

Chapter 3 Implementation Plan

3-1 Implementation Plan

3-1-1 Implementation Concept

(1) Basic Concept

- (a) For the implementation of the Project for Coastal Fishery Development, after the Exchange of Notes (E/N) is signed between the Government of Japan and the Government of St. Lucia, a contract for undertaking consulting services will be concluded between the Government of St. Lucia and the Japanese Consulting Firm.
- (b) The Consulting Firm will prepare all the documents required for the tender and concluding the contract such as the drawings of the fishing port facilities, technical specifications, cost estimations and so forth. After the approval of these documents by the Government of St. Lucia, the contractor for this project will be selected from and among Japanese construction companies by examining their pre-qualifications and tender procedures.
- (c) The construction work will be performed by the selected construction company in accordance with the construction contract concluded between the Government of St. Lucia and the construction company.
- (d) The construction period is expected to last 1 (one) year and 10 (ten) months are necessary taking into considerations of the scale and complexities of the Project.

(2) Implementation Concept

- (a) All the fishing port facilities at Soufriere Site included in the Project will be constructed by on-land work. The maritime construction works of wharf and slipway comprising piling works, concrete & from works, etc. will be conducted as on-land work by installation of temporary groin reclaimed in the corresponding work area. After

the completion of the construction works the temporary groin will be demolished. At Choiseul Site, land reclamation and seawall construction will be executed by on-land works, while breakwater and wharf will be constructed by parallel from offshore side and on-shore side.

- (b) Local construction companies in St. Lucia have not had sufficient experience in undertaking large scaled construction projects. Particularly, most of them have no experience of maritime construction works. Therefore, a Japanese company will be responsible for construction works by providing necessary engineers and the relevant machinery for marine construction. However, some on-land works such as building work, pavement works, installation of electrical wiring, water supply and setting sewage pipelines will be undertaken with an assistance of local firms as much as possible.
- (c) Ice making plant and ice storage as well as septic tank related equipment will be procured from Japan, considering high quality and durability of the products. Assembling and installation works of the equipment at site will be conducted under instruction and supervision of the Japanese experts.
- (d) Careful attention on procurement of construction machinery, work vessels and construction materials, etc. will be required.
- (e) Since the access roads of both site are narrow and pass through local congested areas in many places, it is necessary to establish an implementation plan to prevent the traffic problems and disrupts with residents. Particularly at the Choiseul Site, where fishery operations will be continuing through the period of construction works in the vicinity, it is necessary to take necessary measures to prevent hampering such activities.

(3) Executing Agency in the Government of St. Lucia

Executing agencies, which will be involved in the Project on the part of the Government of St. Lucia, will be as follows.

(a) Responsible agency:

Ministry of Agriculture, Forestry and Fisheries

(b) Responsible agency for project implementation:

Ministry of Agriculture, Forestry and Fisheries

(c) Responsible agency for the supervision of construction work:

Department of Fisheries,

Ministry of Agriculture, Forestry and Fisheries

(d) Management authority after completion of the Fishing Port:

Fishery Port Administrative Committees

Committee, which will be formed by the Department of Fisheries, Soufriere Town or Choiseul Village municipalities, and Fishery Cooperative, will be the responsible organization, while operation and maintenance of the port facilities will be carried out by Fishery Cooperative.

3-1-2 Conditions for Implementation

(1) Construction Materials

The following construction materials are manufactured in St. Lucia, such as filling materials for road construction, concrete aggregates, blocks for building construction, steel sheets for roofing, wooden construction fittings and fixtures, metal fixtures etc. Cement, re-bars and other general construction materials are imported completely from the U.S.A. and other neighboring countries and are distributed in the market.

(2) Labor Force

Since there are no sufficiently experienced local construction companies for the particular construction works and assembling of ice making plant, it will be necessary to dispatch experienced experts from

Japan. A plant engineer will be necessary to be dispatched from Japan for supervision and guidance related to the functional tests and operation of the ice making plant as well as technicians for assembling. As for the construction of septic tank, supervision and instruction by Japanese engineer and technician will also be required. Furthermore, Japanese expert except skilled labor will be needed for the special work items such as pile driving, concrete armor block placement and operations of working vessels, which are difficult to be procured in St. Lucia.

(3) Construction Machinery

There is no leasing companies of construction machinery in St. Lucia. However, Some of the construction machinery owned by local construction companies will be available for general road construction works such backhoe (0.4 to 0.7m³ class), tyre shovel (1.2 to 2.4 m³ class), dump truck (10 t), truck crane (25 t capacity), crawler crane (40 t capacity), and other relevant machinery. As for the marine construction works included in the Project, work vessels such as crane barge, tug boat, anchor boat and diver boat will be needed for relatively long period during the construction. Since there are no construction companies owning such work vessels in St. Lucia, it will be necessary to procure them from the neighboring countries such as Trinidad and Tobago where many construction companies possess such working vessels. Since there is a difficulty in procuring pile-driving machine of vibro-hammer and diesel hammer at the local market, procurement from neighboring countries will be projected.

Large quantity of casting concrete will be required for the construction works under the Project. However, since the local ready mixed concrete plants are located far from the project sites and take more than 1.5-hours for transportation, which result in quality problem of the ready mixed concrete. Therefore, concrete mixing plants will be installed for each project site.

(4) Safety Control

Among the construction machinery and equipment procured locally,

there is a lot in superannuated and deteriorated condition, hence careful inspection and regular check up for their operation should be carried out for safety control of the construction works. Further, appropriate construction schedule plan will be established, considering the local natural conditions specifically to the sea conditions.

As for the construction of breakwater and other maritime facilities, it will be necessary to clearly mark the construction area by buoys so that not to hamper the fishing boat operations. On-land construction works will be required to give a special attention to local fishermen and residents. the roads and routes, which will be used for the transportation of material and equipment, should be clearly indicated to avoid any nuisance to the city residents.

(5) Environmental Considerations

Soufriere Site, in particular, is situated in the famous tourist area. Coral reefs are distributed in the adjacent offshore area, where the special interests in the marine environment has been made. Upon sufficient understanding of such an environmental situation, it is required to carefully consider the counter measures to prevent water turbidity due to the construction works. As for the temporary construction road at Choiseul Site, it will be necessary to take sufficient measures to maintain in a good condition and to prevent the water flow of the river from obstruction due to the damage of the temporary road.

3-1-3 Scope of Works

Scope of works to be undertaken by the Government of Japan and the Government of St. Lucia are as follows.

(1) Scope of works to be Undertaken by the Government of Japan

1) Consulting Works

- (a) Detailed design works for the project facilities
- (b) Tender works and relevant documentation
- (c) Construction supervision

2) Construction Works for Soufriere Fishing Port

- (a) Construction of jetty
- (b) Construction of slipway
- (c) Construction of revetment and reclaimed land
- (d) Construction of in port road and parking lot
- (e) Construction of administration building
- (f) Construction of ice making and ice storage building
- (g) Construction of workshop
- (h) Construction of gear lockers
- (i) Construction of lavatory with shower building
- (j) Construction of fish retail shop
- (k) Construction of septic tank

3) Construction Works for Choiseul Fishing Port

- (a) Construction of breakwaters
- (b) Construction of reclaimed land
- (c) Construction of temporary construction road
- (d) Construction of wharf
- (e) Construction of slipway
- (f) Construction of administration building
- (g) Construction of ice making and ice storage building
- (h) Construction of workshop
- (i) Construction of gear lockers
- (j) Construction of lavatory with shower building
- (k) Construction of fish retail shop
- (l) Construction of septic tank

4) Equipment and Materials Procurement

- (a) FRP fishing boats: 20 boats (24 ft-type, 85HP engine)
- (b) Fishing gear for tuna long line: 1 set
- (c) Fishing port related equipment: 1 set
- (d) Instruments and tools for workshop
- (e) Transportation vehicle

(2) Scope of Work to be Undertaken by the Government of St. Lucia

Following scope of work will be undertaken by the Government of St. Lucia.

- (a) Securing of project site
- (b) Securing access road to project site
- (c) Connection of utilities such as electricity, water, telephone lines to project site
- (d) Construction of fuel supply facility
- (e) Construction of fence surrounding the project area with gates
- (f) Planting and landscape gardening works
- (g) Procurement of furniture and office equipment

3-1-4 Consultant Supervision

It is the policy of the Government of Japan that a grant aid project will be implemented under the strict supervision of the Consulting Firm, which is fully aware of technical details of work during the whole period of the Project. The Consulting Firm will supervise the construction works through the close contact and communications with local engineers in regard to the design, inspection and schedule of work.

(1) Supervisory Policies

- (a) The time frame of the work will be strictly observed by establishing close contact and communications with the persons and organizations concerned on the part of St. Lucia to prevent any delay of work.
- (b) Provision of prompt and appropriate guidance and advice will be essential for the contractor as to the construction of the facilities in compliance with the drawings and specifications agreed upon.
- (c) High priority will be accorded to the utilization of local materials and technologies.

- (d) The project will ensure to provide adequate advice and guidance regarding the maintenance of equipment and material delivered for the work.

(2) Supervisory Work

(a) Preparation of a Contract

Provision of services will be provided by the Consulting Firm in relation to the selection of a contractor, determining the type of the contract, drafting the contract documents, evaluating the bills, and holding a contract awarding ceremony.

(b) Evaluation and Approval of the Drawings of Retail Shops.

Evaluation will be carried out as to the drawings of a retail shop, materials to be used, and equipment.

(c) Instruction on Construction Work

Reviewing construction plan and schedules, providing supervision to the contractor and reporting the progress of work to the Government of St. Lucia will be carried out.

(d) Process of Payment

Evaluation and approval of the bills for the payment to the contractor during the work will be carried out taking into account the progress of work and upon completion of work.

(e) Inspection and Witness

The Consulting Firm will inspect, when necessary, the work in progress and give appropriate instructions to the contractor. The Consulting Firm, having confirmed that the work has been completed and the contract fulfilled, will witness the delivery of the Project and confirm the government's acceptance. The Consulting Firm will also report to the Government of Japan about the progress of work, payment procedures and status, and the delivery of facilities completed.

3-1-5 Procurement Plan

In the process of procuring materials and equipment being necessary for the Project, special attention will be paid to the following items.

(1) Procurement Policy

Priority should be given to the use of locally available material and equipment if the quality and quantities will meet the need of the project work. In this way the procurement cost from Japan will be minimized.

1) Procurement from Japan

A detailed procurement and transport schedule must be prepared well in advance for the material and equipment to be procured from Japan. This normally will take a long period of time before manufacturing, packing and shipment of goods until to be completed. Construction machinery will have to be procured from Japan when they are not available in the country.

2) Local Procurement

Rubble stones and aggregates, which can be locally procured, should be carefully examined as to the quarry site, quality, availability and transport capacities.

3) Cost

The cost is an important element to be taken into account in the selection of materials from local sources, neighboring countries and Japan. It should be borne in mind that the prices of procurement from Japan include the charges for packing, transport, insurance, while port charges and taxes are to be exempted. On the basis of the above principles and rules, the detailed plans will be established for the procurement of construction materials and equipment.

(2) Procurement Items

Table 4.1-1 Procurement country

Items	Procurement from Japan	Local Procurement	Procurement from 3rd Countries	Remarks
1) Materials and Equipment		rubble, aggregate, wood and timber, cement, steel member, re-bar, general construction materials, electric equipment and materials, equipment and materials for water supply and sewage		
	Fender, navigation aids, ice making plant and ice storage, internal devices for septic tank, fishing gear, repair tool and materials, steel pipe piles, steel sheet piles,			Acquisition is difficult in locally and also from neighboring countries.
			Reinforced concrete pile FRP fishing boat	Not produced in locally
2) Construction Machinery		Dump truck, tyre shovel, diver boat, crawler crane, bulldozer, backhoe, truck crane		
	Concrete mixing plant			The acquisition is difficult in locally and also from neighboring countries
			Tug boat, crawler crane barge, anchor barge, pile-driving machine	These machineries are not available locally.

3-1-6 Implementation Schedule

Japanese Government grant aid program will follow normal project implementation schedule. After the Exchange of Notes (E/N) is signed between the two countries, a Japanese Consulting Firm will be appointed by the Government of St. Lucia and the consulting contract will be concluded between the Government and the consulting firm.

E/N will provide details on the tender procedures, supervising and construction work. The project will be implemented in accordance with the conditions stated in the E/N.

(1) Preparation of Detailed Design Document

After the consulting contract will be concluded between the executing agency of St. Lucia and the Japanese Consulting Firm, the contract will be verified by the Government of Japan and the consultant will draw up detailed designs. In the detailed design the tender documents consisting of design drawings, technical specifications, instruction to tenderers, etc. will be prepared on the basis of the Basic Design Study. In the meantime, consultations will be held with the Government of St. Lucia regarding the details of the fishing port facilities and eventually the tender documents will be approved by the Government of St. Lucia. About 4 (four) months will be required for the preparation of a detailed design

(2) Execution of Tender

The contractor (a Japanese construction company) who will be involved in the construction of the project facilities will be selected through the tender. The tender procedures will be as follows: first invitations will be extended to interested parties; acceptance of the tenders; examination of the pre-qualifications; evaluation of tender documents, submitting the tender, evaluation of the tender, designation of the contractor and conclusion of a construction contract. The whole procedure will take 2 (two) months.

(3) Execution of Construction Work

Construction work will be started after the conclusion of the contract and verification by the Government of Japan. The construction period of each site is expected to last about 16 months considering the size of the project and its complexities, including the problems relating to the local construction conditions. However, unforeseen situations, which might occur in the course of the work, are excluded.

Figure 3.1-1 shows individually the implementation schedule of each site covering from the Exchange of Notes to the completion of Project.

Item	Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Remarks	
Detailed Design	Field Survey	///																						Sounding Survey, Boring Survey	
	Home Office Work Reporting																							Design/Cost Estimation Tender	
	Approval of Recipient Government				///																			Approval of Tender Documents	
																								Inspect and Hand Over	
Sofuriere	Mobilization							///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///		
	Temporary Work							///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///		
	Civil Works							///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///		
	Land Development																								
	Jetty																								
	Slipway																								
	Revetment																								
	Building Works																								
	Administration Office																								
	Ice Making Plant, Ice Storage Bin																								
	Workshop																								
	Gear Locker																								
	Shower Room / Lavatory																								
	Fish Market																								
	Septic Tank																								
	Outdoor Works																								
	Mobilization																								
	Choiseul	Temporary Work																							
		Civil Works																							
		Breakwater																							
		Revetment																							
		Landing Wharf																							
Reclamation																									
Dredging																									
Slipway																									
Building Works																									
Administration Office																									
Ice Making Plant, Ice Storage Bin																									
Workshop																									
Gear Locker																									
Shower Room / Lavatory																									
Fish Market																									
Septic Tank																									
Outdoor Works																									

8-1-7 Obligations of the Recipient Country

In the implementation of this project, St. Lucia government is required to carry out the construction work indicated below, during the period of the project.

- (1) to provide the necessary data and information for implementation of the project;
- (2) to secure land which is necessary for the site of the project prior to commencement of the construction, to secure the rights of the Department of Fisheries to construct the facilities, to secure the temporary construction yard for the construction office and concrete mixing plant in the vicinity area, and to secure promptly the rights concerning the land required for temporary construction road at Choiseul;
- (3) to construct fence and gate surrounding the fishing port area and implement landscaping and gardening works and other supplementary exterior works;
- (4) to provide connection works for distribution of electricity, water supply and drainage and other incidental facilities to the site;
- (5) to secure personnel and budget for appropriate management, operation and maintenance of buildings and equipment constructed and supplied by the project;
- (6) to bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and other payment commissions, to conclude bank agreement with a Japanese bank immediately after the Exchange of Notes (E/N) signed by the Government of Japan and the Government of St. Lucia, and to issue the authorization to Pay (A/P) toward the

mentioned bank immediately after contracting with a Japanese judicial organization or individual;

- (7) to ensure all the prompt execution for unloading, customs clearance at the ports of disembarkation and internal transportation of the products purchased under the Grant Aid;
- (8) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts;
- (9) 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 works.
- (10) to provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary;
- (11) to maintain and operate the facilities constructed and the equipment supplied by the project under full responsibility of the Department of Fisheries, Ministry of Agriculture, Forestry and Fisheries;
- (12) to sell the products purchased under the Grant Aid according to the relevant articles stipulated in Exchange of Notes;
- (13) to bear all the expenses other than those covered by the Grant Aid, necessary for the Project;
- (14) to provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary; and,
- (15) to provide immediately the necessary assistance, decisions and

judgment on matters applied by the consultant for smooth implementation of the project.

3-2 Project Cost Estimation

The cost borne by St. Lucia is estimated tentatively as follows.

Total cost will be 231,720 EC\$. Details are as follows.

Items	Soufriere		Choiseul		Total
Water supply	Water supply pipe installation to site	22,300	Water supply pipe installation to site	48,700	71,000
Electricity	Power supply cable installation to site	28,000	Power supply cable installation to site	28,000	56,000
Telephone	Telephone line installation to site	250	Telephone line installation to site	250	500
Gate, Fence	Gate and Fence	41,220	Gate and Fence	63,000	104,220
Total		91,770		139,950	231,720

3-3 Operation and Maintenance Costs

3-3-1 Administration, Operation and Maintenance System

(1) Administrative Organization

Fishery ports constructed under this Project are controlled by the Department of Fisheries and are operated and managed by the Fishery Port Administrative Committees formed by respective town and village municipalities and local fishery cooperatives. The respective fishery cooperative will carry out daily operation and maintenance of the fishing port.

(2) Administrative Staff

The following staff will be assigned with daily administration, maintenance and operation of the port facilities.

- Managing Director of Cooperative: already employed
- General Manager: already employed
- Sales Managers of fuel and ice: newly employed
- Sales Managers of shop: already employed
- Maintenance engineer: newly employed

3-3-2 Operation and Maintenance Costs

(1) Additional Operation and Maintenance Costs

Annual operation and maintenance costs in addition to the current costs required for two fishing ports at Soufriere and Choiseul implemented under this project is approximately estimated as follows.

Table 3.2.1 Additional Annual Expense for Port Administration

Item	Sub-item	Cost (EC\$)	Estimate Condition
Personnel Expense		43,200	Average Salary EC\$900.00 x 4 persons x 12 months
General Office Expense	Communication & Consumables	8,600	Personnel Expense x 20 %
Utility Costs	Water	39,800	22m ³ x EC\$4.95 x 365days
	Electricity	226,300	765KWh x EC\$0.81 x 365days
	Sub-total	266,100	
Facility Maintenance Cost	Septic Tank	7,600	Regular Maintenance 2 times/yr
	Ice Plant/Storage	10,000	
	Sub-total	17,600	
Facility Repair Cost	Lamp Bulbs	4,000	1% of electrical work cost
	Painting	25,000	5% of painting work cost
	Water / Sewage	7,500	1% of water supply/sewage cost
	Sub-total	36,500	
Total		372,000	

Chapter 4 Project Evaluation and Recommendation

4-1 Project Effect

Fisheries in St. Lucia is characterized by large seasonal fluctuations in fish catches. Some 75% of total catches are taken in the peak season from December to May and the great majority of catches consists of large migratory species, while the catches during off-season are mainly demersal species and coastal migratory fishes. Whilst there are favourable fishing grounds around St. Lucia, fishery resources have not been rationally exploited due to the lack of infrastructure facilities in landing sites and prevalence of primitive wooden canoes.

The problems confronting in Soufriere and Choiseul are in some cases common such as (i) no facilities are available for fish landing and marketing; (ii) lack of ice to maintain the freshness of fish; (iii) lack of shore facilities such as gear lockers, slipway; (iv) no facilities are available to moor and shelter boats safely. These problems compel fishermen to undergo laborious work on the beach. In Soufriere the number of full-time fishermen has been declining due to the decrease of fish landings as a result of over-exploitation of coastal resources and rising tourism industry with which fishermen gain part-time employment opportunities. In Choiseul, wooden boats do not have access to offshore fish resources despite promising offshore fishing grounds.

The present situation and the problems in the project sites as confirmed by the basic design field survey are as follows.

Soufriere

- (1) There is no shelter for fishing boats to shelter and no protection for land facilities.
- (2) Fish landing facilities were damaged by hurricanes and have not yet been rehabilitated. Thus, working environment is not favourable for fishermen.
- (3) Utilization of coastal waters is complex and the fishing area is considerably limited.
- (4) There is no ice-making and ice storage facilities and so it is difficult to maintain the freshness of fish.

Choiseul

- (1) Many boats are small wooden canoe and it is difficult to operate in offshore fishing grounds.
- (2) Choiseul is located on the south western coast and is exposed directly to the waves from the Atlantic Ocean as there are no barriers to protect. There are boulders and gravels on the shore side.
- (3) There is no refugee ports shelter nearby in case of rough weathers.
- (4) Since there is no fish landing facility, work efficiency is low. Working conditions for fishermen is bad.
- (5) The land usable for building a fish market is not available.
- (6) There are no ice making and storage facilities and therefore the freshness of fish cannot be maintained.

Whilst both sites are closely located each other, there is a sharp contract between them in respect of the structure of fishing communities and types of fishing. In Soufriere tourism is prosperous and fishermen are also engaged in side jobs. This phenomenon is in particular conspicuous among young fishermen who depart from fishing in some cases. On the other hand, Choiseul is a typical fishing village and it is an important task to modernize fishing to revitalize the fishing community. If these two sites having different characteristics are simultaneously reinforced, complementary effects could be generated as stated below.

Direct effects

(1) Soufriere

- (a) Improved efficiency can be expected in fish landing through the improvement of fish landing facilities.
- (b) Freshness of catches can be maintained through the provision of ice-making machine. Thus, the quality of fish as well as fish prices can be increased.
- (c) Working conditions of fishermen will be improved through the construction of support facilities such as workshop, gear lockers, etc.).

(2) Choiseul

- (a) The water area will be secured for fishing boats to moor safely.

Provision of FRP vessels will modernize fishing, improve productivity and facilitate the exploitation of untapped fisheries resources in offshore waters.

- (b) Calm areas will be secured in rough weathers for fishing boats to shelter.
- (c) Fish marketing functions will be strengthened through the provision of fishery infrastructures and improvement of fish landing efficiency.
- (d) Maintenance of freshness of fish will become possible through provision of an ice-making plant. This will enable to upgrade the quality of fish and increase the level of fish prices.
- (e) Working conditions of fishermen will be improved through provision of fishery support facilities such as a workshop and gear lockers.

Indirect effects

- (a) In Soufriere and Choiseul fishing communities will be established equipped with comprehensive fishery infrastructure facilities such as fish selling sheds, workshops, fishermen's conference halls, fisheries cooperatives offices, etc. This would enable them to facilitate communication among fishermen, strengthen extension services, so that fishing activities may be revitalized.
- (b) Choiseul is renowned for producing high value fish and there is already close contact between them regarding the marketing of high value fish. This relationship would be further strengthened.
- (c) The project is expected to provide quality fish to other areas other than Choiseul and Soufriere.
- (d) FRP vessels will be sold to fishermen as part of the fishery loan scheme and the money repaid by fishermen will be utilized as a revolving fund so that more fishermen may enjoy benefits.

On the basis of the above observations, there are sufficient justifications to finance the project for Soufriere and Choiseul.

4.2 Recommendations

The following recommendations are made for the management and supervision of the new facilities.

- (a) Fisheries infrastructure facilities will be managed by the fisheries cooperative under the guidance of Fisheries Department and the organizations concerned. It is recommended that standard operating procedures should be prepared as was done by Vieux Fort Fishery Complex.
- (b) Fishermen should be advised not to moor boats, after landing fish, to the wharf and jetty in order that these facilities will be effectively used.
- (c) In Soufriere fishermen should be advised to pull up boats onto the land for protection using the slipway when hurricanes approach. Fishermen having powered boats should be advised to go to nearby refugee ports.
- (d) The mooring basin within Choiseul port will be protected by the breakwaters and the water quality in the port will be easily affected by the slush drained by boats, discarded gear/nets, fish guts dumped in the port. Strict control should be enforced in this regard and septic tanks should be regularly checked.
- (e) The mooring basin in Choiseul will not be silted under normal conditions. However, siltation may occur as a result of high waves caused by hurricanes and long-period waves. Therefore, monitoring should be carried out regarding sand deposition on a regular basis, and maintenance dredging needs to be done when required.
- (f) Quality fish could be made available through provision of ice-making and storage plants. Fishermen should be encouraged to use ice under the guidance of the Department of Fisheries and the fisheries cooperative.
- (g) It is important to collect accurate data on fish catches. At present catch data are collected at 10 fishing bases out of 24 fish landing sites. It is necessary to expand the coverage of data collection sites.
- (h) Fishery extension officers will continue to provide technical guidance on fishing technology, fish handling and fishery management. Also it will be an important task for them to create awareness among fishermen of the importance of sustainable exploitation of fisheries resources.
- (i) It is necessary to foster the talent of staff of the fisheries cooperatives in order to strengthen the management of the fisheries cooperatives. In this connection appropriate guidance should be provided by the competent offices.
- (j) FRP boats, engines and fishing gear to be provided by the Project will be

sold to fishermen under the supervision of the Fisheries Department. Fishermen should be trained by JICA experts as to the use of these boats and equipment in collaboration with fisheries extension officers.

- (k) The money paid back by the borrowers who purchased boats, engines and gear should be well managed and be revolved to give benefits to other fishermen.

APPENDICES

[APPENDICES]

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Appendix-1 Member List of the Survey Team

Field Survey

Assignment	Name and Position
Leader	Mr. Hiroshi KITANI Senior Adviser, Institute for International Cooperation Japan International Cooperation Agency
Technical Advisor	Mr. Shigehiro HATANAKA Deputy Director, Fishing Grounds and Facilities Division Resources Development Department Fishing Agency
Project Coordinator	Mr. Naomichi MUROOKA Fourth Project Management Division Grant Aid Management Department Japan International Cooperation Agency
Project Manager/ Marine Engineering	Mr. Norio TANAKA ECOH CORPORATION
Fishery Facility Planning	Mr. Masao OKUI ECOH CORPORATION
Natural Condition Survey	Mr. Takahisa AOYAMA ECOH CORPORATION
Fishery Equipment Planning	Mr. Tatsuhiko TOKU ECOH CORPORATION
Construction Planning/ Cost Estimation	Mr. Masanori IKEDA ECOH CORPORATION
Fishery Marketing Planning	Mr. Masamichi HOTTA ECOH CORPORATION

Explanation of Draft Basic Design

Assignment	Name and Position
Leader	Mr. Hiromichi MURAKAMI Deputy Director, Fourth Project Management Division Grant Aid Management Department Japan International Cooperation Agency
Technical Advisor	Mr. Shigehiro HATANAKA Deputy Director, Fishing Grounds and Facilities Division Resources Development Department Fishing Agency
Cooperation Planning	Mr. Masakazu FUKUWAKA Senior Advisor, Institute for International Cooperation Japan International Cooperation Agency
Project Manager/ Marine Engineering	Mr. Norio TANAKA ECOH CORPORATION
Fishery Facility Planning	Mr. Masao OKUI ECOH CORPORATION
Fishery Equipment Planning	Mr. Tatsuhiko TOKU ECOH CORPORATION

Appendix-2 Survey Schedule

1st Field Survey

Date	Day	No. of Days	Hiroshi XIAMI	Shigehiro HATAMAKA	Hiromichi HIRAKAWA	Haruo TAKAKA	Masao OKUI	Takahisa AOYAMA	Tatsuhiko TOKU	Yasunori KEDA	Hiromichi HOTTA
			Leader	Technical Advisor	Project Coordinator	Project Manager /Marine Engineering	Fishery Facility Planning	Natural Condition Survey	Fabory Equipment Planning	Construction Planning /Cost estimation	Fishery Marketing Planning
20-Jul	Thu	1	MH010 11:00 Manila → 10:30 New York				MH010 11:00 Manila → 10:30 New York				
21-Jul	Fri	2	JM090 07:00 New York → 12:45 St Lucia Courtesy Call to the Government of St Lucia, JICA				JM090 07:00 New York → 12:45 St Lucia Courtesy Call to the Government of St Lucia, JICA				
22-Jul	Sat	3	Site Survey				Site Survey				
23-Jul	Sun	4	ditto				ditto				
24-Jul	Mon	5	Discussion								
25-Jul	Tue	6	discussion						Site Survey		
26-Jul	Wed	7	ditto						ditto		
27-Jul	Thu	8	ditto						ditto		
28-Jul	Fri	9	(AM) ditto (PM) Signature on the Minutes of Meetings						ditto		
29-Jul	Sat	10	Discussion								
30-Jul	Sun	11	BM083 8:50 St Lucia → 9:55 Port of Spain				Data Analysis				
31-Jul	Mon	12	Report to Embassy of Japan BM424 ; 17:10 Port of Spain → 22:00 New York				Site Survey				
1-Aug	Tue	13	RH009 ; 12:15 New York →				ditto				
2-Aug	Wed	14	(RH009) ; → 14:50 Manila				ditto				
3-Aug	Thu	15				ditto					
4-Aug	Fri	16				ditto					
5-Aug	Sat	17				Data Analysis					
6-Aug	Sun	18				Data Analysis					
7-Aug	Mon	19				Site Survey					
8-Aug	Tue	20				ditto					
9-Aug	Wed	21				ditto					
10-Aug	Thu	22				ditto					
11-Aug	Fri	23				Team Meeting, Data Analysis					
12-Aug	Sat	24				Data Analysis					
13-Aug	Sun	25				Site Survey					
14-Aug	Mon	26				ditto					
15-Aug	Tue	27				ditto					
16-Aug	Wed	28				Site Survey			JM091 16:15 St Lucia → 22:30 → New York	Site Survey	
17-Aug	Thu	29				ditto			RH009 12:15 New York →	ditto	
18-Aug	Fri	30				ditto			NH009 14:50 → Manila	ditto	
19-Aug	Sat	31				Team Meeting, Data Analysis					Team Meeting Data Analysis
20-Aug	Sun	32				Data Analysis					Data Analysis
21-Aug	Mon	33				Site Survey					Site Survey
22-Aug	Tue	34				ditto					Site Survey
23-Aug	Wed	35				BM083 08:50 St Lucia → 09:55 Port of Spain 11:30 Report to the Embassy of Japan BM424 17:10 Port of Spain → 22:00 New York	JM091 16:15 St Lucia → 22:30 → New York	Site Survey	JM091 16:15 St Lucia → 22:30 → New York	JM091 16:15 St Lucia → 22:30 → New York	
24-Aug	Thu	36				RH009 12:15 New York →	RH009 12:15 New York →	ditto	NH009 12:15 New York →	NH009 12:15 New York →	
25-Aug	Fri	37				MH009 → 14:50 Manila	RH009 14:50 → Manila	ditto	MH009 14:50 → Manila	MH009 14:50 → Manila	
26-Aug	Sat	38						JM091 16:15 St Lucia → 22:30 → New York			
27-Aug	Sun	39						NH009 12:15 New York →			
28-Aug	Mon	40						RH009 14:50 → Manila			

Explanation of Draft Basic Design

Date	Day	No. of Date	Official Member			Consultant		
			Hironichi MURAKAMI	Shigehiro HATANAKA	Masakazu FUKUWAKA	Norio TANAKA	Masao OKUI	Tatsuhiko TOKU
			Leader	Technical Advisor	Cooperation Planning	Project Manager /Marine Engineering	Fishery Facility Planning	Fishery Equipment Planning
3-Nov	Fri	1	Study at Dominica	NH010:11:00 Narita →9:15 New York	Study at Dominica	NH010:11:00 Narita →9:15 New York		
4-Nov	Sat	2	Study at Dominica	JM090:07:00 New York →13:55 St. Lucia	Study at Dominica	JM090:07:00 New York →13:55 St. Lucia		
5-Nov	Sun	3	LI333:7:50 Dominica→8:50 St. Lucia Site Survey	Site Survey	LI333:7:50 Dominica→8:50 St. Lucia Site Survey	Site Survey		
6-Nov	Mon	4	Courtesy Call to the Government of St. Lucia and Discussion					
7-Nov	Tue	5	Discussion with Government of St. Lucia			Discussion with Government of St. Lucia		
8-Nov	Wed	6	Discussion with Government of St. Lucia			Discussion with Government of St. Lucia		
9-Nov	Thu	7	Discussion and Signature on the Minutes of Meeting BW841:19:50Castries→21:45 Port of Spain			Discussion and Signature on the Minutes of Meeting BW841:19:50Castries→21:45 Port of Spain		
10-Nov	Fri	8	Report to Embassy of Japan BW424 : 17:50 Port of Spain→21:45 New York			Report to Embassy of Japan BW424 : 17:50 Port of Spain→21:45 New York		
11-Nov	Sat	9	NH009:11:10 New York→			NH009:11:10 New York→		
12-Nov	Sun	10	→14:50 Narita			→14:50 Narita		

Appendix-3 List of Parties Concerned in the Recipient Country

Prime Minister and Minister of Finance

Hon. Kenny D. Anthony	Prime Minister and Minister of Finance
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Ministry of Agriculture, Forestry and Fisheries

Hon. Cassius B. Elias	Minister
Dr. James Fletcher	Permanent Secretary
Mr. Horace D. Walters	Chief Fisheries Officer
Mr. Vaughn Charles	Deputy Chief Fisheries Officer
Ms. Pastry Harewood	Senior Administrative Officer
Mr. Rufus George	Senior Fisheries Extension Officer
Ms. Sarah George	Fisheries Biologist

Ministry of Foreign Affairs

Hon. Dr. George Odlum	Minister
-----------------------	----------

Ministry of Planning, Development, Environmental and Building

Hon. Dr. Walter Francois	Minister
Mr. Herald Nicholas	Chief Architect
Mr. Michael Gittens	Economist
Mr. Fadlien Vincent	Surveyor

Ministry of Communications and Works

Mr. Regis	Chief Metrological Officer
Mr. Thomas Auguste	Metrological Officer

Soufriere Fisheries Cooperative

Mr. Edward Mongson	President
Mr. Alexis Julian	Manager

Choisel Fisheries Cooperative

Mr. Eusebe A Lawrence	President
Ms. Aurelia Theodora	Manager

JICA Expert

Mr. Shin Sasao	JICA Expert
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**MINUTES OF DISCUSSIONS
ON
THE BASIC DESIGN STUDY
ON
THE PROJECT FOR COASTAL FISHERIES DEVELOPMENT
IN
SAINT LUCIA**

In response to a request from the Government of Saint Lucia (hereinafter referred to as "the Government of St. Lucia"), the Government of Japan decided to conduct a Basic Design Study on the project for Coastal Fisheries Development (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to the St. Lucia the basic design study team (hereinafter referred to as "the Team"), which is headed by Mr. Hiroshi KITANI, Senior Adviser, Institute for International Cooperation, JICA, and is scheduled to stay in the country from 21 July to 26 August, 2000.

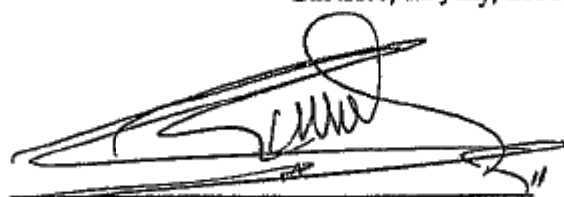
The Team held discussions with the officials concerned of the Government of St. Lucia and conducted a field survey at the study area.

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

Castries, 28 July, 2000



Mr. Hiroshi KITANI
Leader
Basic Design Study Team
JICA



Mr. Hon. Cassius B. Elias
Minister
Ministry of Agriculture, Forestry and
Fisheries

ATTACHMENT

1. Objective

The objective of the Project is

- (1) to construct appropriate fisheries infrastructure and supply facilities and equipments in Soufriere and Choiseul, which have been left undeveloped, though they were major fish landing sites,
- (2) to rehabilitate fisheries activity which was badly damaged by hurricane,
- (3) to provide safe mooring area to promote the transition of the boats from canoe to FRP boat, and modernize the fisheries activities in order to improve productivity in Choiseul,
- (4) to provide basic landing facility for efficient fisheries activity in Soufriere.

2. Project Site

The site of the Project is located at Soufriere and Choiseul, shown in Annex-1.

3. Responsible and Implementing Agency

- 3-1. The Responsible Agency is the Ministry of Agriculture, Forestry and Fisheries.
- 3-2. The Implementing Agency is the Department of Fisheries(hereinafter referred to as "the DOF").

4. Items requested by the Government of St. Lucia

After discussions with the Team, the items described in Annex-2 were finally requested by St. Lucia side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

5. Items to be studied in Japan

- 5-1. St. Lucia side understood that while St. Lucia requested the fishing ports enclosure with ramp as the most important components in this Project, Japan side would conduct further study on its feasibility and the necessity after coming back to Japan based on the results of the consultant's survey.
- 5-2. As to the construction road in Choiseul, consultants will study the necessity continuously and bring its result to Japan.
- 5-3. As to the insulated cars, St. Lucia side explained that they will be owned by the Government of St. Lucia and assigned to fisheries cooperatives in the Project sites for the purpose of distributing fish and ice. Consultants will study the necessity continuously and bring its result to Japan.

6. Japan's Grant Aid System

- 6-1. St. Lucia side has understood the Japan's Grant Aid Scheme explained by the Team, as described in Annex-3.
- 6-2. St. Lucia side will take the necessary measures, as described in Annex-4, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

7. Counterpart Fund

- 7-1. St. Lucia side understood that in case of selling or lease-to-own arrangement for procured components, Government of St. Lucia is obliged to open a bank

account and deposit local currency equivalent to the FOB value of the procured equipment & materials within a period of 4 years from the date of the signing of the E/N (Exchange of Notes). The fund is called the "counterpart fund" and it is to be used for the purpose of fisheries development in the St. Lucia.

7-2. The St. Lucia side understood the system of 'counterpart fund' and made a definite promise to execute it by their own responsibility.

7-3. In relation to the revolving fund, both sides agreed that consultants will investigate the assurance of introduction of FRP boats and the fishing gear(long line).

7-4. The St. Lucia side explained the system of selling the equipment procured under the Japan's Grant Aid and the way of deposit as the following;

Selling : The equipment will be sold at the price decided by the cabinet of St. Lucia to the fishermen in Choiseul.

Deposit : The deposit which is equivalent to the FOB value of whole equipment will be made in the DOF's account in St. Lucia Development Bank within three months.

8. Schedule of the Study

8-1. The consultants will proceed to further works in St. Lucia until 26 August, 2000.

8-2. JICA will prepare the draft report in English and dispatch a mission in order to explain its contents around October, 2000.

8-3. In case of that the contents of the report is accepted in principle by the Government of St. Lucia, JICA will complete the final report and send it to the Government of St. Lucia around February, 2001.

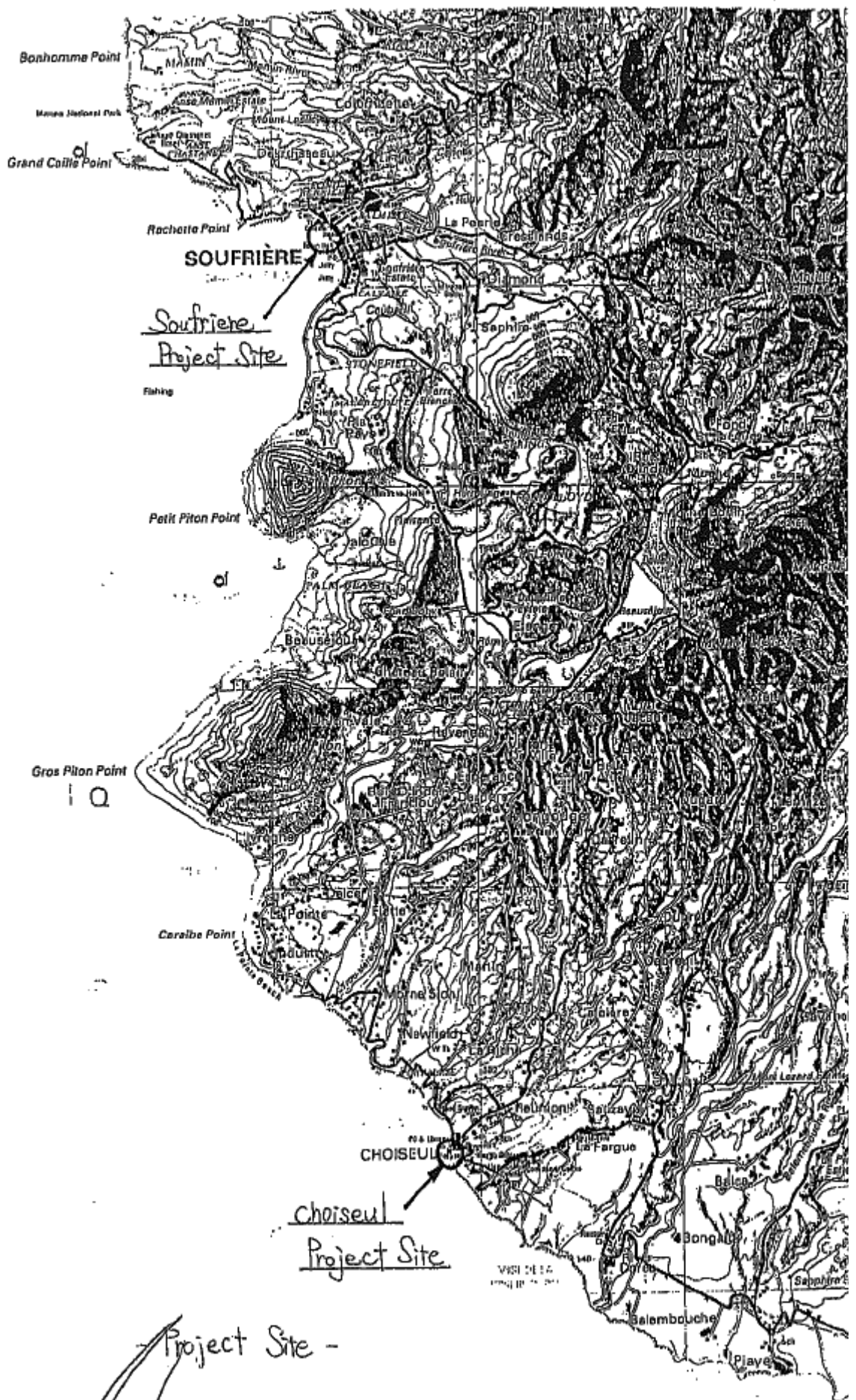
8-4. In case of that change of the schedule mentioned above is needed for longer and more careful investigation, JICA will inform it to the Government of St. Lucia as soon as possible.

9. Other relevant issues

9-1. The St. Lucia side agreed to allocate the budget necessary to operate and properly maintain the equipment and facility provided under the Grant Aid for the Project.

9-2. The St. Lucia side agreed that it will be responsible for the management, administration, financial and personnel matters, which are not covered by Japan's Grant Aid, for the Project.

9-3. The Project site shown in Annex-1 doesn't require legal procedures for acquiring the right of land-use since the site is a public land.



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Project Site -

Items requested by the Government of St. Lucia

Soufriere

Fisheries Administration Office (for Department of Fisheries, Fisheries
Cooperative and Retail outlet for fishing gear, spares)
Ice-making equipment (including storage)
Fish cart
Fish box
Workshop for nets, gear and engine repairs
Gear lockers
Shower and toilets
Fish market (including stalls)
Gas facility (only space)
Jetty and ramp
Back up generators
Septic tank -
2 sets of computers and printers

[Insulated car]

Choiseul

Fisheries Administration Office (for Department of Fisheries, Fisheries
Cooperative and Retail outlet for fishing gear, spares)
Ice-making equipment (including storage)
Fish cart
Fish box
Workshop for nets, gear and engine repairs
Gear lockers
Shower and toilets
Fish market (including stalls)
Gas facility (only space)
20 units of FRP vessels with 85 HP outboard engines and fishing gears (long line)
Back up generator
Septic tank
2 sets of computers and printers

[Fishing ports enclosure with ramp including reclamation work]

[Construction road]

[Insulated car]

* Items in [] will be continuously studied in Japan.

Japan's Grant Aid Program

1. Japan's Grant Aid Procedures

- (1) The Japan's Grant Aid Program is executed by the following procedures.

Application (Request made by a recipient country)

Study (Preparatory Study / Basic Design Study conducted by JICA)

Appraisal & Approval (Appraisal by the Government of Japan and

Approval by the Cabinet of Japan)

Determination of Implementation (Exchange of Notes between the both Governments)

Implementation (Implementation of the Project)

- (2) Firstly, an application or a request for a project made by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to see whether or not it is suitable for Japan's Grand Aid. If the request is deemed suitable, the Government of Japan entrusts a study on the request to JICA (Japan International Cooperation Agency).

Secondly, JICA conducts the Study (Basic Design Study), using a Japanese consulting firm. If the background and objective of the requested project are not clear, a Preparatory Study is conducted prior to a Basic Design Study.

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 approved by the Cabinet becomes official when pledged by the Exchange of Notes signed by the both Governments.

Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.

2. Contents of the Study

- (1) Contents of the Study

The purpose of the Study (Preparatory Study/Basic Design Study) conducted on a project requested by JICA is to provide a basic document necessary for appraisal of the project by the Japanese Government. The contents of the Study are as follows:

- a) to confirm background, objectives, benefits of the project and also institutional capacity of agencies concerned of the recipient country necessary for project implementation,
- b) to evaluate appropriateness of the Project for the Grant Aid Scheme from

- a technical, social and economical point of view,
- c) to confirm items agreed on by the both parties concerning a basic concept of the project,
 - d) to prepare a basic design of the project,
 - e) to estimate cost involved in the project.

Final project components are subject to approval by the Government of Japan and therefore may differ from an original request.

Implementing the project, the Government of Japan requests the recipient country to take necessary measures involved which are itemized on Exchange of Notes.

(2) Selecting (a) Consulting Firm(s)

For smooth implementation of the study, JICA uses (a) consulting firm(s) registered. JICA selects (a) firm(s) through proposals submitted by firms which are interested. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference made by JICA.

The consulting firm(s) used for the study is (are) recommended by JICA to a recipient country after Exchange of Notes, in order to maintain technical consistency.

(3) Status of a Preparatory Study in the Grant Aid Program

A Preparatory Study is conducted during the second step of a project formulation & preparation as mentioned above.

A result of the study will be utilized in Japan to decide if the Project is to be suitable for a Basic Design Study

Based on the result of the Basic Design Study, the Government would proceed to the stage of decision making process (appraisal and approval) .

It is important to notice that at the stage of Preparatory Study, no commitment is made by the Japanese side concerning the realization of the Project in the scheme of Grant Aid Program.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non reimbursable funds needed to procure facilities, equipment and services for economic and social development of the country under the following principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not in a form of donation or such.

(2) Exchange of Notes (E/N)

The Japan's Grant Aid is extended in accordance with the Exchange of Notes by both Governments, in which the objectives of the Project, period of execution, conditions and amount of the Grant etc. are confirmed.

(3) "The period of the Grant Aid" means one Japanese fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedure such as Exchange of Notes, concluding a contract with (a) consulting firm(s) and (a) contractor(s) and a final payment to them must be completed.

(4) Under the Grant, in principle, products and services of origins of Japan or the recipient country are to be purchased.

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

However the prime contractors, namely, consulting, contractor and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons.)

(5) Necessity of the "Verification"

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

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

In the implementation of the Grant Aid, the recipient country is required to undertake necessary measures such as the following:

- a) to secure land necessary for the sites of the project and to clear and level the land prior to commencement of the construction work,
- b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
- c) to secure buildings prior to the installation work in case the Project is providing equipment,
- d) to ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,
- e) to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,
- f) 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.

(7) Proper Use

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

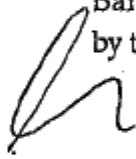
(8) Re-export

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 shall open an account in the name of the Government of the recipient country in a 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 Government of the recipient country or its designated authority under the contracts verified.

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 the recipient country or its designated authority.



Major Undertakings to be taken by Each Government

NO	Items	To be covered by Grant Aid	To be covered by Recipient side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the building	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and/or elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		●
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4) Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame / panel (MDF) of the building		●
	b. The MDF and the extension after the frame / panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
8	To bear the following commissions to a bank of Japan for the banking services based upon the B / A		
	1) Advising commission of A / P		●
	2) Payment commission		●
9	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)

10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
11	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 contract		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
13	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

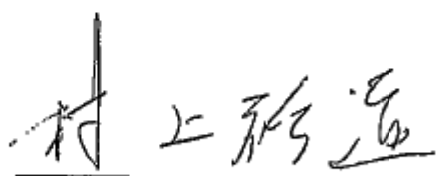
MINUTES OF DISCUSSIONS
ON
THE BASIC DESIGN STUDY
ON
THE PROJECT FOR COASTAL FISHERIES DEVELOPMENT
IN
SAINT LUCIA
(CONSULTATION ON THE DRAFT REPORT)

In July 2000, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Basic Design Study Teams on the Project for Improvement of Coastal Fisheries Development in Saint Lucia (hereinafter referred to as "the Project"), and through discussions, site surveys, and technical examination of the results in Japan, has prepared the draft report of the study.

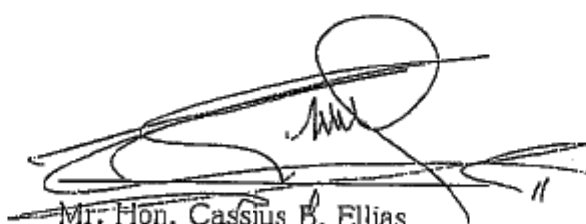
In order to explain and to consult Saint Lucia side on the components of the draft report, JICA sent to Saint Lucia the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Hiromichi MURAKAMI, Deputy Director, Fourth Project Management Division, Grant Aid Department, JICA, from 6 November to 9 November, 2000.

As a result of discussions, both sides have confirmed the main items described on the attached sheets.

Castries, 9 November, 2000



Mr. Hiromichi MURAKAMI
Leader
Basic Design Study Team
Japan International Cooperation Agency



Mr. Hon. Cassius B. Elias
Minister
Ministry of Agriculture, Forestry and Fisheries

ATTACHMENT

1. Components of the draft report

The Government of St. Lucia agreed and accepted the components of the draft report explained by the Team.

2. Japan's Grant Aid System

The Government of St. Lucia understands the Japan's Grant Aid Scheme as explained by the Team and will take the necessary measures described in Annex 3 signed on 28th July 2000 as the minutes of discussions of the basic design study, on condition that the Grant Aid by the Government of Japan is extended to the Project.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed items and send it to the Government of St. Lucia around January 2001.

4. Other Relevant Issues

4-1. Counterpart Fund

4-1-1. The Government of St. Lucia understood that in case of selling or lease-to-own arrangement for procured components, the Government of St. Lucia is obliged to open a bank account and deposit local currency equivalent to the FOB value of the procured equipment and materials within a period of 4 years from the date of the signing of the Exchange of Notes. The fund is called "counterpart fund" and it is to be used for the purpose of fisheries development in the St. Lucia.

4-1-2. The Government of St. Lucia understood the system of "counterpart fund" and made a definite promise to execute it by their own responsibility.

4-1-3. The Government of St. Lucia understood that the counterpart fund is utilized with authorization of the Government of Japan in advance.

4-1-4. The Government of St. Lucia explained the system of selling the equipment procured under the Japan's Grant Aid and the way of deposit as the following:

Selling : The equipment will be sold at the price decided by the Cabinet of St. Lucia to the fishermen in Choiseul.

Deposit : The deposit which is equivalent to the FOB value of whole equipment will be made in the Department of Fisheries' account in St. Lucia Development Bank within three months.

4-2. Gear Lockers in Soufriere

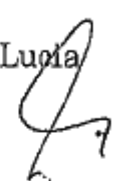
The Government of St. Lucia requested that the number of gear lockers in Soufriere should be changed to 40.

4-3. Meeting Rooms

The Government of St. Lucia requested that the design of meeting rooms in both sites should be modified with walls. However, it was not accepted by the Team.

4-4. Fish Market

Layout in fish markets in both sites was discussed between the Government of St. Lucia and the Team.



Appendix-5.1 Natural Condition Survey Points

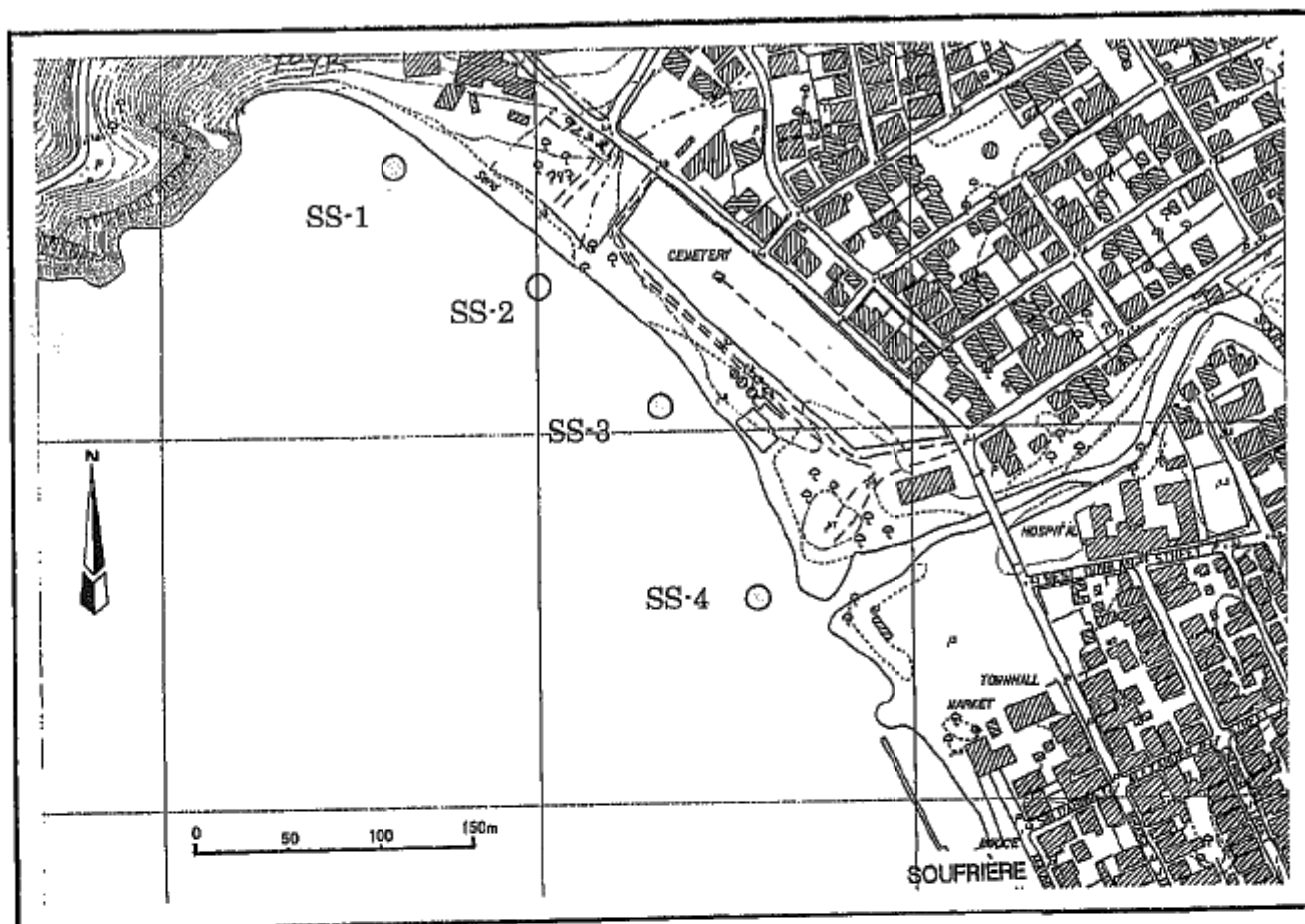


Figure A5.1-1 Sediment Quality Sampling Points at Soufriere

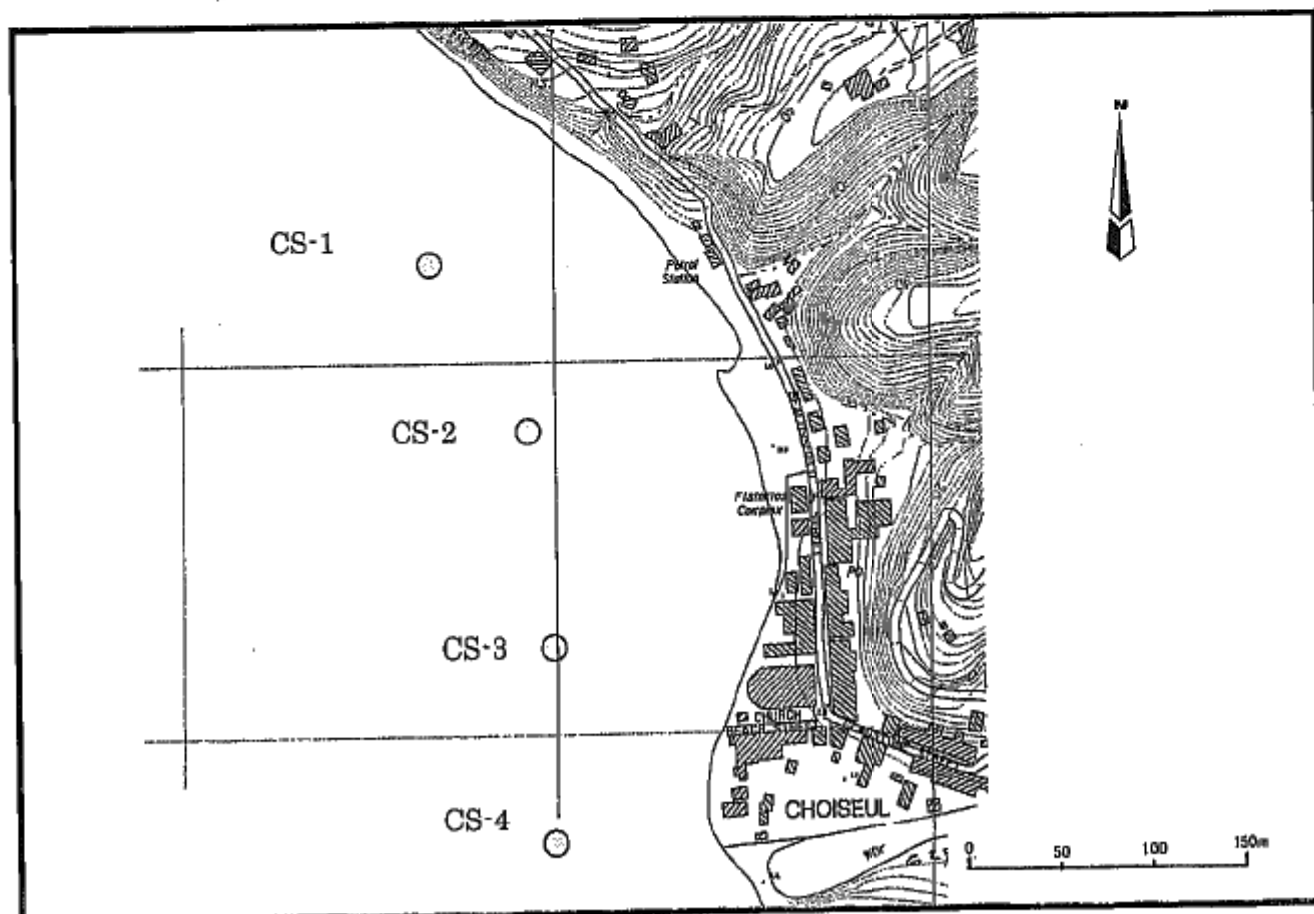


Figure A5.1-2 Sediment Quality Sampling Points at Choiseul

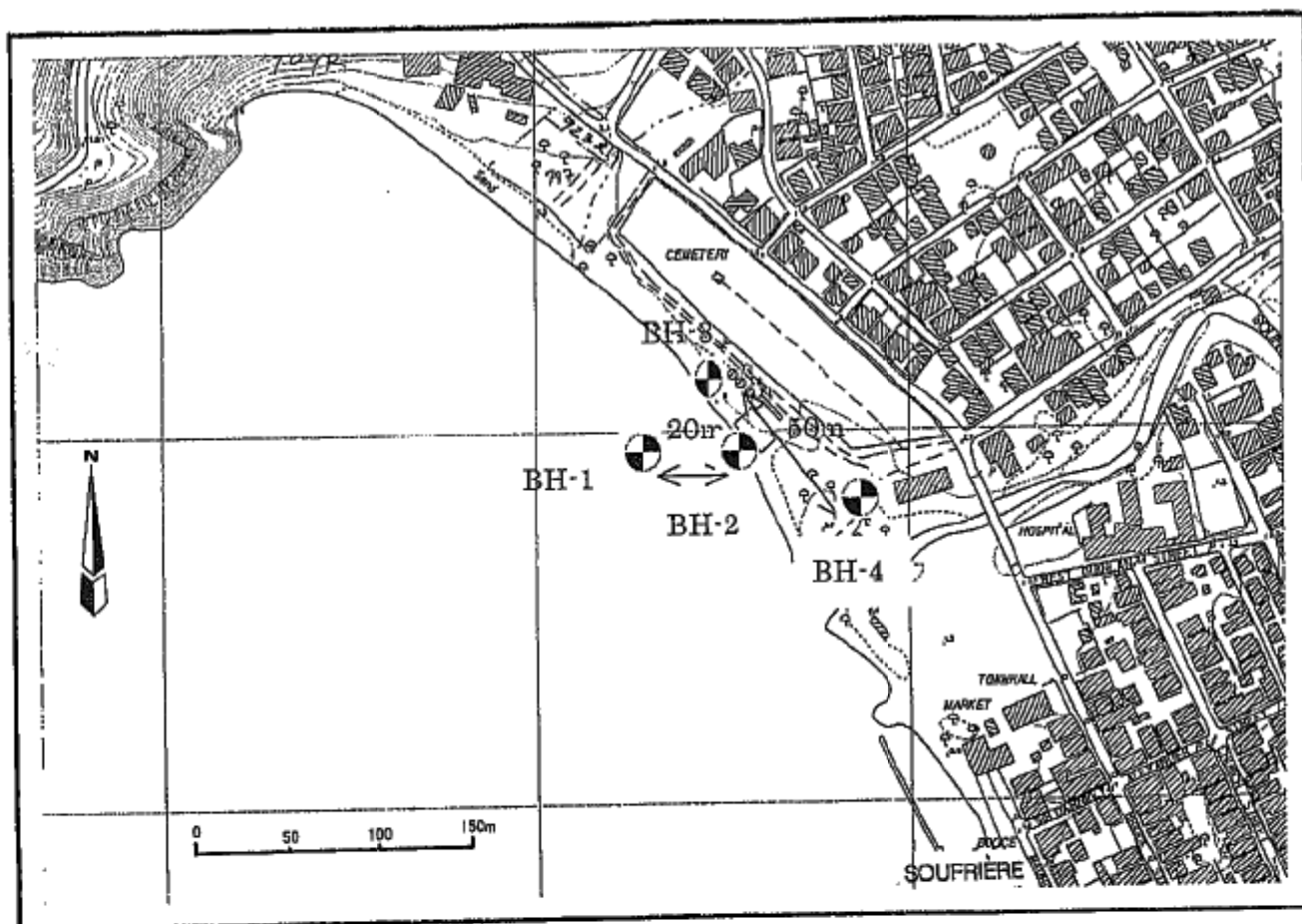


Figure A5.1-3 Soil Investigation Points at Soufriere

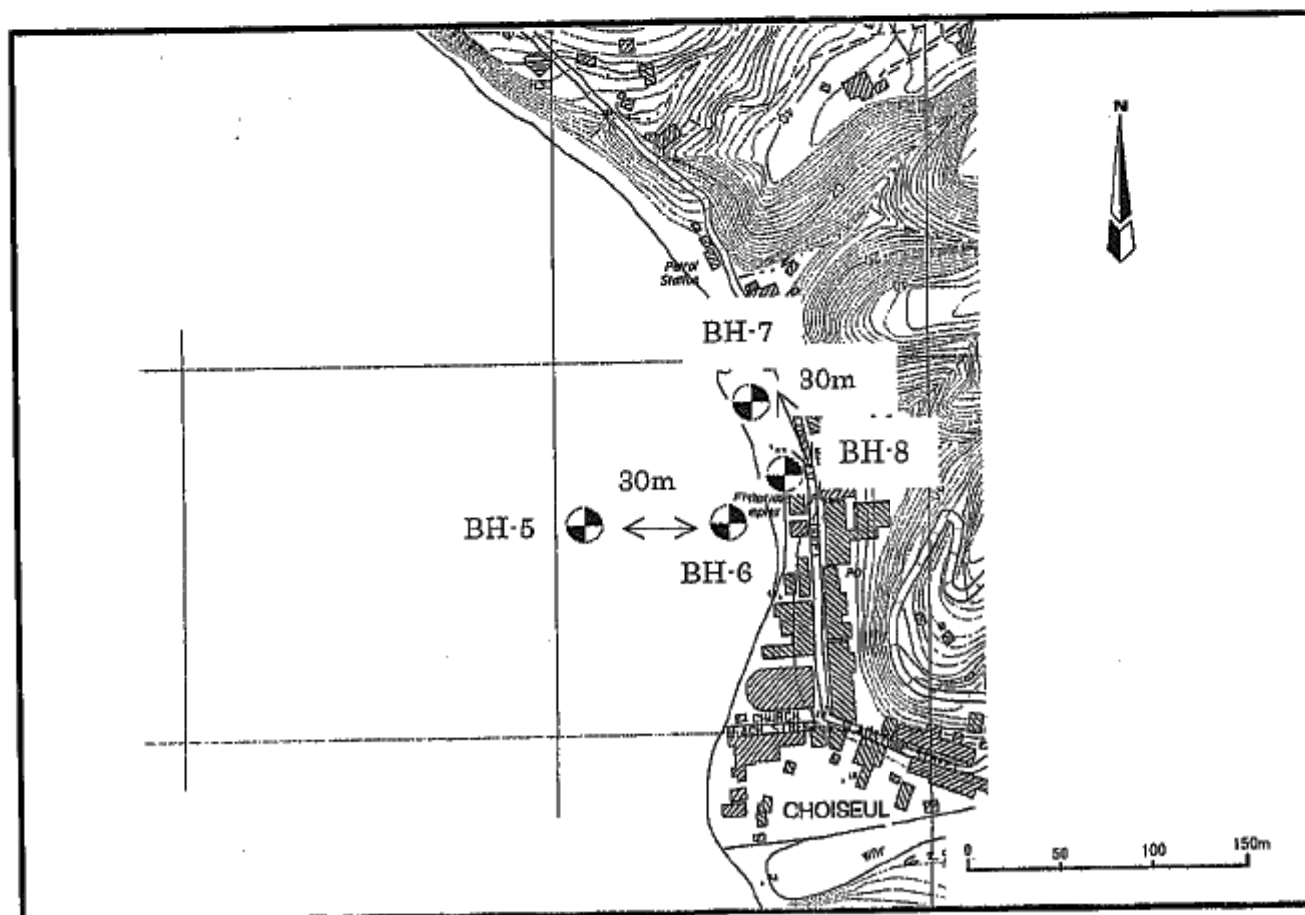


Figure A5.1-4 Soil Investigation Points at Choiseul

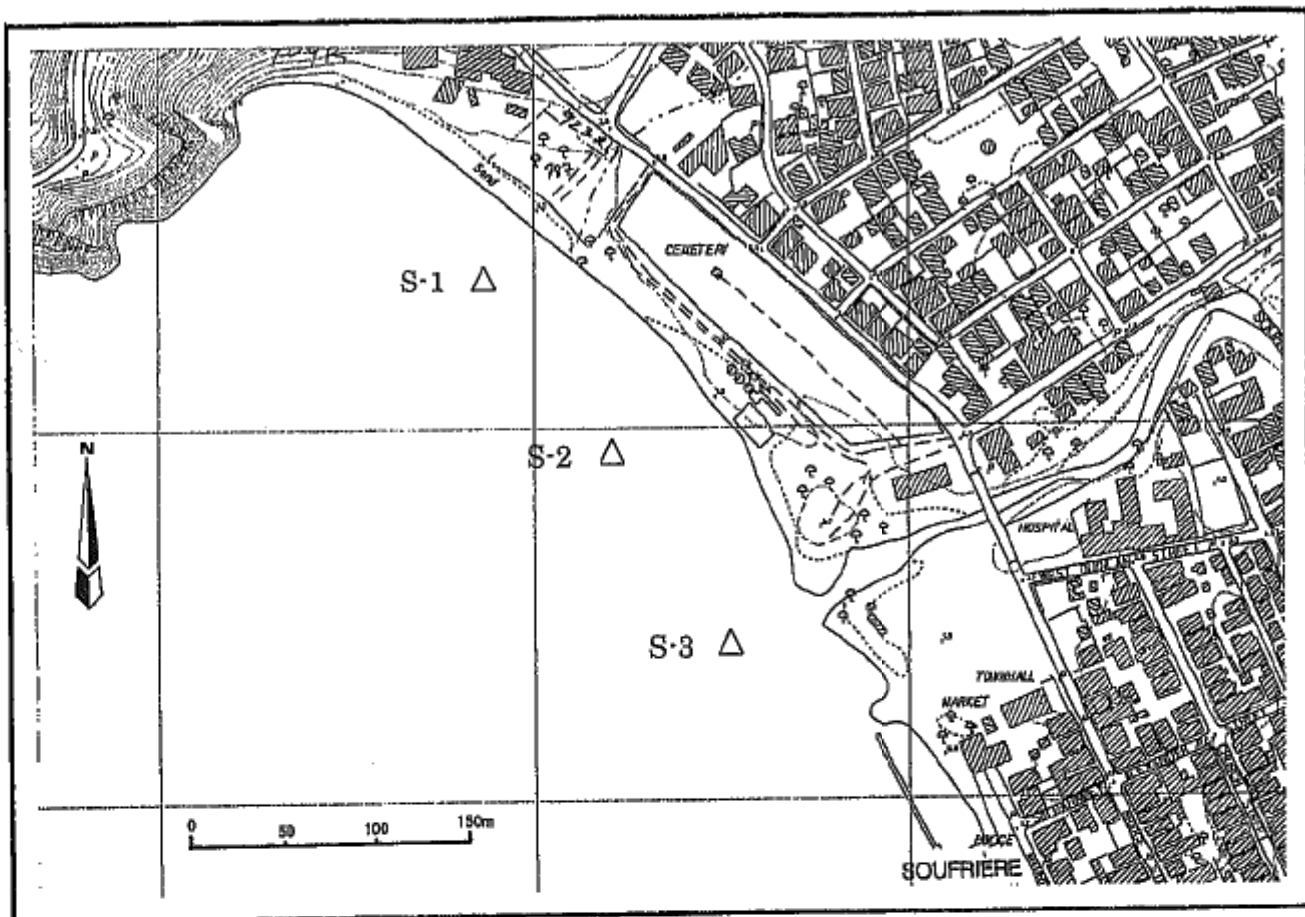


Figure A5.1-5 Water Quality Sampling Points at Soufriere

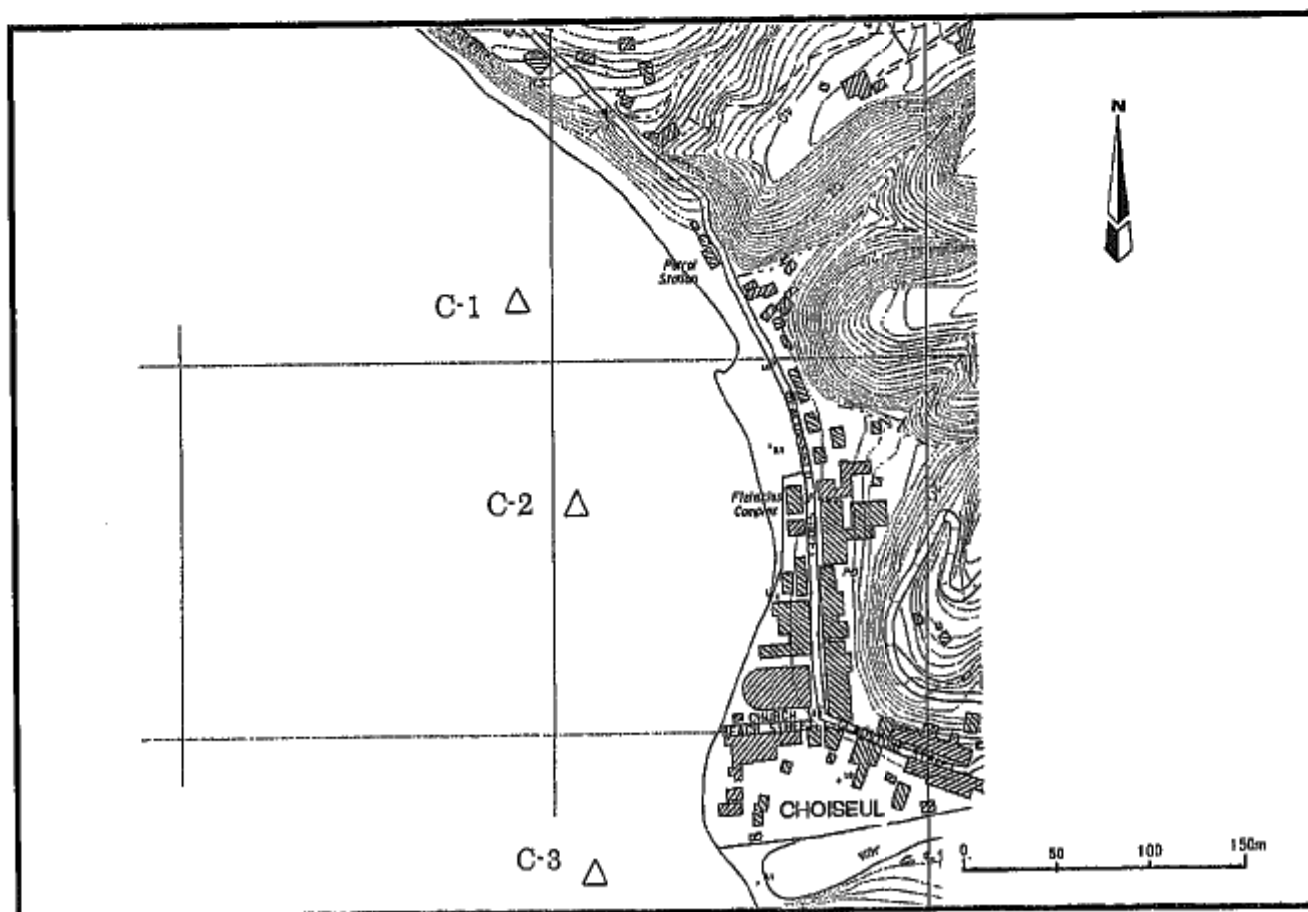
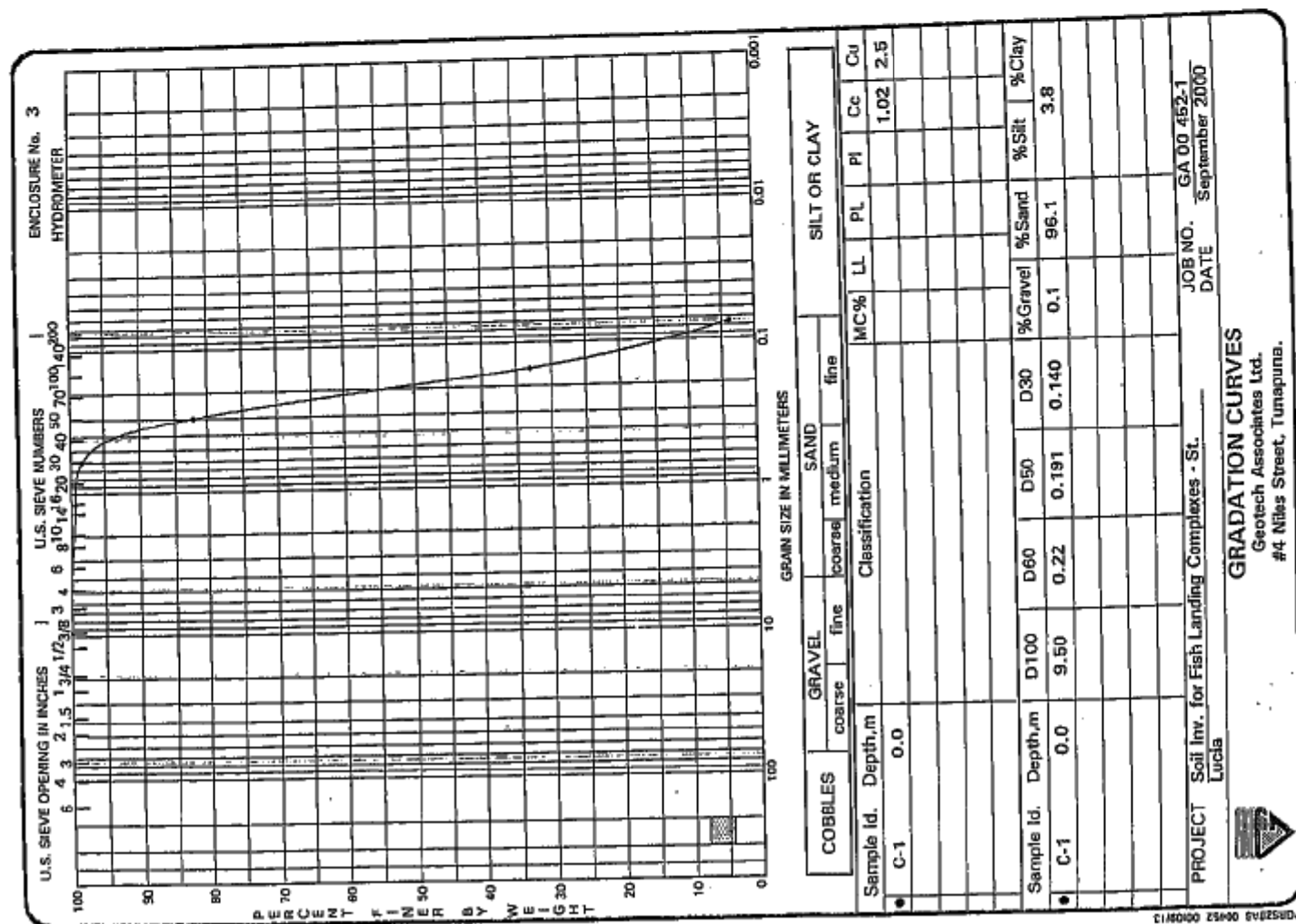


Figure A5.1-6 Water Quality Sampling Points at Choiseul

Appendix-5.2 Result of Sediment Quality Survey



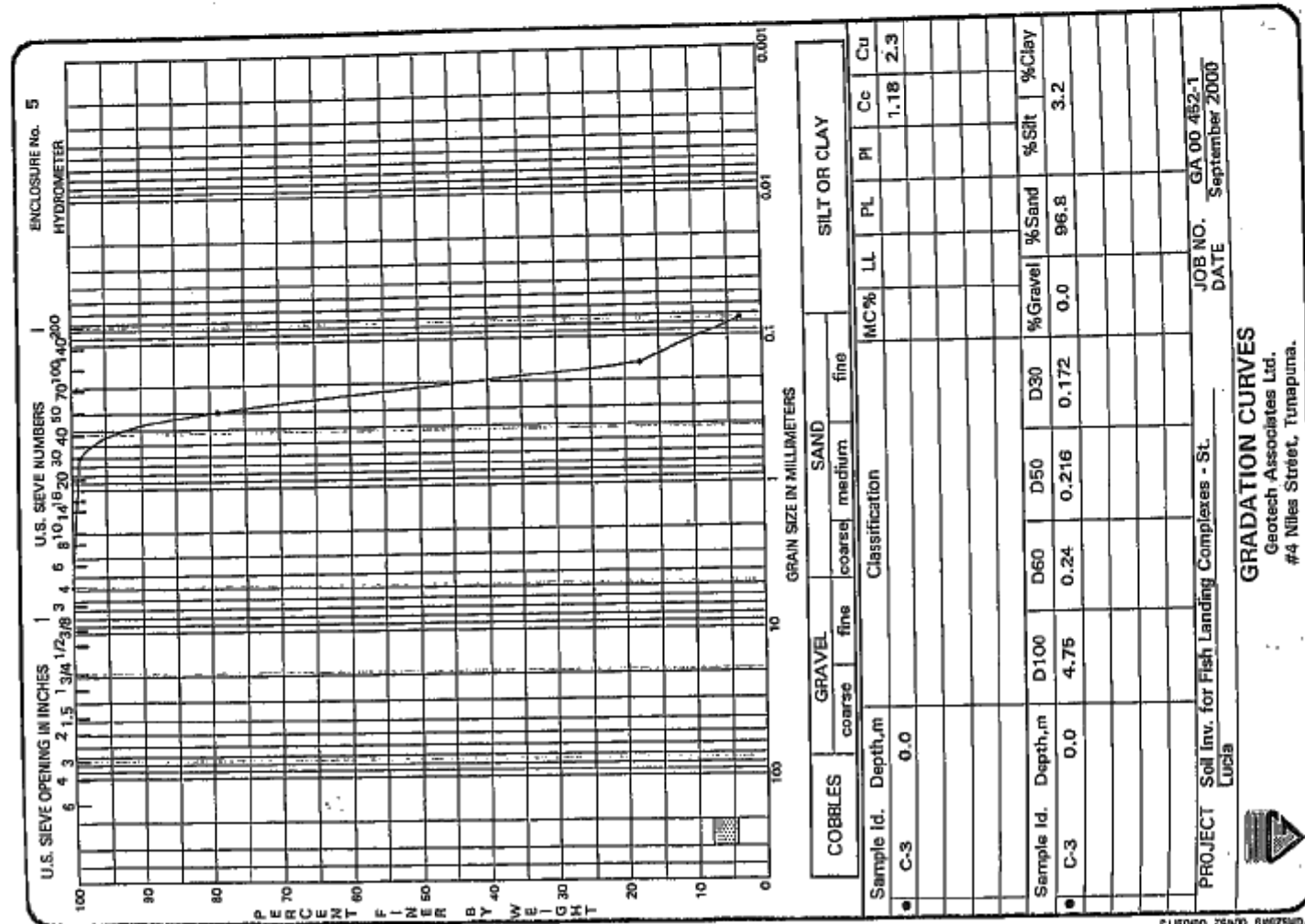


Figure A5.2-3 Gradation Curves of Sediment at Soufriere (C-3)

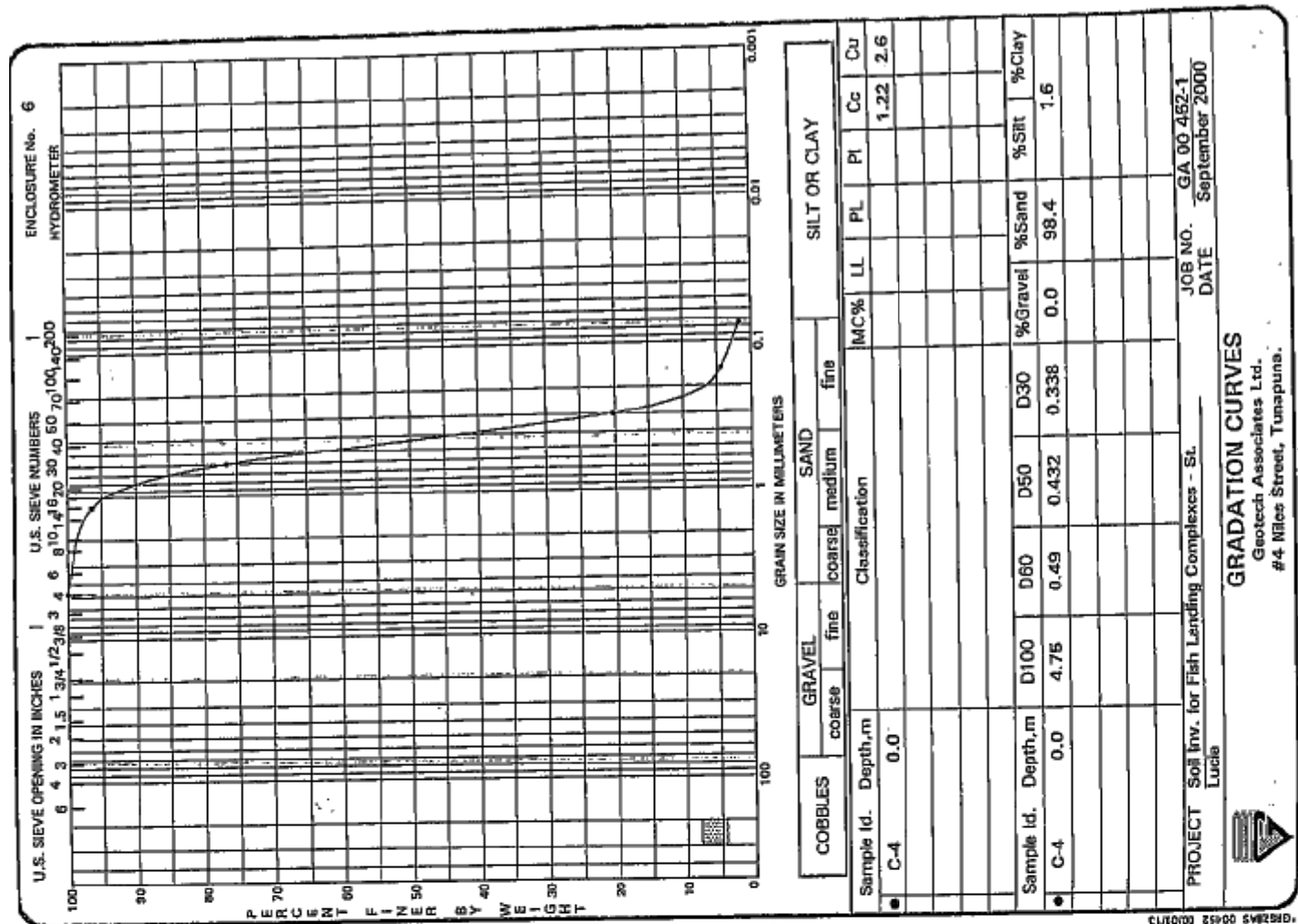
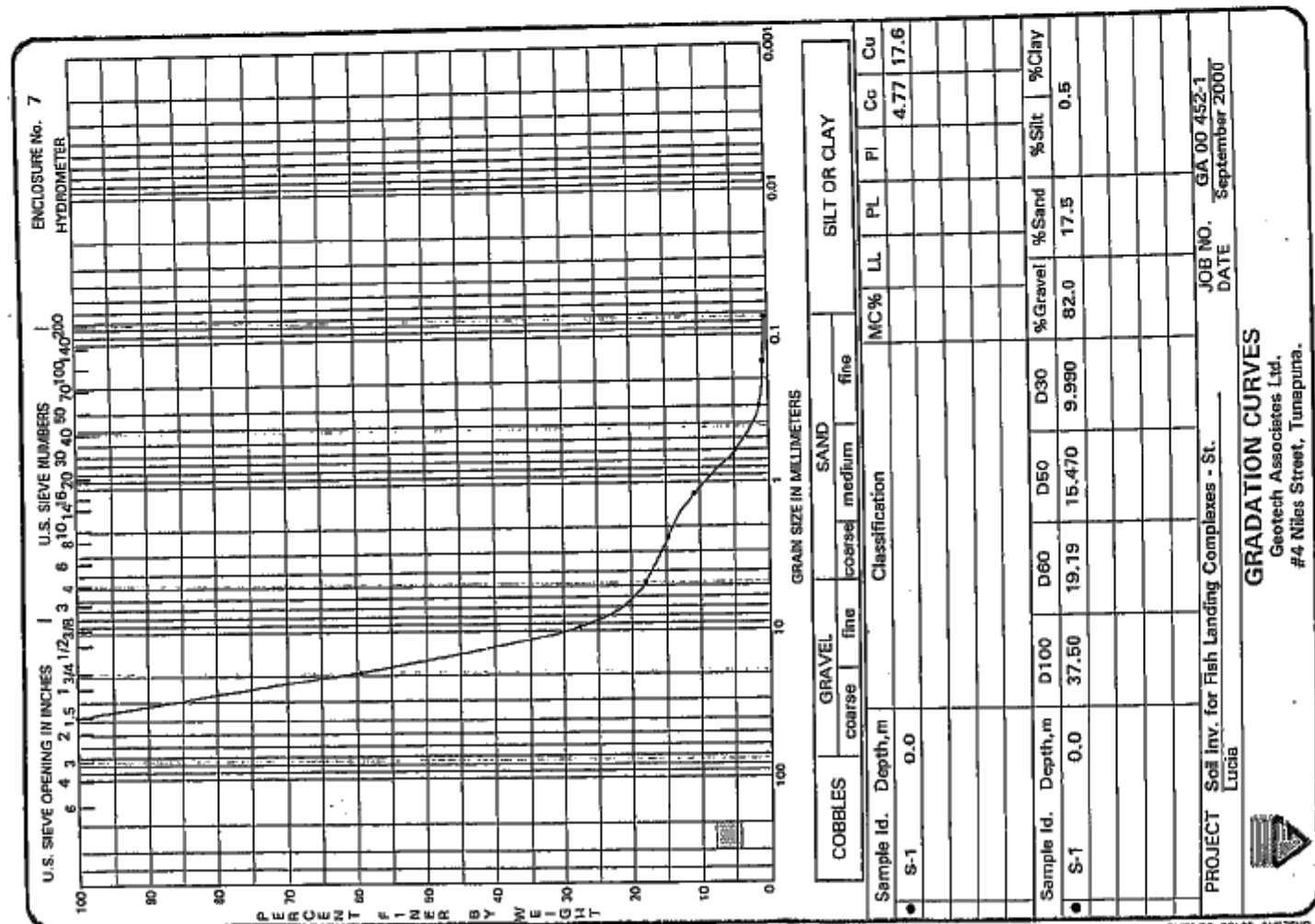


Figure A5.2-4 Gradation Curves of Sediment at Soufriere (C-4)



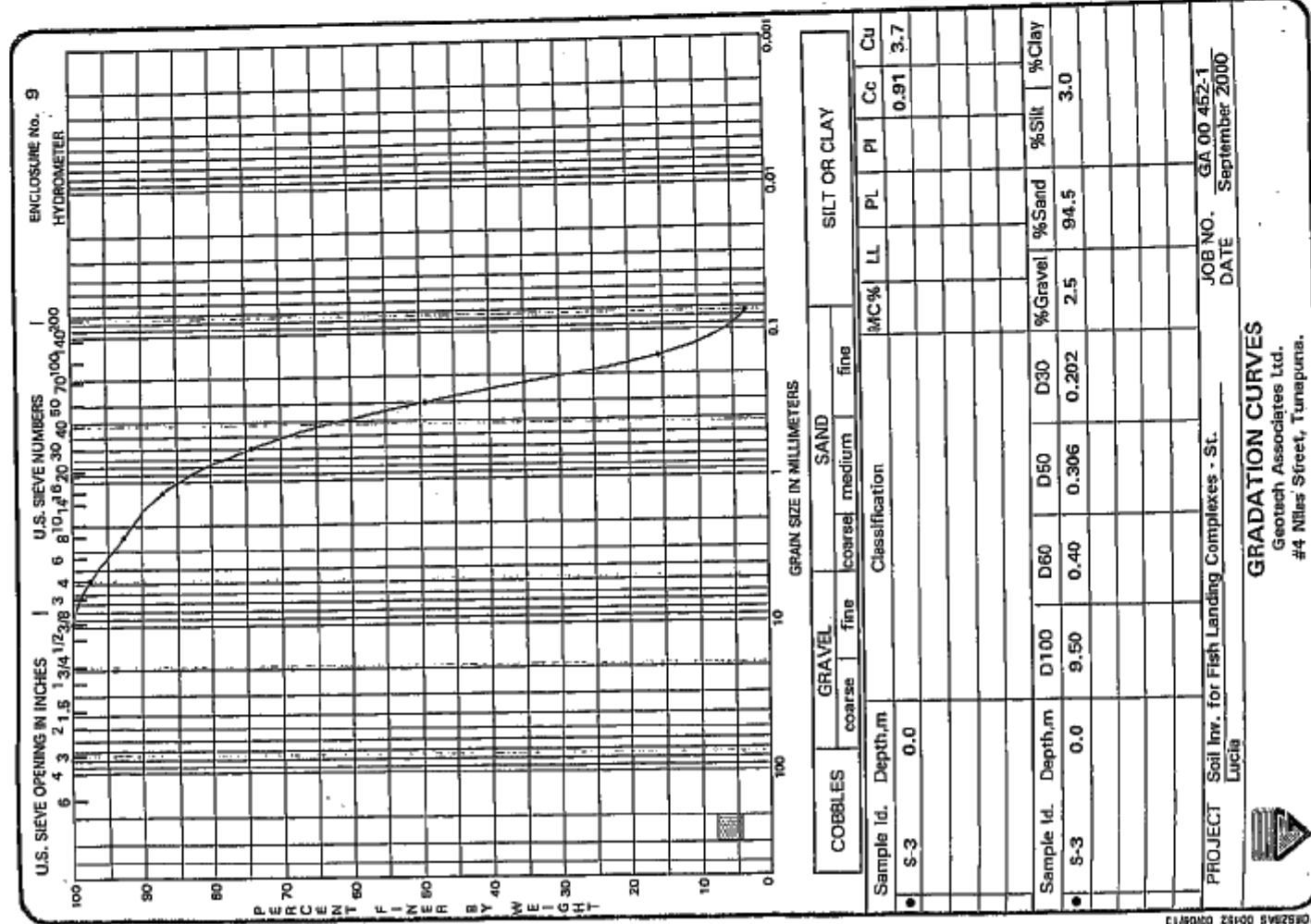


Figure A5.2-7 Gradation Curves of Sediment at Choiseul (S-3)

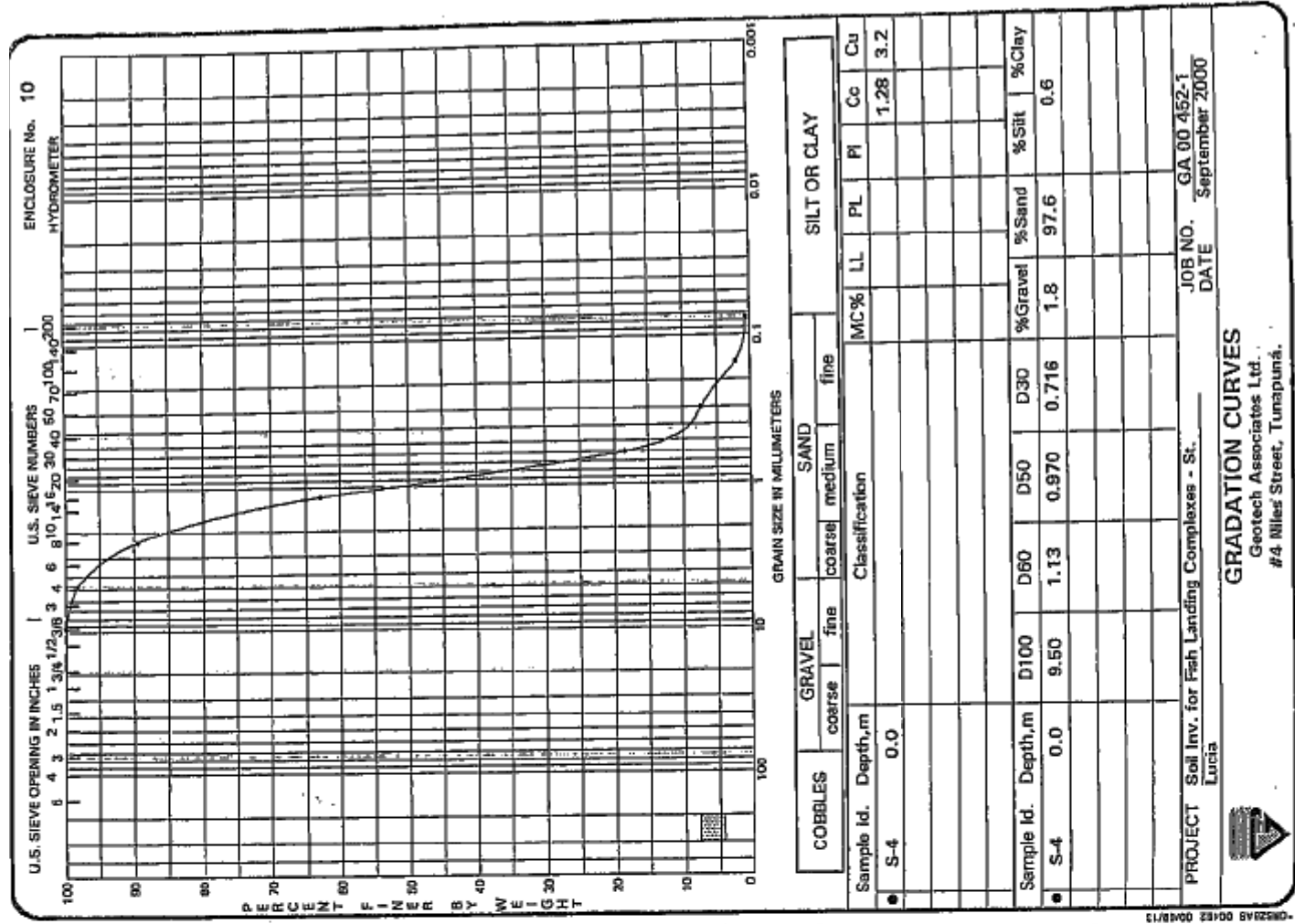


Figure A5.2-8 Gradation Curves of Sediment at Choiseul (S-4)

Appendix-5.3 Result of Water Quality Survey

Table A5.3 Result of Water Quality Survey

Soufriere

Sampling July 27, 2000

Sampling Point	Time	PH	Temp. (°C)	DO (mg/l)	SS (mg/l)	COD (mg/l)
S-1	9:40 Low tide	8.13	28.3	6.2	26.1	810
S-2	9:50 Low tide	8.16	28.6	6.8	39.3	750
S-3	10:00 Low tide	8.17	28.4	6.6	41.4	800
S-1	13:42 High tide	8.14	29.2	7.2	25.7	1040
S-2	13:37 High tide	8.13	29.3	6.8	48.7	1270
S-3	13:30 High tide	8.10	29.5	7.2	31.0	760

Choiseul

Sampling July 27, 2000

Sampling Point	Time	PH	Temp. (°C)	DO (mg/l)	SS (mg/l)	COD (mg/l)
C-1	10:45 Low tide	8.16	29.1	6.6	24.4	770
C-2	10:35 Low tide	8.14	29.7	6.8	31.5	750
C-3	10:25 Low tide	8.14	28.6	6.7	34.6	860
C-1	13:05 High tide	8.13	29.0	7.0	23.9	900
C-2	13:00 High tide	8.12	29.2	7.7	26.7	800
C-3	12:55 High tide	8.13	29.0	7.0	30.6	760

Appendix-5.4 Result of Topographical Survey

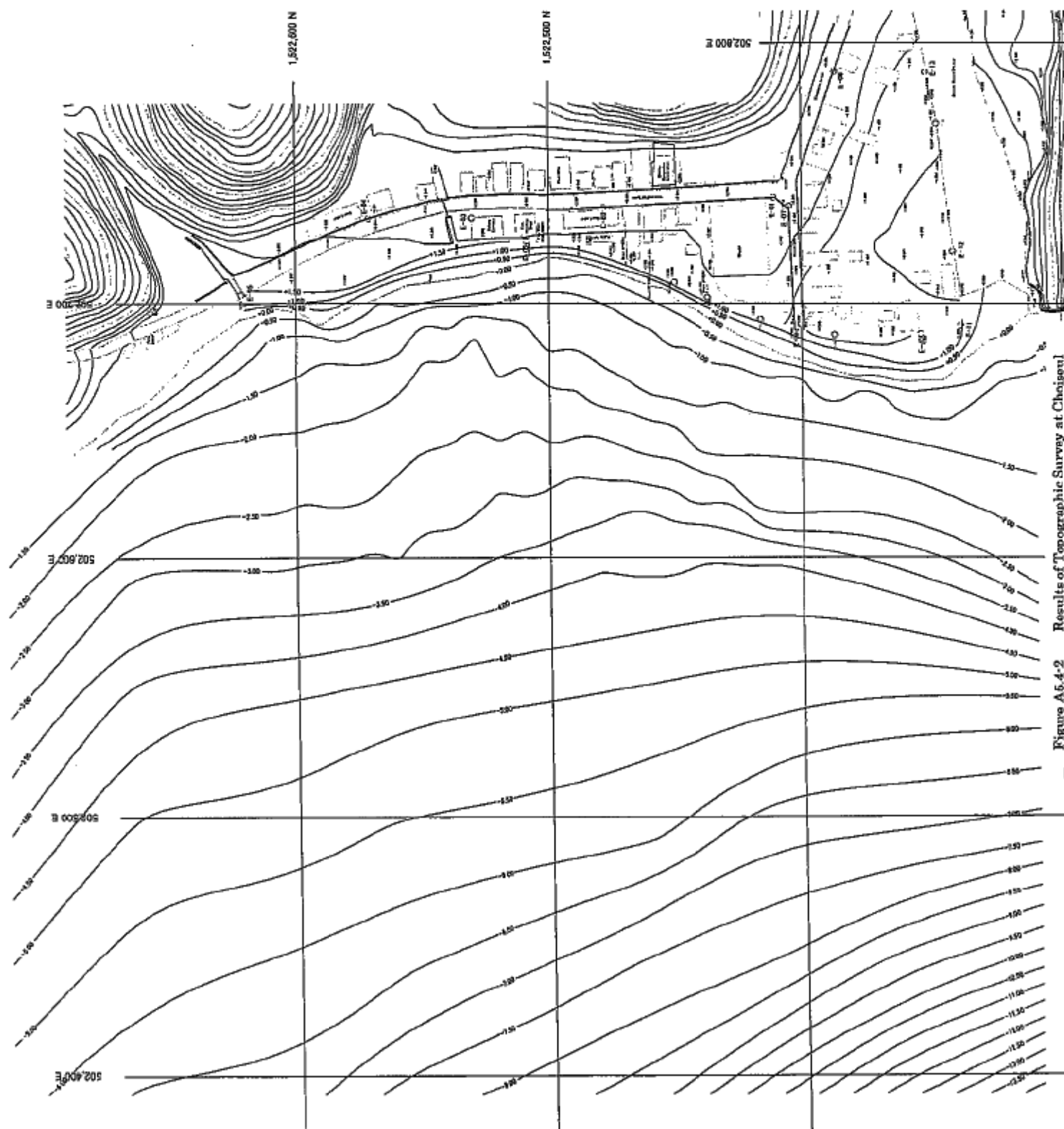


Figure A5.4-2 Results of Topographic Survey at Chinoen

Appendix-5.5 Results of Wind, Waves, and Tide Survey

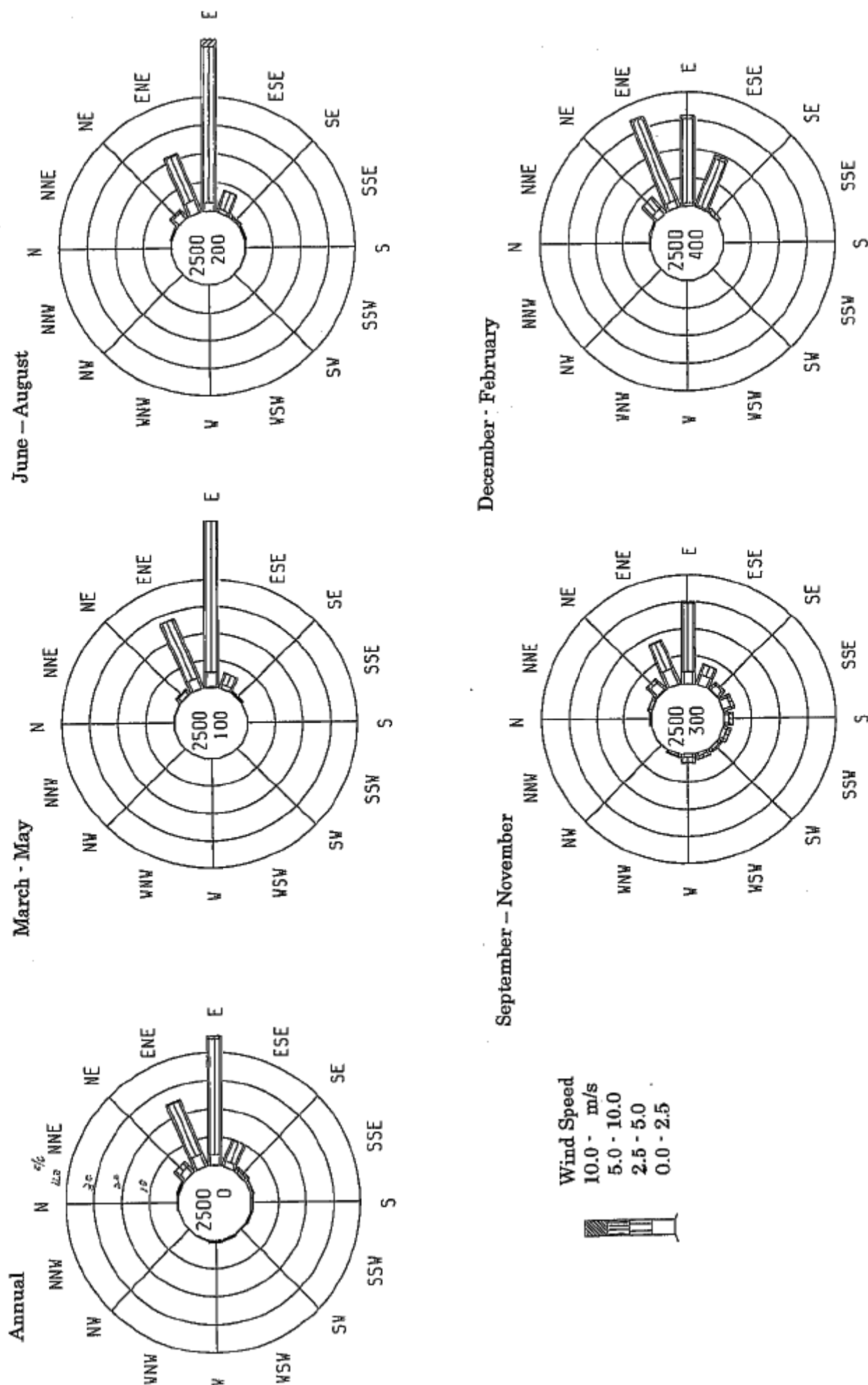


Figure A5.5-2 Wind Rose at Vieux Fort (Hewanorra Airport, 1999)

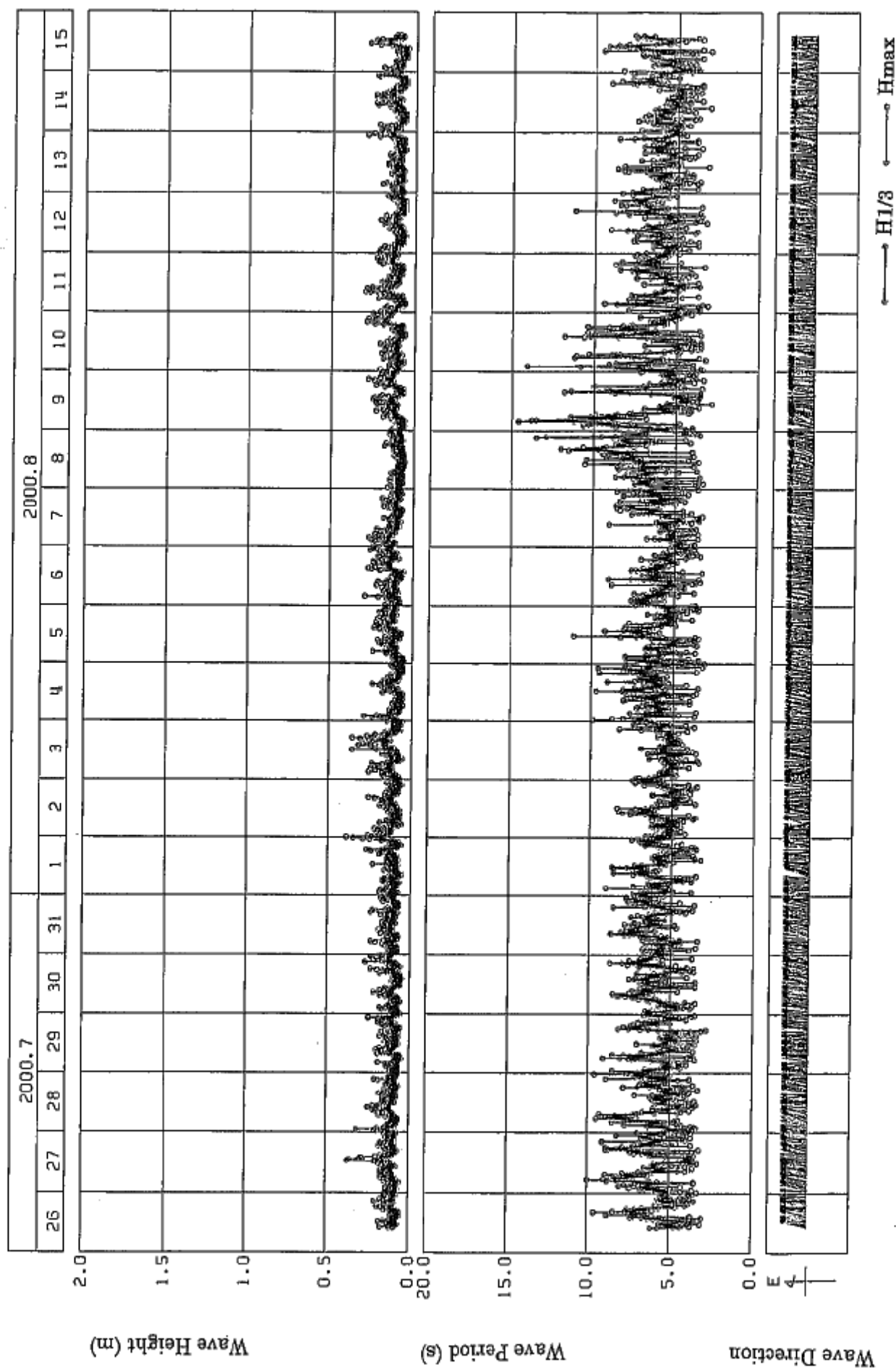


Figure A5.5-3 Time Series Data of Observed Waves at Soufriere

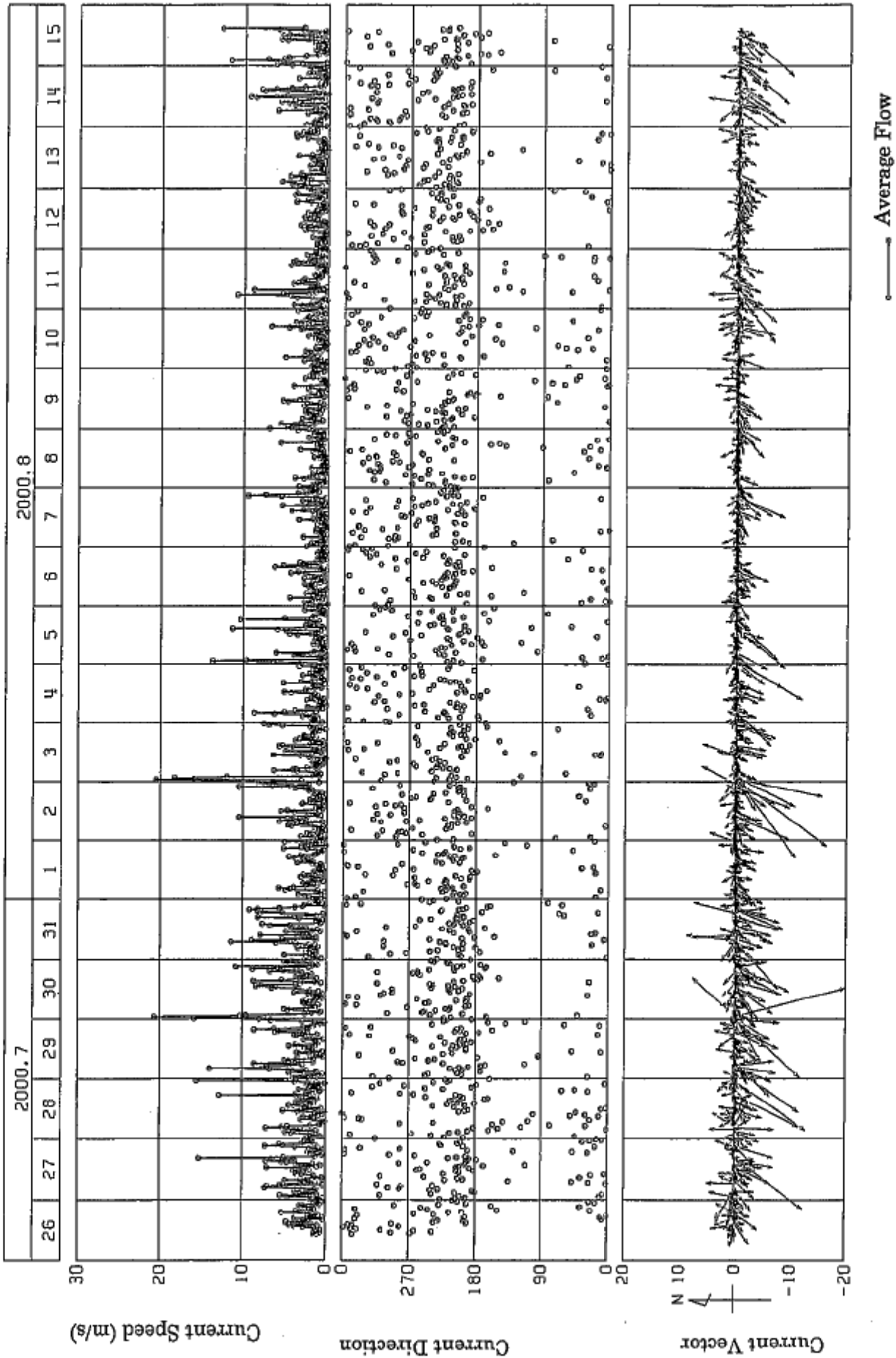


Figure A5.5-4 Time Series Data of Observed Currents at Soufriere (1)

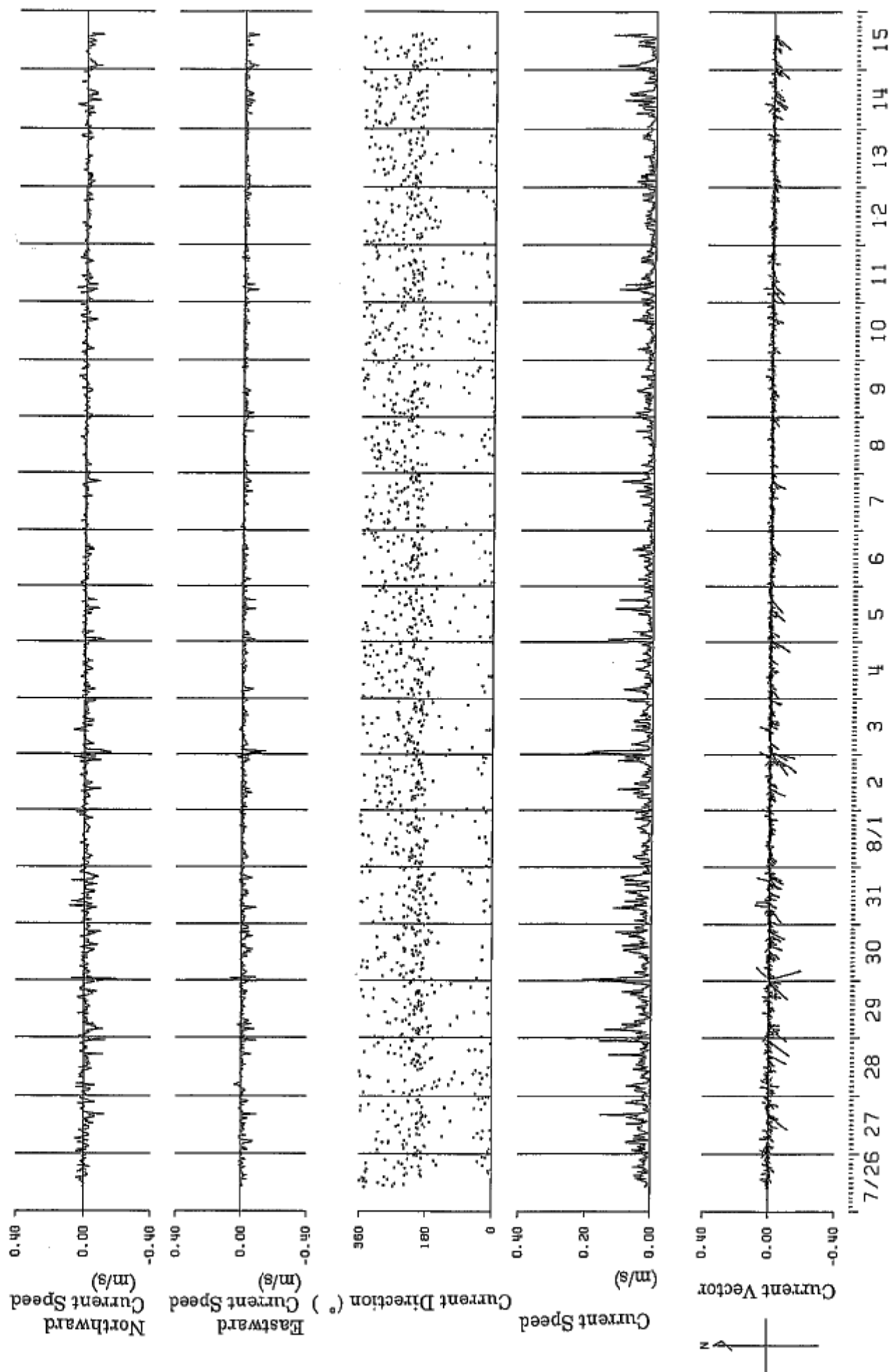


Figure A5.5-5 Time Series Data of Observed Currents at Soufriere (2)

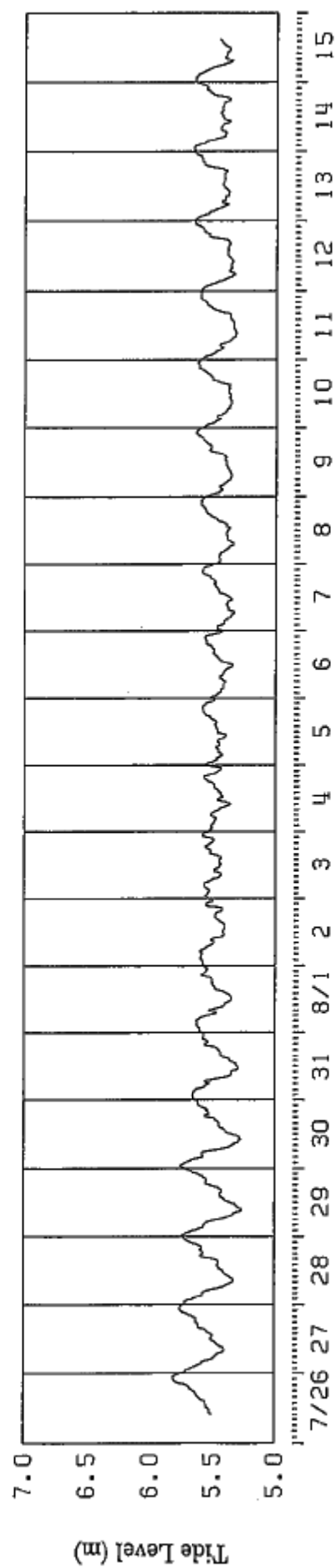


Figure A5.5-6 Time Series Data of Tide at Soufriere

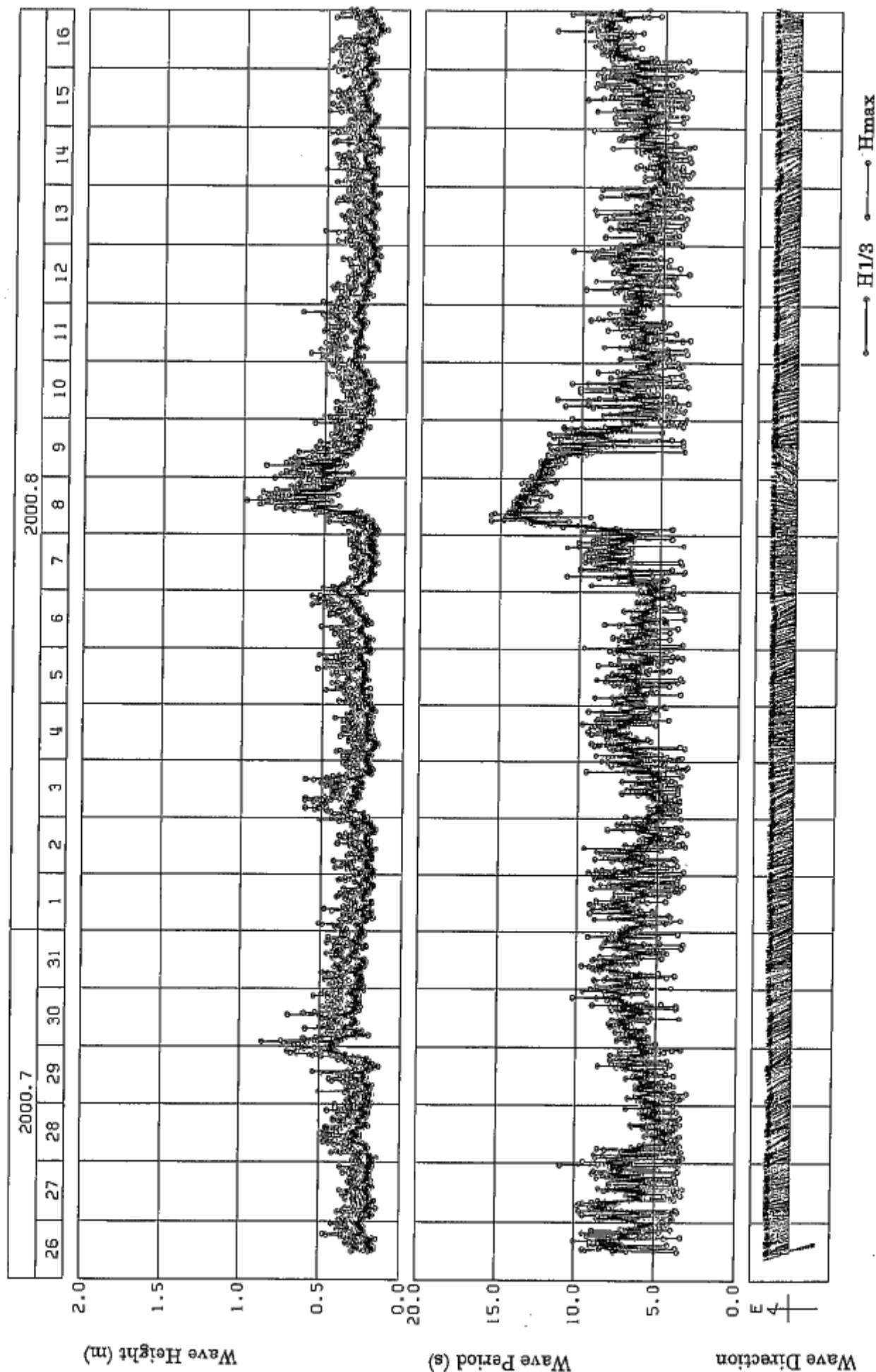


Figure A5.5-7 Time Series Data of Observed Waves at Choiseul

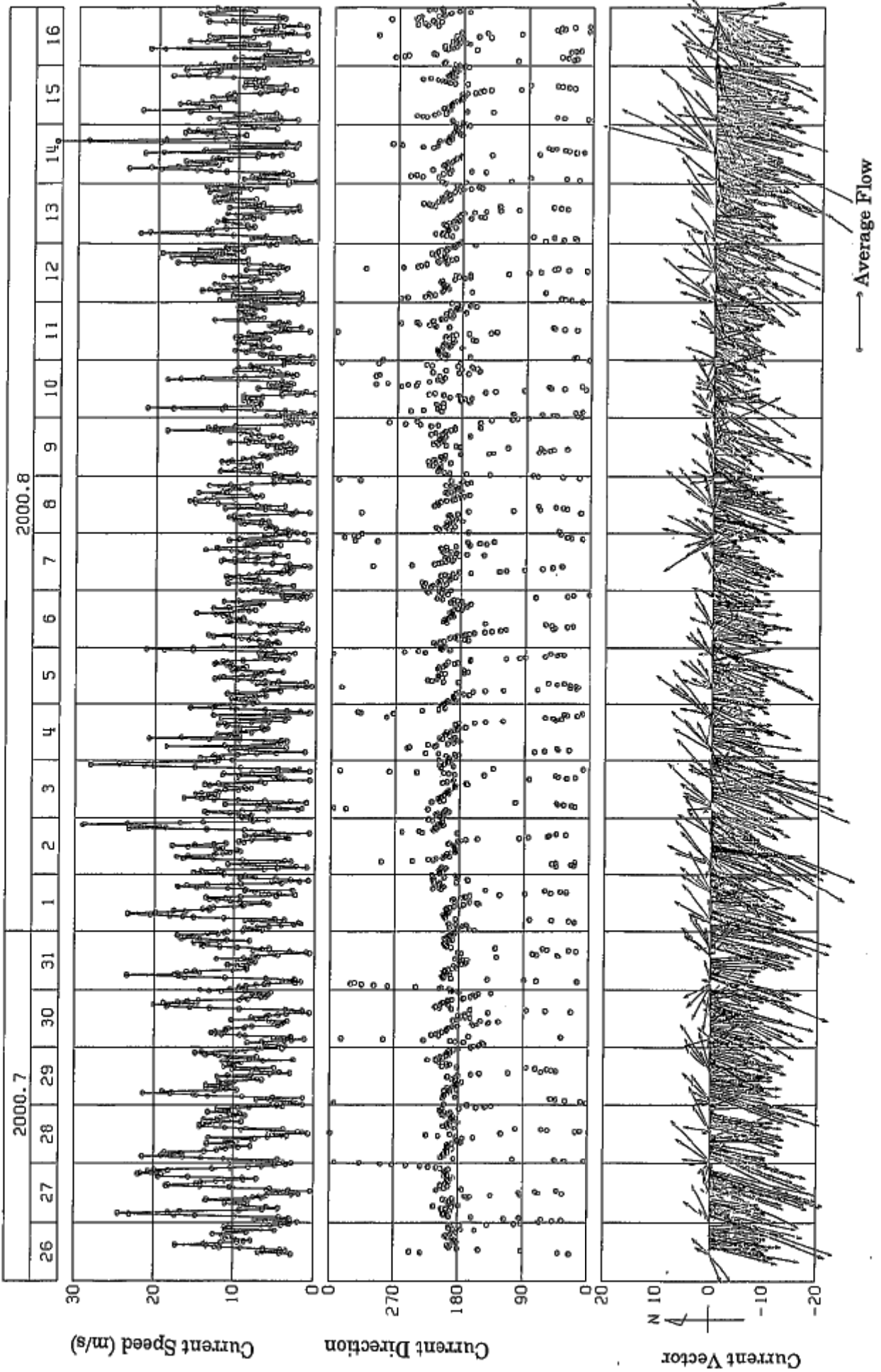


Figure A5.5-8 Time Series Data of Observed Currents at Choiseul (1)

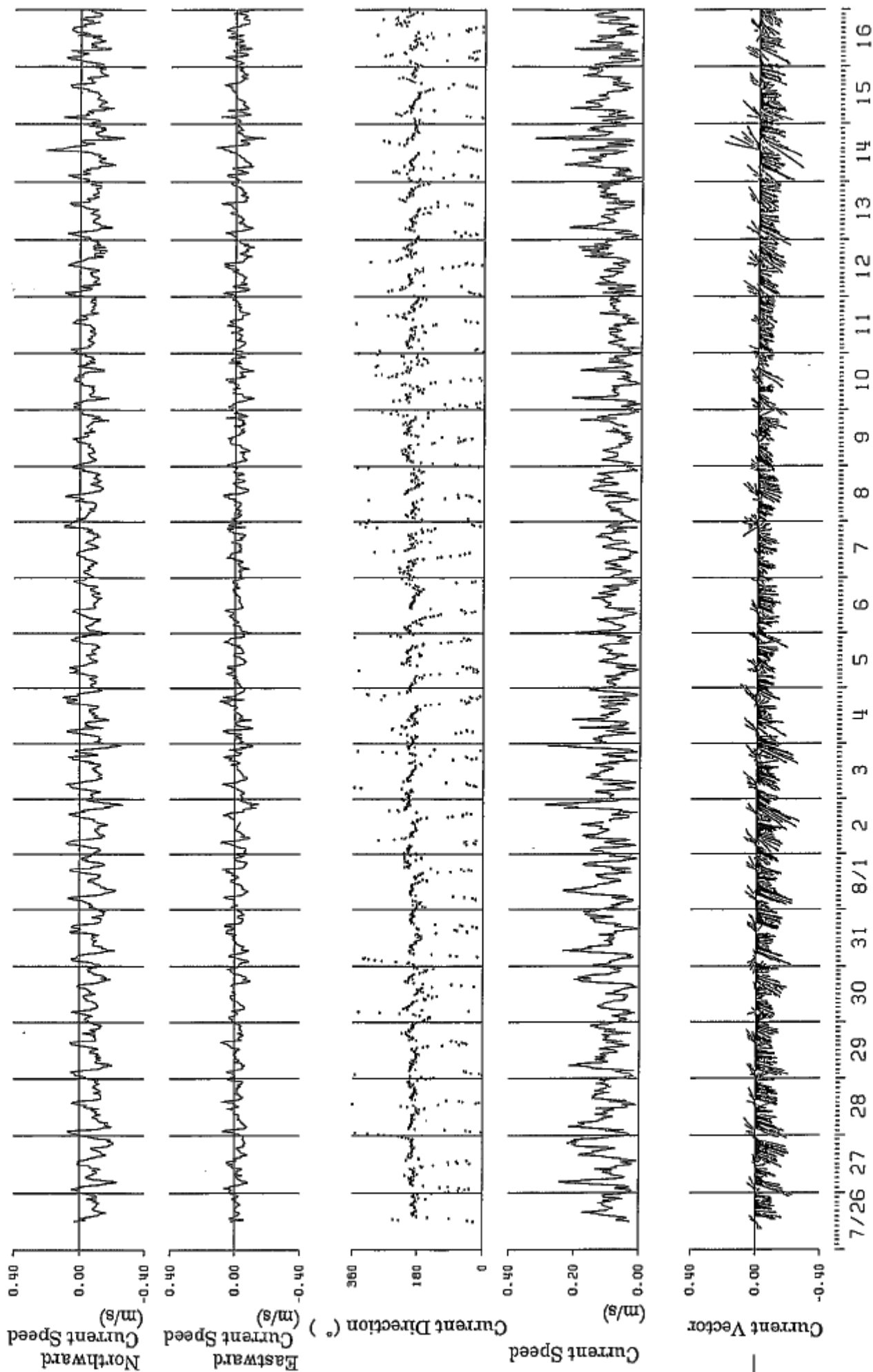


Figure A5.5-9 Time Series Data of Observed Currents at Choiseul (2)

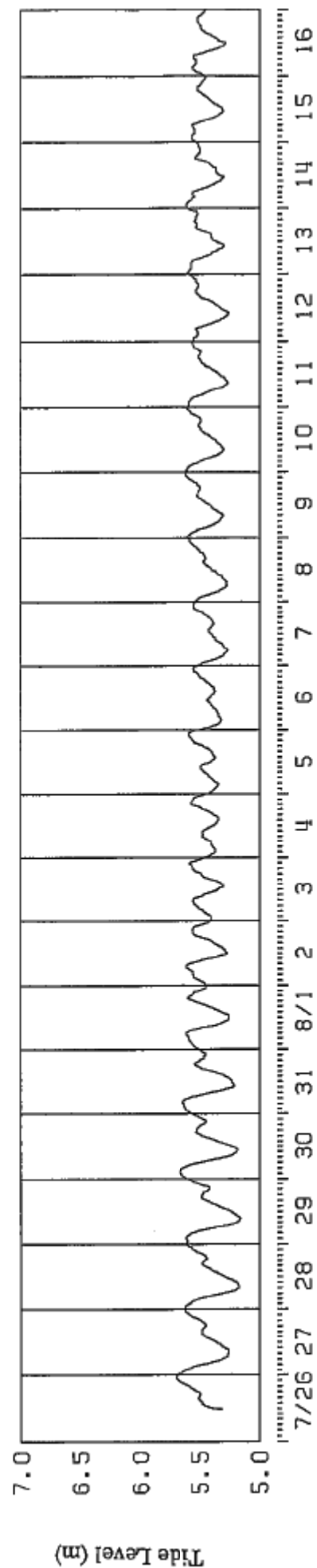


Figure A5.5-10 Time Series Data of Tide at Choiseul

Table A5.5-1 Harmonic Constant at Soufriere

Tidal Constituent	Amplitude (m)	Lag of the Tide (°)
K1	0.090	178.9
O1	0.056	184.2
P1	0.030	178.9
Q1	0.019	182.2
M2	0.034	85.3
S2	0.006	66.0
K2	0.002	66.0
N2	0.016	166.9
M4	0.015	145.1
MS4	0.008	9.0
A0	5.490	

Table A5.5-2 Harmonic Constant at Choiseul

Tidal Constituent	Amplitude (m)	Lag of the Tide (°)
K1	0.092	178.1
O1	0.062	183.7
P1	0.030	178.1
Q1	0.022	196.5
M2	0.071	135.1
S2	0.007	168.5
K2	0.002	168.5
N2	0.028	114.5
M4	0.012	20.5
MS4	0.005	13.7
A0	5.445	

Table A5.5-3 Results of Harmonic Analysis at Soufriere

	Northward		Eastward		Current Ellipse						Dominant	
	Current		Current		Apsides			Minor Axis			Directions	
	Current Speed (m/s)	Lag of Tide	Current Speed (m/s)	Lag of Tide	Direc -tion	Current Speed (m/s)	Lag of Tide	Direc -tion	Current Speed (m/s)	Lag of Tide	Current Speed (m/s)	Lag of Tide
K1	0.2	319.6	0.2	26.0	28.6	0.2	337.9	118.6	0.1	67.9	0.2	334.3
O1	0.3	235.5	0.1	183.2	12.5	0.3	232.3	102.5	0.1	142.3	0.3	229.7
P1	0.1	319.6	0.1	26.0	28.6	0.1	337.9	118.6	0.0	67.9	0.1	334.3
Q1	0.4	315.0	0.2	295.7	27.0	0.4	311.0	117.0	0.1	221.0	0.4	311.6
M2	0.3	289.4	0.1	303.8	18.2	0.4	290.8	108.2	0.0	20.8	0.4	291.1
S2	0.4	227.7	0.2	232.5	27.6	0.5	228.7	117.6	0.0	318.7	0.5	228.6
K2	0.1	227.7	0.1	232.5	27.6	0.1	228.7	117.6	0.0	318.7	0.1	228.6
N2	0.4	20.7	0.1	70.1	15.9	0.4	25.3	105.9	0.1	115.3	0.4	27.2
M4	0.1	235.0	0.1	209.8	38.0	0.2	225.4	128.0	0.0	135.4	0.2	228.8
MS4	0.2	169.0	0.1	203.6	39.0	0.3	182.9	129.0	0.1	272.9	0.3	177.7
V0	-1.0 cm/s		-1.0 cm/s		1.4 cm/s 225.2°						-1.2 cm/s	

Table A5.5-4 Results of Harmonic Analysis at Choiseul

	Northward		Eastward		Current Ellipse						Dominant	
	Current		Current		Apsides			Minor Axis			Directions	
	Current Speed (m/s)	Lag of Tide	Current Speed (m/s)	Lag of Tide	Direc -tion	Current Speed (m/s)	Lag of Tide	Direc -tion	Current Speed (m/s)	Lag of Tide	Current Speed (m/s)	Lag of Tide
K1	0.4	249.0	0.6	30.9	301.1	0.7	221.6	31.1	0.2	311.6	0.2	279.5
O1	0.5	28.2	0.6	314.9	56.1	0.7	341.0	146.1	0.5	251.0	0.6	8.9
P1	0.1	249.0	0.2	30.9	301.1	0.2	221.6	31.1	0.1	311.6	0.1	279.5
Q1	0.2	165.8	0.3	60.9	288.6	0.3	228.5	18.6	0.2	138.5	0.2	136.4
M2	4.3	102.2	2.2	83.7	26.9	4.8	98.3	116.9	0.6	8.3	4.7	99.2
S2	1.4	58.3	0.7	46.8	27.6	1.5	55.8	117.6	0.1	325.8	1.5	56.4
K2	0.4	58.3	0.2	46.8	27.6	0.4	55.8	117.6	0.0	325.8	0.4	56.4
N2	1.6	22.7	0.9	317.2	18.1	1.6	13.5	108.1	0.8	283.5	1.6	12.6
M4	3.7	220.2	1.5	221.7	22.5	4.0	220.4	112.5	0.0	310.4	4.0	220.4
MS4	0.9	195.4	0.6	218.7	33.9	1.1	220.4	123.9	0.2	292.8	1.1	200.1
V0	-6.7 cm/s		-1.5 cm/s		6.8 cm/s 192.6°						-6.8 cm/s	

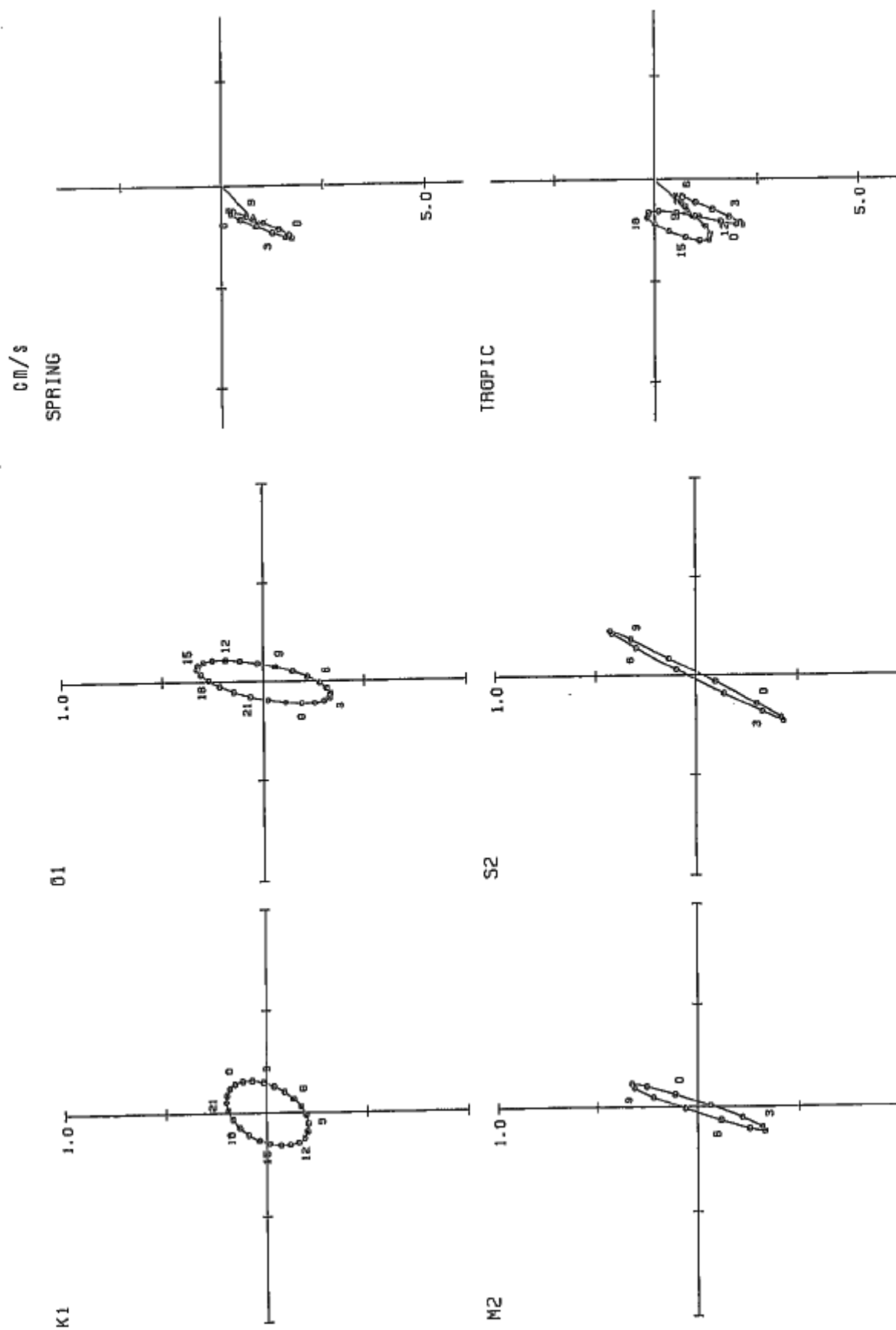


Figure A5.5-11 Tidal Current Ellipse at Soufriere

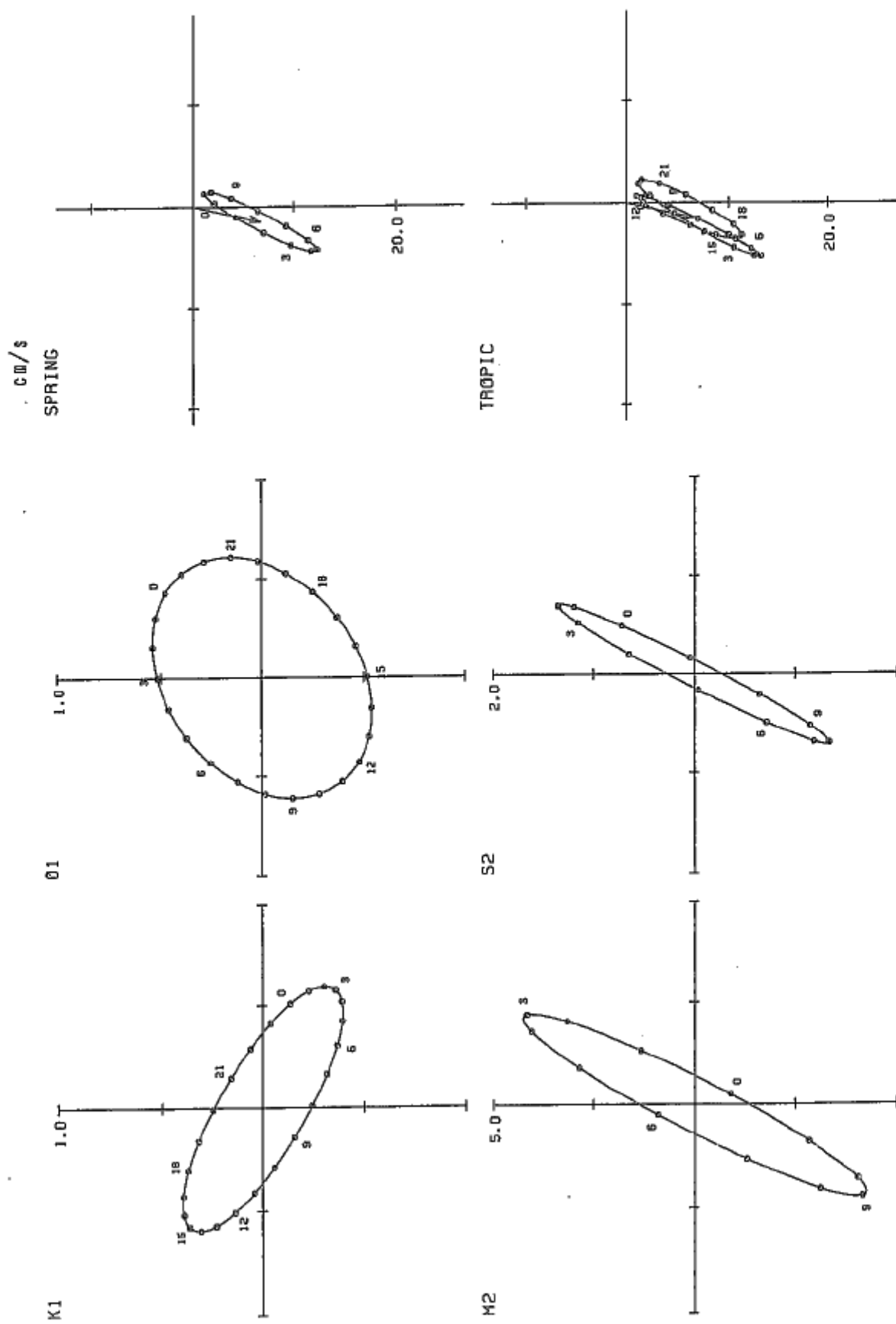


Figure A5.5-12 Tidal Current Ellipse at Choiseul

Appendix-5.6 Study of Design Waves

Study of Design Wave

Table A5.6-1 List of Target Hurricane for Wave Hindcasting

No.	Year	No.	Name	Date			
				Year	month	Day	Hour
1	1979	05	DAVID	1979	8	25	12
2	1980	02	ALLEN	1980	7	31	12
3	1989	09	HUGO	1989	9	10	12
4	1995	13	LUIS	1995	8	28	18
5	1995	14	MARILYN	1995	9	12	18
6	1998	16	GEORGES	1998	9	15	12
7	1999	16	LENNY	1999	11	13	21

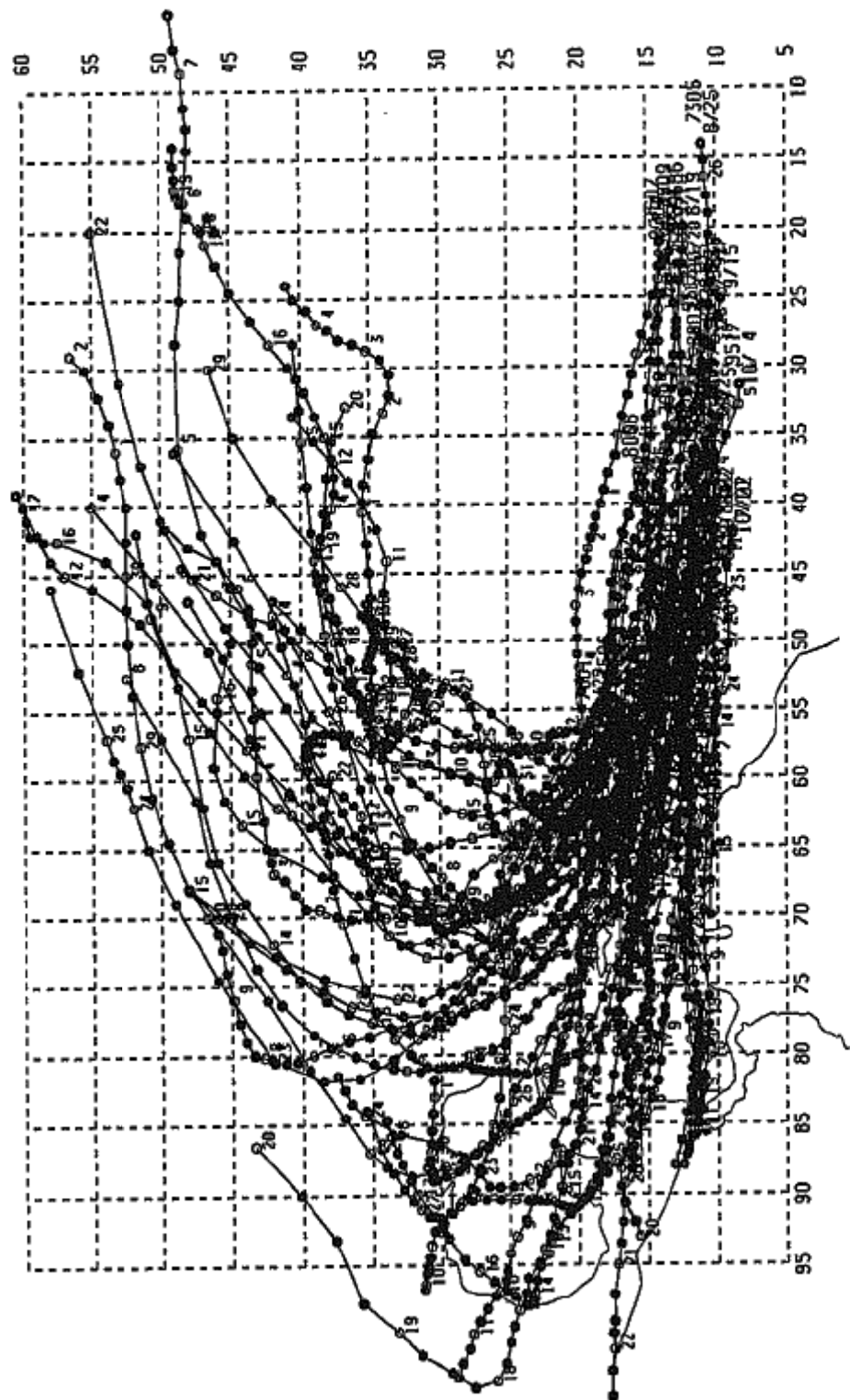


Figure A5.6-1 Hurricane Routes (1970~1999)

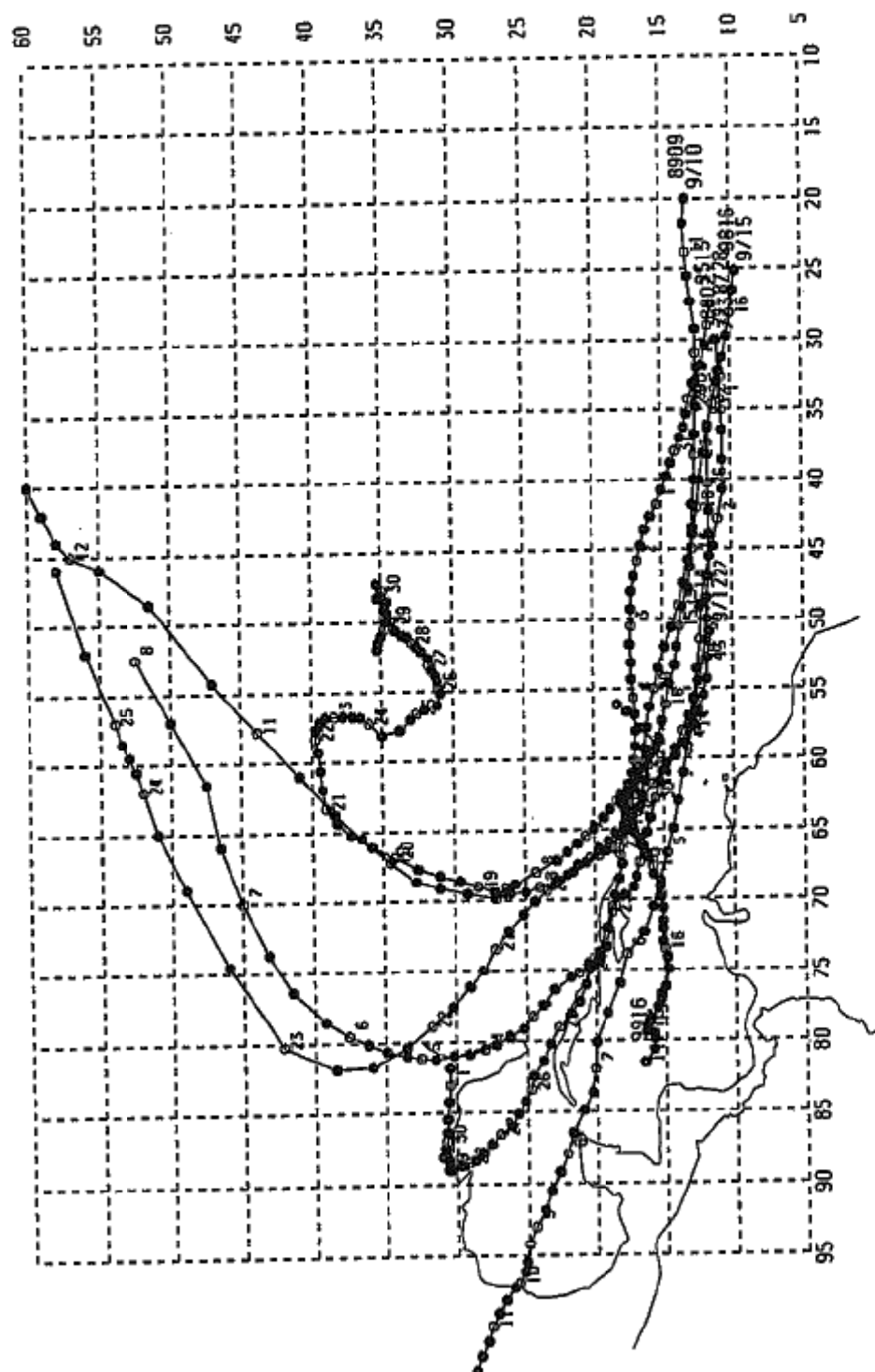


Figure A5.6-2 Object Hurricane Routes for Wave Hindcasting

Table A5.6-2 Results of Wave Hindcasting by Hurricanes
(West Coast of St. Lucia, Offshore Condition)

Wave Height (m)	DAVID 1979	ALLEN 1980	HUGO 1989	LUIS 1995	MARILYN 1995	GEORGES 1998	LENNY 1999
NNE							
NE							
ENE							
E							
ESE							
SE		3.55					
SSE		5.63					
S							0.48
SSW	6.09						
SW	6.19				1.52		0.63
WSW	6.22	3.67			1.44		0.19
W	2.16	3.00			1.39		4.33
WNW	6.00		4.71	3.86	1.37	0.46	5.76
NW	5.76		4.60	5.39	1.54	1.35	3.20
NNW	5.77	1.88	4.33	5.45	1.13	1.77	1.30
N							

Wave Period (s)	DAVID 1979	ALLEN 1980	HUGO 1989	LUIS 1995	MARILYN 1995	GEORGES 1998	LENNY 1999
NE							
ENE							
E							
ESE							
SE		8.58					
SSE		9.14					
S							2.69
SSW	8.78						
SW	8.84				4.92		2.94
WSW	8.91	7.69			4.66		1.92
W	8.67	7.87			4.62		8.89
WNW	8.74		8.04	7.43	4.97	6.36	9.92
NW	8.72		7.84	8.45	4.96	5.34	8.36
NNW	8.70	6.84	7.71	8.47	4.27	5.63	5.06
N							

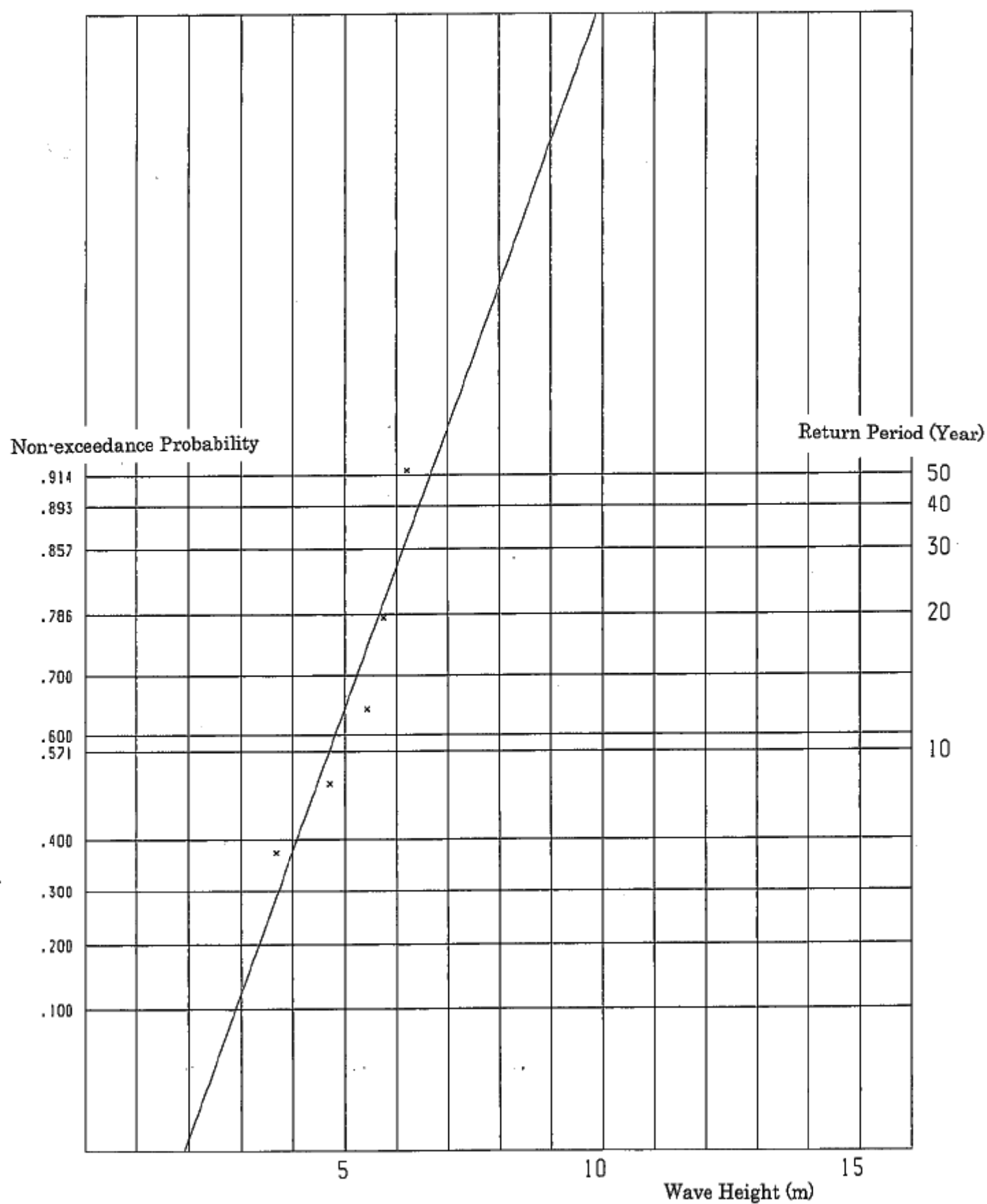


Figure A5.6-3 Return Period of Wave Height (West Coast of St. Lucia, Offshore Condition)

Table A5.6-3 List of Return Period of Wave Height

Return Period (year)	Wave Height (m)	Wave Period (s)	Wave Direction
10	4.7	10	SSW~NNW
20	5.7	10	"
30	6.1	10	"

Table A5.6-4 Results of Wave Deformation Calculations

Offshore Wave Condition			Soufriere		Choiseul	
Direction	Height	Period	Refraction Coefficient	Wave Direction	Refraction Coefficient	Wave Direction
SE	6.1m	10s	0.09	S 37.8° W	0.41	S 41.1° W
SSE	"	"	0.19	S 42.6° W	0.60	S 44.2° W
S	"	"	0.36	S 45.6° W	0.79	S 48.0° W
SSW	"	"	0.61	S 47.7° W	0.96	S 51.4° W
SW	"	"	0.83	S 51.5° W	0.89	S 56.6° W
WSW	"	"	0.78	S 54.9° W	0.93	S 63.0° W
W	"	"	0.56	S 58.7° W	0.87	S 69.5° W

Table A5.6-5 Equivalent Deepwater Wave Conditions at Soufriere

Offshore Wave Condition			Refraction Coefficient	Equivalent Deepwater Wave Height (m)	Incident Wave Direction
Direction	Height	Period			
SW	6.1 m	10.0 s	0.83	5.06	S51.5° W

Table A5.6-6 Equivalent Deepwater Wave Conditions at Choiseul

Offshore Wave Condition			Refraction Coefficient	Equivalent Deepwater Wave Height (m)	Incident Wave Direction
Direction	Height	Period			
SSW	6.1	10.0	0.96	5.86	S51.4° W

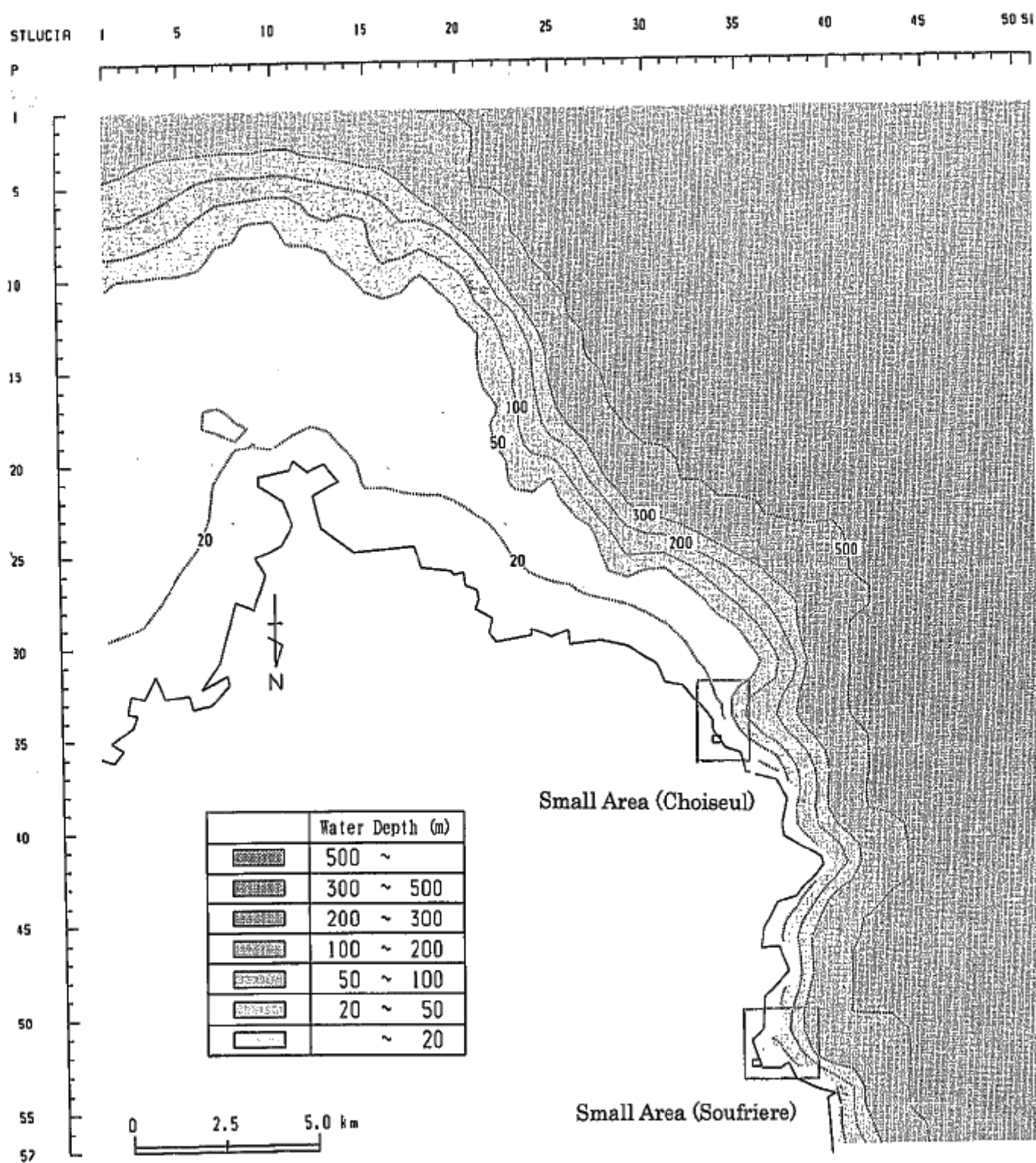
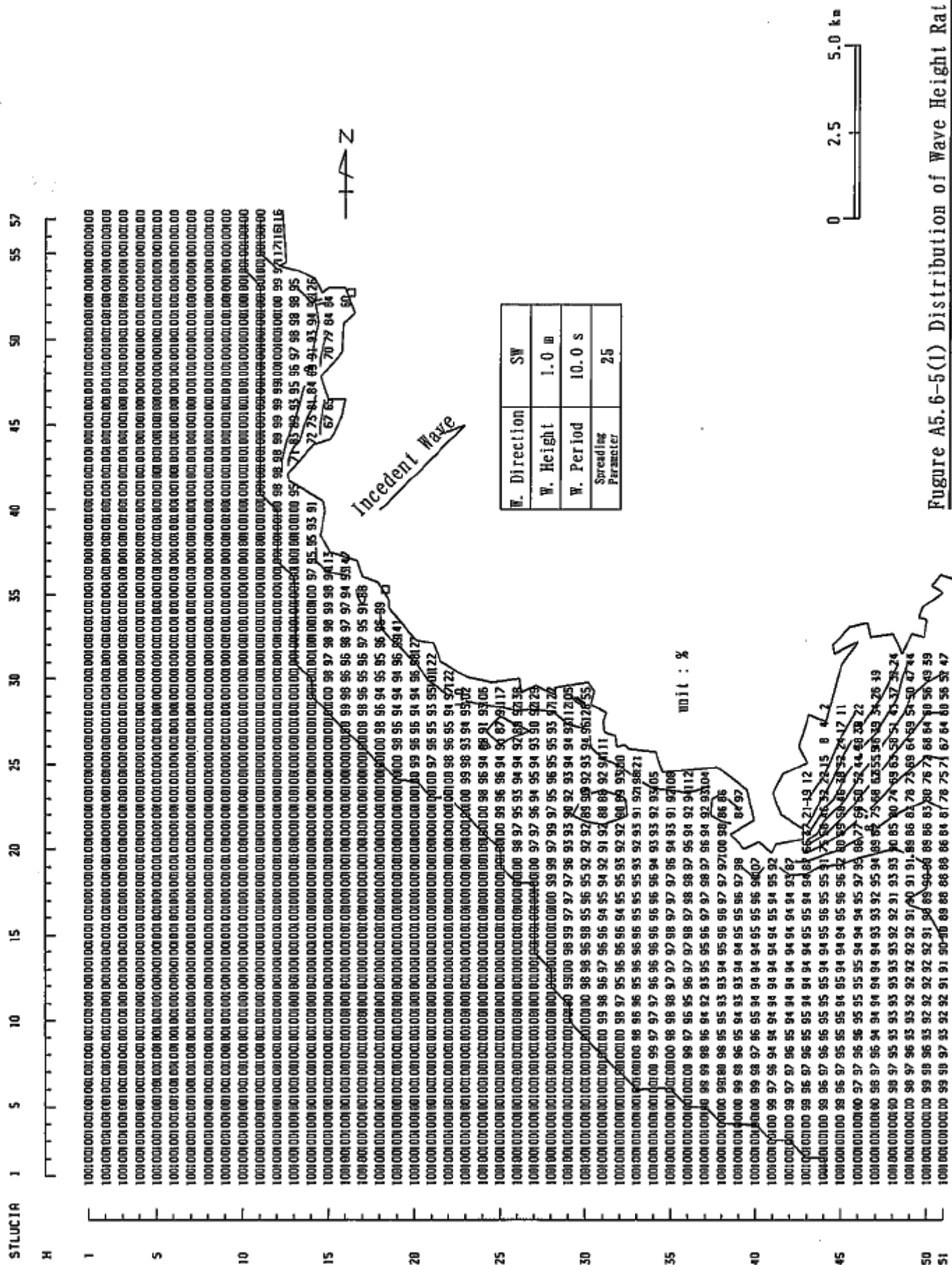
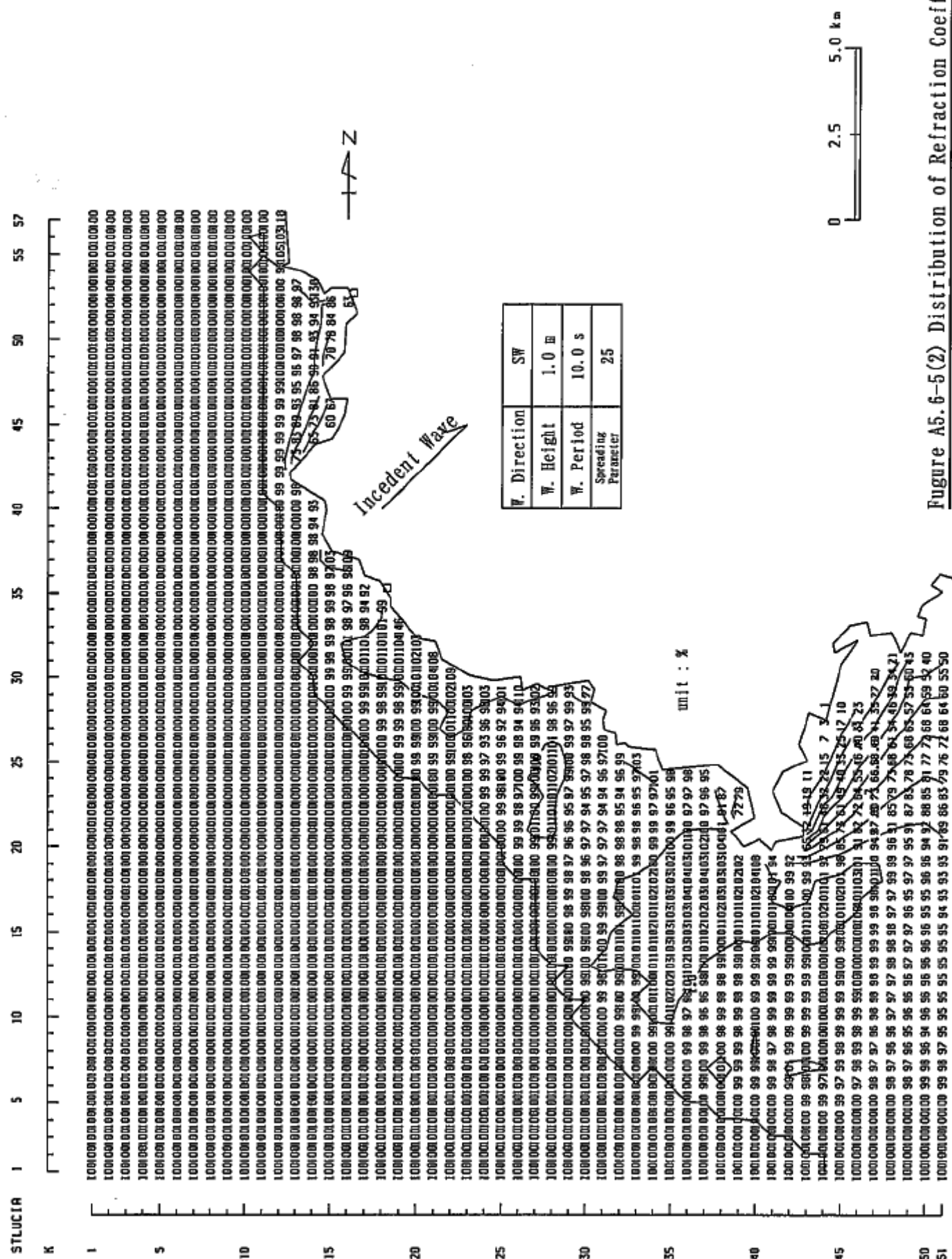


Figure A5.6-4 Calculation Area Wave Deformation (Large Area, Small Area)





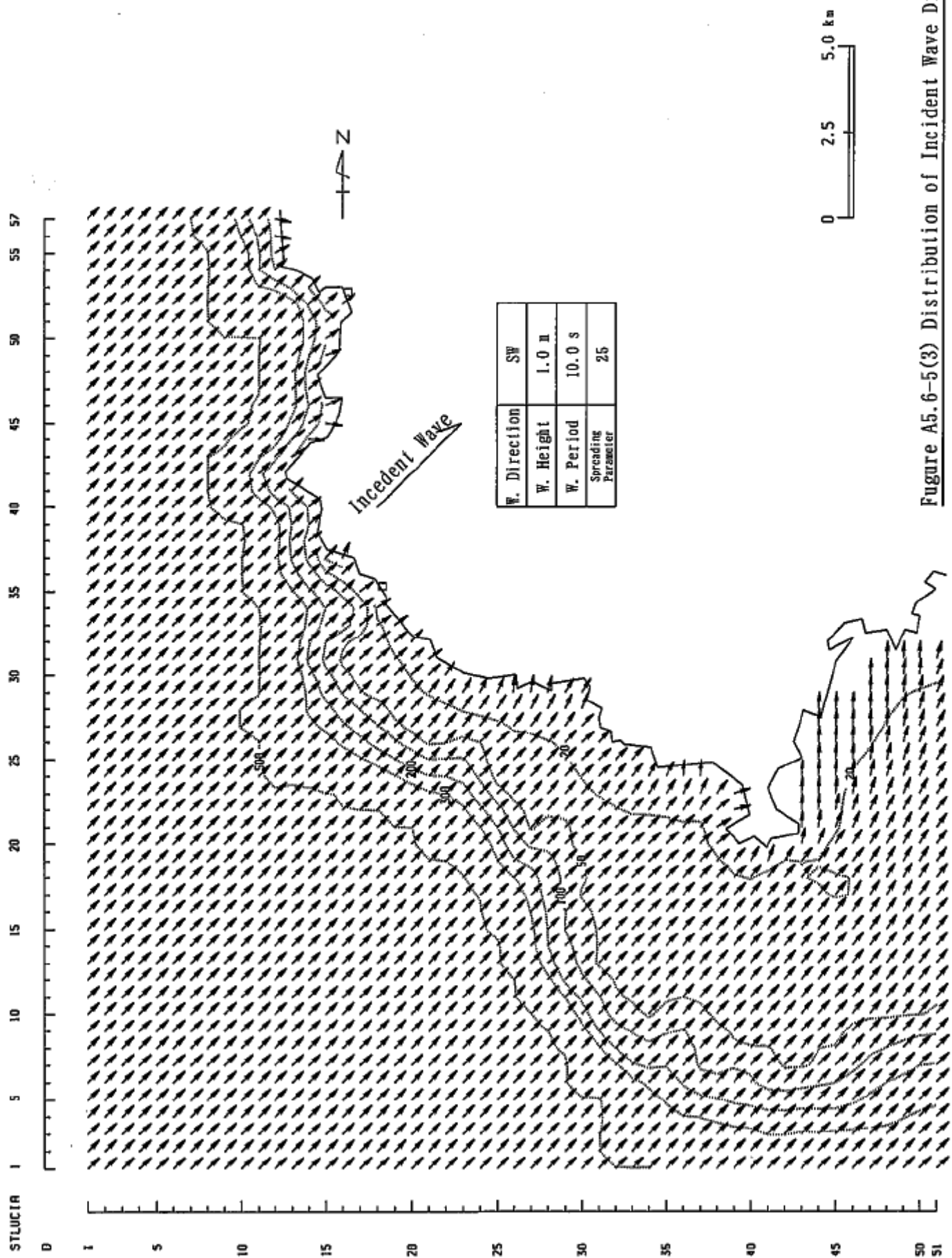


Figure A5.6-5(3) Distribution of Incident Wave Direction

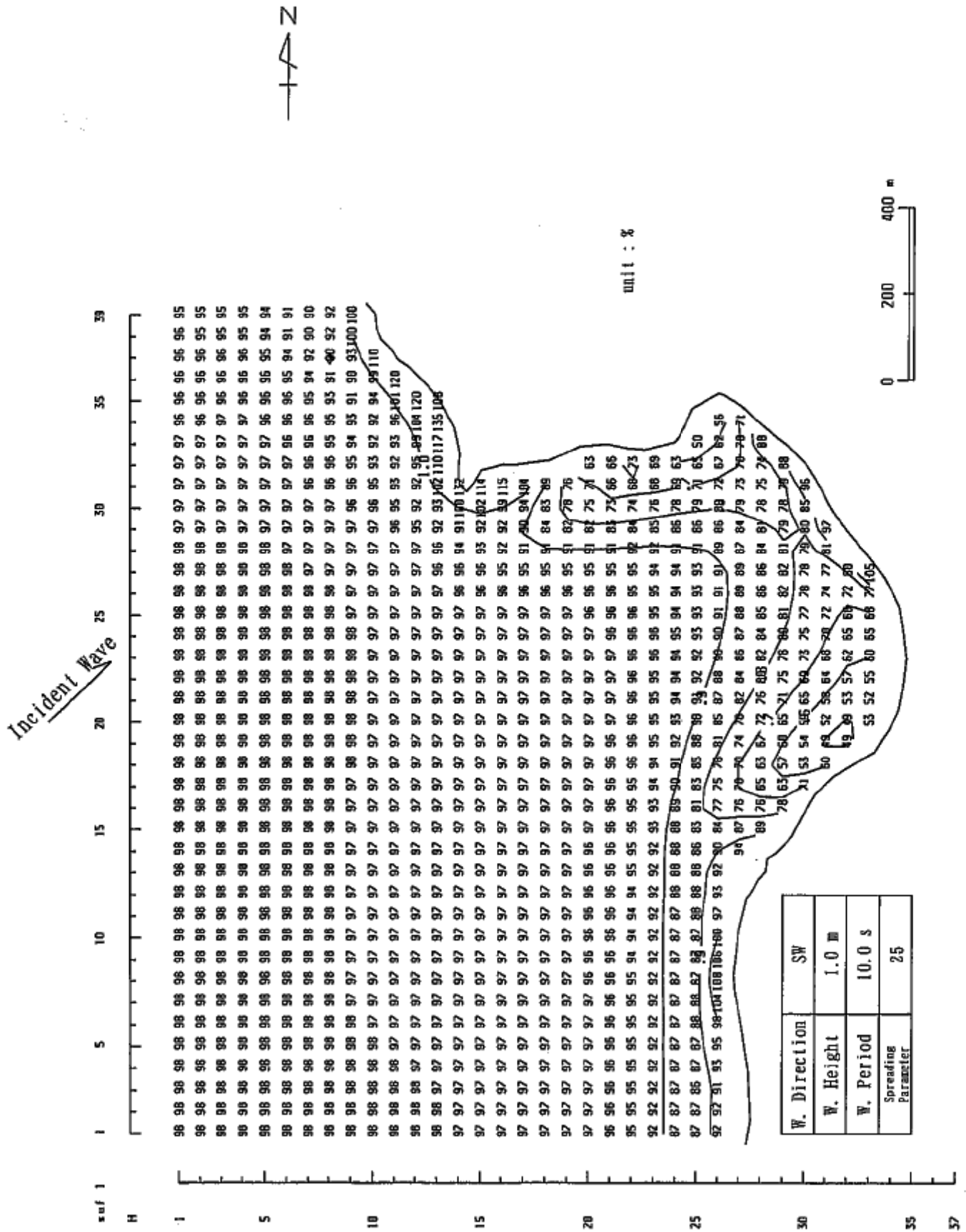


Figure A5.6-6(1) Distribution of Wave Height Ratio

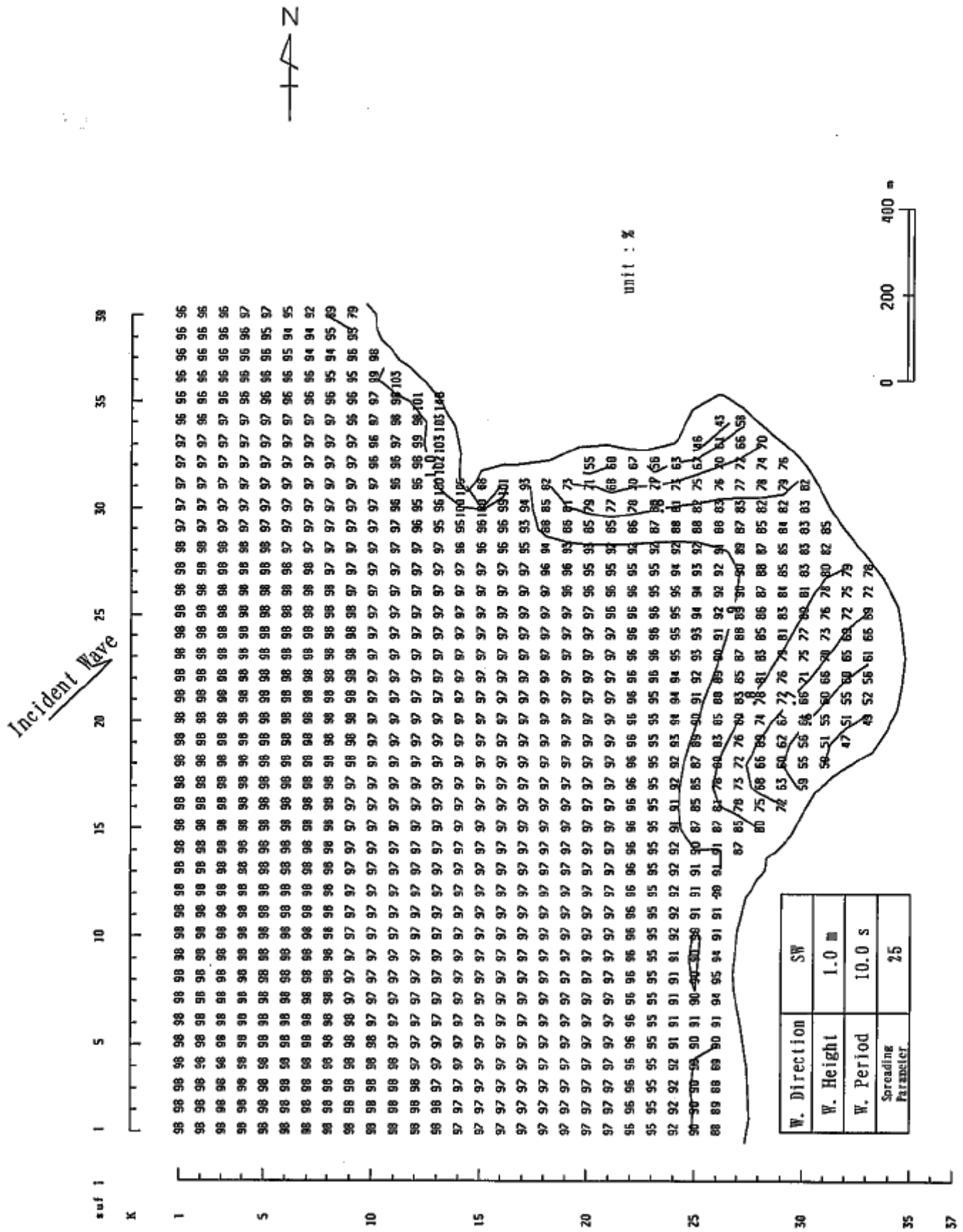


Figure A5.6-6(2) Distribution of Refraction Coefficient

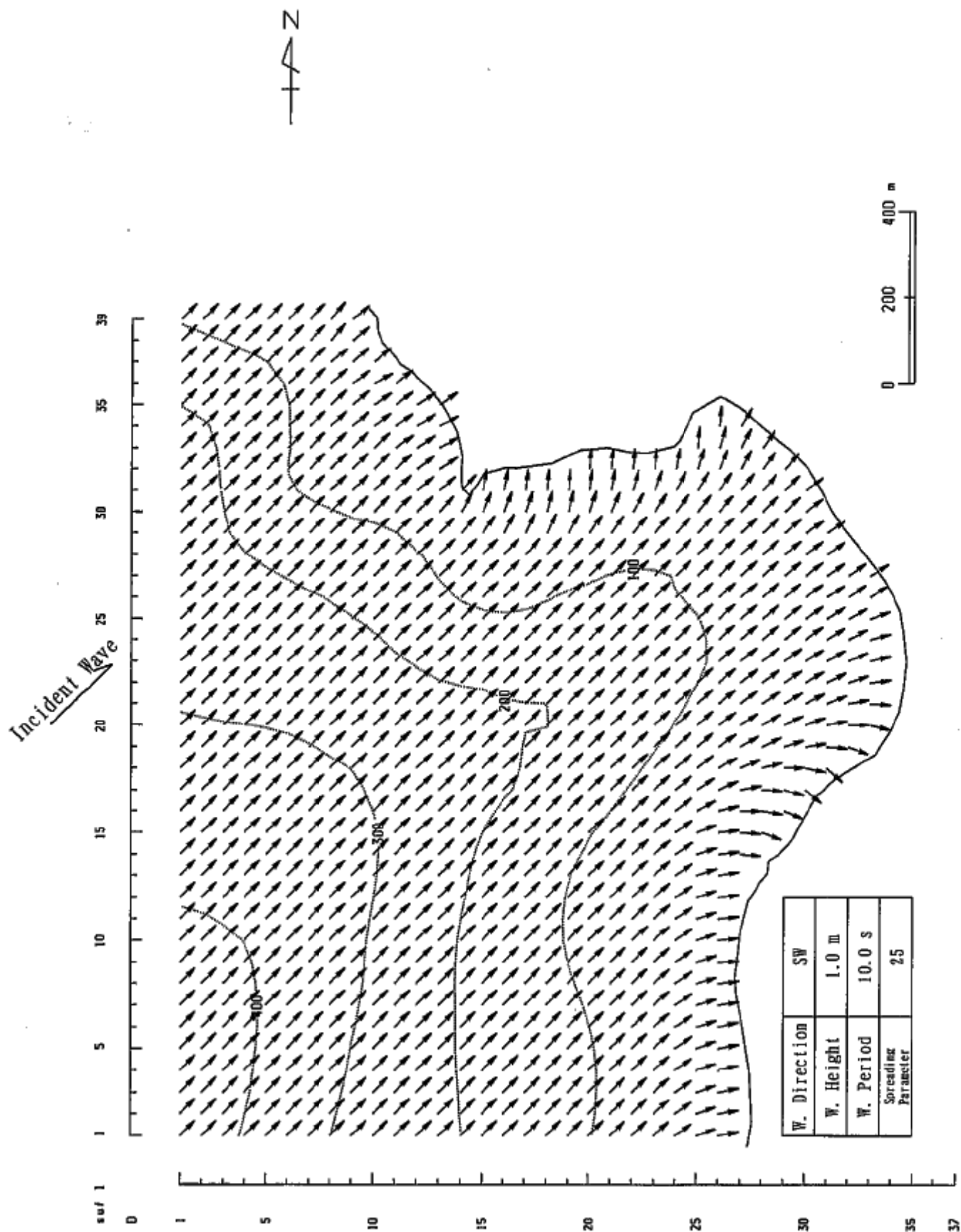


Figure A5.6-6(3) Distribution of Incident Wave Direction

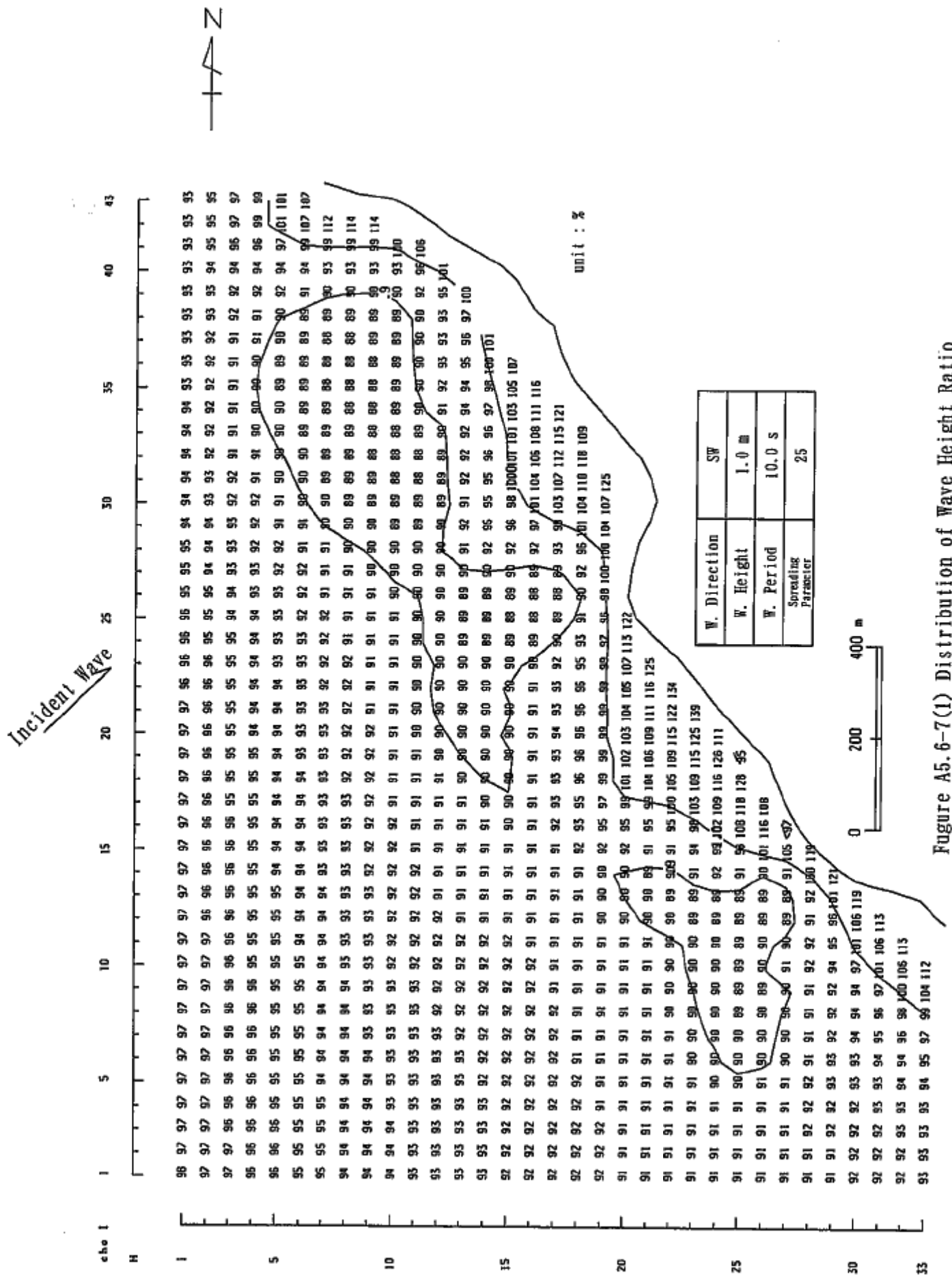


Figure A5.6-7(1) Distribution of Wave Height Ratio

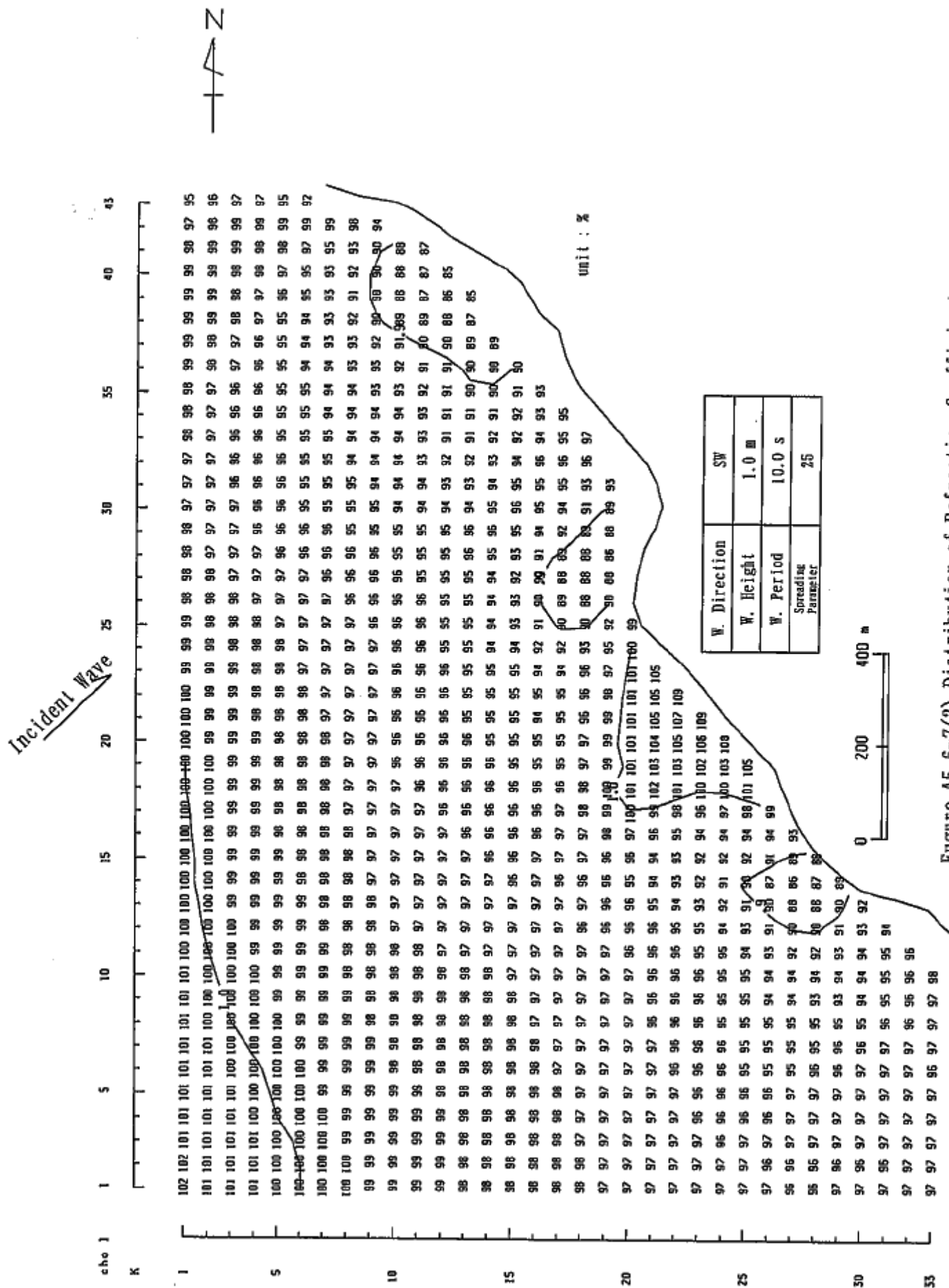


Figure A5.6-7(2) Distribution of Refraction Coefficient

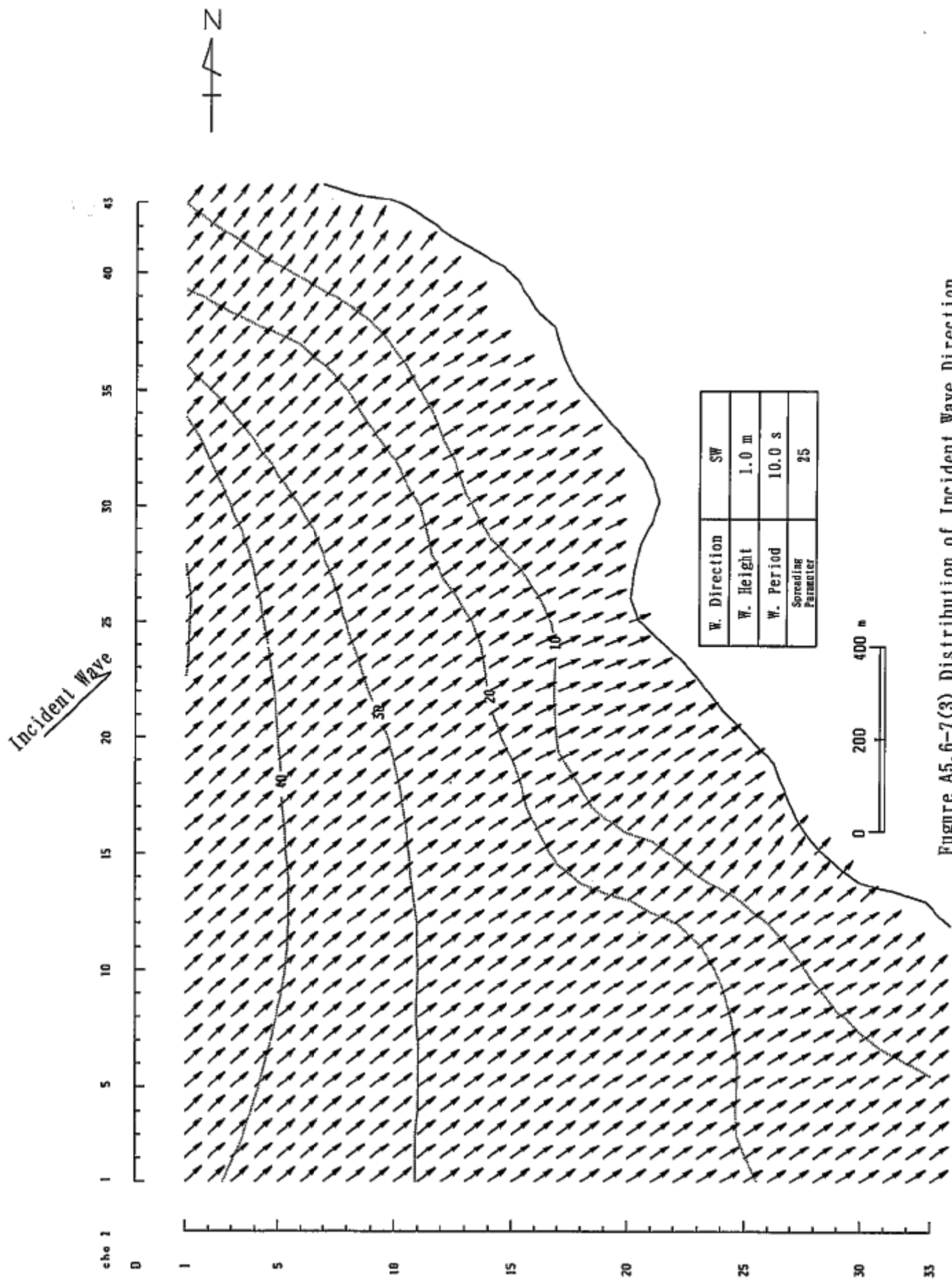


Figure A5.6-7(3) Distribution of Incident Wave Direction

Table A5.6-7 Wave Conditions at Design Points of Soufriere and Choiseul

Point	Water Depth	Period	Equivalent Deepwater Wave Height (m)	Bottom Slope				Significant Wave Height (m)
	D(m)	T(s)	Ho'(m)	1/slop	Ho'/Lo	h/Ho'	H3/Ho'	H1/3(m)
Soufriere	0.5	10	5.06	10	0.032	0.099	0.387	1.96
	1	10	5.06	10	0.032	0.198	0.470	2.38
	1.5	10	5.06	10	0.032	0.296	0.554	2.80
	2	10	5.06	10	0.032	0.395	0.637	3.22
	2.5	10	5.06	10	0.032	0.494	0.721	3.65
	3	10	5.06	10	0.032	0.593	0.804	4.07
	3.5	10	5.06	10	0.032	0.692	0.888	4.49
	4	10	5.06	10	0.032	0.791	0.971	4.91
	4.5	10	5.06	10	0.032	0.889	1.055	5.34
	5	10	5.06	10	0.032	0.988	1.138	5.76
Choiseul	0.5	10	5.86	20	0.038	0.085	0.170	0.99
	1	10	5.86	20	0.038	0.171	0.234	1.37
	1.5	10	5.86	20	0.038	0.256	0.297	1.74
	2	10	5.86	20	0.038	0.341	0.361	2.12
	2.5	10	5.86	20	0.038	0.427	0.425	2.49
	3	10	5.86	20	0.038	0.512	0.489	2.87
	3.5	10	5.86	20	0.038	0.597	0.553	3.24
	4	10	5.86	20	0.038	0.683	0.617	3.61
	4.5	10	5.86	20	0.038	0.768	0.680	3.99
	5	10	5.86	20	0.038	0.853	0.744	4.36

**Appendix-5.7 Study of Ordinary Waves, Harbor Tranquility,
and Sea Bottom Changes**

Figure A5.7-1(1) Result of Ordinary Wave Hindcasting (Frequency of Wave direction and Height)

1999		0																			
W.DIRECTION		CALM	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	TOTAL		
W. HEIGHT (M)																					
CALM		8130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8130		
		92.8	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	92.8		
0.00 - 0.24		0	0	0	0	0	0	0	0	0	7	247	9	10	9	3	6	0	291		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	2.8	.1	.1	.1	.0	.1	.0	3.3		
0.25 - 0.49		0	0	0	0	0	0	0	0	0	28	117	16	18	6	1	0	0	186		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	1.3	.2	.2	.1	.0	.0	.0	2.1		
0.50 - 0.74		0	0	0	0	0	0	0	0	0	21	17	10	22	9	0	0	0	79		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.2	.1	.3	.1	.0	.0	.0	.9		
0.75 - 0.99		0	0	0	0	0	0	0	0	0	6	8	11	9	1	0	0	0	35		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.1	.1	.1	.0	.0	.0	.0	.4		
1.00 - 1.24		0	0	0	0	0	0	0	0	0	4	3	0	4	1	0	0	0	12		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1		
1.25 - 1.49		0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0		
1.50 - 1.74		0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	4		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0		
1.75 - 1.99		0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	4		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0		
2.00 - 2.24		0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	5		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1		
2.25 - 2.49		0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	6		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.1		
2.50 - 2.74		0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0		
2.75 - 3.00		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0		
3.00 -		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0		
TOTAL		8130	0	0	0	0	0	0	0	0	66	396	52	76	30	4	6	0	8760		
		92.8	.0	.0	.0	.0	.0	.0	.0	.0	.8	4.5	.6	.9	.3	.0	.1	.0	100.0		
					</																

upper : Frequency
lower : Probability

Figure A5.7-1(2) Result of Ordinary Wave Hindcasting (Frequency of Wave Height and Period)

W. PERIOD (S)	1999																TOTAL
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	14-	
W. HEIGHT (M)	CALM	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-	TOTAL
CALM	8130 92.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8130 92.8
0.00 - 0.24	0	5	194	90	2	0	0	0	0	0	0	0	0	0	0	0	291
	.0	.1	2.2	1.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	3.3
0.25 - 0.49	0	0	9	126	50	1	0	0	0	0	0	0	0	0	0	0	186
	.0	.0	.1	1.4	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	2.1
0.50 - 0.74	0	0	0	29	42	8	0	0	0	0	0	0	0	0	0	0	79
	.0	.0	.0	.3	.5	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.9
0.75 - 0.99	0	0	0	0	25	10	0	0	0	0	0	0	0	0	0	0	35
	.0	.0	.0	.0	.3	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4
1.00 - 1.24	0	0	0	0	4	8	0	0	0	0	0	0	0	0	0	0	12
	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1
1.25 - 1.49	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4
	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1.50 - 1.74	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	4
	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1.75 - 1.99	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4
	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2.00 - 2.24	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	5
	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1
2.25 - 2.49	0	0	0	0	0	0	2	4	0	0	0	0	0	0	0	0	6
	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1
2.50 - 2.74	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2.75 - 3.00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3.00 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOTAL	8130 92.8	5	203	245	123	34	9	11	0	0	0	0	0	0	0	0	8760 100.0
	.1	2.3	2.8	1.4	.4	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0

upper : Frequency

lower : Probability

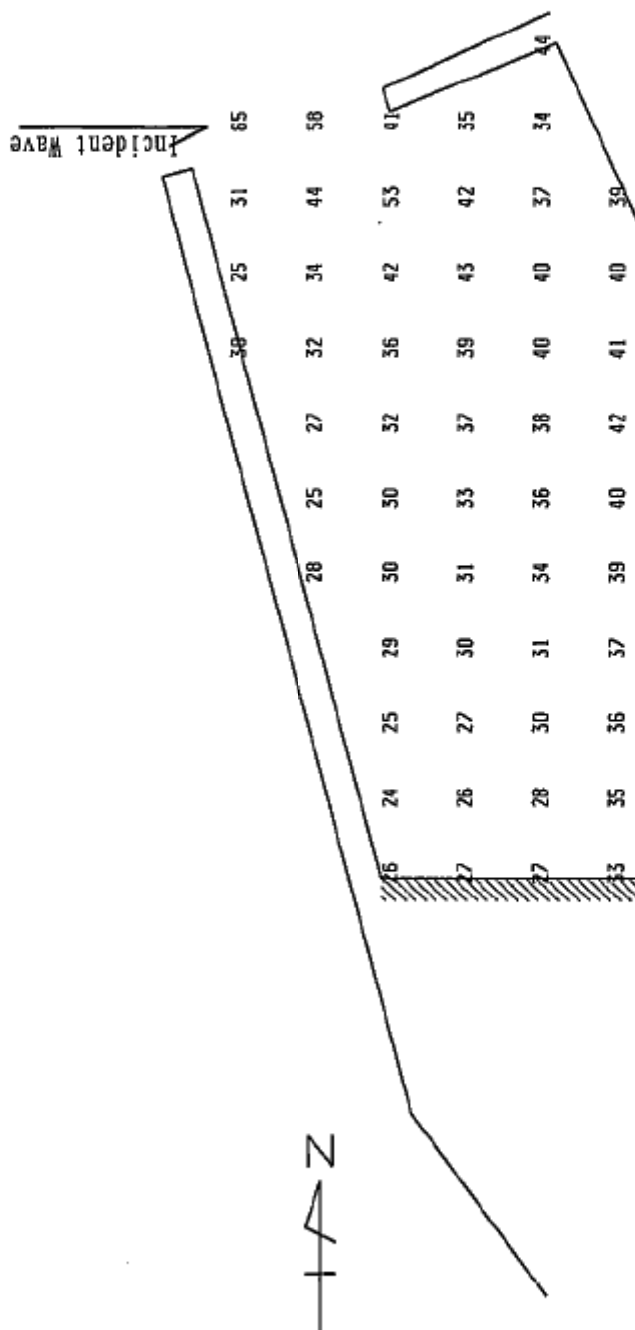
Y	M	D	H	W.D	W.S(M/S)	W.D	H(M)	T(S)	Y	M	D	H	W.D	W.S(M/S)	W.D	H(M)	T(S)
1999	11	11	1	ESE	5.4		.00	.00	1999	11	16	1		.0		.00	.00
			2	SE	5.6	SW	.07	1.44				2		.0		.00	.00
			3	E	5.8		.00	.00				3		.0		.00	.00
			4	E	4.5		.00	.00				4		.0		.00	.00
			5	SE	4.5	SW	.09	1.66				5		.0		.00	.00
			6	ESE	3.1		.00	.00				6		.0		.00	.00
			7	NNE	3.1		.00	.00				7		.0		.00	.00
			8		.0		.00	.00				8	SSE	2.7	SW	.06	1.20
			9	S	3.1	SW	.10	1.30				9	S	5.4	SW	.23	1.87
			10	SSE	3.6	SW	.12	1.67				10	SSE	3.6	SW	.17	2.11
			11	ESE	4.9		.00	.00				11	SSE	6.4	SW	.26	2.39
			12	SE	5.8	SW	.13	1.54				12	S	5.4	SW	.39	2.62
			13	ESE	4.9		.00	.00				13	SSE	5.8	SW	.34	2.83
			14	ESE	4.9		.00	.00				14	SSW	5.8	SSW	.66	2.79
			15	ESE	4.9		.00	.00				15	S	4.5	SW	.42	2.94
			16	E	5.8		.00	.00				16	S	4.5	SW	.44	3.03
			17	E	5.4		.00	.00				17	SSE	4.5	SW	.33	3.02
			18	ENE	5.4		.00	.00				18	SSE	4.9	SW	.36	3.07
			19	ENE	3.6		.00	.00				19	SSE	4.5	SW	.36	3.21
			20	NE	5.4		.00	.00				20	SSE	4.5	SW	.37	3.27
			21	ENE	4.5		.00	.00				21	SSE	3.6	SW	.33	3.47
			22	ENE	5.8		.00	.00				22	SSE	3.6	SW	.10	1.44
			23	E	5.8		.00	.00				23	SSE	3.1	SW	.12	1.72
			24	ENE	6.3		.00	.00				24	SSE	4.5	SW	.18	2.04
12	1			ENE	5.8		.00	.00	17	1			SSE	4.5	SW	.22	2.81
	2			E	7.6		.00	.00		2			SSE	5.8	SW	.30	2.61
	3			ENE	5.8		.00	.00		3			SSE	4.5	SW	.31	2.85
	4			ENE	5.4		.00	.00		4			SSE	5.4	SW	.35	2.96
	5			E	4.9		.00	.00		5			SSE	5.8	SW	.40	3.14
	6			E	5.4		.00	.00		6			SSE	5.4	SW	.42	3.32
	7			E	5.4		.00	.00		7			SSE	5.4	SW	.44	3.43
	8			E	5.4		.00	.00		8			S	3.1	SW	.33	3.01
	9			ESE	4.9		.00	.00		9			SSE	5.8	SW	.18	1.94
	10			E	5.4		.00	.00		10			SSE	5.4	SW	.26	2.40
	11			E	5.4		.00	.00		11			SSE	5.4	SW	.31	2.68
	12			E	5.4		.00	.00		12			SSE	5.4	SW	.34	2.99
	13			E	5.4		.00	.00		13			S	5.4	SW	.48	3.03
	14			ESE	5.4		.00	.00		14			V	5.4	V	.29	1.67
	15			S	5.8	SW	.25	1.84		15			SW	4.5	SW	.31	2.07
	16			S	3.1	SW	.23	2.25		16				.0		.90	.00
	17			ESE	4.5		.00	.00		17				.0		.90	.00
	18			E	3.1		.00	.00		18			NE	2.2		.90	.00
	19			NNE	3.1		.00	.00		19			ENE	3.1		.90	.00
	20				.0		.00	.00		20			ESE	3.6		.90	.00
	21				.0		.00	.00		21			SE	3.1	SW	.95	1.30
	22				.0		.00	.00		22			E	4.5		.90	.00
	23				.0		.00	.00		23			SSE	2.2	SW	.95	1.04
	24				.0		.00	.00		24			S	3.6	SW	.13	1.44
13	1				.0		.00	.00	18	1			S	4.5	SW	.22	1.92
	2			NNE	3.1		.00	.00		2			S	3.6	SW	.24	2.15
	3			NNE	3.1	SW	.08	1.80		3			S	4.9	SW	.32	2.37
	4			SSE	3.1		.00	.00		4			S	3.6	SW	.31	2.59
	5				.0		.00	.00		5			S	3.1	SW	.31	2.82
	6				.0		.00	.00		6			S	3.1	SW	.31	2.83
	7				.0		.00	.00		7			S	3.1	SW	.31	2.84
	8			S	4.5	SW	.18	1.66		8			S	4.5	SW	.37	2.71
	9			SSE	4.5	SW	.18	2.04		9			SSE	3.1	SW	.26	3.09
	10			SSE	4.9	SW	.24	2.35		10			SSW	4.5	SSW	.44	2.57
	11			SSE	4.5	SW	.26	2.67		11			SSW	4.5	SSW	.47	2.71
	12			SSE	4.9	SW	.30	2.72		12			SSW	4.5	SSW	.50	2.83
	13			S	5.4	SW	.44	2.83		13			S	5.4	SW	.45	2.87
	14			S	5.4	SW	.48	3.02		14			S	5.4	SW	.49	3.05
	15			SSW	4.5	SSW	.58	3.12		15			S	5.4	SW	.52	3.20
	16			SSW	3.6	SW	.52	3.39		16			SSW	5.4	SSW	.68	3.24
	17			S	3.6	SW	.36	3.09		17			SSW	5.4	SSW	.71	3.36
	18			SSE	3.6	SW	.27	2.82		18			S	2.7	SW	.25	2.64
	19			SSE	1.8	SW	.09	1.87		19			S	4.5	SW	.18	1.66
	20			SSE	1.8	SW	.04	.83		20			SW	4.9	SW	.32	2.04
	21			S	1.8	SW	.05	.93		21			SSW	4.9	SSW	.40	2.34
	22				.0		.00	.00		22			SSW	4.5	SSW	.43	2.56
	23				.0		.00	.00		23			SSW	2.7	SSW	.31	2.59
	24				.0		.00	.00		24			S	3.6	SW	.13	1.44
14	1				.0		.00	.00	19	1			S	3.1	SW	.16	1.72
	2				.0		.00	.00		2			SSW	3.6	SSW	.24	1.88
	3				.0		.00	.00		3			S	4.9	SW	.28	2.19
	4			S	3.6	SW	.13	1.44		4			SSW	5.4	SSW	.46	2.46
	5			SSW	3.1	SSW	.18	1.68		5			S	5.8	SW	.42	2.71
	6				.0		.00	.00		6			S	4.9	SW	.45	2.95
	7				.0		.00	.00		7			SSW	4.9	SSW	.50	3.00
	8				.0		.00	.00		8			SSW	5.4	SSW	.64	3.12
	9				.0		.00	.00		9			SSW	5.8	SSW	.71	3.25
	10				.0		.00	.00		10			SSW	6.3	SSW	.79	3.41
	11			SW	3.6	SW	.16	1.44		11			SSW	5.8	SSW	.62	3.59
	12			SW	4.9	SW	.31	1.88		12			SSW	6.7	SSW	.82	3.69
	13			W	4.9	W	.36	2.19		13			SSW	8.1	SSW	1.08	3.87
	14			SW	4.9	SW	.38	2.28		14			SSW	8.1	SSW	1.19	4.12
	15			WSW	4.5	WSW	.41	2.46		15			SSW	6.7	SSW	1.18	4.37
	16			W	5.4	W	.49	2.61		16			WSW	6.3	WSW	.89	3.97
	17			W	5.4	W	.56	2.85		17			SW	7.6	SW	1.08	3.94
	18			W	4.5	W	.56	3.04		18			SW	6.3	SW	1.07	4.19
	19			W	5.8	W	.66	3.10		19			SW	8.5	SW	1.26	4.21
	20			W	5.4	W	.69	3.29		20			SW	7.6	SW	1.30	4.45
	21			WSW	5.4	WSW	.70	3.31		21			SW	8.1	SW	1.39	4.68
	22			WSW	4.9	WSW	.71	3.45		22			SW	8.1	SW	1.46	4.73
	23			WSW	5.8	WSW	.78	3.48		23			WSW	8.5	WSW	1.50	4.72
	24			WSW	5.4	WSW	.80	3.63		24			WSW	7.6	WSW	1.51	4.94
15	1			WSW	5.4	WSW	.82	3.70	20	1			WSW	8.1	WSW	1.59	5.00
	2			W	6.3	W	.87	3.63		2			WSW	10.7	WSW	1.85	5.05
	3			WSW	5.4	WSW	.82	3.71		3			WSW	9.8	WSW	1.93	5.33
	4			WSW	5.8	WSW	.87	3.75		4			WSW	8.5	WSW	1.82	5.59
	5			WSW	.4	WSW	.91	.49		5			W	9.8	W	2.00	5.44
	6			WSW	5.4	WSW	.29	1.87		6			W	8.9	W	2.01	5.66
	7			WSW	4.9	WSW	.38	2.27		7			W	9.6	W	2.14	5.70
	8			WSW	4.9	WSW	.45	2.53		8			W	10.3	W	2.26	5.83
	9			SSW	5.4	SSW	.47	2.63		9			W	10.7	W	2.39	5.96
	10			SW	4.9	SW	.49	2.70		10			W	9.8	W	2.41	6.18
	11			WSW	4.9	WSW	.52	2.89		11			W	8.1	W	2.30	6.55
	12			WSW	6.7	WSW	.66	3.64		12			W	8.9	W	2.40	6.41
	13			WSW	5.4	WSW	.70	3.39		13							

Harbor Tranquility

Table A5.7-1 List of Average Wave Height

Wave Condition	Port Layout	Wave Height Ratio	
		Landing Wharf	Idling Wharf
Ordinary Waves Direction : W Period : 8s	Type A	0.48	0.45
	Type B	0.46	0.44
	Type C	0.46	0.43
	Type D	0.49	0.44
Ordinary Waves Direction : SW Period : 8s	Type A	0.27	0.20
	Type B	0.26	0.19

Type	Varied Harbor Layout
A	Slipway alone absorbs waves
B	Slipway and the tip portion of the breakwater (on the basin side) equipped with WAB (Wave Absorbed Blocks) absorb waves.
C	Slipway and the entire breakwater (on the basin side) equipped with WAB absorb waves.
D	Slipway and the tip portion of the breakwater (on the basin side) equipped with permeable WAB absorb waves.

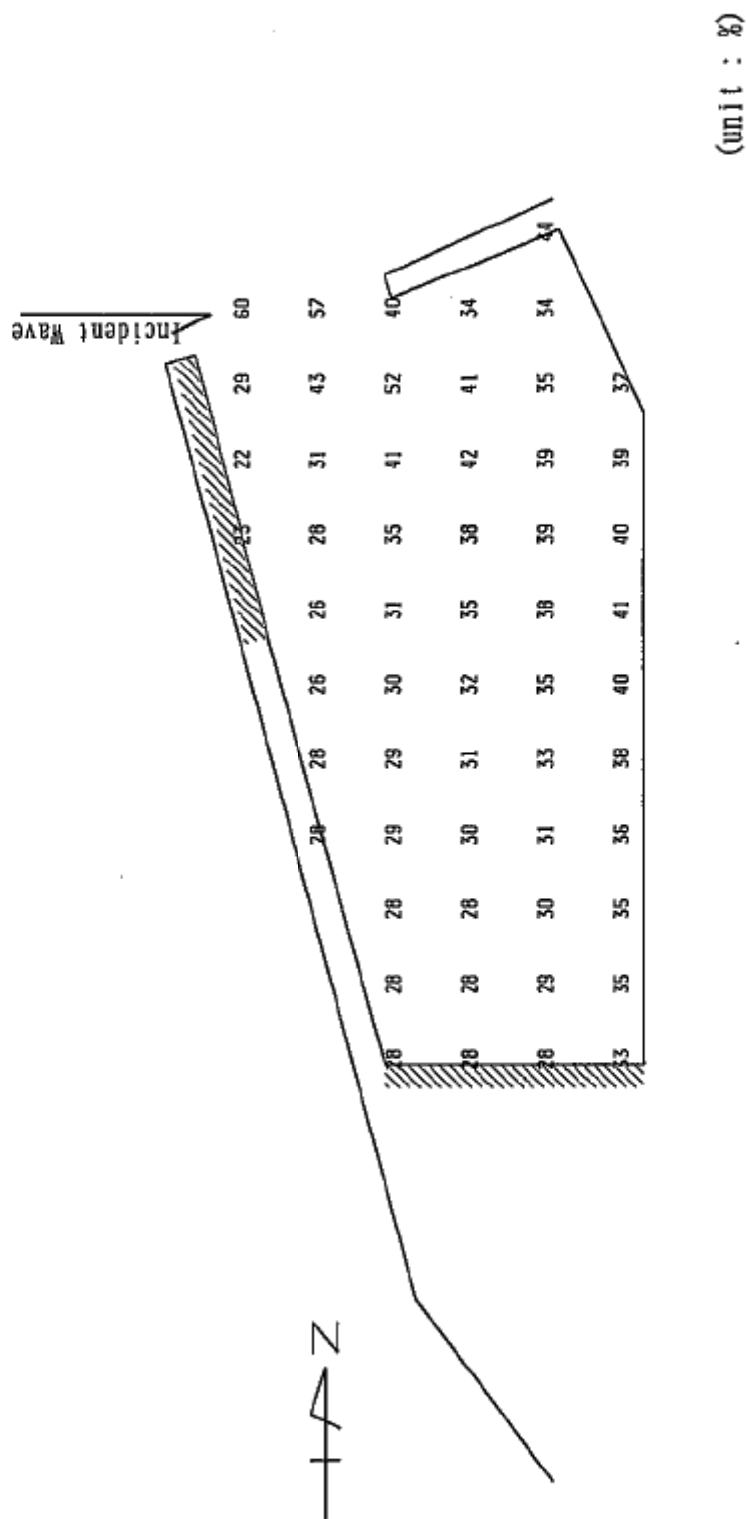


(unit : %)

W. Direction	W
W. Height	1.0
W. Period	8.0 sec
Spreading Parameter	25



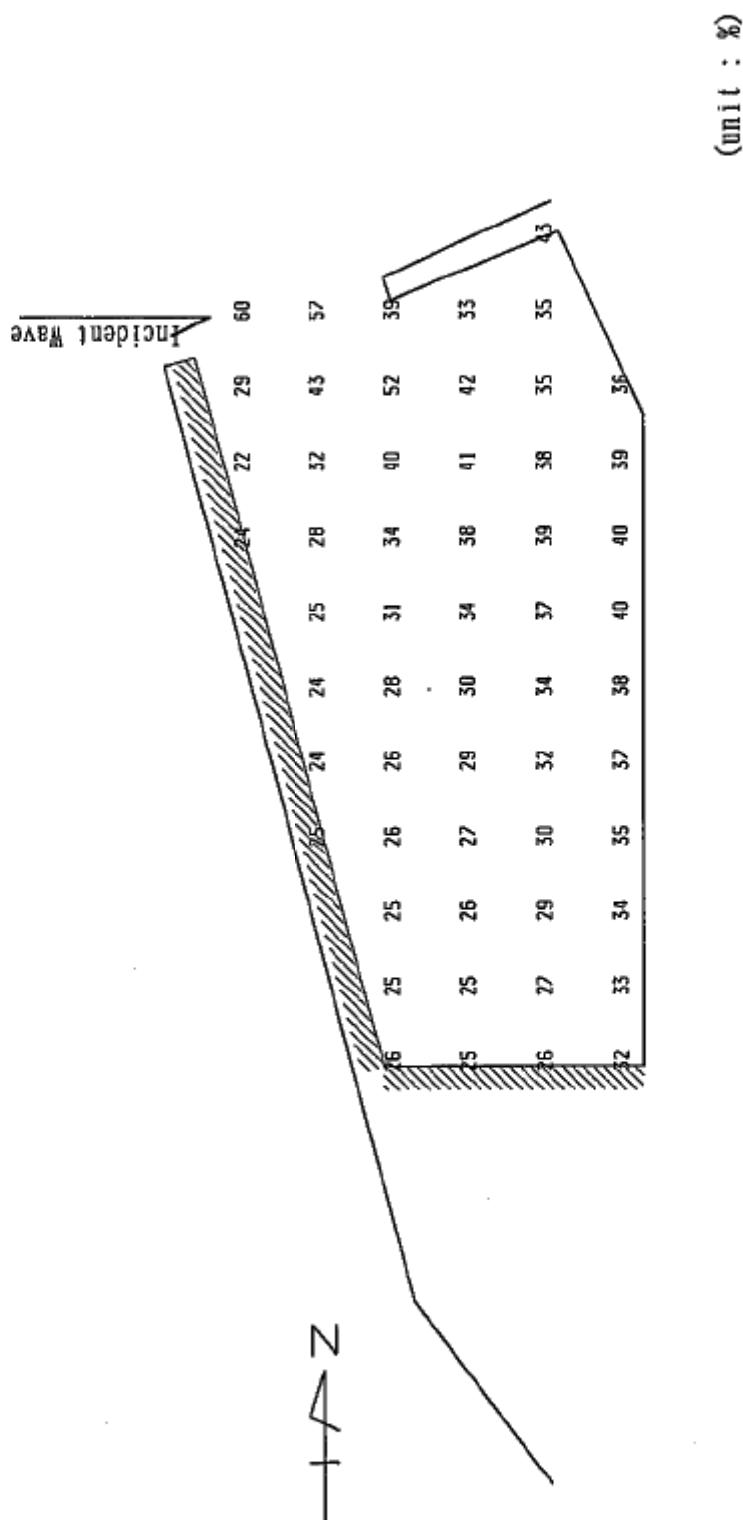
Figure A5.7-2(1) Distribution of Wave Height Ratio



W. Direction	W
W. Height	1.0
W. Period	8.0 sec
Spreading Parameter	25



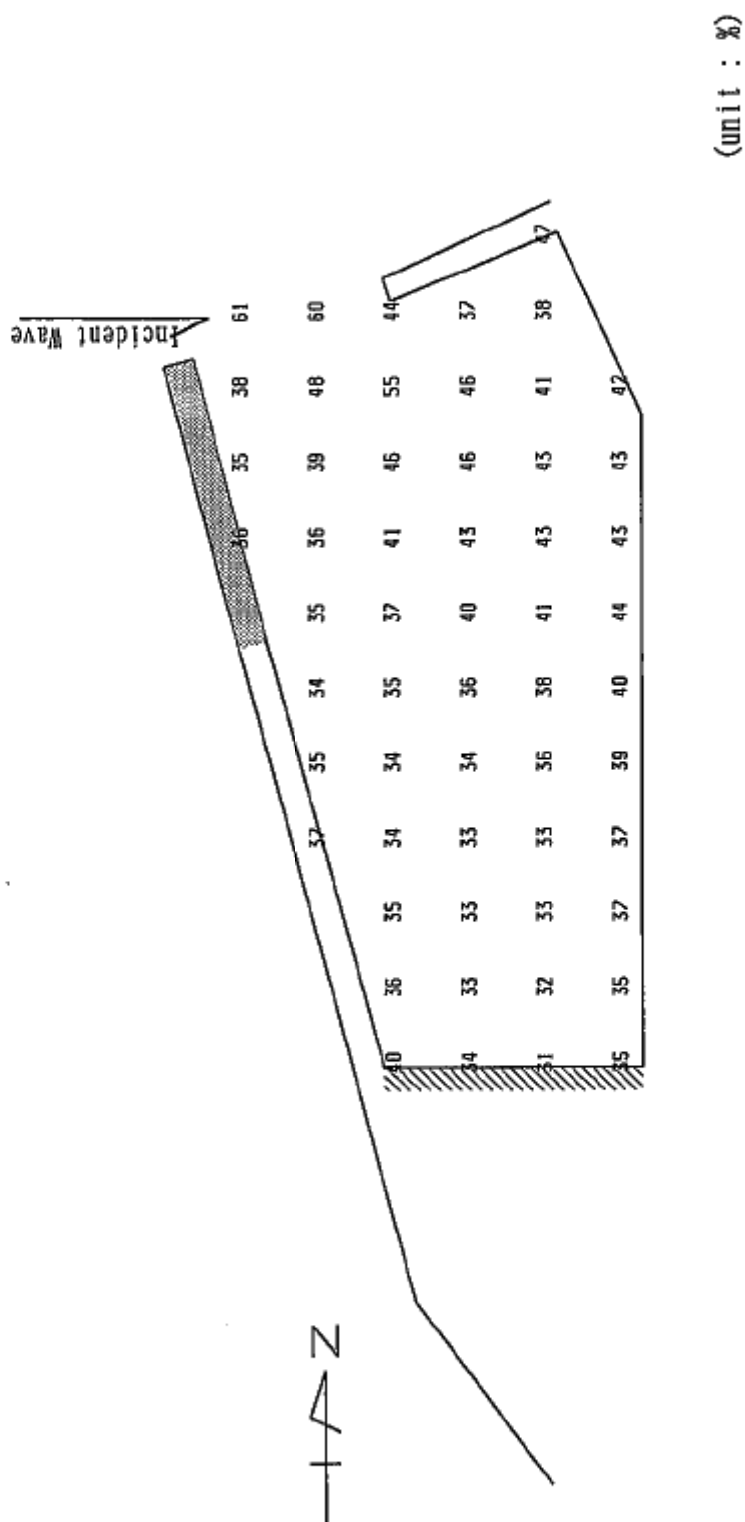
Figure A5.7-2(2) Distribution of Wave Height Ratio



W. Direction	W
W. Height	1.0
W. Period	8.0 sec
Spreading Parameter	25



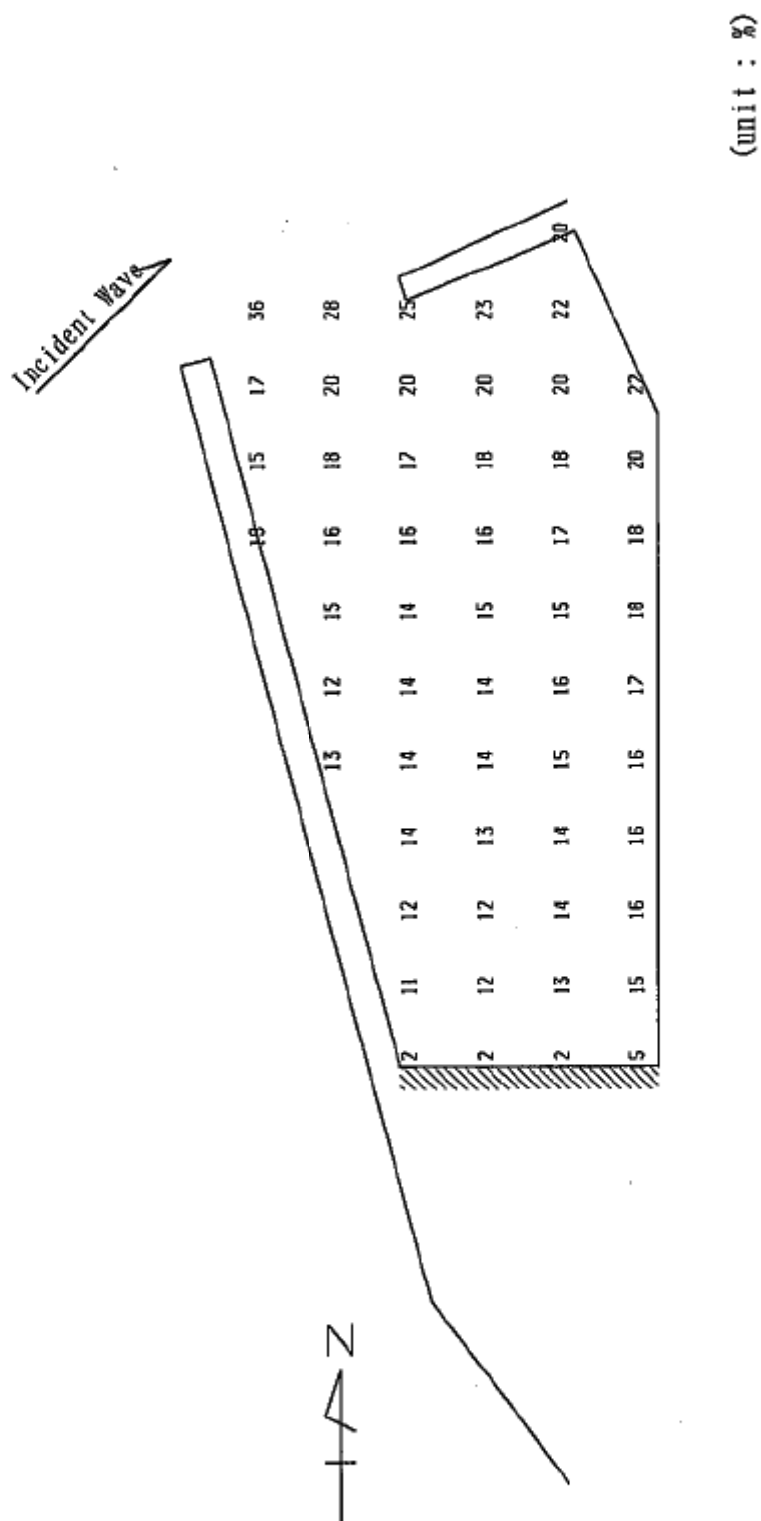
Figure A5.7-2(3) Distribution of Wave Height Ratio



W. Direction	W
W. Height	1.0
W. Period	8.0 sec
Spreading Parameter	25



Figure A5.7-2(4) Distribution of Wave Height Ratio



W. Direction	SW
W. Height	1.0
W. Period	8.0 sec
Spreading Parameter	25

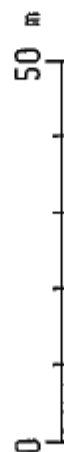


Figure A5.7-2(5) Distribution of Wave Height Ratio

Harbor Tranquility by Long Period Waves

Table A5.7-2 Wave Height Ratio by Long Period Waves

Wave Condition	Harbor Layout	Wave Height Ratio	
		Landing Wharf	Idling Wharf
Ordinary Waves Direction : W Period : 125s	Upright Structure in Harbor	5.6	7.0
	Slipway alone absorbs waves	1.7	1.8
	Slipway and the tip portion of the breakwater (on the basin side) equipped with WAB	1.1	1.2

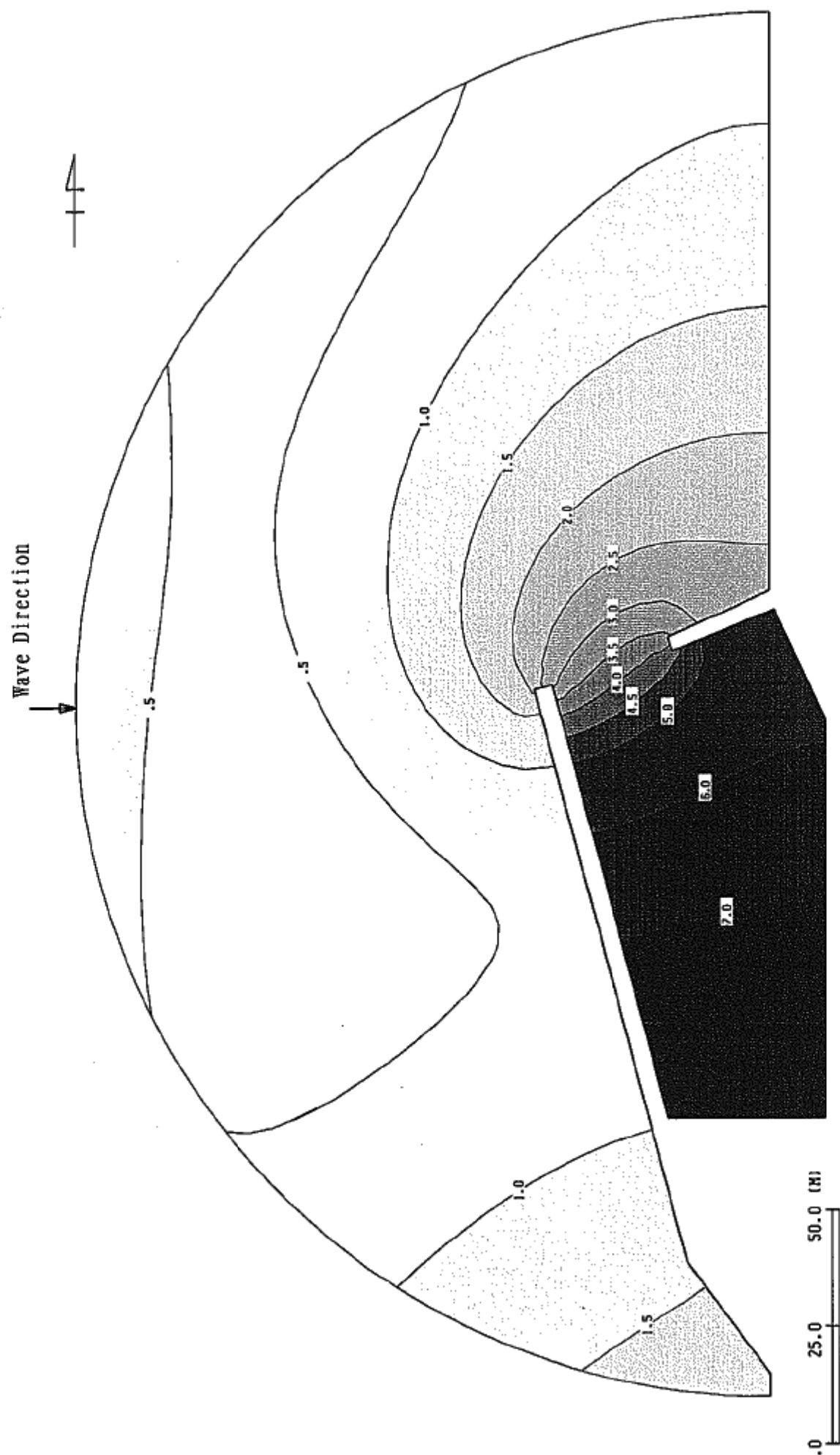


Figure A5.7-3(1) Distribution of Wave Height Ratio by Long Period Waves (upright Structures in Harbor)

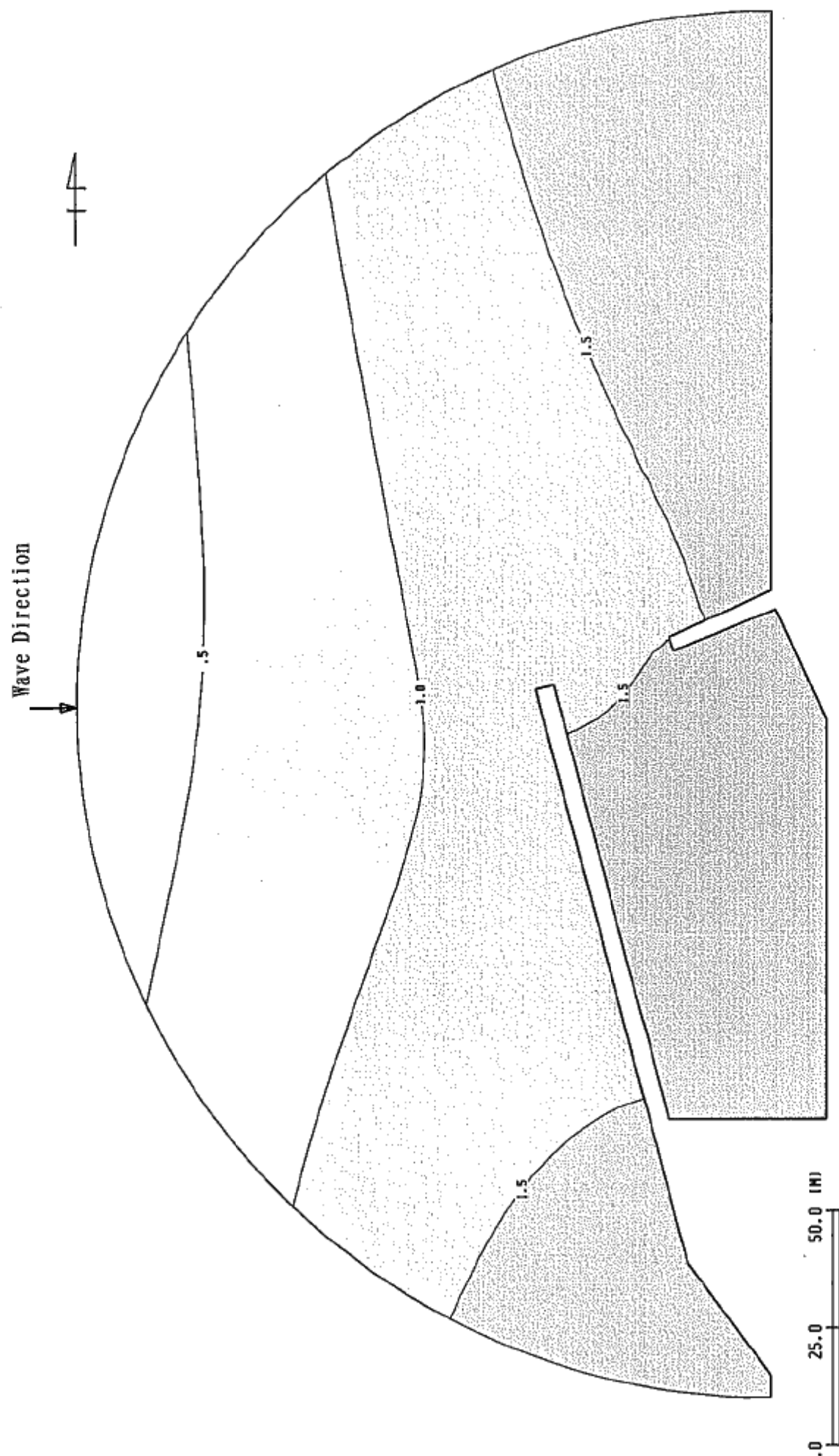


Figure A6.7-8(2) Distribution of Wave Height Ratio by Long Period Waves 125.00sec 270°
(Wave Absorption Structures in Harbor Back)

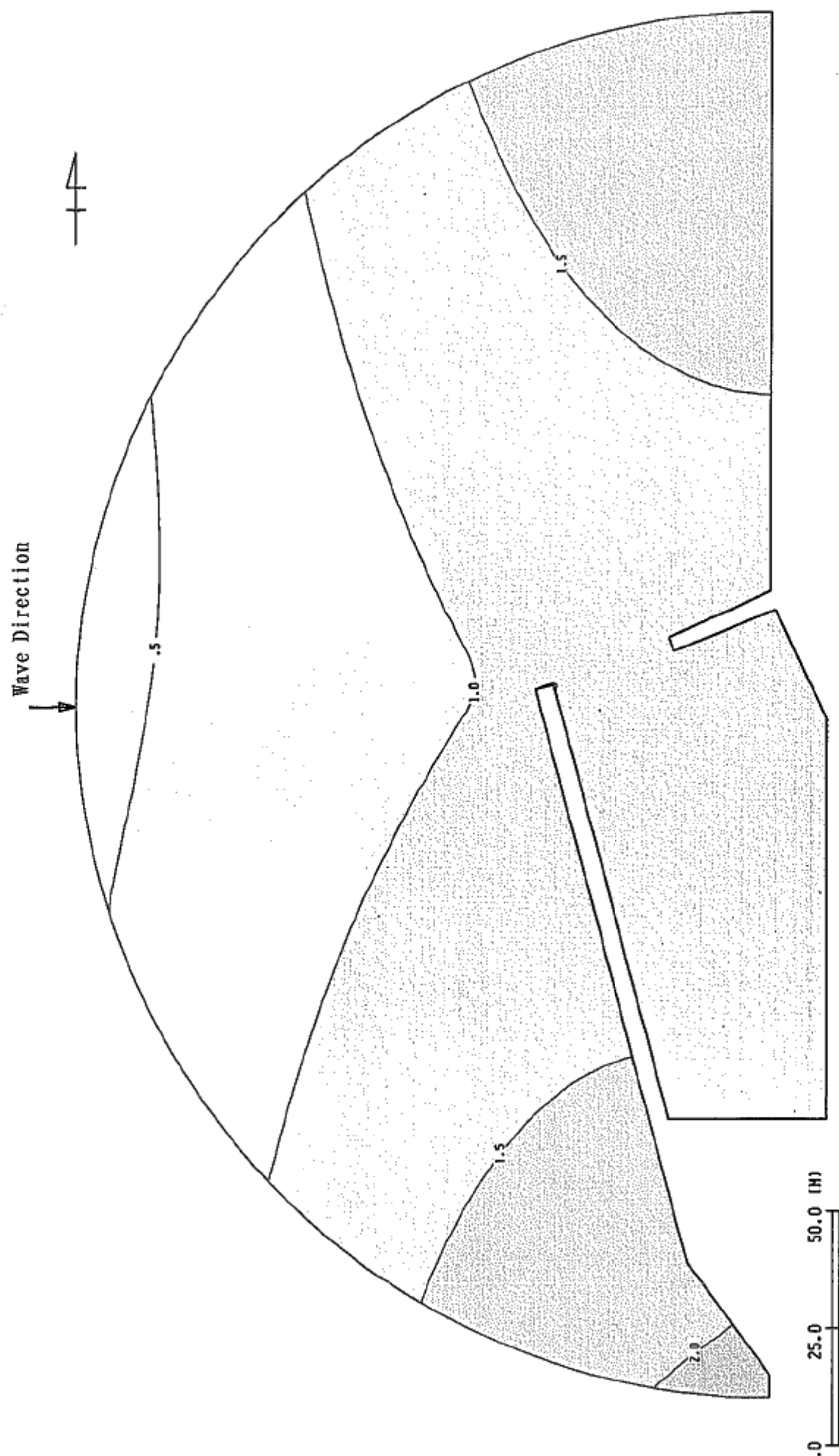


Figure A5.7-3(3) Distribution of Wave Height Ratio by Long Period Waves 125.00sec 270°
(Wave Absorption Structures in Harbor Back and Back side of Tip of Breakwater)

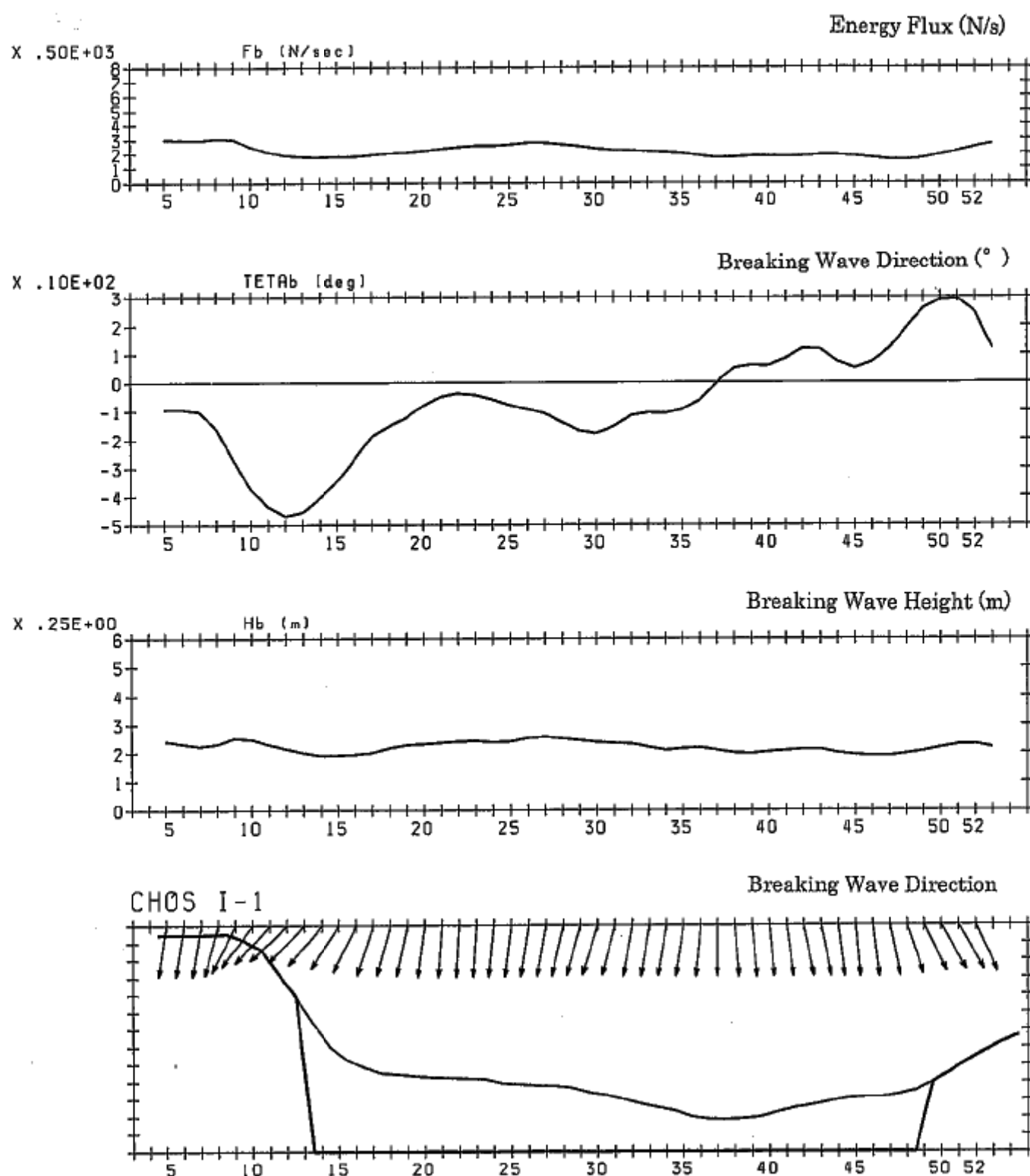


Figure A5.7-4(1) Result of Shore Line Changes Calculation

(Distribution of Breaking Wave Conditions at Present Condition)

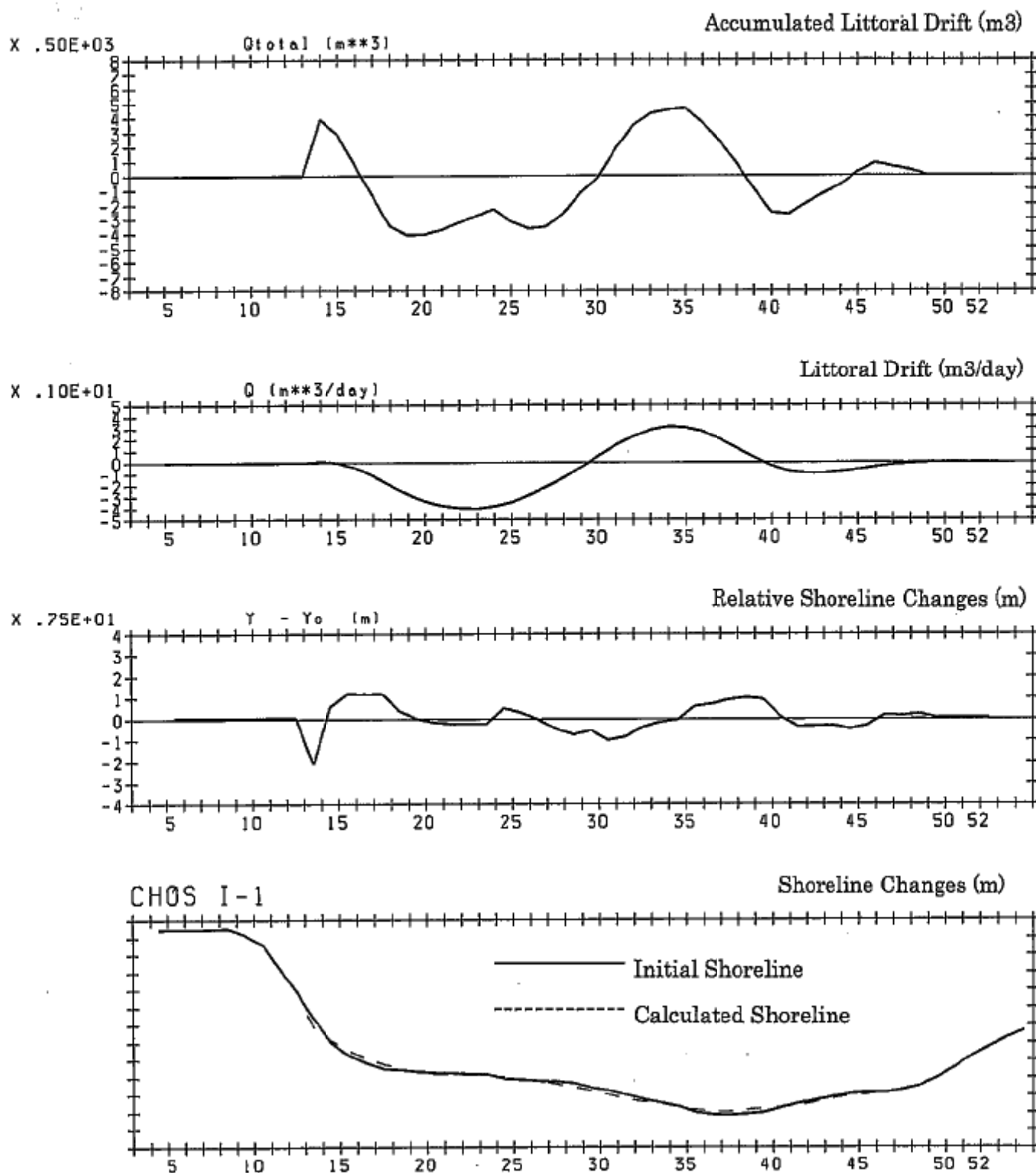


Figure A5.7-4(2) Result of Shore Line Changes Calculation (Shore Line Changes at Present Condition)

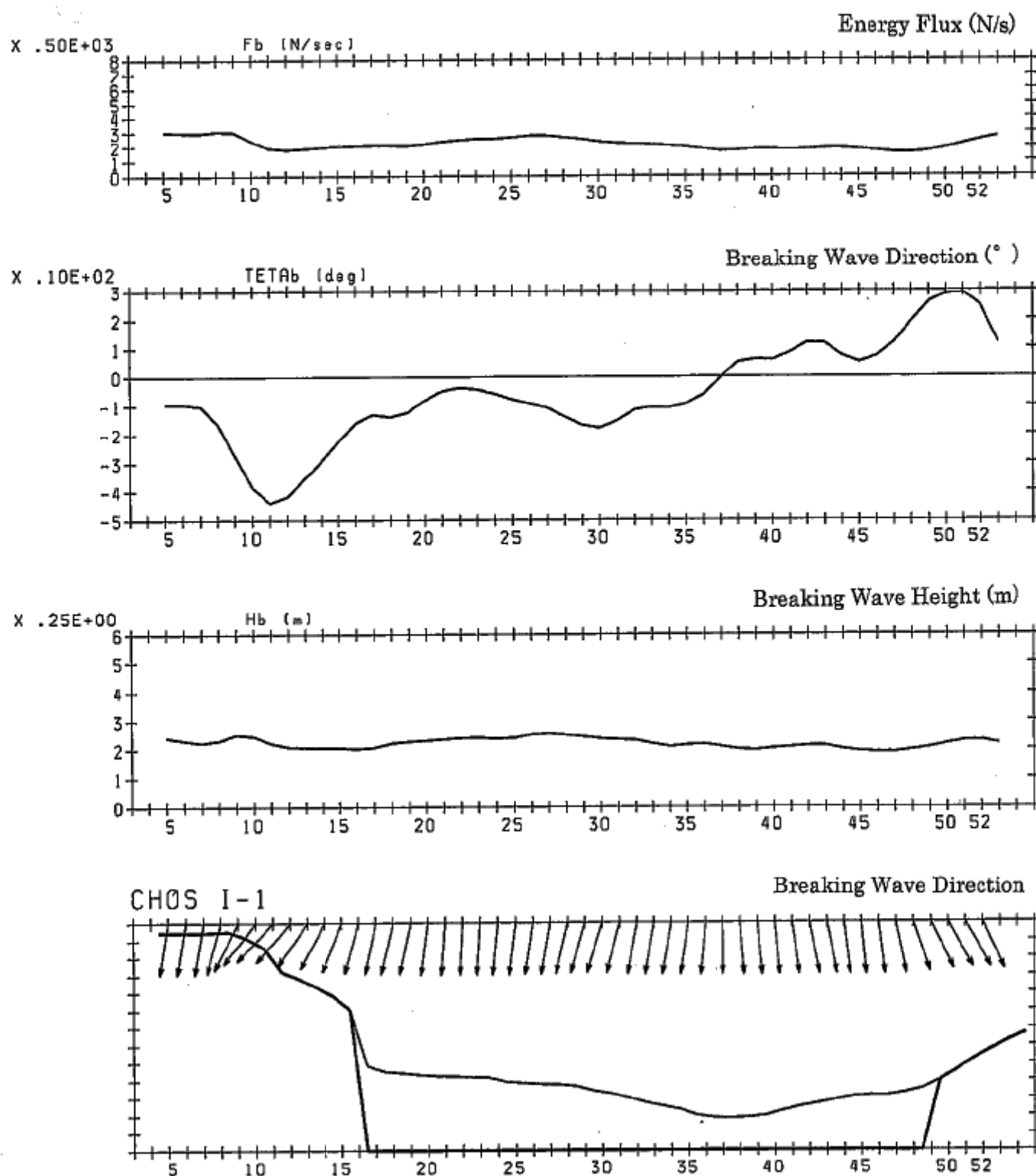


Figure A5.7-4(3) Result of Shore Line Changes Calculation

(Distribution of Breaking Wave Conditions after Construction of Breakwater)

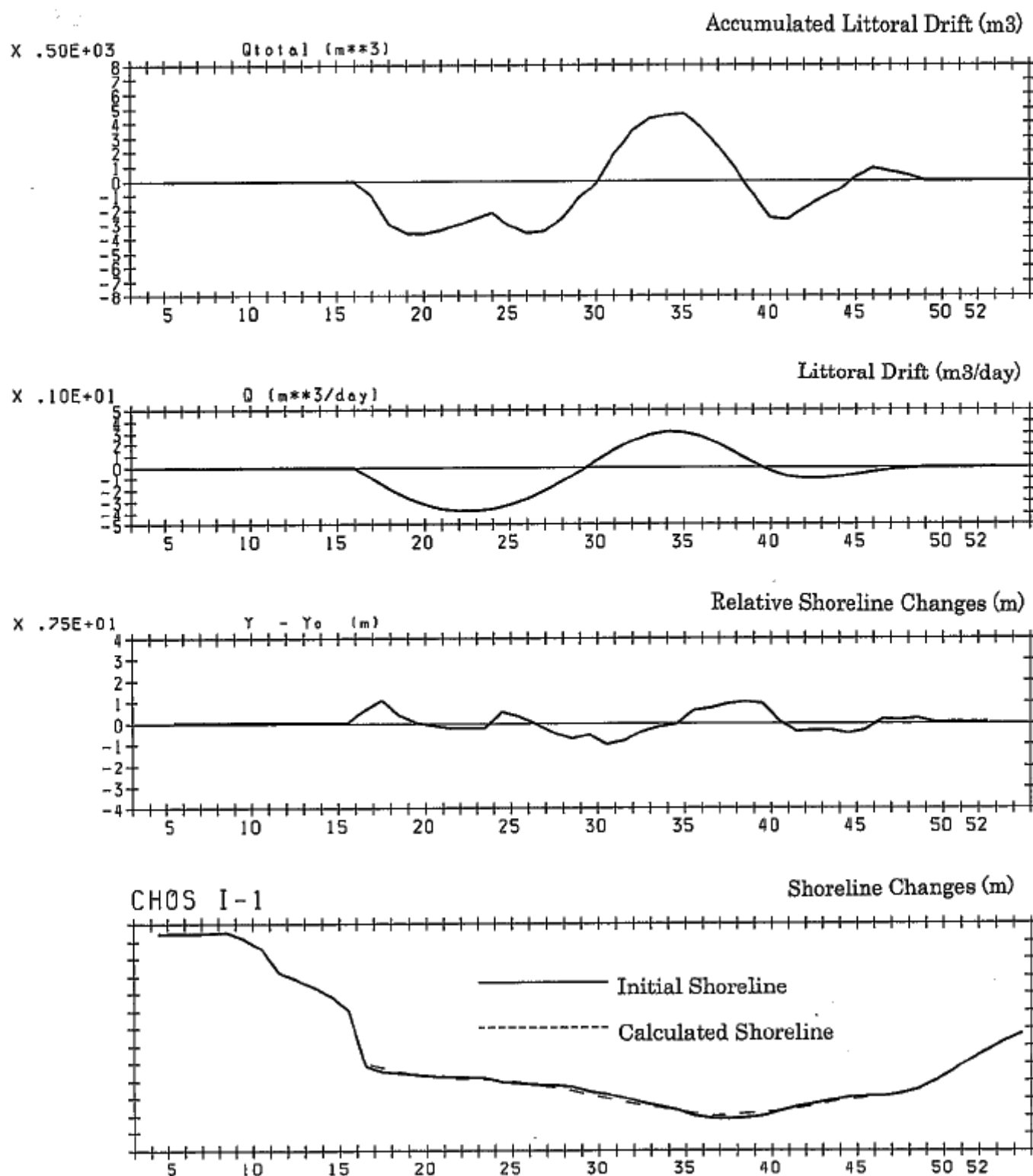


Figure A5.7-4(4) Result of Shore Line Changes Calculation

(Shore Line Changes after Construction of Breakwater)



Incident Wave

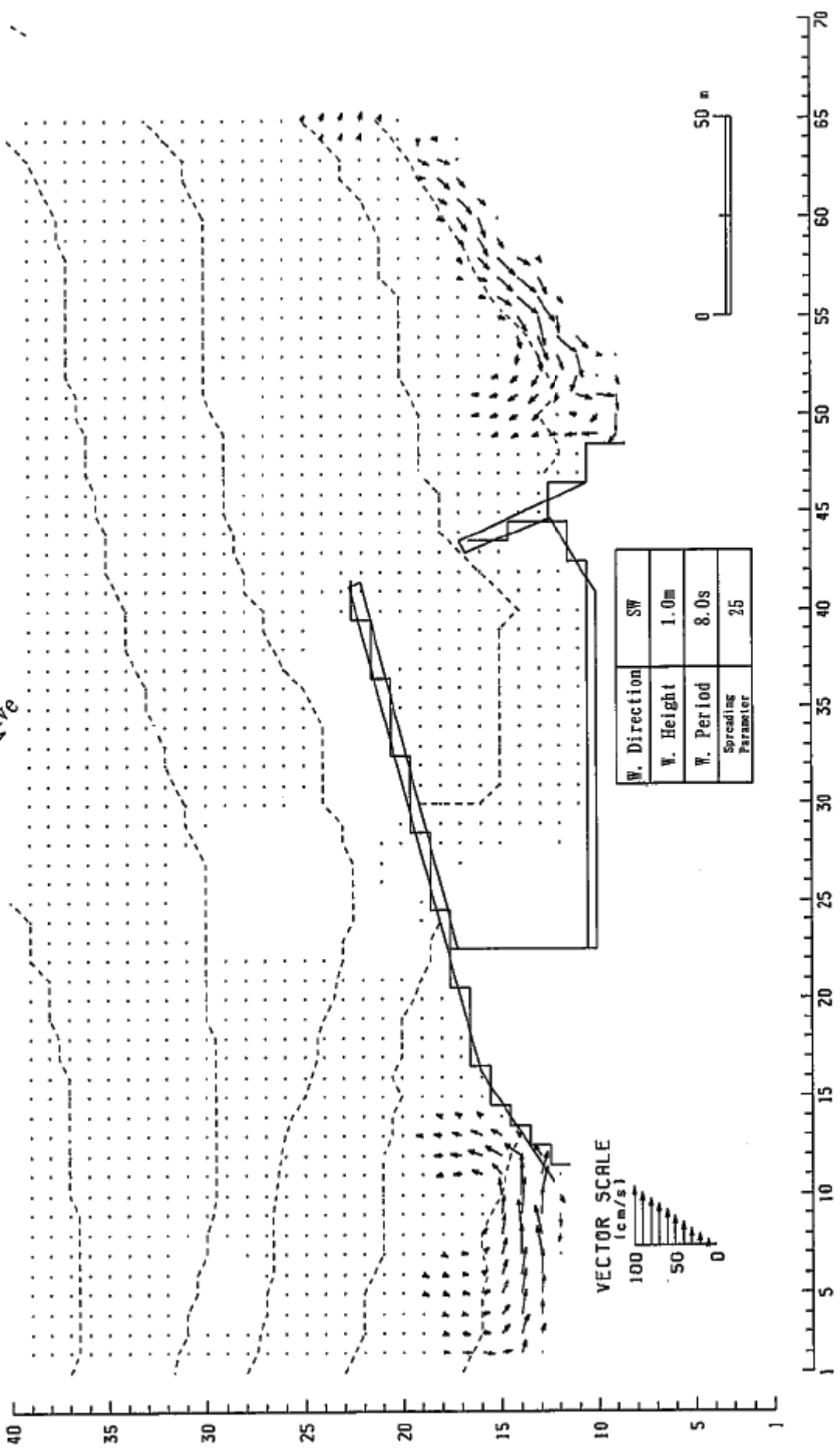


Figure A5.7-5(1) Distribution of Current

Incident Wave

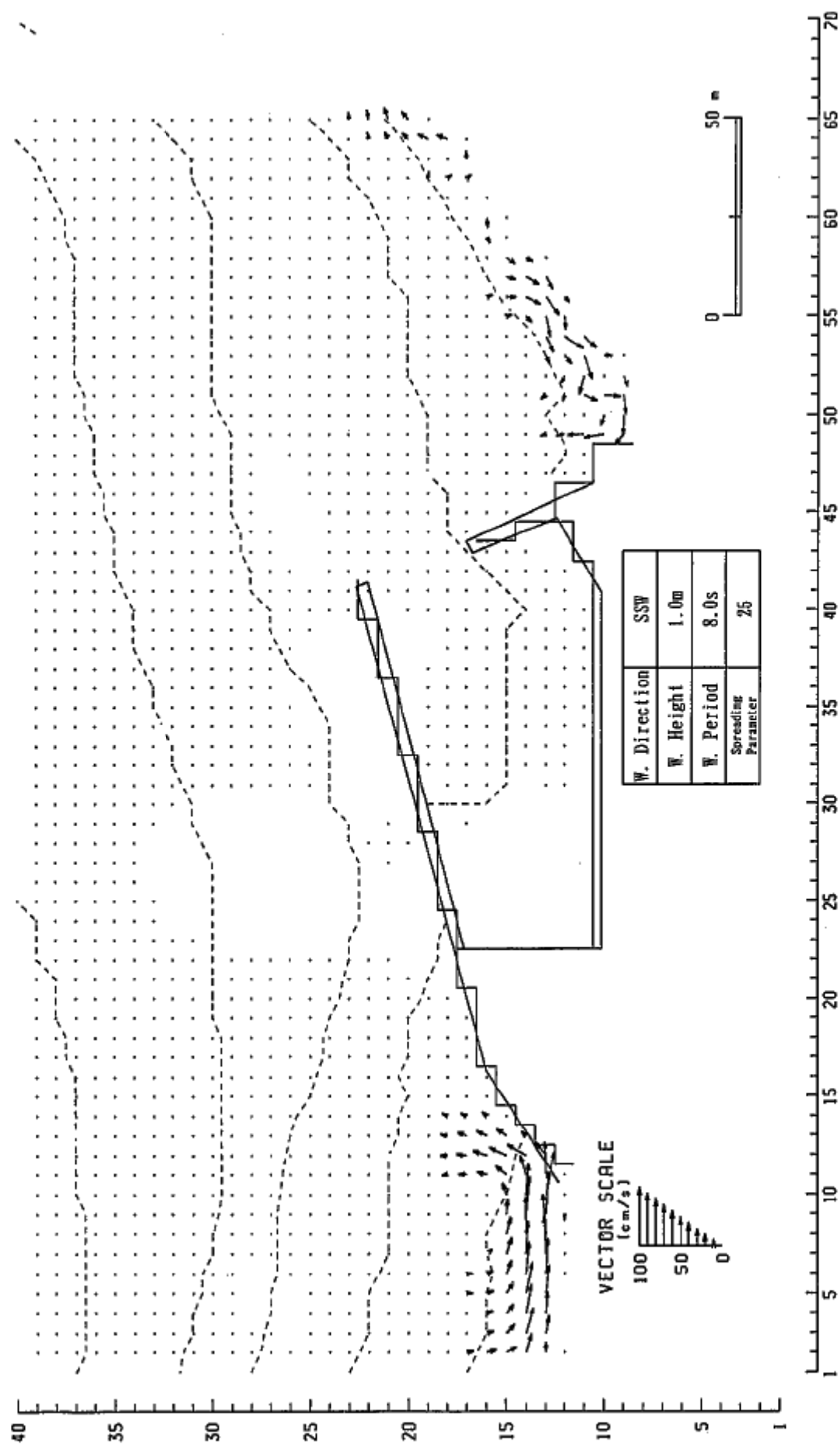


Figure A5.7-5(3) Distribution of Current

Incident Wave

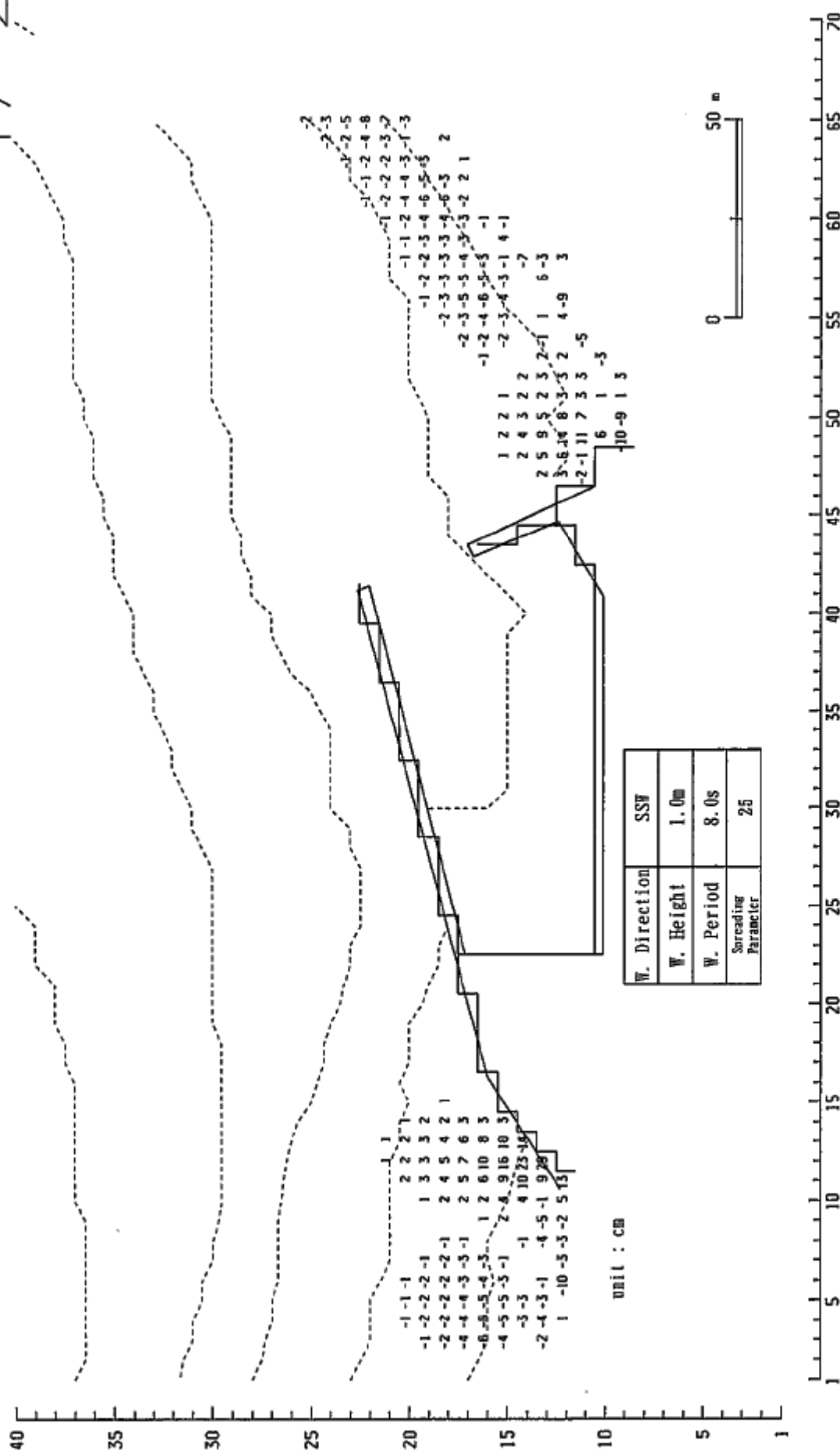


Figure A5.7-5(4) Distribution of Sea Bottom Changes

Study of Sedimentation of the Harbor at Choiseul

Analysis has been made regarding sediments deposited in the harbor caused by long period waves on the basis of the following assumptions.

1. Long period waves of 1cm high with 125 seconds wash the port 5 days a year.
2. The current speed caused by the above waves is 2cm/second and it lasts for a half period.
3. The concentration of suspended sediments at the entrance of the harbor is 50mg/litre or grams/m³.
4. The cross section of the harbor mouth has the area of 15m x 2m and the entire quantity of the suspended sediments, which flow in the harbor, will be deposited in the harbor.

The results of the analysis are as follows.

1. The quantity of water mass which flows in the harbor per one period.
 $15\text{m} \times 2\text{m} \times 0.02\text{m/s} \times 62.5\text{s} = 37.5\text{m}^3$
2. Number of waves which wash the harbor per one hour
 $24 \times 3600 \text{ s} / 125\text{s} = 691 \text{ waves}$
3. Volume of sand which flows in the harbor per year
 $1.3 \text{ tons} \times 5 \text{ days} = 6.5 \text{ tons}$
4. Average rate of sedimentation
 $6.5 \text{ tons} / 5000\text{m}^2 \text{ (the area of the harbor)} = 1.3\text{mm/year}$

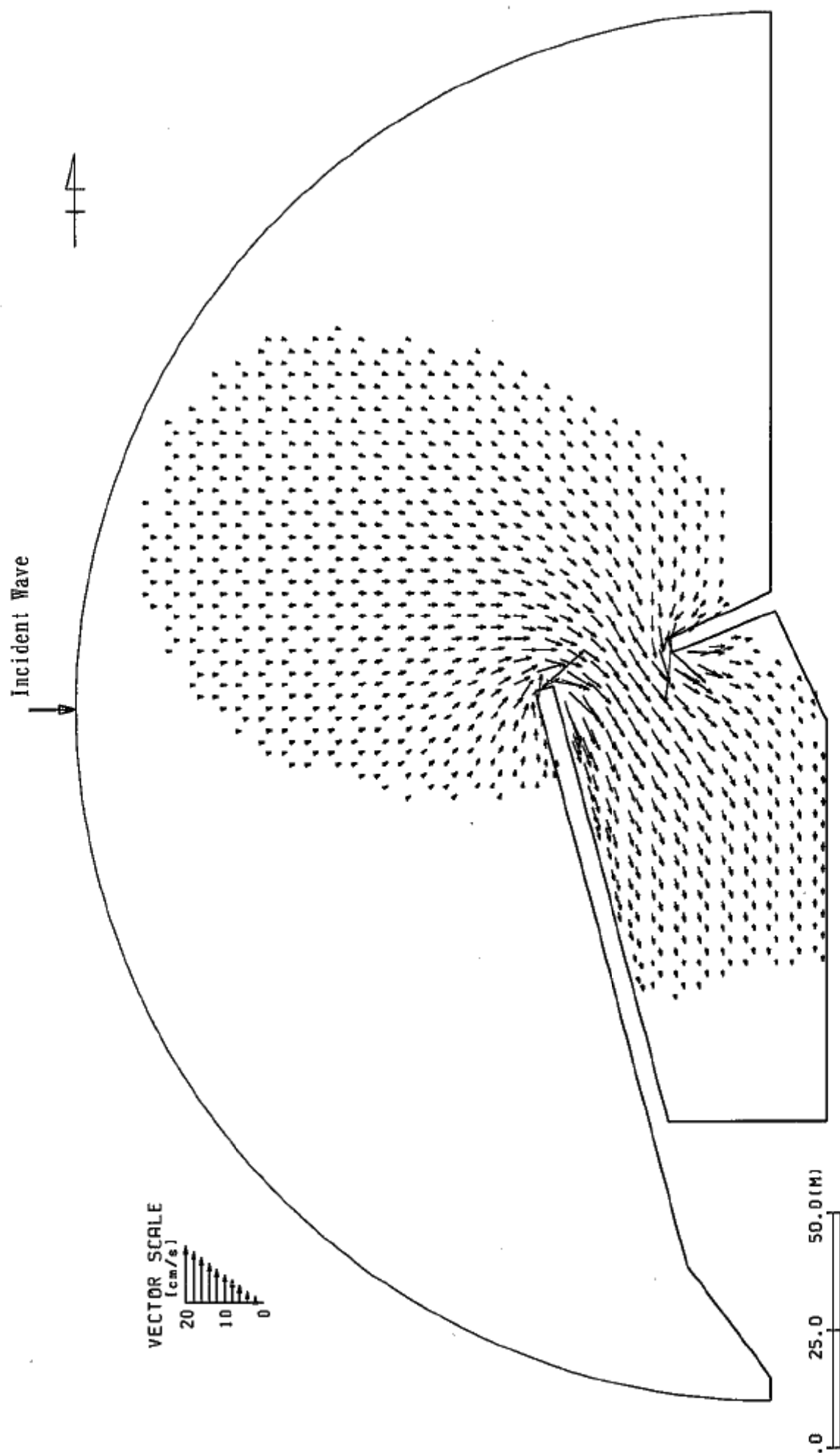


Figure A5.7-6(1) Distribution of Current by Long Period Waves (Uptight Construction in Harbor)
(Condition which current velocity toward harbor is the largest)

125.00sec 270°

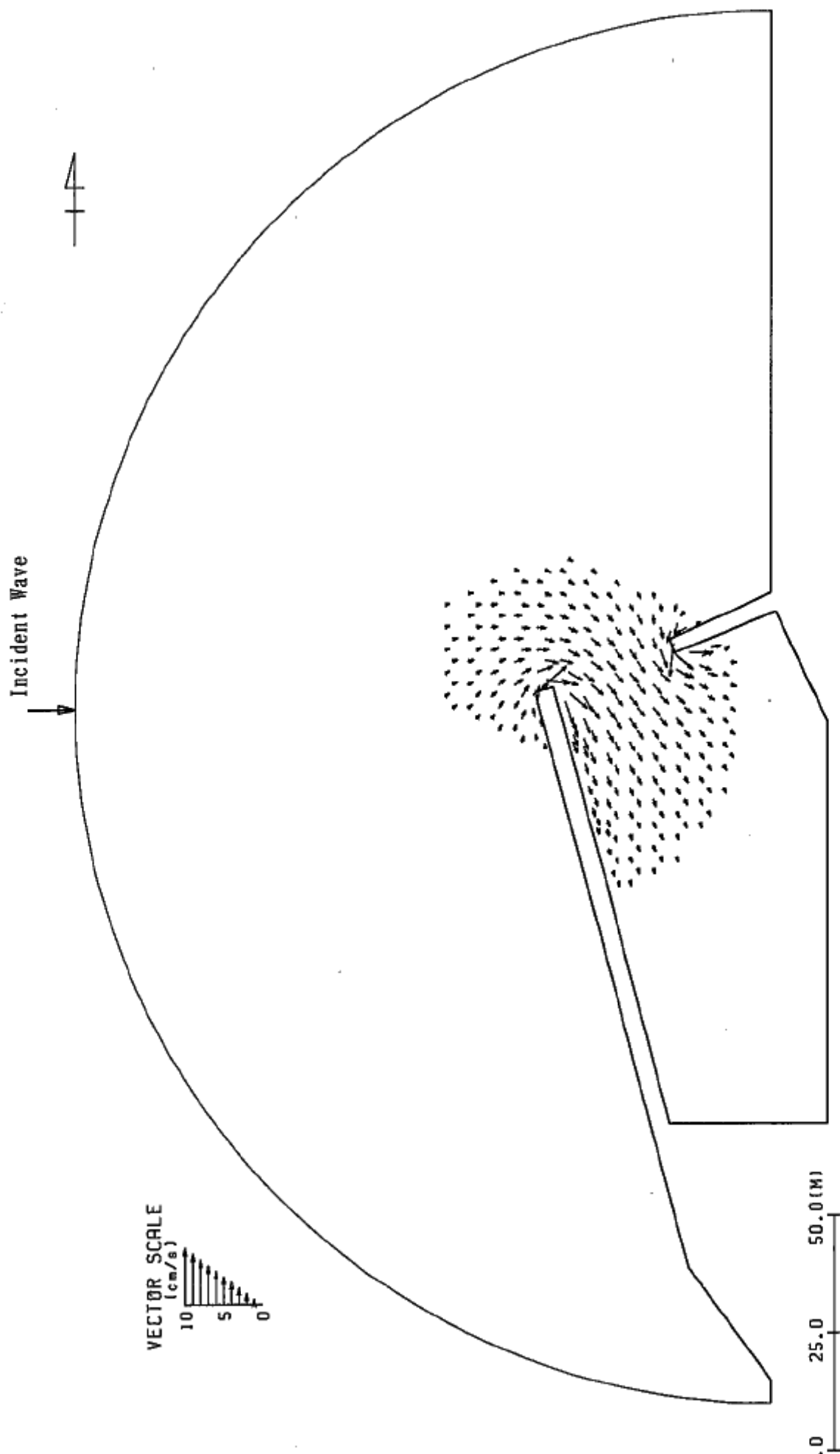


Figure A5.7-6(2) Distribution of Current by Long Period Waves (Slipway alone absorbs waves)
(Condition which current velocity toward harbor is the largest)

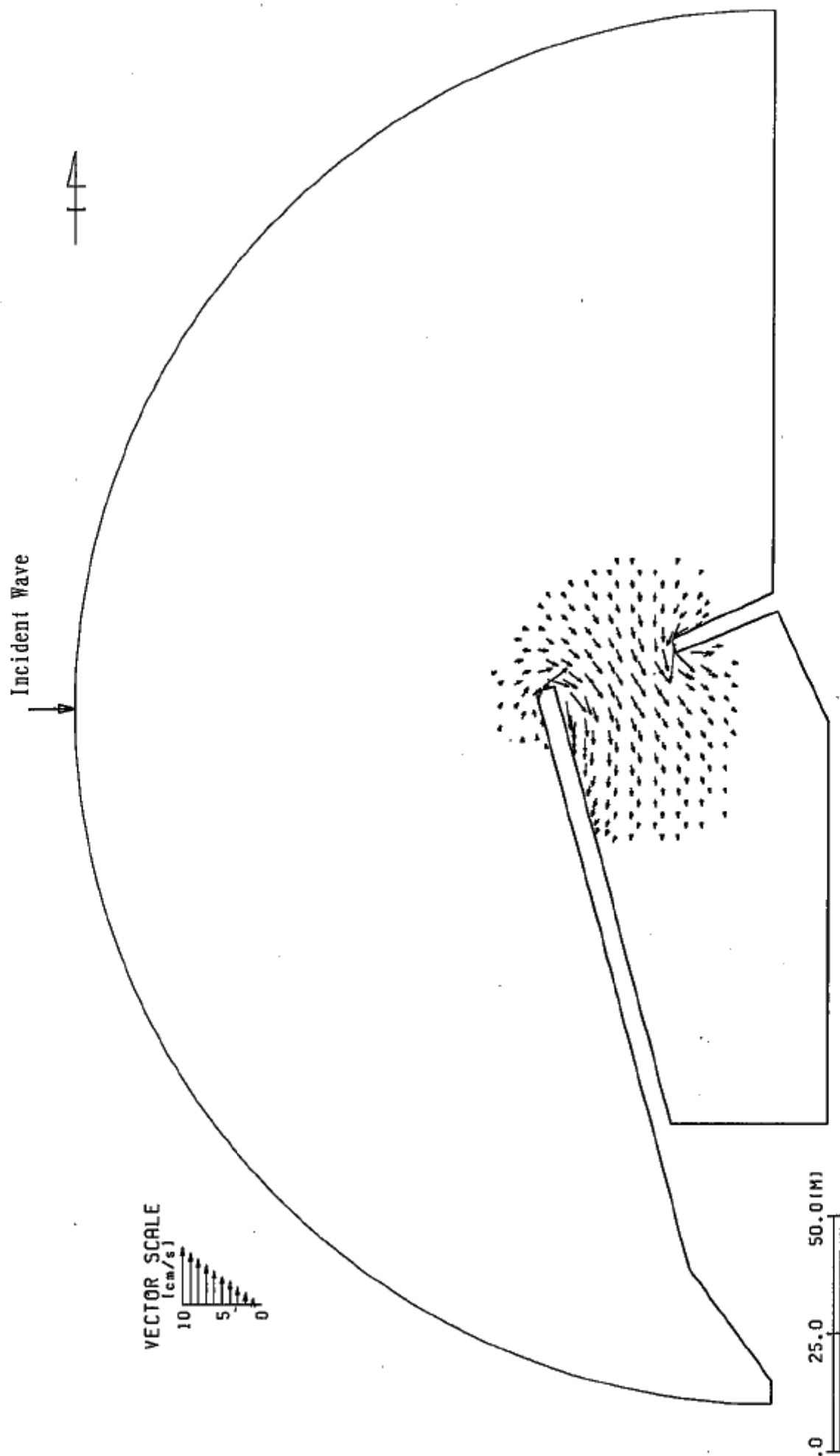


Figure A5.7-6(3) Distribution of Current by Long Period Waves
 (Slipway and Tip Portion of Breakwater (on the basin side) absorb waves)
 (Condition which current velocity toward harbor is the largest)