

at. To meeting these requirements, it is necessary to display products and sell in quantities small enough for general consumers. Thus, in the sales station to be installed under the Project, equipment needed to cut large frozen fish to retail sizes, pack, display, store, measure or otherwise handle them will be introduced.

4.4.3 Basic Plan

(1) Expansion of the Castries Fishery Complex

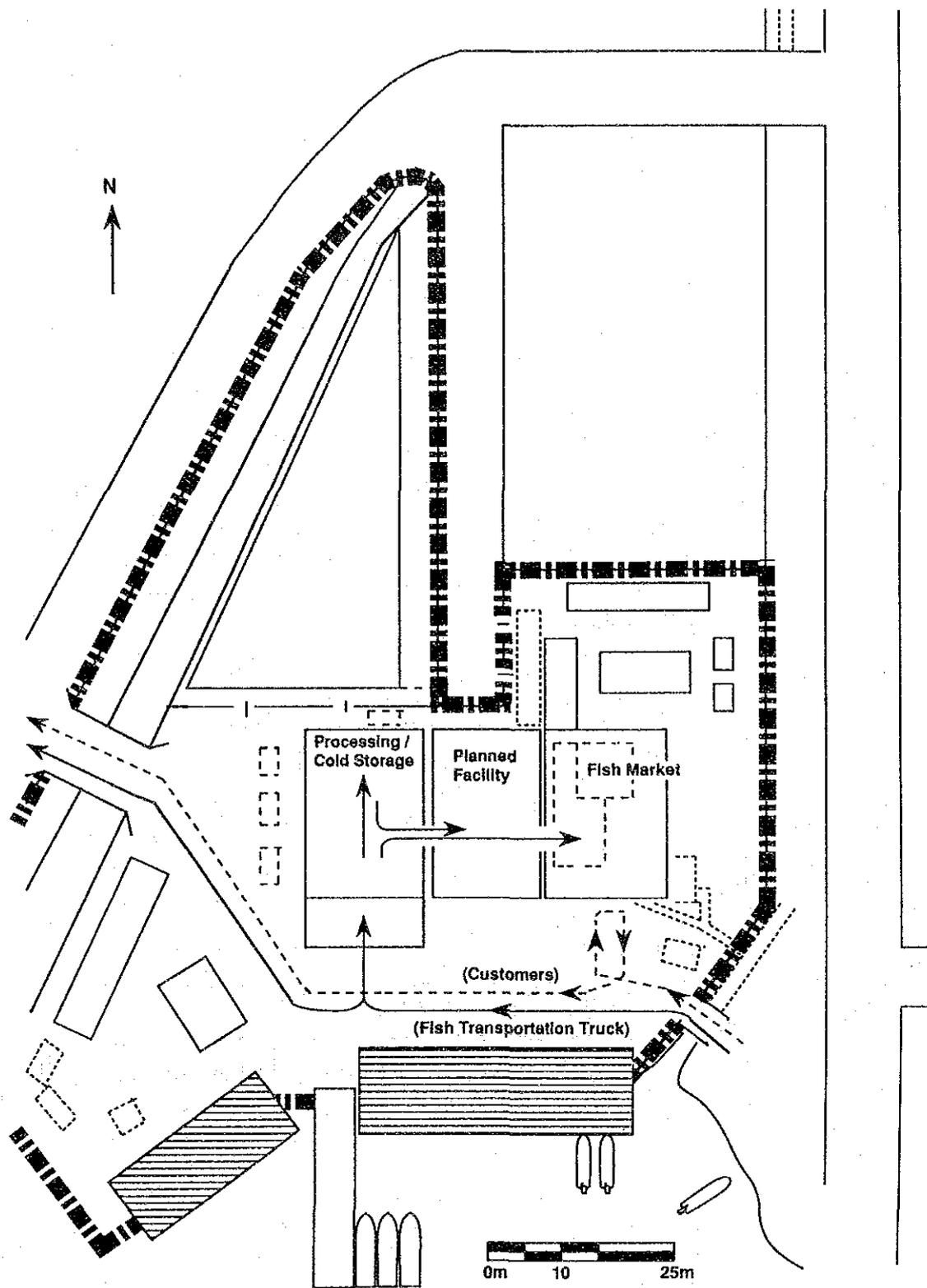
1) Layout plan

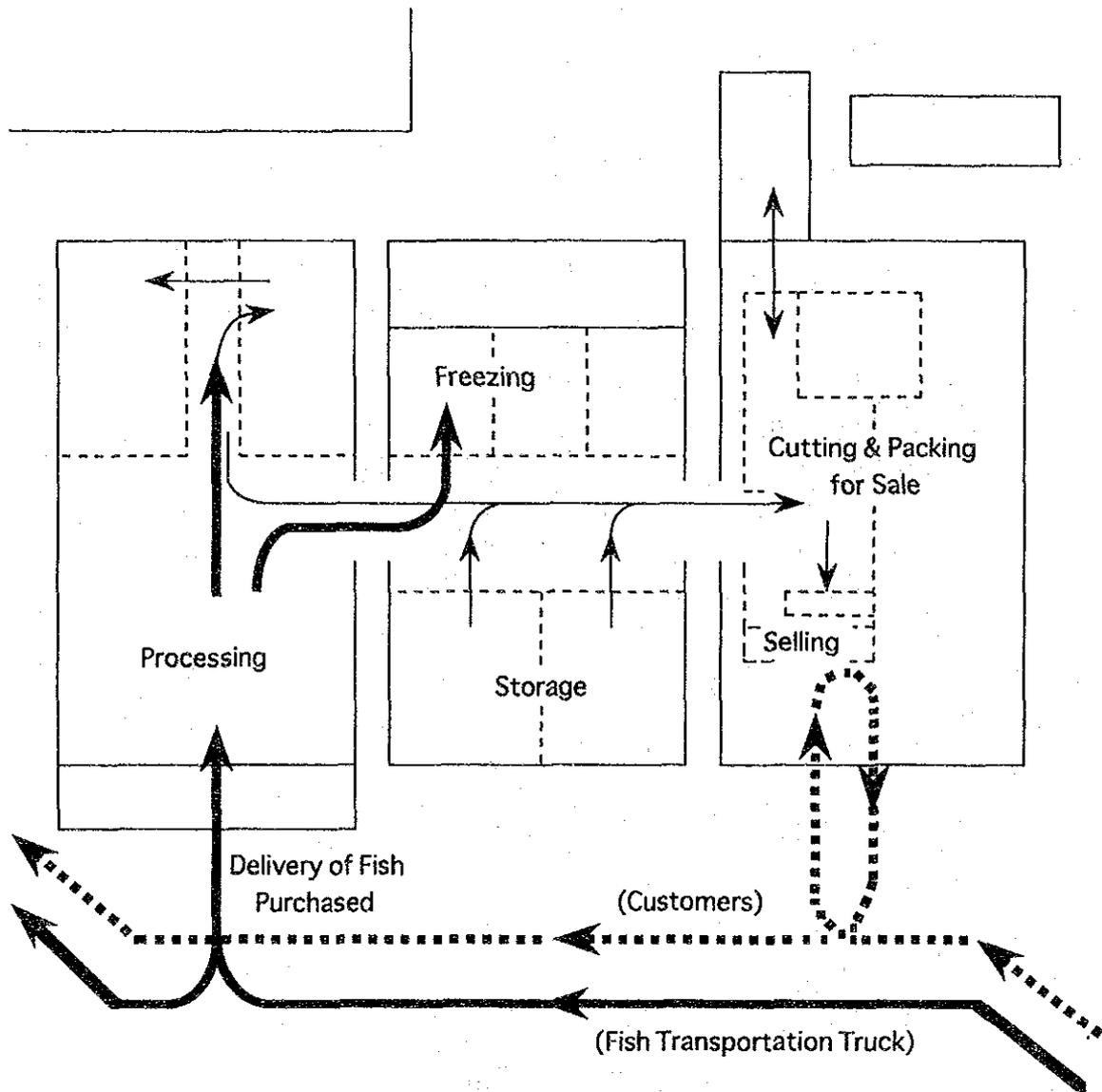
On the basic principles mentioned in Item 4.4.2, namely, i) to ensure a smooth flow of people and cars for efficient fish processing operations, and ii) to avoid as much as possible removing the existing facilities, the facilities will be laid out as follows:

The refrigerating facilities under the Project will be constructed between the existing processing cold storage and the existing fish market. This layout will not require removal of the existing facilities, and it will also provide a smooth flow of the fish processing operations from the receiving of raw fish, processing and freezing to the selling. It is for these reasons that FMC, the operating and managing body of the facilities, has decided on this layout and in line with it, further necessary work has been proceeded. This layout, however, blocks a passage in the Fisheries Complex, and a new passage needs to be made. This new passage will be made with its entrance/exit located on the west side of the Complex.

A frozen fish retail shop for individual consumers and its ancillary facilities (station to cut and pack fish for retail sale, and office) will be installed on a site to be vacated by removing part of the existing fish stands within the existing fish market.

The arrangement plans for the refrigerating facilities are shown below.





2) Construction plan

In order to ensure a smooth flow of operations between the processing station within the existing refrigerating facilities and the planned freezer room, and between the planned cold storage and the frozen fish retail shop to be installed in the existing fish market, a working passageway for the planned refrigerating facilities will be installed in a line connecting the entrance/exit of the existing processing station and the existing fish market. On one side of this passageway will be built the freezer room and on the other the cold storage.

As mentioned in Item 4.4.2 (1), "Basic principles," the freezer room will be divided into two compartments, and the cold storage into three compartments so that operation of the refrigerator can be adjusted according to the purchase quantity and the stock level. Freezing will be accomplished on FMC's current freezing shelve carts to be arranged in the freezer room. The cold storage will be designed with an effective working height of about 2 meters, and a sufficient space for working and stowing fish by species.

Freezer room:

Will accommodate 12 existing freezing shelve carts, with two compartments of approx. 4.3 meters wide × approx. 7.8 meters deep each.

Cold storage:

It is assumed that the rate of stowage to the effective storage capacity will be about 0.4,

With two compartments of approx. 6.1 meters wide ×
approx. 7.9 meters deep each.

With one compartment of approx. 3.2 meters wide × approx. 7.9 meters deep.

The freezer room and the cold storage will be insulated with prefabricated insulation panels.

3) Refrigerating facilities plan

a) Design conditions

Atmospheric conditions concerning these facilities will be as follows:

Atmospheric temperature : 35°C

Relative humidity : 70%

Water temperature : 25°C

- ≠ Compressors will be of the open type that allows easy replacement and repair of parts.
- Æ Freezing method will be of the forced air circulation type, which is the same as that used in the existing freezer room. The freezing shelves carts now in use will be arranged in the new freezer room, as is currently done by FMC.
- Ø Defrost method will be by spraying for the freezer room and by electric heater for the cold storage.

In the case of the freezer room, it would be difficult to defrost completely from the cooler fins with electric heaters alone in short off-freezing hours during which defrost has to be accomplished. Electric heaters are used for the same purpose in the existing cold storage.

Local tap water will be used for the spraying purpose. However, when the concentrations of ions of silica, magnesium, silicon and others contained in it become high, their crystals may form in the cooler fins, piping, etc. and clog them, finally lowering their cooling power. In order to avoid this eventuality, tap water will be filtered before being used as defrosting water.

b) Outline of freezer room and cold storage

i) Freezer room

Two compartments will be provided to the following specifications, and each will be designed to operate according to the fish stock level:

- Freezing capacity: Approx. 1.35 tons/day (20 hours)/compartment
- Temperature : -25°C (final room temperature)
- Cooling : By direct dry expansion type unit cooler
- Refrigerant condensation : By air-cooling
- Defrosting : By circulating-water spray

Main Equipment

Each compartment will be provided with the following equipment:

- Freezing condenser unit : With open-type multicylinder compressor
- Cooling capacity : Approx. 13,600 kcal/hr, ET-33/CT+45 DEG. C.

Compressor motor	: Approx. 18.5 kw
Cooler	: Floor-mounted, defrosted by circulating-water spray
Cooler surface area	: Approx. 150 m ²
Condenser	: Air-cooled, floor-mounted
Condenser capacity	: Approx. 45,000 kcal/hr, CT+45 DEG. C.

Compartments:

Construction	: Constructed with prefabricated insulation panels
External dimensions	: Two compartments combined Approx. 9 m wide × approx. 8.1 m deep × 3.2 m high (divided into two compartments with insulation panels)

Material for insulation panels

panels	: In-site foamed rigid urethane, 100 mm thick
Surface coating	: Color-baked galvanized steel plate

(ii) Cold Storage

Three compartments will be provided to the following specifications, and each compartment will be designed to operate according to the stock level:

Volume	: Approx. 120 m ³ (approx. 40 tons)/compartment × 2 compartments (A and B) Approx. 65m ³ (approx. 20 tons)/compartment × 1 compartment (C)
Inner temperature	: - 20°C
Cooling	: By direct dry expansion type unit cooler
Refrigerant condensation:	By air-cooling
Defrosting	: By electric heater

Main Equipment:

Each of compartments A and B will be provided with the following equipment:

Cold-storage condensing unit	: With open-type multicylinder compressor
Cooling capacity	: Approx. 4,800 kcal/hr, ET-30/CT + 45 DEG. C.
Compressor motor	: Approx. 11 kw

Cooler	: Ceiling-hung, defrosted by electric heater
Cooler surface area	: Approx. 120 m ²
Condenser	: Air-cooled, floor-mounted
Condenser capacity	: Approx. 45,000 kcal/hr, CT+45 DEG. C.

Compartment C will be provided with the following equipment:

Cold-storage condensing unit	: With open-type multicylinder compressor
Cooling capacity	: Approx. 4,800 kcal/hr, ET-30/CT + 45 DEG. C.
Compressor motor	: Approx. 7.5 kw
Cooler	: Ceiling-hung, defrosted by electric heater
Cooler surface area	: Approx. 70 m ²
Condenser	: Air-cooled, floor-mounted
Condenser capacity	: Approx. 27,000 kcal/hr, CT+45 DEG. C.

Cold Storage:

Construction	: Constructed with prefabricated insulation panels
External dimensions	: Two compartments A and B combined Approx. 12.6 m wide × approx. 8.1 m deep × 2.7 m high (divided into two compartments with insulation panels) Compartment C Approx. 3.6 m wide × approx. 8.1 m deep × 2.7 m high

Material for insulation panels	: In-site foamed rigid urethane, 100 mm thick
Surface coating	: Color-baked galvanized steel plate

(2) Fisheries Development Center

1) Layout plan

The Fisheries Development Center will be built on the Fisheries Department's land secured north of the Castries Fisheries Complex site. The road (at present connected with the north exit of the Complex) on the east side of this triangular land will be used by the Center as well. A parking lot will be installed between the Complex's refrigerating facilities and the Center building.

The workshop, where technical guidance will be provided in fishing-boat engines, will be located adjacent to the boat ramp on the southwestern edge of the Complex site, for it is convenient to have fishing boats nearby.

2) Building plan

The land available is too small to accommodate the Center's operations in a one story building, so a two-storied building will be constructed. For ease with which equipment and materials can be managed and gotten in and out, the Storage and the Diving Equipment Room will be provided on the ground floor. The Working Room for Extension Officers/Surveillants will also be provided on the ground floor. On the first floor will be installed the General Affairs Room, the Working Room for Researchers/Staff, the Laboratory, the Meeting Room, etc.

As mentioned in item 4.4.2 (2), "Setting the scale of the planned facilities," each room or facility will have the following floor area:

a) Center building

(Ground floor)

Storage	:	Approx. 90 m ²
Diving Equipment Room	:	Approx. 38 m ²
Air Compressor Compartment	:	Approx. 16 m ²
Working Room for Extension Officers/Surveillants	:	Approx. 68 m ²
Toilet and shower room	:	Approx. 52 m ²
Corridor	:	Approx. 29 m ²
(Total for the ground floor	:	Approx. 295 m ²)

(First Floor)

Working Room for Researchers/Staff	:	Approx. 176 m ²
General Affairs Room	:	Approx. 34 m ²
Director's, Deputy Director's, and Experts' Offices (3 offices)	:	Approx. 49 m ²
Meeting Room	:	Approx. 90 m ²
Interior corridor space	:	Approx. 57m ²
Laboratory	:	Approx. 57 m ²

Kitchenette	:	Approx. 10 m ²
Storage	:	Approx. 40 m ²
Toilet	:	Approx. 28 m ²
Corridor	:	Approx. 23 m ²
(Total for the first floor	:	Approx. 510 m ²)
Total	:	Approx. 805 m ²

b) Workshop

Working station	:	Approx. 44 m ²
Storage	:	Approx. 14 m ²
Office	:	Approx. 8 m ²
Toilet	:	Approx. 4 m ²
Total	:	Approx. 70 m ²

3) Building-materials plan

a) Fisheries Development Center building

i) Exterior finish schedule

Roof	:	Concrete steel-trowel finish, prefabricated insulation board 30 mm thick, covered with bituminous membrane waterproofing, 80 mm of covering concrete on top.
Coping and Facia	:	Fair-faced concrete with AEP
Soffit	:	Plywood, 9 mm thick, with AEP
Wall	:	Fair-faced concrete with AEP Cement mortar steel-trowel finish, 25 mm thick, with AEP
Column and Beam	:	Fair-faced concrete with AEP
Base	:	Fair-faced concrete
Floor	:	Concrete steel-trowel finish with hardener
Stair and Balcony:		
Tread and Rise	:	Cement mortar steel-trowel finish, 30 mm thick
Soffit	:	Fair-faced concrete with AEP
Wall	:	Fair-faced concrete with AEP

Screen block with AEP

Door and Windows : Steel door with SOP
Aluminum sash

ii) Interior Finish Schedule

Office (Working Room) Area

Floor : Vinyl tile on cement mortar steel trowel finish
Base : Vinyl base (H = 75 mm)
Wall and Column : Cement-mortar steel-trowel finish, 25 mm thick,
with AEP
Column : Fair-faced concrete with AEP
Ceiling : Rockwool board, on plywood board, 5 mm thick

Storage

Floor : Cement-mortar steel-trowel finish with hardener
Base : Cement-mortar steel-trowel finish, H = 100 mm
Wall and Column : Cement-mortar steel-trowel finish, 25 mm thick
with AEP
Fair-faced concrete block with AEP
Ceiling : Fair-faced concrete

Toilet and Shower Room

Floor : Ceramic mosaic tile on cement mortar
(Ground floor)
Ceramic mosaic tile on bituminous membrane
waterproofing (First floor)
Wall and Column : Semi-ceramic wall tile on cement mortar
Ceiling : Rockwool board on plywood board, 5 mm thick,
with wood suspension

b) Workshop

i) Exterior Finish Schedule

Roof : Galvanized steel corrugated roofing sheet, 0.8 mm
thick, with sprayed polyurethane foam
Gutter : Baked galvanized steel sheet

Wall	: Cement-mortar steel-trowel finish, 25 mm thick, with AEP, on concrete block
Column	: Fair-faced concrete with AEP
Base	: Fair-faced concrete
Door and Windows	: Steel door with SOP Steel shutter with SOP Aluminum sash

ii) Interior Finish Schedule

Workshop and Storage

Floor	: Concrete steel-trowel finish with hardener
Base	: Cement-mortar steel-trowel finish, H = 100 mm
Wall	: Concrete block on concrete screen block
Ceiling	: Rockwool board on plywood board, 5 mm thick

Office

Floor	: Concrete steel-trowel finish with hardener
Base	: Cement-mortar steel-trowel finish, H = 100 mm
Wall	: Cement-mortar steel-trowel finish, 25 mm thick, with AEP
Column	: Fair-faced concrete with AEP
Ceiling	: Rockwool board on plywood board, 5 mm thick, with wood suspension

Toilet

Floor	: Ceramic mosaic tile
Wall and column	: Semi-ceramic wall tile
Ceiling	: Plywood board, 5 mm thick, with AEP

4) Equipment plan

a) Water supply equipment

A new water supply will be provided for the facility under the Project separate from the supply to the existing buildings on the Project site.

i) Quantity

Number of personnel to use the Center =
full-timers 21 + external personnel 21/3 = approx. 30

Required quantity: 100 liters/person \times 30 = 3,000 liters/day

ii) Water supply system

Lift pumps will transfer water from an outdoor storage tank to an elevated tank, and the water will then be supplied by gravity to the Center block and the Workshop block.

Storage tank:

Storage quantity = 3 m³ (equal to a day's supply)
Dimensions = approx. 2 m \times 2 m \times 1 m (height)
Material = FRP

Elevated tank:

Storage quantity = 0.75 m³
Dimensions = approx. 1 m \times 1 m \times 1 m (height)
Material = FRP
Installed height = 10 m

Lift pump:

Lift rate = approx. 40 liters/minute
Head = 15 m
Power rating = 0.4 kw
Quantity = 2 sets

b) Waste water equipment

Waste water from the Center block, namely, from such various sources as the laboratory, toilet and shower room, will flow separately, both indoors and outdoors, until, with the help of a waste water pump to be installed for the facilities under the Project, the waste water joins in the existing catch basin for discharge into the existing city sewer mains.

Waste water from the Workshop block, which originates in the toilet alone, will be flowed to an outdoor catch basin to be connected to a waste water pump pit.

c) Ventilating and air-conditioning equipment

A window-mounted air-conditioner unit will be installed on each of the Director's and Deputy Director's Offices, the Working Room for Researchers/Staff and Laboratory on the first floor of the Center block. Other offices will be equipped with ceiling fans in the number appropriate for each office. A ventilation fan will be installed in the laboratory and the toilet. A ceiling fan will be installed on the staff room of the workshop.

(3) Facilities on the Gros Islet landing port

1) Boat ramp

The ramp's apron and slope will be finished to an even concrete surface. Sleepers will be laid on the slope to prevent damage to boat bottoms and to facilitate bringing boats ashore.

Rampway: 45 m in length (frontage) × 16 m in width (depth)

2) Landing wharf

A 5 meter wide apron will be provided in front of the fishing gear storage. Along the waterfront will be constructed a retaining wall of stone masonry, and along this wall will be further installed a 1.5 m wide wooden platform. The platform will be of such a height that it is easy to work fishing boats alongside it. Any difference in height between the platform and the retaining wall will be adjusted by installing steps.

Landing wharf: 30 meters long

3) Fishing gear storage: A new fishing gear storage will be constructed of concrete and concrete blocks in place of steel, which is apt to corrode.

Floor area: 80 m² (storage space: 4 m²/compartment × 16 compartments)
(part of this area will be used for the manager's office = 14 m²)

4) Fuel supply station: A refueling station equipped with an underground fuel tank will be built. However, the pump equipment will be procured and installed by the government of Saint Lucia in cooperation with a local gas company.

5) Toilet and shower room

Broken toilets, water supply system, sewerage, or lighting equipment will be repaired. The existing simplified percolation basin included in the sewerage will be altered in accordance with the current sewerage equipment regulations.

6) Access road: Will be paved with asphalt over a distance of some 60 meters.

(4) Equipment and materials plan

1) Equipment and materials for the Fisheries Development Center

The following will be introduced as equipment and materials to be directly operated by the Fisheries Development Center under the Fisheries Department in conducting research activities and guiding fishermen in fishing techniques:

a) Exploratory fishing boat

The boat will be owned by the Fisheries Department and directly operated by the Fisheries Development Center.

The main objectives of operating this boat are as follows:

- To conduct experimental fishing operations, with priority given to the survey of tuna longlining, vertical lining and exploitation of new fishing grounds.
- To survey marine environment
- To guide fishermen in fishing techniques

Number of boats: 1

Main specifications

Boat type	:	With wheelhouse and cabin on the bow side, and working deck on the stern side	
Material of hull	:	Fiberglass reinforced plastic	
Principal dimensions	:	Approx. 12.7 m long × approx. 3.8 m wide × approx. 2.2 m in molded depth	
Main engine	:	Inboard marine diesel engine, approx. 330 hp × 1 unit	
Speed	:	Approx. 14 knots in trial max.	
Volume	:	Fuel tank	Approx.liters 1.5 m ³
Crew berth	:	5 people	
Navigation equipment:		Magnetic compass	1 unit
		Radar	1 unit
		GPS	1 unit
		Echo sounder	1 unit

	Water thermometer	1 unit
	Wireless telephone, SSB VHF	1 of each
Fishing equipment	: Main-line reel for tuna longlining (hydraulic)	1 unit
	Branch-line reel for tuna longlining (hand-operated)	1 unit
	Line hauler for vertical lining (hydraulic)	1 unit
Fishing gear	: Tuna longlining gear (10 miles long, of nylon monofilament)	1 set

b) Small experimental fishing boats

These are the exploratory fishing boats which will be operated by the Fisheries Development Center. The purpose of their introduction is to have them serve as a model for the next standard type of fishing boat in light of modernization of the fishing fleet. Mainly intended for tuna longlining, the boats will be used to fish experimentally, make demonstrations for fishermen, and guide them in fishing techniques.

Number of boats: 1

Main specifications

Boat type	: With wheelhouse on the bow side, and working deck on the stern side
Material of hull	: Fiberglass reinforced plastic
Principal dimensions	: Approx. 10 m long × approx. 2.8 m wide × approx. 1.4 m in molded depth
Main engine	: Inboard marine diesel engine, approx. 135 hp × 1 unit
Speed	: Approx. 14 knots in maximum speed with light load
Crew berth	: 2 people
Fishing equipment	: Main-line reel for tuna longlining (hydraulic) Branch-line reel for tuna longlining (hand-operated) Navigation equipment Magnetic compass GPS Echo sounder
Fishing gear	: Tuna long lining gear (5 miles long, of nylon monofilament)

c) FRP boat for fishermen

The purpose of introducing this type of small boat is to spread modern fishing boats among fishermen.

Number of boats: 20

Main specifications

- Boat type : Open boat with outboard engine
Material of hull : Fiberglass reinforced plastic
Principal dimensions : Approx. 7.6 m long × approx. 1.9 m wide × approx. 0.7 m deep
Propulsion : Outboard gasoline engine, approx. 75 hp × 1 unit
Fishing equipment : Hand-operated main-line reel for tuna longlining and branch-line reel (for 18 boats)
Net/line hauler with small hydraulic unit (for 2 boats)
Other equipment : Life jackets 3 units/boat

d) Fishing gear and materials

These will be used by the Fisheries Development Center for fishing gear development, experimental fishing, distribution to fishermen for spreading of these techniques. Main items of equipment and materials are listed below.

- Materials for tuna longlining : Nylon fishing gut, hooks for tuna, floats, and tools to make fishing gear
Materials for vertical-lining : Fishing lines for vertical-lining, nylon fishing gut, and hooks
Materials for trolling : Various parts to make lures
Gill nets for flying fish : Completed set 40 sets
Gill nets for demersal fish : Completed set 40 sets
Safety devices : Anchors and ropes 20 sets
Hand compasses 40 units
GPS 20 units
Life jackets 50 units

e) Project car

This car will be used by the Fisheries Development Center for its research and instructional activities.

Project car : 1 unit

Four-wheel drive, of wagon type, with a capacity of 7 persons, equipped with diesel engine

f) Laboratory equipment

These will be provided in the laboratory of the Fisheries Development Center. Main items of equipment are listed below.

For physicochemical examination

Salinometer	1 unit
Conductivity meter	2 units
pH meter	2 units
Dissolved oxygen meter	2 units
Water quality monitor	1 unit
Spectrophotometer	1 unit
Kjeldahl's nitrogen conversion and distillation equipment	1 unit

For bacteriological examination

Incubator	1 unit
Autoclave	1 unit
Dry sterilizer	1 unit
Colony counter	1 unit
Biological microscope	2 units

For physical examination

Thermistor thermometer	1 unit
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For general purposes

Chemical balance	1 unit
Electronic even balance	3 units
Centrifuge	1 unit

Homogenizer	1 unit
Hot plate	2 units
Water purifier	1 unit
Refrigerator	1 unit
Draft chamber	1 unit
Laboratory table, cabinet, cart, glass equipment	1 set

For experimental processing

Meat chopper	1 unit
Blender	1 unit
Steamer	1 unit
Pressure cooker	1 unit
Gas range	1 unit
Microwave oven	1 unit

g) Fisheries data analysis and management equipment

These will be installed in the Fisheries Development Center for use by its researchers. To share data among the Center's sections, one central computer (server) and each section's computer (client) will be linked together to build a network. Main equipment are listed below.

Computer (server)	1 set
Computer (client)	5 sets
Printer	1 set
Power supply	1 set
Copier	1 unit

h) Audiovisual aids

For instructional and training purposes

Overhead projector	1 unit
Slide projector	1 unit

i) Radio equipment

i. Communication with the exploratory fishing boat

The following radio equipment will be installed in the Fisheries Development Center to establish communication between the Center and the exploratory fishing boat in assisting the boat with its operations:

SSB wireless telephone, approx. 150 w 1 set

ii. Communication for safety of fishing boats

A means of communications between fishing boats, fishermen's cooperatives, the Fisheries Department and land based organizations will be established.

VHF portable transceivers, approx. 5 w, drip-proof: 20 sets

These will be prepared to spread this type of equipment among fishermen. (to be revised)

VHF transceiver, approx. 45 w 15 sets

These will be provided in the Fisheries Department and fishermen's cooperatives to receive radio messages from fishing boats.

j) Equipment and materials for the Workshop

For use in the Workshop attached to the Fisheries Development Center, equipment, tools and materials for the repair of outboard engines, small diesel engines, etc. will be provided. Main items of equipment include:

Hand-tools	1 set
Bench drill	1 unit
Bench grinder	1 unit
Hydraulic press	1 unit
Air compressor	1 unit
Electric welder	1 set
Gas welder	1 set
Workbench	2 units
Cart	2 units

k) Air compressor

This will be installed in the Compressor Compartment of the Fisheries Development Center's Diving Equipment Room to fill diving air cylinders.

Air compressor 1 set

Capacity:

delivery pressure: 200 kg/cm²; displacement capacity: 90 - 100 m³/day;

electric motor drive; air cooled; motor power: 2 -3 kw

Accessories for filling air-cylinders 1 set

2) Equipment and materials for the Fisheries Complex

For use by the Fish Marketing Corporation Ltd. in collecting and transporting purchased fish and in selling products, the following equipment will be introduced.

a) Truck with insulated van 1 unit

Diesel engine

Load capacity: Approx. 2 tons

b) Electric band-saw 1 unit

c) Workbench 2 units

Dimensions: 1.8 m × 0.7 m × 0.8 m

Of stainless steel

d) Platform scale 1 unit

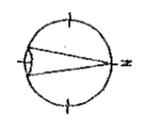
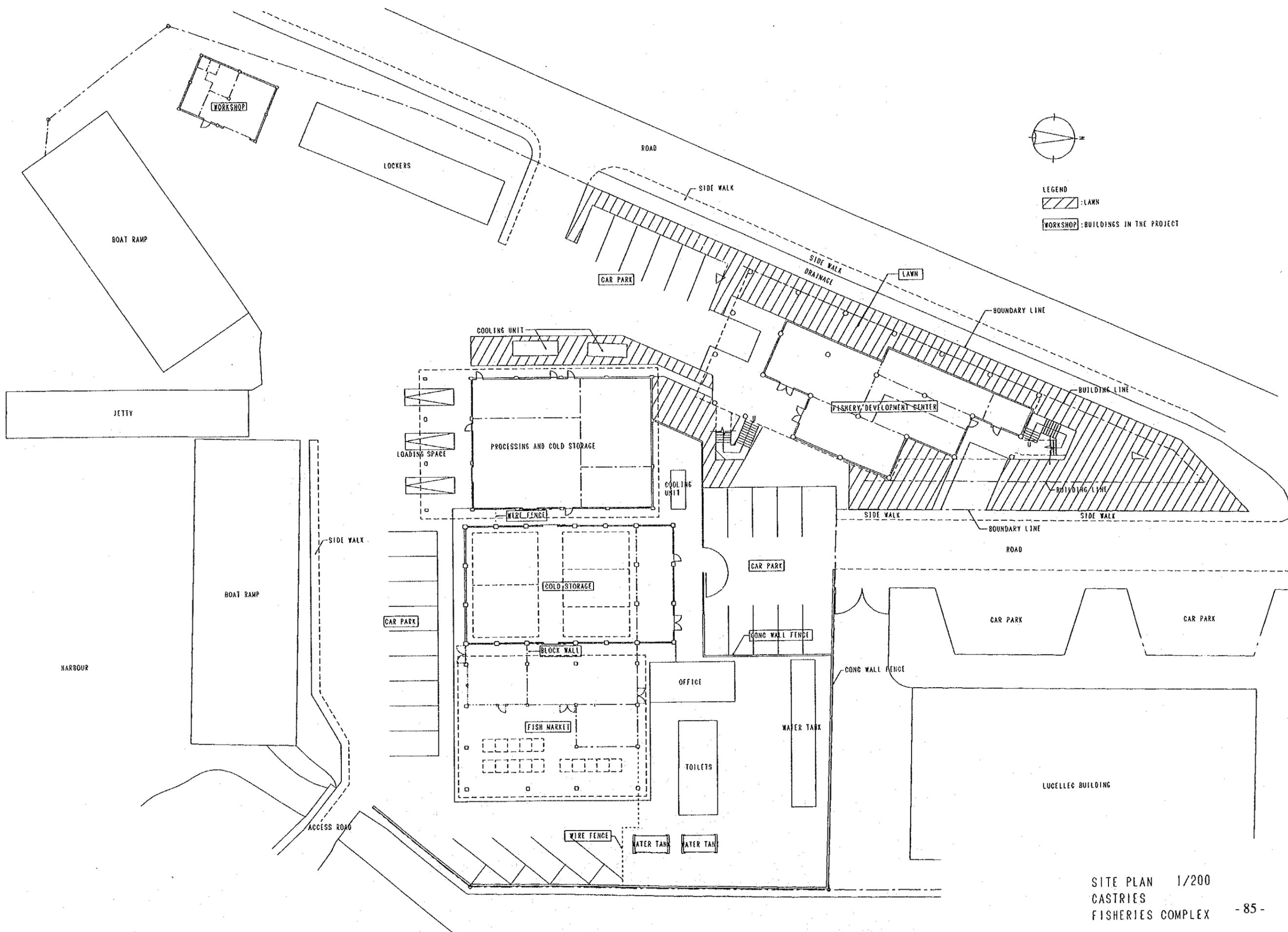
Weighing range: From 0 to 100 kg

e) Balances for retail sales purposes 2 units

f) Frozen fish case 2 units

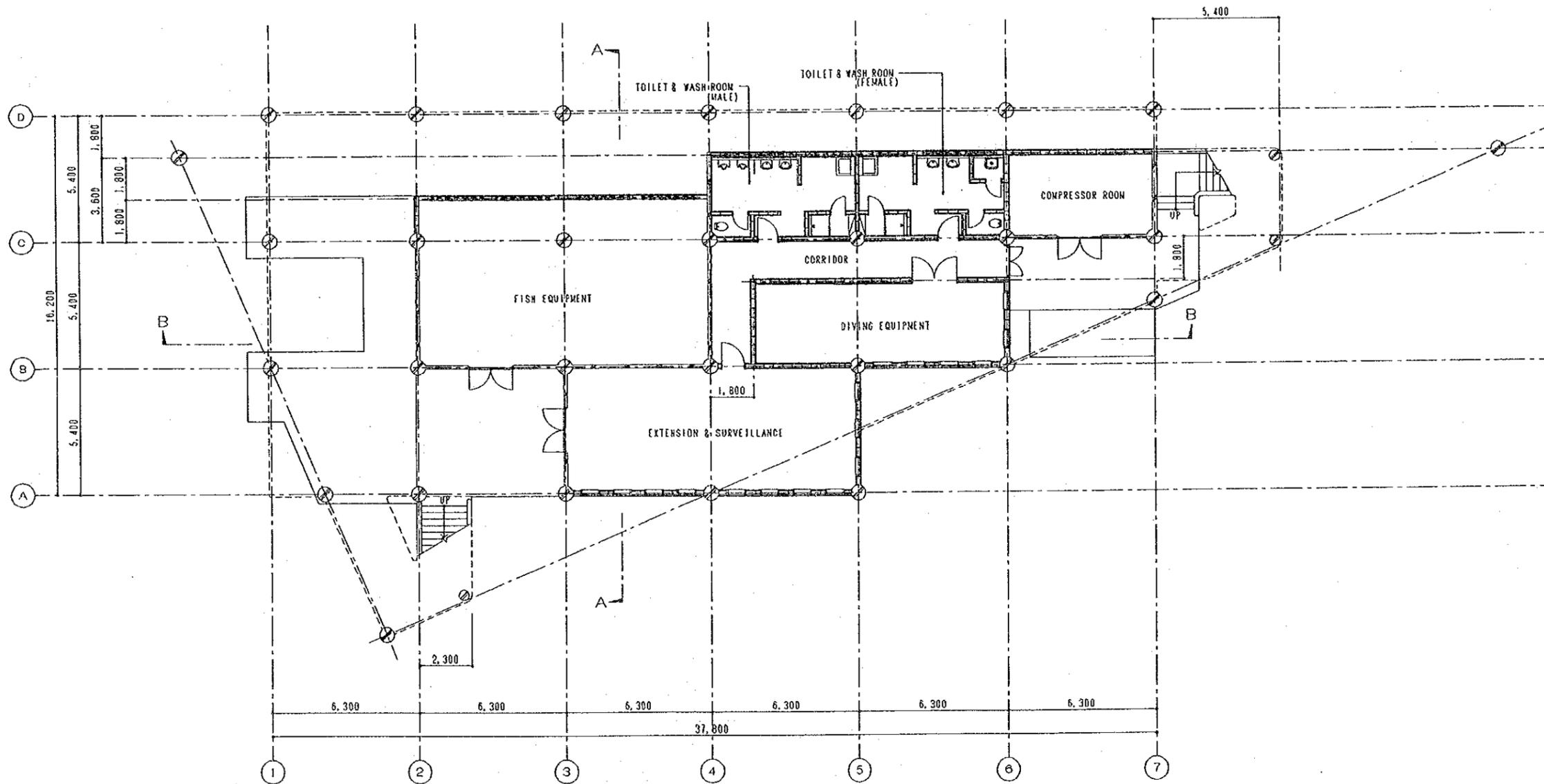
g) Chest freezer 2 units

Capacity: Approx. 600 liters

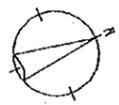


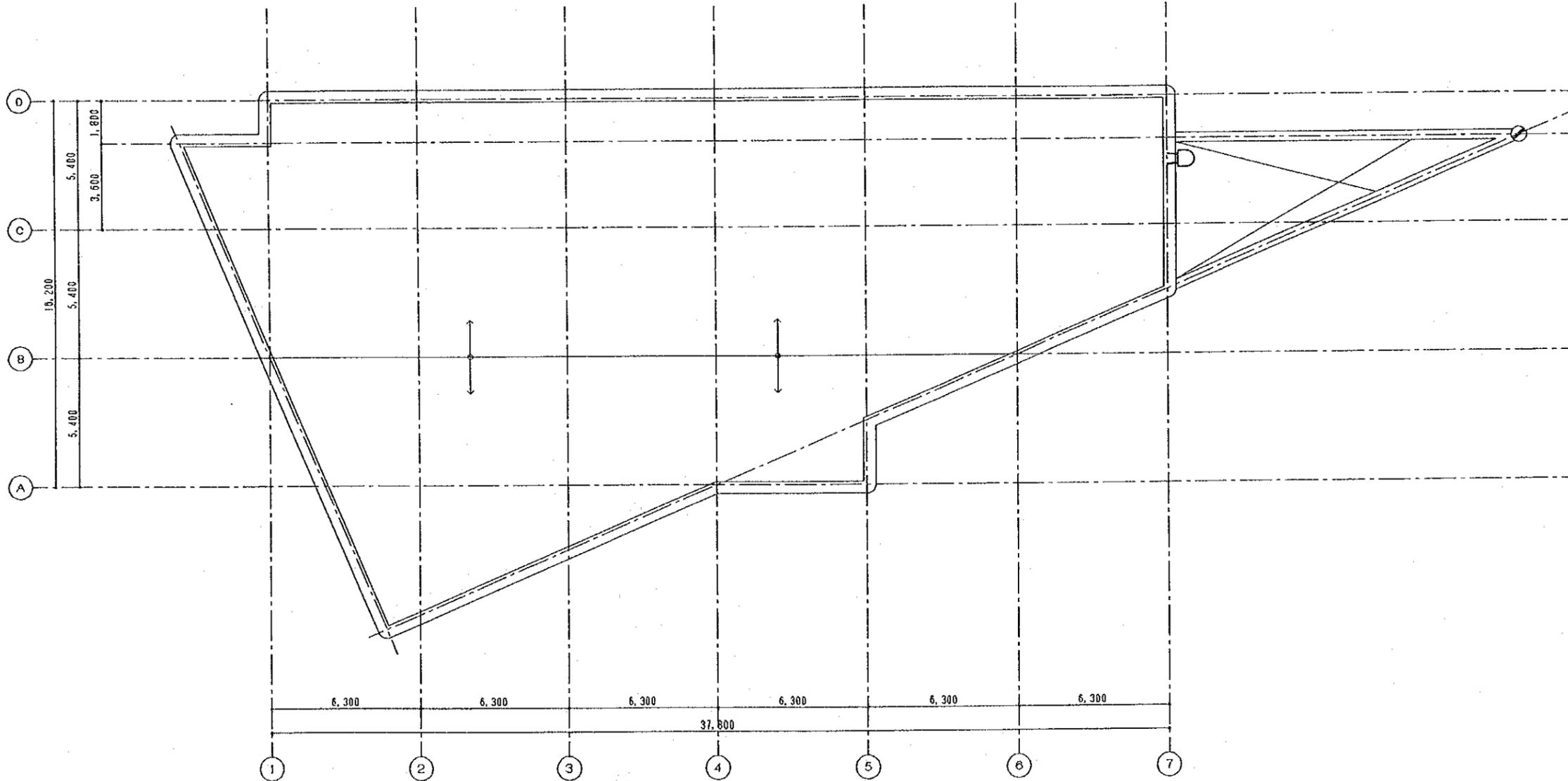
LEGEND
 [Hatched Box] : LAWN
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SITE PLAN 1/200
 CASTRIES
 FISHERIES COMPLEX - 85 -

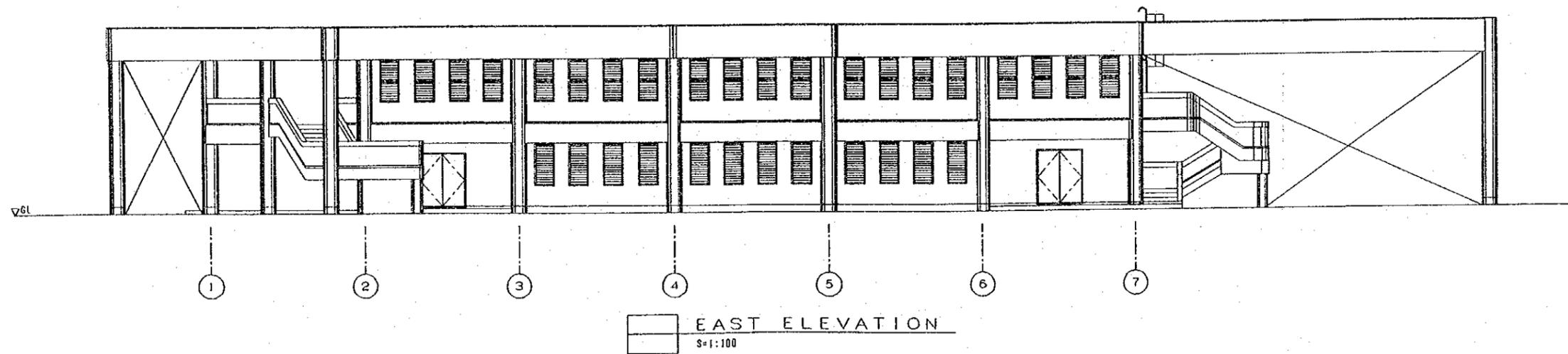
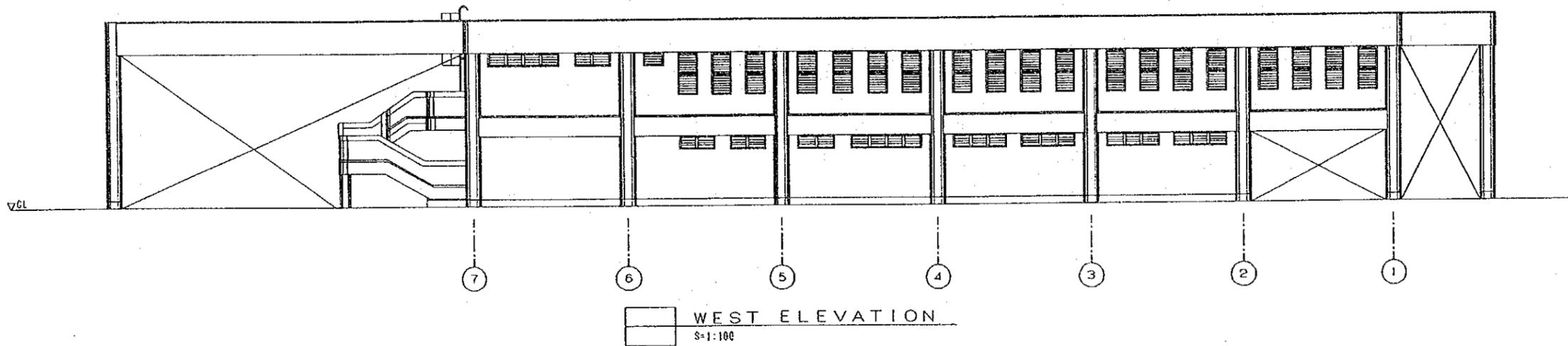
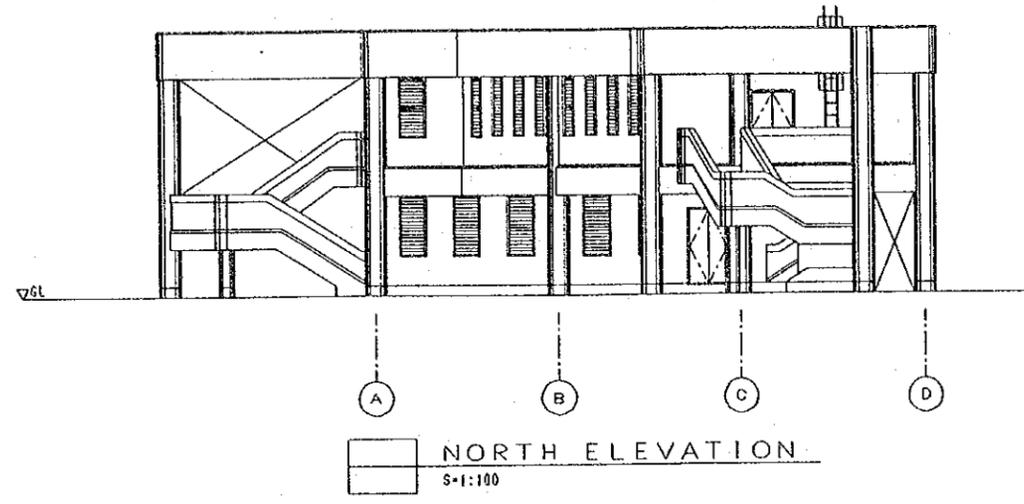
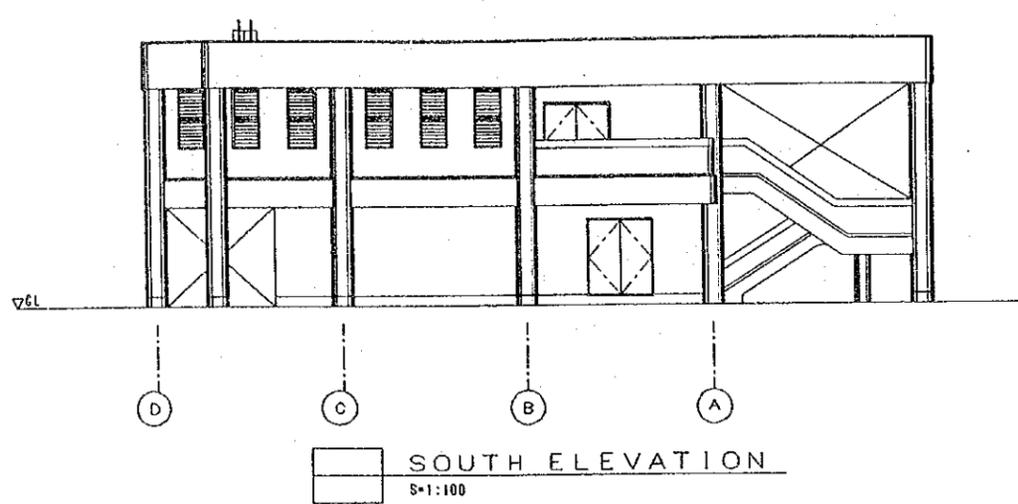


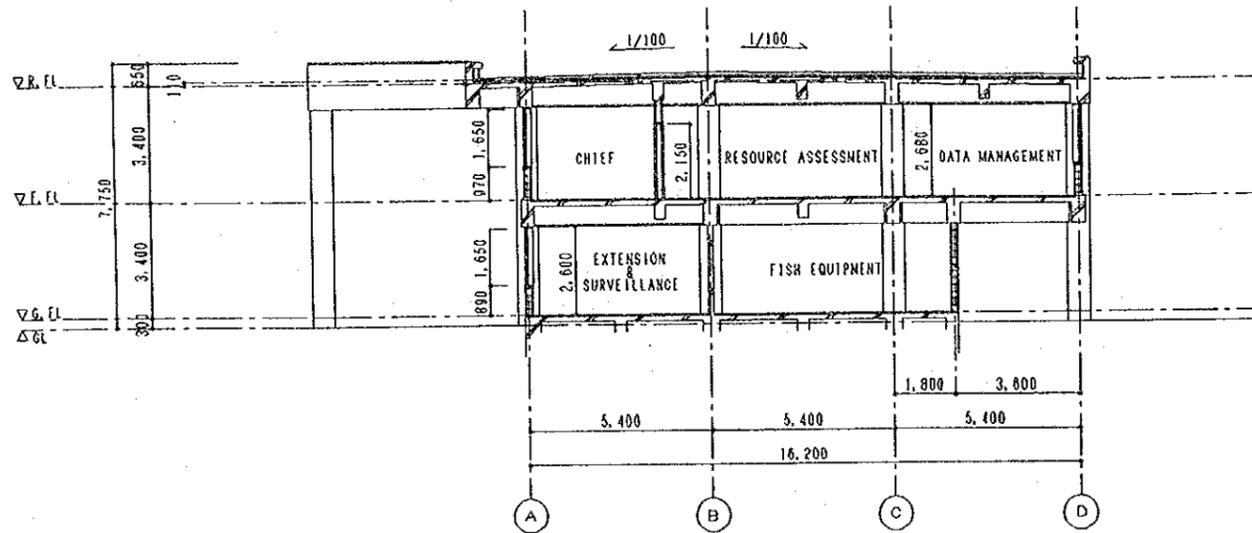
GROUND FLOOR PLAN
 S-1:100



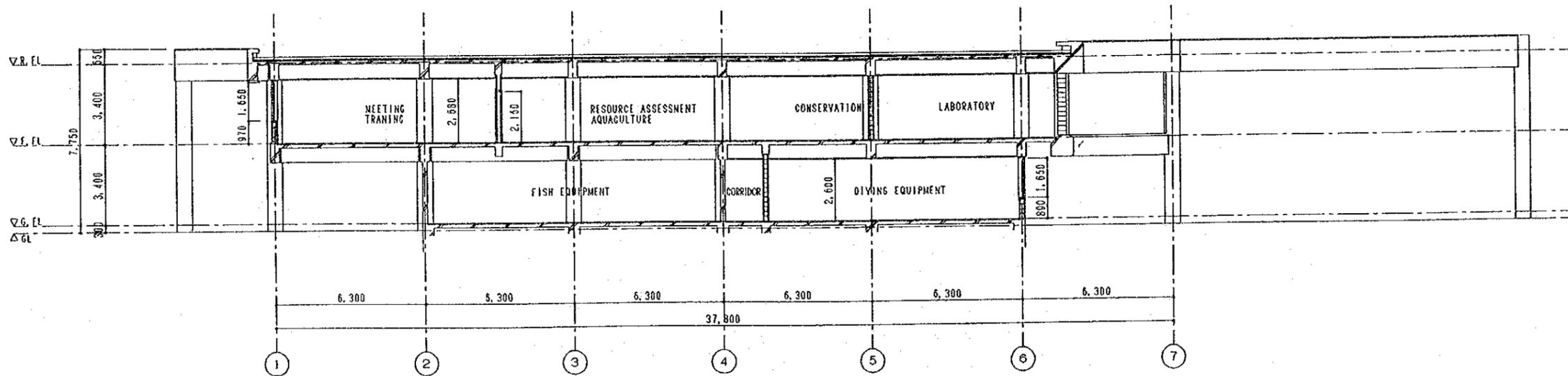


ROOF PLAN
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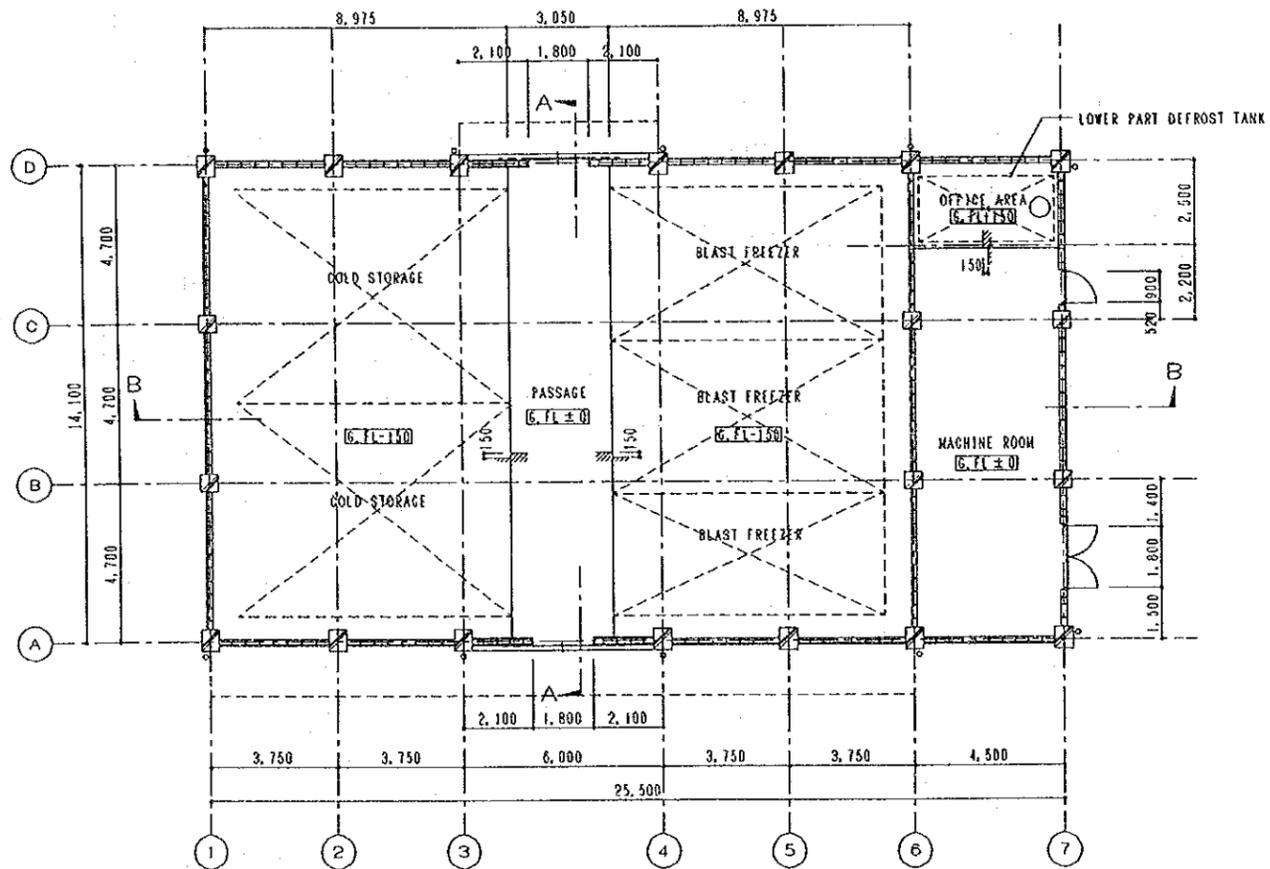




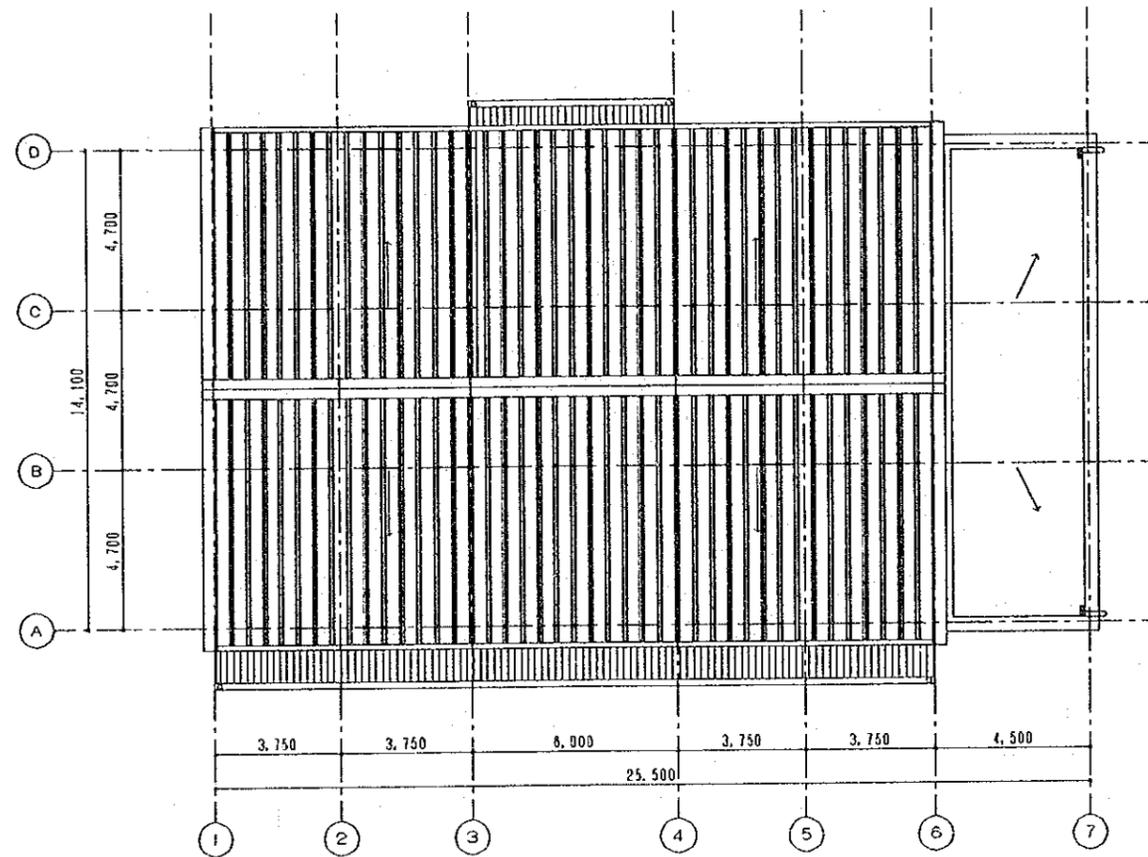
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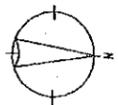
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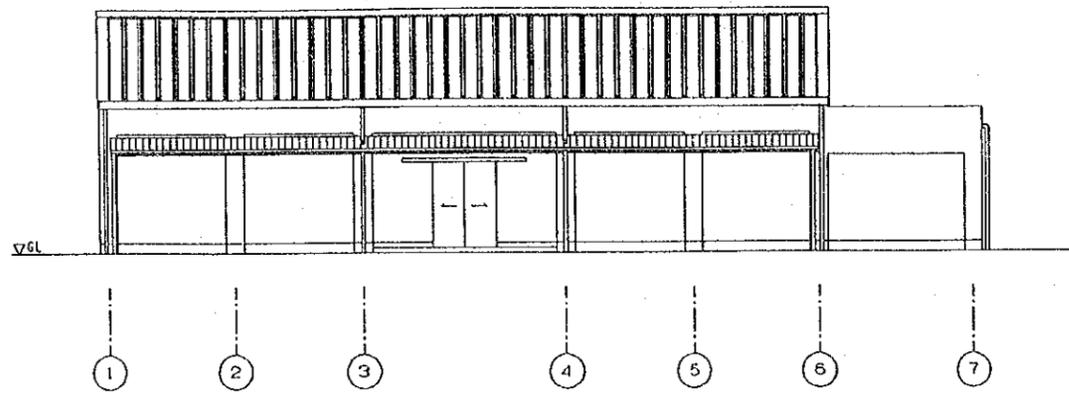
GROUND FLOOR PLAN
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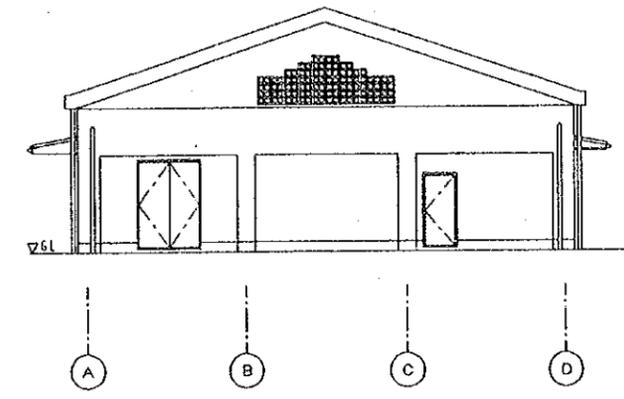
ROOF PLAN
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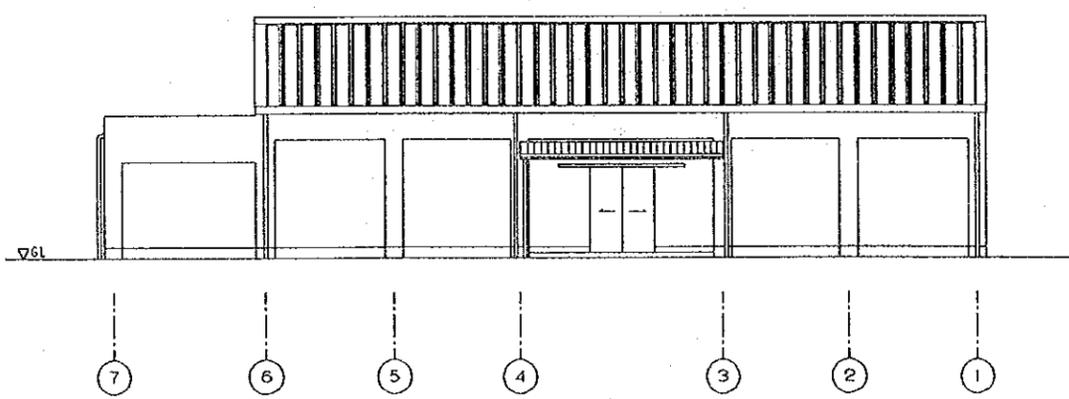
COLD STORAGE 1/100
CASTRIES
FISHERIES COMPLEX



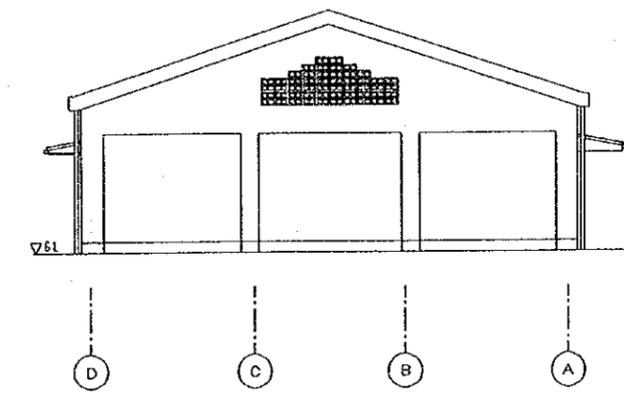
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NORTH ELEVATION
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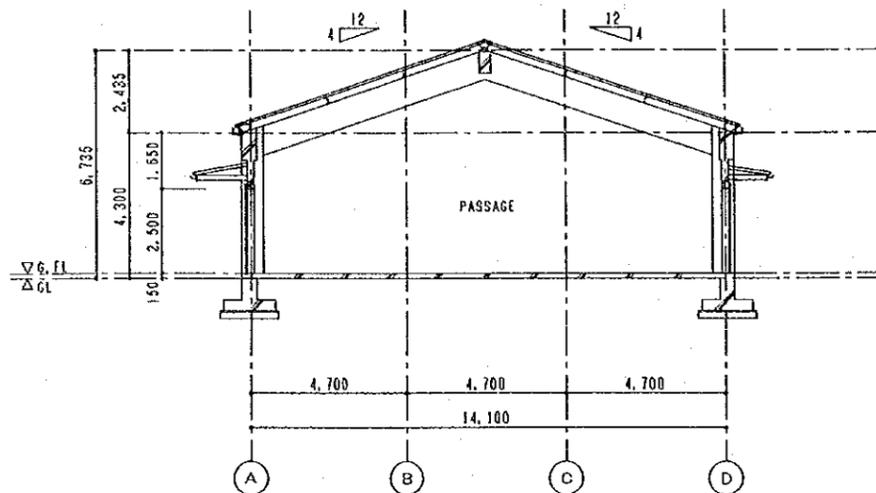


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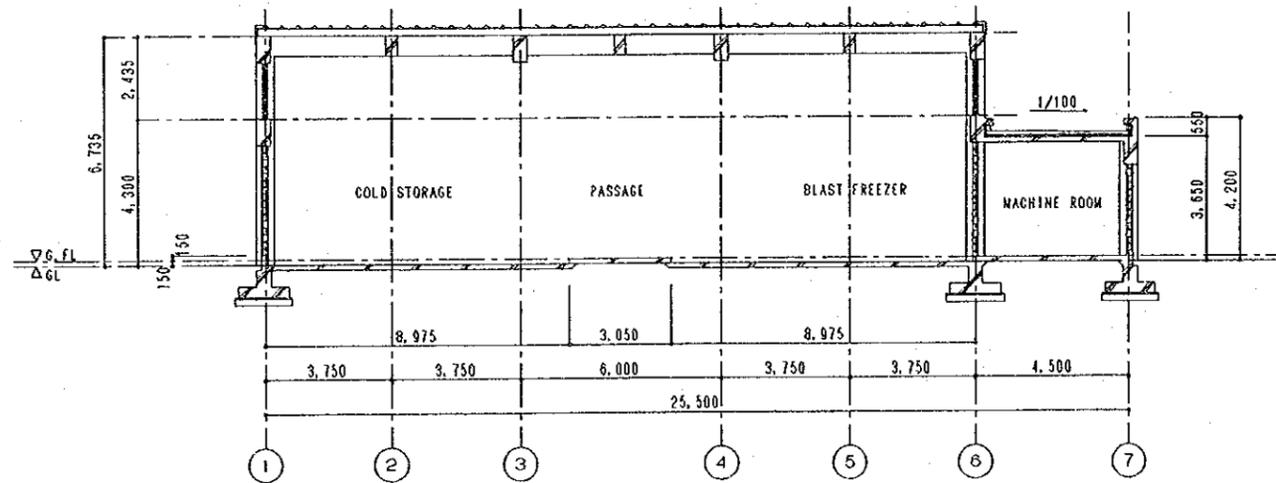


SOUTH ELEVATION
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COLD STORAGE 1/100
CASTRIES
FISHERIES COMPLEX

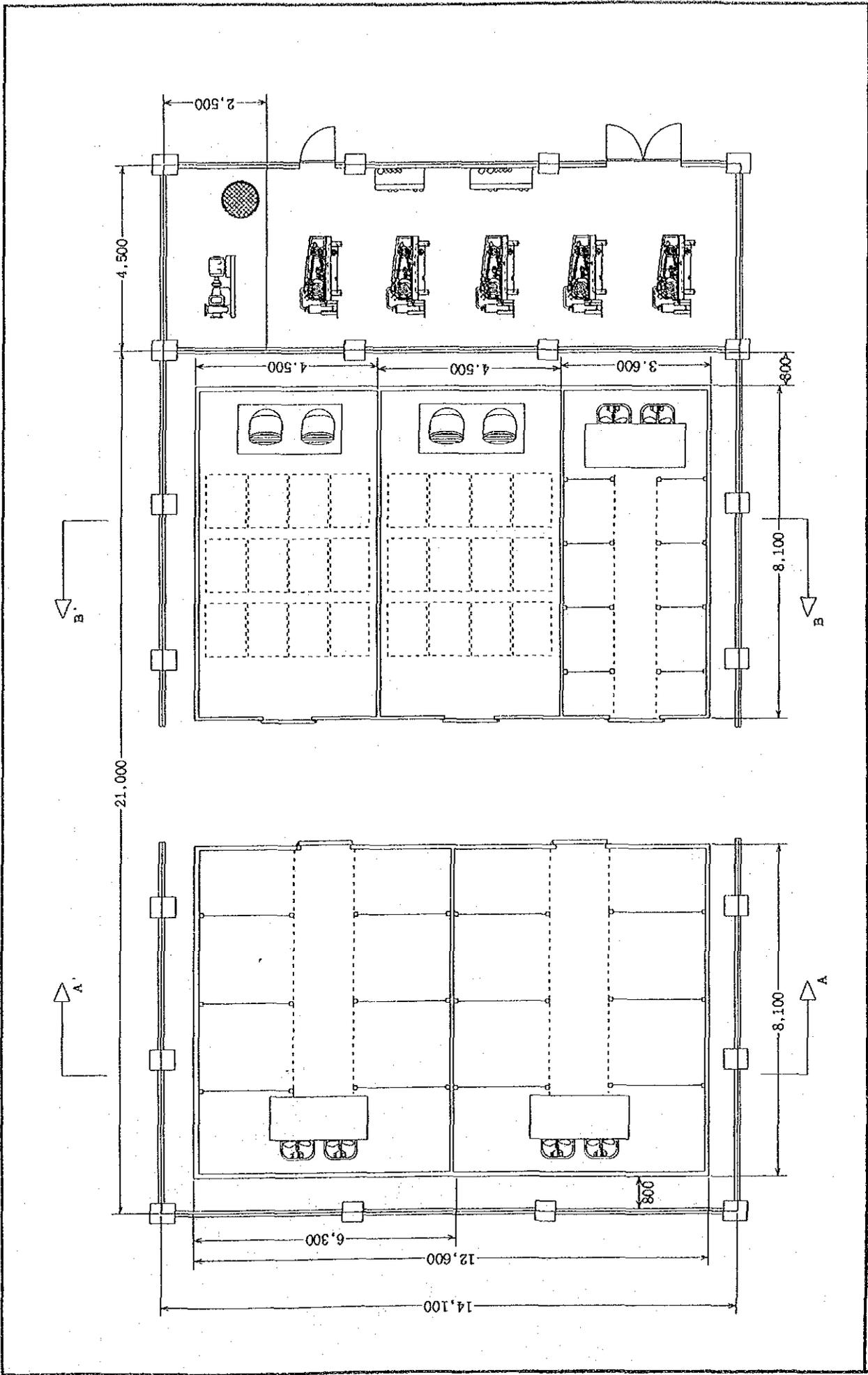


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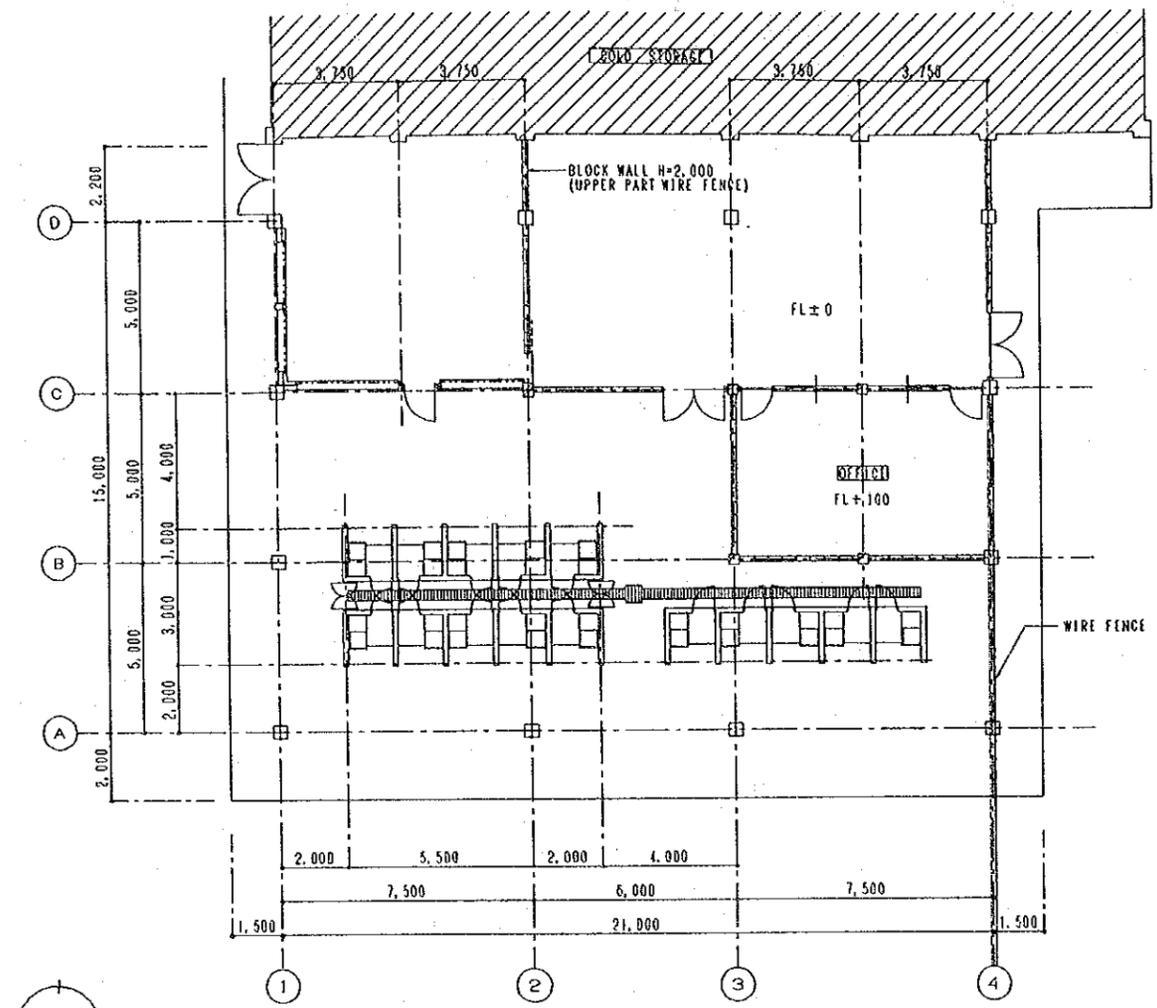
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COLD STORAGE 1/100
 CASTRIES
 FISHERIES COMPLEX

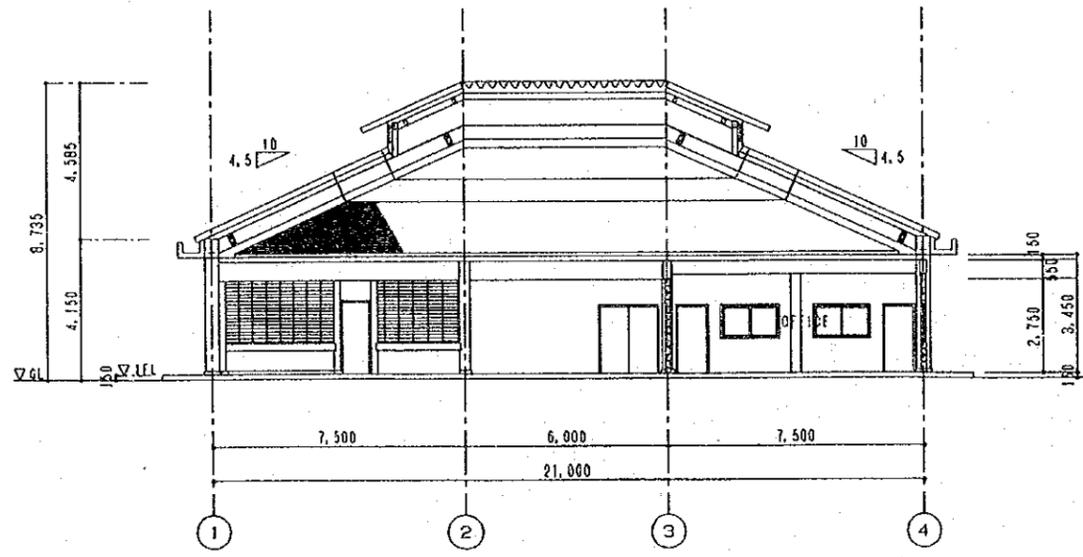


LAYOUT PLAN FOR COLD STORAGE AND FREEZER

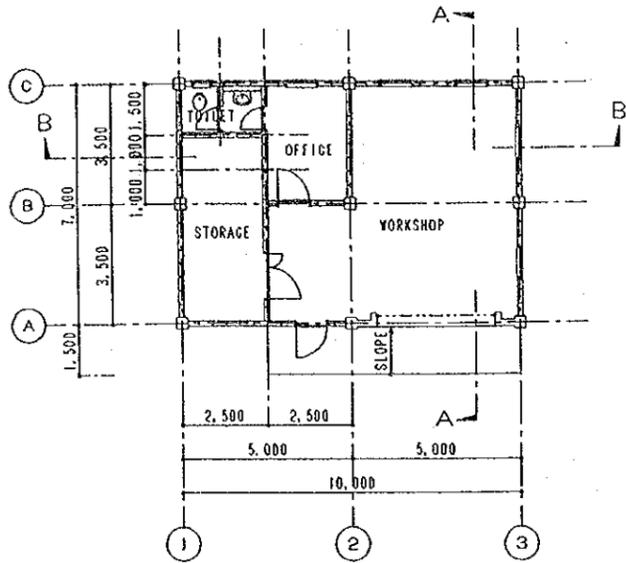
OVERSEAS AGRO-FISHERIES CONSULTANTS



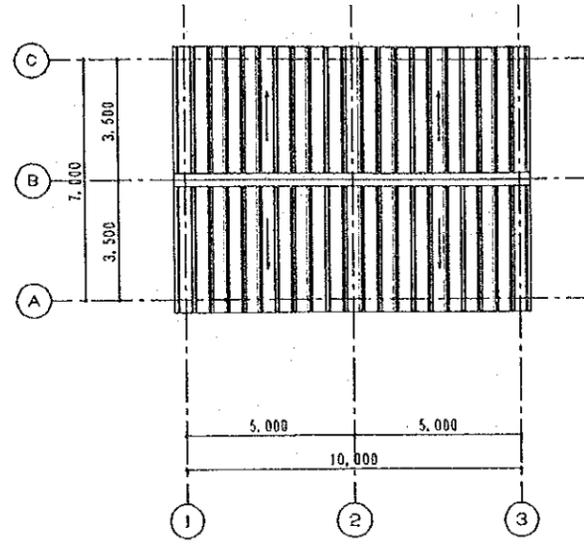
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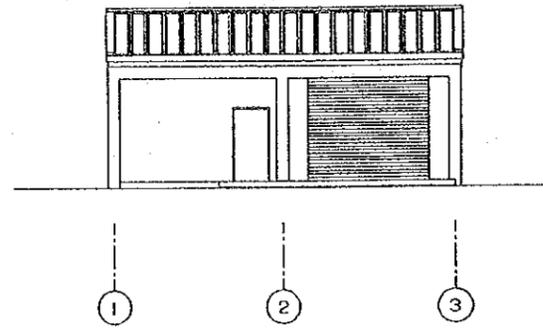
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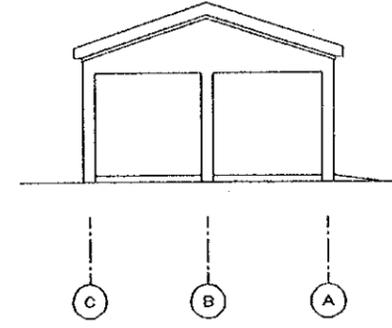
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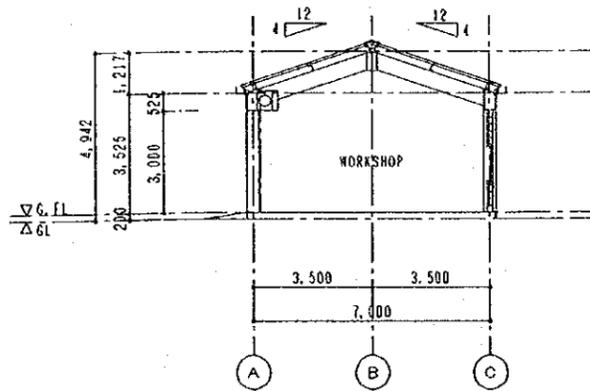
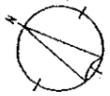
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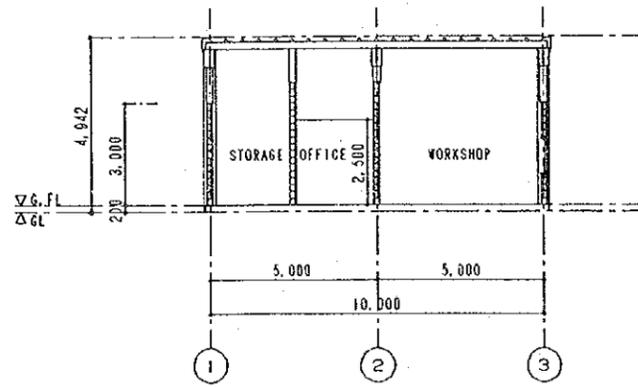
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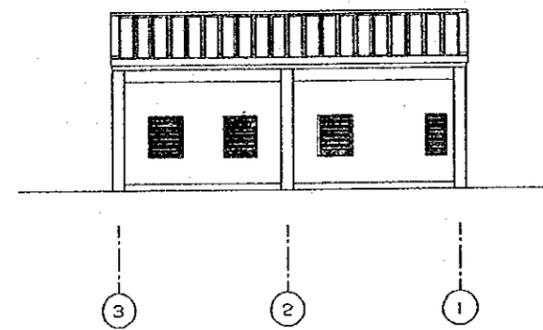
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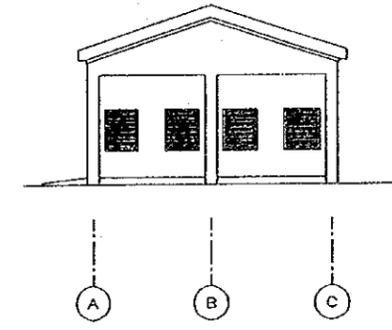
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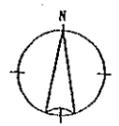
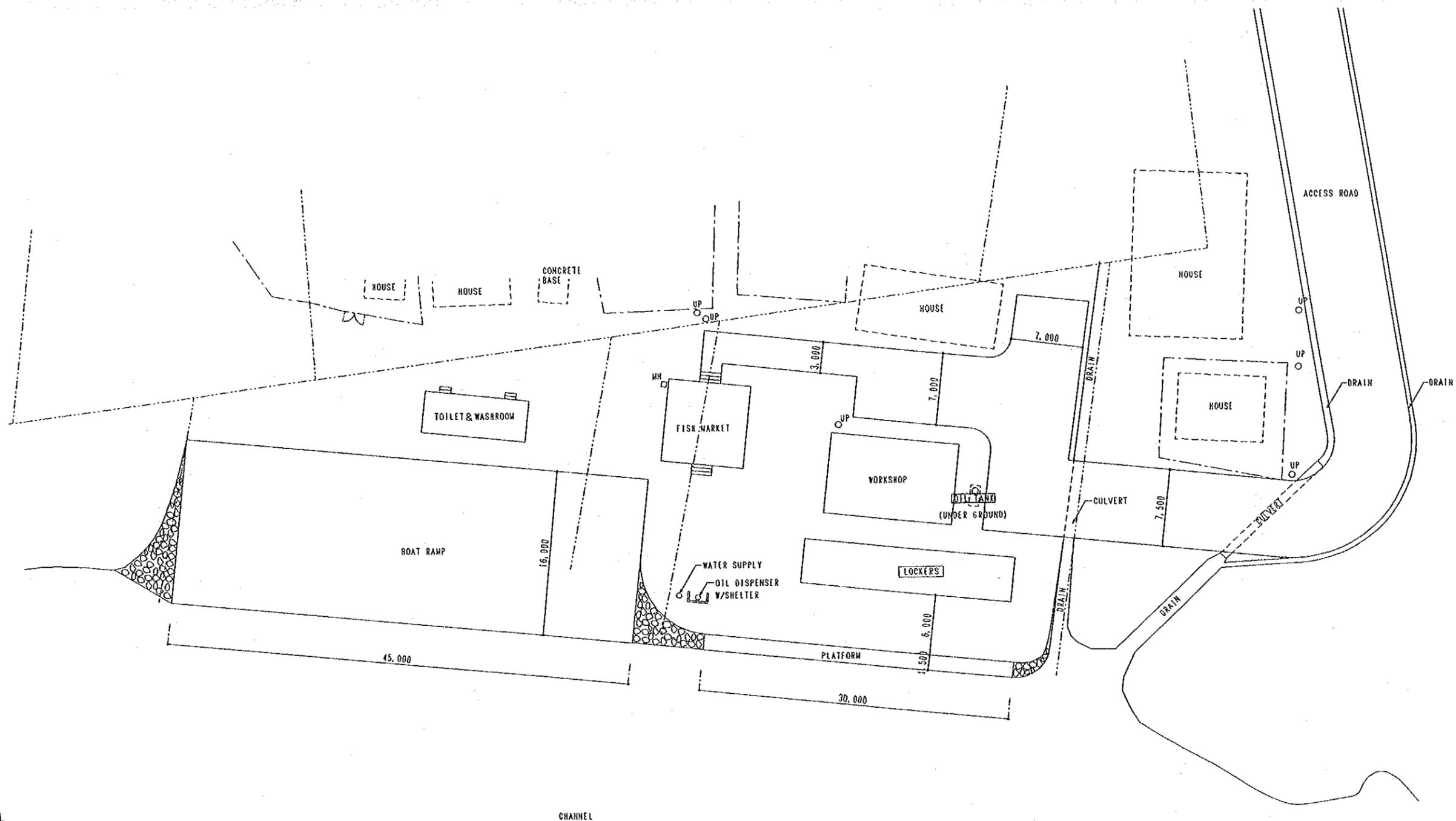
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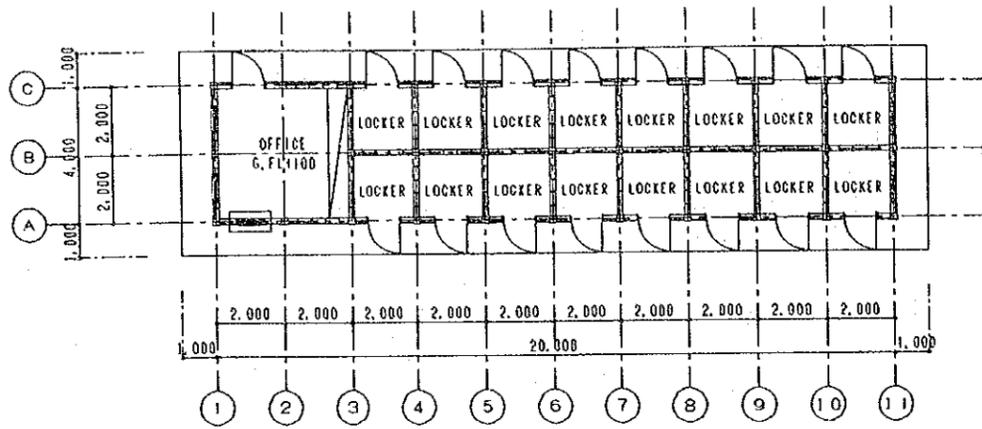


8 SOUTH ELEVATION
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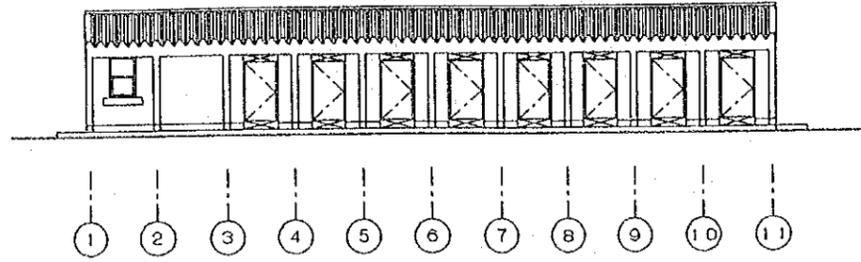


- LEGEND
- FENCE
 - - - - BOUNDARY LINE
 - UP UTILITY

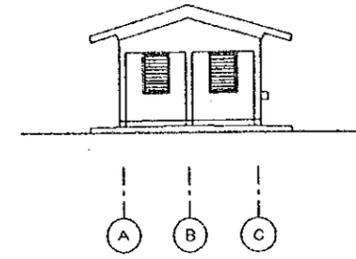
SITE PLAN



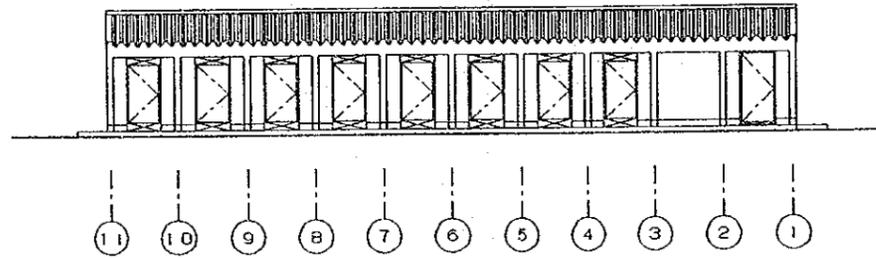
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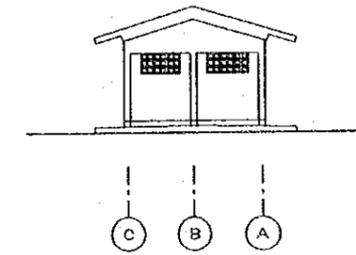
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S=1:100



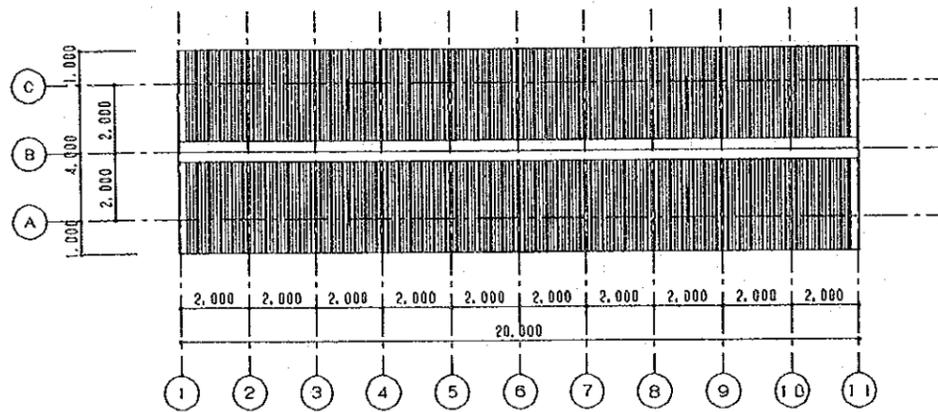
4 WEST ELEVATION
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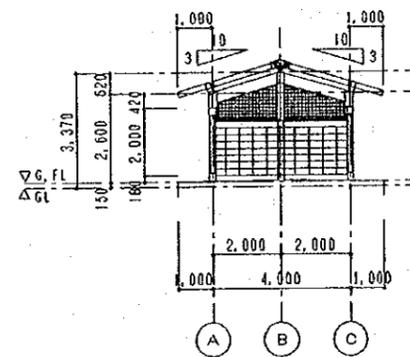
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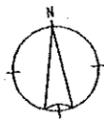
6 EAST ELEVATION
S=1:100



2 ROOF PLAN
S=1:100

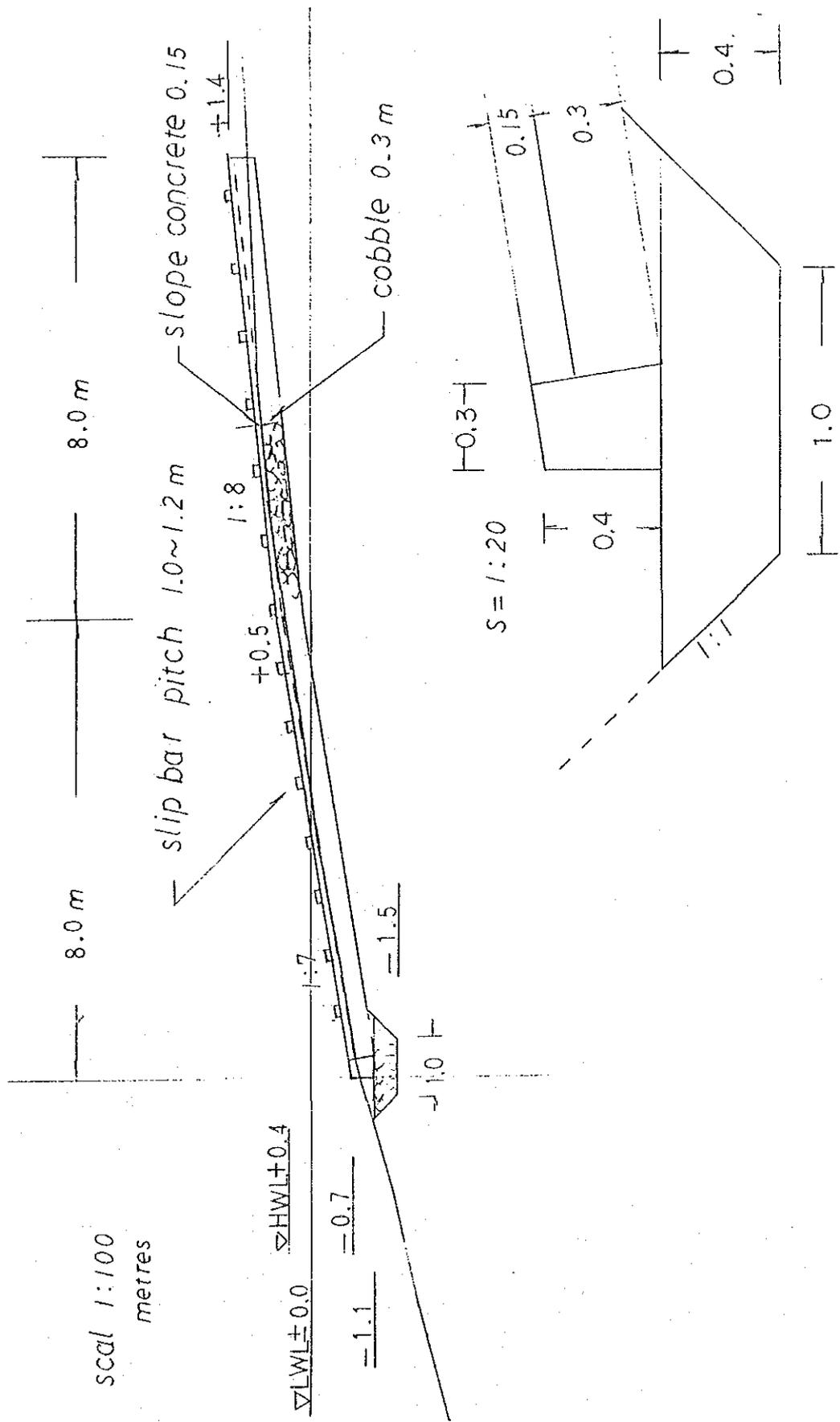


7 SECTION
S=1:100



ST. LUCIA
GROS ISLET

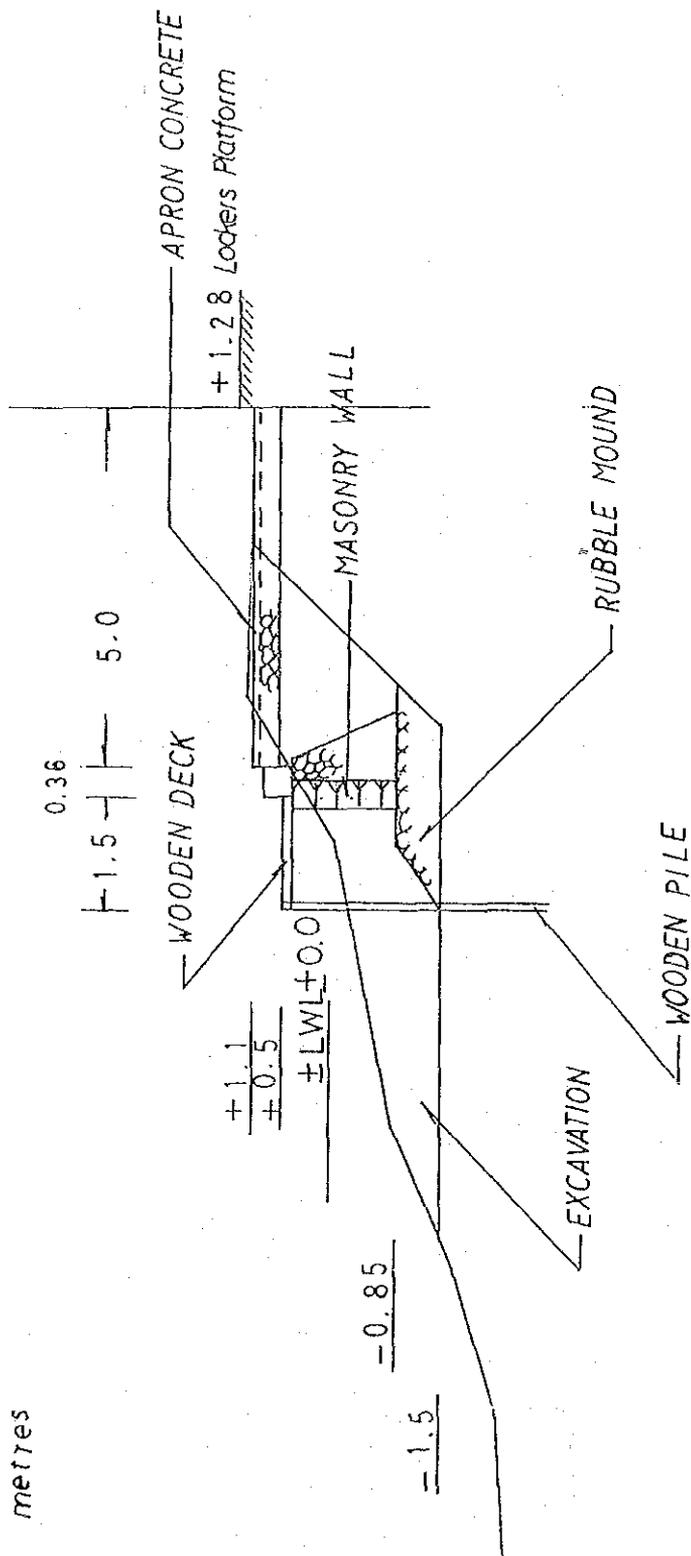
slipway L = 45 m



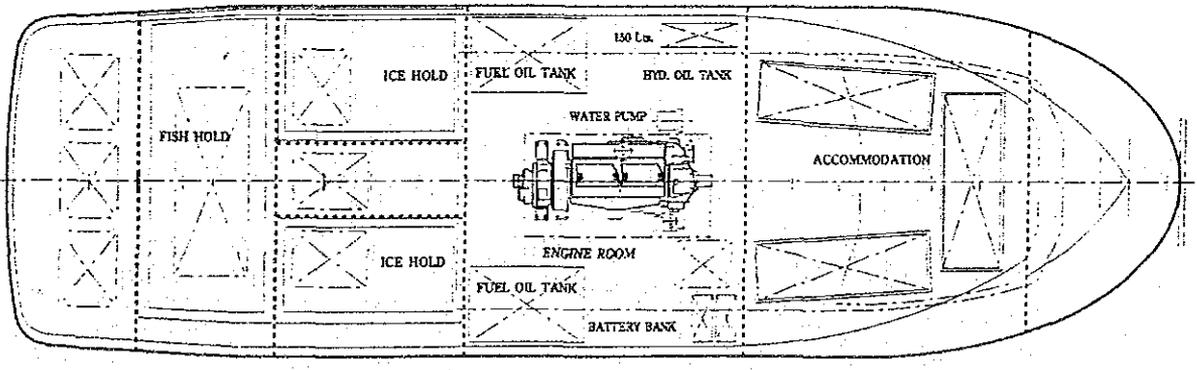
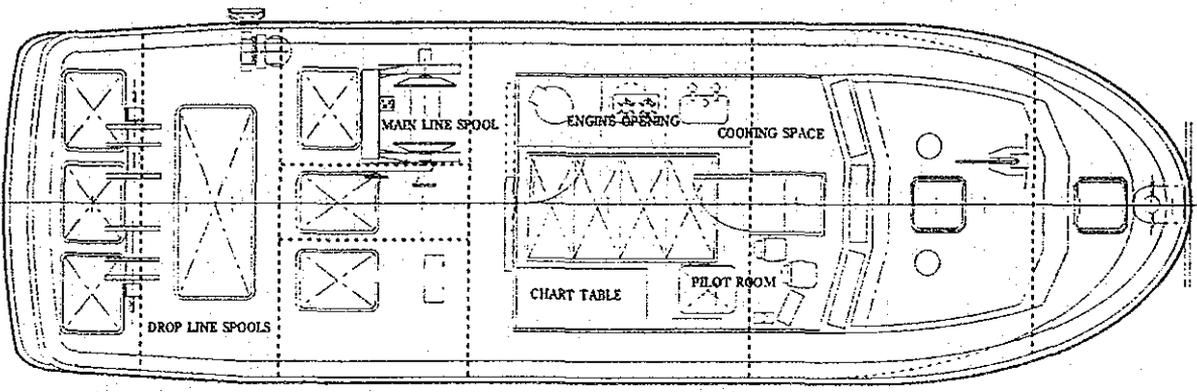
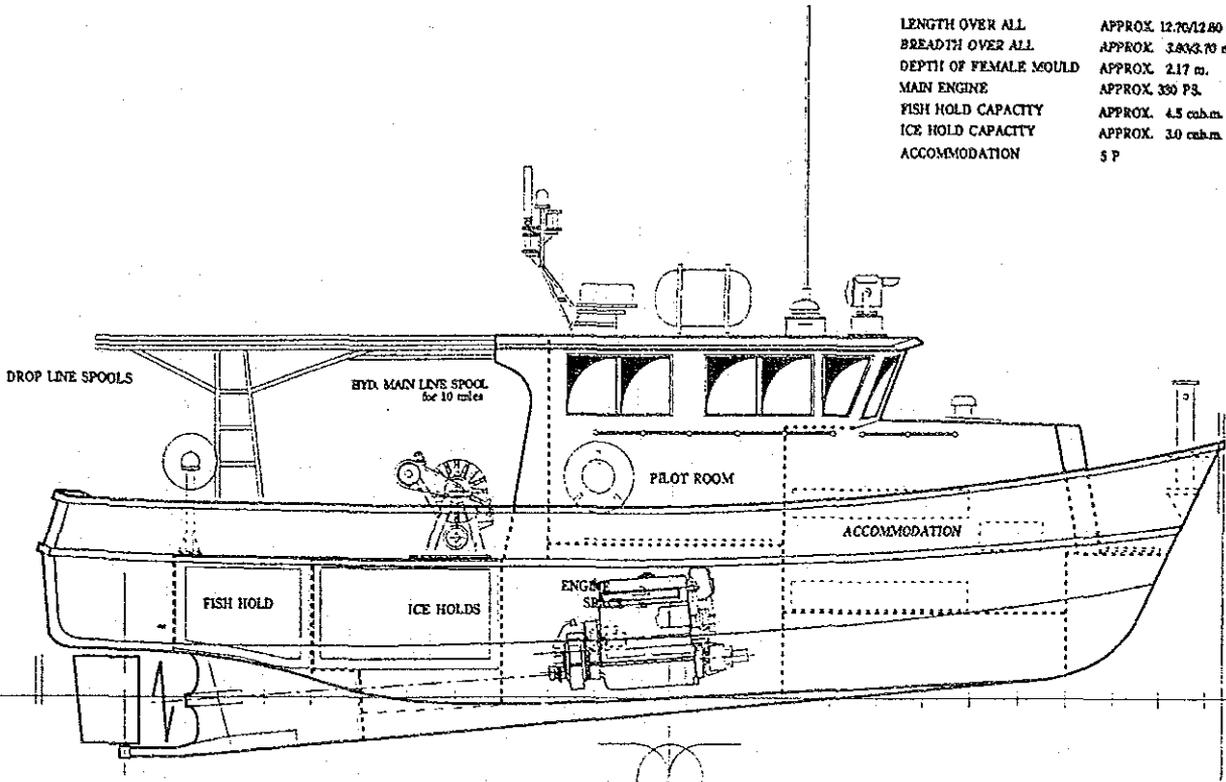
ST. LUCIA
GROS ISLET

-1.5m quay L=30m

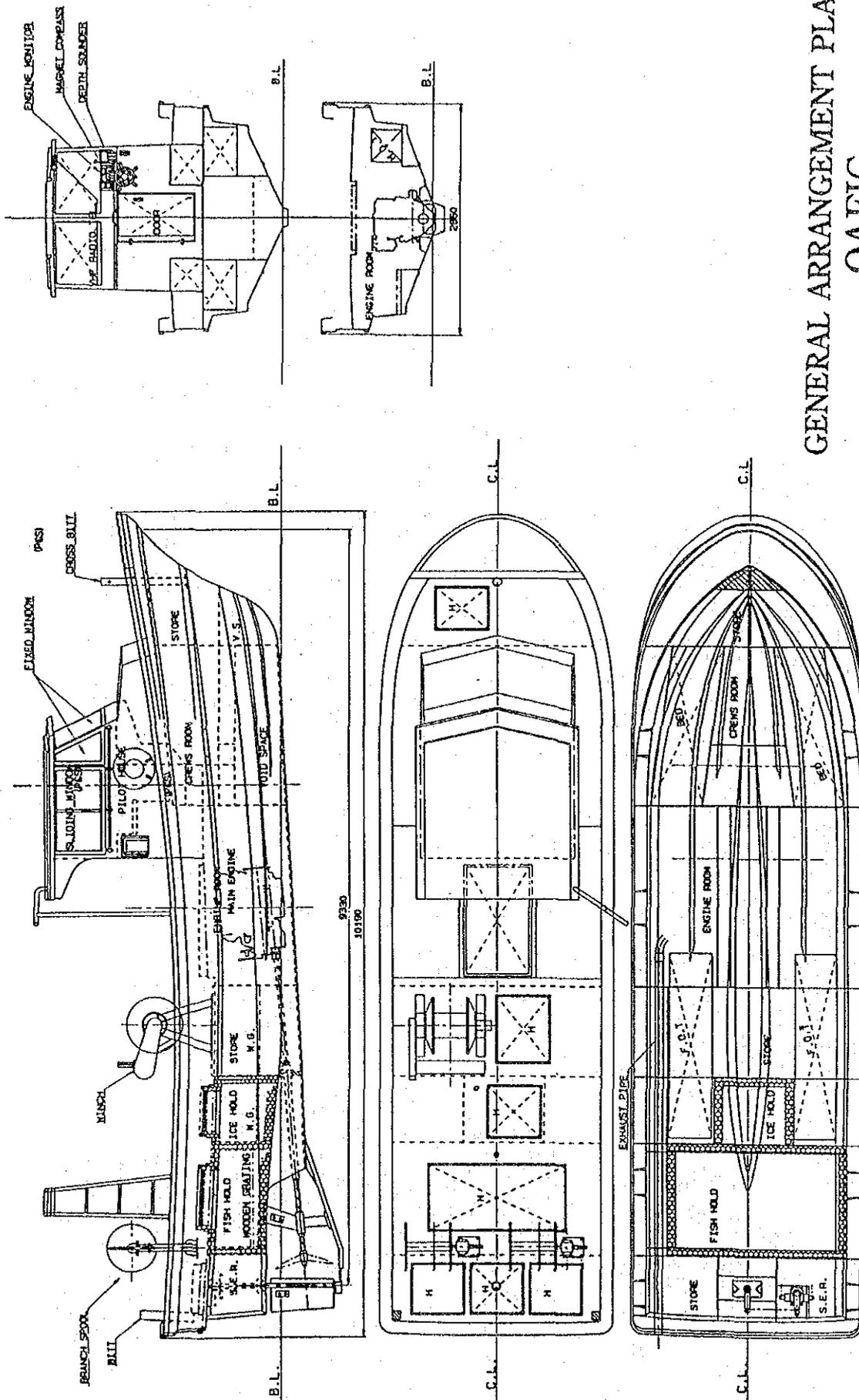
scal 1:100
metres



LENGTH OVER ALL APPROX. 12.76/12.80 m.
 BREADTH OVER ALL APPROX. 3.83/3.70 m.
 DEPTH OF FEMALE MOULD APPROX. 2.17 m.
 MAIN ENGINE APPROX. 330 PS.
 FISH HOLD CAPACITY APPROX. 4.5 cub.m.
 ICE HOLD CAPACITY APPROX. 3.0 cub.m.
 ACCOMMODATION 5 P



GENERAL ARRANGEMENT PLAN
OAFIC
 Overseas Agro-Fisheries Consultants Co., Ltd.



GENERAL ARRANGEMENT PLAN
OAFIC
 Overseas Agro-Fisheries Consultants Co., Ltd.

4.5 Construction Plan

4.5.1 Construction Principles

(1) Construction principles

The construction plan under the Project will be prepared based on the following principles:

- 1) Local labor, equipment and materials will be used as much as possible.
- 2) Close contact will be maintained with the Ministry of Planning of St. Lucia, which is the supervisor of development projects and facility construction in the country, as well as with the Project implementation agency, to bring the Project into alignment with the nation's development projects and facility construction standards in such a way as not to raise any problems.
- 3) The expansion of facilities on the Castries Fisheries Complex will be carefully executed so as to maintain operations of the existing refrigerating facilities in principle. In case, the facilities are to be stopped for power supply work, the period should be minimized as short as practicable.
- 4) The construction of the facilities on the Gros Islet landing port will be carefully executed so as not to hinder navigation, maintaining the passage located in front of the Project site.
- 5) The nation's culture and tradition will be respected.

(2) Scope of work

The scope of work under the Project is as listed below.

- 1) Expansion of facilities on the Castries Fisheries Complex
 - Construction the refrigerating facilities
 - Alteration of part of the fish market
 - External work necessitated by a change in the road within the Complex site (Construction of a new entrance/exit on the west edge of the site)
- 2) Establishment of the Fisheries Development Center
 - Construction of the Center building
 - Construction of the Workshop

3) Improvement of facilities on the Gros Islet landing port

Facilities improvement work, including renovation of the boat ramp, construction of the landing wharf, reconstruction of the fishing gear storage and construction of the access road

4) Procurement, delivery and installation of fishing equipment and materials

(3) Items of work to be undertaken by the Governments of St. Lucia and Japan

Under the Project, each Government will execute the following items of work:

1) Items of work to be undertaken and conveniences provided, by the Government of St. Lucia

- ① Provision of Project sites and storage yards for construction machines, equipment and materials, and removal of obstacles from the sites and yards
- ② Provision of supply sources of stones and sand to be used in the Project
- ③ Preparation of access roads to the project sites.
- ④ Provision of a water supply, sewerage, and electrical power supply systems leading into the Project sites
- ⑤ Customs clearance of equipment and materials to be used for the Project, and exemption of such equipment from import duties
- ⑥ Exemption of equipment and materials to be procured in St. Lucia for use in the Project from taxes
- ⑦ Exemption of Japanese nationals from all taxes and charges to be levied in St. Lucia when they provide construction equipment, materials and services
- ⑧ Grant of permit to stay and other permits to be required by Japanese nationals concerned with the Project
- ⑨ Efficient operation, maintenance and management of the facilities/equipment provided with the grant aid.
- ⑩ Procurement and installation of ancillary equipment necessary for operation of the facilities under the Project

3) Items of work to be undertaken by the Government of Japan

- ① Procurement of all equipment, materials and labor necessary for construction under the Project
- ② Sea and land transportation of imported equipment and materials necessary for construction under the Project, and payment of relevant export insurance premiums
- ③ Assistance in detail design of the Project and tendering with consultancy services, including construction supervision

4.5.2 Points to Note for Construction Work

(1) The construction of the Castries Fisheries Complex

In order to maintain the operations of FMC, including the buying and selling of excess fish, are the priority, the construction site shall be organized and the construction shall be conducted so that the period which the electrical power to the existing refrigeration facility is to cut off due to work on electrical power supply, and obstruction to the flow of delivery trucks to the existing refrigeration facility and shoppers shall be kept at a minimum. With this purpose, the construction schedule will be thoroughly discussed with FMC and the stoppage time will be minimized as short as practicable, in collaboration with FMC and other, relevant agencies in St. Lucia.

(2) At the Gross Islet landing port

The safety of the marine traffic in the waterway in front of the construction site must be guaranteed, and the preservation of the ocean and shore environment around must be given consideration during the construction.

For this purpose, the dredge work shall be done with back-hoes from the land and not by barges from the water. Also, rocks dredged at the site shall not be disposed into the waterway. Excavated dirt shall be disposed in designated places away from population centers, and these areas shall be provided by the Saint Lucia Government. For construction of the underwater concrete structures, underwater concrete which will not separate in water shall be used in consideration of protecting the surrounding water quality.

4.5.3 Work Supervision Plan

After signing a contract for detail designing and supervision for the Project with the Government of St. Lucia, the Consultant will conduct detail surveys and have a final consultation with the Government. The Consultant will then prepare in Japan detail design drawings, specifications of the facilities/equipment, statements of structural calculation, bills of quantities and other necessary tender documents. After completion of the tender documents, the Consultant will undertake the tendering procedures, obtaining the approval of the Project, screening the qualifications of tenderers, and assessing tenderers' bids.

Following the awarding of the construction contract, the Consultant will, in Japan, examine working drawings to be submitted by the contractor, supervise the fabrication and preparation of worked materials, and test and inspect products, equipment and materials for quality before shipping to St. Lucia. For supervision of the execution of the Project, the Consultant will dispatch its engineers to St. Lucia to have periodic technical meetings with the Government of St. Lucia; supervise the work on site; witness inspections to be conducted for quality control; measure work progress against the schedule; and prepare supervision reports.

4.5.4 Equipment and Materials Procurement Plan

(1) Materials and machinery for construction

Main materials required for the construction will be procured as follows:

Aggregate (sand and gravel)	:	Procured in St. Lucia
Cement	:	Imported from a neighboring country
Reinforcing bars	:	Procured locally or imported from a neighboring country
Stone	:	Procured locally

Cranes and other necessary construction machinery will be available from local leading construction companies.

(2) Equipment and materials

Equipment and materials to be introduced in the Fisheries Development Center and the Fisheries Complex will be planned as follows:

① Exploratory fishing boat

The exploratory fishing boat and the small experimental fishing boats to be operated by the Fisheries Development Center for experimental fishing operations, survey of fishing grounds, spread of fishing techniques, demonstrations, need to be built by a shipyard which has sufficient experience and the technological background to build these types of boats. The construction also requires examinations of detailed construction drawings; inspections and adjustment at each step of the building process and sea trials. For these reasons, the boats will be built in Japan where these requirements are sure to be satisfied.

② FRP boat for fishermen

This type of boat is similar in specifications to those that have been introduced in St. Lucia and are already being used by some fishermen there. They are built in a neighboring country of St. Lucia. It is, therefore, planned that the boats will be built and procured in that country.

③ Cars

Most of the cars in St. Lucia are Japanese-made, and each of the Japanese manufacturers has established local service shops. For this reason, a Japanese-built car will be introduced under the Project.

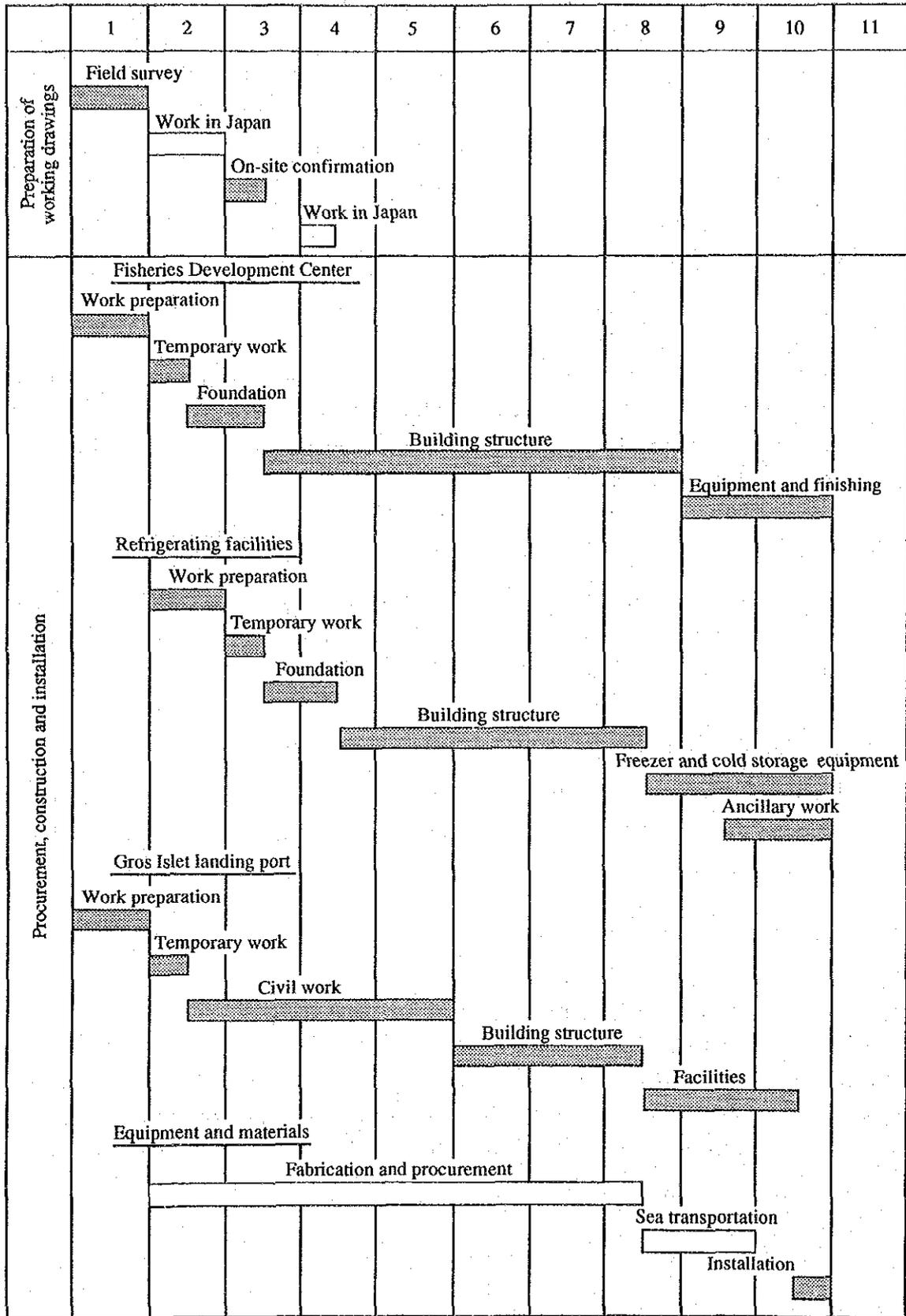
④ Equipment for data processing/management and radio equipment

From the standpoint of maintenance, repair, and services following their introduction, it has been decided to procure this equipment directly from their sales agents in St. Lucia.

4.5.5 Implementation Schedule

The Project implementation will require 2.5 months for the preparation of working drawings; 1 month for the tendering procedure; and approximately 10 months for the preparation for construction work, construction work implementation, the procurement, transportation and inspection of equipment and materials, and the delivery of such equipment to the Project implementation agency. The Project implementation schedule is indicated on the next page.

Project implementation schedule



4.6 Costs to be payed by St. Lucia Government

In the case of the Project is implementated as a grant aid project of the Government of Japan, the cost to be borne by the St. Lucia side is estimated as follows.

- | | |
|--|----------------|
| 1) Removal of existing facilities and land preparation | |
| EC dollars | Approx. 5,000 |
| 2) Electrical and plumbing work | |
| EC dollars | Approx. 29,000 |
| 3) Water supply system and sewerage | |
| EC dollars | Approx. 30,000 |

Conditions of Estimation:

Time of estimation : October 1994

Project implementation schedule : as in the project implemantation schedule sheet

4.7 Technical Cooperation

The Fisheries Development Center's planned activities of developing fishing boats and gear, finding new fishing places, and spreading and giving guidance in these techniques are important in St. Lucia's overall efforts toward fisheries development. In these fields, the Fisheries Department is in the process of developing its own staff with external technical assistance thus far offered, and the staff need to receive further guidance from experts in fisheries. One fishing method in which such guidance is particularly needed is longlining for large pelagic fish, which the Center will emphasize considering the fact that the Fisheries Department has just started its developmental and instructional work on it. Furthermore, the Center's other planned activities of spreading the techniques of maintaining and repairing fishing-boat engines and fishing equipment among fishermen, and of developing technicians for this go hand in hand with the introduction of modernized fishing boats to the country. These activities, will be more effectively conducted with guidance from the experts. Therefore, in parallel with the execution of the Project, the technical cooperation is desired in all of these activities for the Center.

CHAPTER 5 PROJECT EVALUATION AND RECOMMENDATIONS

2.5.1 Project Effects

The Project will make considerable contributions to the fisheries development of St. Lucia by helping to i) utilize the fish catch for stable supply by expanding refrigerating facilities, ii) help the Fisheries Department with its research and instructional activities by providing it with facilities, equipment, and iii) revitalize the activities of local fishermen by improving fisheries facilities in Gros Islet.

(1) Increase in refrigeration capacity

Expansion of refrigeration facilities in the Project will greatly improve FMC's capacity to buy landed fish and eliminate the waste of unsold fish. Also, the existence of a stable buyer for the fishermen coupled with an improvement in fishing methods will increase the overall catch. And as a further benefit to the consumer, the supply of fish will be stabilized.

From 1987 to 1993, the volume of fish landings increased at approximately 20% per year and has been from 960 tons to 1,114 tons in the past few years. As improvement in fishing boats, equipment and methods proceed, the volume of landings are expected to continue to increase. The combination of these improvements with increased fisherman performance due to the elimination of FMC's buying limit can increase the catch by 100 tons and expected to guarantee a catch of 1,200 tons per year.

The buying capacity of the FMC has been 25% of the catch or approximately 250 tons per year, but with the implementation of the Project, the goal is 30% of the catch or 360 tons per year. If this goal can be reached, the supply of domestic fish to the consumer market during the lean season, can be brought to a level close to the supply during the bumper season.

(2) Establishment of a Fisheries Center

The establishment of a Fisheries Center will allow the Fisheries Department to conduct its research, educational and other activities more effectively and over a wider area.

Collection and analysis of fisheries data and management of statistical material:

Will be conducted more widely with greater results. Combined with, research on fishing, assessment and management of marine resources will be more effective.

Research on marine environment and its conservation:

Periodic monitoring at fixed observation points and the analysis of samples will be conducted. Combined with fisheries surveillance, research on the marine environment will be reinforced.

Aquaculture and marine product development:

Basic research and product quality inspection will start

Development of new fishing methods and gear through experimental operations:

Exploratory fishing boats, and equipment will be introduced to perform experimental fishing operations for the purpose of developing new fishing methods in particular tuna longlining, new fishing grounds and providing guidance in such techniques.

Various educational and instructional activities directed at fishermen and those concerned with fisheries:

Using facilities to be constructed and equipment and materials to be fully provided, practical instruction and training will start.

Guidance in the methods of maintaining and repairing fishing-boat engines:

Practical guidance will be given to fishermen.

The Fisheries Department's reinforced activities will not only help spread fishing techniques among the fishermen but also help the people in general realize further the importance of the country's fishing industry and the conservation of the marine environment, thereby contributing to the promotion of fisheries development.

(3) Expansion of Gros Islet Landing Port

Lastly, in connection with aim iii), when the facilities on the Gros Islet are improved, a base for local fishermen will be secured. The existing fisheries facilities in Gros Islet remain unused because some of them are inadequate. This situation has the fishermen using temporary landing points scattered along the shore. However, when the existing facilities are improved under the Project, the fishermen will be given a base from which to operate. This will facilitate launching their boats into the sea and bringing them ashore, landing catches, loading fuel and fishing gear, and performing other fishing operations. It will then revitalize the Fishermen's Cooperative's activities to offer better services to the fishermen, which will further revitalize the fishermen's fishing operations.

All these effects following the implementation of the Project are summarized in Table 5.1.

Table 5-1 Expected Effects Following the Implementation of the Project and Degree of Improvement

Present Situation and Problems	Improvement Measures Under the Project	Degree of Improvement and Project Effects
<p>Fish catches are concentrated in a certain period of the year. At times of large catch, excess occurs at the landing point. Conversely, in the lean period, substantial shortages occur.</p> <p>Despite FMC's effort at stable supplies through excess fish purchase, cold-storage and timely sale, their insufficient refrigerating and cold storage capacities make it impossible to purchase enough excess fish. This is a factor behind fishermen's dampened desire to produce, which limits production.</p>	<p>In FMC's base, or the Castries Fisheries Complex, refrigerating facilities will be added to increase FMC's capacity to purchase excess fish.</p>	<p>FMC'S capacity to purchase fish will increase by some 50%. This will ensure sales outlets for fishermen, giving them a great stimulus to produce more. It will also stabilize supplies for consumer markets.</p> <p>When FMC's purchase goal is met, supplies nearly as large as those currently available during the bumper period will be provided even during the lean period.</p>
<p>Despite its need to conduct surveys, research and instructional activities for fisheries development, the Fisheries Department has difficulties in conducting these activities or is simply unable to do so, because of insufficient facilities, resources, equipment or materials.</p>	<p>The Fisheries Development Center which will become the Fisheries Department's research and instruction base will be built. In addition, resources, equipment and materials necessary for these activities will be introduced into the Center.</p>	<p>The Fisheries Department's research and instructional activities will be expanded with results as follows:</p> <ul style="list-style-type: none"> - Fishing gear and methods will be developed, and new fishing grounds found, through experimental fishing operations. - Fishermen will be taught in new techniques through actual operations, obtaining greater results from the instruction. - New research activities will be conducted, including the monitoring of the marine environment, and food analysis and inspection. <p>The Fisheries Department's educational activities will help the people to have greater interest in and deeper understanding of the fishing industry.</p>
<p>Fisheries facilities in Gros Islet remain unused. Fishermen operate from temporary landing points all along the shore, part of which is being considered for tourist development. Thus, there is a need to ensure a base for the fishermen.</p>	<p>Existing facilities, including the port ramp, will be improved or renovated so that local fishermen can use them as their landing port.</p>	<p>Fishermen will be saved labor, including bringing their boats to the sea or ashore, and loading fishing gear aboard. As a result, their fishing operations will become easier.</p> <p>The Fishermen's Cooperative's activities will also be revitalized, which will in turn further revitalize the fishermen's operations.</p>

5.2 Appropriateness of the Project

This Project addresses the problems facing fisheries development and promotion in Saint Lucia, and its aims matches the goal of the country to progress its fishing industry.

The expected effects following the implementation of the Project are as mentioned in item 5.1, and the beneficiaries of the Project are as follows:

- 1) Expansion of facilities for the Fisheries Complex (Construction of freezer and cold storage)

Direct beneficiaries will be fishermen, and if FMC's purchasing activity extends across the nation, it will benefit 1,800 fishermen. If fish supplies are stabilized, individual consumers all over the country will also be among the beneficiaries.

- 2) Establishment of Fisheries Development Center

Direct beneficiaries will be the Fisheries Department's personnel who conduct research and instructional activities in the Center; and fishermen, fishermen's cooperatives, and those concerned with fisheries across the nation who receive guidance from the personnel using the Center, and equipment and materials available in it. In the field of conservation of the environment, there will be more beneficiaries, including travel agents who will also receive guidance.

- 3) Improvement of Gros Islet landing port

Direct beneficiaries will be some 100 local fishermen, and those from neighboring areas who use the facilities for fish landing, refueling and other purposes.

As shown above, the beneficiaries of the Project will cover the people of the whole country, particularly fishermen.

Facilities, equipment and materials planned for introduction will be such that they can be operated and managed under the supervision of the Project implementation body. With regard to the facilities planned for the Fisheries Complex, FMC has sufficient experience and technology for the direct operation and management under the supervision of the Fisheries Department.

Given these facts, the Project will greatly contribute to the nation's fisheries development and promotion, and the Project's implementation as a grant aid project of the Government of Japan is deemed appropriate.

5.3 Recommendations

1) Cooperation and Aid of Related High Level Bodies

The Project will be executed under the supervision and guidance of the Fisheries Department. In performing these jobs, the Department will need to have necessary budgets approved, coordinate its operations with those of other ministries concerned, and get cooperation from them. It is desired that higher public organizations concerned, including the Ministry of Agriculture, Lands, Forestry and Fisheries, understand the Department' implementation of the Project, and its operation and management of the resultant facilities, equipment and materials, and assist the Department with its job.

2) Informing the Citizens and Fishermen

The expected effects following the expansion of the facilities on the Fisheries Complex, mentioned in 5.1, will materialize only if the quantity of excess fish purchased by FMC grows and at the same time its sales to consumers increase. For this reason, the Fisheries Department and FMC need to inform the people of the implementation of the Project and FMC's plan to increase fish sales. Also, they must take steps to attract individual consumers to the Complex.

3) Guidance Regarding Safety in the Waterway

Although the Fisheries Department's staff will play a principal role in the conduct of the Fisheries Development Center's activities, it is desired that outside experts in fisheries and fishing-boat engines continue to offer technical cooperation for the Fisheries Department in developing fishing boats and operations and in introducing modernized fishing boats and operations with good results, in line with the objectives of the implementation of the Project.

The Gros Islet landing port is situated along the narrow waterway, and safe navigation is indispensable for this public waterway. Therefore, it is necessary to guide not only local fishermen but also those using the waterway and the yacht harbor farther into it regarding safety of fishing boats entering and leaving the landing port, and other boats navigating in the waterway.

4) Guidance and Development of the Gros Islet Fishermen's Cooperative

The Gros Islet Fishermen's Cooperative is still on its way to maturity, and hence the Fisheries Department and other relevant organizations need to offer guidance and assistance to the Cooperative in various matters, including the management of the landing port.

Management of the cooperatives for the members and fishermen

Utilization and management of the landing facilities

Sales of fuel oil and management

Cooperation with other cooperatives

APPENDIX

1. List of Study team members
2. Schedule of survey
3. List of persons met by the study team
4. *Minutes of discussions*
5. FMC refrigeration facilities operation plan and expenses
6. Exploratory fishing boat operation expenses

1. List of Member of the Survey Team

(For Field Survey)

Team Leader	: Mr. Senichi KIMURA	Deputy Director, Second Basic Design Study Division, Grant Aid Study & Design Department, Japan International Cooperation Agency (JICA)
Grant Aid Cooperation	: Mr. Koichi TAHARA	Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs
Fisheries Development	: Mr. Atsushi OKUMA	Office of the Overseas Fisheries Cooperation, Fisheries Agency
Facilities Equipment Planner	: Mr. Junichiro MORI	Overseas Agro-Fisheries Consultants Co., Ltd. (OAFIC)
Port Civil Engineer	: Mr. Kazumi UETANA	Overseas Agro-Fisheries Consultants Co., Ltd. (OAFIC)

(For Explanation of the draft final report)

Team leader	: Mr. Satoshi KUWARHARA	Section Chief, International Affairs Division, Oceanic Fishery Department Fisheries Agency
Fisheries Development	: Mr. Osamu KOHARA	International Cooperation Division Ministry of Agriculture, Forestry and Fisheries
Chief Consultant	: Mr. Kazumi IIDA	Overseas Agro-Fisheries Consultants Co., Ltd. (OAFIC)
Facilities Designer	: Mr. Masato ARAYA	Overseas Agro-Fisheries Consultants Co., Ltd. (OAFIC)

2. Schedule of the Survey

Field Survey Schedule

No.	Date	Field Survey Details	
		(government officials, chief consultant, facilities designer)	(facilities, equipment planner, port civil engineer)
1	July 17 (Sun)	Departure for New York	
2	July 18 (Mon)	New York to Saint Lucia	
3	July 19 (Tue)	Fisheries Department: explanation of inception plan, discuss survey schedule. Visit Foreign Affairs Ministry.	Tokyo to New York
4	July 20 (Wed)	Conference with Ministry of Agriculture Lands, Forestry and Fisheries concerning the background of the project, the project plan, contents of the request. Inspection of the Gros Islet fisheries facilities. Survey of fishermen.	New York to Saint Lucia
5	July 21 (Thu)	Visit Ministry of Planning, Personnel, Establishment and Training. Conference with Fisheries Department about contents of the request, the project plan and operation and management plan. Survey of the Castries fisheries facilities, market and refrigeration facilities. Oral survey with the St. Lucia Development Bank.	
6	July 22 (Fri)	Conference with the Fisheries Department. Survey of the Dennery fishing port.	
7	July 23 (Sat)	Survey of the condition of previous grant aid facilities in the local fishing villages of Vieux Fort, Laborie, etc.	
8	July 24 (Sun)	Survey of the facilities of the Castries fisheries complex. Survey of the Gros Islet fishing facilities. Preparation for the site surveying.	
9	July 25 (Mon)	Conference with Ministry of Planning, Personnel, Establishment and Training. Meeting with minutes with the Fisheries Department. An oral survey of the Gros Islet fisherman's cooperative and Gros Islet fishermen.	
10	July 26 (Tue)	Signing of Detailed Minutes of Meeting with Minister of Agriculture, Lands, Forestry and Fisheries. Report to the Foreign Affairs Ministry.	Fisheries Department meeting. Survey of the fisheries complex.
		(government officials)	(consultants)
11	July 27 (Wed)	Leave Saint Lucia for Port of Spain	Investigation of the fishing, distribution and construction situation; Surveying of the site; collecting information from the meteorological office.
12	July 28 (Thu)	Leave Port of Spain for New York	Survey of machines and materials, and construction and transportation technology. Investigation of the site. Electric company; Department of Water Works
13	July 29 (Fri)	Leave New York	Oral survey of the fishermen of Gros Islet. Oral survey of the St. Lucia Air & Sea Ports Authority, electricity company, Department of Water Works, etc.
14	July 30 (Sat)	Arrive in Japan	Surveying of the fisheries complex, refrigeration facilities and Gros Islet site
15	July 31 (Sun)		Organization of information collected, meeting among group members, surveying of the Gros Islet site.
16	Aug. 1 (Mon)		Conference with the Fisheries Department

17	Aug. 2 (Tue)	Construction related investigations. Meeting with Texaco Oil Co. (Those in charge of facility, machines and materials planning, civil engineering work in the bay leave Saint Lucia)
18	Aug. 3 (Wed)	Building construction meeting. Meeting with Dept. of Building Planning, Ministry of Planning, Personnel, Establishment and Training. Meeting with FMC. Gathering information on port operating cost, etc.
19	Aug. 4 (Thu)	Building construction meeting. Meeting with Ministry of Planning, Personnel, Establishment and Training. Gathering Development Bank information. Survey of FMC's facilities. (Those in charge of facility, machines and materials planning, civil engineering work in the bay return to Japan)
20	Aug. 5 (Fri)	Meeting on facilities, resources, machines and materials. Meeting on facilities planning.
21	Aug. 6 (Sat)	Gathering information
22	Aug. 7 (Sun)	Organization of information gathered
23	Aug. 8 (Mon)	Joint meeting involving Fisheries Department, Ministry of Planning, Personnel, Establishment and Training, Ministry of Transportation on the facilities plan
24	Aug. 9 (Tue)	Final consultation with Fisheries Department, Ministry of Agriculture, Lands, Forestries and Fisheries
25	Aug. 10 (Wed)	Leave Saint Lucia for Port of Spain
26	Aug. 11 (Thu)	Report to the Japanese Embassy. Conduct construction related survey. Leave Port of Spain for New York
27	Aug. 12 (Fri)	Leave New York
28	Aug. 13 (Sat)	Arrive in Japan

Explanation of the draft final report

No.	Date	Report Explanation Details
1	Aug. 29 (Sat)	Leave Tokyo for New York
2	Aug. 30 (Sun)	New York to St. Lucia
3	Aug. 31 (Mon)	General explanation of the Report to related ministries and departments at the Ministry of Agriculture, Lands, Forestry and Fisheries. Detailed explanation of the Report at the Fisheries Department
4	Nov. 1 (Tue)	Supplementary study of Project Sites (Castries, Gros Islet) Inspection of local areas.
5	Nov. 2 (Wed)	discussion of the Draft Report (Facilities, Equipment and materials) with the Fisheries Department, FMC and the Ministry of Construction.
6	Nov. 3 (Thu)	Ditto Discussion of the minutes at discussion (M/D) with the Fisheries Department, FMC and the Ministry of Construction.
7	Nov. 4 (Fri)	Report at the contents of discussions to the Ministry of Agriculture, Lands, Forestry & Fisheries Signing at the M/D.
8	Nov. 5 (Sat)	Team Leader Leaves St. Lucia for New York Organization of Materials.
9	Nov. 6 (Sun)	Leave St. Lucia of Part of Spain
10	Nov. 7 (Mon)	Report to the Japanese Embassy Leave Port of Spain for New York
11	Nov. 8 (Tue)	Arrive in New York
12	Nov. 9 (Wed)	Return to Tokyo

3. List of Persons Met by the Study Team

Ministry of Agriculture, Lands, Fisheries and Forestry

Hon. Ira d'Auvergne	:	Minister
Mr. Cosmos Richardson	:	Permanent Secretary
Mr. Horace D. Walters	:	Director of Fisheries Department Chief Fisheries Officer
Mr. Keith E. Nichols	:	Deputy Chief Fisheries Officer
Mr. Wilfredo Pierre	:	Economist, Planning and Statistical Unit

Ministry of Foreign Affairs

Mr. Cyrus J. Reynolds	:	Principal Assistant Secretary
Mr. Peter Lansiquot	:	Foreign Service

Ministry of Planning Personnel, Establishment and Training

Ms. Marcia Philbert-Jules	:	Chief Economist
Ms. Delia Didier Nicholas	:	Representative, Development Control Authority
Mr. Douglas G. Mac Farlane	:	Chief Architect
Mr. Peter Norville	:	Environmental Engineer, Physical Planning Section

St. Lucia Fish Marketing Corporation Ltd.

Mr. Dunstan Duboulay	:	Chairman
Mr. Joseph Lawrence	:	General Manager
Mr. Lucas Armstrong	:	Assistant Manager – Finance
Mr. Gerald Louis	:	Plant Maintenance Supervisor

St. Lucia Development Bank

Mr. Daniel Gerard	:	General Manager
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Gros Islet Fisheries Cooperative

Mr. Thaddeus Montoute	:	President
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St. Lucia Air & Sea Ports Authority

Mr. Dermot Peter Saltibus : Maritime Safety Administration

JICA Expert

Mr. Iwao Shindo : Fishery expert

Embassy of Japan in Trinidad Tobago

Takeshi Tsuruta : Ambassador

Takashi Suzuki : Councilor

Kenishi Namimatsu : Third Secretary

4. Minutes of discussions

MINUTES OF DISCUSSIONS BASIC DESIGN STUDY ON THE FISHERIES DEVELOPMENT PROJECT IN SAINT LUCIA (PHASE III)

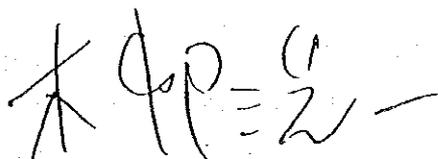
In response to the request from the Government of St. Lucia the Government of Japan decided to conduct a basic design study on the Fisheries Development Project (Phase III) (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to St. Lucia a study team, which is headed by Mr. Senichi Kimura, Deputy Director, Second Basic Design Study Division, Grant Aid Study and Design Department, JICA, and is scheduled to stay in the country from 18 July to 10 August, 1994.

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

In the course of discussions and field survey, both parties have confirmed the main items described on the attached sheets. The study team will proceed with further works and prepare the basic design study report.

Castries, 26 July, 1994

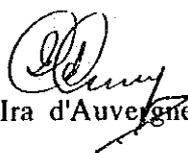


Mr. Senichi Kimura

Leader

Basic Design Study Team

JICA



Hon. Ira d'Auvergne

Minister

Ministry of Agriculture, Lands, Forestry and
Fisheries

ATTACHMENT

1. Objective

The objective of the Project is to accelerate development of fishery industries in St. Lucia by means of expansion of facilities and equipment.

2. Project component

The project consists of following components :

The location of each component is shown in Annex I

1. Expansion of Castries Fishery Complex
2. Establishment of Fishery Development Center
3. Expansion of Gros Islet Fish landing center

(Unless feasibility is confirmed by the further study, it might be excluded.)

3. Executing agency and Responsible organization

Fishery Department, Ministry of Agriculture, Lands, Forestry and Fisheries, St. Lucia
Organization chart is attached as Annex II

4. Item requested by the Government of St. Lucia

As a result of discussions and field survey by the study team, the items requested by the Government of St. Lucia were confirmed as shown in Annex III. However, the final components and specifications of each item of the Project will be decided after further studies.

5. Japan's Grant Aid system

- (1) The Government of St. Lucia has understood the system of Japanese Grant Aid explained by the study team.
- (2) The Government of St. Lucia will take necessary measures, described in Annex IV for smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

6. Schedule of the study

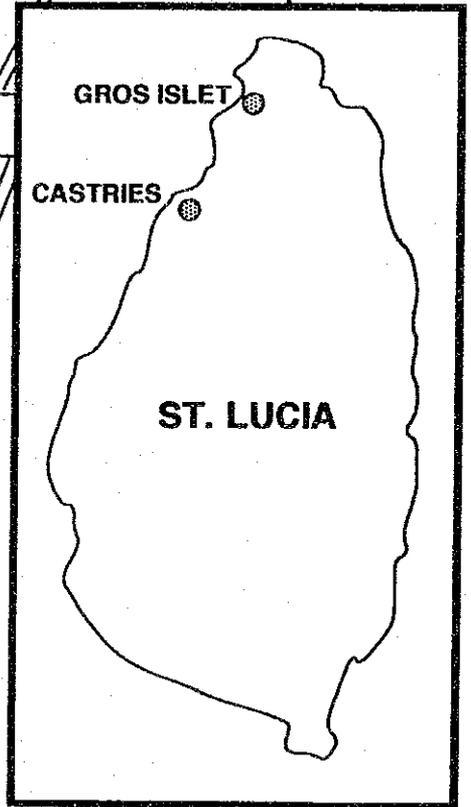
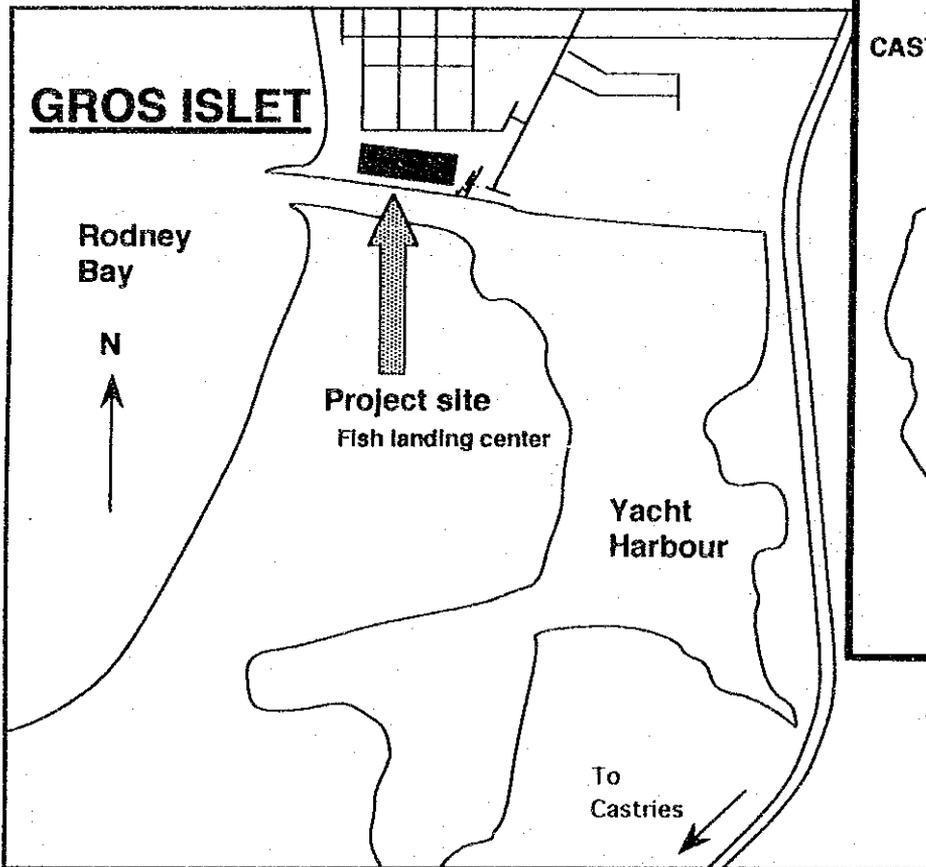
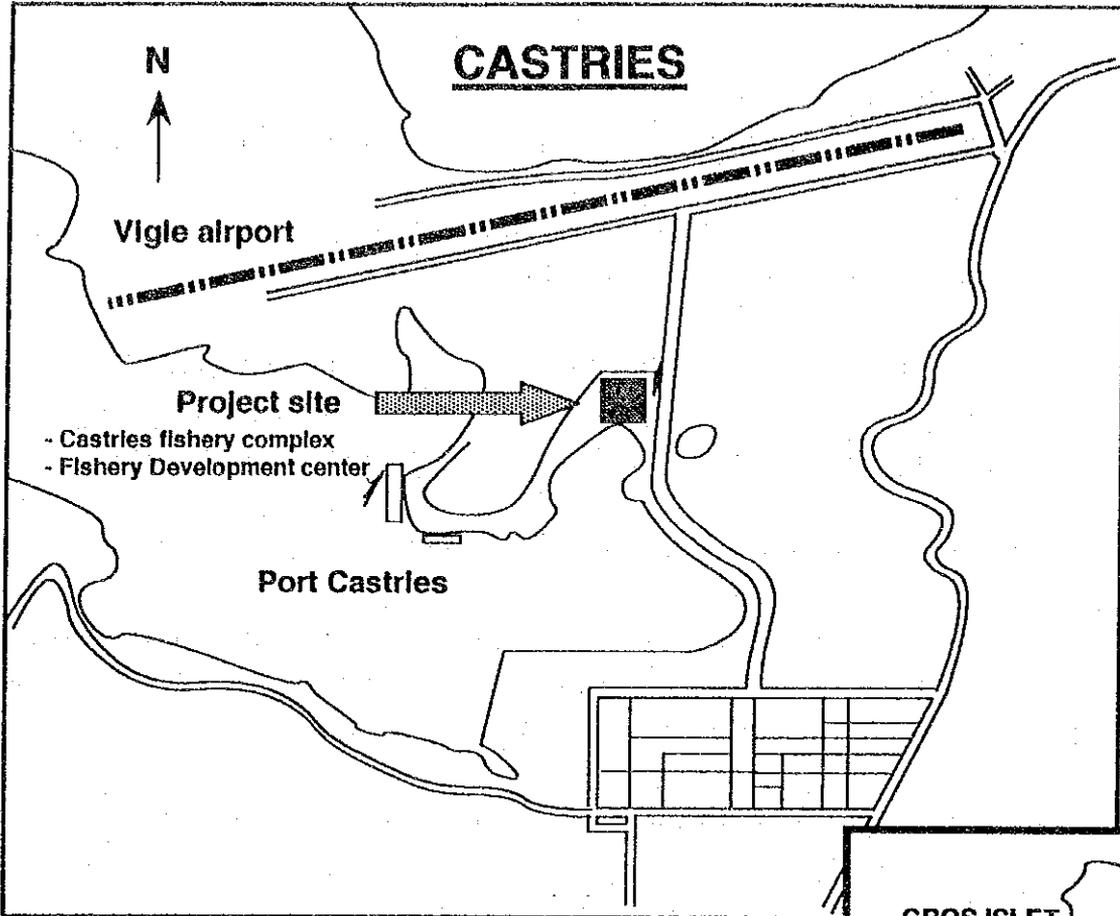
- (1) The consultant will conduct further studies in St. Lucia until 10 August, 1994.
- (2) JICA will prepare the draft final report in English and dispatch a mission to explain its contents around October 1994.
- (3) When the contents of the draft final report is accepted in principle by St. Lucia side, JICA will complete the final report and send it to the Government of the St. Lucia by January 1995.

7. Proper use of equipment and the counterpart fund

When some fishing equipment, purchased by Japan's grant, in case the Project is extended, are sold or leased to fishermen, the Government of St. Lucia shall take necessary measures as follows:

- (1) to inform the plan of sales and leasing to the Government of Japan,
- (2) to make fishermen who buy or lease equipment ensure effective and proper use of them,
- (3) to deposit, in local currency, the amount to be obtained by such sale or lease in a suitable account of the Government of St. Lucia as a counterpart fund,
- (4) to utilize the above-mentioned counterpart fund for the purpose of fisheries development and maintenance of equipment purchased by the grant from the Government of Japan, and
- (5) to report to the Government of Japan upon the use of the counterpart fund.

Annex I Location



ANNEX II

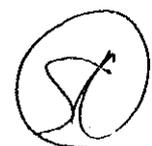
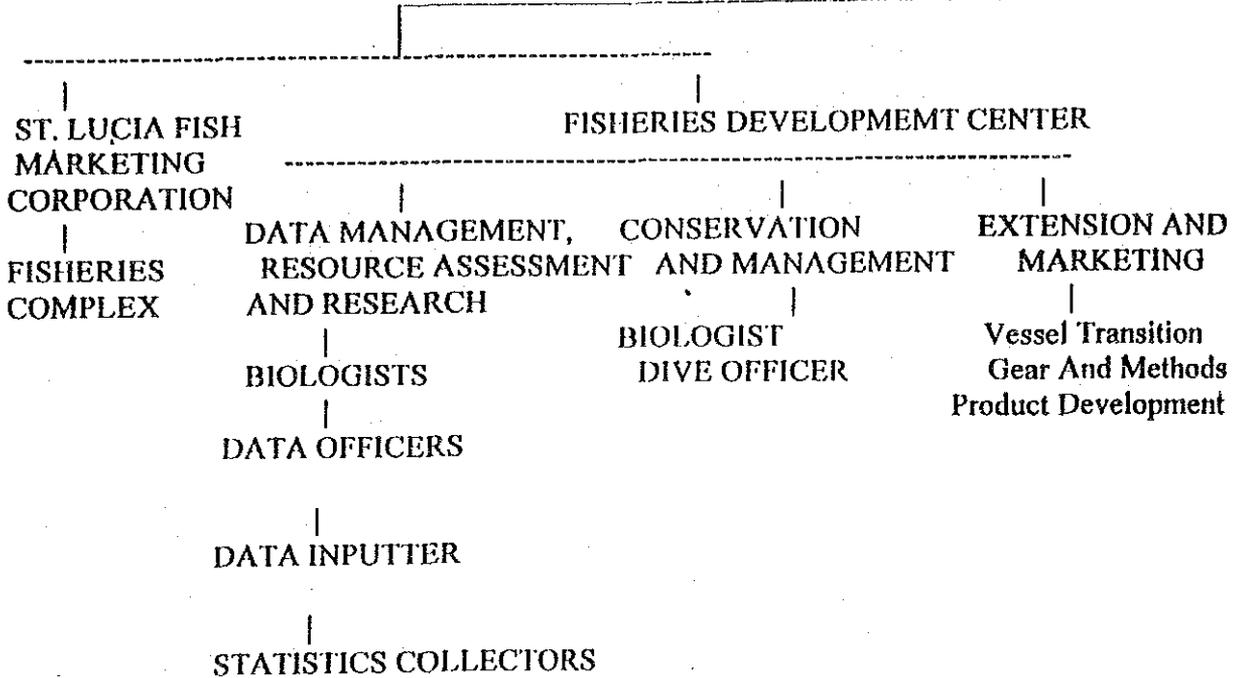
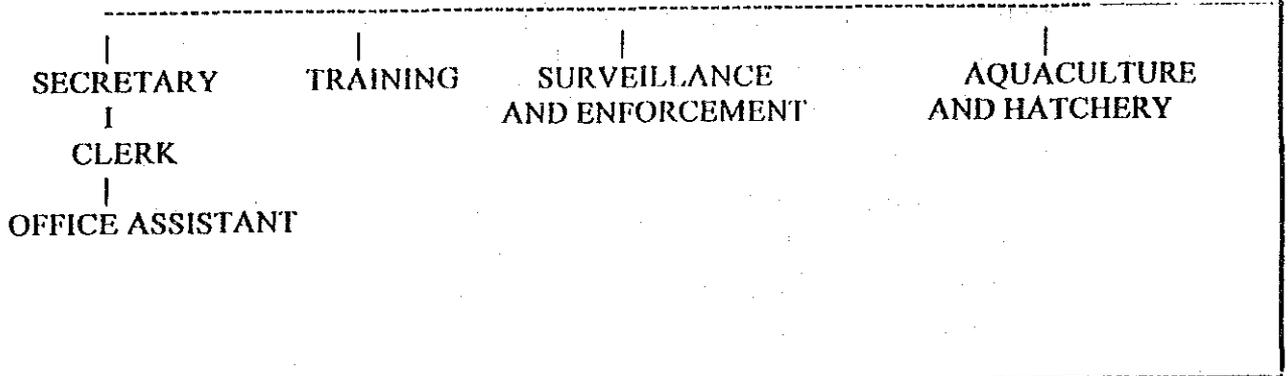
MINISTRY OF AGRICULTURE

PERMANENT SECRETARY

FISHERIES DEPARTMENT

JICA ----- CHIEF FISHERIES OFFICER

DEPUTY CHIEF FISHERIES OFFICER



Annex III

Item Requested by the Government of St. Lucia (in order of priority)

1. Expansion of Castries Fishery Complex
 - Blast Freezer
 - Cold Storage
 - Insulated truck

2. Establishment of Fishery Development Center
 - Center building
 - Fishing Training cum exploratory research vessel
 - Extension service vehicle
 - Radio Telephone System
 - Data Management Network and Accessories
 - Product Development Laboratory Equipment
 - Other fishing equipment

3. Expansion of Gros Islet Fish landing center (if feasible)
 - Canoe ramp
 - Access road
 - Fishermen's locker
 - Other necessary facilities

Annex IV

Necessary measures to be taken by the Government of St. Lucia in case Japan's Grant Aid is executed.

1. To secure the ownership and/or right of sites for the Project.
2. To clear and level the site prior to commencement of the Project.
3. To ensure that the sea area necessary for the construction of the facilities be freely accessible.
4. To secure yard for stocking material and constructing temporary facilities at the Project site.
5. To provide necessary permissions, licenses and other authorizations for smooth implementation of the Project.
6. To provide facilities for distribution of electricity, water supply, drainage, telephone line and other incidental facilities.
7. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
8. To exempt taxes and to take necessary measures for custom clearance of the materials and equipment brought for the project at the port of disembarkation.
9. To accord Japanese nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into St. Lucia and stay therein for the performance of their work.
10. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant.
11. To bear all the expenses other than those to be borne by the Grant, necessary for the Project.
12. To coordinate and solve any matters which may arise with third party and inhabitants living in the Project area during implementation of the Project.

**MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY
ON
THE FISHERIES DEVELOPMENT PROJECT (PHASE III)
IN ST LUCIA**

(CONSULTATION ON DRAFT FINAL REPORT)

In July 1994, the Japan International Co-operation Agency (JICA) dispatched the Basic Design Team on the Fisheries Development Project (Phase III) (hereinafter referred to as the Project) to St Lucia, and through discussions, field survey and technical examination of the results in Japan, JICA has prepared the draft report of the study.

In order to explain and consult the St Lucian side on the components of the draft final report, JICA sent to St Lucia a study team, which was headed by Mr Satoshi Kuwahara, Section Chief, International Affairs Division, Oceanic Fishery Department, the Fisheries Agency and scheduled to stay in the country from October 30 to November 06, 1994.

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

Castries, November 4, 1994

桑原 智

Mr Satoshi Kuwahara
Leader
Draft Final Report Explanation Team
JICA



Hon, Ira d'Auvergne
Minister
Ministry of Agriculture,
Lands, Forestry and
Fisheries

ATTACHMENT

1. Components of the Draft Final Report
The Government of St Lucia has agreed and accepted in principle the components of the Draft Final Report proposed by the Team.

2. Japan's Grant Aid Programme
 - (1) The Government of St Lucia has understood the system of Japanese Grant Aid explained by the Team
 - (2) The Government of St Lucia will take necessary measures, described in ANNEX, for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

3. Further schedule
The team will make the final report in accordance with the confirmed items, and send it to the Government of St Lucia by the end of January 1995.

7.
S. K

ANNEX

Necessary measures to be taken by the Government of St Lucia in case Japan's Grant Aid is executed.

1. To secure the ownership and/or right of sites for the Project.
2. To clear and level the sites prior to commencement of the construction.
3. To ensure that the sea area necessary for the construction of the facility be freely accessible.
4. To secure yard for stocking material and constructing temporary facilities at the Project site.
5. To provide necessary permissions, licenses, and other authorizations for smooth implementation of the Project.
6. To provide facilities for distribution of electricity, water supply, drainage, telephone line and other incidental facilities.
7. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
8. To exempt taxes and to take necessary measures for custom clearance of the materials and equipment brought for the project at the port of disembarkation.
9. To accord Japanese nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into St Lucia and stay therein for the performance of their work.
10. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant.
11. To bear all the expenses other than those to be borne by the Grant, necessary for the Project.
12. To co-ordinate and solve any matters which may arise with third party and inhabitants living in the Project area during implementation of the Project.

S.K.

5. FMC' Refrigerating Facilities Operating Plan and Expenses

(1) Operating plan for refrigerating facilities

On the basis of FMC's purchase goal set in chapter 4, item 4.4.2 (2), "Setting the scale of the planned facilities," the purchase quantity, the shipping quantity and the stock level for each month will be standardized, and the planned refrigerating facilities accordingly operated, as follows:

(a) Purchase quantity

Purchase goal: 360 tons/year

Of this, 324 tons will be purchased from January through June = 54 tons/month

36 tons will be purchased from July through December = 6 tons/month

(b) Shipping (Sales) quantity

120 tons from January through June = 20 tons/month

240 tons from July through December = 40 tons/month

1) Operation of the cold storage

The purchase quantity (arrival), the shipping quantity and the stock level for each month will be standardized, and each compartment of the cold storage accordingly operated, as follows:

Operation of each compartment

In tons

Month	Purchase quantity (Arrival)	Shipping (Sales) quantity	Stock level	Stock level at end of each month for each compartment				
				Existing cold storages		Planned cold storage		
				CIDA	At other localities	Compartment A	Compartment B	Compartment C
1	54	20	34	34	--	--	--	--
2	54	20	68	63	--	5	--	--
3	54	20	102	63	--	32	--	--
4	54	20	136	63	--	40	33	--
5	54	20	170	63	7	40	40	20
6	54	20	204	63	41	40	40	20
7	6	40	170	63	7	40	40	20
8	6	40	136	63	--	40	33	--
9	6	40	102	63	--	39	--	--
10	6	40	68	63	--	5	--	--
11	6	40	34	34	--	--	--	--
12	6	40	0	0	--	--	--	--

* Of the existing cold storage (CIDA)'s capacity or 70 tons, 7 tons will be set aside for imported marine products, and the remaining 63 tons for domestically purchased fish.

Therefore, the number of operating months (days) for the planned cold storage will be set as follows:

Compartment A = 10 months/year (300 days/year)

Compartment B = 4 months/year (100 days/year)

Compartment C = 4 months/year (120 days/year)

2) Operation of the freezer room

Existing freezer room:

1.4 tons/day (Although the nominal freezer capacity is about 2.7 tons, the capacity will fall to some 1.4 tons when the regular freezing method, namely, freezing-shelf dollies, is used)

Planned freezer room's compartment F-1 = 1.3 tons/day

Planned freezer room's compartment F-2 = 1.3 tons/day

It is assumed that collection and freezing operations will be done at a rate of 5 days a week for a total of 20 days a month. From January through June, the combined freezing quantity will be 2.7 tons/day. With variations in collected quantity in mind, the number of operating days for each freezer room will be set as follows:

From January through June:

Existing freezer room: = 120 days (20 days/month x 6 months)

Planned freezer room's compartment F-1 = 120 days (20 days/month x 6 months)

Planned freezer room's compartment F-2 = 60 days (10 days/month x 6 months)

From July through December:

Existing freezer room = 120 days (20 days/month x 6 months)

Planned freezer room's compartment F-1 = none

Planned freezer room's compartment F-2 = none

(2) Operating expenses of planned refrigerating facilities

1) Electricity charges

Refrigerating compressor capacity and annual operating days for freezer room and cold storage

Freezer room	Compartment F-1	18.5 kw	120 days/year
	Compartment F-2	18.5 kw	60 days/year
Cold storage	Compartment A	11 kw	300 days/year
	Compartment B	11 kw	180 days/year
	Compartment C	7.5 kw	120 days/year

Electricity consumption

(a) Freezer room

	Power rating of freezing equipment	Efficiency	Daily operating hours	kwh/day	kwh/year	Total kwh
F-1	Compressor 18.5kw x 1	0.8	20	296	35,520	39,732
	Condenser 0.1kw x 6	0.8	20	9.6	1,152	
	Cooling unit 0.75kw x 2	0.8	20	24	2,880	
	Defrost pump 2.2kw x 1	1.0	0.7	1.5	180	
F-2	Compressor 18.5kw x 1	0.8	20	296	17,760	19,866
	Condenser 0.1kw x 6	0.8	20	9.6	576	
	Cooling unit 0.75kw x 2	0.8	20	24	1,440	
	Defrost pump 2.2kw x 1	1.0	0.7	1.5	90	
Total kwh for freezing equipment						59,598

(b) Cold storage

Cold storage	Power rating of freezing equipment	Efficiency	Daily operating hours	kwh/day	kwh/year	Total kwh
A	Compressor 11kw × 1	0.7	20	154	46,200	57,000
	Condenser 0.1kw × 5	0.8	20	8	2,400	
	Cooling unit 0.4kw × 2	0.8	20	16	4,800	
	Defrost heater 12kw × 1	1.0	1.0	12	3,600	
B	Compressor 11kw × 1	0.7	20	154	27,720	34,200
	Condenser 0.1kw × 5	0.8	20	8	1,440	
	Cooling unit 0.4kw × 2	0.8	20	16	2,880	
	Defrost heater 12kw × 1	1.0	1.0	12	2,160	
C	Compressor 7.5kw × 1	0.7	20	105	12,600	14,856
	Condenser 0.1kw × 4	0.8	20	6.4	768	
	Cooling unit 0.4kw × 1	0.8	20	6.4	768	
	Defrost heater 6kw × 1	1.0	1.0	6	720	
Total kwh for cold storage equipment						106,056

Total electricity consumption = (a) + (b) = 165,654 kwh/year

Annual electricity charges = 165,654 kwh/year × (basic rate 0.40 EC dollars/kwh + surcharge 0.12 EC dollars/kwh)
= 86,140 EC dollars/year

2) Maintenance expenses

The refrigerating facilities will require no particular overhaul for the first several years (3 to 4 years) of operation. No particular parts replacement or refrigerant refilling will be required, either. To be on the safe side, however, the following expenses will be taken into account:

Refrigerant 50 kg/year × 25 EC dollars/kg	=	1,250 EC dollars/year
Refrigerating machine oil 100 liters/year × 10 EC dollars/litter	=	1,000 EC dollars/year
Parts and repair expenses	=	3,000 EC dollars/year
Total		5,250 EC dollars/year

Assuming that the first overhaul will be carried out five years after the start of operation, with each succeeding overhaul at 3 years intervals thereafter, 15,000 EC dollars/overhaul will be taken into account.

(3) FMC's financial conditions (Fiscal 1991 through 1993)

Balance sheet

Fiscal year	In thousands of EC dollars		
	1991	1992	1993
Assets	4,071	4,447	4,420
Current assets	1,449	2,039	2,218
Fixed assets	2,621	2,408	2,201
Liabilities			
Current liabilities	247	230	336
Deferred funding assistance	2,703	2,640	2,578
Stockholder's equity			
Paid-in capital	0,015	0,015	0,015
Contributed capital	2,002	2,002	2,002
Profit/loss carried forward	▲ 882	▲ 426	▲ 497

Income statement

Fiscal year	In thousands of EC dollars		
	1991	1992	1993
Sales	5,828	6,411	6,216
Purchases	4,763	4,738	4,977
Production cost	614	859	979
Cost of sales	5,377	5,597	5,956
Gross profit	451	814	260
Operating expenses	539	450	440
Operating income	▲ 88	364	▲ 180
Non-operating income	12	29	46
Amortization of deferred funding assistance	63	63	63
Net income for the year	▲ 13	456	▲ 71
Profit/loss carried forward	▲ 882	▲ 426	▲ 497

(4) Estimate of sales and purchases arising from the operation of planned facilities

1) Sales

Domestically produced fish:

Average selling price = 5.70 EC dollars/lb. (For fiscal 1993)

Quantity: 360 tons = 793,700 lb.

Amount: 4,524,000 EC dollars(1)

Imported fish:

(It is assumed that the quantity of imported fish will be kept at the 1993 level)

Average selling price: 14.23 EC dollars/lb. (For fiscal 1993)

Quantity: 98.69 tons = 217,868 lb.

Amount: 3,100,000 EC dollars(2)

Total sales = (1) + (2) = 7,545,000 EC dollars

2) Purchases

Domestically produced fish:

Average purchasing price = 4.22 EC dollars/lb. (For fiscal 1993)

Quantity: 360 tons = 793,700 lb.

Amount: 3,349,000 EC dollars(3)

Imported fish:

Average selling price: 11.27 EC dollars/lb. (For fiscal 1993)

Quantity: 98.69 tons = 217,868 lb.

Amount: 2,455,000 EC dollars(4)

Total purchases = (3) + (4) = 5,804,000 EC dollars

3) Production cost

Following estimate is based on the production cost for the fiscal year 1993:

	1993	Estimate of production cost arising from operation of planned facilities	Estimate assumptions
Plant supplies	110,913	122,000	Will increase by 10%
Import duties, brokerage	173,107	174,000	Imported fish will remain unchanged in both quantity and dollar amount
Wages	174,243	244,000	Will increase in proportion to a 40% increase in purchased fish quantity.
Water	8,374	12,000	Will increase in proportion to a 40% increase in purchased fish quantity
Electricity	171,000	258,000	Increase due to operation of planned freezer room and cold storage will be 86,140 EC dollars/year
Plant maintenance	31,656	37,000	Maintenance cost for planned refrigerating facilities will be 53,000 EC dollars
Vehicle expenses	29,245	44,000	One vehicle will be added to existing 2 vehicles under the Project, resulting in an 50% increase in vehicle expenses
Salaries	106,956	136,000	Will increase by 3 (2 freezer men and 1 driver), amounting to an increase of 800 EC dollars/month \times 12 months \times 3
Insurance	49,913	55,000	Will increase by 10%
Depreciation	123,835	224,000	Refrigerating facilities will be depreciated equally over 7 years: 700,000 EC dollars \times 1/7 = 100,000 EC dollars
Total	979,242	1,306,000	

Therefore, the operating income following the operation of the planned facilities is estimated as follows:

In thousands of EC dollars	
Sales	7,624
Purchases	5,804
Production cost	1,306
Cost of sales	7,110
Gross profit	514
Operating expenses	450
Operating income	64

6. Exploratory Fishing Boat Operation Expenses

ESTIMATION OF OPERATION COST OF THE EXPLORATRY FISHING BOAT

AAA. MAIN PARTICULARS OF THE BOAT

Length o.a. :	Approx.	12.7 meter
Breadth	Approx.	3.8 meter
Depth	Approx.	2.2 meter
Main engine	Approx.	330 HP
Compliment		5 persons

BBB. FACTORS ON OPERATION COST

Fuel	0.65	EC\$/liter	(L.O is estimated at 5% of F.O cost.)
Wages for crew			
Captain	1,500	EC\$/month	
Engineer	1,200	EC\$/month	
Deck-hand (A)	900	EC\$/month	
Deck-hand (B)	700	EC\$/month	
Deck-hand (C)	600	EC\$/month	
Provisions	100	EC\$/day	(5persons/day)
Fresh water	0.02	EC\$/liter	(Consumption: approx.15 liter/person/day)
Unit price of ice	0.50	EC\$/kg	
Quantity of ice	1,000	kg/voyage	
Bait	1000	EC\$/vage	(250pcs/time x 4times/voyage x 200g/pc. x 11EC\$/kg)
Fishing gears, material	15,000	EC\$/year	
Maintenance cost of engine	12,000	EC\$/year	(Approx.5% of price of engine)
Maintenance cost of hull	8,000	EC\$/year	(Running repair, bottom cleaning, painting etc.)
Supply/stores	5,000	EC\$/year	(Rope, deck stores)

CCC. OPERATION SCHEDULE

(1) Annual operation schedule

1) Fishing operation (Tuna fishing)	2 voyages/month (Jan-Jun) + 1 voyage/month (5 months)	17	Voyages/year
2) Other exploratory fishing operation		11	Voyages/year
3) Marine research	1 voyage/month x 11	11	Voyages/year

(2) Operation plan per voyage

1) Long-line fishing operation (Tuna fishing)			
Number of days per voyage		4	days/voyage
Sailing to fishing ground from port		0.3	day
Number of days for fishing		2	days/voyage
Number of fishing operation		3	times/voyage (6 hours per operation)
Sailing from fishing ground to fishing ground		0.3	day
Sailing to port from fishing ground		0.3	day
2) Other exploratory fishing operation			
Number of days per voyage		2	days/voyage
Sailing to fishing ground from port		0.2	day
Number of days for fishing		1	days/voyage
Number of fishing operation		3	times/voyage (3 hours per fishing)
Sailing to port from fishing ground		0.2	day
3) Marine research			
Number of days per voyage		2	days/voyage
Sailing to research area from port		0.3	day
Number of days for research		0.5	days/voyage
Sailing to port from research area		0.3	day

DDD. SUMMARY OF OPERATION COST

Annual operation schedule	Number of voyage	Days/voyage	Total days
1) Long-line fishing	17 Voyages/year	4	68 days/year
2) Other fishing	11 Voyages/year	2	22 days/year
3) Marine research	11 Voyages/year	2	22 days/year
Total	39 Voyages/year		112 dyas/year

Annual operation cost		
(1) Fuel oil		41,690 EC\$/year
(2) Wages for crew		58,800
(3) Provisions		11,434
(4) Ice		10,100
(5) Fishing gears/mateials		15,000
(6) Supply/stores		5,000
(7) Maintenance for engine		12,000
" for hull		8,000
Total		162,024 EC\$/year
Income from fish caught in fishing operations		155,960 EC\$/year
		(6,063 EC\$/year)

EEE. COST ESTIMATION

(1) Fuel oil

Main engine horse power	330 HP
FO consumption rate	185 g/HP/hr
Specific gravity of FO	0.85

1) Long-line fishing operation (tuna fishing)

(a) Sailing	
Engine load rate	85 %
FO consumption per hr.	61 liter/hr.
Sailing hours	22 hours
FO consumption for saili	1,319 liter
(b) Fishing	
Engine load rate	60 %
FO consumption per hr.	43 liter/hr.
Fishing hours	18 hours
FO consumption for saili	776 liter
FO consumption per voyage	2,094 liter/voyage (a) + (b)
Cost for FO	1,361 EC\$/Voyage

2) Other exploratory fishing operation

FO consumption per voyage	
(c) Sailing	
Engine load rate	85 %
FO consumption per hr.	61 liter/hr.
Sailing hours	10 hours
FO consumption for saili	586 liter
(d) Fishing	
Engine load rate	65 %
FO consumption per hr.	47 liter/hr.
Fishing hours	9 hours
FO consumption for saili	420 liter
FO consumption per voyage	1,006 liter/voyage (c) + (d)
Cost for FO	654 EC\$/Voyage

3) Marine research

FO consumption per voyage		
(e) Sailing		
Engine load rate	85 %	
FO consumption per hr.	61 liter/hr.	
Sailing hours	14 hours	
FO consumption for saili	879 liter	
(f) Research		
Engine load rate	50 %	
FO consumption per hr.	36 liter/hr.	
Fishing hours	12 hours	
FO consumption for saili	431 liter	
FO consumption per voyage	1,310 liter/voyage	(f) + (g)
Cost for Fuel Oil	852 EC\$/Voyage	

Fuel oil per year

	Number of voyage	Q'nty/voyage	Q'nty annual	FO Cost
1) Long-line fishing	17 Voyages/year	2,094	35,604	23,143
2) Other fishing	11 Voyages/year	1,006	11,069	7,195
3) Marine research	11 Voyages/year	1,310	14,411	9,367
			61,084	39,704 EC\$/year
L.O. per year = to be estimated at 5 % of cost for F.O.				1,985 EC\$/year
			Total	41,690 EC\$/year

(2) Wages for crew

Captain	1,500 EC\$/month	18,000 EC\$/year
Engineer	1,200 EC\$/month	14,400 EC\$/year
Deck-hand (A)	900 EC\$/month	10,800 EC\$/year
Deck-hand (B)	700 EC\$/month	8,400 EC\$/year
Deck-hand (C)	600 EC\$/month	7,200 EC\$/year
	4,900 EC\$/month	58,800 EC\$/year

(3) Provisions

	Number of voyage	Days/voyage	Total days
1) Long-line fishing	17 Voyages/year	4	68
2) Lift-net fishing	11 Voyages/year	2	22
3) Marine research	11 Voyages/year	2	22
Total	39 Voyages/year		112 dyas/year
	Provisions per day		100 EC\$/day/Screw
	Provisions per year		11,200 EC\$/year
Fresh water	300 liter/voyage		0.02 EC\$/liter
	Water per year		234 EC\$/year
Annual provisions cost			11,434 EC\$/year

(4) Ice

	Number of voyage	Q'nty/voyage	Total q'nty
1) Long-line fishing	17 Voyages/year	800	13,600 kg/year
2) Other fishing	11 Voyages/year	500	5,500
3) Marine research	11 Voyages/year	100	1,100
Total	39 Voyages/year		20,200 kg/year
	Price of ice		0.50 EC\$/kg
	Annual cost for ice		10,100 EC\$/year

**FFF. ESTIMATE OF CATCH IN EXPERIMENTAL FISHING OPERATIONS
AND REVENUE FROM THE CATCH**

(1) Long-line fishing (Tuna fishing)

Number of hooks	400 pcs/set		
Catching rate	1.5 %		
Average weight of fish caught	40 kg/pc.		
Number of fishing operation	3 times/voyage		
Quantity of catch/voyage	720 kg/voyage		
Quantity of catch/year	12,240 kg/year		
Saling price	11.04 EC\$/kg	(=	5.00 EC\$/lb)
Sales per year	135,099 EC/year		

(2) Other fishing

Quantity of catch per time	150 kg/time		
Number of fishing operation	3 times/voyage		
Quantity of catch/voyage	450 kg/voyage		
Quantity of catch/year	4,950 kg/year		
Bait for fishing tuna	180 kg/voyage		
	3,060 kg/year		
Quantity for sale	1,890 kg/year		
Saling price	11.04 EC\$/kg	(=	5.00 EC\$/lb)
Sales per year	20,861 EC\$/year		

Total revenue in saling fish caught 155,960 EC\$/year

ESTIMATION OF OPERATION COST OF THE SMALL EXPERIMENTAL FISHING BOAT

AAA. MAIN PARTICULARS OF THE BOAT

Length o.a. :	Approx.	10 meter
Breadth	Approx.	2.8 meter
Depth	Approx.	1.7 meter
Main engine	Approx.	135 HP
Speed	Approx.	knot
Compliment		3 persons

BBB. FACTORS ON OPERATION COST

Fuel	0.65	EC\$/liter	(L.O is estimated at 5% of F.O cost.)
Wages for crew			
Captain	1,000	EC\$/month	
Deck-hand (B)	700	EC\$/month	
Deck-hand (C)	600	EC\$/month	
Provisions	60	EC\$/day	(3persons/day)
Fresh water	0.02	EC\$/liter	(Consumption: approx.10 liter/person/day)
Unit price of ice	0.50	EC\$/kg	
Quantity of ice	150	kg/voyage	
Bait	287	EC\$/vage	(200pcs/time x 1times/voyage x 100g/pc. x 14.3EC\$/kg)
Fishing gears, material	6,000	EC\$/year	
Maintenance cost of engine	7,000	EC\$/year	(Approx.5% of price of engine)
Maintenance cost of hull	1,000	EC\$/year	(Running repair, bottom cleaning, painting etc.)
Supply/stores	1,000	EC\$/year	(Rope, deck stores)

CCC. OPERATION SCHEDULE

(1) Annual operation schedule

1) Fishing operation (Tuna fishing)	10 voyages/month (Jan-Jun)	60	Voyages/year
2) Other exploratory fishing operation	5 Voyages/month(Jul-Dec)	30	Voyages/year

(2) Operation plan per voyage

1) Long-line fishing operation (Tuna fishing)			
Number of days per voyage		1	days/voyage
Sailing to fishing ground from port		0.3	day
Number of days for fishing		1	days/voyage
Number of fishing operation		1	time/voyage (6 hours per operation)
Sailing to port from fishing ground		0.3	day
2) Other exploratory fishing operation			
Number of days per voyage		1	days/voyage
Sailing to fishing ground from port		0.2	day
Number of days for fishing		1	days/voyage
Number of fishing operation		1	times/voyage (3 hours per fishing)
Sailing to port from fishing ground		0.2	day

DDD. SUMMARY OF OPERATION COST

Annual operation schedule			
	Number of voyage	Days/voyage	Total days
1) Long-line fishing	60 Voyages/year	1	60 days/year
2) Other fishing	30 Voyages/year	1	30 days/year
Total	90 Voyages/year		90 days/year

Annual operation cost	
(1) Fuel oil	23,444 EC\$/year
(2) Wages for crew	27,600
(3) Provisions	5,508
(4) Ice	5,700
(5) Bait	17,219
(5) Fishing gears/materials	6,000
(6) Supply/stores	1,000
(7) Maintenance for engine	7,000
" " for hull	1,000
Total	94,471 EC\$/year

Income from fish caught in fishing operations	96,026 EC\$/year
Profit	(1,555 EC\$/year)

EEE. COST ESTIMATION

(1) Fuel oil

Main engine horse power	135 HP
FO consumption rate	185 g/HP/hr
Specific gravity of FO	0.85

1) Long-line fishing operation (tuna fishing)

(a) Sailing

Engine load rate	80 %
FO consumption per hr.	24 liter/hr.
Sailing hours	14 hours
FO consumption for sailing	338 liter

(b) Fishing

Engine load rate	55 %
FO consumption per hr.	16 liter/hr.
Fishing hours	6 hours
FO consumption for sailing	97 liter

FO consumption per voyage	435 liter/voyage	(a) + (b)
Cost for FO	283 EC\$/Voyage	

2) Other exploratory fishing operation

FO consumption per voyage

(c) Sailing

Engine load rate	80 %
FO consumption per hr.	24 liter/hr.
Sailing hours	10 hours
FO consumption for sailing	226 liter

(d) Fishing

Engine load rate	55 %
FO consumption per hr.	16 liter/hr.
Fishing hours	3 hours
FO consumption for sailing	48 liter

FO consumption per voyage	274 liter/voyage	(c) + (d)
Cost for FO	178 EC\$/Voyage	

Fuel oil per year	Number of voyage	Q'nty/voyage	Q'nty annual	FO Cost
1) Long-line fishing	60 Voyages/year	435	26,127	16,982
2) Other fishing	30 Voyages/year	274	8,224	5,346
			34,351	22,328 EC\$/year
L.O. per year = to be estimated at 5 % of cost for F.O.				1,116 EC\$/year
				Total 23,444 EC\$/year

(2) Wages for crew

Captain	1,000 EC\$/month	12,000 EC\$/year
Deck-hand (B)	700 EC\$/month	8,400 EC\$/year
Deck-hand (C)	600 EC\$/month	7,200 EC\$/year
	2,300 EC\$/month	27,600 EC\$/year

(3) Provisions

	Number of voyage	Days/voyage	Total days
1) Long-line fishing	60 Voyages/year	1	60
2) Other fishing	30 Voyages/year	1	30
Total	90 Voyages/year		90 days/year
			Provisions per day 60 EC\$/day/5crew
			Provisions per year 5,400 EC\$/year
Fresh water	60 liter/voyage		0.02 EC\$/liter
	Water per year		108 EC\$/year
Annual provisions cost			5,508 EC\$/year

(4) Ice

	Number of voyage	Q'nty/voyage	Total q'nty
1) Long-line fishing	60 Voyages/year	150	9,000 kg/year
2) Other fishing	30 Voyages/year	80	2,400
Total	90 Voyages/year		11,400 kg/year
			Price of ice 0.50 EC\$/kg
			Annual cost for ice 5,700 EC\$/year

(5) Bait for tuna fishing

200 pcs/time x	60 times/year x	
100 g/pcs	=	1200 kg/year
		6.5 EC\$/lb
		17,219 EC\$/year

FFF. ESTIMATE OF CATCH IN EXPERIMENTAL FISHING OPERATIONS

(1) Long-line fishing (Tuna fishing)

Number of hooks	200 pcs/set		
Catching rate	1.5 %		
Average weight of fish caught	40 kg/pc.		
Number of fishing operation	1 times/voyage		
Quantity of catch/voyage	120 kg/voyage		
Quantity of catch/year	7,200 kg/year		
Selling price	11.04 EC\$/kg	(=	5.00 EC\$/lb)
Sales per year	79,470 EC/year		

(2) Other fishing

Quantity of catch per time	50 kg/time		
Number of fishing operation	1 times/voyage		
Quantity of catch/voyage	50 kg/voyage		
Quantity of catch/year	1,500 kg/year		
Quantity for sale	1,500 kg/year		
Saling price	11.04 EC\$/kg	(=	5.00 EC\$/lb)
Sales per year	16,556 EC\$/year		

Total revenue in saling fish caught 96,026 EC\$/year

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