

2-3-5-2 Plans for the building planes of the various facilities

Three buildings are planned for the site: one will contain administration offices, a hygienic laboratory and a meeting hall, while another will be a stand-alone processing plant and the third will house an workshop for engine repair area and fishing gear lockers. Areas of greenery will be placed at appropriate locations between the various buildings, and the buildings will be linked by means of roads on the grounds.

(1) Administration office building

This building will have two stories. The first story will be generally divided into a meeting hall to be used by visitors to the facility, lavatory and shower facilities for the fishermen, and a hygienic laboratory that will be linked to the adjacent processing plant. In order to maintain the hygienic laboratory in a sanitary condition, it will have a separate entrance, and to prevent internal intersection with the flow lines of the meeting hall, it will be completely partitioned off from the meeting hall using interior walls. Also, a crew room will be provided on the first floor of this building for security and cleaning personnel who provide support functions on the grounds.

The administration office will be located on the second story. Offices other than the port manager's office will comprise one large common office space, designed with an efficiently organized floor area. In addition to this direct office, there will be a document room that doubles as a room where staff can hold internal discussions, a copy room, and a small kitchen area. Also, staircases will be assured in two locations, in consideration of having means of escape available in two directions in the event of an emergency. The main staircase will be for staff and visitors, and will lead to the offices, while the other staircase will be exclusively for staff, and will connect the office on the second story with the hygienic laboratory.

(2) Processing plant building

This facility consists of various rooms pertaining to the catch contents and various rooms pertaining to the workers. The various rooms are categorized as "contaminated areas", "semi-contaminated areas" and "clean areas", and measures will be taken to prevent contamination of the "clean areas".

Contaminated areas : Rooms into which raw fish are brought for sorting, office of the person responsible for processing, rooms from which products are transported out, packaging storehouse, staff entrances, locker rooms, lavatories and small kitchen areas

Semi-contaminated areas : anterooms, pre-processing rooms, chilled rooms,
packaging rooms and air blast rooms
Clean areas : Processing rooms

In the entrances and exits from the contaminated areas to the semi-contaminated areas, automated equipment for washing the hands and feet will be provided. Also, in order to ensure thorough sanitation management at all times in the pre-processing room which is in the semi-contaminated area and the processing room which is in the clean area, the floors will be finished with an epoxy resin coating that can be washed, and the floors will be sloped, with water drainage troughs provided. Net-type traps will be provided on the water drainage troughs to keep rats, mice and insects from coming in. Also, the baseboards in the corners where the floors and walls meet will be rounded to keep dirt and dust from accumulating in them.

(3) Workshop / fishing gear locker building

This building consists of workshop for the engine repair area and the fishing gear locker space. The workshop is located adjacent to the boat yard at the end of the slipway for the fishing boats, with the aim of shortening the distance over which the outboard engines have to be transported. Also, lockers will be provided back-to-back in the center of the fishing gear locker building, and will be positioned so that dead angles are not possible, in order to prevent theft. Given its functions, this building will have no outer walls, but rather will be an open-style building with only pillars and a roof.

2-3-5-3 Cross-section plans

(1) Processing plant, etc.

Because of its function, this building will be a single-story building.

The height of the current wharf tip is 1.1 m above the D.L. This level is set to the design GL of the group of building facilities at the Point Wharf landing site. At the same time, as at Codrington, the high tide height when a hurricane occurs is +1.4 m above the D.L., so the floor height of this building is set at GL +0.5 m, which is above the disaster water level. A crossbeam height of FL + 4.0 m is assured, and a height of 3.5 m is assured for the ceiling of the processing room.

(2) Administration office building

Because the administration office that handles central management of the Point Wharf landing site is located in this building, it will have two stories, from the standpoints of monitoring this section and the effective use of the site.

The meeting hall and hygienic laboratory will be located on the first story and the administration office on the second story.

Like the marine products processing plant described above, the floor height will be GL +0.5 m. Also, to assure a ceiling height of FL +3.0 m for the meeting hall, where large numbers of people will gather, the height of the second story will be FL +4.0 m. Moreover, based on the ordinary story height, the height of the second story roof crossbeams will be 3.5 m.

(3) Workshop / fishing gear locker building

Because of its function, this building will be a single-story building.

When the installation of the equipment for this building was considered, emphasis was placed on everyday convenience rather than on assuring a floor height above the high tide height when a hurricane occurs, and it was thought that it would be more effective if the floor height was not significantly different from the surrounding foundation. Consequently, the floor height was set at GL +0.2 m. Also, the height of the roof story was set as the ceiling, which is formed directly by the roof slabs, and is thus FL +3.5 m, creating a feeling of openness.

2-3-5-4 Building Structure Plan

Because the site facilities are not required a particularly long service span, they will have a frame construction made of concrete reinforced with steel. For the outer walls, walls of reinforced concrete will be placed between the pillars, with a roof slab construction. As a condition when the foundation design was put together, there are disparities in the bearing capacities of the planned site (7 to 20t/m²). Consequently, the structural design presupposes an independent foundation with no posts having a designed bearing capacity of 10 t/ m², underground girders, and structural earthen floor slabs. In areas where the bearing capacity specified as a design condition cannot be assured, measures such as foundation improvement using a material such as crushed stone and rolling will be used to assure the bearing capacity.

2-3-5-5 Finish Schedule

(1) Exterior Finish Schedule

Exterior Finish is the followings ;

*Exterior Wall (Concrete) : Sprayed Acrylic emulsion stucco coating on the concrete wall after patching with cement mortar with metal trowel as paint base

- *Exterior Wall (Masonry) : Sprayed Acrylic emulsion stucco coating after plastering with cement mortar with metal trowel as paint base.
- *Door and Window : Aluminum
- *Eaves Ceiling : Acrylic emulsion paint on cement board, or weather coat paint on American cedar
- *Roof (Flat slab) : Asphalt roofing with sand covering
- *Roof (sloped slab) : Trapezoid colored metal roofing on the concrete slab with asphalt roofing water proofed roofing

(2) Interior Finish Schedule

Interior finish Schedule is as follows.

Table 2-3-5-5 (1)-1 Interior Finish Schedule

Building/Room	Floor	Wall	Ceiling	Ceiling Height
Administration Office Building				
Meeting hall	Plastic Tile	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Acoustic Board	3.0
Meeting hall Reception	Epoxy Resin Floor Paint	As same as Exterior Wall	Cement Board with Acrylic Emulsion Paint	3.0
Preparing Room	Plastic Tile	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Acoustic Board	2.7
Security Room	Plastic Tile	Column : Mortar Smooth finish by Metal Trowel and Emulsion Paint Others : Concrete Block Exposed Finish	Cement Board with Acrylic Emulsion Paint	2.5
Restroom	Ceramic Tile	Porcelain Tile	Cement Board with vinyl Emulsion Paint	2.5
Shower Room	Ceramic Tile	Porcelain Tile	Cement Board with vinyl Emulsion Paint	2.5
Hygienic laboratory poach	Ceramic Tile	As same as Exterior Wall	Cement Board with Acrylic Emulsion Paint	vaulted
Hygienic laboratory entrance	Ceramic Tile	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Acoustic Board	3.2
Hygienic laboratory ①Organoleptic ②Chemical ③Bacteriological	Epoxy Resin Floor Paint	Porcelain Tile above 2 meters from floor, and vinyl paint on mortar wall	Cement Board with vinyl Emulsion Paint	2.7
Sample Receiving	Epoxy Resin Floor Paint	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Cement Board with Acrylic Emulsion Paint	2.5

Table 2-3-5-5 (1)-2 Interior Finish Schedule

Building/Room	Floor	Wall	Ceiling	Ceiling Height
Reagent Storage	Epoxy Resin Floor Paint	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Cement Board with Acrylic Emulsion Paint	2.5
Exchange Room	Epoxy Resin Floor Paint	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Acoustic Board	2.5
Restroom	Ceramic Tile	Porcelain Tile	Cement Board with Acrylic Emulsion Paint	2.5
Stare step	Ceramic Tile	As same as Exterior Wall	Sloped Ceiling: Cement Board with vinyl Emulsion Paint	3.0~4.0
Administration Office	Plastic Tile	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Sloped ceiling: Acoustic Board	3.0~4.0
Director Room	Plastic Tile	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Acoustic Board	3.0
Reception	Plastic Tile	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Acoustic Board	3.0
Document Storage	Plastic Tile	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Cement Board with Acrylic Emulsion Paint	2.5
Storage	Plastic Tile	Column : Mortar Smooth finish by Metal Trowel and Emulsion Paint Others : Concrete Block Exposed Finish	Exposed concrete slab	
Processing Plant Building				
Receiving	Epoxy Resin Floor Paint	Column : Mortar Smooth finish by Metal Trowel and Emulsion Paint Others : Concrete Block Exposed Finish	Exposed concrete slab	
Vestibule	Epoxy Resin Floor Paint	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Cement Board with vinyl Paint	2.7
Pre-processing Room Processing Room Packing Room	Epoxy Resin Floor Paint	Porcelain Tile above 2 meters from floor, and vinyl paint on mortar wall	Cement Board with vinyl Paint	3.3
Chilled Room Air-blast Room	Epoxy Resin Floor Paint	Insulation Panel	Insulation Panel	2.5
Shipping	Epoxy Resin Floor Paint	Column : Mortar Smooth finish by Metal Trowel and Emulsion Paint Others : Concrete Block Exposed Finish	Exposed concrete slab	

Table 2-3-5-5 (1)-3 Interior Finish Schedule

Building/Room	Floor	Wall	Ceiling	Ceiling Height
Food Processing Manager Office	Plastic Tile	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Acoustic Board	2.7
Foreman's Office	Epoxy Resin Floor Paint	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Cement Board with vinyl Paint	2.7
Entrance	Plastic Tile	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Acoustic Board	3.0
Locker's Room	Plastic Tile	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Cement Board with vinyl Paint	2.7
Pantry	Plastic Tile	Mortar Smooth finish by Metal Trowel and Emulsion Paint	Acoustic Board	2.7
Packing Room , Packing Storage	Plastic Tile	Column : Mortar Smooth finish by Metal Trowel and Emulsion Paint Others : Concrete Block Exposed Finish	Exposed concrete slab	
Restroom	Ceramic Tile	Porcelain Tile above 2 meters from floor, and vinyl paint on mortar wall	Cement Board with vinyl Paint	2.5
Workshop and Fishing Gear Locker Building				
Engine Repair Space and Fishing gear Locker	Polyurethane Resin Floor Paint	As same as Exterior Wall	Horizontal eaves : Cement Board with acrylic Paint Sloped roof : Exposed concrete slab	2.7~4.0

2-3-5-6 Drainage water sanitation facility planning

(1) Water supply equipment

The facilities will be connected directly from the public water PVC 6-inch pipe buried along the road at the front of the planned site.

Table 2-3-5-6(1) Dairy Water Demand

	Number of units	Demand per unit (L)	Number of units per hour (/h)	Maximum Demand per hour (L/h)	Operation hour (h)	Coefficiency	Demand per day (L/day)
Processing Plant Building							
City water use							
Toilet closet bowl (low tank)	2	12	9	216	8	0.5	864
Urinal (flash valve)	1	5	16	80	8	0.5	320
Wash basin	2	3	16	96	8	0.5	384
Hand wash basin and foot wash faucet	4	3	16	192	8	0.5	768
Faucet (processing room)	6	25	9	1350	8	0.5	5400
Faucet (13A)	1	15	9	135	8	0.5	540
Processing sink faucet (13A)	1	15	9	135	8	0.5	540
Cubic ice							500
						Sub-total	9,316
Administration Office Building							
City water use							
Shower	1	42	3	126	8	0.5	504
Toilet closet bowl (low tank)	5	12	9	540	8	0.5	2,160
Urinal (flash valve)	3	5	16	240	8	0.5	960
Wash basin	6	3	16	288	8	0.5	1,152
Faucet in lab. vestibule	1	15	9	135	8	0.5	540
Lab. Sink faucet	4	15	9	540	8	0.5	2160
Lab. faucet	4	10	9	360	8	0.5	1440
						Sub-total	8916
Work shop							
City water use							
Faucet (13A)	2	15	9	270	8	0.5	1,080
						計	1,080
Total						Total demand	19,312

(2) Miscellaneous water drainage and dirty water drainage facilities

Dirty water processing is carried out using a joint water purification tank, and the water discharged into the sea under a drainage standard of BOD30 ppm. Drainage water discharged from the hygienic laboratory goes through a neutralizing processing tank before being discharged to the sea. Drainage water discharged from the hygienic laboratory also goes through a neutralizing processing tank before being discharged to the sea. Drainage water discharged from the engine repair area undergoes separation of the oil and water components before being discharged to the sea.

(3) Rainwater drainage equipment

Rainwater is discharged directly into the sea.

2-3-5-7 Air conditioning and ventilation equipment planning

Air conditioning system will be used a package type system that has an air-cooled heat pump. It can be possible air conditioning of individual rooms. The range of air conditioning is as described below.

Air-conditioned places: Administration office, manager's office, documents room, meeting hall, hygienic laboratories 1, 2 and 3, processing manager's office, foreman's office, pre-processing room, processing room, packaging room

2-3-5-8 Electrical equipment planning

A high voltage of 11 KV is sent from the road in front of the planned site. This primary power supply will be stepped down to 3 ϕ 4W-400/230V (60 Hz) , and taken in by an intake switch. The construction up to the intake switch will be the responsibility of the Antigua and Barbuda side. The intake switch and main distributing frame will serve as the central electrical equipment, and will subsequently distribute power to the distribution boards of the various buildings. Taking power outages into consideration, the minimum possible emergency generator equipment will be provided. Consequently, an APUA power source and a main switch that receives power from the emergency power generator will be provided on the distributing frame. Also, nowadays there is an increasing tendency in Antigua and Barbuda to use a low-voltage band power supply of 100 to 120 V for terminal electrical equipment, so a single-phase 208 / 120 V power supply will also be supplied in parallel.

Table 2-3-5-8 (1) is showing facility incoming power capacity:

The electricity load capacities of the various buildings at the Point Wharf landing site are as follows.

Table 2-3-5-8 (1) Facility Incoming Power Capacity

Name of building	Capacity	Demand Ratio	Demand Power
	KVA	%	KVA
Food Processing Building			
Lighting and Ventilation	6.5	80	5.2
1 ϕ Receptacle	14.7	30	4.4
3 ϕ Receptacle	9.3	30	2.8
Air-condition	25.5	100	25.5
Pomp	1.25	100	1.3
Freezer	24.1	80	19.3
Administration • Hygienic Laboratory • Meeting hall Building			
Lighting and Ventilation	12.0	80	9.6
1 ϕ Receptacle	83.4	30	25.0
3 ϕ Receptacle	1.3	30	0.4
Air-condition	38.6	100	38.6
Water heating	10.1	30	3.0
Pomp	1.1	100	1.1
Engine Repair Space and Fishermen's Locker Building			
Lighting	3.6	80	2.9
1 ϕ Receptacle	1.2	30	0.4
3 ϕ Receptacle	2.5	30	0.8
Site Lighting			
Lighting	6.0	100	6.0
Total	241.1		146.2

[Generator capacity table]

The generator capacity is calculated based on the necessary KVA taking into consideration the drop in voltage that occurs during constant operation and startup of the generator, based on the guidelines for calculating generator capacities provided in the standards set by the Japan Engine Generator Association. Basically, the capacity is calculated assuming sequential startup starting from the largest load capacity.

Table 2-3-5-8 (2) General Capacity

Name	Phase	Capacity	Unit	Total of capacity P _m	Efficiency	Efficiency Ratio	Starting Class	Starting Method	Normal Demand of generator	Starting Capacity of generator	Starting Order	Others
Detail of Capacity		(kW)		(kW)		P F _L	β	C	Capacity M ₁ (kVA)	Generator Capacity PG ₁	Capacity	
1) Freezer System												
Freezer	3	8.41	1	8.41	0.83	0.8	8.0	1	12.67	32.97	①	
Cooling Unit	3	1.2	1	1.2	0.83	0.8	9.0	1	1.81	5.29	②	
Ice Making	3	2.25	1	2.25	0.83	0.8	9.0	1	3.39	9.92	③	
Defrost pump	3	0.68	1	0.68	0.83	0.8	9.0	1	1.02	3.00	④	
2) Freezer System												
Condenser	3	4	1	4	0.83	0.8	9.0	1	6.02	17.64	⑤	
Cooling Unit	3	0.2	1	0.2	0.83	0.8	9.0	1	0.30	0.88	⑥	
3) Cubic ice making	3	1.26	2	2.52	0.83	0.8	9.0	1	3.80	11.11	⑦	
4) others												
Pomp	3	0.5	1	2.2	0.83	0.8	9.0	1	0.75	9.70	⑧	Mutual Operation
Blower	3	0.5	1	1	0.83	0.8	9.0	1	0.75	4.41	⑨	
5) Hygienic Laboratory 1, 2, 3												
Lighting	1	0.72							0.864			Average capacity ↑
Receptacle	1	5.4							6.480			↑
6) Administration Office												
Lighting	1	1.08							1.296			↑
Receptacle	1	3.15							3.780			↑
7) Food Processing Building												
Lighting	1	0.36							0.478			↑
Receptacle	1	0.6							0.720			↑
8) Site Lighting												
	1								2.000			
									Total	46.08		

Based on the above capacity table, the necessary generator capacity during constant operation is 46.1 KVA or higher, and during continuous operation of the generator at an 80% load, $46.1 \text{ KVA} / 0.8 = 57.5 \text{ VA}$. In terms of the product configuration of the generator, a generator of 60 KVA/60 Hz was chosen. This meets the condition that the necessary generator capacity taking into consideration the drop in voltage that occurs at startup is at least 33 KVA. Consequently, the selected generator will be one with specifications of 60 KVA/60 Hz and 400/230 VAC.

2-3-5-9 Telephone equipment construction

Telephone cables have been laid along the road at the front of the planned sites. The cables will be guided to the various rooms through empty underground pipes and connected to the telephone outlets of the various rooms. The piping construction will be the responsibility of the Antigua and Barbuda side.

2-3-6 Basic design of the equipment

2-3-6-1 Ice-making and freezing facilities of processing plant

(1) Ice-making machine design

Because ice is used at the pre-processing stage, a simple type of ice-making machine will be installed in the pre-processing room. This ice-making machine will supply the ice used in the relevant processing plant, so the supply of ice to the fishing boats has not been taken into consideration. As a result, the applications in which the ice will be used are as noted below.

- Ice for raw materials and products being processed: 1/2 the weight of the raw materials, meaning 250 kg used
- Cooling of the water used in processing: 1/4 the weight of the raw materials, meaning 125 kg used
- For packing of the products being shipped out (65% of the weight of the raw material yield. 1/3 of the product weight used.)

$$500 \text{ kg} \times 65\% \times 1/3 = 108 \text{ kg} \quad \text{Meaning 108 kg used}$$

Total: approx. 500 kg used per day

A simple type of ice-making machine with a production capability of approximately 500 kg per day is planned.

[Cubic Ice Making Machine]

1 unit

Type :	Air Cooled Package Type
Kind of Ice :	Cubic Ice Approx. 28mm × 28mm × 32mm
Capacity :	460kg (Room Temp. +30°C, Raw Water Temp. +25°C)
Ice Storage Capacity :	345kg
Power Consumption :	Approx. 1.08kw (200V, 60Hz)
Accessories :	Overseas Type (Water Strainer, SUS piping, etc.)

(2) Air Blast Freezer Design

Volume of frozen goods : One half of the overall product (65% of average yield) is to be frozen. In other words, the target for freezing is to be 163kg per day.

$$500 \text{ kg} \times 5\% \times 1/2 = 163 \text{ kg/day}$$

Method of freezing : Shelf-type air blast method use of pans for freezing, Room temperature - 30°C

1) Design Condition

Outside Temperature Degree:	+34°C
Humidity :	75%
Electric Source :	City Electric Supply (3ph., 4W, 60Hz, AC 400/230V)

Kind of Refrigerant: Fluorocarbon R22
 Kind of Raw water: City Water , Temp. +28°C
 Air Blast Freezer Capacity : 180kg/day×1 room,
 Final Room Temp. -30°C

2) Specification

[Refrigeration Unit for Air Blast Freezer]	1 unit
Type:	Open Type Two Stage Refrigeration Unit
Capacity:	6,000 kcal/hr. (TC = +40°C / TE = -40°C)
Rotation:	1,170 r.p.m
Electric Motor :	11kw×400V×3ph.×60Hz Totally Enclosed Fan Cooling Type, Salt Water Proof Type, Tropical Treatment
Accessories:	Oil Separator, Inter Cooler, Coupling, Coupling, Guard, Common Base
[Heat Exchanger]	1 set
Type:	Double Tube Type Heat Exchanger
Outer Dimensions:	65A x 40A
[Unit Cooler for Air Blast Freezer]	1 unit
Type:	Ceiling Hanging Type
Surface Area:	80 m ²
Fan:	dia.500mm, 0.75kw×400V×60Hz×2 sets
Defrost Type:	Water Defrost Type
Accessories:	Fan Duct, Damper
[Air-Cooled Condenser Unit]	1 set
Type:	Heavy Salt Resistance Type
Surface Area:	150 m ² (Approx.)
Fan:	dia.600mm, 0.75kw×400V×60Hz×3sets
Casing:	SUS304
Base:	Galvanizing Finish
High Receiver:	300A×L700mm (Galvanizing Finish)
[Defrost Water Pump]	1 unit
Type:	Centrifugal Type
Capacity:	100lit./min., 20mHead
Motor:	0.75kw×400V×60Hz
[Defrost Tank]	1 unit
Type:	FRP Panel Type
Outer Dimension:	L2,000mm×W1,500mm×H1,000mm

Accessories: Flat Base, Ladder, Anchor Bolts

[Insulation Panel for Air Blast Freezer] 1 lot
Type: Prefabricated, Local Assembly Type
Outer Dimension: W3,800mm × D6,000mm × CH2,400mm
Surface Material: Ceiling & Wall : Color Coated Steel Sheet
(Both Side)
Insulation Material: Rigid Polyurethane
Panel Thickness: 125mm
Floor: Polystyrene Board (thickness 150mm)
Moisture Proof (RA Sheet), Floor Concrete
Insulation Door: Manual Sliding Door, W900mm × H2,000mm
× 1set, Manual Sliding Door, W600mm ×
H2,000mm × 1 set, Vinyl Curtain x 2 sets

[Rack for Air Blast Freezer] 2 set
Type: Local Assembly Type
L3,200mm × D1,200mm × H1,400mm
(6 steps)
Material: SUS304

[Freezing Pan] 200 pcs
Dimension: L575mm × W389mm × H123mm
Material: Polyvinyl Chloride

[Control Panel for Refrigeration Equipment] 1 lot
Type: Indoor, Floor Mounted, Automatic type
Faced Switch Board, Baking Finish
Outer Dimension: W900mm × D400mm × H2,000mm
Control: Refrigeration Unit Control, and Other
Machines Control
Accessories: Transformer 400V/200V 5KVA

(3) Chilled Room

Store volume : Store volume is planned by store time for
raw materials which is processed in one day.
Store method : Raw materials which are put in fish cases
are to be stored on the rack installed in
chilled storage with room temperature –
5°C ~ +5°C.

1) Design Condition

Outside Temperature Degree : +34°C

Humidity :	75%
Electric Source :	City Electric Supply (3ph., 4W, 60Hz, AC 400/230V)
Kind of Refrigerant :	Fluorocarbon R22
Room Temp :	Capacity 400kg, -5°C

2) Specification

[Refrigeration Condensing Unit]	1 unit
Type :	Air Cooled, Semi-hermetic Condensing Unit
Capacity:	5,700 kcal/hr. (Outside Temp. 32°C, Room Temp. 0°C)
Rated Power:	3kw × 200V × 1 set
Power Consumption:	Approx. 4.0kw
Accessories :	Controller
[Unit Cooler]	1 unit
Type:	Ceiling Hanging Type
Surface Area:	23.6 m ²
Defrost Type:	Heater Defrost
Fan Motor:	0.12kw × 200V
[Insulation Panel for Cold Storage]	1 lot
Type:	Prefabricated, Local Assembly Type
Outer Dimension:	W4,000mm × D5,600mm × CH2,400mm
Surface Material:	Ceiling & Wall : Color Coated Steel Sheet (Both Side)
Insulation Material:	Rigid Polyurethane
Panel Thickness:	100mm
Floor:	Polystyrene Board (thickness 125mm) Moisture Proof (RA Sheet), Floor Concrete Plastic Duckboard
Insulation Door:	Manual Swing Door, W900mm × H1,800mm × 1 set, Vinyl Curtain
[Storage Rack]	2 sets
Type:	Local Assembly Type L4,500mm × W1,000mm × H1,150mm
Material:	SUS304
[Fish Box]	210 pcs
Outer Dimension:	L800mm × W450mm × H150mm (5kg) 10 pcs × 4 steps × 2 sets = 80 pcs.
Material :	SUS304

2-3-6-2 Equipment relating to the facilities

(1) For the hygienic laboratories

Equipments are planned for organoleptic evaluation, bacteriological testing, and the chemical testing.

The list of equipment and materials contains detailed information.

(2) For the processing plant

Equipments are planned for use in the production of frozen items, fresh items, salt-cured items and smoked items.

The list of equipment and materials contains detailed information.

(3) For meeting hall

As noted under the scale specification for the meeting hall facility, the target number of people using the meeting hall facility for meetings and other purposes at one time is about 60, and enough desks, chairs and educational materials are planned to accommodate this number of people.

Computers are also planned for data management.

The list of equipment is as follows.

1) Equipment for Laboratory Unit

(a) Chemical testing

Table 2-3-6-2(1) List of Laboratory Unit (Chemical testing - 1)

No.	Item	Qty	Specification	Purpose
A-1	Mortar	2	With Rod, ϕ 110mm	Pounding a sample
A-2	Blender	1	Vessel capacity: 1L, Vessel: glass or SUS, Cutter: SUS	Smash and mix for sample
A-3	Analytical electronic balance	1	Weighing capacity: 42g/210g, Accuracy: 0.1mg/0.01mg	Weighing sample and a reagent
A-4	pH meter	1	Glass electrode measurement, Measuring range: pH0~14, pH resolution: 0.01	pH measurement for sample solution
A-5	Magnetic stirrer with bar	2	Number of revolutions: 100~1500rpm, Maximum capacity: 2L, Bar: $8\phi \times 30$ mm	Stirring for sample solution
A-6	Test tube mixer	2	Number of revolutions: 300~2500rpm adjustable, Upper diameter: ϕ 60 or more	Mix for samples in a test tube
A-7	High Speed Refrigerated Centrifuge	1	Maximum revolutions: 20000rpm, Maximum capacity 1000ml, Angle rotor	Centrifugal separation for sample
A-8	Histamin analyzer	1	ELISA type	Histamine measurement
A-9	Soxhlet fat extractor	1	4 extraction units, Extracting type: soxhlet/heat/high temperature/continuous extraction	Fat contents measurement
A-10	Muffle furnace	1	Temperature: 200~1150°C, Capacity: 7.5L	Ash contents measurement
A-11	Heating Mantle	1	For 1000ml flask, Maximum temperature: 450°C	For heating sample solution
A-12	Moisture meter	1	Infrared lamp type, Automatic measurement, Digital display	Moisture contents measurement
A-13	Water quality analyzer	1	Measuring item: acid, alkali, bromine, calcium, chloride, remained chlorine etc.	Measurement of harmful substance and metal ion in water
A-14	Water quality tester	1	Test item: NH ₄ , NO ₂ , COD, Fe, Sulfide, PO ₄	For field testing
A-15	Water activity measuring unit	1	Portable or desktop type, Measuring range: 0.1~0.98Aw	Preservability test for sample
A-16	Pure water supply unit	1	Purify method: Through ion-exchange resin and distillation. Capa.: 1.8L/h	Purification for water
A-17	Water bath (Thermo-stable water bath)	1	Capa.: 40L, Temperature: RT+5~80°C	Keeping temp. for culture media

Table 2-3-6-2(1) List of Laboratory Unit (Chemical testing - 2)

No.	Item	Qty	Specification	Purpose
A-18	Dryer (Thermo-stable dryer)	1	Capa: 150 L, Temperature:40~260°C,	Drying for instrument
A-19	Mixer	1	Capa. 1 L Glass or SUS	Smash and mix of samples
A-20	Rotary evaporator	1	Flask: 1000ml, with water bath, refrigerated water circulation unit and vacuum pump	Evaporation for sample solution
A-21	Kjeldhal digester and auto titration unit	1	Auto-recording unit, Decomposition unit(6 tubes), Distillation unit, Auto titration unit	Contained Crude Protein measurement
A-22	Refrigerator for reagent	1	Capacity: 300L, Temperature:0~10°C	Stock for culture media
A-23	Freezer for sample	1	Capacity: 200L, Temperature:-20°C	Stock for culture media
A-24	Laboratory chair	4	Round type, Seat cover: vinyl leather or equivalent, Stand: steel pipe,	Chair for staff
A-25	Cabinet for apparatus	2	Size: 900x400/500x1800mm, Consist of upper part and lower part, Upper part: grazed slide	Stock for instrument

(b) Bacteriological testing

Table 2-3-6-2(2) List of Laboratory Unit (Bacteriological testing)

No.	Item	Qty	Specification	Purpose
B-1	Blender	1	Vessel capacity: 1L , Vessel: glass or SUS, Cutter: SUS	Smash and mix for sample
B-2	Electronic balance	1	Weighing capa.: 0.001g/310g	Weighing sample and reagent
B-3	Magnetic stirrer with bar	1	Speed of revolutions: 100~1500rpm, Maximum capacity: 2L, Bar:8 φ x30mm(2)	Stirring for sample solution
B-4	pH meter	1	Glass electrode measurement, Measuring range:pH0~14, pH resolution: 0.01	pH measurement for sample solution
B-5	Test tube mixer	2	Speed of revolutions:300~2500rpm adjustable, upper diameter: φ 60	Mix of samples in a test tube
B-6	Incubator	3	Capacity: 90L, Temperature:RT+5°C~70°C, Temperature distribution accuracy:±1.0°C, Temperature controle accuracy:±0.5°C	Cultivation for bacteria
B-7	Autoclave	1	Automatic high pressure steam sterilizing system, Capacity: 20L, Temperature: 60~126°C, Maximum pressure: 0.16MPa	Sterilization, by high temperature high pressure, of petri-dish and apparatus after cultivation of bacteria
B-8	Colony counter	1	Maximum diameter of petri dish: 125mm, Lense:1.5x, Count method: manual	Count the number for bacteria
B-9	Homogenizer for microbiology inspection	1	Capacity: 80~400ml, Number of puddling: 180 strokes, With bags 1box (500sheets)	Homogenizing of sample for microbiology inspection
B-10	Stereoscopic microscope	1	Magnification:8x~65x, Eyepiece:10x, Zooming range:0.8x~6.5x, Oparation 3 glass type, Magnification:Min.20x~40x,	Observation of sample
B-11	Biological microscope	1	Max.1000x~1500x., Stage operation range: H50mm side70mm	Observation and identification of bacteria
B-12	Water bath (Thermo-stable water bath)	1	Capacity: 25L, Temperature: Room Temp.+5~80°C	For keeping culture media warm
B-13	Water bath (Thermo-stable water bath)	1	Capacity: 40L, Temperature: Room Temp.+5~80°C	For keeping culture media warm
B-14	Dryer (Thermostable dryer)	1	Capacity: 150 L, Temperature:40~260°C, Shelves:2	Drying for instrument
B-15	Refrigerator for culture media	1	Capacity: 300L, Temperature:0~10°C	Stock for culture media
B-16	Freezer for sample	1	Capacity: 200L, Temperature:-20°C	Stock for culture media
B-17	Sink	1	Size: 900x750x800mm, Sink depth:230mm, SUS304, 3-way water cock	Washing of instrment and sample
B-18	Laboratory chair	4	Round type, Seat cover: vinyl leather or equivalent, Stand: steel pipe,	Chair for staff
B-19	Cabinet for apparatus	2	Size: 900x400/500x1800mm, Consist of upper part and lower part, Upper part: grazed slide door	Stock for instrument
B-20	Plastic rack for Homogenizer's bag	1	Standard type, For microbiology examaination	Rack for a homogenized sample's bags
B-21	SPC testing paper	2 Boxes	Standard type (100sheets)	Easy test for microbiology
B-22	Coliform and E-coli testing paper	2 Boxes	Standard type (100sheets)	Easy test for microbiology
B-23	PT Pouch	2 Boxes	For anaerobic bact. testing (500sheets)	Packing sample
B-24	Sealer	1	For PT-Pouh sealing	Sealing PT-Pouch

(c) Organoleptic evaluation

Table 2-3-6-2(3) List of Laboratory Unit (Organoleptic evaluation)

No.	Item	Qty	Specification	Purpose
C-1	Electronic balance	1	Weighing capacity: 0.01g/3100g	Weighing sample
C-2	Stereoscopic microscope	1	Magnification:8x~65x, Eyepiece:10x, Zooming range:0.8x~6.5x, Oparation	Observation of sample
C-3	Fish length measuring unit	1	Maximum measuring length:200cm, Scale:1cm	For measuring fish length
C-4	Electric drill	1	Handy type, Perforation:16mm,	For taking temperature of fish
C-5	Food thermometer	2	Temperature: -40~240°C, Waterproof type	For taking temperature of fish
C-6	Micro-wave oven	1	Capacity:20L, Max1000w	For heating sample
C-7	Laboratory work table (SUS)	1	Size:1800x750x800mm	Table for staff
C-8	Sink	1	Size: 900x750x800mm, Sink depth:230mm, SUS304, 3-way water cock	Washing of apparatus and samples
C-9	Laboratory chair	3	Round type, Seat cover: vinyl leather or equivalent, Stand: steel pipe,	Chair for staff
C-10	Cabinet for apparatus	2	Size: 900x400/500x1800mm, Consist of upper part and lower part, Upper part: grazed slide door	Stock for instrument
C-11	Refrigerator for sample	1	Capacity: 300L, Temperature:0~10°C	Stock for samples
C-12	Freezer for sample	1	Capacity: 200L, Temperature:-20°C	Stock for sample

(d) Glass Apparatus

Table 2-3-6-2(4) List of Laboratory Unit (Glass Apparatus -1)

No.	Item	Qty	Specification	Purpose
D-1	Cover Glass	1Box	For microscopic examination, 18x24mm (100 pieces)	Glass for covering object lens in microscope
D-2	Flask Erlenmeyer	5	Narrow mouth, Capacity: 50 ml	Adjustment of sample and reagent
D-3	Flask Erlenmeyer	5	Narrow mouth, Capacity: 100 ml	Ditto
D-4	Flask Erlenmeyer	3	Narrow mouth, Capacity: 500 ml	Ditto
D-5	Test Tube with Plastic Screw Cap	20	φ : 15mm, Length: 150mm	Ditto
D-6	Test Tube with Rim	200	φ : 16.5mm, Length: 165mm	Ditto
D-7	Petri Dish	220	φ : 90mm, Outer depth: 22mm	Preparation for culture media
D-8	Reagent Bottle (Narrow mouth, glass)	3	With stopper, Capacity: 250 ml	Stock for reagent
D-9	Reagent Bottle (Narrow mouth, glass)	3	With stopper, Capacity: 500 ml	Stock for reagent
D-10	Slide Glass	1	For microscopic examination 76x26mm (100pieces)	For observing sample in microscope
D-11	Dahram Tube	100	φ 6mm, L30mm	For inspecting E-coli
D-12	Beaker	10	Capacity: 100 ml	Adjustment of sample and reagent
D-13	Beaker	10	Capacity: 500 ml	Ditto
D-14	Beaker	5	Capacity: 1000 ml	Ditto
D-15	Pipette Volumetric	3	Capacity: 1 ml	Measuring of sample and reagent
D-16	Pipette Volumetric	3	Capacity: 5 ml	Ditto
D-17	Pipette Volumetric	3	Capacity: 10 ml	Ditto
D-18	Pipette Measuring	3	Capacity: 1 ml	Ditto
D-19	Pipette Measuring	3	Capacity: 5 ml	Ditto
D-20	Pipette Measuring	3	Capacity: 10 ml	Ditto
D-21	Pipette Controller	2	Capacity: 1~ 5 ml	For dispensing a reagent
D-22	Pipette Controller	2	Capacity: 5~20 ml	For dispensing a reagent
D-23	Buret (Clear)	2	Capacity: 10 ml	Apparatus for titration unit
D-24	Stand for buret	1	Clamp required	Stand for buret
D-25	Flask Short Neck (Round bottom)	25	Capacity: 500 ml	Adjustment for sample or reagent

Table 2-3-6-2(4) List of Laboratory Unit (Glass Apparatus -2)

No.	Item	Qty	Specification	Purpose
D-26	Flask Short Neck (Round bottom)	13	Capacity: 1000 ml	Adjustment for sample or reagent
D-27	Separating Funnel	3	Capacity: 500 ml	Separation of samples
D-28	Dispenser	1	Dispensing Range: 10~50ml, Divisions: 1ml, With glass bottle	For dispensing reagent
D-29	Micro pipette	1	Capacity: 0.5~10 μ l	Particle quantification of sample or reagent
D-30	Micro pipette	1	Capacity: 20~200 μ l	Particle quantification of sample or reagent
D-31	Disposable tip for micro pipette	1box	For 0.5~10 μ l, 1000pcs/box	Tip for micro pipette
D-32	Disposable tip for micro pipette	1box	For 2~200 μ l, 1000pcs/box	Tip for micro pipette
D-33	Graduated Cylinder	3	Capacity: 100 ml	Quantification of sample and reagent
D-34	Graduated Cylinder	3	Capacity: 1000 ml	Ditto
D-35	Volumetric Flask	3	Capacity: 10 ml	Ditto
D-36	Volumetric Flask	3	Capacity: 100 ml	Ditto
D-37	Volumetric Flask	3	Capacity: 500 ml	Ditto
D-38	Funnel with filter paper	5	ϕ 45 mm, Filter paper: No.2 type, ϕ :150mm (100sheets)	For filtering sample or reagent to vessels
D-39	Funnel	5	ϕ 75 mm	For pouring sample or reagent to vessels
D-40	Conrage Glass Stick (Stirring Stick)	10	Standard type	Stick for spreading sample in culture media
D-41	Spoid	5	Silicon made, For 2g	For dispensing reagent
D-42	Spoid	5	Silicon made, For 5g	For dispensing reagent
D-43	Protective Glasses	3	Standard type	Eye's protection

(e) Metal Apparatus

Table 2-3-6-2(5) List of Laboratory Unit (Metal Apparatus)

No.	Item	Qty	Specification	Purpose
E-1	Clamp Versatile, Vinyl-coated jaw	4	3-prong grip, Maximum open diameter: 100mm	Support of glass apparatus
E-2	Stand	3	SUS, Flat type, Pole required	Stand for clamp
E-3	Test Tube Stand	5	For ϕ 25 tubes	Stand for test tube
E-4	Tong	1	For beaker	Holding for heated beaker
E-5	Gas Burner Bunsen	5	Standard type, For propan gas	Sterilization for instrument
E-6	Scalpel	2	Standard type	Cutting of sample in microbiology inspection
E-7	Sterilizing Can	2	65x80x400mm	Stock for sterilized pipettes and Scissors
E-8	Wash basket	5	SUS, 200x200x200mm	Washing for instrument, temporary keeping
E-9	Tweezers	5	Laboratory use, Length: 180mm, SUS	Picking up somethings
E-10	Reagent Spoon	2	180 mm	Quantification for reagent
E-11	Laboratory Wagon	3	Standard type	Carrying instrument

(f) Culture Media for Microbiological Analysis

Table 2-3-6-2(6) List of Laboratory Unit
(Culture Media for Microbiological Analysis - 1)

No.	Item	Qty	Specification	Purpose
F-1	CW Agar Base with KM	100gx1	Welsh	Culture media for microbiology inspection
F-2	DHL Agar	300gx3	Salmonella	Ditto
F-3	EC Broth	100gx3	Escherichia coli.	Ditto
F-4	EEM Broth	100gx3	Salmonella	Ditto
F-5	EMB Agar	300gx3	Escherichia coli.	Ditto
F-6	NGKG Agar Base	300gx3	Seleus	Ditto
F-7	TCBS Agar	300gx3	Vibrio parahemolyticus/ Preparation of culture media	Ditto

**Table 2-3-6-2(6) List of Laboratory Unit
(Culture Media for Microbiological Analysis - 2)**

No.	Item	Qty	Specification	Purpose
F-8	TSI Agar	100gx1	Vibrio parahemolyticus	Ditto
F-9	Clostridia Count Agar	300gx1	Clostridia	Ditto
F-10	Selenite Cystine Broth Base	100gx4	Salmonella	Ditto
F-11	Desoxycholate	300gx3	Coliform organisms	Ditto
F-12	Modified Handford Agar	300gx2	Welsh	Ditto
F-13	Polymixine B	1gx2	Vibrio parahemolyticus	Ditto
F-14	Mannitol Salt Agar	300gx3	Staphylococcus aureus	Ditto
F-15	Standard Method Agar	300gx5	SPC (Standard Plate Count)	Ditto

2) Equipment for Processing Unit

(g) Fish Assorting Hall

Table 2-3-6-2(7) List of Processing Unit (Fish Assorting Hall)

No.	Item	Qty	Specification	Purpose
G-1	Working table(SUS)	2	Size: 1200 x 600 x 800 mm, SUS, with caster	Table for fish assorting
G-2	Tank with drain cap (200L)	2	Capacity: 200L, PP	Temporary stock for fish
G-3	Tank with drain cap (500L)	1	Capacity: 500L, PP	Temporary stock for fish
G-4	Plastic pail	10	Capacity: 20L	Countainer for fish
G-5	Scale	1	Weighing Capacity over 330LBS	Weighing raw materials

(h) Processing Room

Table 2-3-6-2(8) List of Processing Unit (Processing Room -1)

No.	Item	Qty	Specification	Purpose
H-1	Smoke chamber	1	Capacity: 100L	For smoking
H-2	Band saw for frozen fish	1		For cutting frozen fish
H-3	Glove for Band saw (SUS)	3	Size: L	For using band saw
H-4	Peeling Machine for shrimp	1		For peeling shrimp
H-5	Belt conveyer	1	Size:450x5000mm, Belt color:white	Convey for fish
H-6	Digital balance (Max 20lb)	1	Maximum weight: 20lbs	Weighing fish
H-7	Digital balance (Max 2lb)	3	Maximum weight: 2lbs	Ditto
H-8	Spring balance (Max 2lb)	1	Maximum weight: 2lbs	Ditto
H-9	Spring balance (Max 10lb)	1	Maximum weight: 10lbs	Ditto
H-10	Wagon with caster (SUS)	5	Size:460x760x900mm, SUS	Carrying fish or instrument
H-11	Working table (SUS)	5	Size:1200x600x800mm, SUS, with caster	Table for fish processing
H-12	Tray (SUS)	20	Size:580x370x90mm, SUS	Tray for products
H-13	Tank with drain cap (500L)	3	Capacity: 500L, PP	Temporary stock
H-14	Tank with drain cap (200L)	3	Capacity: 200L, PP	Temporary stock
H-15	Plastic tray	20	Size:620x370x130mm, Capacity: 20L	Tray for fishery products
H-16	Plastic basket (Round type)	20	Capacity: 20L	Countainer for fish
H-17	Plastic basket (Quadrangle type)	20	Size: 630x440x120mm	Multi purpose for prassing
H-18	High press. Cleaner	1		Cleaning the floor
H-19	Hydraulic lifter	1	Hydraulic manual type	Carryng products
H-20	Plastic Cutting board	10	Plastic	Cutting fish

(i) Packaging room and Cold storage

Table 2-3-6-2(9) List of Processing Unit (Packaging room and Cold storage)

No.	Item	Qty	Specification	Purpose
I-1	Digital balance (Max 20lbs)	1	Maximum weight:20lbs	Weighing fishery products
I-2	Digital balance (Max 2lbs)	1	Maximum weight: 2lbs	Weighing fishery products
I-3	Working table (SUS)	2	Size:1200x600x800mm, SUS	Table for paking
I-4	Vacuum packing machine	1	Seal length: mini. 590mm	For frozen fish
I-5	Heat sealer	1	Seal width: 300mm~	Sealing for products
I-6	Wrapping machine	1	Width of stretch: max 400mm	Packing of the product by film wrapping
I-7	Stocker	1	Capacity:300L, lowest temperature: -30°C	Stock for sample of products

3) Equipment for Administration Unit

Table 2-3-6-2(10) List of Administration Unit (Equipment for Administration Unit)

No.	Item	Qty	Specification	Purpose
J-1	Personal computer	1	OS: Windows XP	Stock and analysis of data
J-2	Printer	1	Color, Ink-jet type	Print of data in computer
J-3	Projector	1	P/C conection	For training and lecture
J-4	Video Camera Recorder	1		Ditto
J-5	Video Deck	1	Multisystem type, Recording function	Ditto
J-6	Television Set	1	Multisystem type, With stand	Ditto
J-7	OA Board	1	Boad size: 1700x800mm, Printer: ink-jet	Ditto
J-8	Overhead projector	1	Size:235 x285mm	Ditto
J-9	Table for lecture	12	For 3 people	Ditto
J-10	Chair for lecture	60		Ditto
J-11	Table for teature	1		Ditto
J-12	Chair for teacher	1		Ditto
J-13	Cabinet for apparatus	2	Size: 1800x400/500x1800mm	Ditto

2-3-7 Basic Design Drawings

Basic design drawings are listed below.

- Figure 2-3-7 (1) Overall Layout Plan
- Figure 2-3-7 (2) Cross Section of Wharf
- Figure 2-3-7 (3) Cross Section of Revetment (1)
- Figure 2-3-7 (4) Cross Section of Revetment (2)
- Figure 2-3-7 (5) Cross Section of Slipway (1)
- Figure 2-3-7 (6) Cross Section of Slipway (2)
- Figure 2-3-7 (7) Layout Plan of Buildings
- Figure 2-3-7 (8) Plan/Elevation/Section of Administration Office Building
- Figure 2-3-7 (9) Plan/Elevation/Section of Processing Plant Building
- Figure 2-3-7 (10) Plan/Elevation/Section of Workshop, Fishing Gear Lockers Building

Main Component is shown in Table 2-3-7(1), (2). The construction work is divided two phases. Procurement of equipments for hygienic laboratory, processing plant and administration building are included in Phase-2 (refer to Table 2-3-6(1) to (10)).

Table 2-3-7(1) Main Component of Civil Structure

	Facilities	Proportion
Phase-1	Wharf	Length : 30m of total length 68m Structure : Gravity Type (Concrete Blocks)
	West Revetment	Length : 48m Structure : Rubble Sloping Revetment with Landing Stage
	Revetment of west side of Slipway	Length : 22m Structure : Gravity Type (Concrete Blocks)
Phase-2	Wharf	Length : 38m of total length 68m Structure : Gravity Type (Concrete Blocks)
	East Revetment	Length : 72m Structure : Rubble Sloping Revetment with Landing Stage
	Revetment of west side of Slipway	Length : 38m Structure : Gravity Type (Concrete Blocks)
	Slipway	Without Rail : 10m×17m With Rail : 10m×45m Slope : 1:8

Table 2-3-7(2) Main Component of Architectural Structure

	Facilities	Proportion
Phase-2	Administration Office Building (Hygienic laboratory, Meeting hall)	Total Floor Space : 627 m ² (1F 316 m ² , 2F 311 m ²) Reinforced Concrete (Two Story, Individual Footing)
	Processing Plant Building	Total Floor Space : 360 m ² Reinforced Concrete (One Story, Individual Footing)
	Workshop, Fishing Gear Locker Building	Total Floor Space : 324 m ² Gear locker area: 243 m ² Reinforced Concrete (One Story) Workshop area : 81 m ² Reinforced Concrete (One Story)

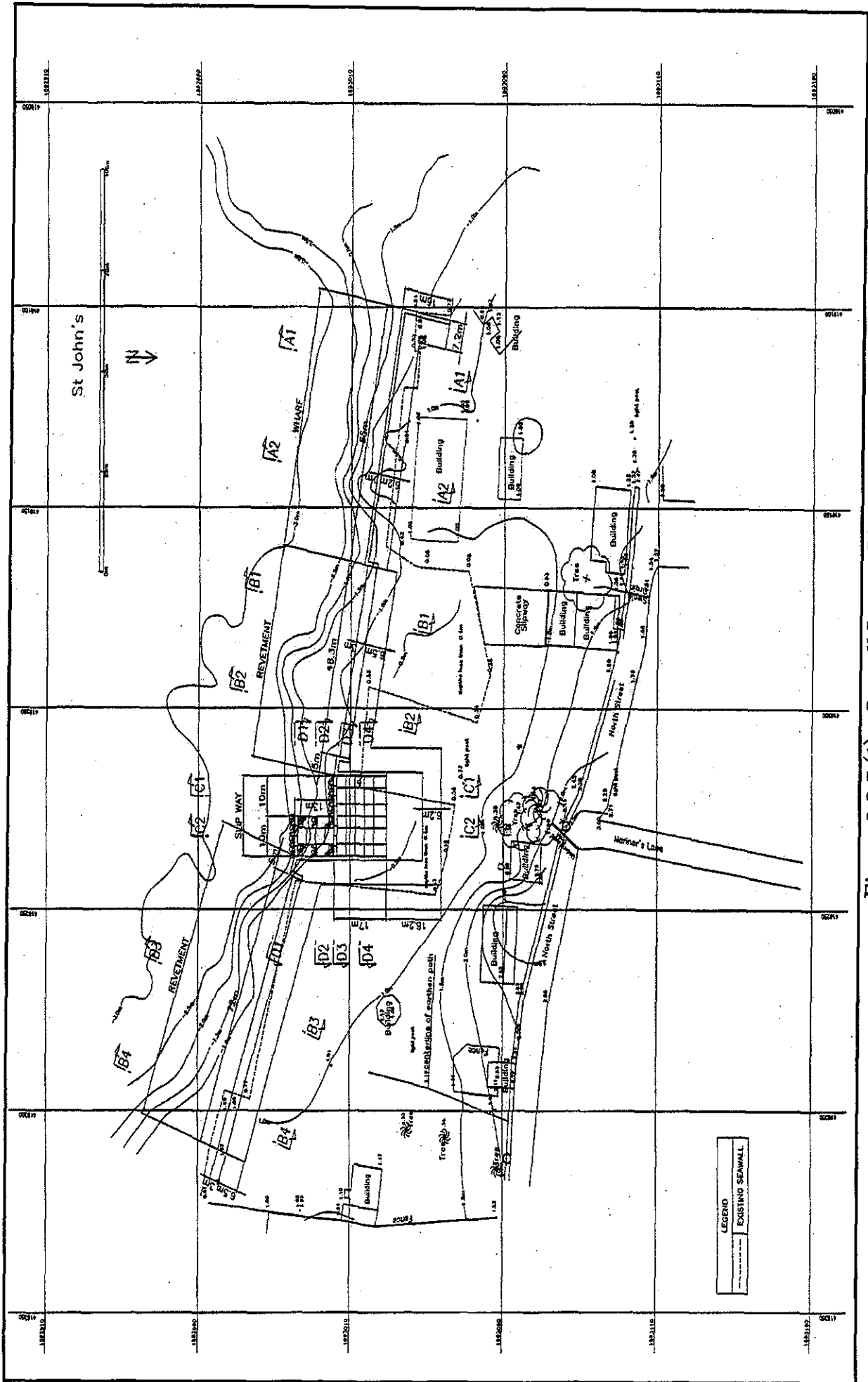
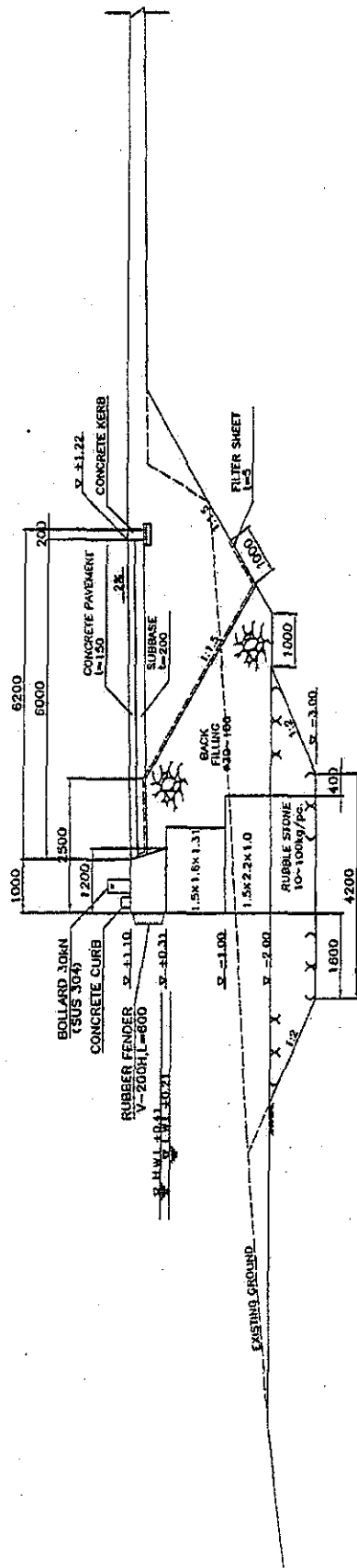
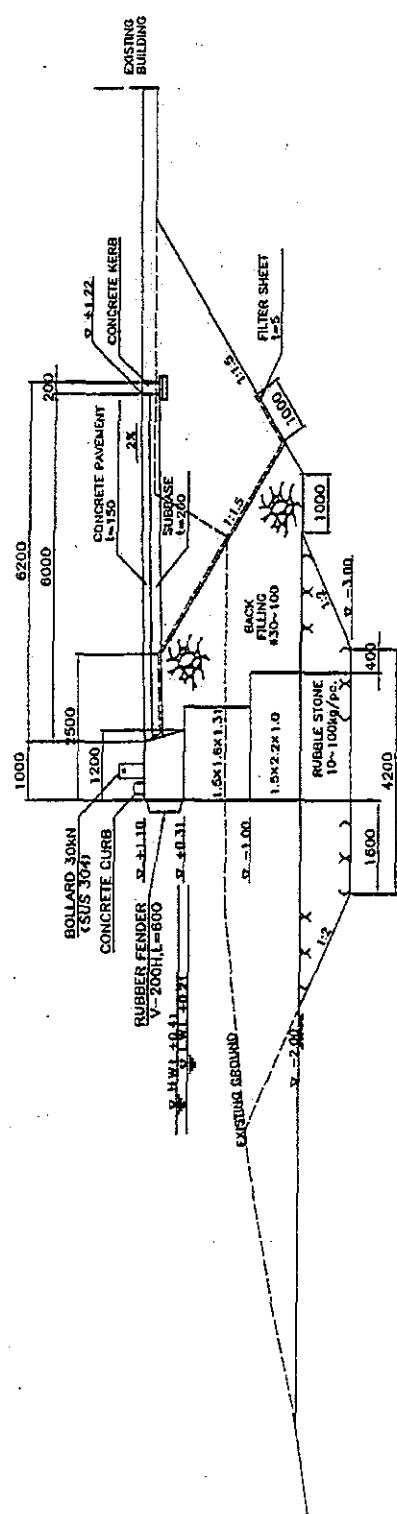


Figure 2-3-7 (1) Overall Layout Plan



SECTION A1
SCALE 1:100



SECTION A2
SCALE 1:100

Figure 2-3-7 (2) Cross Section of Wharf

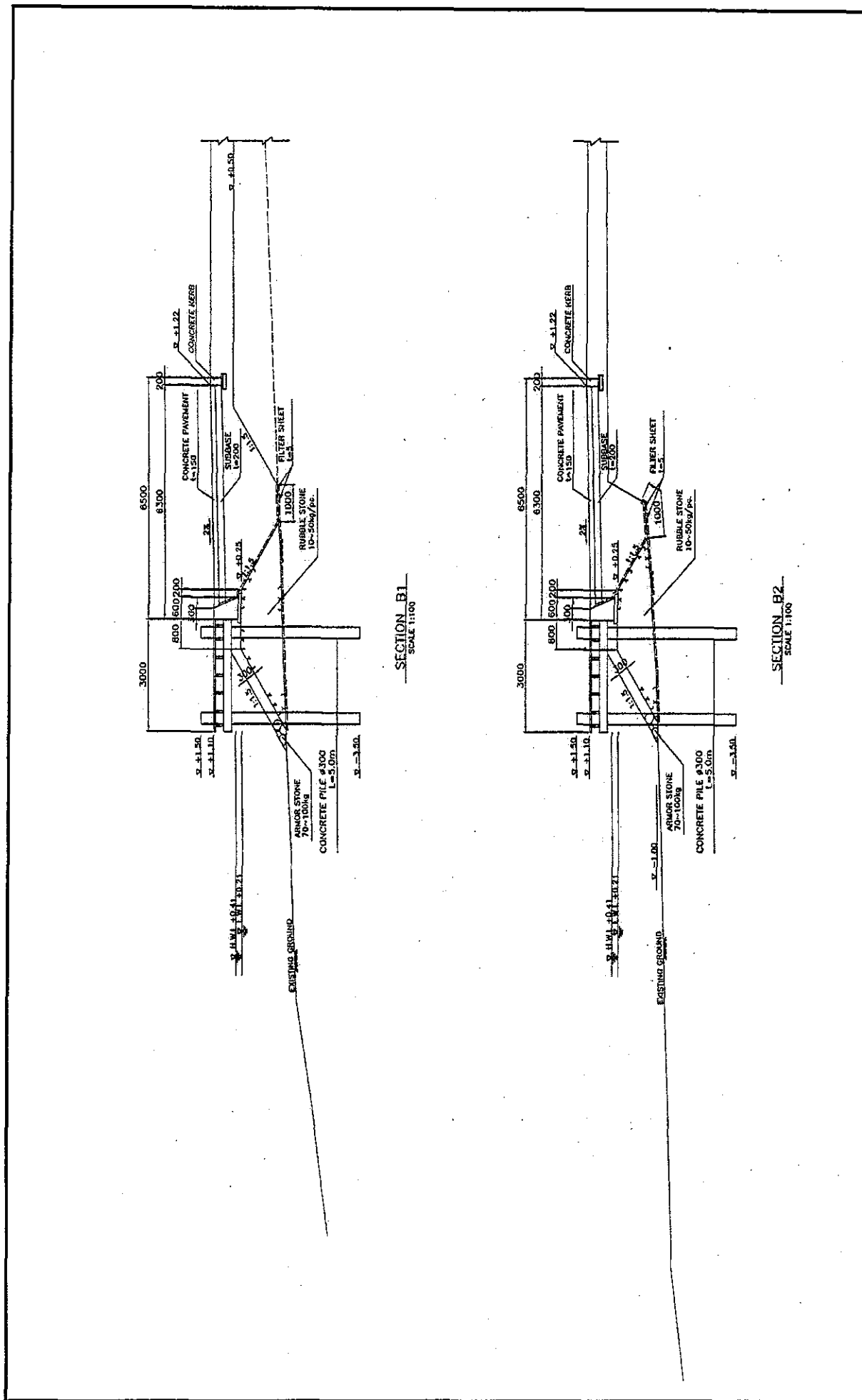
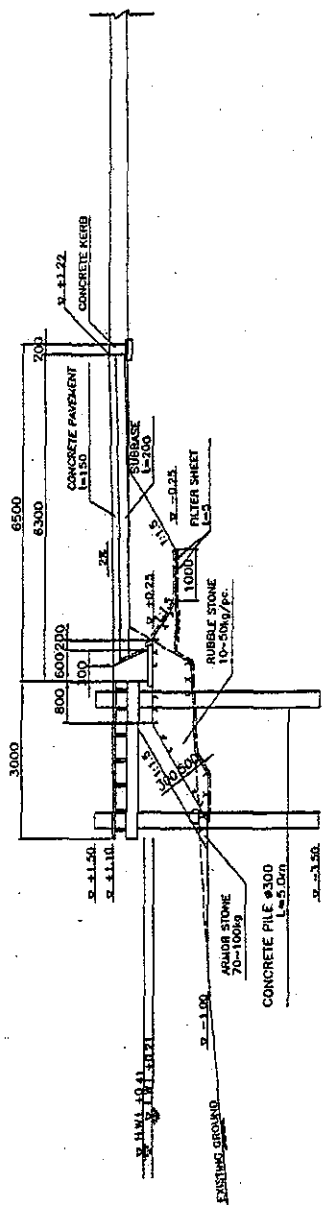
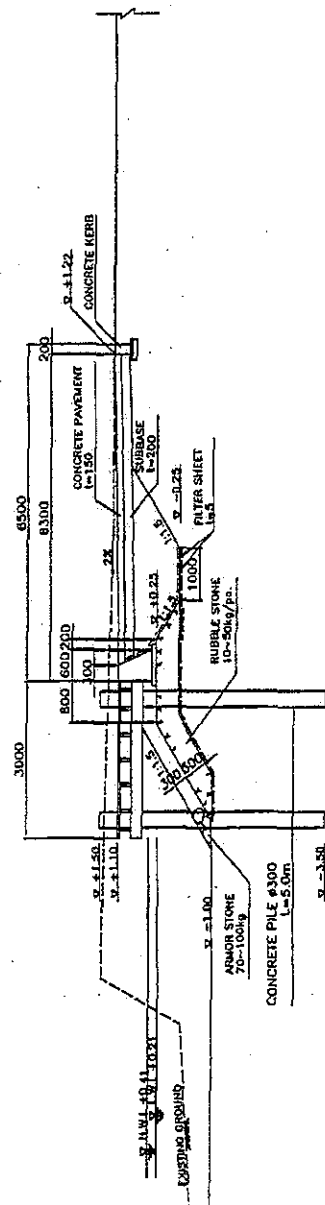


Figure 2-3-7 (3) Cross Section of Revetment (1)

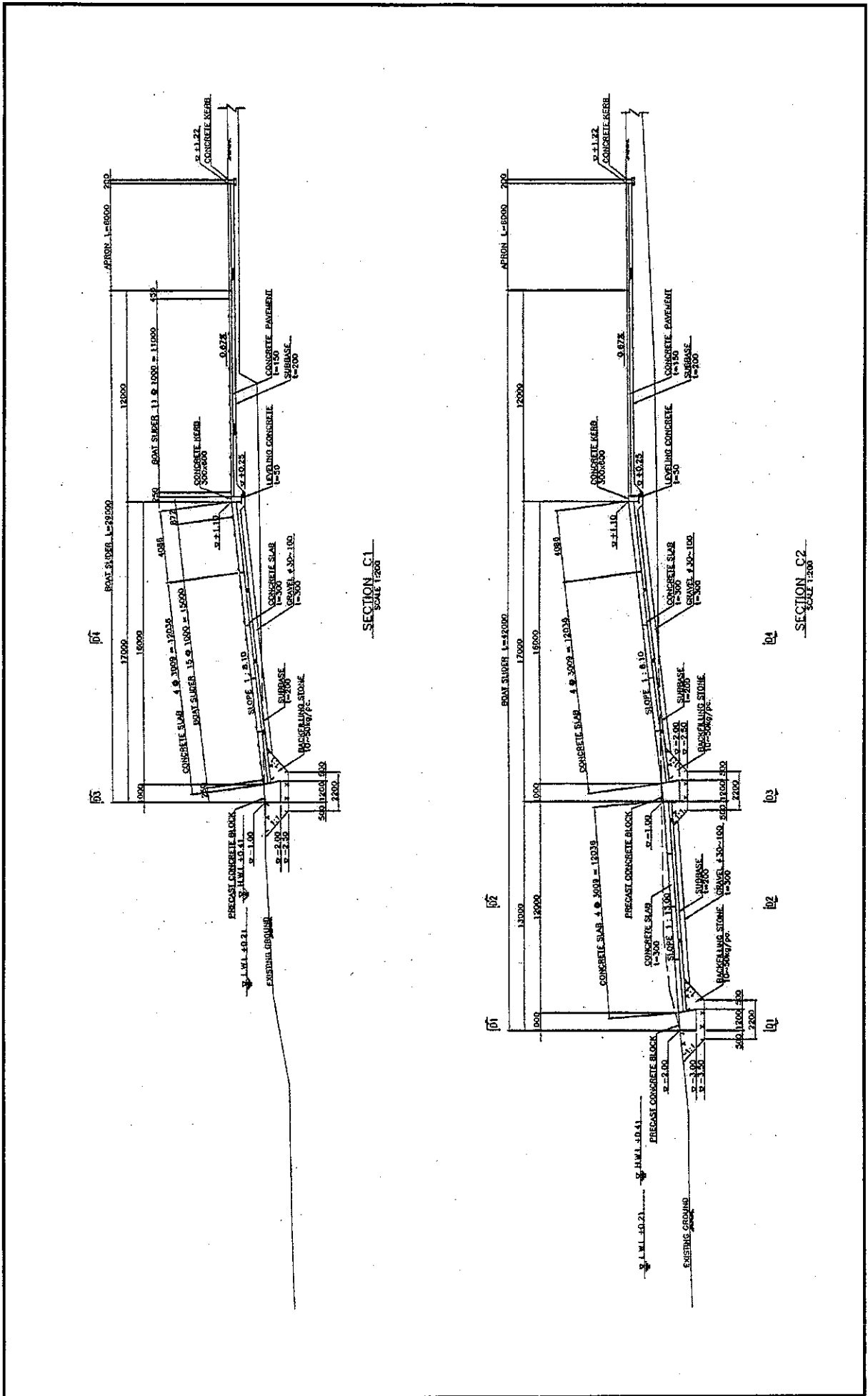


SECTION B3
SCALE 1:100



SECTION B4
SCALE 1:100

Figure 2-3-7 (4) Cross Section of Revetment (2)



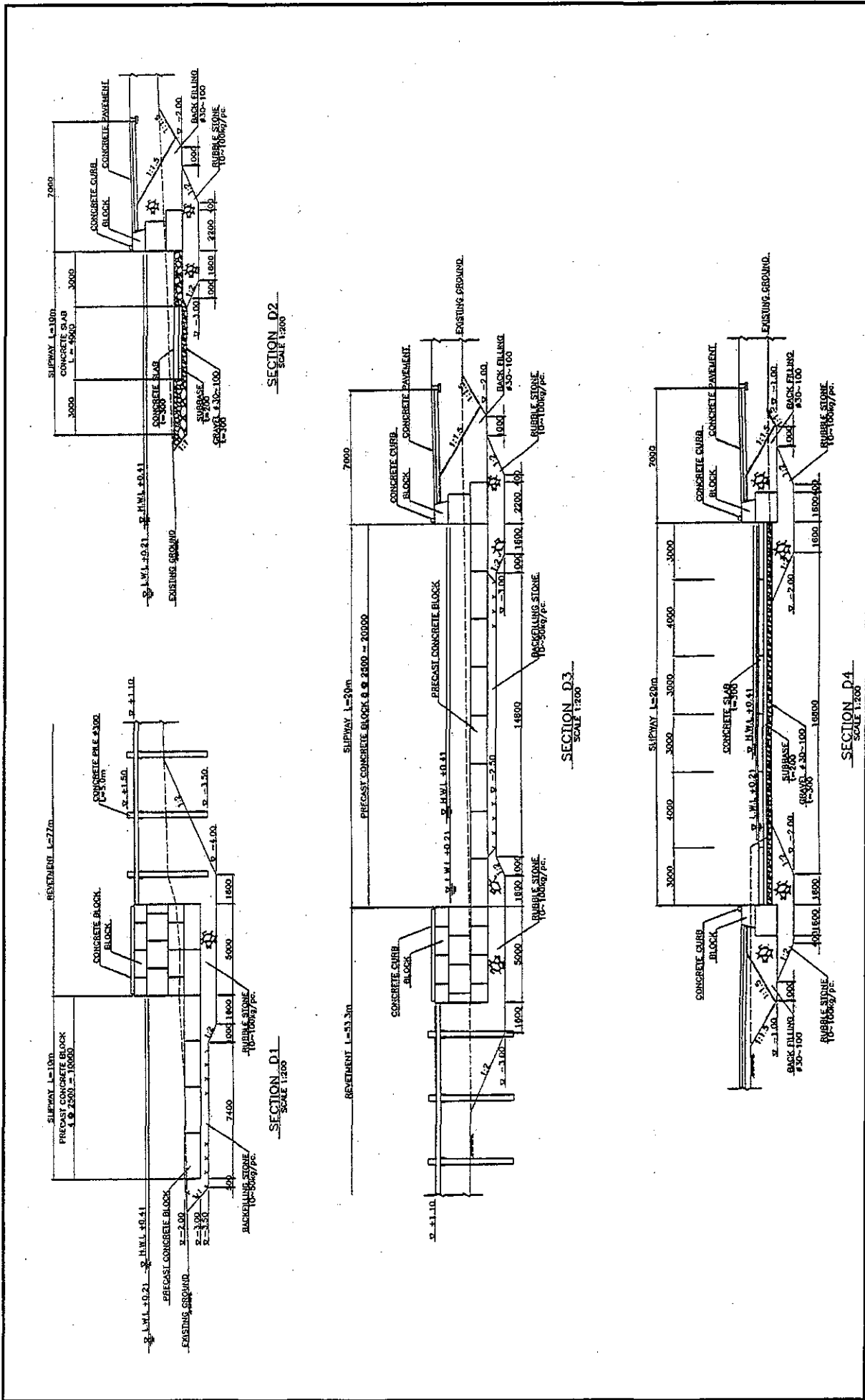


Figure 2-3-7 (6) Cross Section of Slipway(2)

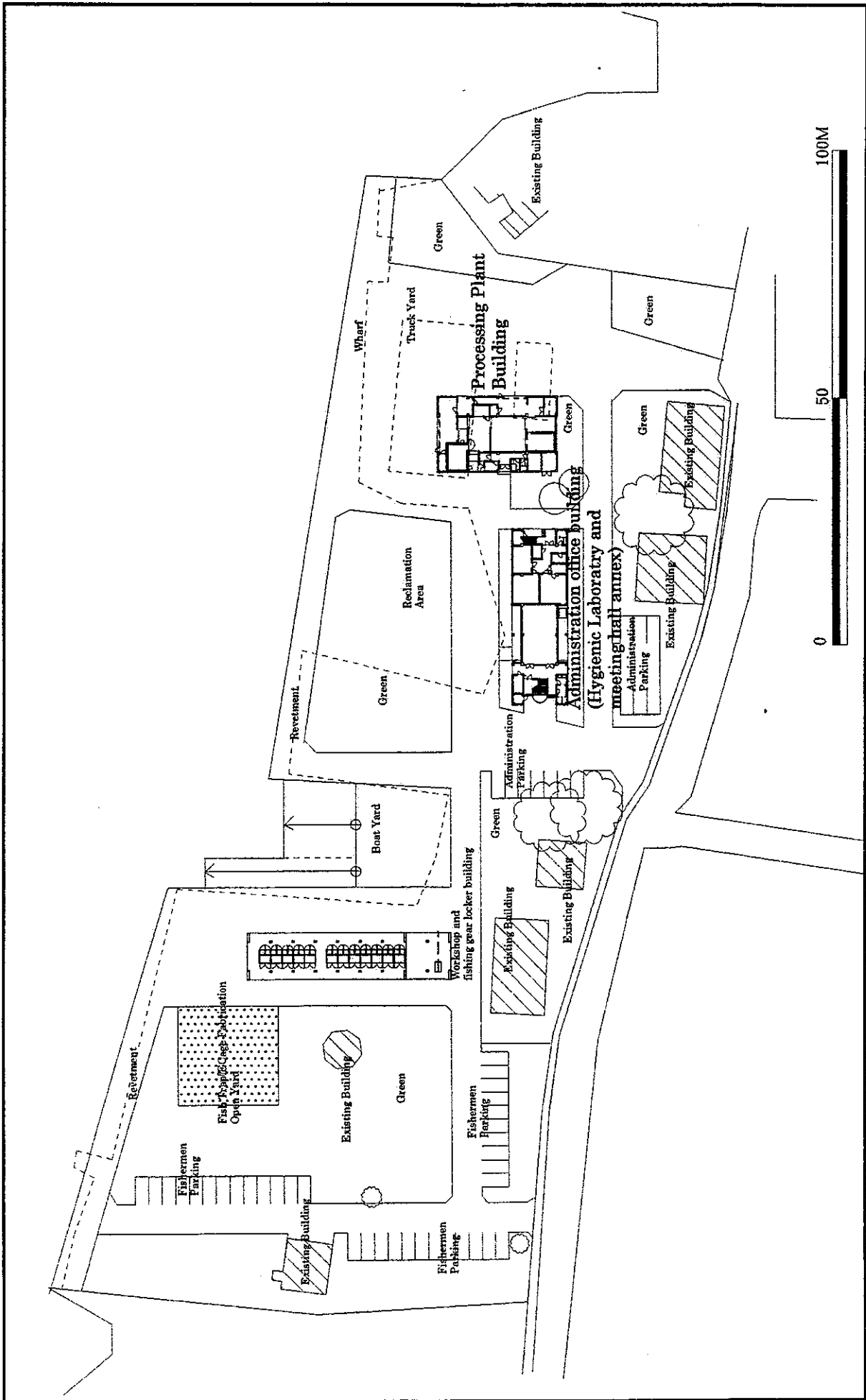


Figure 2-3-7 (7) Layout Plan of Buildings

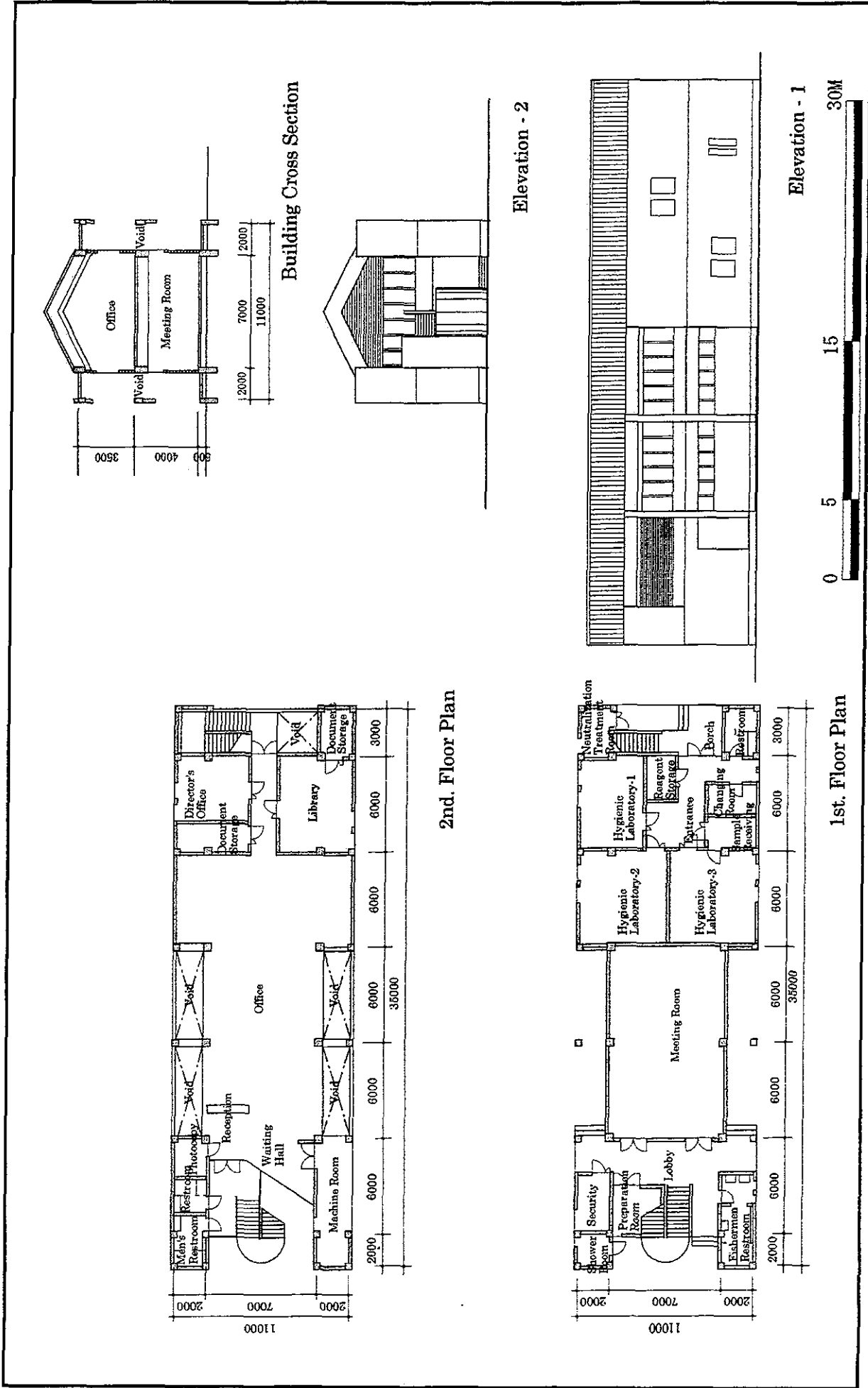


Figure 2-3-7 (8) Plan/Elevation/Section of Administration Office Building

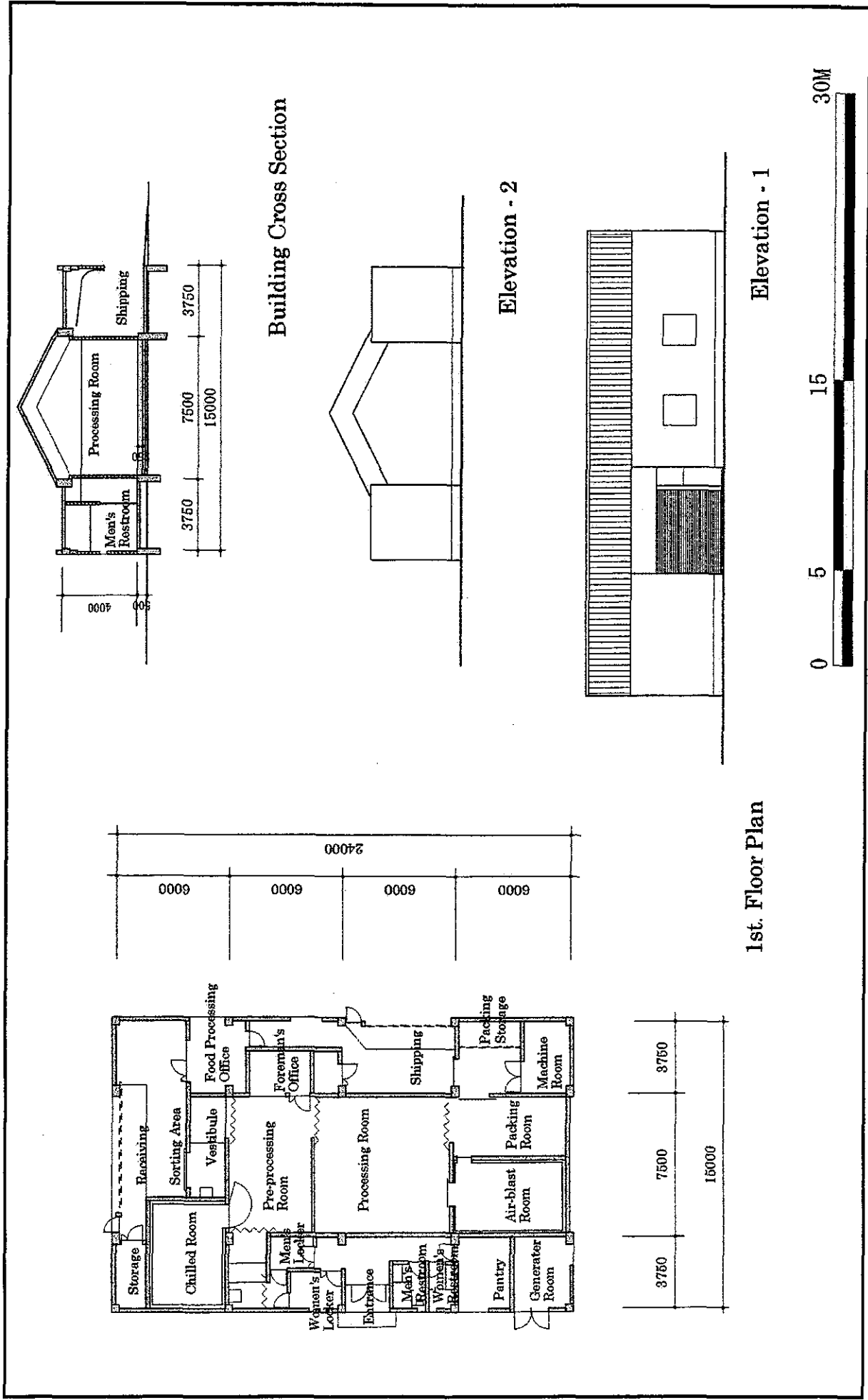


Figure 2-3-7 (9) Plan/Elevation/Section of Processing Building

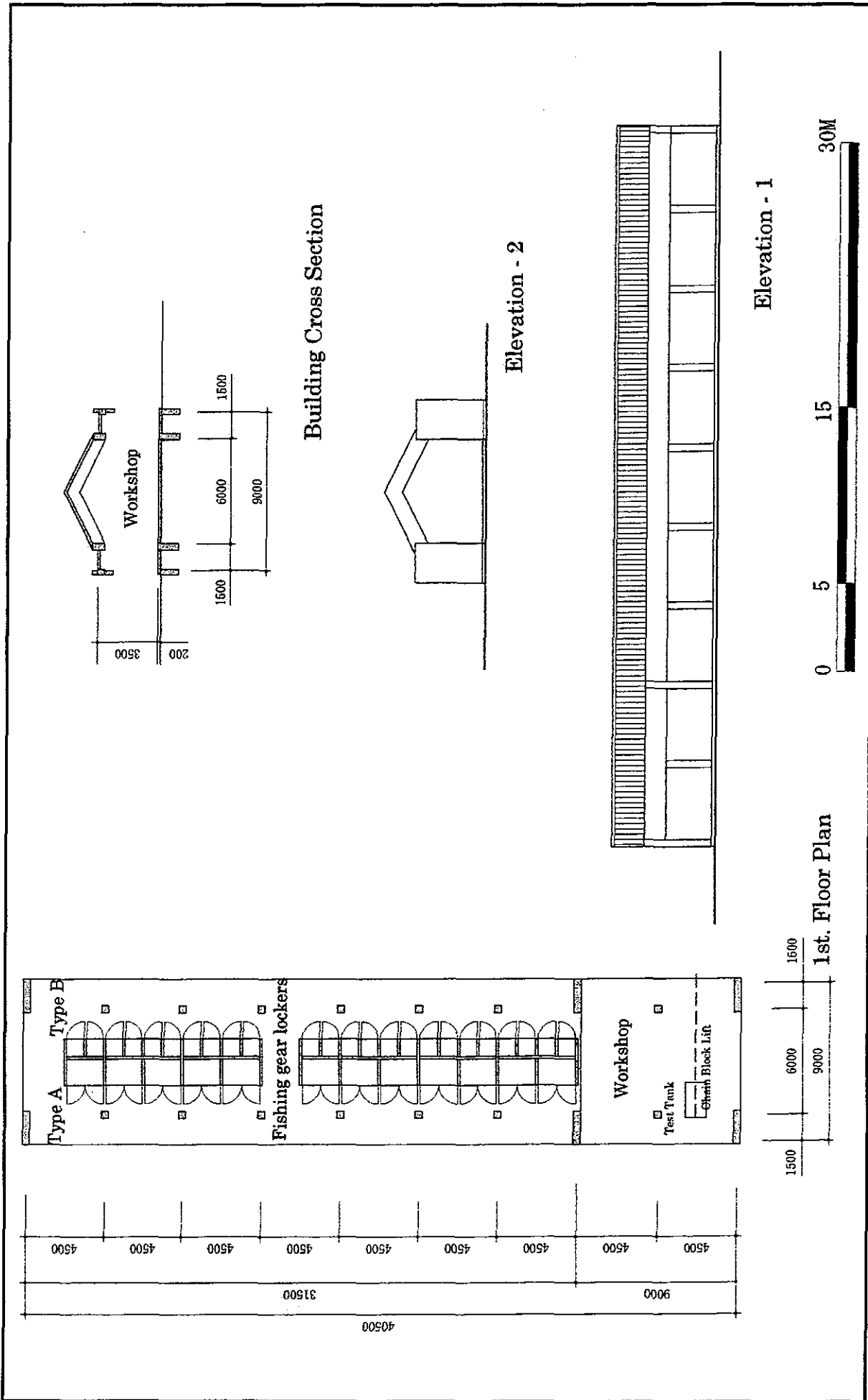


Figure 2-3-7 (10) Plan/Elevation/Section of Workshop, Fishing Gear Locker Building

2-3-8 Execution planning

2-3-8-1 Execution planning / procurement planning

(1) Basic items involving project execution

- (a) With respect to the implementation of the Project for Construction of Fishery Development Center, following the signing by the Japanese Government of an Exchange of Notes (E/N) with the Government of Antigua, a consultant contract will be signed between the Japanese Consulting Firm with Japanese nationality and the Government of Antigua and Barbuda.
- (b) The Consultant will prepare all the documents required for the tender and concluding the contract such as the drawings, technical specifications, and so forth, and after approval of these documents by the Government of Antigua and Barbuda, a Japanese corporate entity will be selected by means of tendering, by screening the tendering qualifications and then screening the tendering documents.
- (c) The construction work will be carried out based on a construction contract signed between the Government of Antigua and Barbuda and the construction company.
- (d) The implementation period of the project will be 5.5 month for the detailed design for the tender and 16 month for the construction works.

(2) Execution policy / procurement policy

- (a) On-land construction is presumed for the wharf, revetment, slipway, and boat landing area, and efforts are to be made to minimize the construction costs and shorten the construction period. The on-land facilities are planned to stand on existing land that has good soil quality, but it will be confirmed as the construction is carried out that the soil has a sufficient bearing capacity. Because the construction site is in a quiet area of the water in the St. John's bay, it will be necessary to find ways to take the environment into consideration, such as measures to keep the muddy water produced by rubble and excavation from spreading. Therefore, when these types of work are carried out, it is to be done in such a way that the spreading of muddy water is minimized.
- (b) Some local construction companies in Antigua and Barbuda have experience as a subcontractor in undertaking large-scale construction projects, such as the St. John's unloading and distribution facilities, the Parham and Uarlings fishing port facilities, and the Heritage wharf (a wharf for tourist boats to come alongside), but there are few building companies that have experience in building harbor and port facilities. There are companies that have experience in constructing hotels and other general architectural construction and equipment construction, and they are also thought to be capable of carrying

out construction such as road construction. With respect to port construction, various types of construction machinery can be procured domestically, but expert engineers will be procured from Japan or another foreign country.

- (c) Taking quality and durability into consideration, the ice-making and icehouse equipment is to be procured from Japan, and the assembly and startup construction are to be done under the guidance of engineers dispatched from Japan.
- (d) With respect to materials that can be procured locally, the quality and supply capability are to be carefully studied, with priority being given to local procurement as much as possible and procurement from Japan minimized in order to suppress costs.

2-3-8-2 Points to be considered with respect to execution and procurement

(1) Conditions for Construction

1) Construction companies

There are several construction companies in Antigua and Barbuda, and they have an experience in construction, and experience was gained through the previous grant aid cooperation, and the construction companies will be assigned as subcontractors under the supervision of the Japanese construction company.

2) Construction machinery

There are few companies in Antigua and Barbuda that lease construction machinery, but some local construction companies possess construction equipment, and it can be borrowed from them. At the same time, however, the machinery that can be leased is limited to items for road construction, such as backhoes, tire shovels, and dump trucks. The quantities are also limited, and the machinery has not always necessarily been subject to good maintenance control. In formulating the execution planning for the on-land execution, working vessels such as crane boats and diver boats are not being taken into consideration for this project. However, heavy equipment such as crawler cranes and truck cranes will be necessary over the long term. Basically, those items that can be procured locally and in neighboring countries will be procured. Almost all of the construction machinery can be procured locally from subcontractors.

3) Workers

Guidance from skilled Japanese experts will be needed concerning the installation of the concrete blocks for the wharf, installation of the protective

rubble mounds, and construction of the building framework to support the roofs. Ordinary skilled workers will be procured locally or from neighboring countries.

4) Construction materials

Construction materials produced domestically in Antigua and Barbuda consist of aggregates for roads and for concrete, and building blocks. Cement and reinforcing bars are distributed as imports from the United States and from Trinidad and Tobago. Most other construction materials are imported from the United States and from Trinidad and Tobago, and can be procured from factories, agencies, and stores in the city. At the same time, however, the stocks of these goods may not be always available and adequate. For the construction planned under this project, of those materials in insufficient stock, those for which it is difficult to assure the necessary quality or the necessary volumes through local procurement will be procured from Japan.

5) Safety control

With the construction planned under this project, a new fishing port will be refurbished adjacent to the existing city area. With respect to construction such as the wharf and revetment, safety will have to be taken into consideration by clearly marking the construction area with buoys and other signs, so as to secure the navigation of fishing boats and other vessels. With respect to the execution of on-land construction, care will have to be taken to avoid causing transportation disasters to the inhabitants of the area, such as by clearly marking the passages by which materials will be transported into the area. Also, construction disposal materials such as earth left after dredging will be transported to a location close to the site, but if public roads are used, planning will be carefully formulated to avoid causing accidents to third parties.

(2) Items to be considered in carrying out the construction

- (a) The natural conditions of the local area are to be given ample consideration in formulating the planning for the temporary construction, the construction methods, and the processes.
- (b) Staff and experts will be dispatched from Japan, in respect of the number of people, the timing, and duration, in accordance with the progress of the construction.
- (c) Local materials will be used as much as possible to minimize the cost for the procurement of such materials from foreign countries.
- (d) Because the Project will involve long-term work at the Point Wharf landing site, which is currently in operation, it will be necessary to provide an alternate landing site so as not to hinder the fishing activities. Thorough

discussion will be conducted with the Government of Antigua and Barbuda to assure an alternate landing site.

- (e) Construction works at the site will require a temporary yard that can be used to accommodate temporary facilities such as a site where stones and aggregates can be placed, a yard where concrete blocks can be manufactured, a processing plant for reinforcing bars, an area where materials and machinery can be placed, and other facilities. As noted in the minutes, this land is to be provided gratis by the Government of Antigua and Barbuda at a location close to the construction site.

2-3-8-3 Scope of Works

The scopes of works to be undertaken by the Government of Japan and the Government of Antigua and Barbuda are as follows.

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

[Construction works]

- *Wharf
- *Revetment with landing stage
- *Boat and engine repair area (slipway / boat yard)
- *Processing plant
- *Administration office building (hygienic laboratory / meeting hall)
- *Workshop, fishing gear locker building
- *Parking lot
- *Paving of the grounds

[Procurement of equipments]

- *Equipment for processing plant
 - Cubic ice making machine (0.5 tons/day, one machine)
 - Freezing equipment (processing plant), other related equipment
- *Emergency generator: 60KVA
- *Set of equipments related to hygienic laboratories
- *Set of other materials

(2) Scope of works to be undertaken by the Government of Antigua and Barbuda

Construction to lay electrical cables, water pipes and telephone lines to the planned site

2-3-8-4 Consultant Supervision

Based on the Government of Japan's policies for grant aid cooperation, integrated and smooth implementation design operations and operations to oversee the execution of the project will be implemented for the project, by a consultant who fully understands the main gist of the basic design. At the stage of overseeing the execution of the project, the consultant will send supervisors at the construction site, and will make sure that experts are sent at the necessary timing based on the progress of the construction works, and will carry out inspections and implementation.

(1) Supervisory policies

- (a) The timeframe of the work will be strictly observed by close communication and reporting between the persons and organizations related in both countries to prevent any delays in completing the facilities, based on the construction execution processes.
- (b) Prompt and appropriate guidance and advice will be provided to contractors as to the construction of the facilities in compliance with the drawings and specifications agreed upon.
- (c) As far as possible, high priority will be given to the utilization of local materials technologies.
- (d) The efficacy of the project as a grant aid cooperation project will be fully realized, with the attitude of promoting technology transfer relating to construction execution methods and execution technology.
- (e) Appropriate advice and guidance will be provided to encourage smooth running of the facility, regarding the maintenance and control of the completed facility delivered to the recipient side.

(2) Supervisory work

1) Preparation of a contract

The Consultant will supervise the selection of a contractor to carry out the construction works, determining the type of the contract, drafting the contract documents, evaluating the contents of the bill.

2) Evaluation and approval of the drawings, etc.

The Consultant will evaluate the drawings, materials, finishing samples, and equipments submitted by the contractor.

3) Instruction on construction work

The Consultant will review construction plans and schedules, provide guidance to the contractor, and report the progress of the work to the Government of Antigua and Barbuda.

4) Process of payment

The Consultant will evaluate and approve the contents of the bills and other documents pertaining to the payment to be made to the contractor during and after the construction, and will provide cooperation in the necessary procedures.

5) Inspection and witness

The Consultant will conduct inspections, when necessary, the work in progress and provide appropriate instruction to the contractor. Having confirmed that the work has been completed and the contract fulfilled, the Consultant will witness the delivery of the Project and confirm the government's acceptance. The consultant will also report to the Government of Japan about any necessary items that arise during the construction concerning the progress of work, payment procedures and status, and the *delivery of facilities completed*.

2-3-8-5 Procurement plan

In the process of procuring the materials and equipment that are necessary for the Project, special attention will be paid to the followings.

(1) Procurement policies

With respect to materials that can be procured locally, the quality (and inspection conditions) and the supply capability (deadlines and quantities) will be thoroughly investigated, and local procurement given priority as much as possible. Procurement from Japan will be kept to a minimum from the standpoint of cost and deadlines.

1) Procurement from Japan

A detailed procurement and transport schedule must be prepared well in advance for, of the materials and equipment to be procured from Japan, those that normally will take a long period of time before manufacturing, packing and shipment of goods until completed.

Basically, construction machinery will be procured locally or from a neighboring country, and procurement from Japan will be kept to a minimum.

2) Local procurement

Of the materials to be procured locally, stone, aggregates and other materials that are primary materials will be decided with ample consideration given to the place of origin, the quality, the transport capability and other factors.

3) Costs

When materials are procured locally or from Japan, cost comparisons will be made and the lower-cost materials used. If materials are being procured from Japan, additional costs for packing, transport, insurance, and port costs will be given consideration, as well as tax-exempt handling.

Based on the above, the procurement plan of the primary materials and equipment to be used in the Project will be established as indicated below.

(2) Procurement items

1) Construction materials

The following indicates the results of investigations of procurement sources conducted based on the previous page.

Table 2-3-8-5 (1) Procurement Plan of Construction Material

Construction Material		Procurement Country			Remarks
		Local	Japan	Third	
Civil work	Rubber Fender, Bit		○		
	Filter Sheet		○		
	Stone, Aggregate, Crusher run	○			
	Steel Bar	○			
	Cement	○			
	Concrete	○			
Building work	Form Material	○			
	Timber & Wood	○			
	Sand, Aggregate	○			
	Steel Bar	○			
	Cement	○			
	Concrete	○			
	Form Material	○			
	Concrete Block	○			
	Timber & Wood	○			

	Steel furnishing	<input type="radio"/>	<input type="radio"/>		
	Wooden furnishing	<input type="radio"/>			
	Waterproofing Material	<input type="radio"/>			
	Roof Material	<input type="radio"/>			
	Glass	<input type="radio"/>			
	Paint	<input type="radio"/>			
	Tile	<input type="radio"/>			
Electric	Cable and Wire	<input type="radio"/>			
	Conduit Pipe	<input type="radio"/>			
	Panel boards, Switch boards		<input type="radio"/>		
	Switch, Outlet	<input type="radio"/>			
	Lighting	<input type="radio"/>			
	Light Ball	<input type="radio"/>			
	Generator		<input type="radio"/>		
Plumbing	Pipe	<input type="radio"/>			
	Valve	<input type="radio"/>			
	Sanitary Fixture	<input type="radio"/>	<input type="radio"/>		
	Water Reserve Tank	<input type="radio"/>	<input type="radio"/>		
	Water Supply Pump		<input type="radio"/>		
	Septic Tank	<input type="radio"/>			
Air Con.	Air Conditioner		<input type="radio"/>		
	Ventilating & Exhaust Fun		<input type="radio"/>		
Equip.	Ice-making Equipment		<input type="radio"/>		
	Cold storage Equipment		<input type="radio"/>		
	Equipments for Hygienic Labo.		<input type="radio"/>		
	Equipment for Processing		<input type="radio"/>		
	Other Equipment	<input type="radio"/>	<input type="radio"/>		

2) Construction machinery

All construction machinery will be available through local sub-contractors. Construction machineries to be used in the Project are shown in the table below.

Table 2-3-8-5(2) Procurement Plan of Main Construction Machinery

Machinery		Country			Remarks
		Local	Japan	Third	
Generator	150KVA	○			
Vibratory Hummer	45kw			○	
Water-jet	100kw			○	
Bulldozer	15t	○			
Power Shovel	0.4m ³	○			Long arm
Power Shovel	0.4~0.6m ³	○			
Dump Truck	2~4t	○			
Dump Truck	10t	○			
Truck Crane	35t	○			
Truck Crane	20~22t	○			
Crawler Crane	50t		○		
Blade Grader	(3.1mClass)	○			
Tire Roller	(8~20tonClass)	○			
Macadam Roller	(8~12tonClass)	○			
Tamper, Lanmer	(60~80kg)	○			
Trailer Truck	(20~30t)	○			
Concrete Vibrator		○			
Cutting Machine of Steel Bar		○			
Bending Machine		○			
Welder(270A)		○			
Water Spreading Car	3~5t	○			

2-3-8-6 Quality control planning

(1) Quality control of materials

With respect to the materials used in the construction, supervision is to be carried out in conformance with the following: the common specifications for port construction published by the Japan Fishing Ports Association, the common specifications for port construction published by the Ministry of Land, Infrastructure and Transport of Japan, the building construction standard specifications and descriptions in JASS 5, published by the Architectural Institute of Japan, the common specifications for building construction published by the Ministry of Land, Infrastructure and Transport of Japan, the building

construction supervision policies published by the Ministry of Land, Infrastructure and Transport and the Japan Standards Association (JIS), and approval is to be obtained in advance before the materials are used.

(2) Concrete mixture design

The composition of the concrete and mortar to be used in the construction will be formulated and tested in advance to confirm the strength, time required for mixing, and other elements, and the methods by which they are to be applied will be investigated. Moreover, a table showing the test results for each mixture, a table showing the concrete strength control, and control charts (X-R control charts, etc.) will be drawn up and the quality maintained and controlled.

(3) Quality control of roadbeds and base courses

Quality standards are to be set to confirm the supporting strength of roadbeds and base courses. Based on these standards, the tests described above are to be carried out, and the dry density and moisture content of the construction execution, and the number of rollings, are to be set and control of these implemented as the execution standards.

2-3-8-7 Implementation schedule

When this project is executed through grant aid cooperation from the Japanese Government, a Japanese corporate consultant will be selected by the Government of Antigua and Barbuda following the signing of an Exchange of Notes (E/N) between the two countries, and a consulting contract will be concluded between the Government and the Consultant. After that, the implementation designs and tendering documents will be drawn up, and the undertaking completed by means of tendering, construction contracts and the building construction.

(1) Preparation of Detailed Design Document

After the consultant agreement is concluded between the Government of Antigua and Barbuda and the Japanese Consultant, the agreement will be submitted to the Japanese Government for verification. Once it is verified the Consultant will begin drawing up the detailed design. In the detailed design, the following tender documents will be drawn up based on this Basic Design Study report: design drawings, technical specifications, tendering guidelines and so forth. During this time, consultations will be held with the Government of Antigua and Barbuda concerning the contents of the facilities

and equipments, and ultimately, the tender documents will be approved by the Government of Antigua and Barbuda.

The time required for the detailed design will be approximately 3.0 months.

(2) Execution of tender

The contractor (a Japanese construction company) who will be involved in the construction of the project facilities will be selected through the tender. The tender will be conducted in the following order: public announcement of tendering, reception of requests to participate in the tender, examination of pre-qualifications, distribution of tender documents, submission of tenders, evaluation of the tenders, designation of the contractor and conclusion of the construction contract. The whole procedure will require 2.5 months.

(3) Execution of construction work

The work will begin after the construction contract is concluded and the contract is verified by the Government of Japan. As a result of calculations of the construction period made taking into account the scale and contents of the project facilities (including the problems relating to the local construction conditions), and on the assumption that no acts of nature beyond human control will occur, a period of approximately 16 months will be required.

The process for carrying out the Project from the Exchange of Notes (E/N) to its completion is as noted in Table 2-3-8-7 (1) below.

Table 2-3-8-7 (1) Implementation Schedule

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Remarks	
Phase-1	Detail Design	■															Consultant agreement, Survey	
	Procurement and Construction	(Field Survey)	■															Design/Cost estimation
		(Confirmation)		■														Approval of Tender Document
	Procurement and Construction		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	Civil Works
			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	Preparation
			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	Reclamation
			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	Wharf
	Phase-2	Detail Design		■	■	■	■	■	■	■	■	■	■	■	■	■	■	Revetment (West side)
				■	■	■	■	■	■	■	■	■	■	■	■	■	■	Slipway
		Procurement and Construction																
																		Design/Cost estimation
																		Approval of Tender Document
																	Clear-up	
																	Wharf	
																	Revetment (East side)	
																	Slipway	
																	Building Works	
																		Preparation/Clear-up
																		Administration Office, Laboratory
																		Processing Building
																		Workshop, Gear Locker
																		External Works
																		Procurement of Equipment
																		Procurement
																		Packing, Transportation
																		Installation

2-4 Obligations of the Recipient Country

2-4-1 Obligation of the recipient country

The following is a summary of the obligations of the Government of Antigua and Barbuda as confirmed in the Minutes of Discussions and other documents during the Basic Design Study.

- *Securing land necessary for the site of the Project prior to commencement of the construction
- *Preparing the building site, removal of any existing buildings or unnecessary items (scrap ships, etc.)
- *Permission to excavate earth and sand for reclamation, and stone materials
- *Securing a site (close to the building site) where earth left over from the construction (dredged earth) can be disposed of
- *Providing facilities for distribution of electricity, water supply and drainage, and lead-in and installation of telephone cables
- *Making provisions for exemption of taxes on the goods being imported to Antigua and Barbuda through Customs
- *Exempting taxes and other surcharges levied by Antigua and Barbuda on Japanese personnel coming into Antigua and Barbuda in order to carry out the confirmed contracts and the work of the contracts
- *Providing the necessary conveniences in terms of entering and residing in the country for Japanese personnel coming into Antigua and Barbuda in order to carry out the confirmed contracts and the work of the contracts
- *Paying the fees for engaging a bank and for payment authorizations
- *Obtaining any approvals and permissions necessary in Antigua and Barbuda in order to carry out the construction
- *Appropriate and effective use of the facilities constructed through grant aid cooperation from Japan
- *Paying all expenses that are necessary to the project and are not covered by the grant aid cooperation from Japan
- *Submission of the implementation plan of the plant and implementation plan of the fishing port of Point Wharf to the Embassy of Japan in Trinidad and Tobago before the completion of the construction work

2-4-2 Project Cost

Project cost estimation is approximate 973,000,000 Japanese Yen. This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant.

Construction of Fisheries Development Center at Pont Wharf

Expense Item		Project Cost Estimation (¥)	
Facilities	Civil Works	Wharf, Revetment Slipway, Boat Yard	297,000,000
	Building Works	Administration / Hygienic laboratory / Meeting hall Building Food Processing Building Engine Repair Shop and Fishermen Lockers Building	495,000,000
Equipment		Hygienic Laboratory Equipment Food Processing Equipment	53,000,000
Detail Design and Consultant Supervision			128,000,000

The cost borne by the Government of Antigua and Barbuda is estimated tentatively. Total cost will be 65,800EC\$. Details are as follow.

Items	Cost (EC\$)
Electric power supply cable installation to site	54,100
Water supply pipe installation to site	6,600
Telephone line installation to site	5,100
Total	65,800

2-5 Project operation plan

2-5-1 Operation and maintenance organization for the facilities

Operating and maintenance control of the facilities constructed are carried out cooperatively by the Fisheries Division of the Ministry of Agriculture, Land and Fisheries and AFL under the supervision of the Ministry of Agriculture, Land and Fisheries. Tables 2-5-1(1) shows the management organization system and the role allocation of the personnel, while Figure 2-5-1(1) shows the management organization diagrams. For the facility, the principal management personnel will be dispatched to the area from Fisheries Division and AFL, and there will be no direct assumption of personnel fees for the operation of the project. Working personnel, on the other hand, will be newly hired by the project operating organization.

In Antigua and Barbuda, with respect to the operating costs for personnel fees and for electricity, water and other utilities, the project operating budget has been calculated, and the operating fees have been guaranteed.

Table 2-5-1(1) Management Organization and Allocation of Personnel Roles

Managing division	No. of people	Role allocation
Port office manager	1	Overall responsibility for maintenance control of the port facilities
Administrative manager	1	Assisting the port manager, and accounting and finance control
Accountant and charge collectors	2	Collecting the boat mooring fees and usage fees for fishing boat and engine repair area and the fishing gear storehouse, and calculating salaries
Finance person	1	Calculating operating expenses and financing small sums
Engineering manager	1	Assisting the port manager and operating control of the port facilities
Quality control personnel	3	Quality inspections
Distribution and processing personnel	2	Operating control of the marine products processing plant
Port facilities operation person	1	Operating control of the mooring facilities and fishing boat repair facilities
Facility maintenance control personnel	3	Maintenance control of quays and buildings, and cleaning control
Data acquisition and dissemination activities personnel	3	Checking catch quantities, managing resources, educating fishing operators, inspecting fishing boats
Total	18	

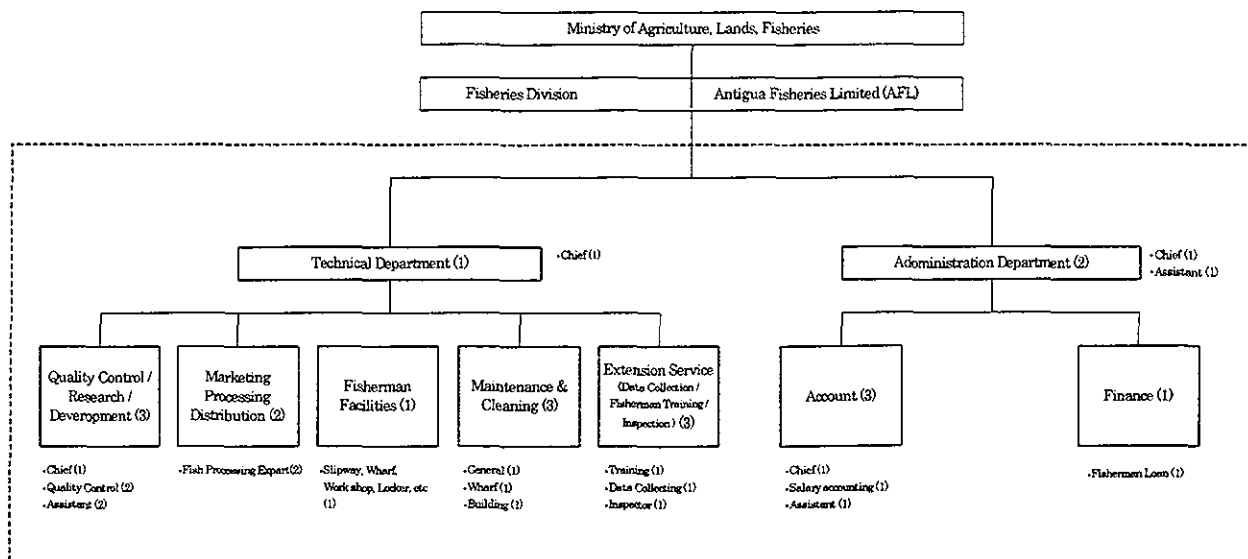


Figure 2-5-1(1) Operation Organization Chart of Point Wharf Facility

2-5-2 Operation Cost

Fisheries Division, Ministry of Agriculture, Lands and Fisheries will be responsible for the operation and maintenance of all the fishery facilities.

Operation cost is calculated based on the tariff of Urlings Fishing Port, tariff of APUA and salary scale of Antigua and Barbuda (2003).

(1) Operation and Maintenance Cost

Operation and Maintenance costs of fishery facilities can be estimated as follows.

a) Income

Mooring fee of fishing boat:	32,640EC\$
40EC/month/boat × 68 boats × 12 month =	32,640
Rental fee of fishing gear locker:	10,080EC\$
A type 50EC/month/unit × 12 units × 12 month =	7,200
B type 10EC/month/unit × 24 units × 12 month =	2,880
Rental fee of engine repair shop:	37,200EC\$
100EC/month × 31 boats × 12 month =	37,200
Rental fee of boat repair yard:	38,700EC\$
300EC/month × 129 boats × 12 month =	38,700
Government budgetary steps	811,200EC\$
Total:	929,820EC\$

b) Expenditure	
Personnel:	553,200EC\$
Port office manager (1)	
4,500EC/month × 12 month =	54,000
Administrative manager (1)	
2,800EC/month × 12 month =	33,600
Administrative staff (3)	
2,400EC/month × 12 month × 3 =	86,400
Engineering manager(1)	
2,800EC/month × 12 month =	33,600
Engineering staff(12)	
2,400EC/month × 12 month × 12 =	345,600
Electricity:	182,000EC\$
Fishing port facilities:	164,000
Equipments of hygienic lab:	18,000
Water:	64,000EC\$
Fishing port facilities:	63,000
Equipments of hygienic lab:	1000
Maintenance fee:	5,000EC\$
<u>General expense:</u>	<u>7,000EC\$</u>
Total:	811,200EC\$
c) Balance:	
902,820 – 811,200 = 118,620EC\$	Surplus

Operation and maintenance costs run in surplus.

(2) Operation Cost of Processing Plant

Operation costs of processing plant can be estimated as follows.

Income

Selling of processed fish:	1,540,000EC\$
325kg/day × 24.54EC/kg × 285 days × 75% =	1,540,000
Yielding percentage 65% (500kg × 65% = 325kg)	
Operating ratio 75%	
<hr/>	
Total:	1,540,000EC\$

Expenditure

Purchase cost of fish:	1,109,000EC\$
$500\text{kg/day} \times 11.46\text{EC/kg} \times 285\text{days} \times 75\% =$	1,109,000
Labor cost:	132,000EC\$
$5 \text{ persons} \times 136\text{EC/day} \times 258\text{days} \times 75\% =$	132,000
Welfare expense:	1,000EC\$
Working wear for 10 workers:	1,000EC\$
Packing material:	12,000EC\$
$1.77\text{EC} \times 325\text{kg} \times 258\text{days} \times 75\%/9\text{kg} =$	12,000
Electricity:	75,000EC\$
Water:	9,000EC\$
Miscellaneous expense:	2,000EC\$
Sales cost:	15,000EC\$
Transportation cost	8,000
<u>Advertising cost</u>	<u>7,000</u>
Total:	1,356,000EC\$

Balance:

1,540,000 – 1,356,000 = 118,620EC\$ Surplus

Operation costs run in surplus.

2-6 Other Relevant Issues

The following are items that should be dealt with promptly following the signature of E/N in order to ensure that the project targeted for cooperation is carried out smoothly.

- 1) Conduct an environmental impact assessment required for applying for a building permit from the government of the recipient country and carry out procedures for obtaining permits related to land reclamation promptly and without delay.
- 2) The Point Wharf Landing Area is located in an urban area and a temporary yard for construction work will be needed. The Ministry of Agriculture Lands and Fisheries will provide government-owned land for a temporary construction yard.
- 3) The Point Wharf Landing Area is currently in use and there are many structures and abandoned boats at the location where construction is planned that need to be removed. Since any delays in clearing the site for construction will have a major impact on the implementation of the project, it is essential that the removal and relocation work be carried out quickly.
- 4) During the construction period, work will interfere with fishing activities and it will therefore be important to limit the use of the fishing port and to set up a temporary relocation area and an alternate landing area.

Chapter 3

Project Evaluation and Recommendation

Chapter 3 Project Evaluation and Recommendation

3-1 Project Effect

The project site of Point Wharf landing site is located on the northwestern side of harbor at St. John's, the capital city, and is the landing site with the largest number of fishing boats and fishermen in Antigua and Barbuda. However, pier and other fishing facilities are dilapidated and damage from repeated hurricanes has impaired the landing function, presenting a major obstacle to the distribution of catch. This landing site also serves an important role as the distribution base for shipping everyday goods to the citizen's of Barbuda and for receiving marine products from Barbuda. However, as explained above the loss of function at its fishing facilities impairs both the function of efficient landing and of distributing marine products.

There was the office of the Fisheries Division of the Ministry of Agriculture Land and Fisheries at Point Wharf and functioned as the administrative center for Antigua and Barbuda's fishing industry, and had a close relationship with the fishermen owing to its location at the landing site. However, when the Fisheries Division moved to another location due to hurricane damage to its building the area lost its function as the center of the marine product administration and a place for close communication with the fishermen. It is hoped that these functions will be restored to the site.

Meanwhile, since many of the tourists to the country are from countries in EU and U.S.A, there is a strong desire to meet the demands to improve the sanitation and quality of catches supplied to hotels and restaurants. In order to expand the marine product industry in Antigua and Barbuda, the challenge is to improve the sanitation and quality of the catches in the country in order to promote artisanal fisheries through improved distribution and reduce imports. At the same time, the issue now faced by the country's marine products sector is the demand for improvement in the quality standards and safety of marine products in order to strengthen export competitiveness as the shift is made to the CSME that starts in 2005.

Given the above-described background and based on the results of the basic design study, the following have been identified as problems that require resolutions at the Point Wharf landing site, the area with the largest fishing force in Antigua, as the distribution base for marine products.

- i) The Point Wharf landing site, the largest in the country both in terms of registered fishing boats and fishermen, is on the verge of collapse and is not functioning adequately as a place for fishing port activities due to dilapidation and hurricane damage to the basic facilities of the port

- (including the wharf, revetment, slope, and workshop). The same area is also the base for the distribution of everyday goods and marine products between the island and Barbuda, but dilapidation of its landing and unloading facilities has greatly compromised the efficiency of those facilities, and it is imperative to rehabilitate and improve them as soon as possible.
- ii) There is a navigation safety problem at the landing sites of Keeling Point and High Street in St. John's Port involving fishing boats and large cruise ships, and the recommendation has been made to move the fishing boats.
 - iii) Although there is a great demand for the provision of safe and sanitary marine products to the tourists from the EU and the U.S.A., in terms of the tourism industry that supports the national economy, the problem is that there are no processing facilities that employ sanitary management.
 - iv) At one time, the Fisheries Division was located at the Point Wharf landing site and it carried out the marine product administration and management of the landing site. However, following hurricane damage to the offices there has been no management system in place and the area no longer serves as a place for communication between fishermen and management personnel.
 - v) At the Point Wharf landing site there are scattered remnants of dilapidated buildings and what was once open land is also falling into a state of ruin with the land being in a disorderly fashion as a fishing gear repair and fish trap manufacturing yard and as a space for parking, hindering the various fishing activities that occur at the site.
 - vi) The lift (slope) and repair facilities that serve the important role of maintaining the fishing boats, the fishermen's assets, are no longer serving their function as a result of hurricane damage and dilapidation. The repair of fishing boats and engines is a financial burden on the fishermen. Also, it is important to ensure that there is an evacuation route for fishing boats, the fishermen's assets, in times of hurricanes.

Items for resolution of the above-mentioned problems and provided components corresponding to those are as follows:

- i) Develop a distribution base to receive catches from outlying residents and Barbuda
 - * Repair unloading wharf and provide a processing plant
- ii) Develop facilities to supply a healthy, sanitary and safe catch to meet the needs of the tourism industry and consumers
 - * Provide a processing plant and provide a hygienic laboratory
- iii) Establish a mooring facility for fishing boats in order to improve the safety

of fishing boats traveling in St. John's Bay

* Repair and improve the wharf and revetment

- iv) Refurbish and repair lost fishing infrastructure
 - * Repair and improve the wharf and revetment
- v) Clarify the use of land for fishing activities and establish areas for various operations
 - * Provide fishing gear lockers, provide a fish trap repairing and manufacturing open yard, and provide parking spaces
- vi) Develop an area for repairing fishing boats and engines and establish an evacuation route for fishing boats to use during emergencies (hurricanes)
 - * Provide workshop for fishing boat and engine repair and provide a slope and boat yard
- vii) Reestablish management functions and create a space for communication
 - * Provide an administrative office building, provide a meeting hall

This plan, when carried out based on the above-described background, is expected to bring about the following impacts.

(1) Direct effects

- i) Repairs and improvements to the landing pier will improve the efficiency of work such as landing catches and will reduce the workload of the fishermen. This will also improve the efficiency of loading and unloading everyday goods to and from Barbuda.
- ii) Repairs and improvements to the landing pier will improve the distribution system for receiving from Barbuda where there are good fishing grounds.
- iii) Repairs and improvements to the revetment will enable safe mooring and efficient preparations for going out to fishing, will improve the efficiency of fishing activities, and will reduce the workload of the fishermen.
- iv) Providing a hygienic laboratory will establish a function for sanitary management.
- v) Providing a processing plant that complies with international standards (HACCP) will make it possible to supply healthy, sanitary and good quality catches. In particular, it will become possible to offer healthy and sanitary catches to meet the high demands of the tourism industry (hotels, restaurants, cruise ships).
- vi) Through provision of (iv) and (v) above will meet the conditions required to resume exports to U.S.A. and the French Caribbean (including islands such

as Martinique and Guadalupe) areas to which it has not been possible to export marine products until now.

- vii) Providing of a slipway and an area for repairing boats and engines will make it easier to repair fishing boats and engines, the assets of the fishermen, greatly improving the fishermen's convenience. It will also make it possible to lift up fishing boats for repair at a low cost and will reduce the financial burden on the fishermen.

Provision of these facilities will also establish a safe evacuation route for fishing boats during hurricanes, which will safeguard the fishermen's assets (the fishing boats).

- viii) Providing a meeting hall will increase the opportunities for courses taught by the Fisheries Division staff on resource management, fishing gear and methods, and engine repair, and will modernize the fishing industry.
- ix) Providing fishing gear lockers for fishermen will enable fishermen to safeguard their assets such as fishing gear. Moreover, it won't be necessary to take their gear home and this will reduce the workload of the fishermen.

(2) Indirect effects

Provision of the facilities is expected to bring about the following indirect effects.

- i) The work environment of the fishermen and other people working in the fishing industry will be greatly improved.
- ii) The work environment in the Point Wharf Site will be improved and it will be possible to then cultivate a fisherman's wharf and other parts of the tourism industry, as well as other industries linked with the marine product sector and the related employment opportunities will be increased.
- iii) By achieving smooth communication between fishermen and the Fisheries Division, it will become possible to smoothly carry out fishery administration, and will promote the marine product sector. In addition, this will encourage organization of the fishermen and will help to secure benefits for the fishermen.

Table 3-1 (1) indicates the effects of carrying out the project and the degree of improvement that will be seen over the current conditions.

Table 3-1 (1) Effects of Project and Degree of Improvement over Current Conditions

Current conditions and problem areas	Countermeasures in the project (within the scope of cooperation)	Effect of project and degree of improvement
The existing pier is damaged and the landing of catches and the loading and unloading of inter-island transport goods are being done inefficiently.	· Construction of a landing pier (68m)	· Will enable efficient landing and will reduce the workload of fishermen and those engaged in the fishing industry. · Will create a system for receiving catches from Barbuda and will enhance the marine product distribution function.
The existing seawall is damaged and safe mooring of fishing boats and efficient preparations are not being carried out.	· Construction of a rubble mound gradual slope breakwater seawall (with a landing stage) (120m)	· Will enable safe mooring and efficient preparations, and will reduce the workload of fishermen.
There is no slope or boat and engine repair area, presenting a great labor and financial burden on the fishermen in terms of repairing their boats and engines. Also, in times of hurricanes boats are not being safely evacuated.	· Construction of a slope (width 20m, water depth -1.0m, -2.0m) and a boat and engine repair area (81 m ²)	· Providing a slope and boat and engine repair area will make it possible to do repair work at the site and will reduce the financial burden on fishermen. · Will enable safe evacuation of fishing boats during hurricanes and will protect the assets of the fishermen.
There are no processing facilities where catches can be processed safely and sanitarily and it is impossible to meet the demands of the tourism industry. Also, since there are no health and sanitation inspection facilities for catches, opportunities for improving the product quality of catches are lost.	· Construction of a processing plant (360m ²), provision of a health and sanitation inspection laboratory (99m ²)	· Will enable the annual supply of 55 tons (volume of raw fish) of safe and sanitary marine products and will make it possible to meet the demands of the tourism industry. Will provide an inspection system for catches and will improve product quality.
Since there is no meeting hall, opportunities for communication with the Fisheries Division are lost, as are opportunities for courses on subjects such as resource management and improvements to fishing tools and methods.	· Provision of a meeting hall (88m ²)	· Will create a place for communication with fishermen, will increase opportunities for courses, and will modernize the marine product industry.
Since there is no storehouse for fishing gear, fishermen take fishing gear, outboard motors and other items home with them and this is a heavy labor burden on the fishermen.	· Fishing gear storehouse (174 m ²) (12 Type A units: 2.1 m x 1.5 m, 24 Type B units: 1 m x 1 m)	Will protect the assets of the fishermen. Will also reduce the labor burden on fishermen.
The project site has become dilapidated due to hurricane damage to its facilities, and is problematic in terms of scenery. Also, land is not being efficiently used by fishermen.	· Provision of overall fishing port facilities	· Will improve the environment of St. John's Harbor and of the Point Wharf area. Will also increase the efficiency of land use according to various fishing activities.

3-2 Recommendations

Following construction of the planned facilities, in order to make effective use of the landing facility, the fishing port management facility and the processing plant facility and to resolve the issues at the Point Wharf fishing port facilities, in terms of management and operation of the facilities it is recommended that the implementing organization, the Ministry of Agriculture Lands and Fisheries, and the organizations that directly carry out the management and operation of the facilities, the Fisheries Division and Antigua Fisheries Limited (AFL), take into careful consideration the following points.

- i) Establishment of an operational framework and the securing of staff and an operating budget

Operate the facilities will require an established operational framework and secured staff. In order to appropriately and smoothly manage and operate the facilities, the Ministry of Agriculture, Lands, and Fisheries has the responsibility of securing the necessary staff and budget.

- ii) Education and training for fishermen

In order to appropriately and smoothly carry out activities at the fishing port, the Ministry of Agriculture, Lands and Fisheries must provide relevant training to fishermen and others who use the fishing port facilities on information regarding the use of the fishing port and familiarize them with use according to the facility rules.

In order to efficiently use the landing wharf, fishermen must be trained so that they do not moor out of service fishing boats at the wharf.

In order to safely store their boats during hurricanes, fishermen must be trained not to moor their fishing boats at the wharf or revetment, but to moor large fishing boats offshore and lift smaller fishing boats onto land using the slope.

- iii) Operation of the hygienic laboratory

The Fisheries Division must develop a plan for the management of the hygienic laboratory that includes appropriate placement of personnel and budgetary measures.

To operate this laboratory smoothly, it is necessary that Antigua and Barbuda take budgetary measures to ensure that reagents are on hand prior to beginning operations at the laboratory. In terms of laboratory glassware and other items, it is important to periodically replenish the required equipment and materials as well as consumable reagents as necessary along with the inspections and increased inspected volume following the start of

operations at the laboratory. Ventilation filters and similar items must not only be periodically inspected and cleaned, but must be replaced following a specified period of time. For that reason, it is important to establish a plan for periodic replenishment and it is vital that budgetary measures are taken to ensure that there is no hindrance to operational activities.

iv) Cooperative activities between the inspection laboratory at the Agricultural Division and the inspection laboratory at the Fisheries Division

It is surmised that both laboratories, as laboratories that handle food products, have commonalities in terms of required technology, equipment and materials, and in terms of the issues they face. Since the hygienic laboratory at the Fisheries Division will start out with only a few staff, it is expected that verification of inspection results by multiple persons will be difficult, and furthermore in order to raise the precision of the inspection results, it is thought that exchange of inspection data and technical information between both laboratories will lead to positive development each other. It would also be possible to have personnel exchanges between them. Through these, it is expected that technical skills will be improved and that the organizations will be revitalized. Therefore, it is recommended that there be cooperative activities between both laboratories including the exchange of personnel.

v) Operation of the marine product processing plant

The marine product processing plant will be operated by the AFL. In order to appropriately operate the marine product processing plant, it is necessary to create a plan for operation that includes a business plan for the securing of staff, raw materials, and buyers, as well as a plan for income and expenditures.

vi) Marine product administration

Gaining an accurate understanding of the volume produced domestically is vital in order to create a plan for future marine product development and to establish a framework for fishery management. It is important to continuously conduct studies on the volume of catches and to gather data.

There should be a smooth introduction of fishery technology, handling of catches, and fishery management through marine product extension workers. Also, in order to raise and instill an awareness in the fishermen of the importance of conservation of marine resources and of their sustainable use, educational extension activities should be carried out through training

courses provided by the staff of the Fisheries Division. The meeting hall can be effectively used for these activities.

vii) Maintenance of the fishing port facilities

When damage occurs to port facilities due to hurricanes (for example damage to the boardwalk at the seawall), repairs to the damaged facility should be promptly carried out by the government of Antigua and Barbuda so that it does not become a hindrance to fishing activities.

viii) Necessity of technical cooperation

The Government of Antigua Barbuda has requested technical cooperation from the Government of Japan with regard to the fisheries facilities including a processing plant at Point Wharf in order to enhance the efficiency in the operation, maintenance and management of these facilities.

Regarding the processing plant, since it will be the first HACCP-based fish processing plant in the country, the capabilities for the operation, maintenance and management of the plant is strengthened through technical transfer.