Accordingly, the annual payroll for the 3 new employees will total $13,800, with $9,000 covering the salaries of the 2 persons working at the facility and $4,800 the services of the skipper for the new fish carrying vessel.

(4) Maintenance of Facilities, Equipment, and Fish Carrying Vessel:

In establishing a maintenance budget for the facilities, equipment, and fish carrying vessel, we made no appropriation for the building structures. For the ice plant, emergency generator, workshop equipment, and truck crane, a maintenance reserve of 2% per year of original equipment cost will be accrued, resulting in a total reserve of $2,740. With respect to the fish carrying vessel, a similar 2% of original cost will be accrued for the hull, engine, rigging, and related equipment, for an annual total of $2,940. Thus, the maintenance budget for the equipment and vessel will amount to $5,680 per year.

3.4.3 Proceeds from Project Operations:

Earnings from commercial activities will include revenues from the sale of catches purchased from Association members, fares and freight charges earned by the new fish carrying vessel, ice sales, proceeds from sales of purchased fuel, and interest income from the operating fund. The bases for calculation of these items are shown in Appendix V-3.

(1) Earnings from Catch Sales:

For the time being the PFFA will be the sales outlet for catches handled at the base. PFFA has set the following buying prices per lb.:

Top grade fish: (such as rabbit fish, rudder fish, mullet, goatfish, bigeye scad) $1.35

2nd grade fish: (such as emperor fish, unicorn fish) $1.10

3rd grade fish: (such as travalley, barracuda, snapper, grouper) $0.85

The above prices represent the prices obtainable by Peleliu fishermen who exercise effective freshness control, through icing, and deliver their catches to the PFFA's refrigerated warehouse in Koror. But since, under this Plan, their catches will be purchased at the Peleliu Dock, which means a

direct saving in transport and freshness retention costs that would otherwise be incurred. It will thus be advantageous for the fishermen to sell their fish at the Peleliu base. Supposing that the fisherman presently delivers a catch of 135kg (300 lbs.) to Koror, the average cost of fuel for his outboard motor will run about 15 cents per kg. Adding in the cost of the extra ice, it is readily evident that the cost of hauling his fish to Koror runs in the order of 20 cents/kg (20 cents/2.2 lbs). Accordingly, the base would buy the fish at 10 cents per lb. lower than the PFFA price for Association's member catches in Koror and sell to the PFFA at the above-listed prices. On this basis, figuring an annual catch volume of 26,450 lbs (12 tons), sales revenue to the base would come to $2,645.

(2) Transport Revenues:

Transport revenues, based on introduction of the new fish carrying vessel should be considered in terms of the outlook for the new fleet of 3 transport vessels, including the 2 existing ships. In Section 3.4.4, we will show a comparative analysis of revenues under the present structure and under the new 3-vessel set-up.

At present, each of the 2 existing vessels make 2 round trips a week to Koror but, because regular schedules cannot be maintained, owing to tidal levels, the vessels are not being used to transport fish. One vessel is able to carry 30-40 passengers, while the other is able to deliver cars and other specialty cargoes to locations lacking port facilities. For this reason, both vessels are frequently approached with charter requests from other states and private parties. The existing vessels must continue to respond to these special requirements, but passengers and small cargo lots, which have previously moved via the 2 existing vessels, can presumably be largely accommodated by the new vessel, which will be in a position to operate regular round trip service to Koror from Monday to Saturday, with the voyage taking only 2 hours each way. In addition, a great many of the people who have not used the existing transport vessels, owing to time constraints, but instead make the round trip journey in their own boats, should now find it more convenient to use the new, more reliable vessel. They could, for example depart Peleliu in the morning, have 4 hours for business in Koror, and return with their baggage to Peleliu by evening.

The one-way rates to Koror being charged by the 2 existing vessels are: $0.50 for a small package of general cargo, $1.00 for a large parcel, $5.00 for a full drum, $2.00 for an empty container, and $3.00 per passenger. These 2 vessels make 17 round trips per month in average, with monthly freight and passenger revenues of about $2,240. Although no breakdown of receipts is presently available, since the new vessel plans 270 round trips per year, it may be expected to generate new demand from among those now using their own boats, representing about 50% of the general cargoes and passenger traffic being carried by the 2 existing vessels. Since the existing passenger and freight revenues for the 2 existing vessels are running $2,240 per month, the increased new demand that can be expected to be generated by a shift from individual boats to the new carrier vessel should produce a gain in revenues amounting to half of the current figure -- i.e., an average of $1,120 per month, or $13,440 per year.

(3) Ice Sale Proceeds:

Since current ice demand runs at least 80 tons per year, the entire production of the new ice plant can be sold. The current ice price may be estimated at about 11 cents per kg, yielding a total revenue of $8,250 for 75 tons.

(4) Revenues from the Sale of Purchased Fuel:

Gasoline sale will be made to Association members for use in their outboard engines, but these sales will be limited to fishing operations only. At the present time, to benefit from the slightly lower gas prices offered by the PFFA, fishermen must travel to PFFA headquarters in Koror. In the new facility, however, by offering stable supplies of gasoline at prices below the market price to Association members, fishing activity can be expected to pick up. Sales at the base of gas for outboard use should be strictly limited to members' fishing operations so as not to impact negatively on the private gasoline business in Peleliu.

Setting 3 hours per week as the duration of fishing activity by outboard motor boats, and figuring the number of member customers at 10, gasoline requirements may be estimated at 800 ltr per week. Based on 45 weeks of operations per year, annual demand should come to 36 Kl (approximately 9,510 gallons). The purchase price for gasoline brought in from Koror in drums ran $62 per 55 gallon drum as of December, 1993. Adding

in transport costs to Peleliu based on the rates charge by the existing vessels belonging to the State, at $7.00 per drum ($5.00 outbound for the full drum and $2.00 for the empty drum on the return trip to Koror), the landed cost of the gasoline at Pelellu becomes $1.25 per gallon. Since the PFFA selling price for gasoline is $1.50/gallon, a net income of 25 per gallon can be earned through this activity, yielding a projected $2,377/year.

(5) Interest Income from the Operating Fund:

Equipment items have been included in the subject Plan with the primary objective of building up an Operating Fund. These items are to be sold directly to the fishermen as a means of developing the coastal fisheries on the island, and the sales proceeds will be deposited to this Operating Fund. The main equipment items will comprise 20 units of 75ps outboard motors and spare parts, along with fishing gear for the gillnet and other fisheries. The market price in Koror for a 75ps outboard as of December, 1993, ran $4,400-4,500. Since this price includes a 3% import tax and a 4% receipt tax, it would be proper to deduct these taxes from the prices charged to the fishermen, resulting in a fisherman price of about $4,000 per unit. Accordingly, from the sale of the 20 outboard engines can be projected at $80,000 plus another $30,000 from the sale of components and fishing gear, all of which will be earmarked for the Operating Fund. We are assuming that sales of these products will be distributed equally over a 4-year period. Thus, assuming that interest from the Fund runs 3% per annum (the local bank rate for time deposits), the average interest receipts over 10 years would come to $2,805 per year.

3.4.4 Net Surplus from Project Operation:

In table 3.2, we have summarized the above operating expenses and commercial revenues, divided between facility and vessel operations.

Table 3.2 Operating Expenses and Revenues of Facilities and Transport Vessels Fleet

1) Facilities (In U.S. dollars)

Revenues		Expense	
(1) Catch sales	2,645	(1) Personnel	9,000
(2) Ice sales	8,250	(2) Electricity	1,313
(3) Fuel sales	2,377	(3) Maintenance	2,740
(4) Interest	2,805	(4) Generator fuel, etc.	739
TOTAL	16,077	TOTAL	13,792

2) Fish Carring Vessel (In U.S. dollars)

Revenues		Expense	
(1) Fares / Cargo	75,413	(1) Labor	38,976
		(2) Fuel	16,060
		(3) Maintenance	10,124
TOTAL	75,413	TOTAL	65,160

The total operating expenses for the facilities are projected at $13,792, with revenues of $16,077, indicating a slight surplus. Operating costs for the 3-vessel transport fleet (including the new vessel) would total $65,160, vs. revenues of $75,413, representing a slight improvement over existing operations with 2 vessels.

Comparing the above figures with the operating costs for the 2 existing transport vessels, the incremental expenses associated with the introduction of the new vessel comprise the salary for the new skipper, fuel costs, and maintenance costs, totaling $14,740 per year.

On the other hand, the increment in revenues is projected at $13,440, but this reflects the additional transport demand generated by the regular daily schedule that will be offered by the new vessel six days a week. The new vessel will be making 270 one-day round trips a year on a regular schedule and so, in addition to the new demand for transport services, it can be expected to carry the major share of the passengers and cargoes that have formerly been transported by the two older vessels. Since the public transport role will be assumed by the new vessel, the 2 older vessels will be freed to make the most of their special features--chiefly the movement of large numbers of people and the haulage of heavy and specialized cargoes. They will also be in an advantageous position to respond actively to charter demand from other areas. Therefore, while it is true that the number of monthly trips by the 2 older vessels will likely decline by about half, in terms of actual transport revenues, both vessels will be able to earn the

established charter rates in the private market ($500 per day) and so can expect an improvement in profitability, as compared with their former role of transporting general cargoes and passengers.

With a 50% reduction in the number of trips, fuel expenses for both of the existing vessels will decline by as much as $7,000 per year. Although the number of operating days for these older vessels will fall, operating expenses will also decline, while the consolidation of the 10-man transport group, serving the needs of all 3 vessels, will mean a major gain in labor productivity. Based on the above considerations, as proposed in this Plan, it is essential that the former system of assigning staff exclusively to a particular vessel be reorganized into a new structure whereby the 10-man transport group will rotate service among all 3 vessels.

In table 3.3, we have shown a comparison in operating costs and revenues between the existing 2-vessel fleet structure and that of the planned consolidated 3-vessel fleet.

Table 3.3 Costs and Revenues Comparison by Fleet Structure

Items	Existing 2-Vessels Structure	Planned 3-Vessels Structure
Crew size	9	10
No. of round trips per year	204	*1 372
Trip expense($)		
Labor	34,176	38,976
Fuel	14,150	16,060
Maintenance	7,184	10,124
Total	55,510	*2 65,160
Fare Revenues($)	61,973	75,413
Net earnings($)	6,463	10,253

(*1) No. of trips:

Existing transport vessels	204* trips x 1/2 = 102 RT (* 17 RT/month x 12 mos.)	
Plan vessel		270
Total 3 vessels		372

(*2) Fuel costs:

Existing vessels	14,150 x 1/2	= $7,075
Plan vessel		8,985
Total 3 vessels		16,060

SECTION FOUR: BASIC DESIGN

4.1 Design guidelines:

With a view to realizing the rural fisheries development program, developed by the Government of Palau, the subject Plan, targeted at Peleliu State which is lacking in well-equipped fishery infrastructure, is intended to provide facilities and equipment support of local fishermen so as to improve freshness control for their catches and rationalize fish distribution. The basic design for the project has been developed subject to the following guidelines:

(1) The Plan forms part of the Peleliu State Fishing Community Development Project, which is aimed at overall regional development in the state. Accordingly, the Plan facilities have been structured in such a way that they will be fully functional, even if the Plan is carried out independently, yet can be fully coordinated with the future superior plan, as and when the latter is implemented.

(2) While the project facilities will naturally function in support of the area's fishermen, considering the paucity of developable agricultural land on the island and the fact that fishing activity constitutes a key element of the people's livelihood, the project is also intended to become a key pillar of the state's economy.

(3) Peleliu State is endowed with a superb natural environment, thanks to its mangrove forests and seagrass beds. Thus, the Plan facilities have been designed with due reference to this environment, in accordance with the policy of the Peleliu State Government, which is geared to sustained utilization in harmony with this environment.

4.2 Design Conditions:

4.2.1 Natural Conditions:

Meteorological observations in Palau are performed by the Meteorological Service Station based in Koror. Excluding Sonsorol and Hatobohei States in the southwest corner of the country, Palalu lies almost entirely between 7^{o}-$7^{o}45'$N. Since its climate is dominated by a marine

tropical pattern, we saw no problem in basing our climatic analysis on observations taken at Koror. However, with respect to the influence of tropical low pressure systems, the strongest impact is felt by states in the northern part of the country. Weather data for Koror are shown in Appendix V-1.

While there are no singular natural conditions that must be particularly reflected in the design conditions for the facilities on Peleliu, since they are to be located on the coast, highest priority must be given to use of materials that will not be damaged by salty winds. Special consideration must also be given to the fact that rainfall is extremely concentrated (in 1979, the highest precipitation for a 24 hour period was 430 mm), and the fact that the area is one of high temperatures and humidity. (Daytime high temperatures average 30.8°C, while maximum relative humidity, occurring around 3:00 a.m., averages 90%.) As to wind velocity, during the typhoon in November, 1990, the maximum instantaneous wind speed recorded was 37 m per second. At that time, the center of the typhoon passed through Kayangel State in the extreme northern part of the country, while wind direction in Koror was from the southwest.

There are no observation data on tidal levels in Peleliu, but we did learn of certain revised tidal data, based on Koror port, that had been recorded for Shonian harbor on an island about 0.8km directly offshore the Peleliu Dock. We understand that Shonian Island had been used in the 1930s as a loading port for phosphate ore, though no traces remain of this former port. Still, given its proximity to the Peleliu Dock, we felt that it would be reasonable to apply the tidal data for this port as a rough indication of the probable tidal action at Peleliu Dock. On the basis of these revised figures, the average tidal range at Shonian at high tide was about 1.34m and the maximum tidal range about 1.95m. High tide at Shonian occurs about 7 minutes earlier than at Koror, and low tide 13 minutes later.

4.2.2 Infrastructure:

Commercial power is provided only 12 hours a day between the hours of 18:00 and 6:00. Three transformers are installed atop an electric light pole on the road passing the Plan site, which step down the 4,160v power to 120/208v. The capacity of each transformer is 25kva, for a total of 75kva for all three. The only facilities presently being served by this power are

the ice plant, dock lights and a few private homes, so there will be ample reserve capacity to meet the needs of the Plan facilities. Water supply is obtained from a well south of the island and the water is piped into a residential area to the northwest. However, no pipes have been laid to the Plan site at the northern tip of Peleliu. Since there are no sewerage facilities, waste water from the plan facilities will be permeated into the soil, while soil water will be treated in a septic tank before permeation and so will not be discharged outside the site.

4.2.3 Applicable Standards:

The Republic of Palau has not yet established its own codification for design standards governing buildings or construction under public works projects. However, plans and blueprints for public structures are examined by the Bureau of Public Works in the Ministry of Resources & Development, on the basis of U.S. standards for public buildings. Judging from the natural conditions, there is no particular need for strict building standards but, with respect to wind pressure, there is a requirement that the design wind force be set at 54m/sec (120 mph). No seismic observations have been recorded in the area, though a large earthquake was reported to have struck in 1911, the epicenter of which was midway between Palau and Yap. Accordingly, we have established the design seismic intensity and wind pressure as follows:

Design seismic intensity: Kh = 0.20
Kv = 0.00

Design wind pressure: $q = 60\sqrt{h}$

q: velocity pressure
h: height (m) from ground level

4.2.4 Environmental Conditions:

Palau is known to be endowed, both on land and in the sea, with an extremely rich natural environment, and the Palau government recognizes full well that it is vital for the country's future development that utilization of this superb environment be designed so as to sustain and perpetuate it. The Plan site in Peleliu State is no exception in terms of having a magnificent natural environment and so, from this standpoint, the Plan facilities must give full consideration to the surrounding environment. The Plan site is a natural beach served by an adjacent dock that is used by transport vessels and small boats. But a distribution of Zostera, a major

species of seagrass bed, is seen on the bottom in the vicinity. The Plan facilities will be small-scale shore-based structures. However, considering the fact that their purpose will be to handle fresh fish, it is essential that, regardless of the existing conditions, water drainage from the facilities not be allowed to drain directly into the sea. The trees on the site are limited to a few coconut palms along the road perimeter, and these will have to be temporarily felled during facility construction and replanted after completion. In the vicinity of the western border of the site area, there is a large Borenean Ru tree, but this poses no impediment to the construction plan, though a few of the lower branches will have to be pruned for the sake of light and ventilation. Even if the facilities were to be eventually expanded in this portion of the site, there would be no need to fell this tree; it would be sufficient to build a protective grating around the root area.

With respect to the refrigerant for the ice plant that is to be installed as one of the Plan facilities, we will avoid any type of Freon, a substance that destroy the ozone layer. It will, therefore, be necessary to use a refrigerant of the HCFC type, which is presently available for commercial use. (This is a compound with a low ozone depletion potential, since it contains hydrogen in addition to chlorine.)

4.3 The Basic Plan:

4.3.1 Site Plan:

The Plan site, as shown in the Site Plan, is a portion of a 3,104m^2 section, owned by the State Government (more precisely, under an unconditional right of succession), which adjoins the western side of the Peleliu Dock. The site extends some 35m lengthwise on an east-west direction, with a width (north-south) of 20m. The northern side of the site faces a natural beach, while the southern faces a 10m wide road. The land becomes lower toward the west, with one portion submerged during high tides. Thus, the buildings are placed toward the southeast portion close to the existing dock and ice plant, with the oil storage and toilet/shower sheds located in separate structures to the west. The main building will comprise a work area, ice plant, workshop, administrative office, and other rooms, and so it will be most convenient to have these rooms located close to the

Dock, which is the arrival and departure point for the transport and carrier vessels. In addition, this location will present no difficulties even in the event of a future Dock extension, based on implementation of the Peleliu State Fishing Community Development Plan, the senior plan for the subject Plan. For both safety and sanitary considerations, the oil storage and toilet/shower sheds will be separated from the main building on the western side of the site. The drum cans will be unloaded from the transport vessels, using the crane-mounted truck, at the existing dock and then moved as received to the oil storage shed. Judging by the meteorological and oceanographic conditions, the beach in front of the facility is not threatened by major wave action but, for safety sake, we are thinking of providing erosion protection, via gabion baskets, for the low-level portion west of the existing dock as well as for the lower portion in the western side of the site. While the buildings are to be deployed in a north-south direction, since the prevailing winds are from the northeast, careful consideration should be given to ventilation.

4.3.2 Floor Plan:

The rooms to be incorporated in the building are the administration room, storage area, workshop, machine room, and work area. This building will eventually become the headquarters for the planned Peleliu State Cooperative Association, and so its main function will be purchasing of catches, freshness control, shipments, and sale of outboard motors and fishing gear along with other services for member fishermen. This will be a small-size structure, with no need for multi-story construction.

Freshness control will consist of washing the fish and then packing it in insulated fish boxes with ice from the ice-plant, and finally loading the boxes from the dock onto the fish carrier vessel. Accordingly, the work area where these operations are to be performed will be located on the northern side of the site, which is closest to the dock. The ice-making equipment will also be located in this area. To the south of the work area will be located the administrative office, storage area for the outboard engines and other equipment to be distributed to fishermen, and the workshop for repair work on the outboard engines.

The machine room, housing the emergency generator, will be placed alongside the workshop. Since potable water pipes will not be laid to the

Plan site, rainwater is to be collected from the roof of the main building and stored for use in the rainwater tank. However, this tank will be built on the eastern side of the main building. Since this building anticipates future implementing of the superior plan, the building approach will be placed mainly on the west side of the structure.

The oil storage shed is intended to provide storage for both the light diesel oil for the state vessels and the gasoline for the outboard engines but, for safety reasons, it will be separated from the main building on the west side, with to the toilet/shower shed continuing on the far side. The total area for the main building, based on the lay-out plan, has been calculated at 100m^2, including the work area. The oil storage shed will be 14.4m^2 and the toilet/shower shed 15m^2.

The facility plan is summarized below:

Facility	Structure/Size	Function
Administration building	RC single story	
Office	6 x 3m 18 sq.m	・For 2 staff
Work area	8 x 4m 32	・Including space for ice-plant
Workshop	5 x 4m 20	・For outboard engineer repairs, 1 permanent and 1 temporary staff
Storage area	6 x 3m 18	・For storage of outboard engines, fishing gear, and spare parts
Machine room	3 x 4m 12	・For installation of emergency generator
Toilet/shower shed	Concrete block construction; single story, 15 sq.m	・With septic tank and soak-away
Oil storage shed	Concrete block construction; single story, 14.4 sq.m	・For storage of gasoline and diesel oil drums

4.3.3 Section Plan:

Considering the high heat and humidity at the Plan site and the fact that commercial power will not be available during the daytime hours, when the facility will be most active, it will be difficult to provide proper ventilation by either mechanical air conditions or by ceiling fans. It will, therefore, be necessary to provide this ventilation via natural means by insuring an adequate number of openings. Some of the comparable facilities viewed in the area were built with no ceilings but, generally speaking,

ceiling heights were 2.5-3.5m in small rooms. We have therefore set the ceiling heights as follows:

Type of Room	Ceiling height (m)
Office	2.7m
Storage area	2.7
Workshop	2.7
Machine room	2.7
Work area	Open ceiling

4.3.4 Structural Plan:

(1) Structural Methods

The structural method will be rigid RC construction with columns and beams, concrete block construction for the walls, and wooden truss construction for the roofs. The structural members will be of small size but the general practice, in the Plan area is to avoid structural methods that invite deterioration from protracted rusting or which can be expected to require anti-rust maintenance. This trend is particularly pronounced in public buildings. The recently completed Palau Central Hospital too uses absolutely no steel in either structural or roofing applications. In the Plan facilities as well, considering the fact that they will face the sea, they will be readily subject to damage from sea winds and the fact that, to date, in the rural fishing development plan carried out in other states, all of the main buildings are of RC construction. Thus, this technique will be used in the subject Plan as well. The wall construction observed locally, excluding ordinary housing, was most often concrete block. And considering the ease of manufacture as well as shipping convenience to the Plan site, we have specified concrete block construction for the walls in the Plan facilities as well. As to the roofing construction, since the beam length is relatively small (8m) and in view of their superiority in terms of rust prevention, we shall use wooden trusses in a hipped roof shape. As roofing materials, we shall utilize cement tiles for their anti-rust properties and because they are readily obtainable in the area.

(2) Foundation Structure:

Detailed geological data are not available for the Plan construction site. However, at he Peleliu Dock, adjoining the site, which was built in the 1930s, was a gravity type structure, but there is no evidence of

subsiding or otherwise unstable foundation. The Plan site is located further inland from the area of the Dock, and the surface soil is fine quality sand. Since the Plan facilities will be single-story, comparatively light-weight construction, we have concluded that there is no danger of subsiding or other mishaps developing in the support foundation. Accordingly, the foundation method for the Plan facilities has been designated as direct spread foundations.

4.3.5 Electrical and Mechanical Equipment Plan:

(1) Electrical equipment

Power for the electrical equipment will be received on a power board as 120/208v 60hz from 75kva transformers located on top of an electric pole installed at the road border of the Plan site. This power will be branched from the power board to power and light sockets. Maximum power loads have been estimated as follows:

Lighting and socket outlet load	3kva
Power equipment load	10kva
Total	13kva

The target power equipment will be the cooling machines of the two ice plants, for which the load voltage is set at 3-phase 208v 60hz. Since commercial power is currently available only for 12 hours per day (from 18:00 to 6:00 a.m.), the ice plant will normally operate at night.

For lighting, we will use fluorescent type, which is most prevalent in the area. Two types of sockets outlets will be installed: one for general room use and the other a specialized socket for the workshop. The general-use sockets will be single phase, while those for the work shop will be both single-phase and 3-phase.

An emergency generator has been provided to permit electricity use during the day. In order to drive both ice-making units during daytime hours when ice supplies are short, the required generating capacity will be as follows:

Engine:	Diesel
Voltage to be supplied:	3-phase, 4 lines; 208v/120v 60hz
Generating capacity:	20kva

Based on conditions in existing public buildings in Peleliu, we will not provide telephones or air conditioning equipment.

(2) Mechanical equipment

Since water supply is not presently available at the site, rainwater is to be collected from the roof of the main Plan facility and stored in a tank of $20m^3$ capacity, then pressure-fed by pump to the location of final usage. Supply outlets for this rainwater will include the ice-plants, work area, and the toilet/shower shed. The tank material will be FRP, since this is easy to maintain and keep clean and because it can be fabricated at the site. As to drainage, due to the special need to protect the marine environment, apart from the drainage of rainwater via a natural gradient, in principle, all of the drainage will be earth-permeated after treatment. The drainage from the work area will be collected in a drain pit and then permeated through a grease trap. Waste water and soil water from the toilet/shower shed will be fed to a septic tank and then permeated after common treatment. In the oil storage shed, in order to guard against seepage from a fall or overturning of the drums, entrance to the shed will be raised slightly, providing a downward slope toward the inside of the shed. This will not only make it easier to carry the drums in and out but will also prevent any oil spillover flowing directly to the outside. The drainpipes will be laid underground, and the piping material will be PVC.

4.3.6 Construction Materials Plan:

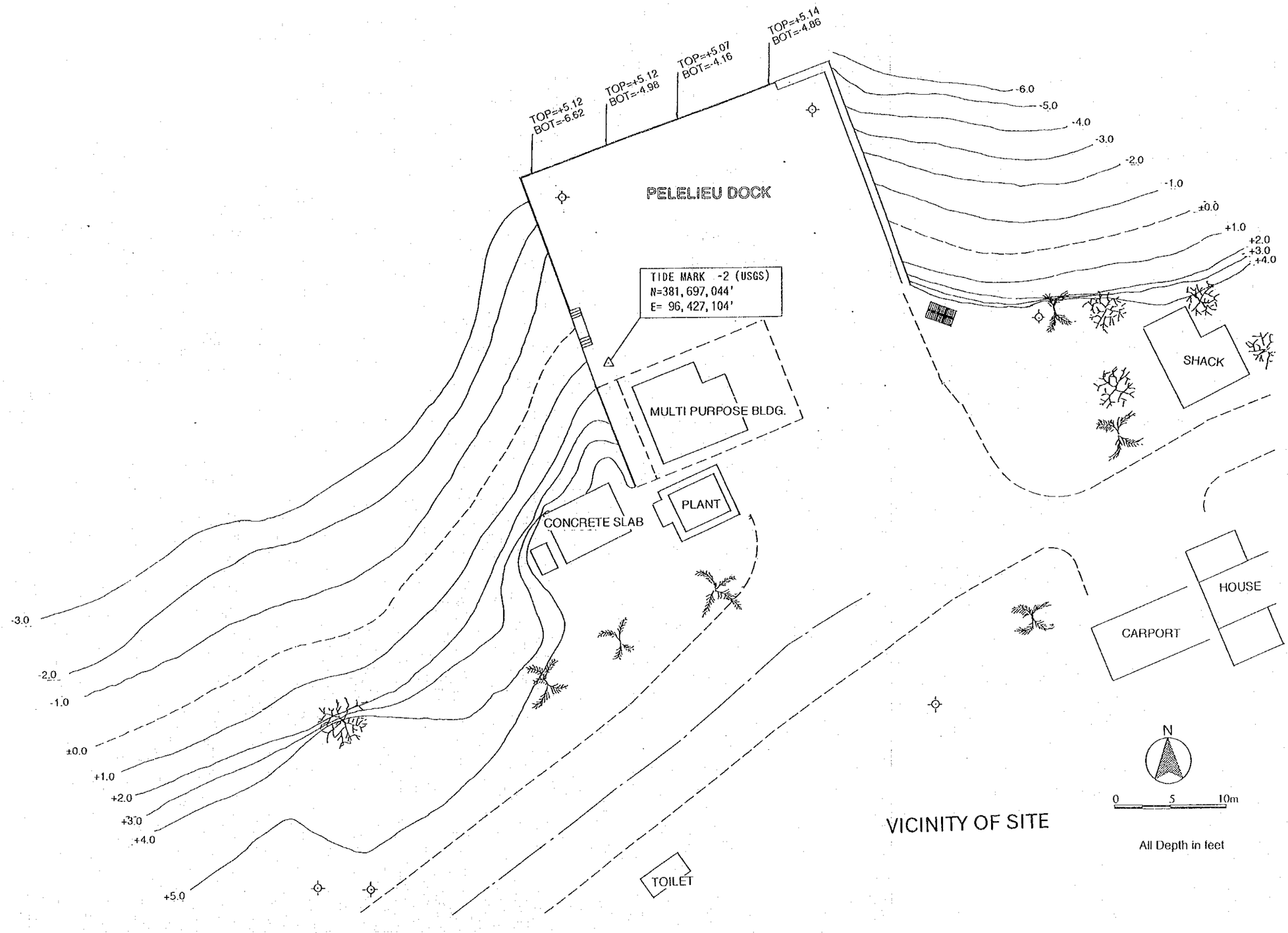
For the finishing materials of the floor, including the administration office, we have selected mortar trowel finish on concrete. However, in the toilet/shower shed, for sanitary reasons, ceramic tile will be used on the floor and for the wainscoting. Walls will be made of concrete block. For exterior surfaces, we will use epoxy paint on mortar plaster and for inside wall, oil paint on mortar plaster, as these are the most common finishing methods used in the area. The ceilings in the administration office, workshop, and storage area will be finished with painted gypsum board. The roofing material, as already noted, will be cement tile, since this is readily obtainable locally and damage can be easily repaired. Fittings and doors will be made of aluminum in the interest of rust prevention.

4.4 Equipment Plan:

The main items of Plan equipment are as shown below. A detailed listing is given in Appendix V-4. Based on the nature of the equipment, we have determined that there will be no need for either local procurement or sourcing from third countries.

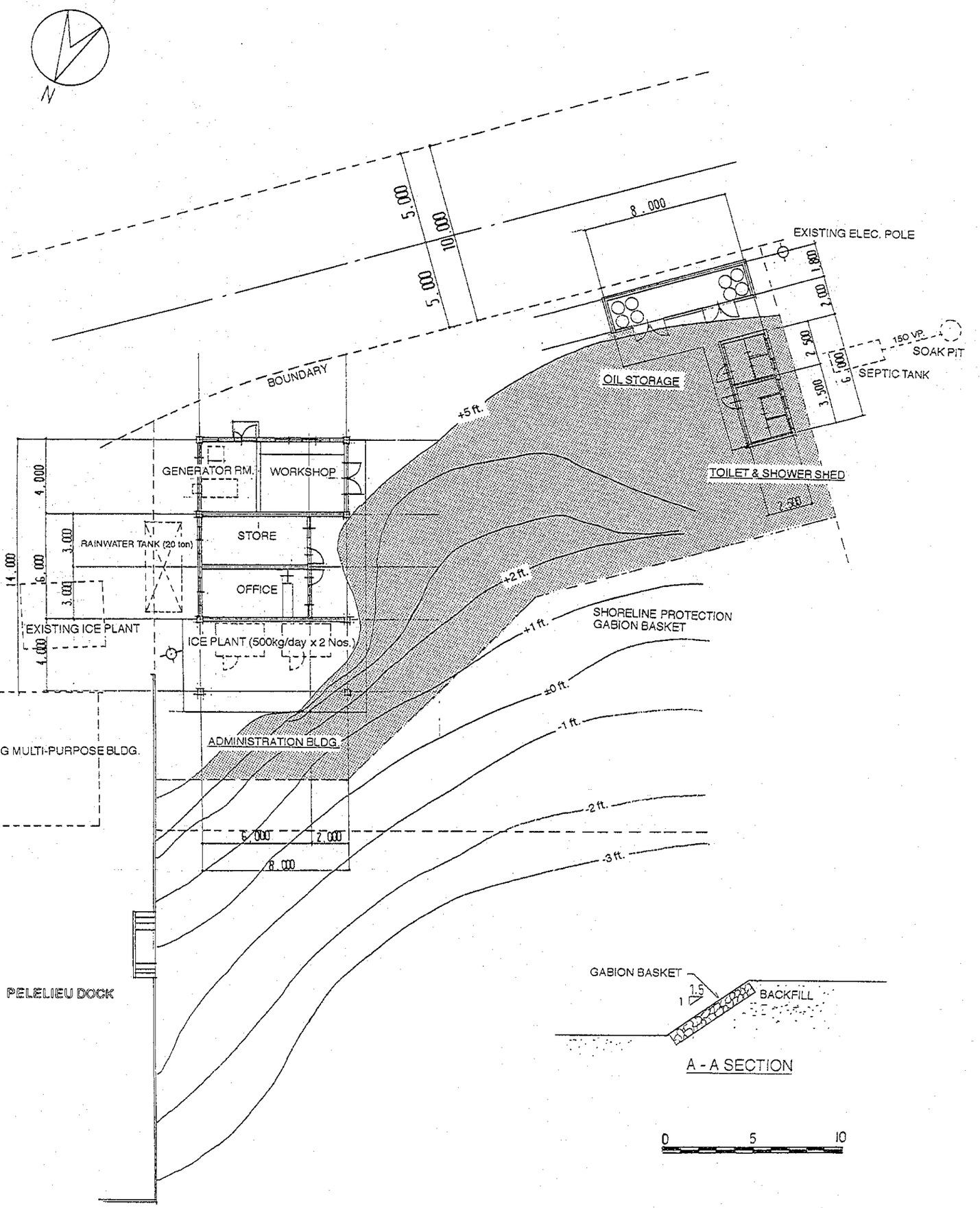
Equipment	Size	Quantities	Description/Functions
Ice plant	500kg/24 hours	2 units	Automatic ice-maker for plate ice, with built-in ice chest (1.5 ton)
Water intake tank	FRP 20cu.m	1 unit	To collect rainwater from building roof; pre-fabricated type (in sections)
Emergency generator	20kva, diesel powered	1 unit	3-phase, 4 line, 208v/120v 60hz
Fish Carrier Boat	LOA:10m, B:2.5m, Depth:1.0m, main engine: diesel(110ps) 13 knots or more	1 unit	FRP construction, cargo deck space 9 sq.m navigating lamps, SSB radio telephone, magnetic compass, life jackets, mooring equipment, other
Outboard motor	gasoline-powered, 75ps	20	with spare parts
Fishing gear:			
Gillnets	net length 1.8m, netting length 120m	36 rolls	3" mesh
Hand lines	lead lines, fish hooks, wire snell,	1 set	
Troll lures	other	1 set	
	lure heads, hooks		
Repair tools for outboard engines	Grinder, compressor, drill, hydraulic press, general and specialized tools	1 set	
Containers for fish transportion	insulated fish boxes (160 liter)	30	
	(90 liter)	30	
	fish barrels (50 liter)	30	
	platform scale (300 kg)	1	
Crane-mounted truck	operating radius: 4.5m	1 unit	
	lift weight 500kg		
	load capacity 2 tons		

4.5 Basic Design Drawing:

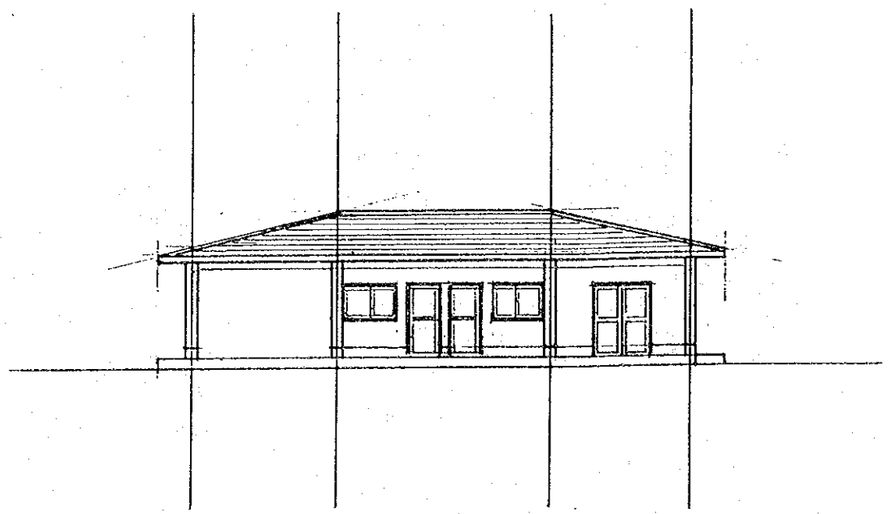


VICINITY OF SITE

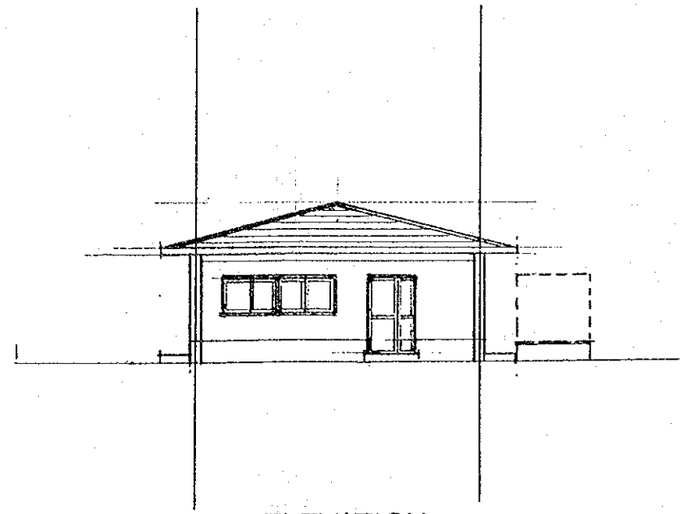
All Depth in feet



LAYOUT/FLOOR PLAN

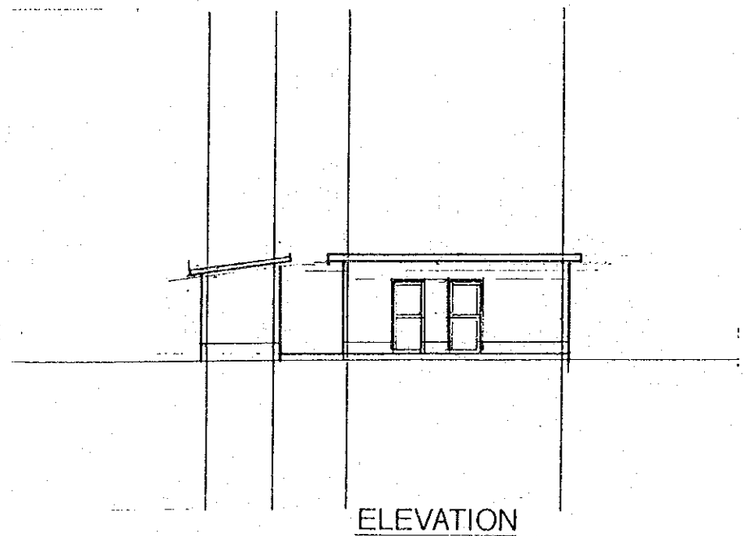


ELEVATION

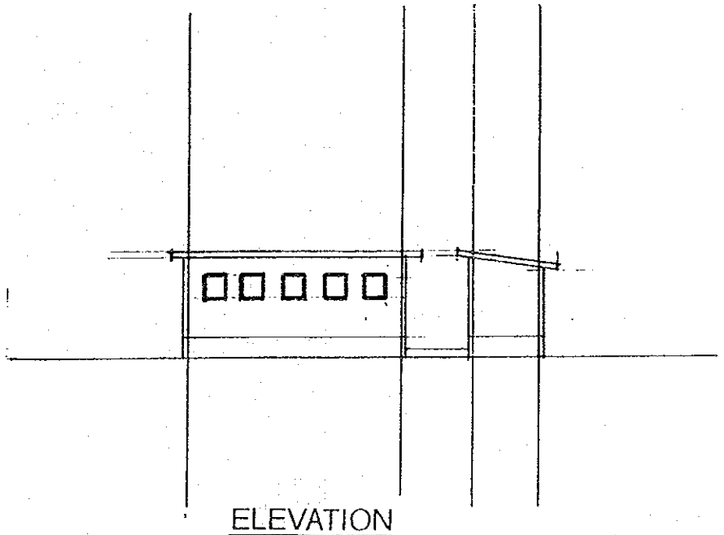


ELEVATION

ADMINISTRATION BLDG.



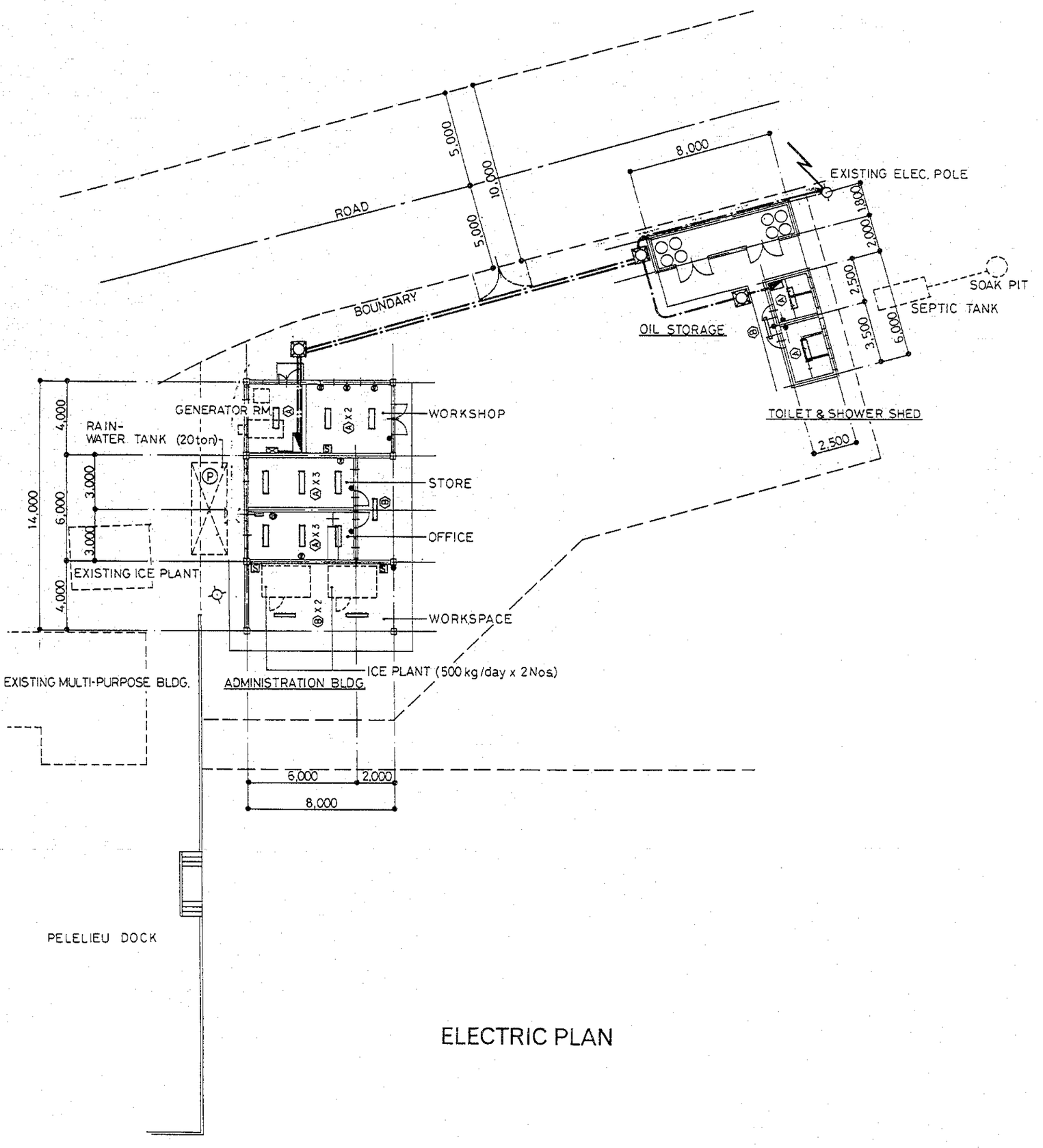
ELEVATION



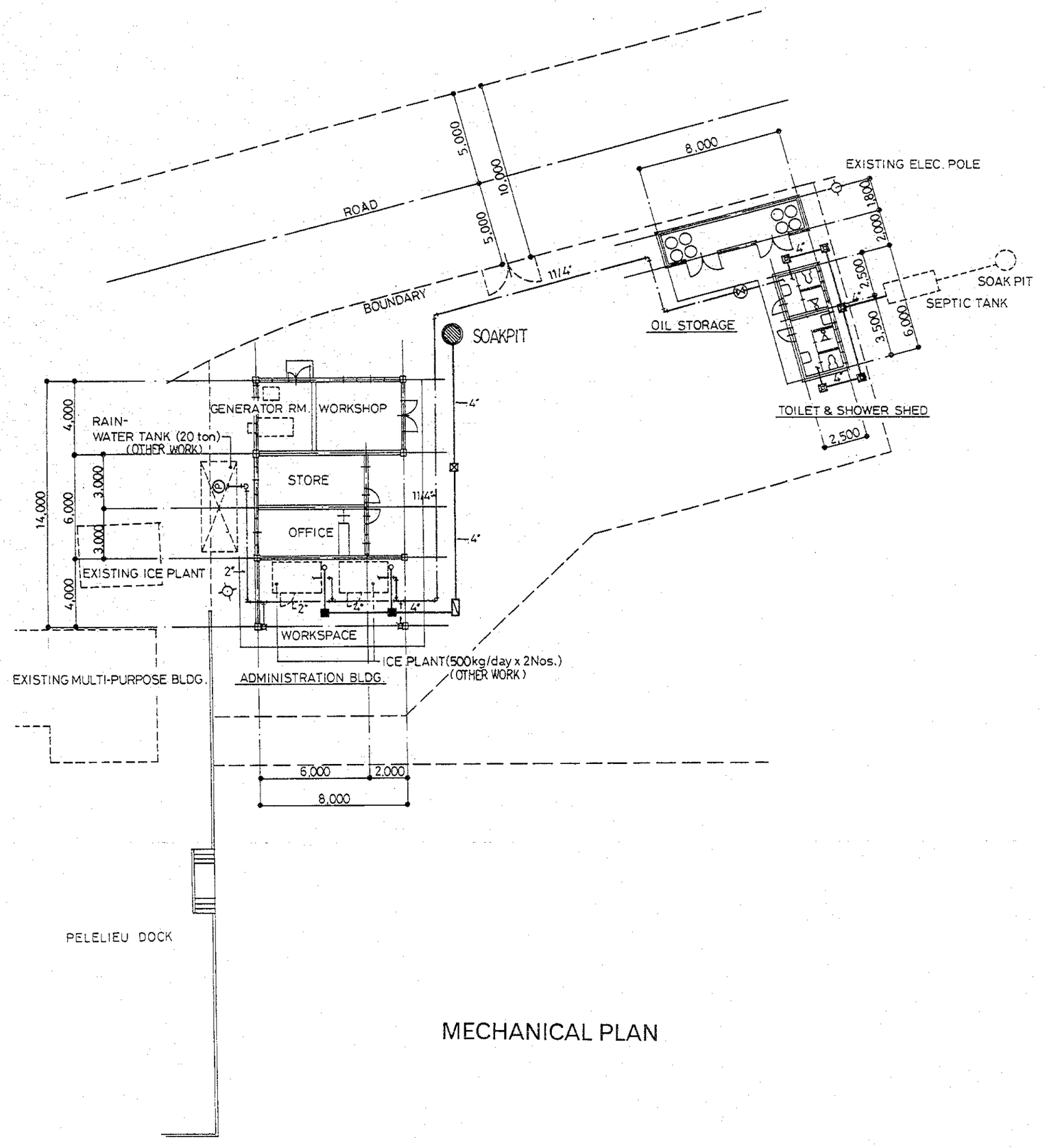
ELEVATION

TOILET & SHOWER SHED, OIL STORAGE

ELEVATION



ELECTRIC PLAN



MECHANICAL PLAN

4.6 Construction Plan:

4.6.1 Construction Guidelines:

The Plan facilities will be small in size and will fit in a floor area of only 130m^2. The construction method, as generally utilized in the area, will be RC for the columns and beams and concrete blocks for the walls. Both materials can be handled with local construction techniques. The project implementation schedule, as considered in Section 4.6.5, is subject to complete within 12 months in connection with the implementation of grant-aid projects by the Government of Japan. In addition, the construction equipment and materials will have to be transported by water from the capital Koror to Peleliu, and there are understandable limits to the amounts that can be carried in any one shipment. In light of the above conditions, we plan the following measures to insure on-time completion of the project.

(1) The agency in Palau charged with examining construction plans for public facilities is the Bureau of Public Works within the Ministry of Resources & Development, which is also the responsible agency for this Plan. In the course of preparing detailed plans, we will submit our design standards and plans as far in advance as possible with a view to expediting the review procedure.
(2) With regard to the construction materials, with the exception of a portion of the fishing materials, water supply and drainage, and the electrical requirements, all items can be locally procured. However, in view of the extremely limited production of concrete blocks and certain other items in Palau, we plan to conduct a prior study with regard to the various time constraints and procurement lead times in the Plan area.

4.6.2 Special Construction Conditions:

Judging by the size of the Plan buildings and construction techniques, there do not appear to be any particular constraints in connection with the construction phase. However as pointed out in Section 4.2.4, the Plan area is endowed with a superlative marine environment, and so a maximum effort is called for in the construction phase to minimize impact on this environment.

In particular, should heavy rains fall during the ground construction phase, special precautions will be required to prevent muddy waters from accidentally flowing into the sea. In addition, extreme care must be taken in supplying fuel oils for equipment operation to prevent any oily substances from permeating the sand and thereby reaching the water.

4.6.3 Construction Supervision Plan:

Following the signing of the Exchange of Notes for the project between the governments of Japan and Palau, a consultant contract will be signed between a consultant of Japanese national and the Ministry of Resources & Development (MRD) of the Government of Palau for the implementation of the Project. The Consultant will prepare all necessary plans and drawings, specifications, tender documents, and contractor agreements, as required for project implementation and, subject to the approval of the MRD, will set tender qualifications, evaluate tenders and tender documents, and select the contractor(s). Following the signing of the construction contract and the receipt of local approvals of the construction plans, the Consultant will conduct inspections of the equipment manufactured as well as supervise facility construction and insure the progress and quality of the construction work. Given the small size of the facility area (130 m^2) and the absence of any specialized construction methods, it will be sufficient for the Consultant to dispatch technicians to the Plan site periodically, as required, to supervise the ongoing construction work.

4.6.4 Procurement of Construction Materials:

(1) Procurement of Construction Materials:

In connection with the construction materials to be used in this Plan, items that can be locally procurement will, in principle, be sourced in Palau. These include sand, gravel, cement, reinforced concrete, and concrete blocks. It is planned that aluminum doors and other fittings, electrical, water supply and drainage, and sanitary equipment, which are difficult to source locally, will be imported from Japan. The procurement sources for the principal items of construction equipment to be used in the Plan are as shown below:

Main Building Materials	Source
Sand	Palau

Gravel	Palau
Cement	Palau
Re-bars (iron bars)	Palau
Concrete blocks	Palau
Wood and veneers	Japan
Fittings	Japan
Paint	Japan

Main Equipment Items

Electric wires	Japan
Lighting fixtures	Japan
Emergency generator	Japan
Switchboard	Japan
Pipes for water intake & drainage	Japan
Sanitary equipment	Japan

(2) Equipment Procurement:

The main equipment items incorporate the ice plant, emergency generator, fish carrier vessel, outboard motors, and crane-mounted truck. Since they are all industrial products, they will, in principle, be sourced from Japan.

4.6.5 Implementation Schedule:

In connection with the implementation schedule, we have summarized below the division of construction responsibility between the Government of Japan and the Republic of Pallau:

(1) Scope of responsibility to be assumed by the Government of Japan:

Assuming this project is carried out on the basis of a grant-aid from Japan, the Government of Japan will assume responsibility for the following items:

1) Facility construction
2) Procurement of the fish carrier vessel, outboard motors, and other equipment
3) Consulting services with respect to detail design, assistance on tenders, and construction supervision.

(2) Scope of responsibility to be assumed by the Republic of Palau:

Assuming this project is carried out on the basis of a grant-aid from Japan, the Republic of Palau will assume responsibility for the following items:

1) Securing construction site and arranging for required landscaping work in the vicinity of the facilities upon completion of the construction work.
2) Obtaining all required permits for the construction work as well as permits for all other phases of project implementation.
3) All required procedures and expenses with regard to bringing power lines into the Plan area.
4) Prompt customs clearance of all equipment and materials imported into Palau in connection with the subject project as well as arranging exemptions from all required duties and taxes thereon.
5) Exemption of Japanese nationals residing in Palau for the purpose of rendering project services from all taxes and duties.
6) All other items that are not specifically included among the responsibilities of the Government of Japan, as necessary for project implementation.

Assuming implementation of the construction work in accordance with the above division of responsibilities, the project implementation schedule has been divided into the following categories: detail design, including tender operations, facility construction work, and equipment supply. In accordance with the Japanese Government grant-aid system, the entire implementation schedule must be completed within period of 12 months. The major construction procedures in connection with facility construction may be broadly classified as follows:

(1) Construction work--
Construction of the administration building, toilet/shower shed, and oil storage shed.

(2) Power, water supply, drainage, and sanitary facilities--
Intake line work, wiring, piping work, and installation of fixtures.

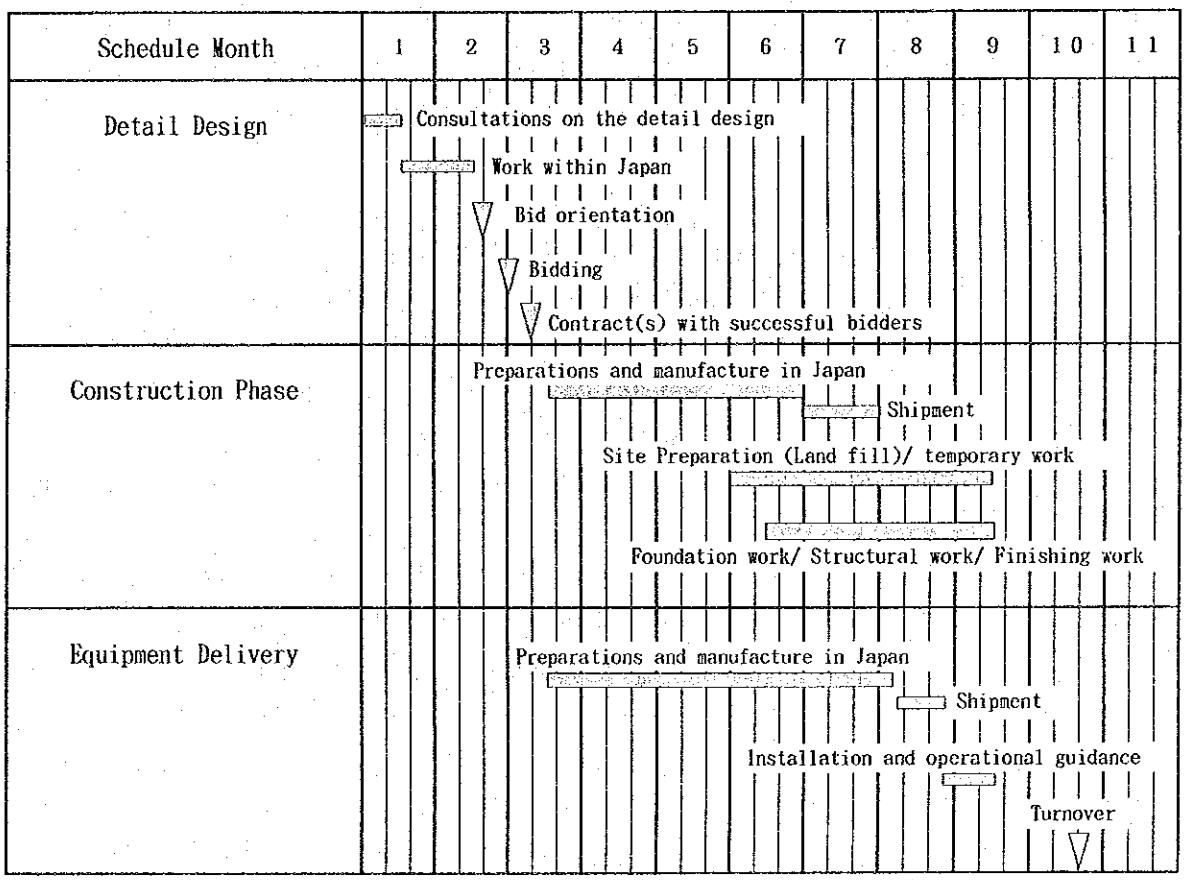
(3) Equipment supply--
Delivery, installation , adjustment, and test operation of the ice plant, emergency generator, and workshop equipment.

About six months are anticipated for the construction phase, including preparatory work in Japan and construction operations in Palau. Procurement time for the equipment will be set at 5 months, since this is the

procurement time anticipated for the fish carrier vessel, the item with the longest procurement lead time. The other equipment can be procured in 2-3 months, but about 0.5 months will probably be required locally for installation and adjustment of the ice plant, emergency generator, and a portion of the workshop equipment.

On the basis of the above conditions, we have prepared an optimum construction schedule, from the standpoint of both time and cost. The resulting Project Implementation Schedule is given in the following chart.

Project Implementation Schedule



SECTION FIVE: PROJECT EVALUATION AND CONCLUSIONS

5.1 Project Evaluation:

When the facilities and management structure developed through the implementation of this Plan start to function, there will be a marked improvement from the present situation, whereby the fishermen have no alternative but to take their catches individually to the capital at Koror for cash sale. With the new facility at the Peleliu Dock, fishermen's catches will be bought up, at first by the Peleliu State Government and later by the planned new fishermen's Association and then sent to Koror, with freshness maintained, for sale. If this sort of distribution structure is activated, the fishermen will be liberated from their present arduous existence, where, after catching their fish, they must haul the catch to Koror in their own boats; and, after converting their catch to cash, return to Peleliu, where they immediately having to start the whole cycle over again. Under this Plan, they can look forward to a more efficient, safer operation. And, with the introduction of the new fish carrier vessel, regular schedules can be established for one-day round-trip journey to Koror. This vessel will carry not only fish but also general cargo and passengers which now move in fishermen's boats, leading to savings in labor, time, and fuel cost. At the present time, there is little production activities in Peleliu other than fisheries, and so most of the population is engaged in fishing either for subsistence or cash income. With implementation of the Plan, it is recognized that fish distribution will be rationalized, and the resulting savings in time and money can be diverted to other forms of productive activity, which should help to vitalize the regional economy. The benefits that can be expected to result from activation of the Plan facilities may be summarized as follows:

(1) Saving of time based on the selling of catches to the new facility:

Some four hours are now consumed when a fisherman transports his catch in his own boat to Koror for sale and then returns to Peleliu. With annual shipments of 12 tons and 135kg (300 lbs.) of fish in average carried per voyage, it may be estimated that, over the course of year, this shipping operation to Koror must be repeated 88 times, which consumes 352 hours a year in all. When the new fishing base is completed at Peleliu, it will buy

the fishermen's catches, relieving them of the need to continue this time-consuming operation. The time thus saved can be diverted to rest, fishing activity, or other pursuits. While it is difficult to estimate quantitatively how much additional production will be generated by the new activity, there is enormous significance in having the fishermen free from the chore of transporting their catches to Koror for sale immediately after completion of their fishing operations.

(2) The saving resulting from a drop in the volume of goods transported in individual boats.

With the execution of this Plan, the new fish carrier vessel will be able to make the round-trip to Koror in 2 hours, while maintaining a regular Monday-Saturday schedule. As a result, a substantial number of people who have been making this trip in their own boats, owing to their inability to use the existing transport vessels due to their difficulty in maintaining regular schedules, will now, it is felt, use the new vessel. While there are no data estimating traffic between Peleliu and Koror by individual boats, estimating on the basis of observations made during our field investigation, there are probably 5 such round-trips made every day, which works out to 1,800 round-trips per year to Koror by water. If the 28 outboard boats in Peleliu made an average of 1 round-trip per week to Koror, this comes to 120 round-trips per month. And, adding in the round-trips by boats based in Koror, an appropriate range could be 150 round-trips per month in both directions, or 1,800 trips per year. Hypothesizing that the overall individual boat traffic will decline by 15%, then the individual boat traffic would decline by an equivalent 270 trips per year. Figuring the average time of an individual trip to Koror as 4 hours -- the same as for fishermen, a reduction of 270 such round-trips per year would result in an aggregate time saving of 1,080 hours per year. Converting this time saving into the equivalent wages of boat operators, the annual savings would amount to $2,073.

(3) Fuel savings based on elimination of the need to transport catches in individual boats.

The distance by water between Peleliu and Koror is 45km. The fuel cost for outboard engine boats over this distance shows little variation by engine horse power; average fuel consumption for the one-way trip runs 12

gallons (45.4 liters), or 24 gallons for the round-trip voyage. If gasoline is purchased from the PFFA in Koror at $1.50 per gallon and lubricating oils are added to this figure, the total fuel cost for the outboard boats becomes $1.85 per gallon. With 88 round-trips per year being made to transport catches to Koror, the value of the fuel consumed by outboard engines for this purpose works out to:

88 RT x 24 gallons x $1.85 = $3,907.20.

This is the amount of fuel expenses that can be saved.

(4) Fuel savings among individual boats and the existing transport vessels, based on the movement of general cargoes and passengers via the new carrier vessel.

At present, some 1,800 round-trips a year are made between Peleliu and Koror in individual boats. This traffic will be reduced by 15%, or 270 individual round-trips per year. The fuel savings for outboard engines, based on a reduction of 270 round-trips per year would be:

270 RT x 24 gallons x $1.85 = $11,988

On the other hand, once the 2 existing transport vessels are able to concentrate of what they do best -- i.e., movements of a large number of passengers and the transport of heavy and other specialized cargoes--, it is expected that there will be a reduction of 17 voyages per month for the 2 existing vessels combined, resulting in fuel economies of $7,000 annually. Accordingly, the total fuel expenses saved by individual boats and the two existing transport vessels, based on the new fish carrier vessel being used to move general cargo and passengers, can be calculated at $18,988 per year.

5.2 Conclusions :

The seas around Palau contain a rich ecosystem, made up of a variety of marine species as well as a sustained volume of renewalable fish and other resources indispensable to mankind. It is only natural that utilization of these diverse marine resources on a sustained basis so as to bring maximum benefits to the people of Palau has been made a national objective. In accordance with this objective, over the 3-year period 1987-1989, Japan has made grant-aid to Palau for the rural fishing development plans in 4 states, aimed at activating their coastal fisheries. Since all of these programs are showing reasonably good results, the Government of Palau, pursuing a policy

of continuing their regional fishery development projects, has drafted a plan for developing facilities for assisting coastal fisheries in Peleliu State, which is detached from the main island and has a population larger than any of the target states thus far served by this program. The susbject project forms part of the Peleliu State Fishing Community Development Plan, for which the Government of Palau had requested a grant-aid from the Government of Japan in February, 1993. Accordingly, we have developed a basic design for the facilities and equipment which have been accorded a particularly high priority in the request document.

The Plan area is a parcel of land adjacent to the Peleliu Dock at the northern end of the state. Ownership of this land has been confirmed to reside with the Peleliu State Government. The greater part of the Plan site is above the high water mark and so no special land preparation will be needed for construction of the Plan facilities. Because of the requirement for a floating pontoon, as included in the original request, has been eliminated, and the coordination with the superior plan for this project, the Peleliu State Fishing Comminity Development Plan will be required, provisions for site reinforcement can be accommodated within the scope of the foundation work for the facilities. Therefore, it has been determined that the foundation present so problems in terms of facility construction.

The Minstry of Resources and Development will have an overall responsibility for the Plan implementation and the operational and supervisory responsibility for the facilities and equipment to be provided under the subject Plan will be assumed by the Peleliu State Government. But, in the future, at such time as the Peleliu State Cooperative Association, presently in the course of formation, is determined to be a smoothly functioning organization, the State Government will probably turn the operation of the Plan facilities and equipment to the new Association. The Ordinance and Articles of Incorporation for establishing this Cooperative have been forwarded to the Ministry of Justice for review. The Articles of Incorporation expressly state that the new Cooperative is to achieve the functional level required to serve as the responsible supervisory and operating body for the facilities and equipment under this Plan. Operationally, the Plan has been divided into the facilities management and the transport vessels operations. With respect to facility operation, total

projected costs per year are $13,792 as against total projected revenues of $16,077, while, in the case of the three transport vessels fleet, costs are estimated at $65,160 per annum against anticipated revenues of $75,413. Thus, even when operations are split in the future with the new Cooperative taking over the facilities and the State continuing to operate the transport fleet, it has been determined that each component will be able to operate on a self-supporting basis.

Implementation of this project will serve to rationalize fish distribution and to achieve various cost savings upon marine transport to and from Koror on which people of Pleliu rely for their basic necessities. On this basis, the project may be expected to contribute meaningfully to the overall development of the regional economy of Peleliu State. It has, therefore, be determined that there is considerable significance in implementing the subject Plan under a grant-aid from the Government of Japan.

ANNEX

I Basic Design Study Team Members

II Survey Itinerary

III Discussants

IV Minutes of Discussions

V Others

V－1 Meteorological Data at Koror Island

V－2 Breakdown of Operation Costs

V－3 Breakdown of Project Revenues

V－4 List of the Equipment

I Basic Design Study Team Members

Name	Assignment and Organization
Kimura Senichi	Team Leader Deputy Director, Second Basic Design Study Division, Grant Aid Study and Design Department, Japan International Cooperation Agency
Kuwahara Satoshi	Fisheries Development Section Chief, International Affairs Division, Oceanic Fishery Department, Fisheries Agency
Terao Toyomitsu	Facilities Planner Fisheries Engineering Co.,Ltd.
Nakajima Naohiko	Equipment Planner Fisheries Engineering Co.,Ltd.

II Survey Itinerary

Day	Date	Kuwahara, Terao, Nakajima	Kimura
1	Dec. 12 (Sun)	Lv. Guam (18:25) CO-953 Ar. Koror (19:25)	
2	13 (Mon)	Joint meeting with organizations concerned, Visit to the planned site in Peleliu State	Lv. Tokyo (10:00) CO-962 Ar. Koror (19:25) via Guam CO-953
3	14 (Tue)	Survey on the planned site, Fishery survey at Peleliu, Discussion with Governor of Peleliu State	
4	15 (Wed)	Fish distribution study at Koror, Joint meeting with organizations concerned	
5	16 (Thu)	Interview with PFFA, Survey on fishery facilities at Melekeok	
6	17 (Fri)	Meeting on the draft of Minutes of Discussions, Signature of the Minutes of Discussions	
7	18 (Sat)	Survey on construction costs	
8	19 (Sun)	Terao, Nakajima	Kimura, Kuwahara
		Data analysis	Lv. Koror (15:00) CO-996 Ar. Guam (17:55)
9	20 (Mon)	Meeting on the results of the topographic survey, Survey on fish distribution	Reporting study results to Consul General of Japan, Lv. Guam (15:55) JL-942, Ar. Tokyo (18:00)
10	21 (Tue)	Site survey and supplementary observation on the tide level at Peleliu Is.	
11	22 (Wed)	Study on the infrastructure in Peleliu Is., Reporting to Governor of Peleliu State	
12	23 (Thu)	Reporting study results to the President Office and Ministry of Resources and Development, Collection of tide data, Survey on construction costs	
13	24 (Fri)	Data analysis	
14	25 (Sat)	Supplementary site survey at Peleliu Is.	
15	26 (Sun)	Lv. Koror (10:25) CO-952, Ar. Tokyo (18:30) via Guam JL-942	

Ⅲ Discussants

Name	Title and Organization
Kuniwo Nakamura	President of the Republic of Palau
Marcelino Melairei	Minister for Resources & Development
David K. Idip	Director, Bureau of Resources & Development, Ministry of Resources & Development
Noah Idechong	Chief, Marine Resources Division, Bureau of Resources & Development
Victorio Vherbelau	Vice Chairman, Palau Maritime Authority
Frannny Reklai	Manager, Palau Fishing Authority & Palau Federation of Fishing Association
Koichi Wong	National Planner, Republic of Palau
August Remoket	Director, Bureau of Public Works
Steven Kanai	Director, Bureau of Foreign Affairs
Ramon Rechebei	Chief, Techincal Assistance Division, Bureau of Foreign Affairs
Hinao Soalablai	Governor, Peleliu State Government
Robert Kintol	State Treasurer, Peleliu State Government
Cordino Soalablai	Liaison Officer (Koror/Peleliu), Peleliu State Government
Yoshio Koshio	Consul, Consulate General of Japan
Katsumi Kira	Fisheries Expert, Overseas Fishery Cooperation Foundation (OFCF)
Ryo Nishii	Fisheries Expert, OFCF

MINUTES OF DISCUSSIONS

BASIC DESIGN STUDY

ON

THE PELELIU STATE RURAL FISHERIES DEVELOPMENT PROJECT

IN

THE REPUBLIC OF PALAU

In response to a request from the Government of the Republic of Palau, the Government of Japan decided to conduct a basic design study on the Peleliu State Rural Fisheries Development Project (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Republic of Palau a study team, which is headed by Mr. Senichi Kimura, Deputy Director, Basic Design Study Division, Grant Aid Study and Design Department, JICA, and is scheduled to stay in the country from December 13 to December 26, 1993. The team held discussions with the officials concerned of the Government of the Republic of Palau and conducted a field survey at the study area. In the course of discussions and field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the basic design study report.

Koror, December 17, 1993

Senichi Kimura
Leader,
Basic Design Study Team,
JICA

Marcelino Melairei,
Minister of
Resources and Development,
Republic of Palau

Witnessed by:

Koichi L. Wong
National Planner,
Republic of Palau

ATTACHMENT

1. Objectives

The objective of the Project is to enhance nearshore fisheries production and improve the handling and marketing of the resulting fish landings by making available improved land based small scale nearshore fishery support facilities in the State of Peleliu.

2. Project site

The project site is the northern end of Peleliu State as shown in the location map as attached in the Annex I.

The land for the Project site has been acquired by the Peleliu State government.

3. Responsible agency

Ministry of Resources Development has overall responsibility for the Project in coordination with the Office of the President. The Peleliu State government is also responsible for the implementation of the Project.

4. Items requested by the Government of Republic of Palau

After discussions with the basic design study team, the items listed in Annex II were finally requested with the priorities by Palau side.

However, the details of the components of the Project i.e. scale, specification, number, and so forth will be examined and finalized after further studies. Especially among these components, the study team has deemed the fish carrier boat should be justified from aspect of financial and managerial feasibility to avoid any foreseeable burden on the implementation organization.

5. Japan's Grant Aid system

(1) The Government of Republic of Palau has understood the system of Japanese Grant Aid explained by the team.

(2) The Government of Republic of Palau will take necessary measures, described in Annex III for smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

6. Schedule of the study

(1) The consultants will proceed to further studies in Palau, until December 26, 1993.

(2) JICA will complete the final report and send it to the Government of Republic of Palau by March in 1994.

7. Counterpart fund

If and when the products, purchased by the grant from the Government of Japan, are sold or leased to fishermen, the Government of Republic of Palau shall take necessary measures to ensure the followings:

(1) to deposit the funds generated from the sale (or the lease) of fishing gear into a separate account,

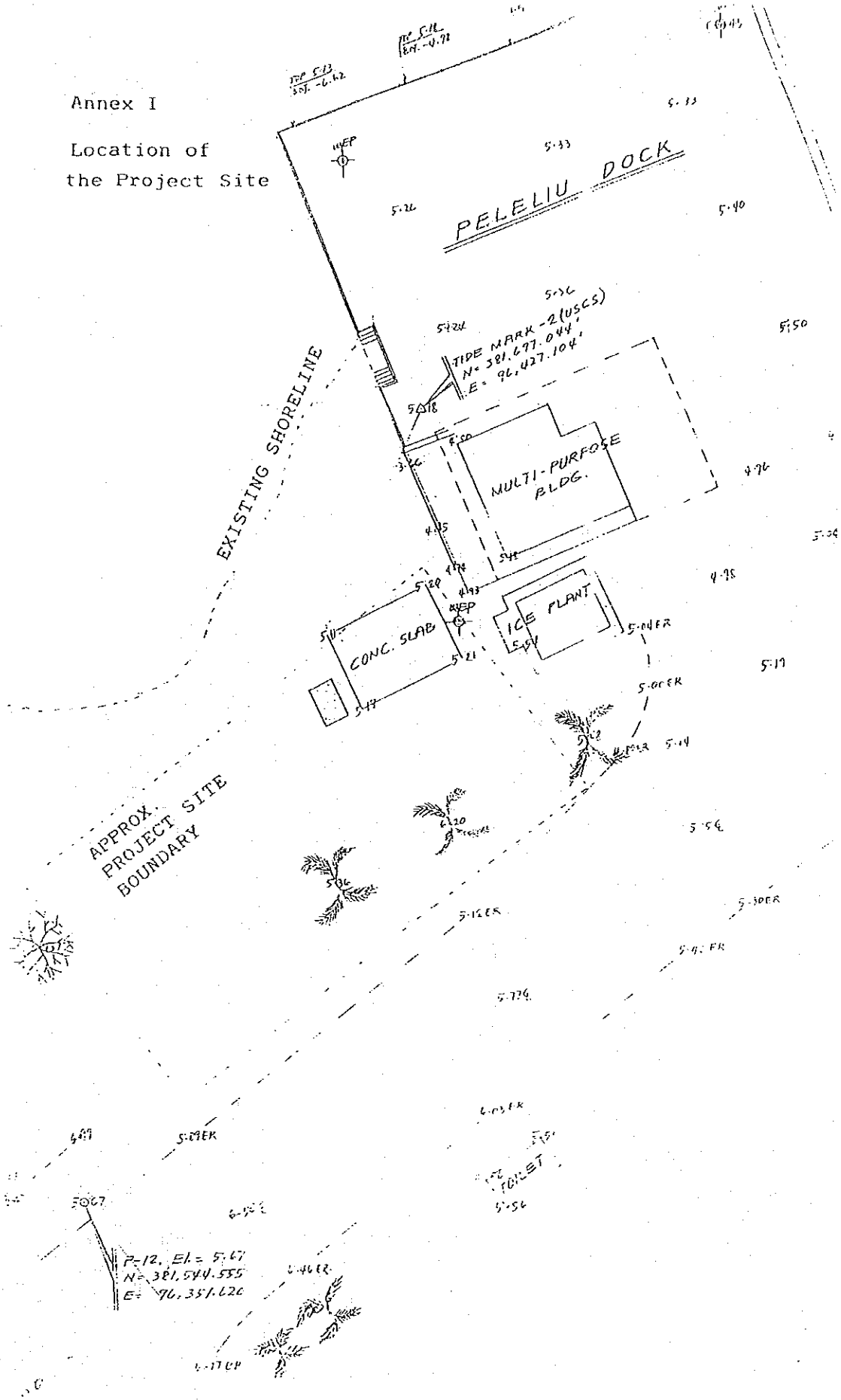
(2) to utilize the funds for the purpose of promoting fishery in Republic of Palau (or in the State of Peleliu),

(3) to consult with the Government of Japan before utilizing any of the funds, and

(4) to provide, on the request of the Government of Japan, a report on the use of the funds and the balance in the account.

Annex I

Location of
the Project Site



Annex II

Items Requested by the Government of the Republic of Palau with priority;

(A) .... Indispensable
(B) .... First priority
(C) .... Second priority

Descriptions	Priority
- Ice making plant with ice storage bin and generator	(A)
- Building(s) Office Workshop Storage Shed to sotck fuel drums Restroom and shower facilities Related necessary facilities	(A)
- Freshwater tank	(A)
- Truck crane	(B)
- Outboard motors (approx.75PS)	(B)
- Fishing gears Gill net Hand line Trolling	(C)
- Fish carrying boxes	(C)
- Fish carrier boat Approx. 9m in overall length Diesel inboard engine of approx. 90PS output	(B)

Annex III

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

1. To clear and level the site prior to commencement of the Project.

2. To secure yard for stocking material and constructing temporary facilities at the Project site, if necessary.

3. To provide necessary permissions, licenses and other authorizations for smooth implementation of the Project.

4. To provide facilities for distribution of electricity, water supply, drainage, telephone line and other incidental facilities, when needed.

5. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.

6. To ensure prompt unloading and customs clearance at ports of disembarkation in Republic of Palau and internal transportation therein of the products purchased under the Grant.

7. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Republic of Palau with respect to the supply of the products and services under the Verified Contracts.

8. To accord Japanese Nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into Republic of Palau and stay therein for the performance of their work.

9. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant.

10. To bear all the expenses other than those to be borne by the Grant, necessary for construction of facilities as well as for the transportation and the installation of the equipment.

11. To coordinate and solve any matters which may arise with third party and inhabitants living in the Project area during implementation of the Project.

V Others

V－1 Meteorological Data at Koror Island

Average Temperature (℃)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Monthly	27.1	27.1	27.4	27.8	27.9	27.6	27.4	27.4	27.6	27.7	27.8	27.5	27.6
Day max.	30.4	30.4	30.8	31.2	31.3	31.0	30.7	30.6	30.8	31.1	31.3	30.8	30.8
Day min.	23.8	23.8	24.0	24.3	24.5	24.2	24.1	24.2	24.3	24.4	24.4	24.2	24.2

Average Relative Humidity (%)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
09:00 H	81	80	79	78	80	81	81	81	80	80	80	80	80
15:00 H	76	75	74	74	77	78	78	78	77	77	77	77	77

Precipitation (mm)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average	283	204	208	259	332	373	415	386	332	347	278	329	3,747
Maximum	715	570	558	703	697	859	884	841	588	571	560	536	4,424
Minimum	54	16	43	42	146	150	105	175	26	172	119	38	2,910

Wind Speed (meter/sec.)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean	3.7	3.8	3.8	3.3	2.9	2.7	2.9	3.0	3.1	3.2	2.9	3.3	3.2
Pre. Dir	NE	ENE	NE	ENE	E	E	NW	SW	W	W	NE	ENE	NE
Maximum	20.1	16.5	32.6	26.8	20.6	25.9	24.1	23.2	23.2	22.8	37.1	22.4	37.1
Dir.	NW	NE	S	SW	S	W	SW	NW	W	SW	SW	N	SW
Year	1985	1990	1967	1976	1989	1990	1986	1986	1991	1991	1990	1972	1990

Source: National Climatic Data Center, USA, 1992 (1963-1992)

V－2 Breakdown of Operation Costs

(1) Shore-based Facilities

1)Personnel Expense

Genral Base Manager	$450 x 12 months	=5,400
Sales Manager	$300 x 12 months	=3,600
Total		$9,000

2)Electricity

Ice making unit A: 12-hour operation in the night time, 300 days per year
B: 12-hour operation in the night time, 24 days per year
(2-day operation per month for peak demand periods)

3.75kw x 12hr x 324days = 14,580kwh
14,580kwh x 9cents/kwh = $1,313

3)Maintenance Cost

Annual budget for the maintenance for the planned facilities and equipment has been estimated at 2% of the ex-go-down price of the ice making units, generator, workshop equipment, and the crane-amounted truck.

$137,000 x 2% = $2,740

4)Fuel Cost

Emergency generator : 25PS x 180g/h x 12hr x 15days /0.84 x $360/kl	=$350
Crane-amounted truck: 8 l/hr x 0.5hr x 270days x $360/kl	=$389
Total	$739

(2) Fish Carrying Vessel

1)Personnel Expense

Skipper	$400 x 12 months	=$4,800

2)Fuel Cost

Diesel fuel:	110PS x 175g/h /0.84 x 4hr x 270days = 24,750 ltr.	
	24.750 kl x $330/kl	= $8,168
Lubicant :	$8,168 x 10%	= $ 817
Total		$8,985

3)Maintenance Cost

A 2% of the ex-go-down price of the vessel
$147,000 x 2% = $2,940

V－3 Breakdown of Project Revenues

(1) Shore-based Facilities

1)Catch Sales
(price to buy from fishermen) - (price to sell to PFFA) = 10 cents/lb.
10 cents/ib. x 264,500 lb. = $2,645

2)Ice Sales
Current ice price: 11 cents/kg
11 cents/kg x 75 tons = $8,250

3)Sale of Purchased Fuel
PFFA selling price for gasoline at Koror: $1.50/gal
Purchase price by the project : $1.13/gal
Transport cost : $0.12/gal

$1.50 - $1.13 -$0.12 = $0.25/gal
Approx. 9,510 gal x 0.25 = $2,377

4)Interest Income from the Operating Fund
Sales of the equipment under the project ($110,000) is assumed to be made evenly over a 4-year period. Average interest income over a 10-year periodis set as follows;

$ 27,500 x 34 years x 3% x 1/10 = $3,215

(2) Fish Carrying Vessel

1)Transport Revenue
Increased new demand can be expected to be generated by a shift from individual boats to the planned fish carrying vessel, which is estimated to correspond to a half of the current passenger and freight revenue by the 2 existing carrier vessels.

As a resulted increase of the transport revenue,
$2,240/month x 1/2 x 12 months = $13,440

V－4 List of the Equipment

1. Outboard Engines and spare parts	Transom height approx. 20"	20 units
2. Tools for Outboard Engine Repairs		
2.1 Hydraulic press machine	15 tons	1 unit
2.2 Bench type drill	13 mm	1 unit
2.3 Air compressor	8 - 10kgf/cm2	1 unit
2.4 Work bench	Approx. 1,500 x 900 x 740mm	2 sets
2.5 Electric tools	Drill, grinder, and others	1 lot
2.6 Hand tools	Wrench, screwdriver, pliers, and others	1 lot
2.7 Battery charger	6 - 12V	1 unit
3. Fishing Gear		
3.1 Hand line	Lead line, hook, sinker, and swivel	1 lot
3.2 Trolling lure	Lure head "Octpus" type	240 sets
3.3 Gill net	Nylon monofilament, 3" str mesh 25MD, 400 ft.	36 rolls
3.4 Insulated fish box	160 ltr.	30 pcs
	90 ltr.	30 pcs
3.5 Fish barrel	50 ltr.	30 pcs
3.6 Platform scale	300kg, minimum reading 100g	1 unit
4. Fish Carrying Vessel	FRP construction, OAL : Approx. 10m, Engine: Marine diesel engine, Approx. 110PS	1 vessel
5. Crane-amounted truck	Loading capacity: 2 tons Lifting capacity: 500kg/4.5m	
6. Office Furniture		
6.1 Desk	Approx. 1,200 x 700 x 700mm	4 sets
6.2 Chair		4 sets
7. Ice Making Plant	500kg/24hr, plate ice	2 units
8. Emergency Generator	20KVA, 60Hz, Fuel tank: 200 ltr.	1 lot
9. Water Catchment Tank	FRP construction, 20,000 ltr.	1 lot