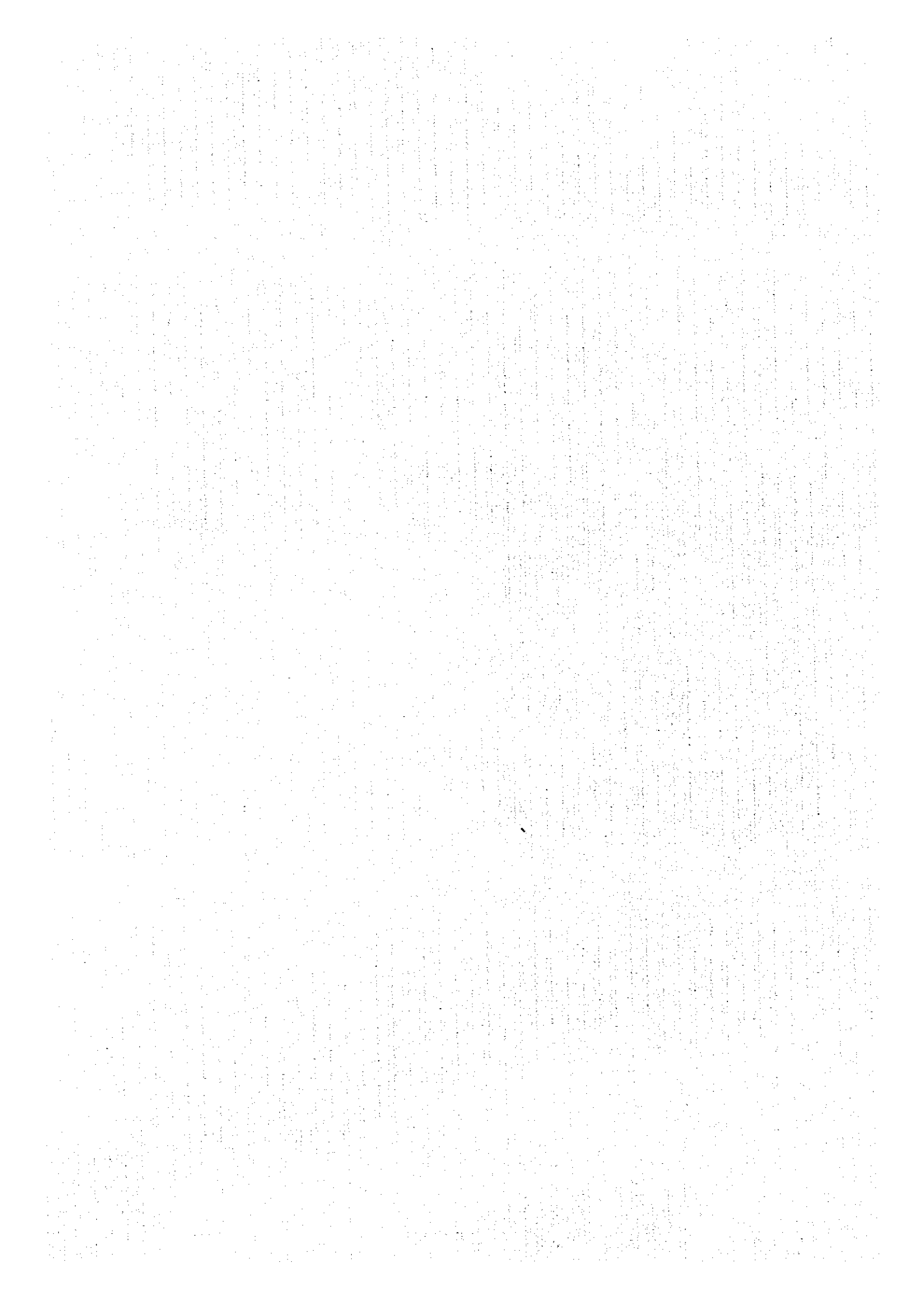


APPENDICES



APPENDICES

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Appendix-1 Member List of the Survey Team

First Field Survey

Name	Assignment	Organization
Official Member Mr. OKA Sadayuki	Leader	Assistant Director, Fishing Port Planning Div., Fishing Port Dept., Fishery Agency, MOAFF
Mr. NAKAGAWA Atsushi	Coordinator	Second Basic Design Study Div., Grant Aid Study & Design Dept. JICA
Consultant Member Mr. IGARI Koichi	Chief Consultant /Fishing Port Planner	Tetra Co., Ltd.
Mr. TAKEMOTO Hitoshi	Natural/Environmental	Tetra Co., Ltd.

Second Field Survey

Name	Assignment	Organization
Official Member Mr. ASAKA Kuniichi	Leader	Assistant Director, Fishing Port Construction Div., Fishing Port Dept., Fishery Agency, MOAFF
Mr. YOSHIDA Katsumi	Coordinator	Second Project Study Div., Grant Aid Project Dept. JICA
Mr. IWAMOTO Yasuaki	Grant Aid Planner	Official, Grant Aid Div., Economic Cooperation Bureau, Ministry of Foreign Affairs
Consultant Member Mr. IGARI Koichi	Chief Consultant /Fishing Port Planner	Tetra Co., Ltd.
Mr. OCHI Yutaka	Port Engineer	Tetra Co., Ltd.
Mr. TAKEUCHI Akira	Fisheries Surveyor	Tetra Co., Ltd.
Mr. KATSUHARA Koichi	Facility Planner	Tetra Co., Ltd.
Mr. TAKEMOTO Hitoshi	Natural/Environmental	Tetra Co., Ltd.

Explanation of Draft Basic Design

Name	Assignment	Organization
Official Member		
Mr. ASAOKA Kuniichi	Leader	Assistant Director, Fishing Port Construction Div., Fishing Port Dept., Fishery Agency, MOAFF
Mr. SUGIYAMA Shunji	Coordinator	Second Project Study Div., Grant Aid Project Dept. JICA
Consultant Member		
Mr. IGARI Koichi	Chief Consultant /Fishing Port Planner	Tetra Co., Ltd.
Mr. OCHI Yutaka	Port Engineer	Tetra Co., Ltd.
Mr. TAKEMOTO Hitoshi	Natural/Environmental	Tetra Co., Ltd.

JICA : Japan International Cooperation Agency

MOAFF : Ministry of Agriculture, Forest and Fishery

Appendix-2 Survey Schedule

First Field Survey

No.	Date	Day	Itinerary	Accommodation	Activities
1	3	16 Sat	1230Tokyo(JL111)-1700Amst	Amsterdam	Movement
2	17	Sun	1145Amst(KL585)-1925Accra	Accra	Movement
3	18	Mon		Accra	Courtesy Call (JICA, Embassy, MOT&C, MOA etc.)
4	19	Tue	Accra-Tema-Accra	Accra	Field Study at Tema Fishing Port
5	20	Wed	Accra-Sekondi-Takoradi	Takoradi	Field Study at Sekondi Fishing Port
6	21	Thu	Takoradi-Elmina-Accra	Accra/Takoradi	Field Study at Elmina Fishing Port
7	22	Fri		Accra/Takoradi	Discussion with Organization concerned
8	23	Sat		Accra/Takoradi	Team Meeting
9	24	Sun		Accra/Takoradi	Data Collection
10	25	Mon		Accra/Takoradi	Discussion with Organization concerned
11	26	Tue		Accra/Takoradi	Signing of Minutes of Meeting/Call at JICA and Embassy
			1950Accra(KL586)		Official Tow Members leaving, Consultant Members continue Field Study
12	27	Wed	Accra-Takoradi	Takoradi	Data Collection, Field Study
13	28	Thu		Takoradi	Data Collection, Field Study
14	29	Fri		Takoradi	Data Collection, Field Study
15	30	Sat		Takoradi	Team Meeting
16	31	Sun	Takoradi- Accra	Accra /Takoradi	Data Collection, Field Study
17	4	1 Mon		Accra /Takoradi	Data Collection, Field Study
18	2	Tue		Accra /Takoradi	Data Collection, Field Study
19	3	Wed		Accra /Takoradi	Data Collection, Field Study
20	4	Thu		Accra /Takoradi	Data Collection, Field Study
21	5	Fri		Accra /Takoradi	Data Collection, Field Study
22	6	Sat	Takoradi-Accra	Accra	Team Meeting
23	7	Sun	Accra- Takoradi	Accra /Takoradi	Data Collection, Field Study
24	8	Mon		Accra /Takoradi	Data Collection, Field Study
25	9	Tue		Accra /Takoradi	Data Collection, Field Study
26	10	Wed		Accra /Takoradi	Data Collection, Field Study
27	11	Thu	Takoradi-Accra	Accra	Meeting with Officials Concerned, Call at JICA and Embassy
					Data Collection, Field Study
28	12	Fri		Accra	Data Collection, Field Study
			2140Accra(KL590)-		One Member leaving
29	13	Sat	Accra-Takoradi	Takoradi	Data Collection, Field Study
30	14	Sun		Takoradi	Data Collection, Field Study
31	15	Mon		Takoradi	Data Collection, Field Study
32	16	Tue		Takoradi	Data Collection, Field Study
33	17	Wed		Takoradi	Data Collection, Field Study
34	18	Thu		Takoradi	Data Collection, Field Study
35	19	Fri	Takoradi-Accra	Accra	Meeting with Officials Concerned, Call at JICA
36	20	Sat		Accra	Data Collection
37	21	Sun	1950Accra(KL586)-	Aircraft	Last Member leaving
38	22	Mon	0645Amst, 1930Amst(JL112)-	Aircraft	Movement
39	23	Tue	1400Tokyo		Arrive at Tokyo

Second Field Survey

No.	Date	Day	Official Member		Consultant Member					
			1,2,3		1	2,3	4	5	6	
1	7	Sat			11:45Tokyo(KL862)→16:45AMS					
2	14	Sun			11:35AMS(KL585)→18:10ACC					
3	15	Mon			Courtesy Call(JICA,Embassy,GPELA)					
4	16	Tue			Accra→Sekondi					
5	17	Wed			Field Study at Sekondi					
6	18	Thu								
7	19	Fri			Sekondi→Accra					
8	20	Sat			Study at Tema					Sekondi→Accra
9	21	Sun								Study at Tema
10	22	Mon								
11	23	Tue			13:00Tokyo(LA07)→18:00FRA					19:50ACC(KL586)
12	24	Wed			12:20FRA(LH564)→16:45ACC					06:45AMS
13	25	Thu			Courtesy Call(JICA,Embassy,MOF&EP,MOT&C,MOA)					14:55AMS(KL861)
14	26	Fri			Accra→Sekondi, Inspection at Sekondi					09:05Tokyo
15	27	Sat			Inspection at Sekondi and Elmina, Sekondi→Accra					
16	28	Sun			Team Meeting					
17	29	Mon			Inspection at Tema, Discussion with GPHA(Site Selection)					
18	30	Tue			Discussion with GPHA(Basic Plan)					
19	31	Wed			Discussion with Organization concerned(Basic Plan)					
20	1	Thu			Discussion with GPHA,MOT&C and MOF&EP(Draft Minutes)					
21	2	Fri			Signing of Minutes, Reporting to JICA and Embassy					
					21:40ACC(KL590)→					
22	3	Sat			06:25AMS					
23	4	Sun			19:30AMS(JL412)→					
24	5	Mon			14:00Tokyo					
25	6	Tue								
26	7	Wed								
27	8	Thu								
28	8	Fri			Reporting to JICA					
					21:40ACC(KL590)→					
29	10	Sat			06:25AMS,19:30AMS(JL412)→					
30	11	Sun			14:00Tokyo					
31	12	Mon								
32	13	Tue								
33	14	Wed								
34	15	Thu								
35	16	Fri								

Note:

- Govt. Officials 1: MR. Kunitichi ASAOXA, Leader
 Govt. Officials 2: MR. Katsumi YOSHIDA, Coordinator
 Govt. Officials 3: MR. Yasuaki IWAMOTO, Grant Aid Planner
 Consultant 1: MR. Koichi IGARI, Chief Consultant
 Consultant 2: MR. Akira TAKEUCHI, Fisheries Surveyor
 Consultant 3: MR. Koichi KATSUHARA, Facility Planner
 Consultant 4: MR. Hiroshi TAKEMOTO, Natural & Environmental Condition Surveyor
 Consultant 5: MR. Norio YANAKA, Expert on Littoral Drift
 Consultant 6: MR. Yutaka OCHI, Port Engineer

Explanation of Draft Basic Design

No.	Date		Day	Itinerary	Activities
1	10	29	Tue	1300Tokyo(JL407)- 1700Frankfurt	Movement
2		30	Wed	1145Frankfurt(LH564)- 1645Accra	Movement
3		31	Thu		Courtesy Call(JICA, Embassy, MOF, MOTC, MOFA)
4	11	1	Fri		Inspection at Sekondi
5		2	Sat		Inspection at Sekondi
6		3	Sun		Team Meeting
7		4	Mon		Inspection at Tema Discussion with GPHA
8		5	Tue		Discussion with GPHA
9		6	Wed		Discussion with Organization Concerned
10		7	Thu		Discussion with GPHA (Draft Minutes)
11		8	Fri		Signing of Minutes Reporting to JICA and Embassy
12		9	Sat	2140Accra(KL590)- -0625Amsterdam	Movement
13		10	Sun	1920Amsterdam(JL412)-	Movement
14		11	Mon	-1455Tokyo	Arrive at Tokyo

Appendix-3 Member List of Party Concerned in the Recipient Country

1. The Government of the Republic of Ghana

1.1 Ministry of Finance(MOF)

- * Mr. Kwame Peprah Minister
- * Dr. William Adote Director
International Economic Division
- * Mrs. Agnes Batsa Head of Bilaterals
- * Mr. Kwashi Opoku Economic Planning Officer and
Officer in charge of Japan's Desk
- * Mr. Edmud Nkansah Economic Planning Officer

1.2 Ministry of Transport and Communications(MOTC)

- * Mr. G. P. Ansah Chief Director
- * Mr. E. A. Kwakye Director(Planning)
- * Mr. T. A. Selby Deputy Director

1.3 Ministry of Food and Agriculture(MOFA)

- * Mr. K. S. Akyeampong Deputy Minister(Fisheries)
- * Mr. M. A. Mensah Director
Fisheries Department
- * Miss Emilia Deputy Director of Fisheries Dept.
- * Mr. S. W. K. Quaatay Assistant Director of Fisheries Dept.
- * Mr. T. K. Insaiddoo Regional Fisheries Officer(Takoradi)

1.4 Ghana Navy

- * Cdr. J. Y. Adoko NOIC(WNC), Naval Base, Sekondi
- * Capt. M. P. Dankwa ALSCO, Ghana Navy Headquarters

1.5 Ghana Ports and Harbours Authority(GPHA)

(1) Headquarters, Tema

- * Cdr. K. T. Dovlo(RTD) Director-General
- * Mr. J. K. Frimpong Chief Maintenance Engineer
- * Mr. B. B. K. Opoku Chief of Port Engineer
- * Mr. K. D. Boateng Assistant Project Coordinator

(2) Tema Port

- * Mr. R. U. Kumedzro Director
- * Mr. B. B. Okutu Chief Port Engineer

(3) Takoradi Port	
* Capt. E. Quansah	Director
* Mr. R. A-Y. Anamoo	Chief Port Engineer Engineering Department
(4) Tema Fishing Harbour	
* Mr. E. F. Owuoh	Fishing Harbour Manager
* Mr. Brem	Acting Manager
* Mr. Frimpong	Principal Accountants
* Mr. Odarty	Audit Manager
* Mr. S. Doodoo	Civil Engineer
* Mr. S. K. Akycanpong	Operations Officer(SNR)
1.6 Western Region	
* Dr. J. Abu	Minister
* Mr. Anamu	Deputy minister
* Lt.-Col. K. Korsah	Metropolitan Chief Executive Shama-Ahanta East Metropolitan Assembly
1.7 Food and Agriculture Organization(FAO)	
* Dr. W. Q-B West	Senior Regional Fisheries Officer Regional Office for Accra.
2. Private Sectors	
2.1 Cold Store	
(1) Ansa Cold Store LTD.	
* Mr. Alh. Faysal M. A. Brakeh	Director
* Mr. Bassel Ghazi	Asst. Manager
2.2 Quarry	
(1) SCC Pomgrad Quarry	
* Mr. Leo Amenakpor	Mining Engineer
(2) GDC	
* Mr. Kwesi Ainey	Quarry Manager
2.3 Ghana Inshore Fisheries Association(GIFA)	
* Mr. C. H. Acquah	Secretary(Sekondi)
* Mr. G. Qdamtten	Secretary(Tema)
2.4 Consultant	
* Mr. B. Owusu-Mensah	Managing Consultant, Benom Consult

Appendix- 4 Minutes of Discussions

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY
ON
THE PROJECT FOR THE CONSTRUCTION OF SEKONDI FISHING PORT
IN THE REPUBLIC OF GHANA
(First Field Study)

In response to a request from the Government of the Republic of Ghana (hereinafter referred to as "the GOG"), the Government of Japan has decided to conduct a Basic Design Study on the Project for the Construction of Sekondi Fishing Port in Ghana (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA")

JICA has sent to Ghana a Basic Design Study Team headed by Mr. OKA Sadayuki, Assistant Director of Fishing Port Planning Division, Fishing Port Department, Fisheries Agency, and the Study Team is scheduled to stay in the country from March 17 to April 21, 1996.

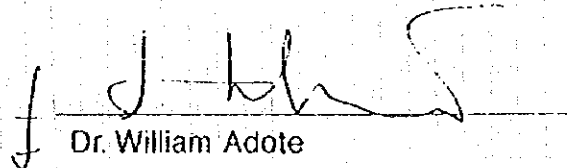
The Study Team held a series of discussions with the officials concerned of the GOG and conducted a field survey at the study area.

In the course of the discussions and field survey, both parties have confirmed the main items described on the attached sheets. The Study Team will proceed to further works and prepare the Interim Report.

Accra, March 26, 1996

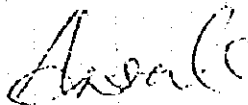
岡 貞 行

Mr. OKA Sadayuki
Leader,
Basic Design Study Team,
JICA

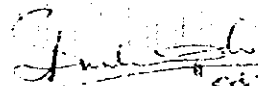


Dr. William Adote
Director,
International Economic Relations
Division,
Ministry of Finance

witnessed by



Mr. G. P. Ansah
Director (Administration),
Ministry of Transport and
Communications (MOTC)



Cdr. K. T. Dovlo (Rtd)
Director General,
Ghana Ports and Harbours
Authority

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ATTACHMENT

1. Objective

The objective of the project is to construct a fishing port and related facilities in Sekondi as the inshore fishery base thereby contributing to the fishery development in the western coast of Ghana.

2. Project Site

Sekondi, Western Region, as shown in ANNEX I.

In case that the fishing port will be constructed at settlement area for fish processing the GOG will take necessary legal measures to resettle the affected persons promptly.

3. Responsible Organization and Implementing Agency

Responsible Ministry : Ministry of Transport and Communications

Implementing Agency : Ghana Ports and Harbours Authority

4. Management and Maintenance

Ghana Ports and Harbours Authority will be responsible for management and maintenance of the fishing port and facilities after construction.

5. Items requested by the GOG

The items requested by the GOG are listed in ANNEX II.

However, the final components of the Project will be subject to further studies.

6. Japan's Grant Aid System

1) The GOG has understood the system of the Japan's Grant Aid explained by the Study Team; the main feature is described in ANNEX III.

2) The GOG will take the necessary measures, described in ANNEX IV for the smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

7. Further Schedule of the Study

1) The Study Team will proceed to further studies in Ghana until April 21, 1996.

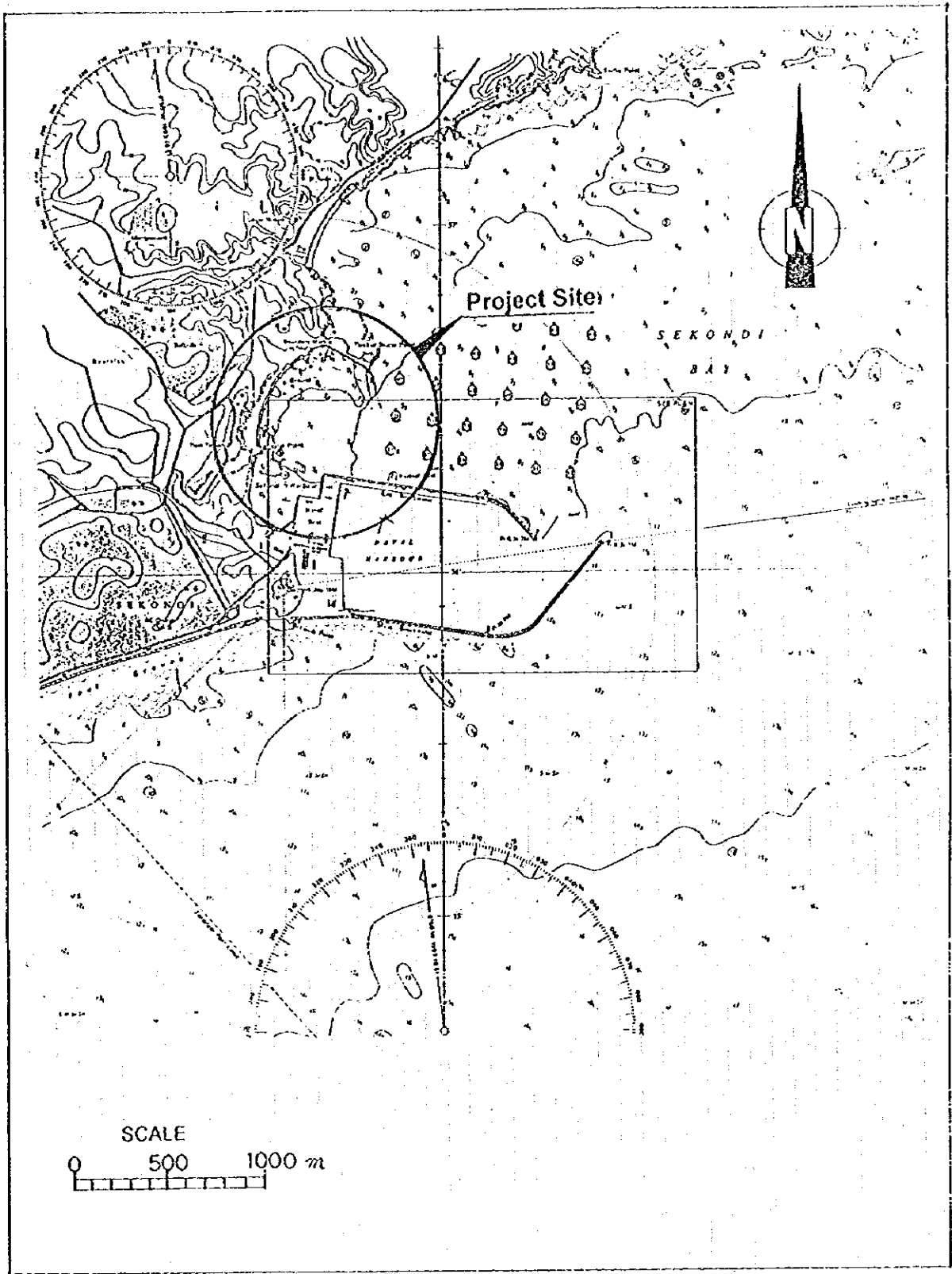
2) Based on the results of the first field study, JICA will prepare the Interim Report and dispatch a team around the middle of July, 1996 for the second field study.

3) Based on the results so obtained, JICA will prepare the Draft Basic Design and dispatch a team around October, 1996 in order to consult with the GOG on outline of the Draft Basic Design.

4) Upon acceptance of the Draft Basic Design by the GOG, JICA will complete the Basic Design Study Report and forward it to the GOG around February, 1997.

ANNEX I

Project Site: Sekondi, Western Region



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ANNEX II: ITEMS REQUESTED BY THE GOG

1. Wharves for Inshore Fishing Vessels
 2. Slipway
 3. Shore Protection Work
 4. Breakwater
 5. Dredging and Reclamation Works
 6. Support Installations
 - 1) Ice Making Plant
 - 2) Cold Storage Unit
 - 3) Water Supply System / Water Tank
 - 4) Electrical / Mechanical Works
 - 5) Administration Building
- ❑ Pavement Works for Area Interior the Fishing Port and Design of the Access Roads

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ANNEX III: JAPAN'S GRANT AID SCHEME

1. Grant Aid Procedure

1) Japan's Grant Aid Program is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan & Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Government of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on the requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- a) confirmation of the background, objectives and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the project's implementation;
- b) evaluation of the appropriateness of the project to be implemented under the Grant Aid Scheme from the technical, social and economic points of view
- c) confirmation of items agreed on by both parties concerning the basic concept of the Project;
- d) preparation of a basic design of the Project; and
- e) estimation of costs of the Project.

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The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the Study, JICA uses a consulting firm selected through its own procedure (competitive proposal). The selected firm participate the Study and prepare a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country, in order to maintain the technical consistency between the Basic Design and Detailed Design as well as to avoid any undue delay caused by the selection of a new consulting firm.

3. Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes concluding contracts with consulting firms and contractors and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

- 4) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

- 5) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability of Japanese taxpayers.

- 6) Undertakings required to the Government of the recipient country

- a) to secure a lot of land necessary for the construction of the Project and to clear the site;
- b) to provide facilities for distribution of electricity, water supply, drainage and other incidental facilities outside the site;
- c) to ensure prompt unloading, tax exemption and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid.
- d) to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts.
- e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.
- f) to ensure that the facilities constructed and products purchased under the Grant be maintained and used properly and effectively for the Project, and
- g) to bear all the expenses other than those covered by the Grant, necessary for the Project.

- 7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them as well as to bear all the expenses other than those covered by the Grant Aid.

- 8) "Re-export"

The products purchased under the Grant Aid shall not re-exported from the recipient country.

9) Banking Arrangement (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of recipient country or its designated authority.

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ANNEX IV: UNDERTAKINGS BY THE GOG

The GOG will take necessary measures:

1. to secure the site necessary for the construction of the Sekondi Fishing Port, and to clear the site;
2. to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;
3. to ensure prompt unloading and customs clearance at ports of disembarkation in Ghana and internal transportation therein of the products purchased under the Grant;
4. to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Ghana with respect to the supply of the products and services under the Verified Contracts;
5. to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts such facilities as may be necessary for their entry into Ghana and stay therein for the performance of their work;
6. to ensure that the facilities and equipment under the Grant be maintained and used properly and effectively for the Project; and
7. to bear all the expenses, other than those covered by the Grant, necessary for the Project.

MINUTES OF DISCUSSIONS

BASIC DESIGN STUDY
ON THE
PROJECT FOR THE CONSTRUCTION OF SEKONDI FISHING PORT
IN THE REPUBLIC OF GHANA
(Second Field Study)

The Japan International Cooperation Agency (JICA) dispatched a Basic Design Study Team for the first field study on the Project for the Construction of Sekondi Fishing Port (hereinafter referred to as "the Project") to the Republic of Ghana in March 1996. As a result of discussions, field survey in Ghana, and technical examination in Japan, JICA has prepared the Interim Report on the Study.

To inform the Ghanaian side with the contents of the Interim Report and to conduct the second field study, JICA sent to Ghana a Study Team headed by Mr. Kuniichi ASAOKA, Fishing Port Construction Division, Fishing Port Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries, and the Study Team is scheduled to stay in the country from July 14 to August 13, 1996.

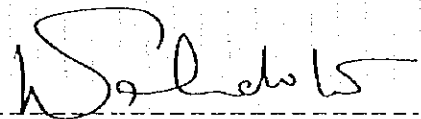
The Study Team held a series of discussions with concerned officials of the Government of Ghana (hereinafter referred to as "GOG") and conducted a field study.

In the course of discussions and field study, both sides have confirmed the main items described on the attached sheets. The Study Team will proceed to further works and prepare the Draft Basic Design of the Project.

Accra, August 2, 1996

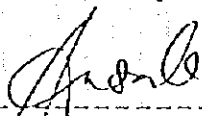
浅岡 邦一

Mr. KUNIICHI ASAOKA
Leader
Basic Design Study Team
JICA

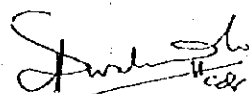


Dr. WILLIAM ADOTE
Director
International Economic Relations Division
Ministry of Finance (MOF)
Government of Ghana

Witnessed by



Mr. G. P. ANSAH
Director for Administration
Ministry of Transport & Communications
(MOTC)



Cdr. K. T. DOVLO (Rtd)
Director General
Ghana Ports & Harbours Authority (GPHA)

ATTACHMENT

1. Contents of the Interim Report

GOG has in principle accepted the contents of the Interim Report presented by the Study Team.

2. Project Site

The Project site is located in the Sekondi Bay, as shown in ANNEX I.

3. Responsible & Executing Agency

- 1) Responsible Ministry: Ministry of Transport and Communications (MOTC)
- 2) Executing Agency: Ghana Ports and Harbours Authority (GPHA)

4. Items requested by GOG

The items requested by GOG are listed in ANNEX II.

5. Japan's Grant Aid System

- 1) GOG has understood the system of the Japan's Grant Aid explained by the Team; the main feature is described in ANNEX III.
- 2) GOG will take necessary measures, described in ANNEX IV, for smooth implementation of the Project if the Grant Aid by the Government of Japan is extended to the Project.

6. Project Site & Facilities

GOG has ensured the followings:

- 1) The proposed Project site, as shown in ANNEX I, should be secured for the establishment of new fishing port facilities;
- 2) the site should be owned by MOTC, and both the site and Project facilities should be under the control of MOTC together with GPHA;
- 3) the facilities shall be utilized exclusively for the fisheries related activities;
- 4) MOTC in close coordination with agencies concerned shall take necessary arrangements to establish smooth fishing port operations; and
- 5) MOTC shall have responsibility to ensure the smooth implementation of the Project and to solve any matters relating to the Project implementation which may arise in the course of the Project execution.

7. Proper Operation & Maintenance

Both MOTC and GPHA are responsible for the allocation of appropriate budget, personnel and whatever measures are necessary to ensure the proper operation and maintenance of such facilities provided under the Project.

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8. Other Issues

- 1) MOTC will take necessary procedures for clearing the Environment' Impact Assessment.
- 2) If the Project site includes a part of existing smoking sheds, GOG will take necessary measures for resettlement thereof.
- 3) MOTC will construct an access road to the main road as well as a walkway to the existing canoe landing beach, for sections which will not be covered by the Japan's Grant Aid. MOTC requested the Japanese side to design the sections of access road and walkway, which would be constructed by the Ghanaian side.
- 4) With due consideration of both fishermen's economy and sufficient utilization of the facilities, utilization charges of the fishing port should be determined carefully among the agencies concerned of GOG.

9. Further Schedule

- 1) JICA Study Team will continue with further study in Ghana until August 13, 1996.
- 2) On the basis of the Minutes of Discussions and technical examinations of the study results, JICA will prepare the Draft Basic Design of the Project and dispatch a team to Ghana around October 1996 in order to consult on the outline of the Draft Basic Design.
- 3) Upon acceptance of the Draft Basic Design by GOG, JICA will complete the Basic Design Study Report, and forward it in its final form to the GOG in February 1997.

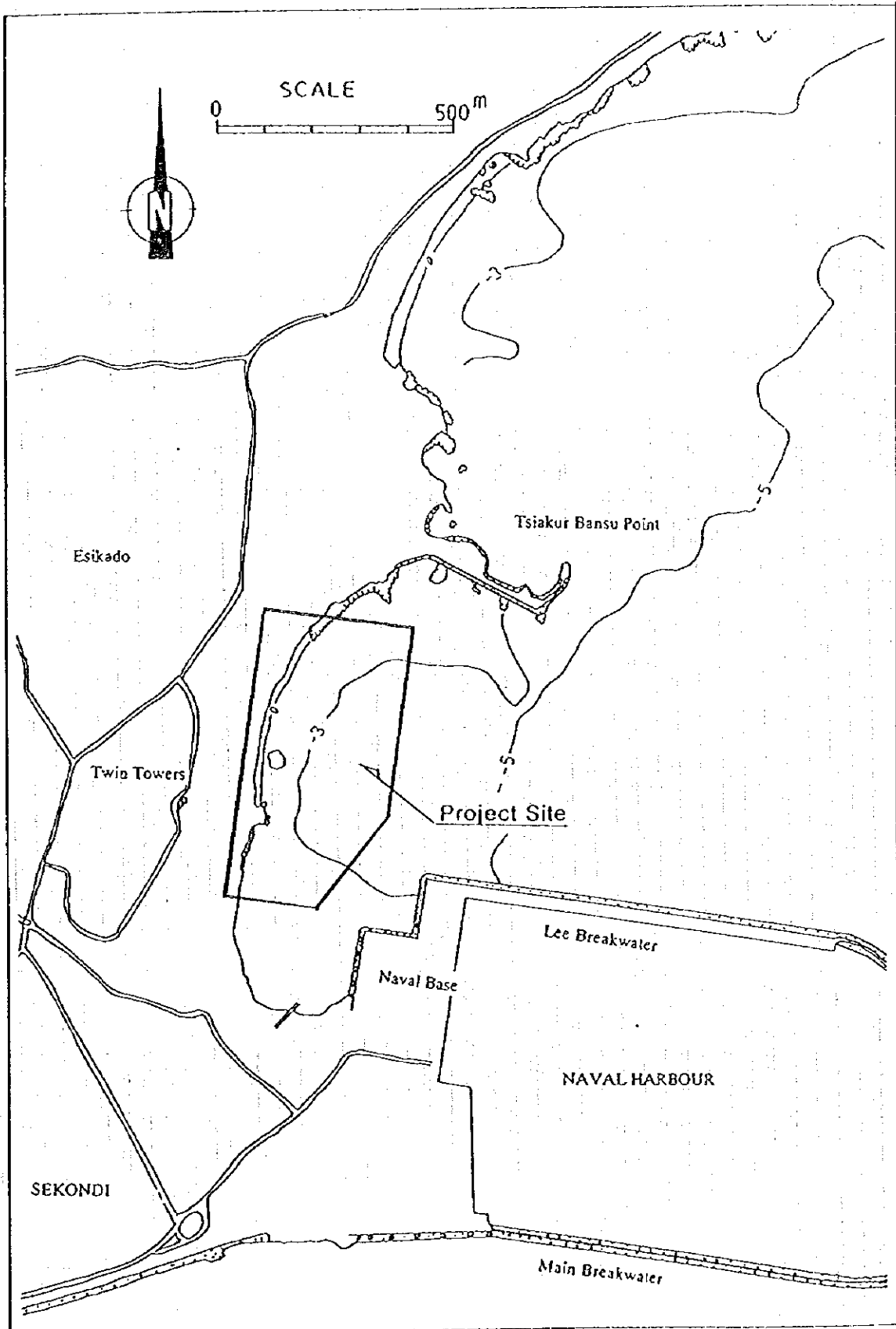
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ANNEX I

Project Site: Sekondi, Western Region



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ANNEX II : ITEMS REQUESTED BY THE GOG

1. Breakwater
2. Wharves for Inshore Fishing Vessels
3. Canoe Jetty
4. Roads in and around the Fishing Port
5. Pavement within the Fishing Port Area
6. Support Installations
 - 1) Ice Making Plant
 - 2) Cold Storage Unit
 - 3) Fish Handling Shed
 - 4) Administration Building
 - 5) Water Supply System
 - 6) Fire Fighting System and Sea Water Pumps
 - 7) Security and Tower Lighting
 - 8) Toilets and Sewage Facilities
 - 9) Fish Market

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ANNEX III: JAPAN'S GRANT AID SCHEME

1. Grant Aid Procedure

1) Japan's Grant Aid Program is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- confirmation of the background, objectives and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation;
- evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from the technical, social and economic points of view;

- c) confirmation of items agreed on by both parties concerning the basic concept of the Project;
- d) preparation of a basic design of the Project; and
- e) estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even through they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the Study, JICA uses a consulting firm selected through its own procedure (competitive proposal). The selected firm participates the Study and prepares a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country, in order to maintain the technical consistency between the Basic Design and Detailed Design as well as to avoid any undue delay caused by the selection of a new consulting firm.

3. Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

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- 3) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

- 4) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

- 5) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability of Japanese taxpayers.

- 6) Undertakings required to the Government of the recipient country

- a) to secure a lot of land necessary for the construction of the Project and to clear the site;
- b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;
- c) to ensure prompt unloading and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;
- d) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
- e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;
- f) to ensure that the facilities constructed and products purchased under the Grant Aid be maintained and used properly and effectively for the Project; and
- g) to bear all the expenses, other than those covered by the Grant Aid, necessary for the Project.

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Ansals

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7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them as well as to bear all the expenses other than those covered by the Grant Aid.

8) "Re-export"

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

9) Banking Arrangement (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.

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ANNEX IV: UNDERTAKINGS BY GOG

1. To secure a lot of land necessary for the Project;
2. to provide a proper access road to the Project site;
3. to provide facilities for distribution of electricity, water supply, telephone trunk line and drainage and other incidental facilities up to the site;
4. to undertake incidental outdoor works, such as gardening, fencing and other incidental facilities in and around the Project site, if necessary;
5. to ensure prompt unloading and customs clearance of the products purchased under the Japan's Grant Aid at ports of disembarkation in Ghana;
6. to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in Ghana with respect to the supply of the products and services under the verified contracts;
7. to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into Ghana and stay therein for the performance of their work;
8. to bear commissions, namely advising commissions of an Authorization to Pay (A/P) and payment commissions, to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A);
9. to provide necessary permissions, licenses, and other authorization for implementing the Project, if necessary;
10. to ensure that the facilities constructed and equipment purchased under the Japan's Grant Aid be maintained and used properly and effectively for the Project; and
11. to bear all the expenses, other than those covered by the Japan's Grant Aid, necessary for the Project.

KA *Anual*

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MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY
ON
THE PROJECT FOR THE CONSTRUCTION OF SEKONDI FISHING PORT
IN THE REPUBLIC OF GHANA
(Explanation of the Draft Basic Design)

The Japan International Cooperation Agency (JICA) dispatched two Basic Design Study Teams for the Project for the Construction of Sekondi Fishing Port (hereinafter referred to as "the Project") to the Republic of Ghana in March 1996 and August 1996. As a result of series of discussions, field survey in Ghana and technical assessment conducted in Japan, JICA prepared the Draft Basic Design of the Project.

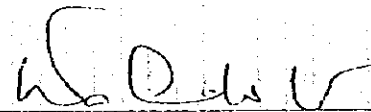
In order to explain and consult the Government of Ghana (GOG) on the components of the Draft Basic Design of the Project, JICA sent to Ghana the Study Team headed by Mr. ASAOKA Kuniichi, Fishing Port Construction Division, Fishing Port Department, Fisheries Agency. The team stayed in Ghana from October 30 to November 8, 1996 during which period they submitted and explained the draft basic design of the Project to GOG.

As a result of the explanations and discussions, both sides in principle agreed to recommend the main items of the Project described in the attached sheets to their respective governments.

Accra, November 8, 1996

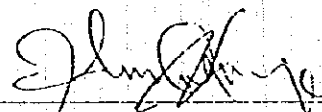


Mr. ASAOKA Kuniichi
Leader,
The Explanation Team,
JICA

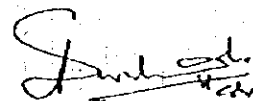


Dr. William Adote
Director,
International Economic Relations
Division,
Ministry of Finance (MOF)

witnessed by



Mr. E.A. KWAKYE
Director (Planning),
Ministry of Transport and
Communications (MOTC)



Cdr. K. T. Dovlo (Rtd)
Director General,
Ghana Ports and Harbours
Authority (GPHA)

ATTACHMENT

1. Participants in the Discussions

During the team's stay in Ghana from October 30 to November 8, 1996, Japanese and Ghanaian sides had a series of discussions on the Draft Basic Design of the Project. List of participants in the discussions is shown in Annex I.

2. Components of the Draft Basic Design

The Government of Ghana has in principle accepted the components of the Draft Basic Design of the Project proposed by the team. The components confirmed by both sides are shown in ANNEX II.

3. Japan's Grant Aid System

- 1) The Government of Ghana has understood the system of the Japan's Grant Aid explained by the team; the main feature of the system is described in ANNEX III.
- 2) The Government of Ghana will take necessary measures, described in ANNEX IV for smooth implementation of the Project if the Grant Aid Assistance of the Government of Japan (GOJ) is extended to the Project.

4. Further Schedule

JICA will finalize the Basic Design Study Report in accordance with the confirmed components of the Project, and send it to the Government of Ghana by February, 1997.

5. Other Relevant Issues

- 1) As stated in the previous Minutes of Discussions dated on August 2, 1996, the Government of Ghana will take necessary procedure for the Environmental Impact Assessment and obtain an approval for the Project by the end of May 1997. Ghana Ports and Harbours Authority will take responsibility for this matter.
- 2) The Government of Ghana shall create and put in place an effective management for the Sekondi Fishing Port on completion of the Project if the Grant Aid Assistance of GOJ is extended to the Project.
- 3) The Government of Ghana considers the Project as the first stage of overall development of the Sekondi Fishing Port and wishes to develop such facilities as additional wharves, cold storage and fish market in the future.

K.A.
E.P.

S. W. C.

ANNEX I: LIST OF PARTICIPANTS IN THE DISCUSSIONS

1. FOR GOG SIDE

Ministry of Finance (MOF)

- Mr. K. OPOKU
Economic Planning Officer, MOF

Ministry of Transport and Communications (MOTC)

- Mr. E.A. KWAKYE
Director (Planning), MOTC
- Mr. T.A. SELBY
Deputy Director (Planning), MOTC

Ministry of Food and Agriculture (MOFA)

- Mr. M.A. MENSAH
Director of Fisheries, MOFA

Shama Ashanta East Metropolitan Assembly

- Lt.-Col. K. KORSAH
Metropolitan Chief Executive

Ghana Ports and Harbours Authority (GPHA)

- Cdr.K.T. DOVLO (Rtd)
Director-General, GPHA
- Capt.J.E. QUANSAH
Director of Port, Takoradi
- Mr. John K FRIMPONG
Chief Maintenance Engineer, GPHA
- Mr. B.B.K. OKUTU
Chief Port Engineer, GPHA
- Mr. K.D. BOATENG
Project Engineer, GPHA

Ghana Navy

- Cdre. J.Y. ADOKO
NOIC(WNC), Naval Base, Sekondi
- Capt. M.P. DANKWA
ALCSO, Ghana Navy Headquarters

2. FOR GOJ SIDE

- ASAOKA, Kuniichi
- SUGIYAMA, Shunji
- IGARI, Koichi
- OCHI, Yutaka
- TAKEMOTO, Hitoshi

ANNEX II: COMPONENTS OF THE DRAFT BASIC DESIGN

1. BASIC FACILITIES

- 1) Breakwater
- 2) Landing wharf and Lay-by wharf for inshore vessels
- 3) Canoe jetty
- 4) Roads in and around the Fishing Port
- 5) Pavement within the Fishing Port Area

2. FUNCTIONAL FACILITIES

- 1) Ice making plant
- 2) Fish handling shed
- 3) Administration building
- 4) Water supply facilities
- 5) Fire fighting system and sea water pumps
- 6) Lighting system
- 7) Toilets and sewage facilities

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ANNEX III: JAPAN'S GRANT AID SCHEME

1. Grant Aid Procedure

1) Japan's Grant Aid Program is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

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Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country. Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

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- a) confirmation of the background, objectives and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation;
- b) evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from the technical, social and economic points of view;
- c) confirmation of items agreed on by both parties concerning the basic concept of the Project;
- d) preparation of a basic design of the Project; and

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- e) estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even through they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the Study, JICA uses a consulting firm selected through its own procedure (competitive proposal). The selected firm participate the Study and prepare a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country, in order to maintain the technical consistency between the Basic Design and Detailed Design as well as to avoid any undue delay caused by the selection of a new consulting firm.

3. Japan's Grant Aid Scheme

1) What is Grant Aid?

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2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final

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payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

- 4) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

- 5) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability of Japanese taxpayers.

- 6) Undertakings required to the Government of the recipient country

- a) to secure a lot of land necessary for the construction of the Project and to clear the site;
- b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;
- c) to ensure prompt unloading and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;
- d) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
- e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;
- f) to ensure that the facilities constructed and products purchased under the Grant Aid be maintained and used properly and effectively for the Project; and
- g) to bear all the expenses other than those covered by the Grant Aid, necessary for the Project.

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7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them as well as to bear all the expenses other than those covered by the Grant Aid.

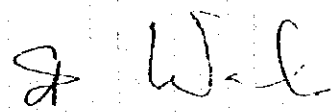
8) "Re-export"

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

9) Banking Arrangement (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank". The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.

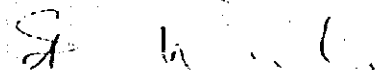
b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.



ANNEX IV: UNDERTAKINGS BY THE GOG

The Government of Ghana will take necessary measures stated as follows:

1. to secure a lot of land necessary for the Project ;
2. to provide a proper access road to the Project site;
3. to connect project facilities to the utilities such as electricity, water supply, telephone trunk line and drainage and other incidental facilities;
4. to undertake incidental outdoor works, such as gardening, fencing and other incidental facilities in and around the Project sit, if necessary;
5. to ensure prompt unloading and customs clearance of the products purchased under the Japan's Grant Aid at ports of disembarkation in Ghana;
6. to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in Ghana with respect to the supply of the products and services under the Verified Contracts;
7. to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts such facilities as may be necessary for their entry into Ghana and stay therein for the performance of their work;
8. to bear commissions, namely advising commissions of an Authorization to Pay (A/P) and payment commission, to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A);
9. to provide necessary permissions, licenses, and other authorization for implementing the Project, if necessary;
10. to ensure that the facilities constructed and equipment purchased under the Japan's Grant Aid be maintained and used properly and effectively for the Project; and
11. to bear all the expenses, other than those covered by the Japan's Grant Aid, necessary for the Project.



Appendix-5 Cost Estimation Borne by the Recipient Country

The cost will be borne by the Government of Ghana is estimated as 779 millions cedis which is detailed as follows:

(1) Utilities:	160,501,800 cedis
Electricity Supply (300 KVA-11KV underground line, 1.5 km long laying):	90,464,500 cedis
Water Supply (6 inches polyethylene coated):	66,667,300 cedis
Telephone Line Laying (2 channels):	3,360,000 cedis
(2) Fence, Gate and Gate House:	66,379,800 cedis
Fence (1,116 m x 36,085 cedis/m):	40,271,500 cedis
Gate:	13,574,400 cedis
Gate House (concrete block structure, 15 m ²):	12,533,900 cedis
(3) Concrete Block Pavement of Access Road:	142,520,400 cedis
(L=200m, 1,200 m ² x 118,767cedis)	
(4) Access Walkway:	409,627,500 cedis
(L1=175 m x 1,637,290 cedis/m):	286,526,000 cedis
(L2= 25 m x 4,924,060 cedis/m):	123,101,500 cedis
Total:	779,119,500 cedis

Appendix-6 Statistics on Fisheries

Table A-6.1 (1) Number of Vessels In-coming per Day and Fish Catch in Peak Season (August 1993)

August 1993		Number of Vessels In-coming per Day and Fish Catch		Calculation of The Standard Day		(1) Top Five Days with Large Daily Catches	
Date No. of Vessels In-coming	Fish Catch / Day (kg)	Fish Catch / Vessel (kg)	Order of Fish Catch	Order of Fish Catch / Day (kg)	No. of Vessels In-coming	Fish Catch / Vessel (kg)	Fish Catch / Vessel (kg)
1	8	6,924	866				
2	4	202	51				
3	NO FISHING FOR FISHING HOLIDAY TUESDAY						
4	6	5,889	982				
5	13	2,458	189				
6	13	1,059	81				
7	11	917	83				
8	18	124	7				
9	15	12,090	806				
10	NO FISHING FOR FISHING HOLIDAY TUESDAY						
11	48	27,230	567				
12	43	28,859	671				
13	59	7,998	136				
14	58	20,131	347				
15	40	11,276	282				
16	49	502	10				
17	NO FISHING FOR FISHING HOLIDAY TUESDAY						
18	34	14,185	417				
19	30	13,950	465				
20	24	3,224	134				
21	20	2,393	120				
22	34	5,351	157				
23	16	246	15				
24	NO FISHING FOR FISHING HOLIDAY TUESDAY						
25	3	358	119				
26	8	4,274	534				
27	5	3,439	698				
28	11	1,608	146				
29	14	1,535	110				
30	15	1,166	78				
31	NO FISHING FOR FISHING HOLIDAY TUESDAY						

(1) Top Five Days with Large Daily Catches		(2) Top Five Days with Large Number of Vessels	
Order	Fish Catch / Day (kg)	Order	No. of Vessels In-coming (kg)
1	28,859	1	59
2	27,230	2	58
3	20,131	3	49
4	14,185	4	48
5	13,950	5	43
Ave.	20,871	Ave.	51.4

Table A-6.1 (2) Number of Vessels In-coming per Day and Fish Catch in Peak Season (October, 1994)

Number of Vessels In-coming per Day and Fish Catch		Calculation of The Standard Day			
October 1994		(1) Top Five Days with Large Daily Catches			
Date No. of Vessels	Fish Catch / Day (kg)	Order of Vessel (kg)	Order of No. of Vessels	Fish Catch / Day (kg)	Fish Catch / Vessel (kg)
1	N/A				
2	N/A			9,951	52
3	N/A			9,688	46
4	NO FISHING FOR FISHING HOLIDAY TUESDAY				
5	N/A			9,207	51
6	N/A			8,611	49
7	N/A			8,185	42
8	N/A				
9	N/A			9,128	48.0
10	40	6,690			190
11	NO FISHING FOR FISHING HOLIDAY TUESDAY				
12	52	9,951	1		
13	50	8,006			
14	42	8,185			
15	37	7,588			
16	36	6,017			
17	46	7,385			
18	NO FISHING FOR FISHING HOLIDAY TUESDAY				
19	51	9,207	3		
20	39	6,628			
21	49	8,611			
22	49	6,738			
23	41	5,477			
24	44	6,494			
25	NO FISHING FOR FISHING HOLIDAY TUESDAY				
26	40	6,473			
27	46	9,688	2		
28	43	5,624			
29	28	3,777			
30	20	2,498			
31	36	4,658			

(2) Top Five Days with Large Number of Vessels	
Order	Fish Catch / Day (kg)
1	9,951
2	9,207
3	8,006
4	8,611
5	8,185
Ave.	9,128

(2) Top Five Days with Large Number of Vessels	
Order	No. of Vessels
1	52
2	51
3	50
4	49
5	49
Ave.	50.2

Table A-6.1.3) Number of Vessels In-coming per Day and Fish Catch in Peak Season (September, 1995)

Number of Vessels In-coming per Day and Fish Catch

September, 1995	In-coming	Fish Catch / Day (kg)	Fish Catch / Vessels (kg)	Order of Fish Catch	Order of No. of Vessels
1	43	7,675	178	2	
2	36	5,920	164		
3	45	8,777	195	1	
4	50	7,326	147	3	
5	NO FISHING FOR FISHING HOLIDAY TUESDAY				
6	40	5,928	148		
7	47	7,085	151		3
8	47	6,546	139		4
9	37	6,283	170		
10	42	7,115	169		5
11	41	6,634	162		
12	NO FISHING FOR FISHING HOLIDAY TUESDAY				
13	43	6,126	142		
14	39	5,898	151		
15	40	4,994	125		
16	26	3,777	145		
17	40	4,391	110		
18	32	4,010	125		
19	NO FISHING FOR FISHING HOLIDAY TUESDAY				
20	40	5,374	134		
21	48	7,240	151	4	
22	35	4,626	132		
23	29	3,321	115		
24	25	3,608	144		
25	21	1,305	62		
26	NO FISHING FOR FISHING HOLIDAY TUESDAY				
27	23	4,496	195		
28	39	5,887	151		
29	41	4,798	117		
30	40	6,958	174		

Calculation of The Standard Day

(1) Top Five Days with Large Daily Catches				
Order	Fish Catch / Day (kg)	No. of Vessels In-coming	Fish Catch / Vessel (kg)	
1	8,777	45	195	
2	7,675	43	178	
3	7,326	50	147	
4	7,240	48	151	
5	7,115	42	169	
Ave.	7,627	45.6	168	

(2) Top Five Days with Large Number of Vessels				
Order	No. of Vessels In-coming	Fish Catch / Day (kg)		
1	50	7,326		
2	48	7,240		
3	47	7,085		
4	47	6,546		
5	45	8,777		
Ave.	47.4			

Table A-6.2.(1) Number of Vessels In-coming per Day and Fish Catch in Off Season (April, 1993)

Number of Vessels In-coming per Day and Fish Catch				Calculation of The Standard Day			
April 1998				(1) Top Five Days with Large Daily Catches			
Date	No. of Vessels In-coming	Fish Catch / Day (kg)	Order of Vessels	Order of Fish Catch	Fish Catch / Day (kg)	No. of Vessels In-coming	Fish Catch / Vessel (kg)
1	26	1,125	43			1	3,793
2	25	987	39			2	1,856
3	26	1,498	58	3	5	3	1,498
4	16	581	36			4	1,463
5	22	1,302	46			5	1,360
6	NO FISHING FOR FISHING HOLIDAY TUESDAY						
7	25	360	14				
8	27	976	36		1	Ave.	1,994
9	NO OBSERVATION FOR PUBLIC HOLIDAY						
10	19	711	37				25.6
11	15	827	55				
12	NO OBSERVATION FOR PUBLIC HOLIDAY						
13	NO FISHING FOR FISHING HOLIDAY TUESDAY						
14	18	612	34				
15	27	1,856	69	2	2	1	976
16	22	1,082	49			2	1,856
17	22	464	21			3	3,793
18	12	243	20			4	1,360
19	18	549	31			5	1,498
20	NO FISHING FOR FISHING HOLIDAY TUESDAY						
21	23	408	18				
22	24	1,112	46				26.8
23	24	857	36				
24	21	1,463	70	4			
25	15	389	26				
26	27	3,793	140	1	3		
27	NO FISHING FOR FISHING HOLIDAY TUESDAY						
28	27	1,360	50				
29	23	975	42	5	4		
30	24	1,023	43				

Table A-6.2.(2) Number of Vessels In-coming per Day and Fish Catch in Off Season (June, 1994)

Number of Vessels In-coming per Day and Fish Catch		Calculation of The Standard Day			
June 1994		(1) Top Five Days with Large Daily Catches			
Date	No. of Vessels In-coming	Fish Catch / Day (kg)	Fish Catch / Vessels (kg)	Order of Fish Catch	Order of No. of Vessels
1	19	3,116	164		
2	22	2,719	124		
3	25	3,385	135	4	
4	25	4,003	160	3	5
5	24	3,130	130		
6	NO OBSERVATION FOR PUBLIC HOLIDAY				
7	NO FISHING FOR FISHING HOLIDAY TUESDAY				
8	33	4,514	137	1	1
9	24	3,230	135	5	
10	26	4,212	162		3
11	17	2,230	131		
12	18	1,966	109		
13	20	1,394	70		
14	NO FISHING FOR FISHING HOLIDAY TUESDAY				
15	29	2,108	73		2
16	26	2,748	106		4
17	18	1,449	81		
18	16	1,557	97		
19	23	2,065	90		
20	22	2,609	119		
21	NO FISHING FOR FISHING HOLIDAY TUESDAY				
22	20	2,570	129		
23	17	2,006	118		
24	19	2,834	149		
25	22	1,932	88		
26	23	2,514	109		
27	20	1,772	89		
28	NO FISHING FOR FISHING HOLIDAY TUESDAY				
29	14	1,665	119		
30	19	2,254	119		

Calculation of The Standard Day		(2) Top Five Days with Large Number of Vessels	
Order	Fish Catch / Day (kg)	No. of Vessels In-coming	Fish Catch / Day (kg)
1	4,514	33	4,514
2	4,212	26	2,108
3	4,003	25	4,212
4	3,385	25	2,748
5	3,230	24	4,003
Ave.	3,869	26.6	27.8

Table A-6.3 Number of Canoes In-coming per Day and Fish Catch in Peak Season (July 1996)

Number of Vessels In-coming per Day and Fish Catch
 July 1996
 Fishing Method : Purse Seine

(1) Average of Catches on The Day Canoes Did Have Catches

Order	Fish Catch / Day (kg)	No. of Canoes In-coming	Fish Catch / Canoe (kg)
1	42,966	22	1,953
2	14,322	8	1,790
3	2,182	22	99
4	8,556	10	856
5	1,922	8	240
6	1,488	4	372
Ave.	11,906	12.3	885

Calculation of The Standard Day
 July 1996
 Fishing Method : Line Fishing

(1) Average of Catches

Order	Fish Catches / Day (kg)	No. of Canoes In-coming	Fish Catch / Canoe (kg)
1	6,662	9	740
2	6,504	8	826
3	5,736	8	717
4	4,738	8	592
5	4,222	7	603
6	4,054	7	579
7	2,266	5	453
8	1,626	3	542
9	1,440	4	360
10	1,114	3	371
11	942	2	471
12	826	2	413
Ave.	3,353	5.5	556

(2) Average Number of Catch on The Day Canoes Did Have Catches

Order	No. of Canoe In-coming	Fish Catches (kg)
1	22	42,966
2	22	2,182
3	10	8,556
4	8	1,922
5	8	14,322
6	4	372
Ave.	12.3	

(2) Average Number of Canoes In-coming

Order	No. of Canoes In-coming	Fish Catch (kg)
1	9	6,662
2	8	6,504
3	8	4,738
4	8	5,736
5	7	4,222
6	7	4,054
7	5	2,266
8	4	1,626
9	3	1,440
10	3	1,114
11	2	942
12	2	826
Ave.	5.5	

Appendix-7 Supplementary Data on Natural Conditions

Table A-7.1 Frequency of Wind Occurrence by Direction and Speed

Speed (knots)	Direction											TOTAL PERCENT	MEAN WIND SPEED
	1-3	4-6	7-10	11-16	17-21	22-27	28-33	31-40	41-47	48-55	56-		
N	0.9	0.2	0.1	*	-	-	-	-	-	-	-	1.3	3.1
NNE	0.1	0.1	0.1	*	*	*	-	*	*	-	-	0.4	11.4
NE	0.2	0.1	*	-	-	-	-	-	-	-	-	0.3	3.9
ENE	0.1	*	*	-	*	-	-	-	-	-	-	0.1	4.5
E	0.4	0.4	0.1	*	*	-	-	-	-	-	-	1.0	4.7
ESE	0.1	0.2	0.1	*	-	-	*	-	-	-	-	0.5	5.7
SE	0.5	0.5	0.1	*	-	-	-	-	-	-	-	1.2	4.2
SSE	1.0	1.0	0.6	*	-	-	-	-	-	-	-	2.7	4.8
S	4.0	5.8	3.6	0.8	*	*	-	*	-	*	*	14.2	5.6
SSW	2.8	4.2	4.7	1.2	*	*	*	*	-	-	-	13.0	6.4
SW	3.8	5.7	5.4	1.9	0.1	-	-	-	*	*	-	17.0	6.5
WSW	1.6	1.7	1.5	0.3	*	-	-	-	*	*	*	5.2	6.0
W	2.1	1.2	0.4	0.1	*	-	*	-	-	-	-	3.8	4.0
WNW	0.8	0.4	0.1	*	-	*	-	-	-	-	*	1.4	4.2
NW	1.2	0.4	0.1	-	*	-	-	-	-	-	-	1.7	3.1
NNW	0.6	0.2	0.1	-	-	-	-	-	-	-	-	0.8	2.9
CLM	-	-	-	-	-	-	-	-	-	-	-	35.6	-
ALL	20.1	22.3	17.1	4.5	0.2	*	*	*	0.1	*	*	100	3.7

* = PERCENT < 0.05

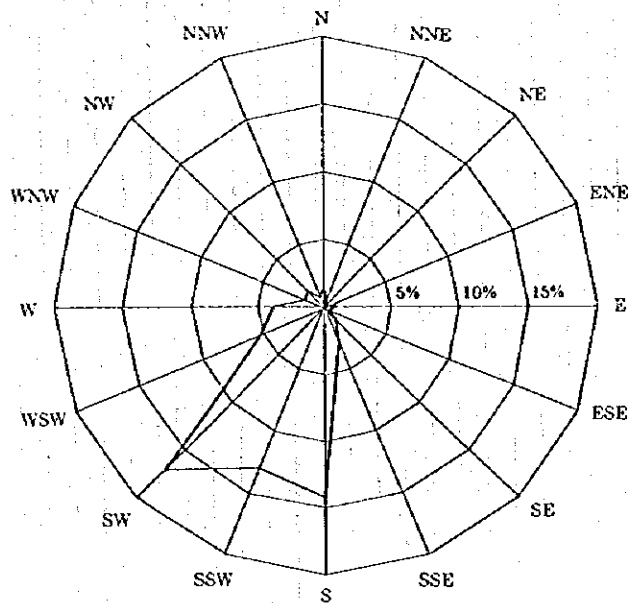


Figure A-7.1 Wind Rose (annual)

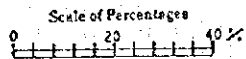
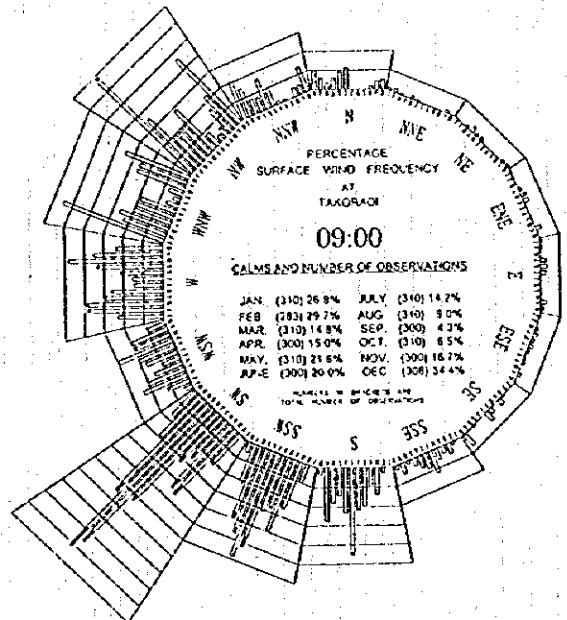
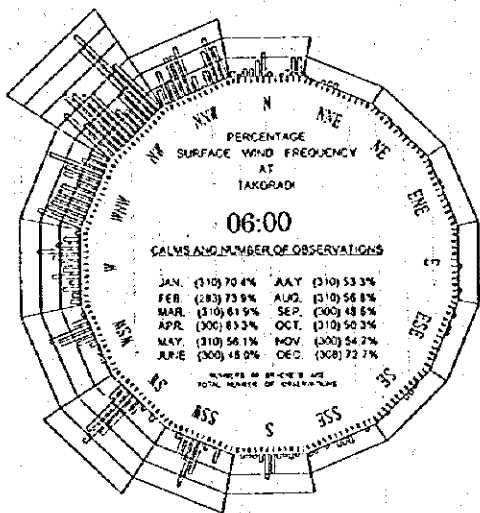
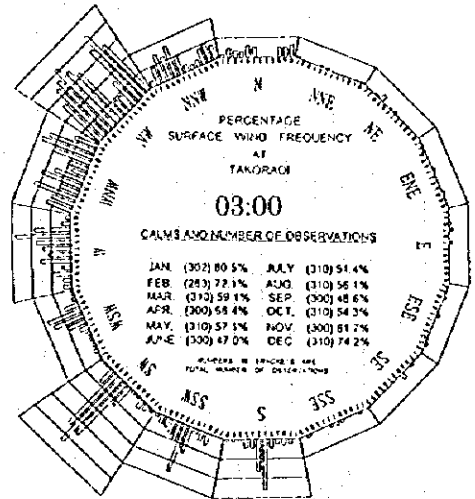
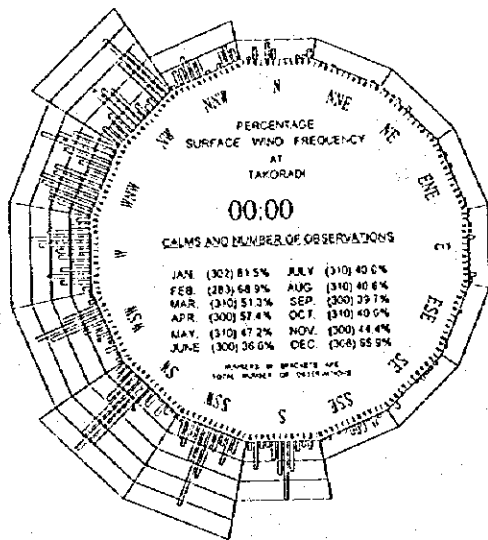


Figure A-7.2(1) Wind Rose at every Three Hours (I)

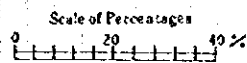
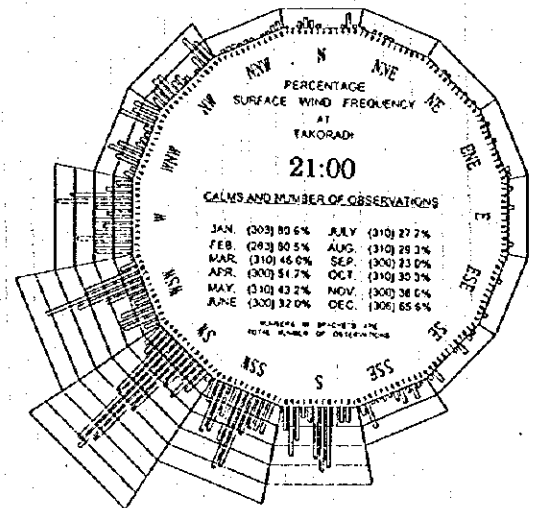
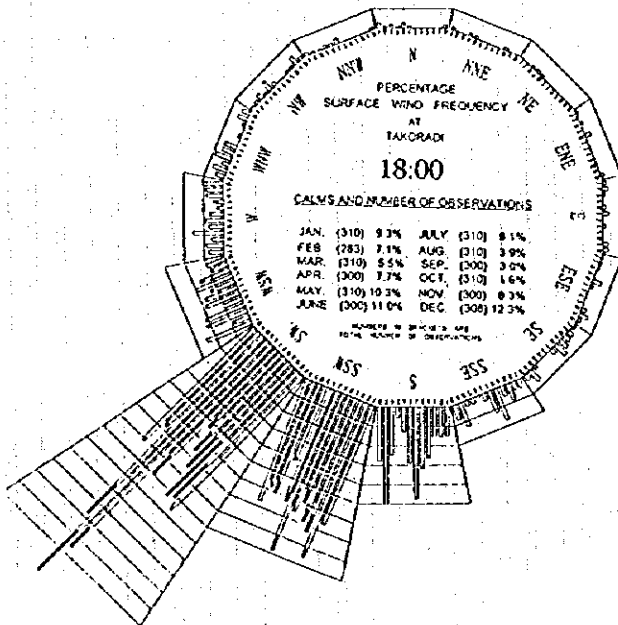
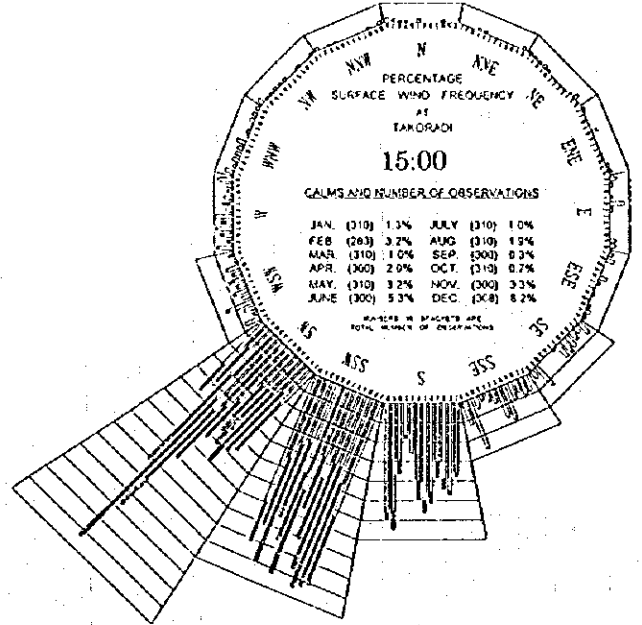
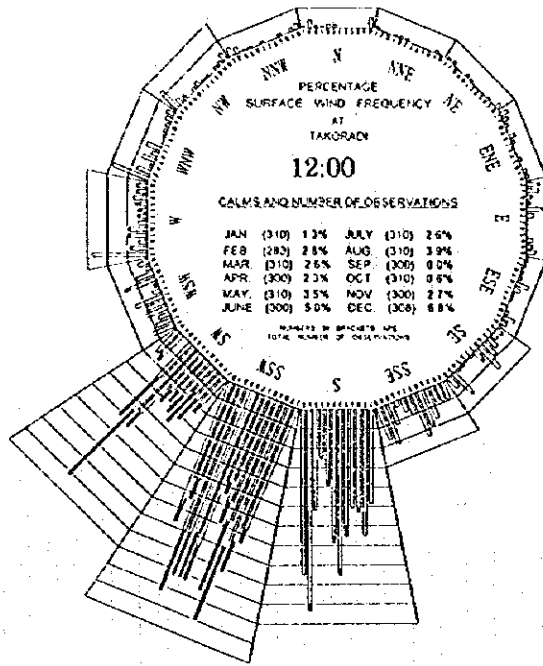


Figure A-7.2(2) Wind Rose at every Three Hours (2)

Table A-7.2 Results of Tide Harmonic Analysis (15 days)

Region : TAKORADI
 Observation Point : Takoradi Port
 Latitude : 4 53' 5" N
 Longitude : 1 44' 42" W
 Observation Period : March 29 to April 12, 1996
 Base Time : 0:00 time
 Datum Level : C.D.L. of Takoradi

Component Tides	Amplitude (cm)	Lag Angle (°)
M2	47.7	107.1
S2	16.3	138.2
K2	4.4	138.2
N2	8.7	105.2
K1	14.3	355.1
O1	2.8	340.8
P1	4.7	355.1
Q1	0.3	356.8
M4	0.7	302.5
MS4	0.8	24.3
AO	109.5	

Location : TAKORADI
1996

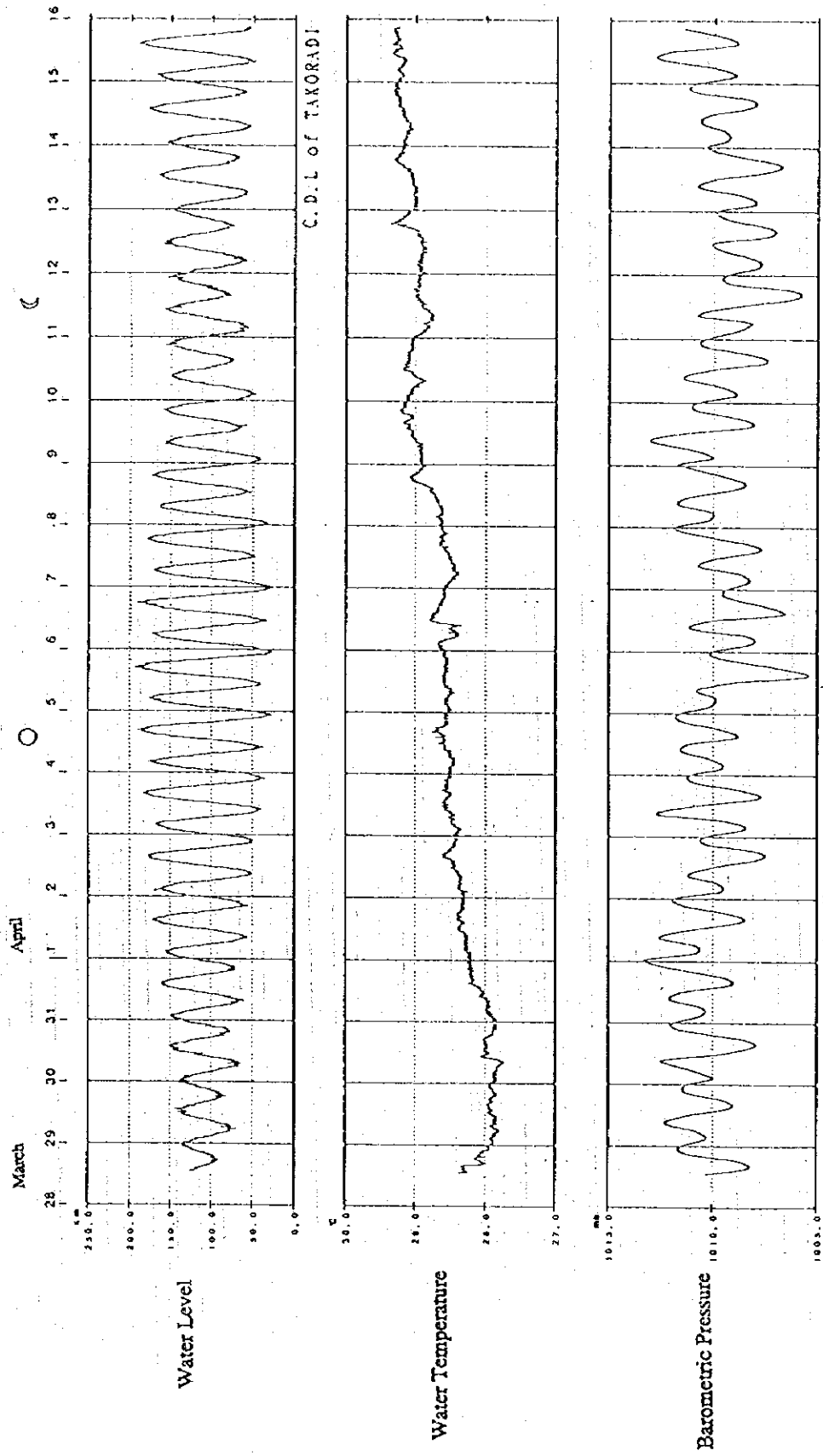


Figure A-7.3 Tide Observation Data

Table A-7.3 Comparison of Harmonic Constants

		ADMIRALTY	OBSERVED VALUE
M2	(m)	0.45	0.477
	(°)	107	107.1
S2	(m)	0.16	0.163
	(°)	134	138.2
K1	(m)	0.12	0.143
	(°)	351	355.1
O1	(m)	0.02	0.028
	(°)	318	340.8

According to the result of tide observation, tide characteristics in this region shows a specific pattern of semi-diurnal type. The above table compares harmonic constants at Takoradi Port according to the ADMIRALTY (1991) and those obtained by the present observation. The harmonic constants observed in Takoradi Port showed substantially equal values, suggesting an extremely high reliability.

The result of the present survey in Takoradi Port was applied to the mean sea level (Zo: +0.98 m) of Sekondi taken from the ADMIRALTY.

Table A-7.4 Frequency of Occurrence of Offshore Waves by Height and Direction (1985 - 1990)

Direction \ Height(m)	CALM	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0-0.5	-	-	0.1	0.2	-	-	*	-	-	1.0	0.3	*	0.1	-	0.2	0.1	0.1	3.1
0.5-1.0	-	*	0.1	0.1	0.1	*	0.1	0.1	-	12.3	7.0	0.6	0.9	0.1	0.5	0.2	0.1	22.1
1.0-1.5	-	-	-	-	-	-	-	0.1	-	17.8	19.2	1.1	1.1	-	-	-	0.1	39.7
1.5-2.0	-	-	-	-	-	-	-	0.1	-	13.2	13.7	0.1	0.3	-	-	-	-	28.1
2.0-2.5	-	-	-	-	-	-	-	-	-	2.0	3.4	0.2	*	-	-	-	-	6.5
2.5-3.0	-	-	-	-	-	-	-	-	-	0.5	0.6	0.1	-	-	-	-	-	1.3
3.0-3.5	-	-	-	-	-	-	-	-	-	0.1	0.1	*	-	-	-	-	-	0.2
3.5-4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	-	-	0.2	0.2	0.1	-	0.1	0.3	-	47.8	44.3	2.6	3.2	0.1	0.7	0.2	0.2	100.0

NUMBER OF OBSERVATIONS : 3333
 (NOTE : * = < 0.5 PERCENT)

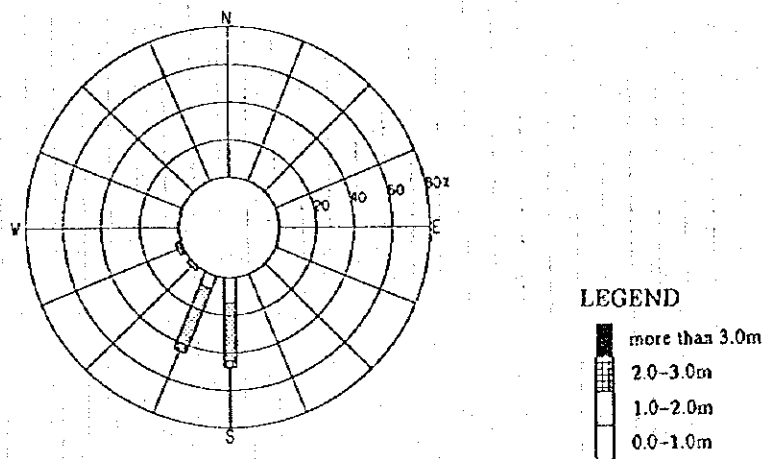
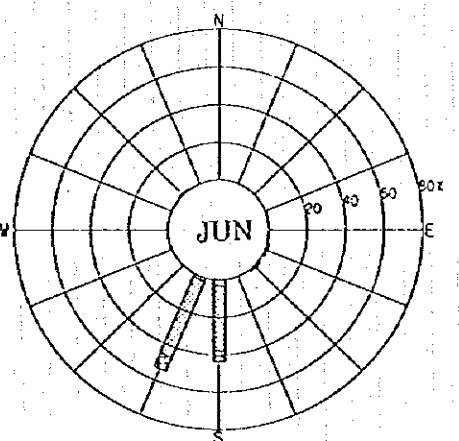
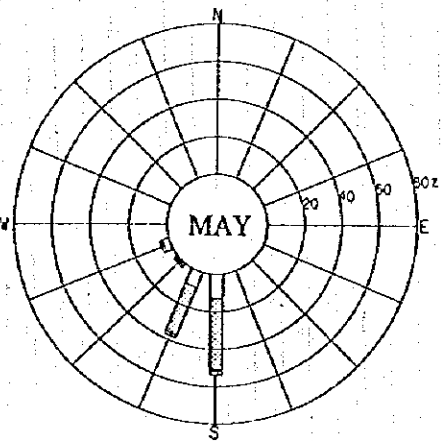
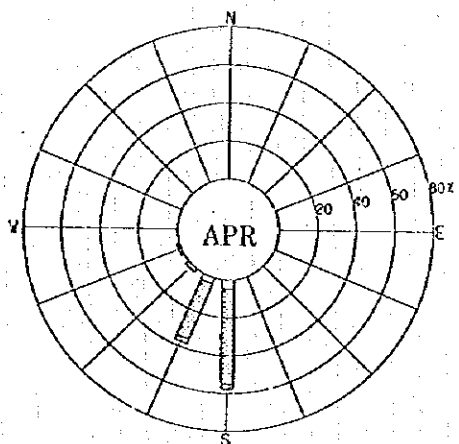
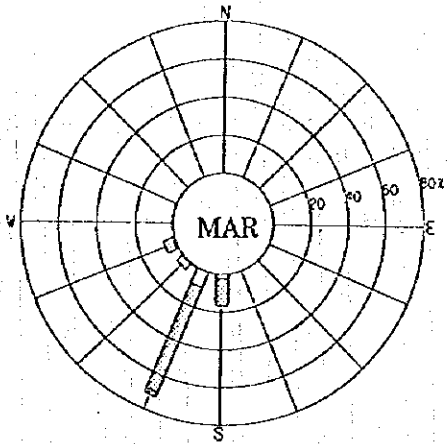
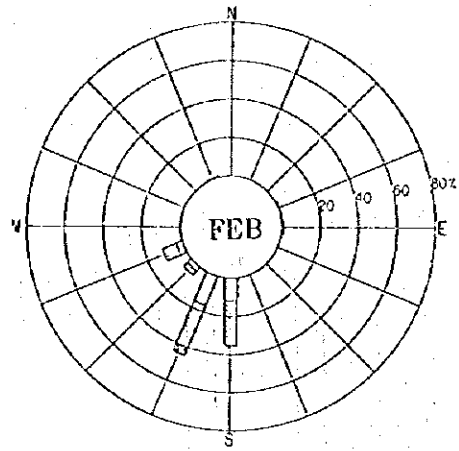
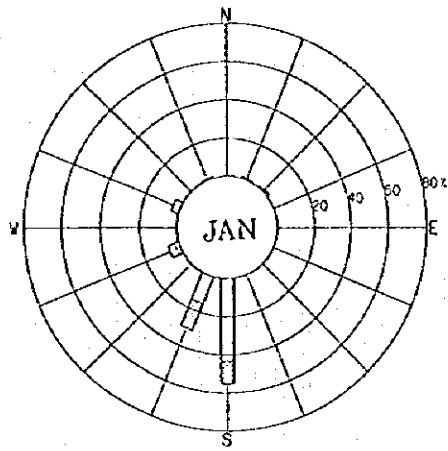


Figure A-7.4 Wave Rose of Offshore Waves in Sekondi (annual)



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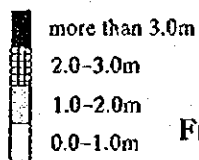
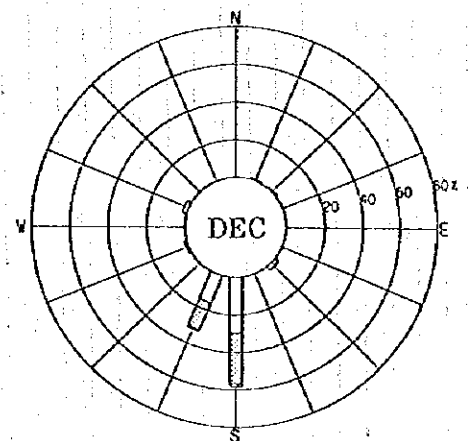
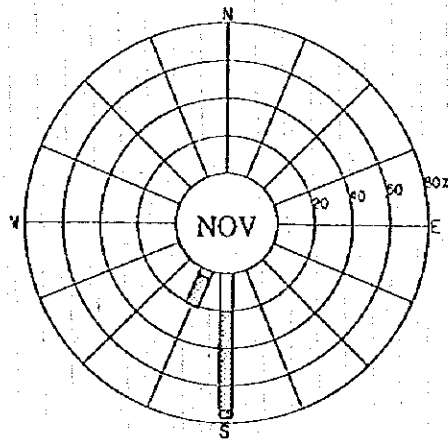
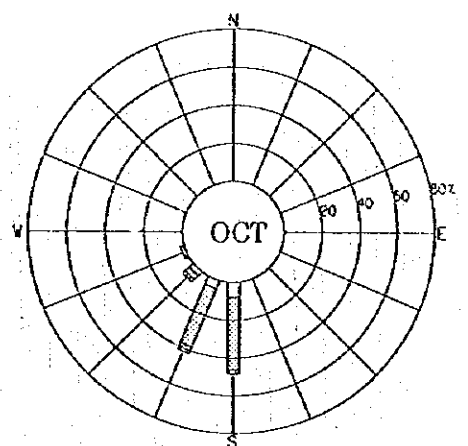
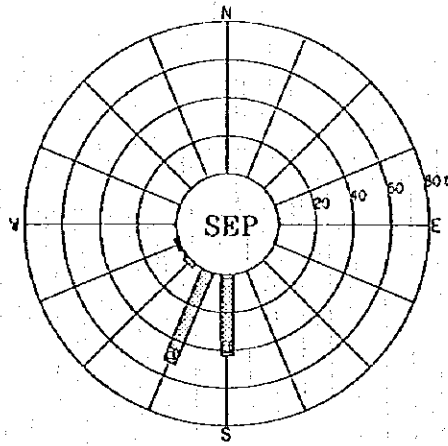
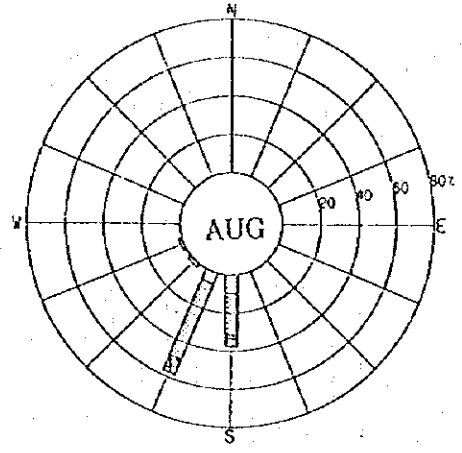
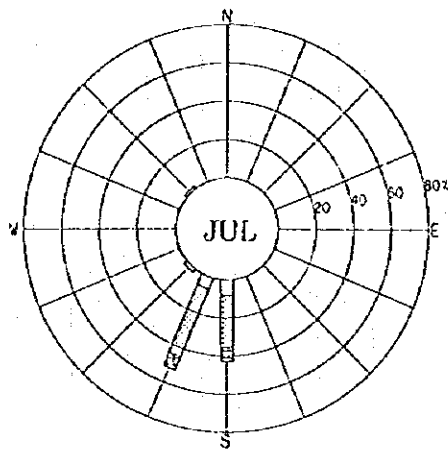


Figure A-7.5(I) Monthly Wave Rose of Offshore Wave in Sekondi (I)



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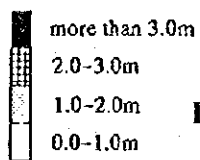


Figure A-7.5(2) Monthly Wave Rose of Offshore Wave in Sekondi (2)

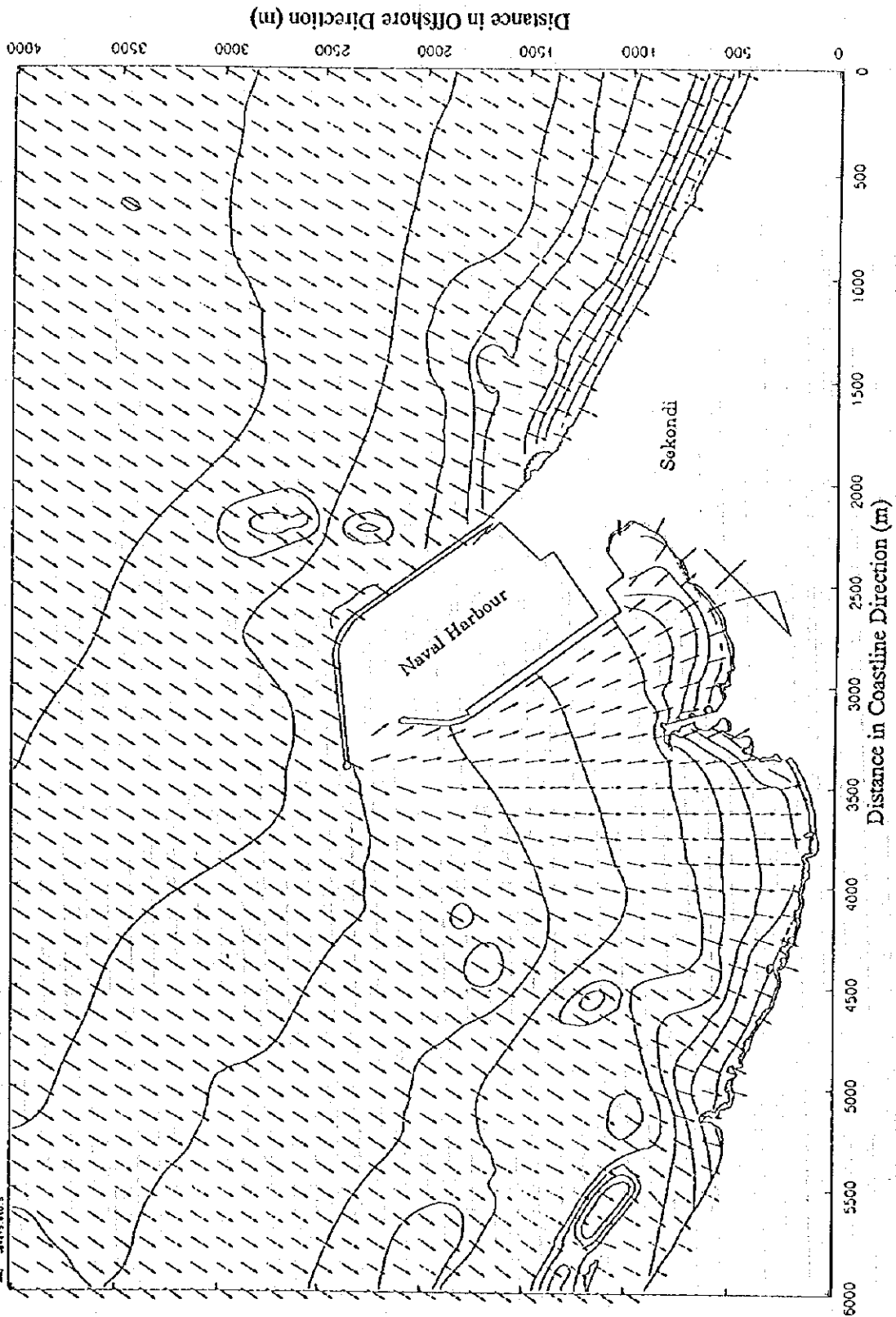


Figure A-7.6(1) Distribution of Wave Direction
 (S, Ho=3.7m, To=12.0sec)

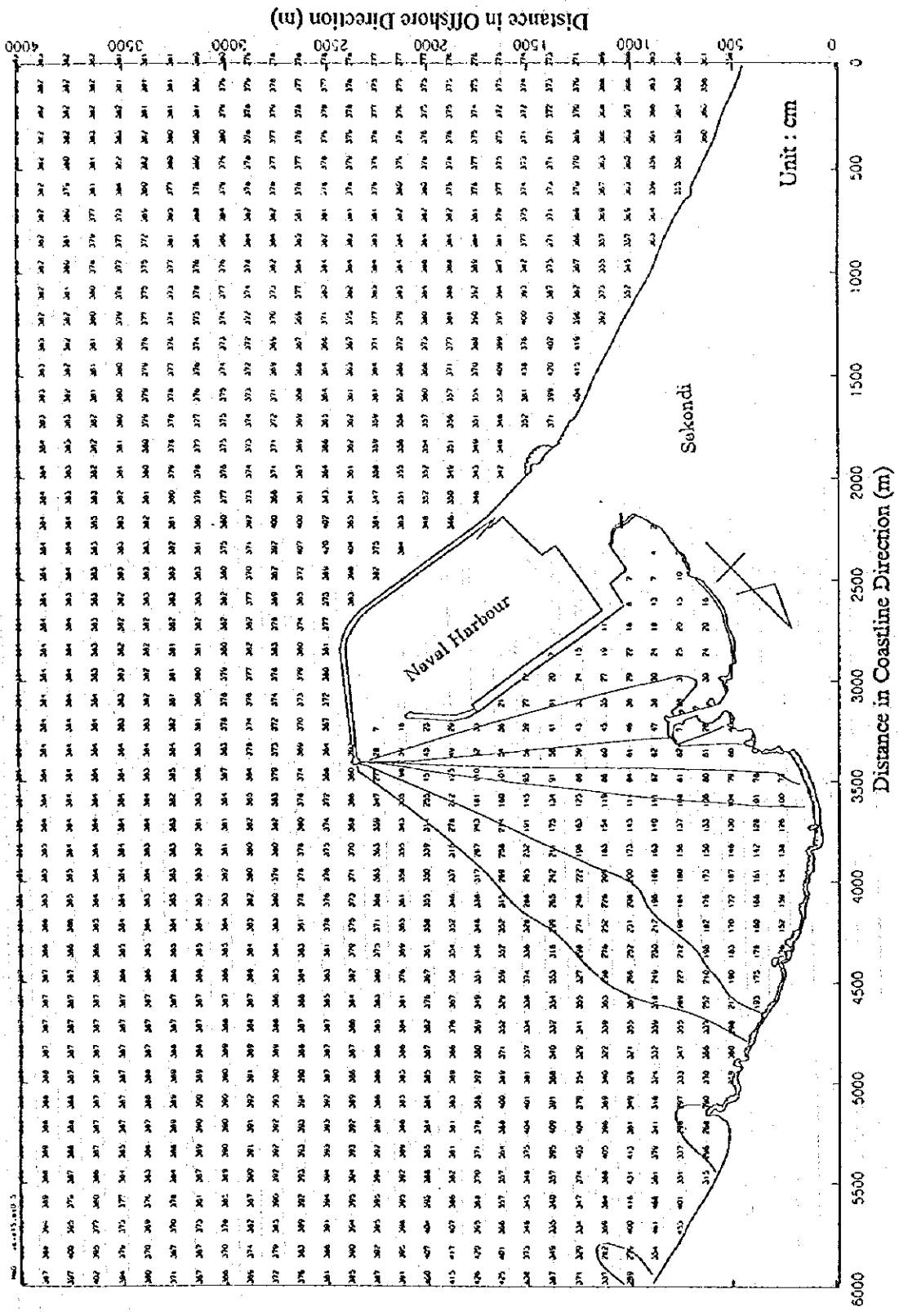


Figure A-7.6(2) Distribution of Equivalent Deepwater Wave Height
(S, Ho=3.7m, To=12.0sec)

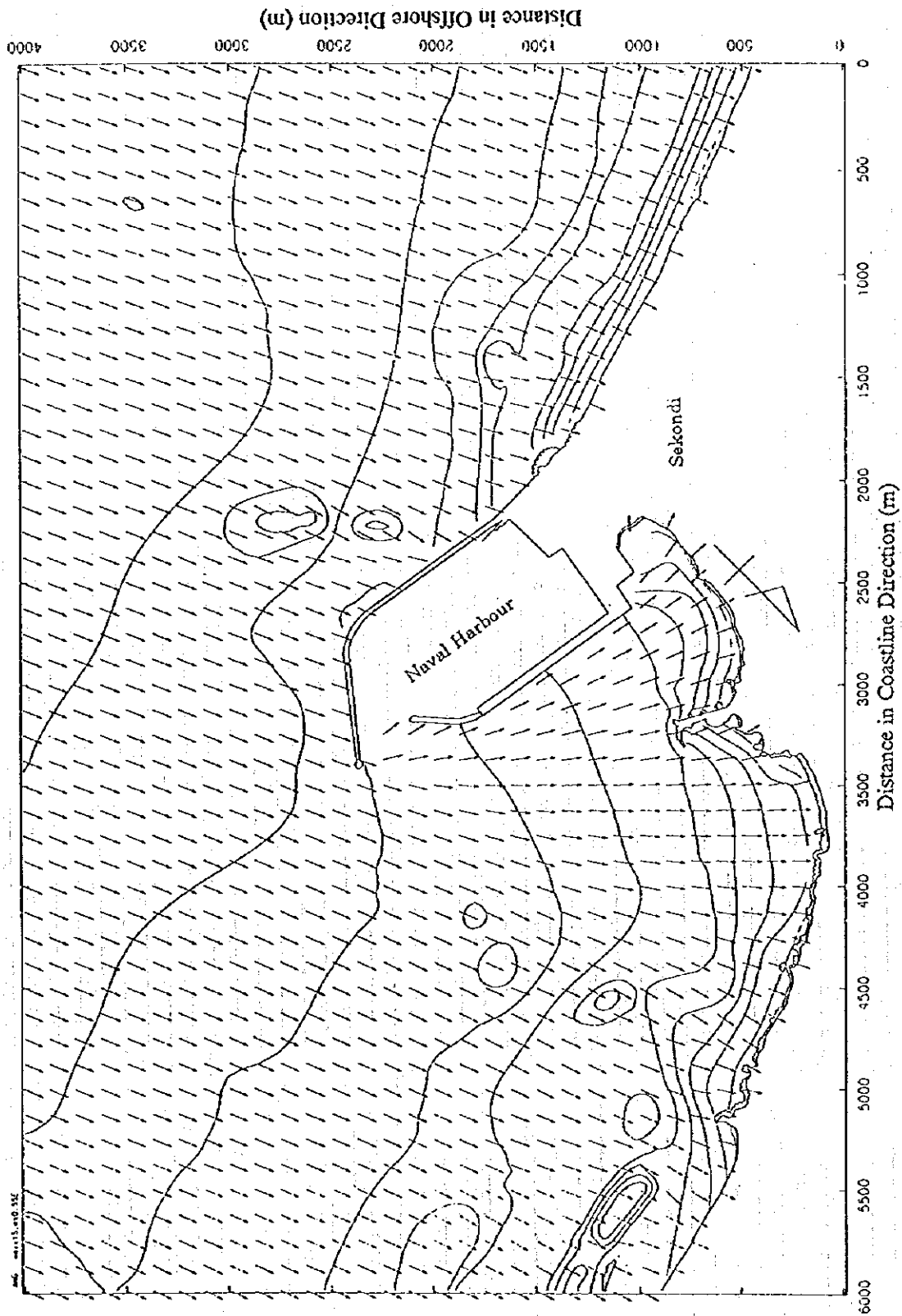


Figure A-7.7(1) Distribution of Wave Direction
 (SSE, $H_o=3.7m$, $T_o=12.0sec$)

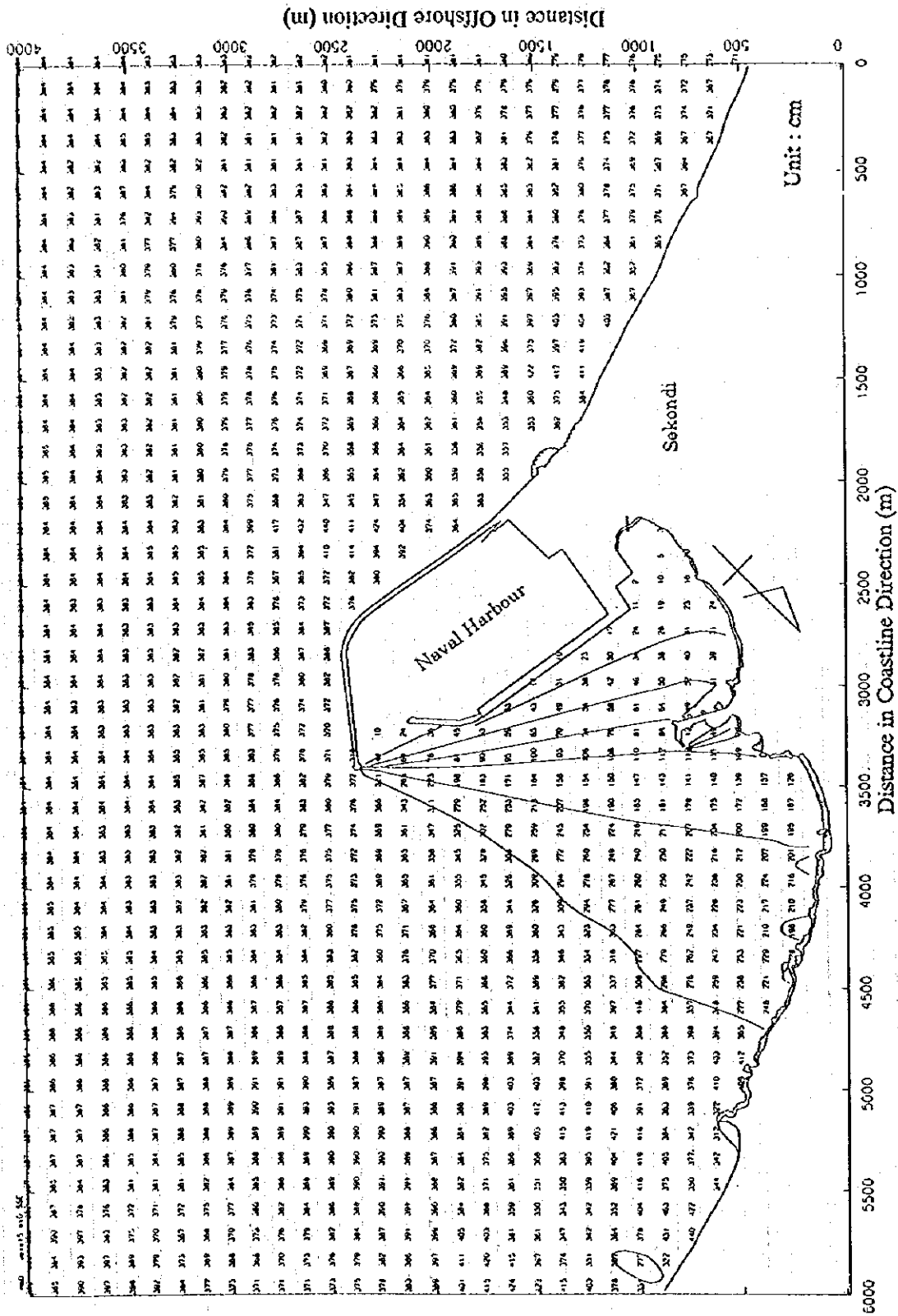


Figure A-7.7(2) Distribution of Equivalent Deepwater Wave Height (SSE, $H_0=3.7m$, $T_0=12.0sec$)

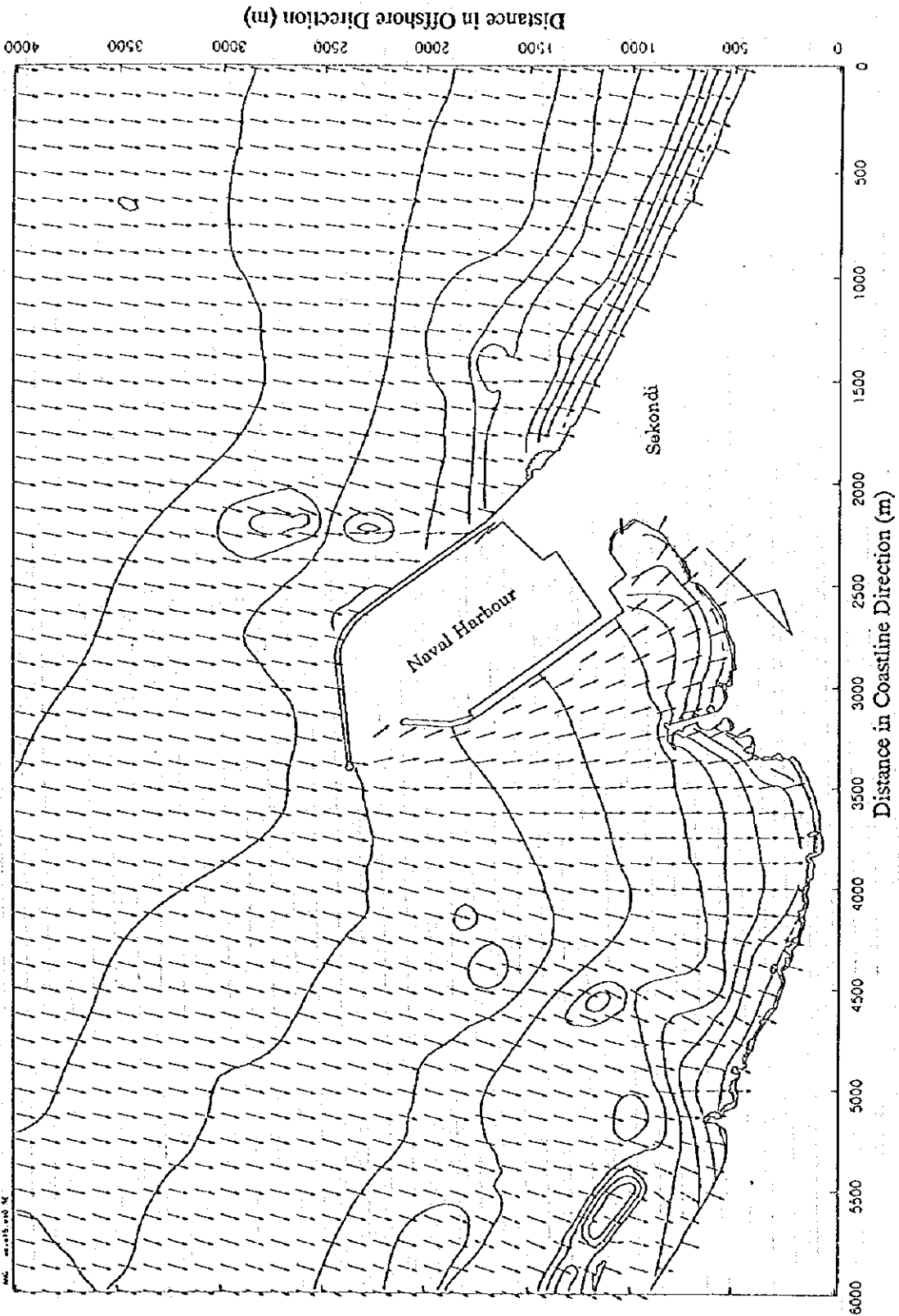


Figure A-7.8(1) Distribution of Wave Direction
(SE, $H_o=3.7m$, $T_o=12.0sec$)

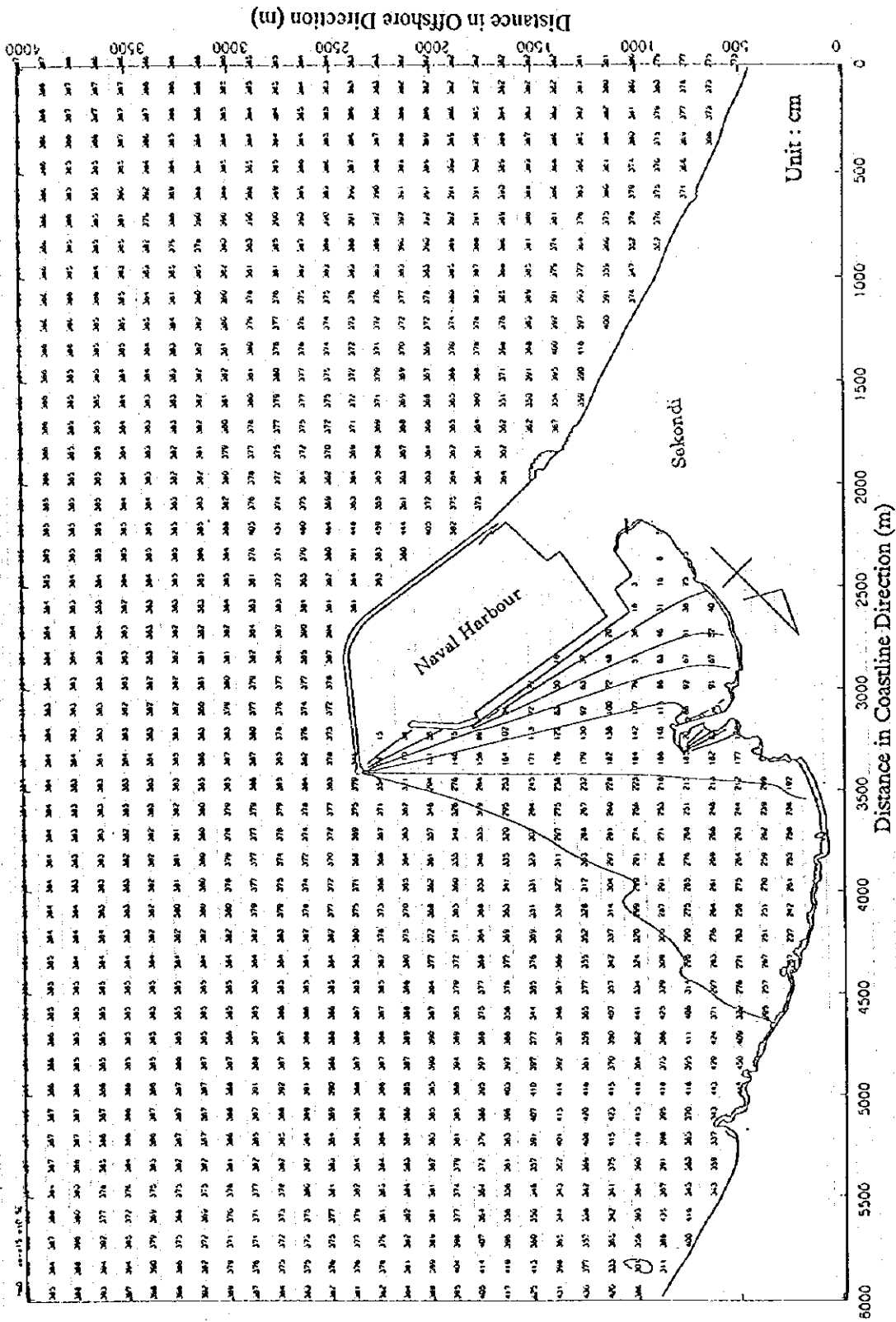


Figure A-7.8(2) Distribution of Equivalent Deepwater Wave Height (SE, Ho=3.7m, To=12.0sec)

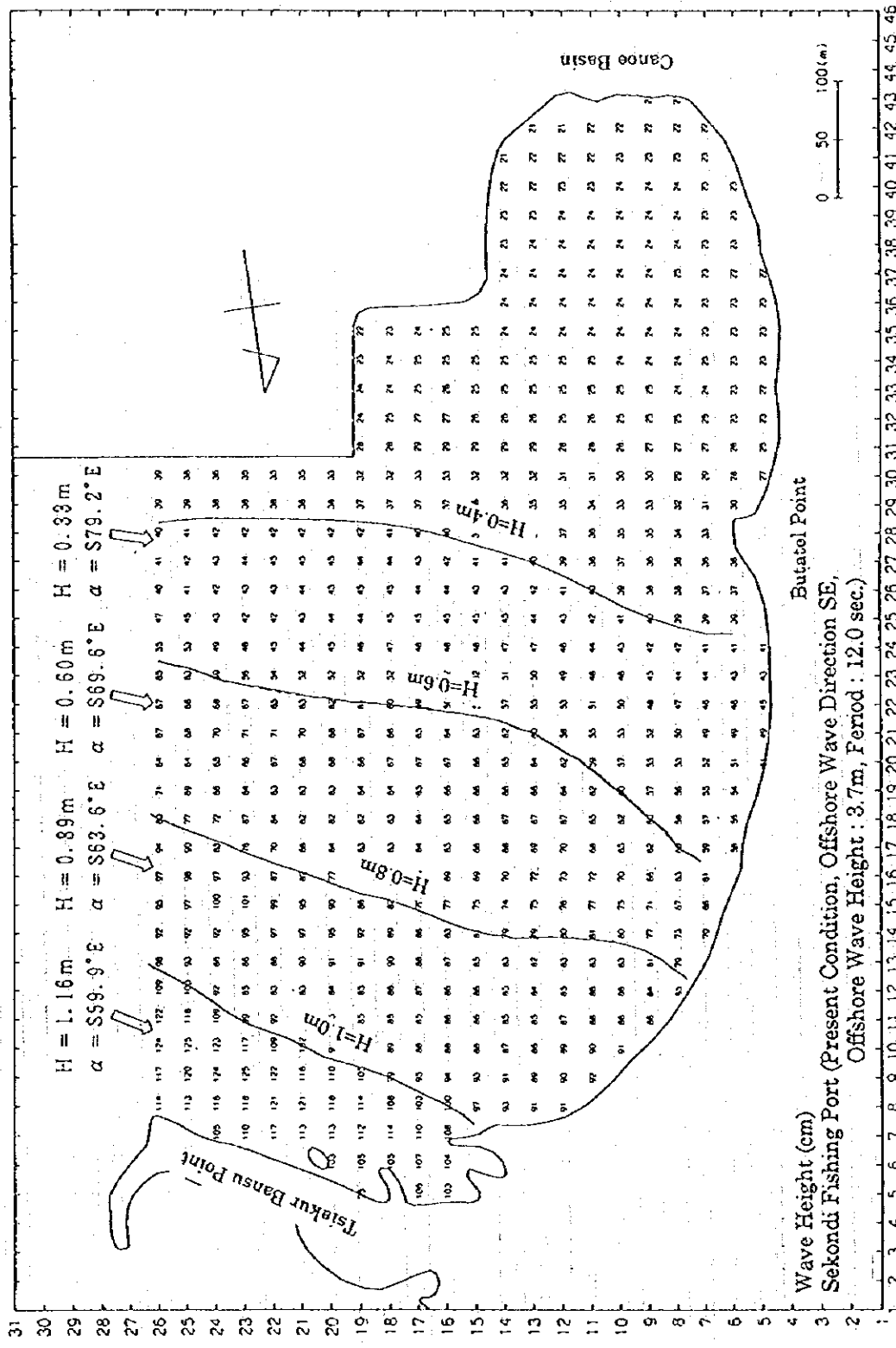


Figure A-7.9 Wave Height Distribution in Sekondi Bay

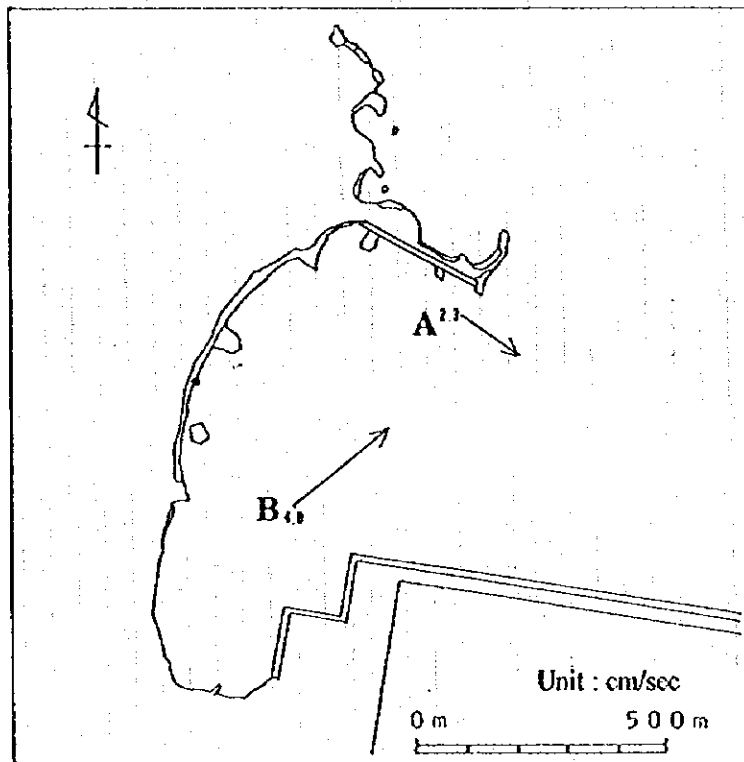
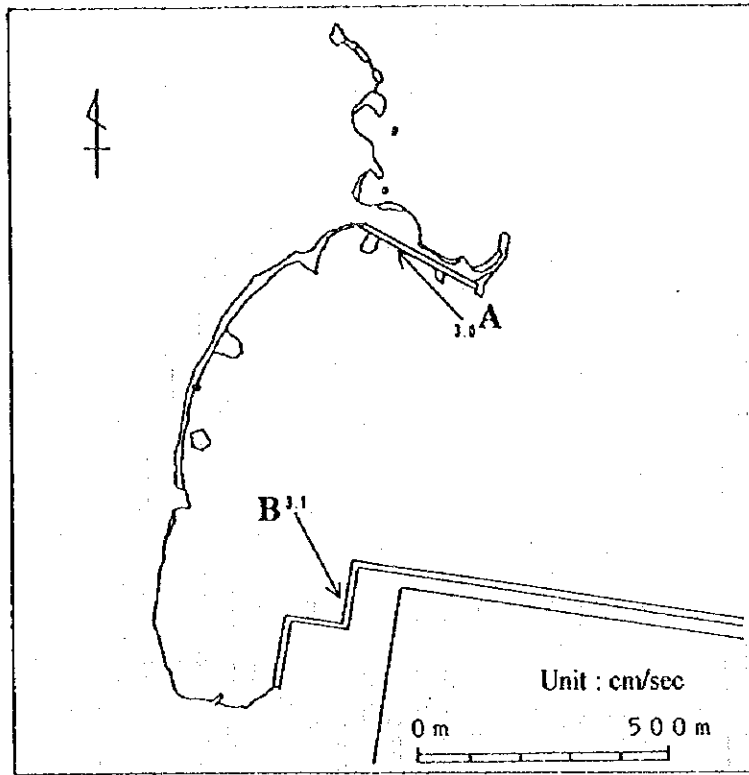
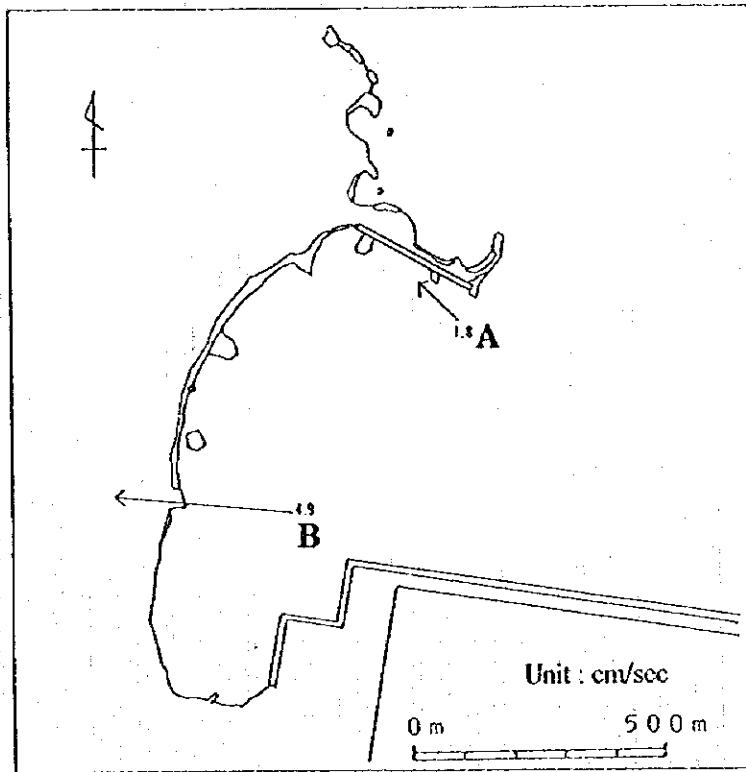
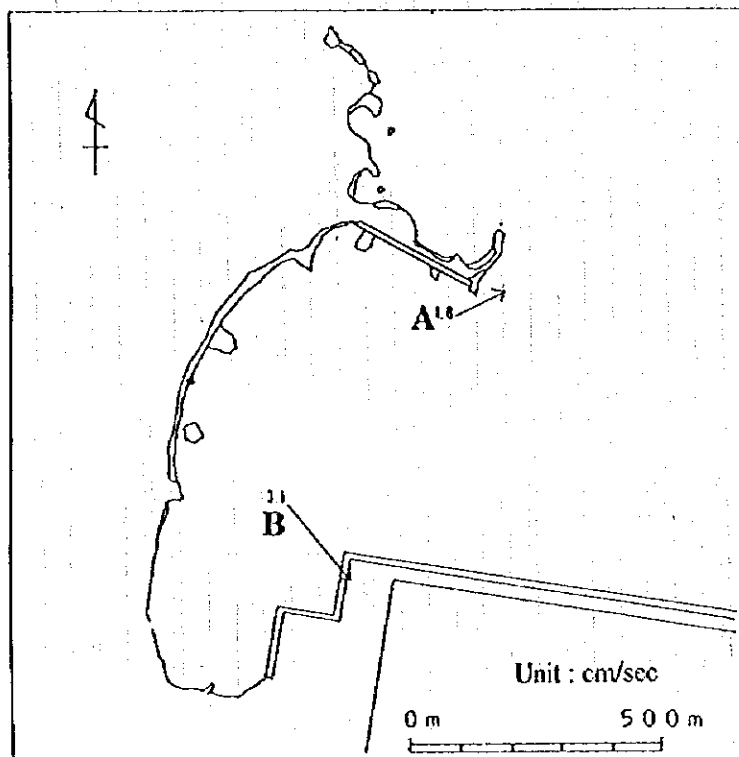


Figure A-7.10(1) Current Observation (April 16 to April 18, 1996)

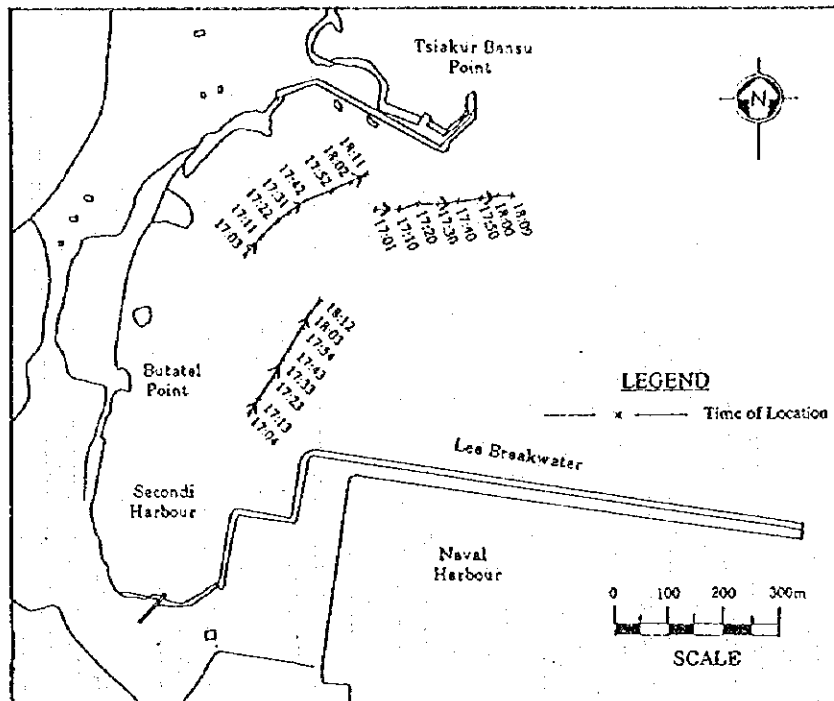


Flood Tide

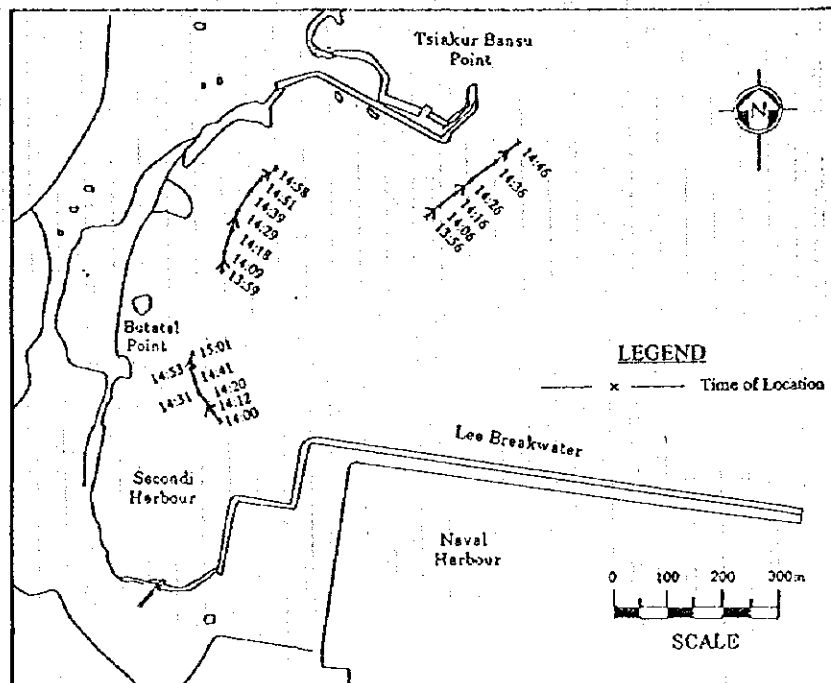


Ebb Tide

Figure A-7.10(2) Current Observation (July 30 to August 1, 1996)



Ebb Tide (July 30, 1996)



Flood Tide (July 31, 1996)

Figure A-7.11 Track of Floats

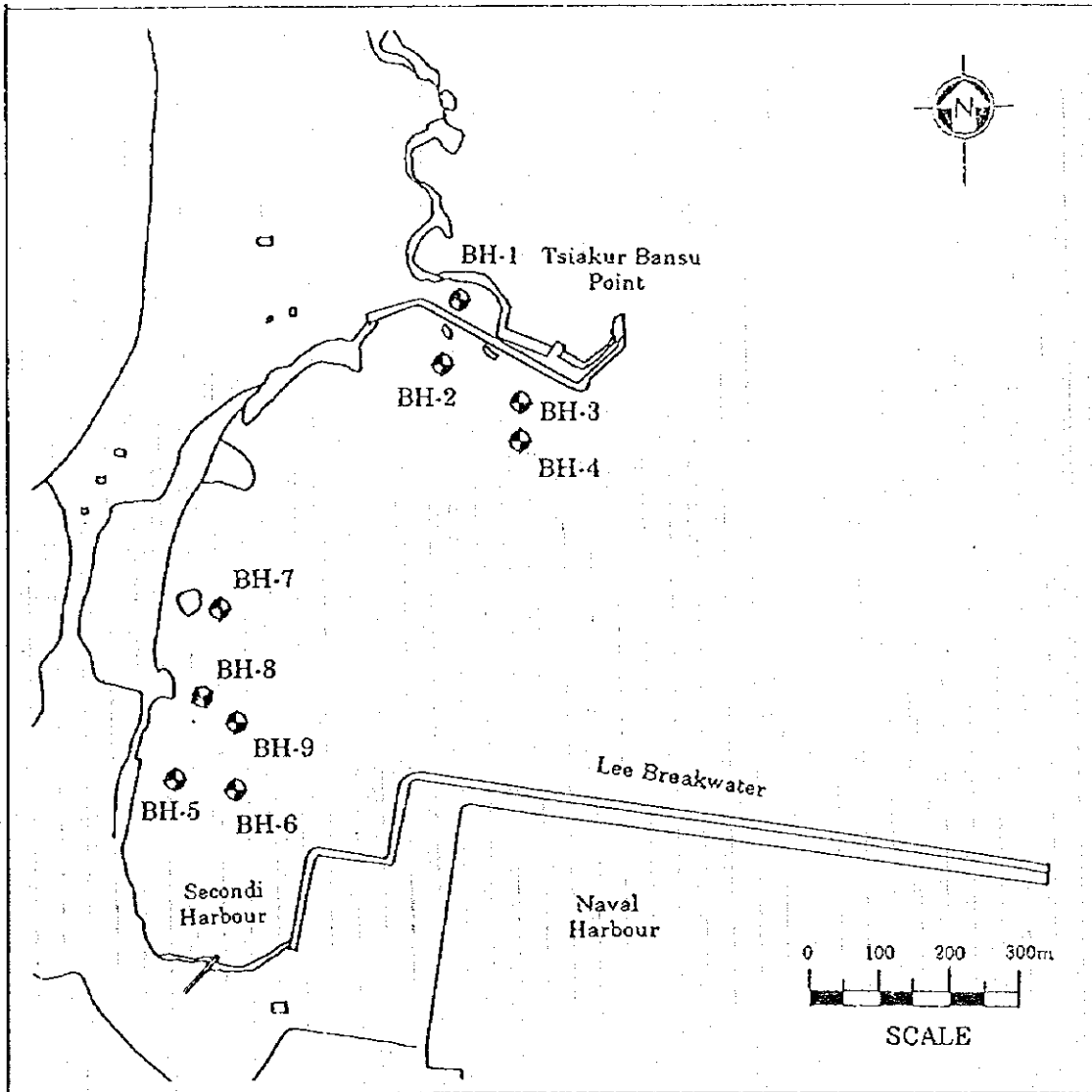







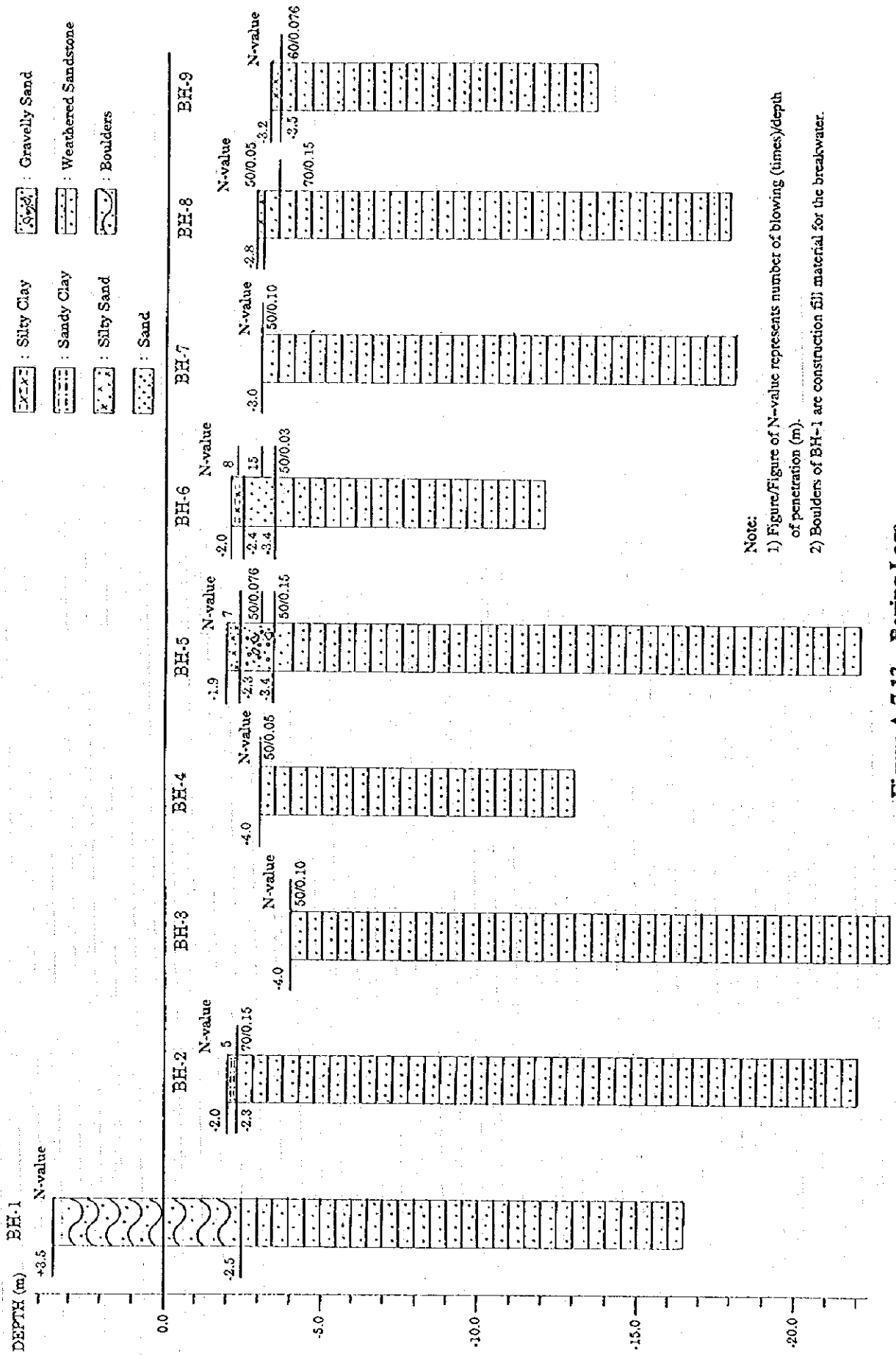


Figure A-7.12 Location of Boring Points

LEGEND

-  : Silty Clay
-  : Silty Sand
-  : Gravelly Sand
-  : Sandy Clay
-  : Silty Sand : Boulders
-  : Weathered Sandstone
-  : Sand



Note:
 1) Figure/Figure of N-value represents number of blowing (times)/depth of penetration (m).
 2) Boulders of BH-1 are construction fill material for the breakwater.

Figure A-7.13 Boring Logs

Table A-7.5 Thickness of Overburden

BH No.	Thickness of overburden(m)	BH No.	Thickness of overburden(m)
1	—	6	1.8
2	0.3	7	0.0
3	0.0	8	0.2
4	0.0	9	0.3
5	1.5		

Table A-7.6 N-value and Laboratory Test Results

Layer	Surface	Bottom (weathered sandstone)
Thickness of Layer (m)	0 to 1.8	more than 5
N-value	5 to 15	more than 50
Median Grain Size (mm)	0.16 to 0.44	----
Water Content (%)	11 to 46	----
Specific Gravity	2.5 to 2.7	2.5 to 2.7
Percentage of Sand Content (%)	69 to 88	----
Percentage of Silt Content (%)	12 to 35	----
Unconfined Compressive Strength	----	88 to 104 kg/cm ²

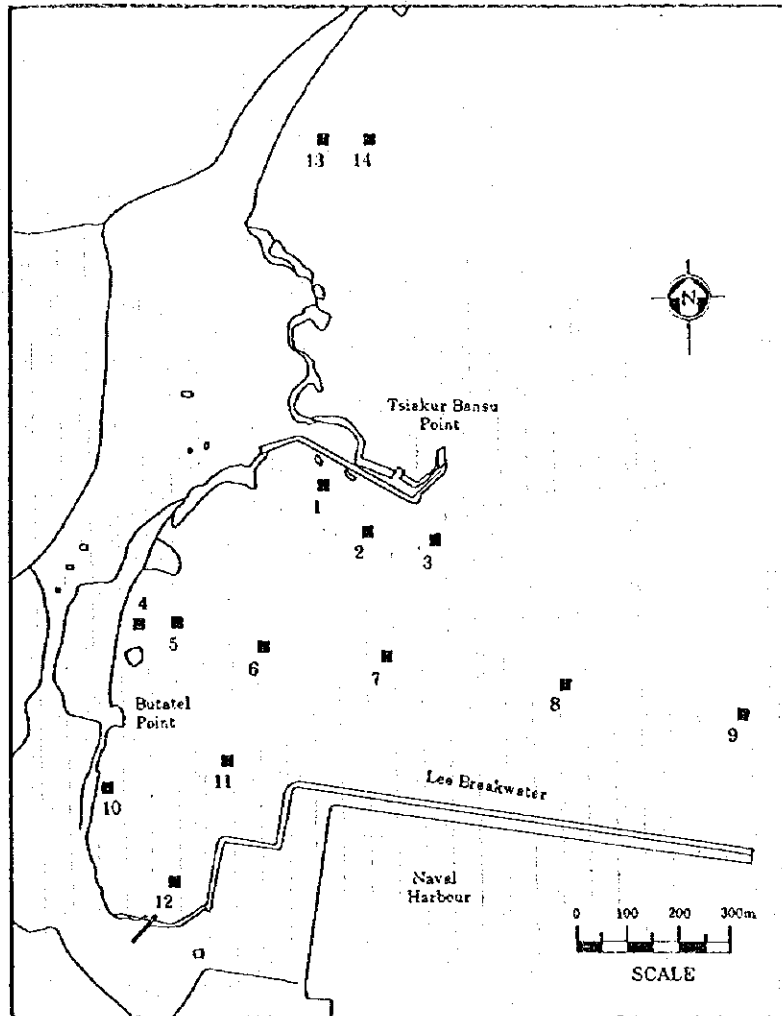


Figure A-7.14 Location of Sampling Points on Seabed Materials

Table A-7.7 Analysis Results of Seabed Materials

Sample #	Median Grain (mm)		Sorting Coefficient (So)		Skewness (Sk)		Water Content (%)		Specific Gravity		Percentage of Sand Content (%)		Percentage of Silt Content (%)	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
# 1	0.150	0.500	5.48	2.12	0.37	0.85	61	31	2.570	2.631	65	80	35	20
# 2	NO-RECOVERY/NO-SAMPLE													
# 3	0.015	0.090	3.40	14.64	1.25	1.14	187	178	2.538	2.589	15	50	85	50
# 4	0.090	0.120	1.41	1.75	1.10	0.95	32	45	2.635	2.655	70	61	30	39
# 5	0.100	0.050	2.34	3.04	0.77	0.79	44	60	2.588	2.659	63	31	37	69
# 6	0.007	0.023	4.51	7.25	1.69	1.20	136	187	2.537	2.469	19	15	81	85
# 7	0.008	0.065	4.79	7.75	2.04	0.60	124	161	2.525	2.503	29	46	71	54
# 8	0.008	0.038	4.30	10.24	1.77	0.57	206	198	2.539	2.535	10	61	90	40
# 9	0.010	0.007	3.57	6.83	1.68	1.58	173	199	2.447	2.434	10	3	90	97
# 10	0.110	0.160	2.24	1.73	0.81	0.87	45	44	2.587	2.599	62	64	38	36
# 11	0.170	0.180	1.73	1.80	0.82	0.80	45	42	2.564	2.573	77	67	23	33
# 12	0.034	0.800	4.47	2.55	0.79	0.13	189	94	2.381	2.480	35	64	65	36
# 13	0.160	0.065	1.45	2.63	0.99	1.05	39	58	2.539	2.534	88	44	12	56
# 14	0.070	0.030	1.92	3.16	1.04	0.74	48	82	2.690	2.568	38	15	62	85

1st Survey : 1996.4.18

2nd Survey : 1996.8.2

Consideration on the analysis results of seabed materials is described in the next pages.

Consideration on the Analysis Results of Seabed Materials

1. First Survey

(1) Distribution of Median Grain Sizes

Generally, the grain size of seabed materials near the seashore is larger toward the downdrift side than the updrift side if the specific gravity was substantially the same. This is due to the fact that larger grain materials are less likely to be subjected to external forces of the waves and currents.

Median grain size is distributed in the following manner; the grain sizes at 0.1 mm or more #1 (existing breakwater), #4 (sandy beach), #5, #10, #11 and #13 are larger than at other points. This is presumably because the finer grains have been washed away near the shore where the wave force is stronger.

Although close to the shore, the grain size at #12 (canoe landing beach) is very small at 0.034 mm. As is clear from the result of the current observation, #12 is unlikely to be subjected to the effect of the overall current circulating the Bay. As it is also located in the area shielded by the Naval Base Breakwater, the incoming waves are assumedly very small. As the waves and the currents are smaller than those at other points, fine grains rolled up in the nearby areas are considered to have sunken and sedimented.

(2) Distribution of Specific Gravity

Those with larger specific gravity remain in the areas with larger external force. On the contrary, in the areas with less external force, even those with less specific gravity remain or those having been removed from other points because smaller specific gravity under larger external force gathers.

In the same as median grain sizes, the specific gravity at #1, #4, #5, #10, #11 are larger than at other points and these points are located in the areas with larger external force for littoral drift. At #12, the specific gravity is smallest of all points and seabed materials are composed of light and fine grains.

(3) Silt Content

The silt content is also larger in areas with larger water depth since the silt remains stationary if the external force directly acting on the bottom sand is small. In case of Sekondi Bay, there are more silts at larger depths such as at #8 and #9. At #12, the silt content is twice as much as that at #1, #4, #5, #10 and #11.

(4) Distribution of Sorting Coefficient (So)

The sorting coefficient is larger than 1. If closer to 1, it means that the grain size of seabed materials is almost uniform. In the seashore facing the outer ocean and where high waves directly act, sorting of the seabed materials proceeds and the grain size often becomes almost uniform. In the areas with smaller external force, sorting does not proceed and the size becomes greater. So distribution shows that the values are smaller at #4, #11, #13 and #14, indicating that sorting has proceeded to a greater extent at those points than at other points.

2. Second Survey

(1) Distribution of Median Diameter

Compared to the first survey, the median diameter has become greater at all the points except #5, #13 and #14. This must be because the finer grain sediments on the bottom of Sekondi Bay were washed away by waves. #12 is less likely to be subjected to the waves as it is in the inner bay, but the median diameter here has changed greatly from 0.034 mm to 0.8 mm. As the second survey was conducted during the peak season, canoes and inshore vessels had landed a considerable amount of catches and their screw propellers must have rolled up silts with smaller diameter.

(2) Distribution of Specific Gravity

Compared to the first survey, there was observed an overall increase similarly in the case of median diameter distribution, indicating the effects of waves.

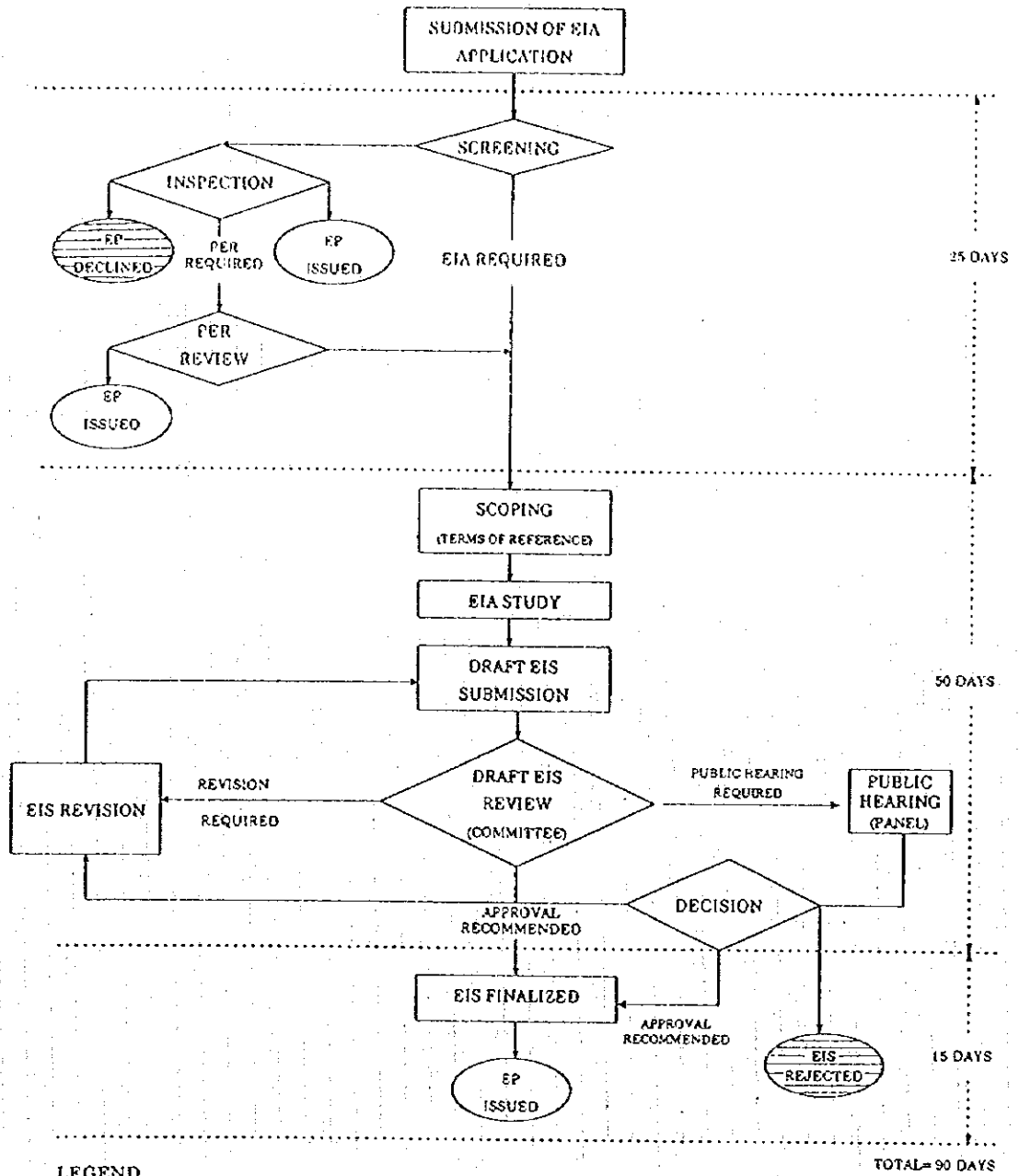
(3) Silt Content

Compared to the result of the first survey, silt decreased at the points #3, #7 and #12. These points correspond to the changes in the median diameter, showing effects of waves.

(4) Distribution of Sorting Coefficient, So

Compared to the result of the first survey, sorting coefficient has apparently become larger at points #3, #6, #7, #8 and #9. This is because sands and gravels with larger diameter became mixed as seen in the diameter curve.

ADMINISTRATIVE FLOW CHART OF THE EIA PROCEDURE IN GHANA



LEGEND

- EIA - Environmental Impact Assessment
- EIS - Environmental Impact Statement
- PER - Preliminary Environmental Report
- EP - Environmental Permit

- ◇ EPA Action
- Proponent's Action
- Favourable Decision (project to proceed)

- ⊘ Negative Decision (provision for appeal)
- Public

NB: APPEAL = Refer to Procedures

Figure A-7.15 Administrative Flow Chart of the EIA Procedure

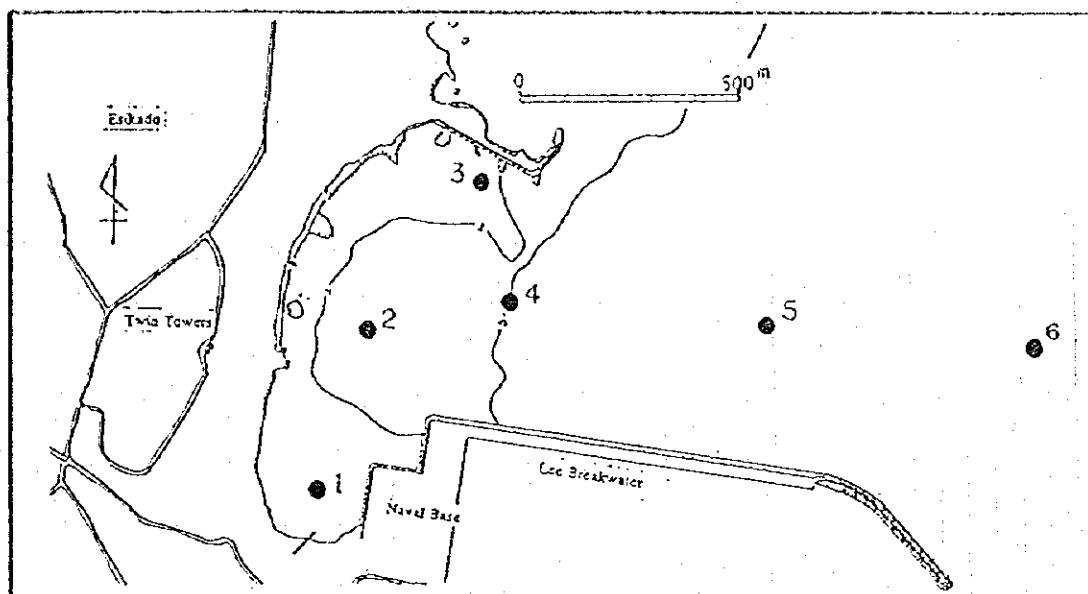


Figure A-7.16 Location of Sampling Point

Consideration on the Results of Water Quality Analysis

1. First Survey

When the results of water quality analysis near the sea bottom in Sekondi Bay is evaluated based on the environmental quality standard of sea water as given in Table-2.4.14, pH (hydrogenion concentration) is about 8 which is within the critical range and DO (dissolved oxygen) is about 7 mg/l which is also within the critical range. However, COD (chemical oxygen demand) indicates a high value ranging between 570 and 880, which is much higher than the standard. As the sea water was sampled near the bottom using a water sampler, the seabed materials must have rolled up and became mixed in the sampler, to thereby show high COD values. At any rate, water pollution is estimated to be proceeding as a large quantity of organic matters is contained in the sea water.

2. Second survey

In the second survey, a study on water quality was performed by analyzing samples taken from the sea bottom, the surface, and the offshore outside the naval base breakwater. As COD values were quite high in the first survey, tests on chlorophyll a and total coliform counts were additionally performed.

At most of the points, pH was 7.9 and there were no particular problems. It is suggested to take attention at the point #2, however, the value near the surface layer was low at 7.2 (acidic).

Compared to the first survey, SS showed a three-fold value. This was considered due to turbidity caused by agitation of bottom mud by waves.

At all the points, DO was lower than in the first survey. Even though they are close to the reference value, the point #1 showed 3.5 - 4.5 mg/l which was lower than at other points. Attention to oxygen depression due to decomposition of organic substances is warranted.

Although COD was lower for all the points than in the first survey, it was still high. At the point #6 which is near to the outer sea, the value was as high as 88 mg/l, suggesting that the difference in analytical techniques was responsible.

Chlorophyll a is known to generally exceed 40 mg/m³ in red tide. It was higher at the point #1 near the surface than at any other points (27.1 mg/m³), where plant plankton proliferate to simulate red tide. At other points, the value decreases towards the outer sea at <1.0 ~ 7.5 mg/m³. As for total coliform counts, they are below the reference value except at the point #1.

Table A-7.8 Results of Water Quality Analysis

(1) First Survey (April 18, 1996 : Bottom)

Sample No.	Transparency (m)	Water Temp. (°C)	PH	COD (mg/l)	DO (mg/l)	SS (mg/l)
1	1.68	32.0	8.11	736.0	7.8	42.0
2	2.19	30.0	8.07	883.2	6.7	34.0
3	2.44	31.5	8.13	671.6	6.9	47.0
4	2.37	30.0	7.93	570.4	6.5	38.5
5	2.81	31.0	8.10	579.6	6.5	31.5

Note: Figure of COD applied to potassium dichromate method.

Water Quality Test Results

(2) Second Survey (August 2, 1996 : Surface and Bottom)

Sample No.	Transparency (m)	Water Temp. (°C)		PH		COD (mg/l)		DO (mg/l)		SS (mg/l)		Chlorophyll (mg/m ³)		Total Coliforms (MPN/100ml)	
		Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom
1	0.52	25.4	24.9	7.9	7.9	76	82	3.5	4.5	134	155	27.1	14.8	4600	4600
2	1.53	24.7	24.6	7.2	7.9	106	110	6.6	5.9	81	91	2.5	2.4	32	900
3	1.21	24.9	24.8	7.9	7.9	80	104	6.6	6.4	64	121	7.5	2.5	180	180
4	1.30	24.7	24.3	7.9	7.9	108	82	6.8	6.4	94	98	2.5	2.5	24	400
5	1.84	24.4	23.9	7.9	7.9	118	92	6.5	6.5	52	65	<1.0	<1.0	18	340
6	-	24.2	-	8.0	-	88	-	5.9	-	71	-	<1.0	-	9	-

Note: Figure of COD applied to Potassium Dichromate Method.

Table A-7.9 Environmental Quality Standard for Sea Water Pollution in Japan

Item Class	Adaptability of Purpose	Standard Value					
		PH	COD	DO	Coliforms	n-Hexane extracts (oil, etc)	
A	Fisheries 1st grade swimming Natural environment conservation B & C	7.8 to 8.3	less than 2mg/l	more than 7.5mg/l	less than 1000MPN /100ml	N.D.	
B	Fisheries 2nd grade Industrial water C	7.8 to 8.3	less than 3mg/l	more than 5mg/l	-	N.D.	
C	Environment conservation	7.8 to 8.3	less than 8mg/l	more than 2mg/l	-	-	

N.D. : Not Detectable

