(2) Examination of implementation plan by each revenue source

Two cases of revenue source, disposition of reserve land, and shared defrayment of public facilities by the management authority, are examined. Case-1 as a revenue source is supplied from disposition of reserve lands, due to the following reasons, however, shared defrayment of public facilities by the management authority is expected to introduce an encouraging land readjustment project.

- Land readjustment legal system has not been enacted in Thailand. As a result, adjustment process of project implementation is quite complicated at present and takes too long.
- The project can progress smoothly if the landowners agree in the implementation.
- It is expected that project commencement will be the first pilot project in Thailand.

(3) The time to dispose reserve land

Reserve land shall be disposed for revenues after the completion of the construction work. The project area shall be divided into three construction sites: Phase 1, Phase 2, and Phase 3. Phase 1 and Phase 2 shall be completed at the stage of the fourth fiscal year. Therefore, it is possible to dispose of reserve land.

7.2 Reference Draft of Land Readjustment Implementation Plan

An implementation plan on the land readjustment project must be stipulated by law and its prescriptions in the clause of the L/R legal system proposal as follows.

(1) Project area
(2) Outline of L/R design
(3) Project schedule
(4) Financial program

Moreover, the principle contents of the land readjustment implementation plan are described below.

1. Project and Implementation Body

1.1 Project Name
1.2 Implementation Body
1.3 Project Area

1.3.1 Location of Project Area
1.3.2 Map of project Area Boundary

2. Outline of L/R Design

   2.1 Purpose of the Project
   2.2 Current Condition of the Project Area
   2.3 Concept Plan
   2.4 Comparison of Land Use before the Project and after the Project
   2.5 Calculation of Reserve Land
   2.6 Development Plan for Public Facilities
   2.7 L/R Design Map

3. Project Schedule

4. Financial Program

   4.1 Revenue
   4.2 Expenditure
   4.3 Annual Financial Plan

5. Others

Reference

The land readjustment implementation plan of this project (85 ha) shall be attached as a reference draft.

L/R PROJECT IMPLEMENTATION PLAN (proposed)

I. L/R Project Title

1. L/R Project Title

(Project Title)

2. Name of the Developer

(Developer Name)

II. L/R Project Area

1. Location of the Project Area

The project area is located in the fringe of Bangkok urban area, about 8 km from the west of the king's palace, is shown in **Figure 3.4.50**. The north side of the project area is facing to an arterial road. Rama IX road and the south side of the project area face the railway line. The opposite side of the Rama IX road, the Skytrain workshop is planned and proposed expressway alignment and proposed Skytrain alignment across the project area.

The project area is designated to middle density residential area by the Bangkok General Plan.

2. The Project Area Boundary

The project area is located in a part of Khet Huai Khwang as shown in **Figure 3.4.51**.

III. L/R Design

1. L/R Design

1.1 Purpose of the Project

Purpose of the project are in line with the idea of CBD development as follows.

(1) Most advanced and high grade CBD
(2) Multi-functional and diversified urban center for next generation
(3) High quality urban landscape

Figure 3.4.50 - Location of the Project Area

Figure 3.4.51 - The Project Area

1.2 Existing condition of the project area

1.2.1 Outline of the project area

The basis features of the project area are summarized as follows.

(1) Pocket Land = Open Land

While Bangkok's built-up area has been largely expanding outward, the project area was left as open land. The area still remained in the rural land use conditions or rural community in spite of the fact the immediate adjacent areas have already been densely built up.

This seems mainly due to the SRT railway blocking the urbanization penetration in the area and the absence of Rama IX road which was recently constructed.

Consequently, the project area features agricultural land uses with some farm houses located along the canal.

(2) Rapid Urbanization

Construction of Rama IX road is generous to urbanization in the project area resulting in conflict between urban land use and agricultural land use.

(3) Large Scale Projects

Large scale projects such as the Expressway, Skytrain and Royal City Avenue, etc., have been planned to traverse the project area.

1.2.2 Existing Land Use

Public Land	0.03%
Private Land for Public Use	13.46%
" (proposed)	6.75%
Private Land	76.92%

1.2.3 Existing Road and Private Land

There is a 6 m width road in the east side of the project area that is identified on the cadastral map.

The others are private road called soi. 20 m width road aligns along the west side of the project boundary where is under development and to through the commercial facility called Royal City Avenue built up on the SRT property.

Most of the private land is being served by 100 m radius area from Rama IX road.

1.2.4 Existing Building

Most of the newly developed commercial facilities and those under construction are being designed as high rise buildings. However, housing design has the majority of two story buildings. Buildings in the Royal City Avenue are five storys.

1.2.5 Geographic Characteristics

The ground level of the project area is -0.5 m to 2.0 m above the sea level and nearby flat undulation. The majority of the project area has a retained water function due to grasslands, otherwise it is vacant land use.

1.2.6 Drainage

There is neither a drainage system nor a plan in the project area. Current storm water in the project area drains to the existing canal.

1.2.7 Supply Facilities

There is a main water supply pipeline along the Rama IX Road, and a water supply to Royal City Avenue (commercial facilities)

1.2.8 Other Facilities

There are no educational facilities and factory.

1.2.9 Existing Land Price

Official average land price in this area, data source from CVA, is 15,200 Baht per sqm.

1.3 L/R Design Concept

1.3.1 Land Use

Legal land use of the project area is medium density residential area designated by the Bangkok General Plan. Under this category of land use, land use development other than residential use is allowable within the 10% of the medium density residential area.

In this project, the land use plan as shown below is set forth in order to indicate the main distribution pattern of urban activities/functions.

1. Business office
2. Office/commercial complex
3. Commercial
4. Residential

1.3.2 Public Facilities Plan

- Road

  Road alignment is set forth based on the Master Plan of the hierarchical road network. Arterial road (width 30 m, 20 m), district road (12 m, 10 m) and access road are planned.

- Park

  More than 3% of the project area is set forth in two areas, and open space and park shall be a planned green network.

- Canal and Open Space

  Khlong Sam Sen and Khlong Yommarat shall be improved for storm water drainage and be planned storm water retention area in the project area. Open space along the canal including canal space is set forth more than 5% of the project area.

- Drainage

  Drainage pipe network shall be planned and drain into the existing canal. Sewerage system in this area shall be planned based on the sewerage improvement plan by the BMA, the existing plan does not cover this area so that the sewerage is proposed by each developer.

- Water Supply

  Water supply in the project area is served by the MWA.

1.3.3 Public Utilities

- Electricity/Telecommunication

  Main transmission lines of electricity/telecommunication have been constructed around the project area. The service system of electricity and telecommunication in the project area shall be establishment by the Metropolitan Electricity Authority and Telephone Organization of Thailand.

1.3.4 Filling Land

The land in the project area shall be filled 1 m average up for preventing floods on the existing land.

1.4 Land Area before and after the Project

1.4.1 Land Use Comparison

See **Table 3.4.44.**

1.4.2 Contribution Ratio

See **Table 3.4.45.**

1.5 Proposed Reserved Land Area

See **Table 3.4.47.**

1.6 Public Facilities Improvement Plan

1.6.1 Major Public Facilities Development except this Project

Proposed Expressway alignment area and proposed Skytrain area are defined as a proposed expropriated area. So that across the area between Expressway, Skytrain and road, a park is defined as public land.

The Royal City Avenue is one of private commercial development, however, the land belongs to the public sector, State Railway of Thailand. Some access roads are connected to the Royal City Avenue development area due to the future railway improvement plan.

1.6.2 Public Facilities Improvement

Road, lighting, safety guards and planting on the arterial and district road shall be improved and roads shall be constructed on the filled land.

park	:	parks shall be improved with necessary facilities, plaza and so on
canal	:	edge of the canal improvement and canal dredging shall be carried out. The area along the canal shall be improved as a retention area and a park.
public facilities list		**(Table 3.4.48)**

2. L/R Work Design Drawing

L/R work design drawing shall be mapped out in the scale of more than 1/1000. **(Figure 3.4.52)**

Table 3.4.44-Land Use Comparison

	Category	Before Project		After Project	
		Area (m^2)	Ratio (%)	Area (m^2)	Ratio (%)
Public Land	CBD arterial road	0	0.00%	23,490	2.74%
	District road	0	0.00%	38,035	4.43%
	Distribution road	0	0.00%	74,483	8.68%
	Access road	270	0.03%	43,980	5.13%
	Sub Total	270	0.03%	179,988	20.98%
	Canal	24,410	2.84%	16,828	2.00%
	Open space	0	0.00%	26,501	3.10%
	Park	0	0.00%	26,889	3.10%
	Sub Total	24,410	2.84%	70,218	8.18%
	Sub Grand Total	24,680	2.88%	250,206	29.16%
Land for Public Use	Expressway	39,621	4.62%	23,967	2.80%
	Skytrain Workshop	0	0.00%	0	0.00%
	Skytrain (MRT)	18,305	2.13%	6,131	0.70%
	Royal City Avenue	93,025	10.84%	89,640	10.40%
	SRT	22,450	2.62%	20,109	2.30%
	School	0	0.00%	0	0.00%
	Sub Total	173,401	20.21%	139,847	16.30%
Private Land	Residential	0	0.00%	0	0.00%
	Commercial	0	0.00%	0	0.00%
	Private Road	0	0.00%	0	0.00%
	Government	0	0.00%	0	0.00%
	Wat	0	0.00%	0	0.00%
	Agriculture	0	0.00%	0	0.00%
	Unused Land	660,004	76.92%	437,732	51.01%
	Sub Total	660,004	76.92%	437,732	51.01%
	Sub Grand Total	833,405	97.12%	577,579	67.31%
	Reserved Land	0	0.00%	30,300	3.53%
	Adjustment	0	0.00%	0	0.00%
	Grand Total	858,085	100.00%	858,085	100.00%

Table 3.4.45-Contribution and Ratio

			Contribution Land Area			Contribution Rate		
Total Private Land Use (A) (sqm)	Total Adjusted Land Area A A (sqm)	Private Land Area after PJ Included Reserved Land E (sqm)	Contribution Area for Public Use P (sqm)	Contribution Area for Reserved Land R (sqm)	Added up Land Area D (sqm)	Contribution Rate for Public p=P/A (%)	Contribution Rate for Reserved Land r=R/A (%)	Final Contribution Rate d=D/A (%)
833,405	833,405	607,879	225,526	30,300	255,826	27.06	3.64	30.70

Table 3.4.46-Private land Price

Private Land Area (A) (sqm)	Adjusted Land Area A (sqm)	Land Price before PJ (Unit) a=V/A (Baht/sqm)	Land Price before PJ (Total) V=Aa (TB)	Land Area after PJ E (sqm)	Land Price after PJ (Unit) e=V'/E (Baht/sqm)	Land Price after PJ (Total) V'=Ee (TB)	Increased Ratio y=e/a
833,405	833,405	15,200	12,667,756	607,879	30,000	18,236,370	1.97

Table 3.4.47-Proposed Reserved Land Area

Total Land Price before PJ V (TB)	Total Land Price after PJ V' (TB)	Increased Land Price (Total) Delta V=V'-V (TB)	Land Price per sqm after PJ e (Baht/sqm)	Maximum Land for Reserved Land Rmax=DV/e (sqm)	Reserved Land Area R (sqm)	Ratio R/Rmax (%)	Remarks
12,667	18,236,370	5,568,614	30.00	185,620	30,300	16.32	

TB: Thousand Baht

Construction and Compensation Cost 909,000 TB 1.090706199 TB/sqm

Average LP before PJ 15.2 Thousand Baht
Land Price after PJ 30 Thousand Baht
Increase Ratio 1.97

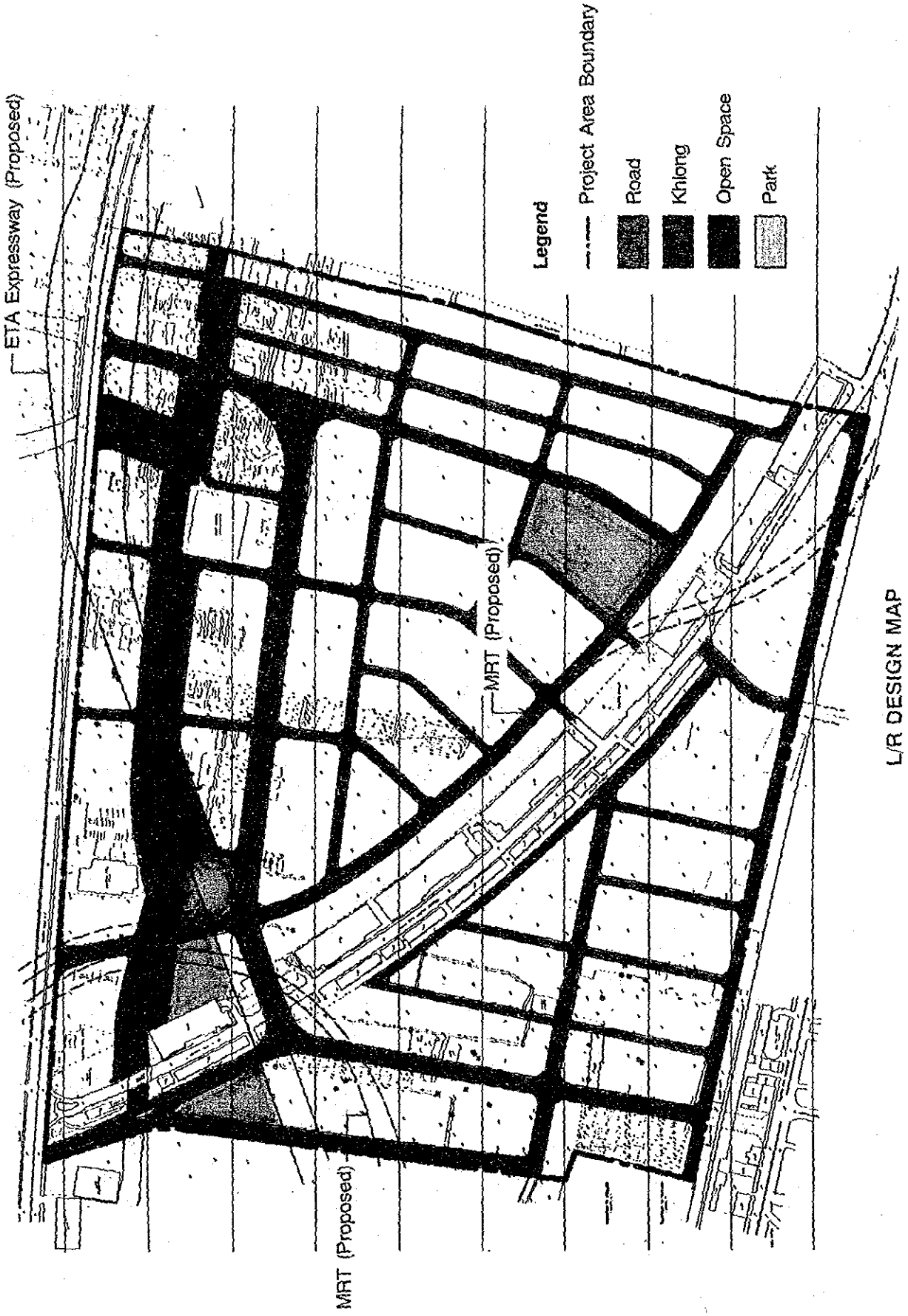
Table 3.4.48-Public Facilities List

Public Land	Width (m.)	Length (m.)	Area (m^2)	Remark
Land for Road				
CBD arterial Road	30	780	23,490	
District Road	20	1,821	38,035	
Distribution Road	18/16/12	5,389	74,484	
Access Road	10	4,333	43,980	
Land for Khlong	20	75	1,500	Khlong Sam Sen:
	18/15	307	5,097	L = 1067 m
	13	787	10,231	Khlong Huai Khwang
				L= 102 m
Land for Park and Open Space				
Pedestrian Park	-	-	11,458	
District Park	-	-	15,431	
Khlong Green Park	-	-	26,501	
Total of Public Land			250,207	

IV. Project Period

Commencement date (approved date)
Completion date

Figure 3.4.52-L/R Design Map



V. Financial Plan

1. Income

See **Table 3.4.49**.

2. Project Cost

See **Table 3.4.50**.

3. Annual Financial Plan

See **Table 3.4.48**.

Table 3.4.49-Income Flow

Category	Amount (1000 Bt)	Calculation
National & local government's subsidies	0	
Sales of reserve land	909,000	30,000 Bt/sqm * 30,300 sqm
Shared defrayment of public facilities by the management authority	0	
Others	0	

Table 3.4.50-Project Cost

Item	Amount (x1,000 Bt)	Remark
1. Compensation cost	98,270	Refer to Table 2.8.2
2. Infrastructure development cost	575,210	Refer to Table 2.8.1
3. Survey and design fee	94,280	14% of item (1. + 2.)
4. Operation cost	76,770	10% of item (1. + 2. + 3.)
Subtotal	844,530	
5. Repayment of interest	64,470	Interest rate : 12% Project period: 5 years
Total Project Cost	909,000	1,059 Baht/m^2

Table 3.4.51-Annual Financial Plan

Unit: Thousand Baht

Year	1	2	3	4	5	Total
Expenses						
Construction	0	0	293,920	281,290	0	575,210
Compensation	0	0	19,450	78,820	0	98,270
Survey & Design	18,800	23,600	14,000	14,000	23,880	94,280
Interest	2,028	6,615	30,267	25,560	0	64,470
Administration	15,000	15,000	15,000	15,000	16,770	76,770
Total	35,828	45,215	372,637	414,670	40,650	909,000
Income						
National & local government's Subsidies	0	0	0	0	0	0
Shared defrayment of public facilities by the management authority	0	0	0	0	0	0
Sales of reserve land	0	0	0	454,550	454,550	909,000
Total	0	0	0	454,550	454,550	909,000
Balance	-35,828	-45,215	-372,637	39,830	413,850	±0
Loan	35,828	45,215	372,637	0	0	453,680

Part IV.
Replotting System and Design/Plan

Volume I.
Land Evaluation

Volume I: Land Evaluation

1. Current Land Evaluation in Thailand

Land evaluation in Thailand is carried out as asset evaluation for the purpose of assessment of taxes and registration fees. Evaluation for land, buildings, etc., was originally carried out objectively by an experienced land assessor. The Ministry of Interior published the *"Asset Valuation Handbook"* in 1982, and currently evaluation methods giving results close to market values are employed.

The asset evaluation methods used in the Asset Valuation Handbook can be categorized into the following three general divisions.

a. Income approach
b. Cost approach
c. Market approach

Of these three methods, the most appropriate method currently in Thailand is the market approach.

Moreover, in parallel to this, based on the Land Act (1954), Land Office, the Ministry of Interior has produced the *"Land Evaluation Handbook"* for the calculation of land value which is the basis for levying associated in the issuing of documents, surveying, registering of rights and legal actions and execution of other actions related to real estate which indicate possession of land rights. The evaluation process based on the Land Evaluation Handbook consists of the following three stages.

a. creation of a map of the land to be valued
b. collection of trade data for the previous three year period and other necessary data
c. comparison with market values, data analysis and evaluation of land

This comparison with the market value is the primary method used in land evaluation in Thailand.

2. Land Evaluation Method for L/R Projects in Thailand

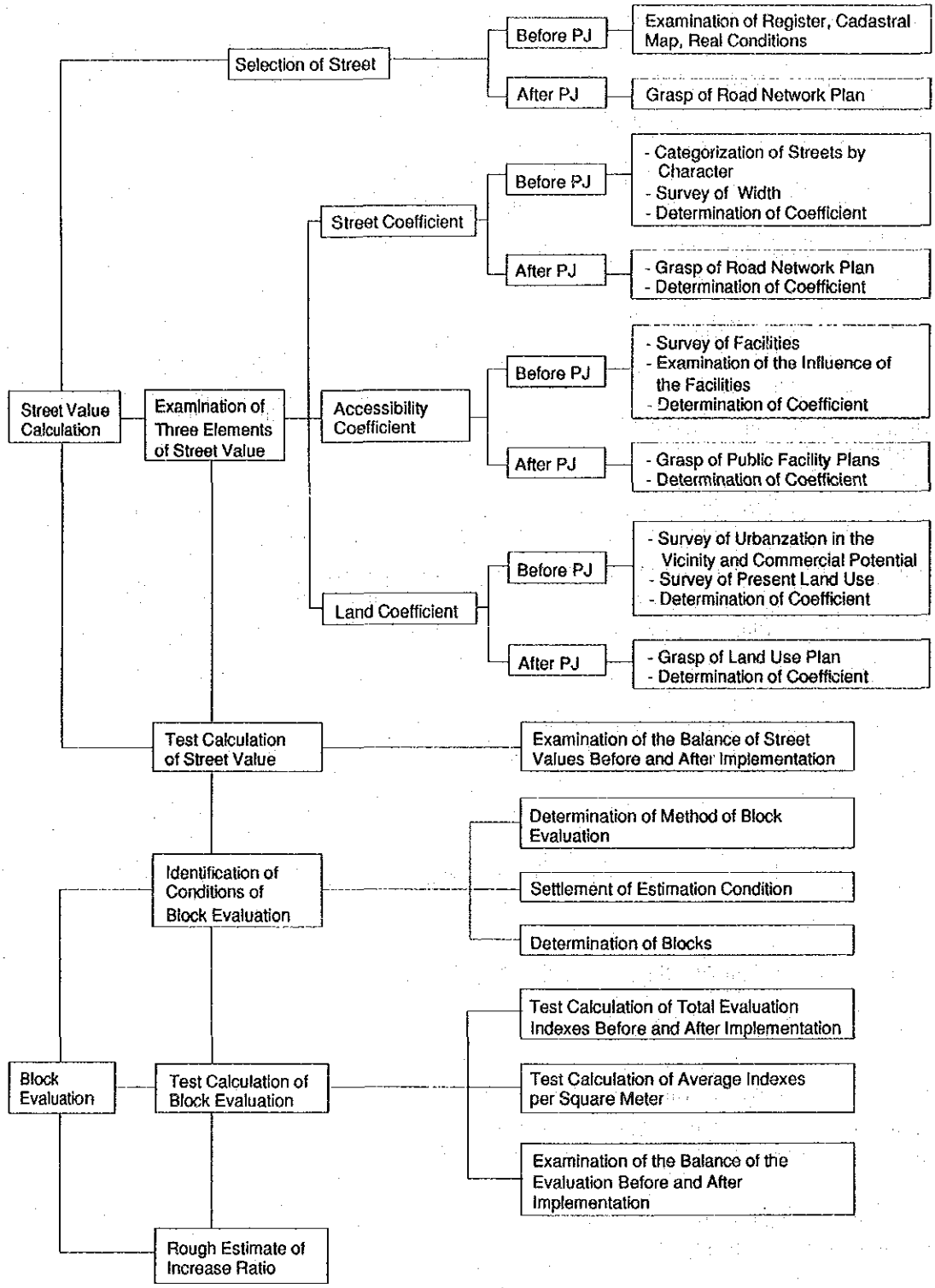
2.1 Proposal Evaluation Method

The method of land evaluation in Thailand is by calculation using market analysis. When this evaluation method is applied to L/R projects, even if it is suitable in the pre-project stage, it is difficult to project the market value for each lot after a project.

For L/R projects in Thailand, we would propose the street value type land evaluation method which is generally used in Japan.

L/R projects aim at the improvement of public facilities and land use within the project area, and land evaluation for an L/R is not to be used in land transactions, but is used to realize fairness, rights, land value, with regard to land ownership rights and land lease rights, et cetera.

Figure 4.1.1 Land Evaluation Flow Chart



Moreover, it is necessary to carry out evaluation of ownership and lease rights covering a large area within a relatively short period and it must be done in a fair and appropriate way. Changing factors within the project due to project implementation and changing social factors without any connection to the project must be separated, and an understanding of the project related factors must be gained.

Regardless of how logically and scientifically the land value is measured, the calculation method is remarkably complex and variations occur depending on the person carrying out the evaluation. Moreover, results in terms of fairness between the persons concerned and distribution of increased benefits due to the project, etc., can conflict considerably with common sense making actual evaluation complicated.

Furthermore, in L/R projects, it is thought that in Thailand the rights of the lot before project will be transferred to the replot at the time of replotting disposition. Considerable time will be required from the project approval to the replotting disposition thus, it is necessary to conduct land evaluation using consistent evaluation standards.

In the above mentioned respects, the characteristics of the street value type of land evaluation are as follows.

- conducts evaluations on large areas in a comparatively short time.
- maintains the various balance for evaluation of large areas of land.
- prevents differences in evaluations depending on the person doing the evaluations.
- can cope with time difference before and after project.
- is relatively simple to obtain the consent of a large number of the concerned persons.

Land evaluation in the planning area will be carried out according to the process as in **Figure 4.1.1.**

2.2 Street Value Calculation

(1) Street Value

The standard value is expressed as the unit price of the standard lot which is assumed to face a standard road on one side and is rectangular.

Street value needs to be established to compare the mutual balance between the lots of the planning area and changes in the lot usage value due to the project. It also needs to be logical and objective enough to be commonly accepted.

The street values are expressed as an index number. Expressing it as a monetary figure is to be avoided because of fluctuations in the circumstances. Evaluation for L/R projects is convenient before and after implementation comparisons of fluctuations in price and increases in value due to project factors.

(2) Selection of Streets for Land Evaluation

In principle, street values should be given on streets consisting of roads and footpaths and making lot useable. When land evaluation is according to street value, the land value depends

on the adjacent road with the street values on it. Accordingly, selection of roads to be given a street value must be carried out with careful consideration. All the roads in the planning area and roads outside the planning area that connect with the planning area are studied, and of those having basic value regardless of whether they are public or private roads, selected roads are then given street values.

Roads given street values will be selected based on the following points.

1) Before L/R

- Public roads can be used by anyone without restriction and even if they are unusable presently, they will be improved using public funds to make them usable, increasing real value. Thus all roads on codastral maps regardless of width, will be given street values.

- Roads outside the project area that are essential for land evaluation will also be given street values.

- Private roads, excepting those that are not serving for access of the other lot, will be given street values.

2) After L/R

By the nature of the project, all the roads will be used for vehicles and pedestrains, and all roads within the project area will be given street values. Roads outside the project area and connected to it will be the same as before readjustment.

(3) Street Value Formula

The structure of the street value formula, while considering the trends of the various coefficients, shall be studied considering the characteristics of the planning area.

The elements making up the structure of the street value formula shall be street coefficients, accessibility coefficients and land coefficients. These three (3) elements are:

1. The categorization of general factors structuralizing prices of land resulting from L/R projects into various elements;

2. find general values expressed by an element obtained by arranging related characteristics together and determining common points;

3. apply the general value to respective lots with adjustments made using elements expressing the necessary conditions for each lot; and ,

   In addition, when available, elements that express physical and other conditions and clearly measure the affect of those conditions on each lot should be included.

These are expressed in a formula as follows

(street value) = (street coefficient) + (accessibility coefficient) + (land coefficient)
$= \{t \cdot F(W)+\Sigma X\}+\{\Sigma m \cdot F(s)\}+\{u \cdot f(P,Q)+\Sigma Y\}$

1) Street Coefficient

The street coefficient is the coefficient expressing the usability value according to the street to which the lot is fronting. It fluctuates according to the systematic continuity, width, structure and landscaping of the street and is expressed as follows.

street coefficient $= t \cdot F(W)+\Sigma X$

$t \cdot F(W)$: the usability value of lot according to street traffic function

ΣX : the usability value of lot according to open space function and degree provision of roads

t : coefficient expressing the grade of a street in terms of street traffic flow characteristics, systematic and continuity, etc., in the road network (see **Table 3.3.1)**

$F(W)$: the function for street width, used to adjust the t value according to width

(a) $F(W) = \frac{W-C}{W}$ ..... $W \geq C$

$F(W) = \frac{W}{C}$ ..... $W < C$

(b) $F(W) = \frac{W}{W+C}$

However, C is a constant determined by the specific project area

X : coefficient for lot usability value based on open space function provided in attached **Table 4.1.2**.

Table 4.1.1 "t" Value

	Commercial Area	Residential Area	Remarks
Arterial Road	2.0~4.0	1.5~2.5	
Second Arterial Road	1.5~3.0	1.5~2.5	
Distributor	1.2~2.0	1.2~2.0	
Access Road	1.0~1.5	1.0~1.5	
Impasse	0.5~1.5	0.5~1.5	
Others			

Table 4.1.2 "X" Value

	Commercial Area	Residential Area	Remarks
Pedestrian Path	0.5~2.0	0.2~2.0	
Side Walk	0.1~0.5	0.1~0.3	
Landscaped Road	0.1~0.2	0.1~0.2	
Unpaved Road	-0.1~-0.2	-0.1~-0.2	
Others	0.5~2.0	0.2~2.0	Canal

- Determination of Coefficients

a. *"t"* Value

It is necessary to determine *"t"* values by studying the connection between arterial roads and the project area and the stratum structure of roads, with sufficient consideration given to changes in the street value for the roads.

In the planning area, Rama IX Road is the only public road before the project while all the other roads are private. Private roads which are used only in daily living are given a *"t"* value of 1.0. At post-readjustment ordinary roads will be given a *"t"* value of 1.0 to be set as the standard. From this, the *"t"* values will be set at 1.2 ~ 1.5 for distributive roads, 1.5 ~ 2.0 for major roads and 2.0 ~ 2.5 for arterial roads. The street value for each of these roads is set taking into consideration the balance of the project area and using the respective *"t"* values.

b. *F(W)* Value

The width of the study area roads is greater than 4 m generally. The road width formula reflecting this is

$$F(W) = \frac{W}{W+4}$$

However, $W=4$ is calculated for roads less than 4 m in width so that there are no changes to the *F(W)* value for these.

c. *"X"* Value

The *"X"* value is determined with consideration of the balance with the value $t \cdot F(W)$.

The *"X"* value for footpaths is set 0.200 regardless of the width of the footpath. Most roads in the central area of Bangkok are paved, unpaved roads shall be given a value of -0.200 as deficient.

2) Accessibility coefficient

The accessibility coefficient expresses the benefits brought about by existing traffic, leisure and public facilities, etc., and can be expressed both as a positive and negative value.

Accessibility coefficient = $\Sigma m \cdot F(s)$

m : index expressing size of benefits resulting from specific facilities

$F(s)$: index successively diminishing the "m" value according to the distance (s) from the specific facility. Expressed as follows.

$$F(s) = \frac{(S-s)}{S} \times n$$

S : effective range
n : characteristics of successive decrease
s : distance between the street and the specific facility

Table 4.1.3 Standard Values of "S", "m" and "n" Values

Facilities		S	m (for Commercial Area)	m (for Residential Area)	n	Remarks
Favourable						
• Transport Facility	. Railway Station . Bus Stop	800~5000 300~1000	0.3~1.5 0.1~0.2	0.3~1.0 0.1~0.2	1 or 2 2	
Commercial Facility	. Neighborhood . Market . Supermarket	500~3000	-	0.3_1.0	1 or 2	
School	. Primary School . Secondary School	500~1000	0.1~0.2	0.1~0.2	1 or 2	Uniform value applicable all over the area
Park	. Small Park . Large Park	- 500~1000	0.1~0.2 0.2~0.5	0.1~0.2 0.2~0.5	- 1 or 2	Uniform value all over the area Uniform value applicable all over the area
Adverse						
With no Antimeasures	. Dump Site . Slaughter House . Electricity Substation . Etc.	100~300	-0.1~-0.5	-0.1~-0.5		
Other Favourable/Adverse Facility						

- Determination of Coefficients

The facilities related to the planning area are shown in **Table 4.1.3** and the use of these facilities before and after readjustment has been determined with consideration to the area conditions, characteristics of each facility and location, et cetera.

Table 4.1.4.4 Application of "*S*", "*m*" and "*n*" Values

Facility		Location (to the area)	Application		Remarks
			Befor e	After	
Transport Facility	. Railway Station . Skytrain Hopewell . Bus Stop	Outside Outside Inside	No No No	No Yes No	. No effect on the area . Open in future, effect expectable . Very small effect although there are routes
Commercial Facility	Ratchadaphisek Road	Outside	Yes	Yes	Department stores (ex. Yaohan, Robinson) are effective strongly
School	. Japanese School . Uthai Tharam School	Outside Outside	No No	No No	. No effect on the area . Very small effective on the area
Park		Inside	-	Yes	Planned after the implementation

The values for the coefficients are shown in Table 3.3.5

Table 4.1.5 "*S*", "*m*" and "*n*" Values

Facility	*S*	*m*	*n*	Remarks
Commercial Facility	2,500	0.5	1	
Skytrain/Hopewell	2,500	0.3	1	
Park		0.2		Uniform all over the area

a. "*m*" Value

The effect of the various facilities on the planning area is small. The largest factors in the land evaluation are usage level derived from the road adjacent to the lands and the regional conditions of the lots themselves.

However, there is some effect from the Rachadapisek Road commercial area, which has therefore been designated as a commercial facility to give a "*m*" value of 0.5. In addition, the new traffic systems are being planned and functioning by the time that this L/R project is implemented. It will therefore be included only as a part of post-readjustment and will be given a value of m=0.3. Furthermore, it is thought that the distance from parks has no effect and therefore a uniform value for the project area of m=0.2 has been assigned.

b. *"S"* Value

The *"S"* value, effective range from the specific facilities, with consideration to the fact that Thailand is a car oriented society, has been assigned a value of S=2500 to cover the whole planning area.

c. *"n"* Value

It is thought that the planning area is not influenced by steep successive decrease resulting from distance from the facilities, and a value of n=1 has been assigned.

d. *"s"* Value

The *"s"* value, distance between the street and the facility is measured considering Thailand's road network given as the effective radius (or the road distance). However, effective radius of every 500 m are categorized as a unit.

3) Land Coefficient

The land coefficient expresses the value for usage condition of the lot itself, cultural characteristics, safety characteristics and natural environment, etc., and is expressed as follows.

$u \cdot F(P,Q)$: the usage and usability value of lots comprehensively derived from the service level of the land use and the public facilities

ΣY : the lot usability value according to the culture and health factors

u : the general usability of the lot as a basic grade according to regional conditions and land usability, shown in **Table 4.1.6**.

Table 4.1.6 *"u"* Value

	u	Remarks
Commercial Area	1.0 ~ 3.0	
Residential Area	1.0 ~ 2.0	

$F(P,Q)$: the function modifies *"u"* value depending on land usability, disaster prevention and safety resulting from infrastructure improvement, expressed as follows

$$F(P,Q) = \sqrt{(P/P_0)(Q/Q_0)}$$

P_0 : standard ratio of public land (%), the standard value will be 20 ~ 30

P : ratio of public land in the district where the lot is located, (%)

Q_0 : standard street density (m/ha), the standard value will be 200 ~ 300

Q : street density in the district where the evaluation point is located (m/ha)

ΣY : index expressing value and usability added due to physical conditions such as improvement of utilities with direct influence on lot usability, shown in **Table 4.1.7.**

The P_0 and Q_0 standard values have been determined using regions in Thailand where land subdivision has been carried out as a reference. From this it was judged that the L/R project after project public land ratios and street density will be approximately the same as in Japan. Nevertheless these values may be altered according to conditions in the project area.

Table 4.1.7 "Y" Value

Items		Y	Remarks
Public Utilities	Improvement of Both Water Supply and Sewage	0.3 ~ 0.5	
	Improvement of Water Supply Only	0.1 ~ 0.3	
	Others		
Natural Environment	Excellent	0.1 ~ 0.2	
	Bad	-0.1 ~ -0.2	
Others			

- Determination of Coefficients

a. "u" Value

- Before Readjustment

The planning area, except a small portion where land subdivision is undergone is almost all under development. So undeveloped land will be given a value of u=1.0 as the standard, while other lands are assigned values of 1.0 ~ 1.6 based on comparisons using this standard and further study.

- After Readjustment

The post-readjustment use planning is made up of commercial areas and residential areas. The "u" value for the general residential area of the project area has been determined at approximately 1.8, considering the development, land contribution balance and pre-readjustment "u" value. The commercial area potential should be added to the original street value. However for this study, considering the fact that use is not established and the complexity of a dual street value allowance because of changes in lot utility either laterally or vertically, will include commercial factors in the land valuation.

b. The $F(P,Q)$ Value

- P_O and Q_O Values

  The P_O and Q_O standard values will be 25 and 250

- "P" and "Q" Values

  $F(P,Q)$ modifies the "u" value that expresses utility of lots, disaster prevention and safety according to the condition of public facilities. "P" is the ratio for public land use in the targeted area and "Q" is the street density for the targeted area.

  Project area roads and roads outside the project area along the project area boundaries influencing utility, disaster prevention and safety of the area will be included in calculations for that area. In addition, the previously mentioned effective usability, disaster prevention and safety of the lot will be judged in total and regardless of whether public or private road, all roads will be added to the street density and public land ratio.

- Before Readjustment

Public land area (m^2) = area of public land roads, canals + private road area

Road length (m) = public road length + private road length

$$P = \frac{\text{public land area } (m^2)}{\text{calculated project area } (m^2)} \times 100$$

$$Q = \frac{\text{road length (m)}}{\text{calculated project area (ha)}}$$

$$F(P,Q) = 1 + \sqrt{(*/25) \times (*/250)}$$

- After project

Public land area (m^2) = area of public land roads, canals, parks

Road length (m) = Length of planning roads, etc.

$$P = \frac{\text{public land area } (m^2)}{\text{calculated project area } (m^2)} \times 100$$

$$Q = \frac{\text{road length (m)}}{\text{calculated project area (ha)}}$$

$$F(P,Q) = 1 + \sqrt{(*/25) \times (*/250)}$$

c. "Y" Value

Both before and after readjustment, water utility facilities will be completed or scheduled for completion. Rainwater drainage is scheduled to be completed after readjustment. The "Y" value will be 0.100 for water supply only and 0.300 when water supply and water drainage facilities are complete without sewage disposal facilities.

2.3 Land (Individual Lot) Evaluation

Evaluation of individual lot is conducted using the street value to find equivalent areas and the standard unit price and adjusting according to the individual characteristics of each lot to find the value for that particular lot.

(1) Basic Calculation Formula and Individual Factors

The evaluation of individual lots is expressed using the following formula.

(street value) x (adjustments according to individual factors of each lot)

In calculating the lot values, careful attention must be paid to the individual factors concerning the lot according to the lot usage conditions. When standard lots and general lots are compared, the factors causing the difference in value can be largely divided into location in relation to the road, alterations to the shape of the lot, and state of utility of the lot.

a. Adjustments according to the location in relation to the road

Adjustments according occurrence of differences in the degree of lot usage due to location of the lot to be valuated in relation to the road and adjoining conditions.

* Adjustments to corner plots, plots with road frontage back and front, lots without road access, et cetera.

b. Adjustments according to alterations to the shape of the lot

Adjustments according to the discrepancy between the real conditions of the lot and the standard, which affects the characteristic of the lot.

* Adjustments to depth, height differences, frontages, et cetera.

c. Adjustments according to the state of utility of lot

Adjustments according to differences in lot utility to the standard lot usage due to the lot being put to special use.

* Adjustments to railway tracks, private roads, areas with high voltage lines.

In carrying out the replotting design, it is sufficient for the before and after project lots and lot values to be determined. When the replotting plan is produced, the value should be expressed as an index, because the real amount of an equity payment can be determined after the project.

(2) Selection of Individual Lot Evaluation Factors

When designated adjustment factors based on lot utility are automatically applied to land evaluation for the before and after readjustment, the outcome is often not appropriate for the situation. Lot evaluation elements must be selected so that lot evaluation results in appropriate prices which can satisfy the holder of the land rights.

Lot evaluation factors for the before and after readjustment have been adjusted to the conditions of this study and shown in **Table 4.1.8.**

Table 4.1.8 Selection of Individual Lot Evaluation Factors

Adjustment Factor	Application		Remarks
	Before	After	
Corner Lot	Yes	Yes	
Lot Being Sandwiched Between Two Different Roads	Yes	Yes	
Unaccessed Lot	Yes	No	No unaccessed lot exists after the implementation
Cul-de-sac Lot	Yes	Yes	
Lot With A High Depth	Yes	Yes	
Irregularly Shaped Lot	No	No	
Lot With Narrow Frontage	No	No	
Lot Lower Than Road Level	Yes	Yes	
Land Use	Yes	Yes	

* For the case that land used as commercial areas, etc., is not reflected in the street value but in lot evaluation.

(3) Lot Evaluation

1) Terminology

Lot : Part of entitled site, to which legal rights of use and benefit, such as leasehold, tenant right and others are attached.

Frontage : Side of the lot facing its standard street

Standard lot : Rectangular lot adjacent at right angles to the street which is supposed to have the highest value in general usage of lot.

Street value : Utility value of a standard lot which is hypothesized to

face a street, expressed in value per m^2.

Street order : Order of street in the list of street values for the lot with multiple street. The larger the street value, the higher the rank. The larger the frontage the higher the rank, when the street values are the same.

Front street : Streets with highest street order, among streets with lots having multiple street faces.

Side street : Street which flanks the side face of a corner plot.

Back street : Street on to which the back face of a lot is adjacent.

Large scale lot: A lot which is too large to be accommodated in ordinary block, and which is or is going to be used as one uniform lot.

2) Indexes for lots, etc.

a. Calculations for the original lot and replot is to give per square meter indexes for each lot and a total index.

b. In special circumstances, neighboring lots may be unified and a total index for the one lot calculated. The per square meter indexes and total indexes for each lot are then set to conform to this total index.

3) Calculation of Lot Indexes

Lots are classified as follows for per square meter and total index calculations.

Normal lots : Lots with only one side facing the street.

Corner lots : Lots at the intersection of two (2) streets with two (2) sides facing the street.

Dual frontage lots: Lots sandwiched between different streets where two opposite sides of the lot face the street.

Unaccessible lots: Lots that have no road access.

4) Calculations for Normal Lots

a. Calculations for normal lots use the adjacent street value index and make adjustments as may be necessary. The per square meter index is calculated and this is multiplied by the lot area to find the total index.

b. When it is necessary to divide a lot into two or more divisions, the index for each division is calculated as indicated above and the sum of these

indexes is divided by the area used to find the per square meter index. The total index is found by multiplying the area by the per square meter index.

5) Calculations for Corner Lots

a. Calculations for corner lots calculate the index as for normal lot calculations using the main street and to this the side street index is added. This is divided by the area to find the per square meter index. The total index is the value obtained by multiplying the area by the per square meter index.

b. The side street additional index is calculated in the following way.

(side street additional index) = (side street value index) x (side street frontage) x (side street addition ratio)

The side street addition ratio shall be 0.5 ~ 1.0.

6) Calculation for Dual Frontage Lots

a. Calculations for dual frontage lots calculate the index as for normal lot calculations using the main street and to this the back street index is added. This is divided by the area to find the per square meter index. The total index is the value obtained by multiplying the area by the per square meter index.

b. The back street additional index is calculated in the following way.

(back street additional index) = (back street value index) x (back street frontage) × (back street addition ratio)

The back street addition ratio shall be 0.25 ~ 0.5.

7) Calculations for Unaccessible lots

Calculations for unaccessible lots use the street value index for the road primarily used by that lot, to be multiplied by the unaccessible lot adjustment coefficient and other necessary adjustment coefficients in calculating the per square meter index. The total index is the value obtained by multiplying the area for that lot by the per square meter index.

8) Adjustment of Indexes

Adjustments are made to the indexes of lots or parts thereof according to the following.

a. Degree of depth of the lot

The depth coefficient shall be 1.00 ~ 0.80.

b. Cul-de-sac lot
The coefficient shall be 0.98 ~ 0.95.

c. Unaccessible lot
The unaccessible lot coefficient shall be 0.90 ~ 0.80.

d. Lot lower than road level
The low level lot coefficient shall be 0.95 ~ 0.80.

e. Current state of lot utility
The coefficient of current state of utility shall be 1.10 ~ 0.80.

f. Lots used as (private) road
The private road coefficient shall be 0.30 ~ 0.10.

9) Calculations for large scale lots

Calculations for large scale lots shall use the weighted average of street length and its street value on the lot to give the per-square-meter index for that lot. The total index is the value obtained by multiplying the area for that lot by the per-square-meter index.

- Determination of Coefficients

a. Depth Coefficient

The depth coefficient is set at a range so as not to be greater than the unaccessible lot coefficient. This is because, while lots are valued according to specific street values, it is inconceivable that lots adjacent to roads have less utility value than unaccessible lots using the same road.

Accordingly, the value is set at 1.00 or less, which is the same range as conditions not adjusted and the unaccessible lot coefficient.

b. Cul-de-sac Coefficient

The primary section of cul-de-sac lots are accessed by a driveway from the road and therefore have less land utility value than normal lots. Even though compared to normal lots, the degree of successive decrease differs to a certain extent according to the project area, it is thought that generally a 5% degree of successive decrease is appropriate.

c. *Unaccessible Lots*

Because unaccessible lots are not adjacent to road, as long as lots are evaluated according to street values given to roads, evaluation using values calculated only with vicinity coefficients and lot coefficients, but without street coefficient is thought to be appropriate. However, if this method is simply applied to a given project area, there is a possibility of the balance of valuation (in other words a contribution ratio agreeable to the persons holding rights to the land) being lost. Thus, the street value formula shall be calculated without the street coefficient, to be multiplied by the unaccessed coefficient. A coefficient of 0.800 has been determined for this project area.

d. *Low Level Coefficient*

The lots that are lower than the street level is not as good as for lots where the level is the same as or higher than the road level and are susceptible to damage from rainwater and flooding. Normally the successive decrease ratio for the cost of lot improvement should be calculated but as discussed in the establishment of the unaccessible road coefficient, the value shall be set with consideration to the overall land contribution balance. For this project, the coefficient will be 0.95 when the difference in the level of the road and the lot is less than 1 m and 0.90 when the difference is greater than 1 m.

e. *Coefficient of State of Lot Utility*

Adjustment for the state of lot use shall be based on residential lots (the residential lot coefficient shall be 1.00) and the coefficient for other lots shall be set after comparison to residential lots. For commercial areas, there are extra characteristics to the original street value which can be included in the value of each plot. In the study area, the utility of land is not established and commercial elements shall be included in plot evaluation.

f. *Private Road Coefficient*

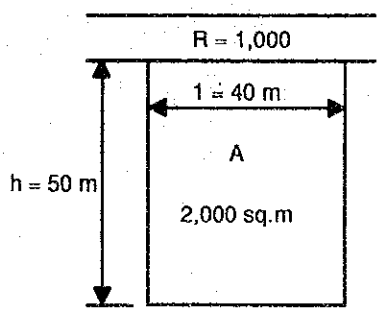
Private roads are for purposes of registration privately owned (that is, not public), however, they used in the same way as public roads. The original purpose is for road use and when compared to general lots in land evaluation under L/R projects, even when considering the ownership rights, it is projected that the value is approximately 10% to 30% of that of general lots. The private road coefficient for this area shall be 0.10 from the point of view of comparison with other lots and the fact that such lots which are exempted tax.

(4) Calculations of Lot Value

The following symbols are used here.

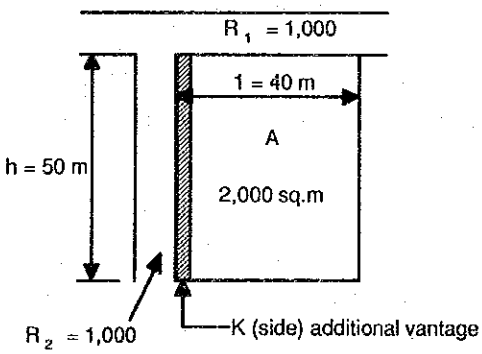
$R_1, R_2, \ldots$	:	Street value index (points)
A	:	Lot area
l	:	Frontage of lot
h	:	Depth of lot
a	:	Unit land value index per square meter (points)
V	:	Total land value index of plot (points)
K (side)	:	Additional vantage ratio by side street
K (back)	:	Additional vantage ratio by back street
m	:	Depth successive decrease ratio
n_1	:	Island decrease ratio
n_2	:	Cul-de-sac decrease ratio
n_3	:	Low ground level decrease ratio
n_4	:	Private road decrease ratio

1) Ordinary lot



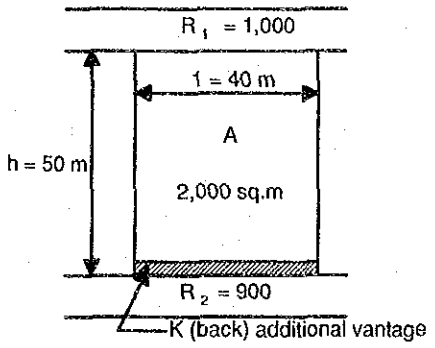
$$a = R \times m$$
$$V = a \times A$$
$$a = 1{,}000 \times 1.00 = 1{,}000$$
$$V = 1{,}000 \times 2{,}000 \text{ sq m} = 2{,}000{,}000$$

2) Corner lot



$$V' = R_1 \times m \times A + R_2 \times h \times K\,(side)$$
$$a = \frac{V'}{A}$$
$$V = a \times A$$
$$V' = 1{,}000 \times 1.00 \times 2{,}000\ m^2 + 900 \times 50\ m \times 0.5\ (side) = 2{,}000{,}000 + 22{,}500 = 2{,}022{,}500$$
$$a = \frac{2{,}022{,}500}{2{,}000} = 1{,}011$$
$$V = 1{,}011 \times 2{,}000\ m^2 = 2{,}022{,}000$$

3) Lot with front and back streets



$$V' = R_1 \times m \times A + R_2 \times l \times K\ (back)$$

$$a = \frac{V'}{A}$$

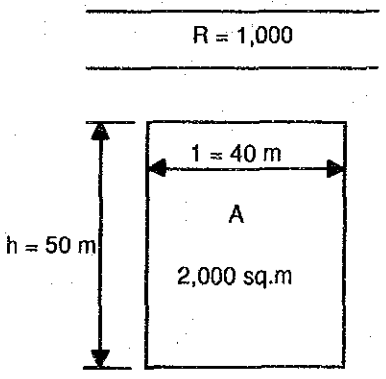
$$V = a \times A$$

$$V' = 1{,}000 \times 1.00 \times 2{,}000\ m^2 + 900 \times 40\ m \times 0.25\ (back) = 2{,}000{,}000 + 9{,}000 = 2{,}009{,}000$$

$$a = \frac{2{,}009{,}000}{2{,}000\ m^2} = 1{,}005$$

$$V = 1{,}005 \times 2{,}000\ m^2 = 2{,}010{,}000$$

4) Isolated lot



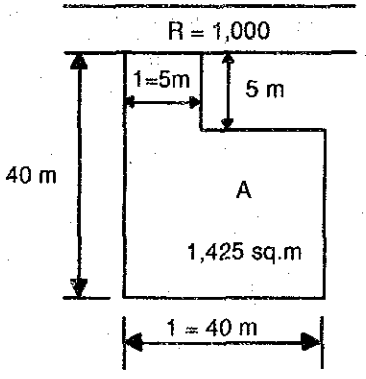
$$a = R \times m \times n_1$$

$$V = a \times A$$

$$a = 1{,}000 \times 1.00 \times 0.90 = 900$$

$$V = 900 \times 2{,}000\ m^2 = 1{,}800{,}000$$

5) i. Cul-de-sac lot



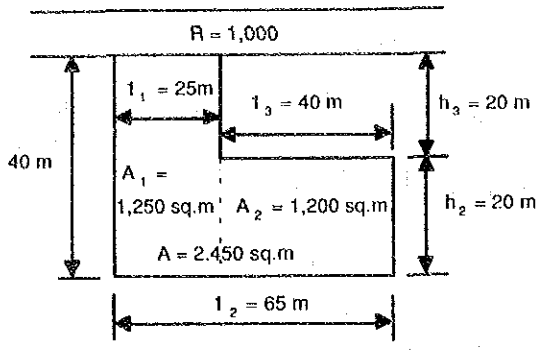
$$a = R \times m \times n_2$$

$$V = a \times A$$

$$a = 1{,}000 \times 1.00 \times 0.95 = 950$$

$$V = 950 \times 1{,}425\ m^2 = 1{,}353{,}750$$

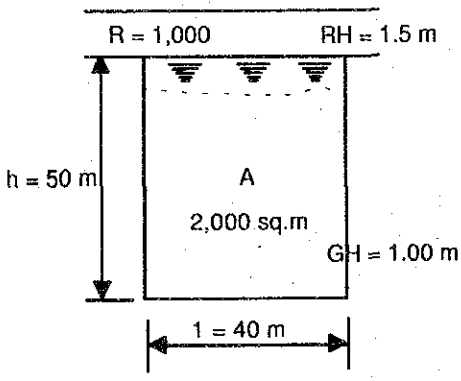
5) ii. Ordinary lot • cul-de-sac lot (separate evaluation)



$$a = \frac{1,250,00 + 1,140,000}{2,450\ m^2} = 976$$

$$V = 976 \times 2,450\ m^2 = 2,391,200$$

6) Ordinary lot (low ground level)



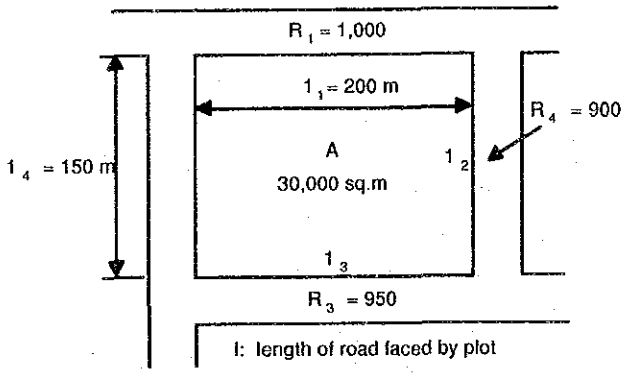
$$a = R \times m \times n_3$$

$$V = a \times A$$

$$a = 1,000 \times 1.00 \times 0.95 = 950$$

$$V = 950 \times 2,000\ m^2 = 1,900,000$$

7) Super block evaluation



$$a = \frac{R_1 + l_1 + R_2 + l_2 + R_3 + l_3 + R_4 + l_4}{l_1 + l_2 + l_3 + l_4}$$

$$V = a \times A$$

$$a = \frac{1,000 \times 200m + 980 \times 150m + 950 \times 200m + 900 \times 150m}{200m + 150m + 200m + 150m}$$

$$= \frac{200,000 + 147,000 + 190,000 + 135,000}{700\ m}$$

$$= \frac{672,000}{700\ m}$$

$$= 960$$

$$V = 960 \times 30,000\ m^2 = 28,800,000$$

2.5 Draft of Land Evaluation Standard

1. Objective

This standard, based on the (Law Name), determines the land evaluation implementation method for the land readjustment project implemented by (Developer Name) and has as its objective appropriate and balanced evaluation.

2. Terminology

For the purposes of this standard, terminology shall be defined as follows.

Lot	:	Part of entitled site, to which legal rights of use and benefit, such as leasehold, tenant right and others are attached.
Frontage	:	Side of the lot facing its standard street
Standard lot	:	Rectangular lot adjacent at right angles to the street which is supposed to have the highest value in general usage of lot.
Street value	:	Utility value of a standard lot which is hypothesized to face a street, expressed in value per m^2.
Street order	:	Order of street in the list of street values for the lot with multiple street. The larger the street value, the higher the rank. The larger the frontage the higher the rank, when the street values are same.
Front street	:	Streets with highest street order, among streets with lots having multiple street faces.
Side street	:	Street which flanks the side face of a corner plot.
Back street	:	Street on to which the back face of a lot is adjacent.
Large scale lot	:	A lot which is too large to be accommodated in ordinary block, and which is or is going to be used as one uniform lot.

3. Evaluation Method

Lot evaluation shall, in principle, be carried out according to the street evaluation method.

4. Roads Assigned Street Values

Street values shall, in principle, be assigned to all roads greater than 4 m in width for traffic of both vehicles and pedestrians. However, in terms of land utility, this shall include all roads which are fulfilling these functions.

5. Method of Assigning Street Values

a. A street value shall, in principle, be assigned for each block.

b. When it is recognized that there are differences in the condition of lots on the same block, street values shall be assigned to divisions of blocks.

6. Street Value Calculations

Street value calculations shall be carried out according to Appendix 1.

7. Street Value Expression

Street values in the project area shall have a before project maximum index of 1000 and will be expressed in the form of a comparative conversion index (hereinafter called the street value index).

8. Indexes for Lots, etc.

a. Normal lots and replots will have per square meter indexes and total indexes calculated for each lot.

b. When necessary, neighboring lots will form one contiguous lot for which a total index will be calculated, the per square meter index and total index for each lot will then be determined to conform with this index.

9. Calculation of Lot Indexes

Lots are classified as follows for per square meter and total index calculations.

Normal lots	:	Lots with only one side facing the street.
Corner lots	:	Lots at the intersection of two streets with two sides facing the street.
Dual frontage lots	:	Lots sandwiched between two different streets where two opposite sides of the lot face the street.
Unaccessible lots	:	Lots that have no road access.

10. Calculations for Normal Lots

a. Calculations for normal lots use adjacent street value index and make adjustments as may be necessary. The per-square-meter index is calculated and this is multiplied by the lot area to find the total index

b. When it is necessary to divide a lot into two or more divisions, the index for each division is calculated as indicated above and sum of these indexes is divided by the area used to find the per square meter index. The total index is found by multiplying the area by the per-square-meter index.

11. Calculations for Corner Lots

a. Calculations for corner lots calculate the index as for normal lot calculations using the main street and to this the side street index is added. This is divided by the area to find the per square meter index. The total index is the value obtained by multiplying the area by the per-square-meter index.

b. The side street index is calculated in the following way.

(side street additional index) = (side street value index) x (side street frontage) x (side street addition ratio)

The side street additional ratio shall be 0.5 ~ 1.0.

12. Calculation for Dual Frontage Lots

a. Calculations for dual frontage lots calculate the index as for normal lot calculations using the main street and to this the back street index is added. This is divided by the area to find the per-square- meter index. The total index is the value obtained by multiplying the area by the per-square-meter index.

b. The back street index is calculated in the following way.

(back street additional index) = (back street value index) x (back street frontage) x (back street addition ratio)

The back street additional ratio shall be 0.25 ~ 0.5.

13. Calculations for Unaccessible Lots

Calculations for unaccessible lots use the street value index for the road primarily used by that lot, to be multiplied by the unaccessible lot adjustment coefficient and other necessary adjustment coefficients in calculating the per square meter index. The total index is the value obtained by multiplying the area for that lot by the per-square-meter index.

14. Adjustment of Indexes

Adjustments are made to the indexes of lots or parts thereof according to the following.

- Degree of depth of the lot
  The degree of depth of shall be 0.80~ 1.00.

- Cul-de-sac lot
  The cul-de-sac coefficient shall be 0.95 ~ 0.98.

- Unaccessible lot
  The unaccessible lot coefficient shall be 0.80 ~ 0.90.

- Lot lower than road level
  The low level lot coefficient shall be 0.80 ~ 0.95.

- Current state of lot utility
  The current state of lot utility shall be 0.80 ~ 1.10.

- Lots used as (private) road
  The private road coefficient shall be 0.10.

15. Calculations for large scale lots

Calculations for large scale lots use the weighted average street length and its street of the street value on the lot, to give the per-square-meter index for that lot. The total index is the value obtained by multiplying the area for that lot by the per-square-meter index.

16. Lot Value Price

a. The lot value price shall be the value produced by multiplication of the lot total index multiplied with the unit price of the index.

b. The evaluated price for each plot shall be the sum of the evaluated prices for the lots within the plot.

17. Index Units

One index unit price shall be determined based on an appropriate price (in other words, standard price) of a standard lot at project completion.

18. Mandate

Aside from the designation of standard value, clauses recognized as necessary pertaining to land value shall be determined by (organization, committee, authority, etc.).

By-laws

These standards shall become effective from DD/MM/YY.

Appendix 1

(Street value) = (street coefficient) + (accessibility coefficient) + (land coefficient)

(1) Street Coefficient

The street coefficient is the coefficient expressing the utility value utility according to the street on to which the lot is adjacent. It fluctuates according to the systematic continuity, width, structure and landscaping of the street and is expressed as follows.

street coefficient $= t \cdot F(W) + \Sigma X$

$t \cdot F(W)$ utility value and utility of the lot according to street traffic

ΣX utility value of lots according to street space and standard of improvement

t coefficient expressing the grade of a street in terms of street traffic flow characteristics, systematic and continuity, etc., within the town area road network, as in **Table 4.1.9.**

$F(W)$ a function for street width, used to adjust the "t" value according to width

$$F(W) = \frac{W}{W+4}$$

However, W=4 is for roads less than 4 m.

X coefficient for lot utility value and utility and state of street repair based on street vacancy, provided in attached **Table 4.1.10**.

Table 4.1.9 "t" Value

	t Value	Remarks
Arterial Road	1.5 ~ 2.5	
Second Arterial Road	1.5 ~ 2.5	
Distributor	1.2 ~ 2.0	
Access Road	1.0 ~ 1.5	
Impasse	0.5 ~ 1.5	
Others		

Table 4.1.10 "X" Value

	X Value	Remarks
Pedestrian Path	0.2 ~ 2.0	
Side Walk	0.1 ~ 0.3	
Landscaped Road	0.1 ~ 0.2	
Unpaved Road	-0.1 ~ -0.2	
Others		

(2) Accessibility coefficient

The accessibility coefficient expresses the benefits brought about by existing traffic, leisure and public facilities, etc., and can be expressed as a positive or negative value.

Accessibility coefficient $= \Sigma \ m.F(s)$

m : index expressing size of benefits resulting from specific facilities as in **Table 4.1.1.**

$F(s)$: index successively decreasing the *"m"* value according to the distance (s) from the specific facility; expressed as follows.

$$F(s) = \frac{(S-s)}{S} \times n$$

S : effective range
n : characteristics of successive decrease
s : distance between targeted street and the specific facility

Table 4.1.11 Standard Values of *"S"*, *"m"* and *"n"*

Facilities		S	m	n	Remarks
Favourable					
Transport Facility	. Railway Station	2,500	0.1 ~ 1.0	1	
Commercial Facility	. Shopping area . Market	2,500	0.3 ~ 1.0	1	
Park		-	0.1 ~ 0.2	-	Uniform value all over the area

(3) Land Coefficient

The land coefficient expresses the value for usage condition of the lot itself, cultural characteristics, safety characteristics and natural environment, etc., and is expressed as follows.

$F(P,Q)$: the usage and utility value of lots comprehensively derived from the standard of improvement for land utility, public facilities

$\Sigma \ Y$: the lot utility value according to the standard of improvement for culture and health

u : the general utility of the lot as a basic grade according to regional conditions and land utility, shown in **Table 4.1.12.**

Table 4.1.12 "*u*" Value

	u	Remarks
Before Land Readjustment	1.0 ~ 3.0	
After Land Readjustment	1.0 ~ 3.0	

$F(P,Q)$: the function modifies "*u*" value depending on effectiveness of lot in land utility, disaster prevention and safety resulting from infrastructure improvement, expressed as follows

$$F(P,Q) = 1 + \sqrt{(P/P_0) \times (Q,Q_0)}$$

P_o : standard ratio of public land (%), the standard value will be 20 - 30

P : ratio of public land in the district where the lot is located, (%)

Q_o : standard street density (m/ha), the standard value will be 200 - 300

Q : street density in the district where the lot is located (m/ha)

$\Sigma\ Y$: index expressing value and utility added due to physical conditions such as improvement of utilities with direct influence on lot utility, shown in **Table 4.1.13.**

Table 4.1.13 "Y" Value

Items		Y	Remarks
Public Utilities	Improvement of Both Water Supply and Sewage	0.3 ~ 0.5	
	Improvement of Water Supply Only	0.1 ~ 0.3	
	Others		

Part IV.
Replotting System and Design/Plan

Volume II.
Replotting Design Method

Volume II: Replotting Design Method

1. Thai Replotting Methods

In Thailand, agricultural land consolidation projects or agricultural land readjustment projects are carried out based on the Agricultural Land Consolidation Act. Under this Agricultural Land Consolidation Act, replotting designs are made and replotting is carried out. This replotting method, the primary objective of which is the increase of the lot (for agricultural use) usage value by altering the plots and regardless of the pre-readjustment and post-readjustment location and value differences, is the contribution ratio method (which is termed as the area replotting calculation method in this report). A fixed contribution ratio (usually less than 7%) is designated and land is replotted in or near the original location with either road or canal frontage.

2. Purpose of Replotting Design

The objective of L/R projects is the integration of the improvement of public facilities and land exchange, the alteration of plot formations, the creation of a favorable town while increasing the effective usage of the lot and contribution to the increase of public welfare by way of carrying out projects for real comprehensive development. This land readjustment project, in order to realize these objectives, for instance in order to ensure public facilities essential in daily life such as roads, parks, etc., takes over the original lots and substitutes with lots after the project, in other words the owners of the land are provided with replotted land. The determination of these replots is one of the key points in the smooth execution of land readjustment projects.

3. Replotting Design of L/R Projects in Thailand

The replotting design is to overlay the total land before the project implementation to the land after the project implementation by changing the lot shape. Replotting is executed by designation of a replotting system based on the legal system of land rights before the project is released, then replotted land is acquired at same time. L/R projects are worked out based on replotting designs as the Thai Agricultural Land Consolidation projects were. It is the replotting plan that provides the specifics of the replots. The replotting plan comprises the method of how to decide the location and size of the replots and how they are provided to the owners of each of the original plots.

Considering agricultural land consolidation projects to date, and current social conditions, two replotting calculation methods for land readjustment projects in Thailand will be proposed. These methods are as follows.

(1) Area replotting calculation method

1) Fixed contribution ratio method (*1)
(the contribution ratio for each lot is the same for the whole area)

2) Zoned contribution ratio method (*2)
(the contribution ratio for each lot is the same within a respective calculation zone according to various conditions)

(2) Evaluation replotting calculation method

1) Proportional evaluation type
(the lot is evaluated both before and after readjustment with contribution ratios being calculated according to the increase in values for each plot of land)

- Advantages and disadvantages of (1)
- The calculation method is simple and clear, making calculations quick.
- In the event that there occurs a difference in value between the various lots (*1) is ineffective but (*2) can be effective if considered in multiple units of blocks.
- In the case of (*2), the contribution ratios will probably be decided by L/R committee and the far-sighted view method will be taken.
- Advantages and disadvantages of (2)
- The calculation method is logical enough to be accepted commonly.
- The calculation method is comparatively complicated, taking time to complete.
- This method is effective for the case whether the project area is large or small and whether the difference among land values is large or small.
- Values after project can be projected prior to the commencement of works.

No hasty conclusions can be made regarding what kind of replotting calculation method should be used as characteristics are different depending on the project area and selection of a calculation method taking into account various conditions is important (creating new calculation methods as may be necessary if the existing methods prove inadequate for this case). In balance of contribution ratios, which are designated by the replotting calculation method, the consent of the people with rights in the project area is the most important point.

Accordingly, replotting calculation methods are necessary whereby land contribution ratios are divided up evenly according to the increased usage of the lot resulting from the implementation of the project so that the difference in contribution ratios between each lot can be understood by the people with rights to the land concerned.

Here, it also becomes necessary to determine the method of equity payment calculations.

- Area replotting calculation method

Half of the difference between the calculated total of levy and compensation are allocated to the respective lots proportionally in the group of levy or compensation so that the actual total of levy and compensation get balance.

In the case of multiple standard land contribution ratios, calculations are carried out in the same way as for the evaluation replotting calculations.

- Evaluation replotting calculation method

The equity is calculated as follows;

$$S = \Sigma E_i e_i \,/\, \Sigma A_i a_i \times A_i a_i - E_i e_i$$

where

S	:	Amount of equity (Compensation or Levy)
A^i	:	Area of respective lot before project
a_i	:	Unit price per square meter of respective lot before project
E_i	:	Area of respective lot after project
e_i	:	Unit price per square meter of respective lot after project

3.1 Average Contribution Ratio

The average contribution ratio for the project area is designated in the project plan. The average contribution ratio of the project implementation area which is designated in the replotting plan consists of the following.

A :	Total lot area before the project
B :	Total lot after the project
C:	Reserved land area
d :	Average contribution ratio

where

Contribution ratio for roads, water ways and parks $= 1\text{-}B/A$
Contribution ratio for reserved land $= C/A$

$$d = 1\text{-}(B\text{-}C)/A \quad \text{.....} \quad {}^{*}1$$

There are cases of no reserved land with subsidy. In addition, lots which are to be specially designated and lots which are to be adjusted, etc., would not be included to calculate the average contribution ratio "d" for the replotting design.

3.2 Area Replotting Calculation Method

(1) Fixed Contribution Ratio Calculation Method

This fixed contribution ratio calculation method calculates the replotting area size using the average contribution ratio explained in 2.2.1.

Computed replotting area size "E_i" is found from

$$E_i = A_i \times d$$

This method is considered appropriate for the projects where there are little public roads prior to implementation, no differences in the values of each lot and little change in land use after implementation.

When project plans are carried out using this method, it is not necessary to have the land values

before and after project for each lot. This is because when replotting is insufficient, equity made using the value per square meter at the time when the implementation is completed.

(2) Grouping Contribution Ratio Method

This grouping contribution ratio method is basically the same as the fixed contribution ratio method, but according to the lot usage conditions before and after implementation, contribution ratios differ among the groups classified in the project area. Under these conditions, the replotting calculations are the same as for the fixed contribution ratio method. Here, it goes without saying that even with replotting area being calculated with contribution ratios being set by groups, the project area as a whole must match the average contribution ratio.

The conditions for the classification differ according to the specific project implementation area. The following are examples of the methods.

1) The project area is divided up into the following three types according to the existing land use whereby the contribution ratios are set.

- lots without road access
- lots served as private roads
- lots not covered by the above

2) The project area is divided up into the following four types according to the land use after project whereby the land contribution ratios are set.
(normal lot etc. are defined in *"3. Land Evaluation"*.)

- replots for normal lot
- replots for corner lot
- replots for lots between different roads
- replots not covered by the above

3) Land use (commercial, residential, etc.) factor is combined with "2)"

4) A combination of *"1)"* and *"2)"* or *"1)"* and *"3)"*

5) Others

The contribution ratios are decided as follows.

a) Far-sighted decision by L/R council.
b) Far-sighted decision by a person familiar with the project area.
c) Decision taking evaluation into account to a certain extent.
(a modification of the street value method; the contribution ratios are classified into some groups.)

The equity is made calculating the unit price per square meter after project as is the case of (1). The method of equity calculation of the above case c) is same as the evaluation replotting calculation method.

3.3 Evaluation Replotting Calculation Method

The evaluation replotting calculation method attempts to calculate replotting with a value comparable to the pre-implementation lot expressed as a value using various conditions. Specifically, it calculates the appropriate replotting area size for each lot while comparing the total value calculated from the before and after implementation values for each lot using the street value. Practically, this value is substituted for an index number and calculated, as discussed in *"Land Evaluation"*.

Where

a_o	:	Average index per square meter before project
e_o	:	Average index per square meter after project
A_i	:	Area of respective lot before project
a_i	:	Index based on the unit price of respective lot before project
E_i	:	Area of respective lot after project
e_i	:	Index based on the unit price of respective lot after project
d_i	:	Contribution ratio
y	:	Increase ratio = e_o / a_o.....*2

In L/R projects when before and after implementation lot index total are compared, the following 3 cases result.

(1) When the total index number for post-implementation lots is higher than the total index number for pre-implementation lots and reservation land is obtained for a part of the project cost

--- $A\,a_o < E\,e_o$

$E = A\,(1\text{-}d)$
$e = a_o\,y$ *3

giving

$E\,e_o = A\,a_o\,(1\text{-}d)\,y$ *4

$\alpha = (1\text{-}d)\,y = E\,e_o / A\,a_o$ .. *5

α is one coefficient and in this case is called a *"proportional coefficient"*.

In this case

$(1 - d)\,y = \alpha > 1$

Reserved land can be designated within the range of $(E\,e_o - Aa_o)$.

(2) When the total index number for the post-implementation lots is less than the total index number for pre-implementation lots

--- $A\,a_O > E\,e_O$

$(1 - d)\,y = \alpha \quad < 1$

The value corresponding to $(A\,a_O - E\,e_O)$ is paid as compensation for reduction of value. In some cases land for public facilities corresponding to the compensation for the reduction of value would have been purchased in advance to the extent of $(A\,a_O = E\,e_O)$.

(3) When the total index number for the post-implementation lots and the total index number for the pre-implementation lots are approximately the same and the reduction in value due to land contribution and the increase in value due to increased land utility are balanced

--- $Aa_O \neq \quad Ee_O$

$(1 - d)\,y = \alpha \quad \neq \quad 1$

In any of the above cases, in order to conform the total index number for the pre-implementation lots with the total index number for the post-implementation lots, the index number is found by multiplying the ratio of the total index number for the pre-implementation lots to total index number for the post-implementation lots by the index number for the pre-implementation lots. Each lot is provided with replot area size corresponding to this right index number.

1) When $A\,a_O < E\,e_O$

From *5 $\quad \Sigma\ E_i\,e_i / \Sigma\ A_i\,a_i = (1 - d)\,y = \alpha$

$\Sigma\ E_i\,e_i = \alpha\ \ \Sigma\ A_i\,a_i$

$E_i = \alpha\ \ A_i\,a_i / e_i$

$d_i = 1 - E_i / A_i = 1 - a_i\,\alpha\ \ / e_i$

Accordingly, the contribution ratio for each lot fluctuates according to the increase ratio of respective lot $(y_i = e_i / a_i)$. The higher the index number (e_i) at the replotted location, the higher the land contribution ratio.

2) When $A\,a_O > B\,e_O = E\,e_O$

As previously mentioned, the increases corresponding to the contribution ratio is not expected and compensation is to be paid for the reduced lot value.

The index number corresponding to the compensation for reduced lot value for each lot is found using the following formula.

$r_i = ((A\,a_O - E\,e_O) / Aa_O) \cdot A_i\,a_O$

r_i : Index of the compensation of A_i

The replotting area and the contribution ratio are calculated in the same way as 1).

3) When $A\ a_O \neq\ B\ e_O = E\ e_O$

The replotting area and the contribution ratio are calculated in the same way as 1).

In this case, because

$$(1 - d)\ y = \alpha \neq 1$$

There is no profit distribution from the project.

The contribution ratio of the lots where $e_i = a_i$ *is 0* (zero) and only the lots where $e_i > a_i$ are to have contribution to the extent of their increases.

3.4 Draft of Replotting Design Standard

1) Evaluation Replotting Calculation Method

(Objective)

1. This standard aims to provide an appropriate replotting design for the replotting design of ((Project Name)) land readjustment project implemented by ((Developer)) by way of determining necessary issues.

(Standard time of replotting design)

2. The replotting is carried out for the lots existing at the project approval date (hereinafter called the *"Standard Day"*).

The following change after the Starting Day may be taken into account on condition that there are no ill effects to other lots.

- Private land changed from public land
- Public land changed from private land
- Land remarkably changed in land use or environment
- Subdivided or consolidated land with application or registration on the rights or disposition
- Land with alteration of the original application or registration

(Original lot area size)

3. The original lot area size and lot area size for land with rights other than ownership rights, which are the basis for carrying out the replotting design, shall be the area size recorded in the land registration.

(Replotting design method)

4. Replotting design shall use the evaluation replotting calculation method.

(Evaluation standard)

5. The standard for evaluating the pre-readjustment lots and post-readjustment lots shall be determined separately consulting with ((Council)).

(Replotting location)

6. The replotting location shall, in principle, be in the original location or within close proximity of the original location.

   (1) When replotting cannot be carried out in the original location or its proximity because of land for use by newly constructed public facilities brought about by the implementation of this project, replotting will be carried in a different location.

   (2) For lots that are smaller than the original lot area size, the replot location shall be determined with consideration of the usability conditions.

   (Replot area size)

7. The replot area size is determined using the area size produced by the following formula as the standard.

$$E_i = \frac{A_i a_i (1-d) y}{e_i}$$

E_i	:	Area of replotting lot
e_i	:	Index of unit price of lot after project
A_i	:	Area of original lot
a_i	:	Index of unit price of lot before project
d	:	Average contribution ratio
y	:	Average increase ratio

The area of replots which have special designations can be determined with consideration to the land use conditions.

(Replot shape)

8. The standard shape of replots will be rectangular and will be determined with consideration to the original land use conditions. However, in case that street shape and the inter-relationships with other lots should require special considerations, the above may not be applicable.

(When replots are not designated with the consent of the owners)

9. For the lots where the owners (including holders of rights to use or profit from the original lot) make the application or consent, replots may not be designated.

(Replot correspondence)

10. Replotting, considering the uniformity of the original lots, will in principle designate one replot area. However, when it is judged that one contiguous replot for original lots that are not uniform or multiple replots for original contiguous lots is appropriate, replots can be designated in such a way.

(Other necessary clauses)

11. Other than the determination of these standards, other clauses necessary to the replotting design are determined separately by the implementation party.

2) Area Replotting Design Method

Replotting design standards for the area replotting design method are basically the same as for the evaluation replotting design method for replotting design. However, 4., 5. and 7. should be replaced with the following;

(Replotting calculation method)

4. Replotting calculations in the replotting design are according to the area replotting design method.

(Evaluation standard)

5. Excluded. However the grouping contribution ratio method is exception and same as the evaluation replotting method.

(Replot area size)

7. The replot area size is calculated with the following formula according to the contribution ratio determined elsewhere;

(Replotting area) = (Original lot area) x [1 - (Contribution ratio)]

Part IV.
Replotting System and Design/Plan

Volume III.
Preliminary Replotting Plan for the Planning Area

Volume III. Preliminary Replotting Plan for the Planning Area

1. Issues of Preliminary Replotting Plan

The present conditions of the planning area are described in *"Part III, Volume III - 2.1 Existing Conditions of Planning Area."* The land use plan has been formulated considering on-going projects such as the express way, skytrain, Royal City Avenue, et cetera.

The following characteristics of the preliminary replotting plan are summarized and take the present conditions and the preliminary implementation plan into consideration, including evaluation of land which is one of the preparatory conditions for the replotting design.

- Evaluation of land including setting of street value
  (There is little public land in the planning area for standard.)
- Balance of replotting location and contribution ratio
- Correspondence between replotting and block plan
- Condition of excessively small lots and the countermeasure in replotting

2. Correspondence between Original Plots and Replots

2.1 Correspondence between Areas of Original Plots and Replots

The replotting plan is to be carried out considering the present conditions, especially the mega-projects.

(1) Land use plan

The land use plan is shown in *"Part III, Volume III - 2.2 Development Framework and Land Use Plan."*

(2) Contribution ratio

The average contribution ratio studied in the previous chapter is to be basis for the preliminary replotting.

(3) Standard land area

Formally the standard land areas are to be evaluated lot by lot because registered land area and actually surveyed area are usually different. However, the area by zone measured in the map with a scale of 1:4,000 used because this is the preliminary stage for selection of the implementation area, and the land survey has not been accomplished as yet. The zones have been divided first from the east and west by the SRT site including Royal City Avenue, and secondly from the north and south by Rama 9 road.

2.2 Results of Preliminary Replotting Plan

The results of the preliminary replotting plan are shown in **Tables 4.3.1 to 4.3.3**. The street value and the method of land evaluation for replotting is in accordance with *"Land Evaluation."*

Figure 4.3.1 - Index of Street Value Before Replotting

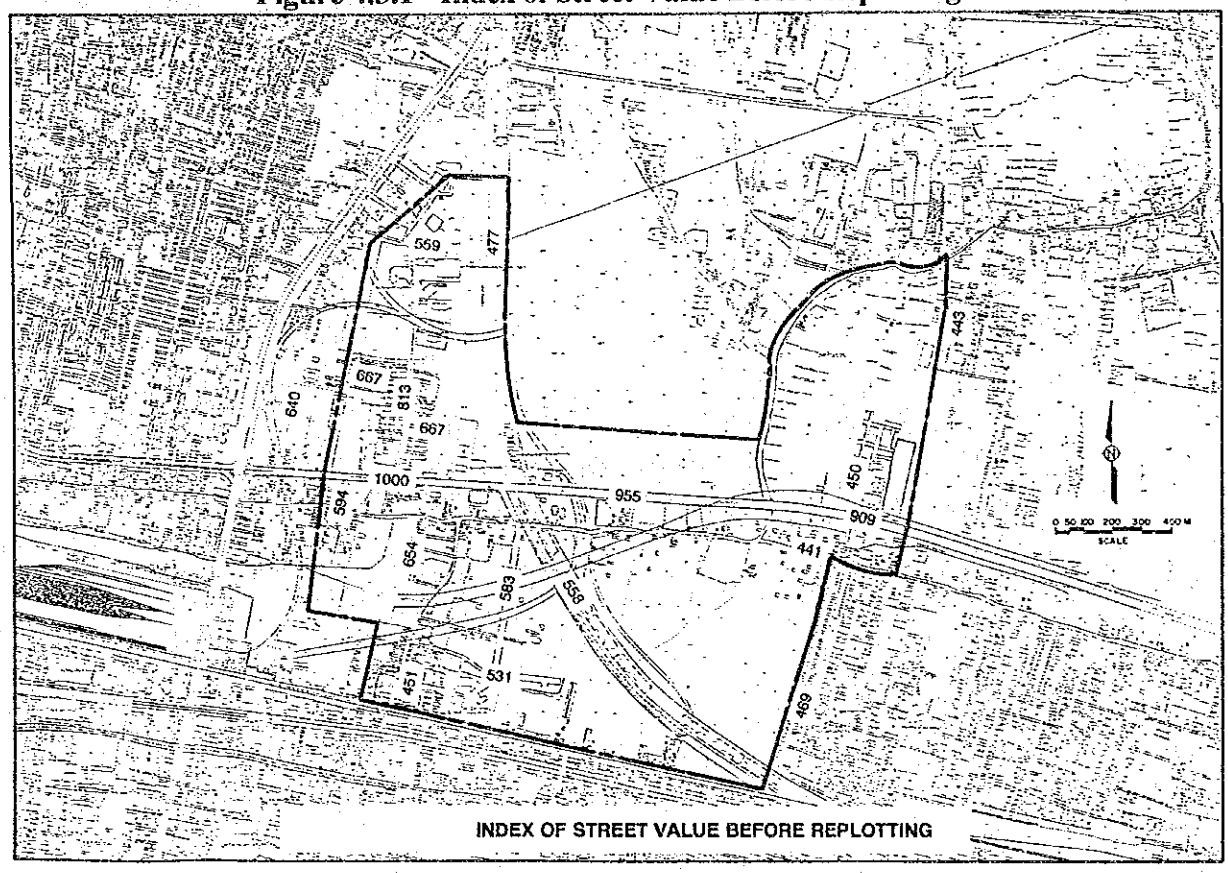


Figure 4.3.2 - Index of Street Value After Replotting

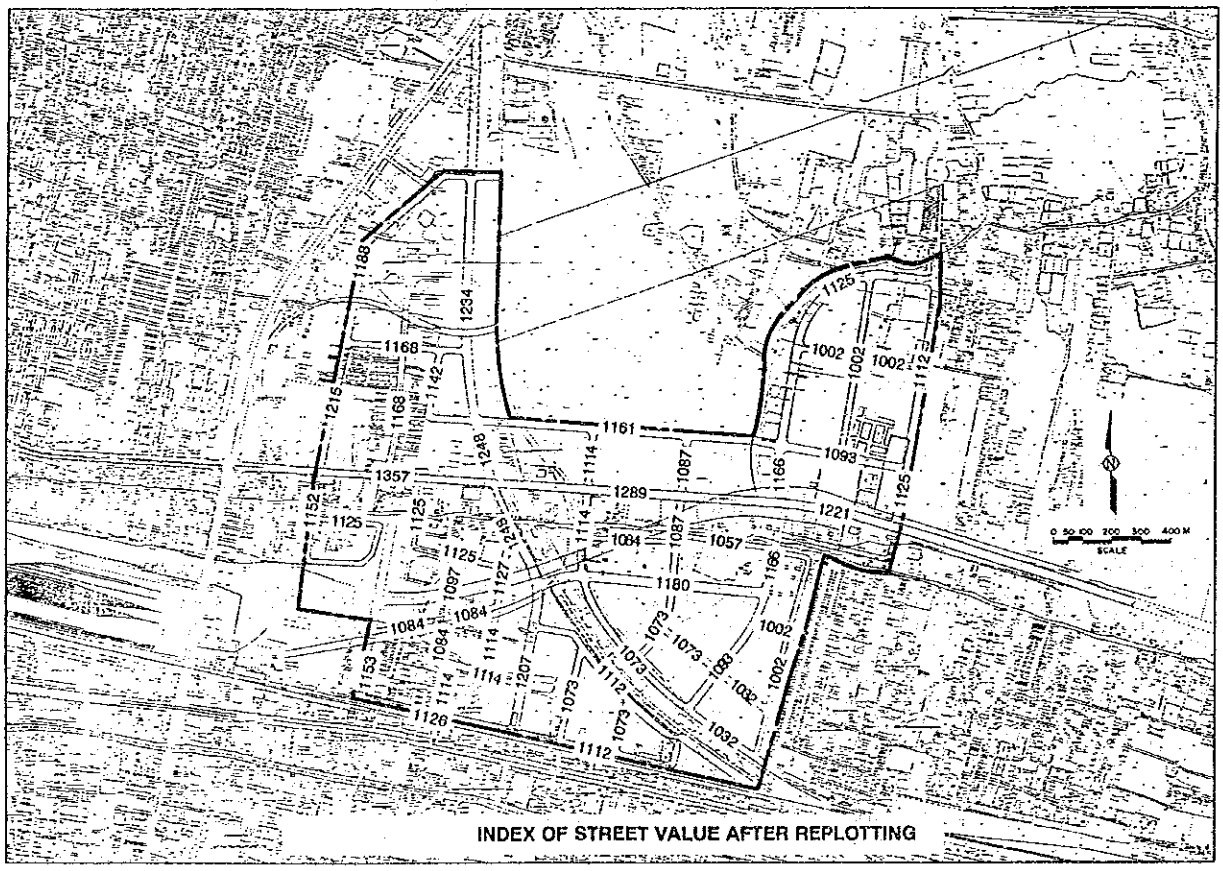


Figure 4.3.3 - Increase Ratio by Zone

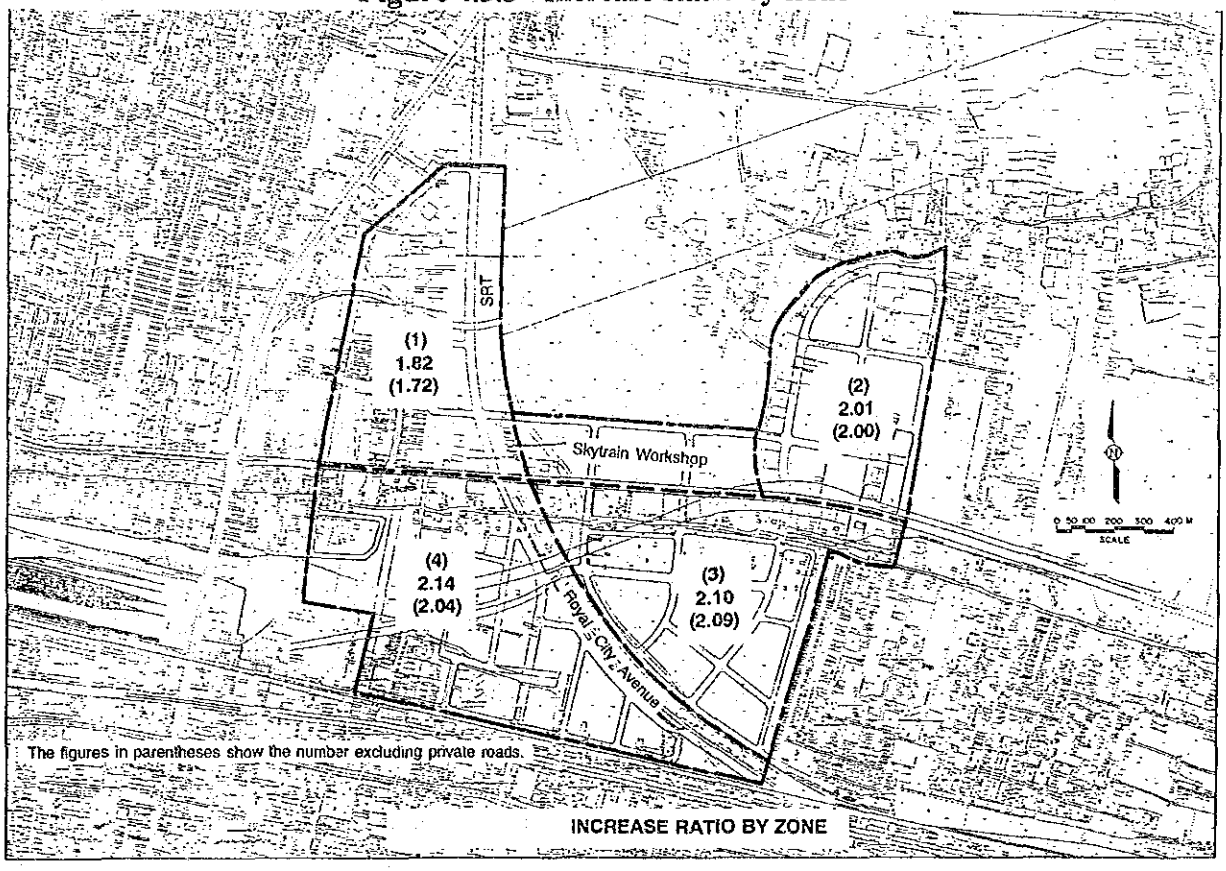


Figure 4.3.4 - Calculated Contribution Ratio by Zone

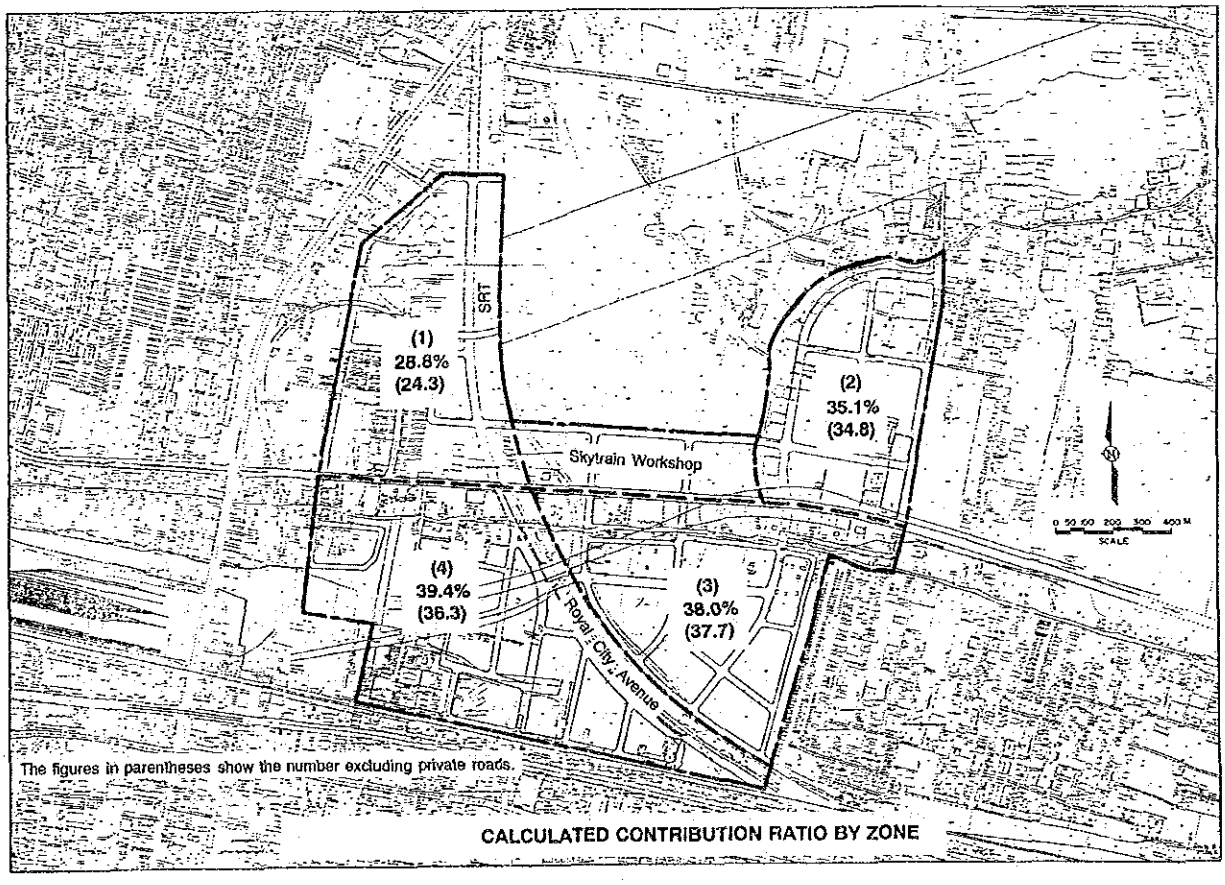


Table 4.3.1 Increase Ratio and Index

	Before Replotting		After Replotting		Contri-bution Rate (%)	Increase Ratio*1	Index*2
	Original Area	@*3	Replotted Area	@*3			
Land for Public Use	550,800	700	499,100	1226	9.4	1.751	
Private Land	1,793,200	594	1,152,000	1,205	35.8	2.029	
Private Lots*4	(1,738,800)	(612)	(1,152,000)	(1,205)	(33.7)	(1.969)	(1.304)
Private Roads*4	(54,400)	(64)	-	-		-	
Total	2,344,000	617	1,651,100	1,213	29.6	1.966	1.384
Reserved Land			99,900	1,213		-	

*1 Increase Ratio $= \frac{\text{@ before replotting}}{\text{@ after replotting}}$

*2 Index = [1 - (contribution ratio)] x (increase ratio)

*3 @ : Index calculated by evaluated land value per square meter before and after replotting

*4 Private lots and private roads are breakdown of private land.

Table 4.3.2 Increase Ratio and Contribution Ratio by Zone (Lands for public use are not included)

	Before Replotting		After Replotting		Increased Ratio	Contribution Ratio (%)
	Original Area	@	Replotted Area	@		
Zone 1	397,500	730	283,100	1,327	1.818	28.8
Private lots	(374,000)	(772)	(283,100)		(1.719)	(24.3)
Private roads	(23,500)	(75)	-	-	-	-
Zone 2	391,800	545	254,300	1,093	2.006	35.1
Private lots	(389,800)	(548)	(254,300)		(1.995)	(34.8)
Private roads	(2,000)	(45)	-	-	-	-
Zone 3	459,400	560	284,900	1,175	2.098	38.0
Private lots	(457,600)	(562)	(284,900)		(2.091)	(37.7)
Private roads	(1,800)	(44)	-	-		
Zone 4	544,500	564	329,700	1,205	2.137	39.4
Private lots	(517,400)	(590)	(329,700)		(2.042)	(36.3)
Private roads	(27,100)	(57)	-	-	-	-
Total	1,793,200	596	1,152,000	1,205	2.022	35.8
Private lots	(1,738,800)	(612)	(1,152,000)		(1.969)	(33.7)
Private roads	(54,400)	(64)	-	-	-	-

Table 4.3.3 Allocation of Reserve Land (Land for public use are not included)

	Block Area	Replotted Area	Reserve Land	Remarks
Zone 1	298,300	283,100	15,200	
Zone 2	241,000	254,300	- 13,300	No reserved land
Zone 3	317,500	284,900	32,600	
Zone 4	395,100	329,700	65,400	
Total	1,251,900	1,152,000	99,900	

2.3 Issues and Discussions on Correspondence between Original Plots and Replots

Distribution of land prices in the planning area is shown as official land prices by the Land Office and the results of the second survey, which indicates the large difference of the price between the lands along Rama IX Road and to the backside. If this difference is directly associated to the land evaluation, the allocation of contributions will be inequal.

Generally speaking, objectives of land evaluation of land readjustment, taxation and trade are different from one another. The main objective of land evaluation of land readjustment lies in evaluating the value of various lots before and after the project, comparing the value at various times, as well as finding an appropriate increase ratio in a wide project area. It also aims to provide a mutual and equitable evaluation of the land and rights of people concerned, evaluating increases in values and fair allocation of created benefit in a framework of established conditions. From a view point of balancing of street values in the area, land evaluation of land readjustment, taxation and trade should not differ much from one another.

The preliminary land evaluation and replotting are studied by zone as follows:

(1) Zone 1

A 20 m wide private road is running from Rama IX Road to the north to National Housing Bank and TV 9. The part along this road has been densely developed for shops and housing, whose lot sizes are as small as about 100 m^2. Contribution from small lots would make it difficult to maintain the present use condition. Besides, no place could be found for replotting in the other zone. Therefore these existing small lots will be replotted to the original location without contribution. The block plan should reflect the above condition.

Taking the land use after the project as commercial, the increase rate of land usability will be low and the contribution ratio will be small.

As shown in **Table 4.3.3**, the reserved land was calculated 15,000 m^2, however this will be very difficult to actualize without contributions from the developed small lands.

Zone 1 will not be advantageous for land readjustment as there are many existing buildings, developed small lands which require compensation, and because a lot of access roads will be required in the developed area.

(2) Zone 2

The land for future workshop of the Skytrain is excluded from replotting.

In this zone there are few roads or existing buildings, so the average land value is low. The future land use of the area along Rama 9 road is planned as commercial and the other area as residential for the next five years. The contribution ratio for public land in this zone is calculated as high as about 38 % for wide roads, retention area and a park, compared to the other zones. The evaluated land value is low because most area is for residential use. The replotting area will be larger than the area of blocks as shown in **Table 4.3.3.** Therefore about 13,000 m^2 should be replotted to the other zone and no reserved land will be secured in this zone. As a matter of fact, replotting to the other zone will be difficult from the principle of the equal land value and characteristics before and after replotting. It will also be difficult to explain and convince the land owners that the land is the same as before and after replotting if the replotting location is apart from the original.

Therefore, decreasing public land contributions will be required (such as making roads more narrow and parks smaller) in the implementation design.

There are 15 large land owners with an average landholding of about 11,000 m^2, and others with an average of about 600 m^2. This should be taken into consideration for block designs and replotting.

(3) Zone 3

There are some buildings, and small roads, but many large lots of more than 1,000 m^2 in Zone 3. The area is divided north and south by the Khlong Kamen. The evaluated land value of these two areas differs significantly. It is roughly estimated that the contribution ratio of the area south of the Khlong Kamen should be 10 to 15 % and that of the north area by 45 to 55 %. In this case replotting to the original location should be important.

Care should be taken to the lots adjoining the SRT and ETA land to ensure having an access road.

(4) Zone 4

Disordered development is in progress west of Zone 4. In the developed area compensation for the existing buildings and correspondence of replotting should be considered for road design, nevertheless removal of many buildings will be required.

The land for public use such as SRT, ETA, a primary school, etc., forms about 20 % of Zone 4. No contribution will be taken from the land for public use, which should be taken into consideration in the block design and replotting design.

Part IV.
Replotting System and Design/Plan

Volume IV.
Replotting Design for the Project Area

Volume IV. Replotting Design for the Project Area

1. Introduction

Replotting Design for the project area (85 ha) shall be formulated in accordance with the following procedure.

- Preparation of Replotting Design
- Land Evaluation
- Replotting Design

Each standard of evaluation, replotting, calculation method, and street value land evaluation method which have been examined and proposed in Volume 1 and Volume 2 of Part V, shall be adopted for the replotting design of the project area.

Numeric value of each coefficient shall be prepared by an output data of the topographic survey, implementation plan, and site survey for replotting.

2. Preparatory Work for Replotting Design

2.1 Determination of Original Land Area Before the Project

The data of the original land area before the project sourced by the Land Department (CVA) of the Ministry of Interior which is described on the certificate of land title shall be adopted. However, the data differs from the area size of the cadastral map. Although the data which are described on the certificate comes before the cadastral map data.

2.2 Cadastral Map

The cadastral map in the project area before the project is shown in **Figure 4.4.1**, and is prepared based on the output of the topographic survey which was carried out before the L/R project plan formulation and mapped at a scale of 1 to 1000. The location of lots before the project, lot shops, lot number and lots, and project area boundary are described on the map.

2.3 Block Map

The block plan map shown in **Figure 4.4.2** and the map showing the block plan overlaid to the cadastral map shown in **Figure 4.4.3**, is prepared for the replotting design with a scale of 1 to 1000.

2.4 Setting Up of Planning Standards for Replotting

2.4.1 Land Evaluation Standards

Land evaluation standards for the project area which has been examined and proposed in the course of previous volumes, is stipulated as follows.

Figure 4.4.1 - Cadastral Map

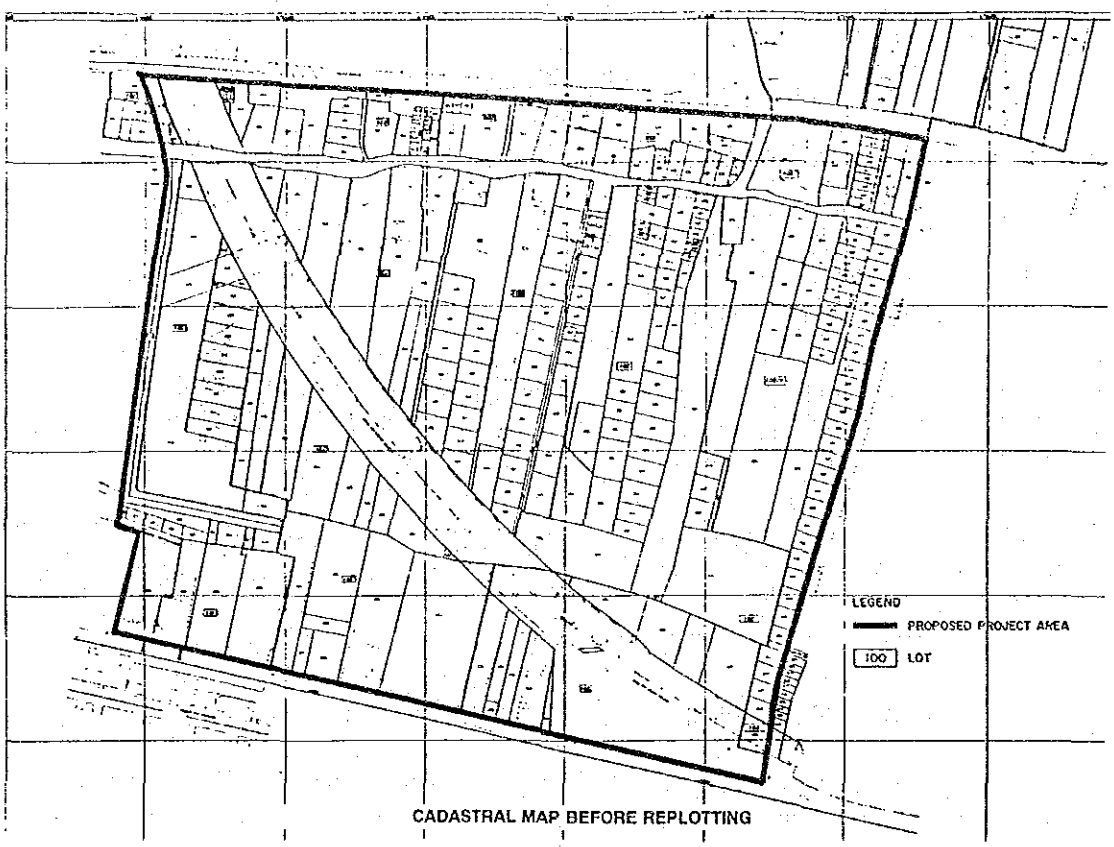


Figure 4.4.2 - Finalized Block Plan

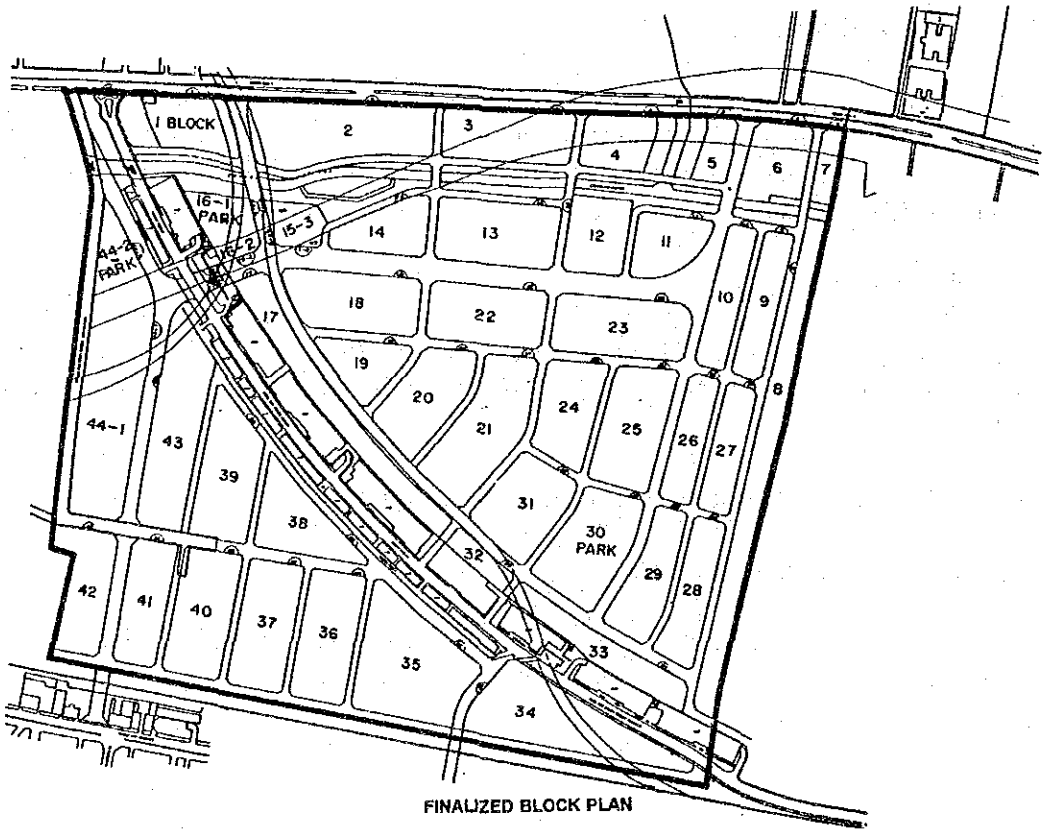
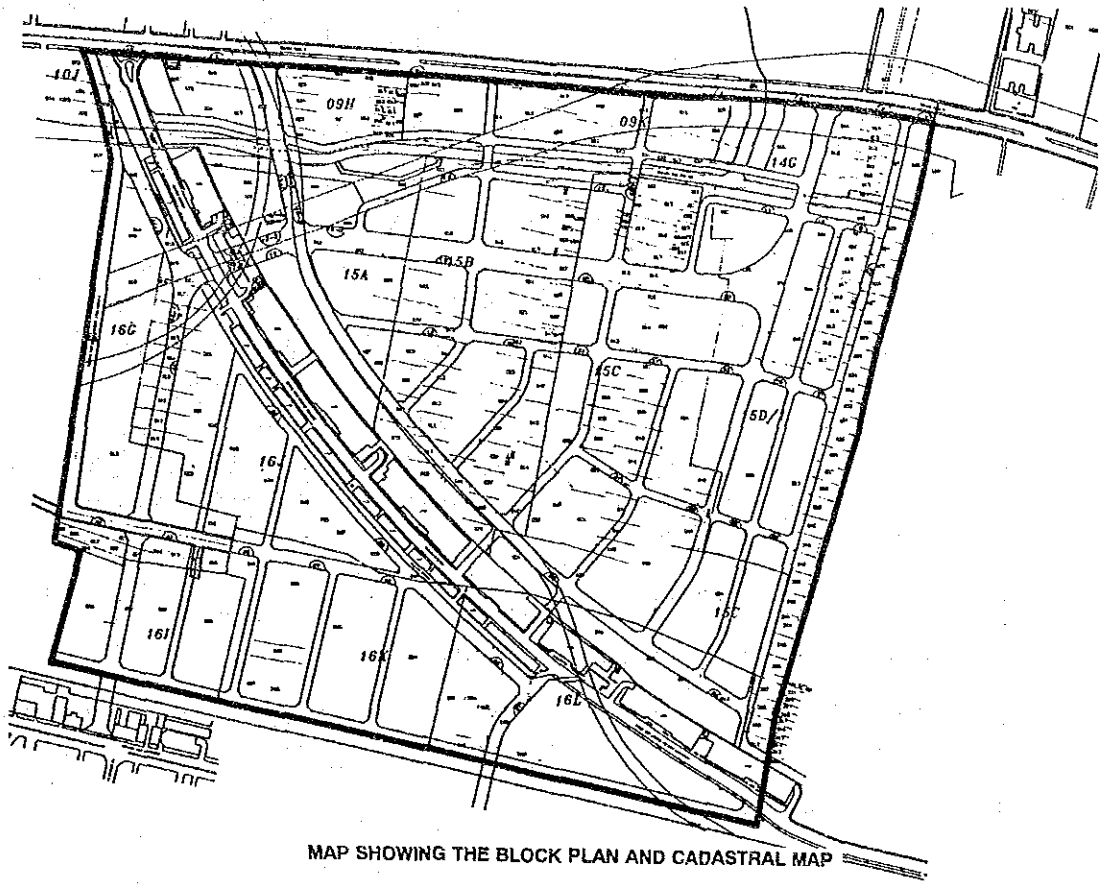


Figure 4.4.3 - Map Showing the Block Plan and Cadastral Map



Draft of Land Evaluation Standard

1. Objective

This standard, based on the (Name of Law), determines the land evaluation implementation method for the land readjustment project implemented by (Developer Name) and has as its objective appropriate and balanced evaluation.

2. Terminology

For the purposes of this standard, terminology shall be defined as follows.

Lot	:	Part of entitled site, to which legal rights of use and benefit, such as leasehold, tenant right and others are attached.
Frontage	:	Side of the lot facing its standard street
Standard lot	:	Rectangular lot adjacent at right angles to the street which is supposed to have the highest value in general usage of lot.
Street value	:	Utility value of a standard lot which is hypothesized to face a street, expressed in value per m^2.
Street order	:	Order of street in the list of street values for the lot with multiple street. The larger the street value, the higher the rank. The larger the frontage the higher the rank, when the street values are same.

Front street	:	Streets with highest street order, among streets with lots having multiple street faces.
Side street	:	Street which flanks the side face of a corner plot.
Back street	:	Street on to which the back face of a lot is adjacent.
Large scale lot	:	A lot which is too large to be accommodated in ordinary block, and which is or is going to be used as one uniform lot.

3. Evaluation Method

Lot evaluation shall, in principle, be carried out according to the street evaluation method.

4. Roads Assigned Street Values

Street values shall, in principle, be assigned to all roads greater than 4 m in width for traffic of both vehicles and pedestrians. However, in terms of land utility, this shall include all roads which are fulfilling these functions.

5. Method of Assigning Street Values

a. A street value shall, in principle, be assigned for each block.

b. When it is recognized that there are differences in the condition of lots on the same block, street values shall be assigned to divisions of blocks.

6. Street Value Calculations

Street value calculations shall be carried out according to Appendix 1.

7. Street Value Expression

Street values in the project area shall have a before project maximum index of 1000 and will be expressed in the form of a comparative conversion index (hereinafter called the street value index).

8. Indexes for Lots, etc.

a. Normal lots and replots will have per square meter indexes and total indexes calculated for each lot.

b. When necessary, neighboring lots will form one contiguous lot for which a total index will be calculated, the per square meter index and total index for each lot will then be determined to conform with this index.

9. Calculation of Lot Indexes

Lots are classified as follows for per square meter and total index calculations.

Normal lots	:	Lots with only one side facing the street.
Corner lots	:	Lots at the intersection of two streets with two sides facing the street.
Dual frontage lots	:	Lots sandwiched between two different streets where two opposite sides of the lot face the street.
Unaccessible lots	:	Lots that have no road access.

10. Calculations for Normal Lots

a. Calculations for normal lots use adjacent street value index and make adjustments as may be necessary. The per-square-meter index is calculated and this is multiplied by the lot area to find the total index

b. When it is necessary to divide a lot into two or more divisions, the index for each division is calculated as indicated above and sum of these indexes is divided by the area used to find the per square meter index. The total index is found by multiplying the area by the per-square-meter index.

11. Calculations for Corner Lots

a. Calculations for corner lots calculate the index as for normal lot calculations using the main street and to this the side street index is added. This is divided by the area to find the per square meter index. The total index is the value obtained by multiplying the area by the per-square-meter index.

b. The side street index is calculated in the following way.

(side street additional index) = (side street value index) x (side street frontage) x (side street addition ratio)

The side street additional ratio shall be 0.5 ~ 1.0.

12. Calculation for Dual Frontage Lots

a. Calculations for dual frontage lots calculate the index as for normal lot calculations using the main street and to this the back street index is added. This is divided by the area to find the per-square- meter index. The total index is the value obtained by multiplying the area by the per-square-meter index.

b. The back street index is calculated in the following way.

(back street additional index) = (back street value index) x (back street frontage) x (back street addition ratio)

The back street additional ratio shall be 0.25 ~ 0.5.

13. Calculations for Unaccessible Lots

Calculations for unaccessible lots use the street value index for the road primarily used by that lot, to be multiplied by the unaccessible lot adjustment coefficient and other necessary adjustment coefficients in calculating the per square meter index. The total index is the value obtained by multiplying the area for that lot by the per-square-meter index.

14. Adjustment of Indexes

Adjustments are made to the indexes of lots or parts thereof according to the following.

- Degree of depth of the lot
  The degree of depth of lot shall be 0.80 ~ 1.00.

- Cul-de-sac lot
  The cul-de-sac coefficient shall be 0.95 ~ 0.98.

- Unaccessible lot

The unaccessible lot coefficient shall be 0.80 ~ 0.90.

- Lot lower than road level
  The low level lot coefficient shall be 0.80 ~ 0.95.

- Current state of lot utility
  The current state of lot utility shall be 0.80 ~ 1.10.

- Lots used as (private) road
  The private road coefficient shall be 0.10.

15. Lot Value Price

a. The lot value price shall be the value produced by multiplication of the lot total index multiplied with the unit price of the index.

b. The evaluated price for each plot shall be the sum of the evaluated prices for the lots within the plot.

16. *Index Units*

One index unit price shall be determined based on an appropriate price (in other words, standard price) of a standard lot at project completion.

17. Mandate

Aside from the designation of standard value, clauses recognized as necessary pertaining to land value shall be determined by (organization, committee, authority, etc.).

By-laws

These standards shall become effective from DD/MM/YY.

Appendix 1

(Street value) = (street coefficient) + (accessibility coefficient) + (land coefficient)

(1) Street Coefficient

The street coefficient is the coefficient expressing the utility value utility according to the street on to which the lot is adjacent. It fluctuates according to the systematic continuity, width, structure and landscaping of the street and is expressed as follows.

street coefficient $t \cdot F(W) + \Sigma X$

$t \cdot F(W)$: utility value and utility of the lot according to street traffic

ΣX : utility value of lots according to street space and standard of improvement

t : coefficient expressing the grade of a street in terms of street traffic flow characteristics, systematic and continuity, etc., within the town area road network, as in **Table 4.4.1.**

$F(W)$: a function for street width, used to adjust the "t" value according to width

$$F(W) = \frac{W}{W+4}$$

However, W=4 is for roads less than 4 m.

X : coefficient for lot utility value and utility and state of street repair based on street vacancy, provided in attached **Table 4.4.2**.

Table 4.4.1 "*t*" Value

	t Value	Remarks
Arterial Road	2.0	Rama IX Road
District Road	1.4 ~ 1.6	
Distribution Road	1.2 ~ 1.3	
Access Road	1.0 ~ 1.2	
Impasse	0.5 ~ 1.0	

Table 4.4.2 "*X*" Value

	X Value	Remarks
Pedestrian Way	0.20	Width > 3 m
	0.10	Width ≤ 3 m
Canal	0.1	
Unpaved Road	1.0	

(2) Accessibility coefficient

The accessibility coefficient expresses the benefits brought about by existing traffic, leisure and public facilities, etc., and can be expressed as a positive or negative value.

Accessibility coefficient $= \Sigma m \cdot F(s)$

m : index expressing size of benefits resulting from specific facilities as in **Table 4.4.3.**

$F(s)$: index successively decreasing the "*m*" value according to the distance (s) from the specific facility; expressed as follows.

$$F(s) = \frac{(S-s)^n}{S}$$

S : effective range
n : characteristics of successive decrease
s : distance between targeted street and the specific facility

Table 4.4.3 Standard Values of "S", "m" and "n"

Facilities		S	m	n	Remarks
Favourable					
Transport Facility	. Railway Station	2,500	0.6	1	
Commercial Facility	. Shopping area . Market	2,500	0.3	1	
Park		-	0.1	-	Uniform value all over the area

(3) Land Coefficient

The land coefficient expresses the value for usage condition of the lot itself, cultural characteristics, safety characteristics and natural environment, etc., and is expressed as follows.

$F(P,Q)$: the usage and utility value of lots comprehensively derived from the standard of improvement for land utility, public facilities

ΣY : the lot utility value according to the standard of improvement for culture and health

u : the general utility of the lot as a basic grade according to regional conditions and land utility, shown in **Table 4.4.4**.

Table 4.4.4 "u" Value

	u	Remarks
Before Land Readjustment	1.4 ~ 2.0	
After Land Readjustment	2.0	

$F(P,Q)$: the function modifies "u" value depending on effectiveness of lot in land utility, disaster prevention and safety resulting from infrastructure improvement, expressed as follows

$$F(P,Q) = 1+\sqrt{(P/P_0)\times(Q/Q_0)}$$

P_0 : standard ratio of public land (%), the standard value will be 20 - 30

P : ratio of public land in the district where the lot is located, (%)

Q_0 : standard street density (m/ha), the standard value will be 200 - 300

Q : street density in the district where the lot is located (m/ha)

ΣY : index expressing value and utility added due to physical conditions such as improvement of utilities with direct influence on lot utility, shown in **Table 4.4.5.**

Table 4.4.5 "Y" Value

Items		Y	Remarks
Public Utilities	Improvement of Both Water Supply and Sewage	0.3	
	Improvement of Water Supply Only	0.1	
	Others		

Table 4.4.6 Adjustment Coefficient

Existing land use	Adjustment coefficient
Commercial	1.1
Housing	1.0
Swamp	0.8
Others	0.9

2.4.2 Replotting Design Standard

Replotting design standard for the project area which has been examined and proposed in the previous Volume shall be formulated as follows, and the evaluation, replotting calculation method is adopted for this replotting design.

Draft of Replotting Design Standard

1) Evaluation Replotting Calculation Method

(Objective)

1. This standard aims to provide an appropriate replotting design for the replotting design of ((Project Name)) land readjustment project implemented by ((Developer)) by way of determining necessary issues.

(Standard time of replotting design)

2. The replotting is carried out for the lots existing at the project approval date (hereinafter called the *"Standard Day"*).

   The following change after the Starting Day may be taken into account on condition that there are no ill effects to other lots.

   - Private land changed from public land
   - Public land changed from private land
   - Land remarkably changed in land use or environment
   - Subdivided or consolidated land with application or registration on the rights or disposition
   - Land with alteration of the original application or registration

(Original lot area size)

3. The original lot area size and lot area size for land with rights other than ownership rights, which are the basis for carrying out the replotting design, shall be the area size recorded in the land registration.

(Replotting design method)

4. Replotting design shall use the evaluation replotting calculation method.

(Evaluation standard)

5. The standard for evaluating the pre-readjustment lots and post-readjustment lots shall be determined separately consulting with ((Council)).

(Replotting location)

6. The replotting location shall, in principle, be in the original location or within close proximity of the original location.

   (1) When replotting cannot be carried out in the original location or its proximity because of land for use by newly constructed public facilities brought about by the implementation of this project, replotting will be carried in a different location.

   (2) For lots that are smaller than the original lot area size, the replot location shall be determined with consideration of the usability conditions.

(Replot area size)

7. The replot area size is determined using the area size produced by the following formula as the standard.

$$E_i = \frac{A_i a_i (1-d) y}{e_i}$$

E_i	:	Area of replotting lot
e_i	:	Index of unit price of lot after project
A_i	:	Area of original lot
a_i	:	Index of unit price of lot before project
d	:	Average contribution ratio
y	:	Average increase ratio

The area of replots which have special designations can be determined with consideration to the land use conditions.

(Replot shape)

8. The standard shape of replots will be rectangular and will be determined with consideration to the original land use conditions. However, in case that street shape and the inter-relationships with other lots should require special considerations, the above may not be applicable.

(When replots are not designated with the consent of the owners)

9. For the lots where the owners (including holders of rights to use or profit from the original lot) make the application or consent, replots may not be designated.

(Replot correspondence)

10. Replotting, considering the uniformity of the original lots, will in principle designate one replot area. However, when it is judged that one contiguous replot for original lots that are not uniform or multiple replots for original contiguous lots is appropriate, replots can be designated in such a way.

(Other necessary clauses)

11. Other than the determination of these standards, other clauses necessary to the replotting design are determined separately by the implementation party.

3. Land Evaluation

3.1 Preparation Work and Land Evaluation

Precondition of advantage and disadvantage factor for the land evaluation in the project area (85 ha) shall be examined as follows.

(1) Land use

(2) Public facilities survey for setting-up of street value

(3) Environmental characteristics

3.2 Land Evaluation

3.2.1 Street Value Calculation

Project area roads and roads outside the project area along the project area boundaries influencing utility, disaster prevention and safety of the area will be included in calculations for that area. In addition, the previously mentioned effective usability, disaster prevention and safety of the lot will be judged in total and regardless of whether public or private road, all roads will be added to the street density and public land ratio.

- Before Readjustment

Public land area (m^2) = $107,849\ m^2$
Road length (m) = $4,410\ m$

$$P = \frac{public\ land\ area\ (m^2)}{calculated\ project\ area\ (m^2)} \times 100$$

$$= \frac{107,849}{884,785} \times 100$$

$$= 12\ (\%)$$

$$Q = \frac{road\ length\ (m)}{calculated\ project\ area\ (ha)}$$

$$= \frac{4,410}{88.4785}$$

$$= 50\ (m/ha)$$

$$F(P,Q) = 1+\sqrt{(12/25)\times(50/250)}$$

$$= 1.31$$

- After project

Public land area (m^2)= area of public land roads, canals, parks

$$= 276{,}906\ m^2$$

Road length (m)= Length of planning roads, etc.

$$= 13{,}290\ m$$

$$P = \frac{public\ land\ area\ (m^2)}{calculated\ project\ area\ (m^2)}\times 100$$

$$= \frac{276{,}906}{884{,}785}\times 100$$

$$= 31\%$$

$$Q = \frac{road\ length\ (m)}{calculated\ project\ area\ (ha)}$$

$$= \frac{13{,}290}{88.4785}$$

$$= 150\ (m/ha)$$

$$F(P,Q) = 1+\sqrt{(31/25)\times(150/250)}$$

$$= 1.86$$

After the calculation of street values, maximum street values before the project represents and index number and defines 1000 indices. Any other street index is calculated by comparing with the maximum street index as shown in **Figure 4.4.7**, **Figure 4.4.8** and **Table 4.4.7** and **Table 4.4.8**.

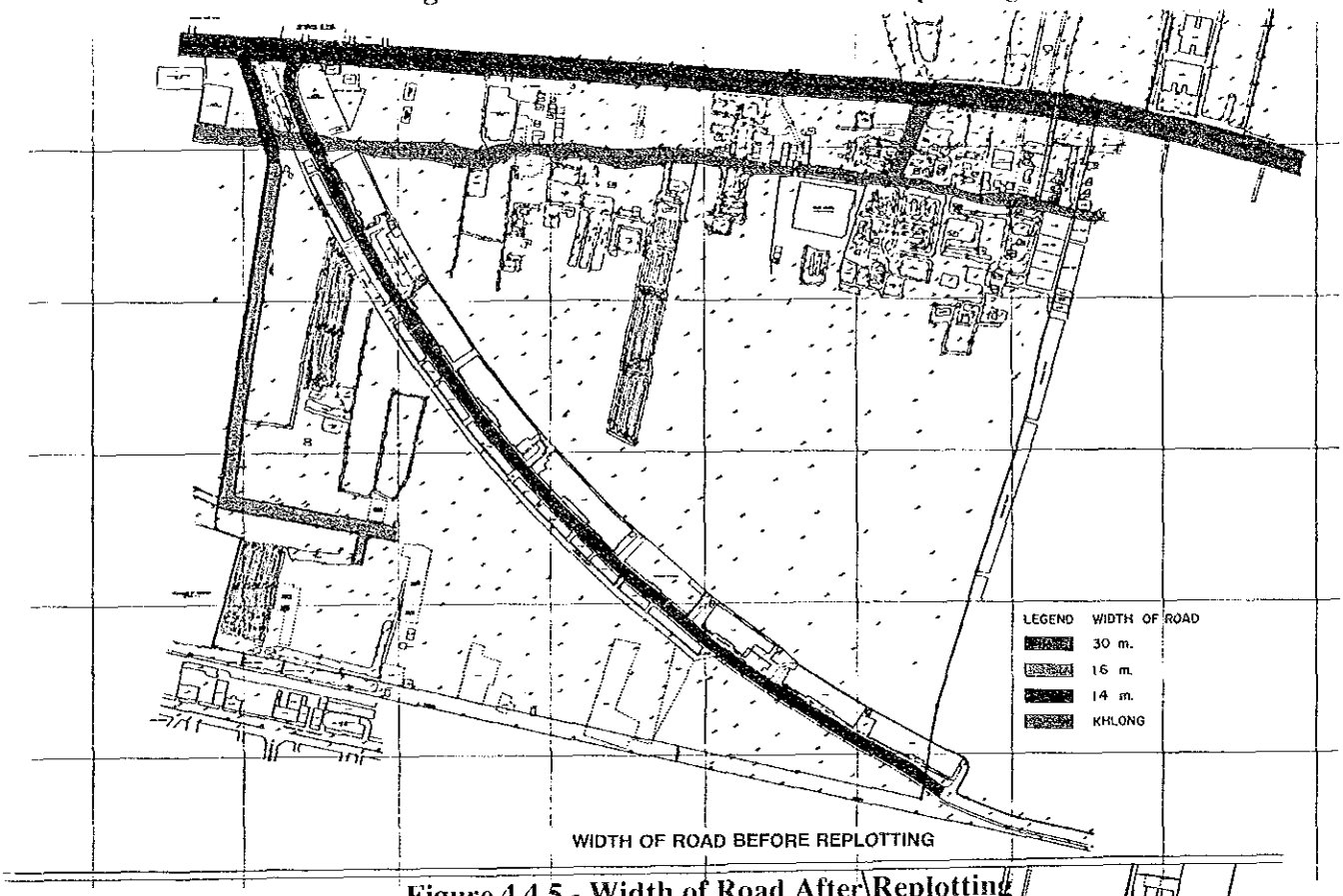
Table 4.4.7 Street Index of Maximum, Minimum and Mean

	Max. Rate	Min. Rate	Mean	Remarks
Before the project	1,000	606	747	
After the project	1,316	1,070	1,153	

Table 4.4.8 Coefficient for Street Value

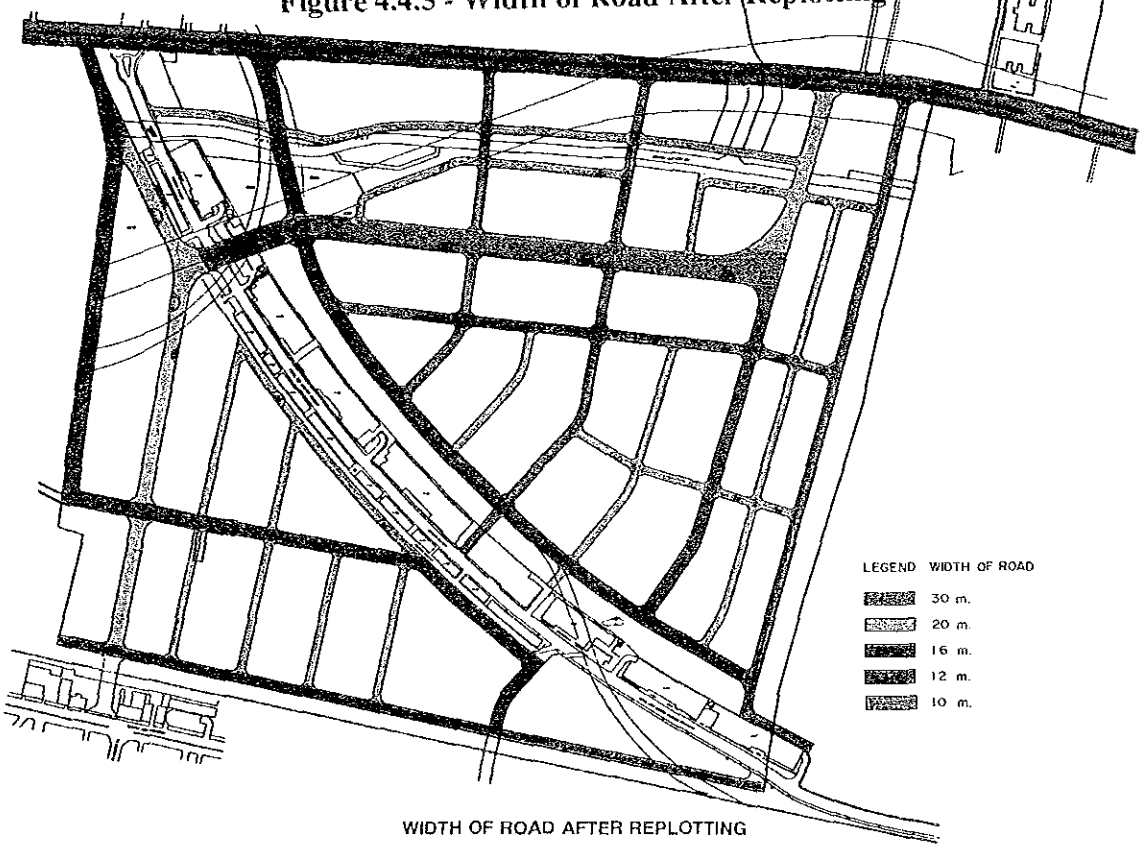
	Street Coefficient	Accessibility Coefficient	Land Coefficient	Remarks
Before the project	30.81%	5.57%	57.62%	
After the project	24.09%	7.40%	68.51%	

Figure 4.4.4 - Width of Road Before Replotting



WIDTH OF ROAD BEFORE REPLOTTING

Figure 4.4.5 - Width of Road After Replotting



WIDTH OF ROAD AFTER REPLOTTING

Figure 4.4.6 - "*t*" Value Before Replotting

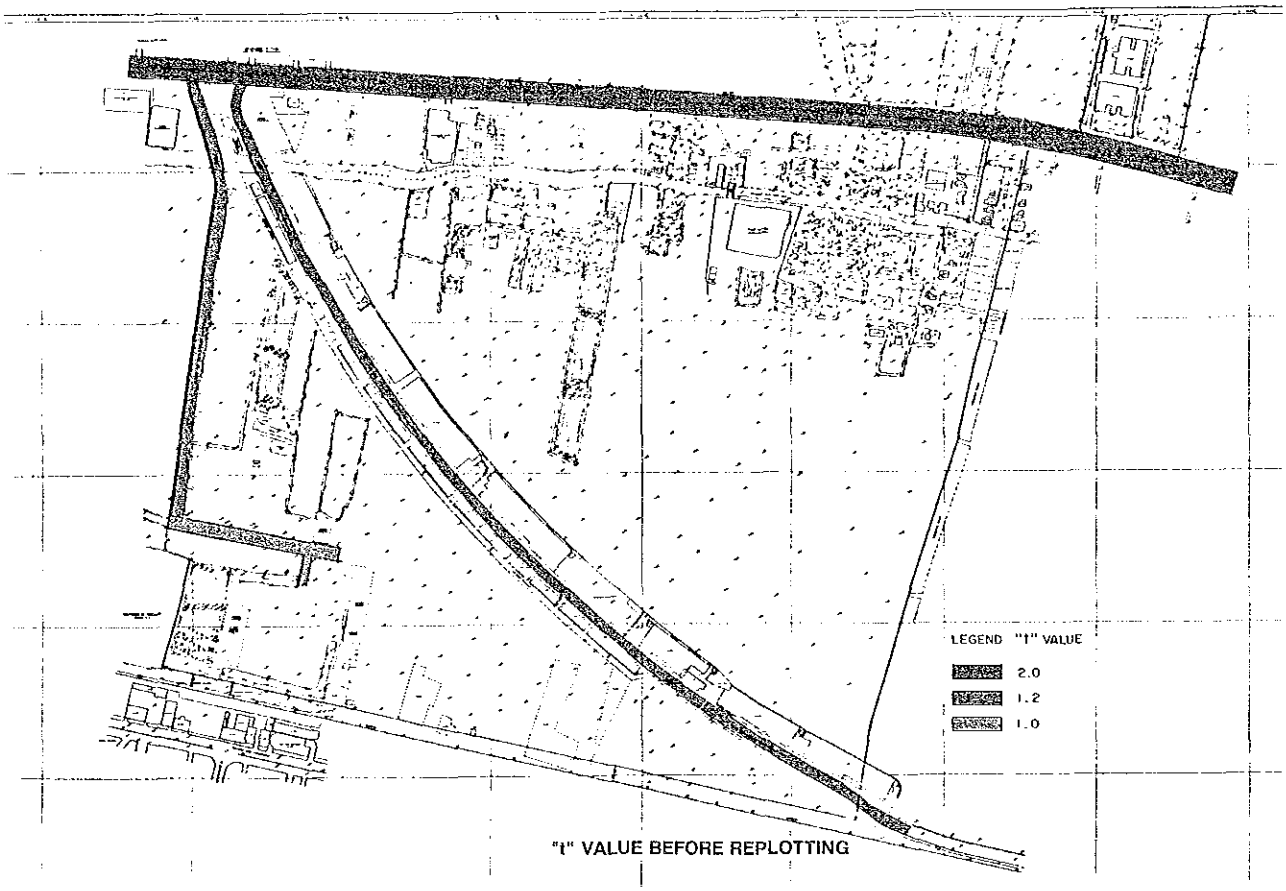


Figure 4.4.7 - "*t*" Value After Replotting

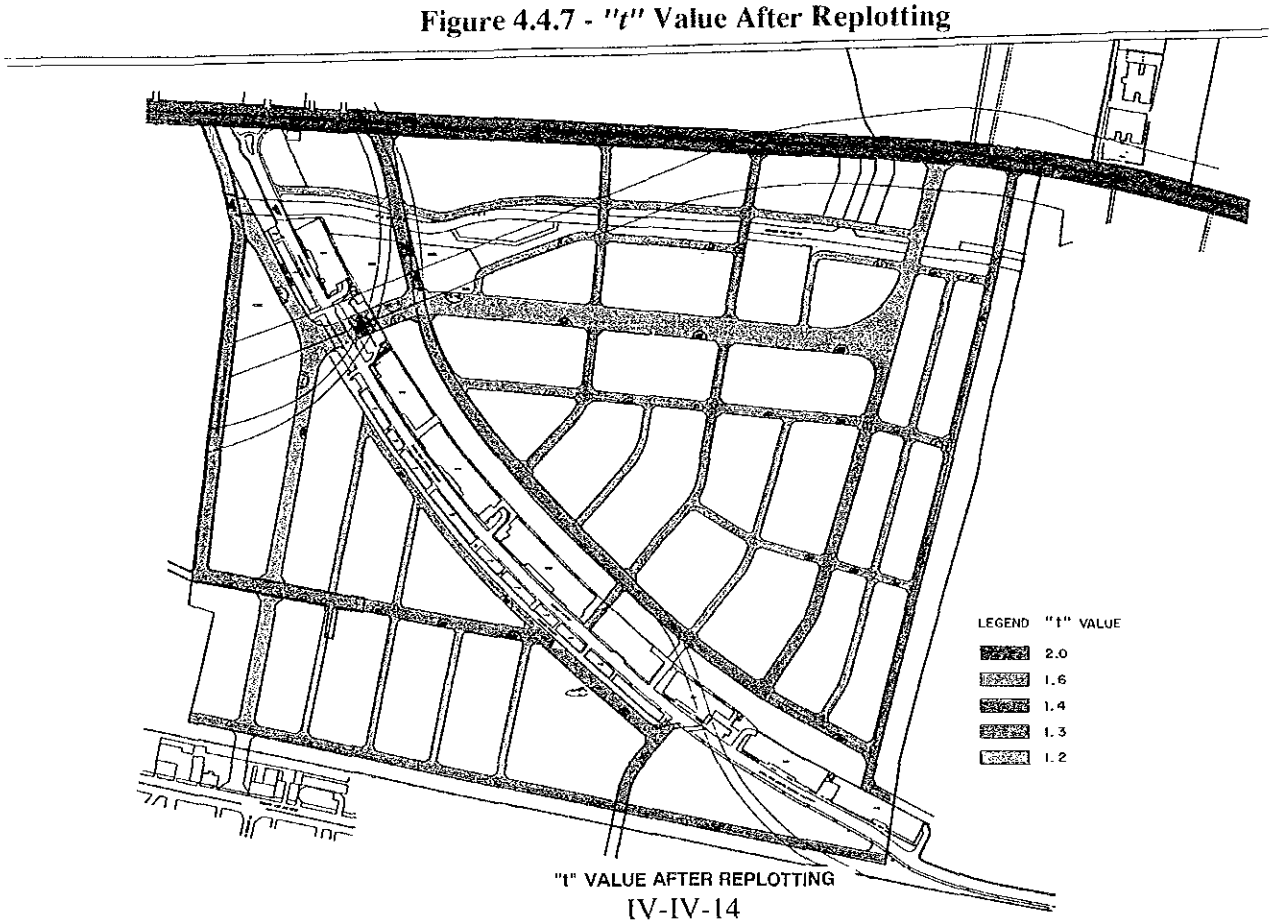
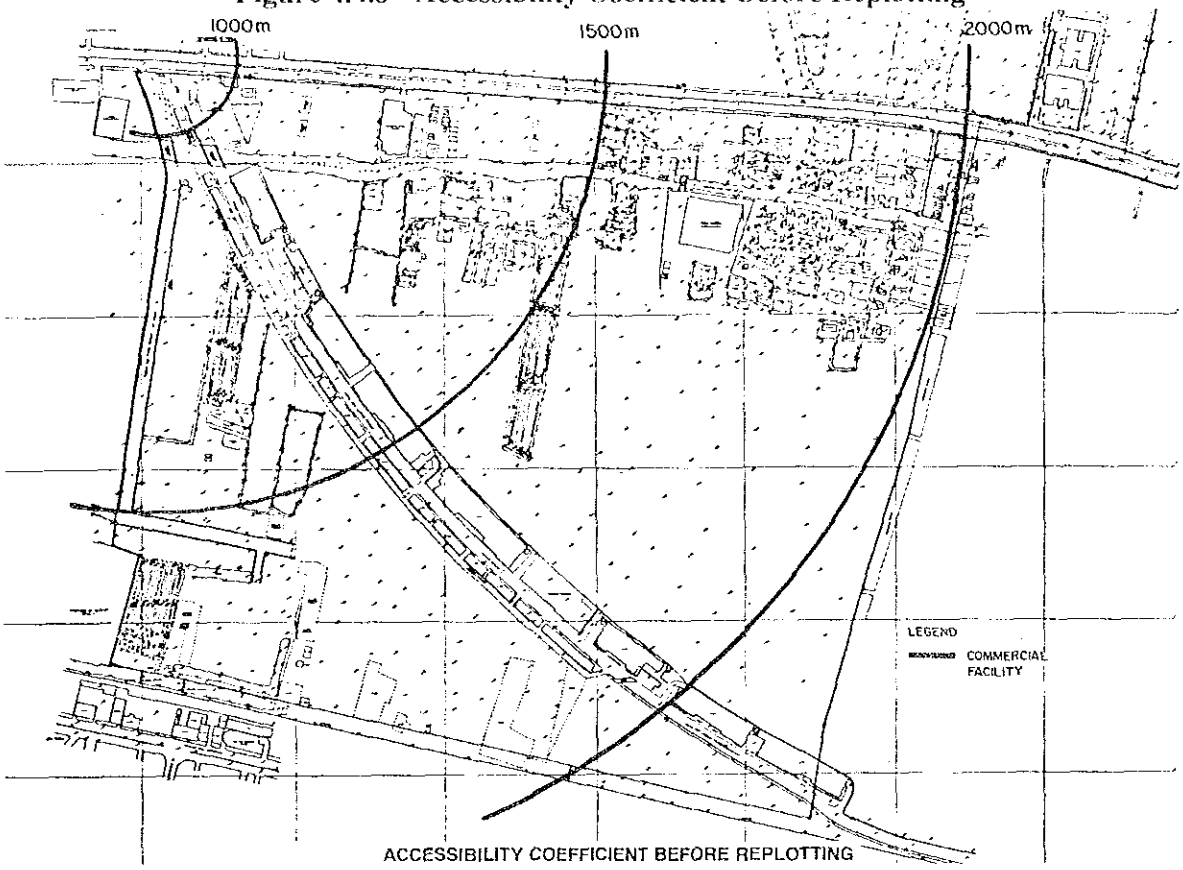
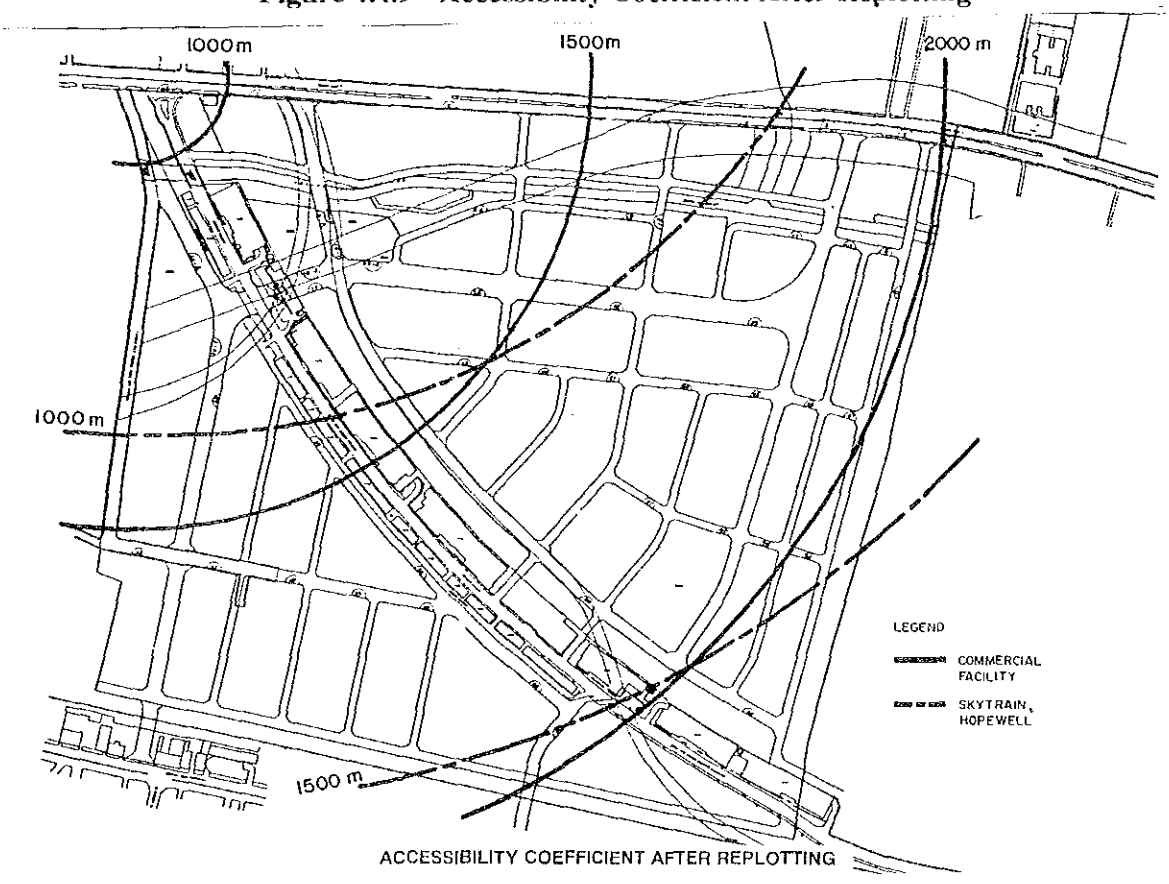


Figure 4.4.8 - Accessibility Coefficient Before Replotting



ACCESSIBILITY COEFFICIENT BEFORE REPLOTTING

Figure 4.4.9 - Accessibility Coefficient After Replotting



ACCESSIBILITY COEFFICIENT AFTER REPLOTTING

Figure 4.4.10 - Index of Street Value Before Replotting

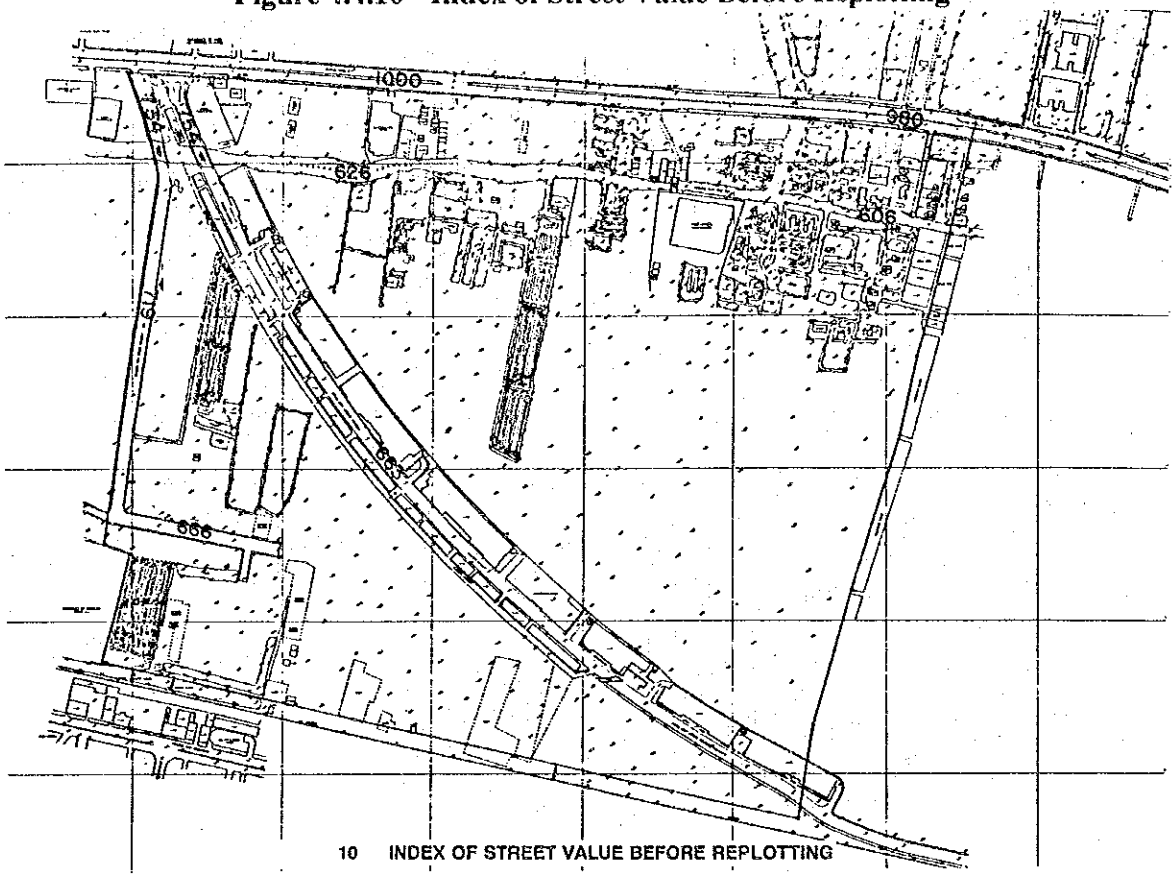
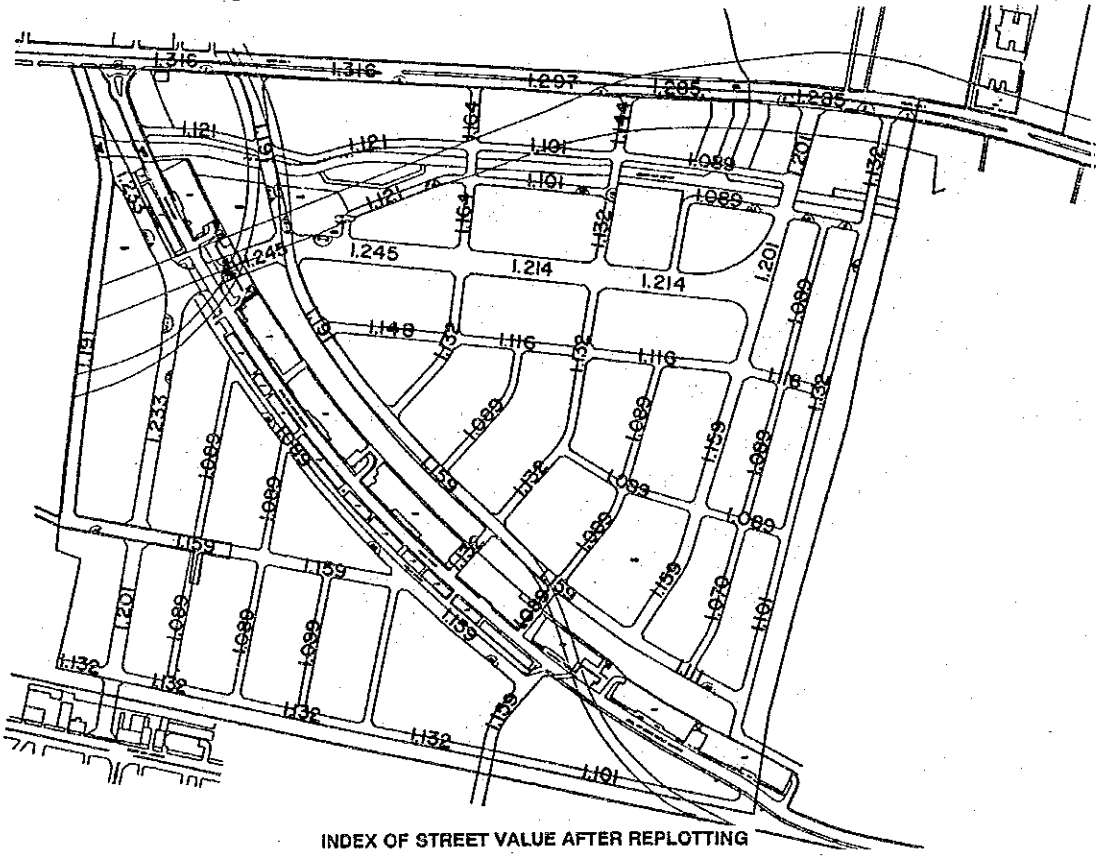


Figure 4.4.11 - Index of Street Value After Replotting



3.2.2 Land (Individual lot) Evaluation

Evaluation of individual lots is conducted by using the street value to find equivalent areas and the standard unit price, and adjusting according to the individual characteristics of each lot to find the value for that particular lot.

The evaluation of individual lots is expressed using the following formula.

(street value) × (adjustment according to individual factor of each lot)

Exceptionally, land for the Expressway and land for the Skytrain take measures that the land value evaluates 50% of a normal lot as a result of the land value calculation summaried in **Table 4.4.9** and **Figure 4.4.13.**

3.2.3 Block Evaluation After the Project

Block Evaluation after the project is calculated in accordance with proposed Land Evaluation Method shown in **Table 4.4.10** and **Figure 4.4.14.**

Table 4.4.9 Summary Table of Land Evaluation

Lot	Area (m^2)	@/m^2	Index	Remarks
9 - H	24,849.60	1,075	26,708,560	
9 - K	24,819.80	940	23,319,168	
10 - J	2,124.00	367	779,508	
14 - G	16,962.00	916	15,541,812	
15 - A	39,374.00	653	25,699,398	
15 - B	86,448.00	597	51,606,714	
15 - C	123,766.00	607	75,069,414	
15 - D	103,588.00	558	57,849,224	
16 - G	52,764.40	621	32,791,087	
16 - I	33,290.80	533	17,743,996	
16 - J	53,543.60	680	36,414,066	
16 - K	59,700.00	585	34,941,140	
16 - L	38,780.00	663	25,711,140	
Total	660,009.20	643	424,175,227	

Table 4.4.10 Block Evaluation Table

Subject Area (m^2)	@/m^2	Total Index
468,031.00	1.267	592,904,534

4. Replotting Design

4.1 Preparatory Work for Replotting

(1) Exceptional Measure

Public transportation projects, the Expressway and the Skytrain have been planned to align in the project area and commercial complex facility, (Royal City Avenue) have also been developed. In this regard, it is predicted that the function of those facilities would be decreased by a normal replotting measure. Therefore, those lands shall be taken as an exceptional measure.

(2) Reference of Replotting Design Data

Numeric data for replotting design is described below.

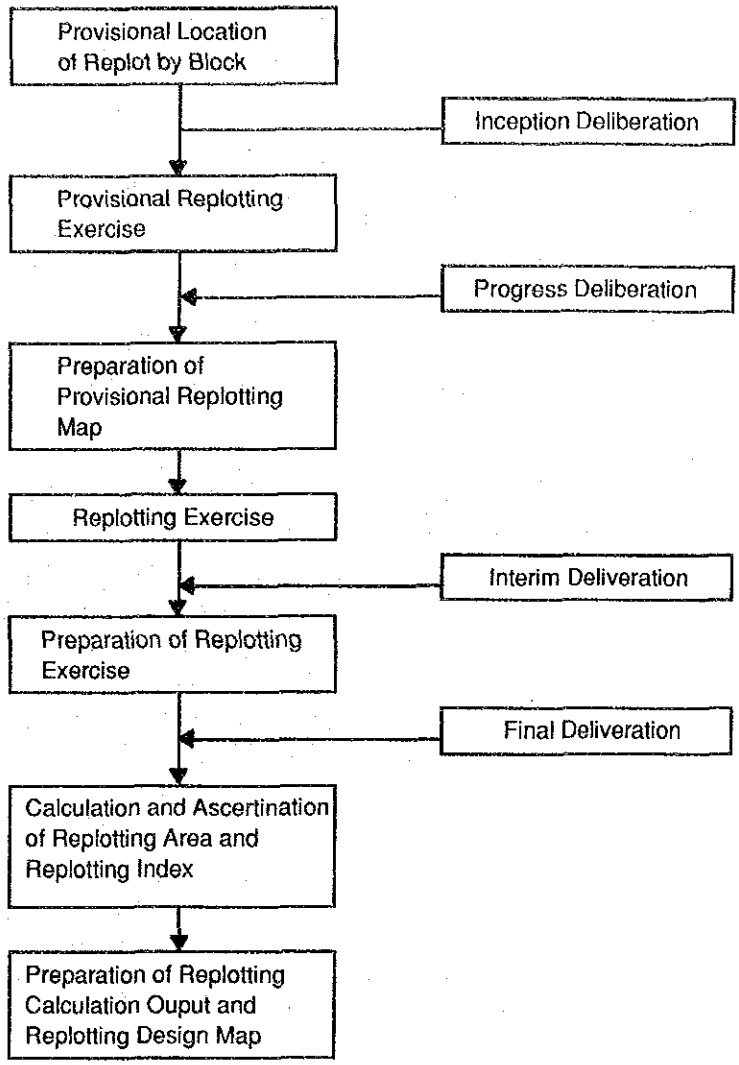
- Average Contribution Ratio
  (1 - (Total private land area after the project/Total private land area before the project) × 100
  = (1 - 437,732/660,009)) × 100
  = 33.7%
- Private land value index per sqm. before the project
  is 643 indices sourced from calculation result of land evaluation before the project.
- Private land value index per sqm. after the project
  is 1263 indecies sourced from calculation result of block evaluation.
- Increased ratio and proportional coefficient of private land.

Table 4.4.11 Increased Ratio and Proportional Coefficient

	Before the Project		After the Project		Contribution	Increased	Proportional
	Area m^2	@	Replotting Area	@	Ratio (%)	Ratio	Coefficient
Private land	660,009	643	437,732	1,267	33.7	1.97	1.306
Reserve land	-	-	30,300	1,267	-	-	-
Exceptional land	173,396	-	139,847	-	19.3	-	-
Total	833,405	-	607,879	-	-	-	-

* @ defines value index per sqm.
* Increased ratio shall be calculated that @ after the project devides @ before the project.
* Proportional coefficient shall be calculated (1 - average contribution ratio) × Increased ratio.
* Exceptional land represents land belong to Expressway, Skytrain, Royal City Avenue and SRT.
* Private land area before the project differ from private land area in the Implementation Plan because area data on the certificate of land title come before.

Figure 4.4.12 Replotting Design Procedure



- Standard index replotting lots

  Standard index of replotting lots shall be calculated for the land value index before the project times the proportional coefficient.

4.2 Replotting Design

A replotting exercise in the project area is carried out to refer to the "preparatory work for replotting design" of the above-mentioned according to the following procedure.

4.2.1 Location of Replot

The location of a Replot in the project area, is to consider its origin of allocation with geological and social considerations. Following points are taken in account for.

- Lot of Expressway, Skytrain, Royal City Avenue and SRT shall be replotted to original location.

- Between last side of Royal City Avenue Axis in the project area and that of west side shall not be replotted.

- Lot of reserve land shall be replotted along the arterial road for smooth disposition.

4.2.2 Replotting Exercise

Replotting exercise is carried out utilizing output of location of replot as shown in **Figure 4.4.14** to **Figure 4.4.17.**

4.2.3 Summarization of Replotting Design

Output of replotting design in the project area is tabulated as shown in **Table 4.4.12.**

Table 4.4.12 Summary Table of Replotting Design

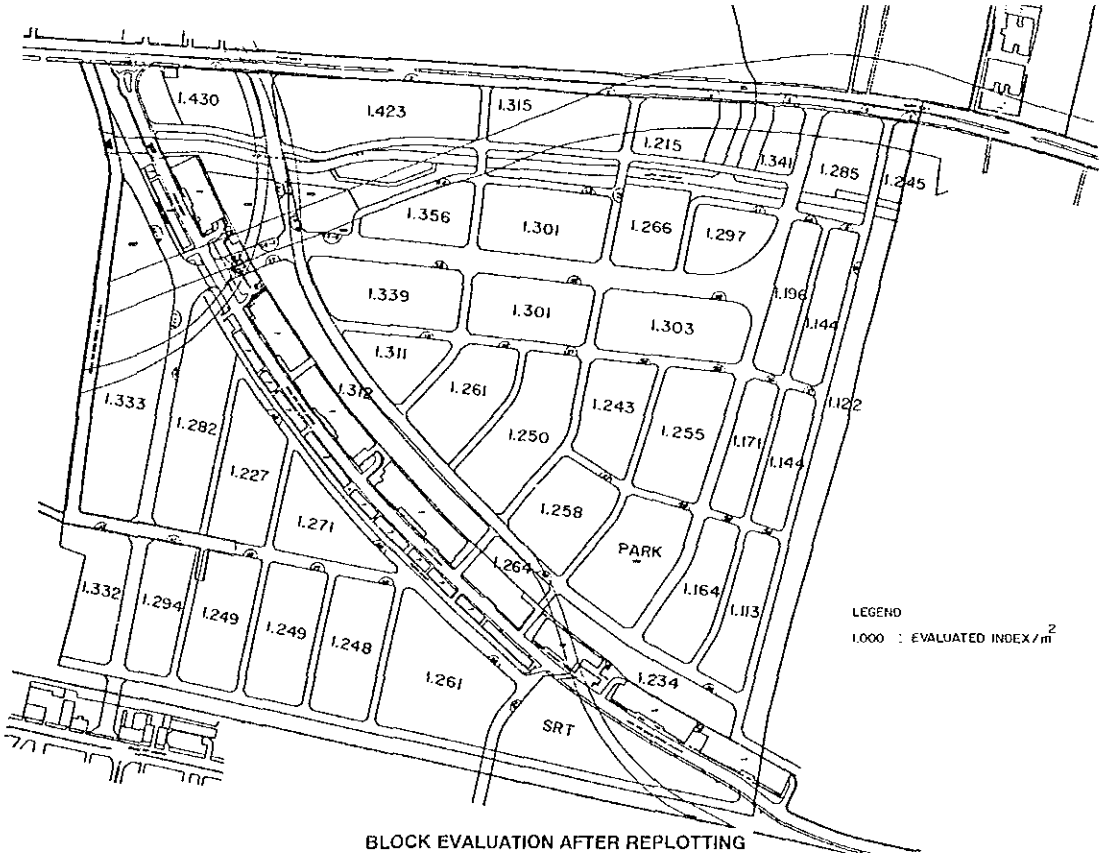
		Land before the Project		Land after the Project		Remarks
		Area	Total Index	Replot Area	Total Value Index	
Public Land		24,680	-	250,100	-	
Private land	Normal land	319 lots 660,009	553,972,844	192 lots 437,216	553,995,406	Contribution 22562
	Exceptional land	173,396	-	139,847	-	
	Reserve land	-	-	30,922	-	
Total		858,085	-	858,085	-	

* Total index before the project area means a total standard index to replot.
* Error of reserve land area between implementation plan and replotting design is caused by the calculation that increase ration and proportional coefficient is calculated to round four decimals down.
* Public land area after the project with Implementation Plan is 250,206 m^2 and that of area with replotting design is 250,106 m^2.

Figure 4.4.13 - Individual Lots Evaluation before Evaluated Replotting

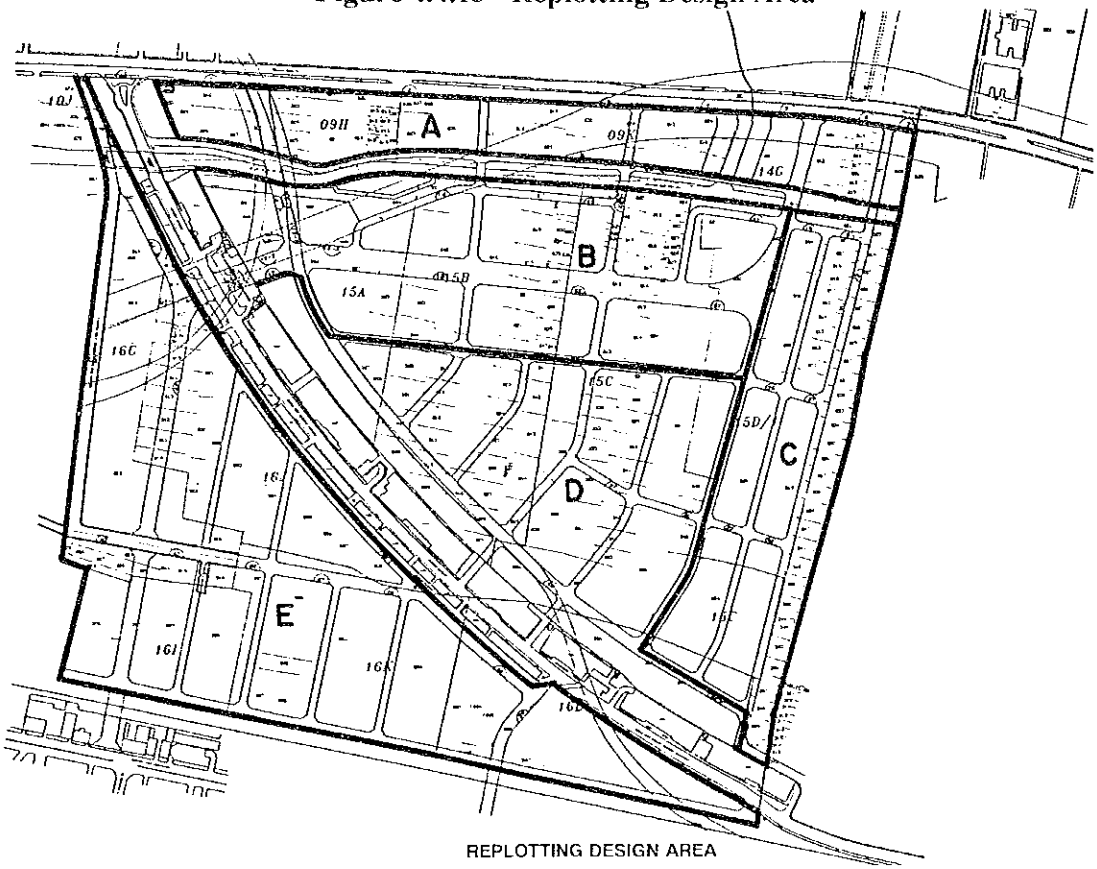
INDIVIDUAL LOT EVALUATION BEFORE EVALUATED REPLOTTING

Figure 4.4.14 - Block Evaluation after Replotting



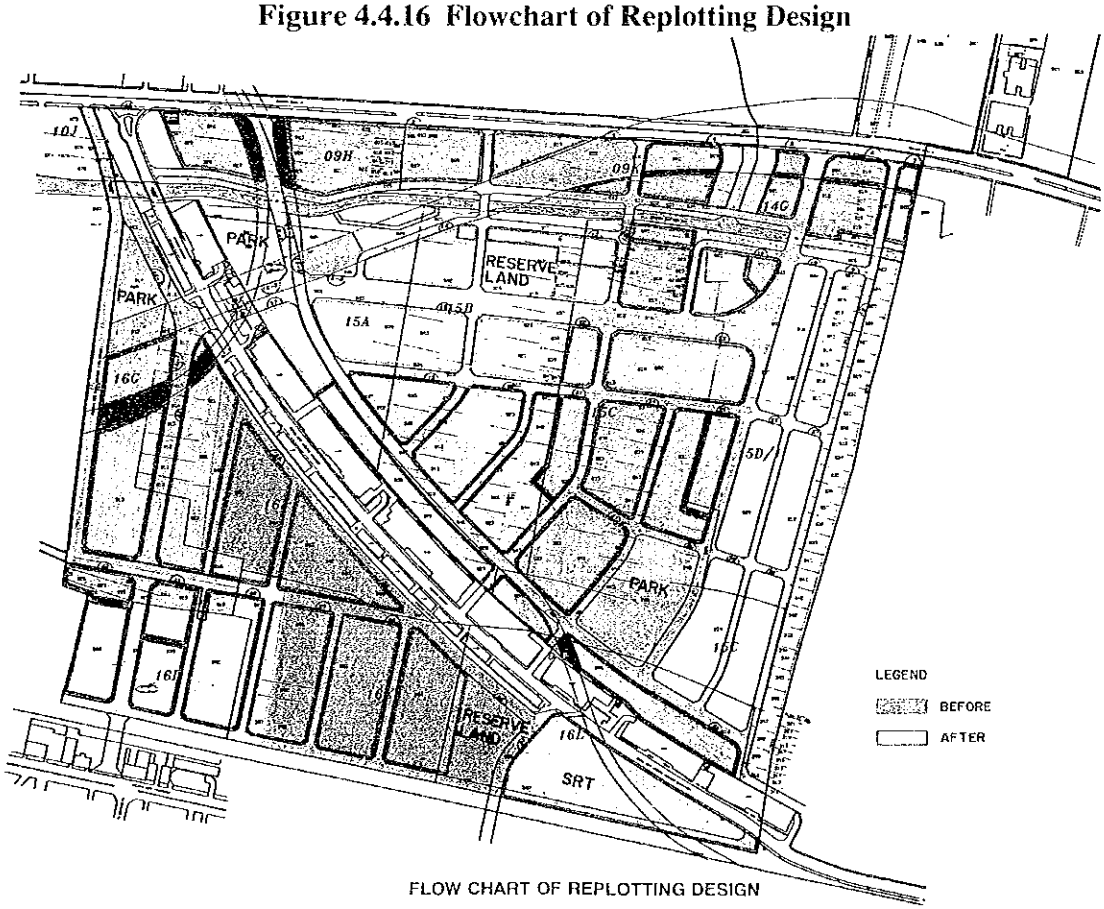
BLOCK EVALUATION AFTER REPLOTTING

Figure 4.4.15 - Replotting Design Area



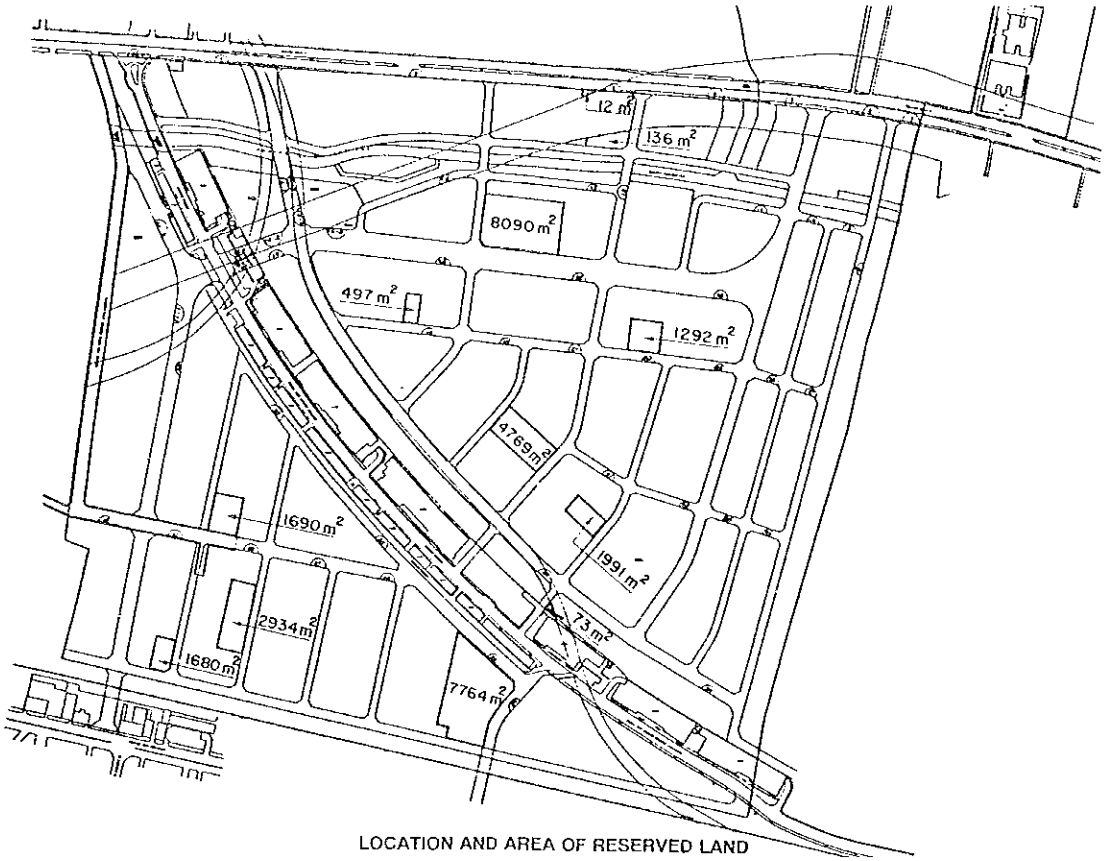
REPLOTTING DESIGN AREA

Figure 4.4.16 Flowchart of Replotting Design



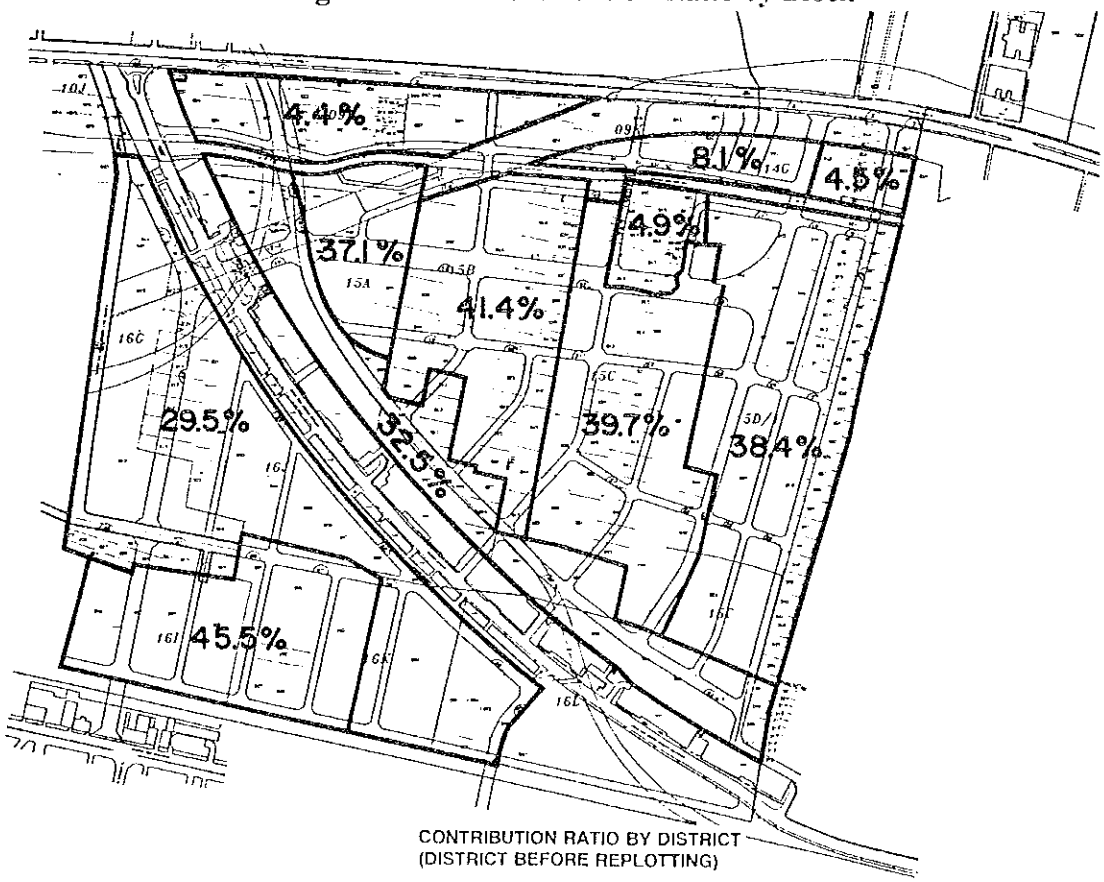
FLOW CHART OF REPLOTTING DESIGN

Figure 4.4.17 - Location and Area of Reserve Land



LOCATION AND AREA OF RESERVED LAND

Figure 4.4.18 - Contribution Ratio by Block



CONTRIBUTION RATIO BY DISTRICT
(DISTRICT BEFORE REPLOTTING)