

MINISTRY OF RESOURCES AND DEVELOPMENT  
REPUBLIC OF THE MARSHALL ISLANDS

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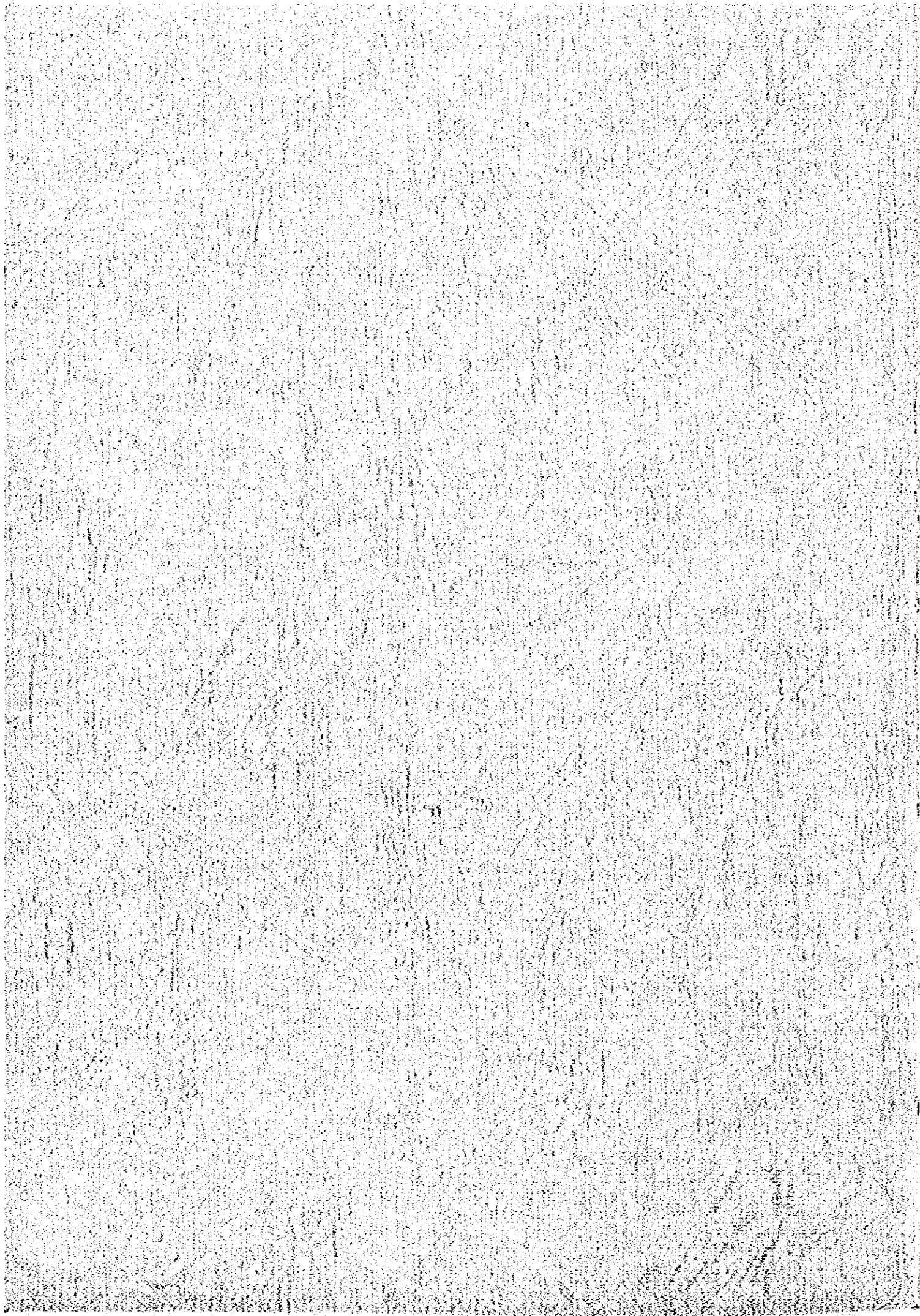
**BASIC DESIGN STUDY REPORT  
ON  
THE PROJECT FOR THE IMPROVEMENT OF  
THE FISH MARKETING SYSTEM  
IN THE OUTER ISLANDS (PHASE II)  
IN  
THE REPUBLIC OF THE MARSHALL ISLANDS**

**February, 1996**



**JAPAN INTERNATIONAL COOPERATION AGENCY  
CRC OVERSEAS COOPERATION Inc.**

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## PREFACE

In response to a request from the Government of Republic of the Marshall Islands, the Government of Japan decided to conduct a basic design study on the Project for the Improvement of the Fish Marketing System in the Outer Islands (Phase II) and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Marshall Islands a study team from September 17 to October 25, 1995.

The team held discussions with the officials concerned of the Government of the Republic of the Marshall Islands, and conducted a field study at the study area. After the team returned to Japan, further studies were made, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Republic of the Marshall Islands for their close cooperation extended to the teams.

February, 1996



Kimio Fujita  
President

Japan International Cooperation Agency





February, 1996

Mr. Kimio Fujita  
President  
Japan International Cooperation Agency  
Tokyo, Japan

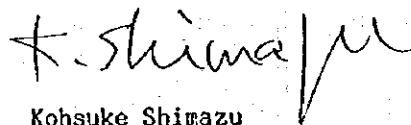
### Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Improvement of the Fish Marketing System in the Outer Islands (Phase II) in the the Republic of the Marshall Islands.

This study was conducted by CRC Overseas Cooperation Inc., under a contract to JICA, during the period from September 13, 1995 to March 4, 1996. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of the Marshall Islands and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,



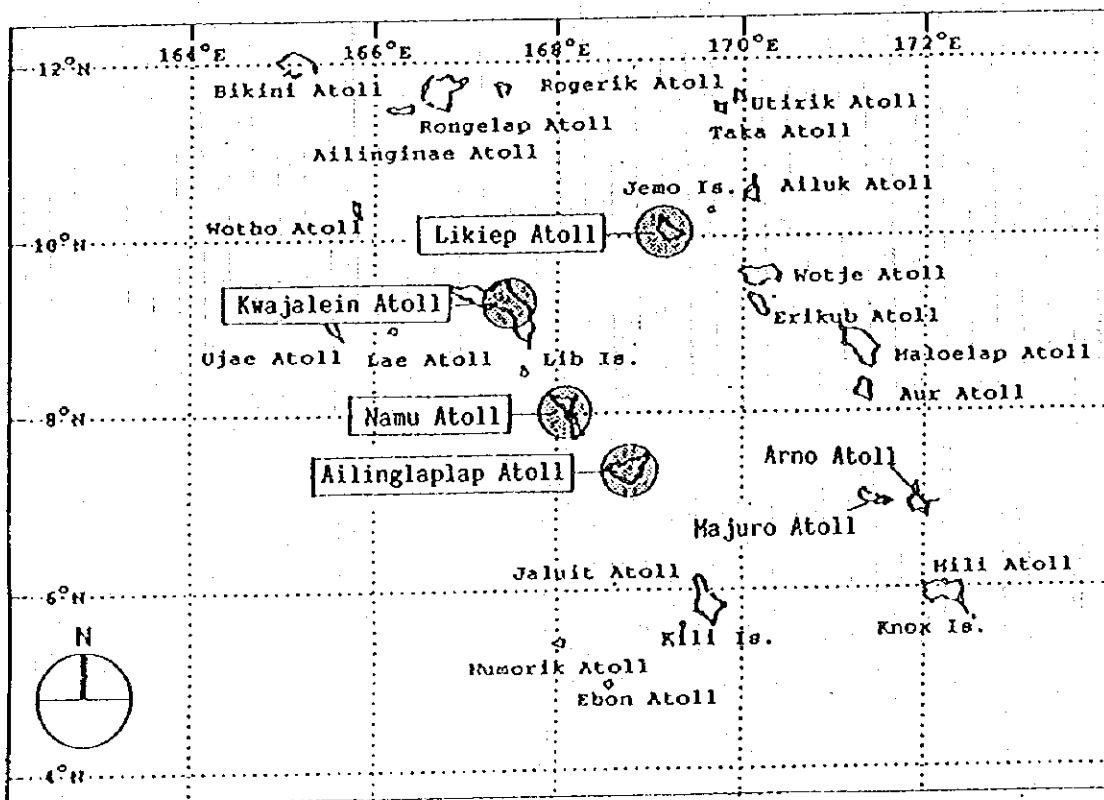
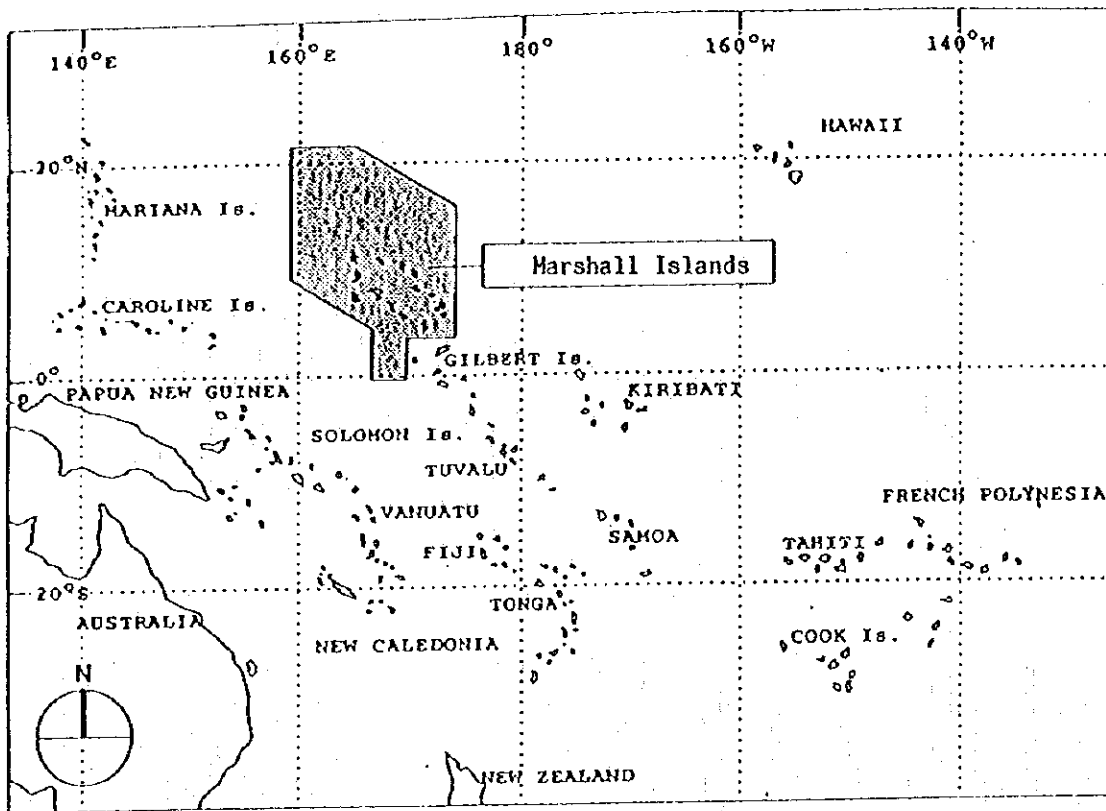
Kohsuke Shimazu

Project Manager

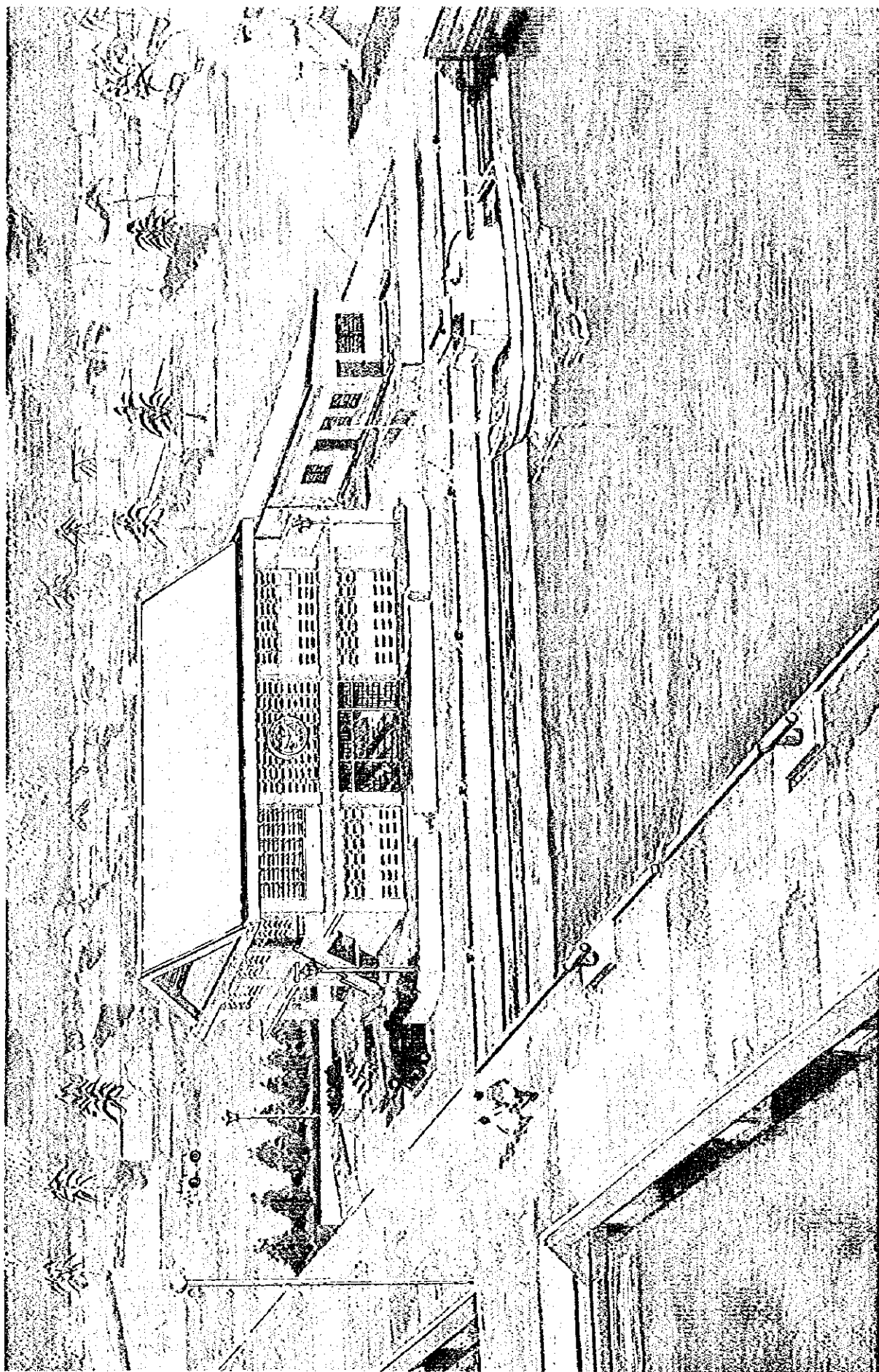
Basic design study team on  
the Project for Improvement of  
the Fish Marketing System in the Outer  
Islands (Phase II)  
in the Republic of the Marshall Islands

CRC Overseas Cooperation Inc.

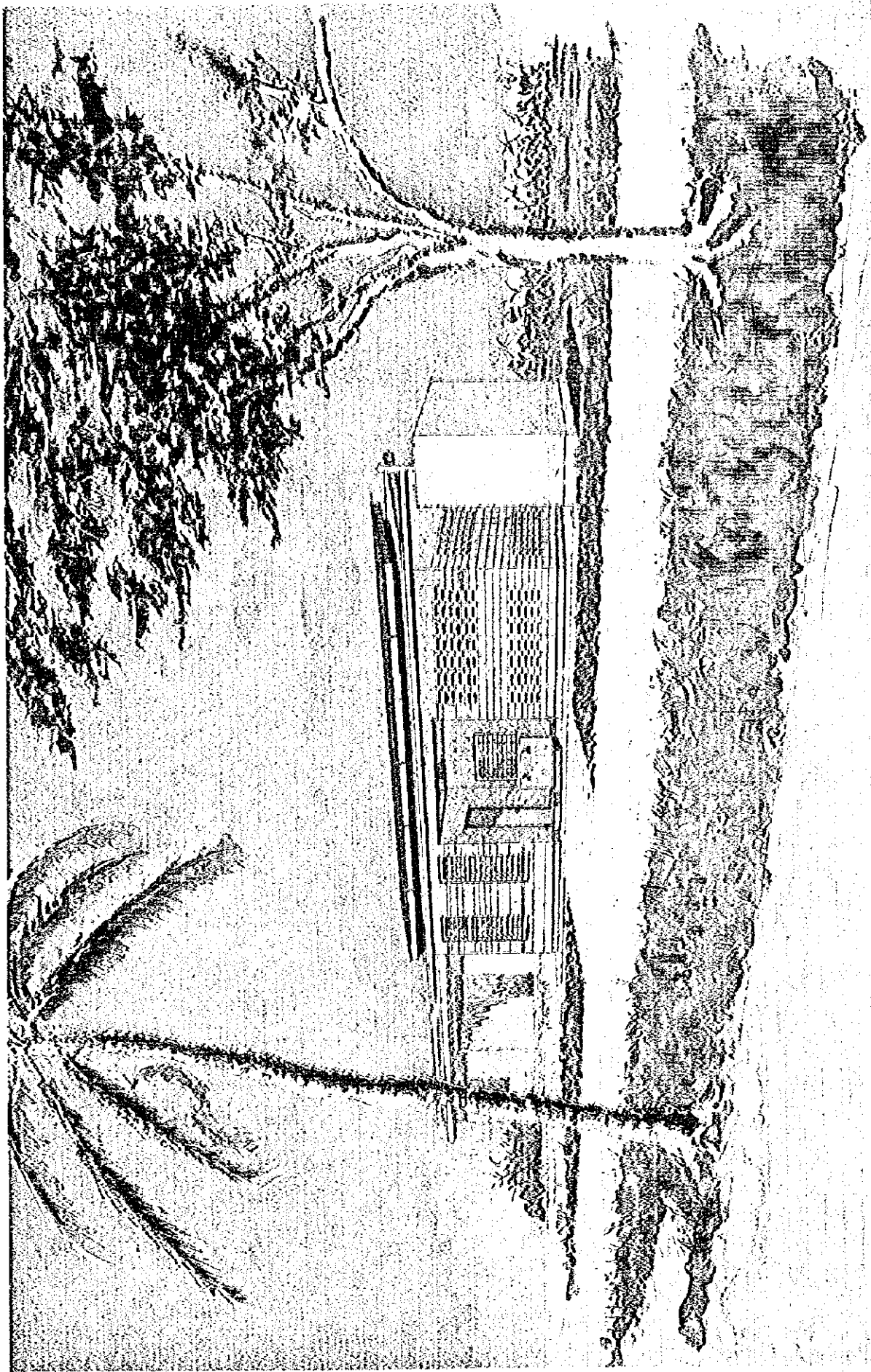




MAP OF THE MARSHALL ISLANDS AND THE PROJECT SITES



EBEYE FISH DISTRIBUTION CENTER



ADDITIONAL FACILITIES OF THE THREE OUTER ISLANDS  
(Ailinglaplap, Namu, Likiep)



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## **CHAPTER 1**

### **BACKGROUND OF THE PROJECT**



## Chapter 1. Background of the Request

### 1-1 Process of the Request

The economic basis of the Marshall Islands is yet to be strengthened, with problems inherent in island countries in the South Pacific, i.e., small land area, unevenly dispersed population, isolation among the outer islands which dot the vast sea area, and poor ground resources.

The main industry is featured by the primary sector producing copra and palm oil, which accounted for more than 95% of the total export amount in 1980.

The national economy is supported greatly by the fund by the United States of America under the Compact Agreement(1986-2001), while the income from any other resources revenue is small. The national economy is of dual structure, a mixture of traditional subsistence economy in the outer islands and monetary economy in the capital city of Majuro and Ebeye which depend on the U.S. base.

A statistical data on employment shows 10,160 employees out of approximately 11,500 labor forces in 43,400 total population.

For further progress of the national economy, a comprehensive development policy covering the whole country with particular attention to development in the outer islands economy should be introduced. Promotion of small scale fisheries, which is considered to be the subsector to induce and expedite economic development, is given the highest importance as the most workable policy for economic development, bringing cash income to the outer islands and also securing stable fresh-fish supply to urban people at island centers such as Majuro and Ebeye .

In recent years, monetary economy is infiltrating into the outer islands in the form of purchase of rice and oil, with the result that there exists a clear sign of the mode of life of the fishermen being changing, through very gradually, changing from self-sufficient to market-oriented.

Promotion of the industry is also required as a measure to keep young people stay in the outer islands. However, fostering of the fishing industry in the outer islands has not been done smoothly enough to achieve some positive consequences, because the distribution system between urban cities and off-shore islands has not been developed and facilities and equipment necessary for productive activities has not been installed, either.

The population of cities are growing with mass-exodus of young people from the outer islands who seek cash income, making Ebeye one of the most thickly populous in the world. As a result, stable supply of fresh catches from the outer islands to meet demand in the congested area has become the issue of urgent nature which must be settled with no loss of time.

The government of the Republic of the Marshall Islands designed a plan for fish-products distribution in 1990, in which Ebeye is set up as consuming area while surrounding three islands as production areas, to cope with the problem above-mentioned and requested the Government of Japan to offer a grant aid on the implementation of the plan.

In response to the request, "the Project for Improvement of the Fish Marketing System of the Outer Islands(I/II)" (the Previous Project) was implemented during 1991-92.

The Previous Project has contributed to establishment of the basis for distribution, bringing cash income to the remote islands through purchase of catches from fishermen who were not marketing before, and supplying fresh fish to Ebeye consumers. But chronic shortage of ice for preservation and transport has been an obstacle to proper distribution.

In order to surmount the current awkward situation in connection with the distribution system, the Government of the Republic of the Marshall Islands made up the following plans for improvement of ice-making and preservation equipment and marketing system.

- ① Installation of ice making facilities and workshop for fishing gear in the outer islands and also improvement of fishing boats and gear.
- ② Installation of facilities for marketing and preservation including ice-making machine so that the current situation can be improved.

This new Project "the Project for Improvement of the Fish Marketing System of the Outer Islands (Phase II)" (the Project) incorporating these plans is an improved one of the Previous Project referred to above and the Government of the Republic of the Marshall Islands requested Japan for another grant aid on this Project.

## 1-2 Outline of the Request and Main Component

### 1-2-1 Outline of the Request

The Project is designed to complete the foregoing "the Project for Improvement of the Fish Marketing System of the Outer Island", placing emphasis on items to be reviewed to achieve higher life standard of residents of the outer island, supply of fish protein to urban consumers and reduction of fisheries import through promotion of small scale fisheries and for that purpose it is planned to develop and reinforce the distribution system including the densely populated Ebeye Island and the productive three surrounding islands, Ailinglaplap Atoll, Namu Atoll and Likiep Atoll.

The following are the components of the facilities and equipment to be requested for the Project. The Project also consists of two sub-projects.

- Sub-project 1:

- "Reinforcement project for productive function at outer islands"

- Outer island : Airok Island in Ailinglaplap

- Majkin Island in Namu Atoll

- Likiep Island in Likiep Atoll

- Required facilities and equipment: Reinforcement of existing facilities and installation of new facilities and equipment

- Sub-project 2:

- "Development plan for collection and marketing of marine products in Ebeye Island"

- Urban Area : Ebeye Island in Kwajalein Atoll

- Required facilities and materials: Construction of a marketing and landing base and installation of materials and equipment for marketing.

## 1-2-2 Main Component

Sub-Project 1: "Improvement Plan for productive function in the outer islands"

Site: Ailinglaplap Atoll, Namu Atoll and Likiep Atoll

Item	Quantity	Item	Quantity
1. Facility (each atoll)		2. Material & equipment (each atoll)	
(1) Building(block, 2-storied)	100m <sup>2</sup>	(1) Fishing boat with outboard motor (20ft, 25hp, gasoline)	5
1F:		(2) Outboard motor (15hp)	20
• Workshop	14m <sup>2</sup>	(3) Fishing Gear	1
(place for repair)		(4) Cooler box	50
• Processing/handling space	20m <sup>2</sup>	(5) Ice making machine(0.5t/d)	1
• Storage	6 m <sup>2</sup>	(6) Generator(8kva)	1
• Ice-making/storage	6 m <sup>2</sup>	(7) Tranceiver	6
• Shower room	4 m <sup>2</sup>	(8) Trailer(landing of boats)	1
2F:		(9) Tools	1
• Meeting room	30m <sup>2</sup>	(10) Drum tin(empty)	15
• Accommodation	10m <sup>2</sup>		
• Security guard's room	10m <sup>2</sup>		
(2) Water tank (concrete)	10ton		
(3) Jetty (Namu Atoll only)			
L: 25m W: 3.5m			
Pile structure			

Sub-Project:

"Improvement plan for collection and marketing of marine products"

Site: Ebeye Island

Item	Quantity	Item	Quantity
1. Management building (block, 2-storied)	180 m <sup>2</sup>	2. Material & Equipment	
• Office	50 m <sup>2</sup>	(1) Ice making machine with storage bin	2 sets
• Workers' station	20 m <sup>2</sup>	(2) Ice cooler box (160L)	50
• Rest room	30 m <sup>2</sup>	Fish tray ( 80L)	40
• Meeting room	60 m <sup>2</sup>	Platform scale (30kg)	2
• Warehouse	20 m <sup>2</sup>	Cooler showcase	7
2. Toilet/shower room	10 m <sup>2</sup>	(3) SSB transceiver	1 set
3. Fuel(drum tin) storage	15 m <sup>2</sup>	(4) Drum tin(empty)	15
4. Water tank(concrete) 10t	2 sets	(5) Office equipment	1
5. Radio telephone antenna	1 set	3. Transport Vehicle	
6. Fence	90m	(1) Pickup truck	1
		(2) Crane truck	1
		4. Transport vessel	1
		15t, 200hp, L:15.75m	



## **CHAPTER 2**

### **CONTENT OF THE PROJECT**



## Chapter 2. Contents of the Project

### 2-1 Objective of the Project

The Previous Project which has been implemented on a Japan's Grant Aid, has greatly contributed to the establishment of a distribution basis, bringing hard currency through purchase of catches by Marshall Islands Marine Resources Authority (MIMRA) from the outer islands where subsistence fishery is still dominant, and enabled supply of fresh fish to consumers in Ebeye. However, the Previous Project is not necessarily working effectively in that ice-production in the outer islands is not sufficient, and facilities for marketing and preservation are not available in Ebeye. Moreover, catches are not fully utilized, with some returned unsold from retailers.

Infrequent visits by the transport vessel often cause lack of fish at shops, which becomes a hindrance to access at any time to fish by the consumers.

In order to improve the situation, the Project is planned to install ice storage in the off-shore islands and develop fishing boats and fishing gear, and to install market facilities with preserving facilities including ice maker in Ebeye.

The following effects are expected by implementation of the Project as well as development of the local industries and living standard of the local communities.

- (1) Higher living standard of the outer island fishermen brought in by cash income,
- (2) Increase of catches while protecting reef-fish resources by exploiting off-shore resources,
- (3) Promotion of artisanal fisheries in the outer islands together with fishermen's desire for higher production by activating market function,
- (4) Stable supply of marine products of good quality to consumers and satisfaction of their taste for reef-fish,

- (5) Improvement of potential demand by providing stable supply of fresh fish and at the same time reduction of food import and.
- (6) Increase of demand to be expected in future by possible entry into school lunch industry.

## 2-2 Basic Design of the Project

### 2-2-1 Contents of the Request, and Results of the Talks and Discussions

The original request by the Republic of Marshall Islands and the results agreed-upon after the talks at the site survey and studies of the team after their return home are shown in the following chart 2-2-1.

In confirming the contents of the request the following was taken into consideration:

- (1) Utilization of the existing facilities
- (2) Cut of expenses for management and operation
- (3) Installation of most suitable facilities for the site

The following items for the additional facilities in the outer islands were omitted from the original request after the study.

- (1) Jetty(Namu)
- (2) Service facilities for fishermen
- (3) Ice-making facilities for the outer islands
- (4) Second floor of the facilities in the outer islands

As for the Fish Distribution Center in Ebeye, the facilities in Ebeye must have functions for handling, preserving and marketing as the base for collection of fish products from the outer islands as well as their sale.

The pending item for provision of a 15 ton transportation vessel is not included in the Project and the 8 ton vessel, which was granted on the Previous Project shall be effectively utilized.

Table 2-2-1 Contents of Original Request and the Approved  
Contents after Discussion

Sub-Project 1: Plan for improvement of productive functions at the outer islands  
Project Site : Ailinglaplap Atoll, Namu Atoll and Likiep Atoll;

(1/3)

Original Request	After Discussion	Reason & Process
1. Facilities (each atoll)	1. Facilities (each atoll)	
(1) Sub-building 100m <sup>2</sup> (block, 2-storied)	(1) Additional-building (block, one-storied) Approx. 65m <sup>2</sup>	Facilities shall be for minimum requirement
1F: Workshop 14m <sup>2</sup> Processing/handling space 20m <sup>2</sup> Warehouse 6 m <sup>2</sup> Ice storage bin 6 m <sup>2</sup>	Workshop Processing/handling space Warehouse Ice storage bin Water tank deleted	Lighting shall be by solar power generation  Washing water for processing/handling
Shower room 4 m <sup>2</sup>	deleted	
2F: Meeting room 30m <sup>2</sup> Resting room 10m <sup>2</sup> Security guard's room 10m <sup>2</sup>	deleted deleted deleted	Repalce with folding cot
(2) Water tank (concrete) 10 t	(2) Install rain water tank in the facility	Rain water tank is in- dispensable to buildings on the outer islands.
(3) Jetty (Namu atoll) pile structure	deleted	Survey on natural condi- tion is required

Original Request	After Discussion	Reason & Process
2. Materials & Equipment	2. Materials & Equipment	
(1) Fishing boats with outboard motor (20ft, 25HP, gasoline) 5	(1) Fishing boat <ul style="list-style-type: none"> <li>• 17ft-15ft boat 2</li> <li>• Fishing boat with inboard engine 27ft, 40HP diesel 1</li> <li>• 10ft canoe 2</li> </ul>	For use by groups  For Likiep only, to be used mainly for operation in & around the lagoon  For crew's communication with the land (install on Ailinglaplap and Namu)
(2) Outboard motor (15HP) 20	(2) Outboard motor (30 - 15 HP) 8	With spare parts
(3) Fishing gear 1 set	(3) Fishing gear <ul style="list-style-type: none"> <li>• Hand lining (material) 50 sets</li> <li>• Trolling(material) 20 sets</li> <li>• Gill net (completed) 6 sets</li> <li>• Fish spear 20</li> </ul>	
(4) Cooling box 50	(4) Cooling box <ul style="list-style-type: none"> <li>160L 5</li> <li>60L 15</li> <li>Large ice cooler box 500 L 3</li> </ul>	For replenishment for transportation vessel For use while operation For over 1 week storage

Original Request	After Discussion	Reason & Process
2. Materials & Equipment	2. Materials & Equipment	
(5) Ice-making machine (0.5T/D) 3 sets	deleted	Ice will be transported from Ebeye
(6) Generator(8KVA) 3 set	deleted	
(7) Radio Telephone 6	(5) Radio Telephone 3	For diesel-engine boats & boat-type fishing
(8) Trailer (landing of boats) 1	(6) Trailer (landing of boats) 2 30ftx1, 17ftx1	
(9) Repair Tool 1 set	(7) Repair Tool 1 set	
(10) Drum Tin (empty) 15	(8) Drum Tin (empty) 5	
	(9) Spare parts • Block for transporta- tion vessel 1 • Spare parts for fishing boat 1set	For existing vessel For transportation vessel
	(10) Pickup Truck 1 (11) Platform scale (300LB) 1 (12) Folding cot 2	For collection of fish at Ailinglaplap. Necessary to weigh fish Accommodation for tour- ing instructor

Sub-Project 2 : "Improvement plan for collection of fish and marketing function"

Site: Kwajalein Atoll, Ebeye Island

(1/2)

Original Request	After Discussion	Reason & Process
1 Facilities	1 Facilities	
(1) Sub-building 180m <sup>2</sup> (block 2-storied) • Office 50m <sup>2</sup> • Workers' station 20m <sup>2</sup> • Rest/Meeting room 90m <sup>2</sup>  • Warehouse 20m <sup>2</sup>	(1) Fish handling/marketing management building (block 2-storied) 560m <sup>2</sup> • Office Deleted  Deleted  • Fish handling/sale area  • Chilling room 20m <sup>2</sup>  • Warehouse/workshop • Garage/parking lot	Base for collection of catches, preservation, marketing.  Places given less priority should be turned to marketing space. Collection of catches from the outer islands Fish market for local consumers. Shipping adjustment & storage of fish.
(2) Toilet/shower room 10m <sup>2</sup>	(2) Toilet	
(3) Fuel (drum tin) storage 15m <sup>2</sup>	(3) Fuel (drum tin) storage	
(4) Water tank 2 (concrete, 10ton)	(4) Water tank 1 (concrete, 30ton)	Improvement of rain water usage.
(5) Radio telephone antenna 1	(5) Radio telephone antenna 1	
(6) Fence	Deleted	Expenses borne by recipient country.



Original Request	After Discussion	Reason & Process
<b>2. Material &amp; Equipment</b>	<b>2. Material &amp; Equipment</b>	
(1) Ice-making machine with storage, plate ice 2 sets	(1) Ice-making machine with storage, plate ice 2 sets	Serve as ice supply base for the outer islands.
(2) Cooling box (160L) 50 Fish tray (80L) 40 Square tray (50L) 40  Platform scales (300LB) 2 Cooler showcase 7	(2) Cooling box (160L) 15 (60L) 15 Fish box (20L) 20 Ice cask (30L) 20 Fish pans 50 Scale (300LB, 50LB, 20LB) 3 Cooler showcase 3	Small scale is necessary for retail
(3) Radio Telephone, SSB 1 set	Radio Telephone, SSB 1 set	
(4) Drum Tins(empty) 15	Drum Tins(empty) 10	
(5) Office equipment 1 set	(4) Analyser for data Copying machine 1 Facsimile 1	Analyse data of catches Control the outer island fisheries
<b>3. Transport Vehicles</b>	<b>3. Transport Vehicles</b>	
(1) Pickup truck 1	Deleted	Utilize the following one
(2) Crane truck 1	(1) Crane truck 1	For handling of cooler boxes & drum tins.
<b>4. Transportation vessel for catches 1 15t, 200HP, L:15.75m</b>	Pending item to be re- discussed after return to Japan	Not include in the Project and utilize the existing 8 ton vessel

## 2-2-2 Improvement of Fish Marketing System

### (1) Basic Concept

- The Project shall be designed based on the concept that fisheries development should go with management of resources, and pelagic-fishing should be encouraged and that catches should be fully utilized.
- The volume of catches, transportation and sales is planned to reach over 50 tons in future, which will bring about sharp rise in income at the outer islands.

The Project is designed to place importance on the development of market in Ebeye, providing fresh fish regularly and continuously, developing new market for tuna through trial sales and further utilization of catches.

### (2) Plans for Improvement

Plans for improvement at each site is as follows:

#### ① Improvement of fisheries in the outer islands

Tuna fishing shall be done besides reef-fishing on an experimental scale from the standpoints of protection of reef-fish and exploitation of pelagic resources. Volume of each catch will be increased from the current 720kg (reef-fish 1600LB) to 900kg (2,000LB : reef-fish 1,800LB, tuna 200LB) in future by the Project.

#### ② Improvement of Operation of Transport Vessel

In order to secure and strengthen the basis of plans for fishery and sales in urban area, transportation vessel need to visit each site once a month, about 10 visits annually, with due consideration to the weather condition. The volume of each transportation will be increased from 1,600LB to 2,000LB as catches increase.

As many as 16 cooler boxes can be stored in the present fish hold and introduction of ice maker through the Project will enable fishermen to chill fish with no loss of time after catch.

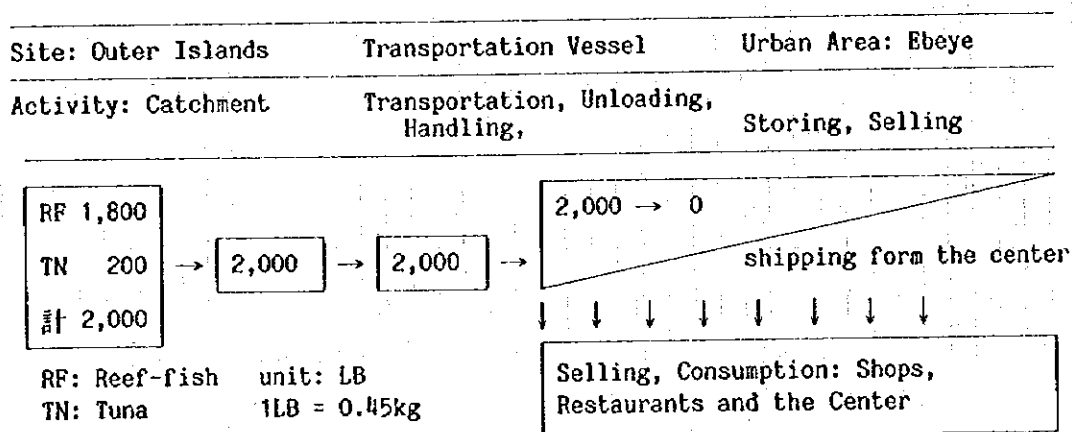
More fish will be packed in each box for transportation and the above amount will be possible by adding more ice at the time of arrival at Ebeye island.

### ③ Improvement of Marketing Site

It is important to make a great effort to resolve a problem of return of unsold fish to the market in Ebeye from the standpoint of full utilization of reef-fish. For that purpose, such measures as (a) Adjustment of selling, (b) Adaptation of better method to keep freshness and (c) Sales at the Ebeye Center shall be studied.

Tuna will be sold experimentally at the Center for sashimi and steak, and will also be provided for School Lunch Center.

Table 2-1 Distribution Plan of the Project



Measures to solve the problems and to take effect

- Increased supply of ice will improve freshness of fish
- Improved preservation of freshness and distributing adjustment with chilling storage will solve the problem of return of unsold fish.
- Constant stock of fish for sale will promote demand.
- Increase of fish catch and handling amount will reflect in the increase of consumption by Ebeye residents.

(3) Concern about resources in implementing the Project

So far, no any survey on marine resources in the outer islands has been performed, which makes it difficult to estimate the amount of reef-fish and fix acceptable limit of catch.

As reef-fish are valuable and have become major means of living for the islanders and they do not propagate well, exploitation plan should be carefully designed.

Compared with the project for Arno, the sole example for our reference, the Project is advantageous in that there are three sites and required extent of improvement of catches per unit lagoon area is one fifth less than that in Arno. Nevertheless, use of gill net with larger mesh and avoiding concentration of fishing grounds should be encouraged to protect the invaluable fishery resources. The development plan, therefore, should be worked out with due attention to resource protection and put in practice, according to the most updated data related to the fishing.

As for pelagic-fishing, there will be no problem, even if 20 to 50 tuna were caught every month since more than one thousand tuna form a group.

(4) 90% of fisheries products sold in Ebeye is brought in from the outer islands with the existing transportation vessel. Current amount of transportation is no more than 1,600LB per week, though it fluctuates, and the catches are distributed to shops and restaurants on the day of landing. But only half of 15 shops and restaurants can receive catches due to insufficient quantity. The amount will be sold out within a week if catches are fresh enough.

The School Lunch Center provides 3,000 pupils in the islands with lunch and it depends on canned food for animal protein. The chief of the Center was quoted as saying, "If supply of fish is regular and stable quantity is expected, then we will use them for school lunch". The amount will be 700LB per week and it is considered to be met with by the supply increased by the Project in the future. According to the survey on household expenses in Ebeye in 1991, fish consumption for each household accounts for 13.6kg a month. Based on this figure, in Ebeye the fish consumption is estimated at 160 tonnes a year.

The results of hearing survey revealed that fish is regarded as kind of "dinner" over which the Marshallian people have preference, and eat once a week, and every household (10 members) takes 2 fishes around 2LB each at a time.

According to the current amount of sales and the above-mentioned results, the potential demand for fish is estimated at 140 tonnes, which is nearly the same as the estimated fish-consumption.

The estimated amount of supply under the Project is 27 tonnes, 1.7 times the current 16 tonnes, will be appropriate if marketing situation is improved as stated above.

In future, efforts shall be made to meet potential demand, to enter into school lunch industry and to develop demand for tuna, and on the other hand measures against cheap chicken which sell at 1 dollar/LB should be taken.

### 2-2-3 Basic Policy of the Project

#### (1) Appropriateness and Necessity of the Project

The economy of the Marshall Islands is supported mainly by the aid from the U.S. Compact Agreement and the nation's prime object at present is to find some other way to become economically independent. Therefore fostering of any industry which will become a mainstay along with copra industry for that purpose. Fishery is considered hopeful, and the government has put the fishery development on the basis of the national development plan. So the policies for that goal shall be carried out under the development plans.

Small scale fisheries, operated by outer islanders, contributes to socio-economy in many fields, being a valuable product among few, serving fish protein to local residents, and generating job opportunity.

There are abundant marine resources of reef-fish around the outer islands and pelagic fish such as tuna in the off shore but fishing is restricted because of insufficient boats and gear as well as limited marketing system.

The standards of socio-economy and living of artisanal fishermen are very low and the production of copla is reaching the limit. Therefore, development of artisanal fisheries is the key to improve the living standard since fishery is the sole promising industry in the outer islands.

The Previous Project which has been implemented on Japan's grant aid paved the way for the marketing system. However, smooth supply of fish to consumers is not necessarily made due to shortage of ice for preservation and insufficient storage. The climate at the sites helps to spoil freshness, which is another problem for effective utilization of the catches. Any efforts to improve the above situation will be essential for the development.

When shipping of fish from outer islands is activated under the Project another effects such as promotion of artisanal fisheries and producers' will are expected. The living standard of local community will also rise with introduction of cash income. Fresh fish of good quality marketed in sanitary condition will satisfy urban consumers. Promoted supply of fresh fish will reduce dependance on imported foods such as canned food.

In summing up the studies on the above, the implementation of the Project on Japan's grant aid shall be very meaningful and determined to be appropriate.

## (2) Basic Policy

In accordance with the requested Project by the government of the Marshall Islands, talks with the officials of the government of the Marshall Islands and survey on the sites were conducted in order to clarify the background of the request and the scale and the management system. The following was formulated as basic policy for the grant aid Project after studying its appropriateness and necessity.

① Development of tourism and fisheries as well as copra industry as the mainstay of national economy, which will lead to economical independence of the nation, is recognized as the basic policy of the nation.

② The economic differentials between the densely populated urban area and the outer islands which bread up in the vast sea should be narrowed in the process of development. The economy is a mixture of monetary economy and subsistent economy and the promotion of fisheries productives in the islands generates opportunity for cash income which contributes to better living in the area while improves nation's nutrition, providing urban consumers with fresh food.

③ With slow but steady infiltration of monetary economy into the outer islands and also with Japan's aid and technical cooperation, small scale fisheries making a transition from self-sufficing to commercial, which makes some encouraged fishermen commercial-oriented.

④ In the outer islands, where marketing system is not set up, abundant reef-fish is left intact due to lack of transportation and means to utilize catches other than domestic consumption.

⑤ In urban area, rapidly growing population requires stable supply of fresh fish. The Lunch Service Center in Ebeye of Ministry of Socil Service, which provides schools with lunches, wants to get stable supply of fresh fish which can replaced canned food.

⑥ To cope with those problems, the government of the Marshall Islands has planned to develop marketing system which brings fish from outer islands and to establish facilities for handling, preservation and sales in Ebeye to serve as a base for marketing.

The plans will activate small scale fisheries with constant collection of fish

from the outer islands. The periodical supply in Ebeye will satisfy the consumers who are naturally fish-eating nation. In this context, the Project is decided to be worthwhile to be implemented.

⑦ Basic idea of the Project

a) In the outer islands

- Catch volume shall be established considering marine resources in the lagoon.
- Facilities shall be operated by current members and at the minimum of expenses for maintenance and management.
- Facilities shall be designed for night works which share half of the fishing activities.

b) Transportation vessel

- Utilize the existing transportation vessel.
- Utilization by islanders and transportation of every day goods shall be taken into account.

c) Marketing site in Ebeye

- Marketing condition shall be created for sales of fresh and sanitary fisheries.
- Facilities shall be designed to serve for the residents with sales of fresh fish and ice, etc.
- The building shall be designed, giving consideration that it is the first building to be constructed by Japan's aid at the most crowded street in Ebeye port.



## 2-3 Basic Design

### 2-3-1 Basic Design Policy

The Project is designed to establish marketing facilities in Ebeye, where fish are landed and consumed and at the same time improve existing facilities in each atoll to meet the new marketing system, enabling them to keep ample catches. The following 4 points are to be studied on building facilities.

① The Previous project for the outer islands fisheries is underway with moderate expenses. But the landing in Ebeye has not reached numerical target of the original plan. It will be an effective measure to build marketing facilities in Ebeye and make it the hub of a new network linking the the outer islands. The plans of the Project shall be designed based on the experiences and achievements concerning the project of MIMRA, existing management entity, and its existing system, to make incomes and expenses well balanced with a minimum employment of new staff and effective operations.

#### ② Arrangement

##### ◇Project site of Ebeye

The construction site in the middle of Ebeye island, facing the ferry dock on the north and container-yard on the south and another wharf to the west. The facilities shall be arranged to make transportation vessel easily supplied with goods which comes along the wharf on the west side, and unloaded vehicular access to the center of the city shall also be convenient. The Fish Distribution Center will be arrange on the north side, facing the road, to provide direct purchasing opportunity for the ferry commuters to Kwajalein.

#### ◇Project site

The project site which will be offered at Ailinglaplap, Namu and Likiep will be adjacent to the existing facilities. At the existing buildings are set up close to the jetty or landing place. There will be no problem of access road. The facilities shall be well arranged considering relations among existing and new-building so that goods can be carried in or out smoothly and that good ventilation among buildings can be obtained.

#### ③ Building plan

Following the basic policy of the Projects, the framework of the improvement plan has been made up to establish a new marketing base in Ebeye island where infrastructure has been developed so that essential goods for production and distribution such as fuel, ice, fishing materials and equipment can be shipped from the base to the the outer islands where the ice storage bin will be constructed as the main of the additional facilities.

The Fish Distribution Center in Ebeye, furnished with chilled room and working area will supply fish constantly to the retail shops, restaurants and the residents who can enjoy shopping of fresh fish. A parking lot will be arranged in front of the building.

#### ④ Construction plan

If materials and equipments for construction are procured timely, and smoothly transported to each island except Ebeye, construction work at of each facility will be not hard in terms of its scale and difficulty of work. As the Project is implemented at 4 sites, close arrangement for procurement and timing for shipment to each site shall be made. Basically, the facilities in developed Ebeye and one of the outer islands will be constructed first, and during Ebeye works are in progress another works in the outer islands will be completed one after another.

## 2-3-2 Study on Conductions for Design and Establishment of Scale

### (1) Study on Condition

#### 1) Establishment of Quantity

The conditions for the design of the development plan of marketing system under the Project is based on the volume of catches brought from three islands. The volume of unloaded fish is equivalent to fish catch volume, and in future it will be the maximum load capacity of the transportation vessel making round trips between the islands once a week.

Transportation of catches to Ebeye is now 1,600LB each time and frequency is about once in half month.

The Project is planned to establish a marketing base in Ebeye where fish are unloaded and consumed, and provide ice to keep freshness of landed fish, and install chilling storage to keep stable supply of fish for consumer in Ebeye, and promote purchase by consumers, installing direct sales shops in the facilities located at very convenient place. After all, the Project is aimed at development of the marketing and consumption.

Target volume will be fixed based on volume of each landing by transported vessel, 2,000LB each visit increasing by 25% of present amount, according to a landing and sales schedule as shown in the table 2-1 (P.15). Following the above, appropriate scale and specifications will be the bases for the equipment and materials for the facilities.

#### 2) The topography of the sites

##### • Outer Islands

Of the three the outer islands, the site at Namu slopes gently toward north-south (approx. 4%). The site is located behind the existing building. As incline of 4% is too steep for the path which will be used for carrying in and out of commodities, the new facilities will be placed as close to the existing one as possible and the slope will be formed to have a incline of

2%, by plowing surrounding ground. The other sites are located at level ground and there will not be any problem.

- Ebeye

There is a difference in level of about 80cm between the wharf in the site and the building site, so the building will be floored at higher level. Transportation from the handling space in the building will make good use of the difference in level. It will be used as platform and formed into L-shape bank as the site is not spacious.

### 3) Construction Methods for Foundation

- Outer Islands

The existing facilities which were completed through the Previous Project, were constructed by way of RC construction and cloth finished based on survey results of natural conditions and have no problems.

Upper part of the facilities is to be finished with concrete block and weight of unit area will be the same. The foundation will also be completed with RC method and cloth-finish.

- Ebeye

The ground has been formed by recent reclamation and durable for over 5 t/m<sup>2</sup> as tightened by coral sand used for re-reclamation. Therefore, the foundation will also be completed by RC and cloth-method.

### 4) Layout of the facilities

Layout of the facilities is planned considering effective utilization of site area and functional work.

- Layout of the Additional Facilities in the outer islands

Handling space shall be located at the center of the facilities and other rooms shall be faced this space.

- Layout of Ebeye Fish Distribution Center

Rooms which have direct relation to handling shall be picked up and arranged around the handling space. The other facilities with no direct relations to handling and sales will be constructed as an annex building. The handling space shall be flat L-shape because it should be open both to the platform, leading to the wharf and the slope in the south side of the building. Handling shall be operated mainly in the wharf-side of the facility and the entrance plant-boxes will be arranged on the dock-road in the north side to increase amenity for the shoppers.

## (2) Decision of Scale of Facilities and Equipment

The scale of the facilities and equipment will be estimated with future increase of handling volume taking into account, based on analysis of current volume.

The above factors will be determined based on condition that the loading volume of the transportation vessel in the the outer islands equals the fish catch and loading volume for each visit of vessel equals unloading and handling volume at Ebeye.

### 1) Additional Facilities of the Fishing Base in the Outer Islands

The catch of the reef fish in one site at a time is 1,800LB and tuna and other pelagic fish of 200LB, totalling 2,000LB. Tuna fishing will be started a few days before the arrival of transportation vessel and make preparation for shipment, putting tuna into cooler boxes in the ice storage bin with ice produced by the existing ice maker.

Reef fish fishing will be concentrated on one or two days after vessel's arrival and the total catch will be 2,000LB in a couple of days. The catches will be preserved with ice and the whole fish will be loaded onto the vessel.

The facilities necessary for the operation will be a handling space and ice storage and another warehouse-1 will be prepared for machine and equipment necessary for the handling of goods.

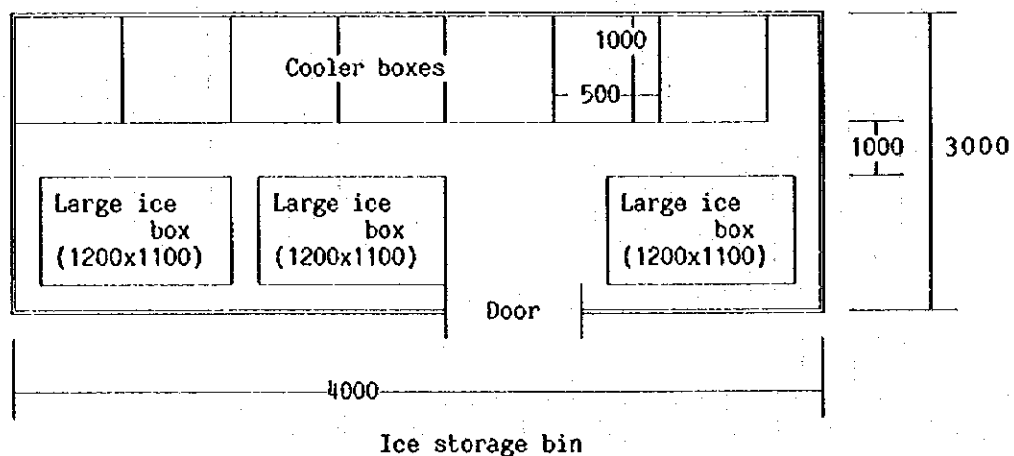
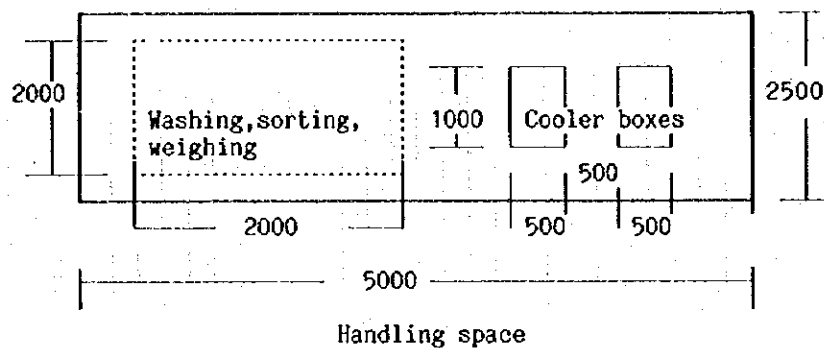
Workshop for repair of outboard motors and equipment and materials for sale and lease to fishermen and spare parts of repare of motors, will be kept in another warehouse.

① Handling Space

The space for handling will be 5m × 2.5m, designed to be used for washing, sorting and weighing of 100 ~ 150LB of fish unloaded from a fishing boat, and packing them in cooler boxes with ice.

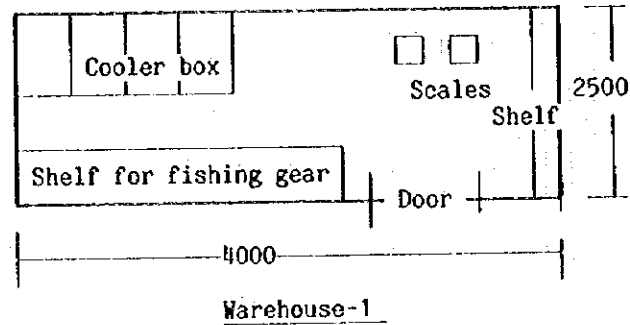
② Ice Storage bin

The size of the ice storage bin will be determined considering the space for fish cooler boxes waiting for shipment, and access road, and large ice boxes. The 2,000LB of fish will be packed in 16 boxes, with each 125LB of fish and ice.



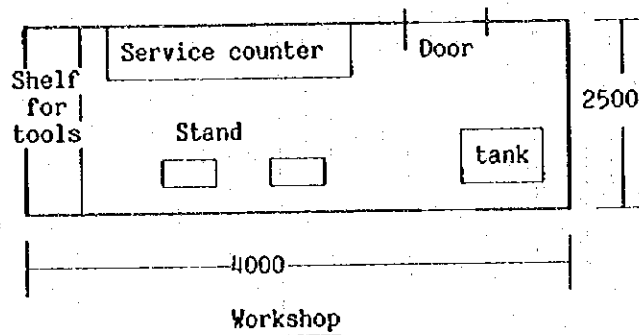
③ Warehouse-1

Space of warehouse-1 will be 4m × 2.5m as it will store cooler boxes for next shipment, scales and fishing gear for lease.



④ Workshop

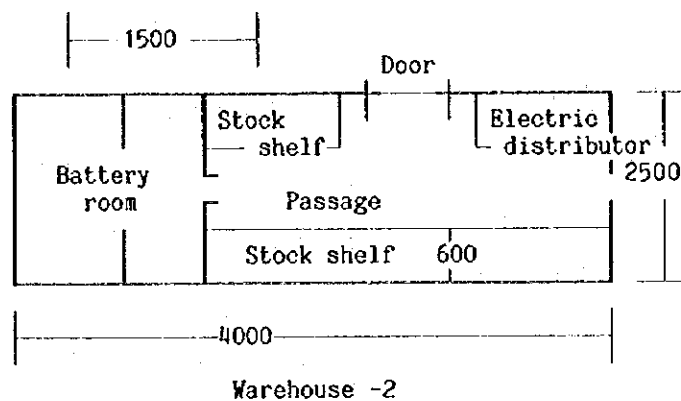
Workshop will be designed for simple repair of outboard motors and fishing boats. Stand, service counter, shelves for tools and testing tank will be arranged in 4m × 2.5m space.



⑤ Warehouse-2

Warehouse-2 will be designed to store machine and equipments as well as spare parts for provision for fishermen. On both sides of the inner passage of the warehouse stock shelves of 60cm depth will be arranged.

Room for battery of solar power will also be arranged in the warehouse with partitions.



The Additional Facilities in the outer islands will be designed as follows:

Handling space	10m <sup>2</sup>
Cooler storage	20
Warehouse-1	10
Workshop	16 (Surrounding walls)
Warehouse-2	10
<b>Total</b>	<b>66m<sup>2</sup></b>



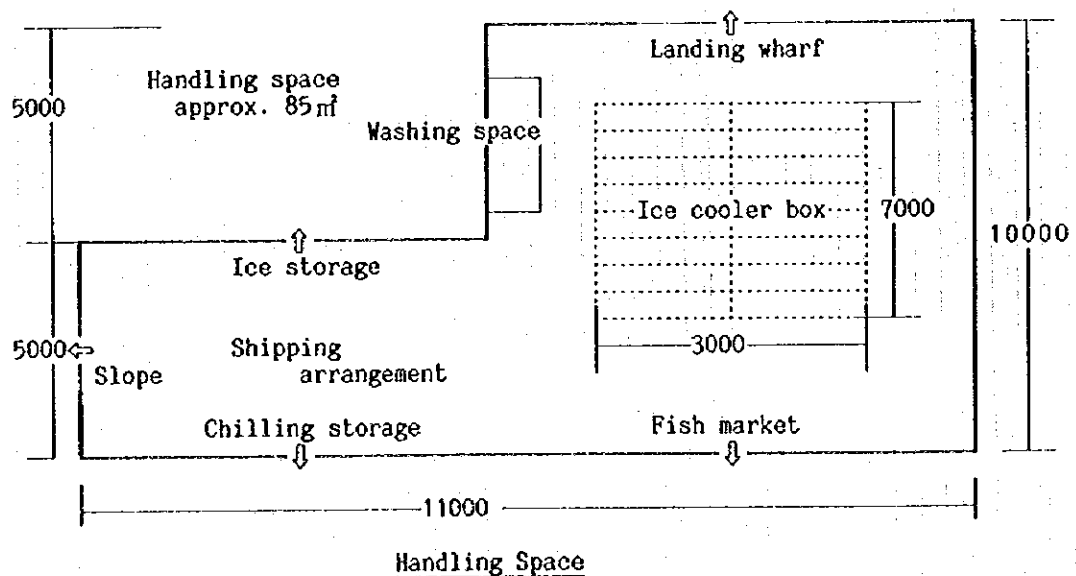
## 2) Fish Distribution Center in Ebeye

Unloaded 2,000LB of fish at each arrival of vessel will be preserved, shipped and sold in about 10 days and the center is ready for the next cycle of shipment, providing the vessel in the ice and fuel necessary for the production with the outer islands. It is the primary function of the center.

Size and function of each supportive facility will be as follows:

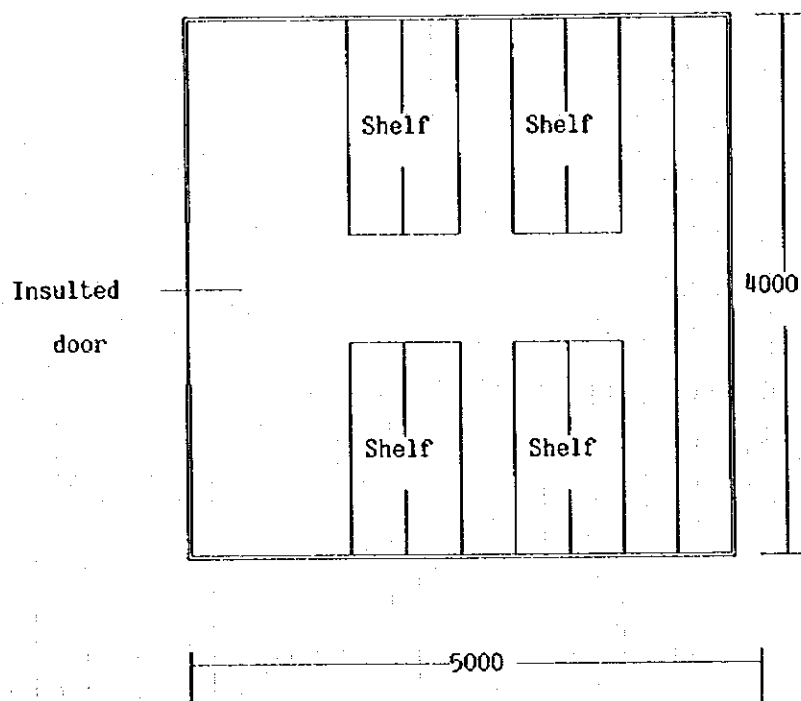
### ① Handling Space

On arrival of transportation vessel, works for sorting, washing, additional supply of ice and preparation for shipment will be performed. 2,000LB of fish in the 16 cooler boxes will be unloaded and placed level, so the space shall be large enough to perform the above works smoothly. The handling space shall be connected in terms of function to the warehouse for equipment and ice storage so that unloading and distribution may be conducted smoothly and it will also open direct to fish market space. The floor will be finished with porcelain tile which is dustproof, durable and non-slippery.



## ② Chilling Storage

In order to keep freshness, the catches brought from the outer islands in ice cooler boxes shall be preserved chilled. Fish will be placed in pans and stored in the shelves of the chilled storage after washed. The shelves will be arranged in 3 tiers, on both sides of the inner path, so that fish can be shipped on first-come first-go basis.



Chilling Storage

## ③ Ice-Making Machine with Ice Storage bin

Necessary amount of ice at the Center for a week to ten days with the peak for the date of departure for the outer islands, are estimated as below. Plate ice will be most appropriate for marketing of fisheries in the outer islands and 2 sets of automatic ice making machine each of which produce 1 ton of ice every day will be installed. The capacity of the ice storage will be 3 tons

and it will be composed of prefabricated insulated panel as same as the above stated chilling storage.

• Necessary ice for transportation of catches from the outer islands	2,000LB
• For fishing and storage in the outer islands	1,000LB
• For consignment sales of Ebeye	1,300LB
• For shop sales at Ebeye	800LB
<hr/>	
	5,100LB(≈2.4 ton)

#### ④ Fish Marketing Area

Maximum sales amount is estimated at 150LB a day and 3 sales stands of stainless steel, cooling with ice, will be provided. The space for sales will be about 42m<sup>2</sup> and composed of dustproof, durable and non-slippery porcelain tiles.

#### ⑤ Office

An office for regular staff will be arranged on the 2nd floor of the building. Accommodation for officials from Majuro will be prepared in the office.

Employee	: 4
Furniture	: Desk - 4 locker, Cabinet for documents - 2, Folding cot (accommodation)
Others	: Fax and copying machine Furniture for reception room

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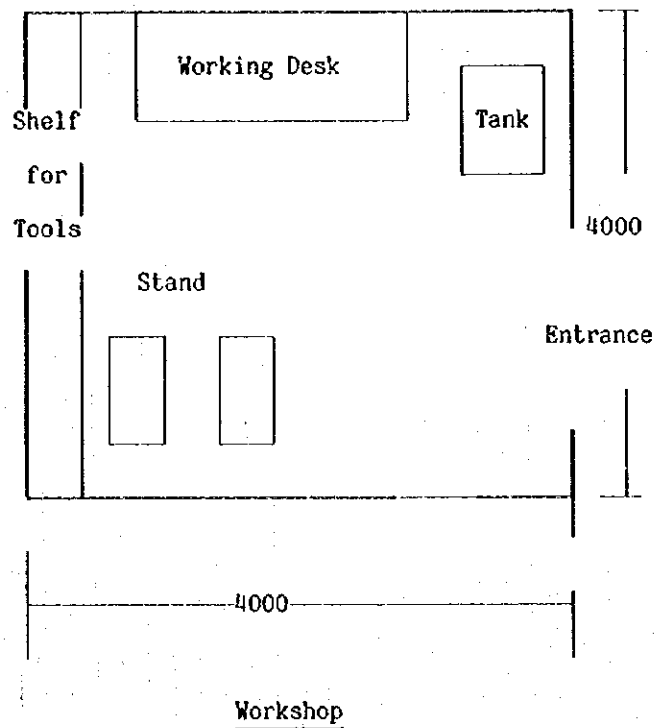
Required space	59m <sup>2</sup>
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#### ⑥ Warehouse

A warehouse (warehouse-1) to store cooler boxes, scales and handcart used for handling for fish will be arranged next to the handling space. The other warehouse (warehouse-2) which keeps spare parts for outboard motors, fishing gears and machine for use by fishermen which need control of storage and inventory, will be arranged next to the annex building of workshop, with the space of 37.5m<sup>2</sup> and 19.2m<sup>2</sup>.

⑦ Workshop

A workshop will be arranged for repairs of outboard motors and fishing boats. The space will be 4m × 4m, enough for layout for stand for repair, service board, shelves for tools and testing tank.



3) Number and size of the material and equipment are examined base on the number of the fishermen of the Project, quantity of catch, transportation, distribution and preservation.

These number and size are shown as follows.

Sub project site- 1 : 「Three Outer Islands」  
Ailinglaplap atoll, Namu atoll and Likiep atoll

Material & equipment (each atoll)	Necessity & criteria of numerical evaluation
(1) Fishing boat & motor ① Fishing boat                      2 (17ft-15ft, without outboard motors) ② Inboard-engine fishing boat                              1 (27ft, 40hp diesel) ③ 10ft canoe                      2 ④ Outboard motor                  8 (details) 15 HP                              1 25 HP                              3 30 HP                              4	• Devide 10 fishermen who do not own boats into two groups and lease one boat to each group.  • For Likiep only: For lease to group of fishermen who operate in and around the lagoon  • For crew's communication with ground (for Ailinglaplap and Namu only)  • 2 for the above boats, 3 for non-motored boats, 3 for replacement of the existing motors which will not last any longer.
(2) Fishing gear ① Handlining (material)                      50 sets ② Trolling (material) 20 sets ③ Gill net (complete) 6 sets ④ Spear                              20 sets	Target fishermen 80  For sales to fishermen (half of them) and stock.  - do -    (2 sets for each 10 groups)  For lease to groups of fishermen - do -    (for 20% of fishermen and stock)

Material & equipment (each atoll)	Necessity & criteria of numerical evaluation
(3) Cooler box • 160L 5 • 60L 15 • Ice boxes 500L 3	For transportation. For lease 1 to 2 to each boat during fishing. For storage of ice produced in the outer islands and transported from Ebeye
(4) Transceiver 6 sets	For communication between the leading 5 fishing boat of the 15 boats and the fishing base.
(5) Trailer (for unloading) • 30ft x 1, 2 17ft x 1	In case of storms and for maintenance. 30ft: for diesel-engine boat 17ft: for small boat
(6) Repair Tool Spare parts 1 set	For out board motors
(7) Drum-tins(empty) 5	For fuel, transportation.
(8) Spare parts for the existing vessel.	Starter for diesel-boat and block for transportation vessel.
(9) Pickup truck 1	(For Ailinglaplap) As each village is 30 minutes' ride from the others, needed for collection during night.
(10) Platform scale (300LB)	For weighing fish.
Folding cot 2	For instructor, and expert to stay.

Sub-project site - 2: "Ebye Fish Distribution Center  
Kwajalein atoll; Ebeye island

Material & equipment	Necessity & criteria of numerical evaluation
<p>(1) • Ice cooler box</p> <p style="padding-left: 100px;">(160L) 15</p> <p style="padding-left: 100px;">( 60L) 15</p> <p style="padding-left: 20px;">• Fish box ( 20L) 20</p> <p style="padding-left: 20px;">• Ice cask ( 30L) 20</p> <p style="padding-left: 20px;">• Scale 3</p> <p style="padding-left: 20px;">• Cooler showcase 3</p> <p style="padding-left: 20px;">• Fish pan 50</p>	<p>Delivery to retailers' shops.</p> <p>1~2 for each of 15 shops.</p> <p style="padding-left: 100px;">- do - : for small quantity</p> <p>For sorting of fish in the market: for small fish</p> <p style="padding-left: 100px;">- do - : for large fish</p> <p>300LB, 50LB, 20LB : wholesale/retail</p> <p>For sales of fish in the market.</p> <p>For preservation of fish (chilled)</p>
<p>(2) SSB transceiver 1 set</p>	<p>(capacity) 25LB for each</p> <p>For communication between transport vessel and the outer islands.</p>
<p>(3) Drum-tin (empty) 10</p>	<p>For fuel, transportation.</p>
<p>(4) Collection and analysis</p> <p style="padding-left: 20px;">machine for statistical data</p> <p style="padding-left: 20px;">Copying machine 1</p> <p style="padding-left: 20px;">Fax 1</p>	<p>For control and management of the outer islands fisheries by collection and analysis of data of catches.</p>
<p>(5) Transport vehicle</p> <p style="padding-left: 20px;">• Crane truck 1</p>	<p>For handling of cooler boxes and drum-tin.</p>

### 2-3-3 Basic Design

#### (1) Plot/Layout Plan

The Project Sites are four sites, Ailinglaplap Atoll, Namu Atoll, Likiep Atoll and Ebeye Island in Kwajalein Atoll.

##### 1) Project Sites of three outer islands

The Project Sites at Ailinglaplap, Namu, and Likiep Atolls are adjacent to each existing facility site. Since each facility is placed near an existing jetty or landing site, having no traffic line problem, the layout plan is to be made in due consideration of delivery of goods and ventilation between the proposed building and the existing building. The building of each island is constructed to keep further away existing trees due to solar power system calling for the insolation efficiency.

##### 2) Project Site of Ebeye Island

The Project Site is situated at the center of the island, facing the ferry dock on the north and the container yard on the south, and has a wharf on the west, and thereby fits the Project requirement.

The layout plan is to be made in consideration of easiness of loading/unloading work of transport vessels directly alongside the wharf. Also an efficient vehicle traffic line will be considered due to delivery of goods to town. Furthermore, a fish marketing area is to be placed on the northern road to excite purchasing interest of commuters to Kwajalein by ferry.

#### (2) Building Plan

##### 1) Plan/Setion Plan

##### ① Additional Facilities for the Fishing Base of three outer islands

A functional configuration is to be planed by a chilled room, a warehouse-1, a workshop and a warehouse-2 being placed around a handling space in an area of



12 m east to west by 5 m south to north.

It is judged that the concrete block construction is most suitable due to the configuration and space requirement of each room and the durability of the building.

Perforated concrete block will be applied due to better natural ventilation and prevention of direct rays of the sun. A section plan with an eaves height of 3.8 m will be designed to promote lighting inside the building.

## ② Ebeye Fish Distribution Center

### ☐ Main building

To build a simple traffic line, a handling space will be faced the landing area and an ice storage bin, a chilled room and a store are placed around the handling space. The back of a fish marketing area also adjoins the handling space, and its main entrance is opened toward the dock road on the north for convenience of shopping. An office and a machinery room, no direct relation to distribution, are placed upstairs. The office is to be placed to have good monitoring view of work inside the base and movement of transport vessels. An ice making machine is placed on the ice storage bin and a refrigerating machine on the chilled room so that the functional efficiency may be performed. The well construction is applied above the handling space and fish marketing area to keep better natural ventilation in the tropical zone.

### ☐ Annex-1

This building, a one-story concrete block building, is for repairing outboard motors and storing parts, having no direct relation to distribution. The area will be 4 m by 10 m.

### ☐ Annex-2

The annex-2 of steel frame construction will house several drum tins for fuel oil and a garage under the roof to prevent the direct rays of the sun. The annex-1 and the annex-2 are placed in a line.

☐ Exterior

① Ramp and retaining wall

A ramp and a retaining wall must be constructed to level about 80 cm difference in level between the proposed building ground and the dock surface. Both the ramp and retaining wall are to be of RC construction considering the tropic climate, and the latter is to be of L-letter shape due to space saving at the site.

② Pavement

From the hygienic point of view with handling foodstuffs, all the exterior roads and the parking lot are to be paved for dust prevention. Pavement material is concrete considering the tropic climate.

③ Drainage

Though there is a difference in level between the building site and the dock surface, each ground is smoothly flat. The drainage basin with drainage ditch will be constructed so that rainwater may be discharged to the sea.

④ Planting

Plant boxes are to be placed on both sides of the main entrance, expecting increasing familiarity toward plants of residents of Ebeye where the flora is getting scarce.

2) Construction plan

① Outline of construction

<u>Facility</u>	<u>Upper construction</u>	<u>Foundation</u>
• Additional facilities of three outer island	Timber roof truss RC girder Concrete block	Floor; concrete RC foundation

• Ebeye Fish Distribution Center	Timber roof truss, partly RC girder and RC pillar RC Rahmen construction	Floor; concrete RC foundation
<input type="checkbox"/> Annex-1	RC girder Concrete block	Floor; concrete RC foundation
<input type="checkbox"/> Annex-2	Steel frame construction	Floor; concrete RC foundation

## ② Criteria of structural design

Marshall Islands have no regulations and standards for structural design, and criteria of 120 mile/hour in respect of wind velocity and the one of 5 ton/ m<sup>2</sup> in respect of ground bearing are used by local constructor on their own judgment. The project will apply the Japanese standard to structural design and its design is to be made in the viewpoint of cost saving and durability. Since few earthquakes occur here, the earthquake proofing construction based on the previous earthquake resisting code will be applied.

## ③ Major construction materials and allowable stress

Concrete aggregate can be supplied locally, but proper addition agent will be necessary to prevent steel injury by salt. Care will be taken for concrete mixing or concrete member design.

## 3) Equipment plan

### ① Water supply system

#### • Water supply system of three outer islands

These islands rely upon rainwater without any water service, and so the Project provides a rainwater catchment tank for gravity water supply.

#### • Water supply system of Ebeye Island

There is the public water works including a desalinization equipment in Ebeye

Island, but suspensions of water supply due to equipment troubles are frequent. On the other hand, the ice-making plant provided by the Project requires considerable quantity of quality fresh water regularly, and also for reducing distribution costs a lot of cheap water is required.

From this point of view, the water supply system of the Center is to be a dual system to deal with the dry season, the rainwater supply plus the public water supply, though putting emphasis on the former. Two water catchment tanks, each 15 ton capacity, attached a piping system with a pump will be provided.

## ② Drainage system

### • Drainage system of three outer islands

Rainwater and overflow of the rainwater tank will be collected in a U-type ditch and then led to any affordable ditch and to the sea.

Fish washing water and floor cleaning water at the handling space are led to a septic tank through a dust basket, and then percolated through the soil.

### • Drainage system of Ebeye Island

Drainage is done to the sea from the dock directly with a U-type ditch.

All the waste water will be led to a drainage basin and then flushed forcefully to the improved city drainage system.

## ③ Electric equipment

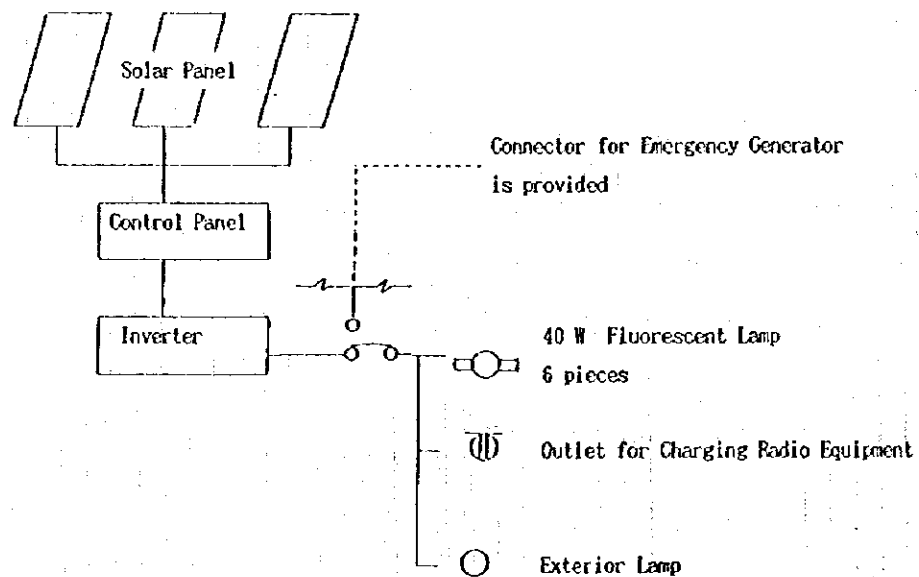
### • Electric equipment of three outer islands

The solar panels placed on the roof of the building generate electricity necessary for lighting the interior and exterior of the building or charging the portable radio equipment. The panel for receiving or distributing electricity some electric outlets are to be provided.

Devices to be provided

Solar panel	5 KW	56 panels
Battery	680 AH	48 pieces
Inverter	1 KVA	1 unit
Controller	48 V	1 unit
Distributing box		1 unit
Joint box		1 unit

Solar system



• Electric equipment of Ebeye Island

Full supply of public electricity is expected at Ebeye Island. Lighting electricity and power electricity supplied to the site are distributed to necessary parts of the facility through a switchboard.

Natural lighting will be utilized to the utmost. Fluorescent lamps and mercury lamps are to be used considering the efficiency and durability.

#### ④ Special equipment

The Ebeye Distribution Center is provided with an ice-making machine, an ice storage bin, and a chilled room necessary for quality control of fish. The specifications of the equipment and machinery for this purpose are as follows.

##### • Ice-making machine/ice storage bin

###### Design condition

1. Ambient temperature	+35°C
2. Raw water	Fresh water
3. Raw water temperature	+30°C
4. Kind of ice	Plate ice (crushed ice)
5. Source	AC 220 V×3 $\phi$ ×60 Hz
6. Type	Indoor type

###### Outline of the equipment

1. Ice-making capability	2 ton/day
2. Storage capacity of ice bin	3 tons at -5°C below
3. Cooling method for ice-making	R-22 direct expansion method
4. Thawing method	Hot gas and spray
5. Source	automatic type using timer

###### Details of the components

###### I. Ice-making machine

a. Ice-making machine	2 units
Ice-making capability	1 ton/day/unit
Outer dimensions	1,900 W × 2,200 L × 1,400 H mm
Casing	Stainless steel
Freezing plate	Aluminum
Refrigerant	R-22
Crush motor	0.75 KW

Raw water pump	0.25 KW
Defrost tank (2 units)	250 ℓ, FRP
Defrost pump (2 units)	0.25 KW, centrifugal type
Ice chute (2 units)	Stainless steel, 20 mm, covered with insulating sheet
b. Condensing units	2 units
Capacity	10,266 Kcal/h, 5.5 KW
c. Air cooling condenser	2 units
Wind volume	141 m <sup>3</sup> /h, 0.285 KW

## II. Ice storage bin

Type	Prefabricated-insulation panel type
Storage capacity	5 tons
Panel thickness	100 mm

## III. Cooling machine for ice bin

Type	1 unit
	Ceiling type, 1.5 KW, R-22

## Chilled room

The room temperature is to be kept at -10 °C

### I. Panel

Type	Prefabricated-insulation panel type
Outer dimensions	3,300 W × 3,600 L × 2,200 H mm

### II. Cooling equipment

#### a. Condensing unit

Type	1 unit
	Remote controlled-air cooling type
Capacity	5,900 Kcal/h
Compressor	Scroll type, 3.7 KW
Air cooling condenser	0.055 KW, 0.08 KW
Refrigerant	R-22

b. Unit cooler	1 unit
Type	Ceiling type, 5,500 Kcal/h
Cooling fan	60 W × 2 units
Defrost heater	3.8 KW

#### 4) Building material plan

Building materials for the Project are available locally and by import. On the procurement of building materials attention is to be paid to the following.

- a. The facilities are exposed to injury from salt due to the vicinity to the sea shore.
- b. Hot and humid peculiar to the tropical zone; the humidity remains more than 70% through the year
- c. Soil hardly, clean easily, sanitary finish materials must be used due to handling fresh marine products.

Major specifications are as follows;

##### ① Exterior finish

- a. Roof: Aluminum sheet with high reflectivity and durability
- b. Outer wall: Concrete block with resin finish enabling to keep good insulation, shading, lighting, ventilation with wide opening.



② Interior finish

	Place	Finish
a. Floor:	Entrance, handling space, fish marketing area, toilet	Porcelain tile work
	Office, night watchman's room, passage, pantry, workshop	Vinyl tile work
	Store, ice-making room, machinery room, fuel oil tank, material store, garage	Concrete trowel finish
b. Wall :	Office, night watchman's room, passage, pantry	Plaster board GL work with resin finish
	Ice-making room, machinery room, chilled room (outer wall), ice storage bin (outer wall)	Outer wall: perforated block with resin finish Other wall: general block with resin finish
c. Ceiling:	Office, night watchman's room, passage, toilet, pantry, workshop	plywood boarding with resin finish
d. Furniture:	All of outdoor furniture are made of aluminum, and the grating furniture of the handling space and fish marketing area is made of steel with anticorrosive finish. Indoor furniture is made of wood.	

(3) Materials Plan

- The following equipment and materials are for the Sub-project I consisting of three fishing bases at the outer islands.

Items	Quantity	Specifications
1) Fishing boats and outboard motors		
Boat type fishing vessel	6 units	Japanese-style FRP boat, 17 feet type and 16 feet type
Boat for crew	2 units	FRP 10 ft type boat with oar
Fishing boat	1 unit	FRP 27 ft type with inboard engine
Outboard motor	24 units	15HP × 3, 25HP × 9, 30HP × 12
2) Fishing gear		
Handlining(material)	150 sets	Trunk line: Braided nylon 1.5 mm, 100 m Branch line: Nylon mono 1 mm, 100 m Leading line: Nylon mono 0.9 mm, 100 m Fishing hook: Kirby #5 & #7, 10 each
Trolling (material)	60 sets	Trunk line: Nylon core/braided nylon 2.5mm, 100 m Leading line: Nylon mono 2.0 mm, 100 m Wireleader: 2 mm, 100 m Lure: Squid shape 10 pcs Fishing hook: Double hook type #2, 10 pcs
Gill net (complete)	18 sets	Netting: Nylon mono 3" M 200 m, D 30M Netting: Nylon mono 4" M 200 m, D 25M Netting: Nylon multi/mono 5" M 200m, D 20M
Spear	60 pcs	Trident, stainless steel 4 mm dia, 1.8 m

Items	Quantity	Specifications
3) Cooler box		
160 ℓ type	15 pcs	Plastic, oblong shape with handling strap
60 ℓ type	45 pcs	Plastic, oblong shape with handling
Large ice box	9 pcs	Plastic, 500 L dicebox with lid
Platform scale	3 units	Pound reading with dial indicator
4) Transceiver	18 units	Portable VHF marine type with battery pack and chargers (9 units)
5) Trailer	6 units	For landing fishing boat, 2 wheel type galvanized steel made, 10×3.5 m (for 30 feet boat) 5 ×2.2 m (for 17 feet boat)
6) Tool and spare parts	3 units	For outboard motor and vehicle
7) Drum tin (empty)	15 pcs	180 ℓ for Fuel
8) Spare parts	1 unit	Starter and propeller for diesel boat & derrick block for transport vessel
9) Folding cot	6 units	2×1.2 m
10) Pickup truck	1 units	Single cabin, 1 ton type

• The following equipment and materials are for the Sub-project II of Ebeye Fish Distribution Center in Kwajalein Atoll.

<u>Items</u>	<u>Quantity</u>	<u>Specifications</u>
1) Marketing equipment and materials		
• Cooler box (160 ℓ)	15 pcs	Plastic, oblong shape with handling strap
• Cooler box (60 ℓ)	15 pcs	Plastic, fishing type with cool box
• Fish box (20 ℓ)	20 pcs	Plastic, with handling strap
• Ice cask (30 ℓ)	20 pcs	Plastic,
• Fish pans	50 pcs	Aluminum, holed type with strap
• Platform scale	3 units	For 300LB, 50LB, 20LB each, Pound reading with dial indicator
• Showcase	3 units	Stainless steel with plastic lid 1.8 × 0.9 × 0.3 m, 0.5 m long legs
2) SSB radio equipment	1 unit	150 W, wide frequency range, marine channel
3) Drum tins (empty)	10 pcs	180 ℓ
4) Apparatuses for collecting and analyzing data		
• Copy machine	1 unit	Desk top type
• Facsimile	1 unit	G3 type
5) Vehicle		
• Crane truck	1 unit	2t type, crane capability 500 kg over

(4) Basic design plans

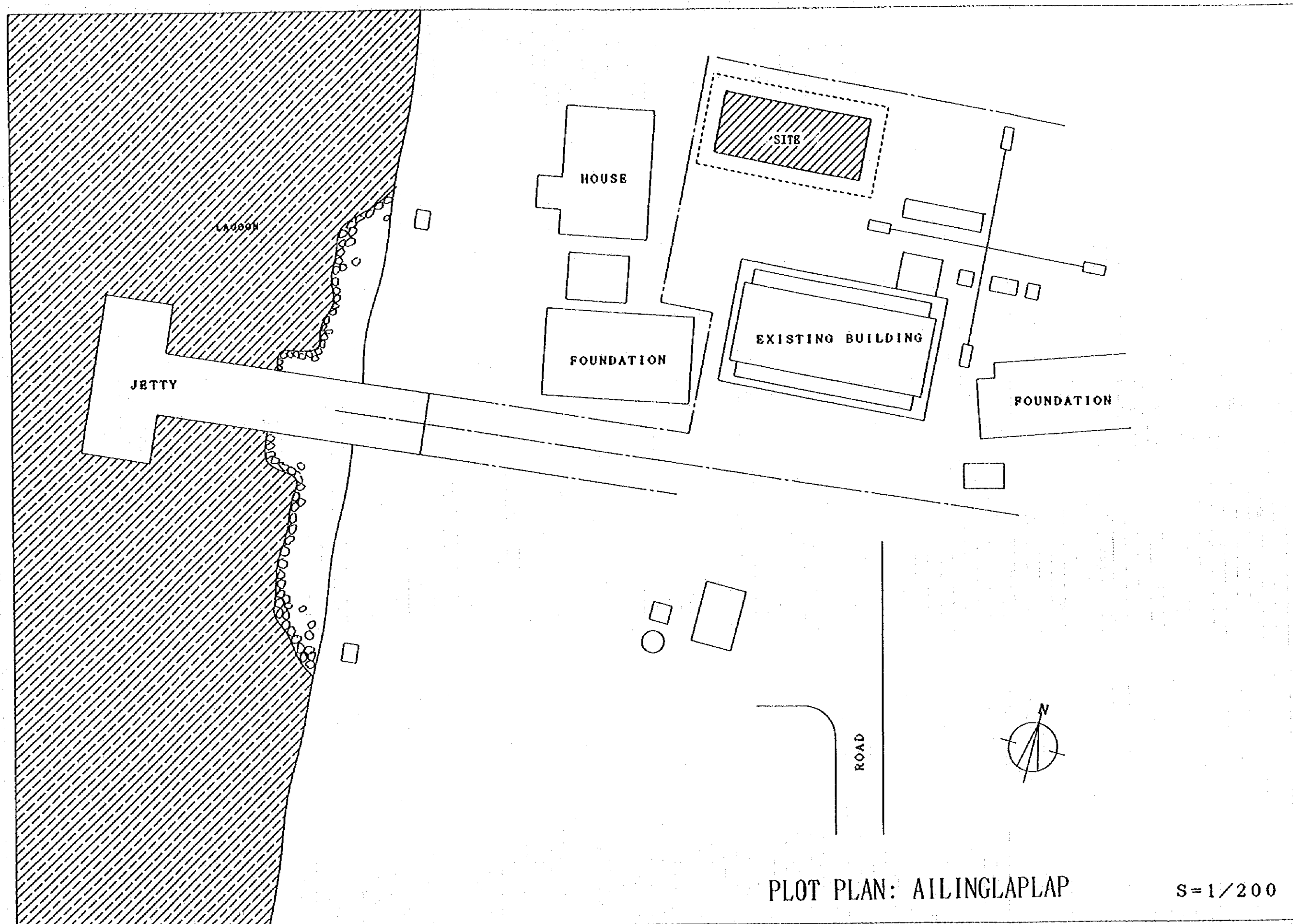
Basic design plans are showed from the next page on. Plans consist of the following plans

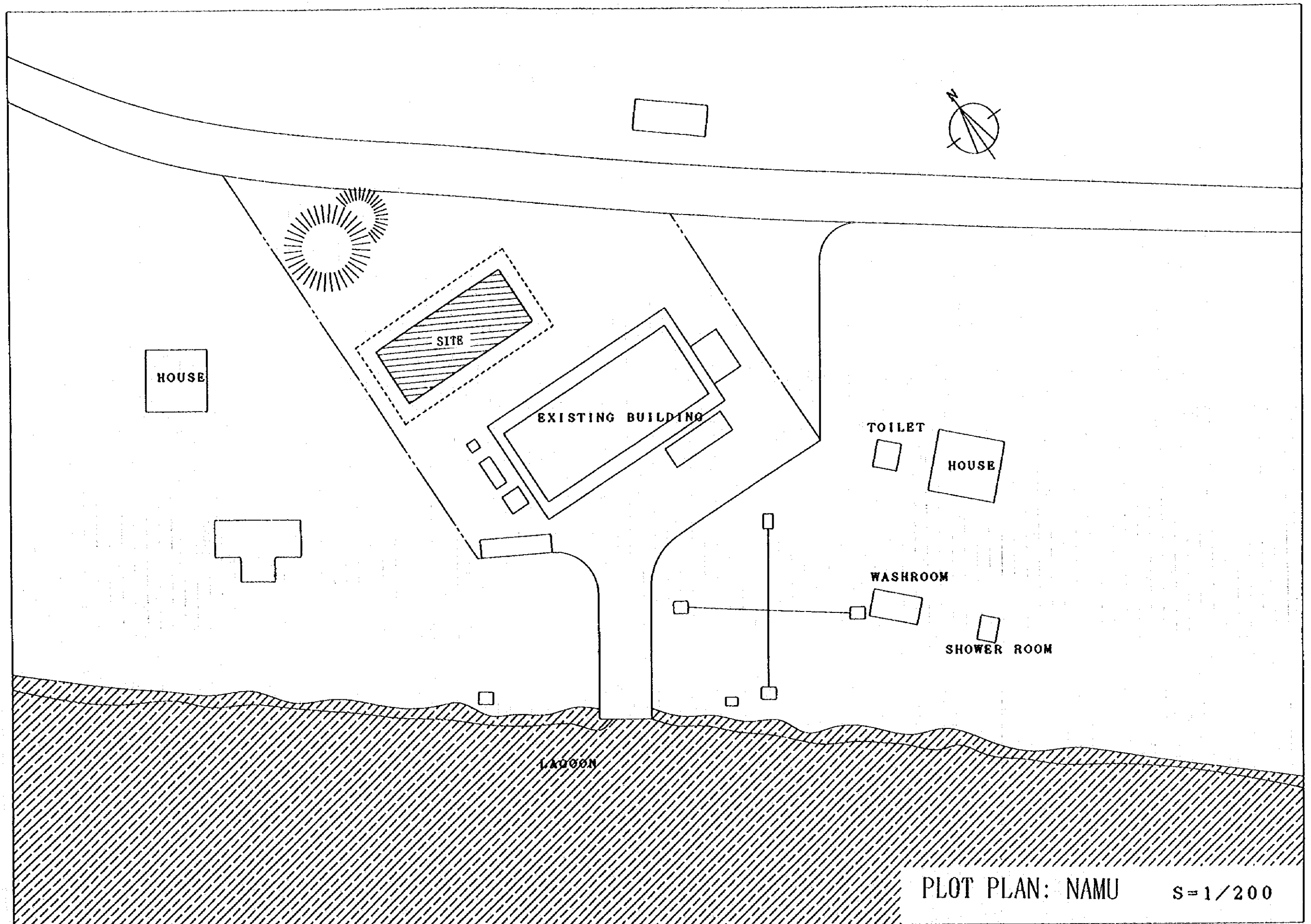
1) Fishing base of three outer islands

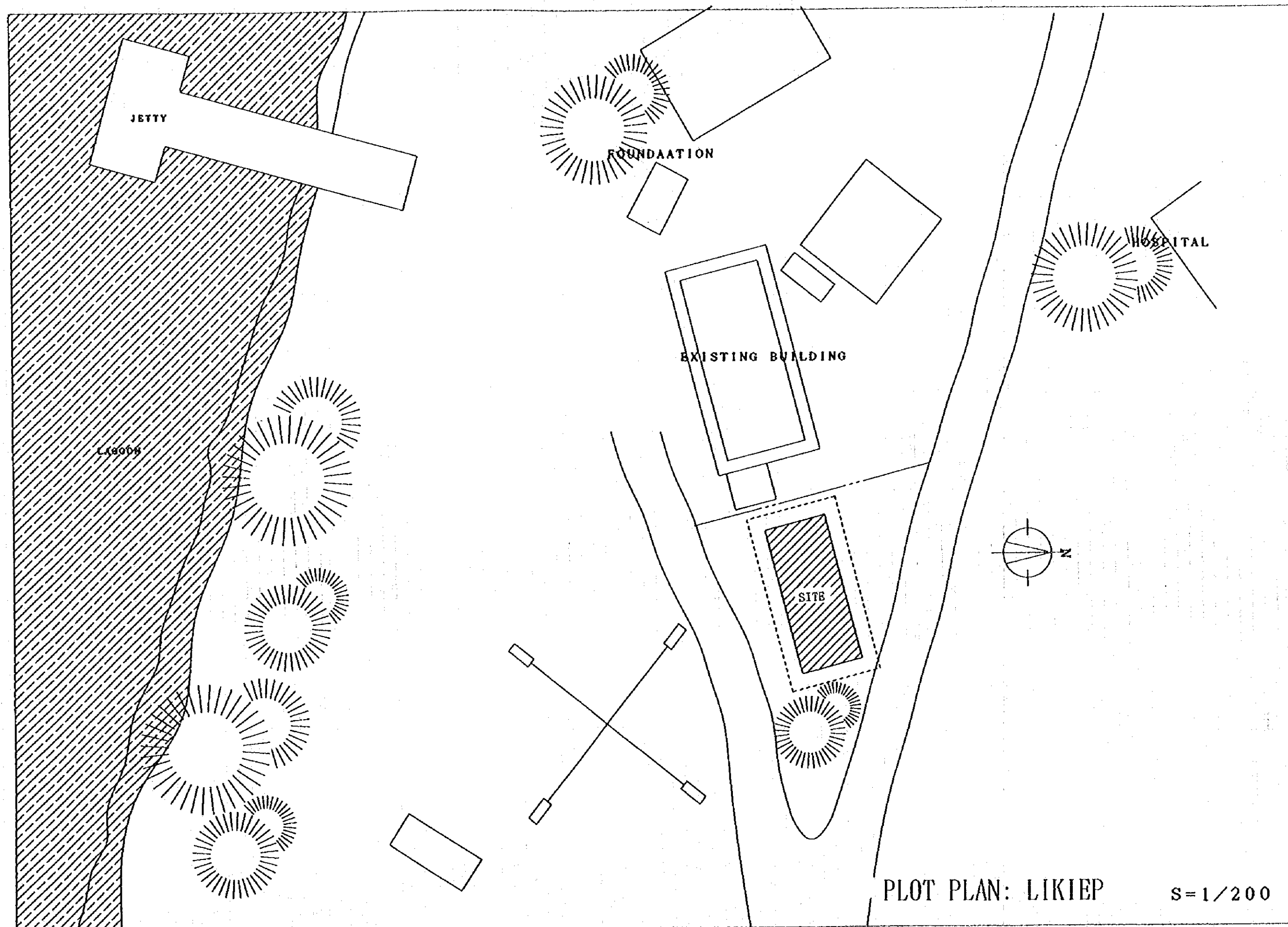
- |                                       |       |
|---------------------------------------|-------|
| • Plot Plan: Ailinglaplap             | 1/300 |
| • Plot Plan: Namu                     | 1/300 |
| • Plot Plan: Likiep                   | 1/300 |
| • Additional Facilities Building Plan | 1/100 |
| ( Plan, Elevation, Section)           |       |

2) Distribution center of Ebeye Island

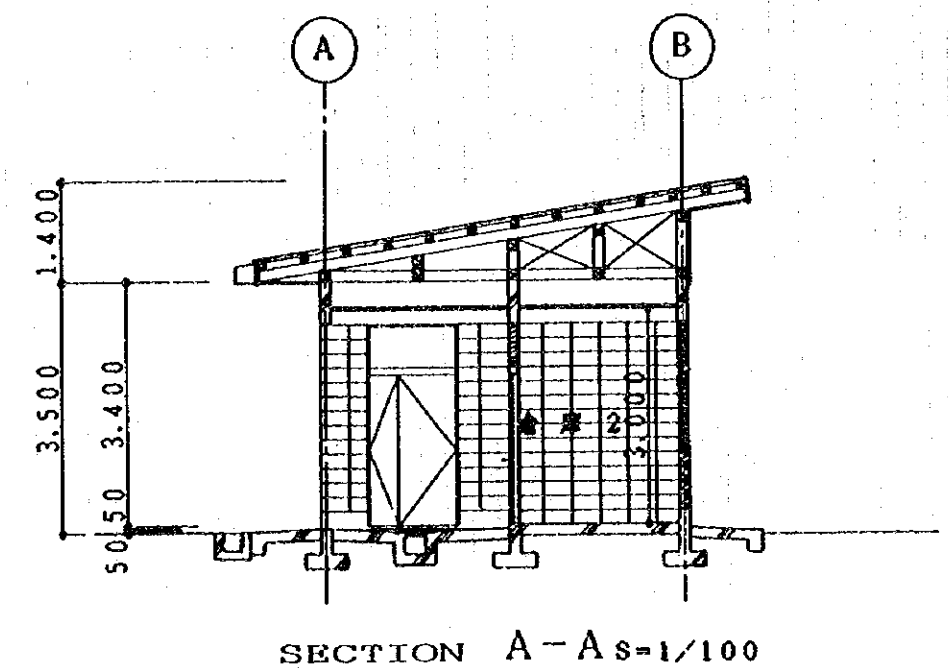
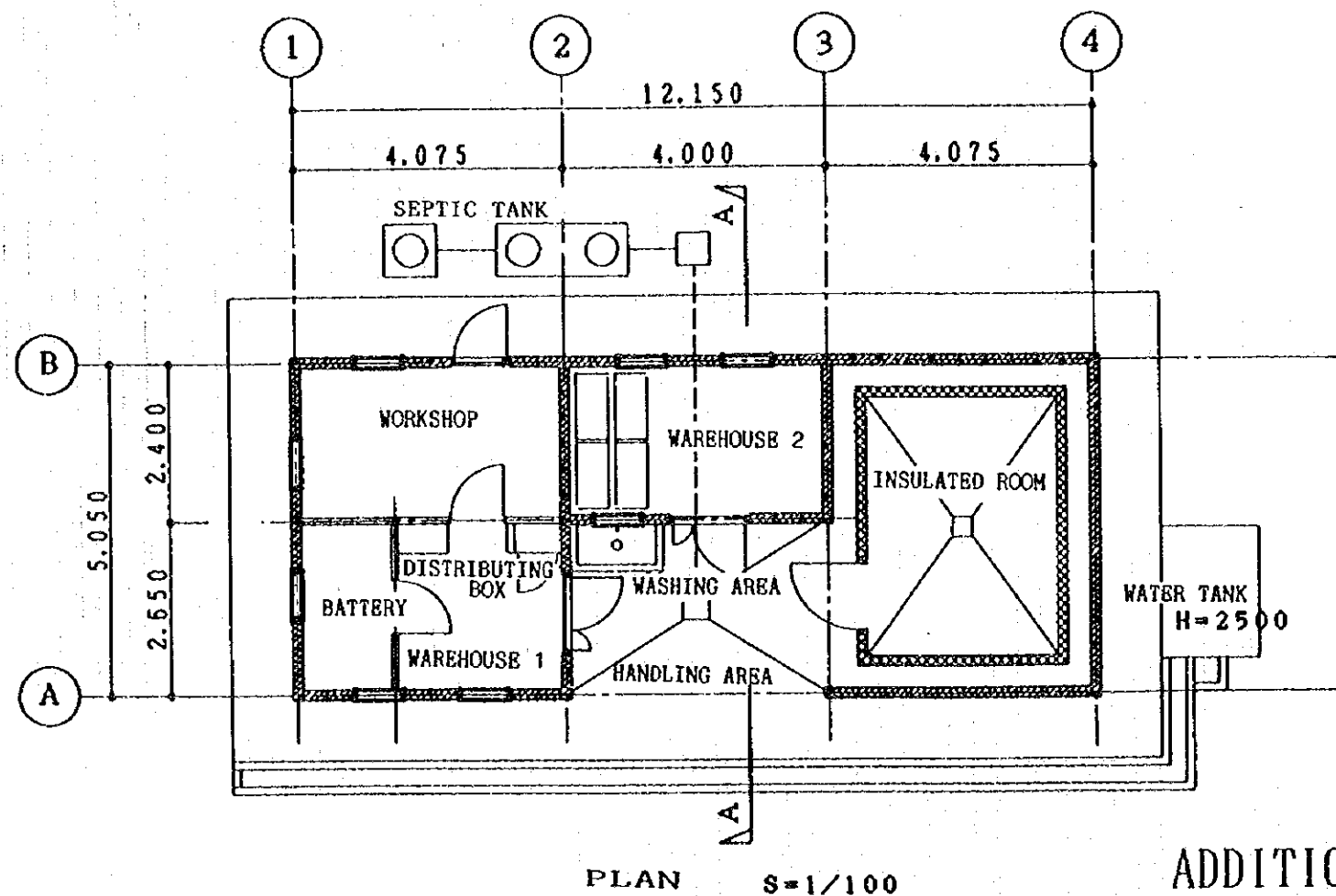
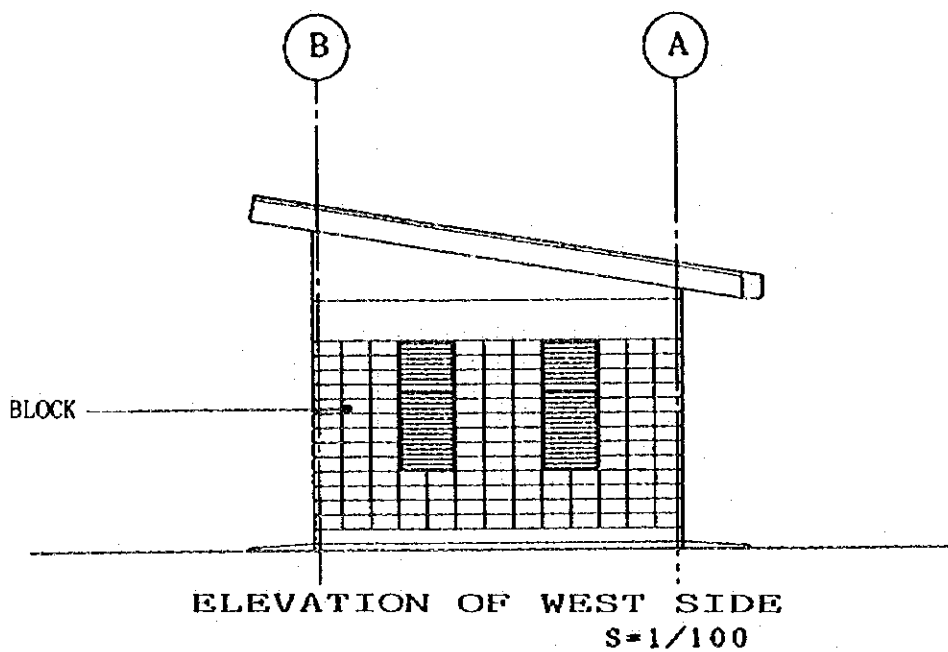
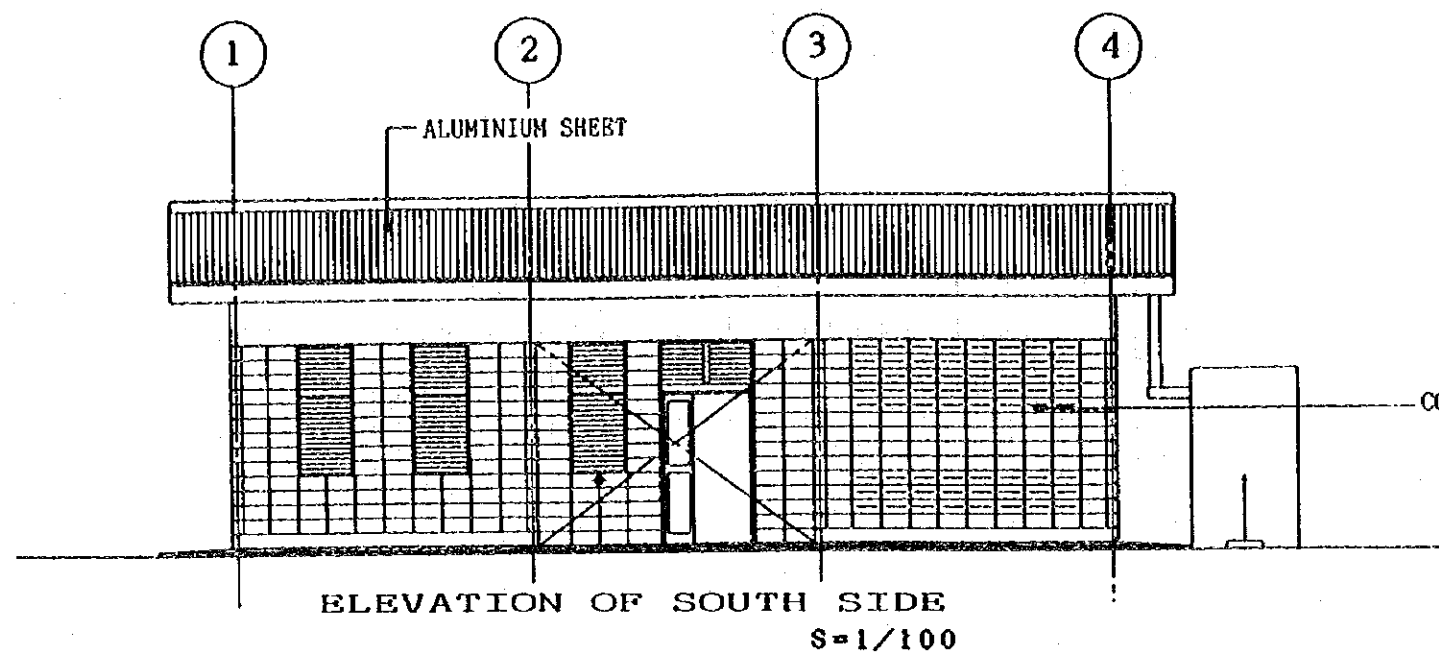
- |                                    |       |
|------------------------------------|-------|
| • Guide Sheet                      | 1/600 |
| • Plot Plan                        | 1/200 |
| • Main Building Plan (1st floor)   | 1/100 |
| • Main Building Plan (2nd floor)   | 1/100 |
| • Main Building Section            | 1/100 |
| • Main Building Elevation          | 1/100 |
| • Annex( Plan, Elevation, Section) | 1/100 |



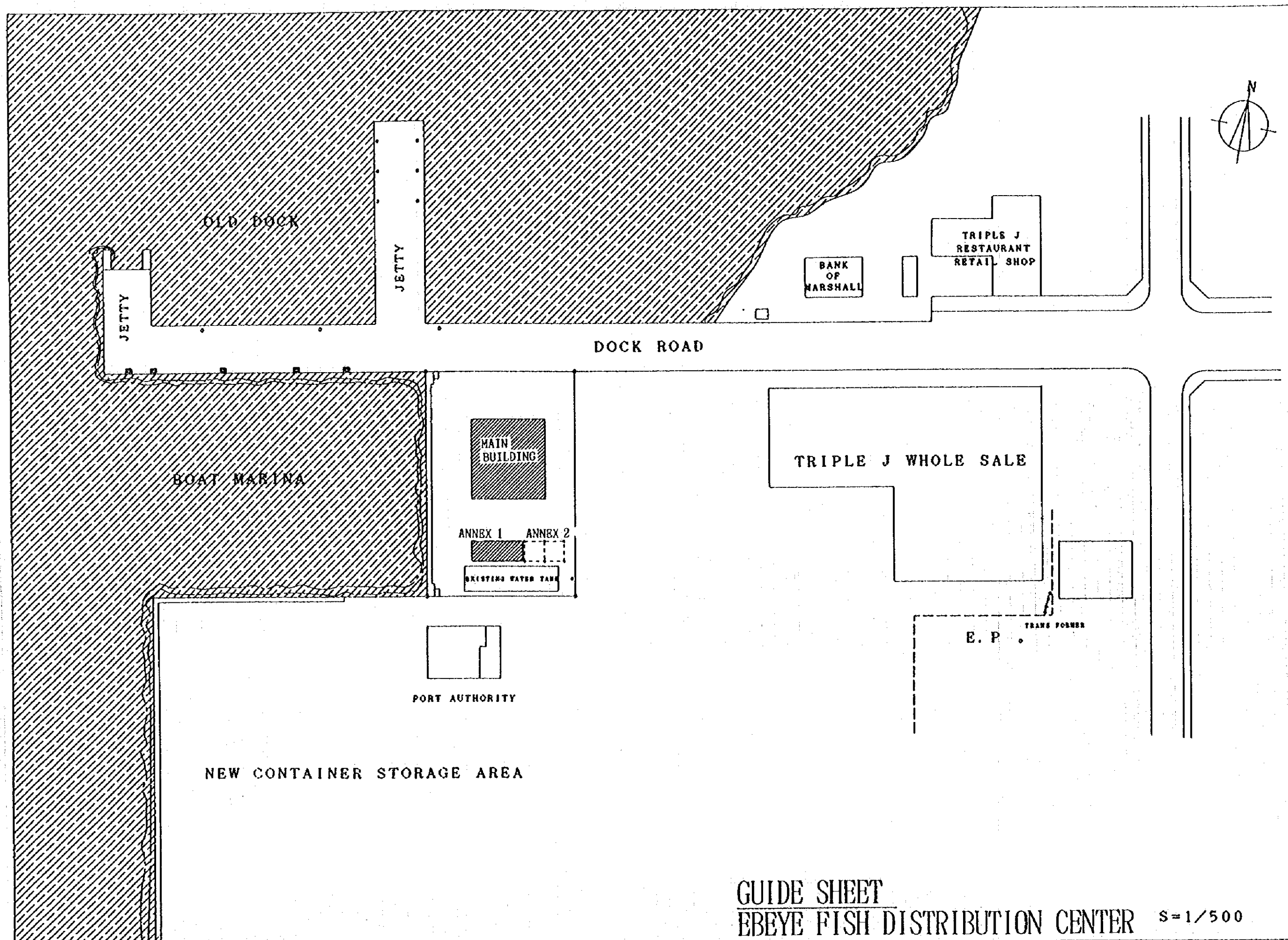




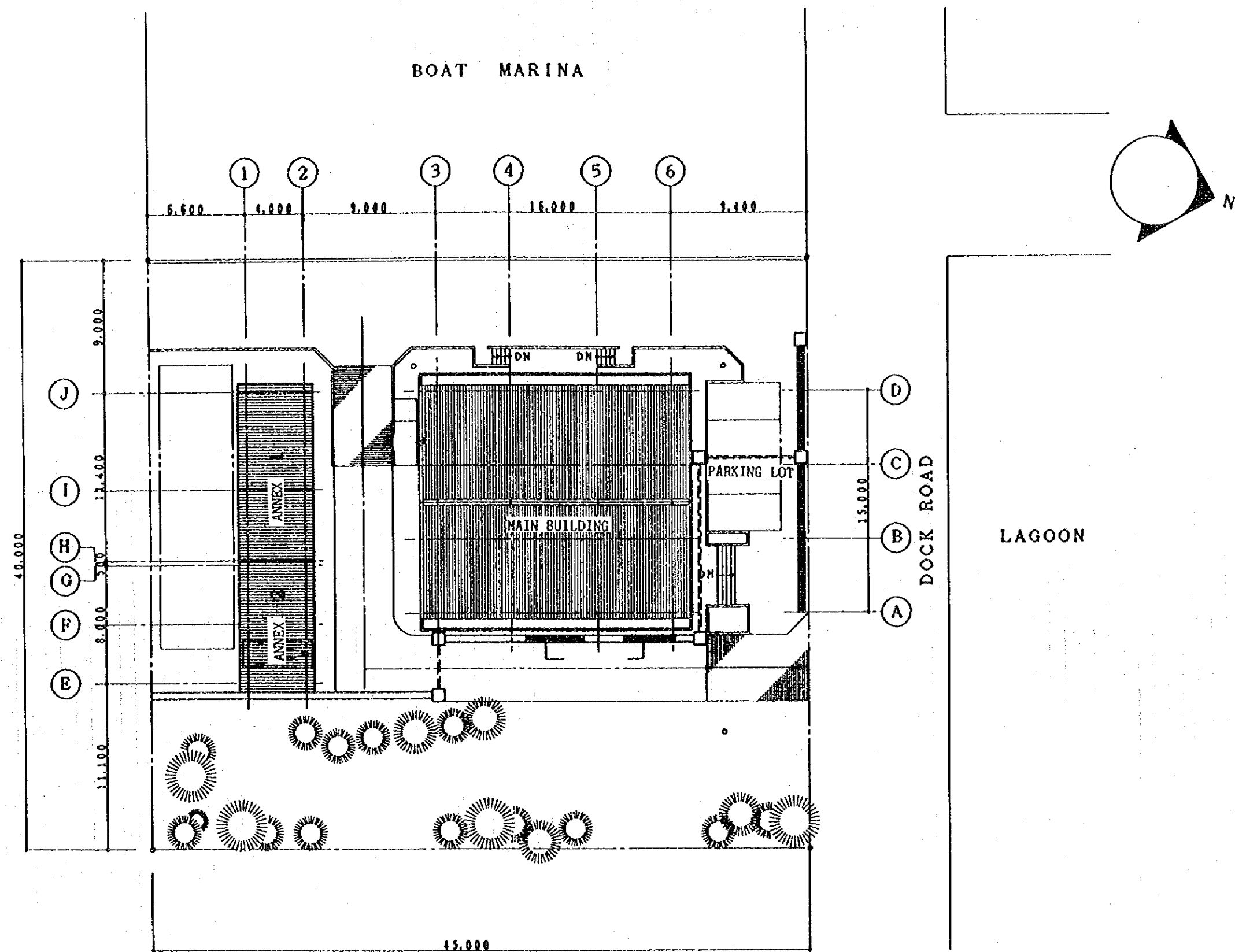




ADDITIONAL FACILITIES PLAN  
OF THE THREE OUTER ISLANDS S=1/100

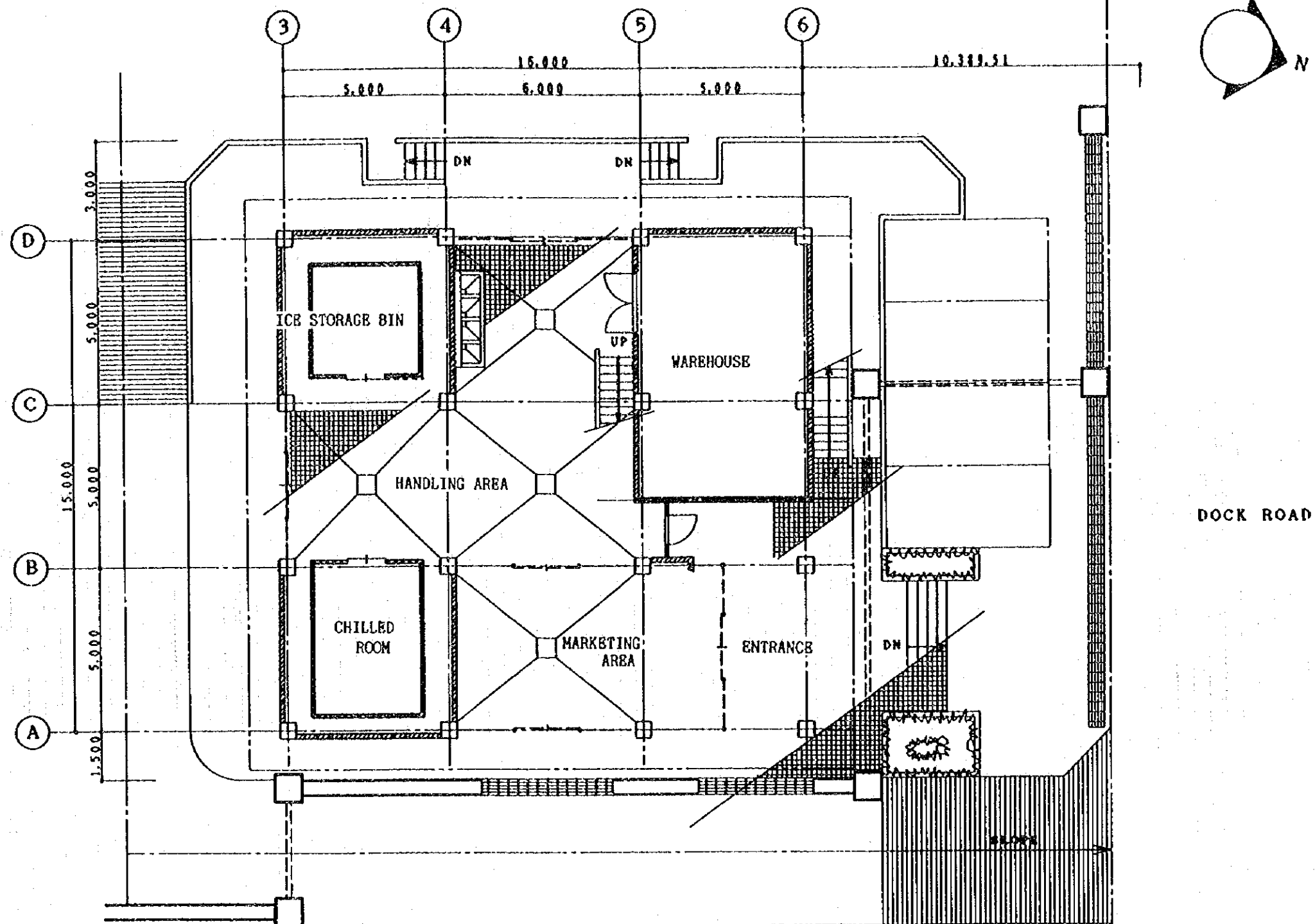


GUIDE SHEET  
 EBEYE FISH DISTRIBUTION CENTER S=1/500



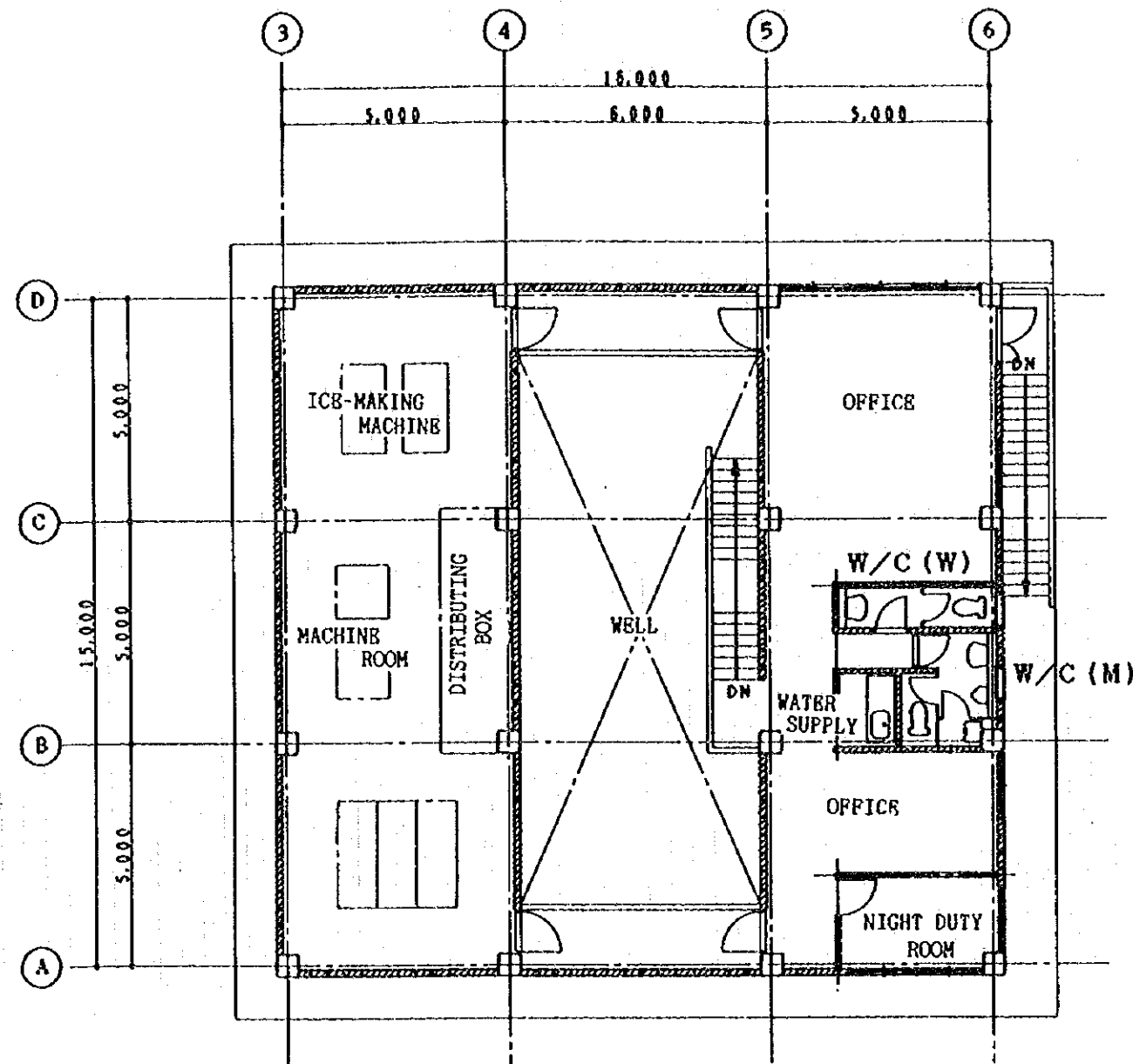
PLOT PLAN  
SCALE=1/200

EBEYE FISH DISTRIBUTION CENTER S=1/200

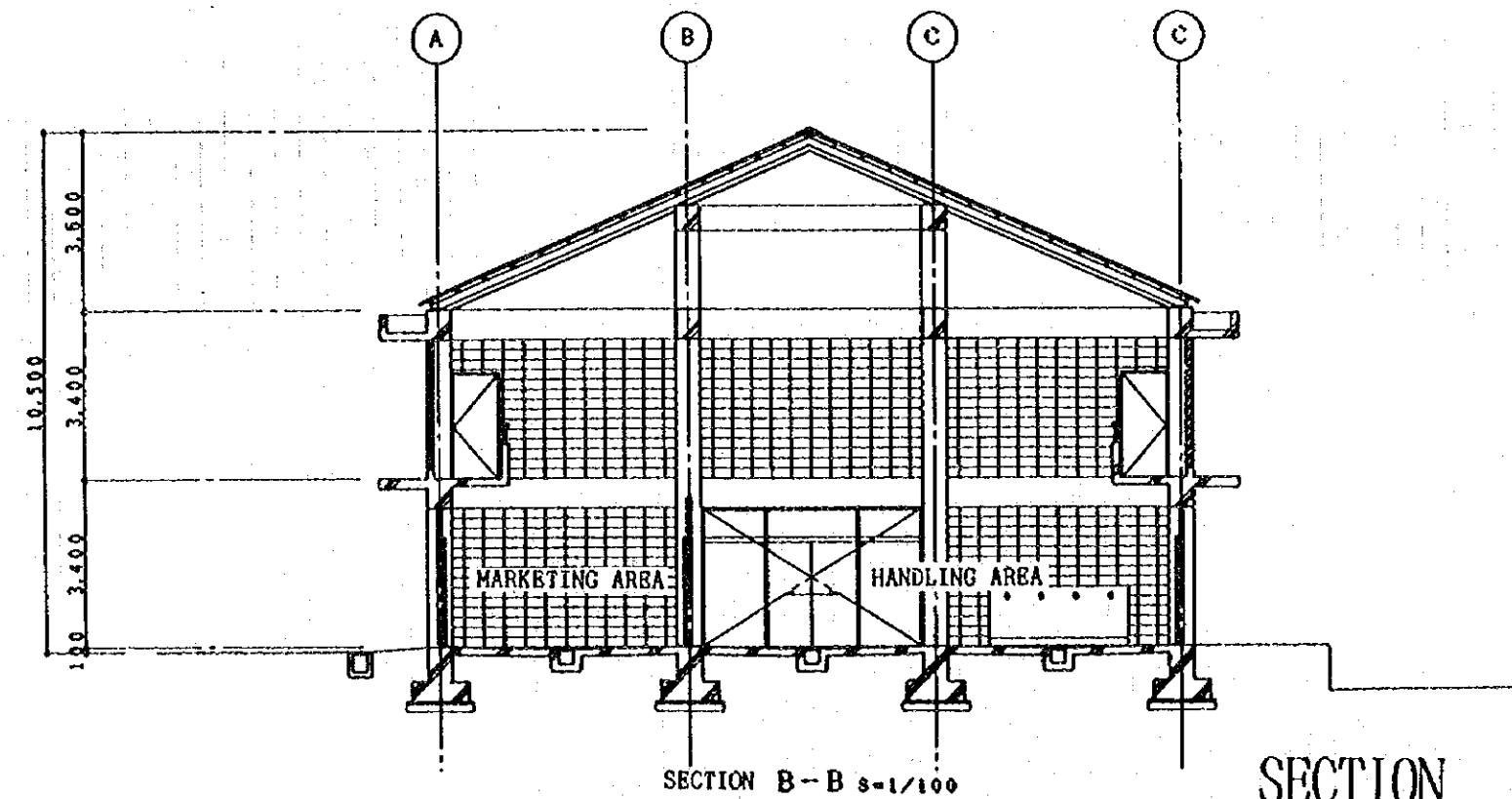
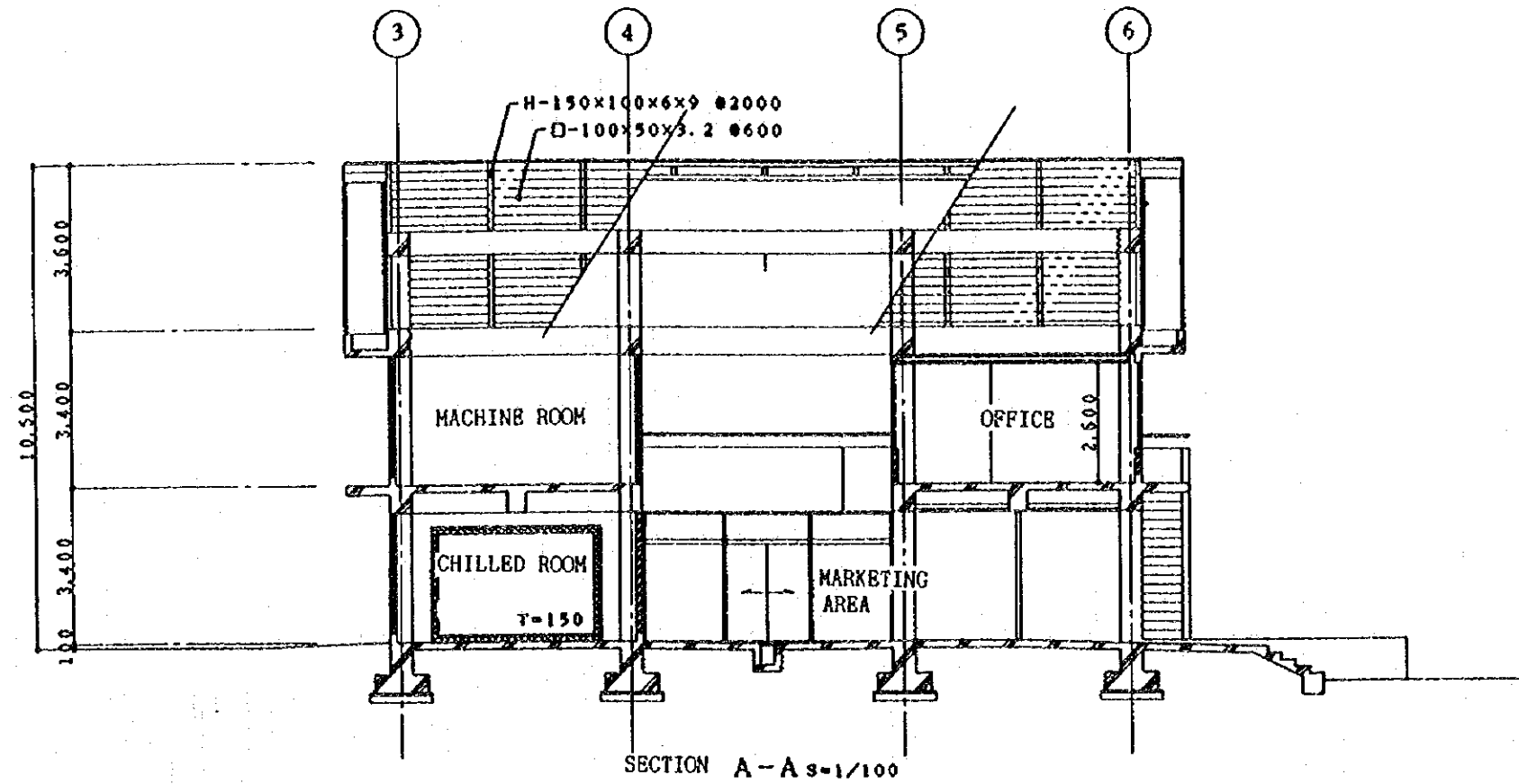


MAIN BUILDING PLAN (1ST FLOOR)  
EBEYE FISH DISTRIBUTION CENTER

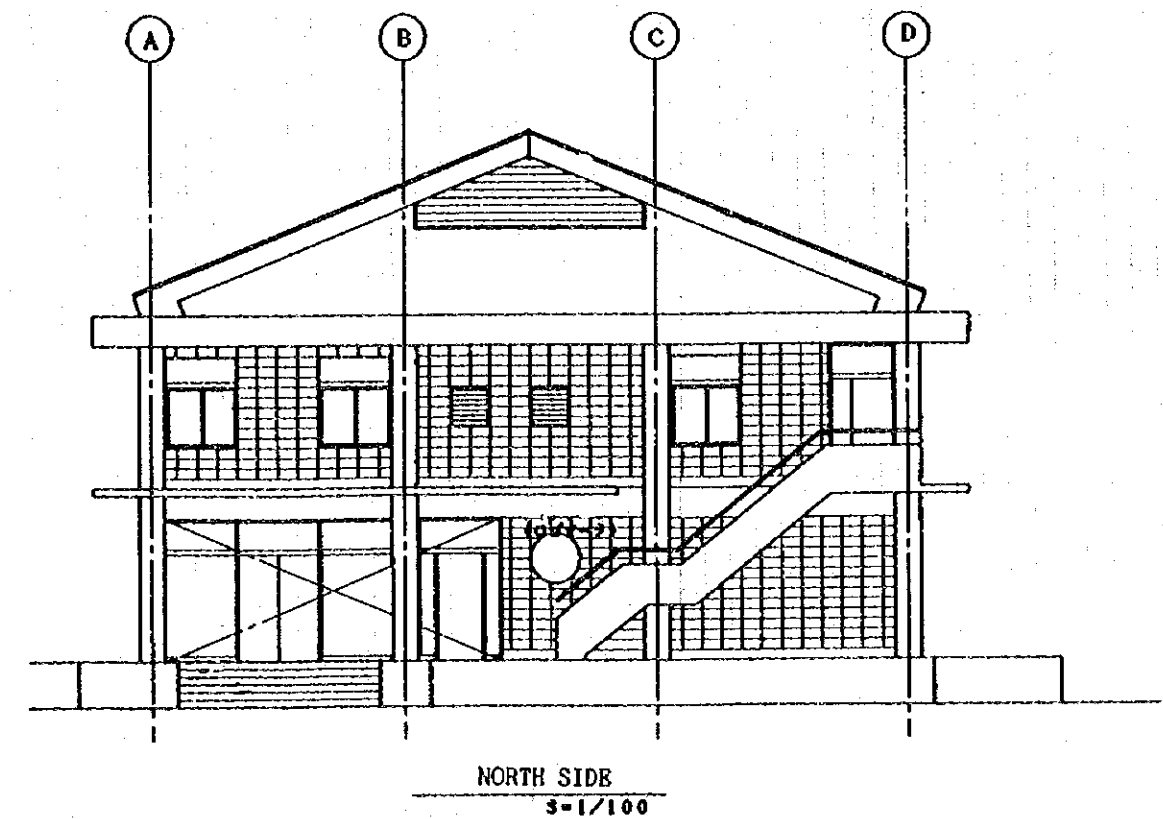
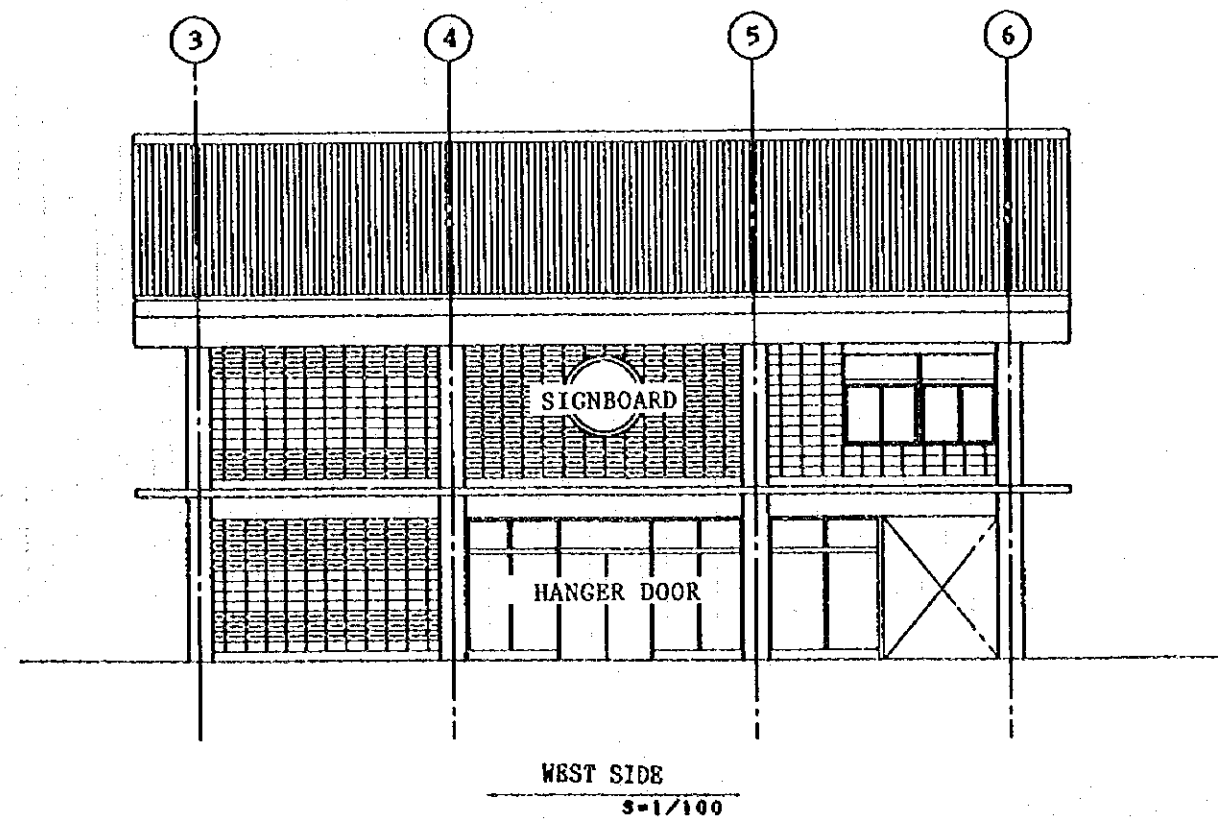
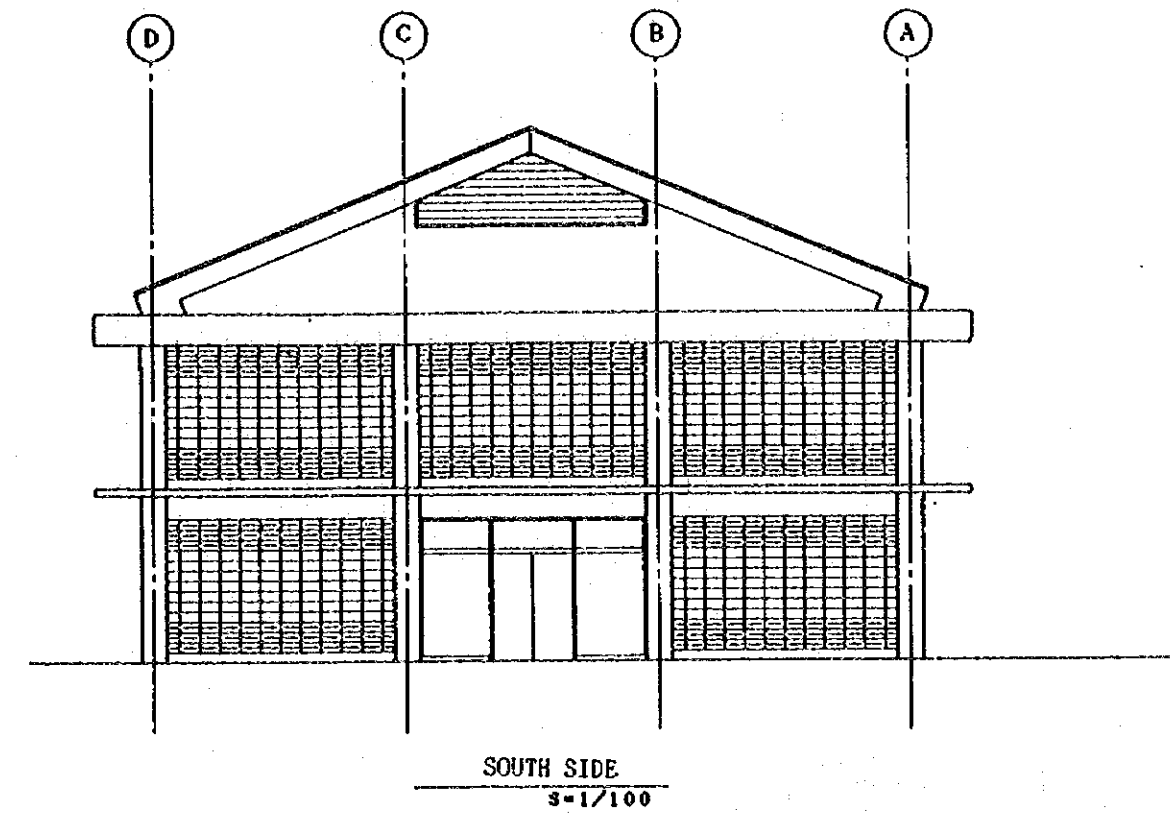
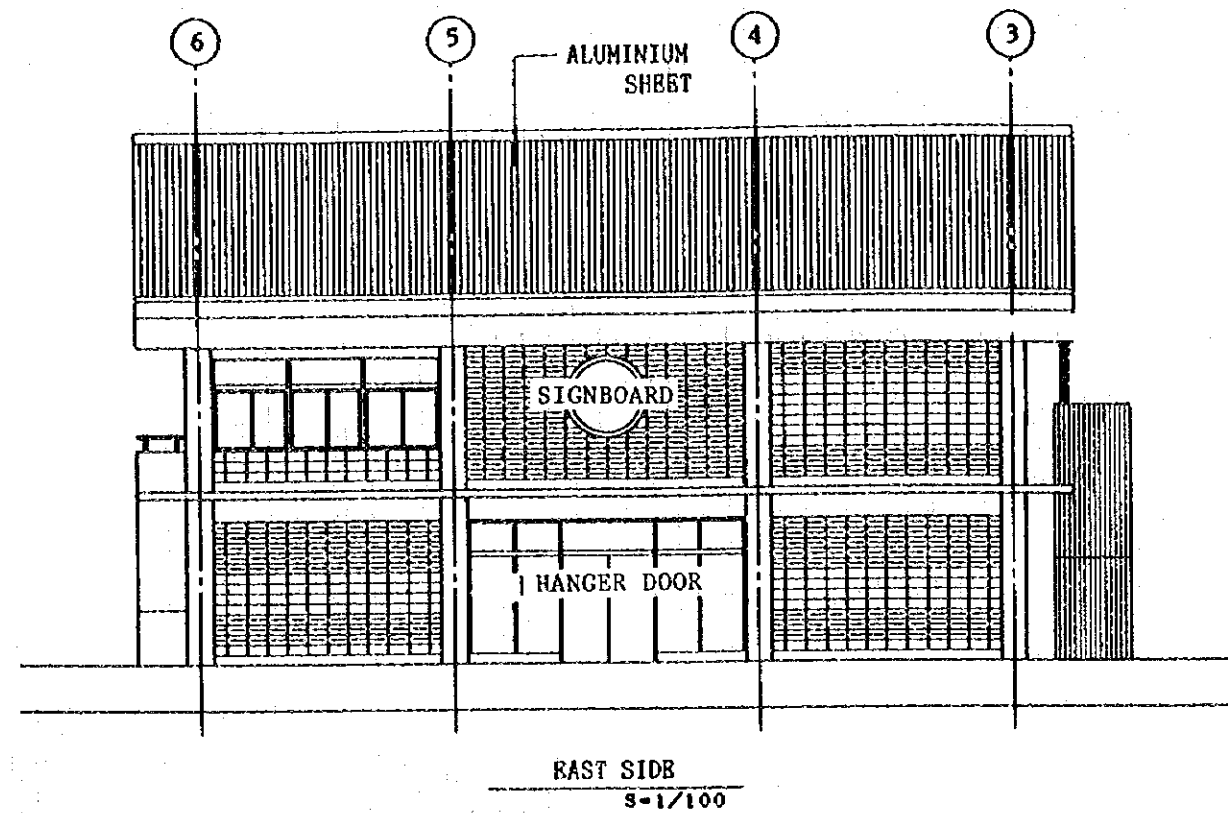
S=1/100



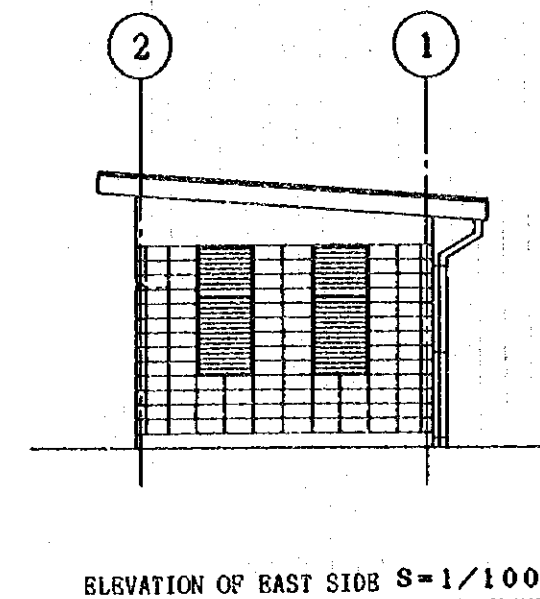
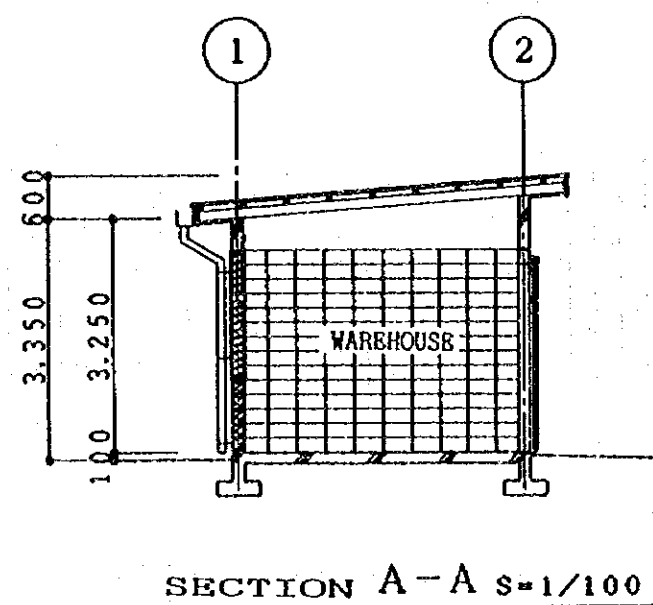
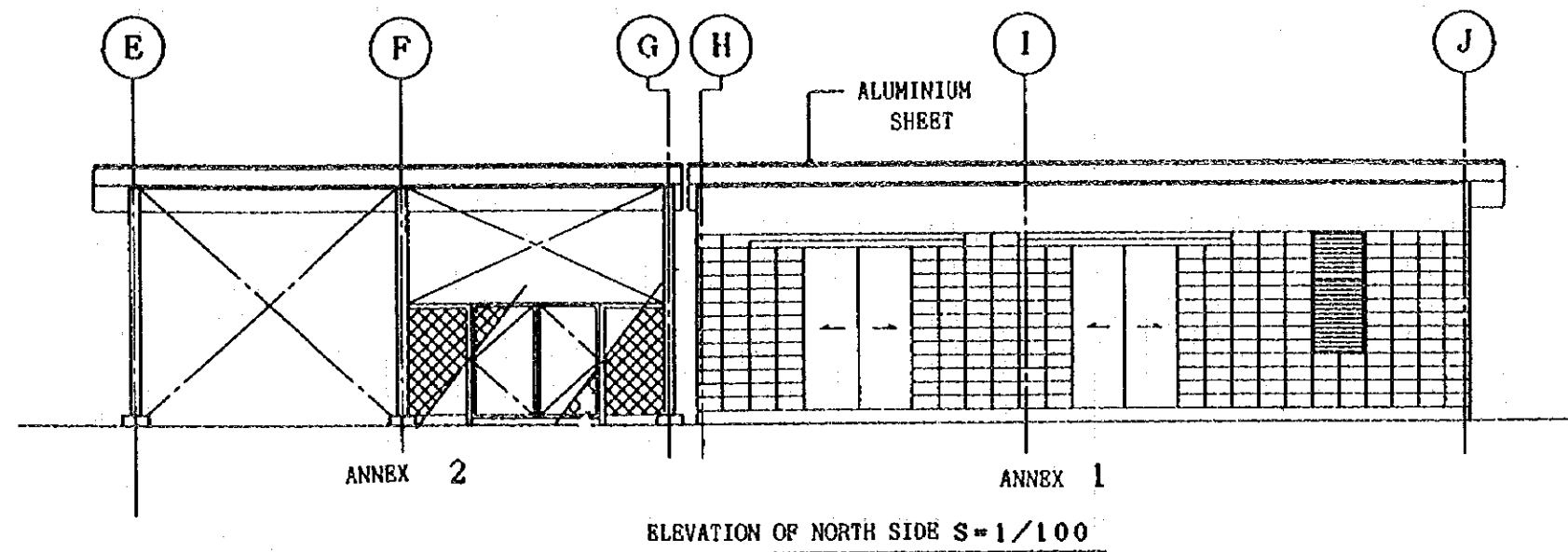
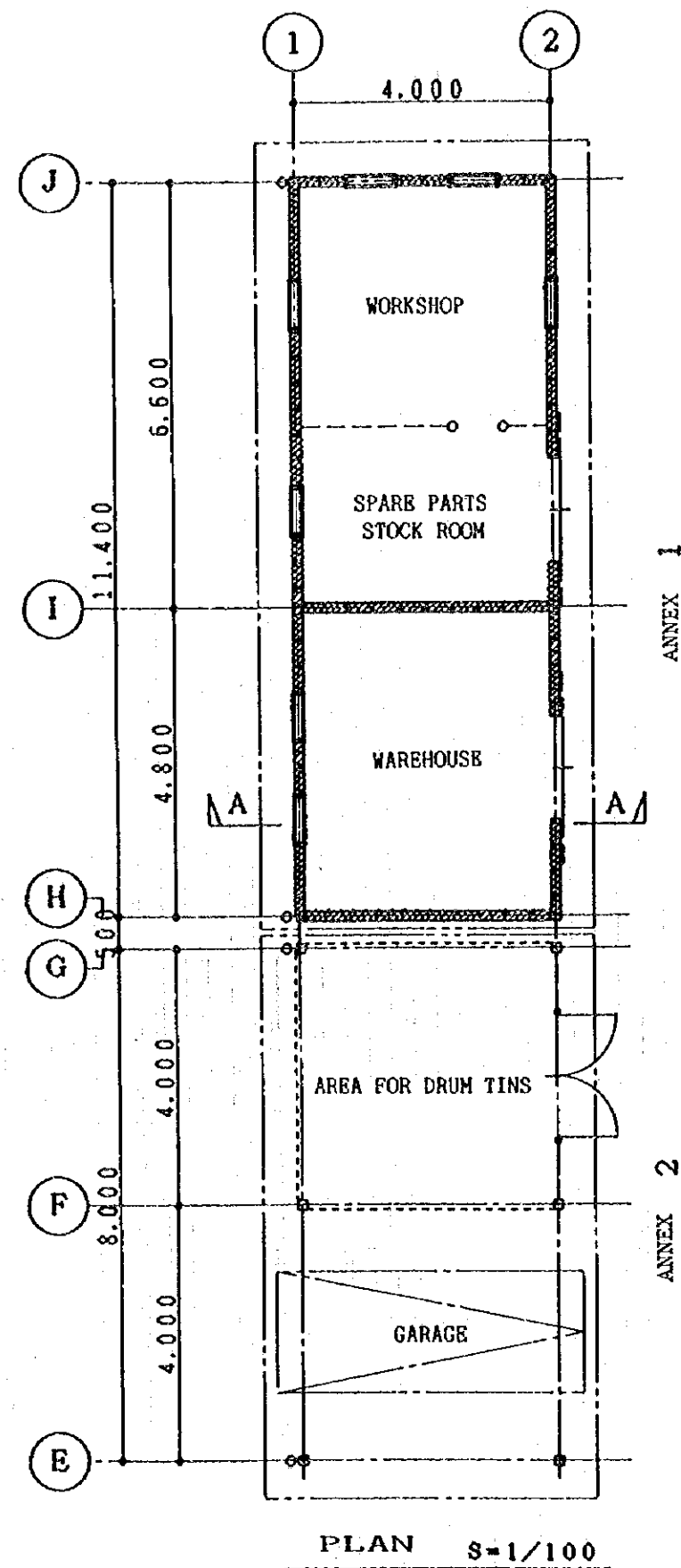
MAIN BUILDING PLAN (2ND FLOOR)  
EBEYE FISH DISTRIBUTION CENTER S=1/100



SECTION  
EBEYE FISH DISTRIBUTION CENTER s=1/100



EBEYE FISH DISTRIBUTION CENTER : ELEVATION S=1/100



EBEYE FISH DISTRIBUTION CENTER : ANNEX S=1/100



## **CHAPTER 3**

### **IMPLEMENTATION PLAN**

## Chapter 3. Implementation Plan

### 3-1 Implementation Plan

#### 3-1-1 Implementation Policy

The Project shall be implemented with the following policy in the spirits of Japan's Grant Aid Scheme.

(1) For smooth and proper implementation of the Project, utmost efforts shall be made to bring about better understanding and good relationship among MIMRA, the Consultant and the Contractor, in the form of exchange of opinions with one another.

(2) Since the construction sites lie in the remote islands 300~400km distant from the capital Majuro, neither material nor labor can be locally procured and employed. Construction materials, say from concrete aggregates to water, shall be sea-freighted from Majuro Island. The overseas procured materials shall be transported onto the construction sites via Majuro by landing vessel of the Contractor. Hence, procurement and mobilization are the most important activities for smooth and successful performance of the Project. Taking the time schedule into full account, the practically workable transportation programme shall be prepared.

(3) The construction sites are privately owned, and so MIMRA shall secure and hand-over to the Contractor under the sole responsibility of MIMRA. Considering the characteristics of the construction site, i.e. its locality, construction method will be worked-out and adopted; such a mode of construction as protects the long-cherished traditional way of life of the local people as much as possible and also ensure quick performance of the Project will be chosen. The Contractor

shall try its best to carry out the works without causing disturbance to the life of the dwellers in the site area as much as possible. Prior to commencement of the works, both the time schedule and the construction method shall be explained to and then approved by the Government of the Republic of Marshall Islands.

(4) The items to be kept in mind and observed are below-mentioned to maintain accurate workmanship and good quality.

(a) Countermeasures against salt damage

As the construction site is situated at the location exposed to salty element, say breeze with salt ingredient, salt-resistant materials shall be selected and procured, and also anti-salt measures shall be taken to protect materials and equipment from salt damages.

(b) The middle and latter half of the construction period fall on the rainy season (October to February) when strong north wind blows. The work, therefore, shall be commenced at the site farther away from Majuro, thus possible risk involved in transportation of construction materials being held at minimum level.

### 3-1-2 Implementation Conditions

At the three outer island as well as Ebeye Island, there has been no large-scale construction work, and the Previous Project implemented five years ago under Japan's Great Aid program is the largest in terms of the magnitude of the work. Furthermore, construction of a hotel accommodation with 150 rooms at the Majuro Island is underway and due to be completed in June, next year (June, 1996).

As for the local contractor eligible for undertaking of this kind of building work, there are a few. There is one local contractor well established and

reputed, and also fully experienced regarding the building and building work-related projects, in addition to which, an company of New Zealand decency, and another local contractor majoring in architectural work though not so well equipped with construction machinery and equipment as the first one, are also working in the same locality.

- ① The most powerful local contractor referred to above is conducting a great variety of construction projects inclusive of not only large-scale work domestically funded but ODA works as well, and has a landing-vessel of its own.

The construction market is very small, and fostering of experts and enterprises of medium status is not enough. Therefore, construction workers, technicians and experts are not fully trained, and so all the local contractors are employing the expatriate personnel instead.

- ② Due to non-availability of the data on the annual rainfall in the Ebeye and three outer islands, the yearly amount of rainfall is unknown. As far as Majuro Island is concerned, instead, its annual precipitation is approximately 3,400 mm. The rainy season is June to December, and there are many squalls taking place throughout the year. In October, north-north-east ward wind blows strongly, making voyage of vessels very difficult very often. The annual average temperature is approx 28 °C, and the humidity amounts to as high as 76%. Like this, the working conditions of the outdoor works are not so good. The governmental offices are adopting five-days-a-week system. Especially at some construction job sites of private companies, however, work is being done even on Saturday and Sunday. Anyhow, with due consideration to both the labour customs and the site conditions currently prevailing, practicable and workable work programme has to be worked out and adopted.

### 3-1-3 Scope of Works

Scope of works of the Project contemplated herein by and between the recipient country and Japan are as follows, and the estimation of costs to be borne by the recipient country is shown in the Appendices;

Table 3-1-1 Scope of Works

Contents of construction works, etc.	Japan	Marshall
1. Land acquisition, site preparation, and securing temporary facilities and space during construction works.		○
2. Introduction of utility to the site (Electricity, water supply, telephone)		○
3. Construction works (the Outer Islands' Additional Facilities, Ebeye Fish Distribution Center, etc)	○	
4. Import procedures, customs clearance (1) Seafreight to Marshall Islands and inland transportation within the Marshall Islands. (2) Tax exemption and customs clearance	○	○ ○
5. Payment of commission to Japanese banks of foreign exchange regarding Banking Arrangement(B/A)		○
6. Formalities for embarkation, disembarkation and stay at the Marshall Islands of Japanese people for the Project.		○
7. Proper and effective management of facilities by Japan's Japan's Grant Aid.		○
8. Bearing all the costs incurred in construction of facility, transportation of furniture & materials, and installation and erection works that cannot be covered by the Japan's Grant Aid.		○
9. All the procedures of application for approval or authorization regarding construction works.		○
10. Arrangement and solution of the troubles between the Contractor and neighbours and third parties during the construction works.		○

### 3-1-4 Consultant Supervision

Basic policy and important points of the consultant supervision are as follows:-

(1) In the course of the progress of the works, the Consultant shall keep in close touch with MIMRA in order to carry out the construction work smoothly. Full discussions and coordinations between MIMRA and the Consultant shall be done beforehand especially in connection with infra-service connection work and grading of the site premises, since there may be a risk of conflict occurring concerning these items of work.

(2) Before commencement of the works, the Consultant shall examine carefully construction plans, and drawings to be submitted by the Contractor, and assess appropriateness of the plan, time schedule, quality of materials to be incorporated into the works, and the method of construction.

(3) At the time of handing over after completion of the Project, the Consultant shall check whether or not the completed works meet with their specifications under the Contract, and give the Contractor proper instructions, if any remedial works are necessary.

(4) An architect shall conduct overall construction work supervision.

### 3-1-5 Procurement Plan

#### (1) Construction Materials

Locally obtainable materials are limited to aggregates, sands, gravels, soils for banking, etc. Reinforcing bars, steel products, plywood, etc. are imported mainly from the U.S.A., New Zealand and Australia, and therefore, are obtainable to some extent. However, steel materials will be imported directly from Japan, because the volume of the materials used is large and local procurement thereof is very costly.

Cement, wood for frame work, etc. used in connection with building work will be locally procured, in principle. But locally unobtainable items and items which cannot be used from the point of quality, even if locally available, or cannot be locally procured upto the required quantity will be procured in Japan and seafreighted to the Marshall Islands.

Construction heavy machinery will be locally leased and deployed because they are locally available and are considered usable with some revision or adjustment.

### Procurement List

Item	Transportation method
1. Construction Materials and Equipment	
① Construction Machinery/Equipment	By seafreight from Japan
a. Concrete-mixer      0.5m <sup>3</sup>	
b. Generator            20kVA	
② General Construction Materials	By seafreight from Japan
a. Reinforcing steel bar	
b. Block with opening	
c. Roof materials	
d. Chilled storage material	
e. Ice making and chilled storage plant	
f. Power distribution panel	
g. Solar power generation materials	

(2) Materials and Equipment

1) For the Outer Islands

① Fishing vessel and outboard motor

• Boat-type fishing vessel and outboard motor

Though not manufactured locally, there are local agencies dealing with fishing boats and outboard motors of Japanese and U.S. made since the boats and motors sold by these agencies are widely used, in there will be locally purchased. It is paid that the artisanal fishermen prefer Japanese ones.

• Inboard engine fishing boats

This type is not available in the Marshall Islands. Just as is the case with the previous project, this will be procured in Japan and transported to the Marshall Islands. (Japanese made)

② Fishing gear

All the fishing gear imported from abroad. The fishermen prefer Japanese made fishing gear superior in durability. Since gill-net is produced upon the order it also will be procured in Japan. (Japanese made).

③ Cooler box

160 ℓ cooler box: Cooler boxes of the previous project were procured in Japan with success the present transportation vessel is designed to accommodate them. Therefore the same type as was procured at the previous project will be procured in Japan. (Japanese made)

• 60 ℓ cooling box: Locally available. (U.S.A. made)

• 500L ice box: Local agencies can handle this type, and so this will be locally procured. (U.S.A. made)

④ VHF trans-receiver

It is seldom used in this locality, and will be procured in Japan. (Japanese made)



⑤ Trailer for drawing fishing boats onto the shore

The 30 FT type is of a special kind manufactured upon the order but is possible to make locally. It will, therefore, be procured locally. So will the 17 FT type.

⑥ Repair tools

They will be procured from the same supply sources as the major machinery/equipment. The tools for outboard motors and truck will be locally procured, and those for diesel boats, from Japan.

⑦ Drum tin

They are locally available.

⑧ Spare parts for the existing vessel

Spare parts will be procured from the same supply sources as the 1st phase supplies, which (for diesel fishing boats) will be procured in Japan accordingly.

⑨ Pick-up truck

Obtainable through local agencies, procured locally. (Japanese made)

⑩ Platform scale and folding cot

Both of them are locally available.

2) For the Ebeye Fish Distribution Center

⑪ Materials and equipment for marketing

- Fish trays and ice cooler pans are unavailable in the Marshall Islands, and will be procured in Japan. (Japanese made)
- Scales are "pound"-indicated, and locally obtainable, so will be locally procured. (U.S.A. made)

- Cooler showcase, being an item to be manufactured upon the order, will be procured from Japan. (Japanese made)
- Cooler boxes of 60L will be locally procured, as they are available in the Marshall Islands.

⑫ SSB radio-phone set, with installation of phone antenna

There are agencies handling this kind of item, and furthermore work of installing antenna fit to required radio-phone set is necessary, and this will be locally procured accordingly. (Japanese made)

⑬ Data collecting and analysing equipment

- Copying machine, tele-facsimile machine

These can be got in the locality, and will be for local procurement.

⑭ Truck with crane

Crane truck, being a specialized vehicle, outside of coverage of local car-handling agencies, will be procured in Japan. (Japanese made)

### 3-1-6 Implementation Schedule

When this Project is decided to be implemented under the Grant aid Programme of the Japanese Government, the Project will be performed after completion of the following course of action: 1) Both the Government conclude the Exchange of Note (E/N). 2) Then the Consultants prepare and complete the tender documents, and the bidding process is taken. 3) The Contractor is selected as a result of the bid, and the construction contract by and between the Government of the Republic of the Marshall Islands and the selected Contractor.

Each step of the implementation schedule is as follows.

(1) Detail design work

Based upon Basic Design Study Report, the Consultant will perform detailed design, and prepare the bidding documents for selection of contractor of the Project. Period required for this work is estimated about two months.

(2) Bidding works

After completion of detailed design works, the Consultant will invite Japanese companies publicly in the form of announcement in newspaper to pre-qualification bid for the Project, examine qualifications of the participants in the bid a for the Project, and decide the participants in the bid for the Project.

Based on the pre-qualification result, the client of the Project will invite the companies pre-qualified to the bid, which is conducted in the attendance of the parties concerned. It takes about 1.15 months from the public announcement for invitation to the bid to selection of a contractor and subsequent conclusion of the contract.

(3) Construction works

After conclusion of construction contract, contract verification will be obtained from the Japanese Government for the commencement of the Project. Necessary period for total works will be around ten (10) months. If the site preparation works conducted by the Marshall side are progressed smoothly without any serious problems, the schedule is roughly be as follows;

### Table 3-1-3 Project Implementation Schedule

Number of month	1	2	3	4	5	6	7	8	9	10
Detailed design	<p>(Domestic works in Japan) Total 2.0 months</p> <p>(Site survey)</p> <p>(Site confirmation)</p>									
Management of construction	<p>(Temporary and preparatory works)</p> <p>(Construction works)</p> <p>Total 10 months</p> <p>(Completion and delivery)</p>									

### 3-1-7 Obligation of the Recipient Country

Site preparation works performed by the Marshall Islands are as follows:  
Site preparation, and connection works of electricity and water supply shall be completed before actual starting of construction works. Fencing work enclosing the Project site also shall be preformed by the Marshall Islands side.

**Table 3-1-4 Preparation Works borne by Marshall Islands**

- 1) Site preparation
- 2) Connection works of electricity
- 3) Connection works of water supply
- 4) Connection works of telephone-set
- 5) Securing of land for the temporary facilities before starting the Project
- 6) Others (bank commission, etc.)

### 3-2 Operation and Maintenance Plan

#### (1) Operation and maintenance plan

The Project is designed to improve and complement the Previous Project already implemented, so the management body of the Project will be MIMRA, Ministry of Resources and Development, adopting the same management system as the present one. Concerning the Fishing Bases in the outer islands, the persons already deployed for the Previous Project will be in charge of operation and maintenance of this Project, so no serious problem may occur. In case of the New Distribution Center in Ebeye, however, facilities will be installed newly and works will be extended, so three men will be newly employed; one in charge of distributing fish and operating ice-making machine and the other two, assistants.

The estimation of the annual revenue and expenditure of the Project is shown as Table 3-2-1.

And the annual total balance is estimated as follows;

Project revenue : US\$ 174,900.--

Project expenditure: US\$ 147,982.--

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Balance US\$ 26,918.--

Table 3-2-1 Estimate of the Annual Revenue and Expenditure of the Project

① Fishing Base in the Outer Islands (Balance of 1 Site)

Revenue of one site			
Items	Description	Amount Time or Month	Year
Delivering fish	2,000LB/time, @0.8/LB	1,600/T	16,000
Weight of delivery to the transportation vessel			
	2,000 LB/Time, 10times/year-site		
Total			16,000
Expenditure			
Buying fish	2,000LB/time, @0.6/LB	1,200/T	12,000
Office expenses	100/month		1,200
Personnel expenses	Budget of MIMRA		
Depreciation			
Lease of the site			
Fuel for truck(Likiep)	5L×8days/3.8gallon ×1.0	10.5/M	132
Total			13,332
Balance			6,668

② Ebeye distribution center (Collect fish from three sites))

Revenue of selling fish from three sites			
Items	Description	Amount	
		Time or Month	Year
Selling fish(whole sale)	4,200LB/time, @1.25/LB	5,250/T	52,500
Selling fish(Center)	1,800LB/time, @1.70/LB	3,240/T	32,400
Selling ice:deliver to the outer islands free of charge			0
Selling ice(Ebeye)	12,000kg×0.2/month	2,400/M	28,800
Total			113,700
Expenditure			
Buying fish	2,000LB/time, @0.6/LB	1,200/T	12,000
Electricity	15KW ×15hr×20day × 0.14/M	756/M	9,072
Water	2ton ×20day ×18.5/M	740/M	8,88
Maintenance expenses	250/M	250/M	3,000
Office expenses	300/M	300/M	3,600
Miscellaneous expenses	300/M	300/M	3,600
Pay for the assistants	400× 2/M	800/M	9,600
Personnel expenses	Budget of MIMRA	-	-
Depreciation		-	-
Lease of the site		-	-
Fuel for the truck	10 L ×20days/3.8gallon×1.0/M	53/M	632
Total			98,384
Balance			15,316

③ Transportation vessel, IEPLAP (Collect fish from three sites))

Revenue of collecting fish from three sites			
Items	Description	Amount	
		Time or Month	Year
Freight of fresh fish	6,000LB/time, @0.20/LB	1,200/T	12,000
Freight of passenger etc.	10% of the above	120/T	1,200
Total			13,200
Expenditure			
Fuel(3 site:540miles)	170g × 100hp/sp.g × 540miles/ 7knots × 1.0-gallon	406/T	4,060
Lubrication oil	10% of the fuel cost	41/T	406
Food for the crew	@ 80 × 3trips	240/T	2,400
Maintenance expenses	100/M	100/T	1,000
Personnel expenses	Budget of MIMRA	-	-
Expenses for dock	2,000/year		2,000
Depreciation		-	-
Total			9,866
Balance			3,334

④ Annual total balance of the Project

$$④ = ① \times 3 \text{ sites} + ② + ③$$

Sites and transportation vessel	Revenues	Expenditure
1. Fishing bases in the outer islands:3 sites	48,000	39,732
2. Ebeye distribution center	113,700	98,384
3. Transportation vessel	13,200	9,866
Total	174,900	147,982
Balance		26,918



## **CHAPTER 4**

### **PROJECT EVALUATION AND RECOMMENDATION**

## Chapter 4. Project Evaluation and Recommendation

### 4-1 Examination on Applicability of the Project and Its Beneficial Effects

#### 4-1-1 Beneficial Effects

By implementation of the Project, about 240 fishermen in the outer islands plus Ebeye island people buying fresh fish totalling to about 10,000 persons, will receive direct benefits. And, additionally the family members (estimated at about 2,000) of the fishermen in the outer islands will enjoy beneficial effects indirectly. The total number of people as the beneficiary from the Project is about 12,000, accounting for 28% of the population of the Marshall Islands.

##### (1) Outer islands

Supply and replenishment of modernized fishing boats and fishing gear will surely increase the number of the fishermen participating in the Project (more job opportunities), which also make possible to catch more of pelagic fish like tuna, bonito, etc. Furthermore, increase in the catches of reef-fish becomes possible, while protecting its abundant resources.

Ice supply from Ebeye will mitigate the restriction on working days inflicted upon the fishermen. And more frequent visits of transportation vessel to the outer islands will surely enable the fishermen to work at sea for larger number of days, resulting in increase of the catches. Like this, income rise in the outer islands is duly expected.

##### (2) Ebeye Fish-selling Sector

Establishment or consolidation of the so-called Fish Distribution Center will ensure supply of the fish the dwellers in Ebeye having a special taste for in very fresh condition. By multiplier effect between more frequent calls of the transport vessels and use of fish-preservation facilities, not only fish-supply

in hygienic conditions but the increase in the number of the days to supply fish to the consumers become possible.

(3) Consumers in Ebeye

Ebeye consumers will be able to purchase fresh and hygienic fish.

(4) In general

With increasing and regular sales of fresh fish in Ebeye, the demand for fishing products is expected to shift from imported tinned fish to fresh fish, possibly leading to reduction in food import. Further, by use of preservation facilities, export of high-quality bottom fish to Hawaii will become possible, resulting in larger demand for marine products for exportation and subsequent rise in income of the fishermen.

#### 4-1-2 Examination on Applicability of the Project

(1) Check-up on Applicability

The Government of the Republic of the Marshall Islands has placed the highest importance on the fishing-industry development as well as that of copla production which has served as its major and key industry until the recent time, to achieve development of the national economy, and positive efforts have been continuously devoted to fisheries industrial development. It is essential that integrated distribution system from the place of production up to that of consumption be firmly established for regional development of the outer islands; simultaneously with consolidation of fishery productive sector, one of the two key industries (the other one: copla production), proper arrangement of means of transportation of fish catches and establishment of marketing system in the urban area are indispensable. Smooth implementation of this Project activates the economy in the outer islands which have no any other material industry than fishery and copla production, and also expedites development of the local

industries. In this connection, this Project is deemed to be very important and deserve the highest priority.

It is also considered very significant that this Project is undertaken under the Grant Aid Scheme of the Government of Japan, with this Project being gifted with reasonable applicability.

① Beneficial effect recipients are both the urban dwellers and the outer island inhabitants, accounting for about 28% of the whole population of the Marshall Islands. (12,000 persons)

② Only the three outer islands can supply the reef-fish the Ebeye dwellers have special taste for, to Ebeye in reasonably large quantity, and so, construction of facility to store the reef-fish in the hygienic manner now become a critical issue.

③ Operating revenues and expenditures per year are estimated at US\$175,000 and 148,000 respectively. Estimated balance of the account is in the black, and management of the Project on the independent profit system is possible.

④ This Project is designed along the target of the National Development Plan, i.e., aiming at correction of disparity in the economic level between the outer islands and the urban area and development of fisheries sector as the key factor for the outer island development as well as the copla production sector.

## 4-2 Recommendation

It is deemed to be of great significance that this Project will be performed under the Grant Aid of the Government of Japan, since it generates the effects mentioned in the earlier sections, and contribute at large to improvement of standard of living of the people.

The following recommendations will be made in the implementation of the Project.

### 4-2-1 Conditions on Project Implementation

(1) Prior to start of the works, MIMRA should prepare, as the running fund for 6 months, US\$30,000 for Ebeye Fish Distribution Center. As the Project progresses, these monies will get reimbursed to MIMRA.

(2) At Ebeye Island, prior to commencement of the works, MIMRA should fully explain the nature of the Project, the method of construction, etc. to the parties concerned and inhabitants there, and arrange for full understanding and cooperation from them.

(3) MIMRA should newly employ the following staff.

• Ebeye Fish Distribution Center:

- Person responsible for marketing  
and ice-making plant control ..... 1
- Assistants ..... 2

(4) As regards the marketing method, positive efforts should be made to sell fresh fish at any time through the efficient utilization of the Project facilities. By this retailers will be highly motivated to shift their mode of delivery from consignment basis to sold-out basis.

#### 4-2-2 Recommendation

To the respective site will the following recommendations will be made.

##### ① Outer islands

Fishing activities have to be done, with full consideration to the characteristics that reef-fish has weak resource-restoration ability. That is to say, intensive fishing operation at one location should be avoided by all means, size of mesh of gillnet should be restricted. Fish resources protecting policy should be introduced and pursued. Simultaneously with these actions, fishing effort should be spread to pelagic fish regarding which such controversial issue as resource preservation is relatively small. Priority has to be given to maintenance of freshness of catches. It is to be noted that the freshness of fish catches at Ebeye, key factor determining whether well sold or not, is largely dependent on whether or not action is taken to keep the freshness.

##### ② Transportation vessel

Efforts should be made to increase the number of trip of transportation vessel as much as possible. Volumes of catch and sales, eventually, depend on how often transportation of fish products will be carried out. To increase the number of transportation, close communication between the outer islands and Ebeye is essentially required. When the vessel leaves Ebeye, then fishing activities at the outer island start, thus shortening waiting time of the transportation vessel. Like this, utmost endeavours should be made to achieve efficient transportation. Since constraint on ice supply will be mitigated by this Project, fishing with ice of their own make at the outer islands will become possible.

Moreover, since the storage/preservation facilities are constructed at Ebeye, an absolute restriction that the day of the week of return to, and arrival at the Ebeye port is only Friday will be removed. And whenever the marine conditions are favourable, any week days departure will be necessitated.

### ③ Ebeye Marketing Sector

The positive use of storage facilities will make fresh fish available all times at the selling booths of retailers. Changing retail-sale system from consignment basis to sold-out basis, expecting responsibility for selling of the retailers themselves.

In the self-sale sector, positive efforts should be devoted to creation of new demand. For example, tuna is a new item in the outer islands, whereas in Majuro tuna is being consumed in the form of "Tuna-steak" or "Sashimi (sliced raw tuna)". Taking such new items considered to be marketable in the future into account, marketing plan has to be made.

Ice-making operation should be done during the night hours. By so doing, electricity charge incurred will be reduced. It is important that the responsible personnel should become versed in how to operate ice-making plant and chilled storage facility as quickly as possible, to properly maintain them.

### ④ MIMRA

MIMRA should do its best to collect as accurate data on fish catches as possible, in connection with implementation of this Project. Also MIMRA should manage matters concerning the fishery sector on the principle of resources-control-type fishing.

The profit generated from the Project should be transferred to the fishermen in the outer islands, in the form of fish-buying price rise, thus leading to improvement of standard of living there, and also to the regional socio-economic development.

It is essential that the spare parts for fishing boats and gear, especially those quickly worn-out and very often replaced, should be amply stocked, lest there should occur any disruption of fishing activities due to lack of them.





## APPENDICES

## APPENDICES

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## 1. Member List of the Study Team

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