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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

SIHANOUKVILLE PORT, MINISTRY OF PUBLIC WORKS AND TRANSPORT

THE KINGDOM OF CAMBODIA

THE STUDY ON THE MASTER PLANNING AND FEASIBILITY STUDY OF THE SIHANOUKVILLE PORT IN THE KINGDOM OF CAMBODIA

FINAL REPORT
VOL.1 SUMMARY
JUNE 1997

FINAL REPORT ON THE STUDY ON THE MASTER PLANNING AND FEASIBILITY STUDY OF THE SIHANOUKVILLE PORT IN THE KINGDOM OF CAMBODIA VOL.1 SUMMARY

THE OVERSEAS COASTAL AREA DEVELOPMENT INSTITUTE OF JAPAN (OCDI)
PACIFIC CONSULTANTS INTERNATIONAL (PCI)

Note) The following exchange rates are employed in this report.

1 US Dollar＝107 Japanese Yen＝2,594 Cambodian Riels
(May 20, 1996)

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FINAL REPORT

Volume 1

SUMMARY

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PREFACE

In response to the request of the Government of the Kingdom of Cambodia, the Government of Japan decided to conduct THE STUDY ON THE MATER PLANNING AND FEASIBILITY STUDY OF SIHANOUKVILLE PORT IN THE KINGDOM OF CAMBODIA and entrusted the study to the Japan International Cooperation Agency(JICA).

JICA sent to the Kingdom of Cambodia a study team three times between March 1996 and March 1997, which was headed by Mr. Hajime Kawate of the Overseas Coastal Area Development Institute of Japan (OCDI) and composed of members from OCDI and the Pacific Consultants International (PCI).

The team held discussion with the officials of the agencies of the Government of Cambodia concerned and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and the enhancement of friendly relationship between the two countries. I also wish to express my sincere appreciation to the officials concerned of the Government of the Kingdom of Cambodia for their close cooperation they extended to the study team.

June, 1997

Kimio Fujita
President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

June, 1997

Mr. Kimio FUJITA
President
Japan International Cooperation Agency

Dear Mr. Fujita:

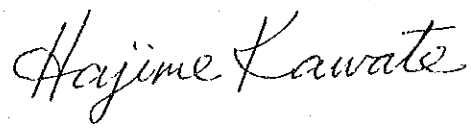
It is my great pleasure to submit herewith the Final Report of the Study on the Master Planning and Feasibility Study of Sihanoukville Port in the Kingdom of Cambodia.

The study team which consists of the Overseas Coastal Area Development Institute of Japan (OCDI) and the Pacific Consultants International (PCI) conducted surveys in the Kingdom of Cambodia over the period between March 1996 and June 1997 as per the contract with the Japan International Cooperation Agency.

The findings of this study, which are compiled in this report, were fully discussed with the officials of the Ministry of Public Works and Transport of Cambodian Government and other authorities concerned to formulate the Masterplan which is the Long-term Development Plan of Sihanoukville Port for the period up to the year 2015, and formulate and examine the feasibility of the Short-term Development Plan of the same port for the period up to the year 2005.

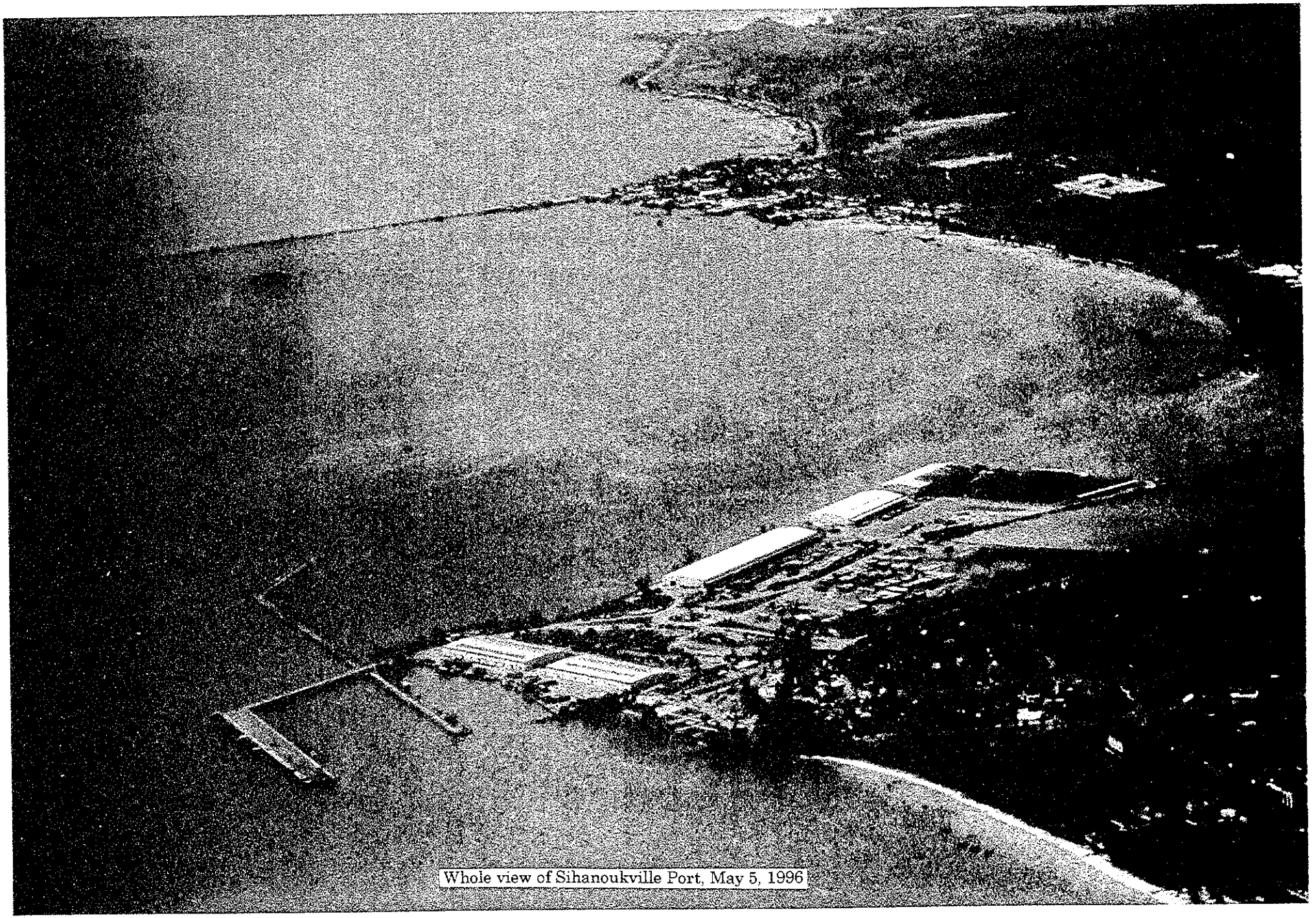
On behalf of the study team, I would like to express my heartfelt appreciation to the Government of the Kingdom of Cambodia, the Ministry of Public Works and Transport and other authorities concerned for their diligent cooperation and assistance in the course of the study.

Yours faithfully,



Hajime Kawate
Leader of the study team
for the Study on the Master Planning and Feasibility Study of Sihanoukville Port in the Kingdom of Cambodia

Location map



Whole view of Sihanoukville Port, May 5, 1996

Sihanoukville Port (Present Situation)

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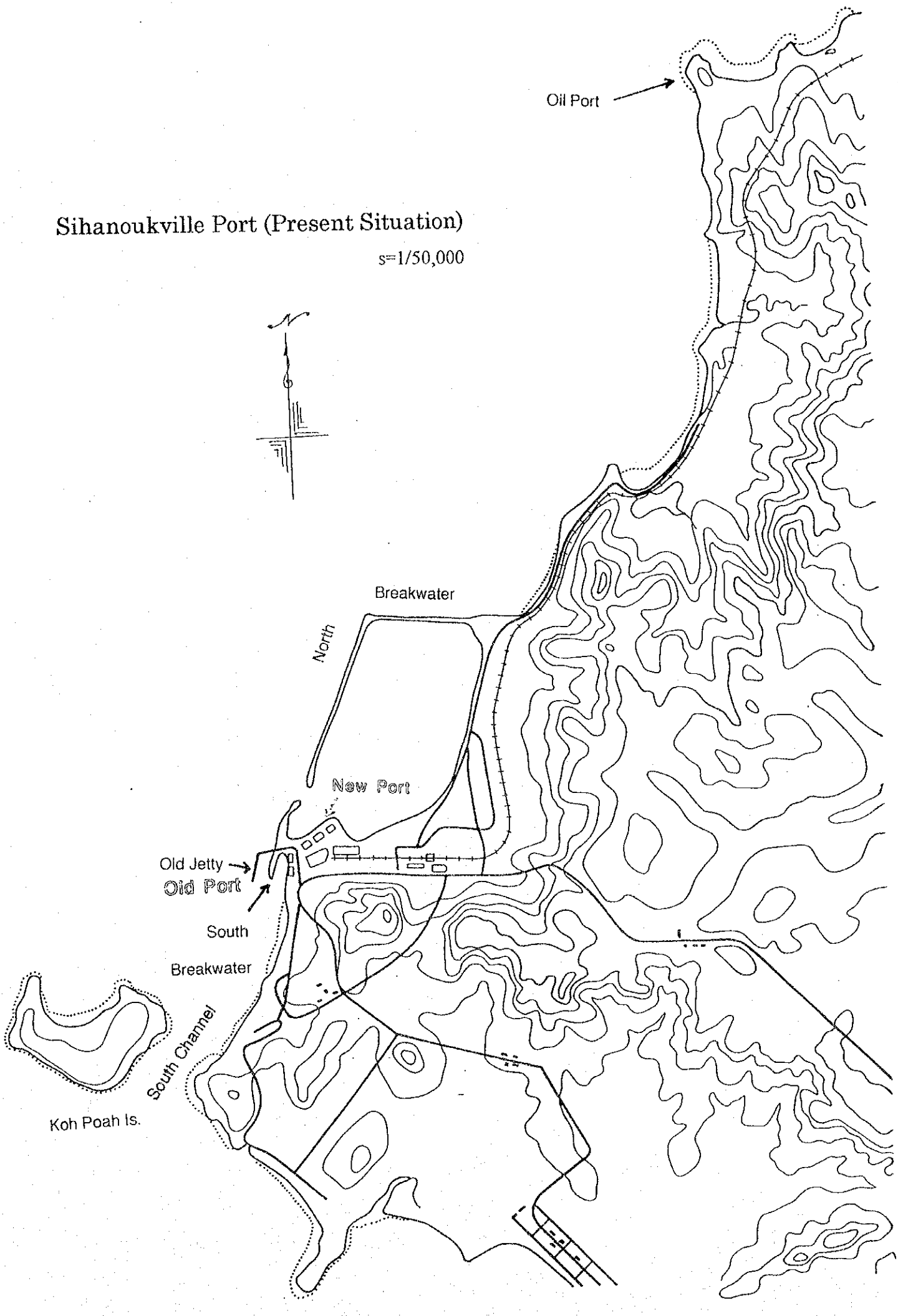
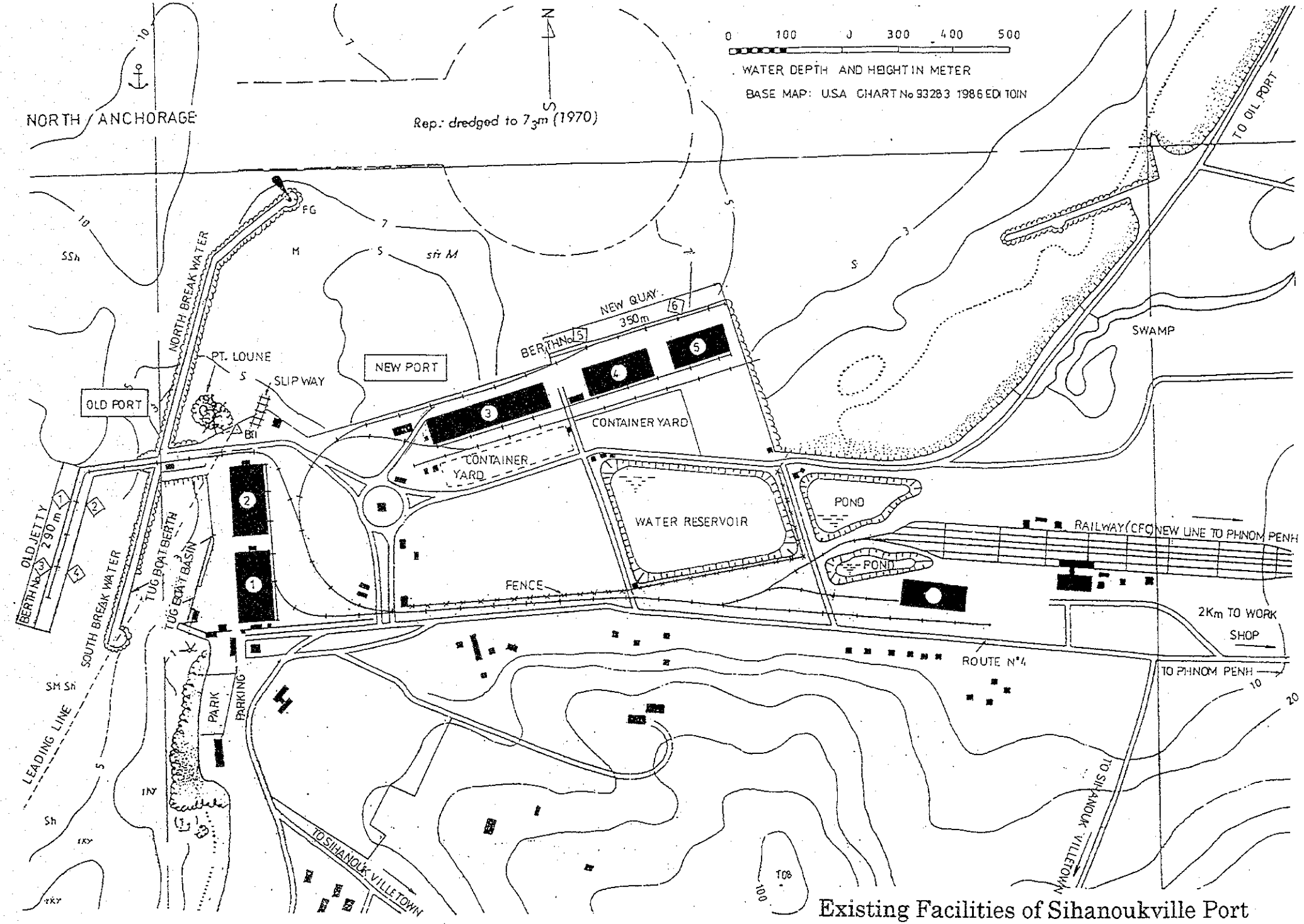
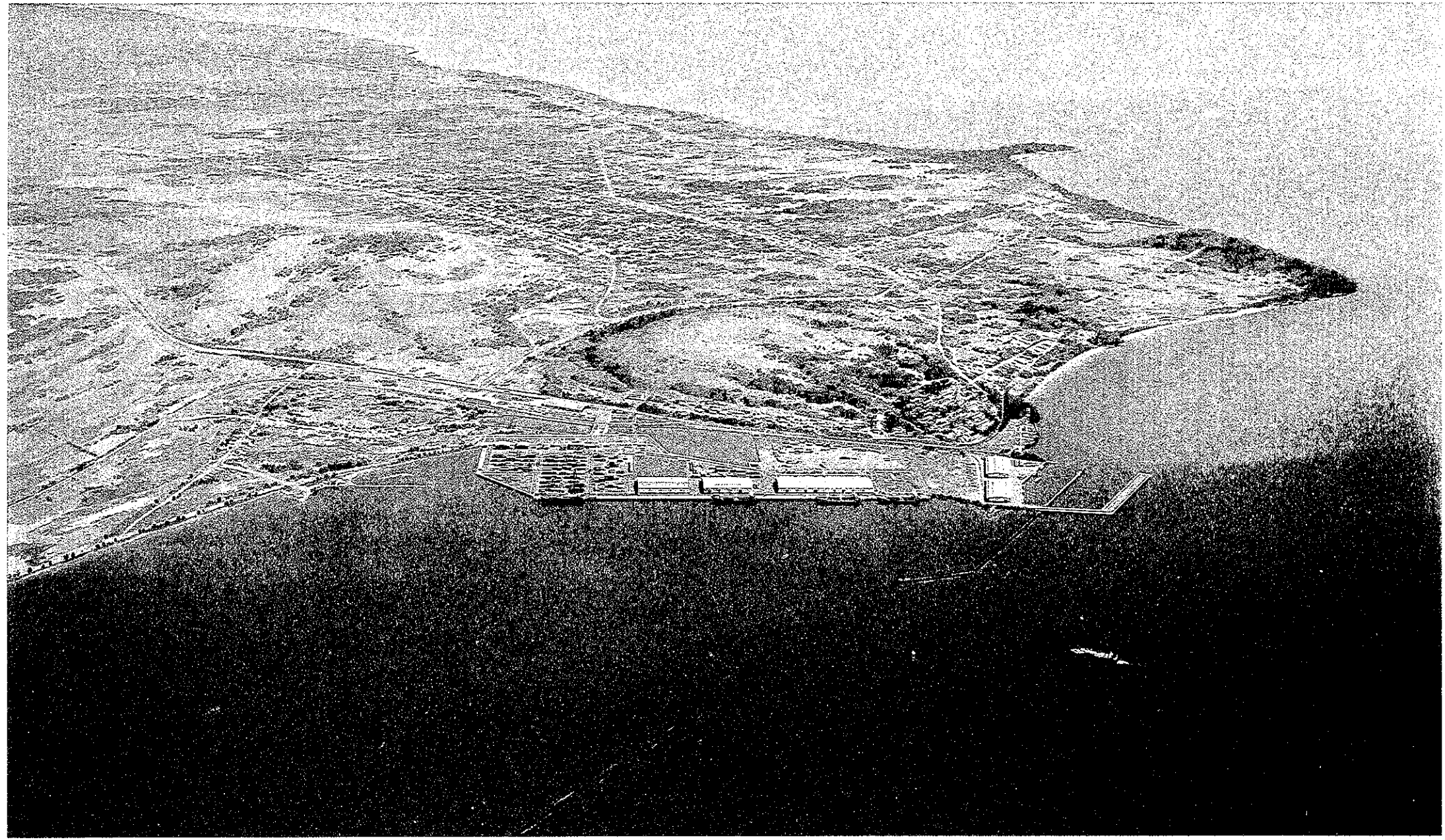
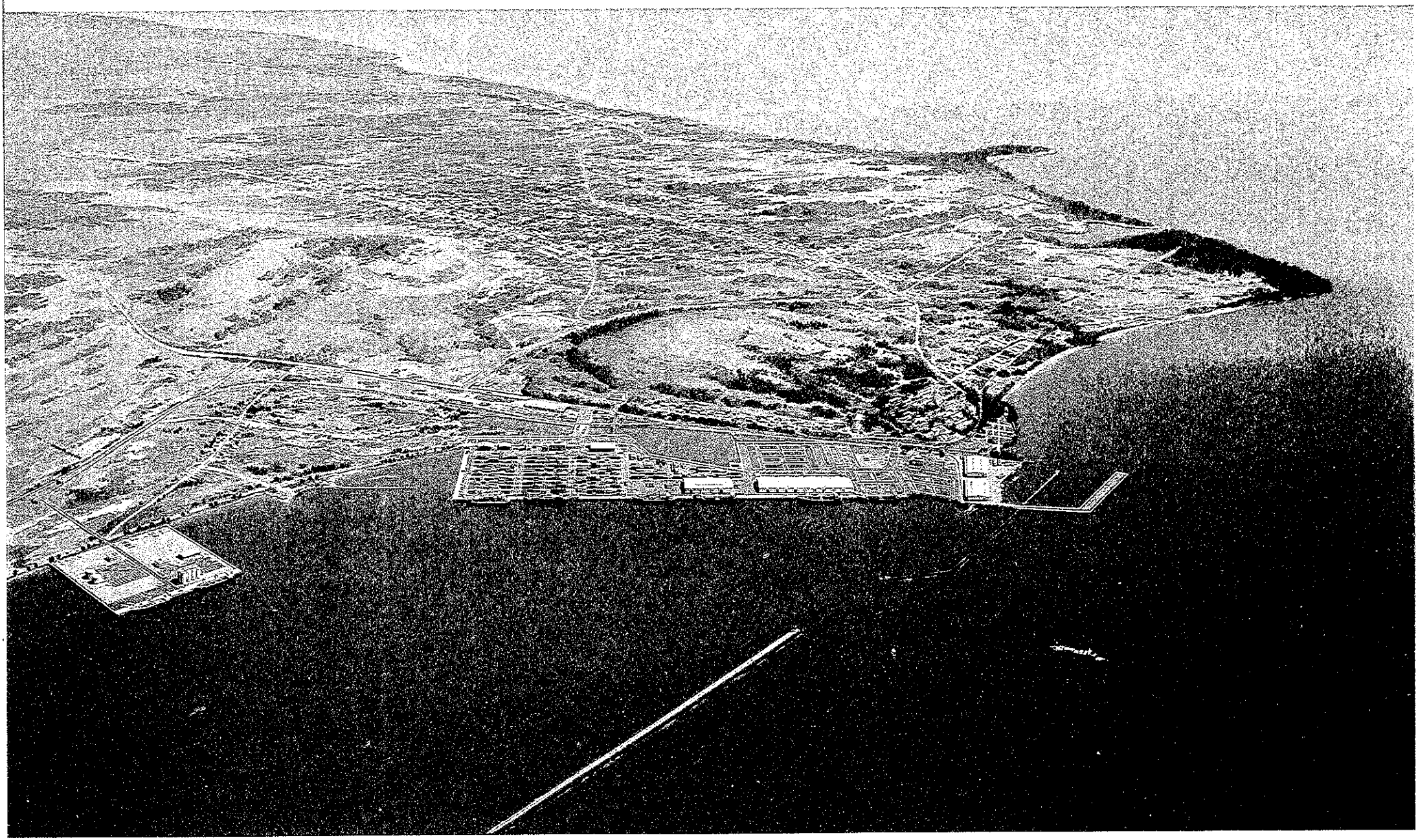




Existing Facilities of Sihanoukville Port



Short-term Development Plan (up to 2005)



Long-term Development Plan (up to 2015)

LIST OF ABBREVIATIONS

A	ADB	: Asian Development Bank
	ASTM	: American Society for Testing and Materials
B	BOD	: Biological Oxygen Demand
	BOR	: Berth Occupancy Rate
	BOT	: Built, Operate and Transfer
C	CD	: Chart Datum
	CDC	: Council for the Development of Cambodia
	CDL	: Chart Datum Level
	CFC	: Conversion Factor for Consumption
	CFRC	: Royal Railway of Cambodia
	CFS	: Container Freight Station
	CIF	: Cost, Insurance and Freight
	COD	: Chemical Oxygen Demand
	COMECON	: Council for Mutual Economic Assistance
	CPI	: Consumer Price Index
	CY	: Container Yard
D	DO	: Dissolved Oxygen
	DWT	: Dead Weight Tonnage
E	EIA	: Environmental Impact Assessment
	EIRR	: Economic Internal Rate of Return
	EMPA	: Europe Maritime Pilot Association
F	FIRR	: Financial Internal Rate of Return
	FOB	: Free on Board
	FSDP	: First Socioeconomic Development Plan, 1996-2000
G	GDP	: Gross Domestic Product
	GOC	: Government of Cambodia
	GOJ	: Government of Japan
	GVW	: Gross Vehicle Weigat
H	HWL	: High Water Level
I	IALA	: International Association of Lighthouse Authorities
	IEE	: Initial Environmental Evaluation
	IUUP	: University of Paris

J	JICA	: Japan International Cooperation Agency
	JIS	: Japanese Industrial Standard
K	KAMSAB	: Kampuchea Shipping Agency & Brokers
L	LAQ	: Lease a Quay
	LOA	: Length Over All
	LUP	: License to Use a Port
	LWL	: Low Water Level
M	MPWT	: Ministry of Public Works and Transport
	MSL	: Mean Sea Level
N	NGO	: Non-government Organization
	NPRDC	: National Programme to Rehabilitate and Develop Cambodia
O	OCC	: Opportunity Cost of Capital
	OCDI	: Overseas Coastal Area Development Institute of Japan
	OECF	: Overseas Economic Cooperation Fund
P	P/C	: Pre-stressed Concrete
	PIP	: Public Investment Program
	PPM	: Parts per Million
	PS	: Horse Power
Q	QC	: Quality Control
R	R/C	: Reinforced Concrete
S	SCF	: Standard Conversion Factor
	SPT	: Standard Penetration Test
	SS	: Suspended Solid
T	TEU	: Twenty Footer Equivalent Unit
U	U/P	: Unit Prices
	UKC	: Under Keel Clearance
	UNCTAD	: United Nations Conference on Trade and Development
	UNTAC	: United Nations Transitional Authority in Cambodia
	US$	: US Dollar
	USSR	: Union of Soviet Socialist Republics
W	WB	: World Bank

Contents

Executive Summary

Executive Summary

Study on the Master Planning and Feasibility Study of Sihanoukville Port in the Kingdom of Cambodia
(March, 1996 through June, 1997)

Background and Objectives

1. Since the establishment of the Royal Government of Cambodia (GOC) in 1993, the government has been pursuing two basic principles: to establish the strategy and administration for the rehabilitation and the development of the country, and to promote private sector participation in the economic development of Cambodia

2. In accordance with the above policy of the country, various investment projects have been brought to the country. The major sectors which invited foreign investment are: agriculture, industry, construction and tourism. In addition, foreign financial institutions have been extending financial assistance programs.

3. The cargo traffic at the ports has subsequently expanded at a very high rate over the past five years. Being the sole deep sea port of Cambodia, Sihanoukville Port has experienced a rapid increase in cargo volume. Constructed in the 1960s, the rehabilitation and expansion of the facilities of the port are quite urgent to meet the demand for handling capacity and, in turn, the country's economic growth.

4. In this regard, GOC requested the Government of Japan(GOJ) to elaborate the master plan for the development of Sihanoukville Port. In response, the Japan International Cooperation Agency (JICA) organized a study team and carried out the study to formulate a master plan of Sihanoukville Port for its development up to 2015 and the feasibility study of the Short-term development for the period up to 2005.

Implementation of the Study

5. Sihanoukville Port and Phnom Penh Port are the only two international ports in Cambodia and practically all the foreign seaborne cargoes are handled in these two ports. Therefore, the hinterland of the two ports are completely overlapped and these two ports share the same function as the gateways of the country.

6. Firstly, the study forecasts the seaborne cargo volume of the country, which is the sum of the cargo volumes handled at both ports, on the basis of three scenarios of the economic growth: High growth, Middle growth and Low growth. The cargo share for every commodity between Sihanoukville Port and the Phnom Penh Port is assumed on the basis of the present situation and the prospect in the coming decades of the transportation network, location of industries, and the facilities of the two ports.

7. To meet the requirements for the cargo handling capacity of Sihanoukville Port in 2015, suitable scale of development is examined, and alternative layout plans are proposed. In the course of layout plan, facilities for general, container, liquid bulk and dry bulk cargoes are zoned to avoid conflict between the traffic routes of these different types of cargoes. Staged development plan is also proposed for the Long-term development plan.

8. In the framework of the Long-term plan, a Short-term development plan up to 2005 is formulated to meet the demand of cargo handling capacity of the port, which is predicted in the cargo volume forecast. The proposed Short-term plan was evaluated from the viewpoints of engineering soundness, economic and financial feasibility. The impacts of the project on the natural and socioeconomic environment are also assessed.

9. Of the facilities included in the Short-term development plan, the facilities which need to be developed urgently, i.e. before 2000, are identified and proposed as the Urgent improvement plan.

Conclusions

(Cargo Traffic Forecast)

10. The cargo volumes are forecasted for three scenarios: High, Middle and Low case scenarios. The results of cargo volume forecast in 2015 for these High, Middle and Low are 7.1mil. (Oil 2.4 mil., others; 4.4 mil.), 6.3 mil.(Oil; 2.1mil., Others; 4.2 mil.) and 4.7 mil.(Oil; 1.6 mil., Others; 3.3 mil.) tons, respectively.

11. On the basis of the Middle Growth scenario, which is the most realistic of the three scenarios, the cargo volume in 2005 is expected to amount to 2.34 million tons (Oil; 0.58 mil., Others; 1.77 mil. including 1.00 million tons of container cargoes) .

(Role of Sihanoukville Port)

12. Phnom Penh Port, located in the center of national economy, has the role as a hub of the

inland water transportation through Mekong River system. Thus, the agricultural products, general cargoes, petroleum products and construction materials are major commodities handled at Phnom Penh Port. Being a sole deep sea port, Sihanoukville Port handles container cargoes, heavy machinery, bulk cargoes and wood products.

(Capacity of the Present Port)

13. The capacity of a berth is defined to be the cargo volume handled over a year with the berth occupancy rate 85%. With this definition, the capacity of the New Quay, with its one general cargo berth and two container berths, has the capacity of 700 thousand tons, and the Old Jetty, with its four general cargo berths, has the capacity 400 thousand tons.

(Bottlenecks)

14. The structural investigation of the timeworn Old Jetty showed that it would not be usable longer than several years. Alternative facilities to Old Jetty is urgent. To cope with the rapid increase of container cargoes, it is necessary to upgrade the container handling facilities at the port.

Project Outline

(Long-term Development Plan)

15. The number of berths required in 2015 are as shown in the following table:

Number of New Berths Required for the Long-term Development
(including Existing the existing New Quay 350m)

Scenario	General cargo berth		Container cargo berth			Bulk cargo berths	
	Number	Length	Number	Length	Cranes	Number	Length
High, Middle growth	5	700 m	3	450 m	4	2	300 m
Low growth	4	570 m	2	300 m	3	2	300 m

In addition to the construction of these wharves, the north navigation channel is deepened and widened to accommodate larger ships.

(The Short-term Development Plan)

16. The major facilities required to be operational by 2005 are as follows:

General cargo berths; 5 (existing 350m and new construction 400m)
Container berths; 2 (new construction 240m)
Container gantry cranes; 2 units.

(Urgent Improvement Plan)

17. Of the facilities listed above, the 400 m long general cargo wharf needs to be constructed by 2000, when the existing Old Jetty is not fully operational.

(Phased construction plan)

18. It is recommended that the facilities included in the Long-term Development Plan be constructed in the following stages:

1998 - 2000; the Urgent Improvement Plan (General cargo wharf 400m)
1999 - 2003; the Short-term Development Plan
(Container terminal 240m, gantry crane 2 units)
2004 - 2006; the Long-term Development Plan (1) (Bulk terminal 150 m),
2008 - 2011; the Long-term Development Plan (2)
(Bulk terminal 150m and additional gantry crane 1 unit)
2012 - 2014; the Long-term Development Plan (3)
(Expansion of container terminal 160m and additional gantry crane 1 unit)

(Structural design)

19. The concrete block type is chosen for the new general cargo wharf, because the level of the rock layer at this site is too shallow for deck-on-pile type. In order to reduce the reflection of the waves at the wharf, concrete blocks placed at the level of sea level should be wave absorbing type. At the location of the container terminal, the level of the rock layer is deep enough and deck-on-pile type is chosen because the cost is less and the reflection of wave is also less than those of concrete block type.

(Construction plan)

20. Working yard for the production of the concrete blocks of the new wharf is required over the construction period. The lot and the basin at the back of the Old Jetty, which is presently used for the mooring of working vessels of the port, can be used for the working yard.

21. The dredged materials are not suitable for the fill of the reclamation of the container terminal. Thus, they are disposed at the dumping sites: the water area either north or south of Dek Koh Island, where the water depths are -20 m or deeper.

To avoid the dispersion of the soil during the dredged work, grab dredger is recommended for the dredging of basin. Dumping site should be chosen depending on the direction of the tidal current: when the current is northward, dumping should be at the north site and vice versa.

(Project cost)

22. The project cost at each stage of development is as follows:

The Long-term Development Plan (including the Short-term and Urgent Plans)
US$250 million (High Growth),
US$245 million (Middle Growth) and
US$212million (Low Growth),
The Short-term Development Plan; US$113.5 million,
(US$85.3 mil. plus the Urgent Improvement Plan US$28.2mil.),
The Urgent Improvement Plan; US$28.2 million.

Project Evaluation

(Economic analysis)

23. The EIRR of the alternative Long-term Plan fell in the range between 14.0% and 17.8% for various cases. The EIRR for the Short-term Plan results in 15.0%. Even the worst case, where the project cost is assumed to increase by 10% and the cargo volume reduces by 10%, the EIRR is 11.0%. Since the project ensures 10% of the EIRR, the Short-term Project is concluded to be economically feasible.

(Financial analysis)

24. The Short-term Development Plan is concluded to be financially feasible, provided that the initial project cost for the Urgent Improvement Plan is not paid for by Sihanoukville Port. The FIRR for this case is 7.9%. In the case that the initial project cost increases by 10% and revenue decreases by 10%, the FIRR is 2.7%. In the calculation of FIRR, the present tariff system is employed.

(Environmental impact assessment)

a. Impact on ecology at dumping site of dredged material

25. It was found that by choosing the dumping site either north or south of Dek Koul Island in accordance of the direction of the tidal current, the impact of the suspended soil on the ecology at these islands can be avoided.

b. Sedimentation in the port

26. It was found that there is no practical change in the magnitude of the sedimentation in the water area within and near the fishing port regardless of the existence of the new container terminal.

c. Impact on socioeconomic activities

27. Neither the Urgent Improvement nor the Short-term Development Plans requires resettlement of any private properties. The construction of the container terminal will not cause substantial inconvenience the passage of the fishing boats.

28. The rerouting of the Municipal Road is very minor, and no considerable impact is foreseen in the traffic in the communities. The route of the heavy cargo trucks to and from Sihanoukville is separated from the municipal road.

(Overall evaluation)

29. The projects proposed in the study has enough capacity to handle the cargo volume in the target years. The Short-term Development plan is beneficial from the viewpoint of national economy. Provided that the initial project cost for the Urgent Improvement Project is shouldered by other agencies that Sihanoukville Port, the Port is able to implement the project with sound financial status. Through EIA, no elements were identified as those on which the project give considerable impact. If appropriate attention is paid during the construction period, the impact on natural and socioeconomic environment can be minimized.

Summing up the above mentioned evaluations, it is concluded that the project is feasible.

Recommendations

(The responsibility of the public port)

30. Since 1993, the government of Cambodia has been making efforts to privatize government corporations. The present status of Sihanoukville Port is an government agency, and it, with its autonomous administration, operates the port fairly efficiently with financial soundness.

31. Thus, it should be avoided to privatize the port as a whole or partially. On the contrary, it is the responsibility of Sihanoukville Port as a public corporation to promote and lead the private industries in the region and country. Being the public port, the port should make efforts to reduce the operation cost and to maintain its tariff at a reasonable level

(Improvement of handling productivity)

32. The cargo handling capacity cannot be increased by the construction of new berths only. It is also important to improve the cargo handling productivity. Therefore, all the efforts should be made to make the best use of available facilities such as the sheds and open storage and to introduce pallets, belt conveyers, etc.

(Harbour services)

33. To use the limited number of berths most effectively, it is necessary to start cargo handling as soon as ships dock at the berth and that the ships leave the port as soon as the cargo handling is over. Thus, it may necessary to allow ships leave the port during the night time. In such occasion, due attention should be paid to the traffic of fishing boats.

34. The unloading facilities of the Oil Port is owned and operated by private sector. However, the tug and pilot service and maintenance of navigation channel should be provided by Sihanoukville Port, since the Oil Port is public facilities and Sihanoukville Port is responsible for harbour safety.

(Operation and management of the port)

35. It is necessary to establish, within Sihanoukville Port, the Container Terminal Division which is responsible all the handling process of container cargoes. Increase of the container cargo volume may require more labor force. It is necessary to prepare employment schedule and to establish training programs for both new and existing port workers.

36. The development of the port should be done in accordance with the cargo volume increase and this required timely review of the schedule of the development. Thus, the Planning division has such responsibility to collect information related to national economy as well as cargoes.

(Fund for the development)

37. The financial situation of Sihanoukville Port is evaluated to be sound. It is recommended the Port to save the net income for the future and establish its own fund. However, the some existing facilities still want maintenance and repair. Thus, it is quite important to well schedule the investment for the port development so that the cost for the maintenance and repair of the existing facilities is not cut down.

(Participation of the private sector in the port operation)

38. At present, it is not necessary to privatize Sihanoukville Port either fully or partially. It is more important for the port to introduce the market economy in the management of the port. However, there are some elements of the port service which can be privatized. Some of these are: the cargo handling service of specific cargoes of a certain company only, such as bitumen, cement or etc., maintenance and repair of the heavy handling equipment, and services for the welfare of the personnel of the port such as restaurant and garbage and cleaning services.

39. For the effective use of the port's own fund, the cooperation with reliable commercial

banks is also needed. To promote local commercial banks may be one of the responsibility of Sihanoukville Port as the leading industry in the region.

(Responsibility as the port administration entity of the government)

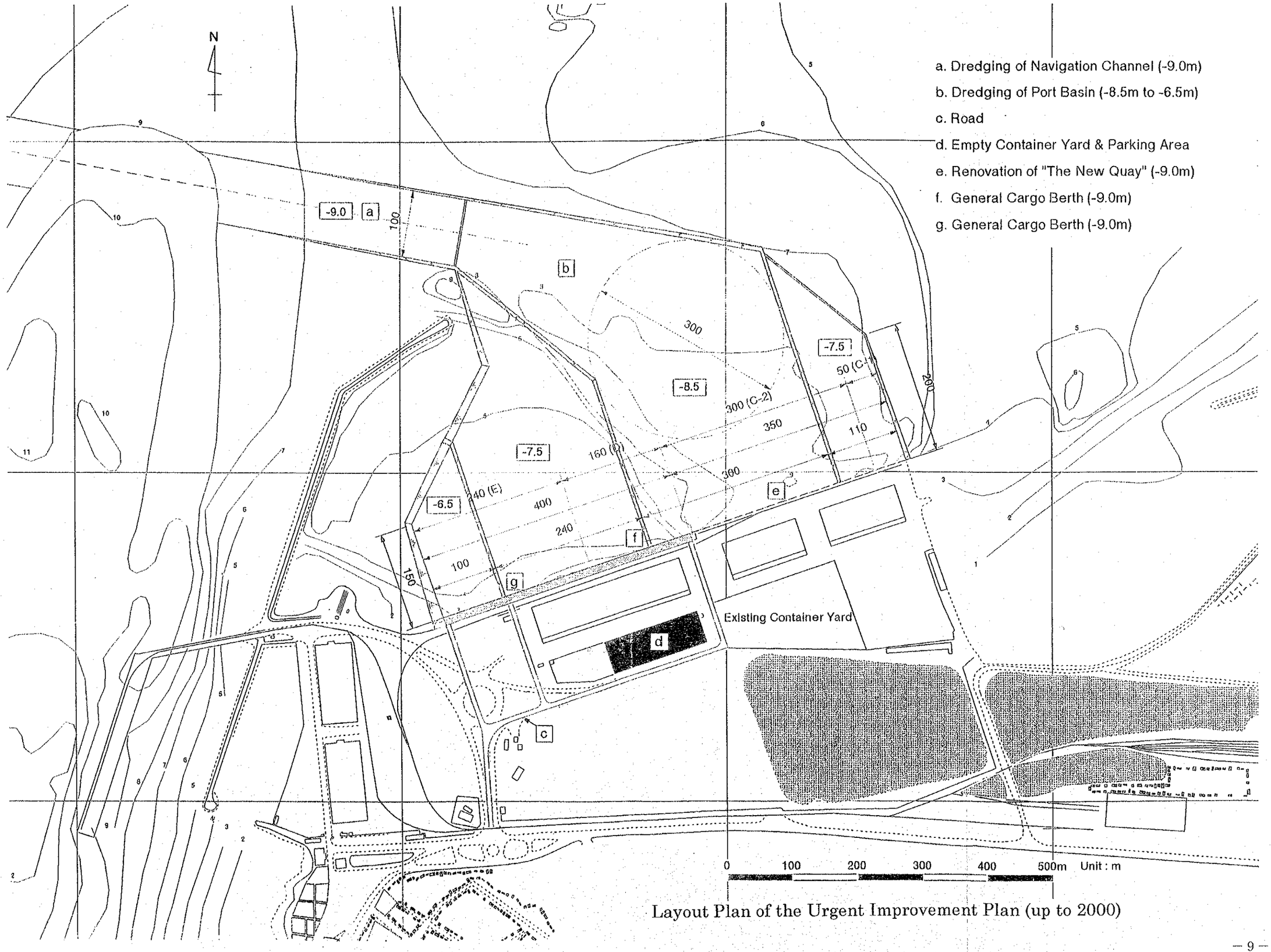
a. Authority of the Port to administrate the Port Related Area

40. The Port Related Area, defined in the land use plan of the Sihanoukville City, has a great potential for future development in various fields. To achieve the most effective use of the area, it is necessary to prepare the master plan and implementation plan. At the same time, piece-wise developments by both public and private sectors which deviate from the master plan should be strictly regulated.

41. At present, except Sihanoukville Port, there is no agency in the region which poses enough capability to keep monitoring and coordinate with all the agencies concerned. It is required to establish such system that any project proposal related port activities should reviewed by Sihanoukville Port before they are implemented.

b. Responsibilities as the coordinator of the development of the area

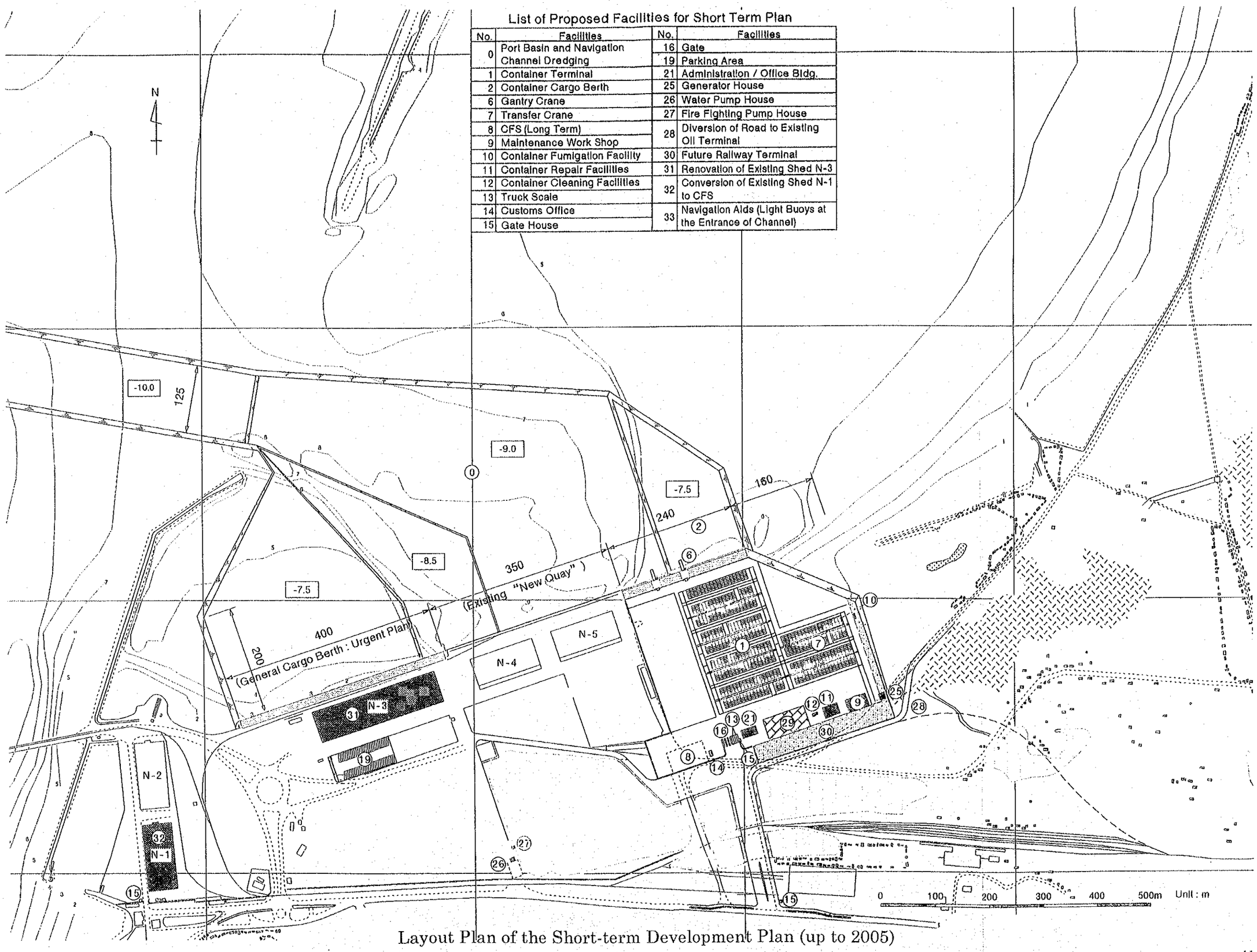
42. As stated above it is very necessary to formulate the master plan of the development of the whole Port Related Area. To achieve this end, Sihanoukville Port has the responsibility to take initiative to organize a committee to discuss and coordinate all the project proposals in the area to formulate an integrated master plan. The constituents of the committee members are the representatives of local agencies such as governor of Sihanoukville City, directors of Fishery Office, Railways, Public Works and Transport. In addition, if necessary, representatives of the local industries could be invited.



Layout Plan of the Urgent Improvement Plan (up to 2000)

List of Proposed Facilities for Short Term Plan

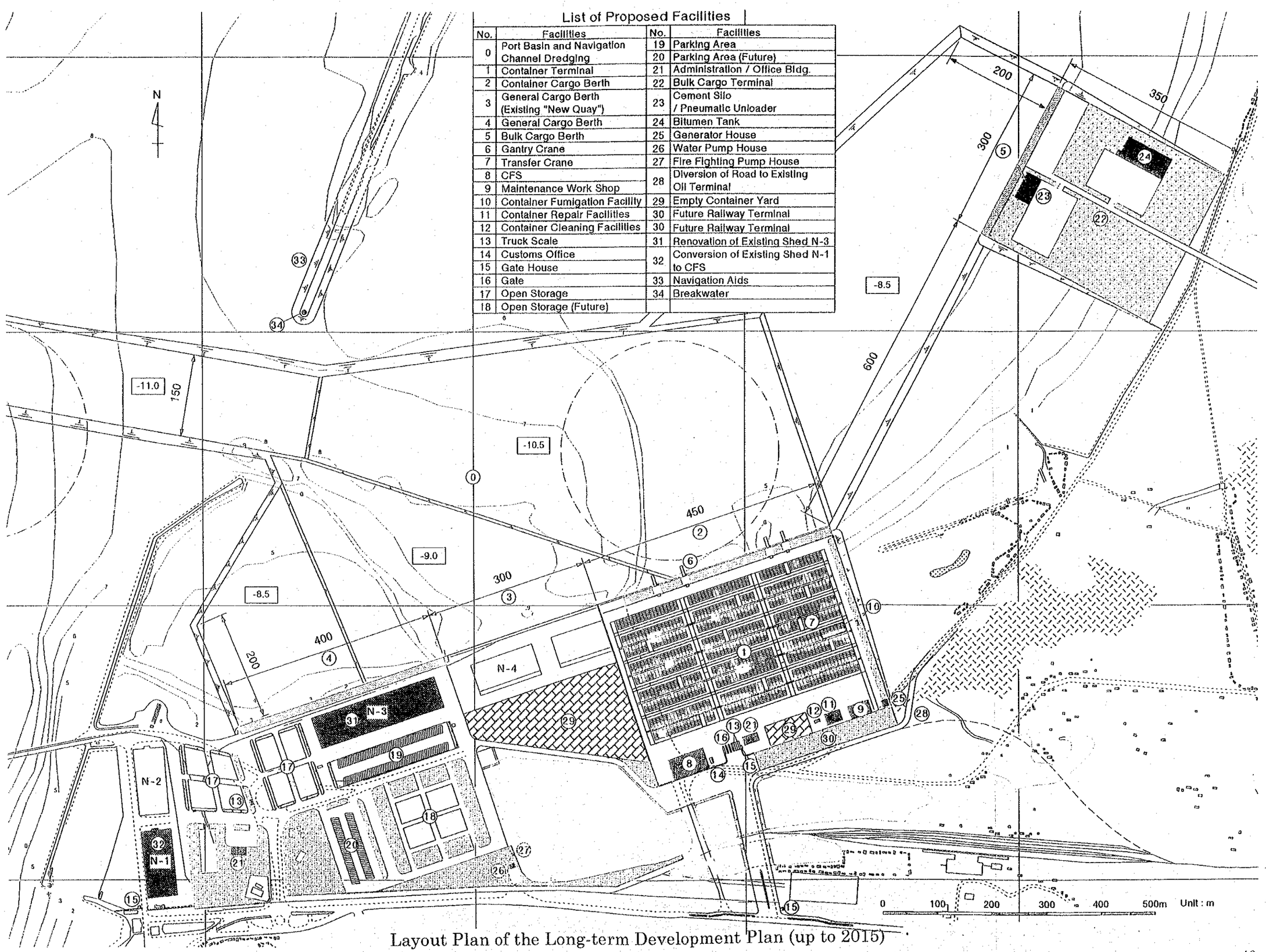
No.	Facilities	No.	Facilities
0	Port Basin and Navigation Channel Dredging	16	Gate
1	Container Terminal	19	Parking Area
2	Container Cargo Berth	21	Administration / Office Bldg.
6	Gantry Crane	25	Generator House
7	Transfer Crane	26	Water Pump House
8	CFS (Long Term)	27	Fire Fighting Pump House
9	Maintenance Work Shop	28	Diversion of Road to Existing Oil Terminal
10	Container Fumigation Facility	30	Future Railway Terminal
11	Container Repair Facilities	31	Renovation of Existing Shed N-3
12	Container Cleaning Facilities	32	Conversion of Existing Shed N-1 to CFS
13	Truck Scale	33	Navigation Aids (Light Buoys at the Entrance of Channel)
14	Customs Office		
15	Gate House		



Layout Plan of the Short-term Development Plan (up to 2005)

List of Proposed Facilities

No.	Facilities	No.	Facilities
0	Port Basin and Navigation Channel Dredging	19	Parking Area
		20	Parking Area (Future)
1	Container Terminal	21	Administration / Office Bldg.
2	Container Cargo Berth	22	Bulk Cargo Terminal
3	General Cargo Berth (Existing "New Quay")	23	Cement Silo / Pneumatic Unloader
4	General Cargo Berth	24	Bitumen Tank
5	Bulk Cargo Berth	25	Generator House
6	Gantry Crane	26	Water Pump House
7	Transfer Crane	27	Fire Fighting Pump House
8	CFS	28	Diversion of Road to Existing Oil Terminal
9	Maintenance Work Shop		
10	Container Fumigation Facility	29	Empty Container Yard
11	Container Repair Facilities	30	Future Railway Terminal
12	Container Cleaning Facilities	30	Future Railway Terminal
13	Truck Scale	31	Renovation of Existing Shed N-3
14	Customs Office	32	Conversion of Existing Shed N-1 to CFS
15	Gate House		
16	Gate	33	Navigation Aids
17	Open Storage	34	Breakwater
18	Open Storage (Future)		



Layout Plan of the Long-term Development Plan (up to 2015)

List of the members of the Study Team and the Counterpart Team

Counterpart Team (Sihanoukville Port)

Mr. Lou Kim Chhun	Director
Mr. Ma Sunhout	Deputy Director
Mr. Va Sonath	Deputy Director
Mr. Chea Yudika	Chief of Technical Service Office
Mr. Ty Sakun	Official of Technical Service Office
Mr. Chhim Hour	Official of Technical Service Office
Mr. Sem Kithai	Chief of Finance and Accounting Office
Mr. Klauk Yeth	Deputy Chief of Finance and Accounting Office
Mr. Nhim Vuth	Chief of Administration and Personnel Office
Mr. Koy Sam Aun	Deputy Chief of Administration and Personnel Office
Mr. Sam Heng	Deputy Chief of Administration and Personnel Office
Mr. Nong Siyeth	Chief of Planning Office
Mr. Chea Sambath	Deputy Chief of Planning Office
Mr. May Marith	Harbour Master
Mr. Peng Hok	Deputy Chief of Harbour Master
Mr. Chhun Hong	Chief of Stevedoring Office
Mr. Srey Narin	Chief of Warehouse Office
Mr. Chhem Chhan	Chief of Machinery and Transport Office
Mr. Pen Socheath	Chief of Business Office
Mr. Men Chann	Interpreter

Study Team

Hajime Kawate	Leader
Koji Kobune	Port Planning/Environmental Consideration
Nobuaki Kojima	Navigation Safety and Ship Maneuvering
Masayuki Fujiki	Cargo Handling System
Yoichi Nishioka	Demand Forecast/Economic Analysis
Takashi Kajiki	Management and Operation/Financial Analysis
Masaaki Goshima	Design of Port Facilities
Katsuhiko Takahashi	Construction Schedule/Cost Estimate
Toshiyuki Inoue	Natural Condition Survey
Shigeru Kanaya	Environmental Survey
Tatsuyuki Shishido	Coordinator
Kenji Kuriyagawa	Coordinator