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MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF HOUSING BUILDING
PLANNING AND URBAN DEVELOPMENT (CIPTA KARYA)

MEDAN URBAN DEVELOPMENT, HOUSING,
WATER SUPPLY AND SANITATION PROJECT

VOLUME IV

HOUSING DEVELOPMENT PROGRAM

PART 3 - SITES AND SERVICES/LOW COST HOUSING PROGRAM

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SINOTECH ENGINEERING CONSULTANTS, INC.
A JOINT VENTURE
in association with
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PREFACE

The feasibility reports emanating from the Medan Urban Development, Housing, Water Supply and Sanitation Project were submitted in draft form to the Government of Indonesia (GOI) in February 1980. These reports, together with the earlier master plan reports, were reviewed by GOI in July 1980 and discussed with the Consultant at a series of meetings at that time. The outcome of this review process was that certain changes in content and format were agreed. These changes have been incorporated into the final printed reports.

A result of adopting the new guidelines provided by GOI is that differences occur between the Repelita III investments proposed in the master plan studies and those contained in the first stage program recommendations. The latter incorporate the final adjustments and represent the recommended program for Repelita III.

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ORGANIZATION OF PROJECT REPORTS

The results of investigations carried out in connection with the Medan Urban Development, Housing, Water Supply and Sanitation Project are contained in the following series of reports:

Inception Report for Long Term Urban Development Plan and Feasibility Study on First Stage Housing Development Project

Volume I	Summary
Volume II	Interim Strategic Plan and Feasibility Study
Volume III	Long Range Urban Development Plan
Volume IV	Housing Development Program
	Part 1 - Housing Development Situation and Strategy
	Part 2 - Kampung Improvement Program
	Part 3 - Sites and Services / Low Cost Housing Program
Volume V	Master Plan and First Stage Program for Water Supply and Sanitation
	Part 1 - Master Plan and First Stage Program for Water Supply
	Part 2 - Master Plan and First Stage Program for Wastewater
	Part 3 - Master Plan and First Stage Program for Drainage
	Part 4 - Master Plan and First Stage Program for Solid Wastes

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Note: Parts 1-3 of Volume IV and Parts 1-4 of Volume V are bound as separate report volumes. Appendices to Part 1, Volume V are also bound separately.

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LIST OF ABBREVIATIONS

ORGANIZATIONS

BTN	Bank Tabungan Negara
DISP	Distributive Investment Strategy Plan
DKKP	City Solid Waste Department
DPU	City Drainage Department
IKIP	Institute of Teachers Training and Educational Science
KIK	Kredit Investasi Real
KMKP	Kredit Modal Kerja Permanen
PENMAS	Community Education Program
RGDP	Regional Gross Domestic Product
SMP	Junior High Schools
APG	Teachers Education School
UISU	Islamic University of North Sumatra
USU	University of North Sumatra

TECHNICAL

mm	millimetre	mg	milligram
m	metre	g	gram
km	kilometre	kg	kilogram
sq m	square metre	t	tonne (metric)
ha	hectare		
sq km	square kilometre	BOD	5-day, biochemical oxygen demand
l	litre	TDS	Total dissolves solids
cu m	cubic metre	ES	Electrical conductivity
		TU	Turbidity units
s	second	DO	Dissolved oxygen
min	minute		
d	day	TDH	Total dynamic head
y	year	LS	Lump sum
		ea	each
m/s	metres per second	na	not available or not known
l/min	litres per minute		
cu m/s	cubic metres per second	Rp	Indonesian Rupiah
cu m/d	cubic metres per day		
mg/l	milligrams per litre		
l/c.d	litres per capita per day		

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SECTION 1

DESCRIPTION OF THE PROPOSED PROJECT

1.1 SITE SELECTION

The selection of any new large housing development site should support both the short and long term DISP development strategy for Medan. Housing sites should be in areas that will have easy access to other services provided by an urban area (employment, education, and cultural activities etc.), as well as be in areas which minimize the requirements for major new investment in infrastructure to join the prospective site with existing water supply mains, transportation networks, and electricity. However, since Medan III will be designed to serve low income households, the principle constraint in site selection is the cost of the land and the development costs which will be associated with it. Well located sites with access to employment and other urban services that are often highly priced due to their location, will result in total housing costs which are beyond the economic capacity of the groups which they are intended to serve. Therefore, the selection of low income housing sites must weigh the effects of several factors in making final site selection decisions.

To reflect these concerns the following five primary site selection criteria were initially developed to aid in evaluating various site alternatives:

1. The cost of raw land must be kept to a minimum (Rp.500 to 1,000 per square metre).

2. Land acquisition procedures must be fairly simple and involve purchase of the site from only one or two owners.

3. The topography of the site should not have steep slopes (the great majority should not exceed 10 percent) and it must be well drained to minimize site preparation costs.

4. The site size should be in the range of 100 to 200 hectares.

5. The site should be close to the existing infrastructure and transportation networks to minimize off-site infrastructure costs and the transportation costs which will be borne by project households.

Using those criteria, three potential sites were evaluated in detail: a 160 hectare site on kilometre 10 of the Brastagi Road; a 200 hectare site located between the Babura and Deli Rivers/in Kampung Masyhur, Kecamatan Johor south of Polonia Airport; and a site 10 kilometres to the southwest of Pancur Batu. The latter site was quickly eliminated due to the roughly 30 kilometres which separate the site from the center of Medan.

The site in Kampung Masyhur, Kecamatan Johor, although meeting the size criteria was found to be very poorly drained as up to 100 hectares of the site would require extensive filling and grading to make it suitable for housing development. The site would also require about two kilometres of access road and is several kilometres from water and power supplies. Due to these characteristics the site was eliminated. However, since at least 100 hectares of the site would be suitable for later development of low income housing, it should be considered as a potential site for development after Medan III.

The site on Kilometre 10 of the Brastagi Road is currently a rubber plantation and abuts into the Brastagi Road. The site is traversed by one large stream and two smaller ones in well defined channels and requires two small bridges and four culverts. It is owned by one person and can be acquired at Rp.750 per square meter which makes it ideal in terms of ease of acquisition and affordability to low income groups. Its site development potential for low income housing is summarized as follows:

	Area	Percent of Total Area
Total site area	160 ha	100 %
Unsuitable for Development	19 ha	11.9 %
Suitable for limited development	14 ha	8.8 %
Suitable for housing development	127 ha	79.3 %

Although the Brastagi Road site is somewhat distant from the city center, it is on well established bus and bemo routes and is in an area which has been subject to recent commercial and light industrial development. Water supply is available from the water distribution system approximately three kilometres to the northeast and the site is near to a future electricity secondary distribution feeder. Since the site is traversed by three streams in well defined channels and has no flooding problems, no major drainage networks are envisioned. Although the site is wooded, sale of the timber for firewood should cover the costs of clearing the site. Thus, due to its site characteristics, location, and cost the site was selected as most feasible of the available sites for the Medan III low cost housing project.

1.2 PROJECT COMPONENTS

The Medan III sites and services and low cost housing project will consist of approximately 8,400 plots aimed at low and middle income groups. Since it will ultimately house a community of about 50,000 persons, it will have a full complement of social facilities such as

schools, public buildings, markets, religious facilities and a health center*. To provide employment on the site, roughly 5 hectares of the site have been designated for commercial development.

The project has been designed to recover all costs incurred in its development. However, since the targeted low income households are unable to afford all of the costs of even the minimum standards of the housing packages designated for them, the project contains 504 three hundred square metre plots designated for immediate sale, at a profit, to upper income groups to provide internal cross subsidies. These capital transfers will be used to lower the costs of the housing units designated for lower income groups, thus eliminating the need for external subsidies.

1.3 AFFORDABILITY AND TARGET GROUPS

A random sampling of 300 rental units within low income kampungs selected for KIP indicates that households at the median household income range are paying roughly eight percent of income or Rp.4,000 per month in rent for often substandard housing lacking water supply, sanitation and other amenities. Households at the 10th percentile pay slightly more, averaging 10 percent of income, for those at the 76th percentile, about eight percent of income is spent**. These rents are often quoted however as annual rents, not monthly, and are paid either biannually or annually. Thus, they indicate a minimum capacity to pay downpayments for housing ranging from around Rp.24,000 for households at the 10th decile to over Rp.54,000 for groups at the median.

Although rents are an indication of a households ability to afford housing, they only partially reflect a household's willingness to pay for housing that is owner-occupied and not rented. While no affordability surveys have been made in Medan, there are some trends which are indicative of what that capacity to afford housing might be.

BTN, for middle and upper income housing mortgage loans, allows up to 33 percent of household income to be spent in payment of housing mortgage loans. Even so, Nation-wide, BTN (serving only government employees), has had no defaults or arrears in payments.

Perhaps a better indicator of affordability is the combination of general household savings trends and rent. Although survey dates differ for the rent and savings/household expenditure surveys, on a percentage basis roughly 21 percent of low income household income is either rent or savings. At the median, roughly 23 percent of income is saved while 10 percent is spent on rent. Among upper income groups, rents remain at nine percent of income, while savings jump to 32 percent. Although not all of savings can or should be devoted to repayment of housing mortgage loans, a portion of it can be, since the purchase of a house

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* The site is adjacent to a new hospital which is presently under construction.

** MUDS September 1979 survey of 300 households which rent housing. See Section 4.4.4, Vol III - Long Term Urban Development Plan Report.

actually represents a secure form of household savings, particularly in inflationary times. Thus, for all income groups, affordability analysis was based on 15 percent of income. While 15 percent is probably low for upper income groups, it seems reasonable for lower and middle income groups since they will be expected to complete core houses and low cost housing units from their own resources*. Also upper income housing units represent only six percent of the plots.

Since practically all of publicly assisted housing finance in Medan has been designated for government employees having incomes above the 65th percentile, the bulk of the units for Medan III were targeted for groups (both privately and publicly employed) at or below the 50th percentile. In addition, two middle and upper income target groups were also selected to provide internal cross subsidies and to satisfy some of the demand for housing which these groups exhibit, particularly among privately employed workers. Broadly, these target groups are outlined below in Table 1.1.

Using the capital resources available for housing as represented by each target income groups, Table 1.2 summarizes the housing standards which are affordable to each group. These standards are further detailed in subsequent sections of this report and are fully presented in Appendix A.

TABLE 1.1

TARGET GROUPS AND CAPITAL RESOURCES OF HOUSEHOLDS DESIGNATED FOR MEDAN III

Target Percentile Group (%)	Monthly Income (Rp)	Affordable Monthly Housing Payment[a] (Rp)	Downpayment Affordable[b] (Rp)	Total Capital Resource Available for Housing[c] (Rp)
10	25,000	3,750	37,500	378,500
30	47,000	7,050	71,000	715,000
50	58,600	8,790	88,000	890,000
76	91,000	13,650	138,000	1,380,000
90	134,917	20,238	210,000	2,100,000

a. Estimated at 15 percent of income.
b. Estimated at 10 percent of affordable monthly payment or 10 times monthly payment which approximates current annual rents.
c. Based on annual interest rates of 12 percent over 20 years with a 10 percent downpayment.

* At the request of Perumnas, a portion of the larger plots have been reserved for BTN financed middle and upper income housing which would qualify for loans under BTN affordability conditions and would want to build their own housing units.

TABLE 1.2

HOUSEHOLD AFFORDABILITY AND HOUSING STANDARDS

Percentile Income Group	10	30	50	76	90
Monthly Income	25,000	47,000	58,500	91,000	134,917
Percent of Income Spent on Housing	15	15	15	15	
Affordable Monthly Payment	3,750	7.050	8,788	13,650	20,238
Total Capital Resource	378,415	711,419	886,758	1,377,436	204,229
Plot Size	60	90	120	140	180
Core House Size	13	21	21	36	45
Neighborhood Density	570	429	340	301	236

* The detailed affordability analysis which this table summarizes is shown in Appendix A.

1.4 PROJECT STANDARDS

1.4.1 Planning Standards

Since the site is traversed by three streams, has a variable terrain, and contains excellent views of surrounding agricultural areas, its topography lends itself to developing a mix of income groups. Therefore, plots designated for upper income groups will generally be located around the perifery of the site in areas having slopes greater than 10 percent, since larger plots can accomodate changes in level while still providing attractive settings for upper income housing. Those areas unsuited for construction, roughly 11.9 percent of the site, follow the streams and can be developed in parks and open space within the site. Thus, due to the site's natural configuration, all housing units can be developed within 500 metres of public open space. The portion of the site which is not suitable for low income housing can be developed into commercial areas, public facilities and middle and upper income housing. However, this area will require some drainage work and possible filling. The bulk of the site will be developed for low and middle income housing. The general planning standards for the site are summarized in Table 1.3.

TABLE 1.3

SUMMARY OF MEDAN III LAND USE

Use	Percent of Site Area (%)	Area (ha)
Residential		
Low Income Housing	35.4	56.6
Middle Income Housing	20.1	32.2
Upper Income Housing	9.4	15.0
Total Residential	64.9	103.8
Community Facilities Including Parks and Open Space	16.8	26.9
Commercial and Small Scale Industry	3.1	5.0
Circulation	15.2	24.3
Total	100.0	160.0

1.4.2 Community Facilities

A general planning standard for development of community facilities of 5.33 square metres of community facilities per person was used to evaluate the feasibility of the project. Thus, for a community of an estimated 50,400 persons, 26.5 hectares of land must be reserved for community facilities. Land for these facilities has been allocated as indicated in Table 1.4.

TABLE 1.4

ALLOCATION OF LAND FOR PUBLIC FACILITIES

	Area (ha)	Proportion or total 160 hectares (%)
Health Clinics	0.4	0.3
Schools		
Primary, 9 units	2.7	1.7
SMP, 2 units	1.0	0.6
SMA, 1 unit	1.0	0.6
Religious facilities	1.5	0.9
Community buildings	0.9	0.6
Parks and Open Space	19.0	11.9
Total	26.5	16.6

In addition to these facilities, an additional 2.4 hectares would be allocated for markets and 5.0 hectares for other, commercial and small scale industry activities. The rather high proportion of the site allocated to parks and open space results from site areas which are subject to flooding and are unsuitable for development. These areas can, however, be used for park facilities, while the existing streams within these areas can continue to provide the major drainage channels for the site. As a result, no major expenditure in site drainage is envisioned.

1.4.3 Infrastructure Standards

Infrastructure standards for Medan III have been designed on an incremental basis whereby higher standards of infrastructure have been permitted in areas serving upper income groups. However, certain basic levels of infrastructure have been maintained for all income groups. Individual water supply has been provided for all housing units. The maximum distance a household must travel to reach a low vehicular intensity access road is 60 metres. All households are provided with a form of individual sanitation facility except for the 300 square metre plots,

where it is assumed that individual upper income households will construct their own facilities. These standards, in terms of access, drainage, water supply and sanitation have been outlined in Table 1.5.

Access standards for the 60 and 90 square metre plots which comprise 45 percent of all plots provide for three and four metre wide right of way footpaths. Both types of footpaths will be paved with 1.2 and 2.0 metre wide asphaltic or concrete pavements. The larger 120 and 140 square metre plots have access provided by four metre wide right of way footpaths and six metre wide low vehicular intensity access roads. Both have asphaltic pavement. Access to the 180 square metre plots will be provided by six metre wide roads while access to the 300 square metre plots will be via six and eight metre wide roads.

Surface water drainage consists of lined and unlined open channel drains. The unlined drains are used in conjunction with footpaths, while lined drains built from brick or concrete block are used on both sides of access roads.

As previously mentioned, all housing units will have individual house water supply. Distribution mains will generally utilize the following design standards: distribution mains of 150 mm - asbestos pipe; secondary mains of 100 mm - locally manufactured PVC pipe; and tertiary mains of 80 mm - PVC pipe. Service connection costs have been included in the basic costs of the housing units. These connections consist of 12 and 18 mm diameter PVC pipes leading to water meters installed in each housing unit. Water supply standards within housing units vary from water taps installed on MCK's for the core houses, to internal house connections in the low cost housing units.

Sanitation for lower income groups (i.e. those occupying the 60 and 90 square metre plots), will consist of shared MCK's connected to a pit. Each household will receive a MCK enclosure with a concrete squat-type water seal toilet facility, but will share a common wall. Each facility will be connected to an individual water meter and will have individual water supply taps. Sanitation standards for middle and upper income groups will consist of internal facilities connected to septic tanks or improved pit latrines.

The average unit cost of all infrastructure investment, excluding on plot sanitation and water supply connections, but including physical contingencies, is estimated Rp.1,239 per gross square metre in September 1979 costs. However, since electricity distribution network costs are recovered from users through user charges, only Rp.1,036 per square metre or 84 percent of those costs would be recovered directly from users*.

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* Since final engineering design and topographic surveys have not been completed, the actual role which site works and therefore physical contingencies will play in total infrastructure costs is uncertain. Therefore, these were not included in affordability analyses. When their role in total project costs is more clearly defined it is expected that they would be added to both unit costs of development and unit selling prices. Physical contingencies on land, which were estimated at 15 percent and amount to Rp.180 million, are aimed at covering the costs of site works since land prices have been fixed and would normally not incur physical contingencies.

TABLE 1.5

INFRASTRUCTURE STANDARDS FOR MEDAN III

Plot Type	Plot Type	Access				Drainage	Water	Sanitation
		Primary		Secondary				
	(sq m)	Row (m)	Pavement (m)	Row (m)	Pavement (m)	(Open Channel)		
A	60	4	2	3	1.2	Unlined	Individual	Shared MCK [a]
B	90	4	2	3	1.2	Unlined	Individual	Shared MCK
C	120	6	3	4	2	Lined [b]	Individual	Shared MCK
D	140[d]	6	3	4	2	Lined	Individual	Septic Tank
E	180	6	3	6	3	Lined	Individual	Septic Tank
F	300	8	4	6	3	Lined	Individual	– [c]

a. Shared MCK in this case means that each household has an individual MCK enclosure which shares a common wall and disposal facility.

b. Lined drainage channels will consist of brick lined open channels.

c. It is assumed that individual households will construct their own sanitary facilities.

d. Six metre ROW streets can be provided for both primary and secondary streets and still remain within costs and affordability parameter. See Appendix A.

1.4.4 Solid Waste Collection and Disposal Systems

The solid waste collection and disposal system would generally consist of collection of wastes every second day from house containers by handcarts. These handcarts would then dispose of the solid wastes either in secondary transfer facilities or "loading stations" or directly in trucks. The trucks would then dispose of the solid wastes in the municipal composting plant or in proposed sanitary land fill sites. Details of the solid waste disposal system are presented in Volume V, Part 4.

Within the Medan III site, loading stations are spaced at about one kilometre intervals along major roads where trucks can empty them. Temporary storage at these loading stations will not exceed 15 cubic metres.

1.4.5 Plot Sizes and Plot Distribution

Plot sizes and thereby neighborhood densities were determined according to the capital resources of each target income group. Necessarily, the costs of land and infrastructure must be balanced against the on-plot development costs such as core housing or low cost housing. Since it is government policy to provide minimal housing (i.e. a single habitable room plus sanitary facilities) for all income groups, those relatively fixed costs must be balanced against land and infrastructure development costs. Thus, densities must be increased through reducing plot sizes and minimizing planning standards. As a result, to reach the lowest income groups, neighborhood densities of 570 persons per hectare have been developed for 10 percent of the plots aimed at households at the 10th percentile of household incomes. These plots have a net area of 60 square metres and would be designed to permit row housing having only minimum front setback restrictions (see Table 1.6).

Progressively, as incomes increase, larger plot sizes can be afforded while providing higher standards of housing and access. Table 1.7 summarizes both on-plot and off-plot development standards.

1.4.6 Core House and Low Cost Housing Standards

Housing standards for Medan III range from a 13 square metre sub-core house plus sanitary unit to a complete low cost housing unit of 45 square metres. All units comprise at least one habitable room of 13 square metres, sanitary facilities, individual water supply and electricity connections. The 13 square metre units designated for the 60 square metre plots (10 percent of all plots) are terrace or row houses while the others are duplex units. About 12 percent of the plots will not have housing units and are designed for middle and upper income households who would prefer to build their own housing or would qualify for separate BTN financed housing.

Physical standards of the units vary, but all have party walls built of non-combustible materials such as concrete block-'conblock'. Other walls are locally manufactured woodwall panel, conblocks or fired clay bricks. In all cases, roofs will be constructed of corrugated

TABLE 1.6

MEDAN III PRELIMINARY PLOT AND BLOCK DISTRIBUTION

Main Plot Size (sq m)	Number of Blocks	Number of Plots per Block	Total Number of Plots 60 sq m	90 sq m	120 sq m	140 sq m	180 sq m	300 sq m
60 - 90	17	48-60 sq m Plots and 4-90 sq m Plots	816	68				
	1	24-60 sq m Plots	24					
90 - 120	102	28-90 sq m Plots and 4-120 sq m Plots		2856	408			
	1	16-90 sq m Plots		16				
120	47	36-120 sq m Plots			1692			
140	31	32-140 sq m Plots				992		
	1	16-140 sq m Plots				16		
180	42	24-180 sq m Plots					1008	
300	42	12-300 sq m Plots						504
Totals	284		840	2940	2100	1008	1008	504

TABLE 1.7

PLOT SIZES AND ON-PLOT HOUSING STANDARDS

Plot Type	Neighborhood Density (Persons/Hectare)	Plot Size (sq m)	Plot Distribution (%)	Superstructure Size (sq m)	Remarks
A	570	60	10	13	Subcore housing unit
B	429	90	35	21	Core housing unit
C	340	120	25	21	Core housing unit on larger plot
D	301	140	12	36	Complete low cost housing unit
E	236	180	6	45	Low cost housing unit
F	236	180	6	-	Middle income serviced plot
H	144	300	6	-	Upper income serviced plot
Average density		31.5 persons per hectare or 52.5 units per gross hectare.			

'zinc' roofing sheets. Windows consist of either locally manufactured wood shutters for the 13 square metre row house to wood framed windows utilizing locally manufactured glass. Details of these standards and unit costs are presented in Appendix A and summarized in Table 1.8.

TABLE 1.8

CORE HOUSE AND LOW COST HOUSING STANDARDS

Plot Type	Plot Size (sq m)	House Size (sq m)	Number	Type of Unit	Party Walls	Other Walls	Roof	Remarks
A	60	13	840	Row	Conblock	Woodwool	Zinc	Has individual water supply, electricity, shared MCK and 1 habitable room.
B	90	21	2940	Duplex	Conblock	Woodwool or Conblock	Zinc	Has individual water supply, electricity, shared MCK and 2 habitable rooms.
C	120	21	2100	Duplex	Conblock	Conblock	Zinc	Similar to "B"
D	140	36	1008	Duplex	Conblock	Woodwool	Zinc	Has individual water supply, electricity, individual bathroom, kitchen and 3 habitable rooms.
E	180	45	504	Duplex	Conblock	Conblock	Zinc	Has individual water supply, electricity, individual bathroom, kitchen, verandah, living room and dining area and two bedrooms.
F	180	-	504	-	-	-	-	Aimed at BTN financed housing. Housing standards left to individual household.
G	300	-	504	-	-	-	-	Upper income serviced plots. Housing standards left to individual households.

SECTION 2

SSCH/LCH PROJECT COSTS

2.1 TOTAL COSTS

The total project costs including price and physical contingencies are estimated at Rp.13,030.9 millions. The project costs minus contingencies, design and overheads are estimated Rp.7,500.6 million of which civil works is 77 percent; land, 16 percent; and community facilities 7 percent. The core houses and low cost houses comprise, of the base costs, the largest single element.

Price contingencies are 27 percent of total costs and were based on the following projected expected increases in project costs over the four-year period:

Year	Annual Rate of Inflation (%)	Percentage Adjustment over Base Year (%)
FY 1980/81	15	112
FY 1981/82	12	122
FY 1982/83	10	135
FY 1983/84	10	149
FY 1984/85	10	164

These figures have been arrived at by recognizing that the current rate of inflation in Medan (estimated at 26 percent per year) has probably peaked in July and August and since then has been decreasing at about 1.6 percent per month. Thus it is assumed that this decrease will remain at about 1.5 percent for the remainder of FY 1979/80 and yield an annual rate of inflation of 22 percent and continue to decrease thereafter as shown. The calculations of the effects of inflation assumes that costs will be spread evenly throughout the year except for the first year when they will be weighted towards the second half of the year. Thus the adjusted rates show the decreases in inflation compounded over the year. The same rates were applied for both foreign and local costs due to uncertainties about world inflation.

Physical contingencies were estimated at 15 percent of civil works and land costs. Although the costs of the land acquisition have been fixed at Rp.750 per square metre, physical contingencies were included on land costs to cover the costs of site works which, due to the lack of topographic surveys, cannot be estimated.

Perumnas overheads of 10 percent were treated as a cost to the project and were applied to the costs of land and civil works minus the costs of electricity supply which would be handled by P.L.N. The cost of the construction of community facilities were excluded from Perumnas overheads because these would be built by the Kotamadya with INPRES funds or would be built by local groups. Since Perumnas overheads at 10 percent are rather high and the composition of these overheads is undetermined, it was assumed that they would cover a portion of site supervision costs. Thus engineering design costs were reduced to six percent of base costs minus the costs of contruction of community facilities.

Interest on bridging finance during construction paid by Perumnas was assumed to be obtainable at a compound rate of 12.75 percent over a one-year loan period. This interest was calculated on the costs of civil works minus electricity supply since land acquisition would be financed through equity contributuons from the Government to Perumnas. Based on discussions with Perumnas, it was assumed that 50 percent of the bridging finance would come directly from the Bank of Indonesia at 12 percent and the remainder would be borrowed from commercial banks at a nearly commercial rate of 13.5 percent. Calculations of both interest and Perumnas overheads are shown in the notes to the affordability table (Table A.1).

The Medan III project phasing is shown in Table 2.2. At the request of Perumnas, the project was phased over five years to allow completion of 804 units in Medan II duirng FY 1980/81. In all cases, infrastructure is phased at the beginning of the program since it is necessary to open up the site prior to construction of core houses and low cost housing units. The 300 square metre plots were also phased at the beginning of the program to speed up the flow of project revenues to Perumnas since the bulk of the cross subsidies would be generated from these plots. Low income housing units were also phased early in the program to reduce the impact which inflation will have on their selling prices and to provide low income households with more rapid access to housing.

2.2 HOUSING UNIT COSTS AND SELLING PRICES

A preliminary analysis of housing unit costs and unit selling prices is shown in Table 2.3. The Table also shows the composition of internal cross subsidies generated through differential pricing of land sales. These subsidies are used to reduce the selling costs of the type A, B, and C plots aimed at households at, or below, the 50th percentile of household incomes. The primary source of these cross subsidies are the 300 square metre plots which would be sold to upper income groups at a profit of 124 percent and commercial plots which would be sold at a profit of 409 percent. For upper income plots caution was taken in developing

TABLE 2.1

MEDAN III
PRELIMINARY COST ESTIMATES

Plot Type	Plot Size (sq m)	Plot Distribution		Civil Works Cost (Millions Rupiah)			
		Percent (%)	Number	Roads and Foot Paths	Water Supply	Electricity	Superstructure
A[a]	60	10	840	40.5	21.5	19.5	262.1
B[a]	90	35	2940	190.2	100.8	91.2	1,481.8
C[a]	120	25	2100	191.0	69.4	62.9	1,058.4
D[a]	140	12	1008	102.3	37.4	33.9	870.9
E[a]	180	6	504	71.5	21.9	20.0	544.3
E.1	180	6	504	71.5	22.0	20.0	-
F[b]	300	6	504	125.4	38.5	34.9	-
Subtotal			8400	792.4	311.5	282.4	4,217.5

TABLE 2.1--CONTINUED

Item	Foreign	Local	Total
1. Civil Works			
Roads and foot paths	137.3	655.1	792.4
Water Supply	124.6	186.9	311.5
Electricity	141.2	141.2	282.4
Corehouses and low cost houses	801.4	3,416.1	4,217.5
Off-site infrastructure	3.5	16.7	20.2
Landcaping (160 hectares)	-	46.9	46.9
Solid waste (160 hectares)	13.8	37.4	51.2
Infrastructure commercial Plots	15.7	23.6	39.3
Subtotal civil works	1,237.5	4,523.9	5,761.4
2. Community Facilities[c]			
Health clinics @ Rp.11.5 million	2.8	8.7	11.5
Public buildings @ Rp.113.0 million	27.3	86.5	113.8
Markets @ Rp.100.0 million	24.0	76.0	100.0
Schools			
Primary 9 units @ Rp.6.0 million	13.0	41.0	54.0
SMP 2 unit @ Rp.92.7 million	44.5	140.9	185.4
SMA 1 unit @ Rp.74.5 million	17.9	56.6	74.5
	129.5	409.7	539.2
3. Land (160 hectares @ Rp.750/sq m)	-	1,200.0	1,200.0
4. Subtotal	1,367.0	6,133.6	7,500.6
Engineering design and Supervision[d]	207.5	138.2	345.7
Perumnas overheads[e]	-	653.1	653.1
Physical contingencies[f]	185.6	858.6	1,044.2
5. Total costs	1,760.1	7,783.5	9,543.6
6. Price contingency[g]	696.5	2,790.8	3,487.3
7. Total	2,456.6	10,574.3	13,030.9

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Notes to Table 2.1:

a. Core housing and low cost housing options. Infrastructure standards include individual water supply, MCK's shared by two households, foot-paths and low traffic intensity access roads, and the option to connect to electrical supply. Core houses would be built from alternative materials such as woodwool.

b. Serviced plots which would be sold to upper income groups to create cross subsidies for lower income group housing.

c. Only land would be supplied by Perumnas, the other costs would be met by INPRES or other sources.

d. Based on six percent of civil works only since Perumnas would be primarily responsible for site supervision during construction.

e. Based on the total costs of housing, but excluding community facilities. See the affordability table for details of the calculations.

f. Fifteen percent of civil works and land only since community facilities would be financed separately.

g. Price contingencies are based on 15 percent in year one, 12 percent in year two and 10 percent thereafter. They were calculated on the costs of civil works, land, and community facilities.

TABLE 2.2

MEDAN III EXPENDITURE PHASING (160 HECTARE SITE)

Item	Number of Units						Estimated Cost in Rp. x 10^6					
	80/81	81/82	82/83	83/84	84/85	Total	80/81	81/82	82/83	83/84	84/85	Total
MEDAN II	804											
MEDAN III												
Land (160 Ha.)							1200.0					1200.0
Off-site infrastructure							20.2					20.2
Plot Type A												
Infrastructure		840				840		62.0				62.0
Core Houses		420	420			840		131.0	131.1			262.1
Plot Type B												
Infrastructure		1764	1176			2940		174.6	116.4			291.0
Core Houses		970	970	1000		2940		488.9	488.9	504.0		1481.8
Plot Type C												
Infrastructure		1000	1100			2100		124.0	136.4			260.4
Core Houses		250	500	500	850	2100		126.0	252.0	252.0	428.4	1058.4
Plot Type D												
Infrastructure			504	504		1008			69.9	69.8		139.7
Core Houses			252	504	252	1008			217.7	435.4	217.7	870.8
Plot Type E												
Infrastructure			504	504		1008			93.5	93.4		186.9
Core Houses			126	252	126	504			136.1	272.1	136.1	544.3

TABLE 2.2--Continued

Item	Number of Units						Estimated Cost in Rp. x 10^6					
	80/81	81/82	82/83	83/84	84/85	Total	80/81	81/82	82/83	83/84	84/85	Total
Plot Type F												
Infrastructure		504				504		163.9				163.9
Core Houses										19.7	19.6	39.3
Commercial Plots												
Electricity		2144	2394	2508	1354	8400		82.2	73.5	82.9	43.8	282.4
Solid Wastes		2144	2394	2508	1354	8400		13.1	14.5	15.3	8.3	51.2
Landscaping		2144	2394	2508	1354	8400		12.0	13.4	14.0	7.5	46.9
Sub Total Medan III								1220.2	1377.7	1743.5	1758.6	6961.4
Engineering							276.6	17.3	17.3	17.3	17.2	345.7
Perumnas Overheads								114.3	180.5	229.9	128.3	653.1
Physical Contingencies							183.0	206.7	261.5	263.8	129.2	1044.2
Housing Totals Medan III												
Infrastructure		4108	3284			8400						
Housing Units		1640	2268	2256	1228	7392						
Costs							1679.8	1716.0	2202.9	2269.6	1136.1	9004.4
Community Facilities Medan III										313.9	225.3	539.2
Total Costs Medan III							1679.8	1716.0	2202.9	2583.5	1361.4	9543.6
Total Cost including Price Contingency							1181.4	2093.5	2973.9	3849.4	2232.7	13030.9

TABLE 2.3

MEDAN III
PROGRAM COST AND SELLING COSTS

Plot Type	Plot Size	Cost per Unit	Selling Price per Unit	Number of Units	Total Cost of Plots (Millions of Rupiah)	Total Selling Price of Units (Milions of Rupiah)	Percent Subsidy	Surplus or Loss
A	60	541,887	378,415	840	455.2	317.9	- 30.2	- 137.5
B	90	833,010	711,419	2,940	2,449.1	2,091.6	- 14.6	- 357.5
C	120	900,272	886,758	2,100	1,890.5	1,862.2	- 1.5	- 28.3
D	140	1,364,279	1,377,436	1,008	1,375.2	1,388.5	+ 1.0	+ 13.3
E	180	1,732,630	2,042,291	504	873.2	1,029.3	+ 17.9	+ 156.1
E.1	180	481,295	790,956	504	242.6	398.6	+ 64.3	+ 156.1
F	300	717,250	1,604.111	504	361.5	808.5	+ 123.7	+ 447.0
				8,400	7,647.3	7,896.6	+ 3.3	249.3
Commercial Plots (50,408 sq m @ Rp.7,000/sq m)			Infrastructure		39.8	39.8		
			Land		37.8	352.8		
			Total		77.1	392.1	408.6	315.0
Subtotal					7,724.4	8,288.7		
Engineering Design					345.7			- 345.7
Total Development Costs					8,070.1	8,288.7	2.7 %	+ 218.6

* The costs of electricity have been omitted from both unit costs and selling prices as these costs are recovered through user charges. However, the costs of interest during construction and Perumnas overheads have beeen included in both costs and selling prices.

these cross subsidies to keep the unit costs of land below Rp.3,000 per square metre (the current selling price of residential plots outside the city centre) so that these plots would still be priced below the market price and would therefore sell rapidly. Similar caution was also taken in the development of the selling prices of commercial plots to keep these below Rp.10,000 per square metre.

Although both price and physical contingencies were excluded from this analysis (since it is assumed that they would be applied equally to unit costs and selling prices as is currently done), the project should still generate surpluses which would enable Perumnas to replicate the project. The project's impact on Perumnas is more fully discussed in the financial analysis in Section 4.

SECTION 3

PROJECT IMPLEMENTATION/ORGANIZATION PROCEDURES

3.1 SELECTION OF BENEFICIARIES

Beneficiary selection up to now has been relatively simple as practically all projects have been earmarked for government or military workers whose employers negotiate with developers, assist in the preparation of loan applications, and collect monthly payments (through deductions from wages), passing the money collected directly to BTN. However, as previously noted, the public employeee market is becoming saturated, and it is recommended that Perumnas and BTN housing be made available generally to households who do not already own a house, particularly low income households.

This change of policy will entail changes in the system and method of selection of beneficiaries. Thus, the following broad suggestions are made.

A general housing waiting list should be opened in Medan whereby applicants could note their interest, and state their qualifications and housing preferences. The advantage of this system is that it should act as a guide to future housing demand. However, it may appear impersonal and, without active follow up, result in long-waiting periods which would frustrate potential buyers.*

Certain criteria will have to be established in addition to waiting lists to aid in the selection of beneficiaries. At present, Perumnas housing is limited to married persons with children. While these persons should be given priority, if houses are not selling rapidly, they should be made available to persons without children, particularly couples who may wish to acquire a house prior to starting a family. This would also support family planning policies.

* Singapore has a two-year waiting list which it finds works well and which it does not plan to shorten. It is a good guide to demand, aids efficient planning, and results in little delay between completion of construction and occupancy. Such a waiting list however would have to be tailored to meet Indonesian conditions.

Special conditions will need to be introduced to encourage self-employed persons to seek Perumnas housing, while minimizing the risk involved to BTN. To do so, it is suggested that self-employed persons should be required to:

1. Have a savings account with BTN for at least three years or have opened a bank account for at least three years and be able to provide a bank reference

2. Be able to provide evidence that their business is in a healthy condition

3. Be able to make the downpayment required

4. Failing to meet the above requirements, they should be willing to open a bank account and agree to have repayments deducted from their account and paid directly to BTN.

Employed persons should be able to prove that they have been employed for at least five years, although not necessarily with the same employer, and be able to provide references from their current employer that their salary is sufficient to meet loan repayment conditions. However, total household income, not salaries alone, should be used to determine the ability to repay housing loans. Whenever possible, beneficiaries should be encouraged to have mortgage payments paid directly to BTN through automatic deductions from savings accounts. This would also have an additional benefit of encouraging beneficiaries to open savings accounts.

3.2 TIMING OF HOUSE SALES

At present, Perumnas houses are not purchased until completed.* However, if the selling process could be accelerated, it would generate an earlier flow of funds to the project and cut down on the risks inherent in selling to lower income groups by starting the sale of units earlier in the construction process. To do so, households could be required to make a firm commitment to buy nine months before they could move into their house by making all or part of the downpayment prior to completion of the housing project. While there may be some resistance to this as households may want to buy finished products, in the case of core houses where households are expected to make improvements anyway, the validity of this argument seems minimal.

Therefore, it is recommended that sales efforts be mounted early in the development process. These could consist of a hard sales campaign, perhaps a mobile sales office displaying pictures and photos of completed units and models of typical neighborhoods. If the campaign is successful, then cash will flow to Perumnas earlier in the form of downpayments and Perumnas' housing market will be assured.

* Presently Perumnas houses are rented for a two-year perod after completion as previously noted. In the future Perumnas intends to stop renting and sell units directly to beneficiaries.

Since it is now customary to pay rents for one or two years in advance of purchase of Perumnas housing, payment of downpayments in advance of occupancy should not meet resistance by the housing market. Furthermore, advance payment would be a form of security, particularly for self-employed persons where no guarantee from employers can be obtained. If low income beneficiaries have trouble meeting these downpayments, they could be allowed to pay in two installments.

Probably the most satisfactory method of repayment of housing loans would be for BTN to open a branch bank at Medan III which would include a mortgage payment counter as well as a savings facility. Back-up staff might also be required to collect arrears directly through house calls, since it is important not to let repayments get into arrears and to ensure prompt collection through good monitoring.

3.3 MONITORING AND ARREARS

Every step should be taken to ensure that arrears are minimized. This will require consistent monitoring and early help to households who run into trouble. Monitoring is more important than a cumbersome selection procedure. As previously mentioned, in order to help control payment, BTN should open a small branch office at each housing site which would act as a savings bank and a credit payment point. Close contact with the community should also assist in controlling the collection of mortgage payments.

In the event of severe defaulting in payments, say greater than 1.5 to 2.0 percent of all loans granted, there should be enforcement of eviction and repossession procedures by BTN. Arrears, while less severe than defaults since it is presumed that the mortgagee will continue payments, should also be closely monitored. Arrears of five percent have been included in the financial analysis since BTN is new to the mortgage market and has not yet provided mortgages on the open market and thus has not yet established arrears trends. Furthermore, since enforcement of repayment of other types of loans has been lax, there is little historical basis from which arrears and default policy could be established. Therefore, while selection of five percent is arbitary, it is used as a guideline since arrears greater than five percent affect the viability of the project.

3.4 COMMUNITY STRUCTURE AT MEDAN III

In Indonesia, the local community structure is traditionally associated with government structure, and so there is a link between kampung and mayor. The kampung community structure of Kepala (head) Kampung and Kepala Loring provides a suitable mechanism for implementing small planning and building programs, collecting sums of money, and administering funds on behalf of a higher echelon of government.

As the system appears to work effectively, and the Kepala Kampung and Lorong appear to have a good grasp of their community's characteristics, needs and abilities, it is proposed that a similar grass - roots structure should be encouraged to develop at Medan III, and steps taken to set up a Kampung and Lorong system. Consultation between the housing authorities and the Kepalas is important, particularly where problems arise.

In addition, in response to government decree, most kampungs have already formed two committees to carry out the planning and implementation of local community programs. There are Lembaga Masyarakat Desa (LMD) and Lembaga Sosial Desa (LSD). It is probable that such committees would have many potential functions to perform, particularly in the fields of maintenance of open spaces, lanes, drains etc., though their resources are limited. The Kepala Lorong should also be encouraged to mobilize and organize residents into helping with community work and maintenance.

Approximately 2,000 houses may be expected to form into one kampung. Therefore, in time, about four kampungs should emerge at the Medan III site, depending on the design of the Medan III estate. Each kampung will require premises from which to run their administration.

3.5 SMALL SCALE INDUSTRIES PROMOTION

The Medan III sites and services low cost housing project will support small scale enterprises in two significant ways: it provides up to five hectares of area (three percent of the site) for development of small scale enterprises within the project; and it will provide significant opportunities for small contractors and building materials manufacturers during construction of the project.

Regarding the first, the project will provide space for up to 1,600 workers in small scale enterprises within the site. These enterprises will mainly be commercial serving the daily needs of the community such as shops selling food and light industry such as tailors, shoe-makers, repair shops and food processors. As is the practice within other small industries within Medan, it is expected that the bulk of these enterprises will be family owned and will utilize family workers as well as provide employment for women. These enterprises will qualify for assistance from other types of government assistance to small business such as the KIP and KMKP programs since the firms will be able to purchase the plots they occupy. Thus they will be able to meet collateral requirements. The project also assists these enterprises through the provision of infrastructure such as water supply, electricity, solid waste collection, and suitable access roads.

Since over 70 percent of construction employment is unskilled, the construction of Medan III is expected to provide a major source of employment. Roughly 1,000 new jobs will be created as a result of direct emoloyment on the site. Furthermore, since households will be expected to complete construction of their units, an additional 1,600 jobs are

expected to be generated among very small contractors and building materials manufacturers. This group will consist primarily of carpenters and masons who are hired on a daily basis by individual home-owners to build additional rooms, construct boundary walls and perform other small construction jobs.

Individual construction contracts are expected to range between Rp.500 and 900 million and attract between eight to fifteen small contractors to the site. However, the actual number of contractors participating in the construction will not be determined until actual tender. To date, Perumnas and BTN housing projects have provided contracts for about 20 contractors. It is expected that construction of Medan III will probably draw from this pool of housing contractors.

The bulk of the building materials utilized for construction of Medan III - type housing comes from small domestic producers. These manufacturers can be assisted through placing bulk orders directly with them to allow them to expand their production to meet the demands placed on them by the project. Advance bulk orders will allow them to obtain credit facilities from commercial banks to invest in plant and equipment to modernize their operations. They will also be able to benefit from other small scale industry programs.

SECTION 4

FINANCIAL ASSESSMENT OF PROPOSED SSCH/LCH PROJECT

The project has been designed to meet Medan's requirements for additional housing and to provide an estate with necessary urban services such as schools, markets and community buildings and spaces. Two basic guidelines have been adopted in the project's design: first, the components should be affordable by the beneficiaries; and second, the costs should be fully recovered for each component, either directly from beneficiaries or indirectly through internal cross subsidies.

The implications of these costs have been considered from two points of view: that of the implementing agency, Perumnas, and that of the beneficiaries.

Table 4.1 shows the proposed phasing for completion of the housing and sale of plots. Smaller plots designated for lower income groups are generally phased earlier in the program to provide housing for groups which have not been served from public housing programs. The repayment schedule shown in Table 4.2 follows this pahsing. The amount of cross subsidy required and the source of those cross subsidies is shown in Table 4.3. As shown in Table 4.3, the project generates small surpluses which improve its financial viability and ensure replicability.

4.1 REPAYMENT

The project was analyzed from Perumnas' point of view due to concern over Perumnas' cash position and to ensure that the project would not incur losses to Perumnas. Early payment of downpayments, while ensuring the project's market, also greatly improves the project's cash flow as revenues accrue to Perumnas much earlier in the project cycle. The effect of introducing early cash downpayments is shown in Table 4.4. These payment would be made directly to Perumnas by prospective project occupants.

Table 4.4 also illustrates how revenues will accrue to Perumnas from BTN. Although the impact of BTN financing of Perumnas housing has thus far been minimal, if BTN is viewed as the purchaser, house payments would flow from BTN to Perumnas as shown. Since mortgage finance will not be available for commercial plots or the 300 square metre plots (type F), it is anticipated that purchasers of these plots would pay Perumnas directly upon completion of those plots. The sale of the commercial plots is phased towards the end of the program since it is anticipated that the market for these plots will not materialize until other project beneficiaries begin living on the project.

TABLE 4.1

PROPOSED PHASING FOR HOUSING COMPLETIONS,
SALEABLE PLOTS AND COMMERCIAL LOTS
(160 HECTARES)

			FY 1981/82	FY 1982/83	FY 1983/84	FY 1984/85	FY 1985/86	Total	% plot Distribution
Completed Houses	Plot Size sq m	House Size sq m							
A	60	13	420	420	-	-	-	840	10
B	90	21	970	970	1,000	-	-	2,940	35
C	120	21	250	500	500	850	-	2,100	25
D	140	36	-	252	504	252	-	1,008	12
E	180	45	-	126	252	126	-	504	6
Total houses	180	-	1,640	2,268	2,256	1,228	-	7,392	-
Plots: E.1	300	-	-	252	252	-	-	504	6
Plots: F		-	300	204	-	-	-	504	6
Commercial Lots Hectares		-	-	-	1.5	2.0	1.5	5.0	

Note: This table sets out the number of houses by year of construction and type of house for the 160 hectare site. In addition there are 1,008 serviced plots to be sold and five hectares of land for commercial development.

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TABLE 4.2

REPAYMENT SCHEDULE FOR EACH UNIT OF HOUSING BY TYPE
RUPIAH THOUSAND

	Plot Size sq m	Selling Price	Deposit (10 % of selling price)	Payment due (credit 90% of selling price)	Annual Loan Repayment
House Type					
A	60	378.4	37.8	340.6	54.7
B	90	711.4	71.1	640.3	84.6
C	120	886.8	88.7	798.1	105.5
D	140	1,377.4	137.7	1,239.7	163.8
E	180	2,042.3	204.2	1,838.1	242.8
E.1	180	791.0	79.1	711.9	-
Plots F	300	1,604.1	160.4	1,443.7	-
Commercial Lots per sq m		7,000	700	6,300	-

Notes: The following payment conditions have been assumed

- Housing : 10% deposit on start of construction; 90% loan repaid over 20 years at 12% p.a. beginning on completion of housing unit.
- House Plots : 10% deposit, with payment on completion of sale.
- Commercial lots : 10% deposit, with remainder paid on completion of sale.

Notes: This table sets out the repayment requirements of each unit. Note the deposit would be paid direct to Perumnas; the 90 percent outstanding would be transferred from BTN to Perumnas upon completion of construction, and the beneficiaries would repay at the amount shown each year in equal installments comprising principal repayment and interest to BTN.

TABLE 4.3

PROGRAM COST AND SELLING COST

Plot Type	Plot Size	Cost Per Unit	Selling Price Per Unit	Number of Units	Total Costs of Plots (Millions of Rupiah)	Total Selling Price of Units (Millions of Rupiah)	Percent Subsidy	Profit or Loss
A	60	541,887	378,415	840	455.2	317.9	- 30.2	- 137.5
B	90	833,010	711,419	2,940	2,449.1	2,091.6	- 14.6	- 357.5
C	120	900,272	886,758	2,100	1,890.5	1,862.2	- 1.5	- 28.3
D	140	1,364,279	1,377,436	1,008	1,375.2	1,388.5	+ 1.0	+ 13.3
E	180	1,732,630	2,042,291	504	873.2	1,029.3	+ 17.9	+ 156.1
E.1	180	481,295	790,956	504	242.6	398.6	+ 64.3	+ 156.1
F	300	717,250	1,604,111	504	361.5	808.5	+123.7	+ 447.0
				8,400	7,647.3	7,896.6	+ 3.3	+ 249.3
Commercial Plots (50,408 sq m @ Rp.7,000 sq m)		Infrastructure			39.8	39.8		
		Land			37.8	352.8		
		Total			77.1	392.1	408.6	+ 315.0
Sub Total					7,724.4	8,288.7		
Engineering Design					345.7			- 345.7
Total Development Costs					8,070.1	8,288.7	2.7 %	+ 218.6

* The costs of electricity have been omitted from both unit costs and selling prices as these costs are recovered through user charges.

Notes: This Table sets out the unit costs, the proposed selling prices according to house type, and the effects of cross subsidisation.

Variations in the plot distribution shown above due to unforseen topographic conditions resulting from the lack of topographic surveys can be accommodated through increasing the selling prices of plot types D,E,E.1, and F. These increases should be weighted so that the larger serviced plot bear the bulk of the increases. By making these changes, the cross subsidies needed for the lower income plots, types A,B, and C, can be maintained. Thus the project's total financial viability will remain unchanged.

TABLE 4.4

SCHEDULE OF REVENUES ACCRUING TO PERUMNAS
RUPIAH MILLION

	FY 1981/82			FY 1982/83			FY 1983/84			FY 1984/85			FY 1985/86			Total
	No.	Deposit	Remainder	No.	Deposit	Remainder	No.	Deposit	Remainder	No.	Deposit	Remainder	No.	Deposit	Remainder	Revenue
Houses:																
A	420	15.9	-	420	15.9	143.1	-	-	143.1	-	-	-	-	-	-	318.0
B	970	69.0	-	970	69.0	621.1	1000	71.1	621.1		-	640.3	-	-	-	2,091.6
C	250	22.2	-	500	44.4	199.5	500	44.4	399.1	850	75.4	399.1	-	-	678.4	1,862.5
D	-	-	-	252	34.7	-	504	69.4	312.4	252	34.7	624.8	-	-	312.5	1,388.5
E	-	-	-	126	25.7	-	252	51.5	231.6	126	25.7	463.2	-	-	231.6	1,029.3
Plots E.1	-	-	-	252	19.9	-	252	19.9	358.8	-	-	-	-	-	-	398.6
Plots F	300	48.1	-	204	32.7	433.1	-	-	294.5	-	-	-	-	-	-	808.4
Commercial Lots	-	-	-	-	-	-	30%	11.8	105.8	40%	15.7	141.2	30%	11.7	105.8	392.1
Total	1940	155.2	-	2724	242.3	1,396.8	2508	268.1	2466.4	1228	151.5	2,268.6	-	11.7	1328.3	8,288.9

Notes: House : Deposit 10% paid at time of constructin by beneficiary. Perumnas reimbursed remainder by BTN on completion.
House Plots : Initial deposit 10% - remainder paid by purchaser when sites completed.
Commercial Lots : Initial deposit 10% - ramainder on completion of sale; assumes 30% sold in 1983/84; 40% in 1984/85; 30% in 1985/86.

Notes: This Table shows the repayment schedule of monies accruing to Perumnas, assuming the deposit is [illegible] prior to completion of houses, and Perumnas receives the remainder after completion of construction.

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Upon completion of the project, Perumnas should show a small surplus or profit as the project has a financial rate of return of 1.9 percent as shown in Table 4.5. While this does not make the project viable at commercial rates, it would enable the project to be replicated. Although the Table does not show the impacts of inflation, it is assumed that both Perumnas and BTN would increase selling costs to take account of prevailing rates of inflation and to cover actual costs incurred, thus maintaining the project's financial rate of return.

4.2 PAYMENT BY BENEFICIARIES

Tables 4.6 and 4.7 show the financial viability of the project from the point of view of the beneficiaries and BTN. The project is definitely viable, even if the community facilities are included in the project's costs. At the proposed 12 percent annual interest rate charged to beneficiaries, the project yields a financial internal rate of return of 6.99 percent. No revenues are shown against the community facilities even though they include markets, which would eventually generate revenues.

4.3 SOURCES OF FINANCE

It is proposed that a loan should be obtained from an international agency to finance up to 50 percent of the project's costs.* Foreign costs which account for less than 20 percent of total costs would be fully financed by the loan as would approximately one-third of the remaining costs. Accordingly, it has been assumed that a loan of Rp.6,414 million (US$ 10.3 million) would be obtained in FY 1981/82, the second year of the program. Expenditure in FY 1980/81 is mostly on land and off-site infrastructure and would be funded locally.

All other domestic costs are to be funded internally from GOI, and would amount to a capital requirement of Rp.6,617 million. Funds for the education and community components may come from INPRES funds and be directed to the Kotamadya for implementation. Details of the required financing are shown in Table 4.8.

The conditions under which BTN and Perumnas will have access to funds are as yet uncertain. Although to date the Bank of Indonesia has loaned funds at zero interest rate to BTN for Perumnas projects, BTN may have access to a mix of funds at different interest rates.

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* Although negotiations are not complete, the project assumes foreign financing from the International Bank for Reconstruction and Development.

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TABLE 4.5

PERUMNAS TOTAL COSTS, REVENUES AND NET REVENUES

Year	Total Costs Rp. Million	Total Revenues Rp. Million	Net Revenues Rp. Million	Discounted Net Revenues Rp. Million 10%	4%
Year					
1. FY 80/81	1,571.5		- 1,571.5	- 1,428.7	- 1,511.1
2. FY 81/82	1,421.2	155.2	- 1,266.0	- 1,046.3	- 1,170.5
3. FY 82/83	2,000.5	1,639.1	- 361.4	- 271.5	- 321.3
4. FY 83/84	2,052.8	2,734.5	+ 681.7	+ 465.7	+ 582.7
5. FY 84/85	1,024.7	2,420.1	+ 1,396.0	+ 866.7	+ 1,147.4
6. FY 85/86	-	1,340.0	+ 1,340.0	+ 756.4	+ 1,059.0
Total	8,070.1	8,288.7	218.8	- 657.7	- 213.8

Notes: Internal Rate of Return 1.87 percent.

1. It has been possible to include a small profit in the project. To date Perumnas has been operating on the concept of an internal rate of return of zero. The FIRR of 1.87 percent hardly makes the project viable but is an improvement on past practice.

2. Both revenues and costs exclude price and physical contingencies which, as appropriate, would be added to both at the time of project sale. However both include Perumnas overheads and interest during construction.

Notes: This table shows total costs and total revenues allowing for arrearsof 5 percent. A small profit was allowed and this is reflected in the positive discount rate which gives an FIRR of 1.87 percent.

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TABLE 4.6

ANNUAL REPAYMENT SCHEDULE TO B.T.N. FOR SITES AND SERVICES
RUPIAH MILLION

Year	A	B	C	D	E	E.1	Total Revenues	Defaults (5%)	Total Revenues Less Defaults And Arrears
1. FY 80/81	-	-	-	-	-	-	-	-	-
2. FY 81/82	18.9	82.7	26.1	-	-	-	128.0	-	128.0
3. FY 82/83	37.8	164.1	79.1	-	-	-	281.0	14.1	266.9
4. FY 83/84	37.8	248.7	131.8	30.6	30.6	47.4	526.9	26.3	500.6
5. FY 84/85	37.8	248.7	221.5	113.2	91.8	47.4	760.4	38.0	722.4
6. FY 85/86	37.8	248.7	221.5	154.5	122.4	47.4	832.2	41.6	790.6
7-22	37.8	298.7	221.5	154.5	122.4	47.4	832.3	41.6	790.7
23	18.9	166.7	195.1	154.5	122.4	47.4	705.0	35.3	669.8
24	-	84.6	142.4	123.9	91.8	47.4	490.1	33.5	456.6
25	-	-	89.6	41.3	30.6	-	161.5	8.1	153.4

Assumptions: A to E repayment varies according to house size, deposit + annual repayment. Deposit paid during construction; loan 90 percent of house price repaid over 20 years at 12% p.a. 5% deducted from year 3 on to represent defaults and arrears in payment BTN revenues on E.1 plots are shown since it is anticipated that BTN would finance mortgage for construction of housing on these plots.

Notes: This table shows the repayment schedule by beneficiaries under the following assumptions:

1. Deposit of 10 percent paid during construction.
2. 90 percent of house purchase price paid after obtaining credit from BTN under following assumed conditions :
   a. interest rate of 12 percent a year
   b. repayment period over 20 years.
   c. no grace period.

TABLE 4.7

BTN TOTAL PROJECT COSTS INCLUDING COMMUNITY FACILITIES AND BENEFICIARIES MORTGAGE REPAYMENTS (RUPIAH MILLION)

Year	Total Costs Including Community Facilities	Total Revenues Less 5 % Default	Net Revenues	Discounted at 9%
1	1,517.5	-	- 1,517.5	- 1,392.3
2	1,421.2	128.0	- 1,293.2	- 1,088.5
3	2,000.5	266.9	- 1,733.6	- 1,338.1
4	2,366.7	500.6	- 1,866.1	- 1,322.0
5	1,249.4	722.4	- 527.0	- 349.0
6	-	790.6	+ 790.6	+ 471.4
7-22	-	790.7	+ 790.6	+ 3,918.6
23	-	669.8	+ 669.8	+ 92.3
24	-	456.6	+ 456.4	+ 57.7
25	-	153.4	-	+ 17.8
Total				- 932.7

Internal Rate of Return: 6.99 percent.
Community costs of 539.2 million include Rp.313.9 in FY 1983/84 and Rp.225.3 million in FY 1984/85. Revenues unchanged.
Years 7-22 show the annual revenues and annual net revenue, but the discounted figure is for the total revenues accruing in those years.

This table shows the total revenues less lost revenues resulting from default on payments of five percent, discounted to calculate the financial internal rate of return (FIRR) of the whole project. This has been calculated over a 20 year period for housing - assumed to be one-third of the life of the house. No figures for maintenance costs are shown as these are assumed to be recovered at cost without profit and will therefore have a net value of 0, and will not affect the project's viability. The table includes the cost of community facilities. Infrastructure replacement costs are not shown here for they are assumed to be included in the infrastructure components evaluation. Roads and solid waste maintenance costs have been included in the maintenance charge.

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TABLE 4.8

SSCH/LCH SOURCES OF FINANCE
RUPIAH MILLION

	Total Finance Required	Foreign Lender	GOI
FY 80/81	1,881.4	-	1,881.4
FY 81/82	2,093.5	1,627.2	466.3
FY 82/83	2,973.5	1,703.1	1,270.8
FY 83/84	3,849.4	1,973.9	1,875.5
FY 84/85	2,232.7	1,109.6	1,123.1
Total	13,030.9	6,413.8	6,617.1
% of Total	100.0	49.2	50.8

4.4 LOAN CONDITION AND DEBT REPAYMENT TO GOI

The following loan conditions were assumed with respect to the portion of the loan which would be foreign financed:

1. The total loan sum would be Rp.6,414 million.

2. Repayment would be in equal installments comprising principal and interest.

3. The repayment period would be 25 years excluding a five-year grace period during which interest would be waived.

4. An interest rate of 8.5 percent annually would be charged by the foreign lender and would also incur Bank of Indonesia's on-lending fee of 0.25 percent, thus totalling 8.75 percent a year.

Under these conditions, the annual repayment sum would be Rp.639 million. If the loan is taken out in FY 1981/82, repayment would start in FY 1986/87.

4.5 MORTGAGE LOAN CONDITIONS

It is anticipated that BTN would receive financing for the mortgage loans from the Bank of Indonesia at 8.75 percent annual interest under the conditions stated above. Since BTN has not granted mortgage loans in the open market, and therefore has not established arrears and default performance trends, it is proposed that it adds an additional 0.25 percent into its mortgage loan interest rates to cover potential losses. This combined with a three percent spread between borrowing and on-lending rates to cover other BTN costs in servicing these loans would bring the interest rates on the mortgage loans to 12 percent annually. As previously stated, financing

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would be available for 90 percent of housing costs and would be over a loan period of 20 years.

It should be noted that these proposals represent a reduction in the spread between BTN's borrowing and lending practices since BTN now enjoys a five percent spread. It is felt that this current spread is unnecessarily high and could be reduced through more efficient banking operations.*

4.6 CASH FLOW STATEMENT

Using the schedule for finance outlined above, a cash flow statement has been prepared for the program and is set out in Table 4.9. Since project costs include estimates of physical and price contingencies, these have also been applied to the selling prices of the residential and commercial plots although thus far these have not been applied in other portions of the financial analysis. Interest during construction which would be paid by Perumnas has also been included. If payments do not fall seriously into arrears, there will be a positive cash flow in each year of the program which would enable the program to be replicated.

4.7 SERVICE AND MAINTENANCE CHARGES

It is understood that, in the future, Perumnas and not the municipality will be responsible for operating and maintaining the housing estates.

To handle such responsibilities Perumnas will require a site office and small staff. Charges should not exceed total costs and should be increased in line with inflation, and be collected regularly - preferably monthly.

Perumnas will be responsible for maintaining public areas including roads, open spaces, solid waste collection and drainage clearance, contracting services out as appropriate.

The present monthly charge is Rp.800 per house. It is considered that this sum will not be sufficient in future.

In future, it is proposed that service charges should be related to house type and plot size. The service charge has been designed to fully recover costs including administrative expenses, but without profit. It is suggested that all houses at the Medan III site should receive the same level of solid waste collection, but the road maintenance charge will vary with the level of service.

The recommended charges at January 1980 prices are given in Table 4.10.

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* It has been proposed that BTN would be the recipient of technical assistance under the World Bank loan to improve its banking operations. (See Volume III, Appendix A).

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TABLE 4.9

SSCH/LCH CASH FLOW STATEMENT
(MILLION OF RUPIAH)

	FY 80/81	FY 81/82	FY 82/83	FY 83/84	FY 84/85	FY 85/86
Source						
Sale of houses and residential plots*	-	217.7	2,544.7	4,484.1	4,268.4	2,506.4
Commercial lots*	-	-	-	201.5	295.9	243.4
Total	-	217.7	2,544.7	4,685.6	4,564.3	2,749.8
Loan	-	1,627.2	1,703.1	1,973.9	1,109.6	-
Government Equity/ Contribution	1,881.4	466.3	1,270.8	1,875.5	1,123.1	-
Total Sources	1,881.4	2,311.2	5,518.6	8,535.0	6,797.0	2,749.8
Applications						
Project Costs						
Land	1,200.0	-	-	-	-	-
Other costs including contingencies *	681.4	2,093.5	2,973.9	3,849.4	2,232.7	-
Interest during construction	-	104.8	183.5	222.6	128.2	-
Total Applications	1,881.4	2,198.3	3,157.4	4,072.2	2,360.9	-
Net Cash Flow (outflow)	-	112.9	2,361.2	4,462.8	4,436.1	2,749.8
Cash Balance	-	-	+ 112.9	+2,474.1	+6,936.9	11,373.0
Cash Balance End	-	+112.9	+2,474.1	+6,936.9	+11,373.0	14,122.8

* Includes physical and price contingencies which were applied in the same the same fashion as they were applied to costs so that assumptions for sources of funds would equal those for applications for funds.

TABLE 4.10

RECOMMENDED MONTHLY SERVICE CHARGES
FOR HOUSEHOLD AND ESTIMATED REVENUES

	Monthly Charge	Total Monthly Monthly Revenues Accuring from All Houses
House Type:		
A	Rp. 800	Rp. 672,000
B	Rp. 1,060	Rp. 3,116,400
C	Rp. 1,175	Rp. 2,467,500
D	Rp. 1,265	Rp. 1,275,120
E	Rp. 1,500	Rp. 1,512,000
F	Rp. 2,660	Rp. 1,340,640
Commercial lots per hectare	Rp.94,600	Rp. 473,000
Total		Rp.10,856,660

Notes to table:

1. The rates for house type A to F have been charged according to estimated costs, except for a small element of cross - subsidy in favour of house type A - estimated at Rp.837 a month, and recovered from other house types, mostly from house type E.
2. Commercial lots have been estimated according to the level of service. Solid waste cost was estimated to the daily generation of 0.1 tonnes per hectare at Rp.8,000/tonne. This is half the estimate of city centre commercial solid waste generation.

The total estimated yield is Rp.10.9 million in a year. These rates will need revision to allow for inflation.

It is proposed that the service charge should be written into the contract, including the right to vary the charge from one year to the next according to changes in costs or the level of service. Payment would be due to Perumnas. However in order to simplify the collection procedures, some system of joint payment of service charge and loan repayment could be considered.

SECTION 5

SSCH/LCH ECONOMIC ASSESSMENT

5.1 INTRODUCTION

An assessment of the project's economic costs and benefits was made to determine its viability in terms of its beneficiaries and the community. This assessment was made over the period of the project's implementation as this is the period when major costs and benefits occur. Other costs such as transport costs will tend to diminish after the sixth year as employment is generated on and in the vicinity of the project. Maintenance of housing is not a significant cost until after the sixth year of the project, at which time its impact on the project's economic internal rate of return will be small and therefore has been excluded. A summary of the project cost and benefit analysis is given in Table 5.1.

This assessment shows that the project is viable as it has an economic internal rate of return of 18.4 percent. The following sections discuss the assumption made regarding economic costs and benefits.

5.2 COSTS

Certain other costs in addition to land and civil works were attributed to the project during the economic assessment, such as increased transport costs which individual households might pay due to the increased distances they would travel to work and shopping and completion of core houses which were not attributed to the financial assessment. In the first case, although there is limited development around the proposed site, there are not yet sufficient employment opportunities in close proximity to the site to support households living on the site. Thus for the first six years of the project's life, it is expected that the bulk of the project beneficiary households will have to travel to the centre of Medan for employment, and possibly shopping, although the latter should be less frequent as the site will provide markets and shopping areas serving daily needs.

The distance from Medan's centre to the Medan III estate is 10 kilometres. Since there are presently only limited employment opportunities near to the site and commercial and small scale industrial enterprises within the site are not expected to establish themselves to any significant extent until after the project's sixth year of occupancy, it was assumed that at least one person from each housing unit, (probably the household head), would make a daily trip to the centre of Medan for employment purposes. Furthermore, the following assumptions were made as to the composition of the mode of travel of those employment trips: 60 percent

TABLE 5.1

SSCH/LCH ECONOMIC COSTS AND BENEFITS
(RUPIAH MILLIONS)

Year	Economic Costs					Economic Benefits				
	Construction Plus Land	Electricity	Completion of Core Houses	Transport Costs	Total Costs	Increase in Land Values	Housing Values	Total Benefits	Net Benefits	Discounted Net Benefits (25%)
1. FY 80/81	-	-	-	-	-	-	-	-	-	-
2. FY 81/82	1572.5	73.0	-	-	1645.5	872.7	-	872.7	- 772.8	- 618.2
3. FY 82/83	2350.9	66.0	833.8	108.3	3359.0	1336.0	1828.4	3164.4	- 194.6	- 124.5
4. FY 83/84	2513.7	73.0	1094.2	266.3	3947.2	1312.8	2299.8	3612.6	- 334.6	- 171.3
5. FY 84/85	1971.2	41.0	793.9	431.2	3237.3	762.0	3375.4	4137.4	+ 900.1	368.7
6. FY 85/86	23.1	-	295.6	521.2	839.9	113.7	1968.1	2081.8	+ 1241.9	407.0
Total	8431.4	253.0	3017.5	1327.0	13028.9	4397.2	9471.7	13868.9	+ 840.0	- 138.3

Economic Internal Rate of Return 18.35 percent
Net present value at 25 percent discount rate Rp. -138.3 million

a Physical contingencies were excluded as they would be applied to both costs and benefits and would be self-cancelling.
b Construction of 45 sq m houses is included in the costs of completion of core houses and housing values for plot types E.1 and F.
c Increased land values include an initial increase of Rp.2,500/sq m due to change in use and estimated net annual real increases of 10 percent.

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of the trips would be made by bus, 35 percent by motorbike and 5 percent by car. These assumptions roughly follow current vehicle ownership trends discussed in Section 6 of Vol III, The Long Term Urban Development Plan Report.

An estimated 45 percent of Medan's work force presently use buses as their mode of transport.[a] However, since over 70 percent of the project households will have incomes at, or below, the median income, it was assumed that at least 60 percent would use buses for transport to work. Thus they incur an average round trip daily bus fare of Rp.100[b], which amounts to an annual transport cost of Rp.113 million.

The present fare from bus stops near the Medan III site to the centre of Medan is Rp.200 per person per single trip. Thus 60 percent of the project household would incur daily travel costs of Rp.400. The weekly costs of operating motorbikes are estimated at Rp.450, while the operating costs of automobiles is placed at Rp.4,700 per week.[c] Thus, based on the assumptions about the composition of the mode of travel to work, the annual transport cost for households living on Medan III would be Rp.634.2 million. This, net of the estimate of current transport costs of Rp.113 million which households now incur, yields an annual incremental transport cost of Rp.521.2 million for the first six years of the project's life.

One of the basic assumptions of all core housing and sites and services schemes is that project households through their own efforts will complete their housing units through expenditure of their own resources. Therefore, in considering the economic costs of the project, the additional costs which a household might incur in completing houses were added to basic construction costs. It was estimated that the completion costs of the houses would require an additional expenditure of Rp.24,000 per square metre. However, since low income households usually self-construct their own construction projects, contractor profits and overheads as well as contractor bridging finance were subtracted from the adjusted costs of these additions.[d]

The upper income serviced plots, for similar reasons, require some form of housing on them before they become habitable. Therefore, the costs of adding a 45 square metre low cost house were added to the costs of Type E.1 and F plots. However, no assumptions were made about the construction of shops and markets. The schedule of these completion costs is shown in Appendix A. The costs of all completions have been adjusted to remove taxes and customs duties to arrive at economic costs.

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a Section 6 of Vol III, The Long Term Urban Development Plan Report.

b Single bus fares tend to range from Rp.20 to Rp.50 per single trip per person. See Table 6.2 of Vol III.

c In both cases, only petrol costs have been included.

d Contractor profits and overheads were estimated at 20 percent of project costs with bridging finance at 9.5 percent. This is in line with assumptions made about Perumnas bridging finance. These construction costs are more fully discussed in Sections 4.4.6 and 4.5 of Vol III, The Long Term Urban Development Plan Report.

The capital costs of installation of electricity distribution networks which were excluded from the financial assessment (since they are not recovered directly from beneficiaries but through user charges) are included in the economic costs since they are part of the total project costs. Operating costs of the system have however been excluded from the economic assessment since they would be charged at cost and thus will cancel.

Construction costs, the capital costs of the electrical system and the costs of completion of core houses have been adjusted to remove customs duties and sales taxes. Customs duties were removed from the indirect foreign cost element of the project. These amount to about nine percent of the total materials costs of all house types or about 4.3 percent of the total costs of housing. Sales taxes were removed from the local cost component of materials of total housing costs. Together, customs duties and sales tax account for about two percent of the total project costs net of physical contingencies. The net economic cost of each unit is shown in Appendix A, while the method of calculating taxes are also shown in this Appendix.

The maintenance charge for upkeep of the estate was excluded since it is to be charged at cost and would therefore be self-cancelling.

Community facilities have not been included in either the calculation of economic costs or benefits as these are not incremental facilities, but must be provided by the city of Medan regardless of the development of Medan III.

5.3 ECONOMIC BENEFITS

As discussed in Volume IV, Part 1, the average increases in raw land values surrounding the Medan I and II housing estates have ranged between 220 and 400 percent per year. These increases have occurred in areas which have not benefited from infrastructure such as water supply or road networks. Thus it was conservatively estimated that the value of the unserviced land within Medan III would also benefit from a such an increase in value and would increase from Rp.750 per square metre (its current selling price as agricultural land) to Rp.2,500 per square metre. These increases are assumed to occur in addition to the selling prices which Perumnas would charge for different house types.

Developed land cost in Medan is conservatively estimated to be increasing by at least 20 percent per year. Thus it was estimated that by 1982/83, the year in which sales of housing units would begin, real increases of 10 percent would accrue to land values once plots were serviced and had housing units constructed on them. These net increases would be in addition to the increases which would be observed when land use changes occur.*

* Information about land value changes was derived from the records of land transactions conducted by Medan real estate agents over the past five years.

Increased residential land values were used for the economic assessment of the project since they are more readily measurable than other types of benefits, such as rental values. The increases in land values due to previous SSCH/LCH projects in Medan are well documented, and serve as a reliable basis for projections.

No assumptions were made about the increases in value of civil works such as housing since data about real appreciation in house values, or for that matter depreciation, is not available. However, house values were measured at either their costs (in the case of the subsidised selling prices of house types A, B, and C), or their selling prices (house types D and E). Residential serviced plots and commercial land were valued at their selling prices also. The value of adding 45 square metre houses to the serviced upper income plots was included in their selling prices to reflect their total housing value.

Since less than 30 percent of Medan's population enjoys the benefits of adequate potable water supply, adequate drainage or sanitation, there will be considerable additional benefits accruing to project households in terms of improved standards of living and the quality of life enjoyed. In particular, improved public health resulting from minimizing the risks of water borne diseases will benefit households living on the estate. They will also benefit from reduced risks of fire and crime associated with over-crowded living conditions in low quality kampungs. In time, residents should also benefit from improved employment opportunities due to increased economic activity generated in close proximity to the project. However, as these benefits are long term in nature, and do not accrue uniformly, no attempt was made to quantity them in this assessment of the project's immediate economic benefits.

5.4 VARIATIONS IN PROJECT COSTS

Since topographic surveys have not been available there may be variations in the actual number of plots which can be constructed on the site. As long as the proportion of each plot type remains roughly equal to that shown in Section 4 and the changes in costs due to changes in the amount of open space are distributed to both economic costs and benefits are thus self-cancelling, the project's economic viability will remain unchanged, or will have only a marginal impact on the project's economic internal rate of return.

APPENDIX A

DETAILS OF SITES AND SERVICES/LOW COST HOUSING PROGRAM ANALYSES

APPENDIX A

DETAILS OF SSCH/LCH PROGRAM ANALYSES

A.1 AFFORDABILITY ASSESSMENT

A detailed affordability assessment based on the income data shown in Section 1 is presented in Table A.1. Each target group shown at the top of the table has a basic capital resource available for housing based on the amount of income which can be afforded for housing and the terms on which they can borrow money for housing. This capital resource is shown on line 5 of the table. It ranges from Rp.378,000 to Rp.2,042,000 according to the various income groups.

This assessment links together planning information regarding plot size and configuration, street widths and block lengths to develop circulation standards. From these circulation standards, densities are determined by combining community facilities standards of 5.33 square metres per persons with average household sizes. These densities are shown on line 16 of the table.

All the costs of housing which are to be recoverd from beneficiaries must be included within this capital resource. These costs are shown in lines 6 through 14, and are based on the densities shown in line 16. In addition to physical costs such as core housing, Perumnas overheads of 10 percent and interest will be incurred during construction of the project and must be recovered from the beneficiaries. The method of calculating these is shown in the notes to the table.

When the full costs of housing included in the housing package aimed at low income groups are totaled they often yield total costs which are beyond the capital resources or affordability of the lowest income group as is indicated by the Type "A", "B" and "C" plots which have negative land costs or land costs below Rp.750/sq m, the selling price of the land. These land costs are indicative of the amounts of cross subsidies which must be generated within the project to provide housing at the standards shown. These cross subsidies are generated from the sale of the land of Type "D", "E", "E.1" and "F" plots at a profit. This profit is justified by the size of the plots and their favourable locations on the site near areas having good views and good access resulting from a higher level of infrastructure. However, in pricing land, care has been taken to keep the price of these plots below Rp.3,000/sq m (the current market price for middle and upper income plots outside of the centre of Medan).

TABLE A.1

MEDAN III
AFFORDABILITY ASSESSMENT

Plot Type	A	B	C	D	E	E.1	F
Percentile	10	30	50	76	90		
Monthly Income	25,000	47,000	58,584	91,000	134,917		
% of Income for Housing	15	15	15	15	15		
Plot Distribution %	10	35	25	12	6	6	6
Number of Plots	840	2,940	2,100	1,008	504	504	504
1. Monthly payment	3,750	7,050	8,788	13,650	20,238		
2. Down payment	10	10	10	10	10		
3. Yearly interest rate	12	12	12	12	12		
4. Recovery period	20	20	20	20	20		
5. Total cost of unit	378,415	711,419	886,758	1,377,436	2,042,291	790,956	1,604,111
6. Land cost/sq m	- 805	- 121	674	816	1,968	1,968	2,878
7. On site infra. cost/sq m	701	708	702	695	730	730	781
8. Off site infra. cost/sq m	20	20	20	20	20	20	20
9. Construction cost/sq m	24,000	24,000	24,000	24,000	24,000	-	-
10. Core house size	13	21	21	36	45	-	-
11. Perumnas overheads	35,000	66,755	78,025	129,654	170,285	62,853	30,525
12. Interest during construction	28,368	43,865	46,805	66,922	89,312	25,409	28,498
13. Solid waste and landscaping				98.1×10^6			
14. Number of hshld per No.13				8,401			
15. Persons per plot	6	6	6	6	6	6	6
16. Density	558	429	340	301	236	236	144
17. Comm. facil. sq m/person	5.33	5.33	5.33	5.33	5.33	5.33	5.33
18. Circulation %	14.5	12.7	13.9	13.7	16.9	16.9	20.1
19. Plot size	60	90	120	140	180	180	300
20. Width primary street	4	4	6	6	6	6	8
21. Width secondary street	3	3	4	4	6	6	6
22. Block length	100	100	112	112	112	112	100
23. Plot ratio (length: front)	2.40	2.5	3.33	2.86	2.5	2.5	1.33
24. Plot frontage	5	6	6	7	9	9	15
25. Plot length	12	15	20	20	20	20	20
26. Network cost per lineal m	7,062	7,062	7,062	7,062	7,062	7,062	7,062
27. Circulation cost/sq m	2,825	3,634	3,713	3,713	3,300	3,300	2,964

Notes to the Affordability Table A.1:

1. Interest during construction was based on short term financing of the costs of infrastructure, electricity, and superstructure costs plus 15 percent physical contingencies. Financing was assumed to be over one year, fifty percent of the costs would be financed at 12 percent onlent from the Bank of Indonesia and fifty percent would be financed at 13.5 percent from commercial banks.

Plot Type	Principle per Unit	Interest (12 %)	Interest (13.5 %)	Total Interest
A	Rp. 479,600	13,340	15,028	28,368
B	741,600	20,627	23,238	43,865
C	491,700	22,009	24,796	46,805
D	1,131,410	31,470	35,452	66,922
E	1,509,959	41,998	47,314	89,312
E.1	429,959	11,948	13,461	25,409
F	481,800	13,401	15,097	28,498

2. Perumnas overheads were calculated as 10 percent of the unit costs minus interest and are as follows:

Plot Type	Total Selling Price Minus Interest and Engineering Design	Perumnas Overheads
A	350,047	35,000
B	667,554	66,755
C	780,253	78,025
D	1,294,594	1,296,544
E	1,702,853	1,702,853
E.1	622,853	62,853
F	305,252	30,525

The composition of the infrastructure costs and housing construction costs are more fully discussed in Sections (A.3 and A.4). In keeping with Government policy, all low income households have been provided with at least a single habitable room of 13 square metres with individual water supply and separate water seal toilet facilities. Although it is anticipated that each plot will have an electrical connection, these have not been included in the affordability analysis as it is assumed the capital costs of electrical installation will be recovered through user charges.

Assumptions regarding interest rates are more fully discussed in the financial analysis of the project. Combined with assessments of income available for housing and the capacity to make downpayments, they are the key to determining the capital resources available for housing and the standards which are affordable to different income groups. Thus the affordability assessment is the central element in the design of a housing project. The assessment shown in Table A.1 was used as the basis for developing total project costs, site plans, housing plans and planning standards for the entire project.

A.2 DESCRIPTION OF THE SITE PLANNING CONCEPT

A.2.1 Planning Criteria

The proposed concept of site planning as shown in Appendix B is based on the following criteria:

1. Optimum Conformity to the Site Configuration: Due to the site's topographic configuration, several distinct sectors emerge, each of which are planned in such a way as to: minimize the earth works involved; maximize cross subsidization; and minimize infrastructure and utilities cost such as drainage, roads and footpaths.

2. Optimize the Internal and External Accessibility: The layout should create optimum internal accessibility between different parts of the residential area as well as externally between the site and ts surrounding area.

3. Accessible by Public Transport: Since most residents will depend on the availability of public transport for their journey to work, the proposed layout should be able to provide possibilities for public transport to serve different parts of the residential area.

4. Optimize the Accessibility to Public Facilities: Public facilities like community buildings, religious facilities, and secondary schools should be centrally located, and therefore accessible from different parts of the residential area.

5. Optimize the Accessibility to Commercial Areas: The commercial areas should be accessible either from outside the site or from the different on-site residential areas. The location of the

commercial areas should be planned in such a way as to eliminate negative effects on residential areas (i.e. noise pollution, traffic congestion and increased solid waste generation).

6. Minimize Social Friction between Income Groups: Since the residents will consist of different income groups, low, middle and high income, the distribution of plots should seek to minimize social disturbance between each income group while optimizing social integration.

7. Maximum Utilization of the Landscape Potentials: The landscape elements of the site, such as streams, topography and good views should be fully utilized in the proposed layout in order to create a dynamic and pleasant residential environment.

A.2.2 The Proposed Layout

Based on the above mentioned criteria, the proposed layout is as follows:

Housing: The 60, 90 and 120 square metre plots occupy the central part of the site which is relatively flat land. This will minimize the total cost per house unit. The other consideration is to locate these plots as near as possible to public facilities and the commercial area. The other plots of 140,180 and 300 square metres are distributed to other parts of the site where slopes are between 10-20 percent in order to maximize the cross subsidization and to create an attractive housing environment for the middle and high income groups. In order to minimize social friction, different plot types will be separated either by streams or roads.

Commercial Area: The commercial area, which will potentially have a high income value, occupies the low land which is located in the central part of the site. This will not only compensate the high cost of earthworks involved, but it will also ensure accessibility from different parts of the residential area.

Community Facilities: The community facilities, which will be a gathering place of the Medan III community, are centrally placed and close to the commercial area. The community facilities will include community buildings, religious house, health centre (Puskesmas), post office and secondary schools (SMP & SMA). These facilities are also adjacent to the new hospital which is being constructed on the eastern boundary of the site.

Green Areas: The green areas are located along the streams and in areas which are unsuitable for housing development. These green areas will be combined with recreation activities. In addition, open spaces will be located throughout the residential area. This open space is combined with location of elementary schools which are expected to serve surrounding areas within a 200-300 metres radius.

Small Scale Industry: Serviced plots reserved for non-polluting small scale business are included. Since this type of industry will not

create an environmental problem, the location of this activity is integrated into the commercial area.

Road and Footpaths: A curvilinear road network is used to obtain maximum number of plots and to provide access to various sectors of the site. Four types of road are planned to serve the Medan III site:

- Main roads with 10-12 metres r.o.w. to distribute traffic from the outside to different parts of residential areas and vice versa. These will also act as a ring road which makes the residential area and other activities accessible from outside.
- Secondary roads with 8 metres r.o.w. function to connect different residential areas with other uses such as commercial and community facilities.
- Residential road with 6 metres r.o.w. serve individual houses with plot sizes of 180 square metres and 300 square metres.
- Footpath with 3 metres and 4 metres r.o.w. serve individual houses with plot size of 60,90,120 and 140 square metres*.

A.3 INFRASTRUCTURE STANDARDS AND UNIT COSTS

The following infrastructure standards and unit costs were used to determine costs of infrastructure:

TABLE A.2

UNIT COSTS AND STANDARDS OF ROADS AND FOOTPATHS

Type	Right of Way (m)	Materials	Cost per Square Metre of Right of Way (Row) (Rp./sq m)
"A" footpath	3	2 m carriageway of 15 m sand, 8 cm mass concrete (1:3:5)	1,309
"B" footpath	4	2.8 m carriageway of 15 cm sand, 8 cm mass concrete (1:3:5)	1,272

* Although the analysis was based on 4 metres r.o.w. house access for the 140 sq m plots, it is possible to provide them with 6 m residential roads and remain within affordability and total project cost parameters.

TABLE A.2--Continued

	Right of Way (m)	Materials	Cost per Square Metre of Right of Way (Row) (Rp./sq m)
Residential Road	6	3 m carriageway of 5 cm sand, 10 cm blockstone, 6 cm gravel, 3 cm bitumeneous surface.	2,099
Secondary Road	8	5.5 m carriageway of 5 cm sand, 15 cm blockstone, 8 cm gravel, 3 cm bitumeneous surface	2,536
Main Roads	10-12	width of carriageway varies 5 cm sand, 20 cm blockstones, 6-8 cm crushed stone, 2-3 cm bitumeneous surface	3,242

The following standards shown in Table A.3 where used to determine the costs of residential drainage systems. Since the site is traversed by three streams and is higher than surrounding areas, no major drainage works are envisioned. However since topographic surveys were not available at the time of preparation of these feasibility studies, it is not possible to determine the actual amount of drainage works which will be required on the site.

TABLE A.3

STANDARDS AND UNIT COSTS OF RESIDENTIAL DRAINAGE

	Depth (cm)	Width (cm)	Materials	Cost per Linear Metre (RP./m)
Footpath	25	30	25 cm sidewalls of brick including plaster, 10 cm concrete base, 15 cm sand	2,325
Footpath drain	30	30	30 cm sidewalls of brick other standards as above	2,560
Residential road	40	60±	40 cm sidewalls of brick including plaster, 10 cm concrete base, 15 cm sand	2,996
Secondary road drain	(to be determined when information on detailed topograhy is available)			

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The following water supply standards were used to determine a gross linear metre cost for water supply:

1. Transmission lines from the existing distribution system are not included in the project cost since these costs are included in a major water supply project being funded jointly by the Government of Indonesia, Asian Development Bank, and the Government of the Netherlands.

2. Distribution network within Medan III including valves and hydrants:

• 5,600 m of 150 mm diameter asbestos pipe at Rp.5,500 per linear metre	Rp. 30,800,000
• 1,100 m of 100 mm diameter PVC pipe at Rp.9,000 per linear metre	99,000,000
• 32,000 m of 80 mm diameter PVC pipe at Rp.4,524 per linear metre	144,770,000
Subtotal	274,570,000
• 25 percent administration and physical contingencies	68,643,000
Total Base Costs	343,213,000
Unit cost per linear metre	Rp. 7,062/m

These costs were then used to calculate a gross cost of infrastructure per gross square metre of residential area to determine total project infrastructure costs. Table A.4 shows the preliminary calculation of unit infrastructure costs for each type of block plan and plot type. Details of these individual calculations are shown in Tables A.5 through A.11.

TABLE A.4

GROSS UNIT INFRASTRUCTURE COSTS

Block Type	Gross Infrastructure Cost from Table B.5 through B.11 (Rp./sq m)	Gross Infrastructure Costs Used for Program Cost* (Rp./sq m)
A	689	701
B	694	708
C	488	702

* These initial costs were used in the Affordability Analysis Section A.1.

TABLE A.4--Continued

Block Type	Gross Infrastructure Cost from Table A.5 through A.11 (Rp./sq m)	Gross Infrastructure Costs Used for Program Cost* (Rp./sq m)
D	585**	695
E	609	730
F	749	781

** If 6 m residential road R.O.W. are used instead of 4 m footpaths, the gross infrastructure cost increases to Rp.605/sq m which is within affordability and project cost parameters.

It will be noted that the gross infrastructure costs shown above are lower than the costs used to determine total project costs. This is due to the fact that no estimates for cutting and filling and other site works have been included due to the lack of topographic surveys. Furthermore, the actual configuration of the drainage system cannot be determined until the site topography can be defined. Therefore, when estimates of these site works and the costs of major roads are included in the total program costs, the infrastructure costs will approach those shown in the affordability analysis and in the program costs shown in Sections 1 and 2 of the report.

A.4 SSCH/LCH HOUSING

Typical plans, elevations and sections along with preliminary cost estimates, housing standards and unit costs used in determining those standards are presented in this Section.

The standards of the core housing are aimed at providing the maximum shelter solutions affordable to each income group. However in keeping with Government policy, all low income groups have been provided with a minimum core house consisting of 13 square metres. In addition to that minimum shelter solution, all groups have also been provided some form of individual water supply and sanitation, which have also been included in these housing costs.

Building materials used in the housing construction are of primary local manufacture such as fired clay bricks, timber, concrete blocks and locally manufactured glass. Imported materials consist mainly of roofing sheets, portions of the plumbing and electrical costs and hardware.

In all cases, the cost of connecting the house to the public water supply have been included in the house costs and are listed as a lump sum for the two duplex units. These costs are itemized as follows:

TABLE A.5

PRELIMINARY COST ESTIMATES AND STANDARDS
FOR TYPE "A" PLOTS

Name / Item	Preliminary Estimate not for Tender			
	Quality	Unit	Unit Cost	Total Cost
1. Footpaths				
3 m ROW Type A	300	sq m	1,309	392,700
4 m ROW Type B	100	sq m	1,272	137,376
2. Drains				
-25 cm deep drains	200	m	2,323	464,600
-25-30 cm deep drains	54	m	2,323	125,442
				Rp.1,120,118
3. Total System Cost	408	sq m	2,746	
4. Gross cost of water supply per linear metre		m	7,062	
5. Gross cost of infrastructure per gross square metre of residential area				Rp.689/sq m

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TABLE A.6

PRELIMINARY COST ESTIMATES AND STANDARDS
FOR TYPE "A" PLOTS

Name / Item	Preliminary Estimate not for Tender			
	Quality	Unit	Unit Cost	Total Cost
1. 3.5 m Footpaths C Area (gravel with bituminous surface)	157	sq m	1,005	158,445
2. 3.5 m Footpaths B Area	560	sq m	1,006	563,360
3. 4 m Main Footpaths	110	sq m	2,099	230,890
4. 25 cm deep drains C Area	66	m	2,693	177,738
5. 30 cm deep drains B Area	204	m	3,000	612,000
6. Main drains ("A" Area)	55	m	6,600	363,000
	827	sq m	2,546	2,105,433
7. Gross cost of water supply per linear metre		m	7,062	
8. Gross cost of infrastructure per gross square metre of residential area				Rp.688/sq m

TABLE A.7

PRELIMINARY COST ESTIMATES AND STANDARDS
FOR TYPE "B" PLOTS

Name / Item	Preliminary Estimate not for Tender			
	Quality	Unit	Unit Cost	Total Cost
1. Footpaths				
3 m ROW	300	sq m	1,309	392,700
4 m ROW	132	sq m	1,272	167,904
2. Drains				
25 cm	200	m	2,323	464,600
25-30 cm	66	m	2,996	197,736
				1,222,940
3. Cost per gross ROW	432	sq m	2,830	
4. Gross cost of water supply per linear metre		m	7,062	
5. Gross cost of infrastructure per gross square metre of residential area				Rp.694/sq m

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TABLE A.8

PRELIMINARY COST ESTIMATES AND STANDARDS
FOR TYPE "C" PLOTS

Name / Item	Preliminary Estimate not for Tender			
	Quality	Unit	Unit Cost	Total Cost
1. Footpaths - Type "B"				
4 m ROW	432	sq m	1,272	186,624
2. Six metre roads				
5 cm sand 10 cm blockstone 6 cm gravel 3 cm bituminous surface	264	sq m	2,099	554,136
3. Secondary drains 25 cm	216	m	2,323	501,768
4. Main drains 40 cm	88	m	2,996	263,648
5. Total drainage and roads	696	sq m	2,164	1,506,176
6. Gross cost of water supply per linear metre		m	7,062	
7. Gross infrastructure costs of system				Rp.488/sq m

TABLE A.9

PRELIMINARY COST ESTIMATES AND STANDARDS
FOR TYPE "D" PLOT

Name / Item	Preliminary Estimate not for Tender			
	Quality	Unit	Unit Cost	Total Cost
1. Main footpaths				
4 m Type "B" footpath	448	sq m	1,272	569,856
2. Six metre roads standards same as Type "C" plots	264	sq m	2,099	554,136
3. Footpath drains 25 cm	224	m	2,323	520,352
4. Main drains 40 cm	88	m	2,996	263,648
5. Total drainage and roads	712	sq m	2,679	1,907,992
6. Gross cost of water supply per linear metre		m	7,062	
7. Gross cost of infrastructure per gross square metre				Rp.585/sq m

Note: Access standards to Type "D" plots can be improved to 6 m ROW primary and secondary streets and still remain within project costs. The gross infrastructure cost per gross square metre increases to Rp.605.

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TABLF A.10

PRELIMINARY COST ESTIMATES AND STANDARDS
FOR TYPE "E" PLOTS

Name / Item	Preliminary Estimate not for Tender			
	Quality	Unit	Unit Cost	Total Cost
1. Six metre ROW main streets standards same as Type "C" and "D" plots	924	sq m	2,099	1,939,476
2. Secondary drains 30 cm deep	216	m	2,560	552,960
3. Main drains 40 cm deep	92	m	2,996	275,632
4. Total drainage and circulation	1,140	sq m	2,428	2,768,068
5. Gross cost of water supply per linear metre			7,062	
6. Gross cost of infra-structure per gross square metre				Rp.609/sq m

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TABLE A.11

PRELIMINARY COST ESTIMATES AND STANDARDS
FOR TYPE "F" PLOTS

Name / Item	Preliminary Estimate not for Tender			
	Quality	Unit	Unit Cost	Total Cost
1. Six metre ROW roads standards same as Type "C", "D" and "E" plots	630	sq m	2,099	1,133,460
2. Eight metre ROW roads standards: 5 cm sand, 20 cm block stone, 7 cm crushed stone, 3 cm bituminous surface	368	sq m	2,535	932,880
3. Secondary drains 30 cm deep	180	m	2,560	460,800
4. Main drains 40 cm deep	92	m	2,996	275,632
5. Total circulation and drainage	998	sq m	2,809	2,802,772
6. Gross cost of water supply per linear metre			7,062	
7. Gross cost of infra-structure per gross square metre				Rp.749/sq m

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• 10 m of 18 mm diameter PVC pipe	Rp. 6,000
• 1-12 mm diameter water meter	7,000
• 1 plug plus bends	5,500
• 1 stop cock	1,700
Unit Cost	Rp.20,000

All house costs also include electrical installations, but the cost of meter and the electrical connection cost must be borne at the time of connection. For a low cost house, these connection costs generally average about Rp.60,000 and can be paid in installments if prior arrangements are made with PLN. In the Medan II site, Perumnas bulk contracted the electrical supply with PLN. Similar arrangements can be made for the Medan III site.

House types A, B, and C consist of habitable core houses of 13 and 21 square metres. These units would be only partially complete. Individual households would be expected to paint interiors and provide ceilings and flooring materials if desired. It is also likely that individual households will want to expand their units by adding one or more rooms. Therefore, the core houses have been placed near the front of plots to allow maximum possibilities for households to expand their units toward to rear of the plot. As suggested in the section on setbacks, except for corner plots, no rear or side setbacks have been imposed on the buildable area of the plot. This is to allow flexibility in making additions to core houses.

The low cost house types C and D have been designed to be complete housing units with internal bathrooms, kitchens, bedrooms and living rooms. These houses have ceilings, internal finishing and complete bathrooms. Individual households may also want to add flooring materials. Eventually they may also want to add additional rooms, thus units have been located on plots to allow maximum construction to the rear of the plot. Unit costs used for SSCH/LCH estimates are presented in Table A.12. Preliminary cost estimates for the various types of SSCH/LCH housing are presented in Table A.13 through A.16.

TABLE A.12

SCHEDULE OF UNIT COSTS USED FOR SSCH/LCH
(SEPTEMBER 1979 COSTS)

	Description	Unit	Unit Costs (Rp.)
1.	Excavation of foundations less than 0.5 metres	cu m	500
2.	Sand filling	cu m	1,250
3.	Insitu concrete (1:3:5)	cu m	18,000

TABLE A.12--Continued

	Description	Unit	Unit Costs (Rp.)
4.	Timber framing of walls (2 by 2)	sq m	865
5.	Timber various sized including planning and fixing 2 x 2	m	290
	2 x 3	m	430
	2 x 4	m	575
	2 x 5	m	720
6.	Timber sheating consisting of 18 mm (3/4" x 8")	sq m	1,440
7.	Plywood Sheating 6 mm	sq m	1,415
	including fixing 9 mm	sq m	2,040
	and nails 18 mm	sq m	3,810
8.	Concrete block walling ("conblock") including mortar	sq m	3,030
9.	Woodwool including fixing (1x1) but excluding framing	sq m	1,080
10.	Brick walling Foundation 25 cm thick	sq m	4,650
	40 cm thick	sq m	7,440
	Walls including 15 mm plaster on two sides -- 15 cm	sq m	2,230
11.	Plastering 15 mm interior	sq m	740
	10 mm interior	sq m	630
	20 mm exterior	sq m	860
12.	Painting exterior wood paint	sq m	820
	exterior concrete paint	sq m	500
	interior concrete paint	sq m	470
	lime wash	sq m	90
13.	Ceiling material - 1 m x 1 m local manufacture asbestos - cement panels including nails and fixing	sq m	500
14.	Roofing materials cement tiles	sq m	2,100
	Corrugated asbestos cement	sq m	2,440
	Asbestos cement tiles 3 mm thick	sq m	1,570
	4 mm thick	sq m	2,150
	5 mm thick	sq m	2,630
	Corrugated galvanized iron (zinc)	sq m	1,050
	Clay tiles (not available)		
15.	Building hardware Door locks	pcs	3,000

TABLE A.12--Continued

	Description	Unit	Unit Costs (Rp.)
	Window	pcs	150
	Door hinges	pcs	250
	Window hinges	pcs	175
16.	Finish work		
	Door including frame	sq m	6,670
	Windows		
	wood louvered shutters including frame	sq m	15,000
	wood frames with glass	sq m	16,400
	Narco louvers with wood frames	sq m	19,100
17.	Plumbing and fittings		
	concrete wc including fittings	pcs	3,000
	concrete sinks wc including fittings	pcs	6,300
	porcelin wc including fittings	pcs	5,950
	shower complete but excluding basin	pcs	8,000

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TABLE A.13

PRELIMINARY COST ESTIMATES AND STANDARDS OF
TYPE A SUBCORE HOUSE (13 sq m)
DUPLEX TYPE

Item	Preliminary Estimate not for Tender			
	Quantity	Unit	Unit Cost	Total Cost
1. Excavation and Backfill	14.07	cu m	500	7,037
2. Sand Filling (15 cm)	3.9	cu m	1,250	4,875
3. Brick Foundations (40 cm)	9.98	sq m	7,440	74,214
4. Concrete Floor Slab (10 cm)	2.9	cu m	18,000	52,200
5. Formwork	2.4	sq m	700	1,428
6. Party Walls (15 cm Brick including Plaster)	14.3	sq m	2,230	31,889
7. Other Walls (15 cm Brick including Plaster)	40.0	sq m	2,230	89,200
8. Roof Framing (2 x 3)	41.93	m	430	18,028
9. Zinc Roofing	31.85	sq m	1,050	33,442
10. Exterior Concrete Paint	40.0	sq m	500	20,000
11. Doors	4	Nos	6670/m^2	53,360
12. Windows Wood Frame with Local Glass (1.5 x 5)	4	Nos	15,000	30,000
13. Subtotal	26	sq m	15,987	415,673
14. Plumbing				
MCK 2 units complete	1	Nos	104,000	104,000
Water Supply connections	1	Nos	20,000	40,000
				144,000
15. Hardware				
Door Locks	4	Pcs	3,000	12,000
Door Hinges	12	Pcs	250	3,000
Window Locks	4	Pcs	150	600
Window Hinges	8	Pcs	175	1,400
				17,000
16. Electricity				
Lights Sockets	2	Nos	6,000	12,000
Walloutlets	2	Nos	6,000	12,000
				24,000
17. Total costs	26	sq m	23,103	600,673

TABLE A.14

PRELIMINARY COST ESTIMATES AND STANDARDS OF
TYPE "B" CORE HOUSE (21 sq m) (AND TYPE "C" CORE HOUSE)

Item	Preliminary Estimate not for Tender			
	Quality	Unit	Unit Cost	Total Cost
1. Excavation of Foundations and Backfill	19.44	cu m	500	9,720
2. Sand Fill	6.71	cu m	1,250	8,388
3. Brick Foundations(40 cm)	14.8	sq m	7,440	110,112
4. Concrete in Floor Slab	4.48	cu m	18,000	80,550
5. Party Walls(Conblock)	16.5	sq m	3,030	49,995
6. Other Walls (Conblock)	73.25	sq m	3,030	221,947
7. Roof Framing	60	cm	430	25,339
8. Zinc Roofing	57	sq m	1,050	59,808
9. Doors (Wood including Frame)	4	sq m	6,670	53,360
10. Windows (Wood Frame with Local Glass)	4(1 x 1)	sq m	16,400	65,600
11 Exterior Plaster(15 mm)	73.25	sq m	740	54,205
12 Exterior Paint	73.25	sq m	500	36,625
13. Subtotal	42	sq m	18,467	775,649
14. Plumbing				
MCK for Two units	1	unit	104,000	104,000
Water supply connections	2	unit	20,000	40,000
				144,000
15. Hardware				
Door Locks	4	Pcs	3,000	12,000
Door Hinges	12	Pcs	250	3,000
Window Locks	4	Pcs	150	600
Window Hinges	16	Pcs	175	2,800
				18,400
16. Electricity				
Light Sockets	4	units	6,000	24,000
Wall outlets	4	units	6,000	24,000
				48,000
17. Total Base Costs	42	sq m	23,477	986,049
18. Optional Interior Paint	106.25	sq m	90	9.562
19. Total Costs	42	sq m	23,705	995,611

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TABLE A.15

MEDAN III
PRELIMINARY COST ESTIMATES AND STANDARDS OF
TYPE "D" LOW COST HOUSE (36 sq m)

Item	Preliminary Estimate not for Tender			
	Quality	Unit	Unit Cost	Total Cost
1. Excavation of Foundations and Back Fill	32.8	cu m	500	16,400
2. Sand Fill (15 cm)	10.8	cu m	1,250	13,500
3. Brick Foundations (40 cm)	127.0	sq m	7,440	200,880
4. Concrete Floor Slab (10 cm)	7.2	cu m	18,000	129,600
5. Exterior Walls and Load Bearing Walls (Brick including Plaster)	118.74	sq m	2,230	264,790
6. Interior Walls (As above)	29.95	sq m	2,230	66,789
7. Roof Framing (2 x 4)	81.32	m	575	46,776
8. Zinc Roofing Sheets	91.35	sq m	1,050	95,918
9. Conc. Reinforced Ring Beam	1.58	cu m		56,231
10. Paint Exterior Walls	118.36	sq m	500	59,180
11. Plaster Interior Walls (10 cm)				
12. Paint Interior Walls	178.26	sq m	470	83,782
13. Exterior Doors	4	Nos	6670/sqm	57,629
14. Interior Doors	6	Nos	6000/sq m	51,840
15. Bathroom Doors	2	Nos	6000/sq m	23,040
16. Windows (Wood Frame and Local Glass, 1 x 1)	10	Nos	16400/sqm	164,000
Kitchen Windows	2	Nos	16400/sqm	16,400
Bathroom Windows (5x5)	2	Nos	16400/sqm	8,200
17. Subtotal	72	sq m	18,819	1,354,955
18. Plumbing				
Water Connection	2	Nos	20,000	40,000
PVC 1/2 ϕ Pipe	10	m	500	5,000
Conc. WC	2	Pcs	3,000	5,000
Conc. Sinks	2	Pcs	6,300	12,900
Bathroom Water Chamber	2	Pcs	7,398	14,296
Shower (Complete Unit)	2	Pcs	6,000	12,000
				90,696

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TABLE A.15--Continued

Item	Preliminary Estimate not for Tender			
	Quality	Unit	Unit Cost	Total Cost
19. Hardware				
Door Locks	12	Pcs	3,000	36,000
Door Hinges	16	Pcs	250	7,500
Window Locks	36	Pcs	150	3,900
Window Hinges	64	Pcs	175	11,200
				28,600
20. Electricity				
Light Sockets	10	Pcs	6,000	60,000
Wall Outlets	6	Pcs	6,000	36,000
				96,000
21. Sanitation (Pit Latrine)				
6 ϕ PVC Pipe	12	Pcs	600	7,200
Pit Complete with Conc. Cover	2	Pcs	17,870	35,740
PVC 6 ϕ Bends	2	Pcs	500	1,000
				43,940
22. Asbestos Tile Ceiling	72	sq m	500	36,000
23. Total Base Costs	72	sq m	22,642	1,630,191

TABLE A.16

MEDAN III
PRELIMINARY COST ESTIMATES AND STANDARDS OF
TYPE "E" LOW COST HOUSE (45 sq m)

	Preliminary Estimate not for Tender			
	Quality	Unit	Unit Cost	Total Cost
1. Excavation and Back Fill of Foundations	44.16	cu m	500	22,080
2. Sand Fill	14.4	cu m	1,250	18,000
3. Brick Foundation	37.2		7,440	276,768
4. Concrete Floor Slab (1:3:5)	9.6	cu m	18,000	172,800
5. Exterior Walls (Conblock)	142.8	sq m	2,230	318,444
6. Interior Walls (Conblock)	74.75	sq m	2,230	166,693
7. Roof Framing (2 x 4)		m	575	57,366
8. Zinc Roofing Sheets including Ridge	118.85	sq m	1,050	125,976
9. Exterior Plaster (15 cm)	142.8	sq m	740	105,672
10. Exterior Concrete Paint	142.8	sq m	500	71,400
11. Interior Plaster (10 cm)	229.3	sq m	630	144,459
12. Interior Concrete Paint	229.3	sq m	420	107,771
13. Ring Beam	1.80	cu m	35,589	64,060
14. Exterior Doors	4	Nos	6,670	57,629
15. Interior Doors	8	Nos	6,000	96,000
16. Wood Frame Windows with Local Glass (1 x 1)				
17. Dido (4 x 1)	2	Nos	16,400	13,120
18. Dido (4 x 5)	2	Nos	16,400	6,560
19. Sub Total	96	sq m	19,008	1,824,798
20. Plumbing				
Concrete WC	2	Nos	3,000	6,000
Sinks (Concrete)	4	Nos	6,300	25,200
Water Chamber	2	Nos	7,398	14,796
Bathroom Shower Head	2	Nos	6,000	12,000
Bathroom Drain	2	Nos	2,500	5,000
1/2 ø PVC Pipe	24	m	500	12,000
3 ø Drain Pipe	28	m	700	19,600
Connection	2	Nos	20,000	40,000
Sub Total				134,596
Total	96	sq m	20,410	1,959,394

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TABLE A16--Continued

Item	Preliminary Estimate not for Tender			
	Quality	Unit	Unit Cost	Total Cost
21. Hardware				
Door Locks	12	Pcs	3,000	36,000
Window Locks	16	Pcs	150	5,400
Door Hinges	36	Pcs	250	9,000
Window Hinges	64	Pcs	175	11,200
				58,600
22. Electricity				
Lights	12	Nos	6,000	72,000
Sockets	8	Nos	6,000	48,000
				120,000
23. Sanitation				
6 "ø PVC Pipe	12	m	300	3,600
4 "ø Drain Pipe	36	m	250	9,000
PVC 6 "ø Bends	2	Nos	500	1,000
PVC 4 "ø Bends	10	Nos	500	5,000
Pit Latrine Complete with Conc. Cover	2	Nos	17,870	35,740
				54,340
24. Asbestos Tile Ceiling	88.7	sq m	500	44,360
25. Total Base Costs	96	sq m	23,299	2,236,694

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A.5 CALCULATION OF ECONOMIC COSTS FOR SSCH/LCH

Table B.17 shows the major building materials composition of the different house types. For convenience, the core houses A, B, and C have been grouped together due to their similarities in construction as have low cost houses D and E. The table also shows the economic costs of each building material type. The economic costs of the building materials of house types A, B, and C are 96.7 percent of the financial costs, while they are 96.8 percent of the financial costs of types D and E.

TABLE A.17

BUILDINGS MATERIALS COST COMPOSITION

Materials	Percent Types A, B and C Financial	Percent Types A, B and C Economic	Percent Types D and E Financial	Percent Types D and E Economic
Concrete	19.4	19.1	19.4	19.1
Brick	8.3	8.1	41.0	40.0
Wood wool	8.8	8.6	-	-
Paint	7.6	7.4	7.6	7.4
Timber	33.9	32.9	10.0	9.7
Sand	0.6	0.6	0.6	0.6
Zinc roofing	4.9	4.7	4.9	4.7
Hardware	2.5	1.7	2.5	1.7
Electrical	4.5	4.2	4.5	4.2
Plumbing/MCK	9.5	9.4	9.5	9.4
Total 100% materials	100%	96.7%	100%	96.8%

The economic costs were calculated by removing the sales tax from the local component of the building materials costs and the customs duties and sales tax from indirect foreign costs*. In doing so, the following assumptions were made regarding the foreign and local costs components of the project:

* Indirect foreign cost components are those which are manufactured locally from imported raw materials, while direct foreign costs are those which are directly imported for use by the project. However since Indonesia is a net importer of cement even though it produces cement, cement is considered a direct foreign cost component for the purposes of this project as usage of cement by the project will require diversion of cement from other uses to the project, and thus additional imports will be required to meet Indonesia's cement needs.

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1. Most materials used in the project's construction are manufactured locally, although they may use imported raw materials.

2. All materials and equipment used by Perumnas or its contractors will be procurred internationally. However, since these direct foreign costs comprise less than one percent of total project costs, they have not been itemized separately.

3. The only major exception to "2" above is cement which under the definition given in the footnote above is a direct foreign cost component.

4. All design and supervision services will be performed by local consultants and thus will incur no foreign costs.

5. Perumnas overheads are all local cost components.

6. Physical contingencies have been applied proportionately to house construction costs and thus need not be itemized separately.

Based on these assumptions, the direct and indirect foreign costs of the project were calculated in the following manner:

1. Indirect foreign costs consist of the costs of the following materials:

   - Paint is made locally from imported pigments which comprise 45 percent of its costs. Thus paint, which comprises 7.6 percent of building materials costs, contributes an indirect foreign component of 3.4 percent of total costs.

   - Hardware, fixtures and fittings are assumed to be procured locally and partially manufactured locally. They are estimated to have indirect foreign components equalling 50 percent of their costs.

   - Electrical equipment and fittings are estimated to have an indirect import component of 25 percent.

   - Zinc roofing sheets have 40 percent of their costs resulting from indirect foreign costs.

2. Direct foreign costs consist mainly of the following materials which utilize cement:

   - Concrete and concrete products costs, such as "conblock", are comprised of 40 percent cement and are 19.4 percent of house building materials costs. Therefore cement is 7.8 percent of total house materials costs.

   - Woodwool, used as an alternative material in lower cost housing units, is 7.8 percent of materials costs of which cement is 30 percent of total costs.

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- MCK's are constructed largely of concrete and thus have foreign costs of 40 percent. Similarly, the imported components of other plumbing fittings are about 40 percent.

The building materials component of housing is estimated to be 48 percent of total costs, - excluding land, contingencies, and engineering design and supervision costs. The total foreign component, both direct and indirect, of housing materials costs is estimated to be 20.4 percent. Therefore the total foreign costs are estimated to 9.8 percent of the total housing costs. Direct foreign costs resulting, as mentioned, from cement consumption are about 3.7 percent of total costs. Therefore the remainder of the foreign costs as a proportion of total costs are indirect. Table .18 shows the composition of these foreign and local cost components.

TABLE A.18

PERCENTAGE OF MATERIALS COSTS ATTRIBUTABLE TO FOREIGN COSTS

Type of Material	Type of Import	Percent of Total House Building Materials Costs (%)	Percent of Total Costs Foreign Costs as a Costs (%)
Cement in concrete	Direct	7.8	7.8
Woodwool	Direct	8.8	1.0
Zinc Roofing Sheets	Indirect	4.9	2.0
Paint	Indirect	7.6	3.4
Hardware	Indirect	2.5	1.3
MCK's and Plumbing	Direct	9.5	3.8
Electrical	Indirect	4.5	1.1
Total Foreign		45.6	20.4
Other local building materials		55.4	-

The sales taxes on local building materials components was deducted according to the schedule shown in Table A.19.

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TABLE A.19

SALES TAX ON LOCAL MATERIALS

Percent Taxation*	Materials
0 %	Asphalt, sand, ready-mix concrete, gravel fired clay bricks, bamboo, gerobak.
1 %	Mixed copper rods, transport equipment, and cement for concrete blocks.
2.5 %	Plastics, PVC, rubber products, glass products, paint, imported bricks, tiles, spare parts.
5 %	Wood sheets, plywood, hardboard, and wood veneer.

* Source: Himpunan. Peraturan Perpajakan dalam Repelita III. No.175/KMK.04/1979. Departemen Keuangan, Republik Indonesia.

Custom duty and additional sales taxes on imported goods were determined according to the "Customs Tariff and Import Statistics" of the Minister of Finance, Minister of Trade and Customs Duty, October 1979. The schedule of rates is shown in Table A.20.

TABLE A.20

CUSTOMS DUTY AND SALES TAX ON IMPORTED GOODS

Imported Material	Customs Duty (%)	Sales Tax (%)
Electrical Equipment	30	10
Cement*	Rp.3,000 per tonne	5
Imported Hardware	45	10
Zinc Roofing Sheets	10	5
Solid Waste Trucks	10	1
Fire Hydrants	10	10
Water Meters	40	10
Pigments for Paint	10	5

* The duty on concrete was calculated as 2.1 percent of the price of concrete.

The adjustments necessary to remove sales tax and customs duty from indirect and direct foreign costs and from local costs and thus arrive at an economic cost were made as follows:

1. Electrical costs were reduced by 5.8 percent.

2. Water supply costs were reduced according to the following individual rates:

   - The costs of regular meters were reduced by 11 percent.

   - The costs of system meters were reduced by 5 percent.

   - The costs of water supply pipes of all materials were reduced by six percent according to the schedule of the PNC.

   - Fire hydrant costs were reduced by 20 percent.

3. Solid waste costs were reduced by 41.4 percent due to the large component of those costs resulting from trucks and plastic containers, both having large imported components.

4. The costs of MCK's were reduced by 1.1 percent primarily due to their cement content.

5. Concrete costs were reduced by 1.8 percent.

6. Timber, although taxed at variable rates, was reduced by an average of three percent.

7. The costs of woodwool were reduced according to the following formula: 30 percent of the cost due to cement was reduced by 2.1 percent, while the remaining 70 percent was reduced by 3.0 percent. The total reduction equals 2.1 percent.

8. Due to the large indirect foreign cost of hardware and thus the large sales taxes and customs duty which it incurs, its costs were reduced by 32.0 percent.

9. Zinc roofing sheets, as they are manufactured from imported sheet metal, were reduced in cost by 4.1 percent.

10. The overall reduction in the costs of paint due to imported pigments is 2.7 percent.

11. The costs of fired clay bricks attracting a sales tax of 2.5 percent were reduced in cost by 2.4 percent.

These adjustments in building materials costs when converted to adjustments in the total costs of housing net of land result in the economic values shown in Table A.21.

TABLE A.21

ECONOMIC VALUE OF HOUSING NET OF CUSTOMS DUTY AND TAXES
(RUPIAH THOUSANDS)

Type	Cost of House	Cost of Land	House Minus Land	Adjustment Percentage (%)	Economic Cost Including Land
A	541.9	45.0	496.9	98.6	533.9
B	833.0	67.5	765.5	98.6	820.8
C	955.9	90.0	865.9	98.5	942.9
D	1,197.3	105.0	1,029.3	98.5	1,180.9
E	1,593.5	135.0	1,458.5	98.5	1,571.6
E.1	481.3	295.8	185.5	98.5	478.5
F	771.3	446.1	325.2	98.5	766.4
Commercial Plots (Millions of Rupiah)	77.1	37.8	39.8	96.5	77.0

Tables A.22 and A.23 show the net value of the costs to beneficiaries of completing core houses and the estimated schedule over which these completions will occur. Except for type E.1 and F houses, other houses were reduced in cost by 31 percent to remove contractor profits and overheads, bridging finance and taxes and customs duty, since it was assumed that individual households would self-contract the construction by buying their own materials and hiring labor on a daily basis. The households designated to occupy the larger type E.1 and F units are expected to hire contractors to build their houses. Thus, no adjustment other than removal of taxes was made.

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TABLE A.22

NET VALUE OF COMPLETION COSTS OF CORE HOUSES
(RUPIAH THOUSANDS)

Type	Unit Cost of Additions	Adjustment due to Contractor Profits, overhead, bridging finance and taxes (%)	Economic Cost of Additions
A	312.0	69.0	215.3
B	504.0	69.0	347.8
C	504.0	69.0	347.8
D*	-	-	-
E*	-	-	-
E.1**	1,080.0	-	1,080.0
F**	1,080.0	-	1,080.0

* These are completed houses and require no additions.
** There are serviced plots on which it is assumed a household would hire a contractor to build a minimum 45 square metre house.

TABLE A.23

SCHEDULE OF COMPLETION OF CORE HOUSES
(MILLIONS OF RUPIAH)

Type	FY 82/83		FY 83/84		FY 84/85		FY 85/86	
	Units	Value	Units	Value	Units	Value	Units	Value
A	420	90.4	420	90.4	-	-	-	-
B	970	337.4	970	337.4	1000	347.8	-	-
C	250	87.0	500	173.9	500	173.9	850	295.6
D	-	-	-	-	-	-	-	-
E	-	-	-	-	-	-	-	-
E.1	-	-	252	272.2	252	272.2	-	-
F	300	324.0	204	220.3	-	-	-	-
Total		838.8		1,094.2		793.9		295.6

A.6 HOUSING FINANCE NOTES AND CONDITIONS

Up to now, at the end of construction and the 2-year rental period, new house owners obtain a loan through Bank Tabungan Negara (BTN). For all Perumnas housing the loan conditions have been set as follows:

1. Maximum loan: 95 percent of house purchase price, or BTN valuation.

2. The balance of the purchase price to be paid by the loan applicant - and deemed to be the deposit, of which 2½ percent is retained by BTN, and in the event of the loan not being approved, is not refundable - but deemed to be the fee for processing of loan.

3. Repayment period for Perumnas schemes: 5 to 20 years. This has been reduced to 15 years in practice.

4. Interest rate for Perumnas schemes is:

   - 5 percent for lower income households (i.e. Civil Servants Grade I and II up to Rp.63,000 a month)

   - For others it is 9 percent p.a., as for BTN financed non-Perumnas housing schemes

5. Debt repayment should not exceed one-third of regular monthly income of borrower, and be repaid monthly.

6. Loans will only be given for houses with land titles eligible for hypotecs (i.e. hak milik or hak guna bangunan).

<u>Additional Charges</u>

1. Approved applicants pay a processing fee of ½ percent of purchase price.

2. Legal fee for notarization range from Rp.7,500 to Rp.15,000

3. All properties require fire insurance. BTN organizes this or approves the insurance company. Annual house insurance premiums are 1.75 percent of the value of the building.

To date mortgage facilities have been virtually limited to public employees of Indonesian nationality and citizenship who do not own a house and are aged over eighteen or married, and under 60. In practice persons who have been in employment for at least ten years have been preferred.

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A.7 ANTICIPATED IMPACTS OF THE SSCH/LCH PROJECT

A.7.1 Environmental Aspects of Medan III

The primary impacts which Medan III will have on the environment are listed as follows:

Positive Impacts	Negative Impacts
• Individual water supply for low income households resulting in improved public health.	• Reduction in agricultural land through conversion of rubber estate into urban uses.
• Improved wastewater management through individual pit latrines.	• Possible increased flooding in surrounding agricultural land.
• Improved solid waste collection for low income families.	Increased urban development pressure on surrounding agricultural areas.
• Development of new job opportunities in area due to commercial and small scale industry sites.	• Possible pollution of streams passing through the site.
• Improved housing for low income households now living in high density substandard dwellings.	• Loss of jobs for agricultural workers now on the site.
• Consolidation of development along the Brastagi road.	

The primary negative impact of Medan III will be the reduction of agricultural land through the conversion of the rubber estate into urban uses. However, the trees on the estate are nearing the end of their productive life and will, within the next ten years, need eventual replacement. Thus investment in new trees will have to occur to keep the estate producing. Since this has not happened over the past few years, production of rubber from the estate will drop during this replanting period. Furthermore, surrounding development such as the hospital which is now under construction, and the linear development along the Brastagi road, already are placing urban development pressures on the surrounding agricultural areas. Development of Medan III will consolidate that linear development which will reduce the need to continue to expand infrastructure and services to serve this linear development.

It is possible that some flooding to surrounding agricultural lands could occur due to channeling all surface water runoff from Medan III into existing streams. However these streams currently drain the site. While there may be an increase in surface runoff due to the paving of streets which reduces soakage area, the total increase in surface

runoff should not cause flooding in existing streams since their channels are well defined and have much lower elevation than surrounding areas. Furthermore, most of the surrounding agricultural uses are rice paddies which require large volumes of water.

A more serious threat to surrounding agricultural areas is the potential pollution of existing streams resulting from drainage of household grey waters into these channels and the possible solid waste disposal by households into these channels. However Medan III will provide solid waste disposal facilities for all residential and other urban uses intended for the site. This solid waste will be either disposed of on solid waste disposal sites on the site or will be trucked to municipal solid waste disposal sites. Thus, the impact on surrounding streams should be minimal. The practice of diposal of household grey waters into streams and rivers is common throughout Medan and, until treatment facilities are constructed, is unavoidable. The impact on these streams will be somewhat minimized since toilet wastes will not be disposed into the streams and low income households tend to consume less water than more effluent households. Thus the impact on surrounding areas should be minimal.

The loss of agricultural employment to the households living on the site will be compensated by the increase in surrounding job opportunities created on the site due to commercial and small scale industrial plots as well as the expected increase in small scale enterprises along the Brastagi road. In the short run, however, construction employment, which largely utilizes unskilled labor, will provide alternative short-term employment.

The positive impacts of developing Medan III outweigh the negative ones already mentioned. The incidence of water borne diseases is high in Medan due to widespread use of polluted shallow wells, particularly among low income groups. Medan III will provide individual house water supply for over 50,000 people, many of whom presently do not have such a supply and rely on polluted sources of drinking water. It will provide each household with individual pit latrines and has been designed to allow easy installation of municipal sewers at a latter date when it proves economically feasible to do so. Each household will be provided with solid waste collection services which will dispose of solid waste in sanitary disposal sites.

As mentioned in the employment section, the project will generate an estimated 1000 new jobs during the construction of Medan III and provides five hectares of commercial and light industrial areas for future employment. It will also stimulate more employment opportunities in surrounding areas along the Brastagi road.

Finally, the Medan III project will provide 50,000 low income persons with the opportunity to own their own housing rather than rent it as most are presently doing, often in substandard living environments.

A.7.2 Impact of SSCH/LCH on Employment Generation

Housing has a significant direct and indirect employment effect. First, the additional construction creates jobs and income; second, estate households provide a labor pool and generate additional employment, particularly if new industrial opportunities locate close by; and third, there is a multipler effect through additional demand created.

The program for the servicing of 160 hectares, and the construction of nearly 8,400 houses will create substantial employment for skilled and unskilled construction workers over the construction period. It is estimated that there are approximately 16,000 persons employed in the construction sector. This would give a city potential of 160,000 man-months a year, assuming ten months are worked in a year. Thus at the program's peak in 1982/83, the Medan III project would create around 1000 jobs or add six percent to the existing numbers of employees. Roughly 70 percent of these workers will be unskilled and thirty percent skilled. At Medan II some 895 person months of employment are scheduled for 1980/81, the last year of that program. Thus, assuming these persons are transferred to Medan III and that workers already at the Medan III site continue, the net generated man-months of employment in 1981/82 would be of the order of 5,760 man-months or approximately 550 persons, though this requirement is estimated to fall in 1982/83. A big increase is estimated for 1983/84 when there should be employment during that year for nearly 1,000 men. Unless the construction industry outside of Perumnas housing is depressed, a maximum of 1,000 additional jobs will have been created by the project.

In addition, there will be demand generated for the completion of the core housing, and the construction on plots sold outright. It is considered likely that many householders will contract out some part of the remaining building activities. Indirect jobs created though the increased demand for materials have been estimated on the basis of 20 percent of materials costs, and each job costed at Rp.260,000 a year. By the end of the second year nearly 600 additional jobs would have been created, increasing by a further 300 jobs in the third year of construction making a maximum of about 900 new jobs.

In addition, 5 hectares of commercial lots have been included, which will also generate jobs in time.

In conclusion, it is considered that a total of 1,900 additional jobs could be created when the construction program is at its peak. The demand would be roughly for 30 percent skilled at the site and 70 percent skilled in the building materials industries.

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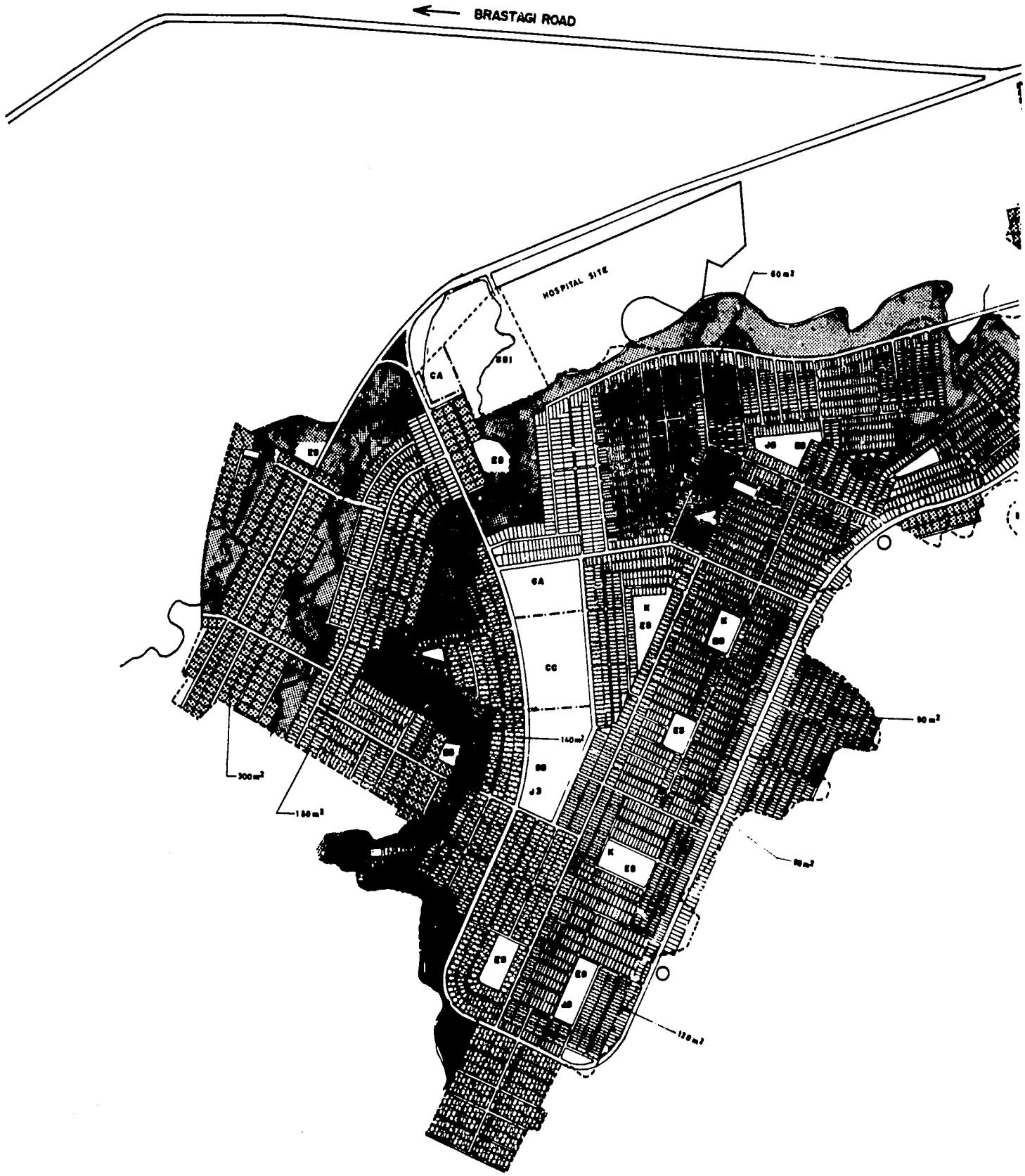
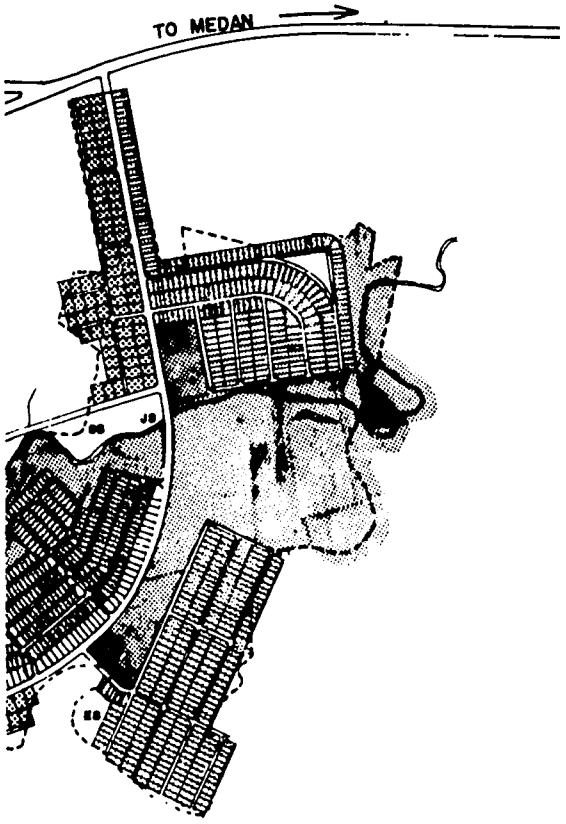
APPENDIX B

SITE LAYOUT FOR SSCH/LCH PROJECT



Best Available Document

SSCH/LCH PROJECT
LAND USE AND PLOT DISTRIBUTION



LEGEND

- 60 M² PLOT (A TYPE)
- 90 M² PLOT (B TYPE)
- 120 M² PLOT (C TYPE)
- 140 M² PLOT (D TYPE)
- 180 M² PLOT (E TYPE)
- 180 M² PLOT (E_1 TYPE)
- 300 M² PLOT (F TYPE)
- CA — COMMERCIAL AREA
- SSI — SMALL SCALE INDUSTRY
- CC — COMMUNITY CENTER
- K — KINDERGARTEN
- ES — ELEMENTARY SCHOOL
- JS — JUNIOR SECONDARY SCHOOL
- SS — SENIOR SECONDARY SCHOOL
- PARKS AND OPEN SPACE
- SOLID WASTE DEPOT
- ----- SITE BOUNDARY

NOTE: SITE ACQUISITION AND SURVEY WORK HAD NOT BEEN COMPLETED AT THE TIME OF PREPARATION OF THIS MAP WHEN DETAILED HORIZONTAL AND VERTICAL CONTROL-DATA ARE AVAILABLE, A 1:1000 SCALE SITE LAYOUT - SHOULD BE PREPARED FOR USE IN THE FINAL DESIGN

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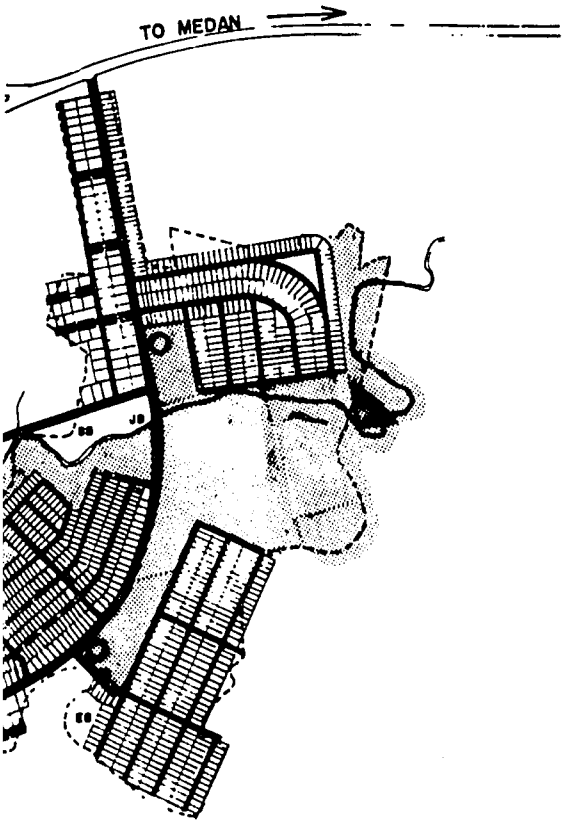
SSCH/LCH PROJECT ROADS AND PATHS



LEGEND

- ROW 12 m
- ROW 10 m
- ROW 8 m
- ROW 6 m
- ROW 4 m
- ROW 3 m
- CA — COMMERCIAL AREA
- SSI — SMALL SCALE INDUSTRY
- CC — COMMUNITY CENTER
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