4. BASIC DESIGN

4-1 SELECTION OF FARM MACHINERY

4-1-1 Farm Machinery Selection Policy

The farm machinery recommended will be selected according to the following conditions and policies:

(1) The machinery for rice cultivation will be provided under the "Rice Mechanization Pilot Project" which is presently being carried out under the cooperation of the Japanese and Egyptian Governments. Therefore, rice cultivation machinery will in general not be included initially in this project except for manuring and land preparation. However, under this project during planning, provisions for possible later inclusion of said machinery in the project has been considered in the design and use of workshop and maintenance facilities.

(2) In general, only machinery for upland cultivation will be selected for inclusion in the Pilot Center scheme.

(3) Farm machinery selection will be based on projected cropping patterns. Proposed cropping patterns will give due consideration to existing patterns as well as to minimizing changes in the same.

(4) Farm machinery selected is classified into two groups; non-conditional and experimental. The two groups will hereafter be termed "practical machinery" and "experimental machinery".

(5) Operation of Pilot Center will be expanded in three phses. The adaption of farm machinery will, therefore, also be divided into three phases. The service acreage of each phase is as follows;

1st phase	2,100ha
2nd phase	3,200ha
3rd phase	4,200ha

(6) Farm machinery to be tested at the experimental level should be introduced in the first phase. Introduction of machinery for the latter phases will be scheduled after evaluation of test results obtained during the first phase.

(7) Daily operation of machinery will be 8 hours during the peak farming season, but 6 hours at all other times.

(8) Selection of types and number of machines has been based on the objective to increase cropping intensity from a present 170% to 200% in the future.

Justification for the selection of farm machinery is presented hereunder.

4-1-2 Justification of Selection

(1) Manuring

Egyptian farms are cultivated under the continuous crop rotation system along the Nile River and its delta area. Consequently fertility of cultivated land is declining year by year. Provision for sufficient manuring is thus an important and essential role of the Pilot Center.

Mechanization of manuring is extremely inadequate, only 2% as shown in Table II-15, while most manuring (71%) is completed manually. Mechanization of this activity will increase the manuring rate, resulting in production increase. Therefore mechanical manure spreaders and manure loaders are recommended as practical machinery.

The rate of tractor use declines just prior to preparation of land for winter crops (July to August). To increase the coefficient of operation of the manure spreader from 0.3 to 0.6, dump trailers will be used during this period to deliver appropriate amounts of manure to designated dump sites where the manure can be spread at a seasonally opportune time.

(2) Plowing

Deep plowing and adequate turning of the soil by the moldboard plow or disc plow can improve yields as shown in Table IV-1 and IV-2, but the sticky nature of Egyptian soil prohibits use of the said plows. Therefore the Pilot Center envisions the use of the chisel plow commonly used in Egypt for about 70% of the service area. The remaining service area will be plowed by the disc plow. This equipment will be included in the list of experimental machinery.

In the case of vegetable crops, the rotary tiller will be included for experimental use.

(3) Harrowing and Leveling

Harrowing and leveling work have been carried out mainly by use of the tooth harrow. After spreading manure it becomes almost impossible to plow in the soil deeply with the chisel plow. Therefore to plow in manure more deeply, both the disc harrow as well as the tooth harrow are recommended as part of the list of practical machinery. The cover areas of the tooth harrow and disc harrow are projected at 50%.

The number of drive harrows required for harrowing and leveling rice fields has been estimated, but the actual quantity, of this equipment will be determined after review of the final report to be prepared under the "Rice Mechanization Pilot Project".

(4) Sowing and Transplanting

Sowing and harvesting require a substantial amount of manpower. Mechanization of these activities would result in a shorter sowing period and ensure an increase in cropping intensity. The sowing machines required for maize and beans, wheat and clover are corn-planters, grain drills and broadcasters.

The estimated number of rice transplanters was determined by the size of the Pilot Center. The actual quantity of this equipment however will be decided after review of the final report to be prepared under the "Rice Mechanization Pilot Project".

(5) Ridging, Cultivating and Weeding

Ridging and farm irrigation ditch work takes place during the intermediate growing period of cotton and maize. To increase the efficiency of the tractor, a ridger makes up part of the inventory of practical machinery.

Inter-row cultivation and weeding for bean, vegetables, cotton and maize crops are recommended during the inceptive and intermediate growing periods. Chemical fertilizer will be used during the cultivating period and therefore cultivators with a fertilizer attachment are recommended as part of the list of practical machinery.

(6) Pest and Insect Control

Pest and insect control is required for beans, vegetables, maize, and especially cotton crops. As it is only possible to use the boom sprayer for these crops before mid-growing season, the boom sprayer will be equipped with a gun-type nozzle with an appropriate length of hose afixed, making it possible to spray chemicals from the field levee. The boom sprayer makes up part of the practical equipment.

(7) Harvesting

Although harvesting requires excessive human labor, mechanization of this work has not yet been strongly promoted in Egypt. A delay in harvest can cause a delay in sowing and thereby decrease the yield of subsequently cultivated crops. Mechanization of harvesting therefore will not only overcome the farm labor shortage but also contribute to an increase in yield. The machinery recommended for each type of crop is as follows;

1) Wheat Harvester

The delay of wheat harvests influences the yield of subsequently cultivated crops. To achieve mechanization of the wheat harvest the head feeding rather than the conventional type of combine is recommended as the latter is too large for the Egyptian field size. Although in future head feeding combines will play an important role in wheat harvesting, very few operators of this equipment are presently available in Egypt. Therefore the walking-type mechanical reaper and the self-

feeding thresher are recommended for initial practical machinery to improve the efficiency of wheat harvesting. The head feeding combine will first be included in experimental machinery, an appropriate number to be proposed if successful after a one year trial period.

2) Clover Harvester

Few reciprocating mowers are presently used in Egypt to harvest clover, the majority of clover fields still being harvested by hand. Clover is marketed principally in the local market. If, however, the quality were improved, the worth of clover as a commercial commodity would increase. To preserve the quality of clover, timely reaping, drying and baling is necessary. For this reason, mowers, tedder rakes and tight balers have been included in the list of practical machinery. The number of machines required was calculated in consideration of both the frequency of harvest, which can occur either two or four times a year, and the area of land in which other crops have been planted.

3) Bean Harvester

Increased bean crops are projected, with soybean as the major crop. The various harvesting methods differ depending on the size of bean type. Therefore only bean harvesters are included in the list of experimental machinery in this category, the 3-P tractor mount bean harvester being specifically recommended.

4) Rice Harvester

The rice harvester will be determined and procured after review of the final report to be prepared under the "Rice Mechanization Pilot Project".

5) Cotton Harvester

Although Egyptian cotton is of good quality given its long fiber, it is difficult to mechanize the harvesting work because of the location of the flower on the plant, and the height and infinite inflorescence of the plant itself. For these reasons no machine has been recommended for harvesting this crop. However, the dead stems will be reaped after

harvest by the mower minimizing the effect on subsequent sowing by quick removal of the same from the field.

6) Maize Harvester

Two types of maize harvesting, namely green fodder maize and grain harvesting will be considered for mechanization. Both will involve reaping of the maize stems. For this purpose a double knife mower is recommended as practical machinery. The maize stems however, should be removed manually after being cut down to avoid obstruction in the reaping of the next row.

7) Dried Rice and Wheat Straw,
Maize and Dried Clover Stem Harvester

Dried rice and wheat straw, and maize and dried clover stems will be chopped for animal fodder after harvest. To perform this task, a tractor mounted fodder chopper will be included in the list of practical machinery.

(8) Irrigation and Drainage Work

Mechanization of irrigation water pumping is still as low as 36%. The majority of farmers have been pumping up irrigation water by utilizing animal-driven pumps (Sakia). Farmers intend to mechanize this task by renting low lift pumps. In this way livestock can be rested and utilized more productively in harvesting crops. As the most popular irrigation water pump at present is a diesel powered pump (ø80m/m at 7 to 8 PS), the same type of pump is accordingly recommended as practical machinery. The rate of irrigation water supply should be 5mm per day for upland crops and 10mm per day for lowland crops.

Irrigation and drainage ditches have mostly been constructed manually. However, due to farmers' requests for mechanization of ditch digging work, a ditcher capable of excavating a 45 to 50cm depth is included in the list of practical machinery. This ditcher will be used during the slack periods throughout the year.

Egyptian soil has a heavy, sticky clay-like consistency with high salinity. Therefore improvement of drainage and subsoil construction by the

use of subsoiler is required. The subsoiler included in the list of practical machinery will be the two-tine vibrating type so that it can be drawn by the 65 PS class tractor. This will also improve the efficiency of the tractor.

(9) Tractor

The 4 wheel drive 65 PS class tractor has been selected on the basis of the requirements of the other machinery listed above. It will be utlized to pull the plow, harrow, seeder and other similar equipment. The two wheel drive tractor, 35 PS class, has also been selected and included in the list of practical machinery. This tractor will be utilized for spreading manure, inter-row cultivation, pest control and other related lighter work.

4-1-3 Prospective List of Agricultural Machinery

The list of projected farm machinery shown in Table IV-3 was determined after due consideration of the changes which are envisioned to occur in cropping patterns with increased agricultural mechanization.

The number and type of each machine for each crop was calculated as shown in the equation below and the total number of machines has been calculated by adding the figures marked in the list of machinery.

Number of Machines

= (cover area (ha) x rate of work (hr/ha)) + (rate of working hours (hr/day) x working days (day) x working coefficient)

The cover area, rate of work, and rate of working coefficient are shown in Table IV-4.

4-1-4 Farm Machinery Allocation Schedule

The actual machinery used under the project will be allocated according to a prepared schedule appropriately coordinated with the overall management program. The management program is separated into 3 Phases, the

1st Phase covering 2,100ha, the second an additional 1,100ha and the third another 1,000ha. Therefore the actual number of farm machines will be determined phase by phase in accordance with the progress of the management program.

However in the case of experimental machinery, a few trial machines will be allocated during the 1st Phase of the management program. If, after experimental use, this equipment is considered suitable for the Pilot Center, the necessary number of machines will be allocated during the 2nd Phase of the management program.

The equipment to be used in rice cultivation was estimated and is shown in Table IV-5. This equipment however, will be allocated only after review of the final report to be prepared under the said "Rice Mechanization Pilot Project".

4-1-5 Farm Machinery Maintenance Program

The workshop of the Pilot Center maintains the farm machinery of both the Center and the substations in the following manner:

(1) Overhaul of all tractors and combines belonging to the Center and substations at 3 year intervals, overhaul of each unit requiring 3 days.

(2) Periodical inspection of all tractors belonging to the Center every 3 months, inspection of which requires one day.

(3) Clearing and repairing before housing of all combines and rice-transplanters at the Center within 60 days after use, to be completed within one day.

(4) Major repairs for all tractors and combines of the Center and substations. It is estimated that such repairs will be necessary every 2 years with a 2-day repair period for each tractor unit. In the case of combines however, an estimated one and a half days of repair will be needed at a frequency of every 3 years. Repairs must be performed within 40 days after breakdown.

The probable frequency of defective units in each of the above cases is estimated by the following equations.

Case (1)

Number of units:

(210 units x 5 stations) - (3 years x 52 weeks x 2 units/week)

= 3.4 units

Case (2)

Number of units:

(160 units x 4 times/month) - (52 weeks x 6 units/week)

= 2.1 units

Case (3)

Number of units:

(50 units - 50 days) + (48 units - 50 days)

= 2.0 units

Case (4)

Number of units:

(160 units x 5 station) - (2 times/year x 52 week x 3 units/week) +

(50 units x 5 stations) - (2 years x 40 days x 2 units/day)

= 4.1 units

The estimated total number of defective units is thus approximately 11.6 units at any given time which will necessitate the provision of at least 12 repair bays.

When equipment breaks down in the field, the mobile workshop will be responsible mainly for the repair of the same although it may also repair substation equipment when necessary.

Implements of the Pilot Center will be repaired in the implement repair room.

Table IV—1 YIELD OF COTTON, WHEAT AND MAIZE AS AFFECTED BY PLOWING DEPTH AND TYPE OF PLOW

Plowing Depth (CM)	Type of Plow		
	Baladi	Chisel	Moldboard
	Cotton yield ka /feddan		
13	948	947	942
25	952	917	1010
	Wheat yield ka/feddan		
13	1375	1358	1433
25	1409	1443	1591
	Maize yield ka/feddan		
13	1078	1118	1120
25	1194	1284	1284

Source: ERA 2000, INC.

Table IV—2 YIELD OF MAIZE GRAIN AS AFFECTED BY TILLAGE

Plowing Treatment	Grain yield kg/feedan	
	Year One	Year Two
Baladi	362	577
Baladi + Subsoil	340	675
Chisel	407	642
Moldboard	473	560
Disk	488	716
LSD .05	89	120

Source: ERA 2000, INC.

Table Ⅳ－3　TYPES OF INTRODUCED AGRICVLTURAL MACHINERY

	WHEAT 1,100ha	CLOVER 1,000	BEANS 480	W. EXTENT. 1,380	W. VEGET. 130	RICE 1,950	COTTON 1,580	MAIZE 370	S. VEGET. 290	J	F	M	A	M	J	J	A	S	O	N	D	J	TOTAL
MANURE SPREADER	9	9	4	11	—	31	25	6	5	▲	(CT)		(MZ) SV	(R)						(WT)			
MANURE LOADER	9	9	4	11	—	31	25	6	5	▲	(〃)		(〃)	(〃)						(〃)			
CHISEL PLOW	9	9	4	11	—	16	13	3	—	×	(〃)		(MZ)	(〃)						(WT.CL. WE.BE)			
DISC PLOW	4	4	2	5	—	7	6	2	—	×	(〃)		(〃)	(〃)						(〃)			
TOOTH HARROW	3	3	2	4	—	—	5	1	—	×	(〃)		(〃)							(〃)			
DISC HARROW	6	6	3	7	—	—	9	2	—	×	(〃)		(〃)							(〃)			
DRIVE HARROW		—	—	—	—	28	—	—	—	×				(〃)									
ROTARY TILLER	—	—	—	—	2	—	—	—	5	×			(S.V)							(WV)			
RIDGER	—	—	—	—	—	—	25	—	—	▲	(CT)												
CULTIVATOR	—	—	6	16	2	—	18	5	4	▲		(CT)			(MZ.CT S.V)						(BE)		
SPRAYER	—	—	3	—	1	—	9	—	2	×(BE)			(CT)			(S.V)							
MOWER	—	18	—	—	—	—	17	4	—	▲	(CL)	(CL)	(CL)						(CL)	(MZ)	(CL)	(CL)	
CORN PLANTER	—	—	13	—	—	—	(43)	10	—	×	(CT)			(MZ)							(BE)		
CUTTER	22	11※	—	—	—	26 (45D)	—	30 (15D)	—	▲			(WT)	(CL)							(R)	(MZ)	
GRAIN DRILL	10	—	—	—	—	—	—	—	—	×										(WT)			
BROADCASTER	—	7	—	—	—	—	—	—	—	▲									(CL)	(CL)			
CULTIPACKER	—	7	—	—	—	—	—	—	—	▲									(CL)	(CL)			
REAPER	10	—	—	—	—	—	—	—	—	—		(WT)											
THRESHER	9	—	—	—	—	—	—	—	—	—		(WT)											
COMBINE	18	—	—	—	—	(50)	—	—	—	—		(WT)								R)			
TEDDERRAKE	—	7	—	—	—	—	—	—	—	▲	(CL)	(CL)									(CL)	(CL)	
TIGHT BALER	—	4※	—	—	—	—	—	—	—	×	(CL)	(CL)									(CL)	(CL) (CL)	
PUMP	23	23	10	28	3	80	32	8	6	—	(WT.CL.BE.WV.WE)			(CT)	(R. MZ) (SV)					(WT.CL.BE.WV.WE)			
DITCHER	3	3	2	4	1	5	4	1	1	▲			(CT.R.MZ.SV)								WT.CL.BE.WV.WE)		
TRAILER	16 (5T)	23 (7.5T)	2 (1.2T)	15※(5T)	1 (1.5T)	25※(9T)	14 (3T)	14 (20T)	2 (2.0T)	▲×	(CL)	(CL) (CT)	BE) (WH)	(MZ)	(R)			(CL) (MZ)		(WT.CL.BE.WV.WE) (R)	(CL)	(CL) (CL)	
RICE SEEDLING SET	—	—	—	—	—	4	—	—	—	—					(R)								
RICE TRANSPLANTER	—	—	—	—	—	48	—	—	—	—					(R)								
COTTON SEED COATER	—	—	—	—	—	—	30	—	—	—	(CT)												
BEAN HARVESTER	—	—	4	—	—	—	—	—	—	×													
SUBSOILER	—	—	—	—	—	—	—	—	—	×													
TRACTOR 35PS										⑧⓪	67	27	67	64	62	33	39	76	⑧⓪	46	59		80
TRACTOR 65PS										69	66	16	52	69	51	12	33	70	⑧⓪	43	27		80

Abbreviation　　Meaning

W. EXTENT : Extension of winter crops for winter fallow area
W. VEGET : Winter vegetable crops
S. VEGET : Summer vegetable crops

CT : Cotton crop　　CL : Clover crop
MZ : Maize crop　　WE : Extension of winter crops for winter fallow area
SV : Summer vegetable crops　　BE : Bean crop
R : Rice crop　　WV : Winter vegetable crops
WT : Wheat crop　　WC : Winter crops

Table IV—4 CALCULATION OF TRACTOR STANDARD

	Work Ability	Working Hours	Working Days	Efficiency	
	(hr/ha)	(hr/day)	(days)	summer	winter
MANURE SPREADER	1.5	8	40	0.3	0.6
MANURE LOADER	—	8	—		—
CHISEL PLOW	2.5	8	40		0.7
DISK PLOW	2.8	8	40		0.7
TOOTH HARROW	1.2	8	40		0.7
DISK HARROW	2.3	8	40		0.7
DRIVE HARROW	2.4	8	40		0.7
ROTARY TILLER	2.9	6	40		0.7
RIDGER	2.0	6	30		0.7
CULTIVATOR	1.4	6	30		0.7
SPRAYER	0.7	6	30		0.7
MOWER	1.5	6	20		0.8
CORN PLANTER	2.6	8	20		0.6
CUTTER	5.0	6	30		0.7
GRAIN DRILL	1.3	8	30		0.6
BROADCASTER	0.7	8	30		0.5
CULTIPACKER	1.1	8	30		0.8
REAPER	4.0	8	30		0.7
THRESHER	4.0	8	30		0.8
COMBINE	4.3	8	30		0.7
TEDDER RAKE	0.8	6	30		0.7
TIGHT BALER	0.8	6	30		0.7
PUMP	0.13	8	1		0.8
DITCHER	1.08	6	100		0.7
TRAILER	12Ton /day	8	—		—
RICESEEDLING SET	0.4	8	40		0.6
RICE TRANSPLANTER	2.0	8	40		0.7
COTTON SEED COATER	2.0	8	45		0.3
BEAN HARVESTER	1.4	8	30		0.7
SUBSOILER	4.0	6	40		0.8
TRACTOR 35PS	—	—	—		—
TRACTOR 65PS	—	—	—		—

Table Ⅳ—5

FARM MACHINERY TO BE INTRODUCED

Machine	PROCUREMENT			TRIAL PROCUREMENT		RICE MACHINE	DESCRIPTION
	1st	2nd	3rd	1st	Final		
MANURE SPREADER	21	11	10				1.5 Ton Loading Capa.
MANURE LOADER	21	11	10				0.3 m³ Bucket
CHISEL PLOW	17	8	8				7 Tines 3P Mount
DISC PLOW				2	13		26″ × 3 Blades
TOOTH HARROW	6	3	3				30 Tines × 4 Blocks
DISC HARROW	11	6	5				20″ × 24 Blades
DRIVE HARROW						28	2.8 M Width
ROTARY TILLER				2	3		1.8 M Width
RIDGER	13	6	6				3 Rows
CULTIVATOR	9	5	4				3 Rows W/Fertilizer Applicator
SPRAYER	5	2	2				7 Liter /min. Discharge
MOWER	9	5	4				1.5 M Width W /W-Knife
CORN PLANTER	7	3	3				4 Rows W/Fertelizer Applicator
CUTTER				2	28		Cylindrical Type 3P Mount
GRAIN DRILL	5	3	2				13 Rows 3P Mount
BROADCASTER	4	2	1				40 Liter Hopper 3P Mount Type
CULTIPACKER	4	2	1				2.4 M Width 3P Mount
REAPER	5	3	2				1.2 M Width Without Knotter
THRESHER	5	2	2				45±10cm×50±10cm Threshing Drum
COMBINE				5	13	32	1.4 ± 0.1M Reaping Width
TEDDER RAKE	4	2	1				Wheel Type
TIGHT BALER	2	1	1				10 to 14 Ton/Hr Working Capa. W/Pick-up
PUMP	63	32	31				80 m/m Dia with 7 PS Engine
DITCHER				2	11		45 to 50 cm Depth × 30 to 40 Width on Bottom
TRAILER	23	12	11				2 Ton Loading Capa W/Dump
RICE SEEDLING SET						4	W /Seeding Box
RICE TRANSPLANTER						48	6 Rows Riding Type
COTTON SEED COATER				2	28		Motor Driven Mixer Type
BEAN HARVESTER				2	2		2 Rows Without Knotter 3P Mount
SUBSOILER	11	6	5				Vibrating 2 Tine Type 3P Mount
TRACTOR 35PS	40	20	20				35PS±5PS at Rate r.p.m.
TRACTOR 65PS	40	20	20				65PS±5PS at Rate r.p.m.
TOTAL							

Table IV—6 SCOPE OF WORK FOR CENTER STATION WORKSHOP AND NUMBER OF TRACTORS

	Tractor	Combine	Planter
Activity of ①	2.6	0.8	—
Activity of ②	2.1	—	—
Activity of ③		1.0	1.0
Activity of ④	2.6	1.5	—
Total = 11.6			

Note: ① Overhaul of all tractors and combines belonging to the Pilot Center and substations at 3 year intervals, overhaul of each unit requiring 3 days.
② Periodical inspection of all tractors belonging to the Pilot Center every 3 months, inspection of which requires one day.
③ Clearing and repairing before housing of all combines and rice transplanters at Pilot Center within 50 days after use, to be completed within one day.
④ Major repairs for all tractors and combines of the Pilot Center and substations. (it is estimated that such repairs will be necessary every 2 years with a 2-day repair period for each tractor unit, and every 2 years with a 0.5-day repair period for each combine unit.)

4-2 BASIC DESIGN OF FACILITIES

4-2-1 Project Area

Sembellawain is located about 160km from Cairo, about 70km from Benha, and about 80km from Meet El Dyba, where the Rice Mechanization Center is to be constructed. The road from Mansura, which is about 8m in width, is well-paved. Sembellawain is a small, old town which spreads along the El Shoon Canal and centers around a railway station connecting Mansura and Zagazig. Its municipal facilities include a telephone office, fire station, Ministry of Agriculture branch office, and bus and taxi depots located at the center of the town. On the opposite side of the proposed site toward the southwest is a new residential area where several apartment houses have recently been built. Some additional apartment houses are now under construction in the area.

(1) Project Site

The government owned proposed site is under the control of the Sembellawain Branch of the Ministry of Agriculture, and is located at the northern tip of the town.

The El Shoon Canal, which flows alongside the public road to the west, is envisioned to provide irrigation water for the practice field. As the site is slightly lower than the roads around it, banking will likely be necessary.

(2) Natural Condition of the Region

1) Climate

Sembellawain, located about 160km north of Cairo, in Dakhalia State, is situated on the Nile Delta. The climate of this area is dry throughout the year, while the maximum temperature in the summer reaches approximately 35°C. However, even during the hottest season, it is cool in the shade due to low humidity. Northwesterly winds often blow, particularly in the summer. In a well-ventilated room, therefore, the heat is more tolerable than would be normally expected.

On the other hand, there is extreme temperature fluctuation during the winter season. In one day, the temperature may range from a minimum

7.2°C to a maximum 19.2°C. Therefore, indoor heating is customary in winter. Toward the end of the winter, a southwesterly monsoom called "Hamsiin" blows through the region, resulting in heavy dust storms.

2) Geological Features

The proposed site is covered with a greyish black clay soil called "cotton soil", which consists of alluvial soil deposited by the flooding of the Nile River. This soil is very hard when dry but it significantly loosens and expands when wet.

Holes for observing strata and geological features, $2m^2$ x 2m deep were dug at three points in the proposed site, east and west. Groundwater was measured in the test holes and the groundwater level was found to be 1.5m lower than the site level, or almost the same as the water level in the canal. The groundwater, which was recorded by an electrical conductivity meter, is the same for both municipal supply and well water, with NaCl equivalent of 155 ppm. This is within the World Health Organization safety limit. Therefore, groundwater on the site is judged to be suitable for drinking as long as the concentration of salts does not drastically increase.

According to data obtained by the cone-penetrometer and the opinion of the Dakhalia State Branch Office, Ministry of Construction, soil bearing capacity as high as $10t/m^2$ (-1.5m) can be expected at the proposed site.

(3) Infrastructures Around Project Site

1) Electric Power

Electric power which is transmitted from Mansura City at 66kV is to be decreased to 11kV at Sembellawain substation before being supplied to the site. The hospital to the west of the site receives electric power at 11kV. Power is reduced to 380V/220V (50Hz) by a cubicle type transformer before being distributed within the hospital.

An 11kV transmission line lies along the northern tip of the proposed site from which a branch line can be led into the site. The Dakhalia State Branch Ministry of Electric Power plans to transmit power to Sembellawain on a loop basis.

2) Telephone

There are 30 telephone repeater stations in Dakhalia State. The Sembellawain Telephone Office plans to expand this to 4,000 circuits within 1983. Therefore, there will be sufficient facilities for connection to the site.

An overhead telephone line lies to the west of the site, but there is a significant shortage of intercity telephone circuits. Thus the communication system requires improvement if adequate service to the site is to be realized.

3) Water Supply

Water which is pumped up from wells at the Sembellawain Pump Station will be supplied to the site. Asbestos pipes, each ø100mm and ø150mm are situated beneath the roads to the east and west of the site. Both pipes are used to supply water to remote villages. Therefore it appears that the sinking of wells within the proposed site will be required, since a large quantity of water will be used for washing equipment, etc. The water supply and well systems will be coordinated together.

4) Drainage

There is no sewage treatment facility in Sembellawain. Therefore, a sewage treatment facility must be planned for the Pilot Center.

As there are no regulations on drainage into the irrigation system located on the southeastern border of the site, it is possible to drain properly treated water into the same.

5) Gas

As there is no municipal gas supply system, gas is supplied from butane gas cylinders.

4-2-2 Basic Design Guidelines

(1) The proposed site is located about 160km northeast of Cairo. It is adjacent to Sembellawain City in Dakhalia State. A truck road about 8m

wide runs along the western border of the Project site. The site is 10 feddans having an oblong rapezoidal shape, situated between two minor roads, each 6m in width, with the El Shoon Canal on the opposite side of one of the roads.

(2) The site is almost flat, with a difference in elevation of about ± 50cm to the roads around it. The site has been divided into roughly three functional zones, namely, the practice field and driver's training yard, wrokshop and farm machinery storage and buildings zone. These zones have been designed to effectively ensure the smooth operational efficiency of the Pilot Center.

(3) Infrastructure connections within the site, such as those for electricity, water supply, telephone, etc., will be most cost-effectively located.

(4) Gates and roads within will be planned to ensure smooth circulation and safety.

(5) Design of facilities will be carried out with due consideration of the engineering methods most compatible to area conditions. Due consideration will also be given to the possible effects of the Egyptian climate on buildings, and to the effect of social practices on such aspects of the plan as organizational composition.

(6) The site lies adjacent to the periphery of the city, with the principal hospital of the area located due west. Due consideration will be given to make the proposed facilities fit these surroundings.

4-2-3 Basic Plan

(1) The following facilities are planned:

a) Administration wing
b) Operator's wing
c) Workshop
d) Utility Building

e) Tractor Shelters

f) Other facilities, such as elevated water tank, sewage treatment facility, oil supply facility, machinery washing facility, garage, etc.

(2) Site and Arrangement Plan

The site is planned in three zones, namely the practice field and driver's training yard, workshop and farm machinery storage and buildings. Various plans on how to arrange these three zones were studied. As a result, the final plan was drawn up with particular consideration of the following points:

1) Coordination between the practice field and driver's training yard

2) Optional functionality with the trunk road, west of the building zone

3) Consideration for possible linkage between the farm machinery storage yard and the driver's training yard

4) Environmental considerations by classification of buildings into administrative and mechanical sections

5) Complete separation between entrances for customers and general staff and tractors and circulation service lines

6) Location of tractor gates, generator room and workshop, all of which are sources of noise, away from the hospital and private residences

7) Balance in scale among the above three land zones in consideration of the irregular shape of the plot, distribution being planned to avoid extremes in scale. The practice field's observational function is emphasized in the overall plan of the Pilot Center.

8) Provision for separate or overall control of each section according to the requirements of the same

(3) Architectural Plan

1) Plan

a) Administration and Operator's Wings

For effective land utilization, the Administration Wing is planned as a two-story structure. This Wing will have a close relationship with overall control of the facility. However, since this sections have fundamentally different contents of operation from one another, the Administration Wing is designed to face the Operator's Wing across a plaza.

The said plaza will be planted with trees. To provide a place for daily Moslem rites and a resting place in summer, an open colonnade was designed. The dining rooms of the Administration and Operator's Wings are separated from one another due to the different services they provide and the varying schedules of their staff.

The planning of managerial and clerical space is based on the present Egyptian design scheme while its scale is designed to provide the amount of ordinary service space customary in Egypt. Tea service facilities and toilets were designed along the same guidelines.

Circulation lines were planned in accordance with the designs of typical government office buildings in Egypt with regards to space around the hall, the type of corridor, etc. Separate approaches for ordinary visitors, staff and services have also been designed.

b) Workshop

As the repair bay is a very vital component of the Wrokshop. The design of the bay enables farm machinery to enter from both sides. Between each row of the bays a broad space is provided to allow men and small equipment to move freely. One section of the

workshop is also designed to handle equipment which requires major repairs such as body and engine work.

The workshop office is designed to allow for monitoring of the workshop dock and spare parts storage control.

c) Shelters

The shelter positions were determined accordng to the circulation and island plan. On this basis the shelter area is designed to allow for parking of farm machinery from both sides, at the same time giving due consideration to optimum utilization of land.

2) Elevation

The Administration and Operator's Wings are situated within the compound to ensure smooth and effective operation as well as to provide a noise free working environment with adequate ventilation. The Workshop was located to maximize adequate and timely repairs while elevation of the shelter area was chosen to provide the maximum shade using a minimum of materials.

3) Section

The height of the Administration and Operator's Wings was determined to facilitate sufficient ventilation as well as to ensure insulation from heat during summer. A special ventilation space is allocated on the top floor. Also the ground floor is set at a level of about +500mm to reduce sand and dirt intrusion.

In planning the hight for the workshop, maximum number of effective repairs was carefully considered. A mezzanine for parts storage was also included to ensure proper utilization.

4) Estimation of the Scale of Facilities

a) Administration Wing

As is mentioned hereafter, the Administration Wing has been provided with suitable office space for 28 general staff. Two training rooms with a capacity of 30 persons each have been provided for lectures plus one additional room with a capacity of 30 persons for audio-visual instruction.

The dining room has space for 28 general staff and 48 workshop staff, a total of 76 persons.

b) Operator's Wings

The Operator's Wing is designed to accommodate 133 persons (14 hire service staff, 85 operators and 34 workshop staff). This design includes an assembly space for announcing assignments, a waiting area, and lockers and washrooms. Kitchen and dining spaces area minimized with provisions only for serving lunch. The kitchen can however, prepare lunch for four shifts if necessary.

c) Workshop

In the workshop there will be a 4 x 8m dockyard for one tractor. Twelve of these dockyards have been planned. An additional 2 dockyards for alignment of tractors have also been designed.

d) Utility Building

A general area of 200m^2 obtained from study of local information is provided for laying out typical power receiver and substation equipment, power generating equipment, etc.

e) Tractor Shelters

The shelter scale has been estimated on the assumption that the net parking space per tractor will be 11.5m^2. This figure does not include carriage ways and clearances.

f) Pavement

A tractor and trailer parking yard is designed to allow an area of 27.2m^2 per tractor or trailer. This represents the gross area including the above carriage ways and clearances.

Other external paved surfaces are classified into: i) extra repair space outdoors around the Workshop and, ii) parking space for customers and general staff around the Administration Wing and service area for the kitchen, etc.

5) Finishing and Materials

All materials required under this project will be selected on the basis of cost-effectiveness and therefore local materials are incorporated into the plan to the extent possible. The table below shows the interior and exterior finishing guidelines.

a) Exterior Finish

Building	Roof	Outside wall	Fittings
Administration and Operator's Wings	Light weight concrete on asphalt water-proofing	Concrete: Paint on mortar finish Brick: Paint on mortar	Aluminium/Steel fittings w/plate glass
Workshop	Ditto	Ditto	Steel fittings w/plate glass
Utility Building	Ditto	Ditto	Ditto
Shelters	Steel fluted sheet Corrugated asbestos cement sheet	Polyvinyl choloride coated steel plate Bricks: Paint on mortar finish	- -

b) Interior Finish

Building	Floor	Base	Wall	Ceiling	Fittings
Administration Wing	Terrazzo tile/ Plastic tile/ Mortar trowel	Terrazzo Tile/ Plastic cove/ Mortar trowel	Vinyl cloth/ Paint on mortar finish	Rock wool accoustic tile Paint on asbestos board	Wooden w/paint
Operator's Wing	Plastic tile/ Mortar trowel	Plastic cove/ Mortar trowel	Paint on mortar finish	Paint on asbestos board	Wooden w/paint
Workshop	Ditto	Ditto	Ditto	Paint on asbestos board Exposed	Wooden w/paint Steel w/paint
Utility Building	Mortar trowel	Mortar trowel	Ditto	Exposed	Steel w/paint
Shelter	Ditto	Ditto	Paint on mortar finish Exposed Metal wall	Exposed	

(4) Structural Plan

The structural system for the project emphasizes accommodation, economy, local engineering practices and performance capability.

1) Administration and Operators Wings

The reinforced concrete rigid frame structure, which is prevalent in Egypt, has been adopted for use. This simple structural system is not only resistant to external forces and dead load, but also improves heat insulation efficiency by the use of an even arrangement of flat-piling bricks throughout the structure which have high heat insulation capacity.

The arrangement of columns has been designed with a span length of 6.4m in both X and Y directions for improved economy.

2) Workshop and Utility Building

These two structures will use a reinforced concrete rigid frame. The basic column spans include two types, namely, 5.4m x 6.8m and 10.8m x 17.8m. The former will be used for smaller spaces, while the latter will be required in the truck repairing section.

3) Tractor Shelter

The shelters require 160 roofs. Since the shelters are open type structures, columns are arrranged at a pitch of 6.4m at the center in the direction of the shorter side. The space is formed by joining a cantilever type shelter frame from each column. To resist various forces such as wind, etc., a steel structure will be designed with optimum arrangement of simple vertical braces.

4) Elevated Water Tank

An independent tower of reinforced concrete is planned for this structure.

5) The table below describes the above structural systems

Name of Wing	Major Structural System	Major Material	Auxiliary Factor	Roof
Administration and Operator's Wings	Rigid frame structure	Reinforced concrete	Bricks	Reinforced Concrete
Workshop	Rigid frame structure	Reinforced concrete	Bricks	Reinforced Concrete
Utility Building	Rigid frame structure	Reinforced concrete	Bricks	Reinforced Concrete
Tractor Shelter	Steel structure	Steel (imported)		Metal/slate
Elevated water tank	Tower structure	Reinforced concrete		

6) Structural Calculations

The structual calculations comply with the standards of the Architectural Institute of Japan (AIJ).

a) Structural analysis is based upon elastic design.

b) Sectional design is based upon the allowable stress method

c) Loading conditions are as follows: Unit: kg/m^2

Category of Live Load	Floor & beam	Frame & Foundation
Office, etc.	300	180
RC roof	100	100
Steel roof	30	30

Wind Load

$W = cqA$ $\quad q = 60h^{\frac{1}{2}}$

h: Height from ground plane (m)

c: Coefficient of wind force

q: Velocity pressure (kg/m^2)

W: Wind pressure (kg)

A: Face area (m^2)

7) Materials

a) Reinforcement

Grade 250 460/425, BS 4449-78

b) Steel

Grade SS41, JISG 3101

c) Bolt

Grade F10T, JISB 1186

d) Concrete

Cement: Ordinary portland cement, BS 12

Design strength (28-day compressive strength using cylindrical sample)

Major structures: $210kg/cm^2$

Non-major structures: $175kg/cm^2$

The materials other than those specified above will conform to the British Standard.

8) Foundation

The foundation will be constructed with the supporting stratum 1.0m below the present ground level. The present design soil bearing capacity is $10.0t/m^2$. However, this capacity will be finally determine after conducting a supplementary soil bearing survey.

(5) Mechanical and Plumbing Plan

1) Codes and Standards

The designing codes and standards are listed below. The design will also comply with the Egyptian standards.

- Japanese Industrial Standard (JIS)
- British Standard (BS)
- The Society of Heating, Air Conditioning and Sanitary Engineers of Japan (SHASE)
- Fire Protection Code of Japan (Fire Hydrant System and Dry Chemical Fire Extinguisher Installation)
- American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE)

2) Design Outline

The basic considerations in planning the heating, cooling and ventilating works and the plumbing works are listed below.

- Conditions of location
- Building characteristics
- Simplicity of design
- Ease of maintenance

3) Heating, Cooling and Ventilating

a) Weather Conditions

Weather conditions in the Project area are mild throughout the year as the following table shows.

	1	2	3	4	5	6	7	8	9	10	11	12
Dry bulb temp. (°C)	11.9	12.4	14.8	18.4	22.7	25.4	26.8	26.8	25.1	22.6	19.0	14.1
Relative humidity (%)	79	76	72	68	63	64	70	72	74	74	78	75

Even given the above, a heating and cooling system is necessary as the maximum and minimum temperatures throughout the year range between 34.9°C and 7.2°C, respectively.

b) Design Conditions

Temperature Condition (in compliance with ASHRAE)

Dry Bulb	Outdoor	Indoor
Cooling	38°C	28°C
Heating	7°C	20°C

c) Heating, Cooling and Ventilation System

An air conditioning unit which can both heat and cool has been adopted. However, such units will only be provided for those rooms where such a system is required. The air conditioning installed in the necessary rooms, mainly those of the Administration Wing, will be a window-mounted coolers with built-in heaters.

A natural ventilating system or a forced ventilating system with an electric fan will be used to remove the smoke, gas, heat etc. generated.

The number of models will be kept to a minimum to facilitate maintenance and the stocking of spare parts.

4) Plumbing

a) Water Supply System

Wells will be sunk within the compound to provide water and an incoming pipe, which will be connected to the existing municipal water main adjacent to the site, will also be installed. Two wells, including one stand-by, will be sunk to prevent water from being cut off. Water meters will be installed on each lift pipe from the wells and on the incoming pipe from the main pipe to check the load of water supply.

The water obtained from the above sources will be stored in the water tank (effective capacity: 50m^3) via a cistern. Water will be lifted up to the elevated water tank (effective capacity: 10m^3) by a pump, and then supplied to each location by a gravity feed system (Figure IV-1).

b) Hot Water Supply System

The hot water supply system i, e, will be used for kitchens and wash rooms but will not cover lavatories.

For safety an electric water from the kitchens heater will be installed near the location where hot water is required (Figure IV-2).

c) Sewage System

There will be three sewage systems-soiled water from toilet and washroom areas, waste water and waste water containing oil from the workshop. A combination drainage system will be adopted in which waste water will be led into the same pipe via a grease trap from the kitchens and an oil intercepter from the workshop.

A sewage treatment tank will be installed on the site. Sewage will be discharged into El Shoon Canal after being treated in the tank until the BOD level reaches 60ppm (Figure IV-3).

Cast iron pipes will be used as soil pipes. Hard vinyl pipes will be used for other waste water.

d) Sanitary Fixtures System

Ceramic sanitary fixtures and chromium-plated accessories will be installed in lavatories, etc. Eastern style water closets will be used.

e) Fire Hydrant System

An interior water hydrant system and portable powder fire extinguishers will be jointly used in the Administration and Operator's Wings.

A sufficient number of stationary powder extinguishers for extinguishing oil fires will be installed at the locations where there is the greatest danger of oil related fires, such as the Tractor Shelter, Workshop, Machinery Washing Facility, etc.

f) Kitchen Equipment System

Stainless steel kitchen equipment will be installed. The kitchen in the dining room of the Administration Wing is for serving lunch to staff and trainees. Basically Egyptian food will be served. Highpower LPG-burning ranges will be installed along with refrigerators, etc. for storing food.

g) Storm Drain

A storm drain has not been considered as the average annual rainfall is as low as 66mm per year.

(6) Electrical Planning

1) Codes and Standards

Electrical planning will comply with the following codes and standards, while the situation in Egypt will also be fully taken into account.

- Japanese Industrial Standard (JIS)
- Standard of the Japanese Electrotechnical Committee (JEC)
- The Standard of Japan Electrical Manufacturers Association (JEM)
- Building Code of Japan (emergency lighting system)
- Fire Protection Code of Japan (fire alarm system and exit lighting system)

2) Explanation of Electrical Planning

a) Basic Guidelines

Electrical planning will be made with the following objectives. The planning will also take into consideration the problems involved in energy and electric power saving, and the architectural design guidelines based on fundamental concepts of construction.

- A comfortable and safe living environment for the users of the facility
- Rationalization of electric installation functions which are required for facility operation
- Simplification of facility maintenance and control
- Economy in construction and maintenance and control costs

b) Power and Substation System

To facilitate maintenance and to ensure operational safety, a unit enclosed type power receiver and substation system will be installed in the power room located in a separate building. The power mode is as follows:

- In comming system:	3ø, 3W, 11kv, 50Hz Single circuit
- Single line diagram:	Figure IV-4
- Transformer capacity:	500KVA

c) Stand-by Generating System

An air-cooled type generator (diesel engine) rated at 3ø, 4W, 380V/220V, 50Hz, 200kVA will be installed as an emergency generator to supply power in case of power failure in the area. This power will be fed to the pump for the fire fighting system, the pump for water lifting, a part of the lighting fixtures, and the equipment required for operation of the facilities. This generator will start automatically and will be stopped manually, although manual start will also be possible. It will be equipped with an oil tank which has a capacity equivalent to 10 hours operation time.

d) Main Feeders and Power Wiring System

d-1 Main Feeders System

Electric power is supplied from the distribution board of the substation to the motor control, panel for lighting, and equipment. The system will be divided according to the operating conditions of the facility.

d-2 Power Wiring System

Electric power will be supplied via the power panel to the heating, cooling and ventilating systems, the plumbing systems and kitchens. The heating and cooling equipment will be of the local manual control system. For automatic control operation equipment, such as a pump for the well, etc., a monitoring display will be provided at the center.

e) Lighting and Receptacle Outlet System

This facility will be illuminated sufficiently for working and to create a comfortable environment. Illumination will mainly consist of fluorescent lamps to minimize power consumption. Lobbies, etc. will be illuminated to harmonize with the architectural design.

Electric system: 1ø, 2W, 220V, 50Hz

Wiring system: The steel conduit system using IV wires will be adopted.

Switch system: To conserve energy, lights in each room will be turned on and off using individual switches. In corridors, 3-way switches will be used so that lamps can be turned on and off at several entrances and exits. Out door lights will be turned on and off by means of automatic switches.

The illumination of major rooms will be as follows:

300 lx Office, general affarirs, managers room, meeting room, class room, information, library, instructor's room, and kitchen

200 lx Waiting hall & dining room

100 lx Lobby, washrooms, parts storage, machine room

50 lx Corridor

Receptacle: One receptacle will be installed about every $20m^2$ except for exclusive receptacles.

f) Telephone Wiring and Piping System

For maintenance and control, operation and economy, an electronic private branch exchange will be installed. Extension telephones will be installed where necessary, such as in office rooms, etc. Also empty piping will be set up to install public telephones in lobbies, etc. (Figure IV-5).

g) Public Address System

A main amplifier, time signal equipment and a main microphone will be installed in an office of the Administration Wing. The public address system will cover the outside area as well as all buildings.

A remote control system will be installed in the office of the Operator's Wing for paging (Figure IV-6).

h) Master Antenna TV System

The antenna required for the master antenna TV will be installed on the roof. A channel will be installed to allow reception via the booster and distributor by a color TV installed in the audio visual room (Figure IV-7).

i) Fire Alarm System

For quick evacuation and fire extinguishing activities during a fire, a fire alarm system, which combines indication panel, lamp and alarm bell, will be installed in each wing. Fire alarm equipment will be installed every 25m (Figure VI-8).

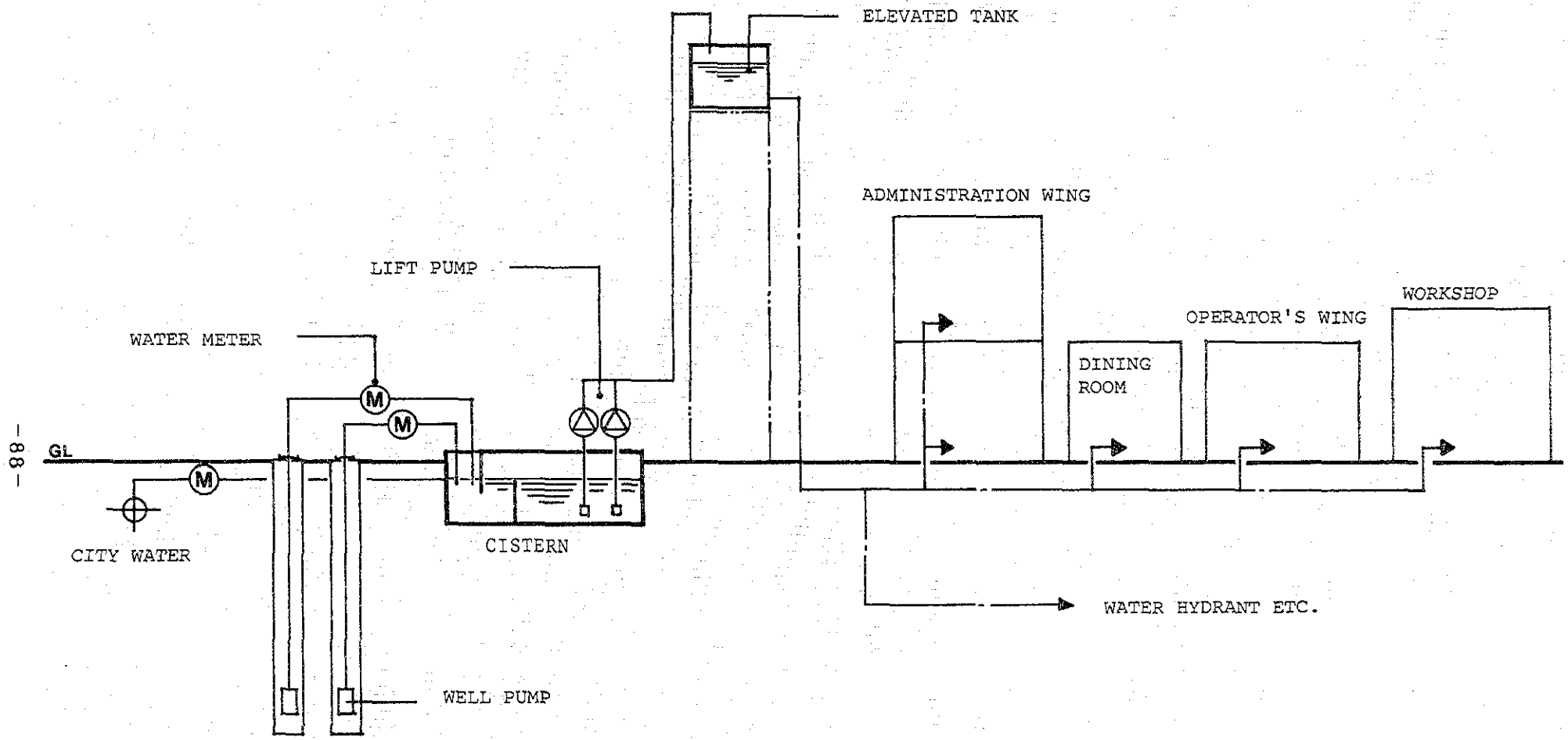


FIGURE IV-1 WATER SUPPLY SYSTEM

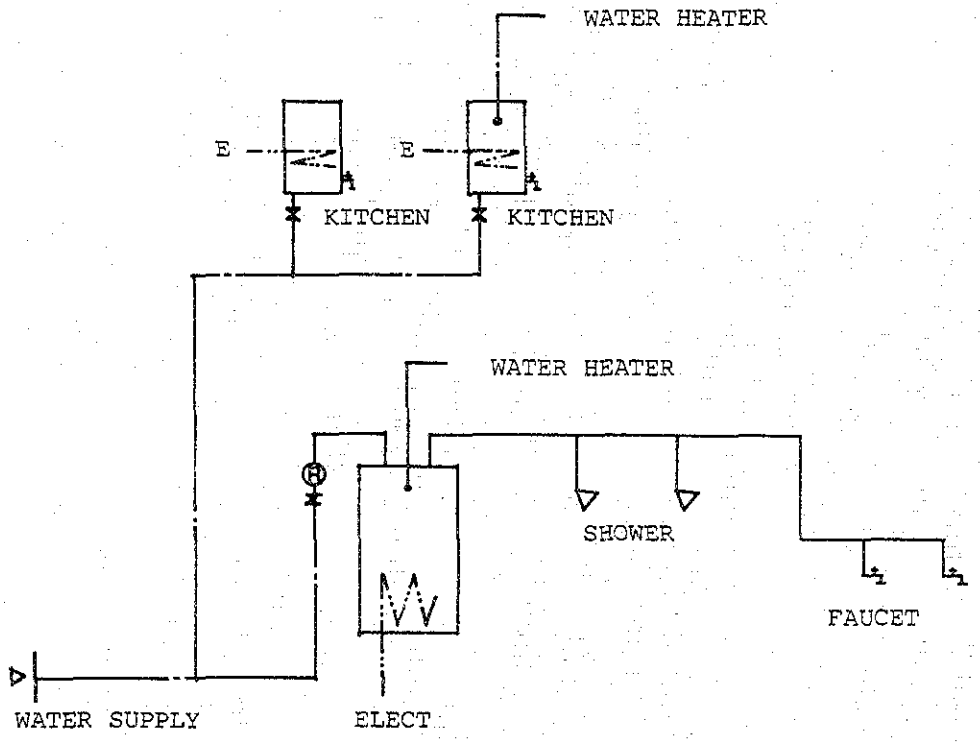


FIGURE IV-2 HOT WATER SUPPLY SYSTEM

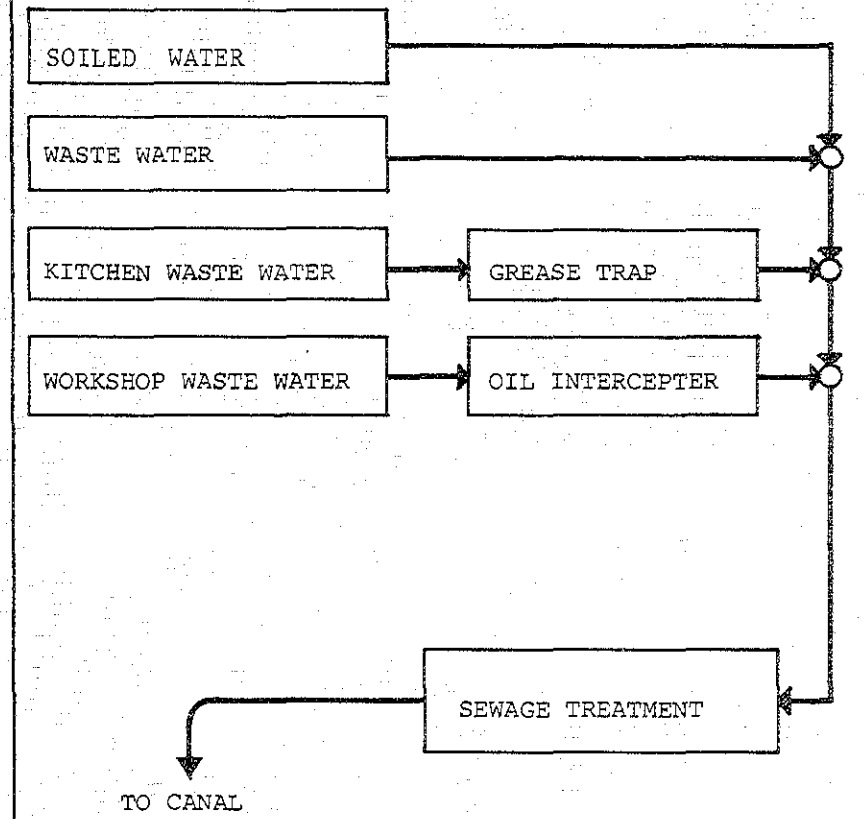


FIGURE IV-3 SEWAGE SYSTEM

LEGEND

52	VACUUM CIRCUIT BREAKER
MOF	METERING OUT FIT
WH	WATT HOUR METER
89	DISCONNECTING ARRESTER
LA	LIGHTING ARRESTER
V	VOLT METER
A	AMPERE METER
51	OVER CURRENT PROTECTION RELAY
W	WATT METER
PF	POWER FACTOR METER
TR	TRANSFORMER
LBS	LOAD BREAK SWITCH
MC	MAGNET SWITCH
MCB	MOLDED CASE CIRCUIT BREAKER
SC	STATIC CAPACITOR

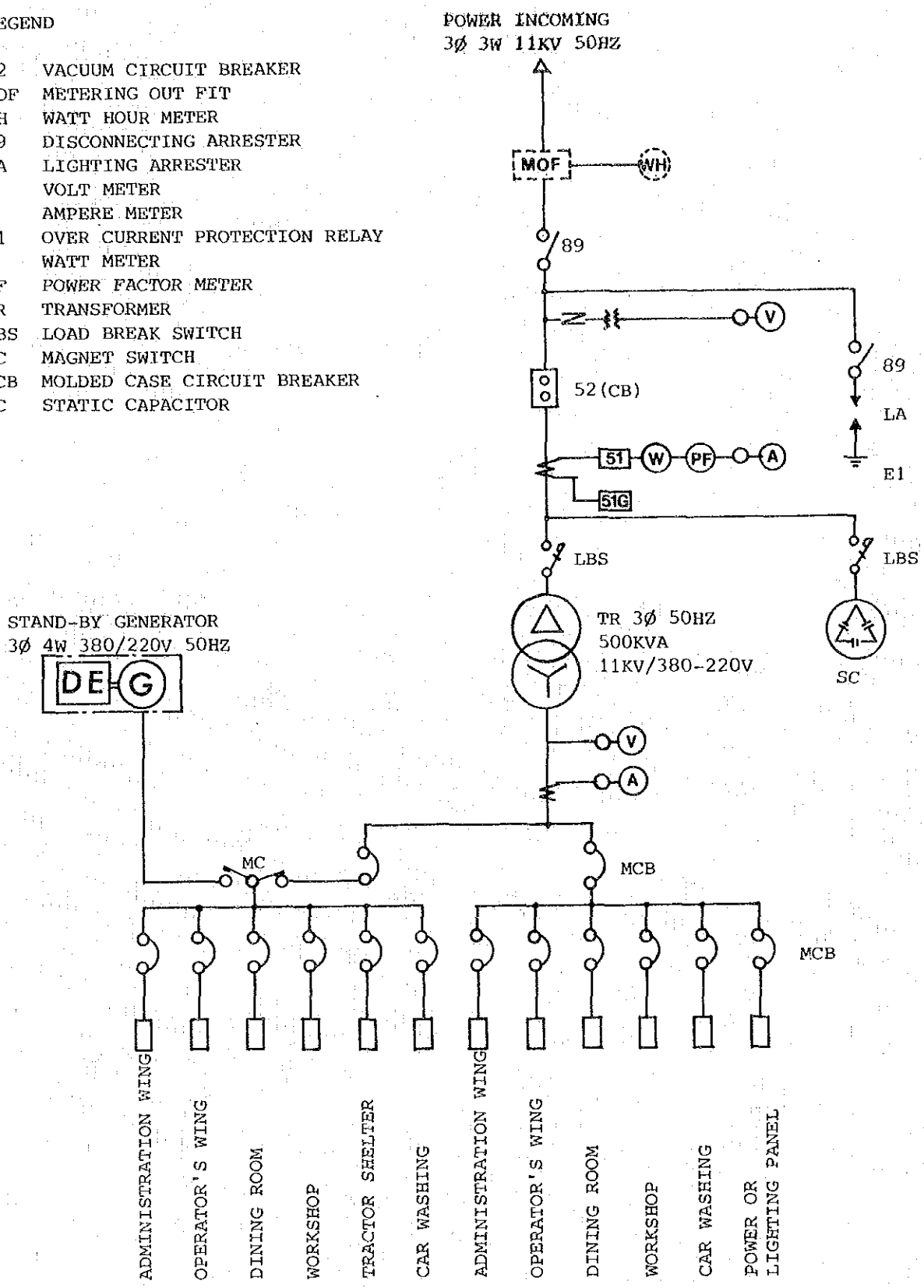


FIGURE IV-4 SINGLE LINE DIAGRAM

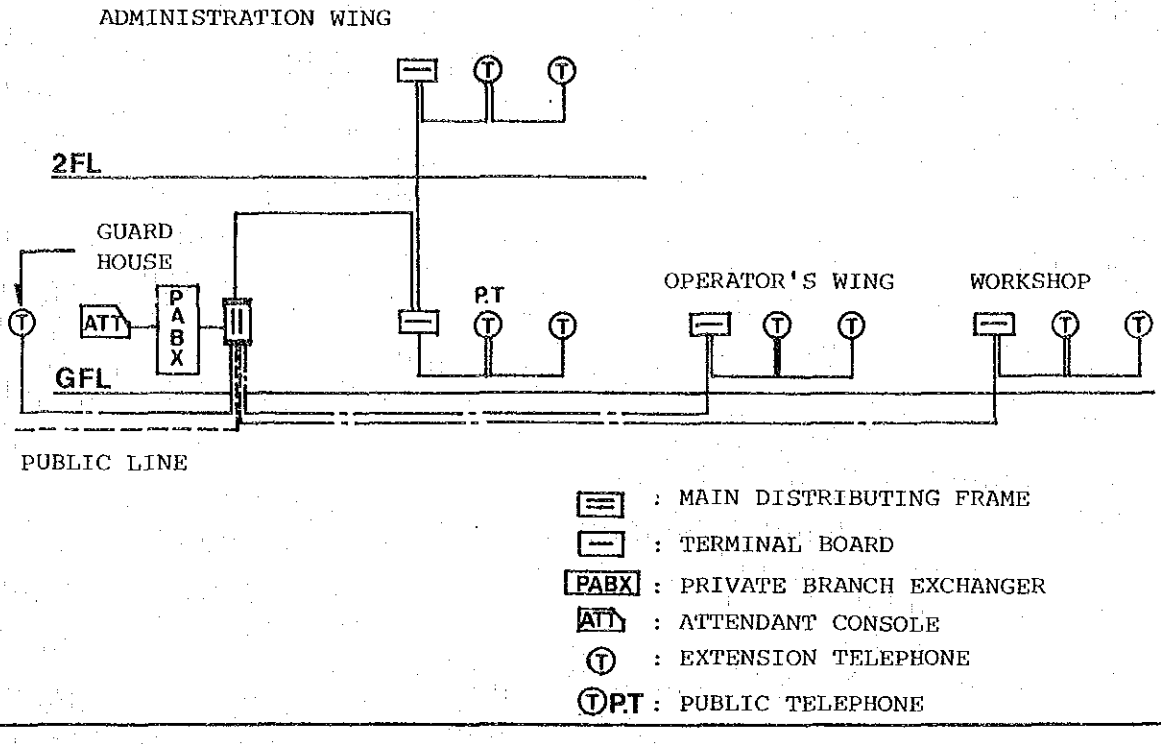


FIGURE IV-5 TELEPHONE WIRING AND PIPING SYSTEM

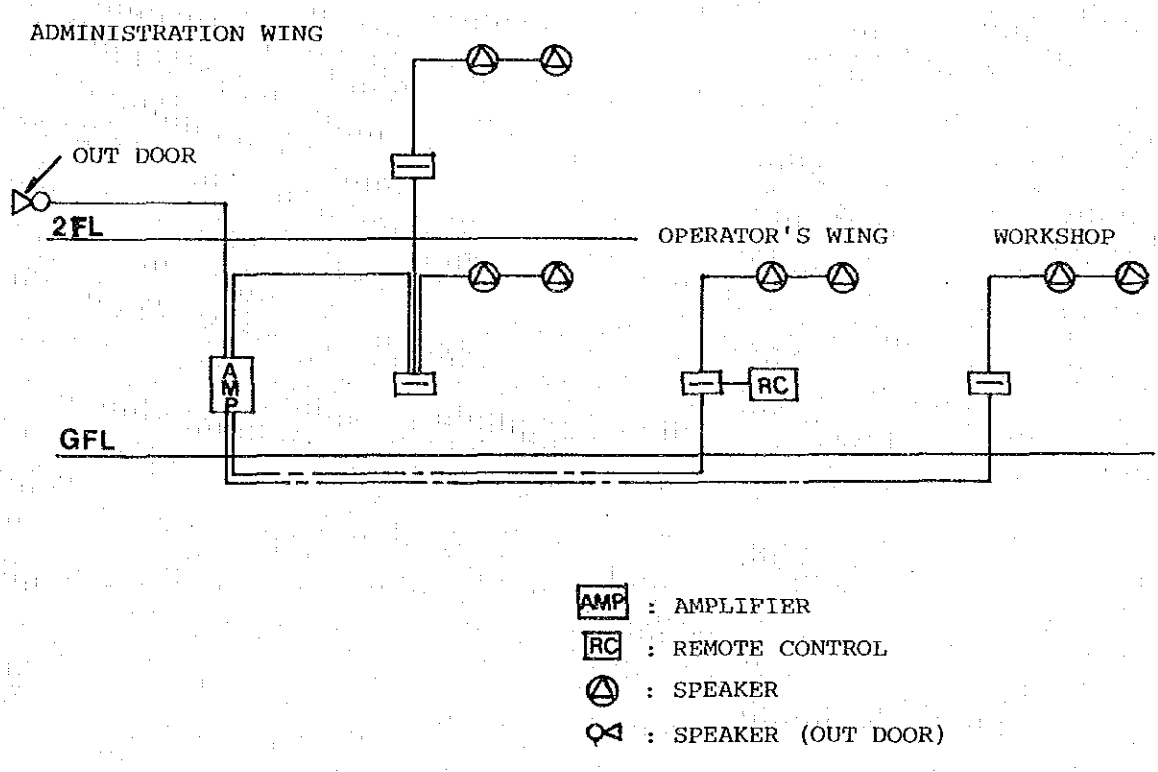


FIGURE IV-6 PUBLIC ADDRESS SYSTEM

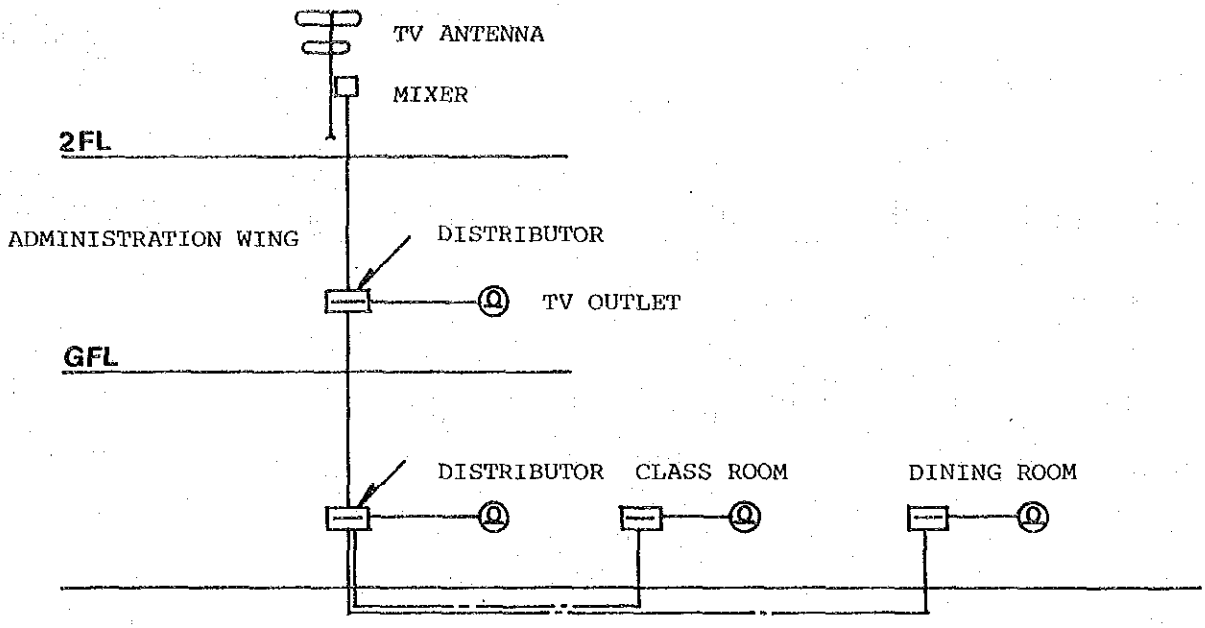


FIGURE IV-7 MASTER ANTENNA TV SYSTEM

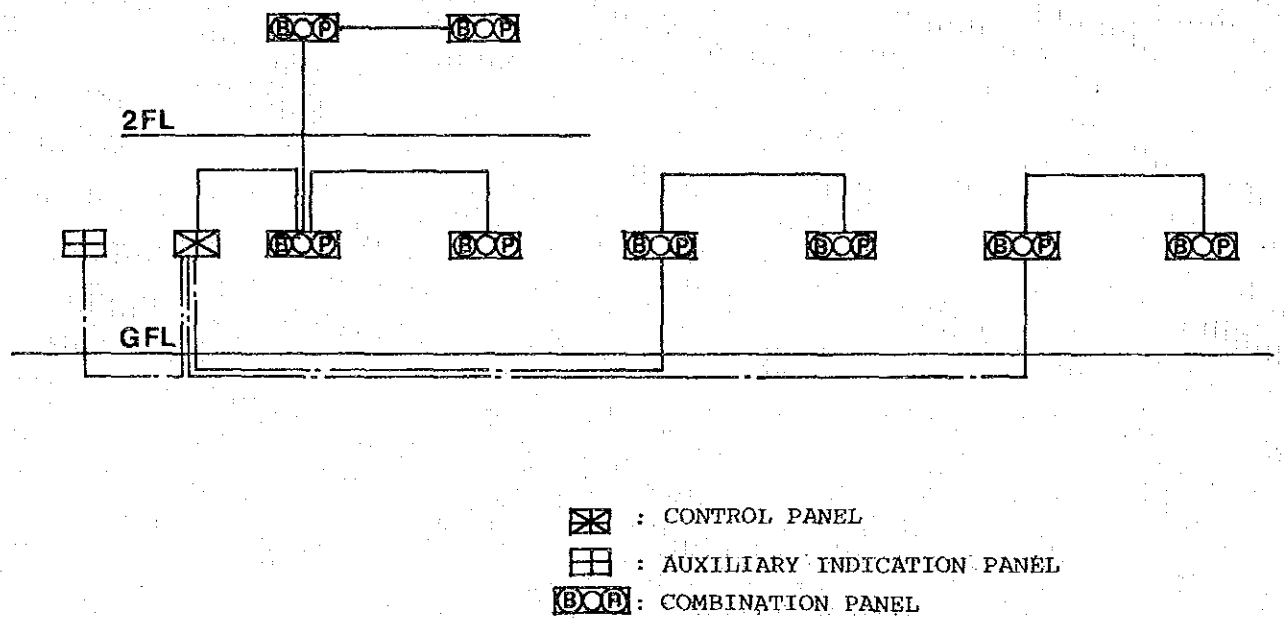


FIGURE IV-8 FIRE ALARM SYSTEM

5. OPERATION AND MAINTENANCE

5-1 OPERATION SCHEDULE

5-1-1 Schedule fo Phased Operation Commencement

After completion of construction, a certain amount of time will be necessary for staffing, organizing and training before full operation of the Pilot Center may begin. Accordingly, operation of the Pilot Center will be started in three phases. Procurement of agricultural machinery, staffing arrangement, training and the like will be scheduled in accordance with each phase of operation.

Schedule of Phased Operation Commencement

Phase	Objected Acreage	Staffing	Training
1st Phase	2,100ha	All of Director, Section Chiefs, Half of Clerks and Operators One third of Engineers	Operators (1 months) Engineers (3 months)
2nd Phase	3,200ha	Quater of Clerks and Operators Remaining Enigneers	Operators (1 months) Engineers (3 months) Farmers (1 weeks)
3rd Phase	4,200ha	All of Remaining	- ditto -

It is recommended that operation of the first substation commence from the third year of the Center's operation and operation of other substations commence subsequently from the fourth year of operation, at least one substation commencing operation every year.

The El Sembellawain Pilot Center, which envisions the later establishment of four supporting substations, will be completed within 6 years after commencement of the Center's operation. The operation of the Pilot Center will result in the accumulation of a great deal of experience,

contributing to the future implementation of the nationwide HSS Program in future.

5-1-2 Staffing Schedule

The personnel listed in the first column of Table V-1 must be recruited before operation of the Pilot Center commences. Personnel will be recruited in coordination with the commencement of each phase. The numbers of personnel per phase are also presented in the above mentioned Table.

Personnel required will be recruited principally in the vicinity of El Sembellawain. The number of personnel to be recriuted is 83 for 1st Phase, 61 for 2nd Phase and 25 for 3rd Phase. As mentioned earlier, assistants can be found in rural areas and engineers can be recruited from El Mansura City (population: 259,387(1976)), about 20km from El Sembellawain.

5-1-3 Estimate of Operation Expenses

Operation expenses of the Pilot Center entail staff remuneration, electricity, water, gas, petroleum and miscellaneous expenses on condition that the exchange rate is LE 1 = ¥339. Variable expenses related to hire service fees are not included in this section.

(1) Personnel Expenses

Personnel expenses for 169 persons at the Pilot Center will be increased according to the phase of operation as shown below, reaching LE 19,000 (6.441 million yen) per month after 3rd Phase (Table V-2).

5-1-4 Hire/Rental Service Fees

Hire/rental service fees will be principally determined on the basis of the service for farm machinery, which will be calculated from the number of tractor service hours.

(1) Tractor Service Hours

Two types of tractors, namely 35PS and 65PS, will be rendered for service. Service hours of tractors will be calculated by multiplying the number of implements per crop (Table IV-4) by the number of service hours and service days for each implement.

Yearly service hours of tractors with 35PS will be total 102,760 (1284.5 hours per unit) and those of tractors with 65PS will be 94,460 (1180.75 hours per unit).

As for trailers, one-third of the total number considered for harvesting will be used for preparatory cultivation activity, and therefore the total numbers of trailers will be obtained by multiplying the numbers listed in Table IV-4 by 1.333.

(2) Service Fee for Farm Machinery

Service fee for farm machinery per working hour is calculated by the following formula:

Service charge per hour (Q) = P x Fc + h + L + F + O + A

Where,

P: Purchase price of agricultural machinery (tractor: LE 7,139, implements: LE 4,985

The total purchase amount of tractors with implements is divided by 160 units of tractors.

Fc: Fixed Cost ratio of tractors and implements

Annual fixed cost ratio is 25% for tractor and 30% for implements.

h: Annual working hours (1,233 hrs.)

Average service working hours of tractors of both types.

L: Personnel expenses; LE 1.01/hr

Average expenses per person including indirect personnel.

F: Fuel expenses (LE 0.32/hr)

Fuel consumption will be 0.18-0.2kg/hr/PS. Fuel cost is LE 0.027/liter. Average HP of tractors is 50 PS, thus, 50 x 0.19 + 0.8 x 0.027 = LE 0.32/hr.

O: Lubricant expenses; (LE 0.094)

Fuel expenses will be 30% of overall operation cost.

A: Administration expenses at the Center Station; (LE 0.17)

Out of administrative expenses at the Pilot Center, 30% will be for the portion of the substations' expenses coverd by the Pilot Center, and 70% for the Pilot Center expenses are calculated by dividing the total expenses by the number of tractors.

Where,

P·Fc/h is calculated as fixed fee (T) = ((purchase price of tractors x 0.325) + (purchase price of implements x 0.3)) ÷ h = LE3.09.

Therefore,

Q = P·Fc/h + L + F + O + A = T + L + F + O + A = 3.09 + 1.01 + 0.32 + 0.094 + 0.17 = LE 4.684/hr

(3) Hire Service Fee

Considering that the present hire service fee is LE 12/ha (LE 2/hr) for land preparaton and LE 19/ha (LE 4.8/hr) for threshing and the like, it will be difficult to establish a hire service fee at a higher level. It will however, be possible to maintain the Pilot Center at the present service fee rate.

(4) Rental Service Fee

The rental service fee has been caluclated on the same basis as the hire service fee. However, since the renter will provide his own operator, the Center's or substation's operator's charge and promotional subsidy will be reduced from the service fee bill.

5-2. MAINTENANCE

5-2-1 Electricity, Water and Gas Expenses

The total of electricity, water and gas expenses is about LE 2,000 per month as shown in Table V-3. It is expected that expenses at the early phase of operation will be less than the said amount. However, the estimate in Table V-3 has been made for 3rd Phase onwards.

5-2-2 Fuel Expenses

The Center will have 5 sedans and 3 micro-buses. Assuming that each vehicle will run about 100km per day, therefore fuel expenses can he estimated about LE 271 per month.

Petrol:

100km/day ÷ 8km/liter x LE 0.15/liter x 25 days x 5 = LE 234/month

Light Oil:

100km/day ÷ 6km/liter x LE 0.03/liter x 25days x 3 = LE 37/month

5-2-3 Fuel Expenses for Mobile Workshop

Fuel expenses for the mobile workshop's 3 trucks and the 2 crane trucks for transportation of implements are as follows:

Mobile workshop truck:

100 km/day ÷ 8km/liter x LE 0.15/liter x 25 days x 3 = LE 141/month

Crane truck:

100km/day ÷ 4km/liter x LE 0.03/liter x 25 days x 2 = LE 38/month

5-2-4 Miscellaneous Expenses

Miscellaneous expenses include office supplies and maintenance of facilities, which are considered to be about 10% of personnel expenses, i.e. about LE 1,900. Maintenance expenses of facilities include depreciation cost of vehicles.

Accordingly, the total operation and maintenance expenses of the Pilot Center will total about LE 4,350 per month.

Table V—1 STAFF RECRUITMENT PLAN

	1st Phase	2nd Phase	3rd Phase	TOTAL
Director	1	—	—	1
Secretary	1	—	—	1
Dept. Manager	2	—	—	2
Section Chief	8	—	—	8
Clerk	8	4	4	16
Engineer	8	15	—	23
Assistant	12	21	—	33
Operator	43	21	21	85
Total	83	61	25	169

Table V—2 PERSONNEL EXPENSES

	Basic Salary	1st Phase	2nd Phase	3rd Phase
Director	400	400 (1)※	400 (1)	400 (1)
Secretary	150	150 (1)	150 (1)	150 (1)
Dept. Manager	300	600 (2)	600 (2)	600 (2)
Section Chief	200	1,600 (8)	1,600 (8)	1,600 (8)
Clerk	70	560 (8)	840 (12)	1,120 (16)
Engineer	150	1,200 (8)	3,450 (23)	3,450 (23)
Assistant	50	450 (12)	1,350 (33)	1,350 (33)
Operator	120	5,160 (43)	7,680 (64)	10,200 (85)
Total		10,120 (83)	16,070 (144)	18,870 (169)

※ ( ) : Number of Personnel

Table V—3 ELECTRICITY, WATER & GAS EXPENSES

	Electricity (kW/month)	Water (Ton /month)	Gas (kg/month)
Administration Wing	36,000	3,000	422.5
Workshop	32,400	85	
Operator's Wing	24,000	225	
Utility Room	1,600	500	
Fuel & Machine Washing Facility	150	280	
Cost/Unit	LE 0.02/kWH	LE 0.02/Ton	LE 0.082/kg
TOTAL	LE 1,883	LE 81.8	LE 34.6

Table V—4 ESTIMATE OF RUNNING COST FOR FACILITIES

Item	Cost (LE/month)
Electricity, Water & Gas Expenses	1,999
Fuel for Vehicle	271
Fuel of Mobile Workshop	179
Others	1,900
TOTAL	4,349

6. PROJECT IMPLEMENTATION PLAN

6-1 IMPLEMENTATION AND OPERATION SYSTEM

Project implemantation will proceed under the general direction of the Egyptian Ministry of Agriculture, following under the dirct jurisdiction of the Departments of Technology and of Mechanized Farming within the same Ministry (After completion of project construction however, Project jurisdiction will be solely in the hands of the Department of Mechanized Farming).

The Ministry of Economic Cooperation will be responsible for exchange of notes between the two governments, and for procedures to obtain the approval of the People's Assembly of Egypt for the same. As exchange of notes only becomes effective upon ratification by the People's Assembly, formulation of a contract between the Mechanized Farming, Ministry of Agriculture, and the consultant recommended by JICA, as well as subsequent implementation of the Project, may only proceed after the said approval is obtained.

Based on the consultant's plan, the Egyptian Ministry of Agriculture will invite tenders for Project implementation from Japanese firms. The successful tenderer selected by the Ministry of Agriculture will conclude a contract with the same and commence construction.

Those responsible persons directing Project activities within the contracting firm and within each agency directly concerned with Project progress including construction must be clearly indicated, and contact between each agency at all times conducted by written document. Furthermore, meetings between the client, consultant and contractor should be conducted as necessary, contact between each of the same diligently maintained, and a system of communication formulated to ensure smooth progress of the construction work.

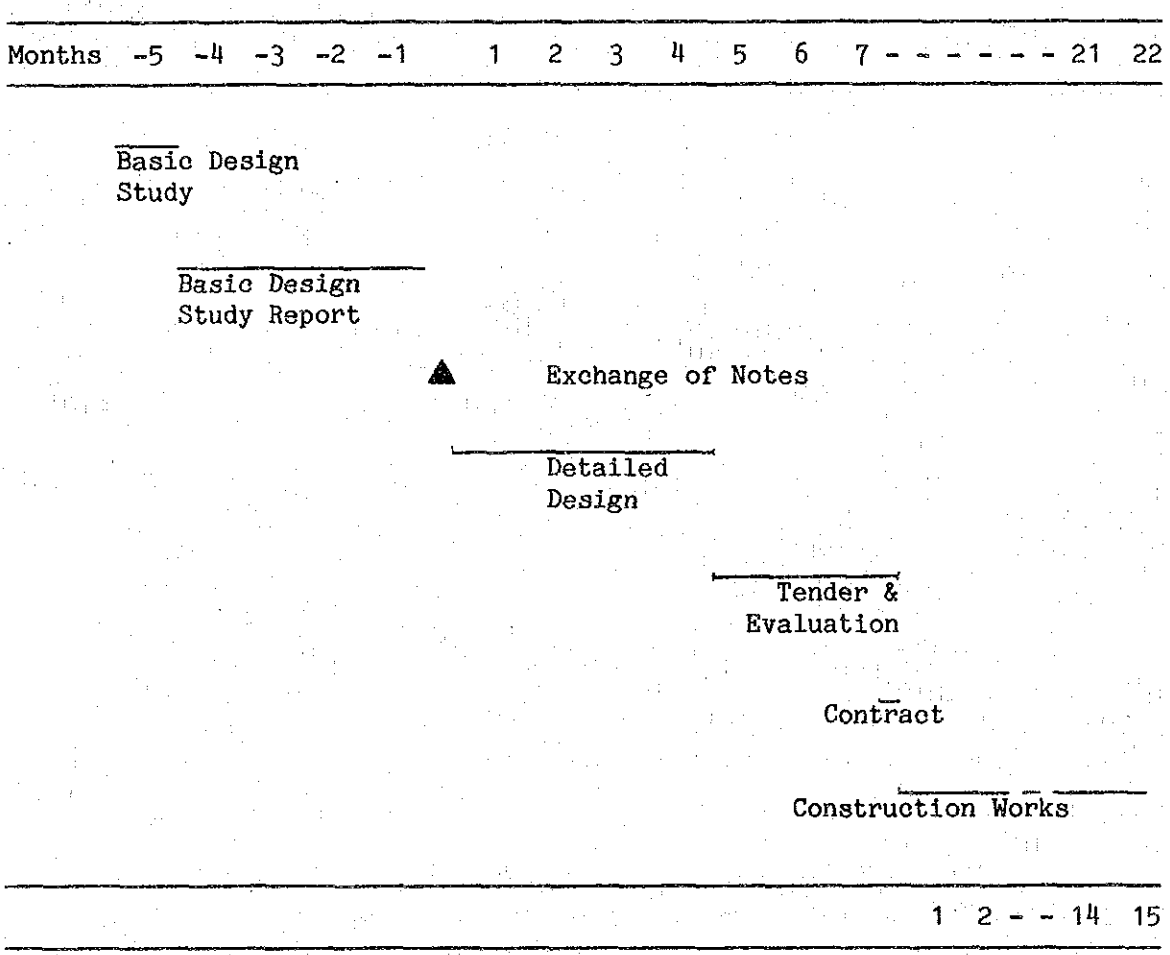
As the cooperation of other government agencies and various local administrative bodies will foreseeably be necessary for approval and arrangement of the various materials and equipemnt required for construction, concerted efforts should be made to maintain effective communication with the same through the Ministry of Agriculture.

6-2 CONSTRUCTION SCHEDULE

The overall Project schedule is divided into 2 parts: (1) basic design study under technical cooperation; and (2) detailed design and construction work under the general grant aid program. The detailed design will commence after completion of the basic design study. The documents required for tendering, evaluation and contracting for the construction work will also be prepared.

Land preparation, etc. must be completed by and on the account of the Government of Egypt before commencing construction work.

Construction Schedule



6-3 SUPERVISION SCHEDULE

During the working period covering 15 months, one construction supervisor will reside on location in Egypt. The same will leave the Project site on occassion to make reports and hold discussions with the head office of the Ministy of Agriculture in Cairo. The person in charge of architectural design and the persons in charge of electrical, plumbing and mechanical planning will visit Egypt several times during the same period to hold discussions on the operation and to make inspections. Meanwhile, the construction supervisor will carry out inspection of work completed. The same will also be in charge of electrical, plumbing and mechanical installations when the respective engineers are not in Egypt.

When the resident construction supervisor temporarily returns to Japan to prepare reports and to hold discussions with concerned Japanese parties, a technician will be dispatched to the field to act on his behalf.

6-4 ALLOCATION OF MAJOR UNDERTAKINGS

6-4-1 Major Undertakings to be Covered by Japanese Government

The Consultant will be responsible for the detailed design, preparation of tender documents, evaluation, and construction supervision. The Japanese government will be responsible for funding construction of building and facilities and provision of materials and equipment required.

6-4-2 Major Undertakings to be Covered by Egyptian Government

(1) General

1) With regards to products imported into Egypt for this Project, the unloading, customs clearance and tax exemption proceedings will be assured by the Egyptian government.

2) The products and services to be provided for the Project will be exempted from tariffs, internal tax and other official levies imposed by the Government of Egypt.

3) The Japanese nationals who provide products and services for the Project will be given due consideration in terms of entree permits, etc. to facilitate execution of their services.

4) All acts to be executed in compliance with Egyptian law such as applications, approvals, etc. which are required for the Project will be readily processed in Egypt.

5) For the construction materials, etc. required under the Project which are to be purchased in Egypt, arrangements will be made so that the same can be purchased at official prices set by the Government.

6) A budget which is necessary for the operation and maintenance of facilities after the completion of the Project will be secured.

(2) Survey of Project Site

1) Survey map of the Project site including topographical survey

2) Soil Survey report and recommendations for foundation design

(3) Land Preparation

1) Demolition or relocation of surface and underground obstacles

2) Land preparation, including banking (The site level will be raised 500mm higher than the level of the roads to the east and west through banking with sandy soil.)

(4) Utilities

1) Electric Power

Purchase and installation of substation and power connections during the construction period and of permanent connections after completion of construction.

2) Telephone

Installation of temporary telephones during the construction period and connection of the external line up to the permanent MDF.

3) Water Supply

Connection of the temporary water supply pipe during the construction period, connection of the permanent main water supply pipe (ø100) and the sinking of two wells within the site will be carried out.

4) Drainage

Treatment of soil and waste water during the construction period and installation of the permanent sewage treatment system will be undertaken.

(5) Site Improvement

Construction of fences, gates and roads within the Center, planting of garden plaza, installation of outdoor lights, and paving of public roads to the east and west which face the Project site will be undertaken.

(6) Furniture

General office furniture, fixtures, office machines, dining hall furniture, etc. will be provided.

6-5 CONSTRUCTION SCHEDULE

The chart below shows the implementation schedule.

Implementation Schedule \ Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Site Preparation (By Egyptian Government)	———														
Foundation Work		———	———	———											
Structure				———	———	———	———								
Block Masonry						———	———	———	———						
Water-proofing Work								———	———						
Fittings								———	———	———					
Interior Finishing										———	———	———	———		
Exterior Finishing											———	———	———	———	
Miscellaneous Work							———	———	———	———	———	———	———	———	
Electrical Work			———	———			———	———	———	———	———	———	———	———	
Plumbing Work			———	———			———	———	———	———	———	———	———	———	
Air-conditioning Work					———	———	———	———	———	———	———	———	———	———	
Site Improvement								———	———	———	———	———	———	———	
Furniture Installation										———	———	———	———	———	
Repair Work															———

7. PROJECT EVALUATION

Agriculture in Egypt has developed rapidly in the first half of the 1970s as a result of the agricultural improvement program strongly promoted by the Government of Egypt. However in the late 1970s, the rapid rate of population growth exceeded agricultural production, creating a deficiency in food supply.

To remedy this situation, the Government of Egypt promoted an open door economic policy and the Food Security Plan. The first priority of the plan is the promotion of mechanized farming. Accordingly, the Ministry of Agriculture plans to establish HSS as the most effective means for smooth implementation of mechanization.

(1) Establishment of HSS Nationwide Network

Agricultural mechanization in Egypt is being promoted as a solution to the manpower difficiency in the agriculture sector, which is a serious problem at the present, and as a means to increase agricultural production. Small-scale farmers who are the majority in Egypt, however, can not afford to pruchase and maintain agricultural machinery.

The Egyptian government therefore plans to establish a HSS nationwide network as a means of facilitating farm mechanization among small-scale farmers.

When the HSS network is operated properly as planed, small-scale farmers will be able to utilize machinery without capital investment and consequently the "Food Security Plan" will be achieved.

The following potential difficulties in the HSS network, however, are foreseeable:

a) inexperience in operation and management of HSS's service system

b) inexperience in workshop management

c) delay in the extension of mechanized farming technology

d) influence on local economy

(2) Establishment of HSS Pilot Center

The difficulties mentioned above should be solved prior to the establishment of the HSS network. The establishment of HSS Pilot Center, is thus designed to deal with and solve the difficulties.

Pilot Center will maintain farm machinery sufficient to cover 4,200ha and, at the same time will control the surrounding substations which will cooperate the Pilot Center.

The Center will also extend mechanized farming and improve the local economy through the hire of farm machinery with and wihout operators.

The Center will through trial and experiment, determine the most effective best management system for the HSS network and thus act as a successful management guide.

(3) Conclusion

The establishment of HSS nationawide network as a part of "Food Security Plan" is an effective policy for achievemnet of self sufficiency in food supply. The HSS pilot Center, will be the key porject, and will firm foundatin for the establishment of a HSS nationwide network

8. CONCLUSION AND RECOMMENDATIONS

8-1 CONCLUSION

To remedy the low self sufficiency of the food supply in Egypt (50%), the Government is promoting the increase of food production through the "Food Security Plan". The first priority of the Plan is farm mechanization which will supplement farm labor and increase agricultural productivity, particularly in the small-scale farm sector. The Government of Egypt intends to promote mechanized farming through a nationwide HSS network.

The implementation of the network, however, may involve several potential difficulties with regards to HSS management, such as machinery utilization and contract farming. Should such difficulties arise, they must be dealt with prior to the establishment of the nationwide HSS network. For this purpose, the Government of Egypt intends to establish one HSS unit as a pilot project and model system for demonstration. With proper utilization by the Egyptian government, this same Pilot Project will be an effective guide for smooth commencement, implementation and management of the envisioned nationwide HSS network. As the Pilot Center will form the model for an HSS management system, the establishment of the same will thus contribute to the establishment of the nationwide HSS network and in consequence to an increase in agricultural productivity. This, in turn, will aid Egyptian farmers, in particular the small-scale farmer, and contribute to stabilization of the food supply in Egypt. It is therefore recommended that this project, the Pilot Center, be established by grant aid of Japanese government.

8-2 RECOMMENDATIONS

The following are recommendations to ensure effective and smooth management of the HSS network:

(1) Since the Pilot Center is the first of its kind in Egypt, its management will likely require strengthening at first. Accordingly, a series of gradual expansions and a variety of initial experiments in the Pilot Center's management are recommended. The results of these experiments

will, in turn, be a valuable contribution to the formation of the management guide for the projected nationwide HSS network.

(2) Four substations to be constructed by the Egyptian government are included in the design of the HSS Pilot Center, each vital for the effective operation of the Pilot Center. For this reason, the Study Team recommends that these substations be constructed as early as possible.

(3) According to the present plan, the Pilot Center and the projected nationwide HSS network will initially be under the direction of the Ministry of Agriculture. In order to lessen the financial burden of subsidy upon the government, it is recommended that, as the envisioned HSS network becomes more firmly established, they encourage the development of a system whereby the HSS can become more economically self-sufficient. Such a system should at the same time protect the small-scale farmers for whom the program is designed from excessively high service fees.

(4) Training and educational programs will be planned not only for persons concerned with the Pilot Center but also for those concerned with the surrounding substations. Staff educated and trained at the Pilot Center will be assigned to substations when needed to extend repairing and operating skills over a broader area.

(5) The Government of Egypt will encourage trainees to attend the scheduled training and educational programs at the Pilot Center. The farmers, as much as possible, will be trained to operate the machinery of both the Pilot Center and the substations, minimizing the number of operators needed at either of the above.

(6) The various HSS management programs, such as the training curriculum program, machinery allocation program, periodic repair program, etc., should be thoroughly and carefully planned.

(7) The improvement of infrastractures in the surrounding area will also be promoted for smooth and effective operation of HSS machinery.

(8) The different cropping patterns and the situation in the surrounding area will be considered when the program for extension of the HSS network is planned.

(9) The depreciation cost for farm machinery must be considered sufficiently when determining service fees.

(10) Machinery for rice cultivation will be adopted by the Pilot Center after review of the final report to be prepared under of the "Rice Mechanization Pilot Project".

APPENDICES

1. Minutes of Discussions

   (1) Minutes of Discussions

   (2) Itinerary of Survey Team

   (3) List of Team Members

   (4) Contact List

2. Drawings

MINUTES OF DISCUSSIONS ON
THE PROJECT OF FARM MACHINERY HIRE SERVICE STATION
IN
EL SEMBELLAWAIN
ARAB REPUBLIC OF EGYPT

In response to the request by the Government of Arab Republic of Egypt, the Government of Japan has sent, through the Japan International Cooperation Agency (hereinafter referred to as " JICA "), a team headed by Mr. Kenichi ANDO (Second Economic Cooperation Division, Economic Cooperation Bureau, Ministry of Foreign Affairs) to conduct a Basic Design Study on the Project of Farm Machinery Hire Service Station in El Sembelawain (hereinafter referred to as " the Project ") from August 5 to end of August, 1983.

The team has conducted the field survey, held series of discussions and exchanged views with the official concerned of the Government of Egypt.

Both parties have agreed to recommend their respective Government and authorities concerned to examine the results of the study attached herewith the realization of the Project.

August 16th, 1983.

Mr. Kenichi ANDO,
Team Leader,
Japanese Study Team,
J I C A .

Dr.Eng. Ali EL HOSSARY,
Undersecretary for
Engineering Affairs,
Ministry of Agriculture,
Arab Republic of Egypt .

ATTACHMENT

1. THE OBJECTIVE OF THE PROJECT

The objective of the Project is to promote the agricultural mechanization in Egypt by establishing Farm Machinery Hire Service Station in El Sembelawain (hereinafter referred to as " H.S.S. ") as a Center Station for domenstration.

2. THE ORGANIZATION OF THE PROJECT

The organization chart of the Project is shown in ANNEX-I, and the Executing body of the Project is Ministry of Agriculture.

The organization of H.S.S. will be examined based on the results of the study.

3. THE FUNCTION AND ACTIVITIES OF H.S.S.

The function of H.S.S. is to demonstrate the farm mechanization to farmers, and its activities are as follows;

1) Operation of the farm machineries for hiring service.

2) Management, maintenance and repair of farm machineries.

3) Training of operators, technicians and farmers.

4. THE PROPOSED SITE FOR H.S.S.

The proposed site for H.S.S. is located in El Sembelawain, Dakahlia Governorate and the land is belonging to Ministry of Agriculture as shown in attachment herewith.

5. UNDERTAKING OF THE STUDY TEAM

1) The study team will carry out the examination of the Project, including determination of Project Scale, basic design of the buildings and sellection of farm machineries etc., considering the positioning of the Project within the related master plan. The building will contain administration block, workshop, machine shelter and training block on its function.

./..

The equipment will be agricultural machineries, workshop tools and the others.

2) The above results will be incorporated in the Draft Final Report which will be submitted to the Government of Egypt by the end of October, 1983. And after the explanation and mutual discussions on that Report, the study team will make the Final Report on the Project.

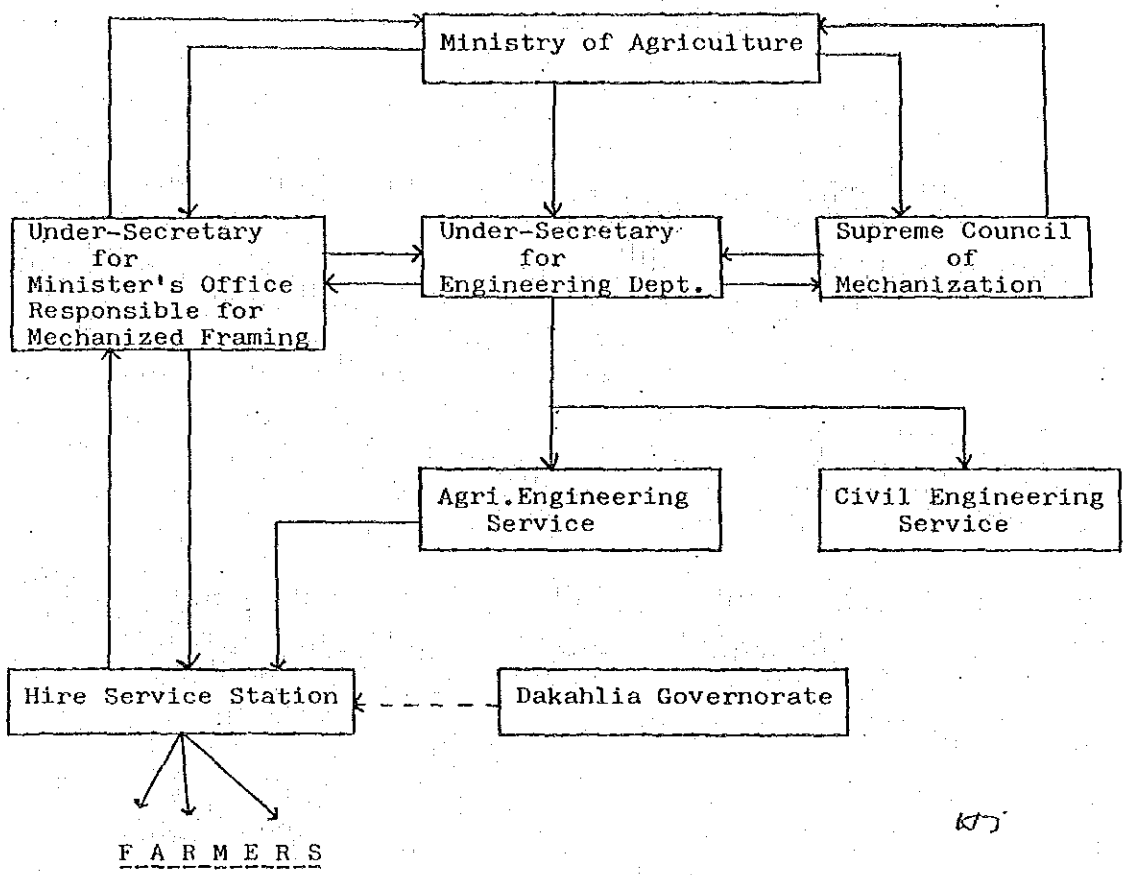
3) The study team will convey the desire of the Government of Egypt to the Government of Japan that the latter will cooperate to the Project within the scope of Japanese economic cooperation in grant form.

6. MAJOR UNDERTAKINGS TO BE TAKEN BY BOTH GOVERNMENTS

The Government of Egypt and the Government of Japan will take necessary measures as listed in ANNEX-II on condition that the grant assistance by the Government of Japan is extended to the Project.

ANNEX-I

Organization Chart of The Project



ANNEX-II

Major Undertakings To Be Taken By Both Governments

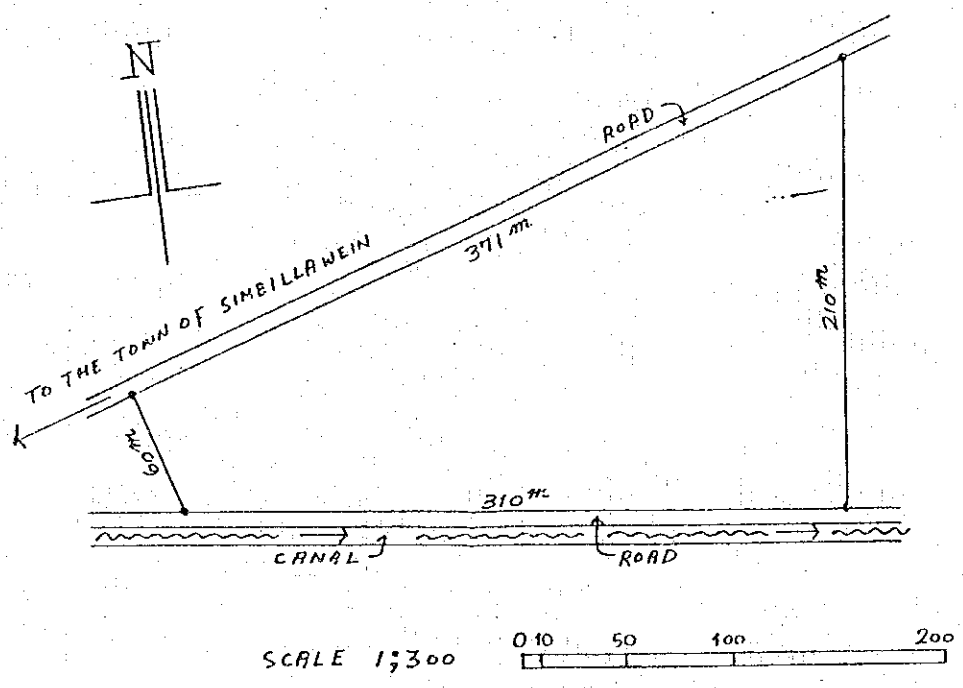
No.	Items	To Be Covered By Grant Aid	To Be Covered By Egyptian Side
1.	To secure a lot of land		o
2.	To clear, level and reclame the site when needed		o
3.	To construct the gate and fence in and around the site		o
4.	To construct the parking lot	o	
5.	To construct the road		
	1) Within the site	o	
	2) Outside the site		o
6.	To construct the building	o	
7.	To provide facilities for distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		o
	b. The drop wiring and internal wiring within the site	o	
	C. The main circuit breaker and transformer	o	
	2) Water Supply		
	a. The city water distribution main to the site		o
	b. The supply system within the site (receiving and elevated tanks)	o	
	3)Drainage		
	a. The drainage city main(for storm,sewer, and others) to the site		o
	b. The drainage system(for toilet sewer, ordinarywaste,storm drainage and others) within the site	o	
	4) Gas Supply		
	a. The city gas main to the site		o
	b. The gas supply system within the site	o	

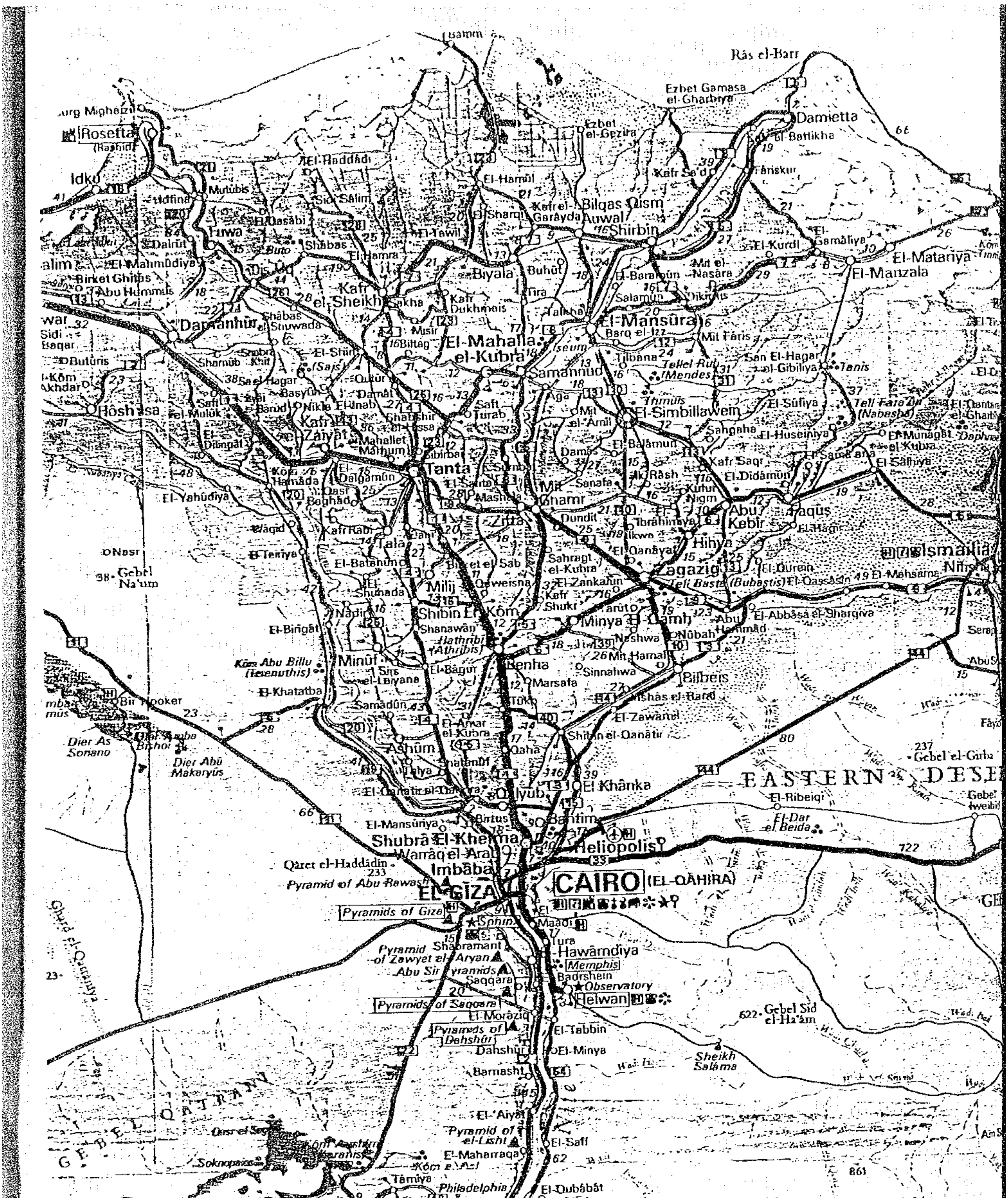
No.	Items	To Be Covered By Grant Aid	To Be Covered By Egyptian Side
	5) Telephone System		
	a. The telephone trank line to the main distribution frame/panel(MDF)of the building		o
	b. The MDF and the extension after the frame/panel	o	
	6) Furnitures and Equipment		
	a. General furnitures(carpet,curtain, table,chair and others)		o
	b. Project equipment	o	
8.	To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the B/A		
	1) Advising commission of A/P		o
	2) Payment commission		o
9.	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine(Air)transportation of the products from Japan to the recipient country	o	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		o
	3) Internal transportation from the port of disembarkation to the project site	o	
10.	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into recipient country and stay therein for the performance of their work		o
11.	To maintain and use properly and effectively that the facilities constructed and equipment purchased under the Grant		o
12.	To bear all the expenses other than those to be bone by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment		o

PROJECT SITE IN EL SIMBILLAWEIN

1) The area of the project site is about 9 feddan.

2) The attached site sketch is a conceptual map only. Exact location, area, and the survey map of the site in requested scales will be prepared by the M.O.A. and will be delivered to the basic study team within the day of requested period.





Râs el-Barr
Ezbet Gamasa el-Gharbiya
Damietta
Rosetta (Rashid)
Idku
Mutubis
Fuwa
El-Mahmûdiya
Birket Ghitâs
Abu Hummus
Damanhûr
Hôsh Isa
Kafr el-Sheikh
Biyala
Shirbin
Bilqas Qism Auwal
El-Manzala
El-Matariya
El-Mansûra
El-Mahalla el-Kubra
Samannud
Tanis
El-Simbillawein
Kafr el-Zaiyât
Tanta
Mit Ghamr
Zifta
Abu Kebir
Faqûs
Zagazig
Tell Basta (Bubastis)
Ismailia
Minya el-Qamh
Shibin el-Kôm
Minûf
Benha
Bilbeis
Ashmûn
Qalyub
El Khânka
Shubrâ el-Kheima
Heliopolis
Imbâba
EL GIZA
CAIRO (EL-QÂHIRA)
Pyramids of Giza
Sphinx
Maadi
Hawâmdiya
Memphis
Saqqara
Pyramids of Saqqara
Helwan
Observatory
Pyramids of Dahshûr
Dahshûr
EASTERN DESE
GEBEL QATRANI
Pyramid of el-Lisht
El-Saff
Philadelphia
Atfih
Pyramid of Maidûm
Sinnûris
El Faiyûm
Pyramid of Hawara
Pyramid of el-Lâhûn
Beni Suef
GEBEL EL GALA
EL BAHARÎYA
A — 8

ITINERARY OF SURVEY TEAM

(August 5 - August 29, 1983)

(A): Team A, (B): Team B

Date	Stay		
Aug. 5 (Fri)		(A)	Leave Tokyo
6 (Sat)	Cairo	(A)	Arrive Cairo
7 (Sun)	"	(A)	Visit Embassy of Japan, JICA
8 (Mon)	"	(A)	Meeting W/Ministry of Agriculture Submit Inception Report
9 (Tue)	"	(A)	Meeting W/Ministry of Agriculture on Inception Report, Project Criteria, etc.
10 (Wed)	"	(A)	Meeting W/Ministry of Agriculture on Organization System, Farm Machinery, etc.
11 (Thu)	"	(B)	Arrive Cairo
		(A)	Arrange to go to Mansura with Ministry of Agriculture and JICA
12 (Fri)	Mansura	(A, B)	Cairo - Mansura Meeting W/Dakhalia Local Chapter of Ministry of Agriculture
13 (Sat)	"	(A, B)	Field Survey El Sembellawain, Aga Visit Governor of Dakhalia Governorate
14 (Sun)	Cairo	(A, B)	Meeting W/Dakhalia Local Chapter of Ministry of Agriculture Field Survey El Sembellawain Mansura - Cairo
15 (Mon)	"	(A, B)	Meeting W/Ministry of Agriculture
16 (Tue)	"	(A, B)	Submit Minutes of Meeting
17 (Wed)	"	(A, B)	Collect Data
18 (Thu)	"	(A, B)	Visit Ministry of Agriculture, JETRO
19 (Fri)	"	(A, B)	Collect Data
20 (Sat)	"	(A, B)	Visit Workshop (Ministry of Agriculture) Visit Dr. Tomita (Team Leader of Mechanized Rice Cultivation Project)
21 (Sun)	Mansura/ Cairo	(B)	Cairo - Mansura Field Survey El Sembellawain
		(A)	Collect Data
22 (Mon)	"	(B)	Field Survey on Existing Agricultural Conditions in El Sembellawain
		(A)	Collect Data

(A): Team A, (B): Team B

Date	Stay	
23 (Tue)	Cairo	(A, B) Visit Mechanized Farming Center in Karf El Sheik
24 (Wed)	"	(A, B) Meeting W/Ministry of Agriculture
25 (Thu)	"	(A, B) Survey and Collect Data
26 (Fri)	"	(A, B) Report Preparation
27 (Sat)	"	(A, B) Visit Embassy of Japan, JICA
28 (Sun)		(A, B) Leave Cairo
29 (Mar)		(A, B) Arrive Tokyo

MEMBER LIST OF THE TEAM

Name		Designation	
Ken'ichi	ANDO	Team Leader	2nd Economic Cooperation Division, Economic Cooperarion Bureau, Ministry of Foreign Affairs, Japan
Keikichi	KANAI	Farm Machinery	Technical Training Instructor, the Agricultural Technique Training Institute, Ministry of Agriculture, Forestry and Fisheries, Japan
Sen'ichi	KIMURA	Project Cordinator	Basic Design Division, Grant Aid Department, Japan International Cooperation Agency
Makoto	MIKI	Consultant Team Leader Architectural Planning	Chuo Kaihatsu Corporation
Yoshihisa	ONISHI	Farm Machinery	Chuo Kaihatsu Corporation
Yuichi	TAGUCHI	Architectural Design	Chuo Kaihatsu Corporation
Isamu	KOIKE	Management and Organization	Chuo Kaihatsu Corporation

CONTACT LIST (83' AUG.)

	Name	Position	Add. & Tel.
1	Dr. Ali Mohamoud El Hossary	Under Secretary (Agricultural Engineering Dept.)	Office 702-042 Dokki, CAIRO
2	Abd El Hamid Ahmed El Farash	Director General (Agricultural Eng. Dept.)	Office 702-315
3	Ezat Yassin	Director General (Civil Eng. Dept.)	"
4	Ayad Isseynos Boutros	Director (Civil Eng. Dept.)	"
5	Abd Allah Hassan Bastawy	(Power Mech. Engineer)	"
6	Mohamad Abbas	Under Secretary (Mechanized Farming)	"
7	Sayed Tantawy	Secretary General (Cooperation Union)	"
8	Abd El Maksoud Sobhy	Director General (Mechanization Assistance)	"
9	Mohamed El Shawadfy	Office Director of Dr. Hossary's Office	"
10	Ahmed Beheiry	Field Executive Director of Farm Mechanization	"
11	Ahmed Dawood	Director of Work Shop & Farm Machinery Dept.	"
12	Mohamed Abd El Aziz	Liaison Officer Foreign Relations Dept.	
13	Mohamed Abd El Latif	South Asia Dept. Foreign Relations	

	Name	Position	Add. & Tel.
14	Elhagg Abd Elaziz Mosilhi	-Member of People's Congress -Cooperative Agr. Union -Supervisor of Agricultural Society	
15	Mansour		M.O.A.
16	Noshi Azmi	Engineer	M.O.A.
17	Mohamed Al Gamal	Vice Minister of Agr. of Dakhalia	Dakhalia
18	Samuel Shehata	Public Relations Coordinator	"
19	Masry		"
20	Shawky		"
21	Shenbeny		"
22	H.E. Tewfik Karara	Governor of Dakhalia	"
23	Yones	Dakhalia	"
24	Mohamoud Shekha	Under secretary of Governorate Electricity Dept.	Dakhalia
25	A'hamed El Gegly	Under Secretary of Tele-Communications	"
26	Soad Mohamed El Said	Under Secretry of Housing & Reconstruction	" "
27	Mr. Medhat		

	Name	Position	Add. & Tel.
28	Mr. Sayet	Sembellawain Agricultural Engineer	
29	Ibrahim Elazab	Agricutural Statistician	CAPMAS Central Agency for Public Mobilization & Statistics
30	M. Noguchi	Minister	Japanese Embassy in Cairo
31	M. Amano	1st Secretary	"
32	H. Kato	1st Secretary	"
33	J. Koizumi		JICA Office in Cairo
34	M. Matsuura		"
35	Dr. T. Tomita	JICA Expert	
36	S. Sugawara	"	
37	Namba	"	
38	Y. Kimura	"	
39	K. Funaki	JETRO Director	740-942, 740-659 31,26th July St.
40	Mohamed Diaq El Din	JICA Public Relations	811-502 26, El Kods El Shareef St. El Mohanssen

THE PROJECT
OF
FARM MACHINERY HIRE SERVICE STATION
IN
SEMBEL LAWAIN, DAKHALIA
ARAB REPUBLIC OF EGYPT

JICA

SEMBELLAWAIN CENTRAL HOSPITAL

HOSPITAL RECEPTION

PUBLIC ROAD

274.5m

ADM. ENT.& EXIT.

8.0m

58.5m

GUARD HOUSE & GARAGE

GUARD HOUSE & GARAGE

TRACTOR EXIT.

PARKING

WATER TOWER

ADMINISTRATION WING

UTILITY BUILDING

PRACTICE FIELD

DRIVER'S TRAINING YARD

60.5m

IMPLEMENT SPACE

PLAZA

DINING RM.

OPERATOR'S WING

AGRICULTURAL ROAD

148.0m

EL SHOON CANAL

TRACTOR SHELTER

WORKSHOP

SUB ENT&EXIT

205.0m

FUEL & CAR WASHING FACILITY

TRAILER PARKING

IRRIGATION DITCH

GUARD HOUSE

TRACTOR ENT.

251.5m AGRICULTURAL ROAD

N

H.S.S.

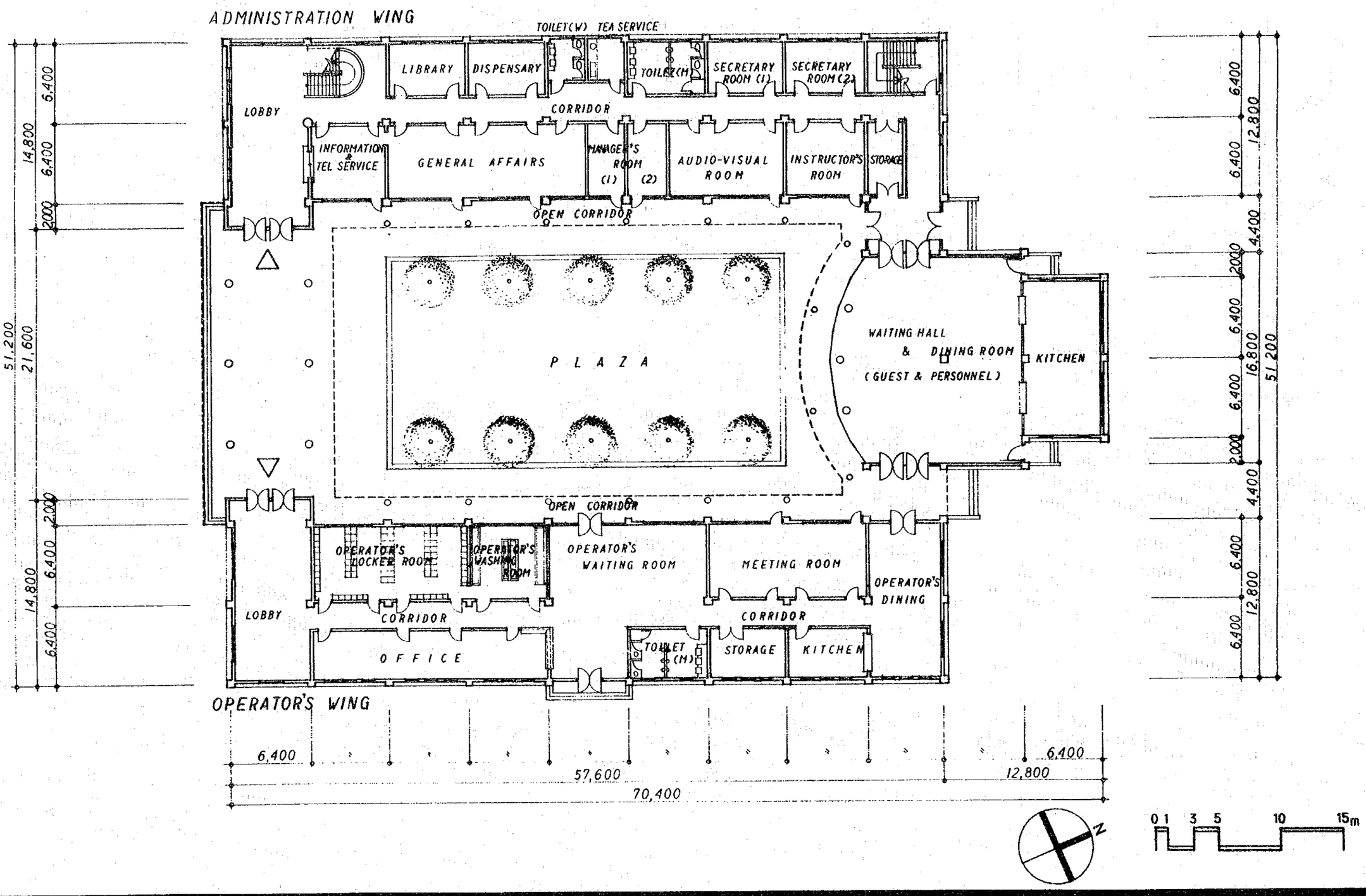
SITE PLAN

0 1 5 10 20 50m

S:1:1000

D – 1

01



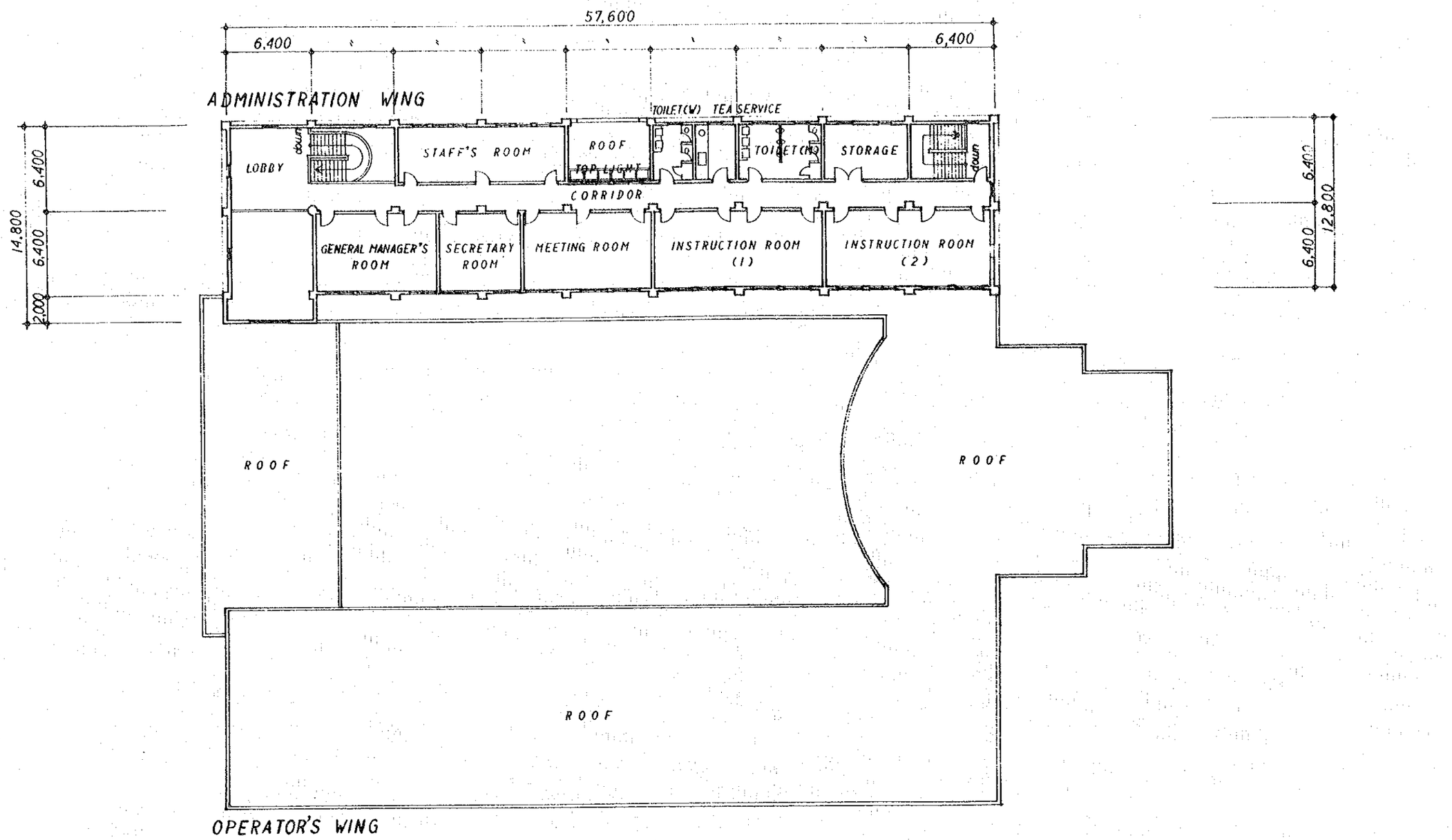
H.S.S.

ADMINISTRATION WING
OPERATOR'S WING

GROUND FLOOR PLAN S:1:300

D – 2

02



N

0 1 3 5 10 15m

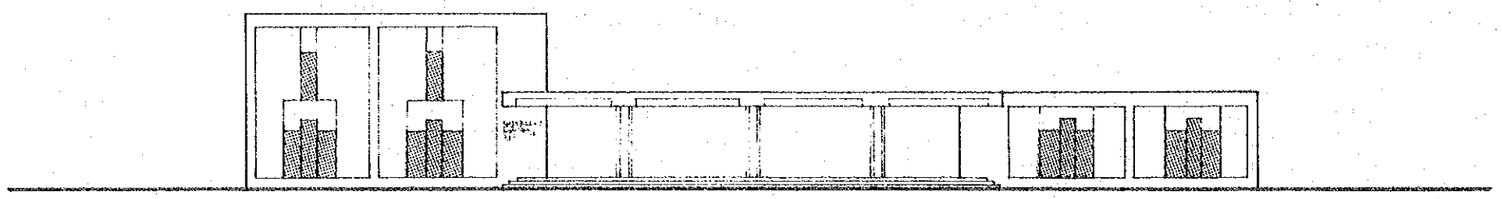
H.S.S.

ADMINISTRATION WING
OPERATOR'S WING

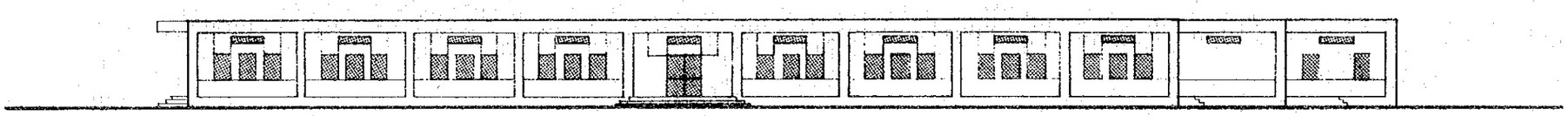
SECOND FLOOR PLAN S:1:300

D – 3

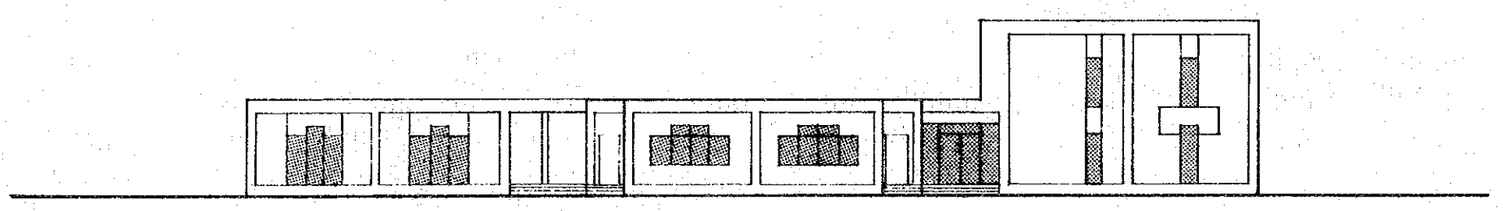
03



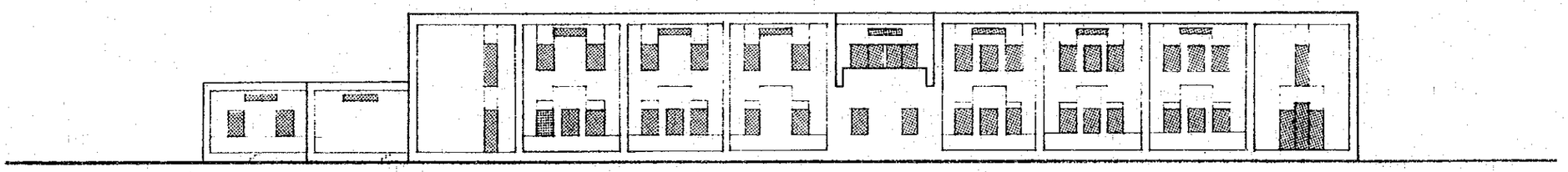
SOUTH ELEVATION



EAST ELEVATION



NORTH ELEVATION



WEST ELEVATION

0 1 3 5 10 15m

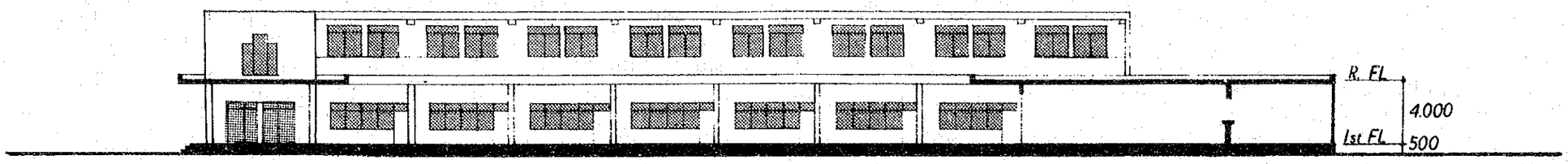
H.S.S.

ELEVATION

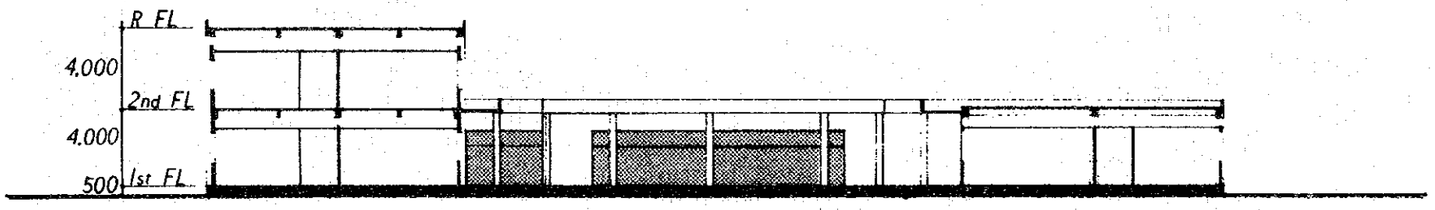
S:1:300

D – 4

04



SOUTH - NORTH - SECTION



WEST - EAST - SECTION

0 1 3 5 10 15m

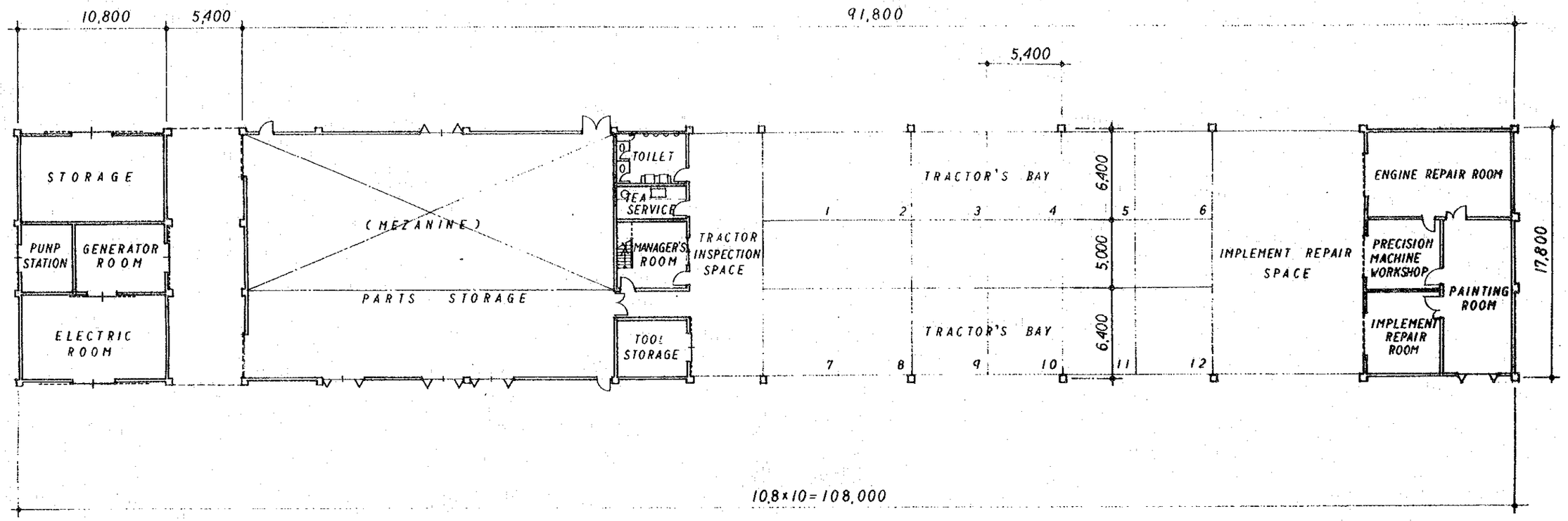
H.S.S.

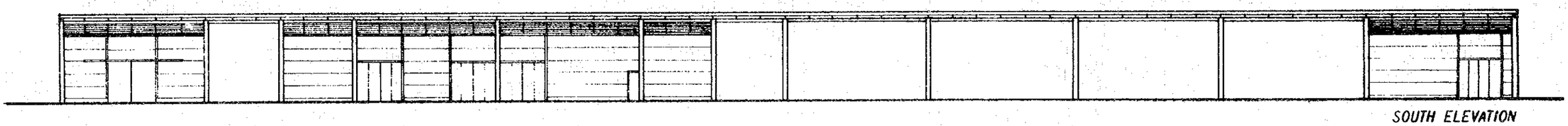
SECTION

S:1:300

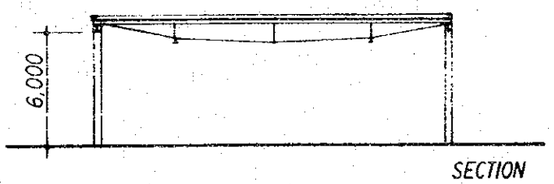
D – 5

05

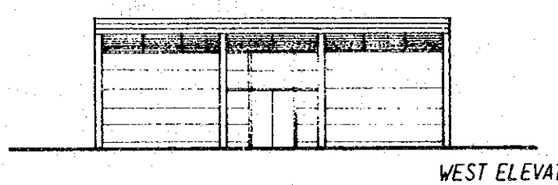




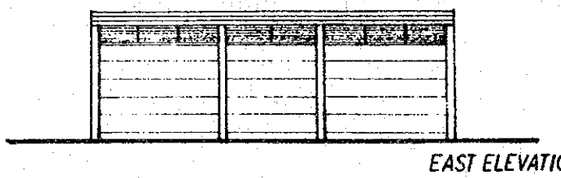
SOUTH ELEVATION



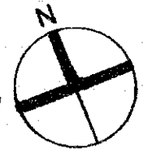
SECTION



WEST ELEVATION



EAST ELEVATION



H.S.S.

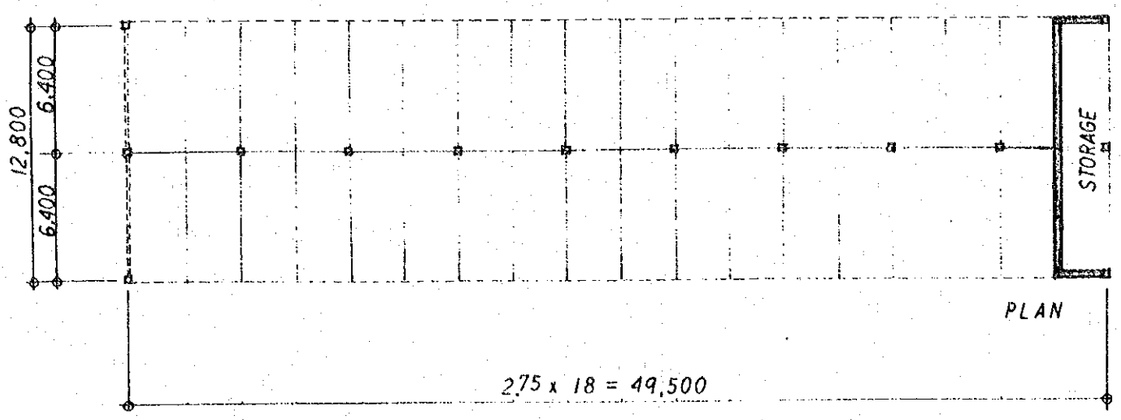
WORKSHOP

0 1 3 5 10 15m

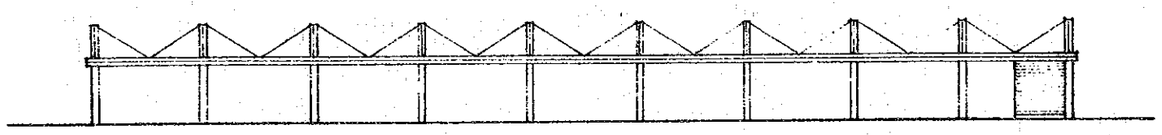
S:1:300

D – 6

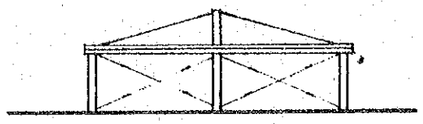
06



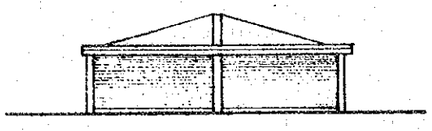
TRACTOR SHELTER



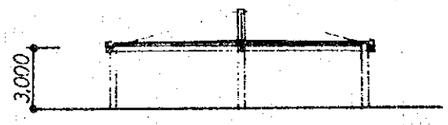
SOUTH ELEVATION



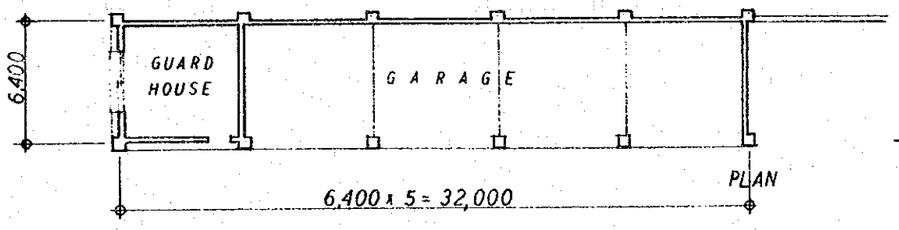
WEST ELEVATION

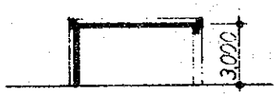


EAST ELEVATION



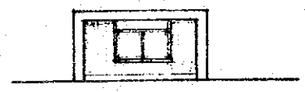
SECTION





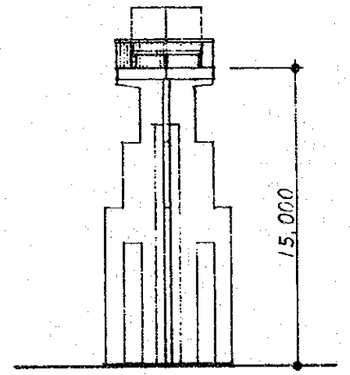
SECTION

SIDE ELEVATION

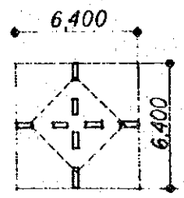


FRONT ELEVATION

GUARD HOUSE GARAGE



ELEVATION



PLAN

WATER TANK

H.S.S.

OTHER FACILITIES

0 1 3 5 10 15m

S:1:300

D – 7

07