REPORT ON BASIC DESIGN
FOR
THE THIRD PHASE CONSTRUCTION
OF
DEMERARA FISH PORT COMPLEX
THE CO-OPERATIVE REPUBLIC OF GUYANA

OCTOBER 1980

JAPAN INTERNATIONAL COOPERATION AGENCY

No.

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80—54

PREFACE

It is with a great pleasure that I present this Report on Basic Design for the Demerara Fish Port Complex Project in the Co-operative Republic of Guyana.

The report embodies the result of a Basic Design Survey which was carried out in Guyana from August 7 to August 28, 1980 by the Japanese Survey Team Commissioned by the Japan International Cooperation Agency following the request of the Government of Guyana to the Government of Japan.

The survey team headed by Mr. Sunao Sakai had a series of discussions with the officials concerned of the Government of Guyana and conducted an extensive field survey and data analysis. I hope that this report will be useful as a basic reference for the development of the Project.

I wish to express my deep appreciation to the officials concerned of the Government of Guyana for their close cooperation extended to the Japanese team.

October , 1980

Keisuke Arita

Keisuke ARITA
President
Japan International Cooperation Agency

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Abbreviation

GFL	Guyana Fisheries Ltd.
GEC	Guyana Electricity Corp.
GBS	Guyana Broadcasting Service
GBC	Guyana Broadcasting Corp.
GUYSTAC	Guyana State Corporation
GSTCL	Georgetown Seafoods and Trading Co., Ltd.
DFPC	Demerara Fish Port Complex
SAMCO	South American Marine Development Co., Ltd.
IDB	Inter-American evelopment Bank
MOED	Ministry of Economic Development
JICA	Japan International Cooperation Agency
IDRC	International Development Research Centre
CANPLAN	Canadian Plant and Process Engineering Limited
E/N	Exchange of Notes

I. SUMMARY OF THE STUDY

1. Purpose of the Study

In February 1980, the Government of the "Co-operative Republic of Guyana"(hereinafter referred to as "Guyana") requested the Government of Japan to offer grant aid and technical assistance for the Third Phase Construction of the Demerara Fish Port Complex in Georgetown. In response to this request, Japan International Cooperation Agency(JICA) sent a survey team to Guyana for twenty two days from August 7th to August 28th 1980. The purpose of the study is to investigate the effect of the past Japanese Grant Aid for the First and Second Phase Construction of Demerara Fish Port Complex and also to prepare the Basic Design of Third Phase Construction based on the investigation and discussion with Guyana governmental agencies.

2. Background of the Request

2.1. General

Guyana, with an area of 215,000 square kilometers, is located at the right shoulder of the South American Continent with its north latitudes between 1 to 9 degrees. Guyana is bounded on the north by the Atlantic Ocean, on the east by Surinam, on the south and southwest by Brazil, and on the west by Venezuela (Refer to Fig. 2-1). The population in 1979 was estimated to number some 843,000 persons, most of whom live in the narrow coastal plain along the Guyana's Atlantic Coast as shown in Table 2-1. Nearly one quarter of the population inhabites Georgetown, the Capital of the nation.

Table 2-1 Estimated Population in Guyana & Major Cities

	Census 1970	1975	1976	1977	1978	1979
GUYANA	699,848	787,000	800,000	812,000	824,000	842,000
GEORGETOWN	164,039	181,100	184,700	188,400	192,200	196,000
NEW AMSTERDAM	17,782	19,600	20,000	20,400	20,800	21,200
LINDEN	23,956	26,400	27,000	27,500	28,000	28,600

Souce: MOED

Due to difficult land accessibility, most of the inland remains undeveloped except for some spots opened for bauxite mining and forestry.

2.2. Economy

Guyana's economy is heavily dependent on three items--sugar, rice and bauxite--and the production of these sectors amounts to some 35 per cent of the total Gross Domestic Products as seen in Table 2-2, and 2-3. It is believed that these three major sectors employed more than one quearter of the total work force in 1979(ie, 190,000-200,000 persons). Although Table 2-4 shows employment for a number of specific industries, it unfortunately does not indicate the number of workers in the fishery sector. However, it is said that employment in fishery related industry accounts for some 6,200 workers. Comparing this number with those in Table 2-4, the fishery industry may be said to employ a fairly large number of people. Unemployment, however, was deemed to have reached nearly 20 per cent of 240,000 total work force in 1979. The annual income per capita was estimated at US$580 which is among the lowest in the Western Hemisphere.

As indicated by the word "co-operative" in the official name of the nation, Guyana has every intention to pursue co-operative socialism to strengthen the existing social bonds of communities for expanding economic opportunities and for improving the physical and social environment. This policy has been working out fairly well in terms of an equitable distribution of income based on nationalizing foreign-owned industries (mainly in bauxite mining and sugar) and expanding the state enterprises and cooperative sectors. However, in recent years, the Guyana economy has ceased its development thrust as seen in Table2-3. As the result of this, the nation is facing serious difficulties in balancing its foreign trade as seen in Table2-5.

GUYANA

Compiled drawn and prepared for publication in the
TOPOGRAPHIC DIVISION LANDS & SURVEYS DEPARTMENT
MINISTRY OF AGRICULTURE
Revised January 1976

SCALES

MILES 10 5 0 5 10 15 20 25 50 75 MILES

STATUTE MILES

25 0 25 50 75

Kilometres

REFERENCE

- ROADS
- RAILWAYS
- TRAILS
- INTERNATIONAL BOUNDARIES
- INTERNATIONAL AIRPORT
- LAND AERODROMES
- WATER AERODROMES
- COASTAL PLAIN
- MAIN TIMBER PRODUCING AREAS
- OTHER FORESTS
- SAVANNAHS
- REGIONAL [illegible]
- RICE
- SUGAR
- CATTLE
- MINES
- GOLD WORKINGS
- DIAMOND WORKINGS
- MOUNTAINS
- WATER FALLS
- AMERINDIAN SETTLEMENTS
- HISTORICAL RUINS
- (1000 Persons) POPULATION DISTRIBUTION

TOTAL POPULATION 750,000

AREA 83,000 SQ MILES

VENEZUELA

BRAZIL

SURINAM

ATLANTIC OCEAN

MINISTERIAL DISTRICT Nº 1

MINISTERIAL DISTRICT Nº 2

MINISTERIAL DISTRICT Nº 3

MINISTERIAL DISTRICT Nº 4

MINISTERIAL DISTRICT Nº 5

MINISTERIAL DISTRICT Nº 6

GEORGETOWN (Pop 167,050)

NEW AMSTERDAM (Pop 18,200)

ROSE HALL (Pop 5000)

CORRIVERTON (Pop 10,500)

LINDEN (Pop 24,000)

HINTERLAND ROAD
Commenced on Sunday
July 19th 1970
Four-weather Safari
11th–14th December 1975

RORAIMA (9094 ft)
Conquered on
11th November 1973

AYANGANNA (6700 ft)
Conquered on 25th May 1968

Site of Cuffy's Revolution 23rd February 1763

Table 2-2 GROSS DOMESTIC PRODUCT AT CURRENT FACTOR COST BY SECTOR, 1970-1979 (in G$ million)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
SUGAR	57.8	73.4	76.6	67.2	249.6	332.2	191.0	104.4	172.1	1[illegible]-7
RICE	17.1	14.4	11.2	15.7	31.3	41.8	29.5	58.2	50.2	40.1
OTHER AGRICULTURE	13.7	14.5	15.2	17.7	19.7	21.8	25.0	35.3	40.2	42.4
LIVESTOCK	10.2	11.3	11.7	13.3	18.1	19.8	24.4	26.4	31.5	36.6
FISHING	5.1	5.4	5.9	6.8	8.6	9.9	10.0	12.8	13.5	14.0
FORESTRY	5.1	5.0	5.6	6.0	7.6	8.5	10.0	10.0	11.0	12.0
MINING & QUARRYING	95.5	90.7	89.7	80.5	114.8	141.0	145.0	164.2	171.4	192.9
MISCELLANEOUS MANUFACTURING(incl.power)	19.7	20.9	22.4	23.9	27.3	41.5	47.5	52.5	52.0	60.0
FOOD, BEVERAGES AND TOBACCO	18.4	18.1	19.5	20.0	22.2	27.5	33.5	34.1	34.0	36.8
DISTRIBUTION	53.5	54.5	58.7	64.4	80.8	94.2	108.1	92.2	96.0	105.9
TRANSPORT AND COMMUNICATION	27.7	29.8	32.8	36.8	46.3	49.9	55.0	58.0	60.0	62.3
ENGINEERING & CONSTRUCTION	36.8	38.6	42.7	47.0	52.7	74.3	85.0	76.9	75.0	75.6
RENT OF DWELLING	10.8	11.3	11.9	12.5	13.7	15.0	16.0	16.4	17.0	17.2
FINANCIAL SERVICES	16.3	18.4	19.1	22.0	27.0	34.7	38.0	42.8	44.0	44.7
OTHER SERVICES	17.7	19.1	19.7	21.6	23.5	25.6	27.0	26.8	28.0	30.0
GOVERNMENT	64.5	73.1	87.8	121.2	126.6	159.8	193.4	200.8	230.0	234.0
TOTAL G.D.P. AT FACTOR COST	470.0	498.4	530.7	576.4	869.8	1097.8	1038.4	1011.5	1125.9	1170.2

Source MOED

Table 2-3 GROSS DOMESTIC PRODUCT AT CONSTANT FACTOR COST BY SECTORS, 1970-1979

1970 = 100.0

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
SUGAR	57.8	68.8	58.8	50.3	65.2	57.6	61.8	45.0	77.6	71.2
RICE	17.1	14.4	11.3	13.2	17.2	19.2	13.3	25.2	14.8	10.9
OTHER AGRICULTURE	13.7	15.4	16.4	16.4	17.1	18.6	17.8	17.5	17.0	17.5
LIVESTOCK	10.2	10.6	11.3	11.7	10.5	12.9	15.2	14.6	14.2	15.4
FISHING	5.1	5.4	5.4	6.2	7.2	6.3	6.5	6.3	6.0	5.3
FORESTRY	5.1	4.7	4.9	5.2	5.6	5.3	5.7	5.7	5.7	5.8
MINING & QUARRYING	95.5	92.7	82.3	79.7	85.2	85.1	75.0	73.4	65.7	58.2
MISCELLANEOUS MANUFACTURING(incl.power)	19.7	20.9	22.3	24.8	32.2	44.0	50.5	48.9	48.0	51.9
FOOD, BEVERAGES & TOBACCO	18.4	20.3	22.6	25.1	24.6	22.8	27.0	25.9	25.2	24.7
DISTRIBUTION	53.5	52.9	52.8	57.9	58.4	73.0	77.0	74.5	75.0	74.2
TRANSPORT & COMMUNICATION	27.7	28.1	27.6	29.5	31.0	33.8	35.4	34.2	34.7	33.6
ENGINEERING & CONSTRUCTION	36.8	38.3	40.5	41.5	38.5	51.5	55.3	53.5	52.5	51.1
RENT OF DWELLING	10.8	11.3	11.9	12.5	13.7	15.0	16.0	15.6	15.7	14.8
FINANCIAL SERVICES	16.3	17.6	17.8	18.6	18.6	20.2	21.0	20.3	20.4	15.3
OTHER SERVICES	17.7	18.8	18.5	18.4	16.7	16.8	16.7	16.3	16.5	15.9
GOVERNMENT	64.5	65.9	71.2	79.9	85.2	106.2	116.4	118.0	130.0	130.0
TOTAL G.D.P AT CONSTANT FACTOR COST	470.0	486.1	475.5	490.8	527.0	588.1	610.5	594.9	619.1	595.8
GROWTH OVER 1970 (%)		+ 3.4	+ 1.2	+ 4.4	+ 12.1	+ 25.1	+ 29.9	+ 26.6	+ 31.7	+ 26.8
ANNUAL GROWTH RATE (%)		+ 3.4	- 2.2	+ 3.2	+ 7.4	+ 11.6	+ 3.8	- 2.6	+ 4.1	- 3.8

Source MOED

Table 2-4 ANNUAL DATA ON EMPLOYMENT FOR SPECIFIC INDUSTRIES

INDUSTRY	EMPLOYMENT									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979 1/
SUGAR	19,615	20,141	19,818	20,118	21,274	20,227	21,527	21,364	24,204	26,701
FIELD	14,664	15,215	14,892	15,076	16,377	15,984	17,999	16,440	19,289	23,697
* FACTORY	4,951	4,926	4,926	5,042	4,897	5,243	5,528	4,924	4,916	3,004
FOOD, BEVERAGES AND TOBACCO	2,335	2,309	2,432	2,547	2,608	2,626	2,886	2,996	3,002	2,985
Other Food	896	851	919	954	948	975	1,082	1,126	1,121	1,164
Aerated Beverages	250	242	255	257	257	230	206	194	171	140
Alcoholic Beverages	948	983	1,033	1,113	1,207	1,223	1,410	1,484	1,505	1,509
Tobacco	241	233	225	223	196	198	190	193	205	172
OTHER MANUFACTURING	5,308	5,272	5,060	5,331	5,804	5,783	6,297	6,130	5,492	5,510
MINING AND QUARRYING	6,375	6,346	6,316	6,342	6,530	6,870	7,522	7,975	7,783	8,100
Bauxite Mining	5,967	5,847	5,981	6,188	6,312	6,677	7,346	7,812	7,647	7,961
Other Mining and Quarrying	408	499	335	154	218	193	376	163	136	139
OTHER SERVICES	6,329	6,196	5,298	5,282	5,732	6,287	5,890	5,893	5,294	5,946
Operation of Wharves	1,872	1,554	1,147	1,324	1,194	1,335	1,127	1,071	946	1,004
Transport and Communication	2,565	2,638	2,496	2,550	3,100	3,383	3,223	3,451	3,208	3,833
Engineering and Communication	1,892	2,004	1,655	1,408	1,438	1,569	1,540	1,371	1,140	1,109
DISTRIBUTION	4,479	4,319	4,068	4,300	4,401	4,276	4,339	4,524	4,351	4,150

1/ 2nd Quarter.

* Include Clerical Administrative and Managerial Employees.

Source MOED

Table 2-5 Blance of Foreign Trade

1970-1979

Unit G$ million

YEAR	Exports including Re-exports	Imports	Balance of Visible Trade (+) Surplus (-) Deficit
1970	266.9	268.3	- 1.4
1971	298.4	267.6	+ 30.8
1972	306.6	297.9	+ 8.7
1973	293.0	372.5	- 79.5
1974	602.5	576.0	+ 26.5
1975	858.1	810.6	+ 47.5
1976	711.3	927.4	-216.1
1977	661.8	804.3	-142.5
1978	750.2	711.1	+ 39.1
1979	742.7	810.0	- 67.4

Source: MOED

The reasons behind the economic hardship and balance of trade problem may be summarised as follows:

(1) High Fuel Cost

Although Guyana is strongly believed to possess oil deposits within its territory, it is so far totally dependent on imported fuel. Thus, the high rise in fuel prices in recent years has not only increased the payments for oil imports but also hampered production in domestic industries since almost all electricity generation in Guyana is dependent on oil consuming generators. It is estimated that the cost of importing oil will amount to approximately one-third of total import expenditure of the nation in 1980.

(2) Weak Economic Structure

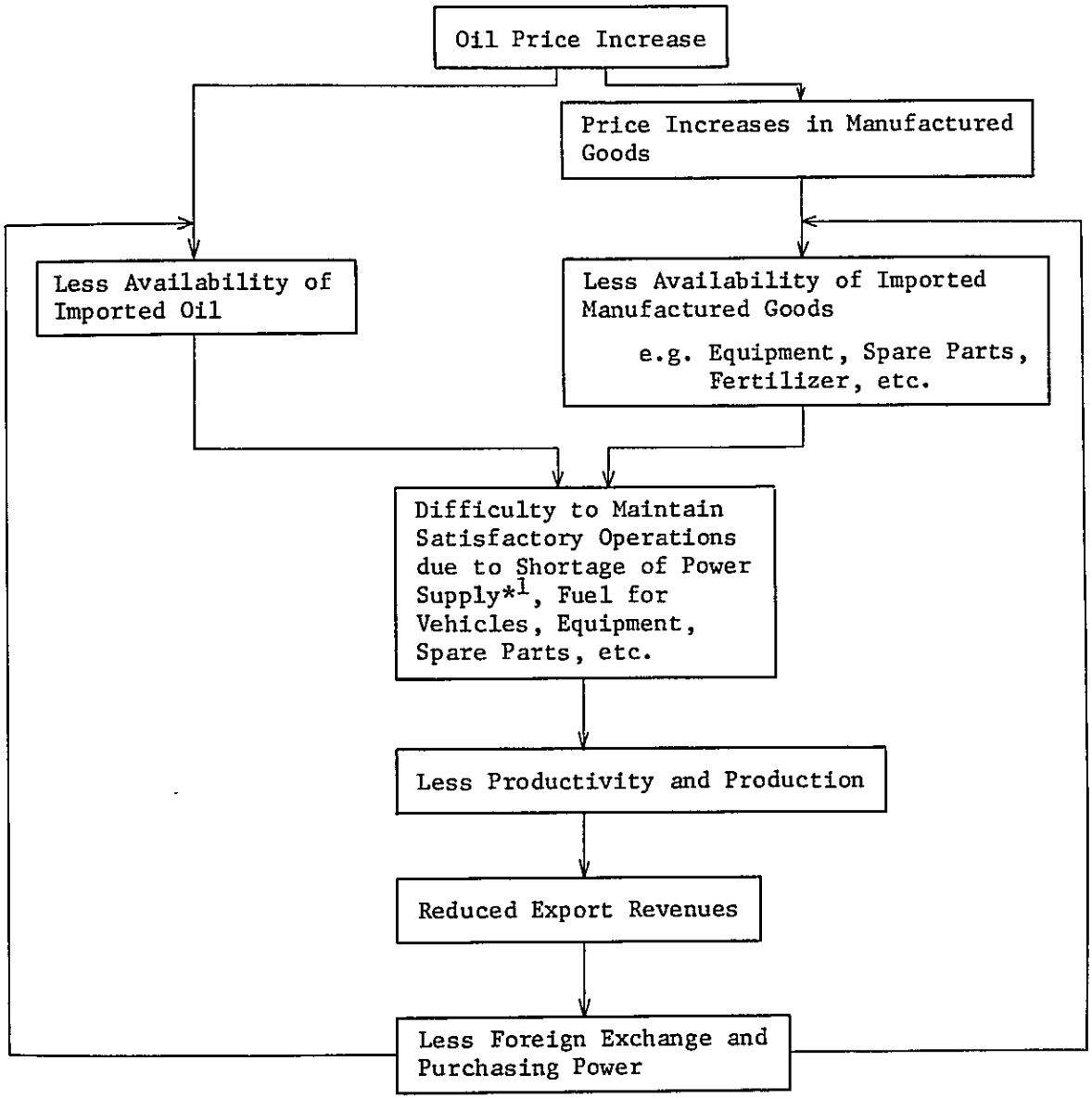
As stated previously, Guyana's economy is heavily depend on agricultural products which naturally are affected by

adverse weather conditions such as the heavy rains which occurred in 1979 and caused reduction of rice products. Prices of agricultural products often face dramatic changes in world markets as was the case of sugar from 1974 to 1976. In fact the sugar price boom in 1974 increased foreign exchange earnings and led to a great expansion of public sector investment, including a high import bill. However, the sudden setback in sugar revenues in 1976 forced the Government to abandon much of its expanded investment program. Thus the country's economy is too easily affected by external economic conditions.

(3) Viscious Cycle of High Fuel Price

Guyana is a typical case of a developing country without oil and involved in economic difficulties due to the high and rising fuel prices in recent year. Not only high fuel prices, but also the high prices of other industrial products derived from high priced fuel have had a serious impact on the unmatured economic structure. In the case of Guyana, viscious cycles are occurring which may be illustrated as follows.

Fig 2-2 Viscious Oil Cost Cycles



Note: *1 Most electric power in Guyana is generated using oil.

2.3. Economic Development Plan

Because of the factors mentioned previously, the Government is struggling in various manners to sustain economic activities and to offset the deficit in foreign exchange. Their strategy may be summarized as follows:

(1) Reduce amount of fuel import by developing hydro power stations or utilizing available domestic fuels such as woods

(2) Cater to export-oriented and import-substituting production activities.

(3) Raise the productivity of installed industrial capacity by adequate resource allocation, up-grading labour skills through training, instituting systematic farm management, etc.

2.4. Background of the Request

Although the contribution of the Fishery Sector for the GDP is not large yet, the development of Demerara Fish Port Complex will contribute to the abovementioned economic strategy (items(2) and (3)), and the Government considers it one of its important development projects for the country for the following reasons:

(1) It will provide the public with sufficient protein at cheaper prices by making use of a readily available and self-sustaining resource: fish.

(2) Besides banning imports of fish and fish products (since 1971) and saving foreign exchange, foreign exchange will be earned by accelerating exports of fishery products.

(3) It will absorb existing unemployed labour force

In order to achieve the abovementioned goals, the Government of Guyana requested the Government of Japan for financial and technical assistance in 1974 to develop the Demerara Fish Port Complex, and the Government of Japan has offered Grants twice in the past as follows:

(1)	1st Grant (1975) ¥340,000,000	Construction of wharf, workshop, connection road; Provision of mobile crane
(2)	2nd Grant (1978) ¥400,000,000	Construction of administration and storage building and workshop; Provision of equipment for workshop

The past assistances from Japan contributed greatly in developing industrialized fishery activities in Guyana in various ways such as by providing facilities, accelerating united and efficient fishery operation, etc. The details of the impacts are described in Chapter III, Section 11 of this report.

However, there are still many unmet needs to further develop the fishery industry in Guyana to meet the demand. Among the

future plans for development of the fishery industry such as increase of its fleet size (ie, purchase of 20 new trawlers be considered under I. D. B. finance), establishing fish processing plant, the Third Phase Construction of Demerara Fish Port Complex is considered to be a vital element for the Government of Guyana.

Consequently, there is a clear need for the financial and technical assistance for the Third Phase Construction of Demerara Fish Port Complex by the Government of Guyana.

3. Members of the Survey Team

Head of the Team

Sunao SAKAI

Disaster Prevention and Coastal Protection Div.,
Fishing Port Dept., Fisheries Agency,
Ministry of Agriculture, Forestry and Fisheries

Member

Cooperation Planning
Masaru OKUNO

International Affairs Division,
Oceanic Fisheries Department, Fisheries Agency,
Ministry of Agriculture, Forestry and Fisheries

Consultant
Hideki MURATA

Engineer (Civil & Transportation Engineering)
Pacific Consultants International

Consultant
Yukio TOYOSHIMA

Engineer (Facility, Mechanical & Electrical Engineering)
Pacific Consultants International

Consultant
Hideaki KANAYAMA

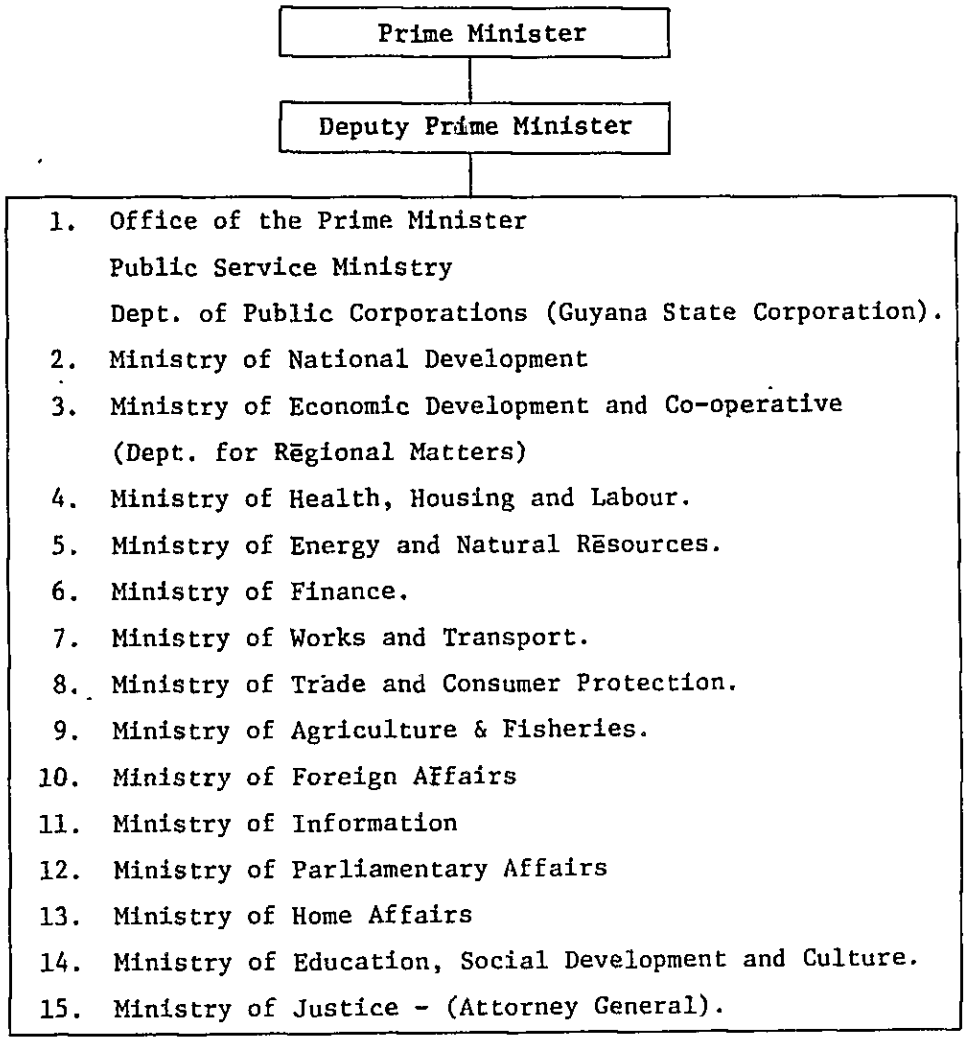
Architect
Pacific Consultants International

Coordinator
Hiroshi SAITO

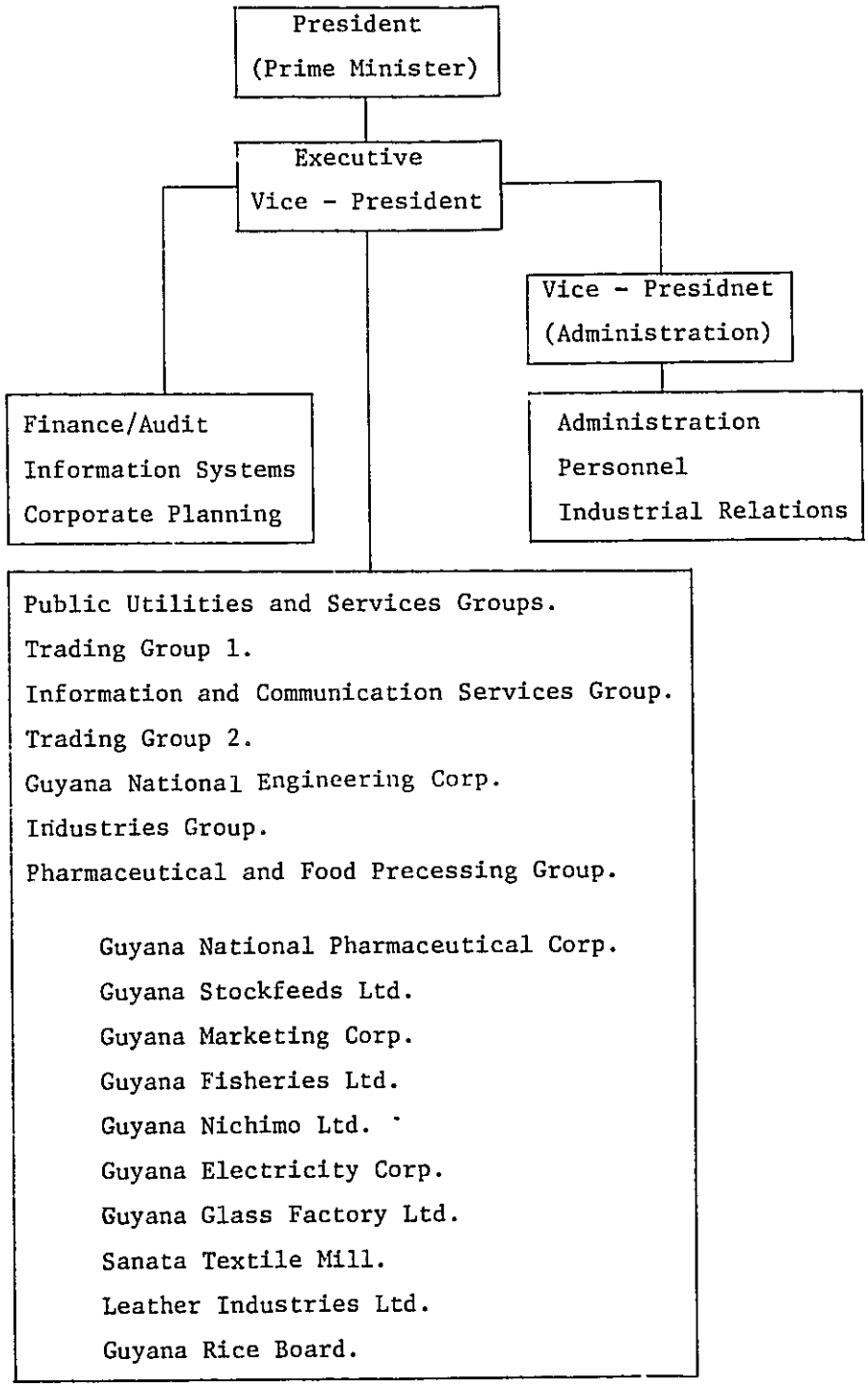
Fisheries Technical Cooperation Division,
Japan International Cooperation Agency

4. Members of the Government of Guyana

4.1. Government Organization Chart



4.2. Guyana State Corporation Organization Chart.



4.3. List of the Persons Concerned (* main persons conferred with)

Ministry of Economic Development

* Permanent Secretary	Mr. Leslie Johnson
* Chief Economic Adviser	Mr. Donald Augustin
Chief Technical Specialist	Dr. James
Head of Far East Desk	Mr. C. Goodchild
Head of Section	Mr. S. Asare
Far East Desk Officer	Mrs. Farnum

Ministry of Agriculture & Fisheries

Minister of Agriculture & Fisheries	Mr. Gavin Kennard
Permanent Secretary	Mr. Maurice King
* Chief Fisheries Officer	Mr. Ruben Charles

Ministry of Works & Transport

* Chief Architect	Mr. R. Field-Ridley
* Senior Civil Engineer	Mr. Owen G. Edwards
* Chief Electrical Inspector	Mr. C. A. Robinson

David Klautky Associates

* Consultant Engineeer	Dr. Klautky
* Senior Engineer	Mr. D. Morgan
* Senior Engineer	Dr. Budhu

Construction Cost Consultant
Guyana Construction Cost Advisory Service

* Quantity Surveyor	Mr. E. C. Browne.

Guyana State Corporation

Executive Vice-President	Mr. Osmond A. Baptist

Guyana Fisheries Limited

* Chairman/Managing Director	Mr. F. A. Peterkin
* Finance Director/Secretary	Mr. K. K. Saul
* Operations Director	Mr. C. Dasilva
* Operations Manager	Mr. Jai Salick

5. Survey Itinerary

The survey was executed for 22 days from 7th to 28th, August, 1980. The following is the main itinerary of the Survey team.

8. 7 Thu. Departed for Los Angeles via JL 64 from Tokyo
Arrived at Los Angeles

8 Fri. Departed for Caracas via PA 417 from Los Angeles

9 Sat. Arrived at Caracas
Salutation to the Embassy of Japan
Meeting with Mr. Nomura, the Ambassador of Japan: Mr. Yamamoto, the first Secretary: Mr. Yoshida, the first Secretary: and Mr. Takayanagi, the second Secretary

10 Sun. Departed to Port of Spain via VA 980 from Caracas
Arrived at Port of Spain
Departed to Georgetown via BW 463 from Port of Spain
Arrived at Georgetown

11 Mon. Meeting on schedule and submission of Questionnaires at the Ministry of Economic Development
Survey of the fish port at Houston

12 Tue. Survey of the processing plant at Kingston
the factory of Guyana Nichimo and the processing building at Mc Doom.
Survey of Georgetown Seafood Ltd.

13 Wed. Meeting on the design conditions with the engineers of the Government of Guyana and the staff of Guyana Fisheries Ltd. (GFL)

14 Thu. Meeting of the Survey Team
Meeting on the fishing activities in Guyana with the Chief Fisheries Officer of the Ministry of Agriculture & Fisheries

15 Fri. Hearing from Messrs Yutaka and Nichimo about the current situation in Guyana
Meeting on the requested equipment for workshop with Mr. Peterkin (G. F. L. Chairman/Managing Director)

16 Sat. Examination of the collected data

17 Sun. Meeting of the Survey Team
Estimate of the Project Cost

18 Mon. Drawing a project sketch based on the meeting of the Survey Team
Salutation to Mr. Baptist: Executive Vice-President of Guyana State Corporation (GUYSTAC)

19 Tue. Examination of the project sketch drawing
Meeting of the Survey Team

20 Wed. Salutation to Mr. Gavin Kennard: Minister of Agriculture & Fisheries
Final meeting on the project sketch drawing with the engineers of the Government of Guyana

21 Thu. Explanation of the project sketch drawing to the staff of the Government of Guyana at the Ministry of Economic Development
Confirmation about the items of Minutes

22 Fri. Signature to Minutes at the Ministry of Economic Development
Examination of the collected data
Meeting of the Survey Team

23 Sat. Further examination of the collected data
Meeting of the Survey Team
Preparation to leave from Guyana

24 Sun. Departed for Port of Spain via BW 464 from Georgetown
Arrived at Port of Spain
Departed for Caracas via BW 376 from Port of Spain
Arrived at Caracas

25 Mon. Salutation to the Embassy of Japan
Meeting with Mr. Nomura, the Ambassador of Japan: Mr. Yoshida, the first Secretary: and Mr. Takayanagi, the second Secretary

26 Tue. Departed for Miami via VA 822 from Caracas.
Transfer at Miami and arrived at Los Angeles via EA 505

27 Wed. Departed for Tokyo via JL 61 from Los Angeles

28 Thu. Arrived at Tokyo

Mr. Gavin Kennavd, Minister of Agriculture and Fisheries (Right) & Mr. Sakai, Head of Survey Team (Middle)

6. The Contents of the Basic Design Survey

The following surveys were executed to collect basic data for the basic design.

6.1. General - Basic Data

A. Natural Site Characteristics

(1) Meteorological Data

a. Rainfall

b. Temperature

c. Wind

d. Relative humidity

(2) Hydrological Data

a. Tide level

b. Tide velocity

(3) Geological Data

a. Topography (Site map)

b. Subsoil Conditions

B. Socio-Economic Data

(1) Statistics of Population

- total population,
- number of employees by sectors,
- population of main cities, etc.

(2) Statistics of Economic Activities and Others

a. G.D.P. (Amount of products by sectors)

b. Income level per capita

c. Trade and balance

d. Food Consumption, Education, Land-use, etc.

C. National Economic Development Plan

D. Government's Organization Chart

6.2. Data on Fishing Activities

A. Number of Fishing Vessels

(1) Number of existing fishing vessels by type and owner

(2) Future plan for fleet size

B. Amount of Fish Catch

(1) Amount of shrimp

(2) Amount of fishes

(3) Maximum and average landing amount per day

(4) Amount of export

(5) Future plan

C. Working Schedule (cycle time) of Fishing Vessels by Type

D. Number of Employees in Fishing

E. Statistics on Maintenance of Fishing Vessels

F. Field Survey Sites

(1) fish port at Houston

(2) Processing building at Mc Doom

(3) Processing plant at Kingston

(4) Slipway and workshop at Friendship

(5) Fish port and processing building of the Georgetown Seafood Trading Company Ltd.

6.3. Data on Fish Marketing

A. Domestic Supply

(1) Capacity of fish processing and storage

(2) Future plan

B. Domestic Consumption

(1) Amount of consumption (per day)

(2) Amount of consumption (per capita)

(3) Future plan

C. Fish Distribution System over the Country

6.4. Information for Construction

A. Civil and Architecture

(1) Site Map

(2) Canada's Plan and Drawings for Demerara Fish Port Complex
- report
- drawings

(3) List of Materials and Instruments available in Guyana
- ready-mixed concrete
- reinforcing bars
- structural steel
- finishing materials
- others

(4) Construction Data
a. Available construction equipment, performance level,etc.
b. Labour skill level, working conditions, etc.
c. Lead time required to obtain piles, boards, etc.
d. Past construction data on similar facilities
(e.g. Wharf, Cold Storage)
e. Others

(5) Any laws, rules, regulations, engineering codes applicable in executing design work, construction and operation of the required facilities

B. Facilities

(1) Regulation/Standard of Facilities

(2) List of Materials and Instruments available in Guyana

(3) General conditions
a. Electric supply
b. Water supply
c. Drainage
d. Air conditioning
e. Telephone
f. Others

(4) Technical Data for Utilities and Infrastructures

a. Available equipment

b. labour skill level, working condition, etc.

C. Past construction data for similar facilities

e. Others

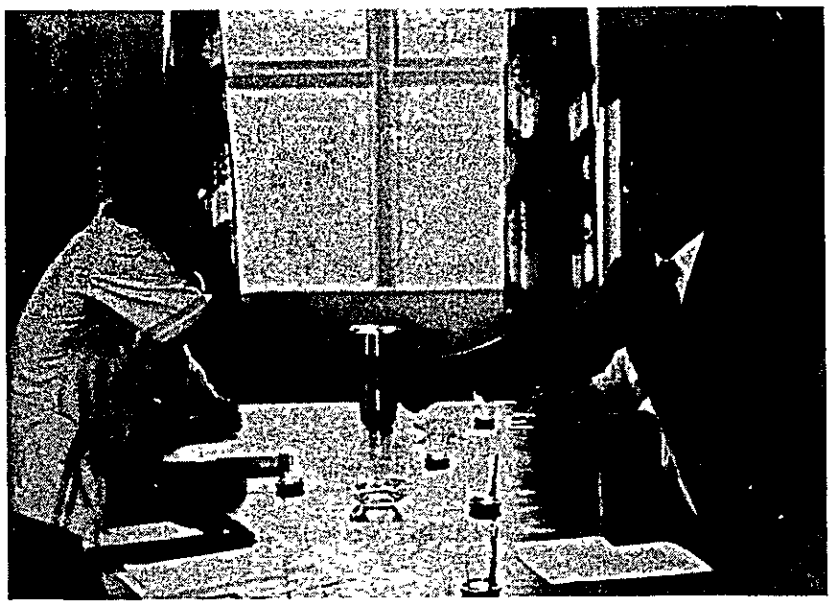
C. Cost Estimate

(1) Material Costs

(2) Labour Costs

(3) Units Costs (Cost per square foot)

7. Minutes of Discussions



Signning of Minutes

Mr. Johnson, Permanent Secretary of
Ministry of Economic Development (Left)
and Mr. Sakai, Head of Survey eam (Right)

MINUTES OF DISCUSSION

ON

THE THIRD PHASE CONSTRUCTION

OF

DEMERARA FISH PORT COMPLEX, GUYANA

At the request of the Government of the Co-operative Republic of Guyana (hereinafter referred to as "Guyana") for assistance in the Third Phase Construction of the Demerara Fish Port Complex in Georgetown, the Government of Japan through Japan International Cooperation Agency (JICA) sent a survey team headed by Mr. Sunao SAKAI (Fishery Agency of Japan) to conduct the basic design survey on the project, for a period of twenty-two days beginning on 7th August, 1980.

The team investigated the project site, including the previously completed wharf and held a series of discussions with Guyana Governmental Agencies under the auspices of the Ministry of Economic Development to exchange views about the Project.

As a result of site reconnaissance including information collected and discussions with Guyanese counterpart staff and other interested parties, the Basic Design Survey Team clearly perceived the contributions of the previously completed facilities for the fishery activities of Guyana.

The Basic Design Team also realized the importance of the Third Phase Construction of the Project for Guyana, and both parties agreed to recommend that their respective Governments take the necessary actions toward the realization of the Third Phase Construction of the Demerara Fish Port Complex Project as stated in the Minutes attached hereto.

Signed in Georgetown, Guyana on August 22, 1980.

Mr. Sunao Sakai
Head of the Japanese
Basic Design Survey Team

Mr. Leslie C.B. Johnson
Permanent Secretary,
Ministry of Economic Development

MINUTES

1. The objectives of the Third Phase Construction of the Demerara Fish Port Complex are to provide new facilities as well as to expand and supplement the previously constructed facilities for the further development of fisheries activities in Guyana which would contribute significantly to the economic development of Guyana.

2. The proposed site of the Third Phase Construction will be on the East Bank Demerara, (as shown in the drawings attached hereto). The proposed Third Phase Construction will comprise the following nine items:

   (a) Wharf (3 berths on each side) and Fender Piles.

   (b) Workshop on Wharf.

   (c) Slipway including Cradle and Winch.

   (d) Workshop for Slipway.

   (e) Cold Storage Facilities (approx. capacity 740 tons).

   (f) Equipment for two workshops.

   (g) Fence.

   (h) Gate.

   (i) Generator sets.

3. The Government of Japan will take the necessary action to ensure the Third Phase construction, including where necessary the supply of materials, in terms of the abovementioned 9 items, from funds to be provided under the Grant.

4. The Government of Guyana will take the following necessary measures:

(a) To secure land suitable for the execution of the Project;

(b) To clear and level the site as required prior to the commencement of the Project implementation;

(c) To provide data and information necessary to execute the Project;

(d) To provide necessary utility supplies to the site as required;

(e) To provide drainage and other incidental facilities outside the site;

(f) To ensure prompt unloading and customsclearance at disembarkation ports in Guyana for the products purchased under the Grant;

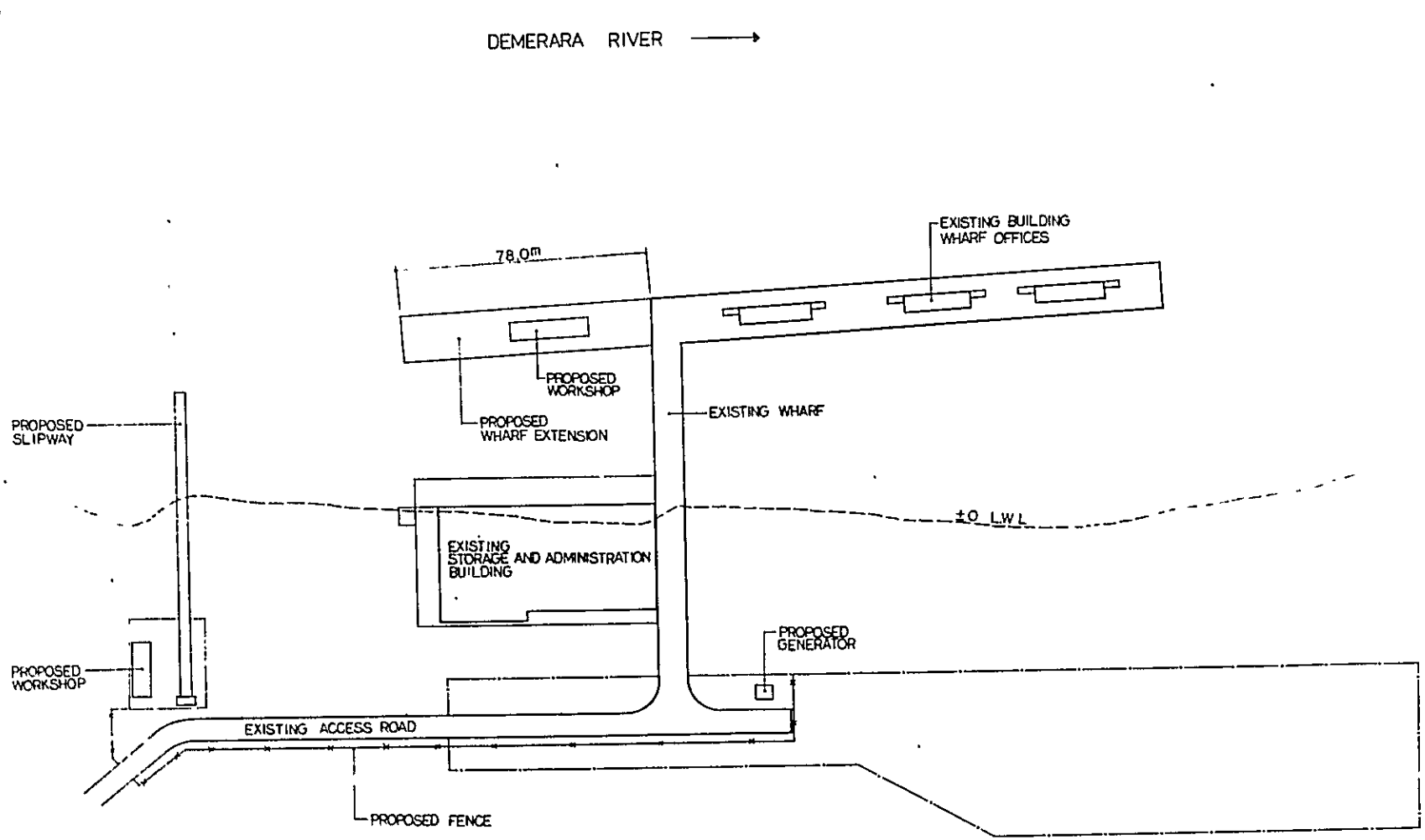
(g) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Guyana with respect to the supply of the products and services under the Contracts to be executed at a later stage.

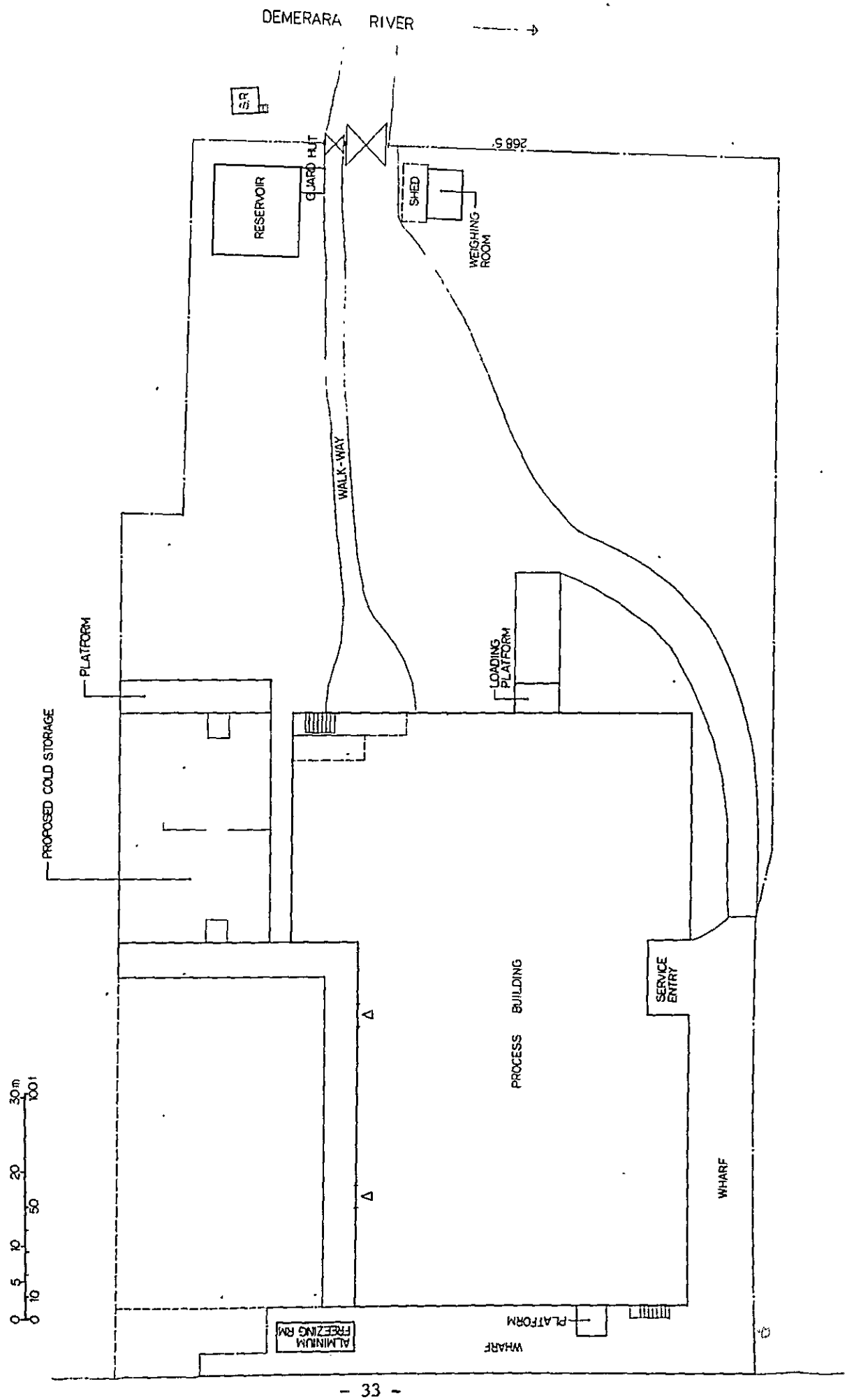
(h) To accord Japanese nationals whose services may be required in connection with the supply of products and services under the Contracts to be executed at a later stage such facilities as may be necessary for their entry into Guyana and stay therein for the performance of their work;

(i) 6. To ensure that the Demerara Fish Port Complex be maintained and used properly and effectively for fisheries activities in Guyana;

(j) 7. To bear all the expenses, other than those to be borne by the Grant, necessary for the execution of the Project; and

5 8. Japan International Co-operation Agency (J.I.C.A.) will send copies of the basic design report to the Government of Guyana.


DEMERARA RIVER
78.0m
EXISTING BUILDING
WHARF OFFICES
PROPOSED
WORKSHOP
PROPOSED
WHARF EXTENSION
EXISTING WHARF
PROPOSED
SLIPWAY
±0 L.W.L.
EXISTING
STORAGE AND ADMINISTRATION
BUILDING
PROPOSED
GENERATOR
PROPOSED
WORKSHOP
EXISTING ACCESS ROAD
PROPOSED FENCE


DEMERARA RIVER
S.R.
GUARD HUT
RESERVOIR
SHED
WEIGHING ROOM
WALK-WAY
LOADING PLATFORM
PLATFORM
PROPOSED COLD STORAGE
PROCESS BUILDING
SERVICE ENTRY
WHARF
PLATFORM
ALUMINUM FREEZING RM
WHARF
0 10 5 10 20 50 30m 100 ft

II. EFFECTS OF GRANTS

8. Effects of Phase I and Phase II.

The construction of Phase I consisted of the following works:

1) Wharf with offices and workshop

2) Equipment to supply water and electricity

3) Mobile crane

4) Access road from highway

The above works were provided for the basic facilities of the Demerara Fish Port Complex.

At the completion of Phase I in 1977, Guyana Marine Foods Ltd. occupied the facility and its boats were based there. This move meant an immediate saving in time and fuel as the boats were now based down river and only a quarter mile from the processing plant. It also meant a saving in time as these boats, previously based beyond the Demerara Harbour bridge, were subjected to delays caused by waiting for the opening of the bridge or closure due to maintenance repairs being effected. In addition Phase I provided better workshop facilities, thereby affording faster repairs maintenance of vessels, resulting in shorter turn around time, less idle-days dock side and increased fishing days at sea.

The construction of Phase II consisted of the following works:

1) Two (2) Duplex Offices/workshop on existing wharf of Phase I

2) Administration Building, Offices and Canteen, Captains changing Locker Room

3) Attendant Wharf, Workshops/Stores/Electrical Shops/Net Repair Shop

The above works were completed in December 1979 and officially handed over in February 1980 to the Government of Guyana.

This was a welcome step in the rationalization process in that the entire Government Fishing Industry Administration was housed in one location with the attendant benefits and spin-offs of increased efficiency coupled with improved facilities.

9. Justification of Phase III

Phase III as enunciated in the Minister's (Economic Development) formal application to the Government of Japan, as per the letter dated 14th March 1980, encompasses the following:

1) Building/extension of Wharf and Fender Piles

2) Construction of Building on Wharf

3) Building of Slipway

4) Building of Workshop for Slipway Operations

5) 700 tons Cold Storage Facilities

6) Equipment for two Workshops

7) Fencing of Compound

8) Construction of gate

9) Generator sets

These residual construction works are considered vital for the Government's plan to increase its Fleet by approximately 20 new Trawlers which will produce the need for increased wharf space together with workshops and ancillary equipment. It is also envisaged in the long term developmental plan of the Government's Fishing Industry to further increase the Fleet to a maximum size of 100 boats adequately service the Processing Plant.

At present there is no slipway facility available. When the needs occur for shrimp trawlers operating at DFPC to be dry-docked, they have to sail to Friendship, some 16 km upstream from DFPC and this causes the following problems:

(1) Waste of time

Since the slipway at Friendship is also utilized by other vessels in addition to the shrimp trawlers, the facility is high utilized and it is common to waste several days just to get a turn to enter the slipway. Also the Demerara Harbour Bridge, which is a floating bridge across the Demerara River and lies between the DFPC and Friendship (refer Fig. 11-2), is open only several times a day for river traffic and this

limits the free navigation between the two points for shrimp trawlers.

(2) Waste of Energy

Although 30 km back and forth to Friendship is not considered too great for a vessel to travel, it is non-productive time resulting in the unnecessary burning of precious imported fuel.

Due to abovementioned problems as well as inconvenience of having separated facilities, it is desired to establish the dry-dock facility within the property of DFPC, which will allow the centralized and improved control of ship assignments, including maintenance.

The fencing of the compound, and construction of gates are necessary for purposes of security.

The Generator sets are included as a result of the present experience, nationally, of frequent electricity black-outs which cause work stopages during the day and impair security arrangements at night. Additionally, these sets are of singular importance in the maintenance of temperature so as to facilitate the preservation of catches and reduce/eliminate losses due to electricity shutdown from the national supply.

Lastly, the 700 tons Cold Storage Facility is necessary due to the following factors:

1) To accommodate high production of by-catch from shrimp trawlers and inshore Fleet.

2) To reduce the imbalance between process capacity and size of catch.

3) To provide for storage of artisanal catches now held in GFL's Cold Storage which causes problems with the storage of shrimp.

III. GENERAL OUTLINE OF FISHERIES INDUSTRY AND ROLE OF DEMERARA FISH PORT COMPLEX

10. General Outline of Fisheries Industry

10.1 Present Conditions

The present conditions of fisheries industry in Guyana are summarized below.

A. The Fish Catch

The annual fish catch in recent 5 years are tabulated in Table 10-1.

Table 10-1: Annual Fish Catch (Unit: ton)

Item / Year	Fish				Shrimp	total
	Atrisanal	Indus-trial	Inland	Sub-Total		
1975	13,838	1,331	786	15,965	4,200	20,165
1976	14,047	1,066	797	15,910	3,172	19,083
1977	19,982	2,042	796	22,820	3,692	26,512
1978	15,749	1,881	795	18,425	3,396	21,821
1979	15,673	2,955	800	19,428	3,617	23,045

B. Fleet Size

The fleet size of shrimp boats and artisanal boats are shown in Table 10-2, and 10-3 respectively.

Table 10-2: Industrial Shrimp Fleet

No. of Vessels	Type			Territory
	Power	Fish Composition	Owner	
69	Inboard Engine	Shrimp and by-catch of snapper, trout, croaker, pagee, mackerel, shark, etc.	G.F.L., Yutaka and Others	Operating at Demerara Fish Port Complex
70	"	"	Georgetown Seafoods Ltd.	Operating at G.S.L. Base
9	"	"	L.A. Buttere, Bertrand Buttiers, etc.	Operating Other than Demerara Fish Port Complex

Table 10-3: Artisanal Fishing Fleet

No. of Vessels	Type			Owner
	Power	Fish Composition	Fishing Gear	
2	Inboard Diesel	Snapper, Groupers	Hand lines	Private local individuals
93	Inboard	Grey snapper, Croaker, gillbacker, tarpon, pagee, mackerel, shark, trout	Gill net	"
233	Outboard up to 48 H.P.	Grey snapper, trout, pagee, shark, croaker, tarpon, gillbacker, mackerel	Gill net	"

- continued

Cont'd.

No. of Vessels	Type			Owner
	Power	Fish Composition	Fishing Gear	
388	Sail, outboard 6-9 H.P.	Seabob, whitebelly immature fish, bangamary, butterfish, catfish	Chinese Seine	Private local individuals
178	Outboard 6-9 H.P.	Catfishes, shark	Cadell	"
76	Sail	Mullet, snook, queriman, catfish, croaker, bangamary	Pin Seine	"
46	Combi-nation of sail outboard 6-9 H.P.	-	Combination of Chinese Seine, Cadell and Pin seine	"

C. Employment

As previously discussed in Section 2, the fishery industry is gradually increasing its importance to the national economy. The current employment in fishery and associated industries are said to be about 6,200 thousand workers excluding an indefinite number of seasonal part-time fishermen from rice farms. This employment accounts for 3 per cent of the total national work force. Considering the employment scale in other industries in the country, employment in the fishing industry is regarded as fairly large (refer Table 2-4 in Section 2) and certainly one of the significant countermeasure contributing to lessen the high unemployment rate.

D. Artisanal Fisheries

The artisanal fishermen are organized into 17 active fishermen's co-operative societies throughout the country. The individual co-operative undertakes the importation of fishing prerequisites and their distribution to their members. Each co-operative possesses facilities for landing of the catch, drying and repairing nets, and maintaining of vessels and equipment. These facilities, however, are either deteriorated or insufficient in most cases. Therefore the financial aid has been sought to upgrade these facilities especially ice plants and storage and distribution facilities by the co-operatives. A US$500,000 grant was made by the U.S. Government in August 1980.

E. Industrial Fisheries

Despite the fact that Guyana offshore areas have abundant fin-fish, industrial fishery is rather concentrated for shrimp catch. This is because the industrial shrimp catch was begun by U.S. and other foreign fleets some thirty years ago for the high value in world markets, and not much investment was undertaken for the lesser value fin-fish. Three major industrial shrimp firms are Yutaka Fisheries Co., Ltd., Georgetown Seafoods and Trading Company Limited (GSTCL) and Guyana Fisheries Limited (GFL).

GSTCL is a U.S. firm operating exclusively with its own facilities at Providence, some 3 km upstream from Houston. (refer to Fig.11-2)

GFL was established because the Government realized the national importance of fisheries development both to provide the public with sufficient protein and to earn foreign exchange by export.

F. GFL

GFL is a part of the Guyana State Corporation and is a fairly new organization, formed on October 1, 1979 by consolidating the former Guyana Marine Foods Ltd., Guyana Marketing corporation and Guyana Industrial Holdings. Eighty percent of GFL's stocks is held by the Guyana Government and 20 percent by SAMCO.

Now GFL based at Demerara Fish Port Complex concentrates on wider aspects of fishery industry development including fish catch, brokerage, processing and sales. GFL also purchases certain kinds of fin-fish from the artisanal fishermen to process or distribute.

G. Fishery Development Project

A review of fishery development projects both undertaken and planned for implementation in near future are as follows:

Table 10-4 : Review of Fishery Development Projects

Demerara Fish Port Complex (1st Phase)	Construction of Wharf and Workshop	1975
Product Development - Agro Industrial Unit - GAPC (IDRC Research Programme) transferred to Research and Development Centre, Kingston	Work on Minced Fish, Fish Jams and Pastes Canning	April 1976
Guyana Food Processors Limited (Shrimp Plant)	Fillets Whole Dressed Fish Minced Fish	June 1976
Fish Distribution Centre (Thom and Cameron Wharf)	By-catch: Whole Round Wet Fish	July 1976
Fish Research and Development Centre (Kingston)	Large Scale: Dry Salted, Smoked, Pickled, Canned, Minced Fish, etc.	November 1976
Demerara Fish Port Complex (2nd Phase)	Construction of Administration & Storage Building	1978
Establishment of Guyana Fisheries Limited	Rationalisation of Industry	October 1979
Updating of Processing Equipment from Project Stage to Nominal Production	Operation of Processing	1980/1981
Demerara Fish Port Complex (3rd Phase)	Extension of Wharf, Construction of Slipway, Workshop, Cold Storage, etc.	1981
Increase of Fleet Size	Purchase of New 20 trawlers	1981 - 1985

10.2 Future Plans

A. Importance of Fishery Development

The importance of fishery development may be summed up as follows:

1) To Provide Fish as a Cheap Source of Protein

It is reported that large numbers of children in Guyana are suffering from malnutrition; 77 per 100,000 children died due to malnutrition in 1975. As a countermeasure to malnutrition as well as to feed the public with sufficient protein at cheap cost, fishery development is a vital concern for the nation.

2) To Earn Foreign Exchange

The fishery industry can contribute greatly towards the earning of foreign exchange by exporting shrimp and other specific types of fin-fish.

3) To Provide Employment Opportunity

Development of the fishery industry will create more jobs to help lessen the existing high unemployment rate and to help absorb the additional 22,000 new workers who are projected to enter the labor force by 1982.

4) To Strengthen the Nation's Economic Structure

By utilizing the existing natural and self-sustaining resources of shrimp and fin-fish, development of the fishery industry will certainly contribute to strengthening the Guyana's economic structure.

B. Projected Fish Catch

The Fishery Agency, Ministry of Agriculture of Guyana has estimated the required fish supply to meet the nation's demand upto 1982. The projection is shown in Table 10-5 below.

Table 10-5: Required Fish Supply for Domestic Consumption

Year \ Item	Projected Population	Consumption per Capita	Required Fish Supply
1979	829,800	29.73 Kg/ Capita	25,270 ton
1980	869,300	30.95	26,900
1981	889,300	32.23	28,650
1982	909,800	33.55	30,530

In terms of resources, there is no difficulty to supply the annual domestic requirement of 30,000 tons of fish since the potential annual fish catch in Guyana Sea is estimated to be 135,000 tons.

C. Problem on Fishery Development

However, the existing fishery industry is facing harvesting difficulties as follows:

1) Inadequate fleet size

2) Insufficient shore facilities

e.g. slipway, workshop, cold storage, process plants

3) Lack of distribution facilities

e.g. regional cold storage, refrigerated transport vehicles

In order to solve the problem of fleet size, there are plans to build trawlers and gill net vessels among artisanal fishermen and GFL with the aid from IDB, and plans to add 20 more shrimp trawlers within 5 years.

A system to distribute the fish and fish products into rural areas is planned based on purchasing 8 small prefabricated walk-in cold storage rooms (20,000 lbs capacity each) and

refrigerated trucks (number not determined); however, the funds for this project are not confirmed yet.

As regards improving the insufficient shore facilities, there are two major plans: one to build fish processing plant with the aid from the EEC and the other to expand the Demerara Fish Port Complex with aid from Japan.

11. Role of Demerara Fish Port Complex

11.1 Present Condition

The present role of the Demerara Fish Port Complex (DFPC) is summarized below.

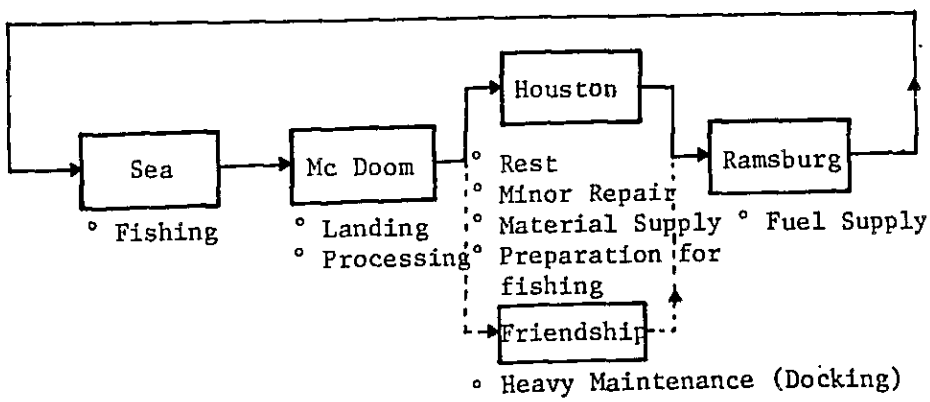
A. General

The DFPC under the management of GFL consists of two districts: one at Houston and the other at Mc Doom, both on the east bank of Demerara River as seen in Fig. 11-2.

Although both districts are close to each other, each district has a different role as illustrated in Fig. 11-1. GFL's administration is located in the Houston district.

In addition to those two districts, GFL also manages the fish processing plant at Kingston.

Fig. 11-1: Shrimp Trawler Routine



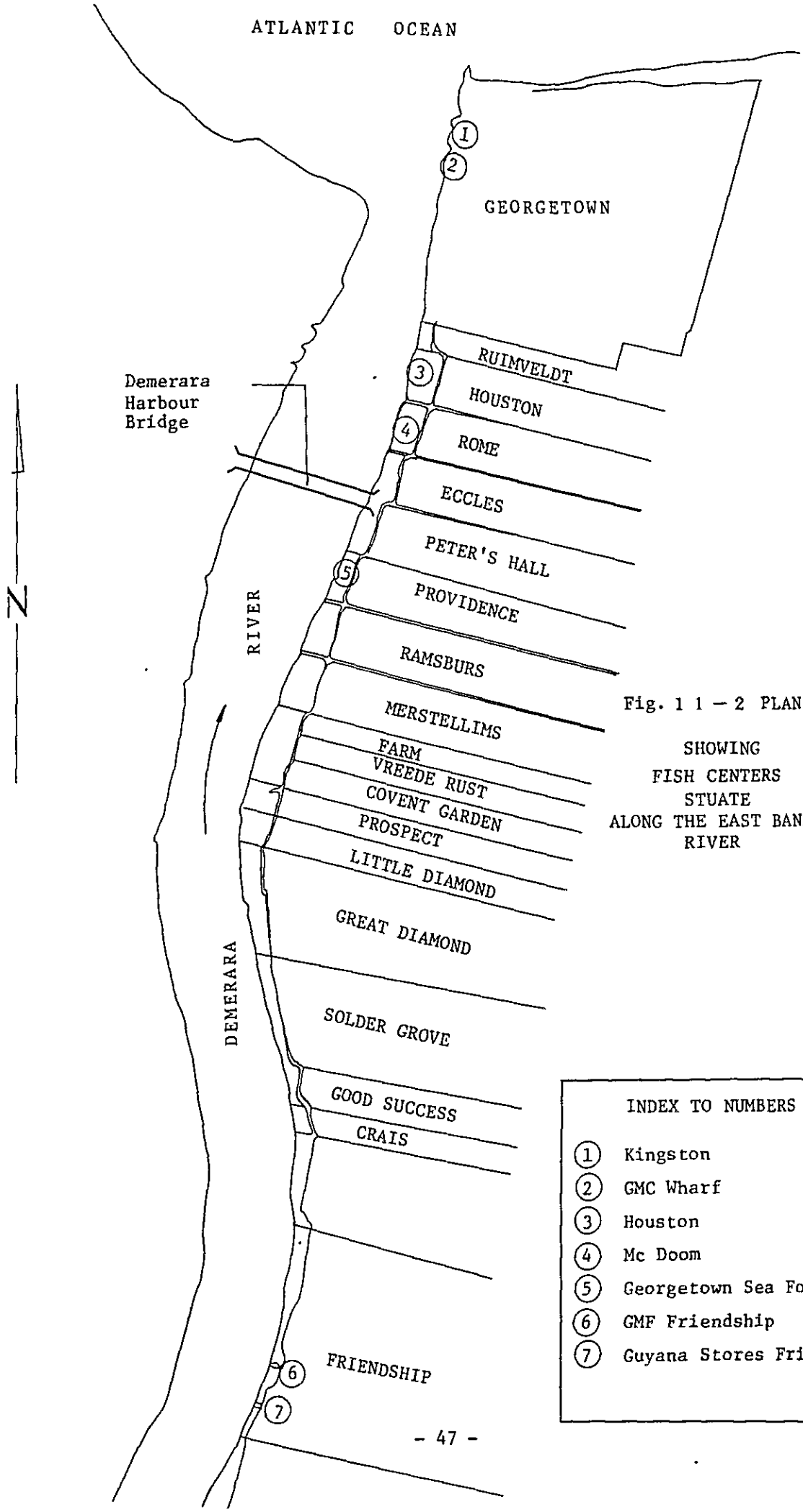


Fig. 1 1 — 2 PLAN

SHOWING
FISH CENTERS
STUATE
ALONG THE EAST BANKDEMERARA
RIVER

B. Fleet Size and Landing Amount

At present, fishery activities at DFPC mainly consist of shrimp trawling and thus all the 69 registered vessels at DFPC are shrimp trawlers. However, Guyana Government has made it a regulation that every trawler has to bring in 2,000 lb (approx. 900 kg) of fish (approximately one day's catch on the way back to shore) for each landing of shrimp. This regulation for shrimp trawlers applies to any shrimp trawler operating in Guyana. Thus the other large shrimp trawler operator, GSTCL, also lands fish at their own facility at Providence to be delivered to Mc Doom.

GFL also buys certain kinds of fish such as grey-snapper from artisanal fishermen to process at Kingston or store in Cold Storage at Mc Doom since no large-scale public cold storage is available anywhere else.

The amounts of shrimp and fin-fish handled by GFL in 1979 are estimated as follows:

Table II-1: Amount of Fish Handled by GFL in 1979

Kind		Amount (tons/year)	Remarks
Fin-Fish	Landed	2,960	
	Purchased	1,750	Assumed to be 10% of the the Artisanal Fish Catch
	Sub-Total	4,530	
Shrimp	Landed	1,440	
TOTAL		5,970	

C. Existing Facilities

The existing facilities under the management of the GFL at Houston and Mc Doom are as shown in Fig.11-3 and 11-4,and their main features are tabulated in Table 11-2.

Table 11-2: Main Features of Existing Facilities

District	Facility	Features	Remarks
Houston	Wharf (1) Wharf (2)	11 Berths, 156 m 3 Berths, 76 m	1st Phase Grant 2nd Phase Grant
	Workshop	3 buildings	1 bldg-1st phase Grant 2 bldgs-2nd " "
	Administration & Storage	2,600 m^2	2nd phase Grant
Mc Doom	Wharf	3 Berths, 80 m	
	Processing Facility	1,400 m^2	
	Fleezing Facility	10 T/D	
	Cold Storage	1,000 tons	

11-2 Future Plan

The physical planning of DFPC is discussed in detail in Chapter IV of this Report. This section deals only with the planning of the fish catch.

The target amounts of shrimp and fin-fish to be handled by GFL in 1985 are estimated as shown in Table 11-3 based on the following assumptions:

1) Fleet size operating at DFPC will amount to 94 vessels

Present Registered Vessels	69
Purchase of new vessels by GFL	20
Other Increments	5
Total:	94 vessels

2) The present fleet composition which is mostly composed of shrimp trawlers will remain about the same, and so the total amount of fish catch is projected as shown in Fig. 11-5.

Table 11-3: Target Fish Catch for GFL, 1985

Item		a. Present	b. Target (1985)	Ratio b/a
No. of Operating Vessels		51 units	94 units	1.8
Fin-Fish	Landed	2,960 tons	6,000 tons	2.03
	Purchased	1,570	5,000	3.18
	Sub-Total	4,530	11,000	2.43
Shrimp	Landed	1,440	2,000	1.39
TOTAL		5,970	13,000	2.18

Therefore, the relation between the total fish trade in Guyana and the amount GFL handles is illustrated in Fig. 11-5.

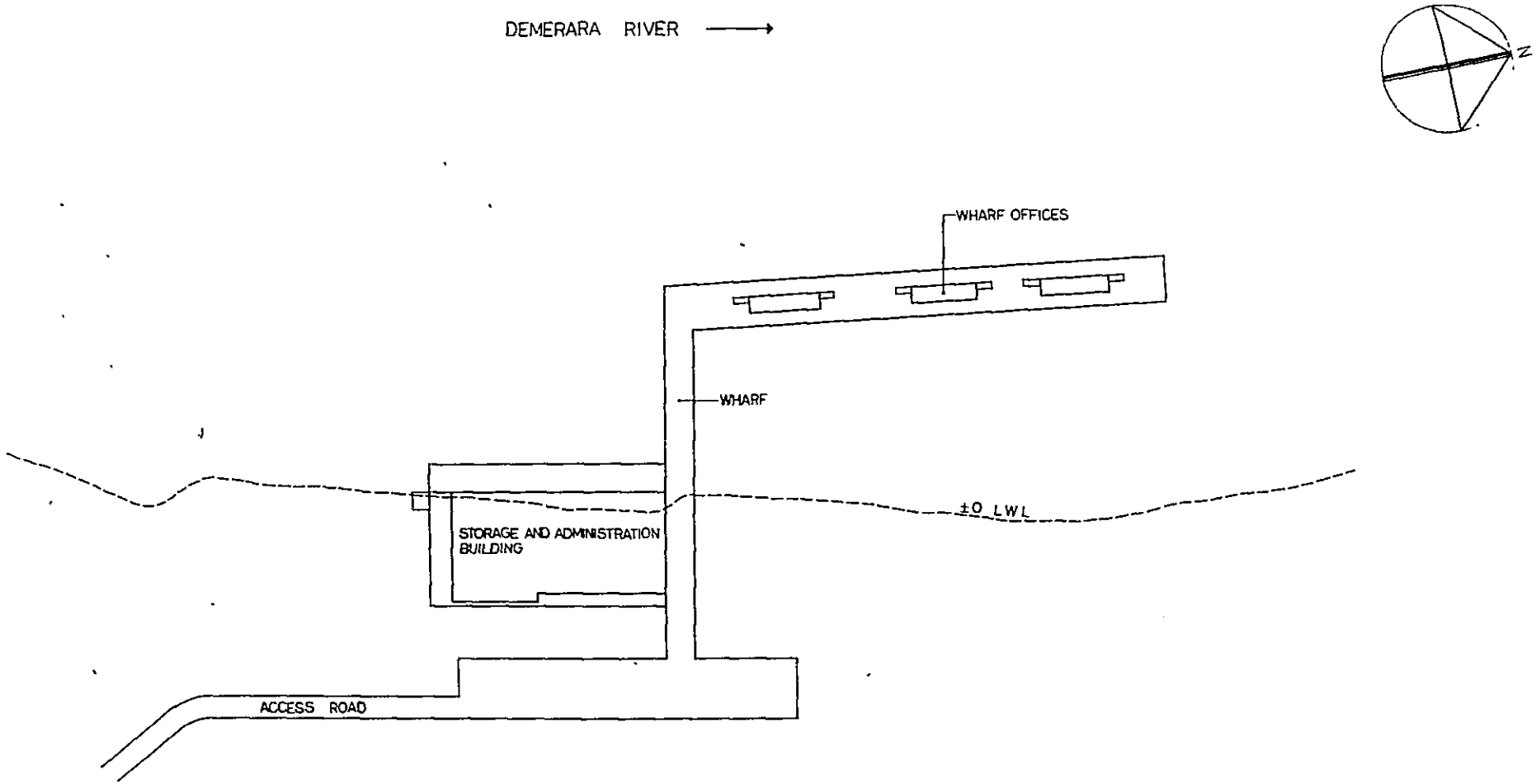


Fig. 11-3 Existing Facilities at Houston District

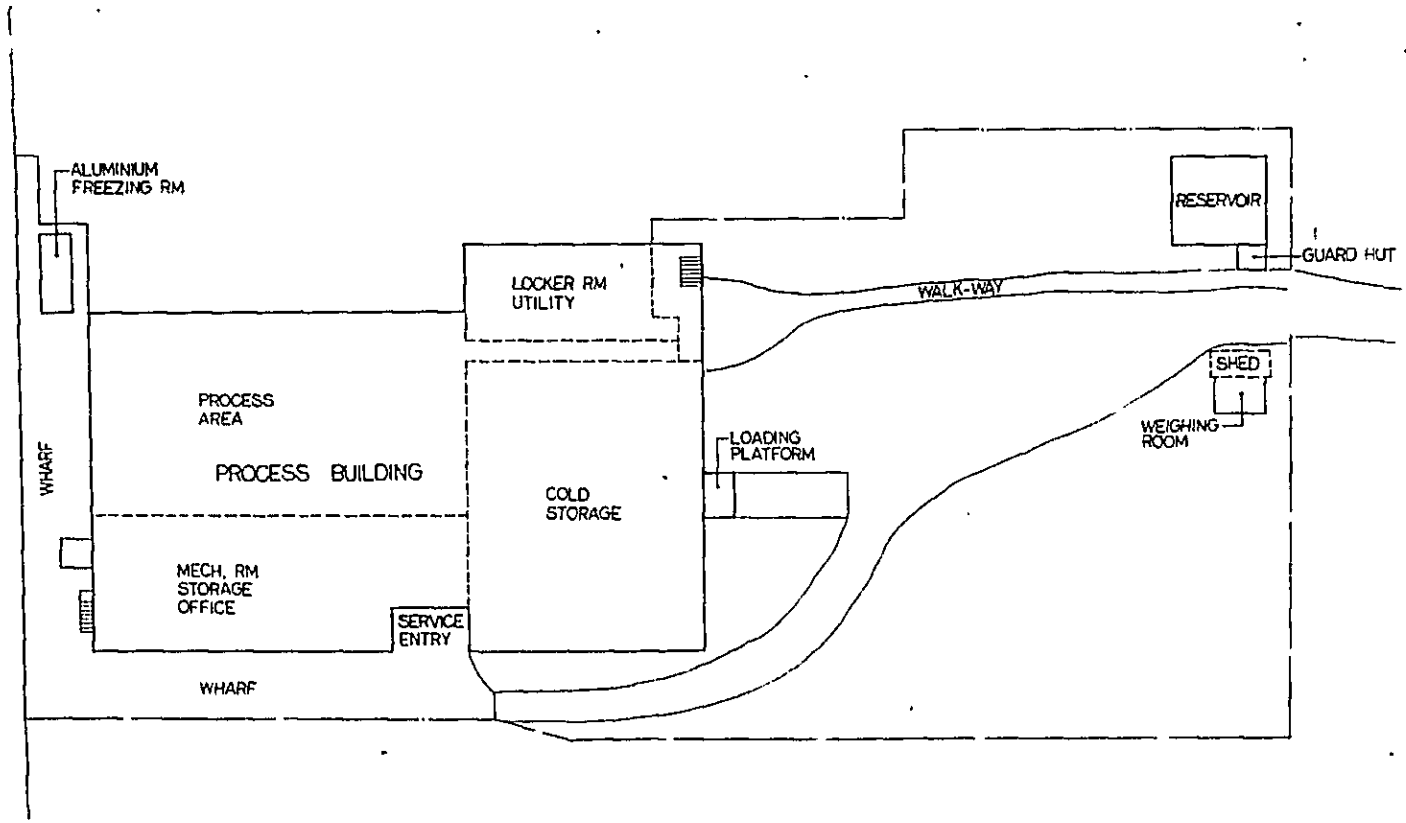
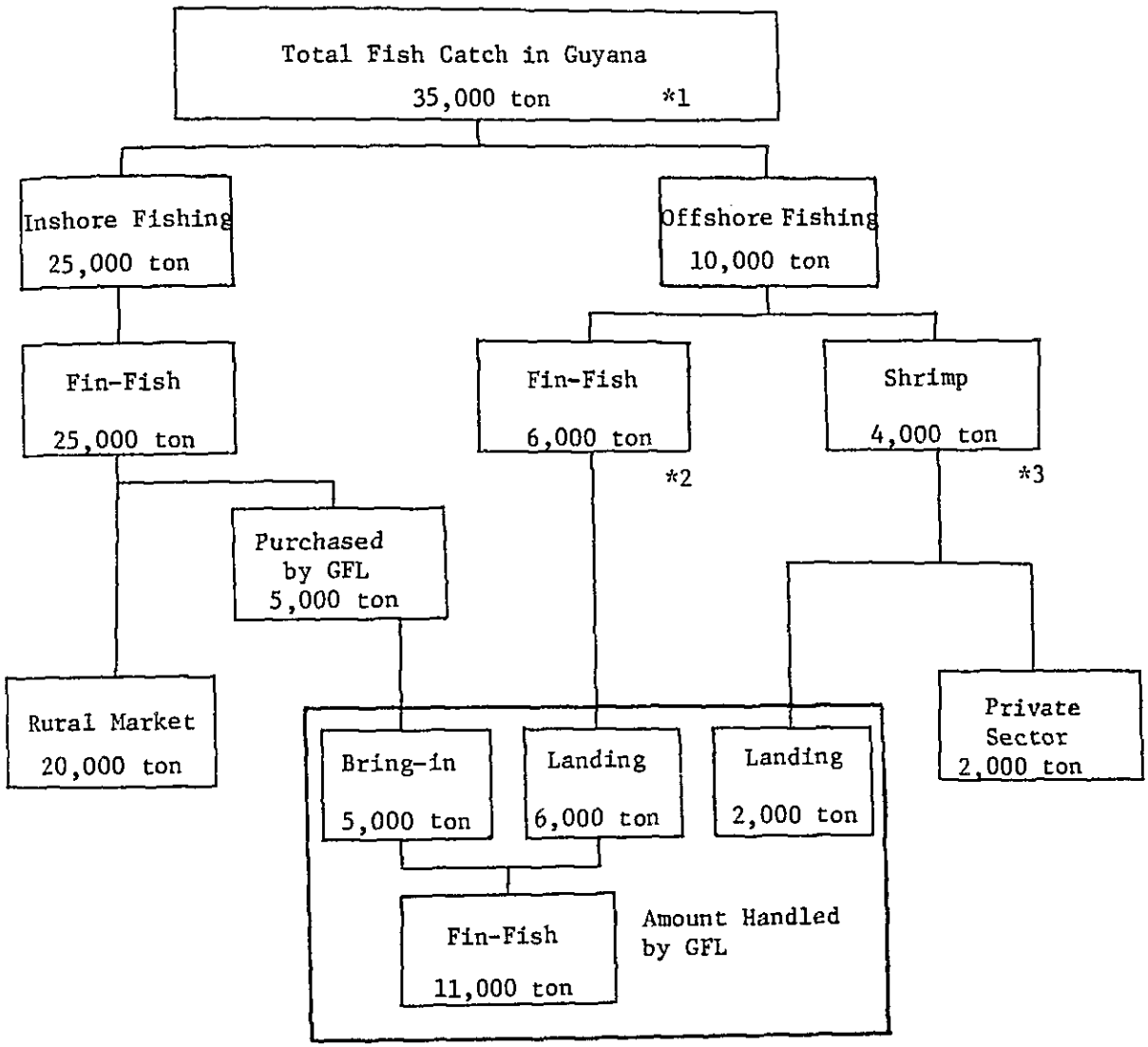


Fig. 11-4 Existing Facilities at Mc Doom District

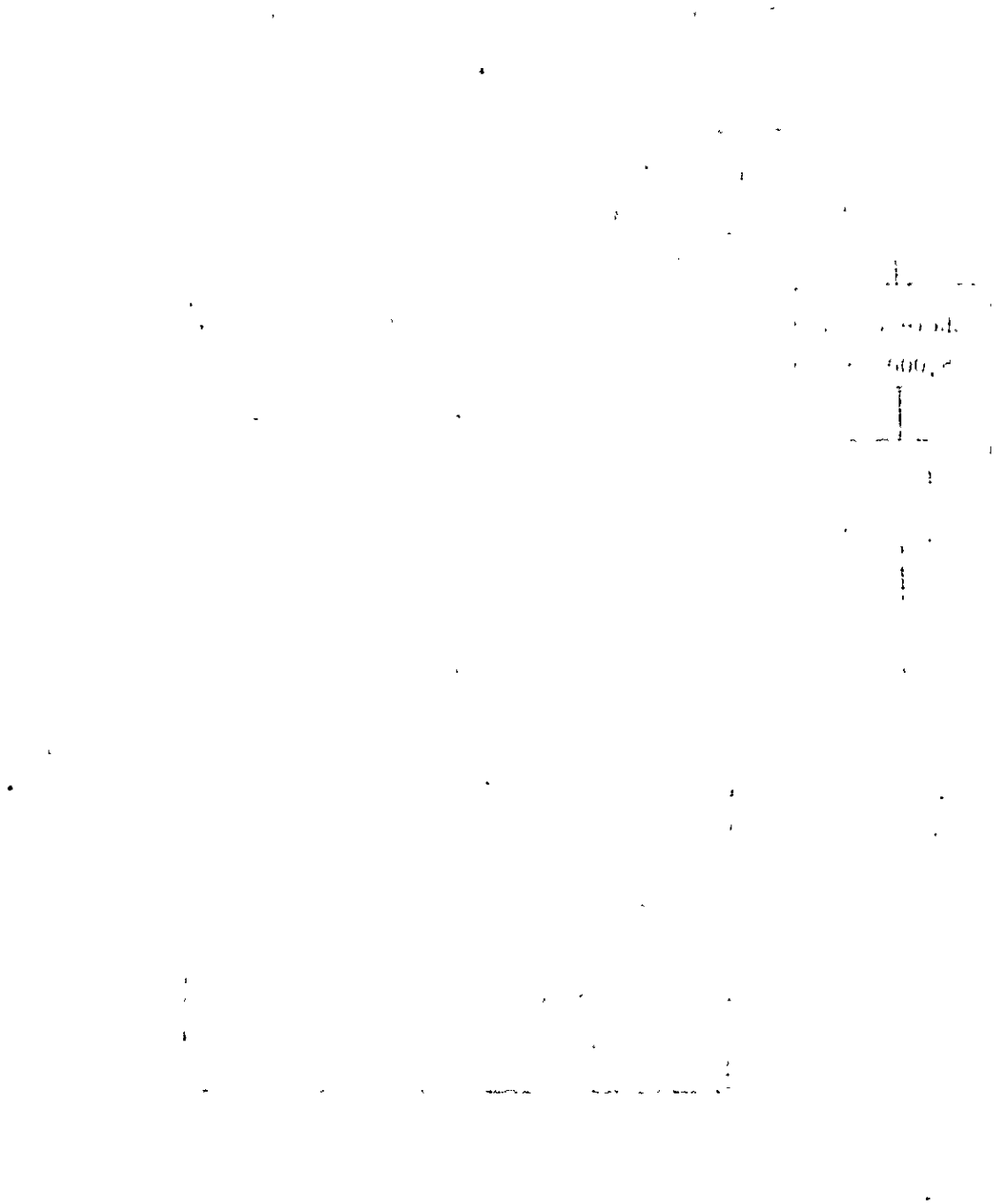
Fig. 11-5: Plan of Fish Catch and Trade in Guyana



*1 Target Amount by Fishery Agency, Guyana

*2 Assumed as double of 1979 amount

*3 Assumed present catch will be maintained to preserve resources



IV. BASIC DESIGN

12. Basic Design Considerations

The basic design was based on the results of the primary survey of August 1980, which was initiated after the study was made of the following two documents: The Report of Construction Planning of Fishery Industries Facilities of Republic of Guyana and the 3rd Phase Request of Assistance Gratis to Guyana.

The above design study was reviewed in detail by the representatives of Guyana and our survey party. The revised study was approved by the representatives of Guyana before the survey party left the country.

The basic design was prepared taking into consideration the revised study and further technical factors which were added as was found necessary.

In order to realize the preliminary construction as scheduled, there are few items which the Government of Guyana must execute, which are listed in Chapter V in detail. The basic design is based on the presumption that these works are carried out as scheduled.

13. Summary of the Project

13.1. Summary of the construction program of Demerara Fish Port Complex.

The primary construction program of Demerara Fish Port Complex as planned by the Government of Guyana consists of Houston and Mc Doom Areas. In order to fulfill the construction schedule of the Port of Demerara as given in Chapter III, the following construction work must be performed.

A. Houston Area

Main items of facility construction for the preparation of vessels leaving port for fishing are for supplying portable water,food stuffs, ship riggings etc. Also facilities for inspection, maintenance and mooring of the vessles are necessary items.

B. Mc Doom Area

Construction of cold storage facilities for sea foods.

13.2. Summary of Various Facilities

Main facilities of the construction program are as follows:

A. Houston Area

- Extension of the wharf
  78m (for 3 berths on each side)
- Construction of repair shops
  150 m^2 single story wooden structure on the wharf proper
  110 m^2 single story wooden structure alongside the slipway
- Construction of slipway and winch
- Emergency Generator
  Rating of 200 KVA
- Unloading facilities and various machine tools for repairing
  Forklifts, Cranes, Lathes, Welding Machines etc.

- Gates and fences

A. Mc Doom Area

- Cold storoge facilities

  Capacity approx, 700 tons

  Dimensions approx, 30m x 15m x 4.5m

- Emergency generator

  Rating of 250 KVA

14. Basic Planning Principles

(1) Planning of the said project shall be made by incorporating the basic plan as agreed with the Representatives of the Guyana Government and the results of the survey expedition.

(2) The 3rd phase project as considered shall harmonize with the 1st & 2nd phase construction work and also its facilities shall be adequately equipped to be worthy of a main fish port complex of the Republic of Guyana.

(3) The project planning shall take into consideration the climatic conditions, the local working conditions, etc.

(4) Procurement of local construction materials and labour shall be recommended as much as possible.

15. Site Conditions

15.1. Geographical Conditions

Guyana has an elaborate system of rivers and creeks. Most of these rivers have their sources in the great mountain ranges of the south and west, and flow northerly and easterly, reaching the Atlantic Ocean after meandering through virgin forests of vast resources.

Rivers reaching the Atlantic Ocean together with their tributaries are: the Essequibo River, the Berbice River, the Barima, the Waini, the Demerara River and the Amakura River.

Georgetown, the capital, lies on latitude 6° 49' N and longitude 58° 10' W and is at the mouth of the Demerara River, on the eastern bank.

It is the main harbour, the seat of Government and the main commercial centre. It covers an area of 644.8 hectares (1,612 acres), and has an estimated population of 183,000.

15.2. Geological Features

A. Topography

The project site is located on the eastern bank about 4.3 kilometers upstream from the mouth of the Demerara River, and consists of two districts: one is the Houston district where there is a wharf for mooring and repairing and the other is the Mc Doom district where there are facilities for landing, processing, freezing and holding.

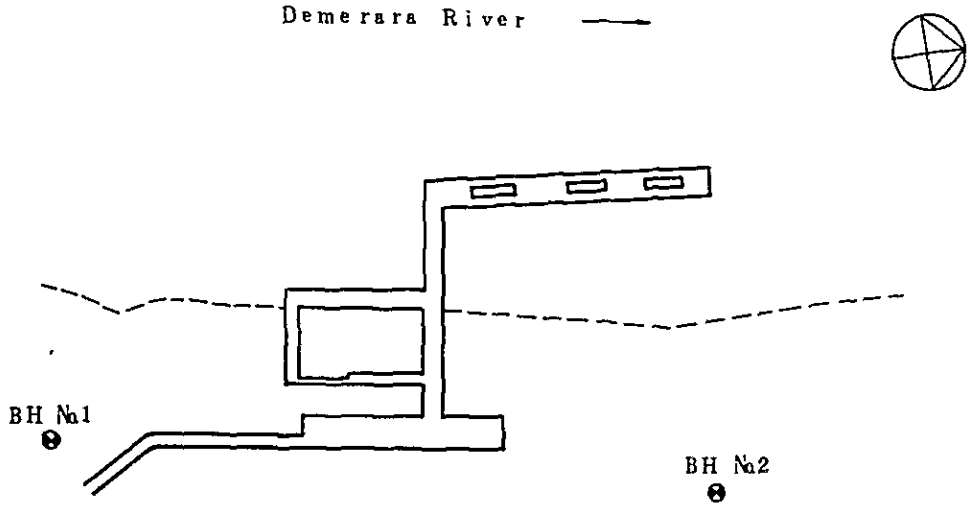
The site at Houston is between the connecting road made by the first Grant and the Demerara River. It is damp ground inclined gradually to the river.

The place for making the cold storage facilities at Mc Doom slopes rather steeply to the North from the service yard of the existing building, and therefore, considering the convenience of delivery and distrubution after completion of construction, it is required to fill the earth partially by Guyana Government which was agreed upon by Minute of Meeting.

B. Sub-soil Conditions

Judging from the boring data obtained, the sub-soil of both sites at Houston and Mc Doom show similar conditions composed of silt and clay. Therefore the unconfined compression strength of soils determined in the former investigation may be applicable to the sub-soil of the site at Mc Doom. The pile will be designed by the adhesion and cohesion of clay, because the supporting sub-soil is clay.

The boring data obtained are illustrated in Fig. 15-1, 15-2.



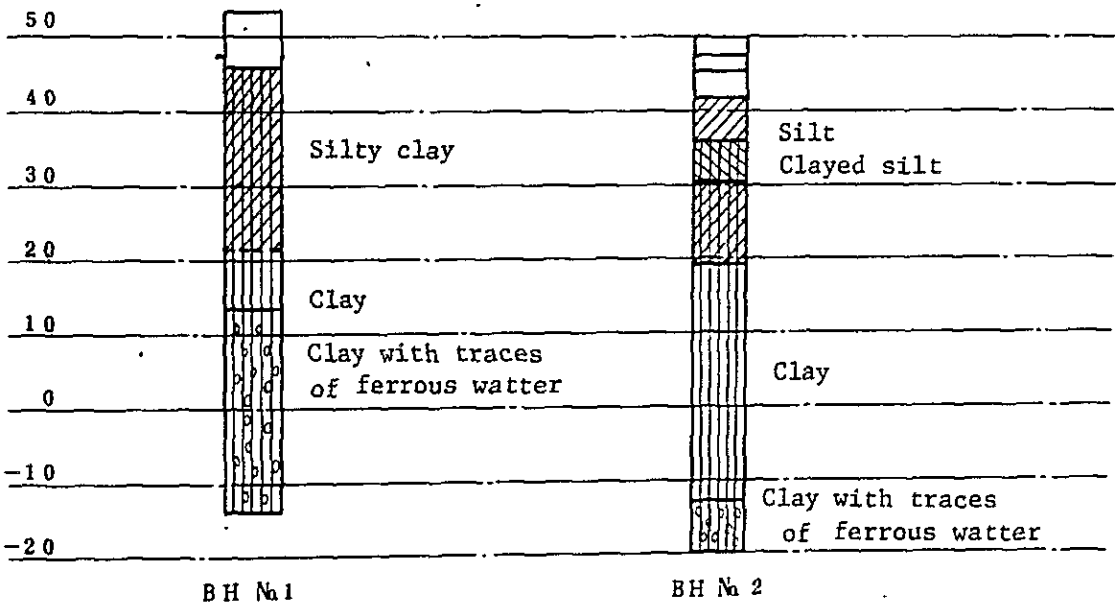
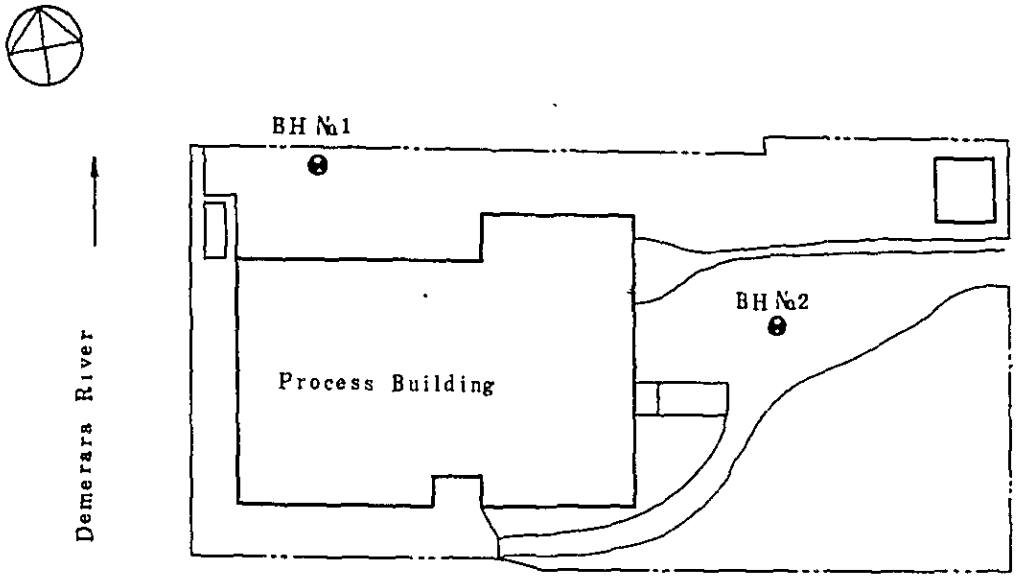


Fig. 15-1 Boring data at Houston



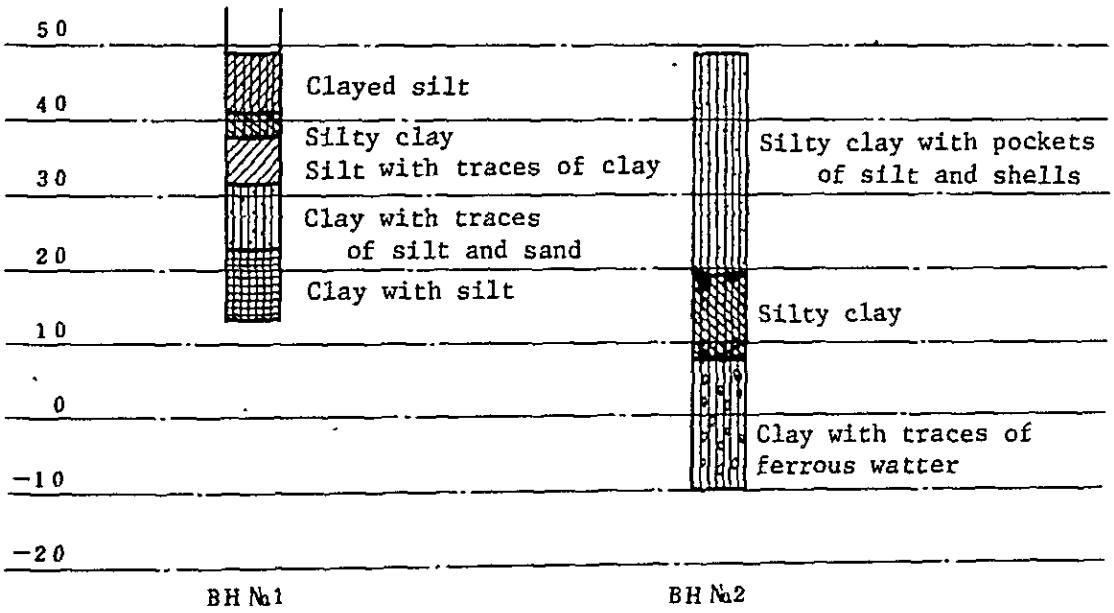
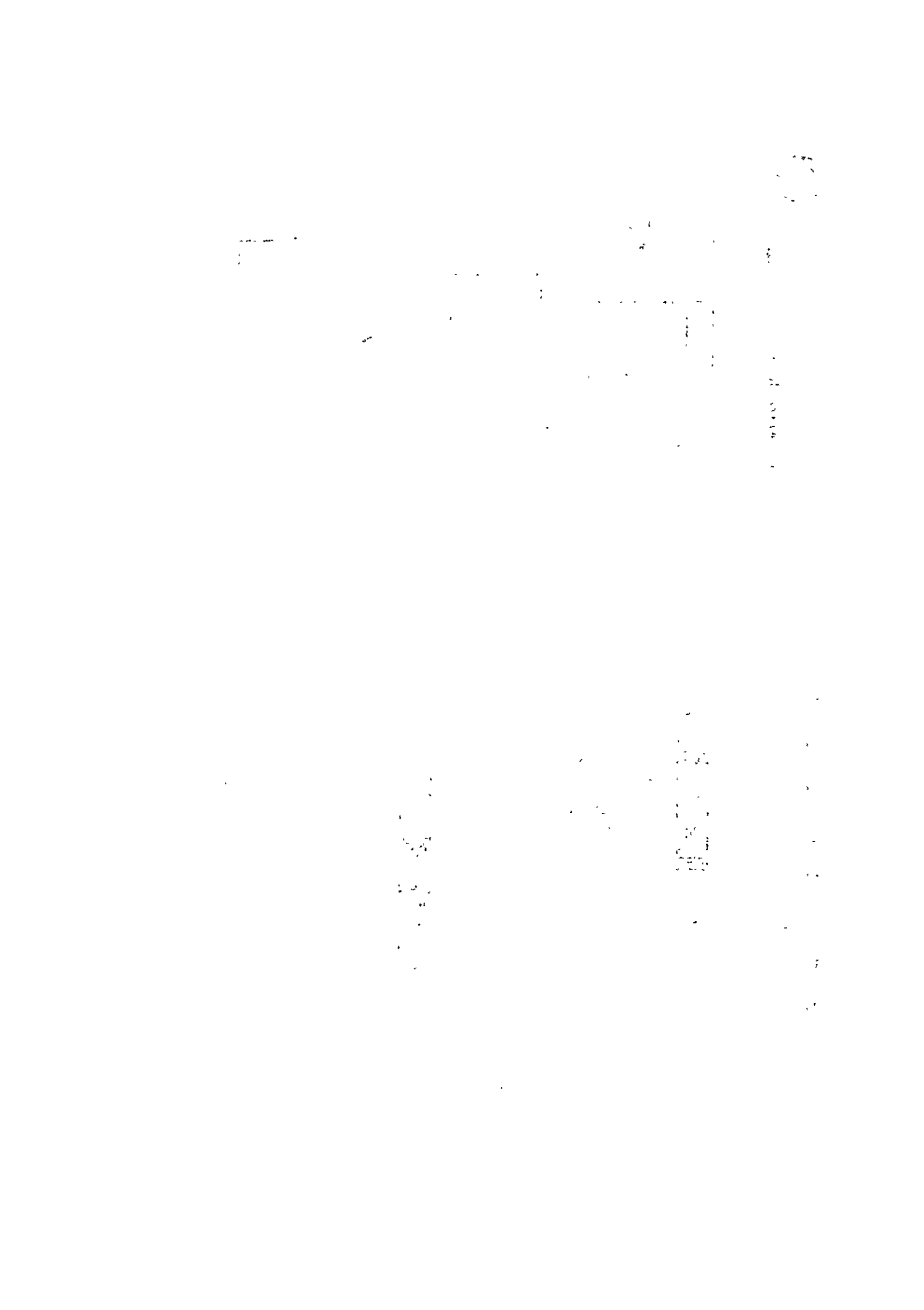


Fig. 15-2 Boring data at Mc Doom District



15.3. Meteorological and Hydrological Conditions

A. Temperature

The temperature range is very narrow throughout the year. The average mean monthly maximum temperature is around 30 degrees centigrade.
The average mean monthly minimum temperature is around 23 degrees centigrade.

There is high temperature throughout the year.

B. Relative Humidity

Like temperature, there is little variation in relative humidity from around 70 to 90 per cent.

There is high relative humidity throughout the year.

C. Wind

A moderate breeze blows throughout the year from the direction of North-East, with a velocity of 7-10 knots (3.6 - 5.1 m/sec). Strong wind velocity has never been recorded.

D. Rainfall

There is a large amount of annual rainfall such that the annual precipitation is around 2,000 - 3,000 milimetres. The monthly rainfall is variable for each year, but normally there are two distinct rainy seasons: one from May to August and the other from November to January.

E. Tide Levels

There is a very wide range in tide level. The difference between MHWL and MLWL is around 2 metres. The difference between MHHWL and MLLWL is around 3 metres.

MHHWL	+ 55.89'
MHWL	+ 54.22'
MWL	+ 50.98'
MLWL	+ 47.73'
MLLWL	+ 45.92'

MINISTRY OF WORKS AND TRANSPORT (WKS)

Min. of W. & T. No. 161
GPL 2304/78

STATION NAME - Georgetown, Botanic Gardens

MEAN MONTHLY MAXIMUM TEMPERATURES (1975 - 1979)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Ave.
1975	82.9	83.4	87.0	84.6	85.2	84.2	83.8	85.8	86.1	87.0	86.1	83.1	84.9
1976	82.5	83.1	82.8	83.9	83.5	83.2	85.3	87.1	88.7	89.3	87.7	84.5	85.1
1977	84.4	84.8	85.0	85.1	84.8	84.4	85.1	86.7	86.8	87.3	88.2	84.8	85.6
1978	83.8	85.3	85.9	87.2	84.9	85.3	86.2	86.1	87.8	87.9	87.6	85.5	86.1
1979	84.4	85.1	84.2	85.6	85.7	86.7	86.6	87.3	88.9	88.9	88.8	85.8	86.5
Ave.	83.6	84.3	85.0	85.3	84.8	84.8	85.4	86.6	87.7	88.1	87.7	84.7	85.7 85.6

MEAN MONTHLY MINIMUM TEMPERATURES (1975 - 1979)

1975	73.0	73.6	75.2	74.7	74.6	74.0	72.9	73.6	74.9	75.1	74.1	73.0	74.1
1976	72.5	72.9	74.1	73.5	74.0	73.1	73.7	74.4	75.3	75.4	75.2	74.1	74.0
1977	73.3	74.2	74.9	74.7	74.0	73.8	73.2	74.4	74.6	75.2	76.1	74.2	74.4
1978	73.2	74.7	75.6	76.4	74.6	73.8	74.0	74.0	74.9	75.1	75.6	74.5	74.7
1979	73.9	76.2	75.5	76.1	75.2	73.8	73.5	75.2	76.2	76.0	76.6	74.4	75.2
Ave.	73.2	74.3	75.1	75.1	74.5	73.7	73.5	74.3	75.2	75.4	75.5	74.0	74.5 74.5

PRECIPIRATION (inches) MONTHLY

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Year	(mm)
1975	9.91	3.57	3.51	5.28	18.97	14.13	13.88	11.90	6.82	4.94	13.76	23.02	129.69	(3.294)
1976	20.73	23.26	16.38	8.27	15.69			4.50	1.36		11.13			
1977	4.86	1.70	0.87	10.81	14.05	9.96	13.48	9.02	4.96	3.51	5.92	5.47	84.61	(2.149)
1978	6.56	1.28	1.26	3.55	18.39	16.40	14.50	12.98	1.77	8.52	5.14	7.87	98.22	(2.495)
1979	6.10	0.70												
Ave.	9.63	6.10	5.51	6.98	16.78	13.50	13.95	9.60	3.73	5.66	8.99	12.12	112.55	(2.859)

STATION NAME - Georgetown, Botanic Gardens

RELATIVE HUMIDITY (%) 0900 G.S.T.

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1970	84	80	78	79	87	87	90	87	81	81	86	85	84
1971	82	77	78	79	86	87	87	88	80	84	84	88	83
1972	84	79	82	80	86	88	84	81	79	78	83	82	82
1973	78	76	74	75	76	87	86	86	88	84	82	86	82
1974	85	79	79	80	77	84	86	84	84	78	82	80	82
1975	84	78	75	78	82	86	87	87	82	81	82	87	82
1976	84	82	81	84	87	90	86	83	78	74	80	82	82
1977	78	77	76	78	86	86	88	85	82	82	79	80	81
1978	80	77	77	80	89	91	87	90	82	82	84	84	84
1979	80	75	82	83	87	92	88	88	82	82	83	89	84
Ave.	82	78	78	80	84	88	87	86	82	81	83	84	83

RELATIVE HUMIDITY (%) 1500 G.S.T.

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1970	81	73	70	75	76	75	76	75	67	70	76	77	74
1971	76	73	73	72	77	79	76	74	72	74	75	78	75
1972	78	72	76	75	80	77	73	71	69	69	76	74	74
1973	74	68	68	67	72	77	78	75	75	74	76	82	74
1974	77	72	74	74	70	76	76	75	74	70	74	72	74
1975	78	73	71	72	75	78	79	74	73	72	71	81	75
1976	78	77	76	79	80	83	75	70	66	65	72	76	76
1977	72	71	71	72	77	78	75	71	73	74	69	74	73
1978	75	70	71	74	82	80	78	73	71	72	75	76	75
1979	76	69	76	77	78	76	75	72	68	75	75	81	75
Ave.	77	72	73	74	77	78	76	73	71	72	74	77	75

WIND TABULATION

Station: Georgetown, Botanic Garden Lat: 06°48' Long 58°08' Month/Year 1976

Height of anemometer above ground: 66 ft.

Height of anemometer above M.S.L.: 67 ft.

Effective height : 66 ft.

Wind Direction / Speed (knots)	N 050 010	020 040	050 070	E 080 100	110 130	140 160	S 170 190	200 220	230 250	W 260 280	290 310	320 340	Total
0 - 2													7.26
3	.18	.91	1.72	.54	.13	.03	.03	.06	.04	.06	.08	.24	4.02
4 - 6	1.06	6.06	14.74	4.51	1.64	.41	.06	.03	.07	.15	.11	.32	29.16
7 - 10	.54	10.48	25.96	5.22	1.87	.33	.02		.02	.01	.03	.12	44.64
11 - 16	.11	2.47	3.52	5.8	.11	.01							6.80
17 - 21	.01	.05											0.06
22 - 27													
28 - 33													
34 - 40													
41 - 47													
48 - 55													
Total	1.90	19.97	45.94	10.85	3.75	0.78	0.11	0.09	0.13	0.22	0.26	0.68	84.68

Variable	4.42
Observations	96.36
Missing	3.64
Total for the month	100.00

15.4. Water Supply

Water for Houston and Mc Doom is supplied by tapping the mains installed under the road leading from Georgetown to the airport. However, since the head is insufficient, not enough water is supplied for the operation of Mc Doom area. Therefore, a well was drilled several years ago. A four inch pipe has been installed to fill the reservoir which has supplied a plentiful amount of water since its installation.

15.5 Electric Power

Electric power is supplied by Guyana Electric Co. (GEC), which distributes the power to various districts.

There are two electric generator plants (A & B) in Kingston, which also supply power to Georgetown. The power supplied is 8.5 MW and 30 MW respectively. Since the total power consumption exceeds the supply capacity, the power is turned off (load shedding) once a week in preselected districts on a rotation basis.

16. Facility and Equipment Planning

16.1. Wharf

A. Facility Requirement

The required extension length for the new whalf is estimated based on the following assumptions.

(1) Design Vessels

The design vessels for the project are as same as for the 1st and 2nd Phase Construction; i.e. 100 ton shrimp trawler with the following general dimensions:

Overall Length	22.9 m (75 ft)
Beam	6.7 m (22 ft)
Max. Draft	3.0 m (10 ft)

Therefore one berth length is set at 26 m.

(2) Mooring Method

In principle, a maximum of 2 vessels per berth may be moored as is the practice at the existing wharf.

(3) Routine Work-cycle Time

Taking into consideration the actual operational duration of shrimp trawlers, the design routin work-cycle time of the vessels are estimated as shown in Table 16-1.

Table 16-1: Design Work-cycle Time

		Guyana Vessels	Japanese and Other Vessels
Actual Operation	Fishing	21 - 28 DAYS	30 - 35 DAYS
	Moor Rest at DFPC	7 - 10 DAYS	3 - 5 DAYS
Design Cycle Time		$\frac{21+10}{10}$ = 3 cycles	$\frac{30+5}{5}$ = 7 cycles

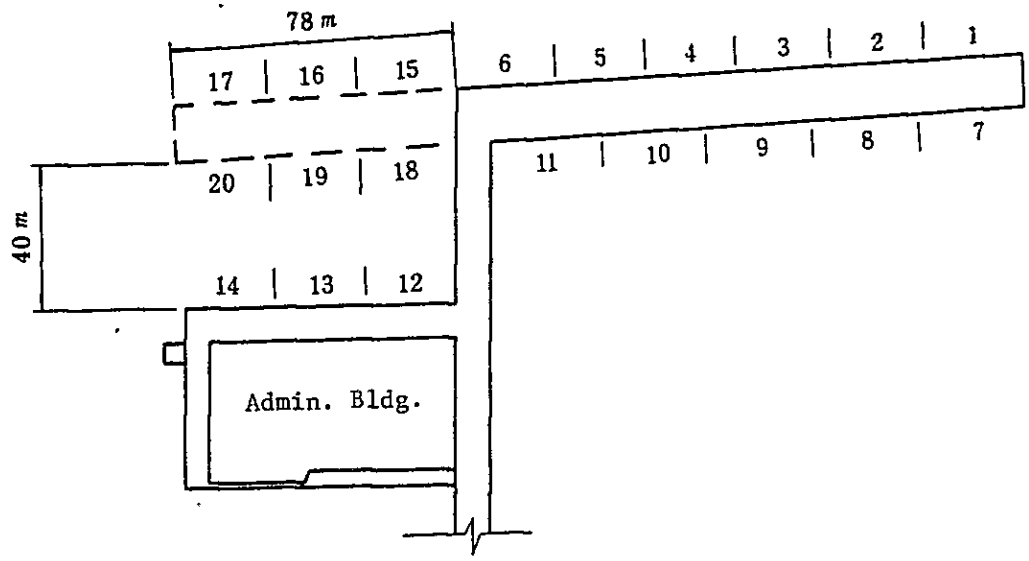
Assuming the number of operating vessels at DFPC as shown in Table 16-2, the required number of berths is estimated as follows under the conditions (2) and (3) mentioned above.

Table 16-2: Required Number of Berths

Item / Time	Country	No. of Vessels	Estimated No. of Vessels to be moored	Calculated No.of berths required	Spare Berths*	Estimated No. of berths required
Present	Guyana	40	40/3 = 14	14/2 = 7		
	Japan & Others	29	29/7 = 4	4/2 = 2		
	Total	69	18	9	3×	12
Future (1985)	Guyana	60	60/3 = 20	20/2 = 10		
	Japan & Others	34	34/7 = 5	5/2 = 3		
	Total	94	25	13	4*	17

Note * No. of Spare Berths ≒ Calcualted No. of Berth x $\frac{30}{100}$

Fig. 16-1: Wharf and Berths



At present there are 14 berths in total as shown in Fig. 16-1. Therefore it is necessary to increase the number of berth to meet the future demand. Considering the narrow open space available between existing wharf at the administration building and the new wharf when it is completed, the number of vessels to be moored at berths No. 12, 13, 14, 18, 19, and 20 would be limited to one per berth in terms of maneuverability as discussed in Section 17 of this Report. Thus, by extending the new wharf 78 m (= 26 m x 3) upstream, it will make available an additional 3 berths on each side and thus DFPC is able to accommodate 34 vessels at one time as follows:

2 vessels/berth x 14 berths + 1 vessel/berth x 6 berths = 34 vessels

This figure is equivalent to 17 required berths obtained previously in Table 16-2 under the assumption that 2 vessels would be moored per berth and that the future demand would be met. The width of the wharf is set at 15 m, the same as the existing one.

B. Structural Design

The structural design conditions for the existing wharf are applied to the new wharf as follows:

(1) Tides

H.H.W.L; + 3.17 m L.W.L; ± 0 m

(2) Wave Action

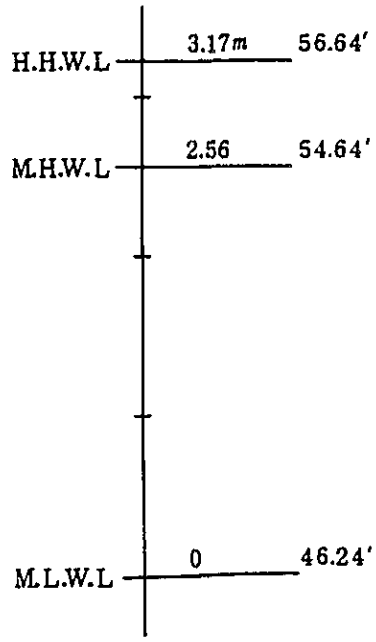
Negligible

(3) Elevation of Wharf

+ 3.90 m

(4) Impact of Vessels

10 ton/Fender Pile



(5) Load

Uniformly Distributed Load 1.22 ton/m^2

(6) Piling (Green heart)

Structural Piles; ϕ = 40 cm (16") at top, 21 m long, 3 m spacing

Fender Piles; ϕ = 40 cm (16") at top, 21 m long, 3 m spacing

(7) Deck

Details of deck arrangement is as shown in Chapter VI of this Report. It shall be noted here that the arrangement of capping is different from that done in the First Phase Construction.

16.2. Workshop on the wharf

The workshop on the wharf is planned as a single story building to be divided into three sections with an area for each section of 48.6 m^2 (540 sq. ft.) or 9.0 m (30') x 5.4 m (18').
The workshop must be well ventilated and provided with a reinforced concrete floor. As equipment for workshop, a half-ton gantry crane is planned to carry heavy equipment into the workshop.

16.3 Slipway

A. Facility Requirement

The current practice of dry-docking frequencies and durations are as follows:

Table 16-3: Frequency and Duration of Dry-Docking

Item / Boat Type	Frequency (Times/YR)	Duration (Days/Dry-Docking)
Steel Boat	2	1/2 - 2
Wooden Boat	2 - 3	1/2 - 3

Assuming that the present dry-docking practice is maintained in future, it is estimated that one slipway will meet the demand at least until about 1985 as shown in Table 16-4.

Table 16-4: Estimates of Dry-Dock Utilization

Boat Type	Ave. D/D Usage Frequency (Times/YR)	Av. Duration (Days/D/D)	No. of Vessels DFPC	Accumulated Duration (Days)
Steel	2	1.25	57	143
Wooden	2.5	1.75	37	365 x 6/7 = 310
			Total	310 DAYS

Note D/D = Dry-Dock

B. Location and Structure

The new slipway site is to be located at the south of the existing Administration Building as shown in Fig. 17-1 for reasons described in Section 17 of this Report.

Details of the structural arrangement are as shown in Chapter VI of this Report.

It will be set the cradle as same as the one at Friendship and GSTCL which has four (4) cars connecting each other, one car has 3 meters length and 7.3 meters width, and has about 15 meters in whole length.

The winch will be equipped infront of the slipway, its capacity is 10 tons with electrical operation.

16.4. Workshop for the Slipway

For the efficient flow of work it is better to locate the workshop at the side of the slipway. The workshop for slipway is planned as a single story building to be divided into two sections: one for welding and the other for painting equipment. The planned area of each section is 56.7 m^2 (630 sq. ft.) or 9.0 m (30') x 6.3 m (21'), and the height is 3.3 m (11'). This workshop, like the one on wharf, must be well ventilated and have a reinforced concrete floor.

It is best to locate the work yard in front of the workshop from the point of view of work efficiency.

16.5 Cold Storage Facilities in the Mc Doom Area

A. Product and Quantity to be Handled

(1) Only sea foods are to be handled with a yearly throughout of 11,000 tons: 20% of which is fresh fish and 80% is shrimp for processing.

(2) Daily landing amounts are estimated at approx. 30 tons. The ultimate amounts handled will be approx. 60 tons per day, of which 10 tons is for marketing after processing and 50 tons to be stored in cold storage.

B. Capacity of Cold Storage

The capacities of cold storage facilities is planned to be suitable for storing 50 tons of processed fish for two weeks. The necessary capacity converted to raw fish is 50 t/day times 14 days which totals to 700 tons. The unit capacity for cold storage is 0.4 tons per cubic meter. Consequently the size of cold storage facilities required for 700 tons of raw fish will be 1750 m^3 or nearly 1800 m^3.

C. Cold Storage Facilities

Cold Storage Facilities shall be of prefabricated panel systems which have high efficiency for insulation and vapor barrier, and have the property for easy to handle at site.

The goods to be stored will be palletised (4' x 4') and be conveyed by forklift. Considering that the palletised goods will be stored on three stacks and the cold air will flow above goods, the height of the cold storage is decided at about 4.5 meters. The planned area is about 30 m x 15 m, and it is divided into two sections which are able to pass through each other.

As it is many rains at site the canopy will be constructed to prevent the cold storage from the rainfall.

The leakage of water causes to decline the insulation efficiency.

D. Refrigeration Requirements

The refrigerator equipment installed shall be highly reliable and easy to maintain.

(1) Compressor

The compressor shall be a reciprocating type. One spare unit shall be provided.

(2) Refrigerants

From the standpoint of ease of procurement and relatively low cost, ammonia shall be used.

(3) Refrigeration system

Closed circuit.

(4) Condenser

Evaporating type.

(5) Defrost system

Water type.

16.6 Fence and Gate

As the location of the slipway and its associated workshop has been shifted from the downstream-side to upstream-side of the existing administration and storage building, the location and length of fences have been altered.

The planned length of fences is some 260 meters and the height is some 2 meters. The fence will be made by painted steel pipe stud with concrete foundation and painted steel net, and the gate will be installed as a part of the fence on the situation of connecting road.

16.7 Facility Equipment

Design Policy

It is available to be easy to maintain and simple to handle, in consideration of the harmony with the existing equipment.

The machines to be installed will be much in free maintenance and the spare parts will be set to the main machines.

16.7.1 Electrical Equipment

A. Electric Power Supply

(1) Houston District

Existing power is supplied from a transformer bank consisting of 3 transformers installed atop distribution line poles near the threshold of the building where feeder lines are brought into an Electric Room build upon the landing wharf,Electric Power in turn is distributed to various after buildings within the premises.

The voltage and ratings of the transformers are as follows:

- 400 V System
  112 KVA, 415 V 1 unit
- 200 V system
  100 KVA, 220 V 1 unit
  50 KVA, 220 V 1 unit

Although two additional workshop are to be constructed for the 3rd phase project, it is considered that the existing transformers are large enough to provide additional power to the new facilities. (Refer APPENDIX - 1)

(2) Mc Doom District

There are two 1000 KVA transformers provided for the existing shrimp processing, refrigeration and cold storage which at present use almost the maximum capacity of the transformers. It is the intention of the Guyana Government to separately operate and maintain the needly installed cold storage facilities under the 3rd phase project. This in turn will require a separate power supply system with a transformer installed near the site. The following transformer ratings shall be used for installation by the Guyana Government.

Voltage - 3ϕ 4W 415V 60HZ

Rating - 250KVA

B. Emergency Generators

Stand-by emergency generator shall be provided to supply electric power to the administration building, the repair shops, the cold storage facilities and to other necessary installations in case of a power failure so as not to interrupt the operation of the DFPC.
In case of power failure, the engine shall start and supply power automatically to the necessary facilities.
When power is restored, the engine shall be stopped manually.
The engine should also be able to be started manually, if necessary.

The installation of the emergency generators is mentioned below. The ratings of the generators are as given in the APPENDIX-2 "Rating calculation sheet for Generators".

(1) Houston District

Electric power shall be supplied to the administration building, the workshop, and to the winch motors in the Houston district

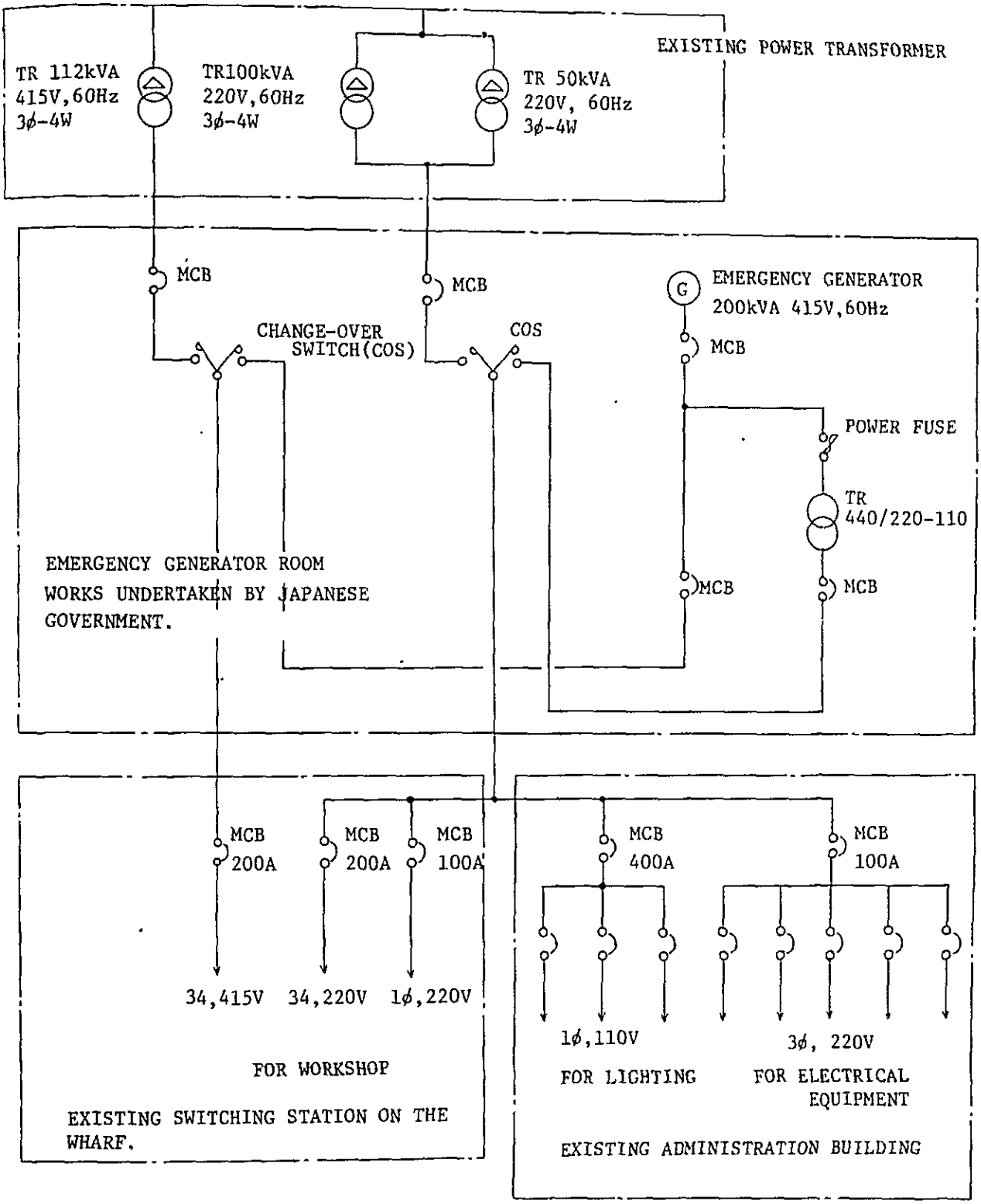
Rating: 200KVA 415V 1 unit

(2) Mc Doom District

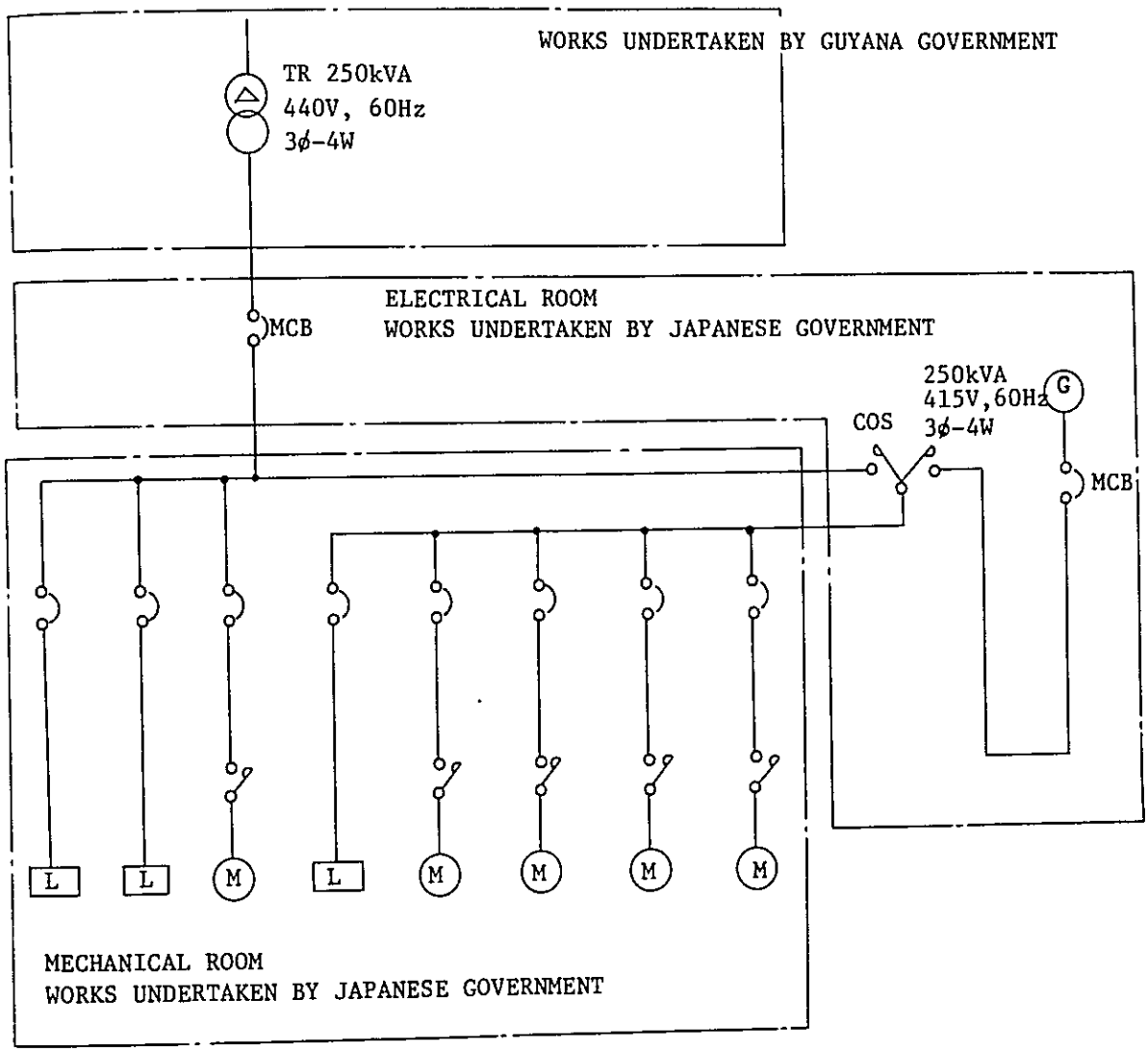
Electric power supply to the cold storage facilities in the Mc Doom district

Rating: 250KVA 415V 1 unit

OUTLINE OF ELECTRIC POWER SUPPLY SYSTEM (HOUSTON DISTRICT)



OUTLINE OF ELECTRIC POWER SUPPLY SYSTEM (MC DOOM DISTRICT)



16.7.2 Water Supply & Drainage System

A. Fresh Water Supply System

For the Houston district, water is supplied by topping off from the branch lines provided by 1st and 2nd phase project. which in turn is topped on to the main city supply.

For Mc Doom district, water supply shall be taken from the existing reservoir (capacity approx. 200 M^3) installed in the premises. The reservoir is supplied from the main city water mains and well water.

B. Drainage System

Storm & soiled water is drained direct to the river for buildings built on the landing wharves.

Seepage system is used for the storm drains for buildings constructed on land, while the soiled water drain is connected to existing septic tank.

17. Layout Planning

17.1 Houston District

The original layout plan (designated as Plan-I) requested by the Guyana Government and the proposed development plan (designated as Plan-II) agreed upon under the Minutes of Meeting for the Houston District are illustrated in fig. 17-1.

The differences seen from Fig. 17-1 between Plan-I and Plan-II are itemized as follows:

1) The proposed wharf extension is shorter

2) The location of the slipway and its associated workshop has been shifted from the downstream-side to upstream-side of the existing administration and storage building.

3) According to 2) above, the location and length of fences have been altered.

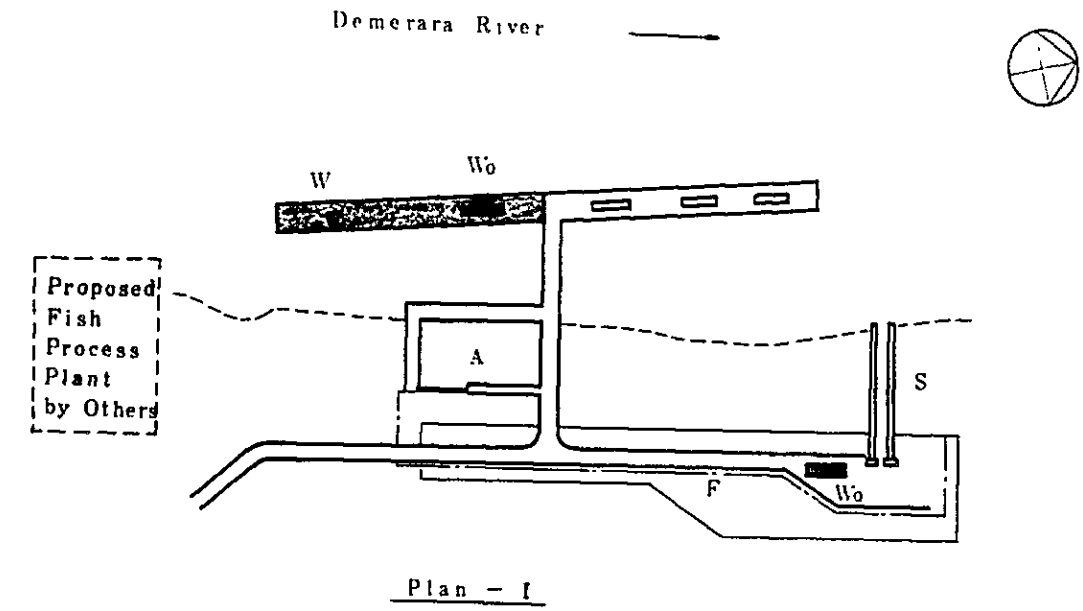
4) The location of the Generator Set has been identified in the plan.

The reasons and background for these concept changes are described by item respectively below:

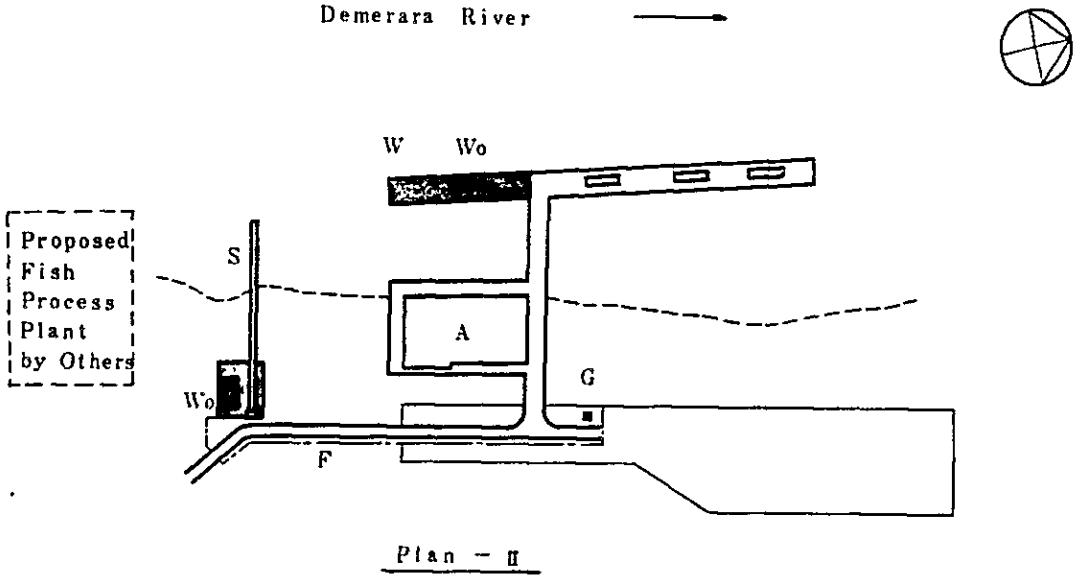
1) Proposed Wharf Extension to be Shorter

The length of the wharf extension in Plan-I was 156 m to accommodate 5 - 6 berths on each side of the new wharf to form symmetrical arms in relation to the existing access wharf. This concept is derived from the CANPLAN's plan which aimed to accommodate 200 shrimp trawlers. In Plan-II, the proposed extension of wharf is 78 m in length, a half of that of Plan-I for reasons as follows:

- Considering the total number of boats operating at DFPC (some 100 boats in 1985) and their cycle of operation (duration of fishing at sea and resting at DFPC, etc.), an



Plan – I



Plan – II

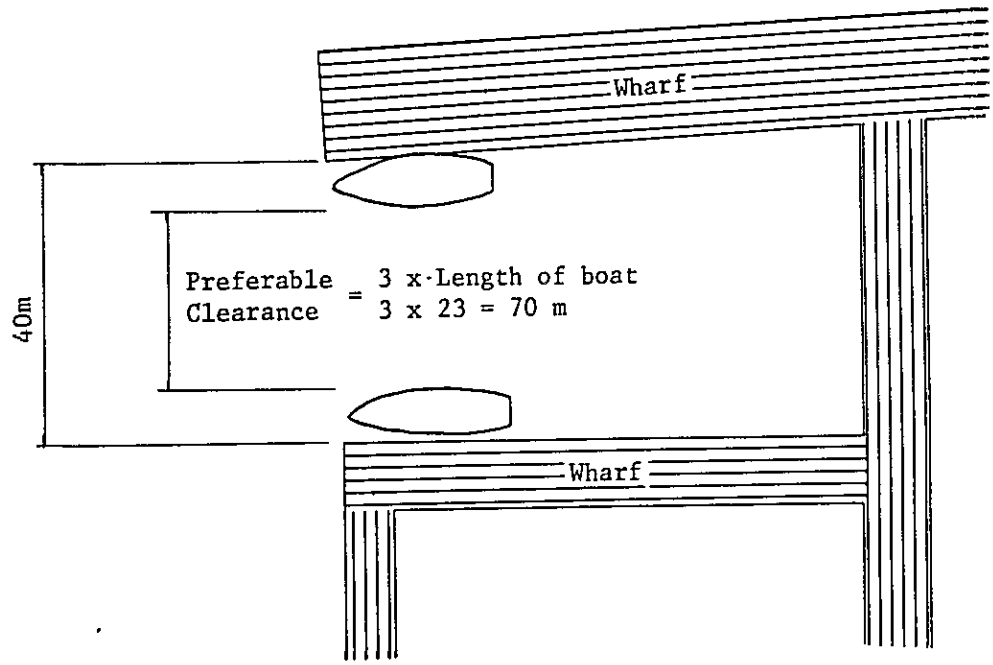
A : Administration building (Existing)
S : Slipway
F : Fence
W : Wharf
G : Proposed Fish Processing Plant by others
Wo: Workshop

Fig. 17-1 Comparison of Layout Plans at Houston District

increment of 3-berths on each side of the wharf is considered to be sufficient. (For details, refer Section 16.1 of this Report)

- Horizontal clearance between wharves, one at the existing Administration Building and the other at the new extension is only 40 meters. Normally when two berths are facing parallel to each other, it is preferable to provide a clearance of 3 boat lengths (about 70 m) for easy manuering of boats as illustrated in Fig. 17-2.

Fig. 17-2 Maneuvering Space for Parallel Berths



Thus, the open space between two wharves in Plan-II is insufficient, however, the opinions of Captains confirmed that even with this limited space they would be able to manuever their vessels if the number of vessels to be moored would be limited to one per berth.

- As shown by dotted line in Plan-II, there is a plan to establish a fish process plant. Therefore it is preferable to reserve more open space in this area.

2) Relocation of Slipway and Its Associated Workshop

The original location of the proposed slipway & its associated workshop was to be at the far end of the wharf, downstream from GFL's property.

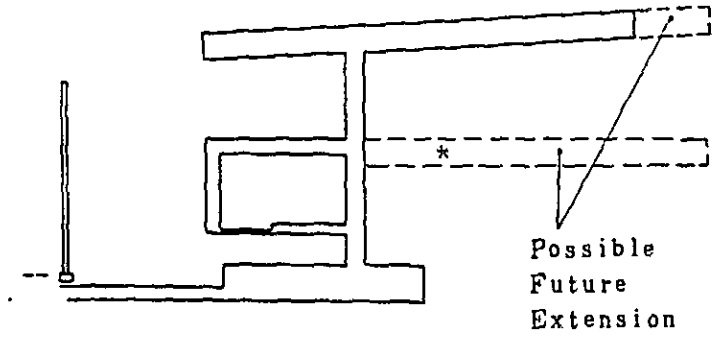
This location is considered to be optimal from the point of view of the ultimate layout plan of the facilities within the available property of the GFL since it does not interrupt the shoreline or other land use plans of the DFPC.

However, it was found that construction of the access road over the existing swamp along the bank to connect the administration building and the proposed slipway would be very costly and beyond the means of the Guyana Government to bear (about G$5,400,000 by filling excluding sheet piles or about G$400,000 by constructing a narrow bridge road of the wharf-type, i.e. wood piles & boards).

Thus, an alternative location was sought and found at the site as shown in Plan-II. The selected site may limit the flexibility of future development of the DFPC as compared to the original location, but it has the greater advantages of reducing the investment cost and grouping the maintenance areas which will allow easy access between them and to the centralized management.

Although the need for extending the wharf beyond that currently proposed in Plan-II is not foreseen in the near future due to the difficulty of obtaining vessels and trained crews, the wharf could be extended parallel to the existing wharf (as shown in Fig. 17-3) when the need arises for one reason or another.

Fig. 17-3: Possible Extension of Wharf



* Note: More space between sharfs may be provided by dredging and shifting new wharf towards shore.

3) Rearrangement of Fencing

Mainly due to the relocation of the slipway, the fence alignment is to altered accordingly.

4) Location of the Generator Set

The location of the generator set was not identified in the Plan-I. As it is discussed in detail in Section 16. of this Report, it is considered appropriate to allocate one emergency generator set of approximately 200 KVA for DFPC.

17.2 Mc Doom District

The original layout plan at Mc Doom District (designated as Plan-III) requested by the Guyana Government along with its proposed development plan (designated as Plan-IV) agreed upon in the Minutes of Meeting are illustrated in Fig. 17-4. It includes the following:

1) Location of the cold storage

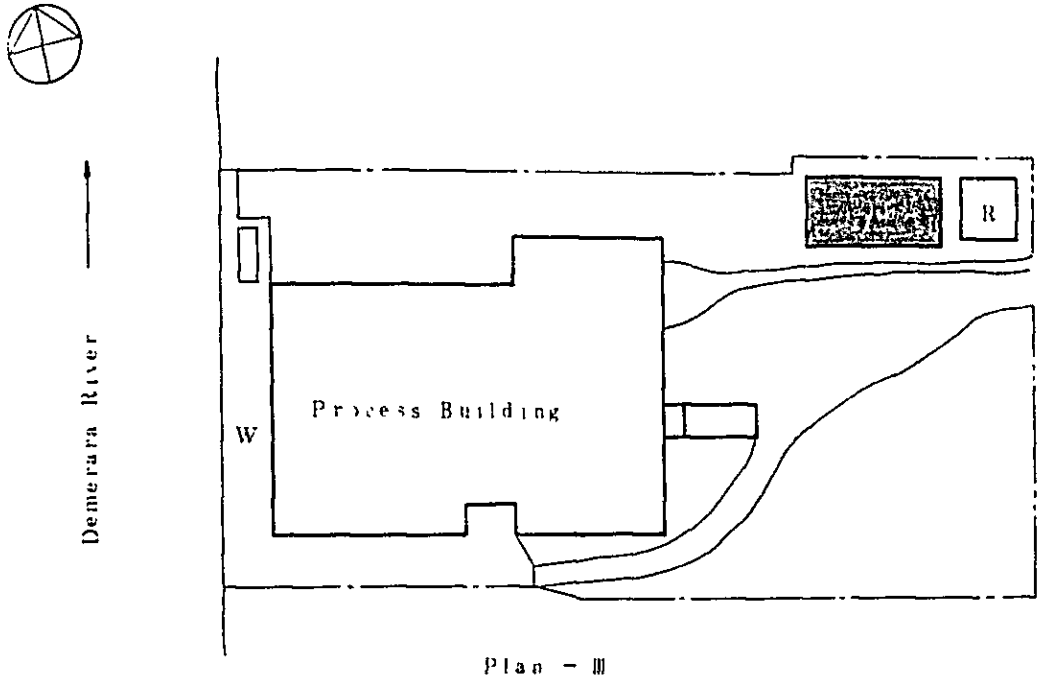
2) Location of the generator set

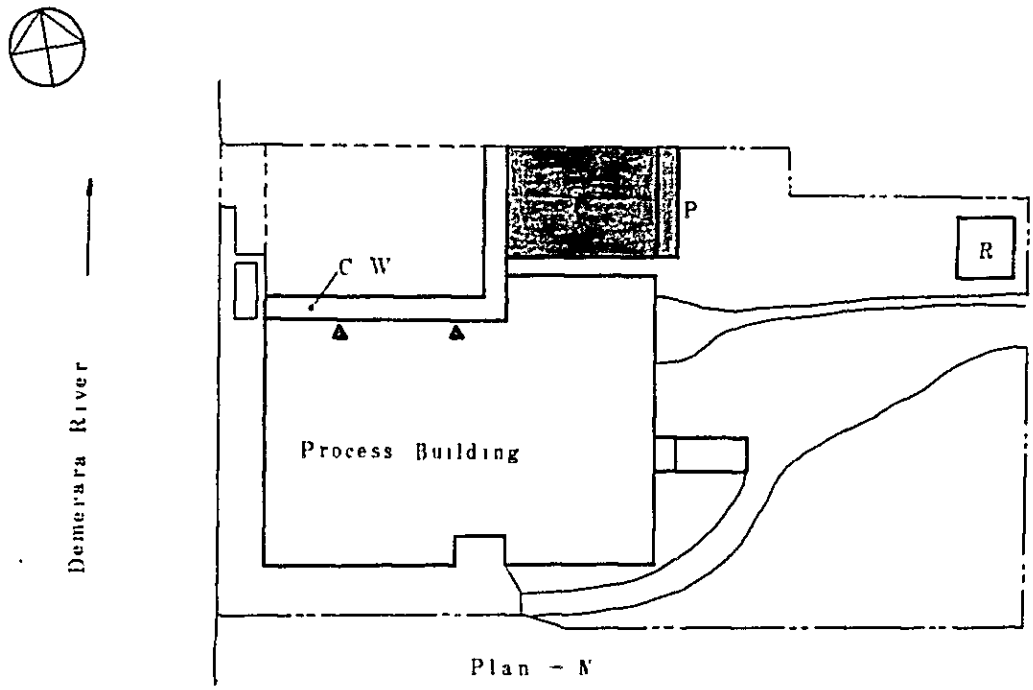
In Fig. 17-4, the location of the proposed new cold storage is to be shifted closer to the shore of the Demerara River to align with the existing building. By this arrangement, Plan-IV may cost a little more than Plan-III since it will require more piling over the water section and for the construction of a narrow access between the existing wharf and the new cold storage. (It should be noted here that the size of the cold storage in Plan-III was not based on demand, but rather on the availability of flat area.) Nonetheless, the proposed arrangements have definite advantages over the original layout as follows:

i) Shorter access to and from existing unloading wharf which means more efficient and less expensive operation

ii) Provision of an integrated functional fishery system by extending existing wharf and establishing process plant in between this new wharf and the new cold storage, in the future.

iii) The site where the cold storage was proposed originally can now be reserved for vehicle parking or other purposes in future.





C : Cold storage R : Reservoir

P : Platform W : Wharf

C/W : Connecting Wharf

Fig. 17-4 Comparison of Layout Plans at Mc Doom District

18. Planning of Machines for Workshop

The machines to be installed in workshop for the repair and maintenance of shrimp trawlers and its appertaining equipment are planned to meet the satisfactory operation of DFPC.

They may be roughly classified as follows:

A. Conveyance Machine

B. Machine Tool

C. Welding Machine, others

Machine List

A. Conveyance Machine

Code	Item	Quantity
A-1	Diesel fork lift	1
A-2	Over head crane	1
A-3	Hydraulic floor crane	1
A-4	Chain hoist	2

B. Machine Tool

Code	Item	Quantity
B-1	Machine lathe	2
B-2	Milling machine	1
B-3	Shaper (or planer)	1
B-4	Drill press	1
B-5	Power hack saw	1
B-6	Hydraulic press	1

C. Welding Machine, Others

Code	Item	Quantity
C-1	Welding transformer	4
C-2	Diesel welding machine	2
C-3	Oxy-acetylene burning machine	3

V. SCOPE OF WORK

19. Scope of Work

The Survey Team has decided the facilities and the scope of work between the Government of Guyana, as follows:

19.1. Responsibility of the Government of Japan (upon approval of Grant Aid).

1) To finance detailed designing and supervision of the construction.
2) To finance construction and supply of materials and equipment for the items listed below.

(i) Wharf and Fender Piles
(ii) Workshop on the Wharf
(iii) Slipway including Cradle and Winch
(iv) Workshop for Slipway
(v) Cold Storage Facilities (approx. capacity 700 tons)
(vi) Equipment for two workshops
(vii) Fence
(viii) Gate
(ix) Generator sets

19.2. Responsibility of the Government of Guyana

(i) To secure land suitable for the execution of the Project;
(ii) To clear and level the site as required prior to the commencement of the Project implementation;
(iii) To provide data and information necessary to execute the Project;
(iv) To provide necessary utility supplies to the site as required;
(v) To provide drainage and other incidental facilities outside the site;
(vi) To ensure prompt unloading and customs clearance at disembarkation ports in Guyana for the products purchased under the Grant;
(vii) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Guyana with respect to the supply of the products and services under the Contracts to be executed at a later stage.

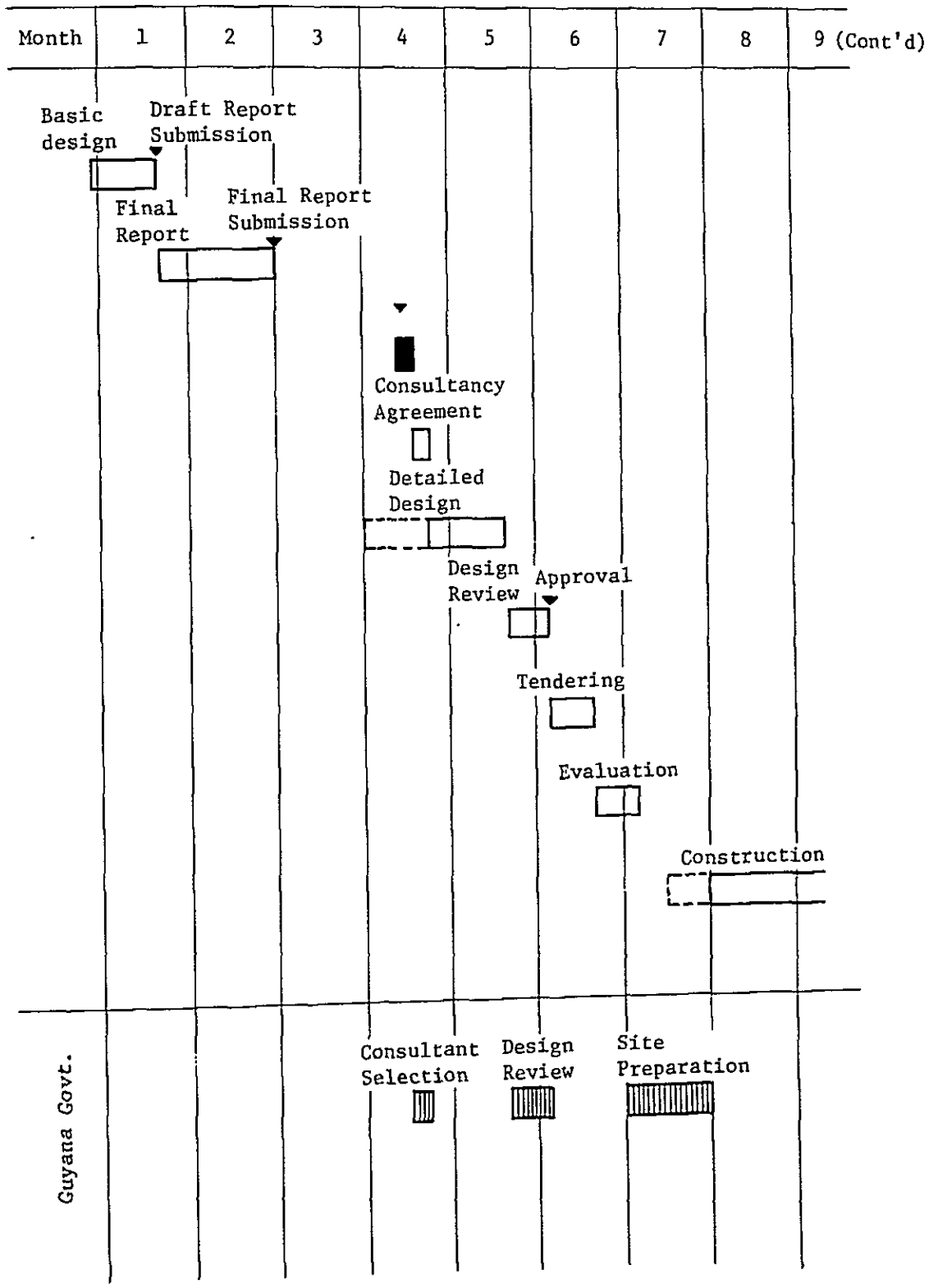
(viii) To accord Japanese nationals, whose services may be required in connection with the supply of products and services under the Contracts to be executed at a later stage, such facilities as may be necessary for their entry into Guyana and stay therein for the performance of their work;

(ix) To ensure that the Demerara Fish Port Complex be maintained and used properly and effectively for fisheries activities in Guyana;

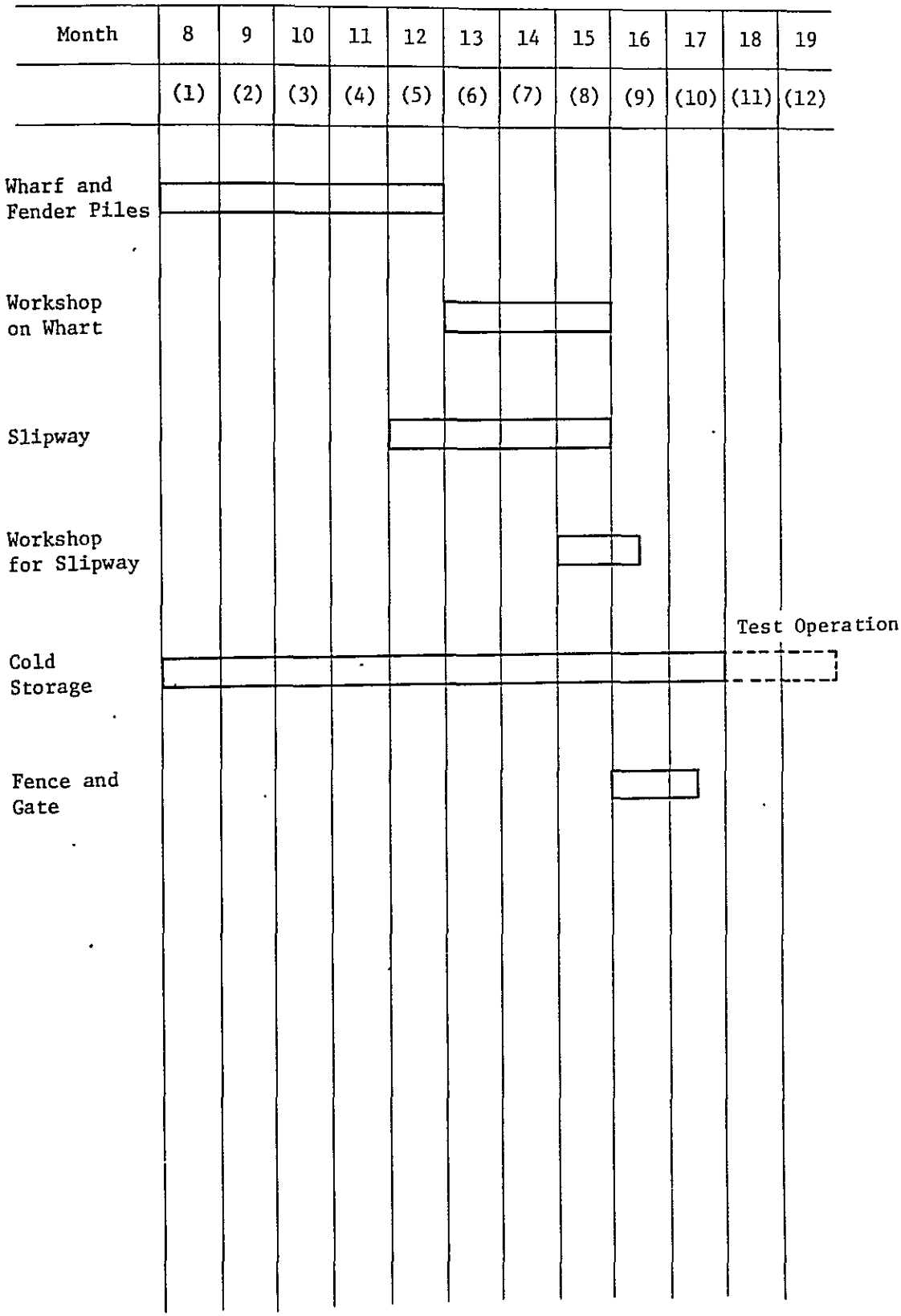
(x) To bear all expenses, other than those to be borne by the Grant, necessary for the execution of the Project;

20. Construction Schedule

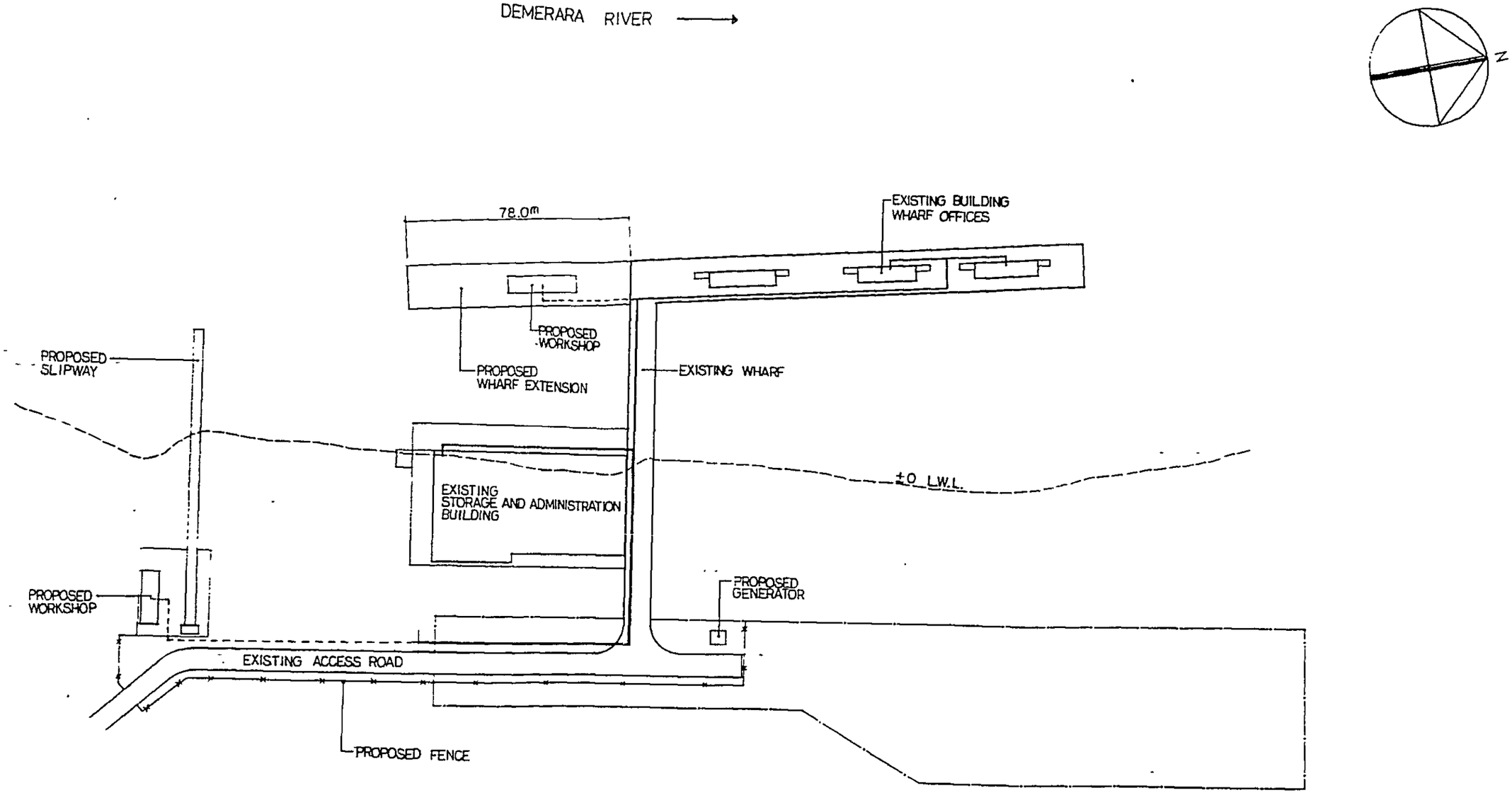
20-1. Overall Schedule Prior to Construction



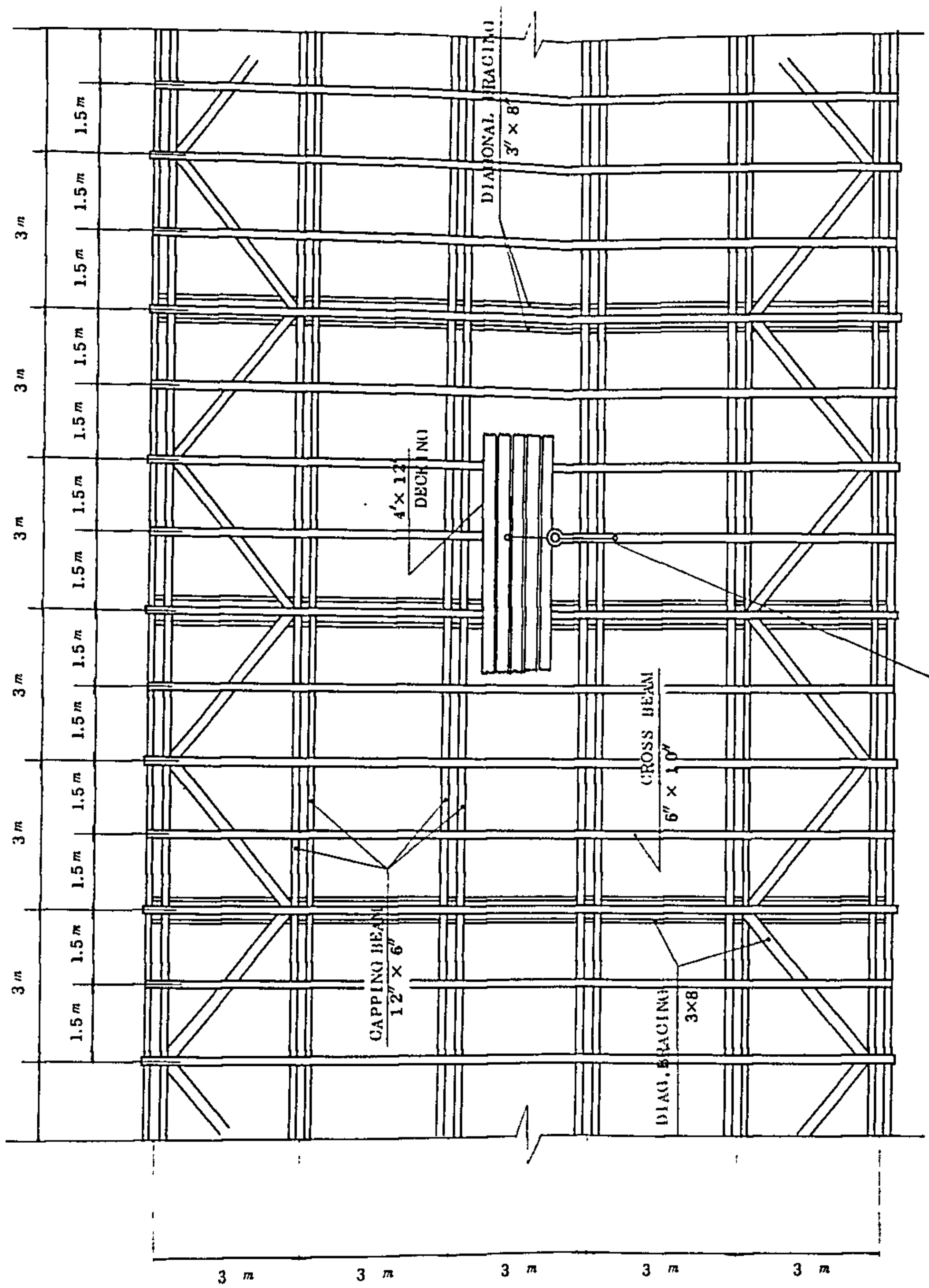
20-2: Construction Schedule

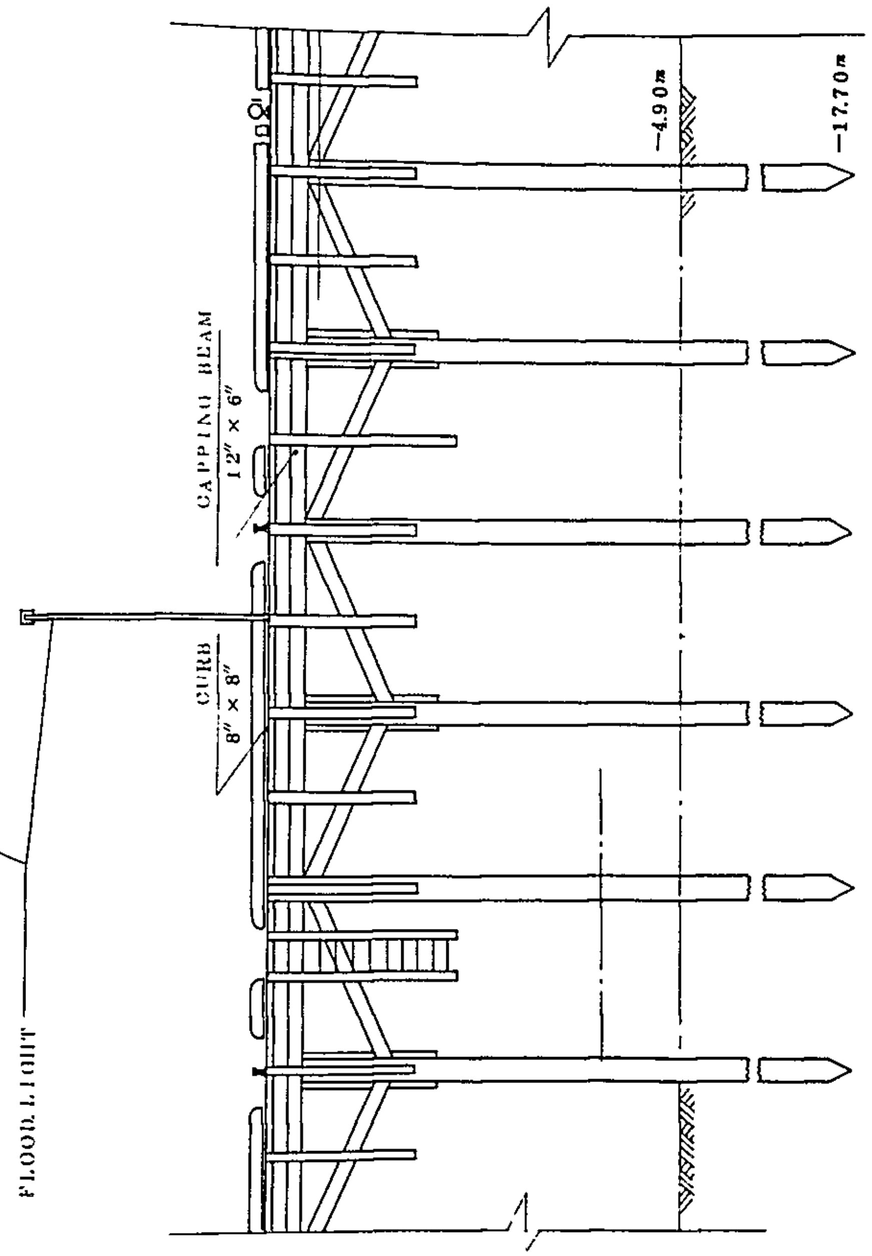


DRAWING OF BASIC DESIGN



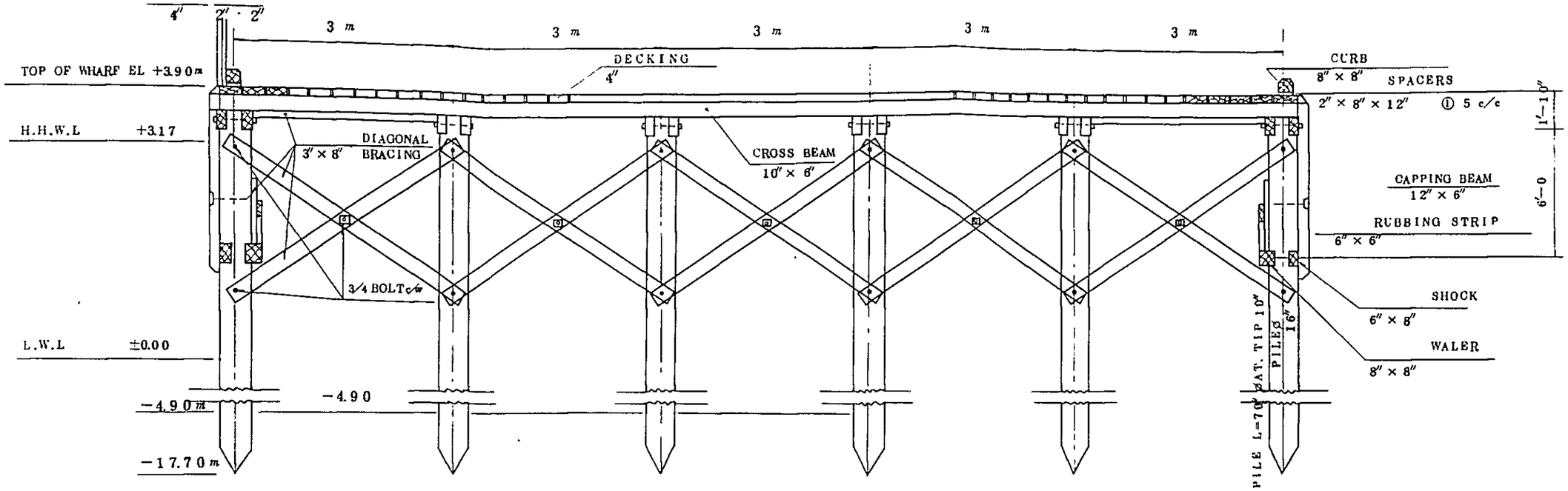
SITE PLAN
at Houston District
DEMERARA FISH PORT COMPLEX

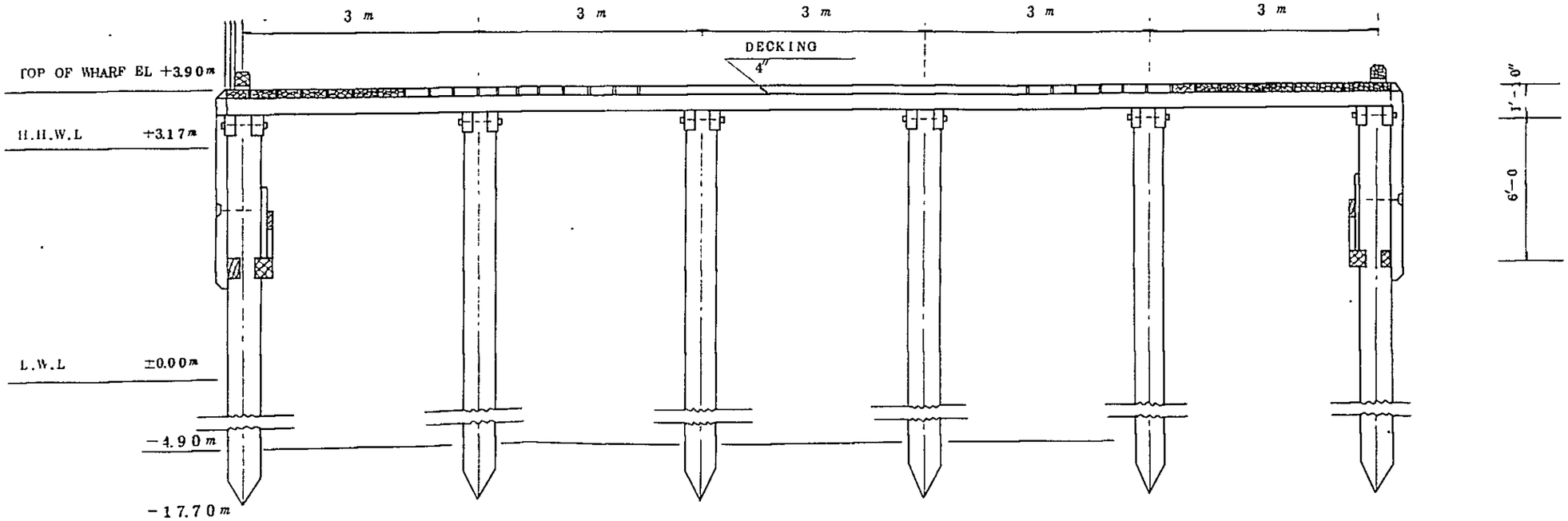




WHARF(I)

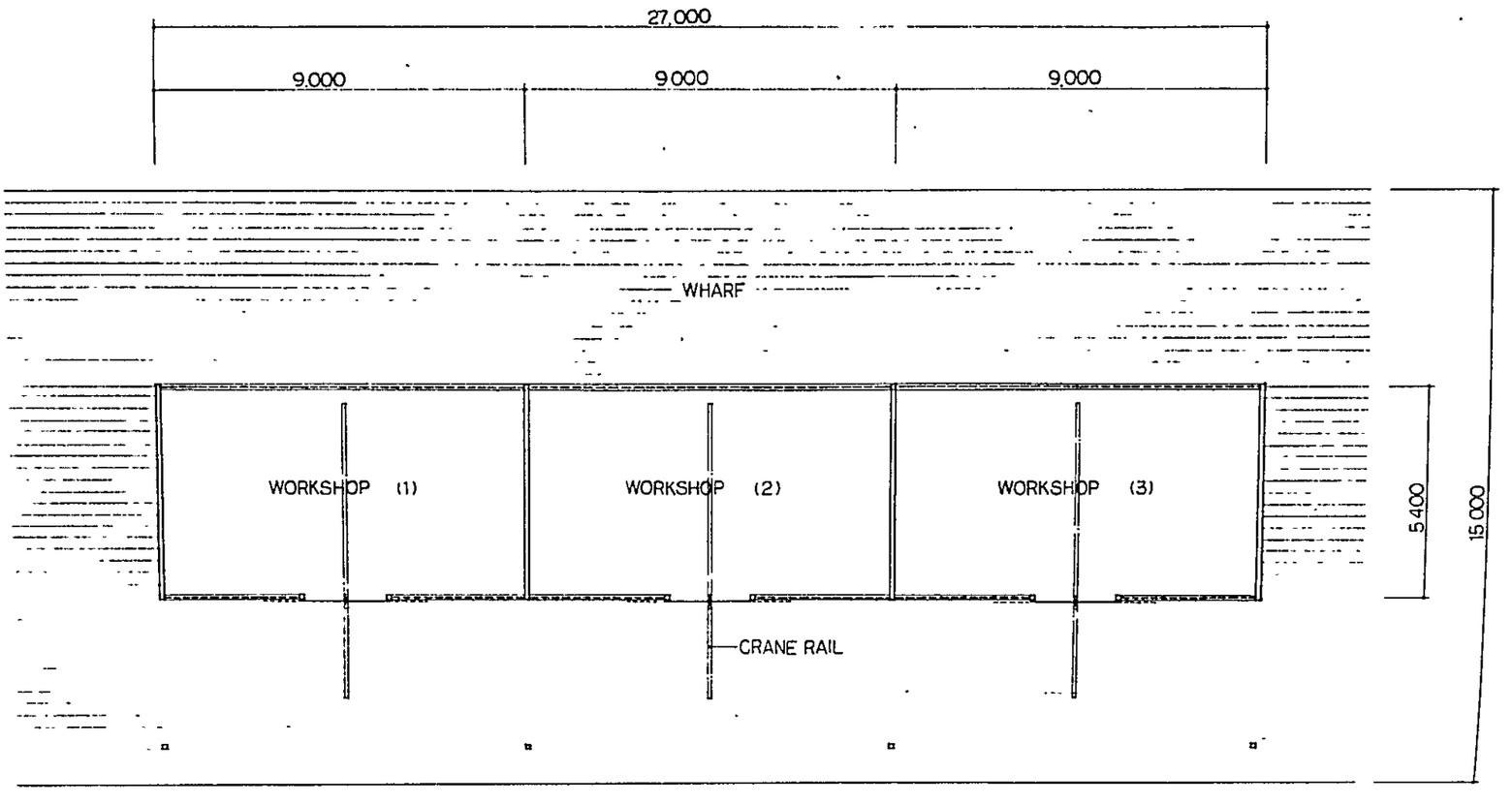
DEMERARA FISH PORT COMPLEX 2



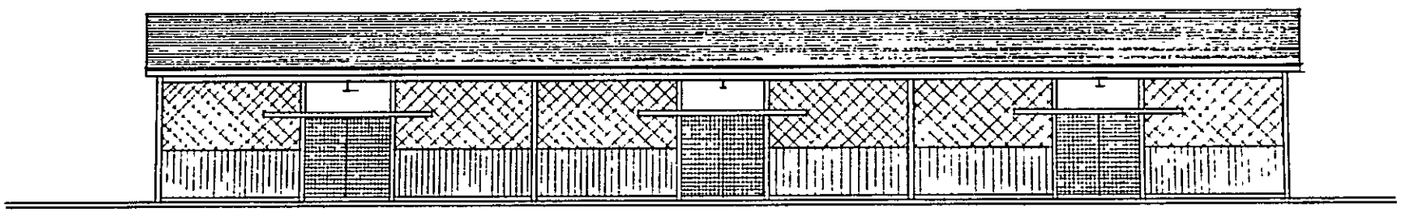


WHARF (II)

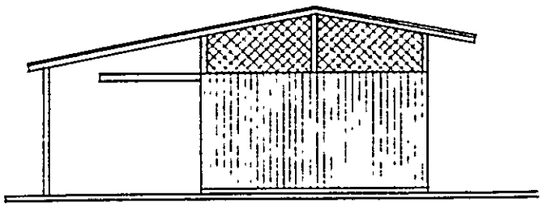
DEMERARA FISH PORT COMPLEX 3



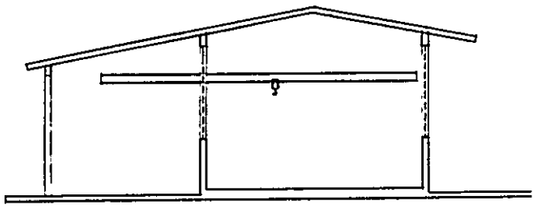
PLAN



ELEVATION

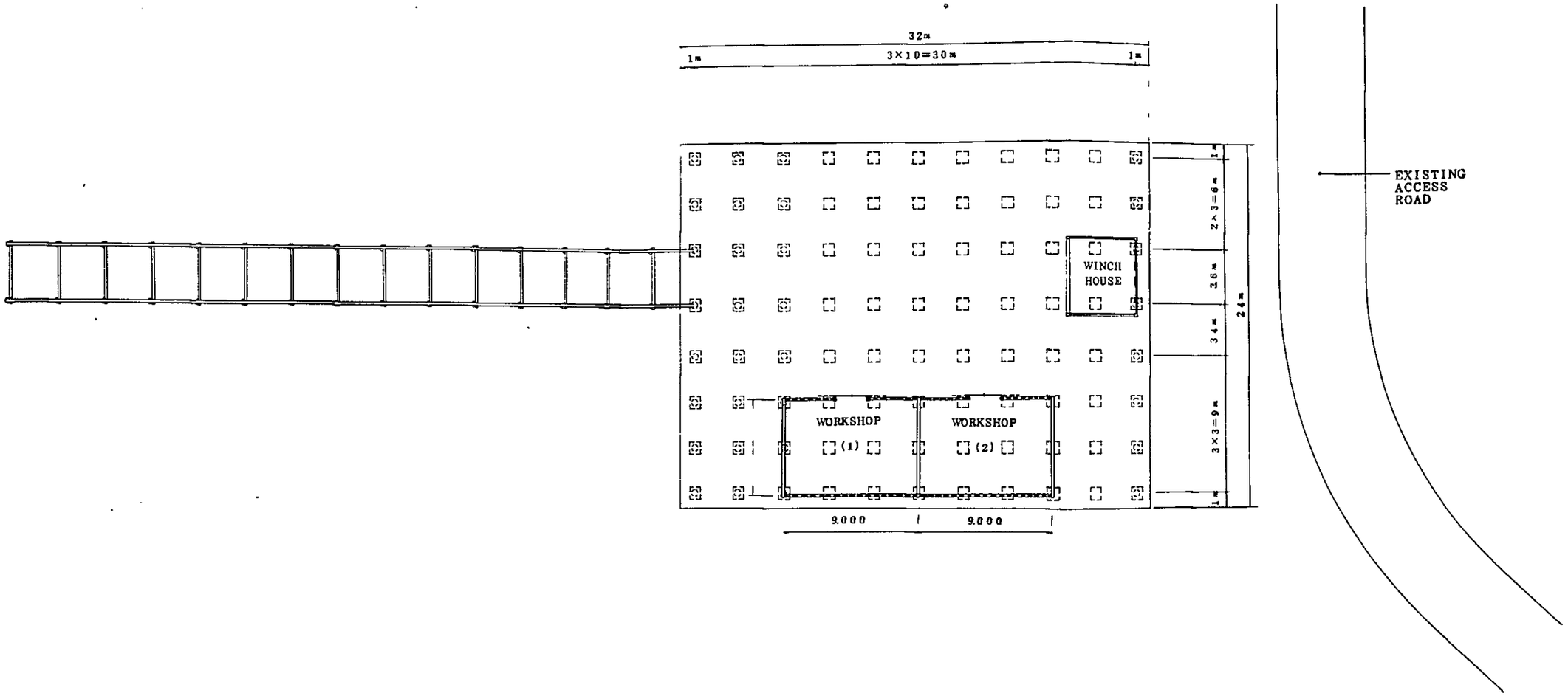


ELEVATION



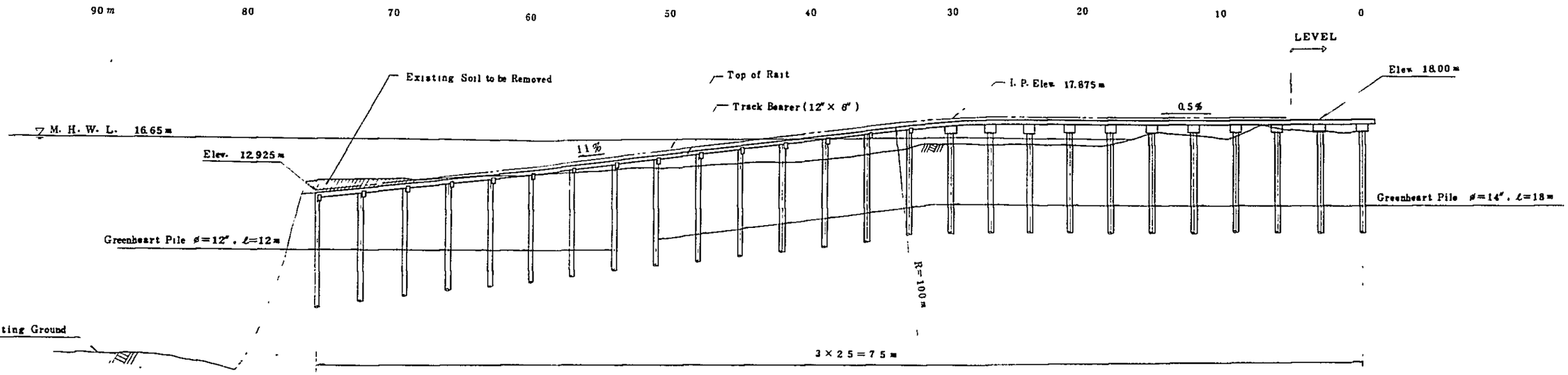
SECTION

WORKSHOP ON WHARF
DEMERARA FISH PORT COMPLEX 4



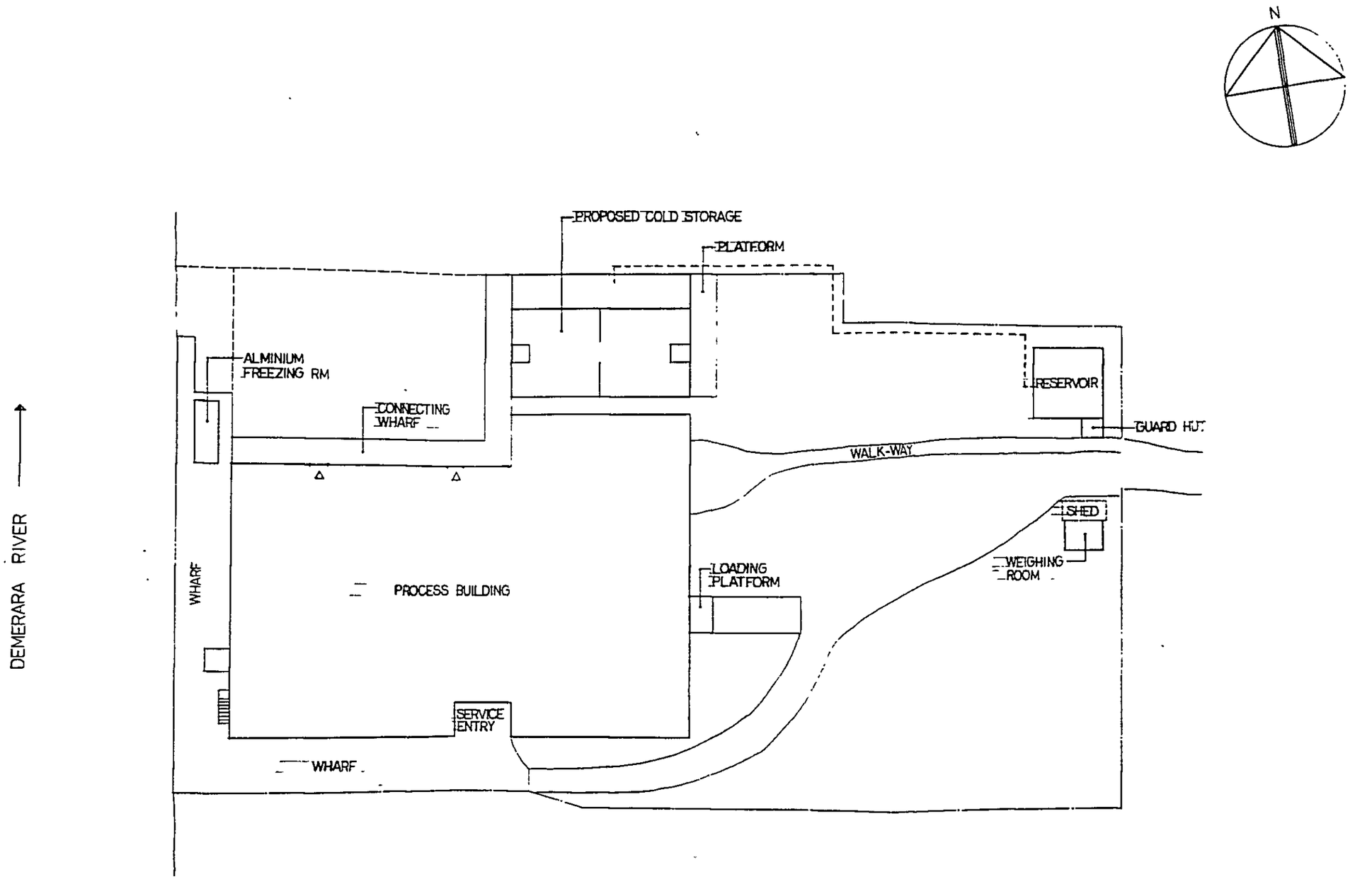
SLIPWAY (I)

DEMERARA FISH PORT COMPLEX 5

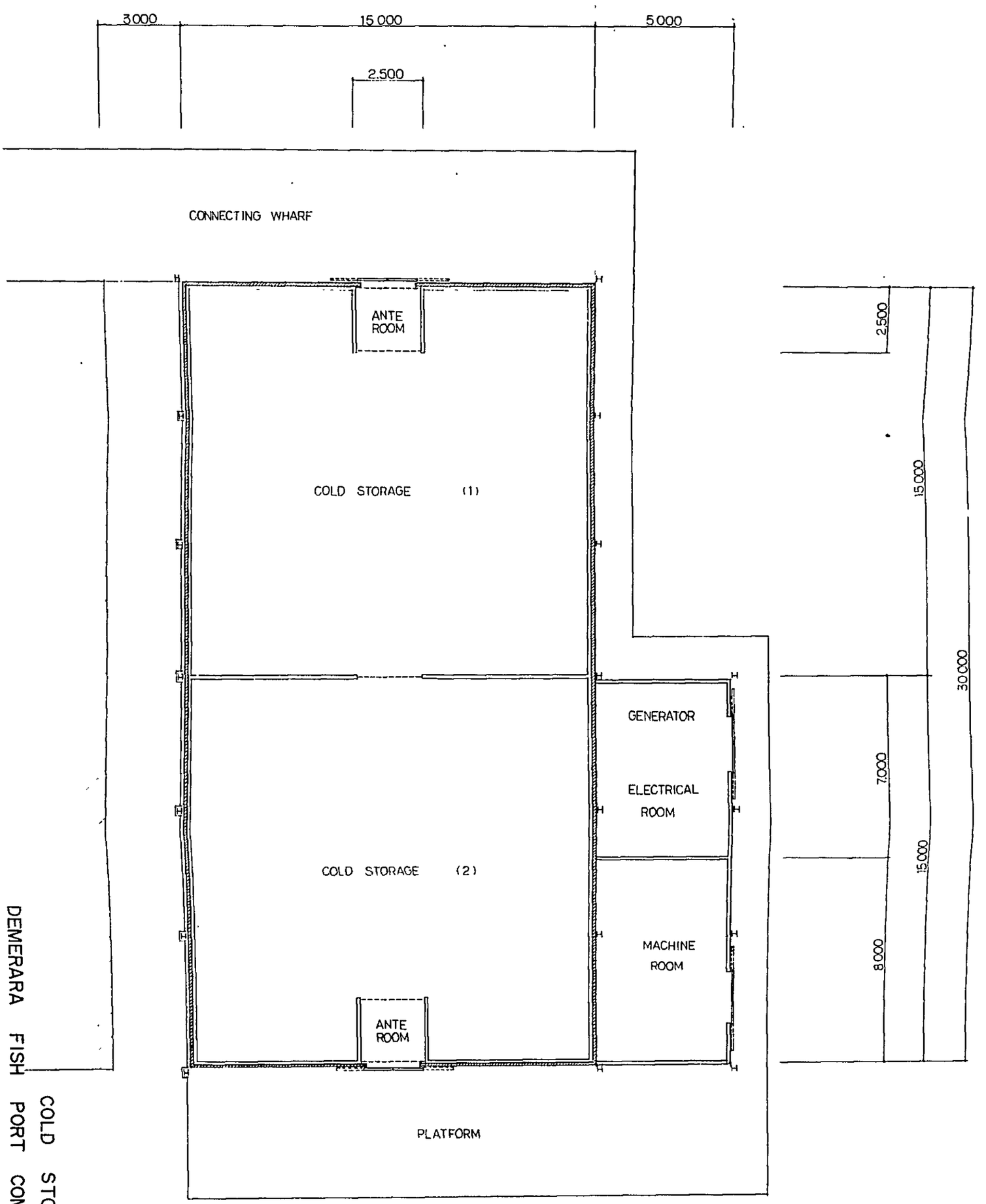


SLIPWAY(II)

DEMERARA FISH PORT COMPLEX 6

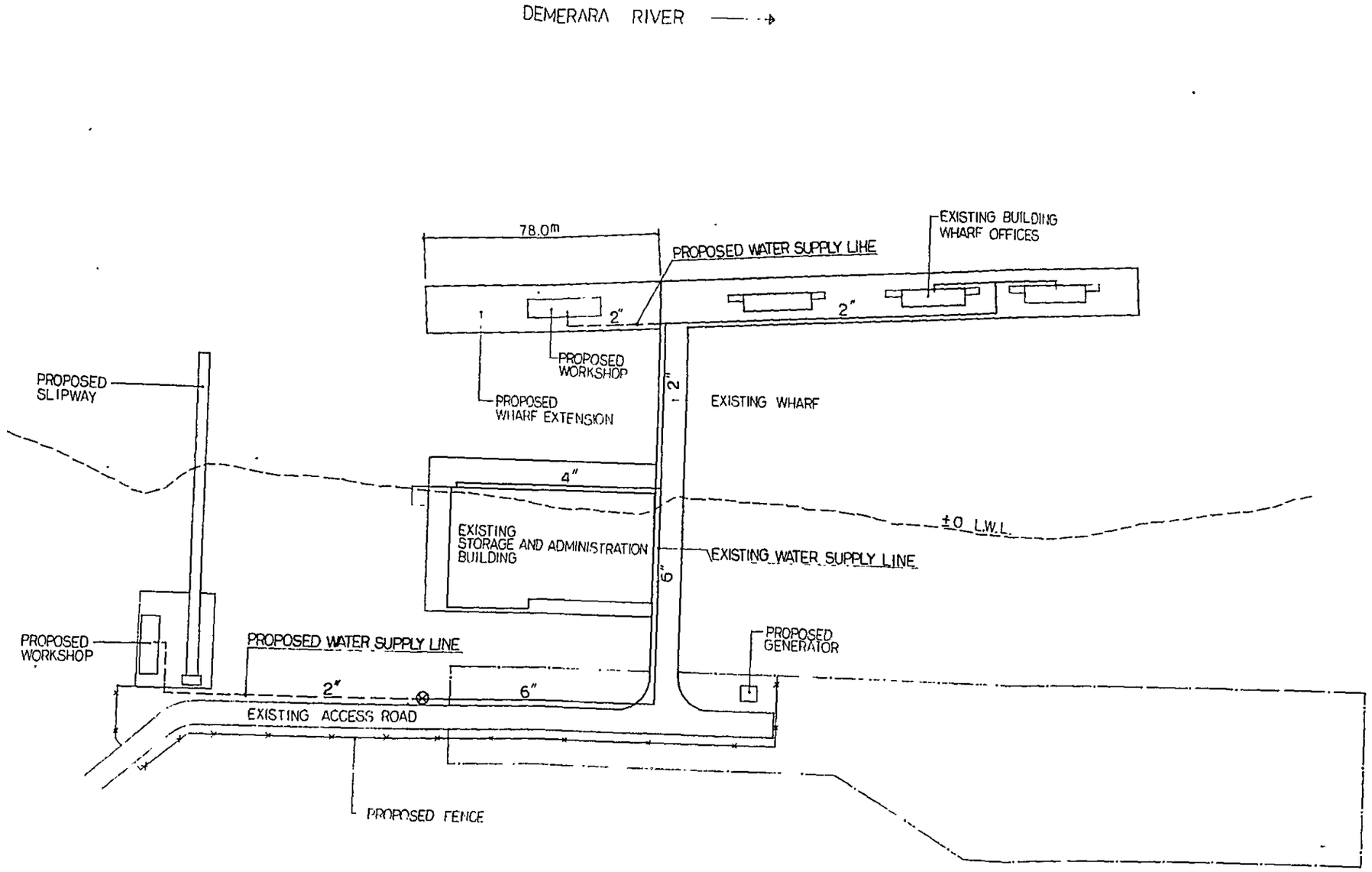


SITE PLAN
at Mc Doom District
DEMERARA FISH PORT COMPLEX 7

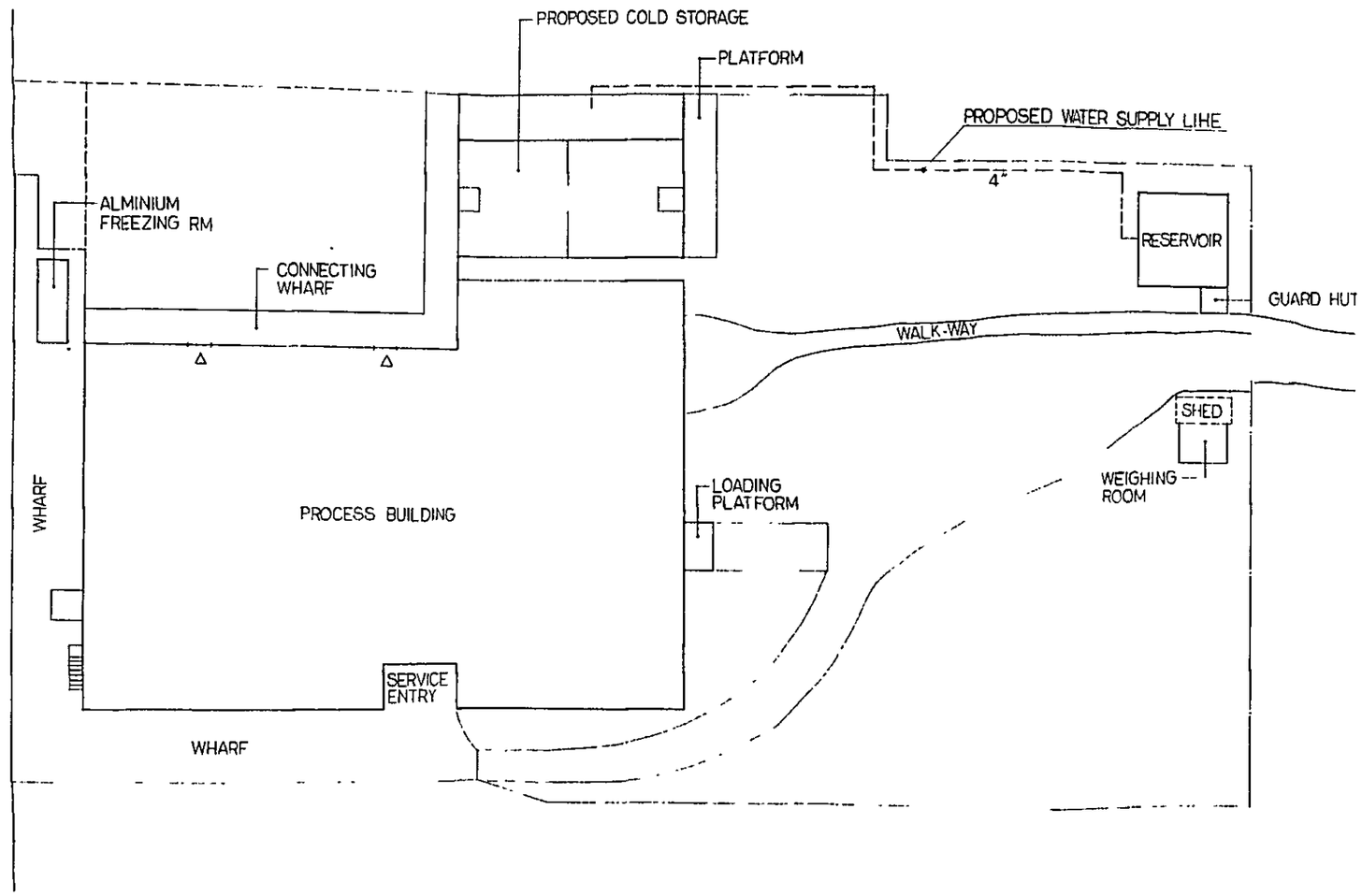


PLAN

COLD STORAGE
DEMERARA FISH PORT COMPLEX
8



WATER SUPPLY PLAN
at Houston District
DEMERARA FISH PORT COMPLEX 9



WATER SUPPLY PLAN
at Mc Doom District
DEMERARA FISH PORT COMPLEX 10

A P P E N D I X

APPENDIX - 1

Power Consumption of Houston District

	Name of Load	Power Consumption (kw)	Remarks
1.	Office Building	44.85 kw	Power Consumption of existing facilities.
	O Office	(13.34)	
	Electric Shop	(15.53)	
	Nichimo Shop	(3.74)	
	Store	(1.04)	
	Carpenter Shop	(1.38)	
	Net Shop and Security	(3.92)	
	Transport Work Shop	(5.90)	
2.	Work Shop (on the Wharf)	74.3 kw	Power Consumption of existing facilities
	No. 1 Work Shop	(26.1)	
	No. 2 Work Shop	(4.2)	
	No. 3 Work Shop	(44.0)	
		Sub-total 119.15 kw	
3.	Work Shop (on the Wharf)	30.0 kw (Estimate)	3rd Phase Project
4.	Work Shop (Slip way side)	30.0 kw (Estimate)	3rd Phase Project
		Sub-total 60.0 kw	
		Grand Total 179.15 kw	

Note : Datas of existing Power Consumption are informed from GFL.

APPENDIX - 2

Rating Calculation Sheet for Emergency Generator

1. Houston District

A. Load List

Refer APPENDIX - 1.

B. Calculation

Calculation formula is as follows:

Generator capacity (kvA)

= Total load (kw) x Demand factor/Total efficiency x Power factor.

∴ Generator capacity (kvA) = 179.15 kw x 0.65/0.64 (0.8 x 0.8)

≒ 182 kvA

Generator capacity to be chosen from the standard capacity as 200 kvA.

2. Mc Doom District

A. Load List (Estimation)

Refrigerators	37 kw	x 3 Nos	= 111 kw	(1-stand by)
Unit coolers	(1.5x2)	x 4	= 12	
Cooling tower fan	0.065	x 1	= 0.065	
Cooling water pump	0.75	x 1	= 0.75	
Defrost pump	1.5	x 1	= 1.5	
Defrost heater	10	x 1	= 10	
Air-curtains	1	x 4	= 4	
Condensers	2.2	x 2	= 4.4	
Condenser pump	1.5	x 1	= 1.5	
Vetilation fan	0.2	x 1	= 0.2	
Heat insulation doors	0.2	x 2	= 0.4	
Lightings, others	20		= 20	
	Total		128.82 kw	

B. Calculation

(i) Calculation method of generator capacity in the case of the generator normal running is as follows :

Generator Capacity (kvA)
= Total load (kw) x Demand factor/Total efficiency x Power factor.

$\therefore$ Generator Capacity (kvA) = 128.82 kw x 1.0/0.64 (0.8 x 0.8)
$\doteqdot$ 202 kvA

(ii) Calculation method of generator capacity in the case of the starting the motor of maximum capacity is as follows :

$$\text{Generator Capacity (kvA)} = \left(\frac{xd'}{\Delta E} - xd'\right) \times \text{motor, maximum starting kvA}$$

where

xd' = Generator transient reactance .... 30%(Assumption)

ΔE = Generator impact voltage drop .... 20%(Assumption)

Maximum starting kvA of 37 kw motor ..... 177 kvA at Y-Δ starting

$$\therefore \text{Generator Capacity (kvA)} = \left(\frac{0.3}{0.2} - 0.3\right) \times 177 \text{ kvA}$$
$\doteqdot$ 212 kvA

Generator Capacity to be chosen from 250 kvA.

JAPAN INTERNATIONAL COOPERATION AGENCY

BASIC DESIGN SURVEY TEAM

GEORGETOWN, GUYANA

August 23, 1980

The Permanent Secretary
Ministry of Economic Development
and Cooperatives
Avenue of the Republic
Georgetown

Dear Sir

Third Phase Construction of Demerara Fish Port Complex

It is our pleasure to submit to you the memorandum of discussion on the construction project of the Demerara Fish Port Complex.

You will find that the memorandum contains further details regarding matters of Facility and Electricity based on our discussion.

Taking this opportunity, we thank you very much for your cooperation to carry out our works.

Very truly yours,

S. Sakai

SUNAO SAKAI (MR.)
HEAD OF THE JAPANESE
BASIC DESIGN SURVEY TEAM

ATTACHED: Power Supply Single-Line Diagram

M E M O R A N D U M O F D I S C U S S I O N

O N

THIRD PHASE CONSTRUCTION OF DEMERARA FISH

----------ooOoo----------

23rd AUGUST, 1980

JAPANESE BASIC DESIGN SURVEY TEAM

----------ooOoo----------

1. FACILITIES

1.1 Cold Storage will consist of two (2) rooms there are nominal capacity will be approximately 700 tons in total.

1.2 Design room temperature of the Cold Storage will be approximately - 20°C considering the purpose of its use.

1.3 Cooling water for the Cold Storage will be intaken from the existing reservoir at Mc Doom.

1.4 Water supply for the new wharf and workshops will be provided by connecting pipes to the existing water supply system.

2. ELECTRICITIES

2.1 The proposed power supply plan and requirements of the electric power sources for the Third Phase construction are as shown in the drawings attached herewith. (DWG No. ET-01, ET-02).

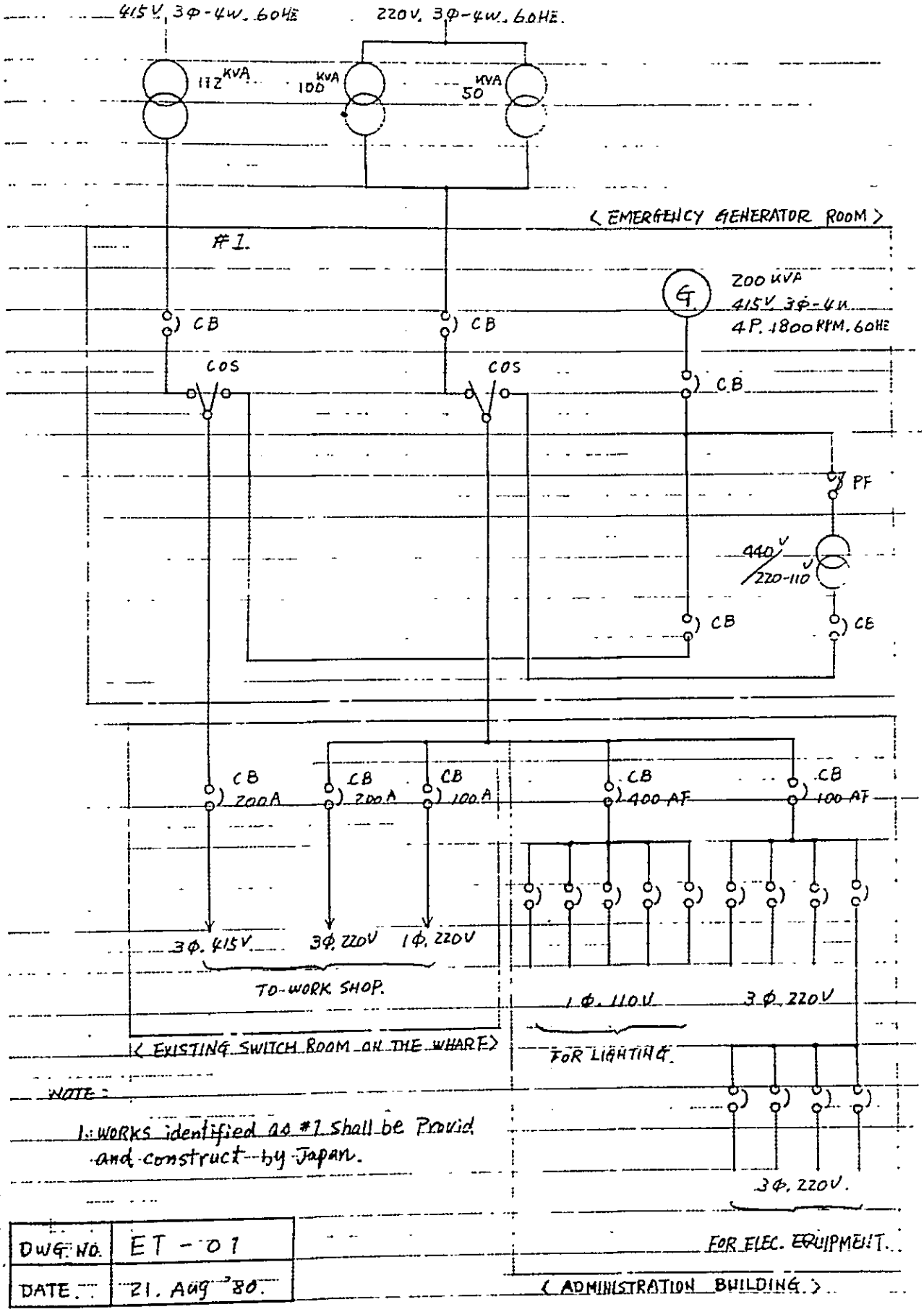
2.2 The procurement and installation of the power transformer and wiring works connecting secondary terminals of transformer and switchboards shall be done by at the expense of the Guyana Government.

2.3 The proposed capacity of the emergency Generator at Demerara Fish Port Complex will be approximately 200 KVA considering the total demand for the site.

2,4 The proposed capacity of the emergency Generator at Mc Doom will be approximately 250 KVA considering the total demand for the refrigerators, pumps and lights, etc.

2.5 The proposed emergency Generator for Demerara Fish Port Complex will be located at the foot of the existing Pier as shown in the drawing attached to Minutes of Meeting. The temporary buildings for the construction which are currently located at the site shall be removed and cleared at the expense of Guyana Government in order to install new emergency generator building.

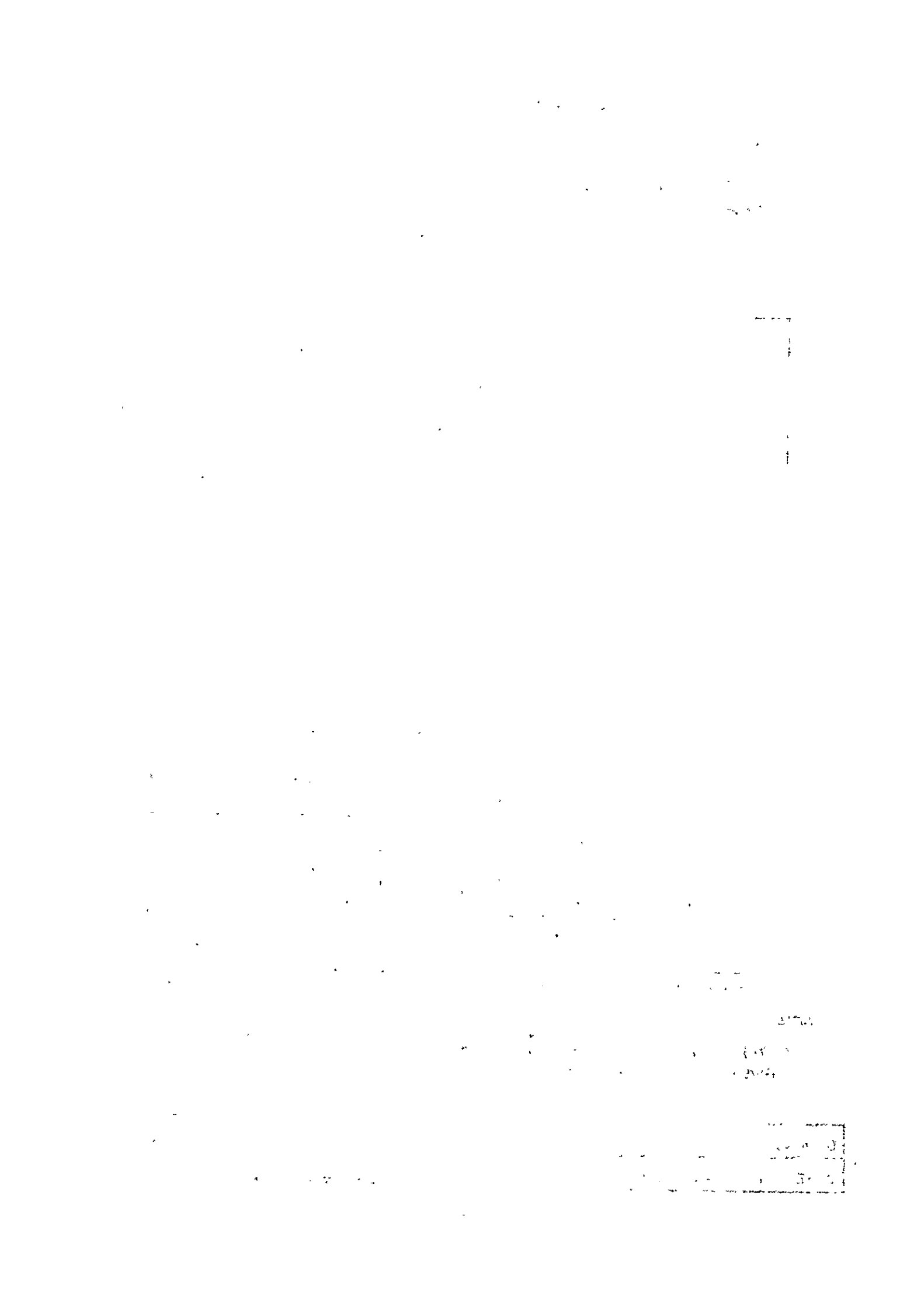
ELECTRIC POWER SUPPLY SINGLE-LINE DIAGRAM (DEMERARA FISH PORT)



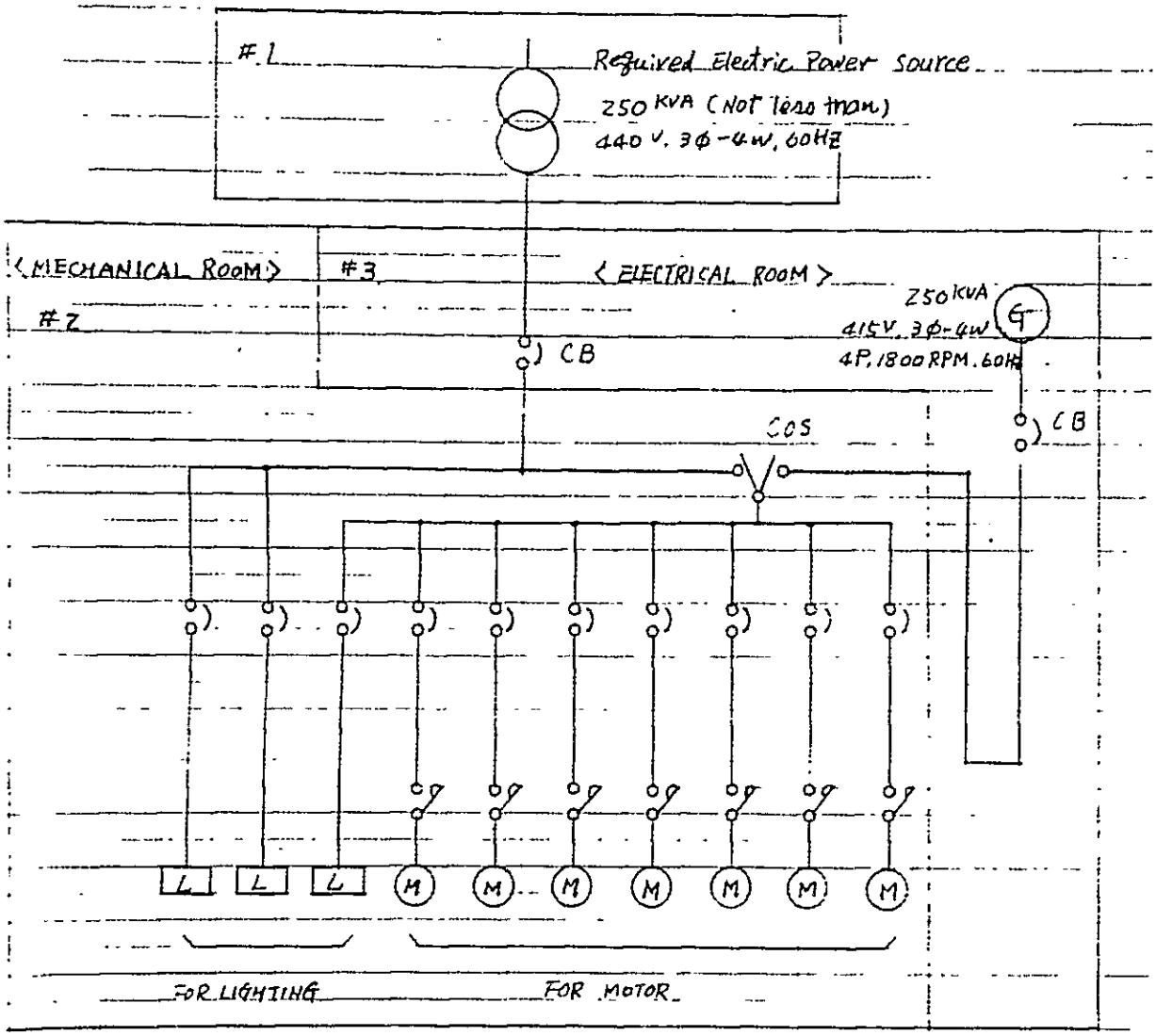
NOTE:

1. WORKS identified as #1 shall be Provid and construct by Japan.

DWG. NO.	ET - 01
DATE	21. Aug '80.



ELECTRIC POWER SUPPLY SINGLE-LINE DIAGRAM < Mc DOOM >



NOTE :

1. Works identified as #1. shall be Provid and Construct by co-operative ~~Republic of Guyana Government~~.

2 works identified as #2. and #3 shall be Provid and Construct by Japan.

Dwg. No	ET-02
DATE.	21, Aug '80