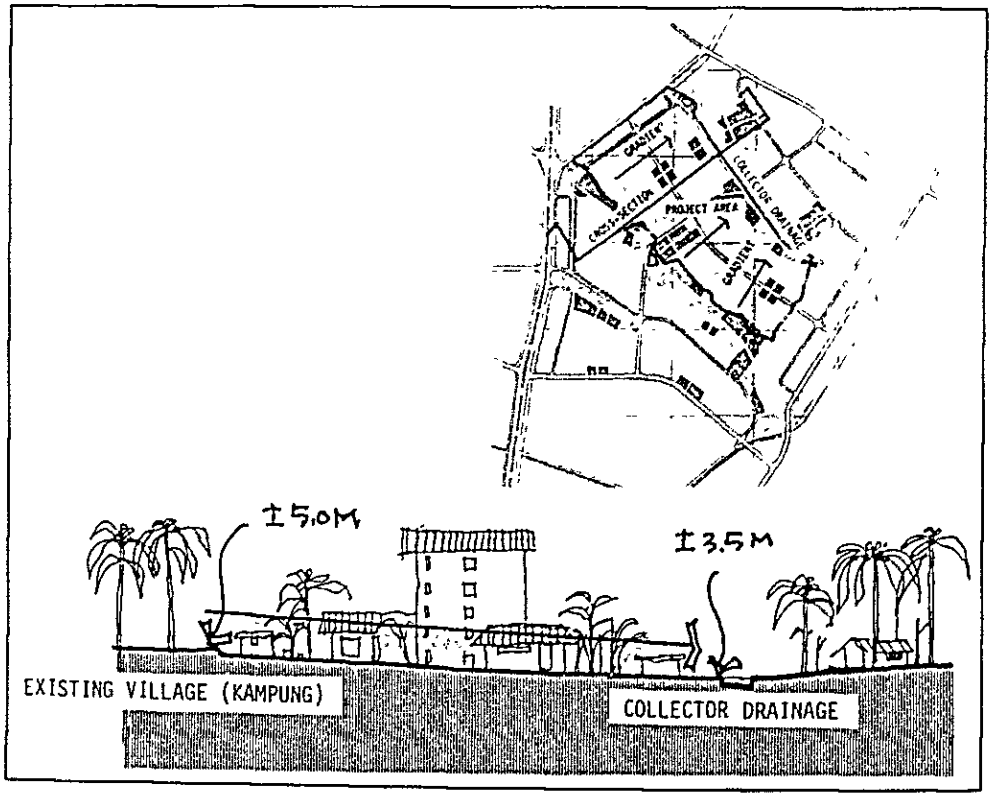
6—3 INFRASTRUCTURE

DRAINAGE AND LAND DEVELOPMENT

In the Project Area, rainwater will be discharged into collector drainage in accordance with PBJR's master plan. Here, the premise is that the macro-drainage to which the collector drainage is to be linked, will be completed by April 1982.

The drainage programme for this area is formulated on the basis of two years' precipitation, so much so, that some parts of the area are likely to be inundated when there is much more rain. In order to minimize the effects of such inundation, the open lots and playgrounds are to be procided with means of adjustment. PERUM PERUMNAS will bear all the cost for the construction of drainage facilities except collector in the Project Area, whereas other areas, the cost will be beared by the institutions responsible.

FIG. 6—3—1 MODEL OF LAND DEVELOPMENT



The land development is based on a dry-up system, but the 150,000m^3 of earth to be excavated in the construction of the Cengkareng Floodway will be brought in and the ground level raised by slightly less than 15cm on the average, or 70cm at the highest, for the reclamation of the swampy lots in the area, and for the assurance of an inclination adequate for drainage.

ROADS

The roads will be designed on the basis of the design standards of PERUM PERUMNAS. The cross-section is indicated in the technical report. PERUM PERUMNAS will bear all the cost except the periphery road for the Project Area, although the maintenance will be transferred to DKI Jakarta several years after completion of the roads.

WATER SUPPLY

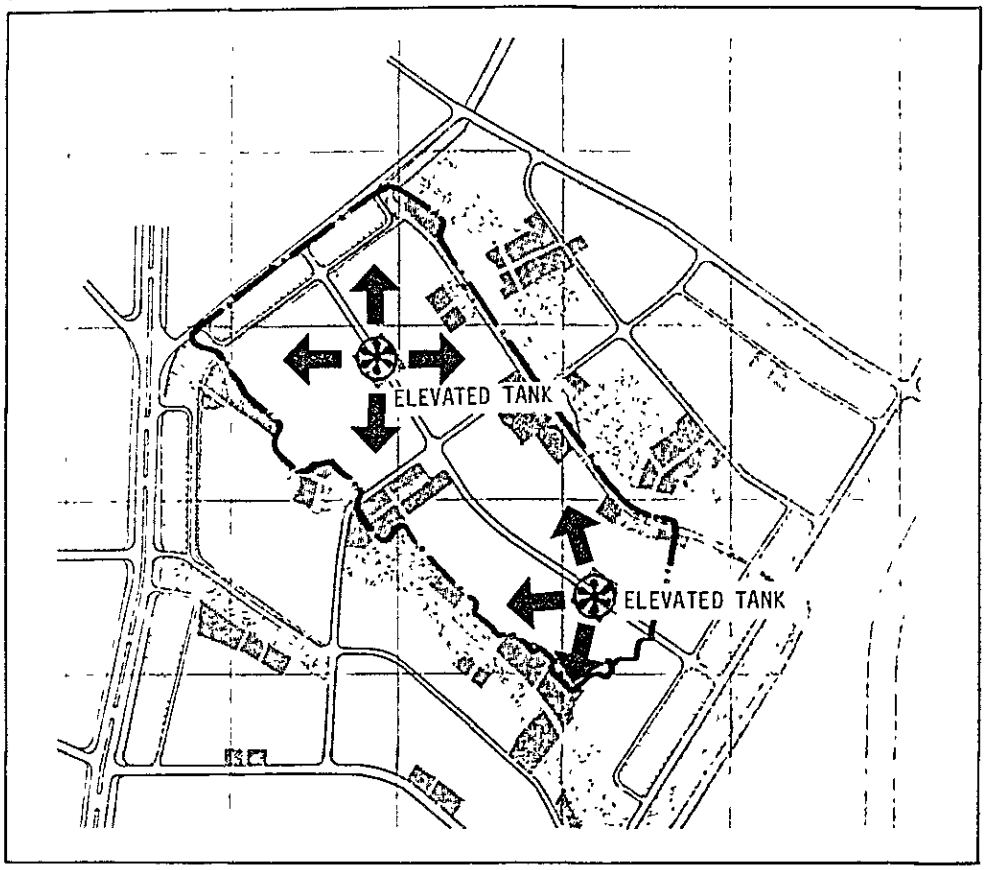
For the supply of water from Pam-Jaya, a booster pump will be installed at Grogol to pressurize and supply it to the Project Area. The water supply will be big enough to cater for an average water supply of 60 ℓ/person a day to the houses, or, to satisfy the demand of a total population of 40,000.

If the Project Area is expanded, however, this water supply system will be inadequate, and it will be necessary to redevelop the regional water supply system installed on the left bank of the Angke River, and to incorporate the Project Area's water supply system into this regional one.

For water distribution within the Project Area, the Project Area will be divided into two zones, in each of which an elevated water tank will be installed, to carry a powered supply of water.

All the construction cost for the Project Area will be shared by PERUM PERUMNAS, whereas that of the water distribution system to the Project Area will be shared by Cipta Karya.

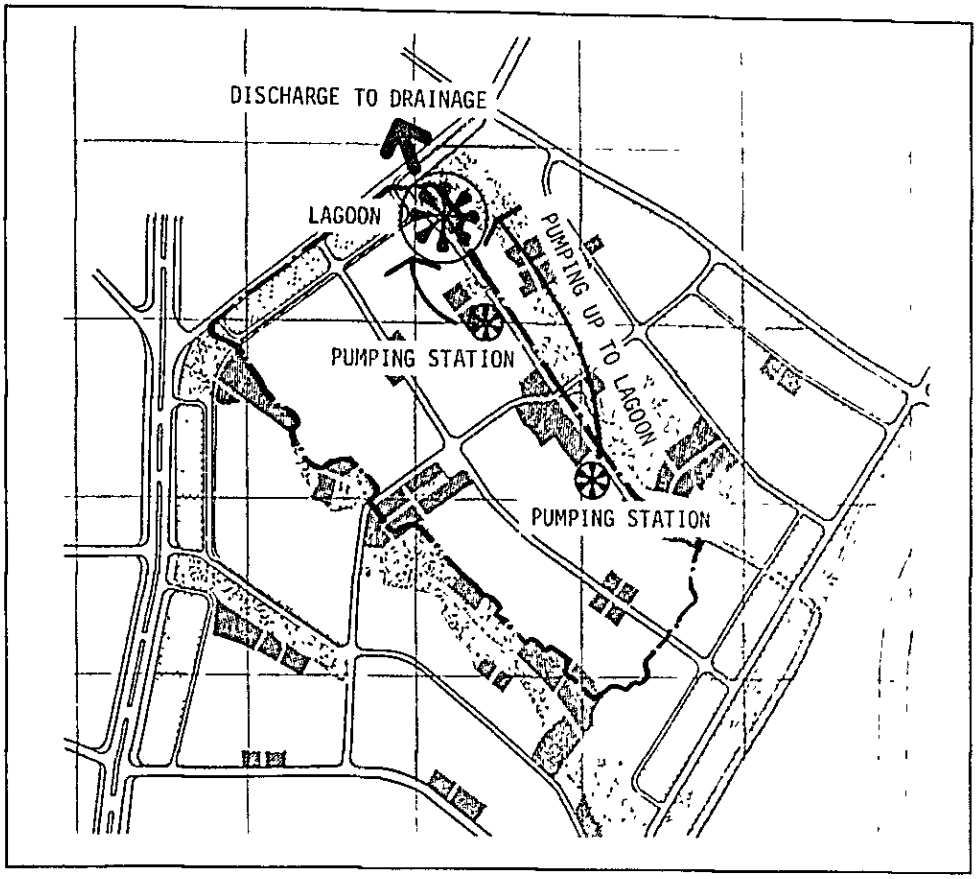
FIG. 6-3-2 WATER SUPPLY SYSTEM



SEWERAGE

As was ascertained at the Steering Committee on November 4, 1980, domestic sewage from the toilets, Mandi, kitchens, and other facilities, will be treated under a single treatment system. The sewage discharged from each household will be collected at two pumping stations and then pressurized and moved to a Ragun treatment plant. Upon treatment there, it will be discharged into a collector drainage channel. When the Project Area is expanded, a similar system will be developed for the expanded section.

FIG. 6—3—3 SEWERAGE SYSTEM



GARBAGE DISPOSAL

The average discharge from the Project area is hypothesized at 12 l/day house. Garbage for collection is transferred by cart from the garbage dump, to be installed in each neighbourhood, to one of four relay dumps, from which it will be moved out of the Project Area by DKI Jakarta trucks. PERUM PERUMNAS will bear all the cost for the construction of facilities in the Project Area.

ELECTRICITY

Electric power will be suppleid by the PLN. The voltage is 20kV, but it will be reduced to 220/380V at the transformer

stations to be distributed in the Project Area for supply to each household.

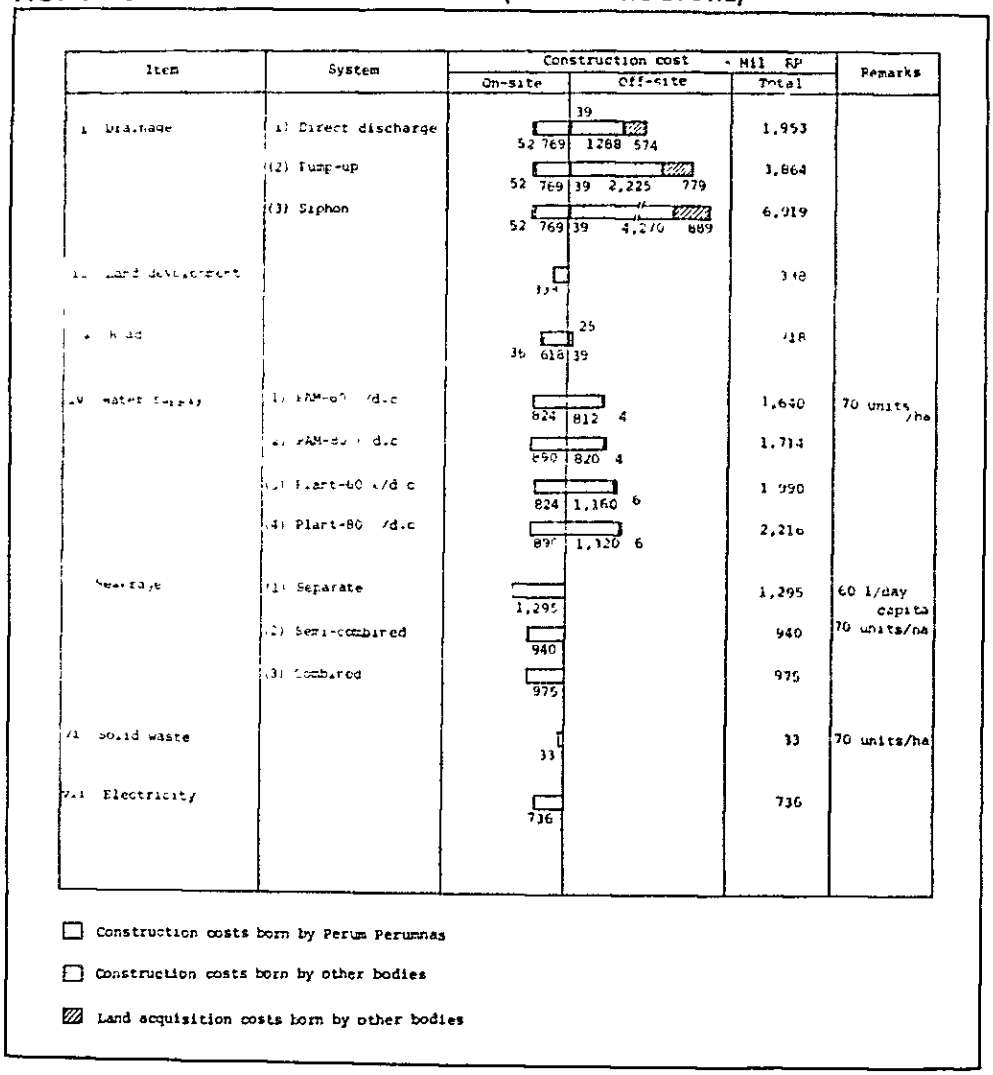
The cost for the construction of facilities outside the Project Area will be shared by the PLN, where PERUM PERUMNAS will bear the cost within the area.

CONSTRUCTION COST

The cost is based on prices prevailing in June 1980, and cost is estimated as for an order placed in December 1983. The rate of inflation is hypothesized at 15%.

The detail informations are indicated in the technical report.

FIG. 6－3－4 DEVELOPMENT COST (INFRASTRUCTURE)



6—4 TYPE OF HOUSING

HIGH-DENSITY TYPE HOUSING

When attempts are made for the development of high density type housing, walk-up and low-rise housing is conceivable. The construction cost of walk-up flats is roughly double that of low-rise housing, and it becomes primarily necessary to study "new ways of living" and make a technical study for a drop in cost.

In respect to low-rise housing of the high-density type, progress has been made in materials and construction techniques, so that it is more desirable to make a study on effective utilization of the lots, and a plane programme for housing, rather to make a structural and technical study.

In respect to the low-density type, low-rise housing, there is a need to make a review of the basic construction methods, while taking account of the ground conditions, and at the same time to compare them with those of the high-density type, as the supply system is effective.

SIZE OF HOUSE AND LOT

In respect to all types of housing under this programme, data on the area of lot, floor area, density, and other factors, are schematized in the following figure. In the figure, the dwellings range from a high density of 200 units/hectare to a low density of 20 units/hectare. Picking up some of them, a substitute program will be formulated. The "unsuitable sector," referred to here, represents that which violates the building standards of DKI Jakarta.

FIG. 6-4-1 TYPE OF HOUSING

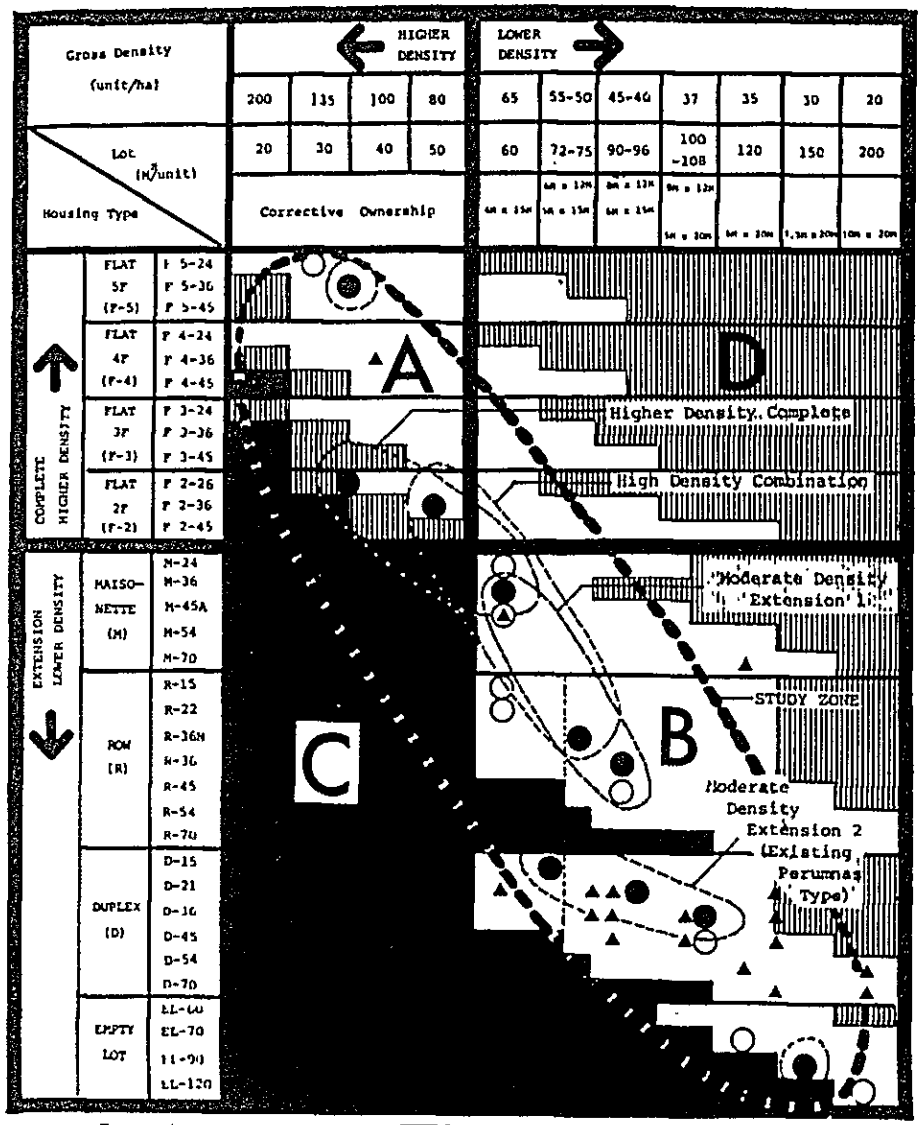


FIG. 6-4-2 TYPE OF HOUSING AND COST

Type			No. of Story	Net Lot Size Per Unit (M) x (M) = (M^2)	Floor Area (M^2)					(A)/(B)	Construction Cost (x 10^3 RP) June/1980		
					Net Floor Area (A)				(B)		(C)		
					Living Area	Veranda St. Inn.Stair	Total	Common Floor Area	Gross Floor Area		Total cost/unit	(C)/(A)	(C)/(B)
Duplex	D-15	●	1	6 x 12 = 72	18.00	-	18.00	-	18.00	100	620.83	34.49	34.49
	D-21	●	1	8 x 12 = 96	24.00	-	24.00	-	24.00	100	819.24	34.14	34.14
	D-36	●	1	9 x 12 =108	36.00	-	36.00	-	36.00	100	1246.14	34.62	34.62
	D-45		1	8 x 15 =120	45.00	-	45.00	-	45.00	100	1470.26	32.67	32.67
Row House	R-15		1	4 x 15 = 60	18.00	-	18.00	-	18.00	100	705.44	39.19	39.19
	R-22		1	4 x 15 = 60	25.00	2.00	27.00	-	27.00	100	971.49	35.98	35.98
	R-36N	●	1	5 x 15 = 75	36.00	2.00	38.00	-	38.00	100	1387.73	36.52	36.52
	R-36	●	1	6 x 15 = 90	36.00	3.00	39.00	-	39.00	100	1222.52	31.35	31.35
	R-45		1	6 x 15 = 90	45.00	3.00	48.00	-	48.00	100	1375.71	28.66	28.66
Maissonet	M-24		2	4 x 15 = 60	24.70	1.70	26.40	3.60	30.00	88.0	1162.16	44.02	38.74
	M-36	●	2	4 x 15 = 60	30.00	8.00	38.00	-	38.00	100	1338.13	35.21	35.21
	M-45A		2	4 x 15 = 60	39.00	11.00	50.00	-	50.00	100	1636.67	32.73	32.73
2 Storied Flat	FS-2-26	●	2	35	25.90	-	25.90	2.10	28.00	92.5	1017.41	39.28	36.34
	FS-2-36	●	2	50	33.90	1.80	35.70	2.10	37.80	94.4	1414.47	39.62	37.42
Walk-up Flat	FS-5-24		5			1.56	26.18	4.26	30.80	85.0	2141.61	81.80	69.53
	FS-5-36	●	5	35		1.69	38.78	4.62	43.40	89.4	2956.09	76.23	68.11
	FS-5-45		5			1.62	46.84	4.62	51.46	91.0	3372.08	71.99	65.53
	FG-5-36		5			1.20	38.88	10.86	49.74	78.2	3116.67	80.16	62.66
	FG-5-45		5			2.90	48.06	10.86	58.92	81.6	3668.25	76.33	62.26
	FM-6-36		6			2.58	38.70	7.66	46.36	83.5	3248.61	83.94	70.07
	FM-6-45		6			3.30	46.80	7.66	54.46	75.9	3686.28	78.77	67.69
	JT-5-36		5			1.95	36.90	4.03	40.93	90.2	3141.02	85.12	76.74

●: Selected type for alternative formulation.

7

ALTERNATIVES

7—1 PREPARATION OF ALTERNATIVES

PURPOSE

This housing development program is designed to supply dwellings in large numbers and, at the sametime, boost the potential of the Cengkareng area.

Many methods are conceivable for the accomplishment of this purpose, and the program may be subject to change, or may take on a different character, depending on the way the methods are put to use. One of the purposes in preparing alternatives programs, is to apply these methods in various ways and prepare programme drafts, in order to cast light on the characteristics of these drafts.

The drafts of such plans, or alternative programs, will be assessed in terms of the targets of the initial program, and will serve as guides for finding the optimum solution.

SELECTION OF INDICATORS

A wide variety of indicators are conceivable for the formulation of alternative program drafts, such as physical, socio-economic, inter-regional, and regional.

The indicators are multifarious in range, including land utilization, location of facilities, composition of residential areas, treatment of existing villages, infrastructure, phased programs, density, ways of supplying walk-up flats, selling rate of housing sites, ways of evolving cross subsidies, target group, and repayment of housing loans.

For the designation of axes from among these indicators, the framework of a Project Area is identified. Next, there is a need to select indicators of the kind which are most closely

tied in with the task of supplying houses in large numbers, as elucidated earlier, and which will have the most powerful impact on the receipts and payments of the project.

7—2 FRAMEWORK OF ALTERNATIVES

MAJOR INDICATORS

The major purpose of this survey is to supply low cost housing in large numbers in an effective manner. Consequently, any alternatives should be evaluated from the standpoint of what effective means they have to accomplish this purpose. The indicators which would shape the alternatives should naturally be determined in line with this purpose. Given this premise, the most appropriate thing will presumably be to formulate alternatives regarding a housing supplying system.

From the aforementioned point of view, eight indicators which constitute basic conditions for the supply of housing, are selected for this survey -- density, ratio of walk-up flats, rate of for-sale empty lots, repayment system, scope of the target income group, housing supply pattern, and housing distribution pattern. All these factors are determinants of the house construction cost and the factors which hold sway over the selling price, selling quantity, and quantity of supply. They also are determinants of the supplying system.

QUANTITATIVE FRAME WORK

Under the Cengkareng programme, the housing density will be projected at 60-80 units/hectare, in the long run. Here, a study will be made within the range of the conventional average density of 40 units/hectare, to the highest density of 150 units/hectare.

In respect to the rate of walk-up flats, there is a need to make an elaborate study from the standpoint of construction, demand, and other factors, but here, a study will be made in

a scope of 0-50%. This is because it is considered unrealistic to supply at least more than 50%, in view of the past socio-economic surveys, status of the Cengkareng area, and total quantity of supply.

This programme is designed to supply low cost housing in large numbers, and PERUM PERUMNAS, the main entity for construction, is the institution which carries out projects under this programme. For this reason, it would not be in line with the purpose of this program for the quantity of supply to a higher income people to become higher than the target for which low cost housing were made available. With this in mind, the scope of this study will be set at 0-60%, including commercial empty lots.

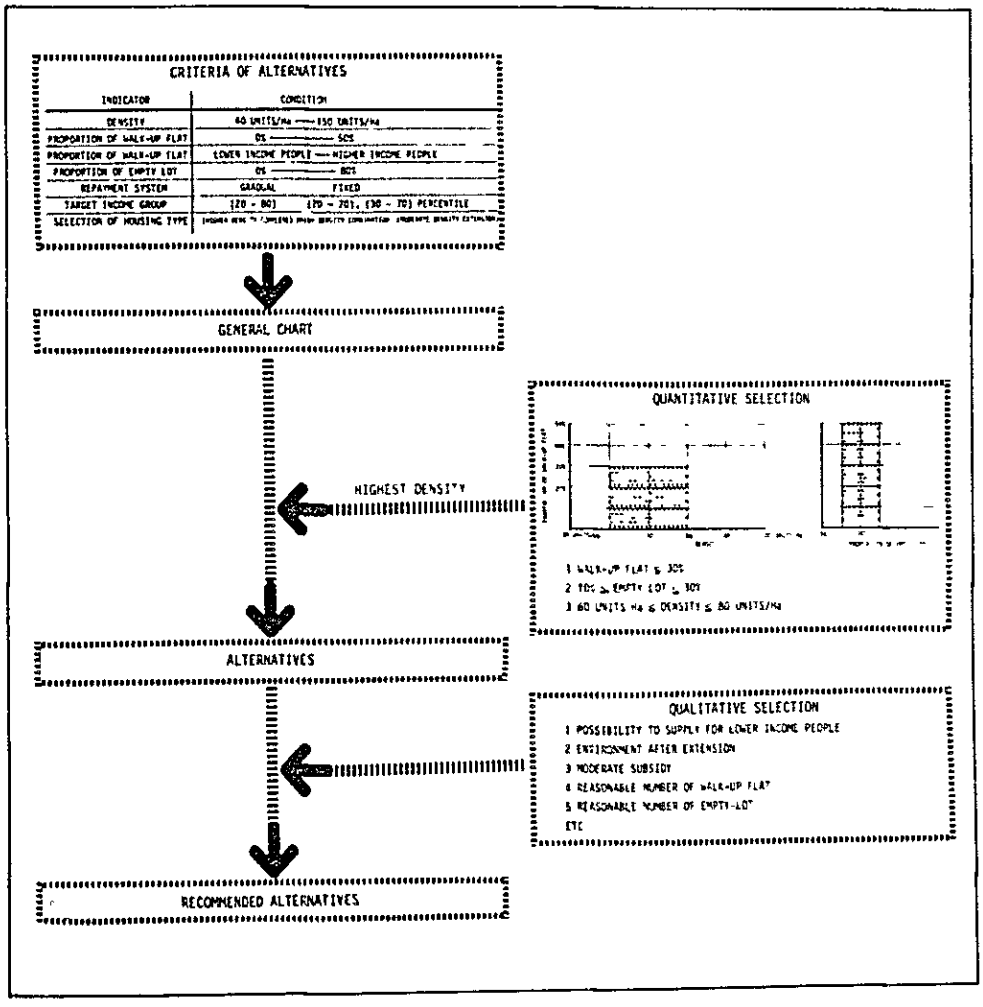
As for the repayment system, a study will be conducted on two methods -- repayment in fixed installments fixed repayment system and repayment in proportionally increasing installments gradual repayment system. In other words, this suggests that the affordability is different, even for people of one and the same income people, and as a matter of course, the quantity of supply and the target income group will be greatly affected. The scope of the target income group is 20-70 percentiles under the fixed repayment system and 20-80 percentiles under that of the gradual repayment. Under the fixed repayment, system, however, the affordability is set lower than that under the other system, so much so that there are limits to the density and the quantity of supplying walk-up flats. As regards the fixed repayment system, therefore, a study will be carried out on the tendency which makes its appearance when the scope of the target income group is moved upward, or in other words, to encompass a scope of 30-70 percentiles.

(The range of 50 - 100 units/ha is indicated at the figures. The detail informations are shown in the technical report.)

FIG. 7—2—1 MAJOR INDICATORS

INDICATOR	CONDITION
DENSITY	40 UNITS/Ha —— 150 UNITS/Ha
PROPORTION OF WALK-UP FLAT	0% —————— 50%
PROPORTION OF WALK-UP FLAT	LOWER INCOME PEOPLE — HIGHER INCOME PEOPLE
PROPORTION OF EMPTY LOT	0% —————— 80%
REPAYMENT SYSTEM	GRADUAL FIXED
TARGET INCOME GROUP	(20 - 80) (20 - 70), (30 - 70) PERCENTILE
SELECTION OF HOUSING TYPE	(HIGHER DENSITY COMPLETE) (HIGH DENSITY COMBINATION) (MODERATE DENSITY EXTENSION)

FIG. 7—2—2 TOTAL FRAME WORK OF ALTERNATIVES



7—3 HOUSING TYPES FOR ALTERNATIVES

TYPES OF HOUSES FOR ALTERNATIVES

The housing type and the supply pattern have their own characteristics, depending on the lot size, floor area and a possibility of extension. Here, the characteristics are divided into three types, which are higher density complete type, high density combination type and moderate density extension type.

The higher density complete type constitutes those houses the construction of which is not premised, in principle, on possible future expansion. Here, the size of a lot per unit is set at 60 m^2/unit at the largest. In the case of walk-up flats, the maximum scale is set at 40 m^2/unit. The high density combination type is subdivided into flats, maisonettes or low-rise housing. For some of these, future expansion is feasible. The minimum size of a lot for moderate density extension is more than 60m^2, and their construction is premised, in principle, on future expansion.

From the aforementioned classification of the three types of characteristics, typical housing types are shown in the figure below. In this survey, some of the 10 types enumerated here will be selected on the basis of a house supplying pattern.

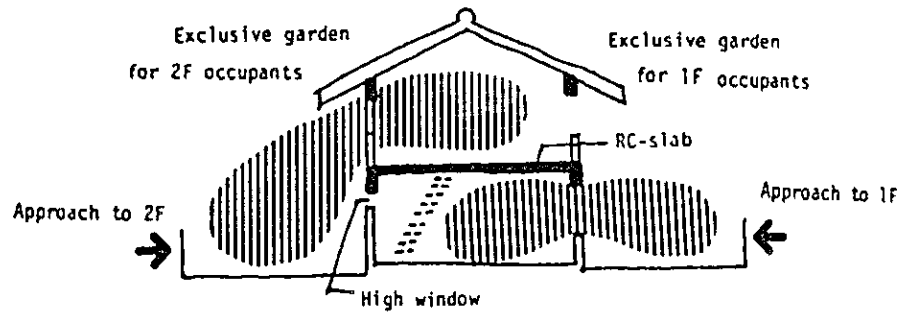
HOUSING SUPPLY PATTERN

For the supply of housing, four housing types are taken up as the basic patterns, in respect to the higher density complete type, high density combination type and moderate density extension type. The F5 type -- five-storied walk-up flats with a floor space of 36m^2 -- is incorporated in all the housing supply patterns. In the long run, four patterns, including those close to the PERUM PERUMNAS' supplying pattern, have been formulated.

FIG. 7−3−1 TYPES FOR ALTERNATIVES

HOUSING TYPE	NOMINAL LOT SIZE (M^2/UNIT)	FLOOR AREA (M^2/UNIT)	COST OF LOT (10^6Rp/UNIT)	COST OF BUILDING (10^6Rp/UNIT)	TOTAL BASIC COST (10^6Rp/UNIT)	POSSIBILITY FOR EXTENSION	(REMARKS) DIRECT COST OF BUILDING IN JUNE,1980. (10^6Rp/UNIT)
(F2-26)	35	26	0.88	2.54	3.42	NO	1.02
(F5-36)	35	36	0.88	7.32	8.20	NO	2.96
(F2-36)	50	36	1.25	3.52	4.77	NO	1.41
(M-36)	60	36	1.50	3.33	4.83	YES	1.34
(R-36N)	75	36	1.88	3.46	5.34	YES	1.39
(R-36)	90	36	2.26	3.05	5.31	YES	1 22
(D-15)	72	15	1.80	1.57	3.37	YES	0.62
(D-21)	96	21	2.41	2.06	4.47	YES	0.82
(D-36)	108	36	2.71	3.11	5 82	YES	1.25
EMPTY LOT	150	-	3.76	-	3.76	-	

COST OF BUILDING INCLUDS COST FOR RIGHT TO BUILD.



F2-36 ---- 2 storied walk-up flat.
One of the new types of houses for alternatives.

FIG. 7－3－2 SELECTION OF HOUSING SUPPLY PATTERN

(SELECTION OF HOUSING TYPE)

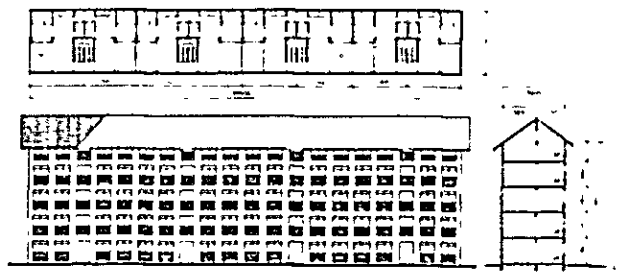
						AVERAGE LOT SIZE
HIGHER DENSITY COMPLETE	TYPE	F2-26	F5-36	F2-36	M-36	$45M^2$/UNIT
	LOT SIZE	35	35	50	60	
HIGH DENSITY COMBINATION	TYPE	F5-36	F2-36	M-36	R-36N	$55M^2$/UNIT
	LOT SIZE	35	50	60	75	
MODERATE DENSITY EXTENSION(1)	TYPE	F5-36	M-36	R-36N	R-36	$65M^2$/UNIT
	LOT SIZE	35	60	75	90	
MODERATE DENSITY EXTENSION(2)	TYPE	F5-36	D-15	D-21	D-36	$78M^2$/UNIT
	LOT SIZE	35	72	96	108	

(NOTE) (1).MODERATE DENSITY EXTENSION(2) is similler to existing PERUM PERUMNAS housing types.

(2).LOT SIZE is the nominal size.

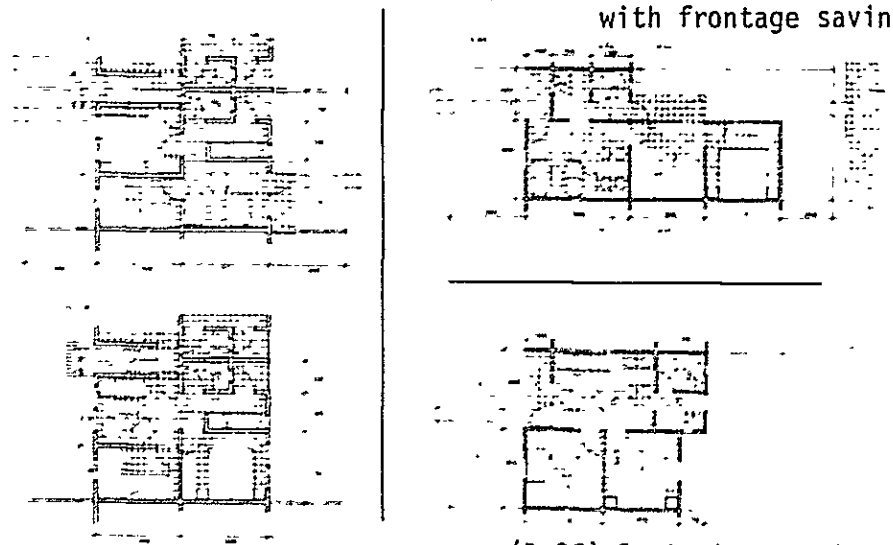
(3).LOT SIZE = M^2/UNIT

(4).AVERAGE LOT SIZE shows the average area, when each type is provided with the same number.



(F5-36) 5 storied walk-up flat.

(R-36N) 1 storied row house with frontage saving.



(R-36) 1 storied row house.

(F2-36) 2 storied walk-up flat.

7—4 GENERAL CHART OF ALTERNATIVES

According to the housing supply patterns, two patterns of supplying walk-up flats are formulated, and for each pattern, a repayment system and a housing distribution pattern are formulated.

Here, the density, rate of walk-up flats, and ratio of empty lot, will be determined so that each housing supply system may always balance the plus and minus factors.

The characteristic tendency of the general chart of alternatives is that the density of housing drops in proportion to a rise in the rate of walk-up flats, in many patterns. This is because the cost related to walk-up buildings is relatively higher than the cost related to the plots. In other words, the cost could be balanced with the selling price, except where the rate of empty lots is raised in proportion to a rise in the rate of walk-up flats. In the end, the rate of walk-up flats is in reverse proportion to the density. This suggests that it is still too early to develop the Chengkareng area into a highly dense housing area by construction of walk-up flats.

Note: Under this program, price for a land acquisition is set at Rp 3,000/m^2. If it is assumed that the price is Rp 15,000/m^2 in areas close to the Angke River, this tendency is a little different. The density of houses could be raised in proportion to a rise in the development of walk-up flats.

In terms of the repayment system, the density of houses and the ratio of walk-up flats may be maintained at higher levels under the gradual repayment system. Roughly, the differences

are 10 units/hectare and 10%, respectively. In case the income group is raised from 20-70 percentiles to 30-70 percetiles under the fixed repayment system, the density of houses and the rate of walk-up flats will be raised to 5 units/hectare and 5%, respectively.

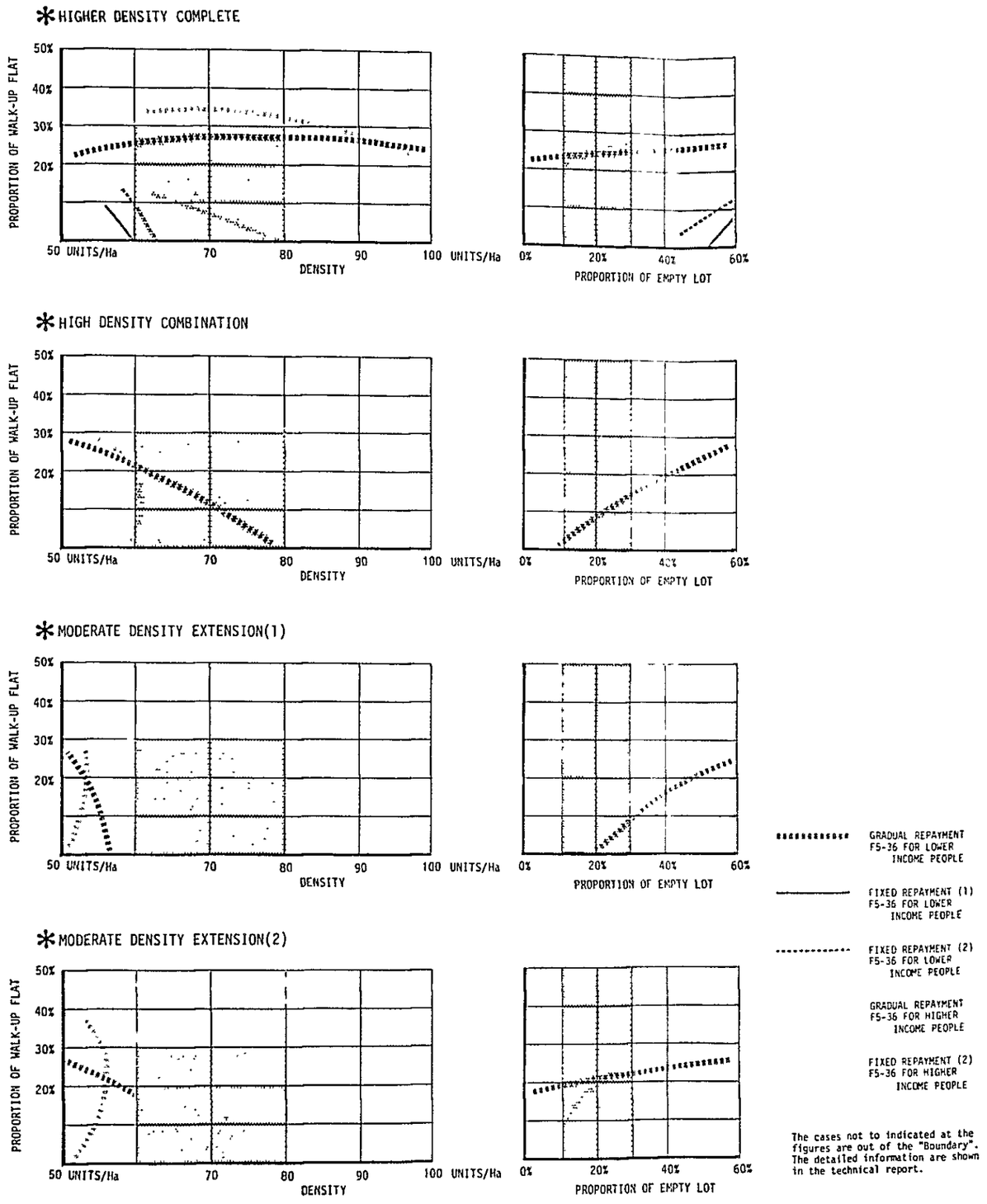
In regard to the pattern of distributing walk-up flats, they will be supplied to people in the lower income people in the case where the rate of walk-up flats is lower than 20%. In the case where the rate of walk-up flats is higher than 20%, the supply of walk-up flats to people in the higher income people will make it possible to raise the housing density. The reason is that in the case where walk-up flats are supplied to people in a lower income people, the number of walk-up flats supplied will influence the amount of the subsidy, thus raising the rate of empty lot and the housing density. In the case where walk-up flats are supplied to people in the higher income people, the amount of the subsidy will remain relatively low, because walk-up flats are supplied. As the change caused by this amount in the rate of empty lot is small, there will not be so much change in the housing density.

One characteristic of the high density combination type supply pattern is that the minimum density of 65 houses/hectare may be maintained. Unless the balancing of the price with a cross subsidy with the cost was considered, the density could be raised to 145 units/hectare at the largest.

In the high density complete type supply pattern, a density of 60-80 units/hectare or so, may be maintained in all cases, and there is little difference between the rate of walk-up flats and the number of housing units.

In the supply patterns of moderate density extension types I and II, the target of a density of 60 units/hectare may seldom be met.

FIG. 7—4—2 GENERAL CHART



The cases not to indicated at the figures are out of the "Boundary". The detailed information are shown in the technical report.

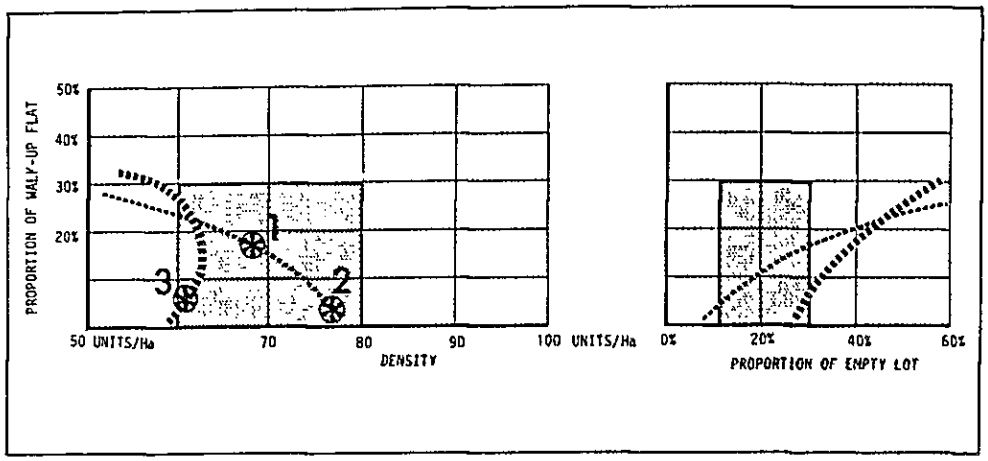
7—5 FORMULATION OF ALTERNATIVES

Empty lots are offered for sale for commercial development, such as those in the town centre and others, and empty lot for housing are also for sale. This programme is designed not only to supply houses, but also to work for comprehensive development of the Cengkareng area. The site for the town centre, and the sites for commercial facilities along the peripheral roads, are the strategic sites for realization of the developemnt. Therefore, at least about 7 hectares should be maintained. For a complex development of the area with the addition of home industries and service industries, it may be considered necessary to set aside at least about 3 hectares of housing land. Therefore, a total of 10 hectares, and a minimum empty lot rate of 10%, are required. On the other hand, this program is designed to supply low-cost housing in large numbers, so that there is a need to put a ceiling on the supply. Here, the rate is set at 30%.

In view of the status of the Cengkareng area, attempts should be made for a high density unlike any housing complexes thus far developed by PERUM PERUMNAS. Here, the minimum density is set at 60 units/hectare, while the maximum density would be 80 units/hectare, so that the density for the formulation of alternatives, is set at 60-80 units/hectare.

In view of the building capacity, the maximum number of housing units which may be constructed under this programme is consiered to be 2,000, or roughly 30%. Here, this figure is considered the upper ceiling.

FIG. 7－5－1 SETTING OF ALTERNATIVES



Based on the conditions mentioned before, 3 alternatives are eliminated which are on the lines of the "High Density Combination Type" in the housing supply patterns.

In Alternative (1) and (2), the walk-up flats are provided for the lowest income people in the target group. In Alternative (3) , the walk-up flats are provided for the middle income people in the target.

7 — 6 EVALUATION OF ALTERNATIVES

3 alternatives are evaluated from qualitative and quantitative points of view and most adequate alternative is chosen for present stage.

	ALTERNATIVE(1) HIGH DENSITY COMBINATION GRADUAL REPAYMENT F5-36 FOR LOWER INCOME PEOPLE	ALTERNATIVE(2) HIGH DENSITY COMBINATION GRADUAL REPAYMENT F5-36 FOR LOWER INCOME PEOPLE	ALTERNATIVE(3) HIGHDENSITY COMBINATION GRADUAL REPAYMENT F5-36 FOR HIGHER INCOME PEOPLE
ALLOCATION	UNITS(%) TYPE 880(12%) F5-36 2,510(33%) F2-36 1,890(25%) M-36 1,500(20%) R-36N 770(10%) EMPTY LOT TOTAL = 7,550 UNITS	UNITS(%) TYPE 170(2%) F5-36 4,000(48%) F2 36 2,340(28%) M 36 1,830(22%) R-36N TOTAL = 8,340 UNITS	UNITS(%) TYPE 1,590(24%) F2 36 1,360(20%) M 36 240(4..) F5-36 2,710(41%) R-36N 770(11%) EMPTY L TOTAL 6 670 UNITS
PROFIT AND SUBSIDY ( )=SELLING PRICE ($\times 10^6$Rp/UNIT)	10^6Rp/UNIT 4.73 0.75 (4.03) (3.47) (5.43) 0.59 (7.19) 1.85 SUBSIDY PROFIT	10^6Rp/UNIT 4 73 1 22 (3 55) (3 47) (5 43) 0 59 (7 19) 85 SUBSIDY PROFIT	10^6Rp/UNIT 1 31 0 19 (4 65) (3 47) 2 77 (5 43) (5 63) 0 31 SUBSIDY PROFIT
DENSITY	70 UNITS/Ha	75 UNITS/Ha	60 UNITS/Ha
ADEQUATE NUMBER OF WALK-UP FLAT	○	△	△
ADEQUATE NUMBER OF EMPTY LOT	○	×	○
HIGHER DENSITY	△	○	×
ENVIRONMENT AFTER EXTENSION	○	○	△
MODERATE SUBSIDY	○	○	×
MODERATE ALLOCATION	○	×	△
RECOMMENDED ALTERNATIVE	⊛		

At first as walk-up flat ratio.
This values vary from min. 2%(170 units) to max. 12%(880 units) and the meaning of walk-up flat in this project is not experimental one but "one component" which compose the housing area. Therefore about 10% of walk-up flat ratio will be adequate for the total compostion of housing area.

Adequate empty lot ratio is set between 10%-30%, but in reality, 10% of empty lot ratio means that all those empty lot area will be covered by empty lot for commercial.
In this project empty lot for housing is indispensable because home industries and housing with shops are expected in these area and also these possibilities of activity enable the existing village inhabitants to settle down within the area composing the mixed community. For those reasons, about 10% of empty lot for housing to total housing unit will be adequate.

Higher housing unit density is desirable because of the characteristics of Cengkareng site. All 3 alternatives have unit density of more than 60 units/ha with 20% higher unit density compared to the existing PERUMNAS housing complexes. But if possible more than 70 units/ha is desirable.

To supply walk-up flat and 2-storied flat for lower income people and expandable housing types for higher income people is one of the effective supply method to keep the environmental level of housing area high. In addition to this usually higher income people desire more expandable housing type with yard and in existing housing complexes these people have been made relatively high livel expansion. For these reasons alternative(3) is not recommendable supply pattern.

Distribution of housing types to be supplied shall be well balanced without any absolute majority of housing type, to meet with the wide range of housing demand and to keep housing area

with variety of housing types. From this point of view, alternative(2) is not well balanced because more than half of houses are 2-storied flat with 2% of walk-up flat and 0% of empty lot. On the other hand alternative(1) has well balanced distribution with each type has more than 10% of allocation.

It is desirable that cross-subsidy will be arranged from higher income people to lower income people and lower income people will be more cross-subsidized from higher. In these meanings alternative(3) has unnatural tendency with housing types for higher income people getting more cross-subsidy than for lower income people.

Considering above mentioned items, alternative(1) is totally evaluated as the most adequate alternative for present stage. And hereafter, development plans, construction shcedule, financial analysis and economic analysis will be studied based on alternative(1).

8

DEVELOPMENT PLAN

DEVELOPMENT PLAN

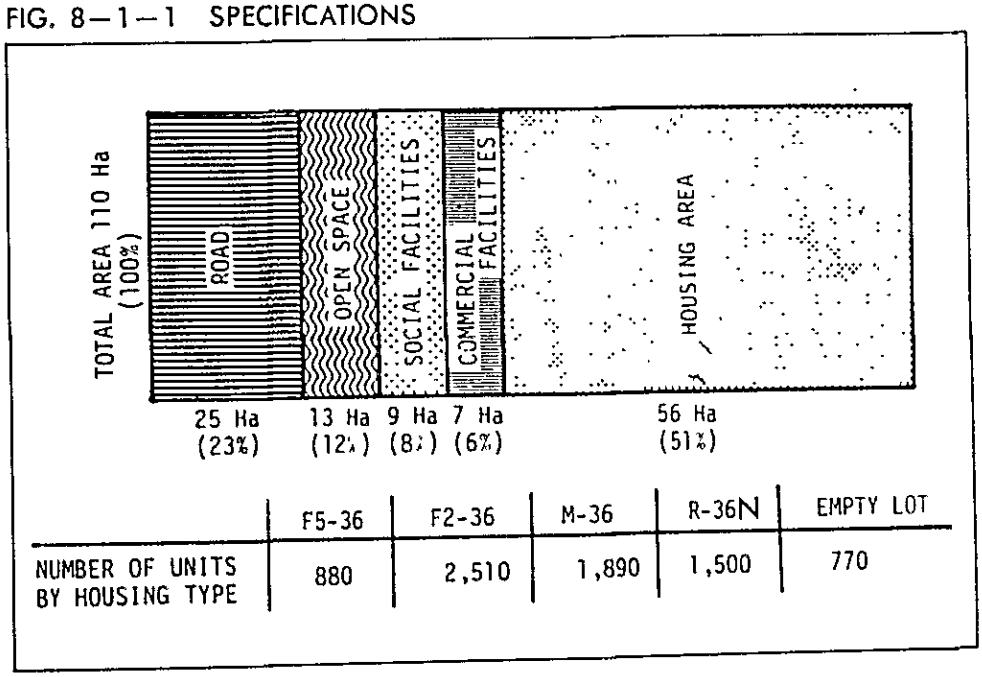
An attempt will be made here to show the composition of space, in the most reasonable of the alternatives.

Depending on the alternative, the specifications for planning differ, but there is not so much difference in terms of space images by function. Even when an alternative is selected from a different point of view, it is possible to use the composition of space here as it is.

SPECIFICATIONS FOR PLANNING

The specifications of this programme are shown in the following table. One of the features of the specifications is the walk-up flats account for 880 flats, or around 10% of the total housing, and that practically every low-rise houses are of the high-density type. The density is 70 units/hectare, up 40% from the normal density of the PERUM PERUMNAS' units at present, which stands at 50 units/hectare.

FIG. 8—1—1 SPECIFICATIONS



	F5-36	F2-36	M-36	R-36N	EMPTY LOT
NUMBER OF UNITS BY HOUSING TYPE	880	2,510	1,890	1,500	770

FIG. 8—1—2 TYPICAL CROSS SECTION

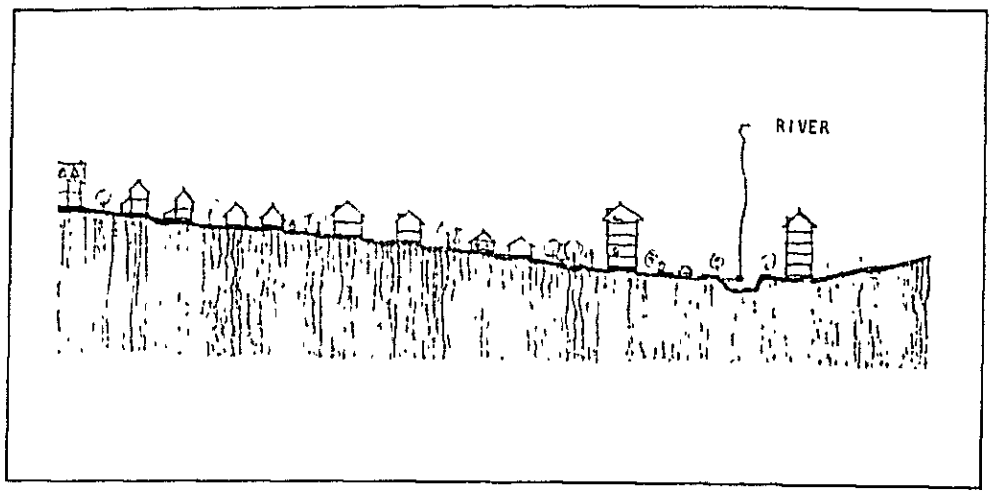
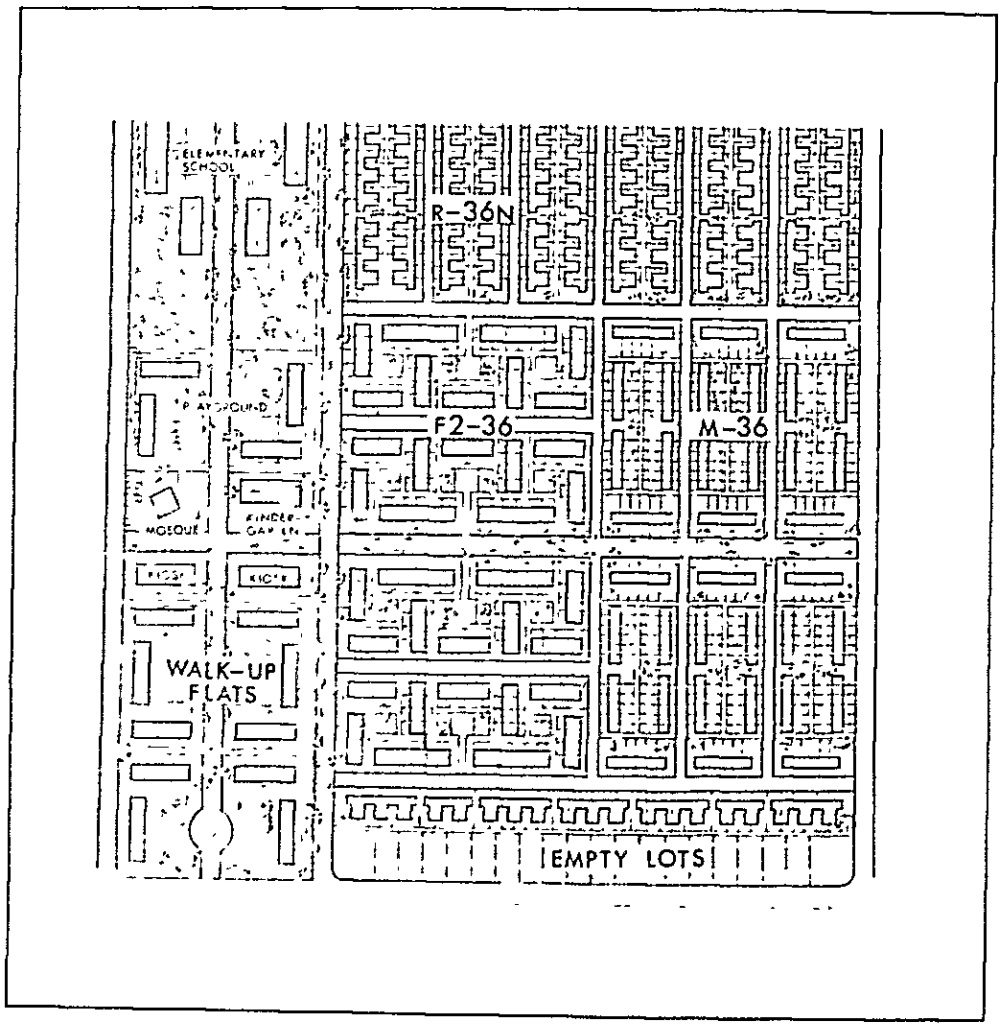
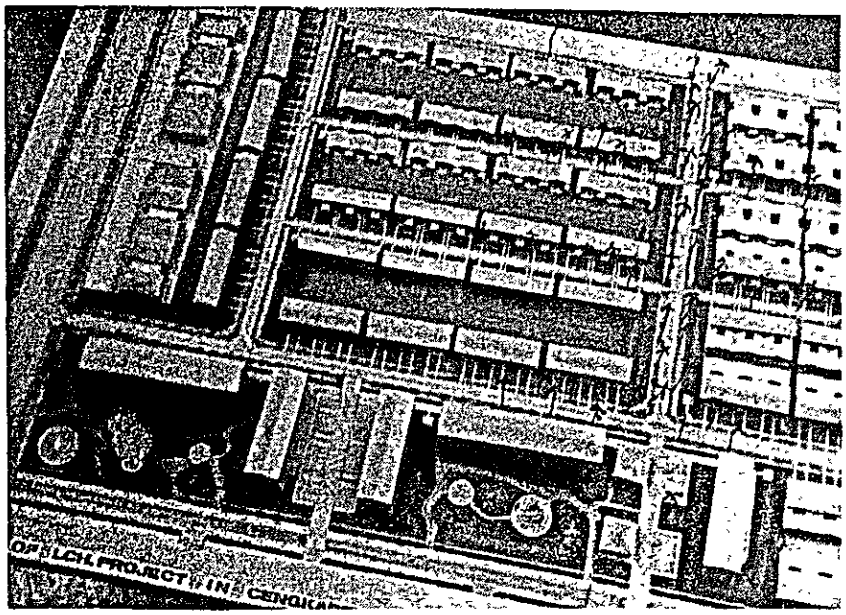
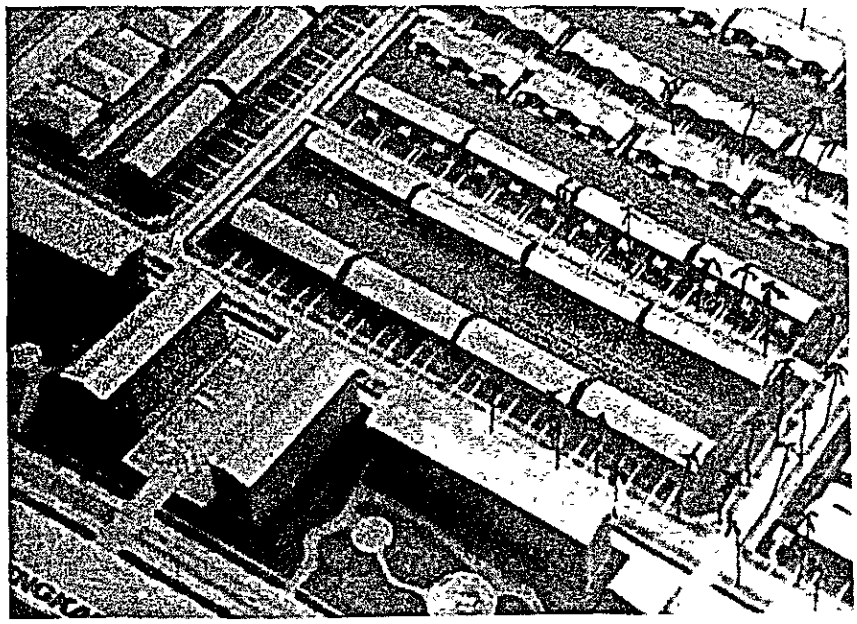


FIG. 8—1—3 TYPICAL HOUSING AREA

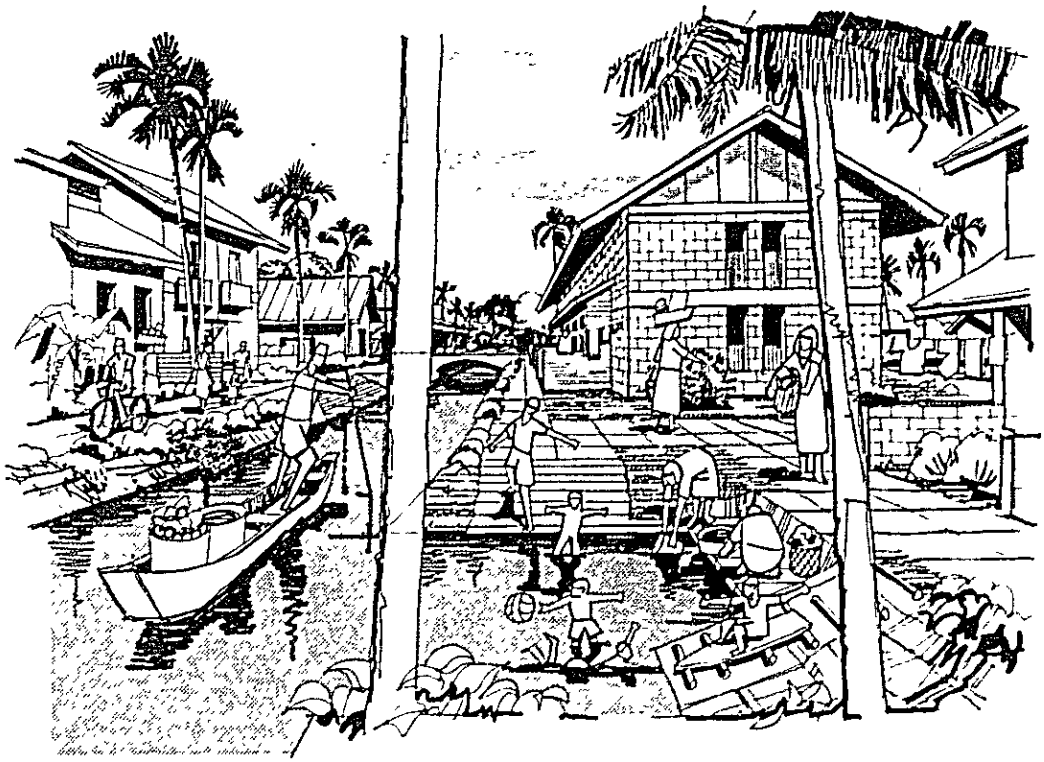






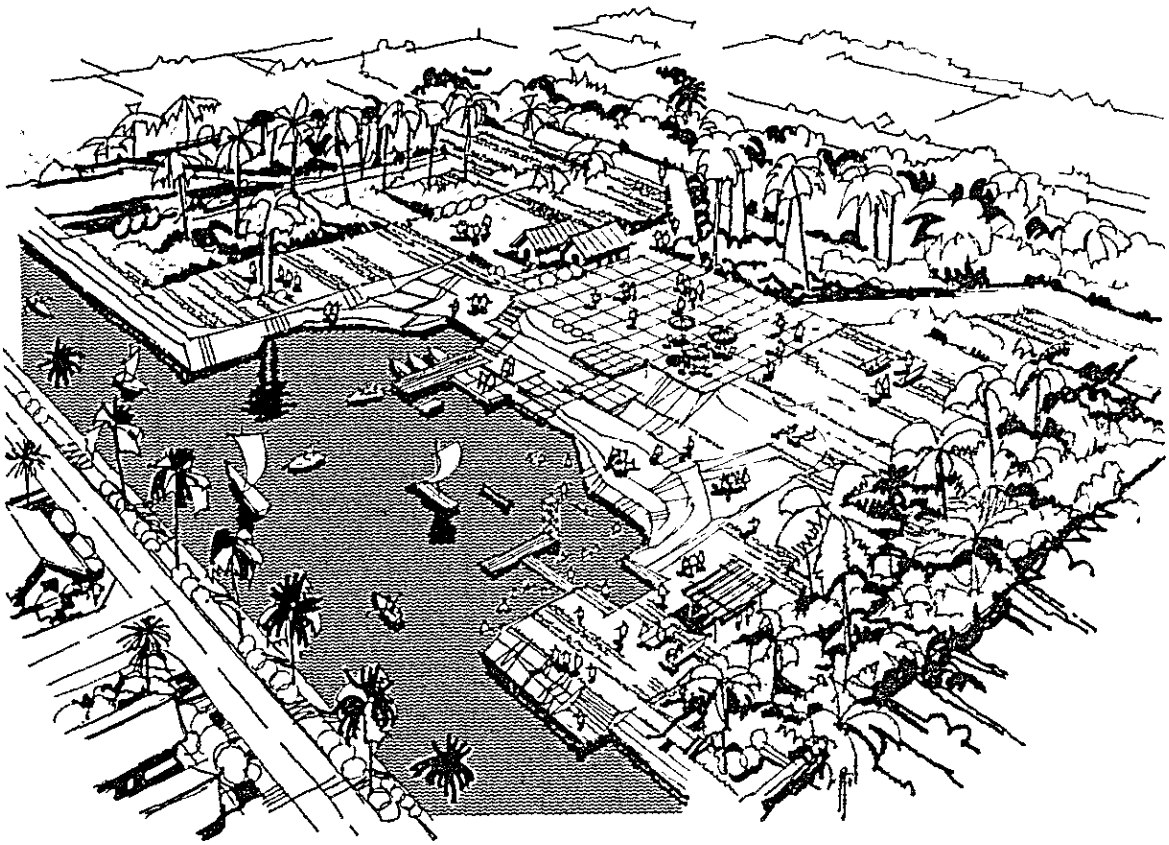
Example of the layout.
Actually the housing layout needs to be comprehensively performed, based on the conditions of the land development. infrastructure system, the town scape and so on.

TYPICAL OPEN SPACE



OPEN SPACE

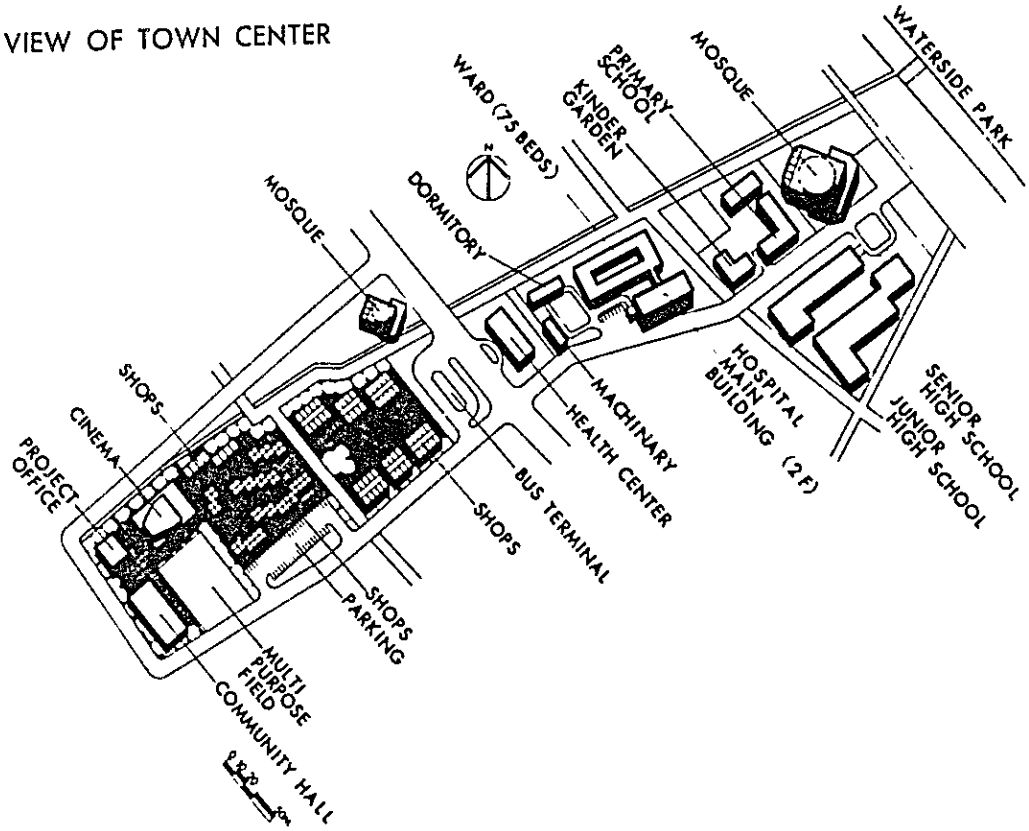
Schools, playgrounds, open lots, etc., will be composed in combination with a "green axis", or a service water system. For effective utilization space will be composed in a visually multifarious pattern.



TOWN CENTRE

While surrounding the existing open space, the centre will be furnished to create a harmony of natural space and artificial urban space.

VIEW OF TOWN CENTER



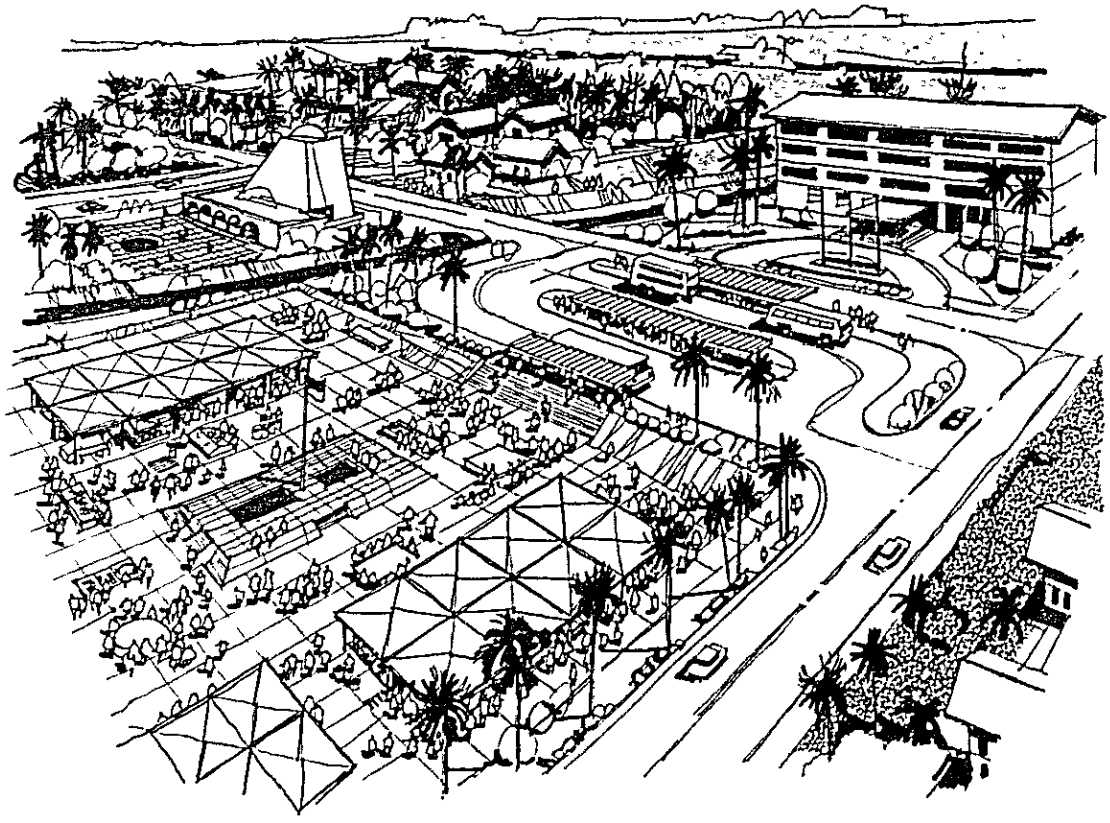
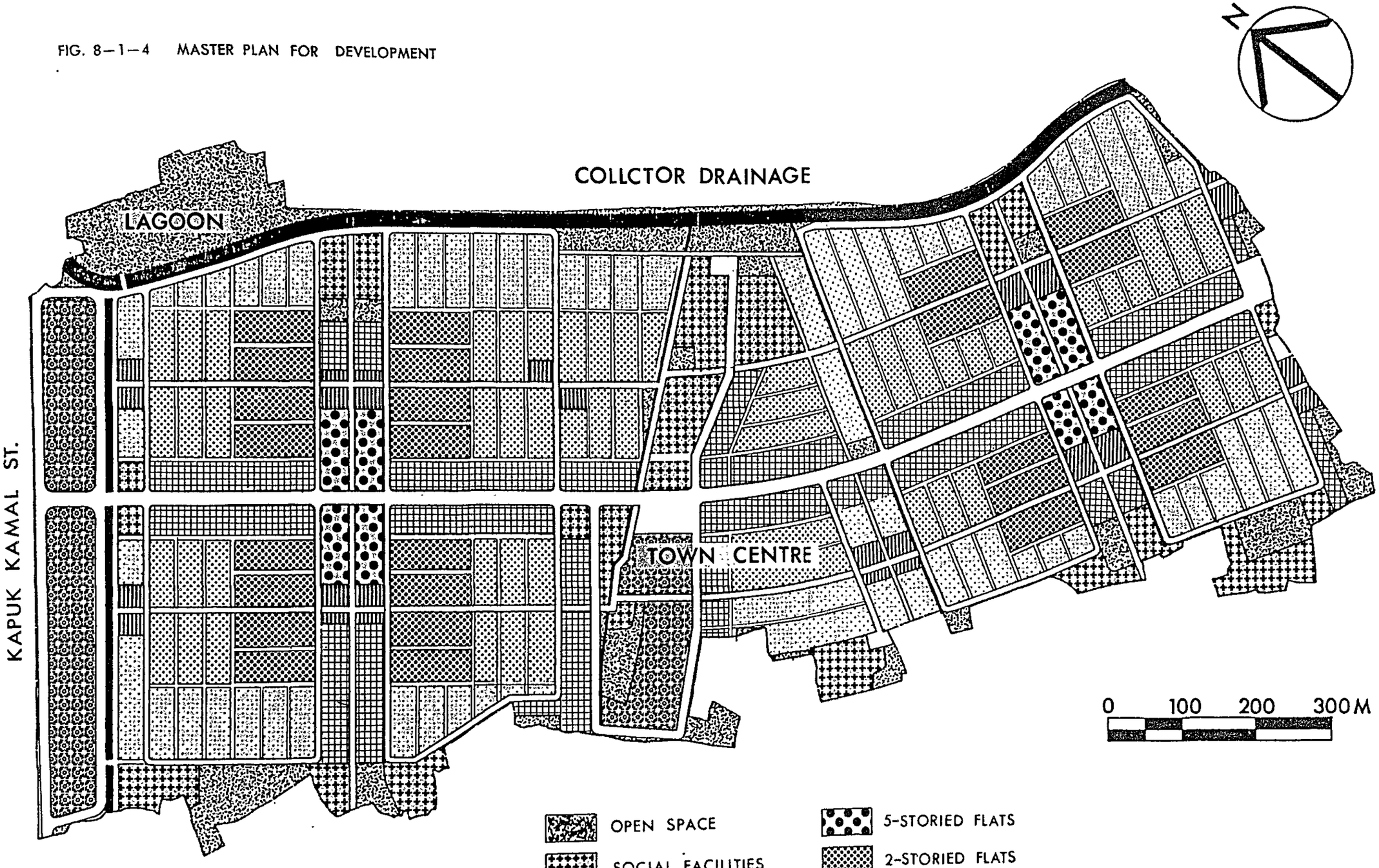


FIG. 8—1—4 MASTER PLAN FOR DEVELOPMENT



9

CONSTRUCTION PROGRAM

CONSTRUCTION PROGRAM

PREMISE

The premise is that the construction project will be completed by March 1984, when the 3RD 5-YEAR DEVELOPMENT PLAN - REPELITA III comes to an end, and the final occupancy will start in April 1984.

In respect to the drainages in Cengkareng, which will produce the greatest influence on the construction project, the matters which were confirmed by the Technical Committee on October 22, 1980, and by the Steering Committee on November 4, 1980, are made a guideline. In other words, the construction of the Cengkareng Floodway was to start in October 1980, and the canal will be completed as far as the Jakarta-Tangerang road, by September 1982. On the other hand, the construction of a macro-drainage canal will start in April 1982, and come to an end in September of the same year. Therefore, before completion of the macro-drainage canal, the functions of the Kapuk Muara River and other existing drainage canals will not be suspended by the construction of the Cengkareng Floodway.

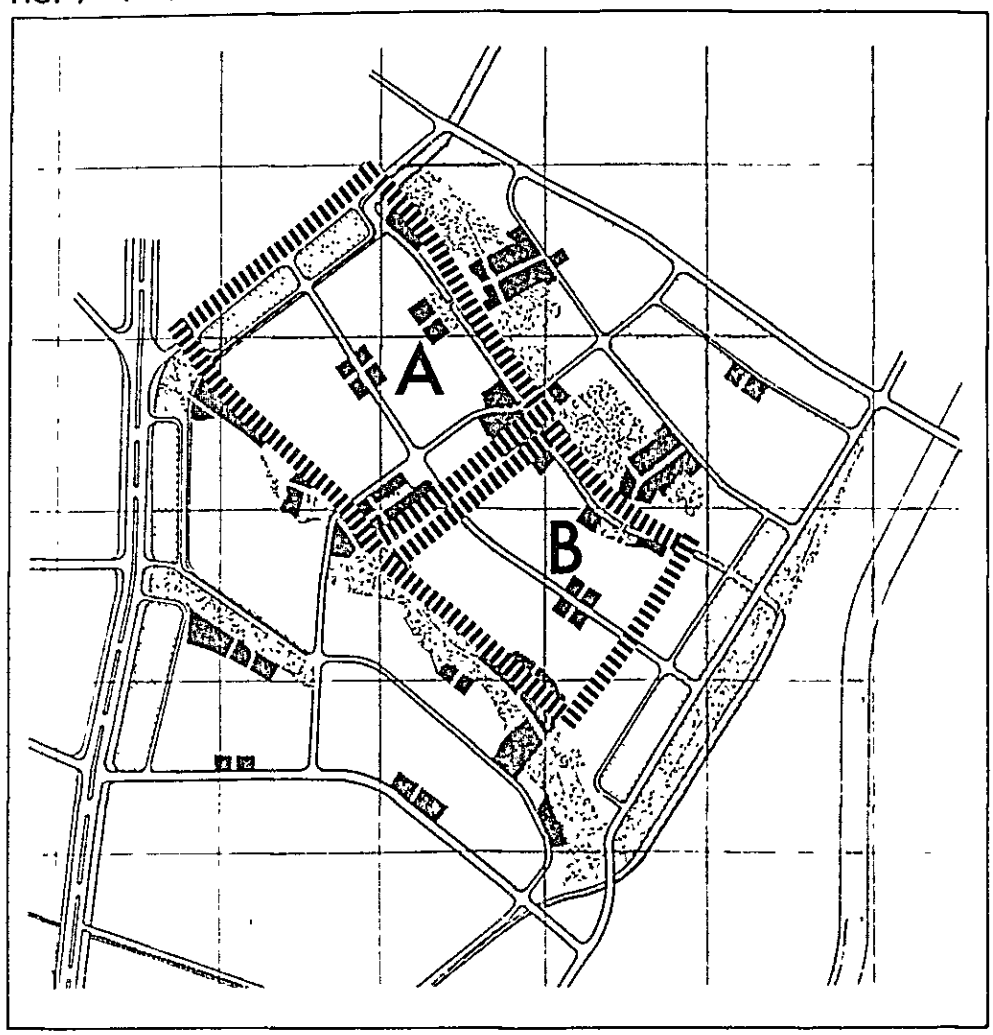
About 150,000m^3 of the earth necessary for the development will be brought in from the site of the Cengkareng Flood-Way excavation starting in July 1982.

Water supply construction work by PAM-Jaya will be completed in March 1983, to start supplying water to this project.

The whole area is divided into two construction sections -- Section A, the construction of which will be started earlier and Section B, where the second phase of construction will be carried out. The idea is to even the amount of construction work for financial and technical reasons and, at the same time, to streamline the clerical procedure for subscriptions and

occupancies by postponing the time of occupancy for six months or so.

FIG. 9－1－1 ZONNING



CONSTRUCTION SCHEDULE

The first phase of construction work consists of the construction of a provisional drainage canal in Section A and its dry-up. This phase will start in February 1982, and come to an end in June of the same year, so that the existing drainage canals will have to be used.

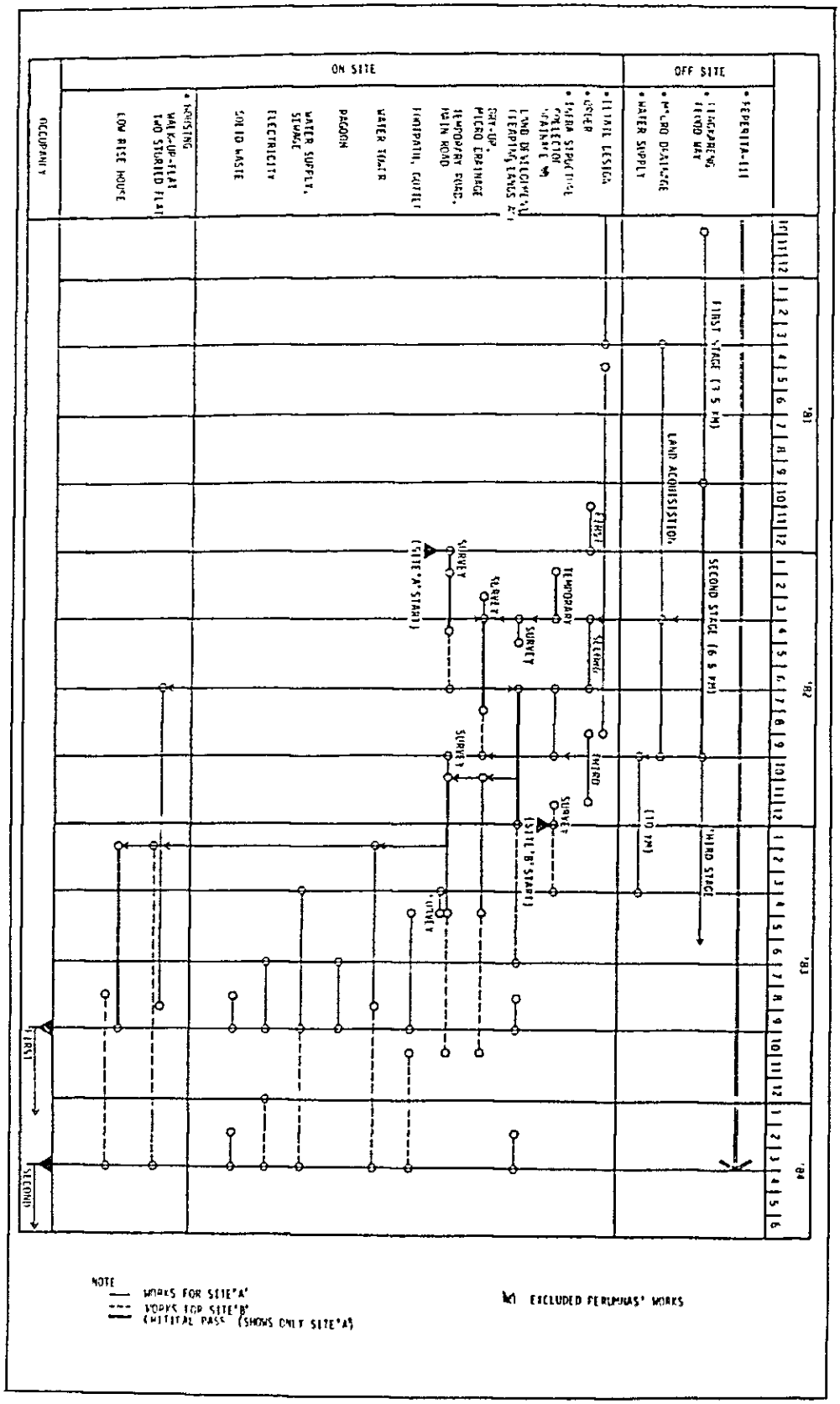
The second phase consists of the construction of a provisional drainage canal in Section B and its dry-up. This phase will

be brought to an end in December 1982, three months after the completion of the Cengkareng Floodway. At the same time, the land development of this section will be carried out with earth carried in from the Cengkareng area. At the same time, the construction of walk-up flats in Section A will be conducted.

The third phase begins at a time when the dry-up of Sections A and B will have been completed, and the construction of the infrastructure and houses can be carried out. This phase will come to an end in September 1983, for Section A, making it possible to admit occupants into the flats.

The fourth, or final phase, is the duration in which construction work is done only in Section B. This phase will come to an end in March 1984.

FIG. 9－1－2　CONSTRUCTION SCHEDULE



10

FINANCIAL ANALYSIS

FINANCIAL ANALYSIS

GENERAL

The project of PERUM PERUMNAS desires to make the income and expenditure balance for each project with a combination of their own capital and borrowed money from theaffilitated financial body of the government at the low annual interest of 13.5%, this being close to 50% of that for private loans, without a direct subsidy from the government. Therefore, after the financial analysis and appraisal of the cash flow, this project has an income of 43,012 million Rupiah and an invetment amount of 41,143 million Rupiah finally.

On the other hand, the total operating amount will be not less than 350,000 million Rupiah, if 120,000 houses are built during REPELITA 111 by PERUM PERUMNAS. The total invetment amount for this project is about 40,000 million Rupiah, that is, the proportion of the total operating amount for this project will be approximately 11%. On the other hand, the total number of houses to be built in this project is 7,500 units, equivalent to 6% of 120,000 units, therefore, the investment amount for this project is large compared to the number of houses. But from the viewpoint of whole of Indonesia, this higher cost is caused by its location in the most expensive city land and the land relating cost due to the development of the lower area. The other projects are in lower price land and easier development, and the investment amount per unit is relatively lower. Therefore, it can be said that this project does not break the balance for total operation by PERUM PERUMNAS.

This project supplies 880 walk-up flats equivalent to 10% of total number of houses to be built. At this time, the walk-up flat is a pioneer type of houses, and problem is that people may not be interested in it, and that it may not attract the effective demand. But walk-up flat will be supplied to the lowest income people in this project, and the lowest sales price

is settled even if the construction cost is twice that of the low rise-houses. If some of the houses remain unsold, this will not affect the financial frame of this project, and this is a safe supply method in financing.

CASH FLOW

a) This project is being carried out with a combination of PERUM PERUMNAS' capital and a lower interest loan from the government banks such as BTN.
Prior to development, PERUM PERUMNAS'own capital will be used for land acquisition costs and planning cost, and also use for interest, overheads, investment for allocation and insurance.
On the other hand, the loan from the government banks is used for the heart of the project such as, infrastructure costs and housing constrction costs. The interest on financing for construction expenses is seemed to be 13.5% per year.

b) The Inflation during the project term will be 15%.

c) Just after completion of construction, all houses and empty-lots for housing will be sold to BTN. Part of these proceeds will be used for repayment of loan for construction, and the other part transferred to PERUM PERUMNAS' own capital and carried over to the further projects.

(NOTE) Each occupant buys the house or empty lot with getting the loan from BTN, and repays the total amount to BTN after 20 years from occupancy. In this procedure the asset such as house and empty-lot are moved to BTN from PERUM PERUMNAS when the occupants are fixed, and the related investment cost is returned to PERUM PERUMNAS from BTN.

CASH FLOW

	Item \ Year	∿ 1981	1982 Jan-Mar	1982 Apr-Jun	1982 Jul-Sep	1982 Oct-Dec	1983 Jan-Mar	1983 Apr-Jun	1983 Jul-Sep	1983 Oct-Dec	1984 Jan-Mar
Source of Funds	Balance									12,356,484	7,009,963
	Capital of PERUMNAS	3,815,163	5,063	10,893	193,208	277,984	649,369	1,048,081			
	Loan from Government Bank		44,027	81,797	1,248,892	1,605,538	3,698,361	5,704,813			
	Selling of Empty Lots								4,355,166		4,355,166
	Selling of Houses								17,150,967		17,150,967
	Total	3,815,863	49,090	92,690	1,442,100	1,883,522	4,347,730	6,752,894	21,506,133	12,356,484	28,516,096
Use of Funds	Land Acquisition	3,430,900									
	Planning	345,258									
	Infrastructure		35,222	65,437	92,361	345,435	489,195	1,231,375	1,983,072	952,900	1,572,323
	Housing Construction				906,753	938,996	2,469,494	3,332,474	4,013,675	2,493,836	2,582,512
	Physical Contingency		3,522	6,544	99,911	128,443	295,869	456,386	541,220	344,673	353,913
	Price Contingency		5,283	9,816	149,867	192,664	443,803	684,578	811,831	517,010	530,869
	Overhead	34,526	4,403	8,180	124,889	160,554	369,836	570,482	734,979	430,842	503,964
	Interest of the Loan			1,486	4,247	46,397	100,584	225,403	417,941	417,941	417,941
	Investment for Allocation	5,179	660	1,227	18,734	24,083	55,475	85,572	110,247	64,627	75,594
	Insurance				45,338	46,950	123,474	166,624	200,684	124,692	127,125
	Cost for the Right to Build								136,000		136,000
	Loan Repayment										12,383,428
	Total	3,815,863	49,090	92,690	1,442,100	1,883,522	4,347,730	6,752,874	9,149,649	5,346,521	18,685,659
									(12,356,484)	(7,009,963)	(9,830,437)

The income and expenditure for every term is summed up based on the above shown cash flow, and the table of profit and loss is as follows:

1. Revenue (Sales)

FS'5-36	3,067,483
FS'2-36N	10,139,478
M-36	10,338,725
R-36N	10,756,247
Emply Lots	4,238,311
Commercial Lots	2,935,627
Irregular Lots	1,536,393
Total	43,012,264

2. Expenses

Land Acquisition	3,430,900
Planning	345,258
Infrastructure	6,767,320
Housing Construction	16,737,740
Physical Contingency	2,230,481
Price Contingency	3,345,721
Overhead	2,942,655
Interest	1,631,940
Investment for Allocation	441,398
Insurance	836,887
Cost for the Right to Build	272,000
Land Price Increase	2,161,466
Total	41,143,766 $\times 10^3$ Rp

3. Profit 1,868,498

11

ECONOMIC ANALYSIS

ECONOMIC ANALYSIS

OBJECTIVES

The basic character of the present project is to put a social development plan into shape, which is able to cope with the common problem of over-population in cities, among developing countries. A large number of people flow into cities and population in cities is increasing. They live in low-grade houses and have repeated illegal occupancy. Many live in rented houses. The amount of inflow population also adds to fears of shortage and unstability of employment opportunities in the city. In order to cope with this, it is necessary to scatter the increasing population to the peripheral areas of the cities, to undertake construction of housing by utilizing land and effective use of limited urban areas, to encourage retention of agricultural activities in the villages and attempt to increase employment opportunities by developing commercial and industrial activities in urban area.

As a line in the chain of this countermeasure policy, the present project is purported;

- to utilize lower land and unoccupied space near the city centre,
- to organize the community facilities and infrastructure while making an effort to safeguard the wooded areas,
- to reorganize the roads and traffic systems around Jakarta-Tangerang Road, and
- to construct urban high-density housing, including walk-up flats.

Also it will attempt

- to put a part of the current commercial and industrial activities inside the industrial lot, by providing this industrial lot, and

- to increase the opportunities for employment by forming a closer relationship with the future industrialization project.

The present project is an urban housing development project towards these ends.

This enables to certain extent, autonomous working of the three living functions "to live, to recreate and to work", that is difficult to achieve in a small-scale project. Therefore, this project aims at developing housing estate which will bring a great deal of social and economic benefits.

The systematic diagram of social and economic benefits described above for the present project, is summarized in Fig. 11-1-1.

FIG. 11－1－1　SYSTEM　CHART

Characteristics of Chengkareng Project

[Cause of Overpopulation in Cities in Developing Countries]

[Countermeasures]

[Urban Housing Project → Formation of Benefit Generation Sources]

[Basic Characteristics and Objectives of Project]

A slightly integrated social development program including a supply of residential houses, the consolidation of living environments, and the creation of employment opportunities. Benefits, which can be attained by small-scale development, are designed to be concentrated in the peripheral sections of cities.

Population Increase and Inflow

Villages

- Illegal occupancy
- Settling in low-grade residential houses
- Dependence on rented residential houses

Cities

- Increased ratio of low-grade residential houses
- Firmness of the demand for residential houses

Scattering of population to peripheral areas of cities (not too distant from cities)

(Environment conservation)

Maintenance of Agricultural Activities

Utilization of unused, low and swampy areas

Installation of efficient facilities in villages

Clearance of slums

Saving and effective utilization of urban space

Increased and stable income. Acquiring ability to own a house to repay a loan

Unstable and insufficient employment opportunities

Increase of employment opportunities

Assured Availability of Green Land (Forest, Grassland, and Parks)

Expansion of Socials and Public Facilities

Schools and playgrounds

Clinics and Hospitals

Meeting Places, Mosques

Improvement of Infrastructures

Drainage

Sewage

Restructuring of Roads and traffic Systems

Construction of Residential Houses

Construction of Multistory Residential Houses

Supply of Industrial Land

Induction and Diversification of Industrial Activities

Planned and spontaneous

Inside industrial zones, Peripheral sections, and suburban section

Formation of correlation with existing industrial zones

Formation of correlation with future industrialization and facility programs

Traffic Services

Commerce

Shopping Centers

stores

Services for Individuals

Services for Enterprises

Industries

Subcontract Processing

To recreate

To live

Good accessibility and proximity

Inside zone, Peripheral sections, Commutation to suburban

CONDITION

The current state of social conditions, living environment, and water and power facilities, in the peripheral area of the Planning Area is, broadly speaking, worse than that of other areas. It is located within 10 km of the city centre and, forthermore, the active development, of commercial and industrial facilities, trunk roads and new airport are planned for the future. In this sense, it is an area with high potenyial but somehow, the image of this area is low, mainly because of such poor conditions in the social environments. On the other hand, social facilities seem to be organized relatively well, from the viewpoint of the per capita ratio.

By taking a look at the material, "Statistic Data of DKI Jakarta,1979", for the study of social and public environment in the peripheral area of the Planning Area, one finds the following facts:

i) From the viewpoint of the indexes of natural and social safety, such as occurrence of fires, and crimes, and of floods due to this being a low and swampy area, the peripheral area of the planned zone has many problems. While flooding occured six times in 1979 as with other flood-prone areas, the number of victims was larger relative to the population number, and the damage suffered by Cengkareng was the most severe. The damage was estimated at 33,500 thousand Rp. Therefore, it forms 43% of the total damage, 78,047 thousand Rp. for the whole of DKI Jakarta.

ii) The number of fire casualties in Cengkareng is third highest out of the thirty towns surveyed and it is ranked eight in damage inflicted.

iii) The number of robberies taking place is relatively large and Cengkareng is ranked fifth among the thirty towns.

iv) In 1979, Cengkareng had one Kelurahan with piped water and nine without piped water. The use of tap water forms 2.24% and the use of well water forms 64.13%. This is second worst to Pasar Minggu (South Jakarta) where no water mains are provided for a total of ten Kelurahan.

v) In 1979, Cengkareng has five Kelurahan having no electricity, half of the total number. Electricity use is 18.39% and the use of oil lamps forms 58.12%. This is a typical example of the poor conditions prevalent, together with those of Seribu town (North Jakarta), Pasar Rebo town and Cakung town (both East Jakarta).

vi) There are many schools (kindergarten, elementary, junior high, and senior high schools) relative to the population. Also there exist many athletic facilities for football, tennis, badminton, etc., and many cinemas, as recreational facilities.

ECONOMIC EVALUATION

Qulitative comments are shown in the Chapter 1, "SUMMMARY AND CONCLUSION". In this chapter, the quantative study is mainly performed and detail informations are also indicated in the technical report.

INTERNAL RATE OF RETURN (IRR)

A The direct benefits which the houses of this project bring to residents can be studied by the following procedure.

i. On the principle that the value of the properties and assets which are formed by production or development activities is determined on the basis of the demand and supply relation, the supply side will be taken up first.

Here "supply' means to prepare the land and infrastructure and to construct houses by assigning a fixed part of the basic production elements (resources) consisting of the land, capital and labour of this country.

The social stock and assets (property) which are formed as the result of investment activities create adequate values for their cost.

These values are the land price and the fixed asset values (equipment and structures). When these fixed assets are used yearly, they create a type of rental

value, such as the land rent, the rent for equipment and machines, house rent and household expenditure.

The land and houses of well developed infrastructure which are supplied by the development of Cengkareng have a fixed value as assets and become a source of yearly rental value.

ii. Secondly, the demand side of the land and houses are considered.

- o The benefit of saving various household expenditure (food expense, medical expense, daily necessities expenses, transportation expenses etc.)
- o The benefit of saving time
- o Employment chances and chances for secondary income
- o Chances to use social facilities (hospital, educational facilities, mosques, recreational facilities etc.)

Generally, they are able to expect a better living environment. Therefore, they demand the land and houses in Cengkarng and agree to make a fixed payment from their household income. Generally, their payment is a house rent of each term or a regular repayment of a housing loan. When a resident pays for a house in lump sum, the reduction of its future value to yearly value is calculated. The Cengkareng Project assumes loan purchase and regular repayment for housing and lumpsum purchase for empty lots and commercial lots.

iii. In principle, these supply factors and demand factors work in the market mechanism and determine prices.

The following demand and supply relation in different land and house markets determines the price (a type of rental value) which becomes the foundation for measuring benefits.

In reality, however, an effective market mechanism related to land and houses is not working or only working to an extremely limited extent in Jakarta.

Therefore, the price (rental value) which is the basis for measuring benefits must be estimated by an indirect method.

Here, the basis for the estimate is that part of a resident's household expense which he is able to pay each term as loan repayment, namely, the amout of repayment per term of the unit price. This is equivalent to 25% of the average household income (60,000 Rp/month in 1980) of the target income group for this project.

It is assumed that the economic cost factors viewed from the supply side and the social and economic benefits viewed from the demand side are included in this price.

On the other hand, the land price in the market in 1980 is used as the basis. The internal rate of return (IRR) of Case 1 is calculated on the basis of this assumption. It is also possible to study the benefits of houses on the basis of the market price.

The following graph shows the price of a house (coverted into housing expense per month) per floor area in 1980 in DKI Jakarta, although the number of samples is extremely limited. Naturally, they are more expensive than the low cost housing which are supplied by PERUM PERUMNAS. The average price may be assumed to be approximately 22,500 Rp/month, which is 50% higher than Case 1. The IRR calculation of Case 2 is based on this assumption. The price of Case 2 is higher than the price of Case 1.

B The economic costs of the housing development project in Cengkareng consists of the following factors. The price in 1980 are used as the basis.

i) Land acquisition cost after subtraction of the right of development and tax costs.

ii) Planning costs

iii) Infrastructure cost after subtraction of price contigency and interest

iv) Housing construction costs after subtraction of price contingency, interest and insurance

v) Reduction of unskilled labour from labour expense

vi) Scale merit is applicable to the construction materials to be used for this project.

Especially, improvements are expected in the material productivity in medium to small scale traditional production process. Technological innovations in modern sectors are also possible. Therefore, economic costs can be applied to construction material expenses.

For the IRR calculations in Case 2, the economic costs of construction materials are estimated as 10% below the financial costs.

C The project life is 20 years after occupancy.

D Internal rate of return (IRR)

Case 1	4.85%
Case 2	11.46%

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12

RECOMMENDATION

RECOMMENDATION

The feasibility study of the project has been proved through financial and economic analyses, both quantitatively and quality.

The alternative plan (1) is recommended as the most suitable alternative plan in scope of physical planning, housing supply programme and financial stability.

Towards the implementation of the project, there are some items which still require consideration by relating authorities in administrative and institutional aspects.
They are:

Method for the development of the existing Kampungs

To preserve and utilize the wooded area where Kampungs lie is among proposed design policies of the project.
Empty lots for commercial, home-industrial and housing use are to be provided for the residents of the Kampungs to settle down when they sell and lose their land. What is to be considered is the solution when a large-scale land acquisition is, for some reason, difficult. If left unguided, sprawling would destroy the wooded area; the environment would turn to be like most of Kampungs already exist in and ground big cities; and would need the help by K.I.P. (Kampung Improvement Project). Various solutions studied beforehand, for example, introduction of land re-adjustment method, endowment of the priority for land acquisition to administrative authorities or deductive application of K.I.P., would be helpful and necessary.

Necessary changes in Cross-Subsidy System or in PERUM PERUMNAS activities

Financial balance in each project by PERUM PERUMNAS is based on the cross-subsidy System. If the present rise in construction cost and land acquisition cost are to be continued, a simple cross-susbidy would face a limitation in near future. PERUM PERUMNAS might need, for example; to sell housing units (building + land) for medium to high income people; to construct shopping or business facilities for sale; or to adopt rental system for housing; in addition to the sale of empty lots for commercial or housing to gain subsidy use for the supply of low cost housing.

The study, both in administrative and institutional aspects, of widening the scope of PERUM PERUMNAS activities might well be started in advance.

Collective ownership and divided ownership

Collective ownership and divided ownership are still at a trial stage. When flat-type housing,which depends on these new ownerships, is expected to become more popular in cities, troubles or confusion might be caused in dealing with expansion of buildings, registration or alienation, due to the lack of sound establishment of these ownerships. Re-development or land re-adjustment projects would be also promoted if these new ownerships are well established both administratively and institutionally.

Maintenance

In flat-type housing, not only land but also a part of building is usually owned collectively. The maintenance of the collectively owned part is the responsibility of the residents who own it. Since whether the collectively owned part is well-maintained or not influences the value of the exclusively

owned part, the establishment of rules or regulations and organizations for the maintenance of the building is indispensable, which may be realized through the experience in RT or RW, Indonesian practice of residents' organization for mutual assistance and communication.

Loan conditions

In addition to a fixed repayment method which has been in practice up to now, a gradual repayment method is proposed in the study. When target income group of low cost housing is to be enlarged, and a diversified demand is to be expected, loan conditions may well be corresponding to it. For example, people who have saved enough money or sell their own house to buy a new house* would prefer to pay more down payment and less monthly repayment. Once diversified loan conditions corresponding to a diversified demand of the target income group, which would be understood through a detailed study of the actual state of it, are introduced, new demands will be stimulated; thus necessitating the continuous examination of lown conditions corresponding to the newest demands.

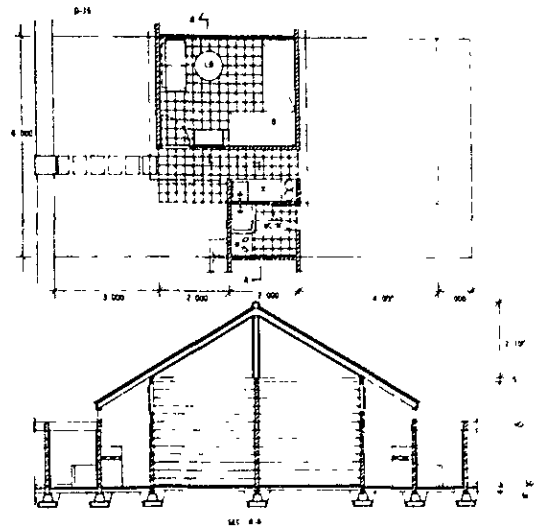
* At present, those who own a house are not qualified for the PERUM PERUMNAS housing.

APPENDIX

D-15

Floor Area/unit	Lot Size 72.0 M^2	Construction Stage		After Extension
	Net Floor Area	Living F.A. 12.0 M^2 WC/M & Stor. 6.0 M^2 Veranda M^2	Total 18.0 M^2	36.0 M^2
	Gross Floor Area	18.0 M^2		36.0 M^2
	Building Area	18.0 M^2		36.0 M^2
	Volume Ratio	25.0 %		50.0 %
	Coverage Ratio	25.0 %		50.0 %
Safety Performance	Seismic Proof (Wall Volume)	Frontage Direction Wall Length		51.94 cm/M^2
		Depth Direction Wall Length		44.72 cm/M^2
	Fire Proof			
	Inundation Differential Settlement			
Health Performance	Ventilation	Cross Ventialtion		
		Effective Ventilation Area		M^2 %
				0.43 M^2 3.5 %
	Daylight	Effective Daylight Area		M^2 %
				1.31 M^2 10.9 %
	Rain Water			
	Toilet & Other Sewer	Combined System		
	Kitchen Exhaust			
Rough Specification	Roof	Unglazed roof tile ex Genteng Kodok		
	Outer Wall	Concrete block t=150 Wood stud + asbestos sheet t=4(under the window)		
	Unit Wall gen: upper:	Concrete block t=150 Wood stud + cement fiber board(t=15) + plaster t 15 both side		
	Gable Wall gen: upper:	Concrete block t=150 Wood stud + asbestos sheet t=4		
	Partition Wall	Concrete block t=150		
	Door & Windows	Wood frame + flash door , Naco or fixed window		
	Stair			
	Floor -F:	Concrete slab on grade t=50,sand fill t=100		
	Structure	Reinforced corner and edge blocks and RC-course		
	Foundation	Batukali foundation + RC-foundation beam		
Number of Units/Row		2 Units		
Cost June,1980	Per Unit	620.83 x 10^3RP/unit		
	Per Square Meter	34.49 x 10^3RP/net M^2	34.49 x 10^3RP/gross M^2	

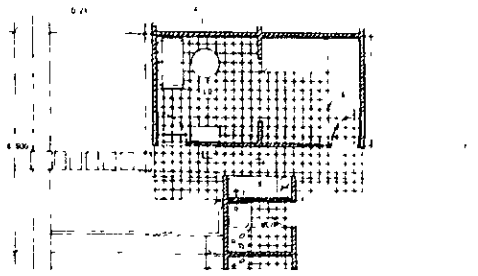
D-15

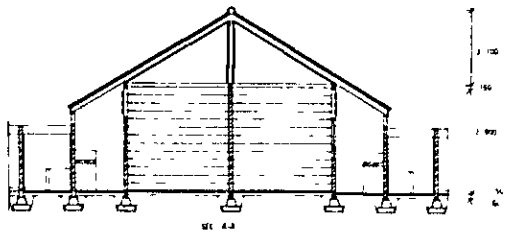


D-21

Floor Area/unit	Lot Size 96.0 M^2	Construction Stage		After Extension
	Net Floor Area	Living F.A. 18.0 M^2	Total 24.0 M^2	33.0 M^2
		WC/M & Stor. 6.0 M^2		
		Veranda M^2		
	Gross Floor Area	24.0 M^2		33.0 M^2
	Building Area	24.0 M^2		33.0 M^2
	Volume Ratio	25.0 %		34.4 %
	Coverage Ratio	25.0 %		34.4 %
Safety Performance	Seismic Proof (Wall Volume)	Frontage Direction Wall Length		44.38 cm/M^2
		Depth Direction Wall Length		37.50 cm/M^2
	Fire Proof			
	Inundation Differential Settlement			
Health Performance	Ventilation	Cross Ventialtion		
		Effective Ventilation Area		M^2 %
				0.85 M^2 4.7 %
	Daylight	Effective Daylight Area		M^2 %
				2.61 M^2 14.5 %
	Rain Water			
	Toilet & Other Sewer	Combined System		
	Kitchen Exhaust			
Rough Specification	Roof	Unglazed roof tile ex. Genteng Kodok		
	Outer Wall	Concrete block t=150 Wood stud + asbestos sheet t=4(under the window)		
	Unit Wall gen: upper:	Concrete block t=150 Wood stud + cement fiber board(t=15) + plaster t=15 both side		
	Gable Wall gen: upper:	Concrete block t=150 Wood stud + asbestos sheet t=4		
	Partition Wall	Concrete block t=150		
	Door & Windows	Wood frame + flash door , Naco or fixed window		
	Stair			
	Floor 1F:	Concrete slab on grade t=50,sand fill t=100		
	Structure	Reinforced corner and edge blocks and RC-course		
	Foundation	Batukali foundation + RC-foundation beam		
Number of Units/Row		2 Units		
Cost June,1980	Per Unit	819.24×10^3RP/unit		
	Per Square Meter	34.14×10^3RP/net M^2		34.14×10^3RP/gross M^2

D-21

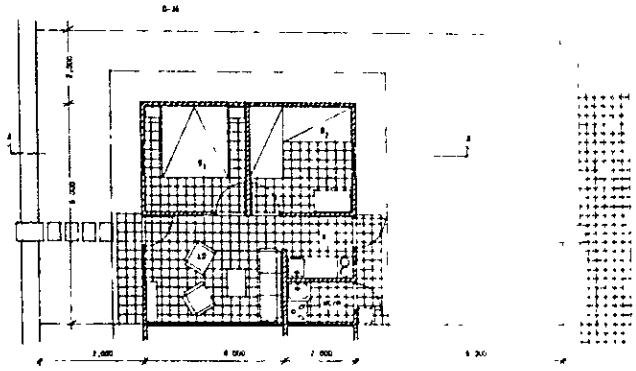


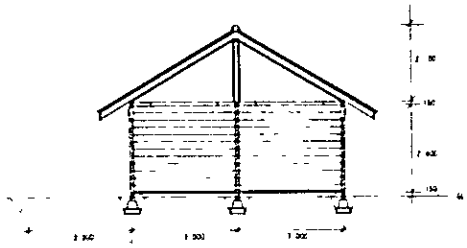


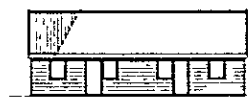
D-36

Floor Area/unit	Lot Size 108.0 M^2	Construction Stage		After Extension
	Net Floor Area	Living F.A. 33.6 M^2 WC/M & Stor. 2.9 M^2 Veranda M^2	Total 36.0 M^2	45.0 M^2
	Gross Floor Area	36.0 M^2		45.0 M^2
	Building Area	36.0 M^2		45.0 M^2
	Volume Ratio	33.3 %		41.7 %
	Coverage Ratio	33.3 %		41.7 %
Safety Performance	Seismic Proof (Wall Volume)	Frontage Direction Wall Length		29.58 cm/M^2
		Depth Direction Wall Length		40.56 cm/M^2
	Fire Proof			
	Inundation Differential Settlement			
Health Performance	Ventilation	Cross Ventialtion		
		Effective Ventilation Area		M^2 %
				1.20 M^2 3.6 %
	Daylight	Effective Daylight Area		M^2 %
				4.43 M^2 13.2 %
	Rain Water			
	Toilet & Other Sewer	Combined System		
	Kitchen Exhaust			
Rough Specification	Roof	Unglazed roof tile ex. Genteng Kodok		
	Outer Wall	Concrete block t=150 Wood stud + asbestos sheet t=4(under the window)		
	Unit Wall gen: upper:	Concrete block t=150 Wood stud + cement fiber board(t=15) + plaster t=15 both side		
	Gable Wall gen: upper:	Concrete block t=150 Wood stud + asbestos sheet t=4		
	Partition Wall	Concrete block t=150		
	Door & Windows	Wood frame + flash door , Naco or fixed window		
	Stair			
	Floor 1F:	Concrete slab on grade t=50,sand fill t=100		
	Structure	Reinforced corner and edge blocks and RC-course		
	Foundation	Batukali foundation + RC-foundation beam		
Number of Units/Row				Units
Cost June,1980	Per Unit			1246.14 x 10^3RP/unit
	Per Square Meter	34.62 x 10^3RP/net M^2		34.62 x 10^3RP/gross M^2

D-36



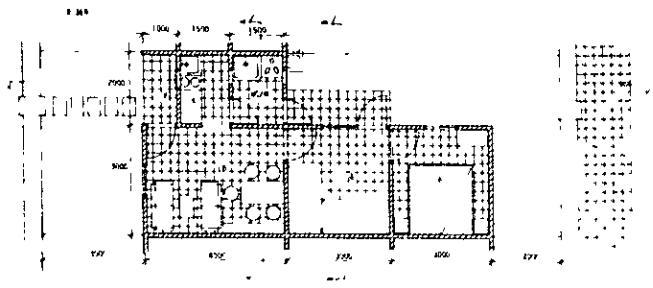


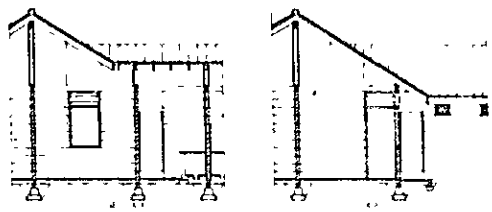


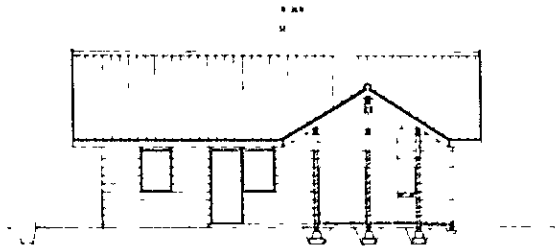
R-36N

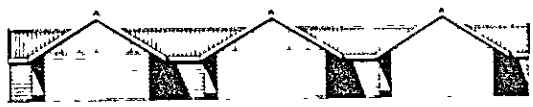
Floor Area/unit	Lot Size 75.0 M^2	Construction Stage		After Extension
	Net Floor Area	Living F.A. 30.0 M^2	Total 38.0 M^2	44.0 M^2
		WC/M & Stor. 6.0 M^2		
		Veranda 2.0 M^2		
	Gross Floor Area	38.0 M^2		44.0 M^2
	Building Area	38.0 M^2		44.0 M^2
	Volume Ratio	50.7 %		58.7 %
	Coverage Ratio	50.7 %		58.7 %
Safety Performance	Seismic Proof (Wall Volume)	Frontage Direction Wall Length		34.82 cm/M^2
		Depth Direction Wall Length		33.80 cm/M^2
	Fire Proof			
	Inundation Differential Settlement			
Health Performance	Ventilation	Cross Ventialtion		
		Effective Ventilation Area		M^2 %
				1.0 M^2 3.3 %
	Daylight	Effective Daylight Area		M^2 %
				3.64 M^2 12.1 %
	Rain Water			
	Toilet & Other Sewer	Combined System		
	Kitchen Exhaust			
Rough Specification	Roof	Unglazed roof tile ex. Genteng Kodok		
	Outer Wall	Concrete block t=150 Wood stud + asbestos sheet t=4(under the window)		
	Unit Wall gen. upper:	Concrete block t=150 Wood stud + cement fiber board(t=15) + plaster t=15 both side		
	Gable Wall gen. upper:	Concrete block t=150 Wood stud + asbestos sheet t=4		
	Partition Wall	Concrete block t=150		
	Door & Windows	Wood frame + flash door , Naco or fixed window		
	Stair			
	Floor 1F:	Concrete slab on grade t=50,sand fill t=100		
	Structure	Reinforced corner and edge blocks and RC-course		
	Foundation	Batukali foundation + RC-foundation beam		
Number of Units/Row		6 Units		
Cost June,1980	Per Unit	1387.73 x 10^3RP/unit		
	Per Square Meter	36.52 x 10^3RP/net M^2	36.52 x 10^3RP/gross M^2	

R-36N





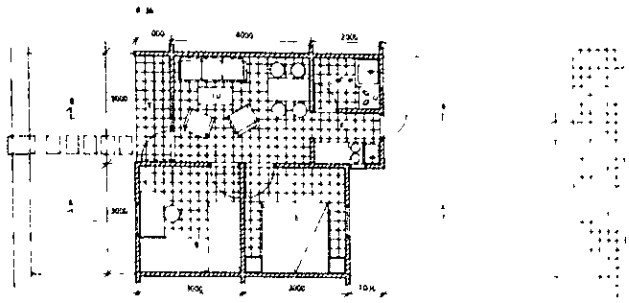


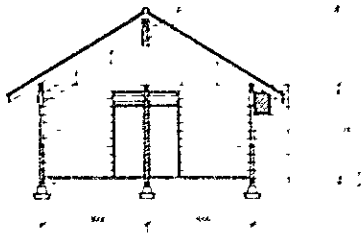


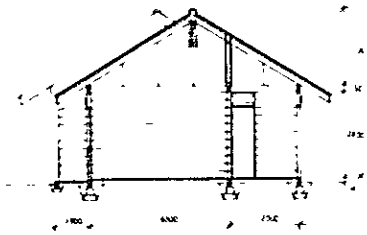
R-36

Floor Area/unit	Lot Size 90.0 M²	Construction Stage			After Extension
	Net Floor Area	Living F.A. 33.0 M²	Total		45.0 M²
		WC/M & Stor. 3.0 M²	39.0 M²		
		Veranda 3.0 M²			
	Gross Floor Area	39.0 M²			45.0 M²
	Building Area	39.0 M²			45.0 M²
	Volume Ratio	43.3 %			50.0 %
	Coverage Ratio	43.3 %			50.0 %
Safety Performance	Seismic Proof (Wall Volume)	Frontage Direction Wall Length			34.52 cm/M²
		Depth Direction Wall Length			31.54 cm/M²
	Fire Proof				
	Inundation Differential Settlement				
Health Performance	Ventilation	Cross Ventialtion			
		Effective Ventilation Area			M² %
					1.24 M² 3.8 %
	Daylight	Effective Daylight Area			M² %
					4.35 M² 13.2 %
	Rain Water				
	Toilet & Other Sewer	Combined System			
	Kitchen Exhaust				
Rough Specification	Roof	Unglazed roof tile ex. Genteng Kodok			
	Outer Wall	Concrete block t=150 Wood stud + asbestos sheet t=4(under the window)			
	Unit Wall gen: upper:	Concrete block t=150 Wood stud + cement fiber board(t=15) + plaster t=15 both side			
	Gable Wall gen: upper:	Concrete block t=150 Wood stud + asbestos sheet t=4			
	Partition Wall	Concrete block t=150			
	Door & Windows	Wood frame + flash door , Naco or fixed window			
	Stair				
	Floor -F:	Concrete slab on grade t=50,sand fill t=100			
	Structure	Reinforced corner and edge blocks and RC-course			
	Foundation	Batukali foundation + RC-foundation beam			
Number of Units/Row					Units
Cost June,1980	Per Unit			1222.52	x 10^3RP/unit
	Per Square Meter	31.35x 10^3RP/net M²		31.35	x 10^3RP/gross M²

R-36



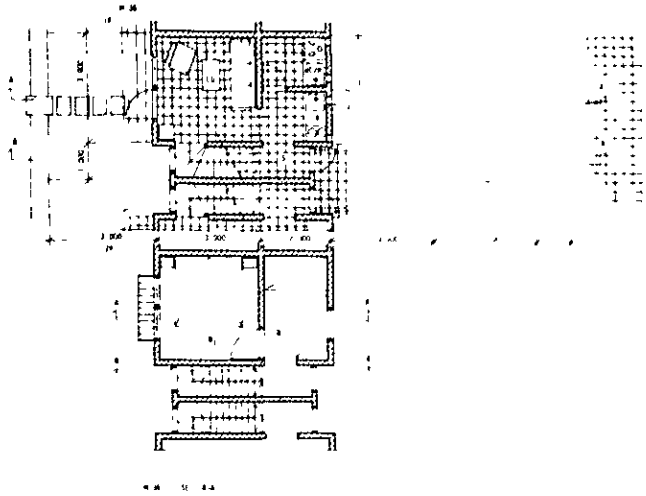


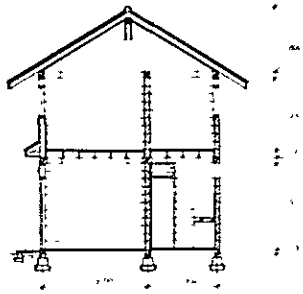


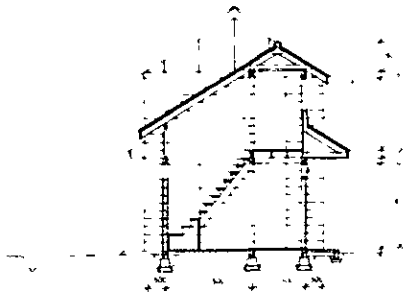
M-36

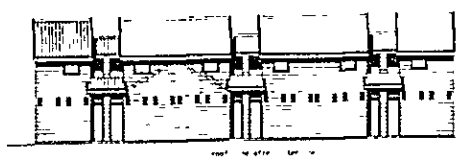
Floor Area/unit	Lot Size (60) M^2	Construction Stage			After Extension
	Net Floor Area	Living F.A. 27.0 M^2	Total		45.0 M^2
		WC/M & Stor. 11.0 M^2	38.0 M^2		
		Veranda M^2			
	Gross Floor Area	38.0 M^2			45.0 M^2
	Building Area	19.0 M^2			28.0 M^2
	Volume Ratio	63.3 %			75.0 %
	Coverage Ratio	31.7 %			46.7 %
Safety Performance	Seismic Proof (Wall Volume)	Frontage Direction Wall Length			35.79 cm/M^2 (1F)
		Depth Direction Wall Length			53.20 cm/M^2 (1F)
	Fire Proof				
	Inundation Differential Settlement				
Health Performance	Ventilation	Cross Ventialtion			
		Effective Ventilation Area	2F		0.48 M^2 3.2 %
			1F		0.93 M^2 6.8%
	Daylight	Effective Daylight Area	2F		2.4 M^2 16.0 %
			1F		1.47 M^2 12.2%
	Rain Water				
	Toilet & Other Sewer	Combined System			
	Kitchen Exhaust				
Rough Specification	Roof	Unglazed roof tile ex. Genteng Kodok			
	Outer Wall	Concrete block t=150 Wood stud + asbestos sheet t=4(under the window)			
	Unit Wall gen:	Concrete block t=150			
	upper:	Wood stud + cement fiber board(t=15) + plaster t=15 both side			
	Gable Wall gen:	Concrete block t=150			
	upper:	Wood stud + asbestos sheet t=4			
	Partition Wall	Concrete block t=150			
	Door & Windows	Wood frame + flash door , Naco or fixed window			
	Stair	Wooden stair			
	Floor 1F:	Concrete slab on grade t=50,sand fill t=100			
	2F	Wood joist + particle board t=16			
	Structure	Reinforced corner and edge blocks and RC-course			
	Foundation	Batukali foundation + RC-foundation beam			
Number of Units/Row		6 Units			
Cost June,1980	Per Unit	1338.13 x 10^3RP/unit			
	Per Square Meter	35.21 x 10^3RP/net M^2			35.21 x 10^3RP/gross M^2

M-36





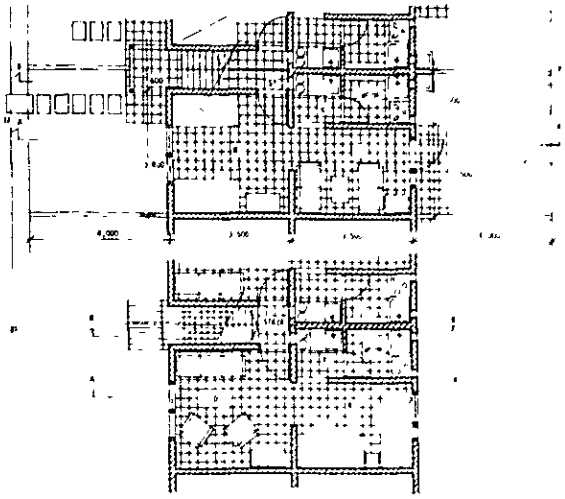


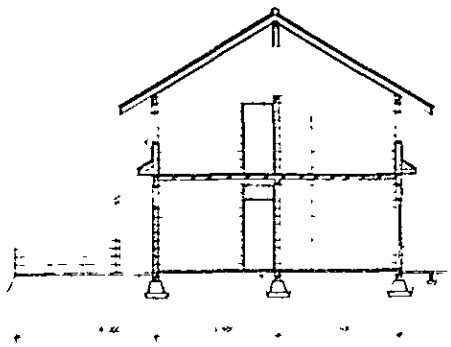


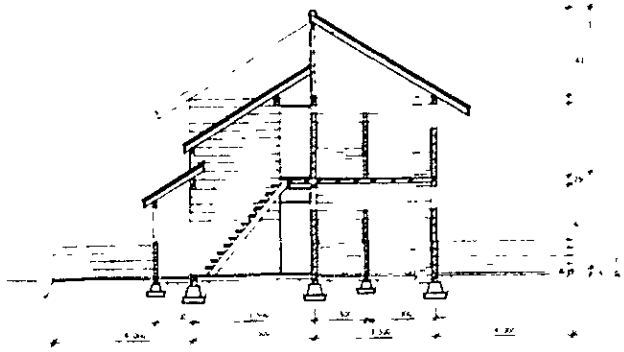
FS'2-26

Floor Area/unit	Lot Size 35 M^2	Construction Stage		After Extension
	Net Floor Area	Living F.A. 22.9 M^2	Total	M^2
		WC/M & Stor. 3.0 M^2	25.9 M^2	
		Veranda M^2		
	Gross Floor Area	28.0 M^2		M^2
	Building Area	14.0 M^2		M^2
	Volume Ratio	80.0 %		%
	Coverage Ratio	40.0 %		%
Safety Performance	Seismic Proof (Wall Volume)	Frontage Direction Wall Length		27.00 cm/M^2 (1F)
		Depth Direction Wall Length		41.76 cm/M^2 (1F)
	Fire Proof			
	Inundation Differential Settlement			
Health Performance	Ventilation	Cross Ventialtion		
		Effective Ventilation Area		M^2 %
				0.54 M^2 2.4%
	Daylight	Effective Daylight Area		M^2 %
				2.70 M^2 11.8%
	Rain Water			
	Toilet & Other Sewer	Combined System		
	Kitchen Exhaust			
Rough Specification	Roof	Unglazed roof tile ex. Genteng Kodok		
	Outer Wall	Concrete block t=150 Wood stud + asbestos sheet t=4(under the window)		
	Unit Wall gen: upper:	Concrete block t=150 Wood stud + cement fiber board(t=15) + plaster t=15 both side		
	Gable Wall gen: upper:	Concrete block t=150 Wood stud + asbestos sheet t=4		
	Partition Wall	Concrete block t=150		
	Door & Windows	Wood frame + flash door Naco or fixed window		
	Stair	Wooden stair		
	Floor 1F: 2F:	Concrete slab on grade t=50,sand fill t=100 RC-slab t=100,mortar t=30		
	Structure	Reinforced corner and edge blocks and RC-course		
	Foundation	Batukali foundation + RC-foundation beam		
Number of Units/Row		12 Units		
Cost June,1980	Per Unit	1017.41 x 10^3RP/unit		
	Per Square Meter	39.78 x 10^3RP/net M^2	36.34 x 10^3RP/gross M^2	

FS'2-26



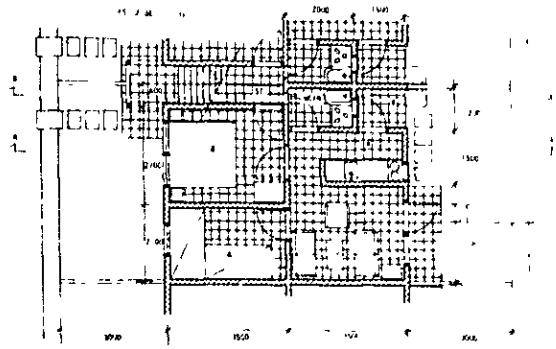


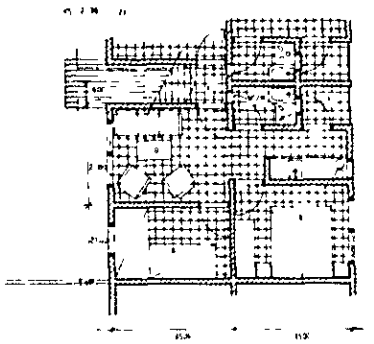


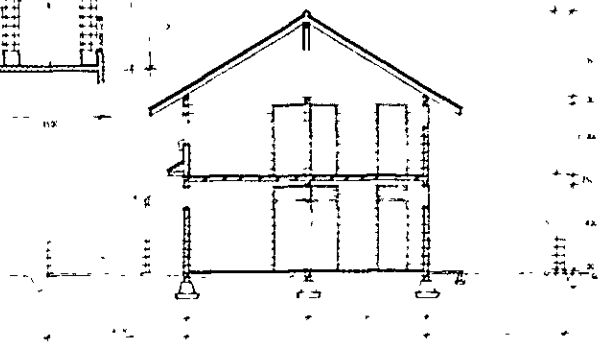
FS'2-36

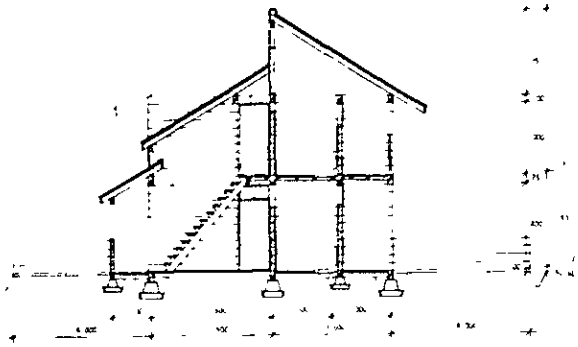
Floor Area/unit	Lot Size 100 M^2	Construction Stage		After Extension	
	Net Floor Area	Living F.A. 31.50M^2	Total 35.70 M^2	M^2	
		WC/M & Stor. 2.40M^2			
		Veranda 1.80M^2			
	Gross Floor Area	37.80 M^2		M^2	
	Building Area	18.90 M^2		M^2	
	Volume Ratio	75.6 %		%	
	Coverage Ratio	37.8 %		%	
Safety Performance	Seismic Proof (Wall Volume)	Frontage Direction Wall Length		27.68 cm/M^2	(1F)
		Depth Direction Wall Length		45.35 cm/M^2	(1F)
	Fire Proof				
	Inundation Differential Settlement				
Health Performance	Ventilation	Cross Ventialtion			
		Effective Ventilation Area		M^2 %	
				0.67 M^2 2.11%	
	Daylight	Effective Daylight Area		M^2 %	
				3.42 M^2 10.85%	
	Rain Water				
	Toilet & Other Sewer	Combined System			
	Kitchen Exhaust				
Rough Specification	Roof	Unglazed roof tile ex. Genteng Kodok			
	Outer Wall	Concrete block t=150 Wood stud + asbestos sheet t=4(under the window)			
	Unit Wall gen: upper:	Concrete block t=150 Wood stud + cement fiber board(t=15) + plaster t=15 both side			
	Gable Wall gen: upper:	Concrete block t=150 Wood stud + asbestos sheet t=4			
	Partition Wall	Concrete block t=150			
	Door & Windows	Wood frame + flash door , Naco or fixed window			
	Stair	Wooden stair			
	Floor 1F: 2F:	Concrete slab on grade t=50,sand fill t=100 RC-slab t=100,mortar t=30			
	Structure	Reinforced corner and edge blocks and RC-course			
	Foundation	Batukali foundation + RC-foundation beam			
Number of Units/Row		12 Units			
Cost June,1980	Per Unit	1414.47 x 10^3RP/unit			
	Per Square Meter	39.62 x 10^3RP/net M^2		37.42 x 10^3RP/gross M^2	

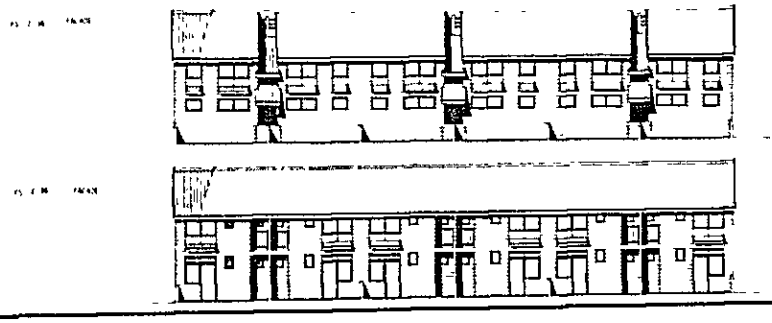
FS'2-36











FS'5-36

Floor Area/unit	Lot Size M^2	Construction Stage		After Extension
	Net Floor Area	Living F.A. 35.0 M^2	Total	M^2
		WC/M & Stor. 2.16 M^2	38.78 M^2	
		Veranda 1.62 M^2		
	Gross Floor Area	43.40 M^2		M^2
	Building Area	M^2		M^2
	Volume Ratio	124.0 %		%
	Coverage Ratio	24.8 %		%
Safety Performance	Seismic Proof (Wall Volume)	Frontage Direction Wall Length		cm/M^2
		Depth Direction Wall Length		cm/M^2
	Fire Proof			
	Inundation Differential Settlement			
Health Performance	Ventilation	Cross Ventialtion		Adequate
		Effective Ventilation Area		M^2 %
				1.06 M^2 3.0 %
	Daylight	Effective Daylight Area		M^2 %
				5.62 M^2 16.1 %
	Rain Water			
	Toilet & Other Sewer	Combined System		
	Kitchen Exhaust			
Rough Specification	Roof	Unglazed roof tile ex. Genteng Kodok		
	Outer Wall	Red brick exposure 1/2 brick Cikarang class		
	Unit Wall gen:	Concrete block t=150		
	upper:	Wood stud + cement fiber board(t=15) + plaster t=15 both side		
	Gable Wall gen:	Red brick exposure 1/2 brick Cikarang class		
	upper:	Wood stud + asbestos sheet t=4		
	Partition Wall	Wood stud + particle board t=12		
	Door & Windows	Wood frame + flash door or Naco windows		
	Stair	RC stair		
	Floor 1F:	Concrete slab on grade t=50,sand fill t=100		
	2,3,4,5F:	RC-slab t=100 + mortar t=30		
	Structure	RC wall rahmen structure		
	Foundation	Pile foundation		
Number of Units/Row		40 Units		
Cost June,1980	Per Unit	2956.09 x 10^3RP/unit		
	Per Square Meter	76.23 x 10^3RP/net M^2		68.11 x 10^3RP/gross M^2

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