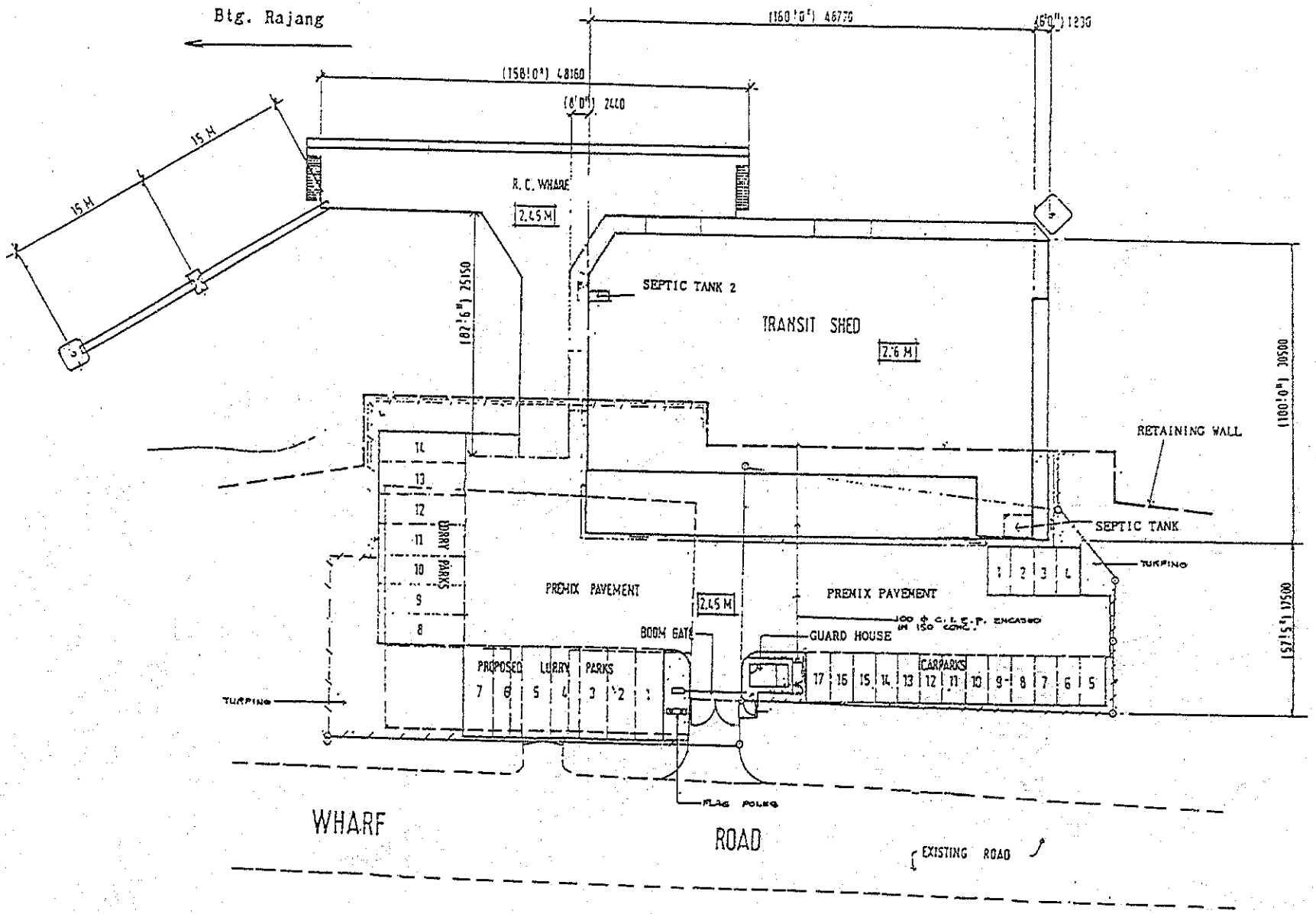


Figure-3.4.1.6 RPA Wharf Facilities in Bintangor

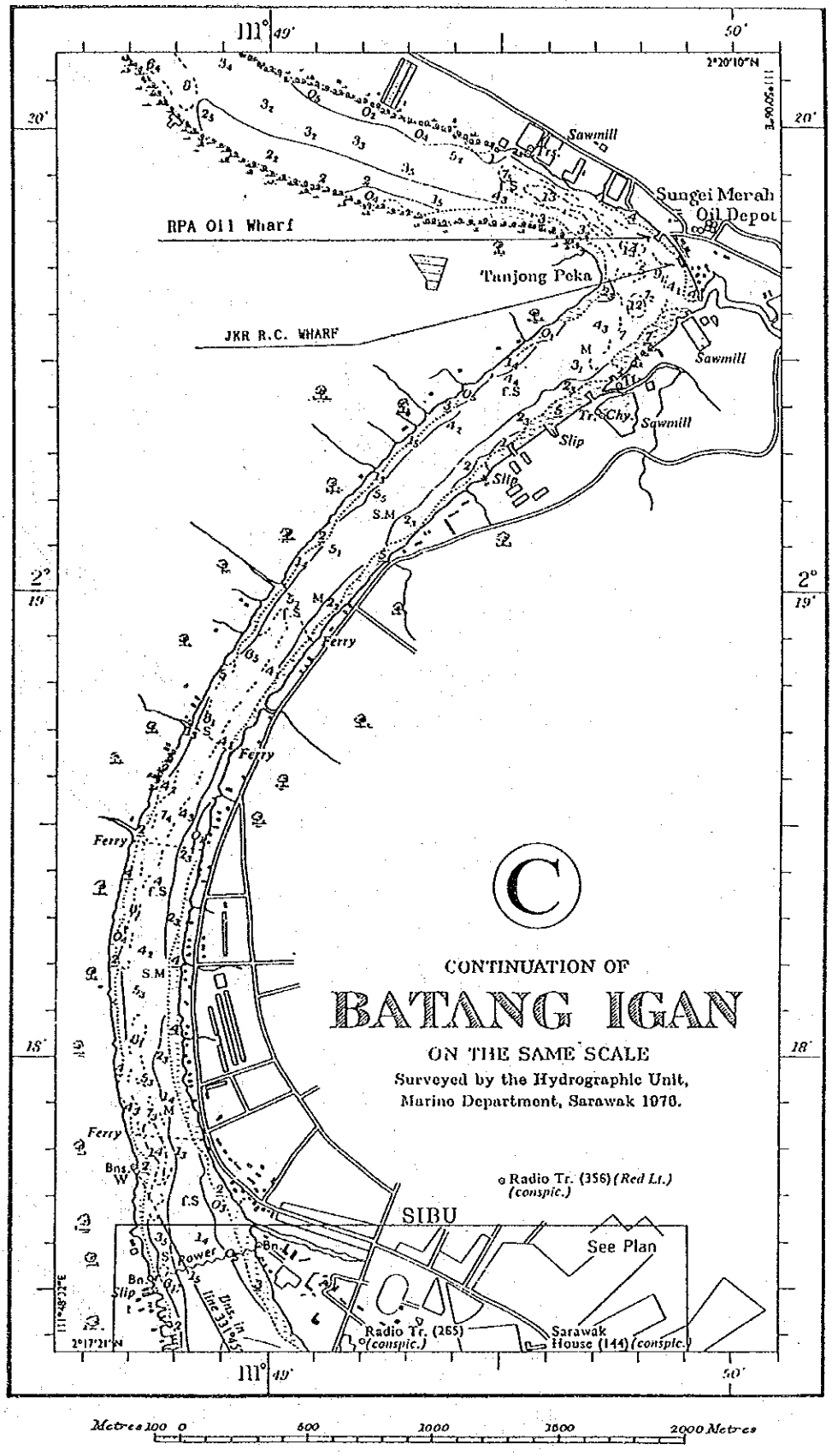


Figure-3.4.1.7 Wharves in Sungei Merah Area

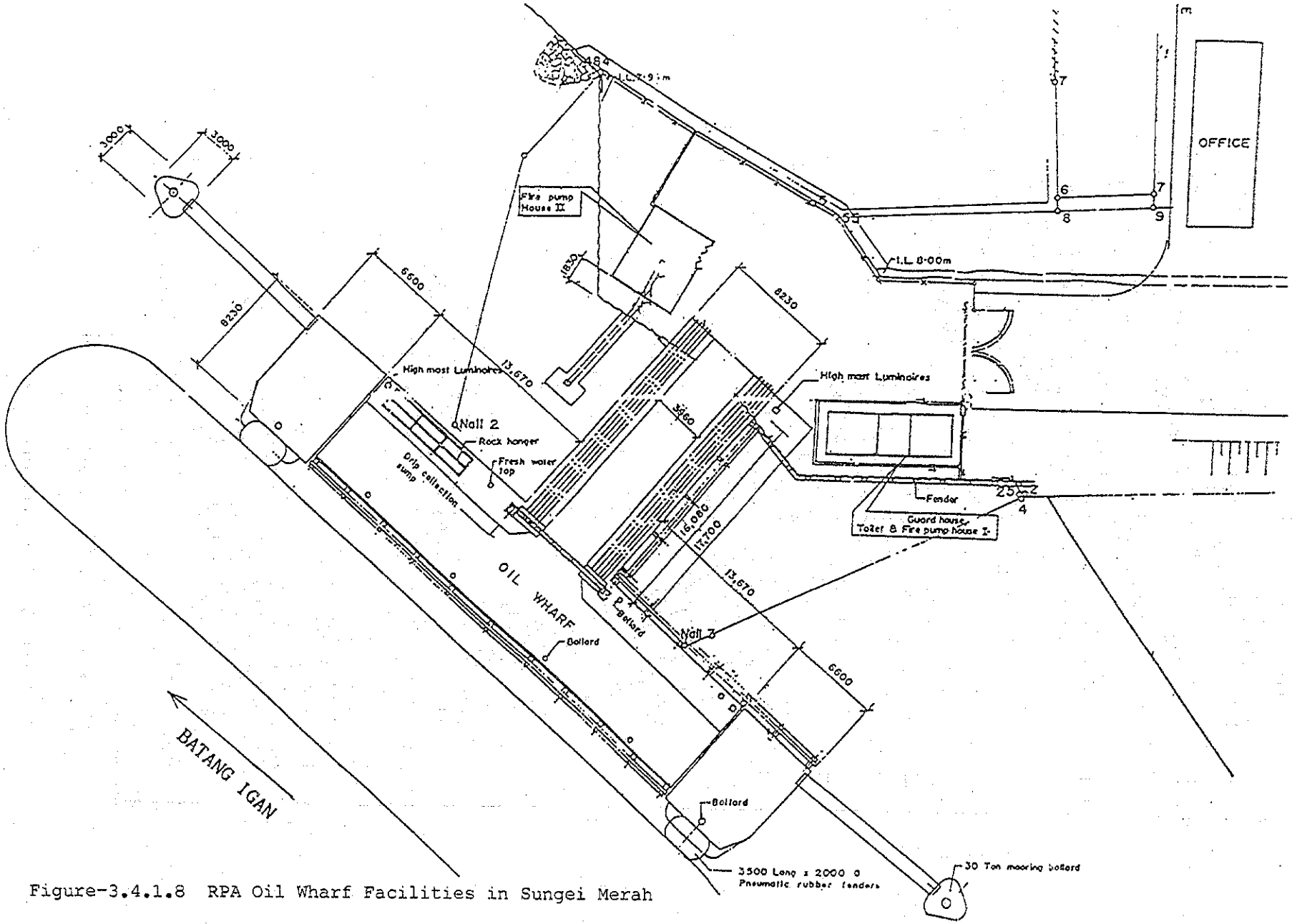


Figure-3.4.1.8 RPA Oil Wharf Facilities in Sungei Merah

Table-3.4.1.2 Present Wharf Facilities of the State Government

Centre	Name of Warf	Warf Width	Approach	Year of Build	Struture	Notes
Sibu	New Coastal Warf	60m x 10m width	5.5m x 9-17m width		Reinforced concrete structure on steel box piles.	1. Can only be operated with ship's gear 2. Direct handling of cargo. 3. Ships are moored 2 or more parallel to the quay.
	Cargo Double-Deckers Warf	70m x 4.3m width	2 Nos. 10m x 2.5m width		7 Nos.R.C. Pontoons (10m x 4.3m wide each)	1. Manual cargo handling. 2. Trucks parked at the entrance of wharf to receive /discharge cargo. Space sufficient for 1 truck only. 3. Ship mooring perpendicular to wharf.
	Cargo Launches Wharf	70m x 4.3m width	2 Nos. 10m x 2.5m width		7 Nos.R.C. Pontoons (10m x 4.3m wide each)	1. Manual cargo hndling. 2. Trucks parked at the entrance of wharf to receive /discharge cargo. 3. Ship mooring parallel to wharf.
	Burong APU Wharf	75m x 7m width	2 Nos. 8.5m x 6m width		Reinforced concrete structure on R.C. piles.	
	Upstream Express Boat Pontoon Wharf	70m x 4.3m width	2 Nos. 10m x 2.5m width		7 Nos.R.C. Pontoons connected horizontally.	Passenger vessels to Song, Kapit, Belaga, Belaga, Daro, Igan.
	Downstream Express Boat Pontoon Wharf	70m x 4.3m width	2 Nos. 10m x 2.5m width		7 Nos.R.C. Pontoons connected horizontally.	Passenger vessels to Bintangor, Sarikei, Labaan, Paloh, etc.
Sarikei	Coastal Commercial Wharf	26 x 9m width	16.5m x 4.5m width	1978	Reinforced concrete deck supported on R.C. piles	Turning of trucks on the wharf not possible.
	Express Boat Pontoon Wharf	50m x 4.5m width	3 Nos. 10.8m x 2.4m width	1986	5 Nos. Reinforced Concrete Pontoon	Express Boat to Kuching, Bintangor, Sibu.
	JKR R.C. Wharf(old)	25m x 9m width	15.6m x 4.8m width	1979	Reinforced concrete Structure	Used by JKR privately.
	JKR R.C. Wharf(new)	51m (length)		1990	Reinforced concrete Structure	Used by JKR privately.
Bintangor	Coastal Wharf	45.6m x 10m width	30.5m x 5.6m width	1989	Reinforced concrete Structure	
	Pontoon Wharf	10m x 4.5m width	10.8m x 2.4m width	1978	2 Nos. concrete Pontoon	Used by express boats and local craft.
	JKR R.C. Wharf	45m (length)		1990	Reinforced concrete Structure	Used by JKR privately.
Tanjung Manis	R.C. Jetty	16m (length)		1988	Reinforced concrete Structure	Used by passenger boats and light cargo

Table-3.4.1.3 Present Private Mooring Facilities

Centre	Name of Warf	Warf Width	Struture	Notes
Sibu	Hong Lian Ice Factory Wharf	40m x 7m widith	Concrete topping over timber deck supported by timber piles	1.Storage Facility:70m² 2.Used by 2 regular Kuching/Sibu general cargo ships.
	Kian Lee Quarry Wharf	52m x 9m widith	Reinforced concrete structure on tubular steel.	1.Storage Facility Limited. 2.Used by 1 regular Kuching/Sibu general cargo ship.
	Sungai Antu Industrial Wharf	11m x 4m widith	Reinforced concrete	1.Used by timber industries and occasionally for general cargo.
Sarikei	Sri Sarikei Wharf	12m x 12m widith	Timber deck on timber piles.	1.Normally used for gravel discharge. 2.Used by 1 general cargo ship.

3.4.2 Storage facilities

The storage facilities of the RPA are described below and shown in **Table-3.4.2.1.**

There are 7 transit sheds and a dangerous goods store at Sibu. Two (Transit Shed 1 & Transit Shed 2) of them are now not used as shed, but used by customs and the RPA privately. One transit shed (Transit Shed 7) is not only used as a transit shed but also used as a container freight station.

There is also an open storage area (container yard, about 11,000m^2) at Sibu, which can store 206 TEUS of laden containers, 380 TEUS of empty containers, and 30 TEUS of reefer containers.

Sarikei wharf has two transit sheds. The new shed adjoins the older one to form a double-span shed. The open storage area is about 1,500m^2. Bintangor wharf has a transit shed and open storage area about 1,600m^2.

3.4.3 Channel and anchorages

(1) Channel

There are two main channels leading to the ports. One is the Paloh route, which is 82 km in length up to Sibu, and is used by vessels up to 152.4m long with a draught of 6.1m (reduced to 5.2m draught during the Northeast Monsoon period from November to March). The other one is the Rajang River route, which is about 112.7km in length up to Sibu, and restricted to vessels up to 61m long with a draught of 3.9m. Entry to the Tanjung Manis Anchorage and the minor centers of Sarikei and Bintangor is through the Rajang River.

Navigation on the Rajang River is restricted by difficult passages at several places, particularly at the Sarikei Rocks, 4.8 km below Sarikei town and Lebaan, 24.1 km below Sibu town, where the Paloh route meets the Rajang River.

These bottlenecks are shown in **Figure-3.4.3.1.**

Table-3.4.2.1 Present Storage Facilities of the RPA

1 Covered Storage Area

Centre	Transit Shed	Area (sq.feet)	Capacity (Tonnes)		Year of Construction	Structure	Note
			Bag Cargo	General Cargo			
Sibu	(Transit Shed 1)	(11400)	(1400)	(600)	1930,s (not clear)	Truss	Now used by customs and RPA privately.
	(Transit Shed 2)				1930,s (not clear)	Truss	Now used by RPA privately.
	Transit Shed 3	11,400	1,400	600	1930,s (not clear)	Truss	
	Transit Shed 4	12,000	1,400	600	1960,s (not clear)	Portal frame	
	Transit Shed 5	39,000	4,550	1,950	1977	Portal frame	
	Transit Shed 6	36,000	4,200	1,800	1977	Portal frame	
	Transit Shed 7. (CFS)	50,400	5,880	2,520	1988	Portal frame	
	Dangerous Goods Store	5,600	653	280	1977	Portal frame	
Sarikei	Transit Shed	17,760	2,072	888	1971/1985 (extention)	Portal frame	
Bintangor	Transit Shed	12,792	1,492	640	1989	Portal frame	

2 Open Storage Area

Centre	Open Storage Area
Sibu	11,110 m^2
Sarikei	1,480 m^2
Bintangor	1,640 m^2

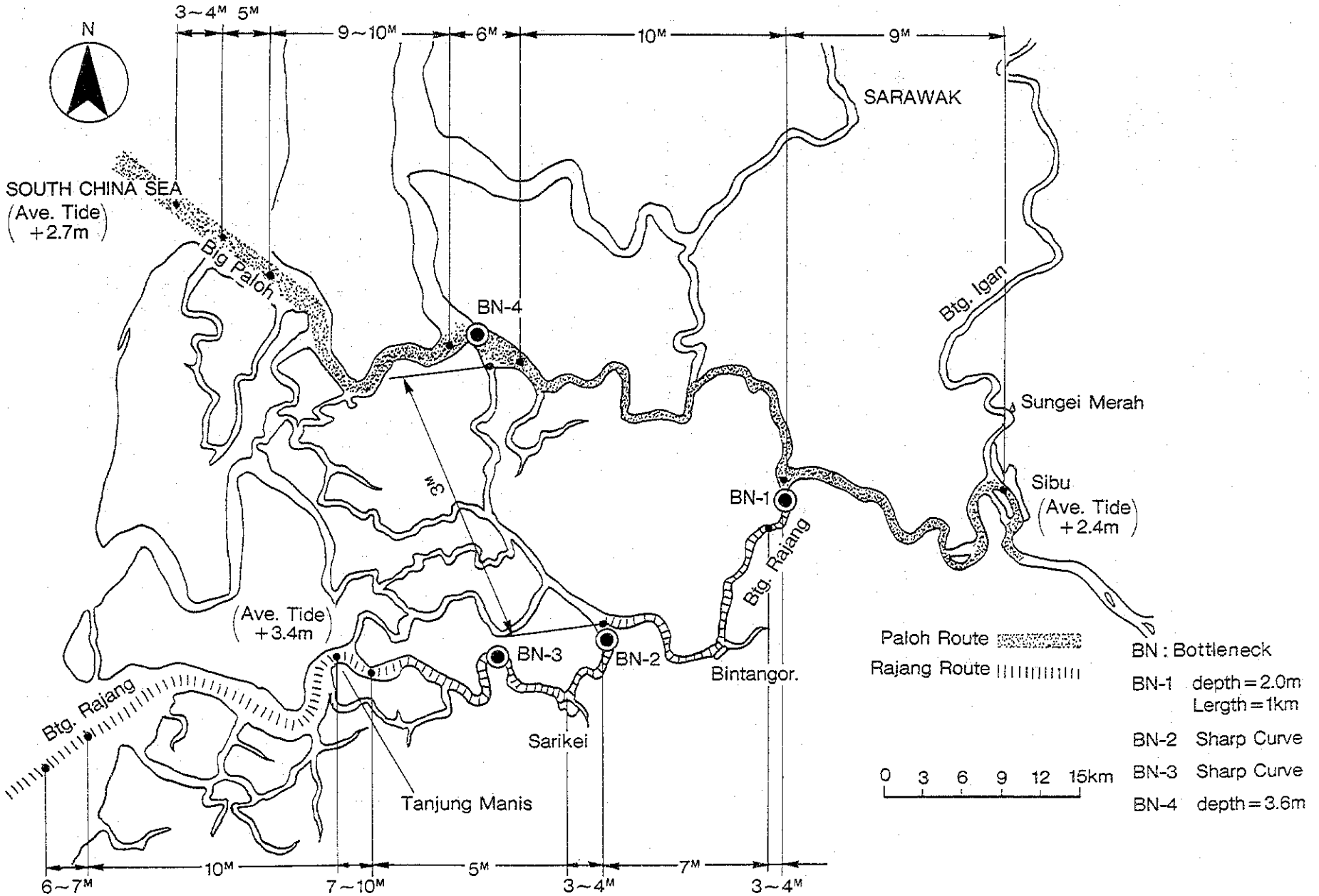


Figure-3.4.3.1 Navigable Depth of Rajang and Paloh Routes
(depth from chart datum)

(2) Anchorages

There is a deep-water anchorage in Tanjung Manis. It lies about 25.7 km from the entrance of the Rajang River. The anchorage is used mainly for loading logs from rafts and sawn timber from lights.

There is a dangerous goods anchorage at Sibu. (Reference **Figure-3.4.1.1**)

3.4.4 Cargo-handling equipment

As of March 1990, the RPA has several types of cargo-handling equipment, as described below.

There are 48 forklift trucks with capacity from 2,500 kg to 7,000 kg, 2 container forklift trucks with capacities of 25,000 kg and 42,000 kg, 21 towing tractors with capacities from 2,500 kg to 4,500 kg, 30 trailers with capacities from 3,000 kg to 40,000 kg, 3 conventional container spreaders with capacities from 25,000 kg to 40,000 kg, 1 lattice boom crane with capacity of 150,000 kg and 3 hand portable pallet truck with capacities of 2,000 kg.

The existing cargo-handling equipment is shown in **Table-3.4.4.1.**

Table-3.4.4.1 Cargo-Handling Equipment

(at March,1990)

Equipment Description	Capacity	Total Unit	Location		
			Sibu	Sarikei	Bintangor
Forklift Truck	2,500kg	4	4	-	-
Forklift Truck	3,000kg	42	38	3	1
Forklift Truck	6,000kg	1	1	-	-
Forklift Truck	7,000kg	1	1	-	-
Container Forklift Truck	25,000kg	1	1	-	-
Container Forklift Truck	42,000kg	1	1	-	-
Total		50	46	3	1
Towing Tractor	2,500kg	19	16	1	2
Towing Tractor	4,500kg	2	2	-	-
Total		21	18	1	2
Low Loading Platform Trailers	3,000kg	5	-	1	4
Low Loading Platform Trailers	6,000kg	15	11	1	3
Skeletal Horn Type Trailer	6,000kg	1	-	1	-
Heavy-duty Low Loading Platform Trailer	20,000kg	2	2	-	-
Skeletal Container Drawbar Trailers(20-footer)	25,000kg	6	6	-	-
Skeletal Container Drawbar Trailers(40-footer)	40,000kg	1	1	-	-
Total		30	20	3	7
20-Footer Conventional Container Spreader	25,000kg	2	2	-	-
40-Footer Conventional Container Spreader	40,000kg	1	1	-	-
Total		3	3	-	-
Lattice Boom Truck Crane	150,000kg	1	1	-	-
Hand Portable Pallet Truck	2,000kg	3	2	-	1

3.5 Cargo Traffic at Rajang Port

3.5.1 International Cargo

(1) General

Four major ports, Rajang, Kuching, Bintulu and Miri Ports, are currently being operated in Sarawak. The total cargo handled at these ports accounted for about 16 million tons in 1988. Rajang Port occupies second place in cargo handling volume, following the leading port, Bintulu (**Figure-3.5.1.1**).

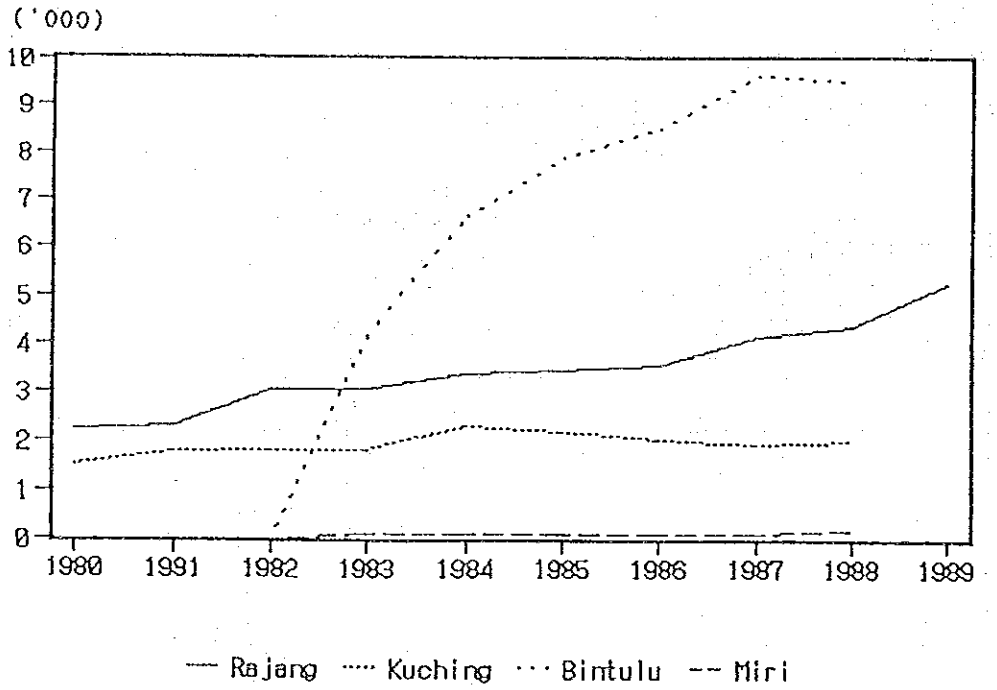


Figure-3.5.1.1 Total Cargo Throughput by Port in Sarawak
('000 tonne)

Table-3.5.1.1 shows the trend of cargo handling volume at the Rajang Port during the last decade. The volume has increased relatively smoothly expanding 137% from 1980 to 1989.

Table-3.5.1.1 Total Cargo Handling Volume at Rajang Port

(1000 tons)

Year	Rajang		
	Export	Import	Total
1980	1696	504	2200
1981	1803	482	2285
1982	2474	542	3016
1983	2450	594	3044
1984	2771	601	3372
1985	2868	560	3428
1986	2939	595	3534
1987	3464	670	4134
1988	3612	724	4336
1989	4437	785	5222

(2) Export

i) Cargo volume by commodity

Figure-3.5.1.2 depicts shares of the cargo volume exported at the Rajang Port by commodity. This figure shows that exported cargo consisted mainly of log timber and timber products. These commodities accounted for almost 93% of total volume in 1989.

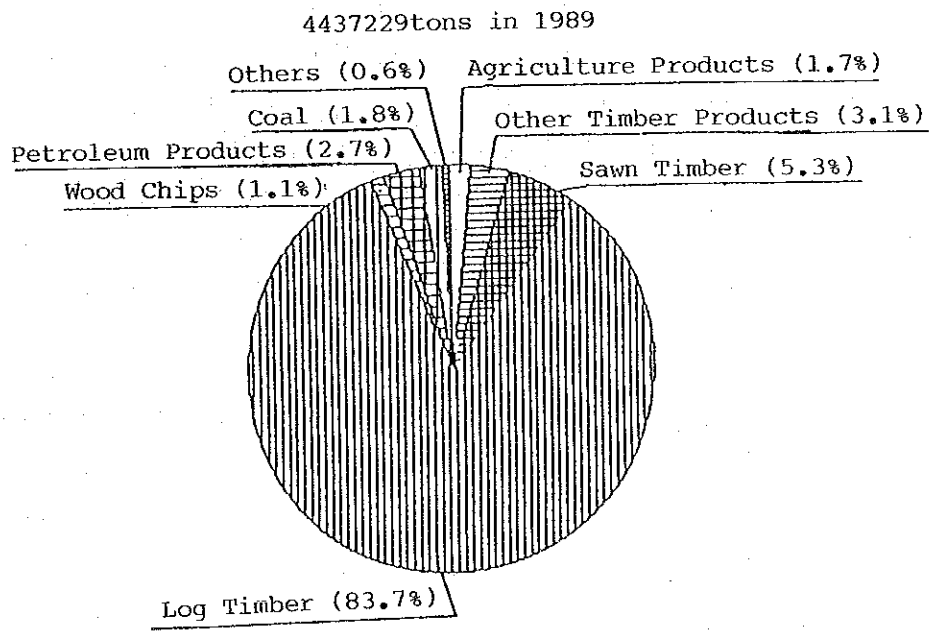


Figure-3.5.1.2 Share by Commodity at Rajang Port (Export)

Although the share of agriculture products volume in exports at the Rajang Ports is not large, the Rajang Port handled about 30% of Sarawak's rubber exports over the past five years, about 70% of Sarawak's black pepper exports, and almost 100% of its sago flour exports.

It should also noted that coal has been handled since 1988.

Table-3.5.1.2 shows export volume by commodity handled at the Rajang Port for the past decade.

Table-3.5.1.2 Export Volume by Commodity at Rajang Port

(Tonnes)

Commodity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Palm Kernel	0	0	0	816	888	1973	1164	742	1653	3223
Jelutong	0	58	30	13	8	4	0	0	0	0
Frozen Shrimps	2994	3110	3264	3577	3516	3891	4640	4801	4340	5939
Pepper	16129	14608	13552	11933	8402	11093	9936	9425	12278	16563
Rubber	11749	10550	6293	7883	6771	6839	6210	6493	8070	4047
Illepenuts	8974	993	18824	389	0	41	6872	21362	916	14
Sago Flour	26410	26707	24909	26397	25353	21711	29139	22679	33135	35881
Swan Timber	317880	304219	291968	247270	139451	151264	188164	171510	182994	236421
Log Timber	1154472	1285445	1941969	1968983	2350035	2469976	2499226	3000407	3096667	3714665
Timber Products	118162	108560	101071	78265	145860	116318	106349	112035	120736	187433
Petroleum Products	34378	36856	49246	63838	71491	74137	74987	91323	110022	121621
Motor Vehicles	0	950	670	397	983	1045	564	0	0	0
Cocoa Beans	0	31	206	924	1679	3613	5398	8780	6660	8267
Sand & Gravel	0	7264	11777	10879	0	0	0	0	0	0
Others	5196	4045	10263	27752	17112	5979	6807	14401	23676	24621
Coal	0	0	0	0	0	0	0	0	11047	78534
Total	1696344	1803396	2474042	2449856	2771549	2867884	2939456	3463958	3612194	4437229

Source: Annual Report of Rajang Port Authority

ii) Destination countries

Table-3.5.1.3 shows the export volume through the Rajang Port by destination country. This table shows that logs, the major export, were mainly shipped to Japan (47%) and other far east countries (38%) and that timber products, the other key export, were exported to European countries (45%) and other Far East Asia countries (34%).

Table-3.5.1.3 1989 Export Volume through Rajang Port by Destination

(1000 tons)

COMMODITIES	W.MALAYSIA	SAR'K/SABA	SINGAPORE	HONG KONG	JAPAN	OTHER F/E	OTHER SEA	WA/ME	AUSTRALIA	U.S.A.	EUROPE	TOTAL
LOGS	2	0	16	193	1745	1420	224	111	0	0	3	3715
TIM. PROD.	3	0	10	17	42	130	2	1	2	8	174	388
AGR. PROD.	14	0	29	0	6	0	0	0	0	0	0	49
FISH PROD.	0	0	6	0	0	0	0	0	0	0	0	6
SCRAP IRON	0	0	3	0	0	0	0	0	0	0	0	3
COAL	0	0	0	0	25	54	0	0	0	0	0	79
OTHER	13	0	4	0	0	0	0	0	0	0	0	17
T O T A L	32	0	67	211	1817	1604	225	113	2	8	176	4256

*F/E: Far East Countries
SEA: South East Asian Countries
WA/ME: West Asian and Middle East Countries
Source: RPA

(3) Import

i) Cargo volume by commodity

Figure-3.5.1.3 depicts shares of the cargo volume imported at the Rajang Port by commodity. This figure shows that imported cargo consisted primarily of petroleum products and "others" (beverage, household necessities, etc.). These commodities accounted for almost 78% of total import volume in 1989.

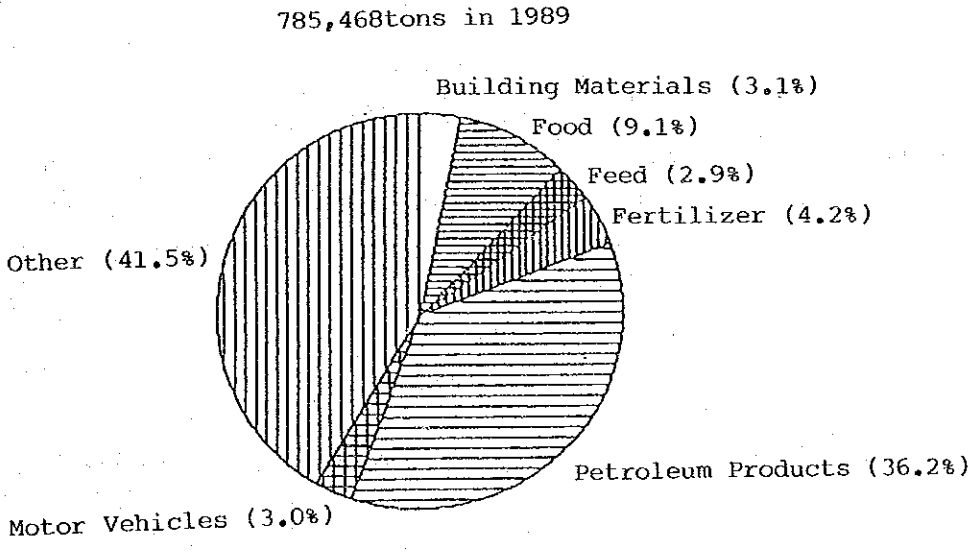


Figure-3.5.1.3 Share by Commodity at Rajang Port (Import)

Table-3.5.1.4 shows the import volume by commodity handled at the Rajang Port during the past decade.

Table-3.5.1.4 Import Volume by Commodity at Rajang Port

(Tonnes)

Commodity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Building Materials	11206	3967	4078	6680	9557	8069	7068	6923	6261	7021
Cement	260	151	84	2977	5782	226	97	154	252	60
Iron & Steel	18110	10553	15987	14252	18529	17141	11303	22321	18353	16884
Machinery	5173	1707	1509	3398	3861	6390	3921	8605	11536	11290
Motor Vehicles	664	7659	12234	15672	13808	4446	4855	8256	7748	9489
Earth Moving Equipment	543	1327	2445	1191	5016	2655	1625	4656	4194	3173
Rice	25358	28259	19998	38226	29545	28349	28386	41264	41461	51477
Sugar	10222	8902	9806	10194	10211	10474	10899	11553	11381	11758
Salt	3918	3432	2891	3481	2633	2750	3872	4355	1599	869
Flour	7041	8325	9371	9042	5836	5052	4696	6228	6685	7127
Maize	9719	9867	14040	13847	13476	16427	19539	20778	19298	16978
Poultry & Animal Mash	12268	9362	6828	11329	12514	10670	8342	8630	5758	5497
Fertilizers	12951	9949	8461	10883	15523	14818	19901	26593	32889	32833
Petroleum Products etc.	133487	150417	182063	198369	211060	210524	210995	228258	249991	284653
Sawn Timber	46749	34703	45282	45629	27519	8768	6384	1709	1069	0
Log Timber	0	450	0	0	0	0	0	0	0	0
Others	206100	192861	206746	209080	215783	213227	252909	270145	305128	326359
Total	503769	481891	541823	594250	600653	559986	594792	670428	72603	785468

Source: Annual Report of Rajang Port Authority

ii) Origin countries

Table-3.5.1.5 shows the import volume through the Rajang Port by origin country. This table shows that almost all imports originated in West Malaysia (47%), Singapore (20%) and Sarawak/Saba (18%).

Table-3.5.1.5 1989 Import Volume through Rajang Port by Origin

(1000 tons)

COMMODITIES	W.MALAYSIA	SAR'K/SABA	SINGAPORE	HONG KONG	JAPAN	OTHER F/E	OTHER SEA	WA/ME	AUSTRALIA	USA/CANADA	EUROPE	TOTAL
CONST MATERIALS	12	0	11	1	0	0	0	0	0	0	0	24
MOTOR VEHICLES	8	0	1	0	0	0	0	0	0	0	0	9
MACHINERY	6	1	5	2	0	0	0	0	0	1	0	4
FOOD	16	0	4	0	0	0	52	0	0	0	0	71
FEED	2	0	6	0	0	0	15	0	0	0	0	22
FERTILIZER	17	0	15	0	0	0	0	0	0	0	0	33
PETRO. PROD.	91	128	10	0	0	0	0	0	0	0	0	230
OHTERS	181	0	89	26	0	1	2	0	0	0	0	299
T O T A L	333	129	141	29	0	1	69	0	0	1	0	703

*F/E: Far East Countries
SEA: South East Asian Countries
WA/ME: West Asian and Middle East Countries
Source: RPA

(4) Unitized Cargo

i) Container Cargo

Container handling at the Rajang Port started in 1982. Currently, containers are handled only at the Sibu wharf. Although container handling volume has increased steadily, containrized export cargo is not large. Empty containers accounted for 1.8% of container imports and 74% of container exports in 1989. The main commodities imported by containers are almost all canned foodstuffs and textiles. **Table-3.5.1.6** and **Figure-3.5.1.4** show containers handled in terms of TEUs at the Rajang Port. **Table-3.5.1.7** shows total container throughput by ports in Sarawak. Containers handled at Kuching and Rajang Ports occupied 92% of the total containers handled in Sarawak.

Bintulu and Miri ports handled only a small number of containers. Containerized cargo handled at the Rajang Port include palm kernels, frozen shrimps, rubber, illepenuts, sago flour, cocoa beans. Pepper is not containerized because moisture in containers can cause mould to develop.

Table-3.5.1.6 Containers Handled (in TEU) at Rajang Port

	IMPORT			EXPORT			TOTAL
	LADEN	EMPTY	TOTAL	LADEN	EMPTY	TOTAL	(IM+EX)
1982	191	0	191	5	104	109	300
1983	728	3	731	105	557	662	1393
1984	1726	5	1731	51	1615	1666	3397
1985	2395	53	2448	155	2232	2387	4835
1986	3014	64	3078	332	2621	2953	6031
1987	3979	55	4034	752	3170	3922	7956
1988	5072	46	5118	1132	3887	5019	10137
1989	6010	109	6119	1584	4422	6006	12125

Source: RPA

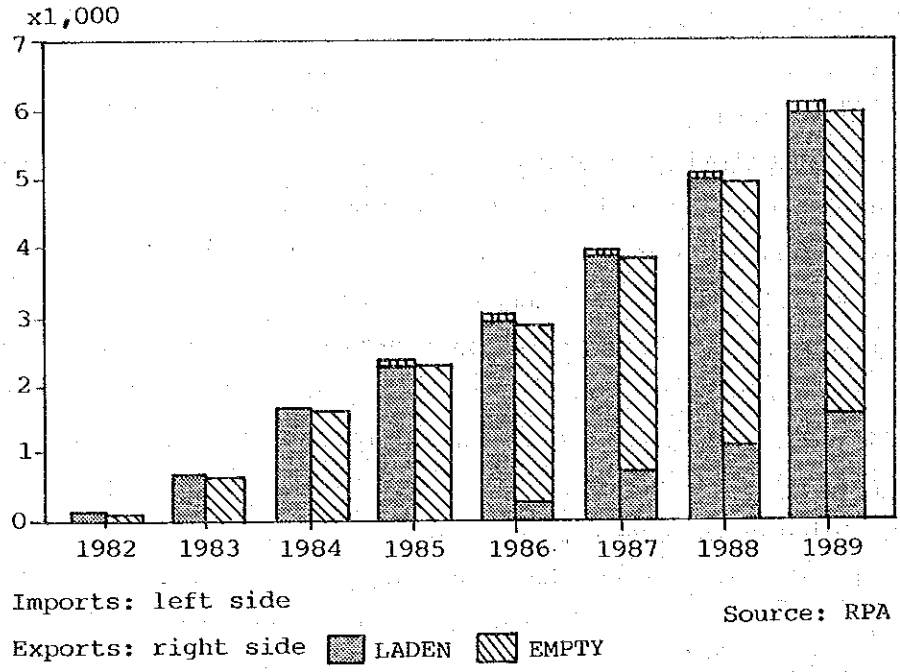


Figure-3.5.1.4 Containers Handled (in TEU) at Rajang Port

Table-3.5.1.7 Total Container Throughput at Each Port in Sarawak (TEU)

Port	1982	1983	1984	1985	1986	1987	1988
Rajang	0	1393	3153	4835	6925	7956	10137
kuching	1073	3635	9890	12431	14441	18432	23400
Bintulu	0	0	831	1100	1036	1342	1507
Miri	0	97	260	419	621	851	1402

Source: Transport Statistics 1987/88, Ministry of Transport, Malaysia

ii) Palletized cargo

Table-3.5.1.8 shows palletized cargo volume during the past decade handled at Sibu. This table shows that the palletized cargo volume and the ratio of palletized cargo occupying in the total cargo except container cargo have declined as a whole.

Table 3.5.1.8 Palletized Cargo Volume at Sibu

(1000 tons)

	non-palletized cargo (1)	Palletized cargo (2)	(2)/[(1)+(2)] %
1980	232	101	30.3
1981	214	91	29.8
1982	241	87	26.5
1983	251	75	23.0
1984	247	51	17.1
1985	227	36	13.7
1986	217	35	13.9
1987	266	38	12.5
1988	244	44	15.3
1989	269	44	14.1
1990	287	39	12.0

Source: RPA Annual Report

(5) Cargo volume by wharf

Table-3.5.1.9 shows cargo handling volume by wharf during the past five years. In 1989, some 92% of the total cargo at Rajang Port was handled at Tg. Manis Anchorage and Sibu. The growth rates of cargo handling volume were large at Sibu (49%, 1989/1985), Sarkei (56%, 1989/1985) and Tg. Manis(53%, 1989/1985).

Table-3.5.1.10 shows cargo handling volume at each wharf by major commodity in 1989.

Table 3.5.1.9 Cargo Handling Volume at each Wharf of Rajang Port

(1000 tons)

Year	Sibu	Tg. Manis	Sarikei	Bintangor	S. Merah	TOTAL
1985	332	2743	36	11	232	3354
1986	344	2807	48	13	238	3450
1987	431	3287	61	12	275	4066
1988	456	3396	59	13	313	4237
1989	495	4185	56	12	340	5088

Source: RPA Annual Report

Table 3.5.1.10 Cargo Handling Volume at each Wharf of Rajang Port by Major Commodity, 1989

(1000 tons)

IMPORT

COMMODITY	SIBU	TG MANIS	SARIKEI	BINTANG.	S. MERAH	TOTAL
CONSTRUCTION MATERIALS	22	0	2	0	0	24
MOTOR VEHICLES	9	0	0	0	0	9
MACHINERY	14	7	0	0	0	21
FOOD	67	0	4	0	0	71
FEED	21	0	1	0	0	22
FERTILIZER	11	0	12	10	0	33
PETROLEUM PRODUCTS	11	0	1	0	218	230
OTHERS	290	0	8	1	0	299
TOTAL	445	7	29	11	218	710

EXPORT

COMMODITY	SIBU	T. MANIS	SARIKEI	BINTANG.	S. MERAH	TOTAL
LOGS	0	3715	0	0	0	3715
TIMBER PRODUCTS	9	379	0	0	0	388
AGRICULTURE PRODUCTS	19	6	23	1	0	49
FISHERY PRODUCTS	3	0	3	0	0	6
SCRAP IRON	3	0	0	0	0	3
COAL	0	79	0	0	0	79
PETROLEUM PRODUCTS	0	0	0	0	122	122
OTHERS	16	0	0	0	0	17
TOTAL	50	4178	27	1	122	4379

Source: RPA

(6) Ships calling at the RPA Facilities

i) Export and import transportation

The number of vessels that called at the RPA facilities and the Tg. Manis anchorage of the Rajang Port and the average gross registered tonnage of the vessels are shown in **Table-3.5.1.11.** This table shows that the sizes of the ships calling at the RPA wharves, except at Sungei Merah and Tanjung Manis, have gradually increased.

Table 3.5.1.11 Vessels Calling at the Rajang Port

Year	Sibu	Bintangor	Sarikei	S. Merah	T. Manis	Total
1980	417	83	191	105	569	1365
	1120	663	602	867	3888	2153
1981	499	71	203	135	573	1481
	1190	732	700	756	4396	2302
1982	564	112	223	144	783	1826
	1257	857	749	826	4451	2507
1983	584	113	242	128	724	1791
	1310	752	793	1195	4787	2602
1984	513	127	227	130	786	1783
	1390	756	727	1215	4704	2708
1985	506	133	229	139	763	1770
	1512	827	821	1050	4852	2775
1986	461	133	268	154	845	1861
	1434	820	858	799	4993	2870
1987	501	100	242	166	922	1931
	1563	860	917	928	4872	2971
1988	471	64	178	192	960	1865
	1577	953	1022	891	4766	3073
1989	490	51	140	144	1134	1959
	1739	843	993	1028	4768	3363

Upper: Nos of Ships Calling

Lower: Average GRT

Source: RPA

Table-3.5.1.12, which shows the GRT distribution of the vessels calling at the Rajang Port in 1989, shows that the maximum sizes of ships were 6,000 GRT class at Sibu, 1,000 GRT class at Sarikei/Bintangor and that ships between 2,000 and 6,000 GRT called mainly at the Tg. Manis anchorage.

Table 3.5.1.12 GRT DISTRIBUTION OF VESSELS IN 1989

	SIBU	SARIKEI	BINTANGOR	S.MERAH	TG.MANIS	TOTAL
BELOW 1000	222	85	32	N.A.	43	382
1000 ~ 1999	132	55	19	N.A.	22	228
2000 ~ 2999	49			N.A.	139	188
3000 ~ 3999	46			N.A.	355	401
4000 ~ 4999	8			N.A.	312	320
5000 ~ 5999	23			N.A.	114	137
6000 ~ 6999	10			N.A.	57	67
7000 ~ 7999				N.A.	2	2
8000 ~ 8999				N.A.	8	8
9000 ~ 9999				N.A.	21	21
10000~14999				N.A.	27	27
15000~19999				N.A.	27	27
OVER 20000				N.A.	8	8
TOTAL	490	140	51	144	1135	1816
Average GRT	1739	993	843	1028	4768	3631

Source: RPA

Almost all ships are general cargo ships, except the oil tankers that moor at the Sungei Merah oil jetty.

Ships carrying containers call at Sibu center. Containers are mainly carried on the deck of the ships and the ships can be categorized into containerized ships, which can hold 2 to 3-story containers, and conventional ships. The sizes of the containerized ships range between 1,500 GRT and 6,000 GRT and carry in and out of the port about 100 containers (usually, 20-foot containers) on an average at Sibu wharves, whereas the average number of containers handled by container-carrying conventional ships is only 18(**Table-3.5.1.13**). Ships carrying containers account for 57% of all ships calling at Sibu.

Table-3.5.1.13 Average Number of Containers Handled per Ship (Sibu)
(1989)

Ship Type	No of Ship	IMPORT			EXPORT			TOTAL		
		Laden	Empty	Total	Laden	Empty	Total	Laden	Empty	Total
Containerized	82	53.3	0.3	53.6	12.8	37.6	50.4	66.1	37.9	104
Conventional	197	7.9	0.4	8.3	2.6	6.6	9.2	10.5	7	17.5
T O T A L	279	21.2	0.4	21.6	5.6	15.7	21.3	26.9	16.1	42.9

Source: RPA

3.5.2 Domestic Cargo

(1) Coastal Cargo

i) Sibu

a. Outbound

According to the "Master Plan Study for Coastal and Riverine Transport in Sarawak" in 1990, in terms of coastal transportation, Sibu had the third-largest monthly volume of outbound cargo, about 11,000 tonnes in 1988, following Kuching and Miri. Sand and gravel accounted for 53.2% of the outbound cargo. Cereals, basic food commodities and other foodstuffs made up 25.1%. Processed wood and timber products accounted for 12.3%.

Coastal vessel routes from Sibu are shown in **Figure-3.3.2.1** in 3.3. **Table-3.5.2.1** shows coastal transportation from Sibu by area and by commodity.

b. Inbound

According to the same source, the Rajang Port received inbound cargo of 22,740 tons monthly in 1988, more than twice the total outbound cargos. Kuching was by far the largest contributor, with 14,866 tonnes per month. The largest four product groups of the inbound cargo were crushed stones at 5,437 tonnes, cement at 5,270 tonnes, petroleum products at 1,690 tonnes and animal feeds at 950 tonnes per month.

Table-3.5.2.1 Coastal Freight Outbound From Sibu

(Freight ton/month, 1988)

Commodities	Kuching	Sarikei	Bintangor	Bintulu	Miri	Maludi	Limbang	Lawas	Matu	Balingian	Tatau	Mukah	Total
Cereals, food	105	600	450	11	930	30	319	183	18	15	12	81	2754
Petroleum	0	0	0	4	0	150	0.4	1	0	0	0	102	257.4
Chemicals	0	0	0	0	0	0	0.9	0	0	0	0	7	7.9
Fertilizer	30	0.5	0	0	0	0	0.5	2.8	0	20	0	4	57.8
Cement	0	0	0	0	0	0	0	0	0	0	0	5	5
Timber products	380	9	0	0	0	0	49	1	0	0	30	0	469
Timber Logs	870	0	0	0	0	0	3	0	0	0	0	0	873
Copra	51	0	0	0	0	0	0	0	0	0	0	0	51
Sago Flour	0	0	0	0	0	0	0	0	0	0	0	0	0
Beverage	0	0	0	0	0	0	0	0	0	0	0	0	0
Crushed stone, Sand, Gravel	0	0	0	4470	800	0	0	0	0	0	90	470	5830
Agricultural products	5	0	0	0	0	0	0	0	0	0	0	0	5
Jungle products	0	0	0	0	0	0	0	0	0	0	0	0	0
Animal feeds	0	0	0	0	0	9	0	0	0	0	0	0	9
Vehicles, etc.	14	0	0	0	0	0	0	1.6	0	0	0	0.5	16.1
Empty bottles, cylinders	286	27	0	0	0	0	0	0	0	0	0	0	313
Construction materials	6	0	0	13	0	0	17	0	0	0	0	41	77
Consumer goods	9	0	0	13	0	43	52	46	6	0	0	2	171
Others	28	0	0	4	0	41	1.3	0	0	0	0	0.5	74.8
Total	1784	636.5	450	4515	1730	273	443.1	235.4	24	35	132	713	10971

Source: "Master Plan Study for Coastal and Riverine Transport in Sarawak", 1990, Ministry of Infrastructure, Sarawak.

ii) Sarikei

Sarikei received monthly inbound cargoes of about 1,200 tons from Kuching and 630 tons from Sibu. On the other hand, its return cargo to Kuching reached only about 270 tons per month. Further, there was no return cargo to Sibu. The cargo received at Sarikei consisted mainly of animal feed, fertilizer and chemicals, beverages, sand, crushed stone and other construction materials. The outbound cargoes were mainly empty bottles and cylinders etc.

iii) Bintangor

Coastal cargo handling at Bintangor was fairly similar to that at Sarikei in its inbound and outbound cargo. However, volumes were much lower, 520 tonnes per month from Kuching, 250 tonnes per month from Sibu and only 5 tonnes per month to Kuching. Similarly, there was no return cargo to Sibu.

iv) Tg. Manis

Since there are no port facilities other than anchorages at Tg. Manis, only mid-stream loading and unloading is possible. In addition, there is also no concentration of population other than some small villages. Thus,

little domestic cargo movement is expected there.

v) Sungei Merah

There is no cargo movement except for domestic petroleum products trade.

The petroleum products, which are imported from West Malaysia, etc., are shipped out to areas in the Rajang River Region and other parts of Sarawak.

(2) Riverine cargo

i) Sibu

According to "the Master Plan Study for Coastal and Riverine Transport in Sarawak", Sibu handled outbound riverine cargo of 2,195 tons per month. Of this total, 1,304 tonnes, or 59.4%, went upstream to kanowit, Ngemah, Song, Kapit and Belaga, whilst 891 tonnes or 40.6% went downstream to Daro, Matu, Dalat, Oya and others. Although most were carried by cargo launches about 80 feet long and 12 feet wide, some were carried by passenger express boats. The main cargo group consisted of cereals, basic food commodities and other foodstuffs. This group accounted for 645 tonnes per month, or 29.4%, of the total riverine cargo outbound from sibu. Fruits and other agricultural products formed the second largest group of 315 tonnes, or 14.35 tonnes per month. Petroleum products at 249 tonnes per month, or 11.3% belonged to the third largest cargo group.

The monthly return riverine cargo was 664 tonnes, mainly from Kapit, of 241 tonnes and was composed of sand and agricultural Products. Oya contributed 150 tonnes per month of sago flour and others were responsible for 170 tonnes per month of logs.

ii) Sarikei, Bintangor, Tg. Manis, Sungei Merah and other districts in the Rajang River Region

Riverine cargo movement can be found also among Sarikei, Bintangor, Tg. Manis, Sungei Merah and other districts in the Rajang River Region such as Kapit, Song and Kanowit.

The commodities of the cargo are timber logs, timber products, household necessities, agricultural products, etc. Timber logs and coal are transported from Kapit or the upstream and timber products from private mills spread on the river as well to Tg. Manis, then exported.

Table-3.5.2.2 shows main Coastal and riverine cargo movement in 1988

in Rajang River Region.

(3) Vessels used for coastal and riverine transportation

"Coastal transportation" means transportation by vessels between the Rajang Port and other parts of Sarawak, and "riverine transportation" means transportation within the Rajang River and the waterway network in the Rajang Delta. Vessels and frequency of service for coastal transportation are shown in 3.3. Generally, the coastal cargo vessels have GRT's ranging from 250 to 890 tons. The overall lengths range from 35m to 58m, the breadths from 7m to 13m and the draughts from 2m to 3m.

So-called double deckers (160GRT, 90ft-long and 6 or 7ft-draught), about 80ft-long and 12ft-wide launches and passenger boats are used for riverine transportation. Passenger boats also transport small amount of riverine cargoes.

Table-3.5.2.2 Present Situation of Coastal and Riverine Transportation in Rajang River Region (1988)

at SIBU	GENERAL OUT	CARGO IN	RICE OUT	CEMEN IN
Ngemah	1656	84		
Song	3366	156		
Kapit	6984	1452		
Sarikei			7200	
Bintangor	3360	378	3000	
T.Sebubal				
Balaga	1400	166		
Durin	48	0		
Daro	2592	36		
Matu	1224	294		
Datat	5382	102		
Oya	420	1800		
Kabong	1050	1110		
R. Other	0	0		
Kuching	7644	24658		63240
Marudi	2210			
Miri	11160			
Limbang	3575			
Lawas	2818	11897		
Others	191	40		
Total	55080	42173	10200	63240

at SARIKEI	GENERAL OUT	CARGO IN	RICE OUT
Sibu			7200
Ngemah			
Song			
Kapit			
Bintangor			
T.Sebubal			
Balaga			
Durin			
Daro			
Matu			
Datat			
Oya			
Kabong			
R. Other			
Kuching	4682	9039	
Marudi			
Miri			
Limbang			
Lawas			
Others			
Total	4682	9039	7200

at Bintangor	GENERAL OUT	CARGO IN	RICE OUT
Sibu	378	3360	3000
Ngemah			
Song			
Kapit			
Bintangor			
T.Sebubal			
Balaga			
Durin			
Daro			
Matu			
Datat			
Oya			
Kabong			
R. Other			
Kuching		1836	
Marudi			
Miri			
Limbang			
Lawas			
Others			
Total	378	5196	3000

Source: Master Plan Study for Coastal and Riverine Transportation in Sarawak, 1990

3.6 Passenger Traffic

3.6.1 Passenger Trips

(1) Total annual trips

Table-3.6.1.1 shows one-way passenger trip volume between each district on the Rajang River; Sarikei, Bintangor, Sibu, Kanowit, Kapit or Belaga and all the other districts in Sarawak.

Table-3.6.1.1 Annual One-Way Passenger Trip Volume Between Rajang River Area and Sarawak (1000 Trips, 1988)

	Sarikei	Bintangor	Sibu	Kanowit	Kapit	Belaga
Kuching	29	5	103	1	2	0
Sri Aman	11	1	5	0	0	0
Betong	16	1	1	0	0	0
Saratok	0	4	6	0	0	0
Sarikei	-	0	107	3	2	0
Bintangor	0	-	0	2	1	0
Sibu	107	0	-	0	50	5
Kanowit	3	2	0	-	6	0
Mukah	1	0	8	0	0	0
Song	1	0	21	0	0	1
Kapit	2	1	50	6	-	0
Belaga	0	0	5	0	0	-
Bintulu	4	2	56	1	1	0
Miri	5	2	50	1	0	0
Marudi	0	0	2	0	0	0
Other	3	0	3	1	1	0
TOTAL	182	17	417	15	63	6

Source: Ministry of Infrastructure Development, Sarawak, Master Plan Study for Coastal and Riverine Transportation in Sarawak, 1990

This table shows most passenger trips take place between O-D pairs such as Sibu-Sarikei, Sibu-Kuching, Sibu-Bintulu, Sibu-Kapit, Sibu-Miri, Sarikei-Kuching, Sibu-Song, Sarikei-Betong and Sarikei-Sri Aman.

(2) Annual Trip by Mode

Passenger trip volume by transportation mode between the above O-D pairs is as shown in **Table-3.6.1.2.**

Table-3.6.1.2 Distribution of Passenger Trips by Mode
(Main O-D Pairs, 1000 Trips/year, 1988)

O-D Pairs	M O D E				
	Air	Bus	Car	Water	TOTAL
Sibu-Sarikei	0	0	20	88	108
Sibu-Kuching	68	0	5	30	103
Sibu-Bintulu	22	18	16	0	56
Sibu-Kapit	0	0	0	50	50
Sibu-Miri	32	11	7	0	50
Sarikei-Kuching	0	1	4	24	29
Sibu-Song	0	0	0	21	21
Sarikei-Betong	0	2	14	0	16
Sarikei-Sri Aman	0	5	6	0	11

Source: Ministry of Infrastructure Development, Sarawak, Master Plan Study for Coastal and Riverine Transportation in Sarawak, 1990

Of these O-D pairs, water transportation is used for Sibu-Sarikei, Sibu-Kuching, Sibu-Kapit, Sibu-Song and Sarikei-Kuching. The percentages of water transportation for passenger trips between these O-D pairs are 81%, 29%, 100%, 100% and 84%, respectively.

(3) Annual water trip by purpose

Passenger trips using water transportation frequently take place from/to Sarikei, Sibu, Kuching and Kapit as shown in **Table-3.6.1.3.**

Table-3.6.1.3 Passenger Trips using Water Transportation by Trip Purpose

(1000 Trips/year, 1988)

Purpose	Kuching			Sarikei			Sibu			Kapit		
	T	B	S	T	B	S	T	B	S	T	B	S
Kuching	-	-	-	24	10	14	30	10	20	2	1	1
Sarikei	24	10	14	-	-	-	88	30	58	2	0	2
Bintangor	4	1	3	0	0	0	0	0	0	1	0	1
Daro	1	0	1	0	0	0	0	0	0	0	0	0
Sibu	30	10	20	88	30	58	-	-	-	50	19	31
Kanowit	1	0	1	1	0	1	0	0	0	6	1	5
Song	0	0	0	1	0	1	21	6	15	0	0	0
Kapit	2	1	1	2	0	2	50	19	31	-	-	-
Belaga	0	0	0	0	0	0	5	2	3	0	0	0
Other	39	9	30	2	2	0	1	1	0	1	2	1
TOTAL (water)	101	31	70	118	42	76	195	68	127	62	23	39
TOTAL(Air)	132	80	52	1	0	1	134	74	60	1	1	0
TOTAL(Bus)	65	19	46	15	5	10	37	15	22	0	0	0
TOTAL(Car)	170	75	95	49	19	30	51	23	28	0	0	0

Purpose; T: Total, B: Business, S: Social

Source: Ministry of Infrastructure Development, Sarawak, Master Plan Study for Coastal and Riverine Transportation in Sarawak, 1990

The number of water trips made for social purposes is almost double that for business purpose and trips with social purposes were made more than half of bus and car trips while business purposes outweigh air trips.

3.6.2 Passenger boat service

(1) Present passenger boat service network

In the study area, many passenger boat service routes have been established as shown in 3.3.3. About 70-passenger boats are operated on almost all routes. The coastal route Sarikei-Kuching, uses larger boats of about 160 passenger capacity. Besides, a number of ferry services across the rivers are provided.

(2) Boats

Boats being used for scheduled passenger boat service are called express boats. And bigger boats are used for coastal service such as Sarikei-Kuching while express boats are used for riverine service.

The basic dimensions of boats for coastal service and express boats are shown in **Table-3.6.2.1.**

Table-3.6.2.1 Dimension of Vessel for Passenger Boat Service

	Passenger	Full Draught	Length
Coastal Service	164	2m	35m
Riverine Service	40 - 70	1 - 2m	20 - 30m

(3) Passenger Volume

Table-3.6.2.2 shows frequency of boat service and passenger volume. These figures are based on our survey conducted in September, 1990.

Table-3.6.2.2 Present Passenger Volume

Route	1990 Freq. daily	Capacity daily	Passengers daily (up and down)
UPSTREAM			
Sibu-Durin	11	748	480
Sibu-Durin-Kanowit	5	340	177
Sibu-Kanowit	5	340	148
Sibu-Kanowit-Ng Dap	4	272	131
Sibu-Kanowit-Song	2	136	45
Sibu-Song	1	68	20
Sibu-Song-Kapit-Tanah Balleh	1	68	69
Sibu-Song-Kapit	4	272	213
Sibu-Kapit	5	340	176
Sibu-Kapit-Belaga	0.5	34	13
Sibu-Kapit-Belaga-Bakun	1	68	38
Sibu-Kapit-Mawai	1	68	36
Sibu-Kapit-Tanah Balleh	0.5	34	73
Sibu-Kapit-Putai	0.5	34	23
DOWNSTREAM			
Sibu-Dalat	0.5	34	22
Sibu-Kuit-Dalat	0.5	34	20
Sibu-Singat-Daro-Kuit-Matu	0.5	34	18
Sibu-Penasu-Semah-Semop	0.5	34	70
Sibu-Sg.Kuit-Igan	1	68	56
Sibu-Paloh	0.5	34	50
Sibu-Ng Ngemah	0.5	34	50
OTHER			
Sibu-Bintangor-Sarikei	19	1292	
Sibu-Bintangor			283
Sibu-Sarikei			1212
Bintangor-Sarikei			221
Sarikei-Tg.Sebubal			
EXPRESS			
Sarikei-Kuching	2	328	419

4 PRESENT MANAGEMENT AND OPERATING SYSTEMS IN RAJANG PORT

4.1 Outline of Systems of Port Management and Operation in Malaysia

There are nine port authorities in Malaysia, of which four are in the Peninsula, four in Sarawak and one in Sabah. These authorities are statutory organizations, each functioning independently of the other and operated as semiautonomous port authorities. They are as follows:

(1) Peninsular Malaysia
- Klang Port Authority
- Penang Port Authority
- Johor Port Authority
- Kuantan Port Authority

(2) Sabah State
- Sabah Port Authority

(3) Sarawak State
- Bintulu Port Authority
- Kuching Port Authority
- Rajang Port Authority
- Miri Port Authority

The four port authorities located in the Peninsula and Bintulu Port Authority are federal ports responsible to the Ministry of Transport. Sabah Port Authority and the three port authorities located in Sarawak (except Bintulu) are under state ministry supervision.

Besides the ports under the responsibility of these port authorities, there are over 80 minor jetties and landing places under the control of the Marine Department. Some minor ports/jetties are run by private operators.

The organization of the port authorities is a two-tier system comprising the Board, which is the policy-making body, and the management unit, which sees to the day-to-day operations of the port. Port authorities are basically responsible for the day-to-day administration of the lands and waters within their working areas, including approaches and anchorages gazetted under the Merchant Shipping Ordinance. Their duties generally include provision of pilotage and towage services, cargo handling and collection of port charges, control of vessel movements within ports areas as well as the maintenance and implementation of capital projects. Port revenues are expected to cover

operating and overhead expenses and service debts incurred in capital improvement programs. Each port authority is expected to be financially self-sufficient and operate without subsidy.

4.2 Outline of Systems of Port Management and Operation in Rajang Port

There are two types of cargo handled in Rajang Port. One is foreign cargo, that is, cargo moving to/from Sarawak. The other is domestic cargo moving inside Sarawak. Basically, foreign cargo is handled by the RPA, and domestic cargo is handled at State Government and private facilities.

Management and operating systems concerning foreign cargo are mainly described in this chapter, but in advance, a brief outline of the management of State Government and private wharves is described in this section.

4.2.1 State Government wharves

The present wharf facilities of State Government are described in chapter 3.4.1, Wharf facilities.

The JKR is responsible for the design, construction and maintenance of government wharf facilities in Sarawak, while the control and operation of the facilities is the responsibility of the Marine Department. The Marine Department executes its rights and duties as established by the Merchant Shipping Ordinance. The Marine Department not only operates government wharves but also carries out the day-to-day functions of licensing of small boats, maintenance and operation of navigational aids, maritime safety, port safety, clearance of ships and pilotage. The Marine Department collects light dues for maintenance and operation of the navigational aids. The dues collected are paid to the State Buoys and Light Fund. The Marine Department also collects the wharfage fees, which are eventually paid to the State Treasury, but there isn't enough control of berthing, mooring, loading and discharging. Basically, ships can use the wharves freely, if they aren't occupied. So, there are several problems, as described below:

-there isn't a system to guarantee a berth for ships wanting to maintain their schedule, so regular service cargo ships don't use government wharves but private ones instead.

-because of the shortage of control over the use of wharves, idle ships sometimes occupy a berth while waiting for cargo.
-wharves are used sometimes for parking private vehicles, which clutter the area and hinder proper cargo handling.
-lack of storage space.

4.2.2 Private wharves

Private wharves are usually related to specific traffic such as timber, gravel, etc., and are used occasionally for handling general cargo. Some of the private wharves are used by ships in regular service, such as between Sibu and Kuching. Shipping companies are free to use whichever wharf they prefer, either Government or private wharves. Though the charges for use of the berth are lower at Government wharves than at private wharves, the private wharves are used frequently for general cargo handling. The principal reason for use of private wharves is because mooring at Government wharves cannot be guaranteed or they are not available at the required time, and for ships on a tight schedule the loss of time is often unacceptable.

4.3 Functions and Organization of the RPA

The RPA was established on the 1st of November, 1970, under Section 3 of the Port Authorities Ordinance 1961. The RPA is a semigovernmental body and the Ministry of Infrastructure Development, Sarawak is primarily responsible for the RPA. The RPA exercises control and co-ordinate all the activities of the Ports within its jurisdiction. The limits of the Ports, which are declared in the Gazette under Section 3A of the Port Authority Ordinance 1961, extend from Kapit in the Seventh Division to the Rajang River under the Sixth Division.

The functions of the RPA are as follows:
(1) to maintain, or provide for the maintenance of adequate and efficient Port services and facilities for all users of the Port;
(2) to co-ordinate the activities of the Port;
(3) to promote the improvement and development of the Port; and
(4) to execute such works as may be necessary to the performance of the duties specified in paragraphs (1),(2)and (3).

The RPA is a corporate body consisting of a Chairman and not more than eight other members appointed by the Minister of Infrastructure Development, of whom not more than half shall hold office in the Government, according to Section 4 of the Port Authority Ordinance.

The present organization chart and number of employees are shown in **Figure-4.3.1.1** and **Table-4.3.1.1.** The Chief Executive of the RPA is the General Manager and advises the Authority on the formulation of policies and is responsible for implementation of policies and management of the Port. There are seven departments. The number of employees is approximately 500, consisting of 300 full-time staff and 200 stevedores.

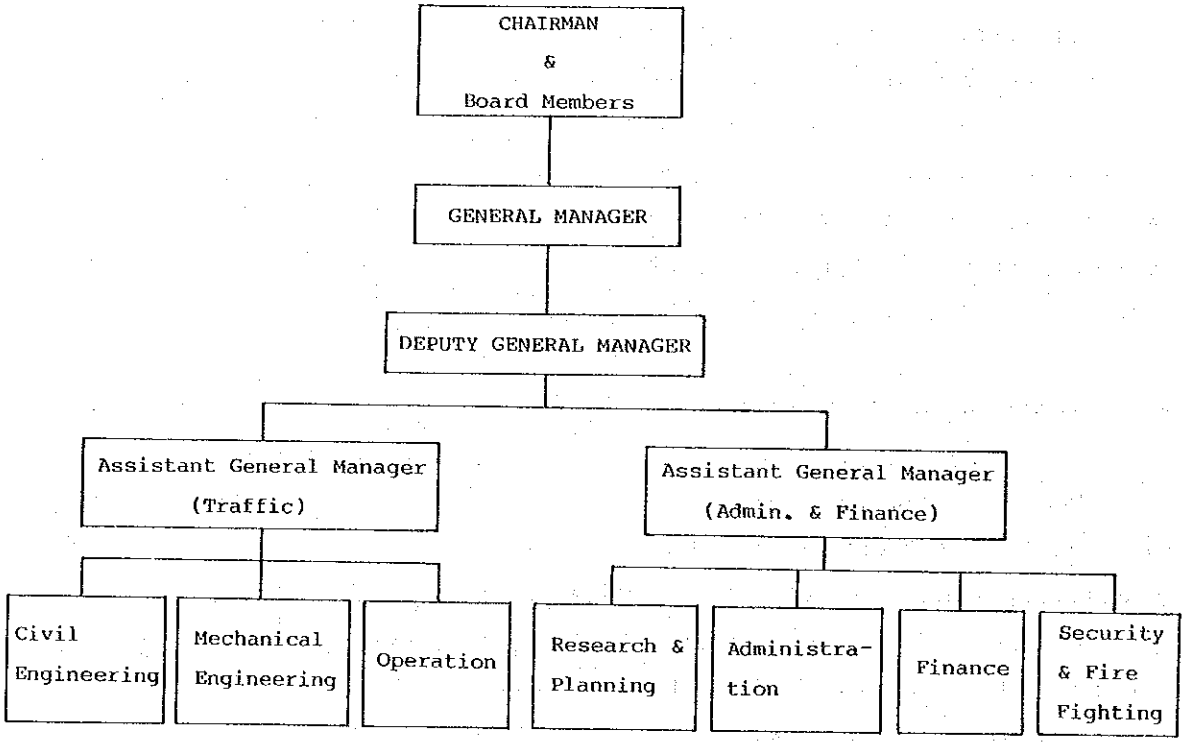


Figure-4.3.1.1 Organization Chart of the RPA

(Source: RPA)

Table-4.3.1.1 Number of Employees of the RPA (1990)

1 Full-time Staff

Department	Professional (A) (Senior Officer)	Sub-professional (B) (Officer)	Supportive (C) (Staff)	Supportive (D) (Staff)	Total
Administration	4	4	8	10	26
Finance	1	7	32	3	43
Research & Planning	1	0	0	0	1
Security & Fire Fighting	2	4	30	20	56
Operation	2	19	49	23	93
Civil Engineering	1	0	5	10	16
Mechanical Engineering	1	2	4	26	33
Sarikei Centre	0	2	18	3	23
Bintangor Centre	0	1	10	5	16
Total	12	39	156	100	307

2 Stevedore

	Employees
Skilled Stevedores	140
Unskilled Stevedores	65
Total	205

(Source: RPA)

4.4 Control of the Limits of Rajang Port

The limits of Rajang Port extend from Kapit to the estuaries of the Rajang River, as described above. If someone plans to build new facilities in the river such as wharves, or to extract sand and gravel or to use a log pond in the port area, he has to go through the following procedure, but these procedures are under the control of the Land & Survey Department, Ministry of Resource Planning, Sarawak, and the RPA only answers the consultation from the Land Survey Department.

(1) Procedure in application to plan facilities in the river

When someone makes an application concerning a proposal for new facilities in the river, the Land & Survey Department consults the Marine Department, the JKR, the District office, the Kuching Port Authority and the RPA. If there is no objection, a State Planning Committee meeting is held and approves the proposal. After that the Minister of Resource Planning gives a licence. There are two types of licence. One is a Temporary Occupation Licence (TOL), which is a licence of 10-20 years, the

other is a Land Title which is a licence of 60 years. Almost all private wharves get a TOL. But on the other hand, there are many illegal private wharves, especially in Sibu, which don't have a licence.

(2) Procedure in application to extract sand and gravel from rivers

When an application is submitted, the Land & Survey Department writes to the Marine Department, the JKR, local councils, the Drainage and Irrigation Department, and other relevant agencies as the case may require. If there is no objection, the Land & Survey Department gives a licence.

(3) Procedure in application to plan log ponds

Log pond licences are granted on a yearly basis by the Land & Survey Department. Before awarding a licence the Land & Survey Department consults the Marine Department, the Forest Department, the District Office, the RPA and the JKR.

4.5 Control of Vessels' Navigation

There are two principal approaches, the Paloh route and the Rajang River route, as described in chapter 3.4.3. The navigation of vessels is under the control of the Marine Department, and pilotage service is provided by the Marine Department according to the Merchant Shipping (Pilotage) Regulations 1961. Though pilotage is not compulsory for the Paloh and Rajang channels, it is strongly recommended that larger vessels use a pilot on all occasions.

Pilots normally embark, when weather permits, in the buoyed channel west of Jerijeh Lighthouse. A pilot can be picked up anywhere to suit the vessel, provided clear and precise information is given in the arrival telex. The Rajang Pilot launch "ALOR" is fitted with a "Hague Plan" VHF Radio for ship-to-pilot communication.

Application for a pilot must be made by giving 24 hours' notice of arrival.

4.6 Berth Assignment

The owners or agents of a vessel proposing to call at an RPA wharf at Sibu, Sarikei or Bintangor shall, as early as possible, and in any case not

less than thirty-six hours prior to the estimated time of arrival, notify the RPA. Vessels can berth from dawn to sunset. If for any reason a vessel needs to berth after 5 p.m., the vessel's owner or agent has to notice the RPA before 3 p.m. on the same day.

The RPA holds a meeting with shipping agents at 2:30 p.m. the day before the berths are used and allots them, including making arrangements for gangs, transit sheds, handling equipment, etc.

Berth assignment by the RPA is made on a public-use principle, basically, that is, a "first-come, first-served" basis. The RPA gives priority use to container vessels, Ro-Ro vessels, military transport vessels and passenger vessels. Regarding container vessels, they are given priority when they are waiting for a berth.

4.7 Cargo Handling

4.7.1 General

The RPA carries out cargo handling. In Sibu the RPA employs port workers, and they handle cargo from/to vessels to/from transit sheds or container yard. These workers are organized in 10 gangs, each of which is an integrated gang of 21 men consisting of a gang foreman and 20 workmen.

In Sarikei and Bintangor, stevedoring from/to vessels to/from shore is contracted to the local Wharf Labourer's Union. The Mechanical Department of the RPA handles cargo from/to shore to/from transit shed.

The Mechanical Department of the RPA carries out delivery and receiving of cargoes at transit shed or container yard.

Port holidays and operational hours are as follows;

(1) Port holidays

- Hari Raya Puasa
- Chinese New Year
- Dayak Festival Day -1st June
- Workers' celebrations Day -1st May
- Christmas Day -25th December
- Malaysia Day -31st August