through prompt communications between the Fisheries Department and Paramaribo Market promptly, a 150 MHz radio telephone should be installed at each facility.

(5) Refrigerating van

Good road condition and ferry service between Paramaribo and the proposed site present no problems with truck transportation. A systematic shipment by refrigerating van to the Paramaribo Market as well as to remote areas promises stable prices of the center's products and extension of the market.

(6) Winch for the slipway

The maximum weight of a target boat (Guyana type fishing boat) is as heavy as 16 tons, and the speed of the Suriname is rather high. In order to ensure pulling a boat, a winding drum type winch attached with a wire traverser and warping end drum should be adopted.

(7) Cradle

One cradle on which a boat is carried on the concrete slipway should be provided.

(8) Ice conveyer

In order to make ice loading work efficiency an ice conveyer should be provided in the ice store.

5-2 Study of Design Conditions

(1) Sedimentation of earth and sand at the riverbank of the proposed site is little as compare with the opposite bank; waves and swells hardly penetrate from the mouth of the river. It is judged that the site presents no problem about the security of a mooring facility.

(2) The Suriname River is flowing at a rather high speed and the range of tide is as large as some 2.5 m. However, the mooring facility of a pontoon type is expected to cope with such natural conditions because boats are small.

(3) The bearing capacity of the soil is enough for the required one of 4 tons/m^2 of the proposed building.

(4) From the viewpoint of the availability of local constructors and construction machinery it will be possible to construct a required mooring facility if a proper construction method is adopted at the early stage and some construction equipment is brought from Japan or other countries.

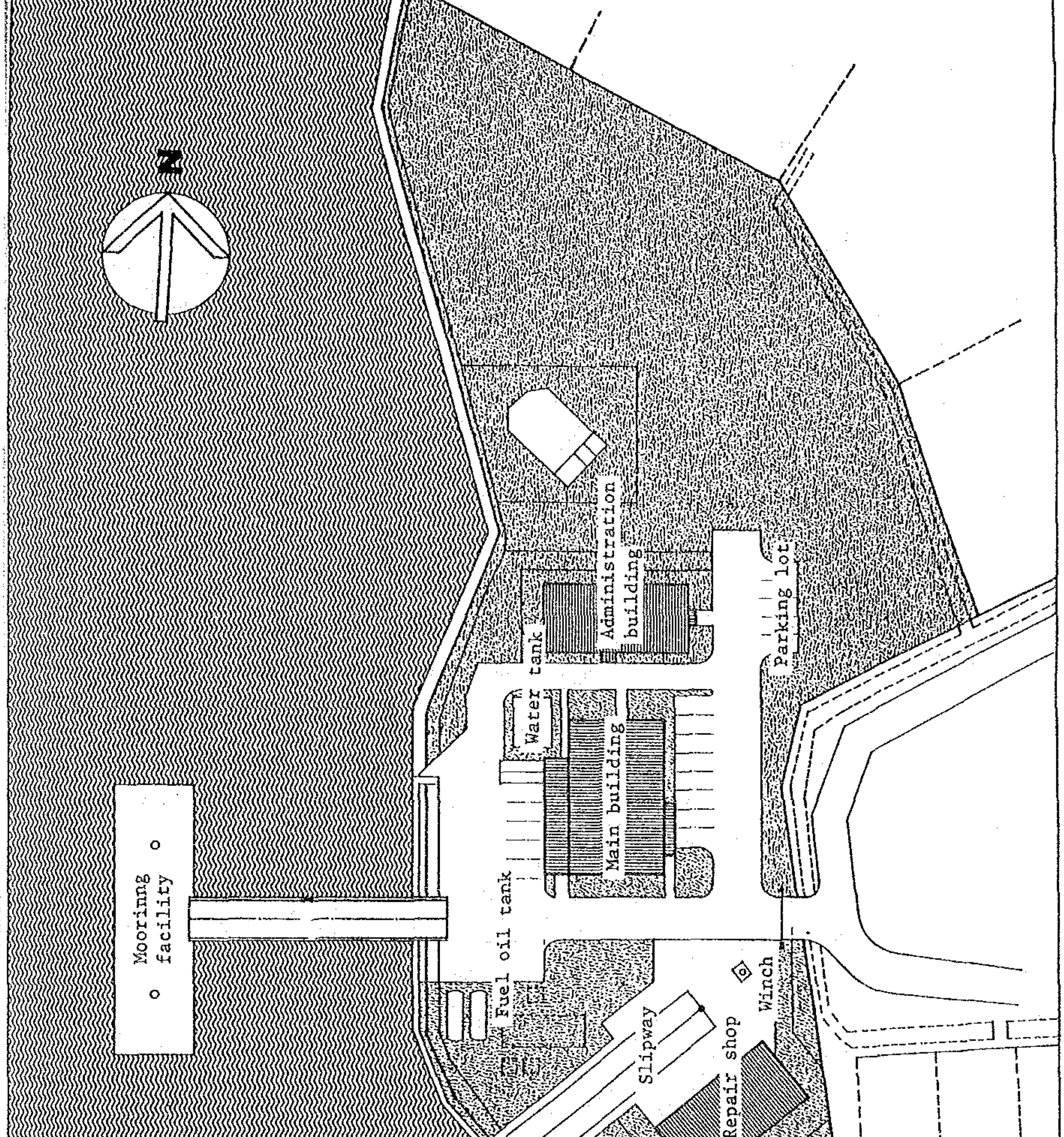
(5) As regards shore facilities, local constructores have enough capacity for the construction of requied buildings, but heat-insulation work will need technical assistance of Japan or other countries. Also refrigerating machinery must be procured in Japan or a third country.

5-3 Basic Planning

5-3-1 Site Layout

On the center of the site is the pontoon with the access bridge facing the river. At the base of the access bridge is the main building on the shortest traffic line between them. The administration building is placed nearby the main building, north of it, so that staffs can see activities of fishing boats around the pontoon. The repair shop, together with the slipway, is constructed on the south of the site; around the slipway is a outdoor repair yard. A parking lot is located east of the main building and east of the administration building respectively. Vehicles can use the existing access road running on the east of the site, and for people on foot a road makes it possible for them to access to the site through the existing road on the wharf and the Monument is constructed.

Fig. 18 Site Layout



5-3-2 Civil Engineering Work

(1) River wall

1) Dimensions

Based on the Site Plan submitted by the Suriname side and the results of the field survey, a river wall is to be constructed within the limits of an access bridge plus a slipway. Considering the experienced maximum tide level (+3.28 m) and mean high tide level (+2.88 m), the levee crown will be +3.5 m.

2) Building construction

Building construction contains the sheet pile type and gravity-type. The schema of each type is shown in Fig. 18 and 19. On the field survey the following are ascertained.

- The foundation of the existing river wall is of soft clay, which is covered with concrete blocks and ripraps, and several parts are broken due to poor materials and tide.
- The outermost layer is so soft that it cannot support heavy articles.
- Since the tide is running at a rather high speed, light and handling-easy construction materials are preferable.

Based on the above findings the sheet pile type is to be adopted.

3) Basic specifications

- Construction style — Sheet pile type
- Length — 65 m
- Levee crown height — + 3.5 m

Fig 19 Sheet Pile Type

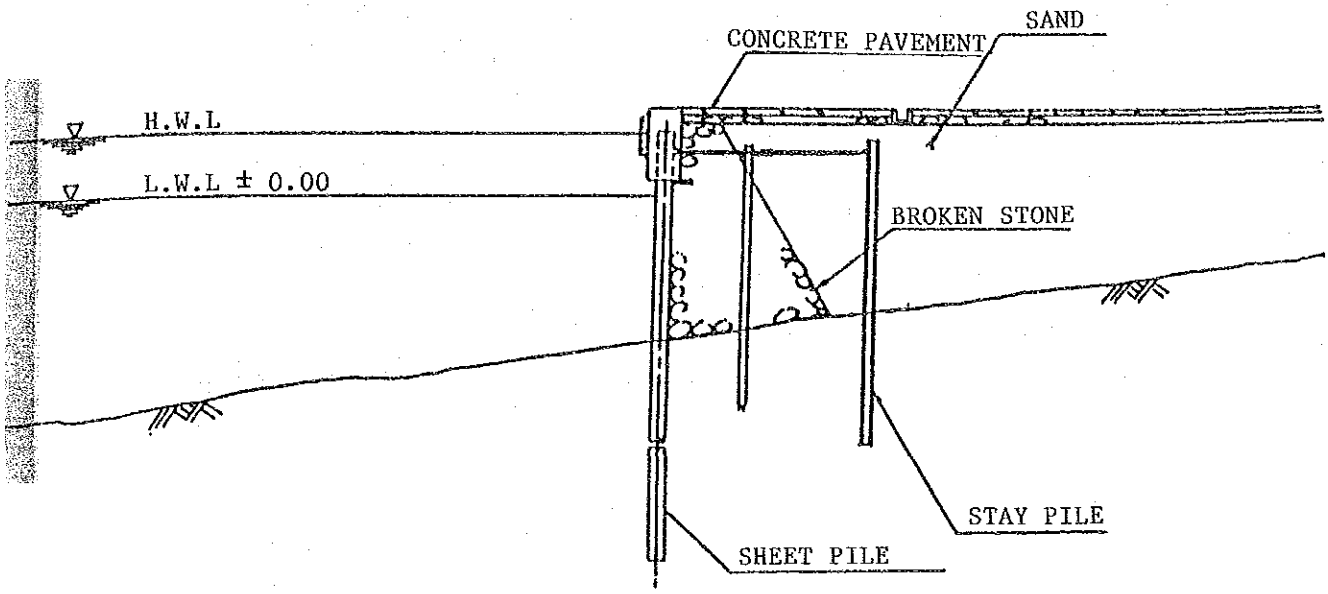
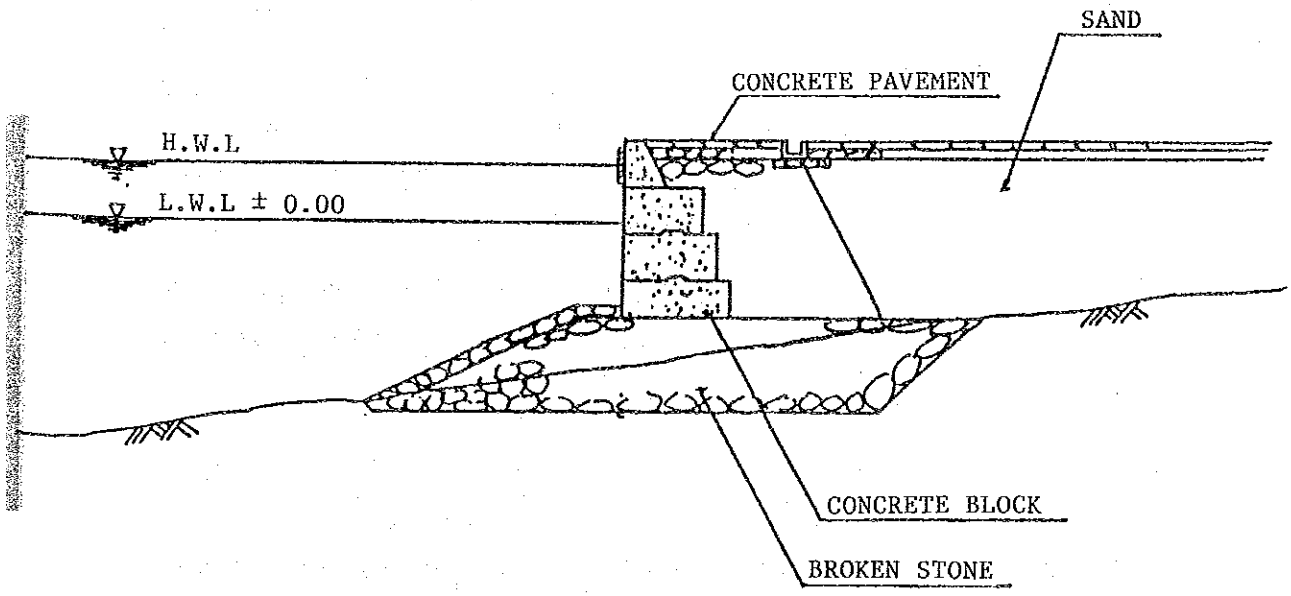


Fig 20 Gravity Type



(2) Mooring facility

1) Required scale

Basic factors

① Natural conditions

- Tide HWL + 2.5 m
  LWL + 0.0 m
- Levee crown + 3.5 m
- Load 0.5 ton/㎡ and one 1 ton truck

② Fishing fleet

a. Number of the fishing boats

The fishing boats of 5 fishing villages plus Paramaribo are shown as the table below.

Table 11 Fishing fleet

Village	Guyana type	Suriname type	total
Pomona	2	58	60
Rust En Werk	0	45	45
Johan En Margareta	0	45	45
Kroonenburug	0	30	30
Nieuw Amsterdam	20	20	40
Sub total	22	198	220
Paramaribo	120	0	120
Grand total	142	198	340

Out of the above fleet Paramaribo-based boats and boats belonging to Pomona villages located at the mouth of the Suriname River are to be omitted. Thus the number of the boats which the Project covers is 22 Guyana type boats plus 140 Suriname type boats.

b. Dimensions of the boat

The table on the following page shows the dimensions of the boat working currently.

Table 12 Dimensions of the Boat

	Length	Breadth	Depth	Draft	Freeboard
Guyana type	14.0m	2.3m	1.5m	0.7m	0.8m
Suriname type	8.5m	1.2m	0.8m	0.4m	0.4m

c. Operation pattern of the boat

Table 13 Operation Pattern of the Boat

	Guyana type	Suriname type
Days under way	7 days	1 day
Trip	30 trips/year	275 trips/year
Landing hours	1 hour	0.25 hour
Concentration	6 hours	3 hours

Berth Length

① Mooring method

- The boat will bring alongside the mooring facility.
- On the offshore side subject to the wind and waves the boats will bring alongside the mooring facility in a single line, and the both ends can be used supplementally.
- On the shore side and the downriver side of the facility, double mooring can be permitted.

② Required number of the berths and length of the berth

- Guyana type boats

No. of boats×operating days×No. of trips/office days of the center=

$22 \times 7 \times 30/300 = 15.4 \fallingdotseq 16$ boats

The expected number of boats per day is;

16 boats ÷7 days=2.3≒ 3 boats

The required number of the berths is;

Boats per day ÷concentrating hours ×landing hours=

3 boats ÷6 hours ×1.0 hour=0.5≒1 berth

Thus the required length of the berth for one boat is;

Boat's length ×Clearance(between boats)×1 =14.0 m ×1.15×1=16.1 m

- Suriname type boats

Similarly,

140 ×1 ×275/365=105 boats

105 ÷3 ×0.25 (landing hours)=8.8≒9 berths

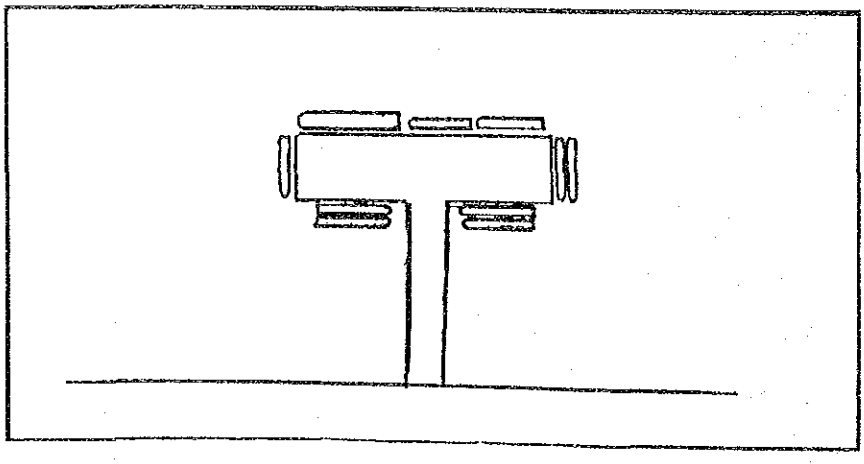
8.5 ×1.15=9.8 m

③ Required dimensions of the berth

Based on the following mooring method the required length of the berth will be calculated as follows;

- Offshore side: One berth for the Guyana type boat+2 berths for the Suriname type boat.
- Shore side: Two berths for the Suriname type boat (4 boats in two rows).
- Both ends: Two berths for the Suriname type boat (2 boats in two rows on the downriver side).

Fig.21 Mooring Method



The required length of the berth is as follows;

- Offshore side: No. of berths ×berth length+Allowance=

  16.1×1 +9.8 ×2 = 35.7 m

- Shore side: 9.8 ×2 +5.0 ×1.15 = 25.4 m

Also a 5 m wide access bridge (unavailable for mooring) should be constructed to connect the shore.

Thus the required length of the facility will be 36 m.

As of the breadth, considering the size of one truck working on the facility and the additional provision of the mooring space for the Suriname type boat, it is planned to be 10 m. The freeboard of the facility should be 0.8 m due to the freeboard of the boats of two types; 0.4 m for the Suriname type boat and 0.8 m for the Guyana type boat.

2) Type of mooring facility

There are 3 types of mooring facility as follows;

① Gravity type

② Pontoon type

③ Pile type

As a result of the field survey it was judged that the gravity type is unsuitable due to the following findings.

① The outermost layer of the riverbed is so soft that it cannot support a heavy construction.

② In view of the rather strong current in the Suriname River, it is feared that scouring may cause non-uniform settling of such a construction as to disturb the flow or that the depth of water may become shallower owing to sedimentation.

Based the above, a pontoon type or pile type mooring facility should be adopted. Fig. 22 and 23 show each construction type. Comparison is given on Table 14.

Fig 22 Pontoon Type

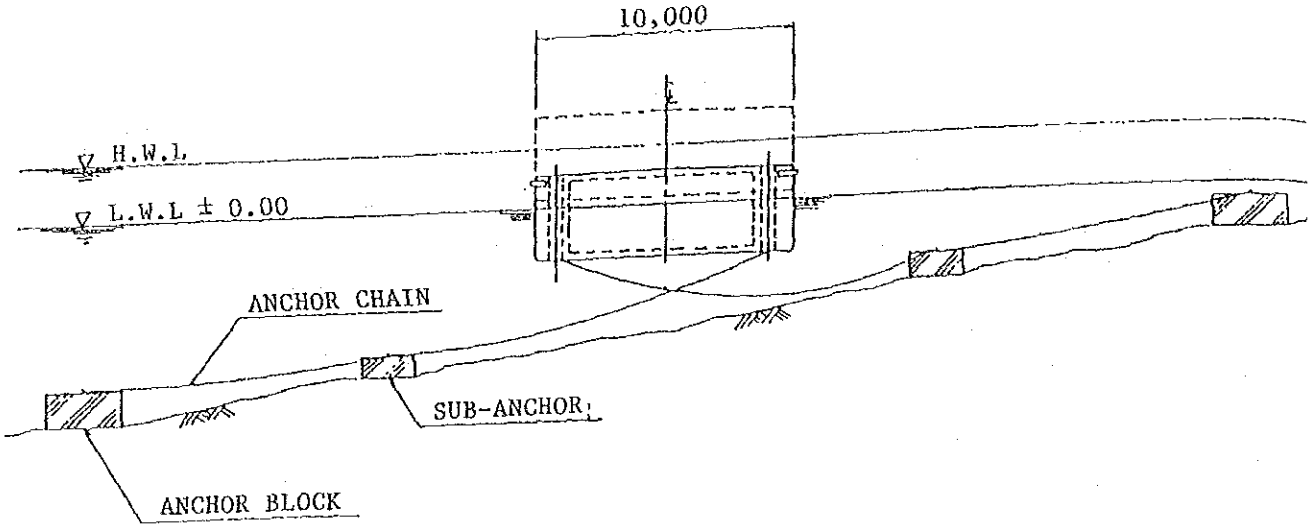


Fig 23 Pile Type

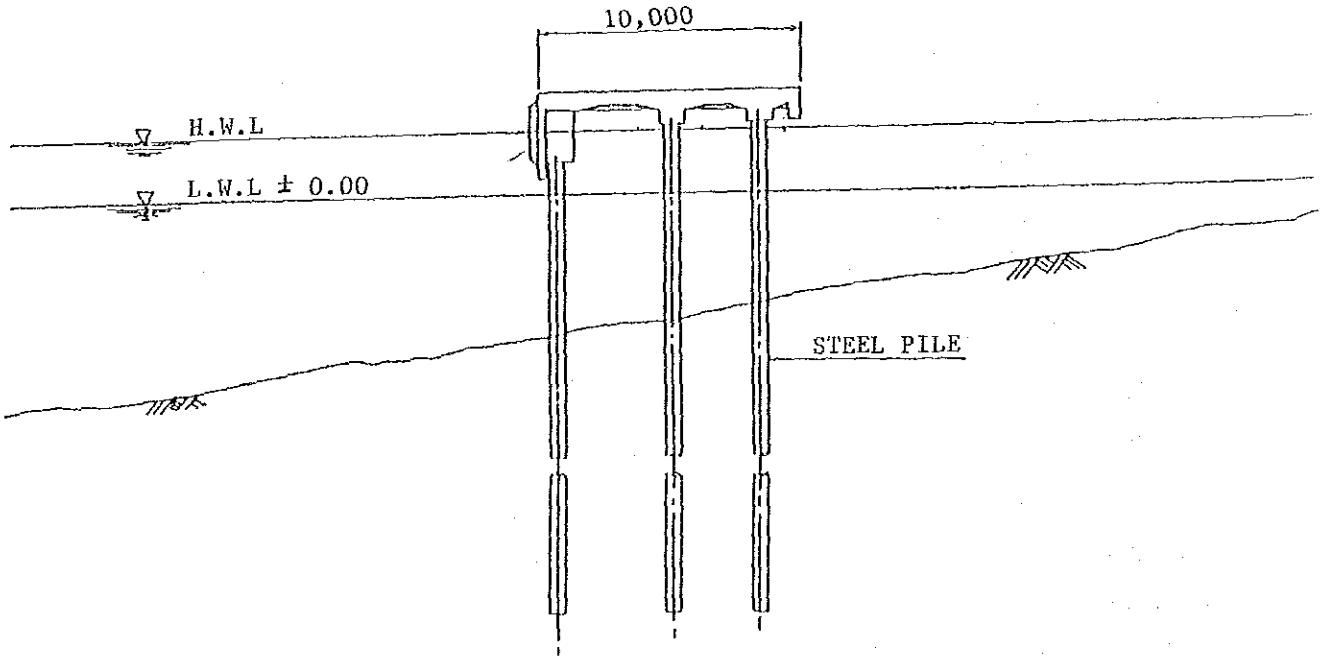


Table 14 Comparison between the Pontoon Type and Pile Type

	Pontoon Type	Pile Type
Range of tide	Levee crown of the pontoon and the water surface can keep the constant difference in height. This makes it easy for boats to land catch and load supplies.	When the tide is low mooring and loading/unloading work are difficult due to difference in height by 3.5 m.
Riverbed	Pontoon itself, floating on the surface, is not affected by the riverbed. Carefull mooring should be required.	Soft riverbed (N = 3 at 20 m deep) does not allow to support a pile structure. Non-uniform sinking may occure.
Durability and maintenance	Though depending upon materials, concrete need not maintain due to high durability. Only access bridge needs maintenance.	Steel piles must be protected against corrosion, but the top of the facility need not to be maintained.
Drift sand and scouring	No influenced.	Influenced.
Tide and waves	Though depending upon the anchoring method, pile anchoring method is not affected.	No influenced.
Appearance	Moving up and down with the water surface, a pontoon may not present unfamiliar scene.	Projecting on the water surface by 3.5m during low tide, the construction presents unfamiliar scene.
Construction period	Comparatively short.	Subject to weather, sea conditions, it may become longer.
Economic aspect	economical.	not economical.

In addition, the following local conditions must be considered carefully.

- The range of tide is about 2.5 m during the spring tide.
- Loading work must be easy for small boats with a freeboard of such low as 0.4 m ~0.8 m.
- Since the proposed site is located at the front of the mouth of the Suriname River, structures must be well-matched with the surroundings.

Based on these above it is considered that the pontoon type mooring facility is most suitable. There are two methods for anchoring a pontoon; the pile anchoring method and the anchor chain anchoring method. Table 15 gives the comparison between two methods.

Table 15 Comparison Between Anchoring Methods

	Pile anchoring	Anchor chain anchoring
Structure	Fixed with piles, no movement occurs.	Fixed with chains and anchors, the movement is checked.
Range of tide	No influence due to being floating on the water surface.	When tide is low slackening of chains may cause some movements.
Riverbed	Though soft, the formation is endurable against horizontal stress due to partly sand layer.	Because the ground is soft anchors may subside.
Execution	Accuracy is required while piling.	Need no accuracy, but a big crane vessel is necessary to provide anchors. Unavailable in Suriname.
Durability	Steel piles must be protected against corrosion.	Cares must be taken to prevent corrosion of chains.
Construction term	Rather short when pile heads are blocked.	Shorter than the pile anchoring if a crane vessel is available.

Taking conditions above into consideration, it is judged that the pile anchoring method be adopted.

Next as construction materials concrete (PC hybrid) and steel are compared as the following Table 16.

Table 16 Comparison Between Concrete and Steel

	Concrete (PC hybrid)	Steel
Structure	Prestressed concrete body supported with steel girders and bulkheads.	Planking, girders, and bulkheads are all of steel.
Durability	Need no maintenance.	Countermeasures to corrosion and electrolytic corrosion are needed, together with maintenance including painting.
Swaying	No swaying because of its shallower draft.	Swaying occurs due to its light weight.
Shock	Strong against a shock.	Easily deformed.
Economic aspect	economical.	not economical.

Access Bridge

① Basic policy

- To secure the ample depth of water that makes it possible for a fishing boat to moor and turn the head at the end of the access bridge.
- To connect the pontoon with the shoreline by the movable type bridge.
- To keep a grade of 1 in 10 less at low tide water.

② Required dimentions

The difference of elevation between the top of pontoon and the levee crown of river wall at low tide is:

$$3.5 - (0.8 - 0.25) = 2.95 \text{ m.}$$

Thus the required length based on the limitation of grade is:

$$2.95 \times 10 = 29.5 \fallingdotseq 30 \text{ m}$$

In view of possible congestion when 10 boats crowd for landing or loading, the bridge will need breadth of one traffic lane plus a sidewalk. Thus the required breadth is:

3.0m(traffic lane)+1.0m(sidewalk)+2 ×0.5m(shoulder) = 5.0 m

③ Basic specifications

a. Design conditions

• Tide	HWL	+ 2.5 m
	LWL	±0.0 m
• Current	1.2 m/sec	
• Waves	Significant wave height	0.7 m
	period	2.5 sec
• Wind force	20 m/sec (a gust of wind)	
• Soil	Subject to data obtained in the field survey.	
• Depth of the water	Subject to data obtained in the field survey.	
• Fishing boats	Guyana and Suriname Types boats	
• Load	0.5 ton/㎡ plus one 1 ton truck	
• Seismic force	Designed seismic intensity	0.05

b. Design standard — Subject to the Suriname and Japanese standards

c. Facility specifications

• Mooring facility	Pontoon type mooring facility	
Dimensions	36m(L)×10m(B)×2.4m(D) ×1.6m(draft) ×0.8m(freeboard)	
Structure	PC hybrid concrete	
Mooring method	Pile anchoring	
• Access bridge	Movable type bridge	
Dimensions	30m(L)×5m(B)	
Structure	Steel plate-girder structure	

(3) Slipway

1) Slipway

Usually at the fore of a slipway a grade is 1 in 8, but the grade of 1/7

should be adopted due to a comparatively narrow depth of the site. Also at the middle part the grade of 1/14 should be kept so that a drastic change does not occur between the slipway and the boat yard.

The height of each part of the slipway will be decided on the following factors.

- Adding an allowance to 0.7 m draft of the Guyana type boat, the depth of water at the front of the slipway should be -1.0 m.
- The depth of water at the front of the river wall is ±0.0 m
- The slope of 1/7 grade and the one of 1/14 shall be same in length.
- The foundation at the shore side to be used as a boat basin should keep +3.5 m in height.

Based these above the required length of each portion of the slipway is as follows;

- Projection portion underwater(1/7 grade, -1.0m ～±0.0 m high)

  1.0×7 = 7.0 m
- Fore portion on land (1/7 grade, ±0.0 m ～+2.0 m high)

  2.0×7 = 14.0 m
- Middle portion on land (1/14 grade, +2.0 m ～+3.0 m high)

  1.0×14 = 14.0 m
- Back portion on land (1/14 grade, +3.0 m ～+3.5 m high)

  0.5×14 = 7.0 m

The total length of the slipway is therefore:

7.0 + 14.0 + 14.0+7.0 = 42.0 m

On the slipway one unit of the Guyana type fishing boat whose breadth is 2.3 m should be hauled by using a 3 m wide cradle. Considering the boat's yawing by the current and work efficiency, the clearance between the boat and the sidewall of the slipway should be decided to be 2 m. Thus the required breadth of the slipway is:

3.0 ×1 + 2.0 ×2 = 7.0 m

In view of durability and working efficiency a concrete-covered rampway construction shall be adopted. The sidewall shall be of a sheet pile structure due to the continuity of the riverwall.

The weight of a Guyana type boat is;

14.0(L)×2.3(B)×0.8(D)×0.55~0.60(Block coefficient)=14.2~15.5≒16 tons

If all of the boats are equipped with a flat bottom, it is easy to haul up the boat on sleepers fixed on concrete. However, some of them are equipped with a box type keel. A cradle therefore must be used.

2) Equipment of the slipway

① Winch

The pulling power P necessary to pull a Guyana type boat weighing 16 tons is;

$$P = FvC + Fh$$

where W: 18 tons (16 tons plus 2 tons of the weight of a cradle)

θ: 8.13 ° ($\tan\theta = 1/7$)

C: $K \cdot 1/R \cdot (\mu \cdot d/2 + f) \fallingdotseq 10$

(a coefficient based on a radius of a wheel, a radius of an axle, rolling friction and sliding friction)

$Fv = W \cos\theta = 18.0 \times 0.990 = 17.82$

$Fh = W \sin\theta = 18.0 \times 0.141 = 2.538$

Thus $P = 17.82 \times 0.1 + 2.538 = 4.32$ tons

The capacity of electric-powered motor Lw is given in the following equation;

$$Lw = P \cdot V/(K \cdot U)$$

where V: Pulling speed, 10~13 m/min

K: Value of KW converted into Joule torque, 6.12

U: Efficiency of motor, 0.8

Thus $Lw = 4.32 \times 13/(6.12 \times 0.8) = 11.47$ KW can be obtained.

Based on the results above a 15 KW (220V, 60 Hz, 4P) motor should be

equipped. The motor must be of salt resistance design, and equipped with a traverser and warping end drum.

② Cradle

One unit of the steel built-up type cradle endurable to a load of 16 tons should be provided. When the cradle runs on rails, its radius of wheel is usually 250 mm to lower its grand clearance , but in case of a cradle the radius must be as large as possible due to frictional resistance on concrete. The rubber-wrapped tire should be avoided due to its easy wear. Instead such the wheel as equipped with a large truck should be provided.

5-3-3 Shore Facilities

(1) Main building

The main building which controls all of the fisheries activities, including landing, supplying and shipment, is a hub of the fishery center. The building houses a cold-storage facility, ice-making equipment, ice store, anteroom/workshop, waiting room, stores, machinery room, dressing room, and toilet. Dimensions should be determined on the best utilization of the space according to the kind of work for each facility.

1) Cold storage facility

① Storage capacity

The capacity is calculated on the basis of the current annually yield in Commewijne District. The number of fishing boats covered by the fishery center is 140 Suriname type fishing boats (out of 198 boats in total 58 boats belong to Pomona village which is located at the mouth of the River Suriname are omitted) plus 22 Guyana type boats. Their operation pattern is as follows;

	Number of trips	Days of a trip	Catch per trip
Suriname type	275/year	1 day	30 kg
Guyana type	30/year	6 ~7 days	3,000 kg

Of Suriname boat's catch of 30 kg only 10 kg will be landed at the fishery center. Thus, adopting the 300 business days of the center, the fish landings per day will be;

Suriname type	140 ×275/365 ×10	= 1,055 kg	
Guyana type	22 ×30/300×3,000	= 6,600 kg	
Total		7,655 kg	≒ 7.65 tons

This is a designed daily shipment to maintain a stable supply.

According to the interview surveys, the good fishing season for the Guyana

type boat is a period of 6 months between May and October, during which a boat catches one and half times average catch; 6,600×1.5 = 9,900 kg in total. Added the catch of the Suriname type boats to this; 1,055 + 9,900 = 10,955≒11.0 tons.

The capacity of the cold store is designed on the basis of this figure, and to keep quality during distribution it is of necessity that all of the products are cooled for 24 hours. The capacity is therefore to be 2 times the above figure, 20 tons.

② Storing method

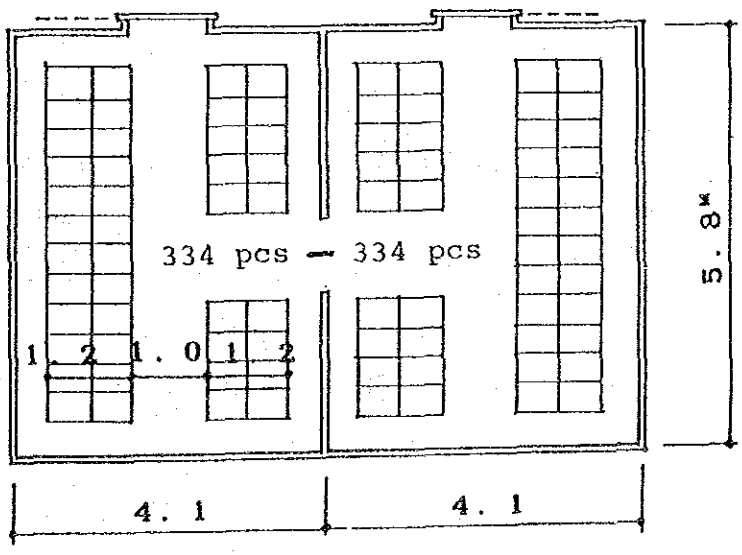
Fish landed on the pontoon should be packed in plastic fish boxes and stored in the cold store after washing. A plastic fish box is the Japanese standard box of 0.0409㎥ capacity, capable of carrying 30 kg fish. The required number of boxes for fish of 20 tons will be 667 pieces.

Boxes bearing fishes should be stacked manually in the cold store.

③ Layout and Space

The space of the cold store is divided into two compartments, each 4.1 m× 5.8 m, cutting off by an insulated door, due to maintenance during the poor fishing season and also to energy-saving (Fig. 24). The ceiling is 2.7 m in height.

Fig. 24 Layout Plan



2) Ice-making equipment and ice store

① Required quantity of ice

a. Suriname type fishing boat

As described above fishermen on board this type of boat are using no ice, unconcerned with keeping freshness of catch. By contrast fishermen of the Guyana type boats go so far as to say that an ice-making equipment should have top priority. Fish marketed at the Paramaribo Market are all in chilled or soft frozen state. In order to market catch harvested by the Suriname type boats on the current distribution route it must be delivered with keeping its freshness. It is therefore of first necessity for the fishery center to educate fishermen to use ice for keeping the freshness.

Required quantity of ice

- Catch: 30 kg per boat.
- Required amount of ice on board: 30 kg similar to the catch
- Number of trips: 275 days (trips) due to a daily operation
- Business days of the center: 300 days/year

Days of calling at the center:

275 days×300 days÷365 days= 226 days/year

Amount of daily supply of ice:

140 boats ×30 kg/boat×226 days/year ÷300 days/year= 3,164 kg

b. Guyana type fishing boat

In the whole of Suriname about 160 fishing boats of this type are now operating. Almost of them belong to the districts along the Suriname river (Paramaribo District has 120, and Commewijne 22, totaling 142). Though these have all become obsolete, the possibility for substitution will very likely be small due to their current economics, and it is expected that all boats in Commewijne District will utilize the proposed fishery center. According to the interview surveys, a boat of this type

loads usually 3 tons of ice before starting.

Required quantity of ice

- Catch: 3000 kg per boat.
- Required amount of ice on board: 3000 kg similar to the catch
- Number of trips: 30 trips; every trip it calls at the center
- Business days of the center: 300 days/year

Amount of daily supply of ice:

22 boats×3,000 kg/boat × 30 trips/year÷300 days/year= 6,600 kg

c. Ice for washing landed catch

In view of quality control, landed catch should be kept in cooling water of temperature of +10℃～ +15℃. The washing tank is a settled type 1,000 ℓ capacity tank. The required quantity of ice should be calculated based of the catch in the high season, one and a half times as much as average according to the interview surveys.

- Landed catch: (3,164 kg ×1/3 +6,600 kg×1.5) = 10,954.66≒10,955 kg
- Temp. of material water: +28℃
- Temp. of washing water: +15℃
- Ratio of volume of washing water to fish: 1 : 1
- Required volume of ice

Heat value for cooling = 10,955kg ×1 Kcal/kg.℃×(28-15) ℃

= 142,415 Kcal

Hence the required volume of ice is;

142,415 Kcal÷80 Kcal/kg = 1,780 kg.

d. Ice for distribution

Catches for shipment by refrigerating van must be covered with ice. The ratio of volume of ice to products should be 0.1.

- Daily shipment: 10,955 kg
- Capacity of the refrigerating van: 2 tons

- Required volume of ice: 10,955 kg ÷2,000 kg = 5.47 ≒ 6 vans

  Hence, 6 vans ×(2,000 kg ×0.1) = 1,200 kg

Required volume of ice at total

(a) for Suriname type boats= 3,164 kg

(b) for Guyana type boats = 6,600 kg

(c) for washing tanks = 1,780 kg

(d) for refrigerating vans = 1,200 kg

Total 12,744 kg ≒ 12,000 kg

Ice is plate ice produced by 2 units of the 6 tons/day capacity ice-making equipment.

② Capacity of the ice store

An ice-making plant makes it possible to produce a fixed quantity of ice, but cannot to meet varying requirements. In order to meet varying demand ice stored in an ice store must be used besides production. The capacity of the ice store therefore should be decided on the current situation in Suriname.

Rotaing machinery such as a generator and ice-making machine is required periodical maintenance. Even such a case the center must supply required ice constantly. Thus the capacity of the ice store is required for one day production plus one and a half day's requirement, that is;

- for the following day's requirement: 12 tons
- for the quantity for a constant supply: 18 tons

Total 30 tons

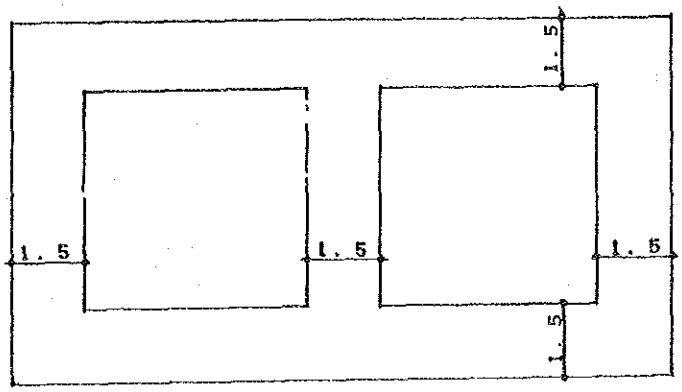
3) Anteroom

This is a space for sorting, weighing and washing catch before storing in the cold store as well as for checking and counting products for shipment. Considering that some 11 tons of fish are landed daily during a good fishing season and the business hours of the center are 6 hours, about 1.8 tons of

fish must be handled an hour.

The space is separated in two zones, as shown in Fig. 25, circled by passages of 1.5 m wide.

Fig. 25 Anteroom and Passages



Fish of 1.8 tons is put in 60 boxes of 30 kg capacity each. When these boxes are stacked in 5 columns for handling, the number of units is 12. The projected plane of one unit is 0.563 m × 0.360 m ≒ 0.2㎡. Assuming that the working space between units is 0.2 ㎡ × 4 = 0.8 ㎡, the required area of one zone is;

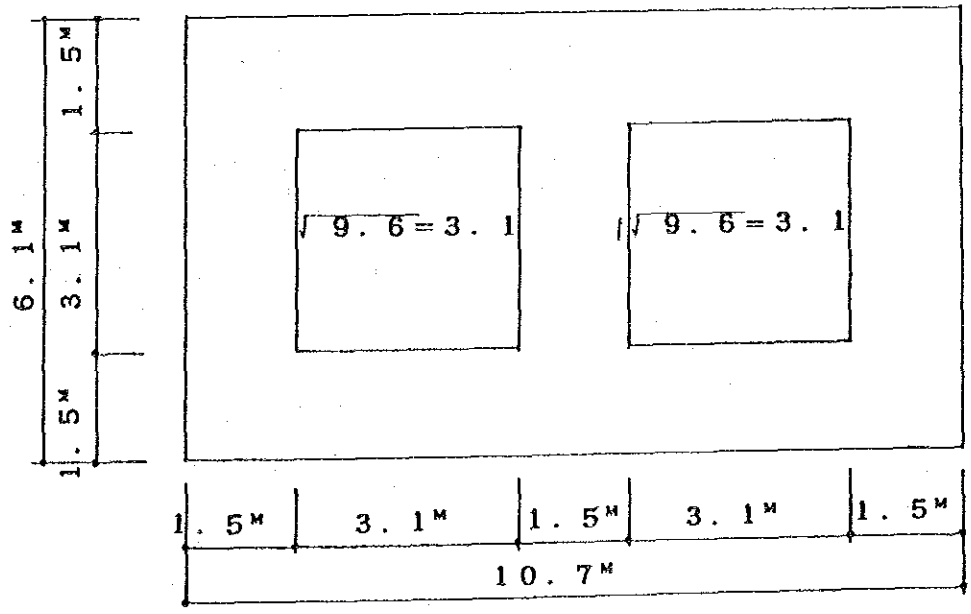
0.8 ㎡/unit × 12 units = 9.6㎡

The total space of the anteroom shall be decided on the basis of the interrelation between the layout and building plan, but an area of

6.1 m × 10.7 m = 65.27㎡ ≒ 65 ㎡

will be required at least.

Fig. 26 Anteroom



4) Platform

Two platform areas should be required; one for unloading (Platform 1) and another for shipment (Platform 2). Platform 1 is to have an enough space that makes it possible for 2 trucks, one for supplying ice and another for unloading catch, to bring backwards. Platform 2 is for 3 trucks for shipment.

5) The waiting room for the following staffs is provided.

Worker in charge of ice (truck driver)	1
Accountant	1
Clerk in charge of marketing (van driver)	2
Clerk in charge of marketing (truck driver)	1
Clerk in charge of fuel oil/water	1
Refrigerating van driver	1
Total	7 persons

Necessary furniture for desk work of each person is a small desk and chair. When its space requires 2.5 ㎡, the waiting room will be 2.5㎡×7 = 17.5㎡ in area.

6) Store

A store, covering an area of 15 ㎡, for handcarts, fish boxes, dusting things, working cloths is provided.

7) Dressing room

This is the room in which workers change their cloths into winter cloths. Two rooms, covering an area of about 4 ㎡ each that enables two persons to change cloths at the same time, one for men and another for women, 3 to 4 persons each, are provided.

8) Toilet

The toilet for 60 persons, 7 staffs plus 60 fishermen (assuming that 35 boats per hour will use the center for an hour, the number of fishermen is 1.5 person/boat×35 boats≒ 53 persons), should be provided. Usually one stool and one urinal bowl for 30 persons are provided in a office. Two stools and one urinal bowl therefore should be installed. The door of the toilet is equipped at the platform side for the convenience of both staffs and fishermen.

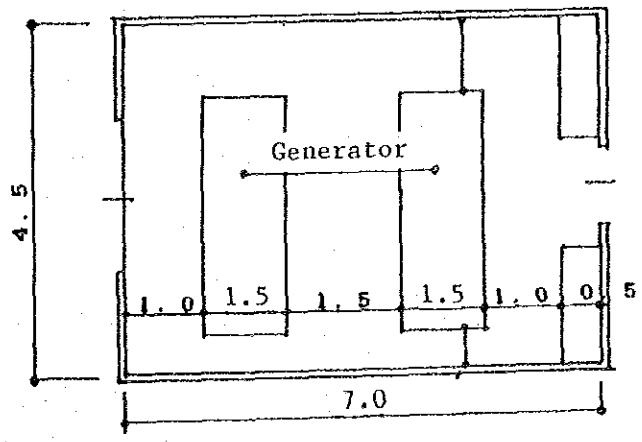
9) Machinery room

Refrigerating machines and condensers are installed in this room. Considering the space occupied by machines and devices connected in series plus passages, the machinery room has a width of 3.5 m.

10) Generator room

The dimensions of a 125 KVA generator are 3m(L) ×1.5m(W) ×2.2m(H). In this room 2 units of such the generator, a switchboard and an incoming panel of the public electric power are installed. Considering the passages as in Fig.27 below, the required space will be 4.5 m ×7.0 m = 31.5㎡ ≒ 32 ㎡.

Fig. 27 Generator Room



(2) Administration building

The administration building consists of an office, conference room, night watchman's room and toilet.

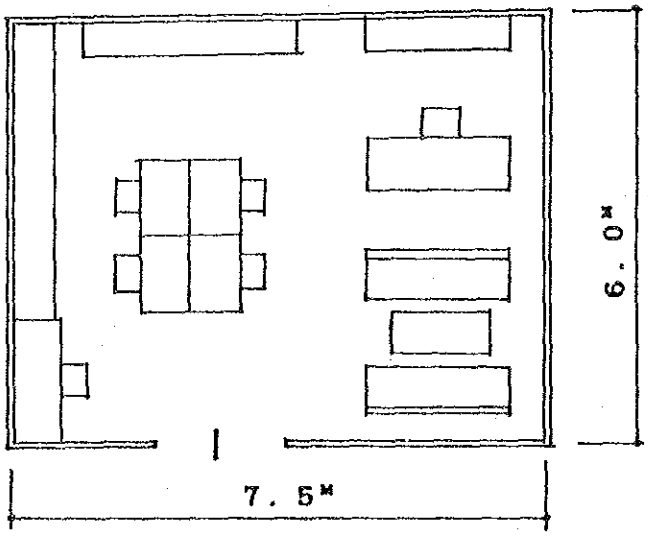
1) Office

The full-time employees working in this building are as follows;

Manager	1
Sales manager	1
Accountant general	1
Clerk	2
Total	5 persons

In the office such furniture as desks, filing cabinets, typewriter, copy machine, etc. are furnished. Generally the working space of a clerk requires 7㎡ to 9 ㎡. This office is to be designed on the figure of 7.5 ㎡. Thus the required area is 5 persons×7.5 ㎡ = 38 ㎡.

Fig.28 Office



2) Conference room

A conference room capable of accommodating about 40 persons shall be provided. Since one person usually requires a space of 1㎡ in case of

conference, the conference room will be 40㎡ in area. The room shall be separated with a movable partition so that it can be used for a meeting of staffs.

3) Night watchman's room

At the location commanding the gate of the building a night watchman's room of 4㎡ with an attached bedroom of 6㎡ is constructed.

4) Toilet

One stool and one urinal bowl should be installed in the toilet for 6 persons woring at this building. An additional stool for women is provided.

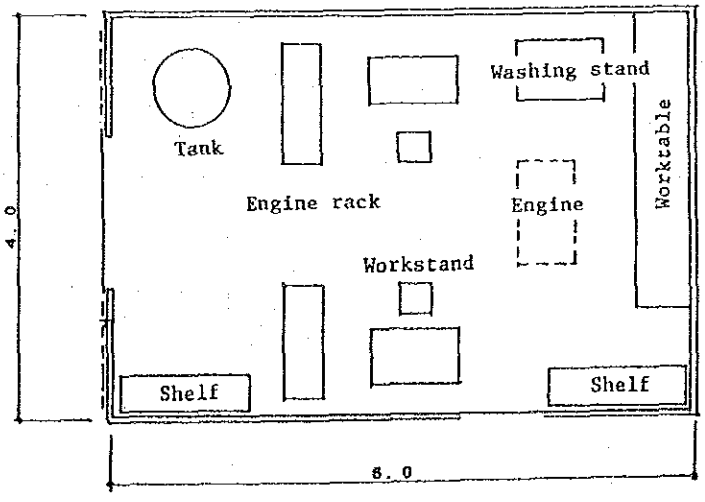
(3) Repair shop

A repair shop housed an engine repair room, workshop, spare parts store and office is constructed. The space of each room should be decided as follows;

1) Engine repair room

Repair and maintenace of engines installed on board the Commewijne fishing boats and all of the machines belong to the fishery center is to be conducted at this shop. Besides a mechanic and an electrician belong to the main building one mechanic is manned exclusively to the shop. Considering such necessary devices to be installed as an engine rack, test tank, workstand, working table, parts shelves, etc., the repair shop will cover about 24㎡ in area.

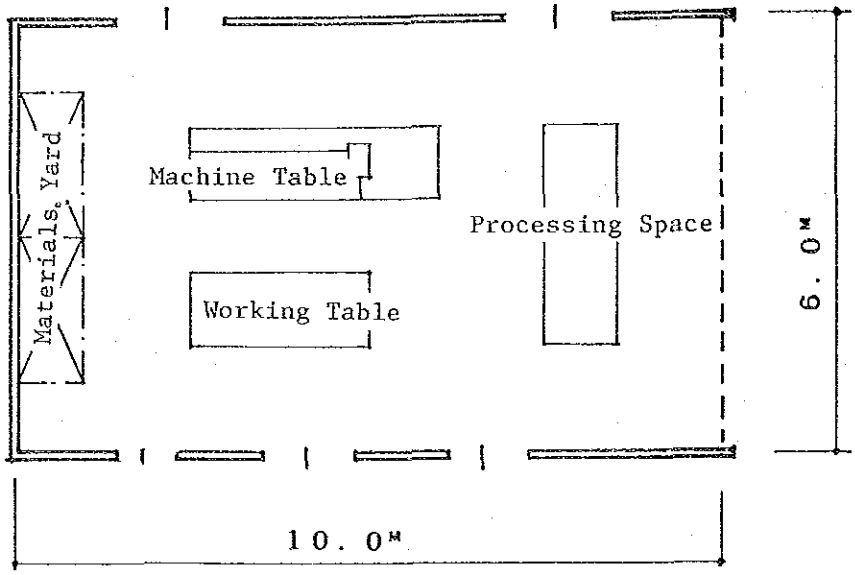
Fig. 29 Engine Repair Shop



2) Workshop

A workshop capable of outfitting and repairing the Guyana type fishing boat is planned to be constructed. In the workshop a working table, materials yard, machine table and compressor are to be installed. The necessary space is about 60㎡. For boats not required a repair in the repair shop, a space of about 180㎡ between the slipway and the repair shop is paved.

Fig. 30 Workshop



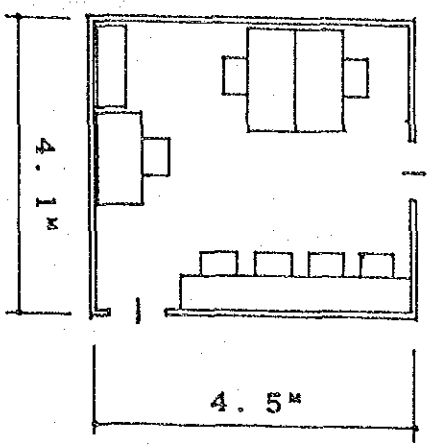
3) Spare parts store

A store, covering 35㎡ in area, is provided to keep spare parts of engines and vehicles, piping materials, refrigerant and so on.

4) Office

For 4 full-time employees belong to the repair shop, one mechanic, two assistants plus one engineer of the main building, an office covering about 20 ㎡, furnished desks, chairs, filing cabinets, etc. is provided.

Fig. 31 Office



(4) Ice-making equipment

The equipment, 12 tons/day capacity, stout, and that makes it possible for local engineers to conduct maintenace and repair easily should be supplied.

① Design conditions

Ambient temperature	+38℃
Ambient humidity	85%
Refrigerating machine	Open or semi-closed, reciprocating type compressor
Condenser	Air-cooling type, subject to rainfall and humidity
Defrost	Hot gas or electric heater
Power source	Independent electric power, 3 ϕ 4W, 60HZ, AC220V
Accessories	Weatherproof, salt resistance
Refrigerant	R-22 or R-502
Water	Riverwater shall not be use due to impurity and salinity. When it is used, a filter and softener shall be provided.

② Specifications

Condensing temperature	+50℃ less
Capacity	12 tons/day (6 tons/day, 2 units)
Ice	Plate ice
Material water	Freshwater and rainwater
Type	Indoor, automatic type

Refrigerating machine	Open or semi-closed, reciprocating type compressor 26 KW
Condenser	Air-cooling type, fan capacity 3.75 KW
Circulating pump	0.75 KW
Crusher	1.50 KW

(5) Refrigerating unit

① Design conditions

Ambient temperature	+38℃
Ambient humidity	85%
Refrigerating machine	Open or semi-closed, reciprocating type compressor
Condenser	Air-cooling type, subject to rainfall and humidity
Defrost	Hot gas or electric heater
Power source	Independent electric power, 3 ϕ 4W, 60HZ, AC220V
Accessories	Weatherproof, salt resistance
Refrigerant	R-22 or R-502

② Cold store

Specifications	Capacity: 10 tons each 2 units Room temperature: -20℃ Storing methods: 8 plastic boxes are stacke in one colum.
Refrigerating machine	Open or semi-closed. Reciprocating type compressor, 15 KW 2 units
Condenser	Air-cooling type, 0.6 KW 2 units
Cooler	Ceiling hanging, forced type, 0.8 KW×2 units
Control panel	Self-standing type Operation indicating lamp, Alarm lamp & bell Indicator, Push button switch, Temperature Regulator

③ Ice store

Specifications	Capacity: 30 tons
	Room temperature: -10℃
	Conveyer: Simple type conveyer
Refrigerating machine	Open or semi-closed,
	Reciprocating type compressor, 7.5 KW
Condenser	Air-cooling type, 0.3 KW
Cooler	Ceiling hanging, forced type 0.65 KW
Control panel	Self-standing type
	(Operation indicating lamp, Alarm lamp & bell Indicator, Push button switch, Temperature Regulator)

(6) Generator

1) Generators supply all power demanded by the fishery center for some time to come. After Commewijne District was electrified, generators will be used for emergency. Thus generators should be stout and ensure cost effective design, quality construction, easy to maintain.

2) Considering load fluctuation, 2 units of 125 KVA shall be provided so that they can be operated alternately.

3) The same design conditions as that of the refrigerating unit shall be adopted.

① Diesel engine

Output	Bonnetless type, 157 PS
Cylinder	6 cylinders, 4-cycle direct injection type
Cooling system	Radiator cooling system
Starting method	Electric starting method
Oil feeding system	Auto-feeding system
Accessory	Complete

② Generator

Output	3 ϕ 4 W, 60 Hz, AC 220 V, 125 KVA
Exciting mehod	Brushless method
Insulation	F grade
③ Controlling	Self-standing type 1 unit
	Operation indicating lamp, Alarm lamp & bell
	Indicator, Push button switch,
	Temperature regulator, Auto oil feeding device
	Reverse power protector, Wattmeter, Switchboard,
	Protector.

(7) Water tank

1) Required quantity

① Material water for ice

In addition to net material water, water for defrosting and drain (usually 20% of net material water) must be considered. Thus required daily volume of water is, 12 tons×1.2= 14.4 tons.

② Washing water

Washing fish aims chiefly to clean fish and to remove blood and scales. In view of hygiene, the rate of the quantity of water to fish to be washed should be 1. Hence the required quantity is,

10,955 kg ×1 ≒ 11,000 ℓ

③ Drinking water for fishing boats

Suriname type fishing boats operating on the daily basis will be omitted. Drinking water should be supplied to Guyana type fishing boats only. At present a Guyana type boat are carrying 200 ℓ of drinking water. Since average number of operating boats a day is 2.2 boats, the required daily quantity of water is, 2.2 boats × 200 ℓ = 440 ℓ.

④ Water for fishermen

On an average, 2.2 Guyana type fishing boats plus 105 Suriname type

fishing boats will call at the center every day. For these fishermen water for their refreshment should be provided. The number of the crew are 5 persons for the Guyana type boat and 2 persons for the Suriname type boat respectively. Thus the total number of the crew are, (2.2×5)+(105×2)= 221 persons. Given 0.5 of coefficient of utilization, the number of the expected users are 111 persons.

Usually for refreshment and drinking 20 ℓ of water is required for one person. Thus, the required water is, 111 ×20 ℓ = 2,200 ℓ.

⑤ Water for the staffs of the center

Generally a required volume of water per person for daily living is said to be 400 ℓ. Omitting water for cooking and showering, 100 ℓ of water will suffice. Given 17 staffs of the center, the required water is,

17× 100 ℓ= 1,700 ℓ.

Based on the above figures the required volume of water is calculated as follows;

14,400 +11,000+ 440+ 2,220+1,700 = 29,760 ℓ ≒ 30 tons.

Rainwater can be used for toilets or cleaning boats. Also owing to circumstances it can be utilized for ice-making and washing fish. Besides this, then, an additional water tank to catch rainwater, having the same capacity of the above-mentioned water tank, should be constructed for emergencies.

(8) Fuel oil tank

1) Required quantity of fuel oil

① Diesel oil

a. Generator

The capacity of the generator is 125 KVA (88 KW). Its consumption of fuel oil is 30 ℓ/hour (at 100%), 24.3 ℓ/hour (at 75%) and 18.6 ℓ/hour (at 50%) respectively. It is estimated that a generator for ice-making will work for 16 hours a day at a 75% load. Thus the daily total load is,

125 KVA ×2 units ×0.75×16/24 hours = 125 KVA. This is equal to a load placed on a 24-hour running generator. Hence, the required oil is,

30 ℓ/hour ×24 hours= 720 ℓ/day.

b. Fishing boats

The number of the expected Guyana type boats that call at the center daily is 2.2 boats as mentioned above. Assuming that a half of them are equipped with a diesel engine (another half with an outboard motor), the required quantity of diesel oil is,

2.2 boats ×300 days×400 ℓ (oil consumption of a Guyana boat for one trip of 7 days) = 264,000 ℓ a year; 264,000 ℓ ÷300 days÷2 = 440 ℓ per day.

c. Insulated van

The van is used for transportation between the center and the Paramaribo Market, and for a travelling sale in remote areas. The Market is about 20 km far away from the center, taking some 40 minutes each way. Three 2 ton capacity vans should make two round trips. Thus the required fuel oil for the van running 80 km a day is,

80 km/day÷4.5 km/ ℓ (milage per ℓ) = 17.8 ℓ/day

The total requirements are 17.8 ℓ/day×3 vans = 53.4 ℓ/day.

Based on the above figures necessary oil for 6 days will be,

(720 ℓ + 440 ℓ +53.4 ℓ) ×6 = 7,281 ℓ. And the center must establish a service system capable of meeting the requirements during a high fishing season and of boats calling at the center for emergencies, and also the oil tank must be supplied periodically. A reserve of 20% therefore will be needed. Hence the required capacity of the fuel oil tank is,

7,281 ℓ ×0.2 +7,281 ℓ = 8,737 ℓ ≒ 10,000 ℓ

② Gasoline

Gasoline must be supplied to 105 Suriname type boats. Since they consume 20 ℓ of gasoline a day, 105 boats ×20 ℓ = 2,100 ℓ.

A half of the Guyana type boats will need gasoline.

2.2 boats ÷2 × 400 ℓ/day(supply a boat) ×300 days (business days of the center)= 132,000 ℓ/year; The daily amount is 132,000 ℓ/year ÷300= 440 ℓ.

In addition, 2 vans will need 10 ℓ ×2 = 20 ℓ of gasoline a day.

Hence the required amount is 2,100 ℓ + 440 ℓ +20 ℓ = 2,560 ℓ/day.

The capacity of the tank should be for one week, including 10% of reserves.

2,560 ℓ/day×6 days×1.1=16,896≒17,000 ℓ.

(9) Exterior work

The exterior work covers preparation of the site, pavement, drainage and outdoor lamps.

1) Preparation of the site

A level difference between the proposed site (D.L. 2.18 m) and MHWL (D.L. 2.88 m) is only 0.7 m, and the site ground sometime is flooded. An area of about 3,500 ㎡ around the site must be banked at D.L. 3.5 m high so that the ground can be drained at high tide, leading drainage to the existing ditch.

The volume of banking is calculated as follows;

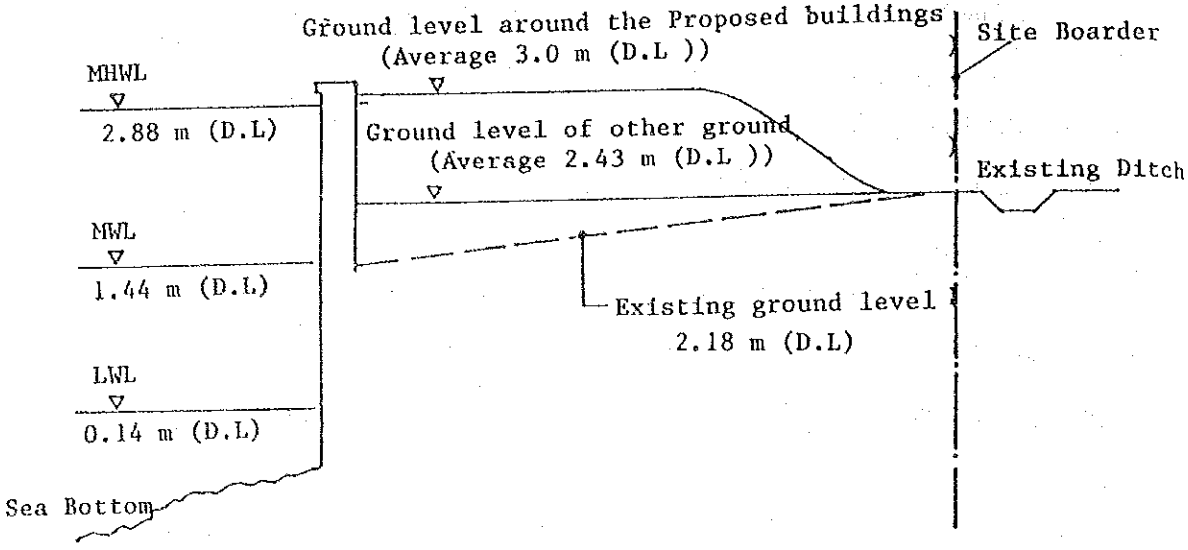
Area around the proposed buildings: 2,627 ㎡×(3.50m-2.18m)= 3,468㎥

Other ground: (10,000 ㎡ - 2,627㎡) ×(2.43 m - 2.18 m) = 1,843㎥

Total 5,311㎥

Assuming that the sinking percentage is 20%, the required volume of banking is 5,311㎥×1.2 = 6,373㎥≒ 6,400㎥.

Fig.32 Banking



2) Pavement

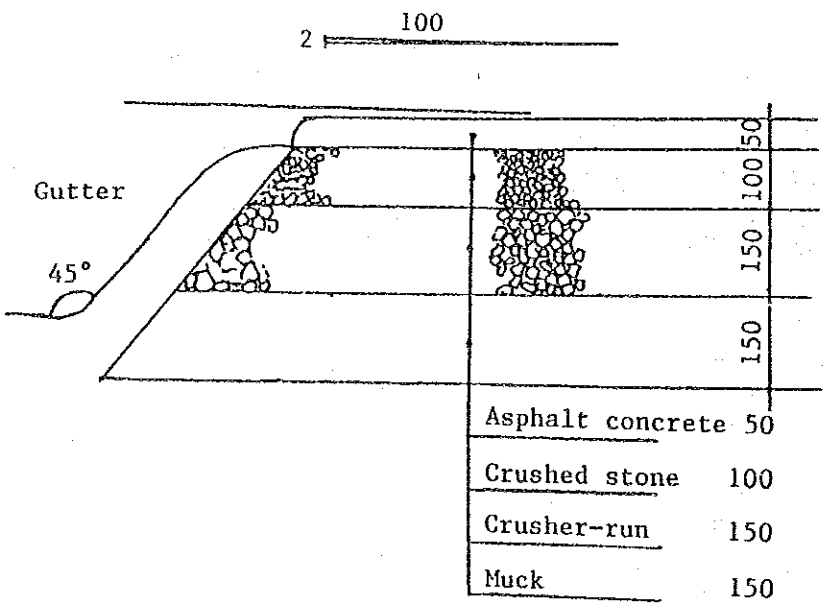
In the site the roads, parking lots, outdoor fishing boat repair area are to be paved with asphalt. The section is shown in the Fig. 33 below.

The required area is as follows;

Fishing boat repair area	166 ㎡
Roads	1,108 ㎡
Parking lots	163 ㎡
Total	1,437 ㎡

Rain drainage should be led to the open ditches on shoulders with a gradient of 45° .

Fig.33 Pavement



3) Exterior lamps

Nesessary exterior lamps must be installed for security.

5-3-4 Building Plan

(1) Plane and section

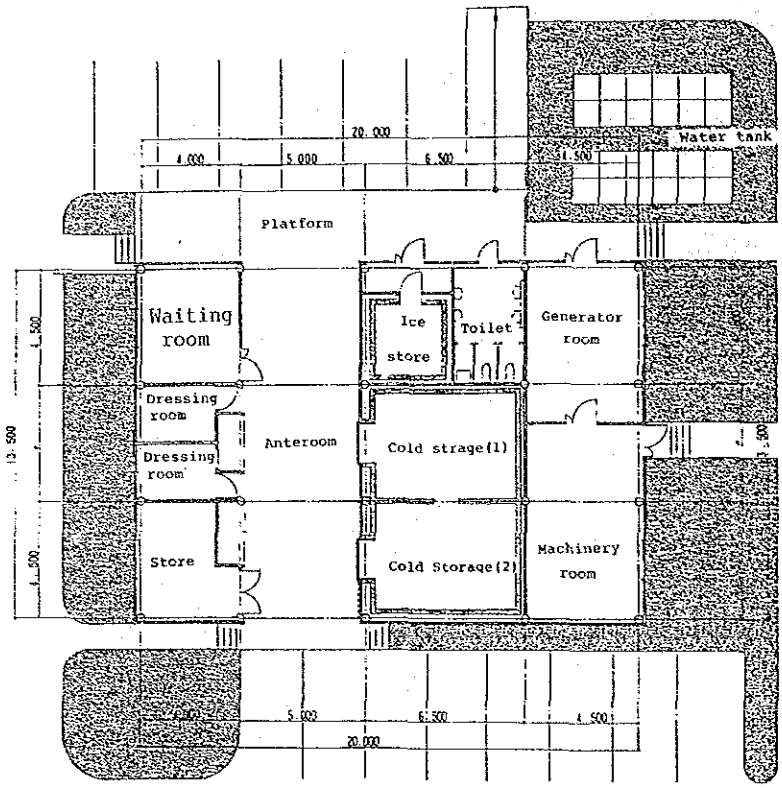
1) Main building

The space for landing catch and loading supplies is to be located on the end of the exterior traffic line to the main building, and the distance between the space and the pontoon must be shortest. The Platform 1 therefore should be constructed on the traffic line from the pontoon to the main building in parallel with the River, and Platform 2 for shipment should be constructed on the east of the main building to avoid a crossing of traffic lines.

Between two platforms is the anteroom/working space, and the waiting room, dressing room, fish washing corner and store are placed on the south of the anteroom; the ice-making machine room, ice-storage room, cold store (1) and cold store (2) on the north of the anteroom. At the back of the cold store (1) the machine room is to be positioned so that piping can be conducted in the shortest distance. The generator room is at the back of the ice-making machine room.

The office should be placed on the southwest corner of the building so that the staffs can look out across the anteroom, platforms, and also the River to survey the activities on the pontoon.

Fig. 34 Plane of the Main Building



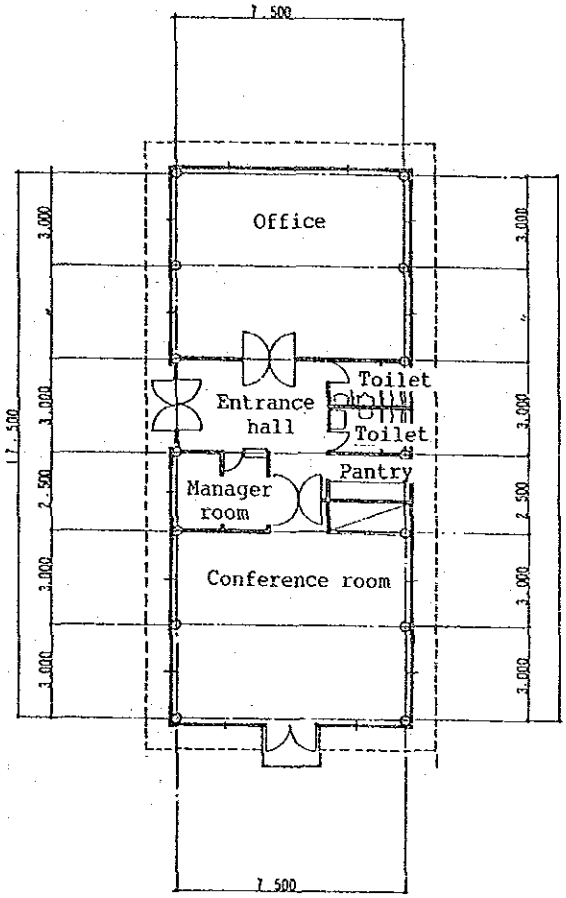
In order to prevent frost heaving under the cold stores and to make the anteroom floor and the bed of the truck of uniform height due to work efficiency, the floor of the main building must be laid 80 cm high the ground surface. Since the ceiling height of the cold stores and waiting room is 2.7 m, the building should have a gable roof, 3.5 m eaves height and 5.0 m ridge height. The part housed the ice-making machine should be a two-storied building with the eaves height of 7.0 m.

2) Administration building

The entrance should open near the main gate and the main building, and the manager's room is to be positioned by the side of the entrance hall. The office is to be placed at the western end of the building and the conference room at the eastern end. The toilet and pantry are positioned

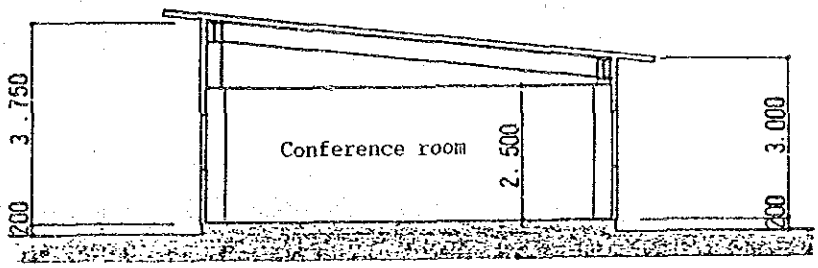
on the north of the entrance hall. The conference room should be equipped with an additional door opening to the exterior for fishermen.

Fig. 35 Plane of the Administration Building



The height of the floor is 20 cm from the ground and the ceiling height of rooms is 2.7 m. The roof is therefore a shed-roof with the eaves height of 3.5 m.

Fig. 36 Section of the Administration Building



3) Repair shop

The workshop should be placed in the center of the repair shop, and its door should be a shutter type door leading to the paved working area outside. On the west of the workshop the paint locker, tool locker and engine repair shop are arranged. The parts store, store room, office and toilet are placed on the east side of the building.

Since it is judged that the 3.0 m ceiling height of rooms including the office will suffice, the eaves height of the building is planned to be 3.5 m.

Fig. 37 Plane of the Repair Shop

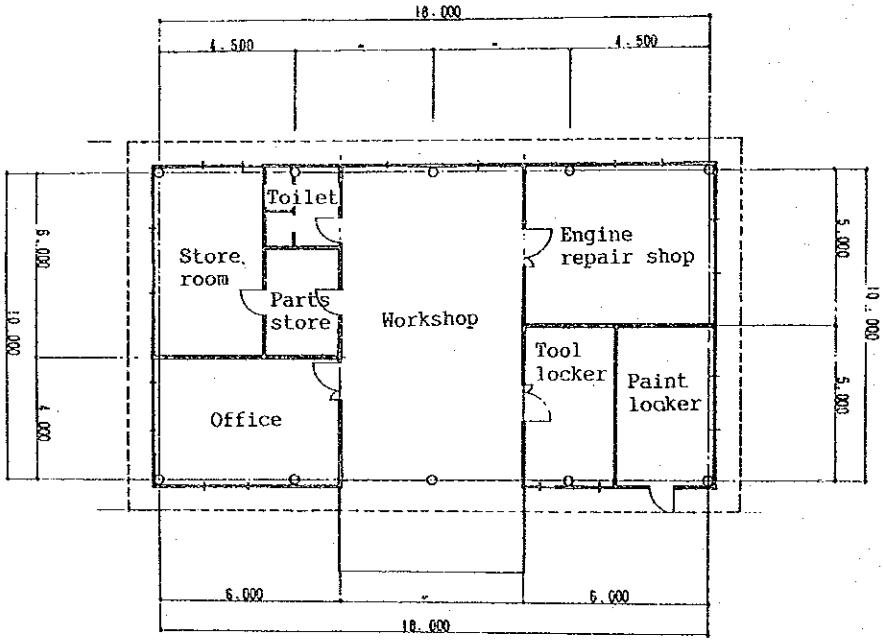
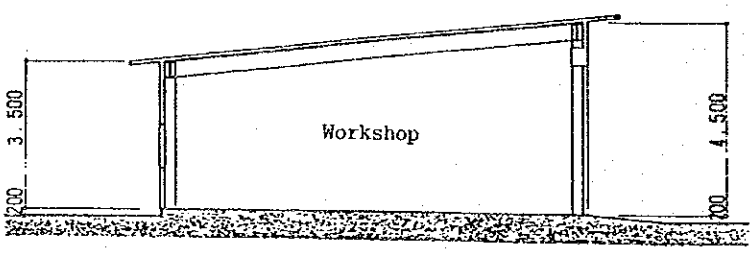


Fig. 38 Section of the Repair Shop



(2) Structure plan

1) Foundation

The field survey revealed that the outermost layer of the porposed site is a sand stratum to the depth of 5.4 ~10.0 m followed by a clay layer to 22.4 m deep.

Among the buildings to be constructed in the site the heaviest one is the main building housed the cold-storage facilities; its horizontal load is 2.8 tons/㎡. Though the clay layer has a bearing capacity endurable to 2.8 tons/㎡, to prevent nonuniform sinking a reinforced concrete strip footing should be applied to foundation of the buildings except the main building, whose foundation is planned to be of a double slab direct footing due to the voide space against frost heaving and the 80 cm high platforms.

2) Main structure

Based on the bearing capacity and the nature of the outermost ground, a heavy steel rigid frame structure will be the most suitable for light weight construction with a long span. In order to minimize injury from salt the construction materials shall be painted in Japan in advance; only a touch-up should be conducted locally.

(3) Building parts

1) Exterior

① Roofing

The roof of each building is comparatively wide and equipped with a rain catchment. Painted corrugated steel plates with a long span should be applied to roofing so that the construction term can be shortened as possible. To prevent heat from remaining under the roof, a louver shall be installed on the gable wall for ventilation.

The roof of the anteroom of the main building should contain partly a semitransparent corrugated resin plate for natural lighting and energy-saving.

② Exterior wall

Light-weighted corrugated steel plates should be applied so that the construction term can be shortened.

③ Opening

Aluminum furniture which is light and endurable against injury from salt should be applied.

2) Interior

① Floor

The floors of the platforms, anteroom and cold stores of the main building, and also the workshop of the repair shop should be of concrete covered with anti-abrasion resin. Other floors are of concrete.

② Wall

On a shock-proof wall, i.e. the back of the platform and the both walls of the anteroom, a concrete wainscot must be provided and painted. Also at toilets and the fish washing corner, parts on which water will splash must be covered by concrete wainscots.

From the standpoint of easy maintenance the interior partition wall should be of paint finish plywood on light steel frame structure.

③ Ceiling

Paint finish plywood on light steel frame are also applied.

A 100 mm thick sandwich panel (a polyurethane panel held between galvanized steel plates) should be placed on the walls and ceilings of the cold store and ice store for heat insulation. On the floors of these facilities concrete should be placed, and concrete should be covered with styrol plates and cinder concrete, and then resine painting is conducted.

(4) Equipment

1) Electricity

Basically a 40 W fluorescent lamp is the lighting fixture in all buildings. One 15 A outlet should be provided for each lamp. For exterior lighting 12 mercury lamps (300 W) in total and 3 water-proof type outlets will be required. In order to supply power to the cold-storage/ice-storage/ice-making facilities, pumps, winch, crane and so on, the electrical power main line should be connected. In addition, 2 units of the 125 KVA generator must be supplied for an emergency.

Installation of telephone wires, TV antenna, lightning rods and alarm devices connecting each building should be included.

The following is a estimated electricity.

	Main Bld.	Admin. Bld.	Repair Shop	Exterior/Pontoon	
Lamp	11.0 KW	2.0 KW	1.2 KW	4.5 KW	23.2 KW
Outlet	1.5	1.0	1.0	1.0	
Cold Store	32.0	-	-	-	120.0 KW
Ice-Plant	70.0	-	-	-	
Ice Store					
Machinery	3.0	-	15.0	-	

2) Water supply and sanitary

	Main Bld.	Admin. Bld.	Repair Shop	Exterior
Floor washing tap	5	-	1	5
Ditch/Grease trap	20 m	-	-	-
Stool	2	2	1	-
Urinal bowl	2	1	1	-
Wash basin	2	2	1	-
Wash tab	1	2	1	-

Water supply and sanitary corresponding to the devices above should be provided. Drainage is led to the Suriname River with a pump after treatment.

5-3-5 Other Equipment and Materials

(1) Fish box

Fish boxes are stackable, reinforced plastic boxes of the following dimensions, and 1,000 pieces should be provided.

L ×B ×D = 573 ×373 ×202 mm

(2) Washing tank

The washing tank is placed on the concrete floor of the anteroom for washing and keeping fishes before they are stored in the cold store; 5 tanks of the following dimensions should be supplied.

L ×B ×D = 1,700 ×1,240 ×730 mm

(3) Ice box

Ice boxes are to be sold to fishermen of the Suriname type fishing boats so that they can cool their catch with ice and land it in the raw state. The size of the box is subject to the daily catch (20~40 kg) and the size of the

boat. It should be a plastic one with a lid. The required numbers are 140; the dimentions are,

L ×B ×D = 1,042 × 500 ×490 mm

(4) Truck

Automobile agents in Paramaribo can deal with all types of Japanese automobile. Most popular, easy-maintenance type of it should be selected. The following is its specifications. Required numbers are 2.

- Whole weight about 2,590 kg
- Dimensions L ×W ×H = 4,720 ×1,690 ×1,760 mm
- Carrying load about 1 ton
- Engine Diesel, 4 cycle, 65 KW (4,000 RPM)

(5) Radio Telephone

For communications between the center, Paramaribo Market and Fisheries Department 3 units of 150 MHz radio telephone should be installed at each facility.

(6) Insulated van

The refrigerating van transports the products of the center to Paramaribo Market and remote areas. Based on the size of a ferry and roads and the transport efficiency, 3 vans of 2 ton capacity should be provided.

- Carrying load 2 tons (13m^3)
- Dimensions L ×W ×H = 6,000 ×1,900 ×2,900 mm
- Engine 70 KW, 4,600 RPM
- Fuel oil Diesel oil
- Others Standard tools, Standard spare parts of 2 year supply

(7) Winch

- Required number 1 unit

- Pulling load — about 4 tons
- Pulling speed — 13 m/sec max.
- Motor — 15 KW (AC 220 V, 60Hz, 6P), Drip-proof marine use motor
- Dimensions — L ×B ×H = 2.90×2.20×1.70 m approximately
- Others — Power source box
  Traverser
  Cluth with handling lever
  Brake with handling lever
  Standard tools, tool box, expendables

(8) Cradle

- Required number — 1 unit
- Structure — Built-up steel structure
- Wheel — Automobile tires
- Others — Keel block, side block, pieces for pulling,
  Spare tires, expentables

(9) Ice conveyer

- Required number — 1 unit
- Type — Water-proof type
- Width — 300 mm
- Length — about 7 m

Fig. 39 Cradle

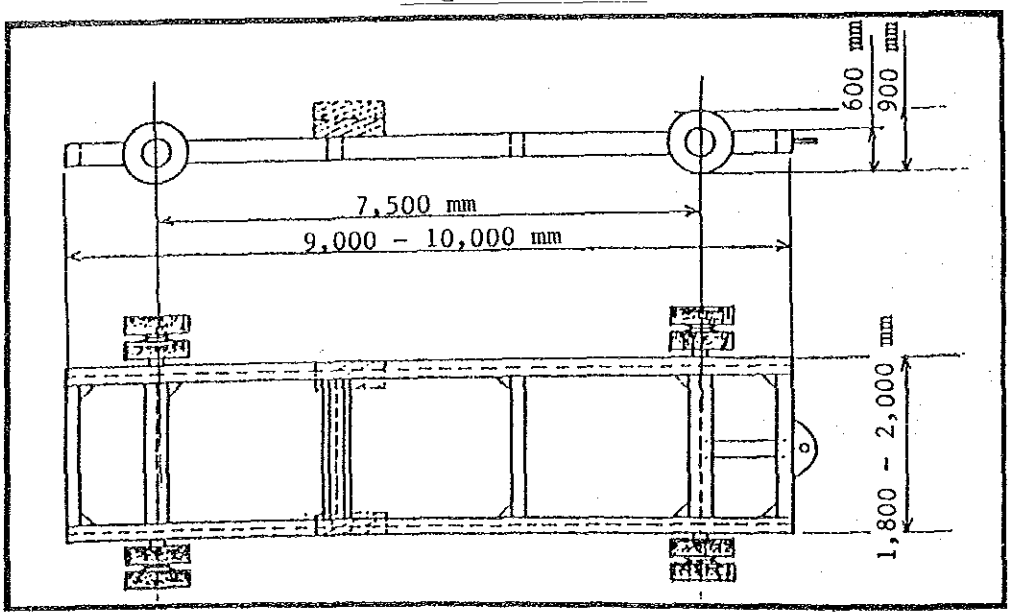
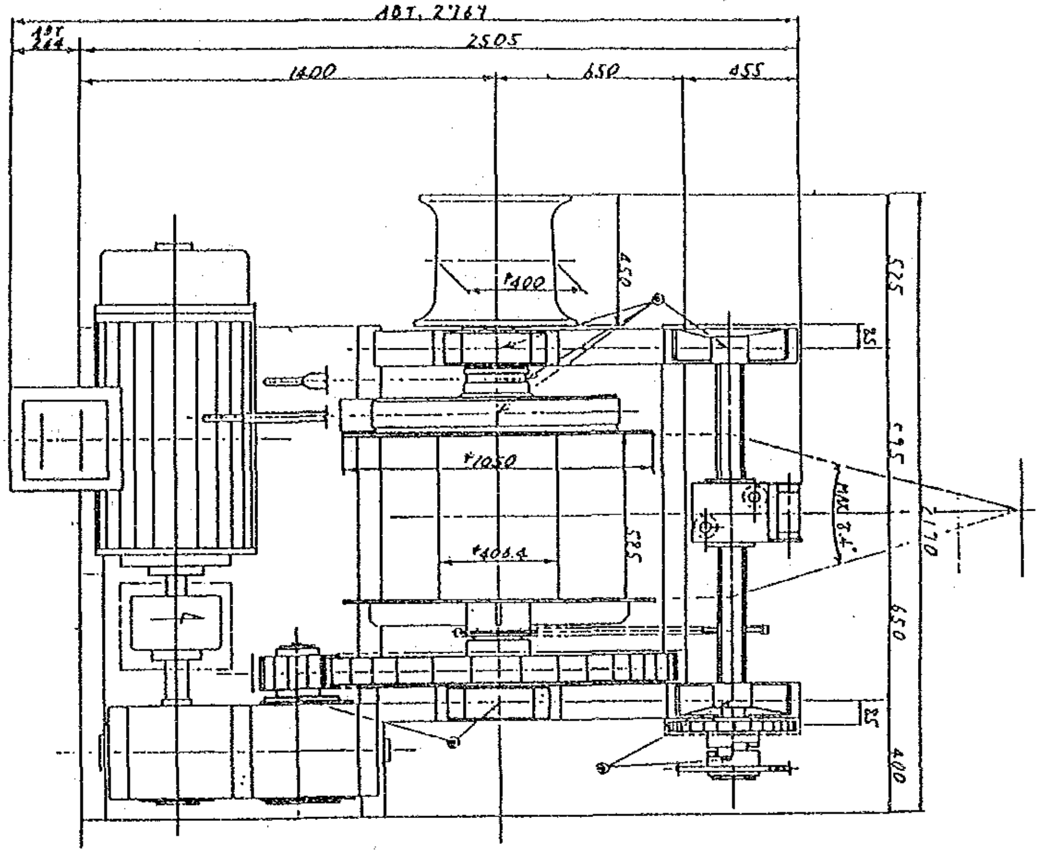
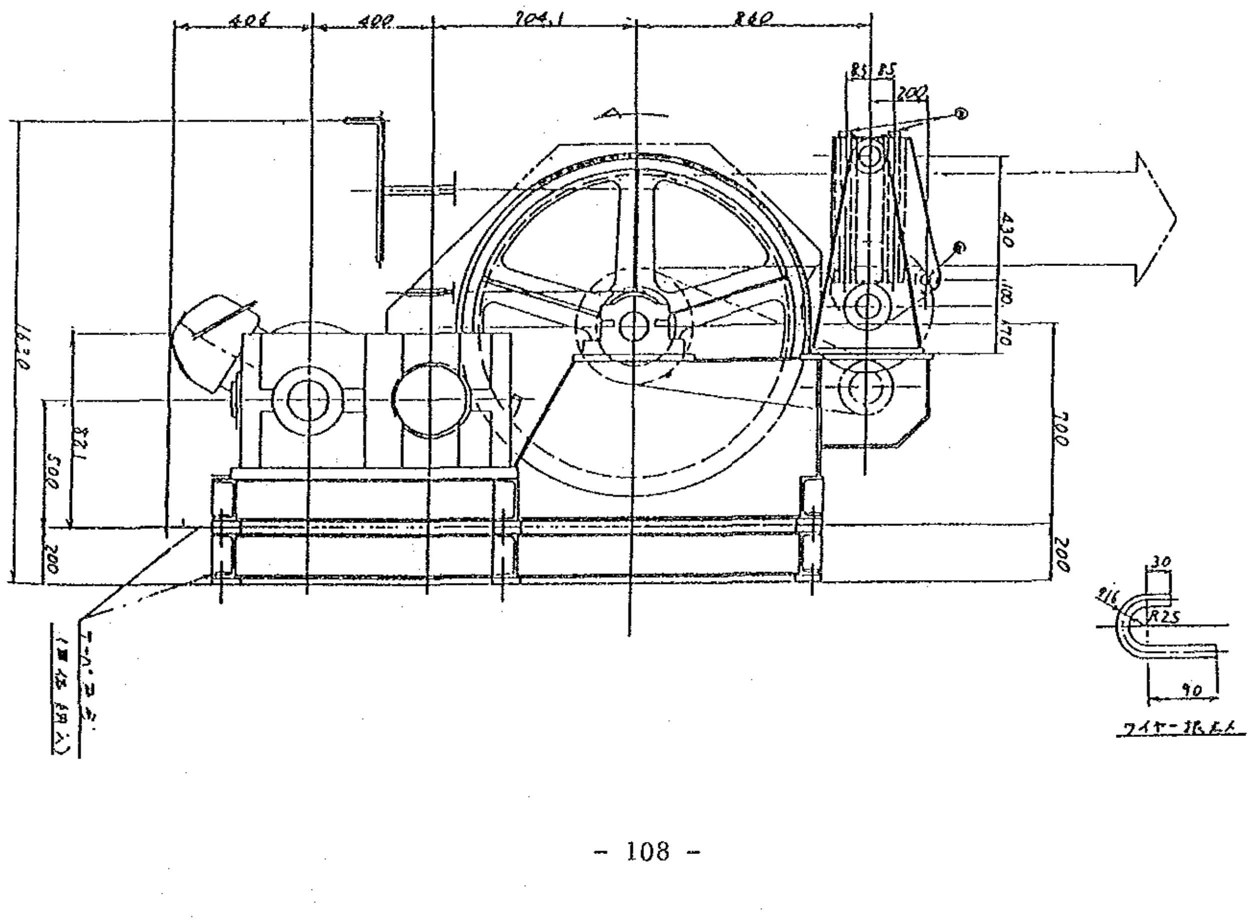


Fig.40 Winch





5-3-6 Basic Design Drawings

(1) Civil engineering

1) Pontoon

① Plot Plan

② General Arrangement

③ Side Elevation

④ Construction Plan

2) Slipway

3) River Wall

(2) Building

1) Plot Plan

2) Main Building

3) Administration Building and Repair Shop

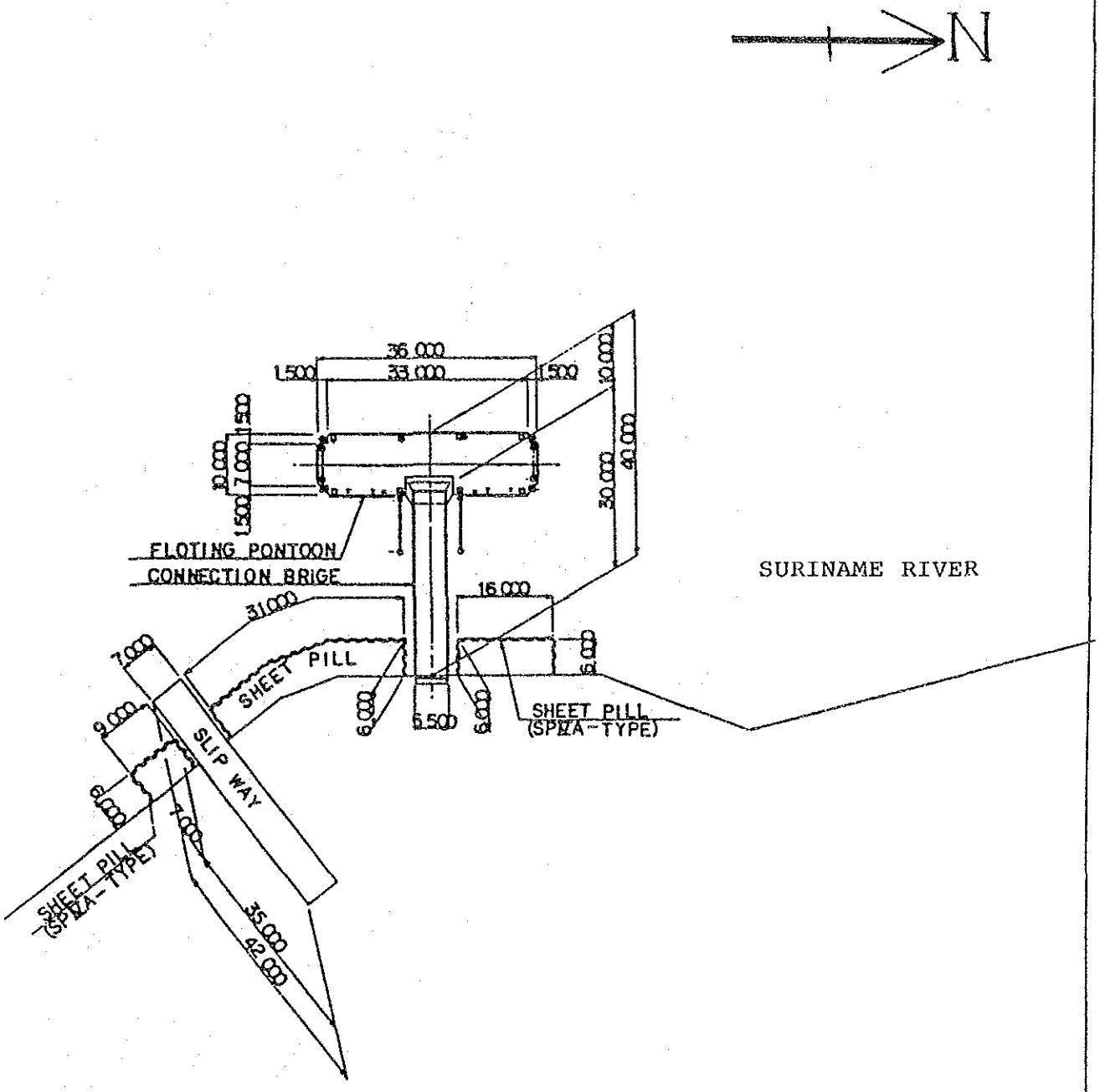
4) Sections

5) Main Building Elevation

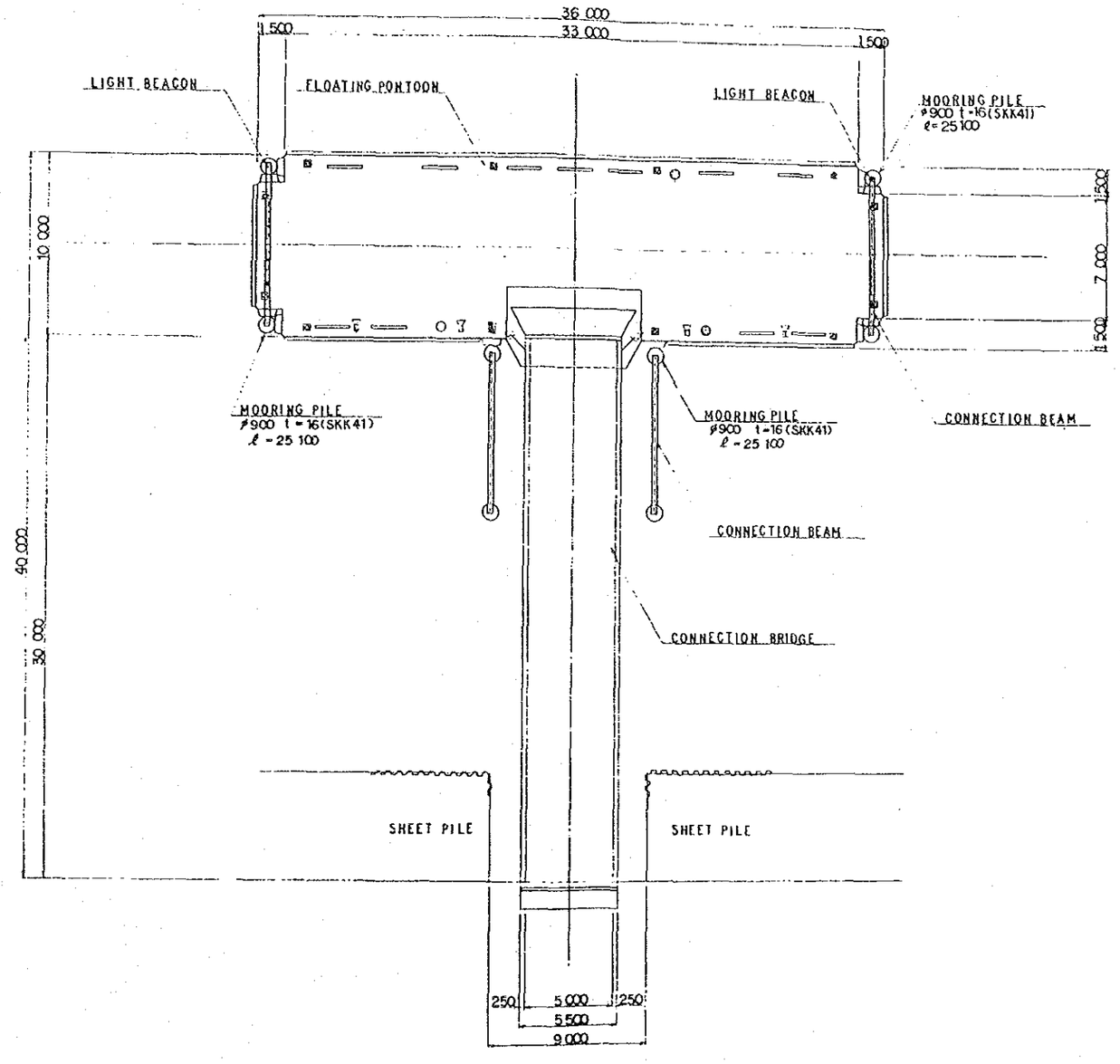
6) Administration Building Elevation and Repair Shop Elevation

Pontoon - Plot Plan

(S = 1/1000)

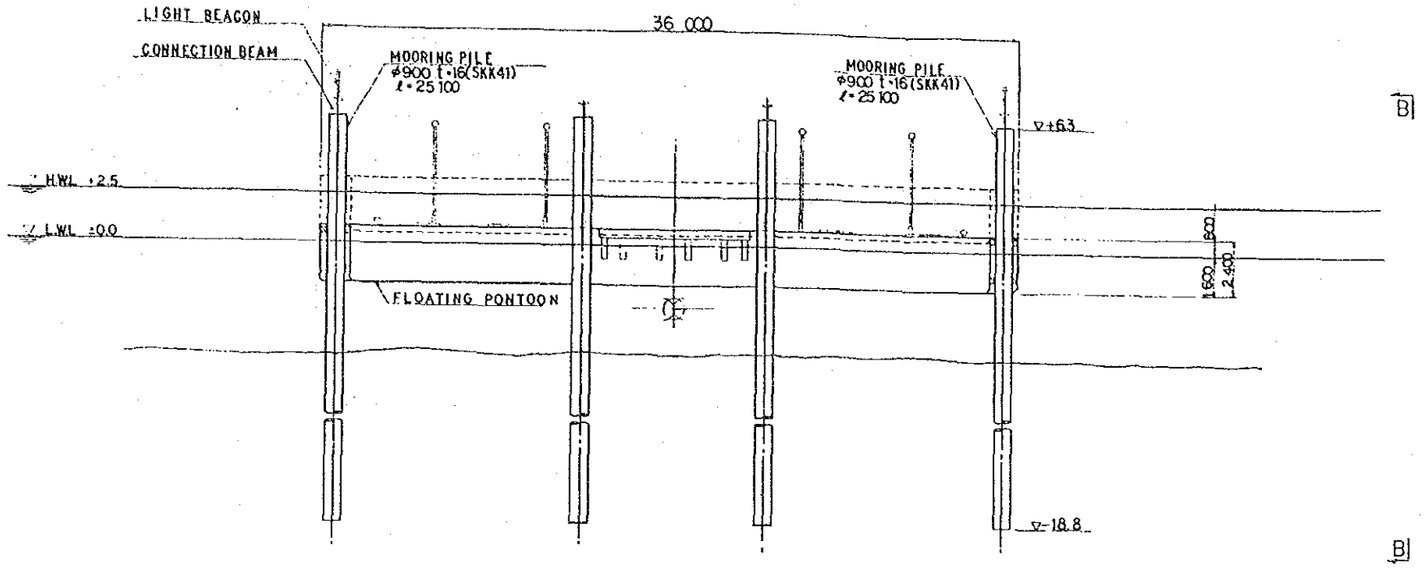


Pontoon - General Arrangement (S = 1/150)

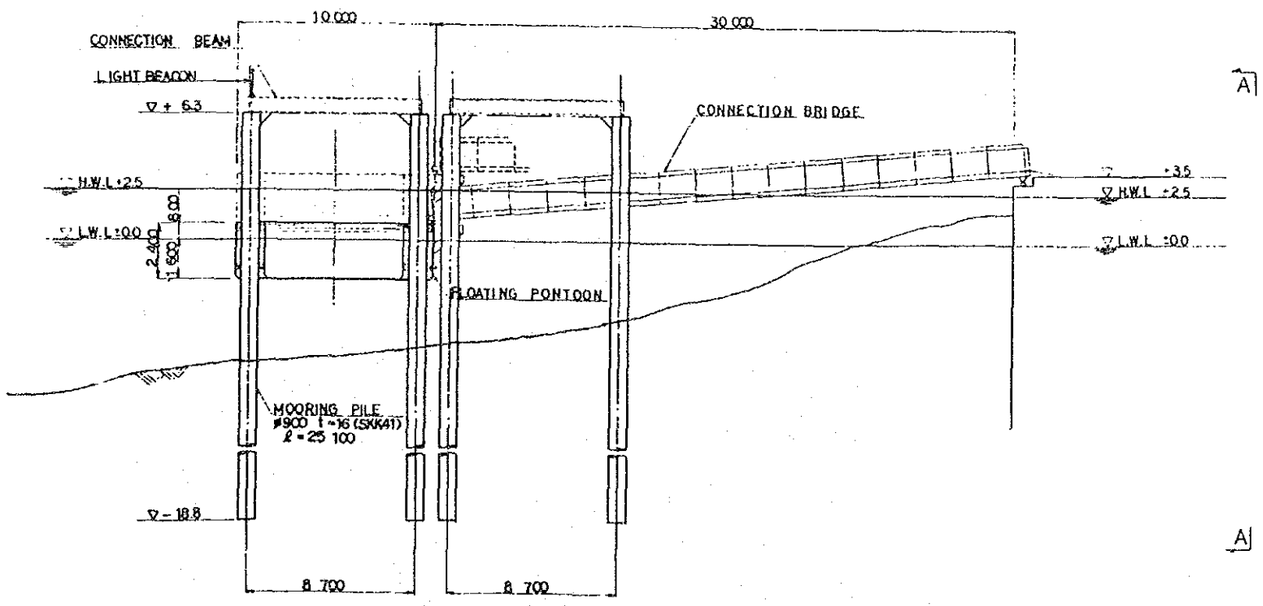


Pontoon - Side Elevation (S = 1/150)

VIEW A-A

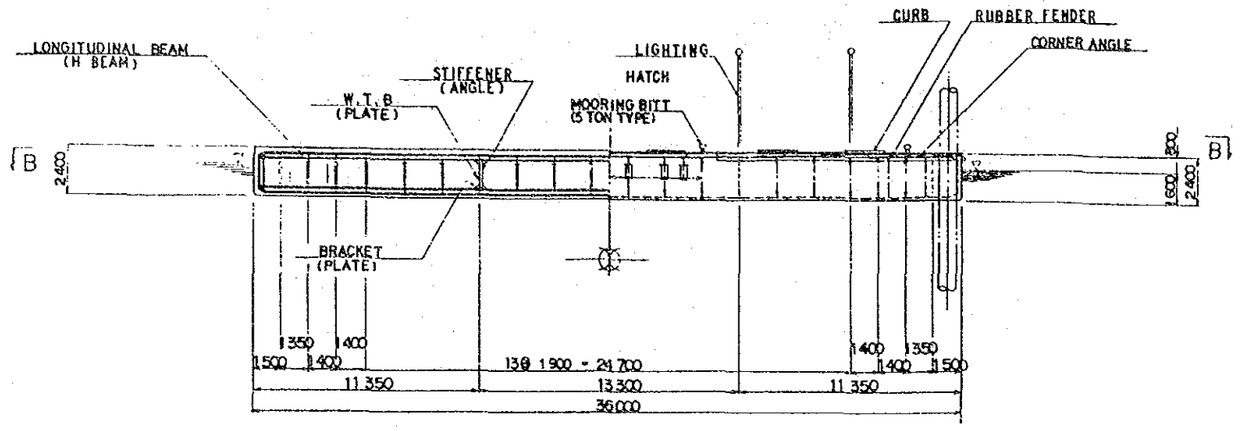


VIEW B-B

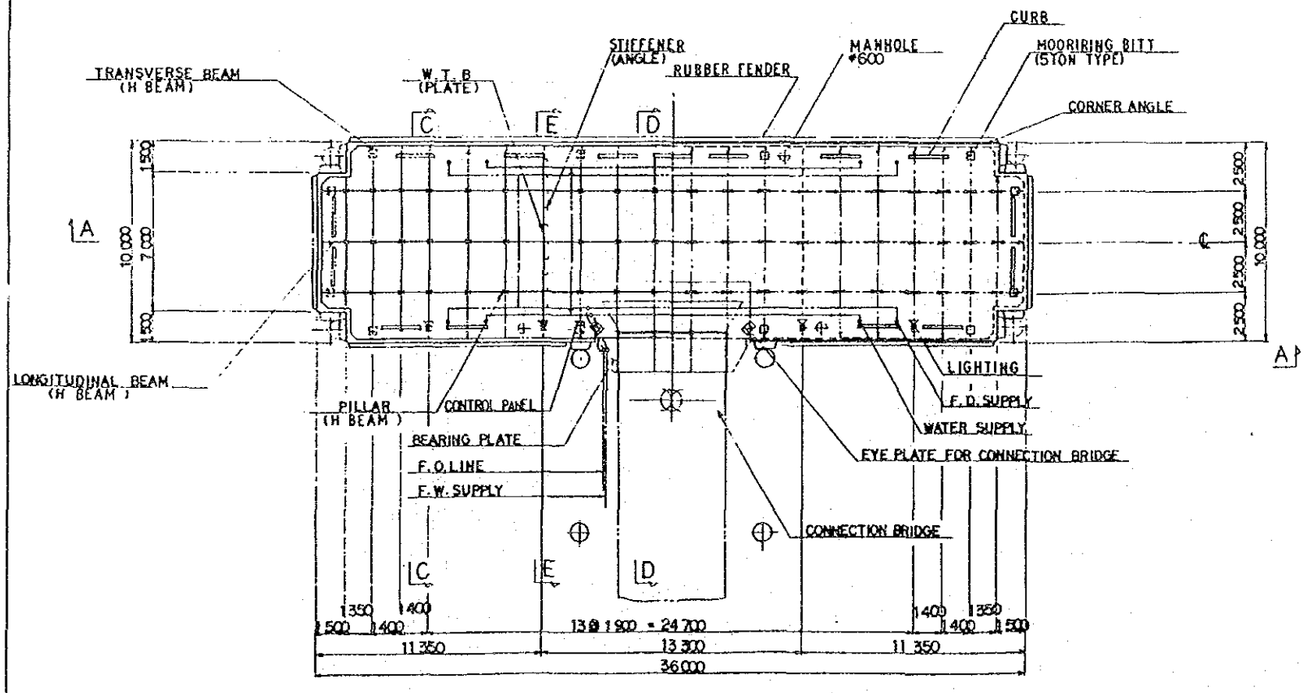


Pontoon - Construction Plan

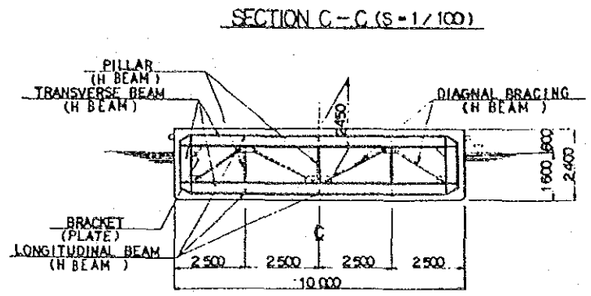
SECTION A - A (S = 1/150)



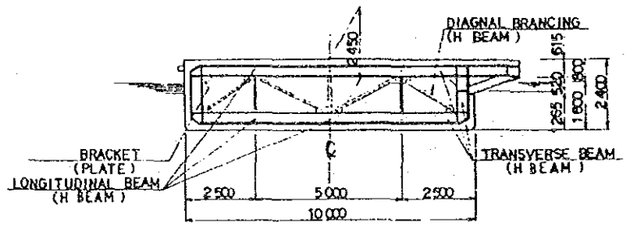
SECTION B - B (S = 1/150)



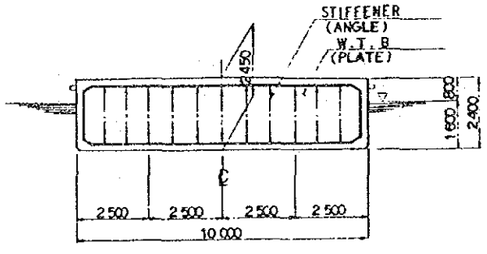
SECTION C - C (S = 1/100)



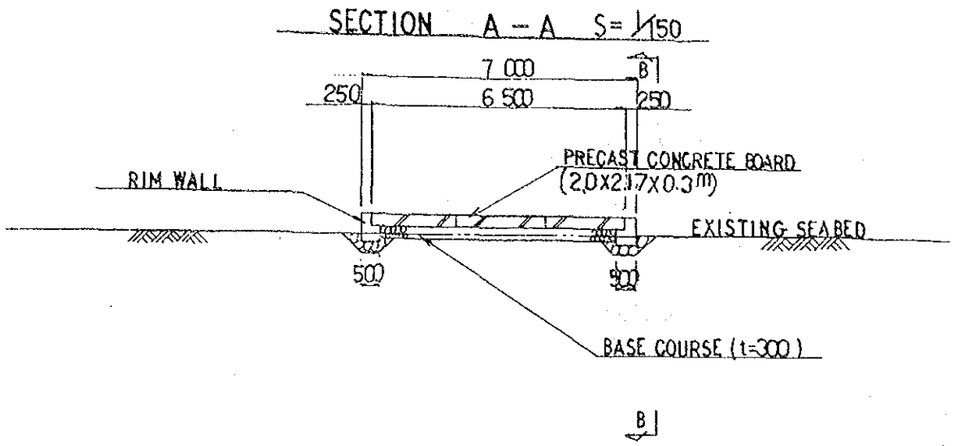
SECTION D - D (S = 1/100)



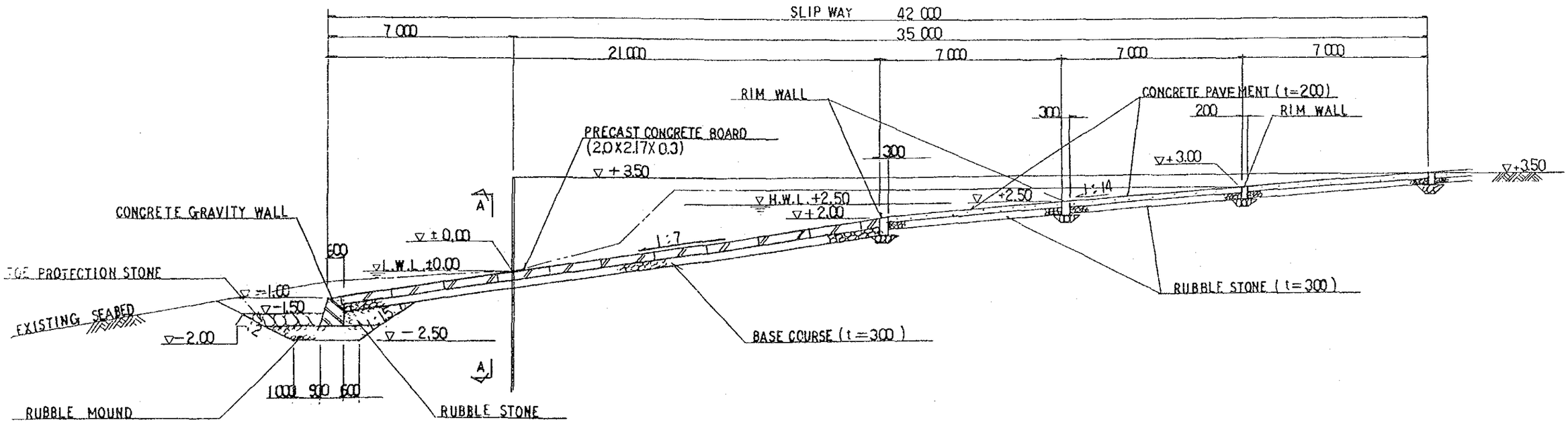
SECTION E - E (S = 1/100)



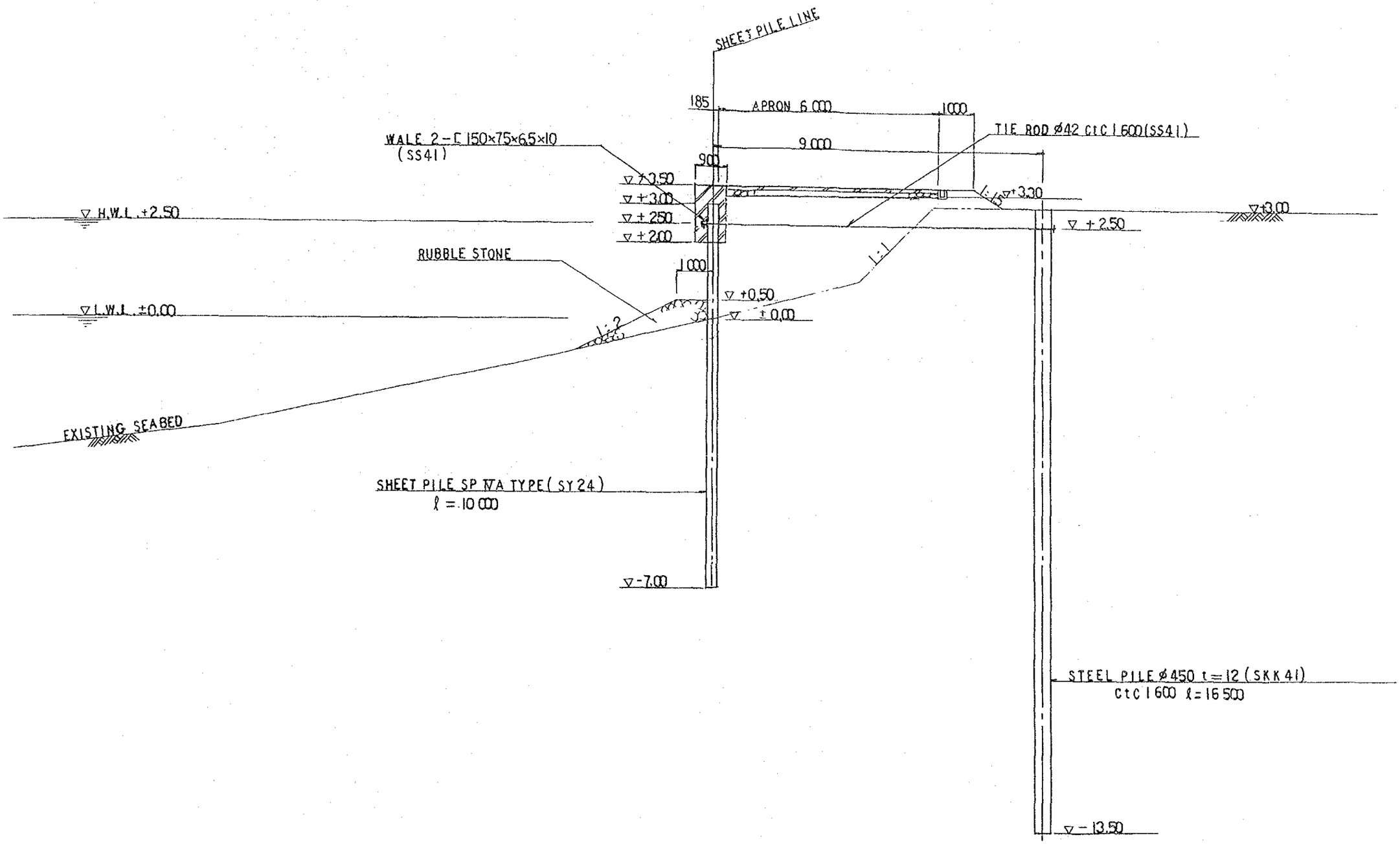
Slipway

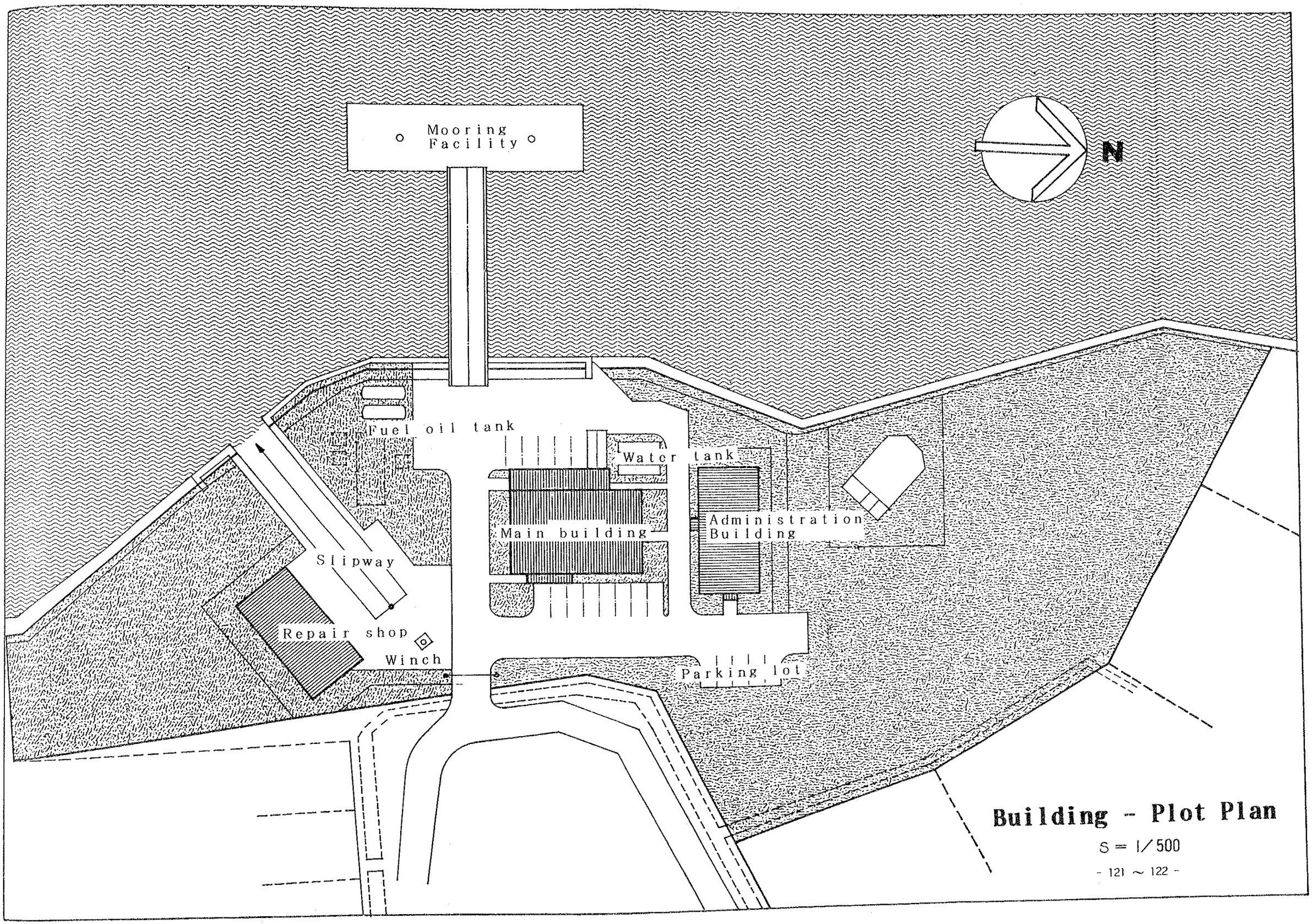


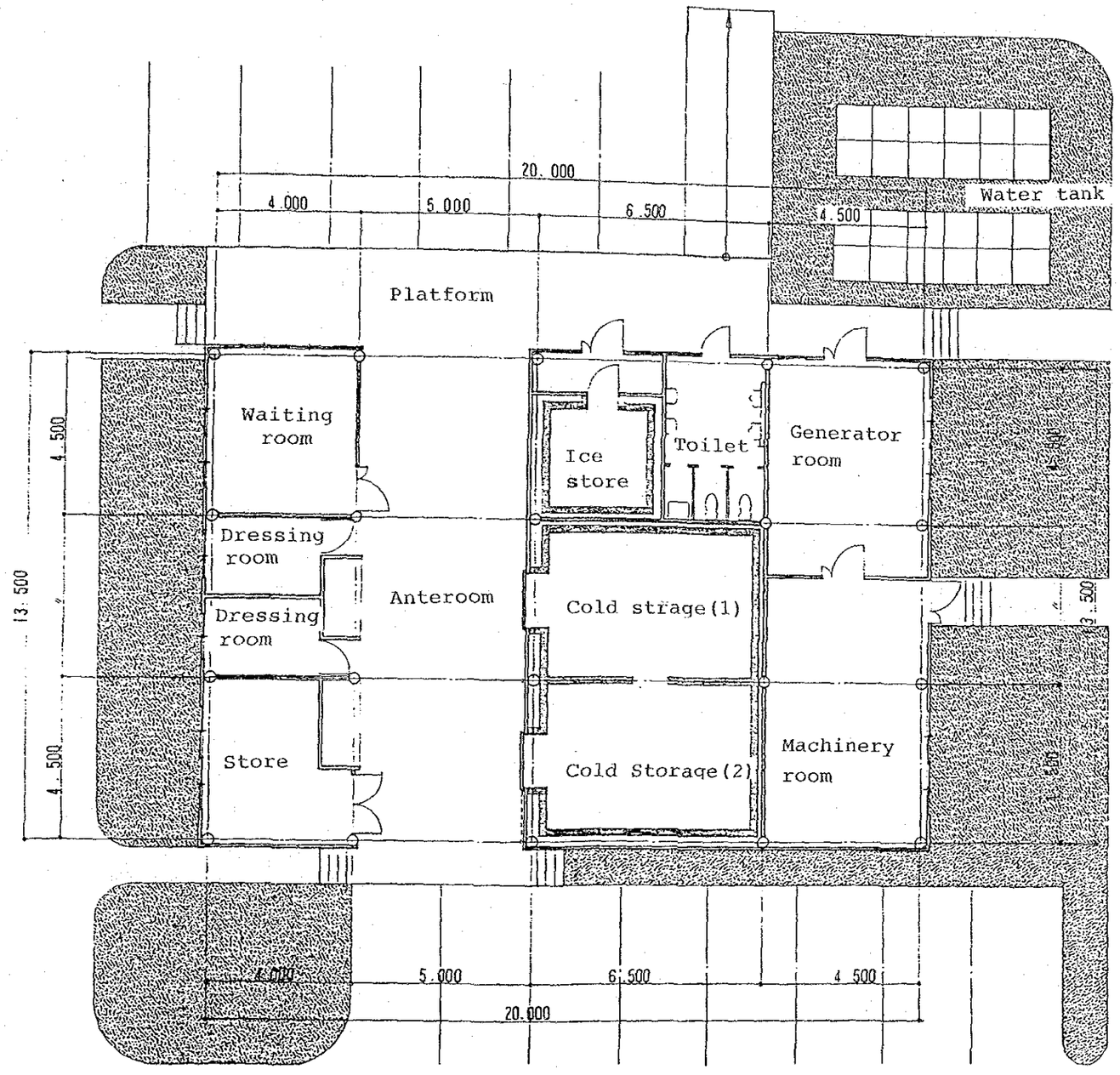
SECTION B – B S= 1/150



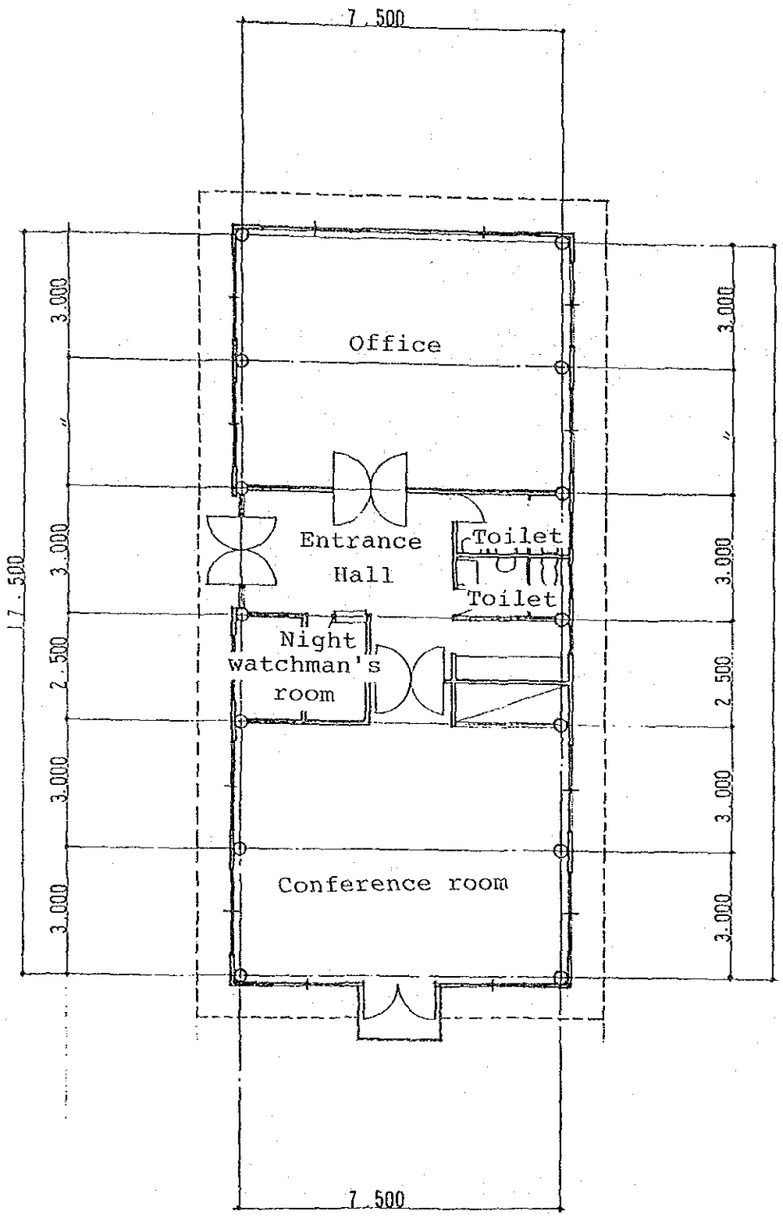
River Wall (S = 1/100)



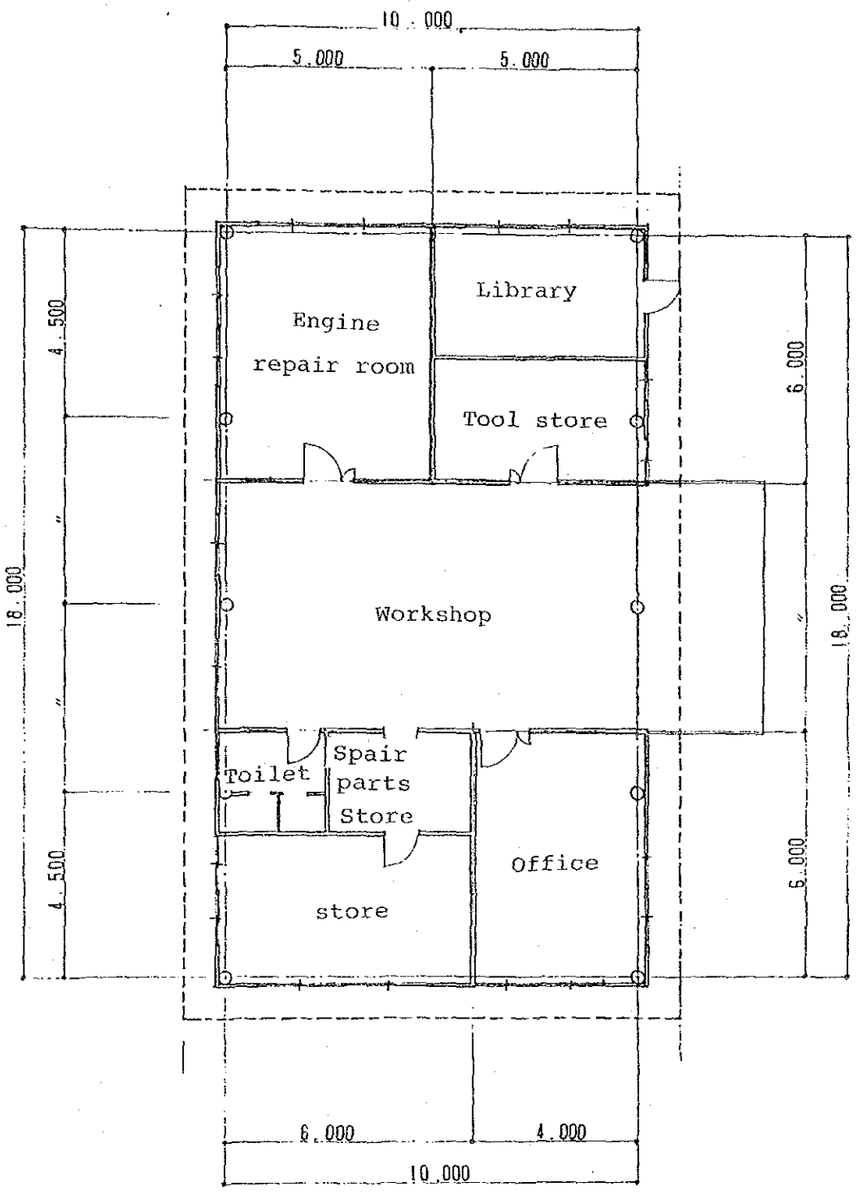

Mooring Facility
N
Fuel oil tank
Water tank
Main building
Administration Building
Slipway
Repair shop
Winch
Parking lot
Building - Plot Plan
S = 1/500



Building - Main Building (S = 1/150)

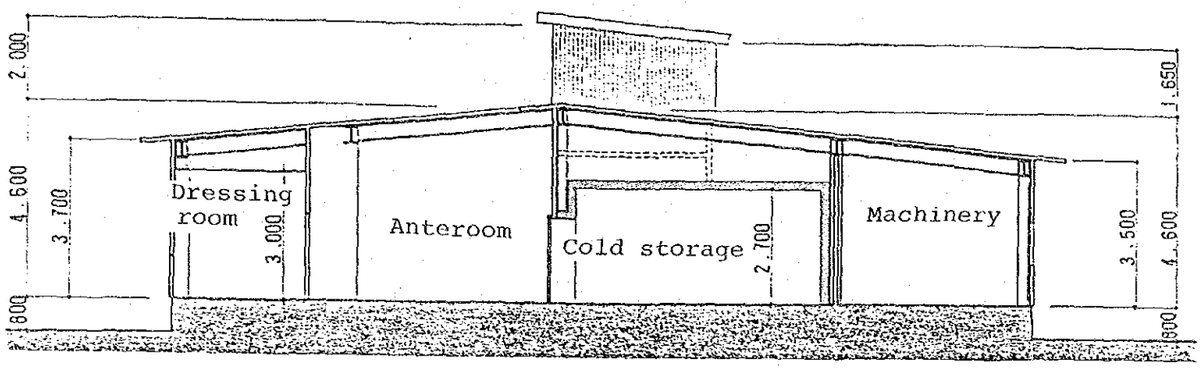


Adiministration Building

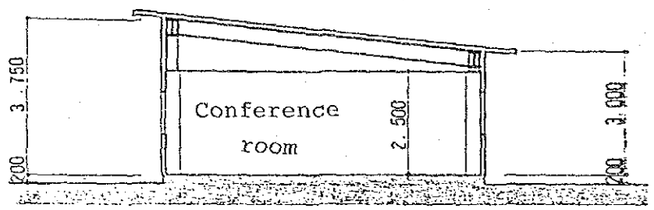


Repair Shop

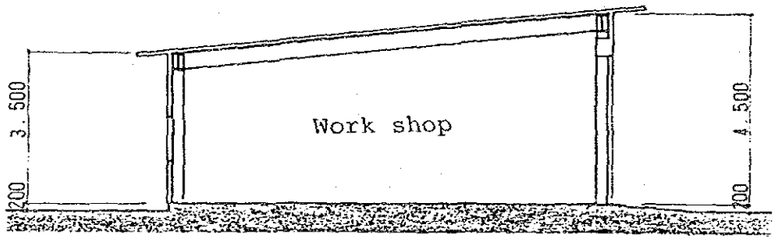
Building - Administration Building and Repair Shop (S = 1/150)



Main Building



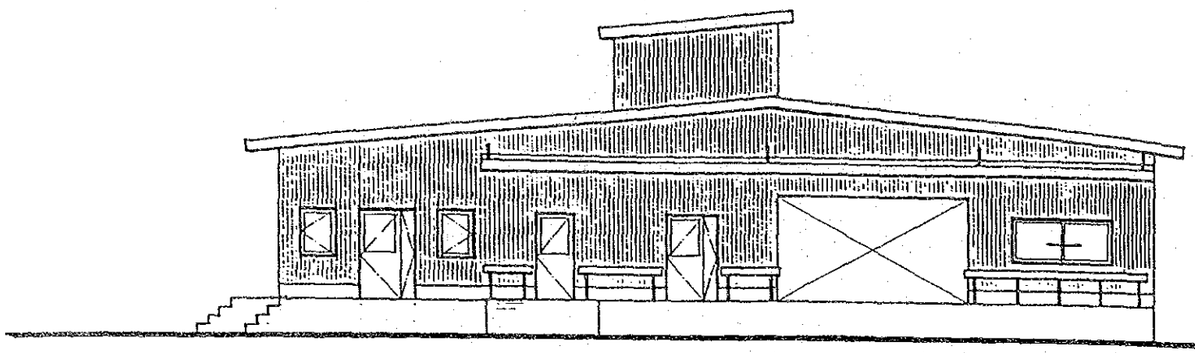
Administration Building



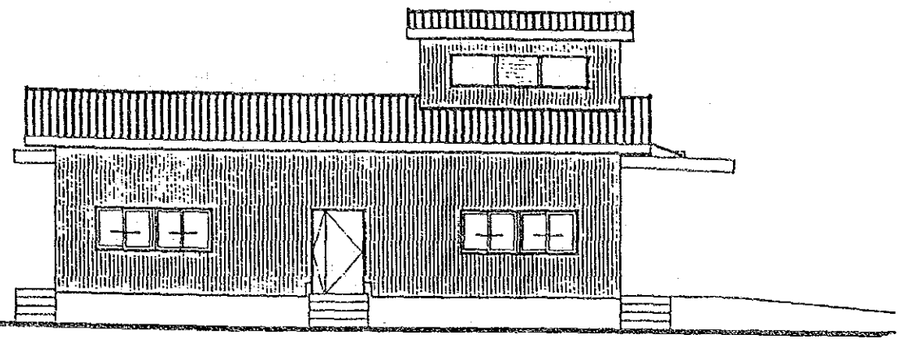
Repair Shop

Building - Sections

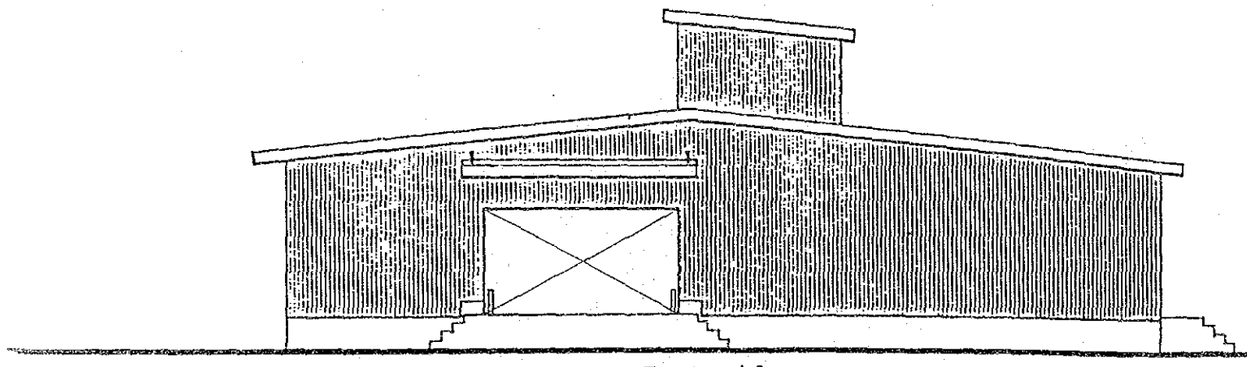
(S = 1/150)



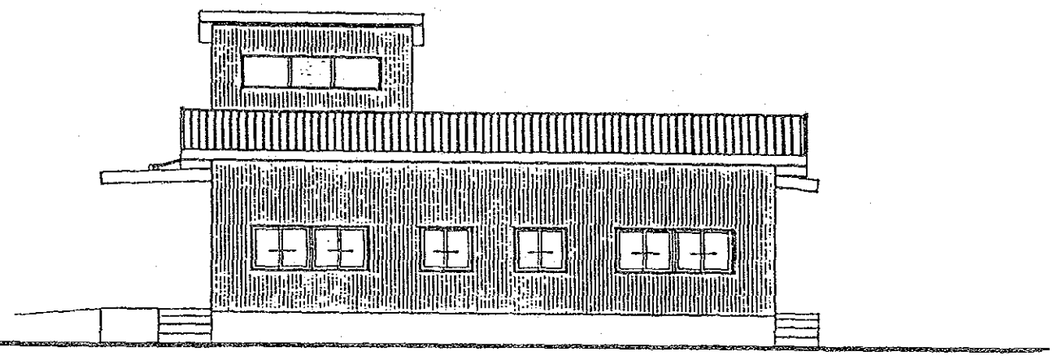
West side



North side



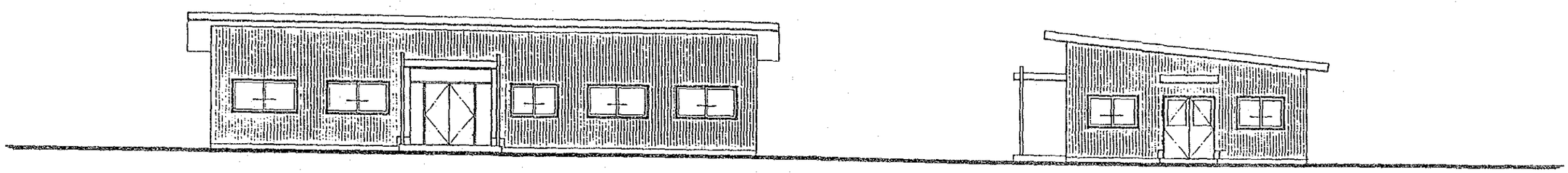
East side



South side

Building - Main Building Elevation

(S = 1/150)

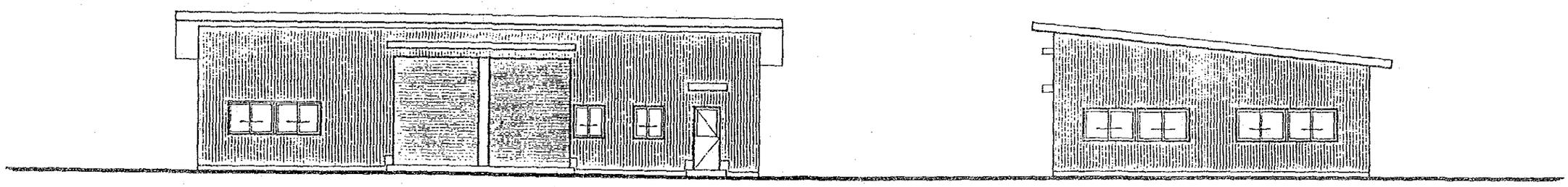


South side

Administration Building

East side

(S = 1/150)



North side

Repair Shop

West side

Building - Administration Building Elevation and Repair Shop Elevation

5-4 Execution Plan

5-4-1 Execution Policy

The following is the works concerning construction work in the Project.

(1) Civil engineering work

Pontoon and Access Bridge	Pontoon: 36 ×10 m, Access Bridge:30×5 m
River wall	Sheet pile structure, 65 m in length
Slipway	PC concrete, 42 ×7 m

(2) Shore facility

Main building	Steel frame construction, one storied,	270 ㎡
Administration building	Steel frame construction, one storied,	131 ㎡
Repair shop	Steel frame construction, one storied,	180 ㎡
Exterior ground	Banking - 6,400 ㎥, Pavement- 1,437 ㎡	

Some engineers are available locally, but it is difficult to keep a certain number of skilled workers. Civil engineers, scaffolding men, sheet metal workers, heat insulation work engineers and refrigerating work engineers are not available at all. These engineers and workers are to be sent from Japan.

5-4-2 Procurement and the Scope of Work

(1) Procurement of materials

1) Construction materials

Construction materials other than ones available in Suriname are to be procured in Japan or other countries. Of necessary construction materials only such aggregate as sand and gravel, concrete blocks and timber are produced in Suriname. Other materials are all imported, spending a long time, at a higher price. Timber, mainly greenheart, is of good quality, but appears on the market in small quantity and rather expensive (the supply

from the producing center in the southern forest land is not steady due to the instability of a political situation).

Since the procurement through import is unsuitable from the standpoint of both costs and time, construction materials to be purchased locally will be aggregate, concrete blocks, and timber; the possibility of the procurement of reinforcing steel and cement from a third country will be examined.

2) Equipment and materials

Such industrial products as vehicles, fish boxes, repair tools, etc. are not produced in Suriname. For all of them Japanese made products, which are highly competitive and of good quality, are to be supplied.

(2) Scope of work

Wheh the Project is implemented on a Japan's Grant Aid programe, the scpoe of work is to be as follows;

- Contruction of a fishery center containing a pontoon, river wall, slipway, main building, administration building, repair shop and exterior at Nieuw Amsterdam.
- Supply of equipment and materials necessary to run the fishery center.
- Service concerning the implementation of the Project.

1) The following is undertaken by the Japanese side.

- Construction of the buildings and manufacturing of the equipment and materials.
- Transportation (air, marine and internal) of the equipment and materials including construction machinary and materials to the site.
- Consulting services concerning Detail Design, Tendering and supervision of work.

2) The Government of Suriname shall undertake the following;

- Tax exemption and customs clearance of equipment and materials.
- To secure land at the proposed site and to clear, level for the installation.

- To provide facilities for the distribution of electricity, water supply and telephone trunk line.
- To exempt the Japanese nationals concerned from customs duties, internal taxes and other fiscal levies imposed in Suriname for the supply of goods and services under verified contracts.
- To maintain and use properly and effectively the facilities constructed and equipment and materials supplied and to bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities and installation of the equipment.

5-4-3 Supervision Plan

After the conclusion of a Contractor's Agreement between the Government of Suriname and a Japanese contractor, the Consultant shall check and approve all the plans and drawings, and also be present at necessary tests and inspections. After the start of the construction, the Consultant shall supervise and inspect work at the site in accordance with the working schedule, and report all details. On completion the Consultant deliver the Project to the Government of Suriname.

5-4-4 Working Schedule

Taking the scope into consideration, the Project should be implemented in 2 phases; the 1st Phase includes civil engineering work concerning the pontoon, riverwall and slipway, and the 2nd Phase consists of shore-based facilities and equipment and materials.

(1) Phase I

It is estimated that the 1st Phase work of the Project will take 11 months to complete. The construction of the pontoon in Japan requires 6 months. Adding transportation (2 months) and anchoring (2 months), 10 months will be needed.Foundation work for anchoring the pontoon shall be complete by the

arrival of the pontoon. The construction of the river bank and slipway will require 11 months.

(2) Phase II

It will take 2.5 months to prepare shore facilities in Japan, 2.0 months to procure and manufacture in Japan and 1.5 months to transport to the site, and at the site, foundation, erection, roofing, wall, interior and finish works should be done in that order for 7 months.

Installation of the equipment will be conducted in parallel with the construction of shore facilities. Materials will require about 2 months for procurement. All the work is planned to complete in 7 months.

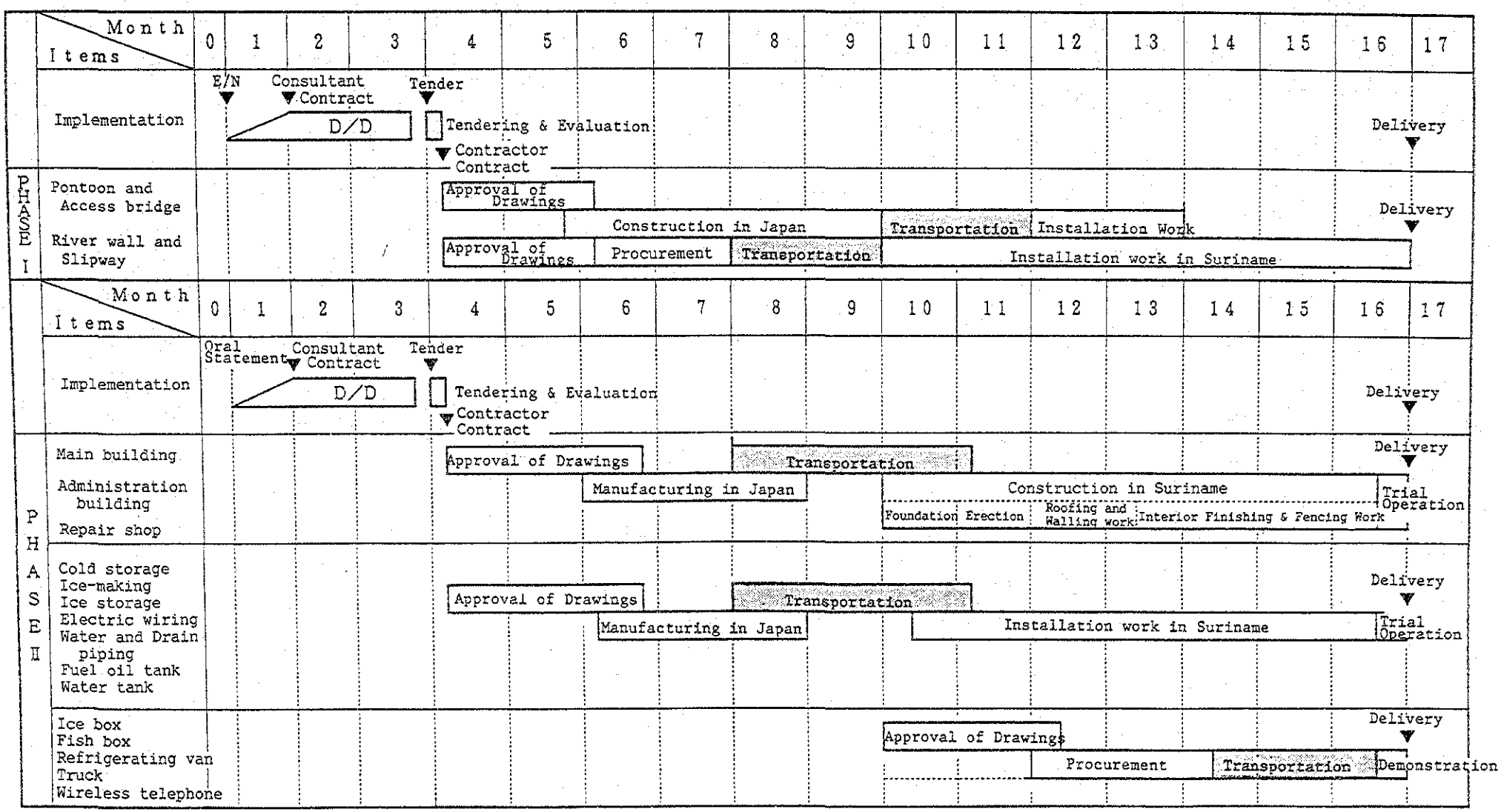
The working schedule is shown on the next page.

5-4-5 Costs to be borne by the Suriname side

Shown below are estimates of expenses to be borne by the Suriname side.

1)	Site clearance	SF	10,000
2)	300 m long fence with 2 gates (including a fence of Monument)	SF	76,000
3)	Electricity and Water	SF	63,000
	Total	SF	149,000

Table 17 Project Schedule



CHAPTER 6 EVALUATION OF THE PROJECT

CHAPTER 6 EVALUATION OF THE PROJECT

To estimate the expected economic and social effects of the Project, benefits and costs for each component shall be calculated.

6-1 Fiscal Status of the Fishery Center

On the completion of the fishery center necessities that the Commewijne fishermen should land their catch at the Paramaribo Market and buy ice at SAIL will be gone. The fiscal status of the fishery center therefore will depend upon earnings generated from the sales of fuel oil, ice, water and fishes, repairing charges, docking charges and so on. Basically these earnings must be enough for managing the center. On the other hand, Commewijne fishermen will be able to enjoy benifits in two aspects; one is the increase of catch by improved fishing activities and another is the increase of income by improved quality of fish.

Here the fishery center's annual earnings on the basis of number of fishing boats to be expected to use the center and sales of goods and materials are estimated as follows;

6-1-1 Estimate of Sales of Supplies and Purchasing Fish

(1) Fuel oil	962,877 ℓ
1) Gasoline	
① Suriname type fishing boat (25 HP outboard motor)	
140 boats ×20 ℓ ×275/365 days×300 days	632,877 ℓ
② Guyana type fishing boat (40 HP outboard motor)	
22/2 boats×400 ℓ ×30 trips	132,000 ℓ
Total	764,877 ℓ

2) Diesel oil

Guyana type 105 HP inboard engine boat (Commewijne District)

22/2 boats×600 ℓ ×30 trips	198,000 ℓ

(2) Ice

① Suriname type fishing boat

140 boats ×30kg×275/365 days×300 days	949 tons

② Guyana type fishing boat

22 boats×3 tons×30 trips	1,980 tons
Total	2,929 tons

(3) Fish

① Suriname type fishing boat

140 boats ×30kg/3×275/365 days×300 days	316,500 kg

② Guyana type fishing boat

22 boats×3,000 kg ×30 trips	1,980,000 kg
Total	2,296,500 kg

(4) Slipway

Only the Guyana type fishing boats will use the slipway because the Suriname type boat is designed for beach-landing. It is assumed that 22 boats of them will dock twice a year.

The docking charge based on the current tariff is as follows;

Docking charge	SF 200 ×1 time	= SF 200
Staying fee	SF 100/day×2 days	= SF 200
Total		SF 400 (except repairing charges)

Hence the yearly sales of the slipway for 44 boats are;

44 boats×SF 400 = SF 17,600

Assuming that repairing charges including repairing, calking, painting, etc. are SF 500 per boat, an additional income of 44 boats×SF 500=SF 22,000 can

be expected. Thus the estimated sales of the slipway are,

SF 17,600 +SF 22,000= SF 39,600

6-1-2 Profit (Yearly)

(1) Fuel oil

Purchasing price gasoline: SF 1.0/ℓ, diesel oil: SF 0.6/ℓ

Selling price gasoline: SF 1.1/ℓ, diesel oil: SF 0.7/ℓ (SF 1=¥80)

Thus,

Gasoline	764,877 ℓ ×SF 0.1×¥80 =	¥ 6,119,016
Diesel oil	198,000 ℓ ×SF 0.1×¥80 =	¥ 1,584,000
Total		¥ 7,703,016

(2) Ice

Assuming that the cost price is SF 70 per ton and the selling price SF 140,

2,929 tons×SF 70 ×¥80 =¥16,402,400

(3) Fish

Currently fishermen are selling their catch at Paramaribo Market at the following price;

Suriname type fishing boat	SF 2.0/kg
Guyana type fishing boat	SF 4.0/kg

The proposed marketing system of fish at the fishery center is as follows;

- The center sells fishermen's catch to brokers at a negotiated price.
- On the following day the center reimburses fishermen for the proceeds of sales, deducting the followings;

Commission	¢4(SF 0.04/kg)
Fuel oil charge	
Ice charge	

① Suriname type fishing boat

One boat lands average 10 kgs of fish a day at Paramaribo Market. When fishermen sell their catch to the center, their income will decrease by

SF 0.04/kg×10 kgs = SF 0.40.

However they can save some 2 hours going to Paramaribo and back, and fuel expenses of

4 ℓ/hour ×2 hours ×SF 1.1/ℓ = SF 8.8.

(Fuel consumption of 25 HP outboard motor is 4 ℓ/hour and the price of gasoline is SF 1.1/ℓ).

They will not, to any degree, find themselves disadvantaged by selling their catch at the center.

② Guyana type fishing boat

One boat lands average 3,000 kgs of fish a day at Paramaribo Market. As a result of selling their catch to the center, fishermen's income will be reduced by

SF 0.04/kg×3,000 kgs = SF 120.

Similar to the case of the Suriname type fishing boat, they can, however, save two hours and about SF 22.4 of fuel expenses.

75 HP × 0.85 ×210 g/hour・HP×2 hours ÷ 0.84 ≒ 32 ℓ

32 ℓ × SF 0.7/ℓ = SF 22.4

Where 0.85: Engine efficiency 210 g: Fuel consumption/ hour・HP

0.84: Specific gravity of diesel oil

The owner of the Guyana type fishing boat usually hires two or three watchmen on board in harbor so that he can give a rest to fishermen and secure to load ice on board by bringing the boat to the SAIL' jetty one or two days before sailing. One watchman costs the owner SF 100 to 120 a night and day. This cost will be eliminated when the boat can be supplied with fuel and ice at the center immediately before sailing.

Thus economy in fuel expenses and watchmen's costs will make up decreasing

proceeds at a price of ¢4 cheaper.

• Revenue of the center

On the basis of the assumption above the revenue of the center generated from the commissions is calculated as follows;

① Suriname type fishing boat

316,500 kg×SF 0.04 ×¥80 = ¥ 1,012,800

② Guyana type fishing boat

Assuming that yearly landing is 1,980,000 kg, daily landing is

1,980,000 kg ÷300 days (Business days of the center) = 6,600 kg

Thus, 6,600 kg×SF 0.04 ×300 days×¥80 = ¥ 6,336,000 .....(a)

Of 6,600 kg of landing, 1,100 kg of fishes good in quality are to be sold to fish processors of Paramaribo at a price of 20% addition of the buying price from fishermen, considering the present market situation.

Assuming that the buying price is SF 4.0/kg, the commission is

1,100 kg × {(SF 4.0 - SF 0.04)×1.2 - SF 4.0} ×300 days×¥80

= ¥ 19,852,800 .....(b)

Commissions for Guyana type fishing boats are (a) +(b) = ¥ 26,188,800

Hence, the revenue is

①+② = ¥ 1,012,800+¥ 26,188,800 = ¥ 27,201,600

(4) Slipway

Assuming that the material costs are 50% of the repairing charges of SF 500,

SF 500×50% ×44 boats/year= SF 11,000/year

(SF 39,600-SF 11,000) ×¥80 =¥ 2,288,000

Hence,

(1) +(2) +(3) +(4) =

¥ 7,703,016+¥16,402,400+¥27,201,600+¥ 2,288,000= ¥53,595,016

6-1-3 Management Costs

The required management costs are calculated as follows;

(1) Slipway

The concrete slipway need not painting for maintenance. Maintenance and repairing costs, including moving parts of the access bridge, hoists, lighting fixture, etc., are calculated at ¥100,000 a year.

Maintenance/repairing costs	¥ 100,000
Management costs	¥ 100,000

(2) River wall

The management expenses of the river wall are not included.

(3) Slipway

1) Electric charges of the winch

15 KW ×(1/2 hour for docking +1/2 hour for undocking)=15 KW/hour

15 KW ×SF 0.175/KW/hour×¥80= ¥210/boat

Thus, the electric charges for 44 boats are,

¥210/boat×44 boats = ¥9,240

2) Wages

One mechanic of SF 2,500 a month and two workers of SF 1,200 should receive 12 months' wages.

Mechanic	1 × SF 2,500 ×12×¥80 =	¥2,400,000
Workers	2 × SF 1,200 ×12×¥80 =	¥2,304,000
3) Repairing	SF 2,500 ×¥80 =	¥ 200,000
Total 1)+2)+3)		¥4,913,240

(4) Ice-making/ice storage facilities

Calculation is based on the following figures;

1) Electricity, rate, price, etc.

① Ice-making facility 32 KW/hour×2 units ×24 hours=1,536 KW/day

② Ice store 8.5 KW/hour ×0.8 ×21 hours =142.8 KW/day

③ Required material water 14.4 tons

④ Engineer 1 person, reckoned in the management expenses of the Main Building.

⑤ Charges Electricity SF 0.175/KW×¥80= ¥14/KW

Water SF 2.9/ton ×¥80= ¥232/ton

⑥ Working ratio

Ice-making machine 24 hours/day, 300 days/year

Ice store 21 hours/day, 365 days/year

2) Management expenses

① Electricity rates

- Ice-making machine 1,536 KW/day×300 days×¥14 =¥6,451,200
- Ice store 143KW/day×365 days×¥14 =¥ 730,730

② Water charges ¥232 ×15.6 tons ×300 days =¥1,085,760

③ Repairing expenses SF 10,000 ×¥80 =¥ 800,000

Management costs ¥9,067,690

(5) Cold storage facility

Calculation is based on the following figures;

1) Required electricity

16 KW/hour×0.8 ×21 hours/day×365 days×2 units= 196,244 KW a year

2) Required water volume for washing fishes

8,000 ℓ/day×300 days/year = 2,400 tons a year

3) Wages of one engineer are reckoned in the management expenses of the Main Building.

4) Management expenses

① Electricity rates	196,244 KW × ¥14 =	¥2,747,136
② Water charges	2,400 tons × SF 2.9 × ¥80 =	¥ 556,800
③ Maintenance expenses	SF 3,000 × ¥80 =	¥ 240,000
Management costs		¥3,543,936

(6) Main building

1) Electricity

Electric lights	11.0 KW/hour	15.5 KW/hour
Outlets	1.5 KW/hour	
Machinery	3.0 KW/hour	

Hence,

① lighting 15.5 KW/hour × 9 hours/day × 300 days = 41,850 KW

② Pumps (pump efficiency-80%, operation hour-70% of business hours)

- Rainwater tank 1.5 KW/hour × 0.8 × 9 hours × 0.7 × 300 days = 2,268 KW
- City water tank 1.5 KW/hour × 0.8 × 24hours × 0.7 × 300 days = 6,048 KW
- Oil tank 1.2 KW/hour × 0.8 × 6hours × 300 days × 2 units = 3,456 KW

Total 53,622 KW/year

2) Water

① Fishing boats 2.2 boats × 200 ℓ × 300 days = 132 tons/year

② Crew members

{(105 boats × 2 persons) + (2.2 boats × 5 persons)} = 111 persons/day

One person consumes 20 ℓ a day, and thus;

111 persons × 20 ℓ × 300 days = 666 tons/year

③ Staffs 8 persons × 100 ℓ × 300 days = 240 tons/year

Total 1,038 tons/year

3) Wages

		Wages per month	Total
Worker in charge of ice,	1 person	SF 1,500	SF 1,500
Accountant,	1 person	SF 1,500	SF 1,500
Mechanic (Repair Shop),	1 person	SF 2,500	SF 2,500
Refrigerating van driver,	2 persons	SF 1,500	SF 3,000
Truck driver,	1 person	SF 1,500	SF 1,500
Clerk in charge of oil/water	1 person	SF 1,200	SF 1,200
Total	7 persons		SF 11,200

(Note) The wages of one refrigerating van driver are reckoned in the management expenses of the Refrigerating Van.

4) Management expenses

① Electricity rates	53,622 KW ×¥14 =	¥ 750,708
② Water charges	1,038 tons ×SF 2.9×¥80 =	¥ 240,816
③ Wages	SF 11,200×12 months ×¥80 =	¥10,752,000
④ Repairing expenses	¥140,540,000 ×0.3% =	¥ 421,620
⑤ Management expenses (5% of ①+②+③+④)		
	¥12,165,144×5% =	¥ 608,257
Management costs		¥12,773,401

(7) Administration Building

1) Electricity

Electric lights	2.0 KW/hour
Outlets	1.0 KW/hour
	3.0 KW/hour

Hence, 3.0 KW/hour×9 hours ×300 days=8,100 KW/year

2) Water

7 persons ×100 ℓ×300 days= 210 tons/year

3) Wages

		Wages per month	total
Manager	1 person	SF 5,000	SF 5,000
Sales Manager	1 person	SF 2,000	SF 2,000
Accountant General	1 person	SF 2,500	SF 2,500
Clerk	2 persons	SF 1,200	SF 2,400
Night watchman	2 persons	SF 1,200	SF 2,400
Total	7 persons		SF 14,300

4) Management expenses

① Electricity rates	8,100 KW×SF 0.175×¥80 =	¥ 113,400
② Water charges	210 tons ×SF 2.9 ×¥80 =	¥ 48,720
③ Wages	SF 14,300×12 months ×¥80 =	¥13,728,000
④ Repairing expenses	¥ 50,590,000 ×0.3% =	¥ 151,770
⑤ Management expenses (5% of ①+②+③+④)	¥14,041,890× 5%=	¥ 702,094
Management costs		¥14,743,984

(8) Repair Shop

1) Electricity

Electric lights	1.2 KW/hour	17.2 KW/hour
Outlets	1.0 KW/hour	
Machinery	15.0 KW/hour	

Hence, 17.2 KW/hour×9 hours ×300 days = 46,440 KW a year.

2) Water

3 persons × 100 ℓ ×300 days= 90 tons/year

3) Wages are reckoned in the management expenses of the Slipway.

4) Management expenses

① Electricity rates	46,440 KW ×SF 0.175×¥80 =	¥ 650,160
② Water charges	90 tons×SF 2.9×¥80 =	¥ 20,880

③ Repairing expenses	¥ 55,000,000 ×0.3% =	¥ 165,000
Management costs		¥ 836,040

(9) Refrigerating Van (3 units)

Accumulated distance covered by 3 refrigerating vans is

80 km ×300 days×3 units = 72,000 km a year.

The distance covered with a liter is 4.5 km.

① Fuel oil expenses	72,000 km÷ 4.5 km/ℓ = 16,000 ℓ, and ℓ = SF 0.6	
Thus,	16,000 ℓ ×SF 0.6× ¥80 =	¥ 768,000
② Ferry charge	SF 20/week ×52 weeks×3 vans× ¥80 =	¥ 249,600
③ Wages	SF 1,500×12 months ×¥80 =	¥ 1,440,000
Management costs		¥ 2,457,600

(10) Truck (2 units)

The required quantity of gasoline for 2 trucks is;

10 ℓ ×300 days×2 units = 6,000 ℓ a year (1 ℓ = SF 1.0)

① Gasoline expenses	6,000 ℓ ×SF 1.0× ¥80 =	¥ 480,000
② Wages are reckoned in the expenses of the Main Building		
Management costs		¥ 480,000

(11) Generator (2 units)

Repairing expenses	SF 5,000× ¥80 =	¥ 400,000
Management costs		¥ 400,000

6-2 Balance

The table below shows the profits and management expenses. Although necessary for reviewing in details, it is judged that earnings and expenses are balanced before depreciation.

Table 27 (Unit: Japanese yen)

Profits		Expenses	
Item	Amount	Item	Amount
Fuel Oil	7,703,016	Pontoon, Slipway,	
Ice	16,402,400	River Wall	5,013,240
Fishes	27,201,600	Ice-making Equip-	
Slipway	2,288,000	ment, Ice Store	9,067,690
		Cold Store	3,543,936
		Main Building and	
		Administration	
		Building	27,517,385
		Repair Shop	836,040
		Refrigerating Van	2,457,600
		Truck	480,000
		Generator	400,000
Total	53,595,016	Total	49,315,891

CHAPTER 7 EFFECT OF THE PROJECT AND CONCLUSION

CHAPTER 7 EFFECT OF THE PROJECT AND CONCLUSION

7-1 Effect of the Project

The Project aims to construct an integral fishery center and coastal fisheries-related infrastructure at Neiuw Amsterdam in Commewijne District so that the small-scale fisheries can be modernized.

To be concrete, the Project includes the mooring/repair facilities that make it possible for fishing boats to raise their working efficiency, and ice-making/cold storage facilities that make it possible fishemen can improve the quality of their catch and thus increase their income. It promises a great impact on the coastal fisheries modernization plan of Suriname.

When the Project is completed, the following benefits can be expected.

(1) Increase of the working ratio of the fishing fleet

① The fishery center with the pontoon type mooring facility make it possible for fishermen, mainly of the Guyana type fishing boats, to land their catch free from early morning hours and tide as compared with the Paramaribo Market. This will give fishermen much time to spare as well as pecuniary interest.

② Landing at the center makes it possible for fishermen to save time and oil expenses required to land their catch at Paramaribo 12 miles away on the Suriname River.

③ The repair shop makes it possible for fishermen to repair and maintain promptly and easily and promises improvement in operation and income.

④ Besides fishing boats in Commewijne District, other District's fishing boats, such as Boskamp's and Nieuw Nickerie's, can utilize the fishery center for repair or landing according to fishing grounds and fishing seasons.

⑤ This holds good for the 120 Guyana type fishing boats of Paramaribo District.

(2) Increase of the fish price through improvement in quality

① The introduction of ice boxes with ice makes it possible for the Suriname type fishing boats to land and sell their catch, which has been processed by smoking or salting, as more expensive fresh fish.

② The cold-storage facility makes it possible to ship the products keeping their quality and freshness at the most favorable time.

(3) Stabilization of the fish price by the controlled shipment

① Drastic decline in price has been frequently experienced due to excess supply during the high fishing season or when fishing boats concentrate to land their catch. The cold facility and insulated vans make it possible to control the shipment so that the fish price can become stable and fishermen can increase their income.

② Exchanging information between the Paramaribo Market and the fishery center through the radio equipment makes it possible to ship the products efficiently and profitably according to the market at the Paramaribo Market.

③ Insulated vans make it possible to forward products to the Paramaribo Market, Kankantree Market, fish processors at Paramaribo and so on for the expansion of outlet.

(4) Social benefit

① The increase in income of some 4,000 fishermen in Commewijne District will attract other village people to the fishery and increase employment opportunities.

② Following incresed activities of the fishery center, other related industries in Commewijne District will be activated. As a result, employment opportunities for the village population will be created.

7-2 Conclusions

Among the strategies of principal policy to rebuilt the sluggish national economy, the Government of Suriname placed an emphasis on the development of fisheries which have a great potential due to its 380 km shorelines and 140 thousands km^2 EEZ.

The fisheries activities in Suriname consists of the shrimp fishing which is being operated by mainly foreign trawlers and the demersal fishery in very small scale. The Government of Suriname has planned a Project, in line with its modernization plan of the small-scale demersal fishery, to construct an integral fishery center at Nieuw Amsterdam, Commewijne District, in eastern Suriname, and requested the Government of Japan to offer a grant aid on this Project.

The Project consists of ① the fishery infrastructure including a mooring facility for the small-scale fishing fleet and ② the shore facilities aiming to improve fish in quality and to promote the organization of the fish distribution. Covered all of the aspects from production to distribution, the Project can be evaluated as a well-balanced plan for modernization of the small-scale fisheries in Commewijne District.

From the standpoint of natural conditions and efficient fishing activities, it is judged that the location of Neiuw Amsterdam presents no ploblems as the proposed site of a fishery center. Moreover, it is expected that fishing boats other than in Commewijne District such as Paramaribo, Boskamp and New Nickerie Districts utilize the fishery center according to fishing grounds and seasons.

As for a fiscal status of the center, it is considered that the proceeds of the sale of fishes, fuel oil, ice, water, fishing gear and materials and so on will meet the requirements of running the center.

For the above, it is judged that the Project is appropriate to the Japan's Grant Aid Program and contributes greatly to the promotion of the modernization of the small-scale fisheries in Commewijne District. And to implement the Project

smoothly and achieve the expected results the Government of Suriname is recommended to take the following measures.

(1) Formation of a self-supporting management system

Under the Project, which is a pilot project to promote the development of the coastal fisheries in Suriname, an integral small-scale fishery center in Commewijne District where the coastal fisheries activities are traditionally most active in the country. It is recommended that in order to make the fishery center economically and financially viable, a management system with a fishermen's cooperative as the central body, in view of paying regard of fishermen's independency as well, be established.

(2) Active training for fisheries engineers

Skilled hands are essential for the fishery center. For some time to come the management of the center will present no problems due to skilled SAIL's engineers under the Fisheries Department's guidance. However it is finally to be handed over to Commewijne fishermen. It is recommended that training for fisheries engineers in all the technical fields related to the operation of the center be push through.

(3) Management policy

It is recommended that while giving fishermen guidance in improvement of the quality of fish, the fishery center should purchase only fish attained the level at a reasonable price. By this fishermen will know that the price of fish depends upon its freshness and quality of fish, and the center will be able to keep a stable price of fish and expect further improvement of the quality.

(4) Fishery center orientation

It is recommended that the fishery center is oriented to increase the input of quality fish as well as to try to improve the quality of fish so that brokers

can buy necessary products at necessary quantity at the center directly.

(5) Improvement of the fish market for effective expansion of fish comsumption

On the completion of the Project an integral system covering production through distribution will be established. However, the current situation of Paramaribo Fish Market is inadequate because it does not function well due to its narrow space causing a traffic congestion. It is recommended that the Paramaribo Fish Market be improved to deal with increasing catch resulting from the modernization of the fisheries of Suriname.

(6) Export of quality fish

It is recommended that the export of high-grade fish be considered to obtain foreign money in the future.

(7) Efficient use of funds

It is recommended that the center's income generating from sales of products, ice, fuel oil, ice boxes, and so on be used efficiently as a fund for the development of the fishery.

A N N E X

I BASIC DESIGN STUDY

1. MINUTES OF DISCUSSIONS
2. MEMBER OF THE STUDY TEAM
3. SURVEY ITINERARY
4. LIST OF THE PERSONS CONCERNED
5. ORGANIZATION CHART
6. BASIC DATA AND RESULT OF NATURAL CONDITIONS SURVEY AT NIEUW AMSTERDAM SITE IN COMMEWIJNE DISTRICT, EASTERN SURINAME
7. FISHERIES ACTIVITIES IN SURINAME
8. PRICE LIST

II EXPLANATION OF DRAFT FINAL REPORT

1. MINUTES OF DISCUSSIONS
2. MEMBER OF THE DRAFT FINAL TEAM
3. SURVEY ITINERARY
4. LIST OF THE PERSONS CONCERNED
5. LAND PROPERTY CERTIFICATE

III PHOTOGRAPHS

I BASIC DESIGN STUDY

1. MINUTES OF DISCUSSIONS

MINUTES OF DISCUSSIONS ON THE PROJECT FOR THE MODERNIZATION OF SMALL SCALE FISHERIES IN COMMEWIJNE DISTRICT IN EASTERN SURINAME IN THE REPUBLIC OF SURINAME

In response to the request of the Government of the Republic of Suriname, the Government of Japan decided to conduct a basic design study on the Project for the modernization of small scale fisheries in Commewijne District in Eastern Suriname (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA"). JICA sent to the Republic of Suriname the basic design study team (hereinafter referred to as "the Team") headed by Mr. Kunihiro Shinoda, Senior Technical Staff, Construction Division, Fishing Port Department, Fisheries Agency, from 28th August to 3rd October, 1989.

The Team had a series of discussions and exchanged views on the Project with the officials concerned of the Government of the Republic of Suriname and conducted a field survey.

As a result of the study and discussions, both parties agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Paramaribo, 7th September, 1989

篠田邦裕

Mr. Kunihiro Shinoda
Team Leader,
Basic Design Study Team,
JICA

Mr. George D. Soerjoesing
Permanent Secretary,
Ministry of Agriculture, Animal Husbandry & Fisheries

ATTACHMENT

1. Objective

The objective of the Project is to improve the condition of the fisheries production and productivity, through the modernization of small scale fisheries in Commewijne in Eastern Suriname.

2. Executing Agency

The Ministry of Agriculture, Animal Husbandry and Fisheries is responsible for the administration and implementation of the Project. Suriname American Industries Limited (S.A.I.L.), owned by the Government of Suriname, for a transitional period takes responsibility of the management and maintenance of the facilities and equipment provided under the Project. S.A.I.L. will in due time transfer these functions to the fishermen's cooperative.

3. Location of the Project Site

The Project is located at Nieuw Amsterdam in Commewijne in Eastern Suriname as shown in ANNEX 1.

The map of the Project site is shown in ANNEX 2.

4. Request of the Government of Suriname

The content of the Project items requested by the Government of the Republic of Suriname is shown in ANNEX 3.

5. Grant Aid Program

1) The Suriname side has understood the Japan's Grant Aid System explained by the Team which includes a principle for the use of Japanese consulting firm and Japanese contractor for the implementation of the Project.

2) The team will convey to the Government of Japan the desire of the Government of Suriname that the former takes necessary measures to cooperate in implementing the Project and provides necessary facilities and equipment within the scope of Japan's Grant Aid Program.

3) The Government of Suriname will take necessary measures shown in ANNEX 4 on condition that the Grant Aid by the Government of Japan is extended to the Project.

篠田邦彦

6. Reporting

The Japanese side will prepare and submit the following reports to the Government of the Republic of Suriname.

1) Draft Final Report

The Draft Final Report contains the results of the field surveys, drafts of basic design of facilities, equipment, materials, fishing boats, etc., cost estimates, implementation schedule and recommendations. This Draft Final Report will be submitted and explained by the responsible team to the authorities concerned of the Government of Suriname in December, 1989. The Government of Suriname is invited to the provide the Team with their official comments during the stay of the Team in Paramaribo, and the comments will be reviewed and examined and reflected in the final report.

2) Final Report

The Final Report will be submited to the Government of Suriname in March, 1990.

篠田邦裕


Visserbank
Braamspunt
DISTRIKT PARAMARIBO
PARAMARIBO
RIVIER
SURINAME
NIEUWE OMMEWIJNE
DISTRIKT
WANICA
LELYDORP
DOMBURG
LA RENCONTRE
COMMISSARIS
WATERLAND
SIMONS POLDER
PETERSBURG
MAGDENBURG
VREELAND
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DE UITVLUGT
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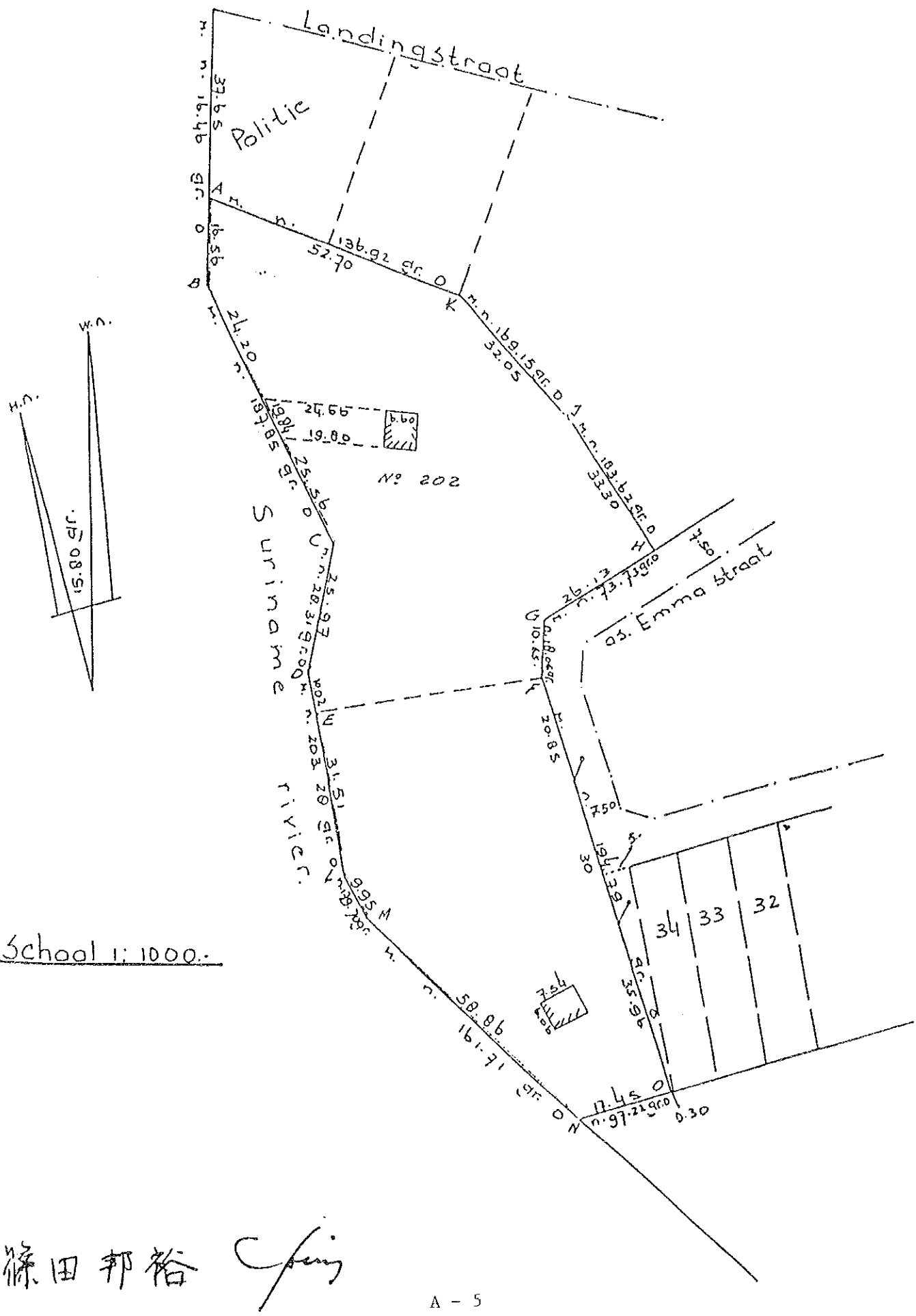
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篠田邦裕

ANNEX 3 Request of the Government of Suriname

The content of the Project items requested by the Government of the Republic of Suriname is as follows:

1) Fishery center at Nieuw Amsterdam
   1. Jetty
   2. Shore protection
   3. Slipway
   4. Ice making machine and ice storage
   5. Cold storage
   6. Generator
   7. Fuel storage
   8. Fuel tank lorry
   9. Water tank
   10. Building for cold storage, processing, etc
   11. Office for manager and night watchmen and meeting room
   12. Workshop and Warehouse
   13. Pavement
   14. Radio telephone
2) Fishing materials and equipment
   1. Outboard engine for Suriname type of small scale fishing boat
   2. Outboard engine for Guyana type of small scale fishing boat
   3. Ice box
   4. Fish box
   5. FRP fishing boat with inboard engine
3) Others
   1. Truck
   2. Insulated van

篠田邦裕

ANNEX 4 Necessary measures to be taken by the Government of Suriname

1. To secure the site for the Project.
2. To clear, level and reclaim the site prior to commencement of construction work.
3. To undertake incidental outdoor works such as gardening, fencing, gates and exterior lighting in and around the site.
4. To provide facilities for distribution of electricity, water supply, telephone, drainage sewage and other incidental facilities to the Project site.
5. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation.
6. 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 Suriname and stay therein for the performance of their work.
7. To maintain and use properly and effectively that the facilities constructed and purchased under the Grant.
8. To bear all the expenses other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.
9. When the materials and/or equipment provided under the Project mentioned in ANNEX 3, section 2), are sold or leased to the fishermen involved in the Project, the Government of Suriname shall take necessary measures to:
   (1) identify the eligible fishermen participating in the Project;
   (2) sell or lease the equipment at reasonable price;
   (3) deposit the money from such a sale or lease in a special revolving fund in an account of the Government of Suriname;
   (4) utilize the above-mentioned fund for the purpose of developing fisheries

篠田邦裕