

CHAPTER NINE:

IMPLEMENTATION PLAN

9.1 CONSTRUCTION PHASING PLAN

9.1.1 Condition for Implementation

For preparation of the construction phasing plan, the Study basically followed the results of the existing master plan, which consists of four construction phases extending from year 2002 to 2011.

On the other hand, the Study has found the following attitudes of the existing residents through the social survey.

- In the existing master plan, NHA considers the Project should have housing units for 85% of the existing residents. However, it is found out that 51% of the existing residents oppose to the project, due to their anxiousness for the living environment after the Project, and 53% of the existing residents intend to return to the Din Daeng Housing Complex.
- An agreement on exchange of lands has been established between BMA and NHA, and Block K 1.3 (B') will become a land for housing use.

Given these conditions, the first phase has been changed to focus on Block K.1.3 (B'). The initial phase will develop pilot housing units without any demolition of existing facilities to secure vacant units in the existing housing units for redevelopment.

Target areas from the second phase focus on smaller blocks as listed below:

- Phase 2: Block A1.1 and C1.5;
- Phase 3: Block A1.2 and Zone D; and
- Phase 4: Block B1.4, I2.9, and I2.10 together with Zone G and H in Phase 4.

Infrastructure and utilities will be developed surrounding the target areas in coordination with existing utilities.

Target areas of each phase are shown in Figure 9.1 to 9.4. Contents of construction works in each phase are summarized in Table 9.1.

Figure 9.1: Construction Phasing Plan

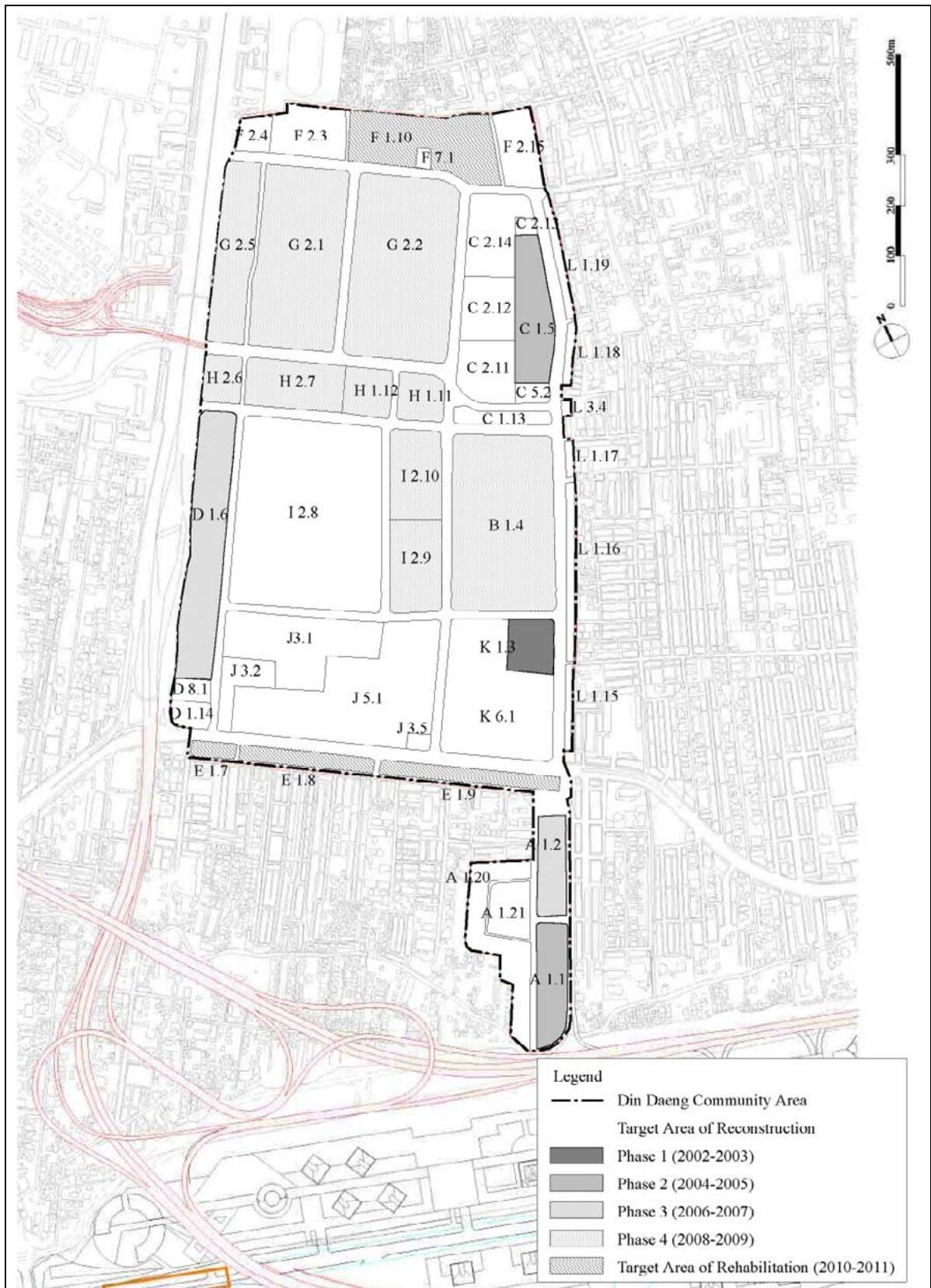


Table 9.1: Scope of Works in Each Phase

Phase	Contents of work	
	Building Facilities	Infrastructure
First	<ul style="list-style-type: none"> ● To construct approx.300 units of residences and commercial space in block K 1.3(B') ● In parallel with construction, to have would-be moving out residents and absentees to evacuate as much as possible in the whole Din Daeng Housing Community. 	<ul style="list-style-type: none"> ● To construct road and drainage at the western part of S-4 in front of K1.3 (B').
Second	<ul style="list-style-type: none"> ● To construct approx.700 units of residences and commercial space in block A.1.1. ● To construct approx.1,200 units of residences in block C.1.5. 	<ul style="list-style-type: none"> ● To expand road width and install sewage collection pipe in front of C 1.5.
Third	<ul style="list-style-type: none"> ● To construct approx.700 units of residences and commercial space in block A.1.2. ● To construct approx.1,500 units of residences in block D.1.6. 	<ul style="list-style-type: none"> ● To construct the following facilities. <ul style="list-style-type: none"> - S-1: Road, sewage collection system, power line, telecommunication line. - S-3: Sewage collection system. - S-4: Sewage collection system and drainage. - M-2: Sewage collection system.
Fourth	<ul style="list-style-type: none"> ● Participation of private sector in block B.1.4. ● To construct public facilities such as underpass, bus terminal, community rejuvenation center. 	<ul style="list-style-type: none"> ● To construct the following facilities. <ul style="list-style-type: none"> - M-1: Sewage collection system - M-3: Sewage collection system - M-4: Road, drainage and sewage collection system. - S-2: Road, sewage collection system and drainage. - S-4: Road, sewage collection system and drainage. - S-5: Road, sewage collection system and drainage. - S-6: Road, sewage collection system and drainage

9.1.2 Implementation Schedule

In the case for reconstruction of housing facilities in Japan, before commencement of the project, it is suspended to allow new residents. When the vacancy rate becomes 30% by autonomous moving-out, negotiation with existing residents is conducted for two years before commencement of construction works. Through negotiation, the compensation fee is fluctuated to achieve the target number of the moving-out residents for implementation. Referring to this experience, the first two years of the implementation period will be applied for negotiation with all residents, except the construction of the pilot housing units in Block K 1.3 (B').

Each construction phase has a two-year period, and renewal works will be completed in 2009. Renovation of Blocks E and F will be brought to completion in 2011. The implementation schedule has been planned as shown in Figure 9.2.

Figure 9.2: Phase-wise Development Plan

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
A1 NHA		moving out about 15% residents	relocation	demolition	construction					
A2 NHA		moving out about 15% residents		relocation	demolition	construction				
B' NHA	construction						relocation			
B Private	moving out about 15% residents			relocation		relocation	demolition	construction		
C NHA	moving out about 15% residents	relocation	demolition	construction						
D NHA	moving out about 15% residents			relocation	demolition	construction				
E NHA	moving out about 15% residents			relocation					next phase	
F NHA	moving out about 15% residents						relocation		next phase	
G Public Facilities							demolition	construction		
H Public Facilities							demolition	construction		
I Public Facilities						relocation	demolition	construction		

9.2 RELOCATION PLAN

9.2.1 Proportion of Returning Residents

Among the 6,818 households which are subjected to the housing renewal scheme, about 15% (1,023 households) are considered to be moving-out to other places upon the following conditions:

- The social survey found out that 47% of the existing residents presented attitude on “non-returning”, including “moving to other NHA” and “relocation”;
- NHA has no concrete data concerning share of “moving-out residents” from the reconstruction projects; and
- To secure sufficient housing units for returning residents, the shares of “moving-out residents” has been determined to be 15%, consisting of 8% for the absentee and 7% for the vacant units as shown in Table 9.2.

Among the remaining 85% households, 62.5% (4,261 households) will be categorized as ordinary returning residents while the rest will be 22.5% (1,612 households) as low income population who are unable to accept rent hike as shown in Table 9.2. According to the criteria employed in the slum improvement by NHA, those who are unable to accept rent hike are considered to earn less than 9,200 baht/month. The distribution of households by income is tabulated in Table 9.3.

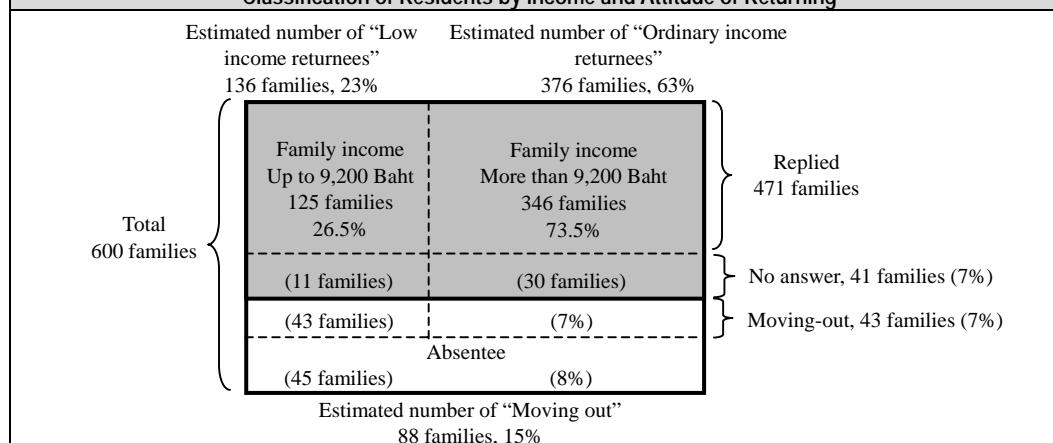
Table 9.2: Estimated Number of Returning Residents by Income Class

Items	Quantity (Households)	Share
No. of Target Units	6,818	100%
No. of Returning Residents		
Ordinary Returnees	4,261	62.5%
Low Income Returnees	1,534	22.5%
Moving-out residents	1,023	15%
Moving to other NHA Housing	465	7%
Absentees	558	8%

Table 9.3: Distribution of Household by Income

Family Member	Up to 9,200 Bt/mth (low income)	9,201-14,000 Bt/mth	14,001-20,500 Bt/mth	25,001-27,500 Bt/mth	27,501-36,000 Bt/mth	36,001-52,000 Bt/mth	More than 52,001 Bt/mth	Total
One	347	101	43	0	14	0	14	521
Two	507	275	463	14	130	72	0	1,462
Three	405	521	391	72	101	58	29	1,578
Four	261	318	521	72	174	130	0	1,477
Five	159	159	391	29	87	43	43	912
Six	43	116	159	43	43	43	14	463
Seven	58	29	58	14	29	14	0	203
Eight	14	43	43	0	14	0	14	130
Nine	14	0	29	14	0	0	0	58
Ten	0	0	0	0	0	14	0	14
Total	1,810	1,563	2,099	261	593	376	116	6,818

Classification of Residents by Income and Attitude of Returning



Note: ¹ There are 125 households, which earn less than 9,200 baht/month among the responded residents to the interview. Dividing the non-responding 41 households into 26.5% and 73.5% corresponding to the proportion of those earning less than 9,200 baht/month and those earning more than that. Adding the former to 125 households, 136 households are assumed to belong to the lower than 9,200 baht/month group. Consequently, proportion of this group to the whole will be $136/600=0.225$ (22.5%).

9.2.2 Relocation Plan

The Study has examined the relocation plan of the existing residents throughout the construction phases, based on the following conditions:

- The numbers of returning and moving-out residents was determined by the estimation discussed in the previous section;
- Ordinary income returnees will have priority to be allocated in reconstructed housing units, while low income returnees are allocated in the renovated housing units;

- Housing units in Block B1.4 is excluded from the relocation plan, because these units will be developed for middle-high income households by the private sector.

The sequence of relocation is planned based on the following consideration;

- The negotiation with existing residents will be commenced after vacancy rate reaches around 30% by autonomous moving-outs;
- Among remaining residents (70%), share of returning residents is assumed to be around 60-70% at the convenient location and 50% at the inconvenient location; and
- By payment of compensation, the project has to secure the vacancy rate of 15% in the first two years.

The relocation scheme in each phase and housing block is depicted in Figure 9.3.

Figure 9.3: Rotation Plan of Residents



9.2.3 Compensation and Rents

(1) Compensation

The compensation fee to the moving-out residents is set at 250,000 baht plus 10,000 baht for moving expense based on the following considerations.

- Compensation money for moving-out residents is equivalent to the majority opinion at the workshop with the existing residents, demanding 250,000 baht; and
- Moving expense plus loss of household goods for moving-out and returning residents is referred to the compensation for residents of slum improvement programs by NHA.

Apart from the above, several options will be provided by NHA such that residents moving to other NHA housing have preferential treatment such as discounted housing rent. In this case, the above compensation will be duly adjusted depending on the nature of the agreement.

In general, if the compensation money is set higher for moving-out residents, so is the proportion of moving-out residents assumed. As a higher proportion of moving-out residents enables a larger number of newcomers, it would render an easier financial management of a housing renewal project. At the final stage of negotiation with the residents, the compensation amount is tactically adjusted such that the proportion of the moving-out residents will reach the target range. It is, therefore, recommended that certain maneuvering allowance for this purpose should be included in the project budget.

Table 9.4: Compensation Amounts

Moving-out Residents	Moving expense +loss of household goods	10,000 baht/household
	Compensation money	250,000 baht/household
	Total	260,000 baht/household
	Others	Preferential treatment for other NHA housing (accompanied with adjustment of compensation money as the case may be)
Returning Residents	Moving expense +loss of household goods	10,000 baht/household
	Total	10,000 baht/household

(2) Rents

Housing rents for returning residents has been determined to be 20% of household income, which is considered as affordable house rent in Thailand. According to the social survey by the Study, average household income of the lower income group is 15,000 baht/month and the lowest income group is less than 9,200 baht/month. Correspondingly the housing rent is set at 600 baht for low income households and 1,500 baht for ordinary income households. As the minimum subsistence amount for a family of four members is around 10,000 baht/month, the said house rent could be accommodated within the monthly income.

On the other hand, the current market rate for housing around DC Area is about 140 baht/m²/month. Therefore house rent for the new residents is set on this basis, which will amount to 5,600 baht/month.

House rents for ordinary income returnees and new residents will be raised step-wise from 1,500 baht/month by 15% every three years.

Table 9.5: Setting of Rents

Classification	Rents		Raising rate	Remarks
	Baht/house/month	Baht/m ² /month		
Returning low income household	600		Not applicable	40m ² /unit
Returning ordinary income household	1,500	37.5	15% in every 3 years	40m ² /unit
New resident	5,600	140	15% in every 3 years	40m ² /unit
Car park	1,500		15% in every 3 years	

In order to secure collection of the house rents, the Project will enhance income generation by providing day-care facilities, and administration service for housing community such as cleaning service, and security guard. These will create an environment to enable women and the young generation to work for low-income child-rearing families.

9.3 INSTITUTIONAL PLAN

9.3.1 Implementation Organization

(1) General

At present, all the project operations in planning and development are under the responsibility of NHA, according to the NHA Act 2000, if the project area only covers land currently used by the NHA and also lands that the NHA could obtain by exchange with the existing users. Meanwhile, BMA is responsible for planning and development of infrastructure outside NHA's project area. There are also utilities on-site that must be connected with utilities outside the project. Thus, coordination with related agencies and organizations becomes necessary.

The Study has held experts meetings attended by related organizations to find out the institutional structure for implementation of the project. Major findings of the meetings can be summarized as follows:

- The country has not yet implemented a large-scale redevelopment project as proposed, though some other large urban development projects have been carried out by their own special institutional and legal framework;
- When there is a large-scale urban development project to implement, but with no clear responsible agency, the tendency in Thailand is to establish a new agency to carry out the project, in the form of, i) public enterprises, ii) private companies, and iii) public organization;
- The likely pattern of a new agency for this project has been selected to be the public organization, because such organization is basically a social organization, appropriate to manage public works, and can be established under the Public Organization Act BE 2543 without drafting of a new law; and
- Therefore NHA, together with other government agencies, should establish a new agency as a public organization.

Discussions also agreed on the fundamental conditions for the public organization, such as function, organizational structure, and funding as listed below.

- The new agency will be responsible for the planning and project implementation. After that, the agency can operate and maintain facilities of the project in association with related organizations, such as BMA.

- Functions of the new agency include; i) community management, ii) strengthening and promoting the residents' quality of life, iii) community relocation, iv) coordinating development work, and v) issuing regulations and legal devices for the project.
- Organization consists of two tiers of administration with a board of execution and the management staff. The board should have representatives from NHA, BMA, and the Treasury Department among its members. Other representatives should come from the community and from urban development expertise.
- Funds should come from BMA, NHA, and other sources. BMA and NHA use their original budget for the area as the initial funds. The other sources may come from investments from domestic or international sources.
- According to the Public Organization Act BE 2543, public organizations can be established to run non-profit activities. Therefore the profitable parts of the project will be separated out for investment and development by the private sector.

(2) Private Sector Participation

The cabinet meeting decision on the NHA's master plan has a comment to study the possibility of joint venture by private sector for land development for commercial area. The existing master plan also insists that the project should be participatory of the private sector to secure initial investment.

Referring the land use plan of DC Area, the target area for the private sector participation is Block B1.4, which include large commercial floor area and housing units for middle-high income households.

There can be four ways for private sector to participate in the Project as listed below:

- 1) NHA constructs buildings and leases floor to private investors;
- 2) NHA constructs buildings and sells them to private investors;
- 3) NHA leases land to private investors and the latter constructs buildings; and
- 4) NHA and private investors jointly construct buildings and operate them.

Among those, the most practical way for NHA is selected to be the third idea where NHA will develop land with infrastructure and utilities and lease the land for private investors to construct buildings. NHA can earn revenue from floor rent with less initial investment. The sequence of consideration is summarized below.

- The first case requires considerable organization and need to be well versed in operation of rental buildings. Therefore this method is not recommended for NHA.
- The land of the government cannot be sold to the third party. Therefore the second and third cases are not applicable for NHA.
- The fourth case will be unstable, as depending on the conditions of private investors, which is required to have stable and sufficient funds.

However, through the financial analysis, it has been found that revenue by land lease fee is smaller than the rent to secure the Financial Internal Rate of Return (FIRR). Thus, it has been proposed that NHA will transfer land use tenure to the Ministry of Finance (MOF), which will put the land into the land trust with a bank. The bank will provide funds as well as develop and operate the land. The private sector will participate in the project as union members to the project.

Dividend of the land trust is in the form of a merit system. In other words, results from management and disposal of trusted properties exclude administration cost and remuneration for the trust. Thus the dividend will be directly reflected by the profit of the project.

In the case of land trust of the national property land, its merits are listed below:

- Earning the profit, the landlord (government) maintains land tenure. Therefore the landlord could utilize the land to follow future changes in the policy;
- Revenue reflects profit by land development, which is not affected only by the land price;
- Utilizing the trust system, it is possible to establish complicated rights arrangement;
- Introducing knowledge of the private sector into construction, management, and disposal, the project could be flexibly proceeded;
- The private sector provides funds for construction of facilities. Therefore the landlord is not required to arrange financial resources; and
- Profit from the project is not subjected to taxation, as government manages the project.

(3) Implementation Organization in Planning Stage and Execution Stage

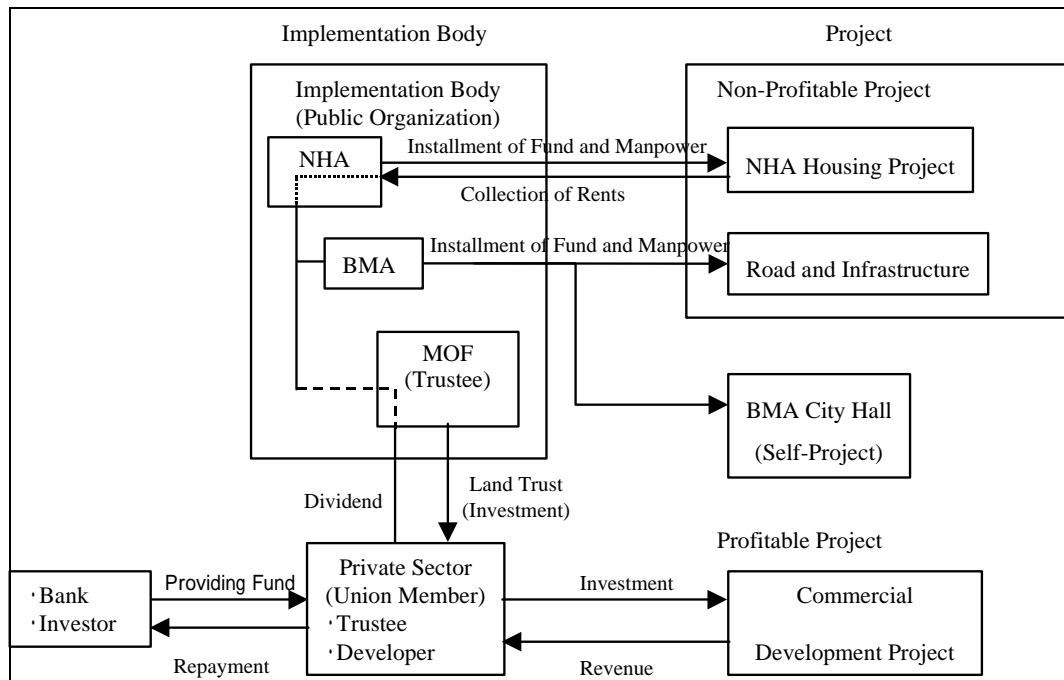
Reflecting the requirements mentioned in the previous sections, the Study has formulated an organizational structure for planning and implementation of the

Project. The schematic structure of the organization is shown in Figure 9.4 and the functions of related parties are explained below.

It is fundamental that the project in early phases is non-profitable and makes in the fourth phase including a large commercial development by the private sector.

The public organization consists of NHA, BMA and MOF, and other relevant institutions. The public organization will formulate an implementation plan and provide funds. Generally, NHA takes charge of implementation and operation of NHA housing projects, and BMA takes charge of other public facilities, such as the new city hall, infrastructure, and bus terminal. Private sector will participate as the union member to trust land and implement the commercial facility.

Figure 9.4: General Organization Structure for Implementation



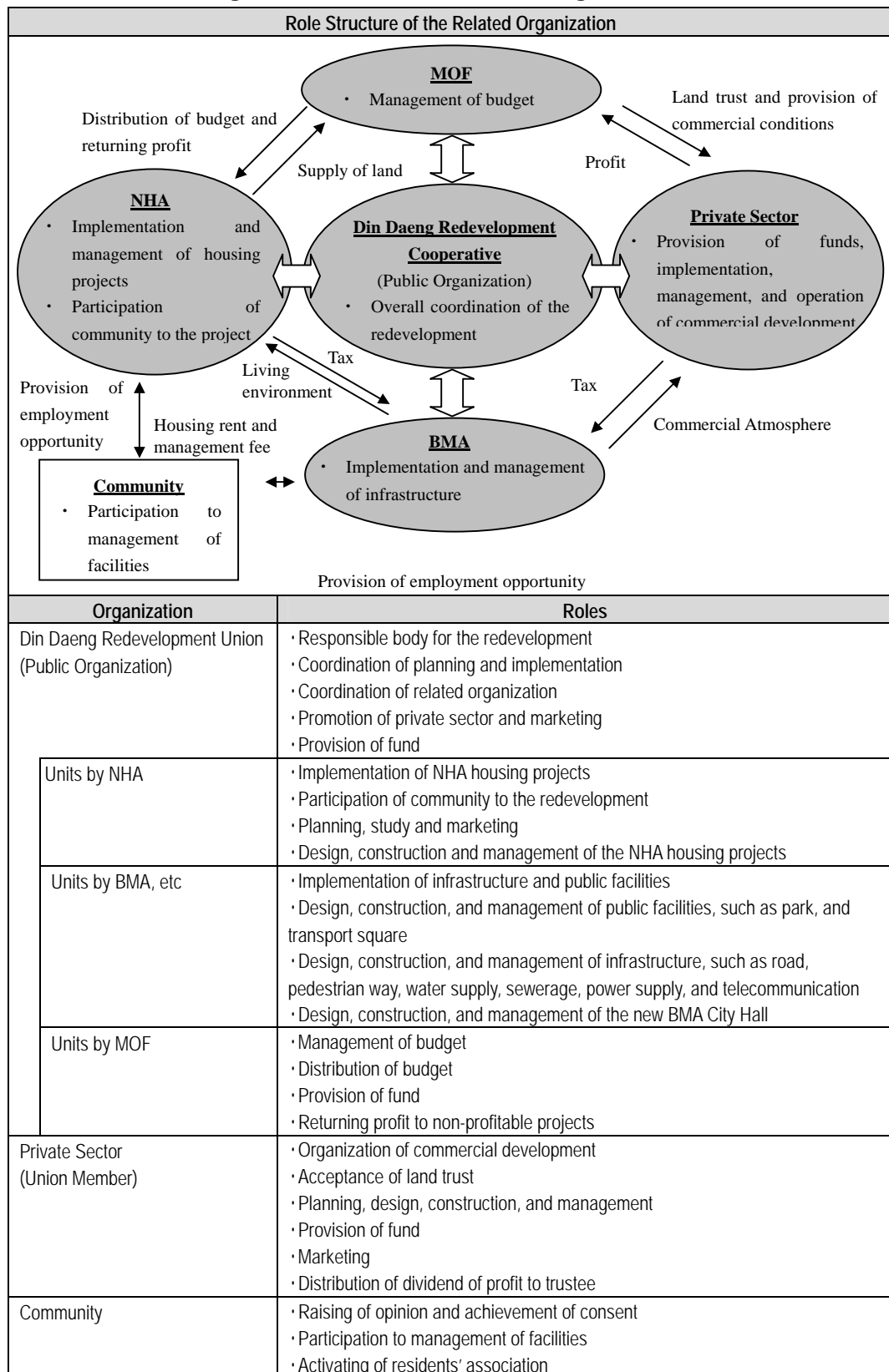
In the course of implementation, the related organizations will execute their roles under the basic direction by the public organization as presented in Figure 9.5.

The public organization plays the role of responsible body for the redevelopment. Among it, units by MOF will be trustee of land trust for the commercial development. The units will distribute dividend from profit of the private sector to NHA and BMA.

In the public organization, the units by NHA caters to roles of implementation and operation of NHA housing projects as well as management of community

participation including provision of employment opportunity for low income households. Units by BMA will operate the public facilities.

Figure 9.5: Roles of the Related Organization



The public organization involves the following institutions and functions in the project planning stage, the project execution stage, and the operation stage.

1) Project Planning Stage

A project planning council will be set up among the concerned public organizations and stake holders, NHA, BMA, MOF, TD (Treasury Department) etc., under the name “ Council for Din Deang Community Development (executive body for planning and execution of the Plan)”.

Concurrently, a Liaison and Coordinating Committee and a Work Party will be organized to work out land use plan, determine scale of housing facility, urban infrastructures, buildings and to set down rules for sharing project costs.

On the other hand, a Project Team will be organized among NHA and BMA to support the activities of the foregoing Council, Committee and Party. The Project Team will be composed of the following consultants and private businesses:

- Consultants: Urban redevelopment consultant, real estate consultant, engineering consultant, financial consultant, legal consultant.
- Private companies which are financial supporting members.
- Financial institution, construction companies, real-estate companies, key-tenants.

2) Project Execution Stage

Contents of the Plan will comprise renewal of NHA Din Daeng Housing Community, development of urban infrastructures, public and welfare facilities and associated land development works. Construction of the new BMA city hall and the profit oriented components (commercial facility and profitable housing for middle or upper income residents) will be undertaken by BMA and private sector respectively.

There could be three execution methods as given below:

By a Stake Holders ' Cooperative : A project execution body will be organized by the stake holders (members of the Council) in a form of a cooperative. This cooperative is aimed at executing construction of facilities and will be subsequently disbanded upon completion of the construction, transferring all facilities to the concerned parties.

By a new organization (New company): This is a joint operation among the members of the Council and the private developers.

The new company established by the participants will aim at executing construction of facilities of the project, and upon completion of construction will transfer the facilities to the operation and maintenance bodies. It will continue to function as a developer to undertake similar enterprises in other places afterwards.

At the initial stage, the company will be financed by the public bodies, for the risk involved in the enterprise is considerably large for the private developers; at this stage main works will be non-profitable renewal of Din Daeng Housing Community and infrastructure development. It will be transformed to a tertiary sector company later importing investment from private sector when the timing is right for commercial development.

By Joint Enterprise under City Planning: Another way is to incorporate the Din Daeng Community Development Plan into the Specific Plan in BMA thereby securing its implementation from the legal side and to execute the Plan jointly among concerned public bodies, each with specific role.

Advantages and disadvantages by each executing methods can be summarized as given below:

Table 9.6: Alternatives of Project Execution Organizations

Alternative	Advantage	Disadvantage
Stake Holders' Cooperative	<ul style="list-style-type: none"> Comprehensive development will be possible. Cost for establishing the cooperative will not be large. Redundant expenses for personnel and administration could be saved as the cooperative is disbanded upon completion of construction. 	<ul style="list-style-type: none"> Transfer of know-how gained in the project could not be effected to other similar undertakings. There will be required to put security for getting fund for the project.
New organization (New company)	<ul style="list-style-type: none"> Comprehensive development will be possible. Transfer of know-how gained in the project could be effected to other similar undertakings. Financial responsibility will be clear cut as the company will obtain the fund independently. It is possible to mobilize private financing initiative. 	<ul style="list-style-type: none"> Cost for establishing the company will be a little costly. The company will have to be certain in profitability in long term perspective.
Joint Enterprise under City Planning	<ul style="list-style-type: none"> No cost is required for establishing new organization such as cooperative or new company as above. Responsibility of the project execution bodies for each component can be clearly defined. 	<ul style="list-style-type: none"> There is some uncertainty in achieving a comprehensive execution. Time schedule control of the project component is crucial for successful implementation. There will be required a reliable mechanism of financing each component to be executed in good timing.

9.3.2 Operation and Maintenance Organization

(1) General

Housing for low income population: NHA should be the operation and maintenance body.

The facilities are basically of non-profitable ones, therefore, financial balance should be attempted to be struck within 30 years period which is the physical service life period of buildings.

Public and welfare facilities: Infrastructures such as roads, parks, transport square, water supply and waste water drainage systems, power supply system etc. should be operated and maintained by the administration office of each facility and system.

Operation and maintenance (O&M for short) bodies for the social service facilities such as schools, care-center for the aged, nursery facility, gathering hall, sports facility, local community rejuvenation center, medical facility etc. should be determined in consideration of public-service-oriented or profit-oriented natures of the facilities. O&M bodies could be BMA, NHA or a new O&M company established for this specific purpose. It should not be overlooked to search ways to get resident community to participate in these activities as employment opportunities.

Commercial facilities: The land for the commercial development should be administered by the Treasury Department (land owner), while the commercial facilities constructed, operated and maintained by private sector.

(2) Building Facilities

Land users of each building site will be given responsibility to operate and manage the facilities on the site. Those building sites excluded from the reconstruction will follow the existing operation and management system. On the other hand, reconstructed sites, especially of NHA, will follow the conditions described below.

Facilities developed by NHA: Main components such as residential and commercial space will be operated and maintained by renters. Administration cost apart from those born by renters will cover:

- i) energy and water cost for common space;

- ii) routine administration cost such as cleaning cost, and electricity charge in common space;
- iii) periodical repair of building and equipment; and
- iv) technical service cost for subletting to the private management company.

Facilities developed by the private sector: Facilities will be operated and maintained by private investors.

(3) Infrastructure and Utilities

After development, infrastructure and utilities will be operated and maintained by the public organization in association with the related agencies. Similar to other public utilities, the public agencies will be responsible for operation and maintenance, such as periodical checking, tariff collection, and cleaning. Related organizations to cope with the public organization are presented in Table 9.7.

Table 9.7: Related Organization for O&M of Infrastructure/Utilities

Items	Responsible Organization
Transport System	Department of Traffic and Transportation (DTT), BMA + Department of Highway (DOH), MTC
Water Supply System	Metropolitan Water Supply Authority (MWA)
Sewage Treatment System	Department of Drainage and Sewage (DDS), BMA
Drainage System	-ditto-
Power Supply System	Metropolitan Electricity Authority (MEA)
Telecommunication System	Telecommunication Organization of Thailand (TOT)
Solid Waste Management System	Department of Public Cleansing (DPC), BMA

9.3.3 Community Empowerment

In order for the smooth implementation of the Project, it is critical to coordinate and settle opinions of the existing 6,818 households. The implementation body is required to establish a special organization to participate and negotiate with existing residents.

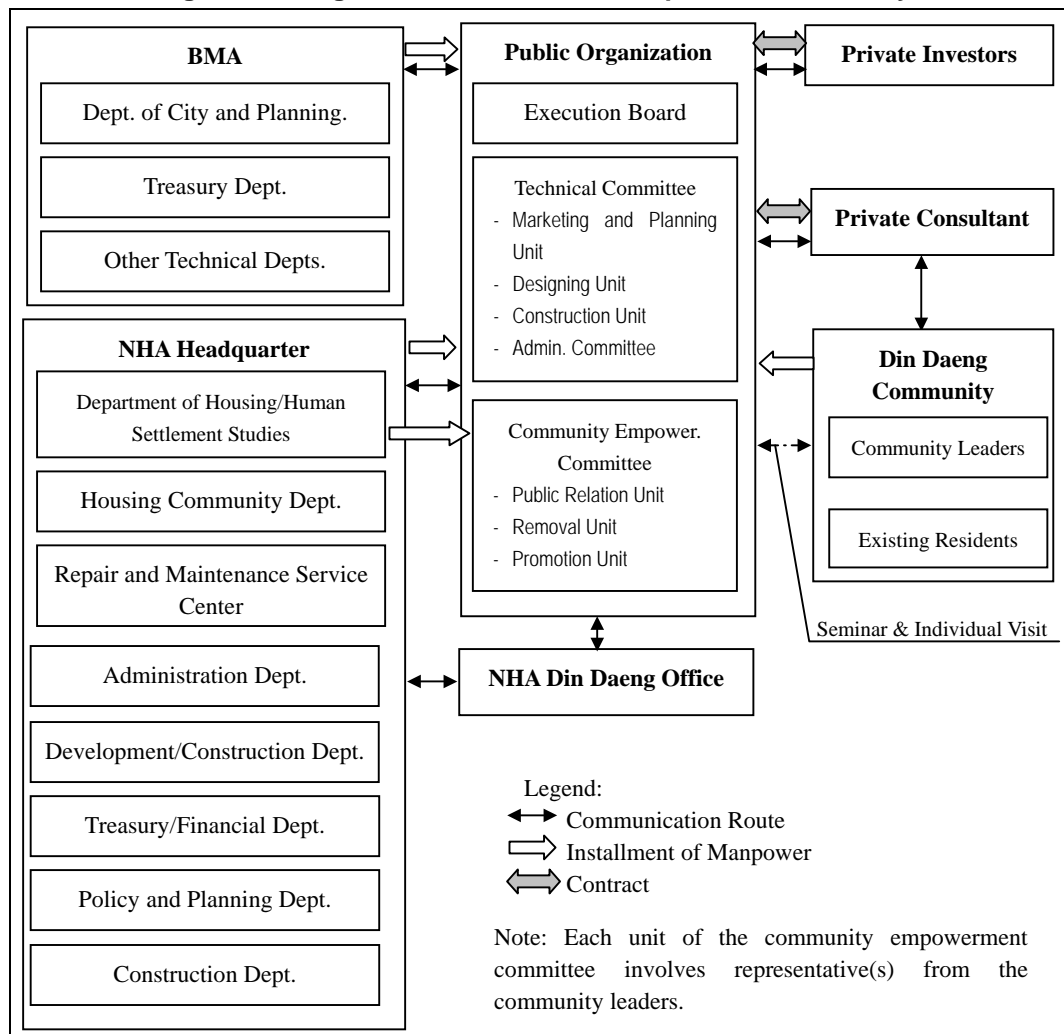
Referring the opinions of the community leaders, fundamental functions of the community empowerment organization include the following:

- To distribute correct and up-to-date information about the project; and
- To coordinate public relation campaigns including; i) publishing leaflets to all households, ii) holding a seminar covering 10% of residents of each flat, iii) arranging public meetings for each flat in which all residents can participate, and iv) setting up a project information center at NHA's Din Daeng office.

In addition to these activities, the organization caters to negotiate with existing residents for identifying returning and moving-out residents through discussing the conditions of new rent, compensation fee and relocation schedule.

By limitation of financial conditions of NHA, it is necessary to activate the community leaders and local politicians in number and skills, as they intend to help explain and answer questions raised by the residents.

Figure 9.6: Organization Structure to Cope with Community



CHAPTER TEN: PROJECT EVALUATION

10.1 COST ESTIMATE

10.1.1 Conditions of Cost Estimation

The Study has examined cost estimates, based on the following conditions.

- The Project envisages to build 4,411 new housing units replacing 5,206 units of the 6,818 existing units. In the meantime, the residences in Zone E and F will remain untouched and be used to accommodate the low income returning households. As a consequence, there will be 6,023 units in total including new and renovated units. Among them, 5,795 units are to be refurbished for returning residents equivalent to 85% of existing residents;
- Car parking will be provided at the rate of one bay per 120 m² of residential floor area, excluding the commercial space. This can be translated into a proportion of about 30% of car parking against the number of residential units, as one NHA unit has about 40 m² floor area;
- In addition to the residential units, there will be commercial spaces, serviced apartments, rental apartment houses, targeted at middle income population in Block B 1.4 with the land area of 71,200 m²;
- The Project will develop a local community rejuvenation center and public square to afford space for NHA housing community to have commercial employment opportunity and for various community activities;
- The Project will develop the new BMA City Hall, having total floor area of 474,600m², in Block G 2.1.
- The Project will develop public facilities including a new road system , utilities, intra-modal transport square, and an underpass across Vibhavadi Rangsit road, on a 100 ha area.

The outline of facilities developed by the Project is presented in Table 10.1 and 2.

Table 10.1: Outline of the Project

Phase	Phase 1	Phase 2		Phase 3	
Block	K.1.3 (B')	A.1.1	C.1.5	A.1.2	D.1.6
Land Area					
Building site	8,418 m ²	14,584 m ²	23,524 m ²	11,129 m ²	38,720 m ²
Public Facility Area	0 m ²	0 m ²	0 m ²	0 m ²	0 m ²
Total	8,418 m ²	14,584 m ²	23,524 m ²	11,129 m ²	38,720 m ²
Floor Area					
	m ² (Units)	m ² (Units)	m ² (Units)	m ² (Units)	m ² (Units)
- Housing A (Non-redevelopment)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- Housing B (6-20 stories)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- Housing C1(6-20 stories)	18,145 (304)	43,062 (651)	76,705 (1,228)	33,600 (740)	124,260 (1,488)
- BMA City Hall (over 20 stories)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- Public Service	5,865	8,691	14,003	0	0
- Commercial	4,816	3,770	6,145	760	0
- Apartment and Hotel	0	0	0	0	0
- Parking (cars)	8,601 (244)	12,370 (399)	13,910 (599)	0 (0)	39,120 (1,118)
Total	37,426	67,893	110,763	34,360	163,380
Public Facility					
- Road	0 m ²	11,820 m ²	0 m ²	5,190 m ²	0 m ²
- Infrastructure	0 m	1,120 m	0 m	960 m	0 m
- Bus-terminal & Square	0 m ²	0 m ²	0 m ²	0 m ²	0 m ²
- Underpass	0 m	0 m	0 m	0 m	0 m
Phase 4					
Phase	Phase 4			Non-redevelopment Flats	
Block	B.1.4 (Private)	I.2.9	BMA City Hall, PF, and LRC	E	F.1.10
Land Area					
Building site	71,200 m ²	18,810 m ²	70,333 m ²	21,139 m ²	31,571 m ²
Public Facility Area	0 m ²	0 m ²	34,071 m ²	0 m ²	0 m ²
Total	71,200 m ²	18,810 m ²	104,404 m ²	21,139 m ²	31,571 m ²
Floor Area					
	m ² (Units)	m ² (Units)	m ² (Units)	m ² (Units)	m ² (Units)
- Housing A (Non-redevelopment)	0 (0)	0 (0)	0 (0)	36,089 (640)	48,667 (972)
- Housing B (6-20 stories)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- Housing C1(6-20 stories)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- BMA City Hall (over 20 stories)	0 (0)	0 (0)	358,600 (0)	0 (0)	0 (0)
- Public Service	0	18,640	8,940	0	0
- Commercial	200,000	0	0	0	0
- Apartment and Hotel	50,000 (544)	0	0	0	0
- Parking (cars)	104,167 (2,083)	0 (0)	116,000 (2,988)	0 (0)	0 (0)
Total	354,167	18,640	483,540	36,089	48,667
Public Facility					
- Road	20,630 m ²	9,950 m ²	116,170 m ²	0 m ²	0 m ²
- Infrastructure	1,050 m	600 m	5,370 m	0 m	0 m
- Bus-terminal & Square	0 m ²	0 m ²	33,500 m ²	0 m ²	0 m ²
- Underpass	0 m	0 m	400 m	0 m	0 m

Table 10.1: Outline of the Project (Continued)

Constructing Plan	Total		
	Redevelopment Area	Non-redevelopment Flats	Total
Land Area			
Building site	256,718 m ²	52,710 m ²	309,428 m ²
Public Facility Area	34,071 m ²	0 m ²	34,071 m ²
Total	290,789 m ²	52,710 m ²	343,499 m ²
Floor Area	m ² (Units)	m ² (Units)	m ² (Units)
- Housing A (Non-redevelopment)	0 (0)	84,756 (1,612)	84,756 (1,612)
- Housing B (6-20 stories)	0 (0)	0 (0)	0 (0)
- Housing C1(6-20 stories)	295,772 (4,411)	0 (0)	295,772 (4,411)
- BMA City Hall (over 20 stories)	358,600 (0)	0 (0)	358,600 (0)
- Public Service	56,138 (0)	0 (0)	56,138 (0)
- Commercial	215,490 (0)	0 (0)	215,490 (0)
- Apartment and Hotel	50,000 (544)	0 (0)	50,000 (544)
- Parking (cars)	294,168 (7,431)	0 (0)	294,168 (7,431)
Total	1,270,168	84,756	1,354,924
Public Facility			
- Road	163,760 m ²	0 m ²	163,760 m ²
- Infrastructure	9,100 m	0 m	9,100 m
- Bus-terminal & Square	33,500 m ²	0 m ²	33,500 m ²
- Underpass	400 m	0 m	400 m

Area and length of roads to be developed is presented in Table 10.2. The locations of those roads are shown in Figure 10.1 and 10.2.

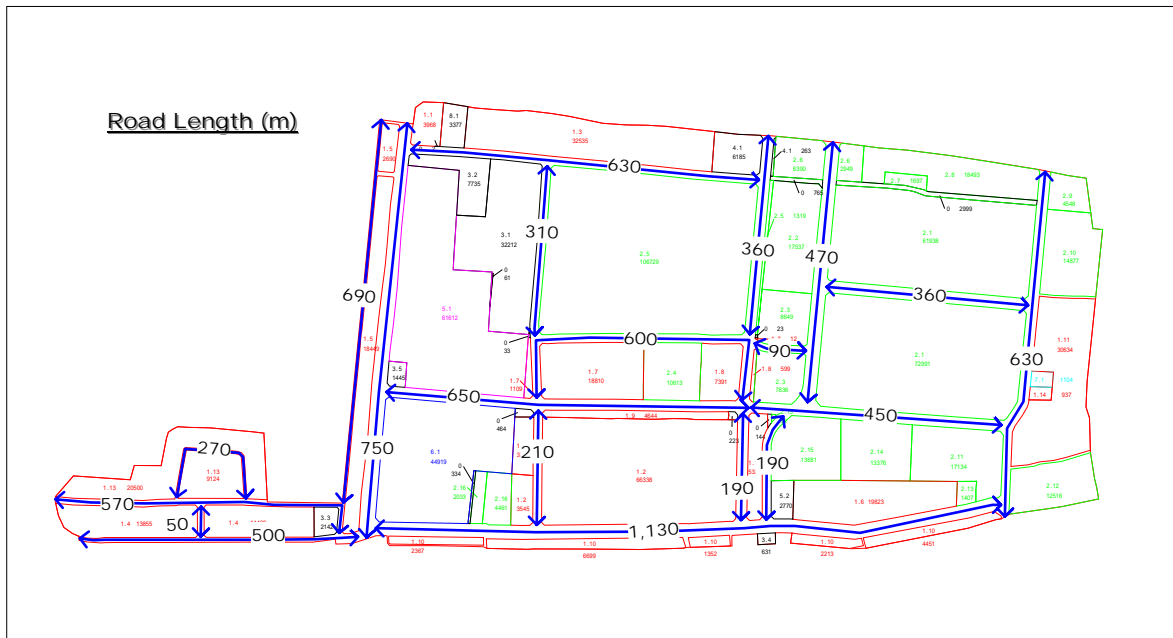
Table 10.2: Outline of Public Road

Roads	Area (m ²)	Length (m)
Din-Daeng Rd.	19,480	750
Pracha Songkhro Rd.	28,410	1,130
Mit Maitri Rd.	11,920	630
Main Roads	59,810	2,510
Developed roads	103,950	6,590
Non-developed	1,940	-
Others	105,890	6,590
Total	165,700	9,100

Figure 10.1: Road Area and Assumption of the Developers



Figure 10.2: Road Length



10.1.2 Conditions of Cost Estimation

(1) Unit Costs

Unit costs for various construction-related items are based upon the conditions listed below. The unit costs are presented in Table 10.3.

- Survey and design cost refer to other projects by NHA.
- Cost for demolition of buildings and site preparation refers to other projects by NHA.
- Cost for complex buildings of residential, parking, commercial, and public facilities around 20 floors is 12,000baht/m² according to estimation by the Case Study.
- Cost for the new BMA City Hall of more than 20 floors is 20,000baht/m².
- Cost for residential and hotel facilities developed by private sector is 18,000baht/m², according to other projects by the private sector.
- Cost for commercial facilities developed by the private sector is 12,000baht/m², according to other projects by private sector.
- Cost for commercial facilities and parking of BMA is 7,000 baht/m².
- Cost for landscaping follows estimation by the Case Study.
- Cost for infrastructure in sites is 7% of building construction cost, according to other projects by NHA.
- Management cost is 7% and contingency is 10% of construction cost.

Table 10.3: Unit Cost

Items	Unit	Unit Cost
Survey and Design		
Survey Cost	(baht/rai)	600
Design Cost		1.75% of Building Construction Cost
Demolition	(baht/m ²)	900
Building Construction		
NHA's Facilities	(baht/m ²)	12,000
New BMA City Hall	(baht/m ²)	20,000
Public Facilities (Rejuvenation Center, and Other Public Facilities)	(baht/m ²)	12,000
Parking Lot of NHA Housing Facilities	(baht/m ²)	12,000
Commercial Facilities		
Service Apartment and Hotel	(baht/m ²)	12,000
Parking Lot of BMA and Private Facilities	(baht/m ²)	7,000
Landscaping	(baht/m ²)	1,520
Infrastructure in Sites		7.0% of Building Construction Cost
Infrastructure/Utilities and Public Facilities		
Road (baht/m ²)		1,200
Infrastructure and Utilities (baht/m)	(baht/m)	9,500
Water Supply (piping)	(baht/m)	5,000
Sewerage (piping)	(baht/m)	2,000
Electricity (cable line)	(baht/m)	2,000
Telecommunication (cable line)	(baht/m)	500
Bus Terminal including Square	(baht/m ²)	4,000
Square	(baht/m ²)	1,200
Underpass crossing Vibhavadi Rangsit Road	(baht/m)	450,000
Management		
Direct Cost		3.5% of Building Construction Cost
Indirect Cost		3.5% of Building Construction Cost
Contingency		10.0% of Building Construction Cost

(2) Compensation for BMA Facilities

Wichutit school in Zone H will be relocated to develop the bus terminal and square. This school has to be re-located to another place.

Cost estimation includes relocation cost for office buildings in Block K1.3 (B'). Land for a new building is provided by land exchange between NHA and BMA. Scale of the new office buildings will be similar to the existing. Existing total floor area is 10,697m², consisting of 8,940m² for the school and 1,757m² for the office.

- Demolition cost: Gross floor area*900 baht/m²
- Construction cost: Gross floor area*11,000 baht/m²

- Total unit cost: Gross floor area*11,900 baht/m²

(3) Required Housing Units

Among the 6,818 households, the number of moving out households is 1,023 (15%). On the other hand, 62.5% or 4,261 households are ordinary income returning households, and 22.5% or 1,612 households are low income returning households, which are not applicable for hike of house rents.

Table 10.4: Number of Household and Housing Unit

	Number of Existing Residents		Supply of Housing Units after the Redevelopment		
	No. of Household	Share (%)	No. of Housing Units		Share (%)
Moving-out	1,023	15.0	-	-	
Low Income Returning	1,534	22.5	Non-reconstructed Units	1,612	24.5%
Ordinary Income Returning	4,261	62.5	New Units by NHA	4,411	67.2%
Middle-high Income (new comer)	-	-	New Units by Private	544	8.3%
Total	6,818	100.0%		6,567	100.0%

(4) Compensation

Compensation for moving-out household is set at 250,000 baht/household and for returning household 10,000 baht/household as moving cost.

Table 10.5: Compensation Fee

Classification	Compensation	
Moving-out Household	Moving cost and Property Loss	10,000baht
	Compensation for Moving-out	250,000baht
	Total	260,000baht
Returning Household	Moving cost and Property Loss	10,000baht

(5) Construction Phasing

Cost estimation follows the construction phasing discussed in Chapter 9. The outline of each phase is presented in Table 10.6.

Table 10.6: Construction Works in Each Construction Phase

Phase	Scope of Works
Phase 1 (2002-2003)	<ul style="list-style-type: none"> ● To construct approx.300 units of residences and commercial space in block K 1.3(B'). ● In parallel with construction, to have would-be moving out residents and absentees to evacuate as much as possible in the whole Din Daeng Housing Community.
Phase 2 (2004-2005)	<ul style="list-style-type: none"> ● To construct approx.700 units of residences and commercial space in block A.1.1. ● To construct approx.1,200 units of residences in block C.1.5.
Phase 3 (2006-2007)	<ul style="list-style-type: none"> ● To construct approx.700 units of residences and commercial space in block A.1.2. ● To construct approx.1,500 units of residences in block D.1.6.
Phase 4 (2008-2009)	<ul style="list-style-type: none"> ● Participation of private sector in block B.1.4 including 20,000m² for commercial facilities, 50,000m² for service apartment, and 100,000m² for parking. ● To construct the new BMA City Hall. ● To construct public facilities such as underpass, bus terminal, community rejuvenation center etc.

(6) Inflation

The annual inflation rate applying to the construction cost is set at 4.5%.

10.1.3 Implementation Cost

(1) Total Implementation Cost

The total cost of implementing the Project has been estimated at 23.8 billion baht consisting of 0.3 billion baht (1.3%) for survey and design, 19.9 billion baht (74.7%) for construction, and 3.0 billion baht (12.7%) for project management. The costs of other major items are mentioned below and the details are presented in Table 10.7.

- Compensation cost is 320 million baht.
- Building construction cost is 17,782 million baht.
- Infrastructure and public facility construction cost is 1,858 million baht.
- Cost for relocation of the school and office is 127 million baht.

Table 10.7: Implementation Cost of the Project (without inflation)

- Construction Cost : Total construction cost (NHA, BMA and Private Development) No.5

Item of Initial Expenses		Unit Price	Grand Total			
			Volume	Price	(per ct.)	Remarks
Survey, Design and Planning Cost				311,370	(1.3%)	
Survey Cost		600 baht/rai	116.5 rai	70	(0.0%)	
Design Cost		1.75 %/build.cost	17,782,500 ,000baht	311,300	(1.3%)	
Planning Cost				0	(0.0%)	*Included in Indirect Cost
Land Clearance Cost				553,900	(2.3%)	
Compensation Cost				320,200	(1.3%)	
- Returnee		10,000 baht/unit	5,433 units	54,300	(0.2%)	
- Returnee (Staying Through)		0 baht/unit	0 units	0	(0.0%)	
- Move-out Family		260,000 baht/unit	1,023 units	265,900	(1.1%)	
- Rent Subsidy		3,000 bt/unit/mon. for Temporary Move-out	20 monthes 0 units	0	(0.0%)	
Demolition Cost		900 baht/sq.m	259,690 sq.m	233,700	(1.0%)	
Land Readjustment Cost		0 baht/sq.m	186,385 sq.m	0	(0.0%)	*Included in Demolition Ct.
Construction Cost				19,907,400	(83.7%)	
Building Construction Cost			1,309,895 sq.m	17,782,500	(74.7%)	Rent. Rate & Floor Area
- Housing A		baht/sq.m	48,667 sq.m	0	(0.0%)	0 % 0
- Housing B		12,000 baht/sq.m	0 sq.m	0	(0.0%)	0 % 0
- Housing C1		12,000 baht/sq.m	295,772 sq.m	3,549,200	(14.9%)	67 % 197,764
- BMA City Hall		20,000 baht/sq.m	358,600 sq.m	7,172,000	(30.1%)	100 % 358,600
- Public Service		12,000 baht/sq.m	47,198 sq.m	566,400	(2.4%)	
- Parking		12,000 baht/sq.m	190,001 sq.m	2,279,900	(9.6%)	5,348 Cars
- Commercial		12,000 baht/sq.m	215,490 sq.m	2,585,800	(10.9%)	97 % 209,748
- Apartment and Hotel		18,000 baht/sq.m	50,000 sq.m	900,000	(3.8%)	100 % 50,000
- Parking		7,000 baht/sq.m	104,167 sq.m	729,200	(3.1%)	2,083 Cars
Landscape Construction Cost		1,520 baht/sq.m	92,011 sq.m	139,800	(0.6%)	
Infrastructure Construction Cost		7.0 %/build.cost	17,782,500 ,000baht	1,244,700	(5.2%)	
Public Facility Construction Cost				613,100	(2.6%)	
- Road		1,200 baht/sq.m	163,760 sq.m	196,500	(0.8%)	
- Infastructure		9,500 baht/m	9,100 m	86,400	(0.4%)	
- Bus-terminal & Square		4,484 baht/sq.m	33,500 sq.m	150,200	(0.6%)	
- Underpass		450,000 baht/m	400 m	180,000	(0.8%)	
Relocation of School and Office		11,900 baht/sq.m	10,697 sq.m	127,300	(0.5%)	
Project Management Cost				3,022,700	(12.7%)	
Indirect Cost		3.5 %/build.cost	17,782,500 ,000baht	622,200	(2.6%)	
Direct Cost		3.5 %/build.cost	17,782,500 ,000baht	622,200	(2.6%)	
Reserve		10.0 %/build.cost	17,782,500 ,000baht	1,778,300	(7.5%)	
Interest for Funds				0	(0.0%)	
Initial Cost Total				23,795,370	(100.0%)	

*The price is shown in thousands

(2) Implementation Cost by Year and Phase

The Study has examined the implementation cost by year throughout the 10year project period. The initial cost in the first year is 368.9 million baht, equivalent to 1.1% of the whole amount. The shares of the other nine years are listed below.

- The second year (2003): 557 million baht (4.2%)
- The third year (2004): 1,341 million baht (10.3%)
- The forth year (2005): 1,947 million baht (6.1%)
- The fifth year (2006):1,650 million baht (5.2%)
- The sixth year (2007):2,364 million baht (7.4%)

- The seventh year (2008):9,559 million baht (29.9%)
- The eighth year (2009): 14,162 million baht (44.3%)

Table 10.8: Implementation Cost by Year (with inflation)

- Total of Initial Expenses by Year [After Adding Inflation] No.3

Grand Total		Total construction cost (NHA, BMA and Private Development)										
Item of construction cost	Present Price	Grand Total : Annual Initial Expenses									Total	
		2545	2546	2547	2548	2549	2550	2551	2552	2553		2554
Inflation Rate		1.05	1.09	1.14	1.19	1.25	1.30	1.36	1.42	1.49	1.55	
Survey, Design and Planning Cost	311.4	8.3		42.9		51.8		305.3				408.3 1%
Land Clearance Cost	553.9	116.4	174.2	56.2		90.3		219.4				656.5 2%
Construction Cost	19,907.4	212.3	332.9	1,076.0	1,686.5	1,307.7	2,049.7	7,848.6	12,303.0			26,816.7 84%
Building Construction Cost	17,782.5	187.7	294.2	978.5	1,533.7	1,182.8	1,854.0	6,976.7	10,936.1			23,943.7 75%
- Housing A	0.0											0.0 0%
- Housing B	0.0											0.0 0%
- Housing C1	3,549.2	91.0	142.6	656.1	1,028.3	944.3	1,480.1					4,342.4 14%
- BMA City Hall	7,172.0							3,904.0	6,119.6			10,023.6 31%
- Public Service	566.4	29.4	46.1	124.3	194.8			121.8	190.9			707.3 2%
- Parking	2,279.9	43.1	67.6	143.9	225.6	234.0	366.8	757.7	1,187.7			3,026.4 9%
- Commercial	2,585.8	24.2	37.9	54.2	85.0	4.5	7.1	1,306.4	2,047.8			3,567.1 11%
- Apartment and Hotel	900.0							489.9	767.9			1,257.8 4%
- Parking	729.2							396.9	622.2			1,019.1 3%
Landscape Construction Cost	139.8	2.8	4.4	17.7	27.7	34.5	54.0	13.7	21.6			176.4 1%
Infrastructure Construction Cost	1,244.7	13.1	20.6	68.5	107.3	82.8	129.8	488.3	765.5			1,675.9 5%
Public Facility Construction Cost	613.1			11.3	17.8	7.6	11.9	312.0	489.0			849.6 3%
- Road	196.5			6.5	10.2	3.1	4.8	95.9	150.3			270.8 1%
- Infrastructure	86.4			4.8	7.6	4.5	7.1	36.3	56.9			117.2 0%
- Bus-terminal & Square	150.2							81.8	128.2			210.0 1%
- Underpass	180.0							98.0	153.6			251.6 1%
Relocation of School and Office	127.3	8.7	13.7					57.9	90.8			171.1 1%
Project Management Cost	3,022.7	31.9	50.0	166.3	260.7	201.0	315.1	1,186.0	1,859.0			4,070.0 13%
Total	23,795.4	368.9	557.1	1,341.4	1,947.2	1,650.8	2,364.8	9,559.3	14,162.0	0.0	0.0	31,951.5 100%

*The price is shown in millions

The cost for the initial phase in 2002 and 2003 is 926 million baht in total, which is equivalent to 2.8% of the whole amount. Cost for the other phases are described below.

- Phase 2 (2004 - 2005): 3288.6 million baht (10.3%)
- Phase 3 (2006 - 2007): 4,015.6 million baht (12.6%)
- Phase 4 (2008 - 2009): 23,721 million baht (74.2%)

Implementation cost in Phase 4 shares the highest of 74.2%, due to development of the new BMA City Hall, the bus terminal, and the underpass.

Table 10.9: Implementation Cost by Phase (with inflation)

Item of Initial Expenses	2001 Present Price	Phase 1 (2002 to 2003)		Phase 2 (2004 to 2005)			Phase 3 (2006 to 2007)				Phase 4 (2008 to 2009)				Grand Total			
		K.1.3 (B)	Compensation	Total	A.1.1	C.1.5	Compensation	Total	A.1.2	D.1.6	Renovating E and Compensation	Total	B.1.4	I.2.9		BMA Facilities	Renovating F and Compensation	Total
Survey, Design and Planning Cost	311.4	8.3		8.3	16.3	26.6		42.9	9.0	42.8		51.8	96.0	5.3	204.0		305.3	408.3
Land Clearance Cost	553.9	5.3	285.3	290.6	18.8	29.6	7.8	56.2	20.6	44.7	25.0	90.3	168.2	13.9		37.3	219.4	656.5
Construction Cost	19,907.4	545.2		545.2	1,065.9	1,696.6		2,762.5	597.9	2,734.9	24.6	3,357.4	6,073.8	378.1	13,683.2	16.5	20,151.6	26,816.7
Building Construction Cost	17,782.5	481.9		481.9	954.6	1,557.6		2,512.2	527.6	2,509.2		3,036.8	5,631.1	312.7	11,969.0		17,912.8	23,943.7
- Housing A	0.0			0.0				0.0				0.0					0.0	0.0
- Housing B	0.0			0.0				0.0				0.0					0.0	0.0
- Housing C1	3,549.2	233.6		233.6	605.6	1,078.8		1,684.4	516.0	1,908.4		2,424.4					0.0	4,342.4
- BMA City Hall	7,172.0			0.0				0.0				0.0		10,023.6			10,023.6	10,023.6
- Public Service	566.4	75.5		75.5	122.2	196.9		319.1				0.0		312.7			312.7	707.3
- Parking	2,279.9	110.7		110.7	173.9	195.6		369.5		600.8		600.8			1,945.4		1,945.4	3,026.4
- Commercial	2,585.8	62.1		62.1	52.9	86.3		139.2	11.6			11.6	3,354.2				3,354.2	3,567.1
- Apartment and Hotel	900.0			0.0				0.0				0.0	1,257.8				1,257.8	1,257.8
- Parking	729.2			0.0				0.0				0.0	1,019.1				1,019.1	1,019.1
Landscape Construction Cost	139.8	7.2		7.2	15.4	30.0		45.4	13.8	50.1	24.6	88.5		18.8		16.5	35.3	176.4
Infrastructure Construction Cost	1,244.7	33.7		33.7	66.8	109.0		175.8	37.0	175.6		212.6	394.1	21.9	837.8		1,253.8	1,675.9
Public Facility Construction Cost	613.1			0.0	29.1			29.1	19.5			19.5	48.6	24.7	727.7		801.0	849.6
- Road	196.5			0.0	16.7			16.7	7.9			7.9	34.7	16.7	194.8		246.2	270.8
- Infrastructure	86.4			0.0	12.4			12.4	11.6			11.6	13.9	8.0	71.3		93.2	117.2
- Bus terminal & Square	150.2			0.0				0.0				0.0			210.0		210.0	210.0
- Underpass	180.0			0.0				0.0				0.0			251.6		251.6	251.6
Relocation of School and Office	127.3	22.4		22.4				0.0				0.0			148.7		148.7	171.1
Project Management Cost	3,022.7	81.9		81.9	162.3	264.7		427.0	89.6	426.5		516.1	957.2	53.1	2,034.7		3,045.0	4,070.0
Total	23,795.4	640.7	285.3	926.0	1,263.3	2,017.5	7.8	3,288.6	717.1	3,248.9	49.6	4,015.6	7,295.2	450.4	15,921.9	53.8	23,721.3	31,951.5

*The price is shown in millions

(3) Implementation Cost by Project Components

Total implementation cost is divided into four major project components, consisting of NHA Housing Project, infrastructure, the new City Hall, and commercial development.

- NHA housing project: 8,978 million baht
- Infrastructure: 850 million baht
- BMA City Hall: 15,046 million baht
- Commercial development: 7,078 million baht

Table 10.10: Implementation Cost by Project Components

Projects Components	Implementation Body	Implementation Cost (million baht)	Project Year
NHA Housing Project	NHA	8,978	2002-2009
Infrastructure	BMA and other related organizations	850	2002-2009
- Road		271	
- Infrastructure		117	
- Bus Terminal & Square		210	
- Underpass		252	
BMA City Hall	BMA	15,046	2007-2009
Commercial Development	Private Sector	7,078	2007-2009

10.2 FINANCIAL EVALUATION

10.2.1 Target Facilities for Financial Evaluation

The facilities targeted for financial evaluation include NHA's facilities, public facilities, and infrastructure as listed below:

- Urban utilities, which are necessary for the redevelopment, such as roads, parks, and infrastructure; and
- Public facilities including local rejuvenation centers and schools;

On the other hand, the following facilities are excluded:

- New BMA City Hall, which does not generate revenue; and
- Large commercial facilities, as those buildings are developed by the private sector, while the revenue from those facilities will flow through MOF to the implementation body .

The financial evaluation adopts the same conditions for construction cost as for the cost estimation. The outline of each Block is presented in Table 10.11.

Table 10.11: Outline of Target Facilities for the Financial Evaluation

Constructing Plan	Phase 1		Phase 2			Phase 3				
	K.1.3 (B')		A.1.1		C.1.5	A.1.2		D.1.6		
Land Area										
Building site	8,418	m ²	14,584	m ²	23,524	m ²	11,129	m ²	38,720	m ²
Public Facility Area	0	m ²	0	m ²	0	m ²	0	m ²	0	m ²
Total	8,418	m ²	14,584	m ²	23,524	m ²	11,129	m ²	38,720	m ²
Floor Area	m ² (Units)		m ² (Units)		m ² (Units)		m ² (Units)		m ² (Units)	
- Housing A (Non-redevelopment)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
- Housing B (6-20 storeys)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
- Housing C1(6-20 storeys)	18,145	(304)	43,062	(651)	76,705	(1,228)	33,600	(740)	124,260	(1,488)
- BMA City Hall (over 20 storeys)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
- Public Service	5,865		8,691		14,003		0		0	
- Commercial	4,816		3,770		6,145		760		0	
- Apartment and Hotel	0		0		0		0		0	
- Parking (cars)	8,601	(244)	12,370	(399)	13,910	(599)	0	(0)	39,120	(1,118)
Total	37,426		67,893		110,763		34,360		163,380	
Public Facility										
- Road	0	m ²	11,820	m ²	0	m ²	5,190	m ²	0	m ²
- Infrastructure	0	m	1,120	m	0	m	960	m	0	m
- Bus-terminal & Square	0	m ²	0	m ²	0	m ²	0	m ²	0	m ²
- Underpass	0	m	0	m	0	m	0	m	0	m
Constructing Plan	Phase 4					Non-redevelopment				
	B.1.4		I.2.9		BMA Facilities	E		F.1.10		
Land Area										
Building site	71,200	m ²	18,810	m ²	0	m ²	21,139	m ²	31,571	m ²
Public Facility Area	0	m ²	0	m ²	0	m ²	0	m ²	0	m ²
Total	71,200	m ²	18,810	m ²	0	m ²	21,139	m ²	31,571	m ²
Floor Area	m ² (Units)		m ² (Units)		m ² (Units)		m ² (Units)		m ² (Units)	
- Housing A (Non-redevelopment)	0	(0)	0	(0)	0	(0)	36,089	(640)	48,667	(972)
- Housing B (6-20 storeys)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
- Housing C1(6-20 storeys)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
- BMA City Hall (over 20 storeys)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
- Public Service	0		18,640		8,940		0		0	
- Commercial	0		0		0		0		0	
- Apartment and Hotel	0		0		0		0		0	
- Parking (cars)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Total	0		18,640		8,940		36,089		48,667	
Public Facility										
- Road	20,630	m ²	9,950	m ²	116,170	m ²	0	m ²	0	m ²
- Infrastructure	1,050	m	600	m	5,370	m	0	m	0	m
- Bus-terminal & Square	0	m ²	0	m ²	33,500	m ²	0	m ²	0	m ²
- Underpass	0	m	0	m	400	m	0	m	0	m

Table 10.11: Outline of Facilities for the Financial Evaluation (Continued)

Constructing Plan	Total				
	Redevelopment		Non-redevelopment		Total
Land Area					
- Building site	186,385	m ²	52,710	m ²	239,095 m ²
- Public Facility Area	0	m ²	0	m ²	0 m ²
Total	186,385	m ²	52,710	m ²	239,095 m ²
Floor Area		m ² (Units)		m ² (Units)	
- Housing A (Non-redevelopment)	0	(0)	84,756	(1,612)	84,756 (1,612)
- Housing B (6-20 storeys)	0	(0)	0	(0)	0 (0)
- Housing C1(6-20 storeys)	295,772	(4,411)	0	(0)	295,772 (4,411)
- BMA City Hall (over 20 storeys)	0	(0)	0	(0)	0 (0)
- Public Service	56,138	(0)	0	(0)	56,138 (0)
- Commercial	15,490	(0)	0	(0)	15,490 (0)
- Apartment and Hotel	0	(0)	0	(0)	0 (0)
- Parking (cars)	74,001	(2,360)	0	(0)	74,001 (2,360)
Total	441,401		84,756		526,157
Public Facility					
- Road	163,760	m ²	0	m ²	163,760 m ²
- Infrastructure	9,100	m	0	m	9,100 m
- Bus-terminal & Square	33,500	m ²	0	m ²	33,500 m ²
- Underpass	400	m	0	m	400 m

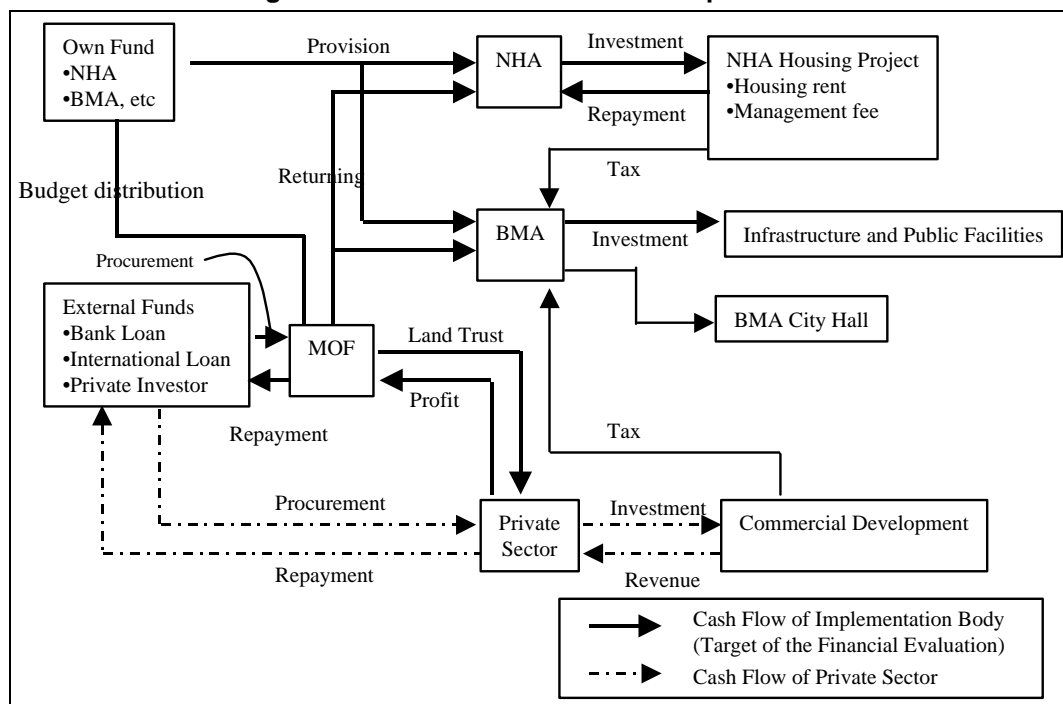
10.2.2 Financial Structure

The implementation body (the public organization) provides the funds for redevelopment by their own funds and loans. NHA and BMA implement and operate the non-profitable portion, while the private sector takes charge of profitable portion. The profit for the commercial development is returned to MOF and distributed as dividends to NHA and BMA. Demarcation of funding resources is presented in Table 10.12 and the cash flow is illustrated in Figure 10.3

Table 10.12: Project Components and Funding Resource

Projects	Implementation Body	Implementation Cost (million baht)	Funding Resource	O & M
NHA Housing Project	NHA	8,978	Own Fund (Governmental Budget) Loan Fund by the Public Organization	NHA
Infrastructure	BMA and related organizations	850		BMA and related organizations
- Road		271		
- Infrastructure		117		
- Bus Terminal & Square		210		
- Underpass	252			
Commercial Development	Private sector	7,078	Private Fund	Private sector

Figure 10.3: Flow of Revenue and Expenditure



10.2.3 Implementation Cost for the Financial Evaluation

(1) Implementation Cost in Total

Total project cost is estimated 7,960 million baht as presented in Table 10.13. The costs of the major components are estimated as listed below.

- Compensation amounts to 320 million baht (4.0%).
- Public facilities amount to 613 million baht (7.7%).
- Building construction cost is 5,189 million baht (65.2%).
- Project management cost is 882 million baht (11.1%)

Table 10.13: Implementation Cost for the Financial Evaluation

- Construction Cost : Case-1 [NHA's Construction and Public facilities]

No.5

[without Inflation]

Item of Initial Expenses	Unit Price	Grand Total (NHA Blocks and Public Facilities)		
		Volume	Price (per ct.)	Remarks
Survey, Design and Planning Cost			90,970 (1.1%)	
Survey Cost	600 baht/rai	116.5 rai	70 (0.0%)	
Design Cost	1.75 %/build.cost	5,189,300 ,000baht	90,900 (1.1%)	
Planning Cost			0 (0.0%)	*Included in Indirect Cost
Land Clearance Cost			553,900 (7.0%)	
Compensation Cost			320,200 (4.0%)	
- Returnee	10,000 baht/unit	5,433 units	54,300 (0.7%)	
- Returnee (Staying Through)	0 baht/unit	0 units	0 (0.0%)	
- Move-out Family	260,000 baht/unit	1,023 units	265,900 (3.3%)	
- Rent Subsidy	3,000 bt/unit/mon. for Temporary Move-out	20 monthes 0 units	0 (0.0%)	
Demolition Cost	900 baht/sq.m	259,690 sq.m	233,700 (2.9%)	
Land Readjustment Cost	0 baht/sq.m	186,385 sq.m	0 (0.0%)	*Included in Demolition Ct.
Construction Cost			6,432,700 (80.8%)	
Building Construction Cost		481,128 sq.m	5,189,300 (65.2%)	Rent. Rate & Floor Area
- Housing A	baht/sq.m	48,667 sq.m	0 (0.0%)	0 % 0
- Housing B	12,000 baht/sq.m	0 sq.m	0 (0.0%)	0 % 0
- Housing C1	12,000 baht/sq.m	295,772 sq.m	3,549,200 (44.6%)	67 % 197,764
- Public Service	12,000 baht/sq.m	0 sq.m	0 (0.0%)	0 % 0
- Parking	12,000 baht/sq.m	47,198 sq.m	566,400 (7.1%)	
- Commercial(NHA)	12,000 baht/sq.m	74,001 sq.m	887,900 (11.2%)	2,360 Cars
- Parking	12,000 baht/sq.m	15,490 sq.m	185,800 (2.3%)	63 % 9,748
	baht/sq.m	0 sq.m	0 (0.0%)	0 % 0
	12,000 baht/sq.m	0 sq.m	0 (0.0%)	0 Cars
Landscape Construction Cost	1,520 baht/sq.m	92,011 sq.m	139,800 (1.8%)	
Infrastructure Construction Cost	7.0 %/build.cost	5,189,300 ,000baht	363,200 (4.6%)	
Public Facility Construction Cost			613,100 (7.7%)	
- Road	1,200 baht/sq.m	163,760 sq.m	196,500 (2.5%)	
- Infastructure	9,500 baht/m	9,100 m	86,400 (1.1%)	
- Bus-terminal & Square	4,484 baht/sq.m	33,500 sq.m	150,200 (1.9%)	
- Underpass	450,000 baht/m	400 m	180,000 (2.3%)	
Relocation of School and Office	11,900 baht/sq.m	10,697 sq.m	127,300 (1.6%)	
Project Management Cost			882,000 (11.1%)	
Indirect Cost	3.5 %/build.cost	5,189,300 ,000baht	181,500 (2.3%)	
Direct Cost	3.5 %/build.cost	5,189,300 ,000baht	181,500 (2.3%)	
Reserve	10.0 %/build.cost	5,189,300 ,000baht	519,000 (6.5%)	
Interest for Funds			0 (0.0%)	
Initial Cost Total			7,959,570 (100.0%)	

(2) Implementation Cost by Year

The total project cost of 7,960 million baht in the present value comes to be 9,828 million baht after 8 years, due to the annual inflation of 4.5%. Implementation cost in each phase is presented in Table 10.14 and summarized below.

- Phase-1: Total cost is 926 million baht consisting of 641 million baht for block K 1.3 (B') and 285 million baht for compensation for moving-out residents.
- Phase 2: Total cost is 3,289 million baht consisting of 1,263 million baht for Block A.1.1 and 2,018 million baht for Block C.1.5.
- Phase 3: Total cost is 4,016 million baht including 718 million baht and 3,249 million baht for Blocks A.1.2 and D.1.6 respectively.
- Phase-4: Total cost is 1,597 million baht for roads, utilities for the land of private sector participation, and the community rejuvenation center.

Table 10.14: Implementation Cost by Year for the Economic Evaluation

- Total of Initial Expenses by Year		[After Adding Inflation]										No.3	
Grand Total		Case-1 [NHA's Construction and Public facilities]											
Item of construction cost	Present Price	Grand Total : Annual Initial Expenses										Total	
		2545	2546	2547	2548	2549	2550	2551	2552	2553	2554		
Inflation Rate		1.05	1.09	1.14	1.19	1.25	1.30	1.36	1.42	1.49	1.55		
Survey, Design and Planning Cost	91.0	8.3		42.9		51.8		5.3				108.3	1%
Land Clearance Cost	553.9	116.4	174.2	56.2		90.3		219.4				656.5	7%
Construction Cost	6,432.7	212.3	332.9	1,076.0	1,686.5	1,307.7	2,049.7	513.9	805.7			7,984.7	81%
Building Construction Cost	5,189.3	187.7	294.2	978.5	1,533.7	1,182.8	1,854.0	121.8	190.9			6,343.6	65%
- Housing A	0.0											0.0	0%
- Housing B	0.0											0.0	0%
- Housing C1	3,549.2	91.0	142.6	656.1	1,028.3	944.3	1,480.1					4,342.4	44%
- BMA City Hall	0.0											0.0	0%
- Public Service	566.4	29.4	46.1	124.3	194.8			121.8	190.9			707.3	7%
- Parking	887.9	43.1	67.6	143.9	225.6	234.0	366.8					1,081.0	11%
- Commercial	185.8	24.2	37.9	54.2	85.0	4.5	7.1					212.9	2%
- Apartment and Hotel	0.0											0.0	0%
- Parking	0.0											0.0	0%
Landscape Construction Cost	139.8	2.8	4.4	17.7	27.7	34.5	54.0	13.7	21.6			176.4	2%
Infrastructure Construction Cost	363.2	13.1	20.6	68.5	107.3	82.8	129.8	8.5	13.4			444.0	5%
Public Facility Construction Cost	613.1			11.3	17.8	7.6	11.9	312.0	489.0			849.6	9%
- Road	196.5			6.5	10.2	3.1	4.8	95.9	150.3			270.8	3%
- Infrastructure	86.4			4.8	7.6	4.5	7.1	36.3	56.9			117.2	1%
- Bus-terminal & Square	150.2							81.8	128.2			210.0	2%
- Underpass	180.0							98.0	153.6			251.6	3%
Relocation of School and Office	127.3	8.7	13.7					57.9	90.8			171.1	2%
Project Management Cost	882.0	31.9	50.0	166.3	260.7	201.0	315.1	20.7	32.4			1,078.1	11%
Total	7,959.6	368.9	557.1	1,341.4	1,947.2	1,650.8	2,364.8	759.3	838.1	0.0	0.0	9,827.6	100%

*The price is shown in millions

10.2.4 Analysis of Housing Rent

Focusing on the residential section, the net floor cost of housing unit is estimated at 31,900 baht/m² upon the following conditions;

- Total cost for the residential section is 6,313 million baht.
- Total floor area of residential section is 295,772m²; and
- Rentable floor area ratio is 71%.

Table 10.15: Construction Cost of Residential Portion

[Floor Price]

Floor Use	Division of Total Project Cost				Floor Value	
	Rate of Construction Cost	Total Cost into Categories	Rate of Construction Cost	Total Cost into Facilities	per Gross (baht/sq.m)	per Net (baht/sq.m)
- Housing A	0.0 %	-	0.0 %	0	0	0
- Housing B	0.0 %	-	0.0 %	0	0	0
- Housing C1	68.4 %	-	100.0 %	6,312,683	21,300	31,900
	0.0 %	-	0.0 %	0	0	0
- Public Service * Included in the above each facilities	10.9 %	-	-	-	-	-
Housing Sub Total	79.3 %	6,312,683	100.0 %	6,312,683	-	-
- Parking for Housing * Floor price is for 1 car	17.1 %	1,361,899	100.0 %	1,361,899	-	577,100
- Commercial	3.6 %	-	100.0 %	284,988	18,400	29,200
	0.0 %	-	0.0 %	0	0	0
- Parking * Included in the above each facilities	0.0 %	-	-	-	-	-
Housing Sub Total	3.6 %	284,988	100.0 %	284,988	-	-
Total	100.0 %	7,959,570	-	7,959,570	-	-

Furthermore, applying a project period of 30 years, residual value of 10% at the expiry of the project period, 5% inflation rate, required housing rent to cover the construction cost is estimated 167baht/m²/month. Taking fluctuation of inflation rate 2.5 - 10.0% and discounting of construction cost, the minimum required rent is still estimated 58 baht/ m²/month.

Therefore commercial floor is required to mitigate the surplus of the net floor cost against the housing rent of 140baht/m²/month for new residents and 37.5 baht/m²/month for ordinary income returning residents.

Table 10.16: Required Housing Rents for Construction Cost

Inflation Rate	Discount Rate		
	- 40% (15,312 baht/m ²)	- 20% (25,520 baht/m ²)	0% (31,900 baht/m ²)
2.5%	58	96	120
5.0%	80	134	167
7.5%	106	177	221
10.0%	134	223	279

10.2.5 Conditions for Financial Evaluation

(1) Revenue

1) General

Floors generating revenue are residential units, car park annexed to residences, and commercial floors, though the common space in the residential building, space for local public services and car park belonging to the commercial spaces are categorized as appurtenant facilities, and not as revenue generating spaces.

2) NHA's Facilities

The rent of NHA's facilities has been set as shown in Table 10.17. The background of those rents are discussed in Chapter 9. Occupancy rate adopted is 95%.

Table 10.17: Rents of NHA's Facilities

Facility	Rent
Housing Unit for Ordinary Income Returning Household	1,500 baht/unit/month with increasing ratio 15% per 3 years
Housing Unit for New Household	5,600 baht/unit/month with increasing ratio 15% per 3 years
Parking	1,500 baht/month with increasing ratio 15% per 3 years
Commercial	550 baht/m ² /month with increasing ratio 15% per 3 years

Note: Housing rents of 600 Baht/unit/month from the low income returning household is excluded from the revenue of the financial evaluation, as those households are planned to relocate in the existing housing units.

3) Facilities developed by Private Sector

The Study has preliminarily examined financial analysis to find the floor rents of the commercial facilities in Block B 1.4, which has the area of 71,200m² developed by the private sector. As a result, the floor rent is set at 800 baht/m²/month upon the following conditions;

- The private sector provides funds and distribute dividend to the land trustee after reduction of management cost and repayment to the loan fund;
- Revenue from the investor is only floor rent with occupancy rate of 95%, excluding parking and key money;
- Floor rent is raised by 15% every 3 years;
- Management cost is assumed at 20% of revenue;
- Inflation rate is 4.5% annually;
- No imposition of taxes for fixed property and profit; and
- It is the first year in which the private sector invests construction cost.

Table 10.18: Assumption of Floor Rents in the Commercial Development

Initial Investment						
Land Area	71,200	m ²				
Assumed land price in 2007	71,110	Baht / m ²	(5,063 Million Baht in total)			
Building	Commerce	200,000	m ²	16,771	Baht/m ²	3,354 Million Baht
	Apartment & Hotel	50,000	m ²	25,156	Baht/m ²	1258 Million Baht
	Parking	104,167	m ²	9,783	Baht/m ²	1,019 Million Baht
	Total	354,167	m ²	15,900	Baht/m ²	5,631 Million Baht
Revenue						
Building	Rental floor area	150,000	m ²	42	% (Net rate)	
	Occupancy floor area	142,500	m ²	5.0	% (Vacancy rate)	
	Key money		Baht / m ²		Million Baht	
	Floor rent	800	Baht / m ² / month	1,368	Million Baht / year	
Expenditure						
Building	Management cost	20.0 % * Rent		270	Million Baht / year	
Tax	No imposition				Million Baht / year	

Table 10.19 : Cash Flow of the Commercial Development

< The Long-term Revenue and Expenditure >

Year	1	2	3	4	5	6	7	8	9	10	15	20	25	30	40	50	
(Income Inflation) 15% every 3 year	(1.00)	(1.00)	(1.00)	(1.00)	(1.15)	(1.15)	(1.15)	(1.32)	(1.32)	(1.32)	(1.75)	(2.31)	(2.66)	(3.52)	(5.35)	(9.36)	
(Expense Inflation) 4.5% every year	(1.00)	(1.05)	(1.09)	(1.14)	(1.19)	(1.25)	(1.30)	(1.36)	(1.42)	(1.49)	(1.85)	(2.31)	(2.88)	(3.58)	(5.57)	(8.64)	
- Building	5,631																
Building Cost	5,631																
Management Cost		282	295	308	322	336	352	367	384	401	500	623	777	968	1,503	2,334	
- Loan	0																
Interest 5.0%		366	366	366	366	366	366	366	366	366	366	366	366	366	0		
Expense Total	5,631	648	661	674	688	703	718	734	750	768	866	989	1,143	1,334	1,503	2,334	
- Building	0																
Key Money	0																
Rental Fee		1,368	1,368	1,368	1,573	1,573	1,573	1,809	1,809	1,809	2,393	3,164	3,639	4,812	7,319	12,801	
Income Total	1,368	1,368	1,368	1,573	1,573	1,573	1,809	1,809	1,809	1,809	2,393	3,164	3,639	4,812	7,319	12,801	
Cash Flow by each year	-5,631	720	707	694	885	870	855	1,075	1,059	1,042	1,526	2,175	2,496	3,478	5,816	10,467	
Accumulated Cash Flow	-5,631	-4,912	-4,205	-3,511	-2,626	-1,756	-901	175	1,234	2,275	9,177	18,298	30,150	46,058	95,732	176,919	

*The price is shown in millions

Further FIRR of the commercial development is estimated 18% for the 30 years project period.

Table 10.20: FIRR of the Commercial Development

Duration (years)	10	15	20	30	40	50
FIRR (%)	7	14	16	18	18	18

(2) Expenditure

1) Repayment of Loan Money

In case of the financial evaluation, entire fund for construction is loaned from a

bank(s) at an interest rate of 5.0% per annum. According to the interview by the Study, private banks normally loan to the government offices at 5.0 –7.0% interest per annum without a grace period.

2) *Land Lease Fee of NHA's Land*

According to the Ratchapatsadu Land for State Enterprise as of July 1, 1999, land lease fee of NHA's lands is set at 14 baht/wah/month, excluding fees for Block B 1.4, which is used by MOF.

3) *Management Expense*

Twenty percent of house rent revenue is allocated to management expense for NHA.

4) *Taxes*

There will be no tax imposed on the Project in association with purchase of or transfer of fixed property or on the profit, since the buildings are constructed and operated either by NHA or BMA itself.

(3) *Inflation*

Inflation rate was assumed to be 4.5% per annum. It is noted that the hiking rate of house rent revenue was set at 15% every 3 years which is nearly equal to the inflation rate.

Table 10.21: Conditions of the Cash Flow Analysis

Revenue	
Revenue from Private Sector	Dividend from land trust to private sector. Floor rent: 800Baht/m ² /month, excluding management fee (Rentable floor: 150,000m ² with vacancy rate of 5%) Management cost: 20% Conditions of loan for private sector: inflation rate - 5%, repayment period - 30 years Hike of floor rent: 15% in every 3years Increasing of inflation rate: 4.5%
Revenue from NHA's Facilities	
- Returning Lowest Income Resident	600 baht/house/month. (Not counted in cash flow)
- Ordinary Income Returning Resident	1,500 baht/unit/month
- New resident	140 baht/m ² /month
- Car park	1,500 baht/car/month
- Commercial facility	550 baht/m ² /month(rentable floor)
- Vacancy rate	5%
Expenditure	
Inflation Ratio	Annual 4.5%
Repayment of Loaned Money	
- Fund	Whole fund loaned with repayment period of 30 years
- Interest	Annual 5%
Administration Expense	
- Management expense	20% of house rent revenue including clerical and facility admin. cost.
- Land rent payable to government	14 baht/wah/month
Tax	
- Fixed property transfer tax, stamp duty	Not applicable
- Local tax(income from fixed property)	Not counted in cash flow.

Note: Figure in () is required period for repayment.

10.2.6 Cash Flow Analysis

(1) Cash Flow Analysis (Base Case)

The Study has examined the financial analysis upon conditions discussed in the previous sections. As a result, regarding implementation cost of 9,828 million baht with inflation, covering the public facilities, FIRR is estimated 6.6% in a 30 year period, 8.9% in a 40 years, and 9.8% in a 50 years.

Financial balance for a fiscal year turns to the surplus in the 9th year when the project investment is completed, and for cumulative turns in the 21st year. The cash flow is presented in Table 10.22.

Table 10.22: Cash Flow of Base Case

- Cash Flow of 50 years Base Case [NHA's facilities and Infrastructures, plus Profit from Private Sector(REIT)]

Facility	Remarks	*The price is shown in millions																	50years Total		
		1	2	3	4	5	6	7	8	9	10	15	20	25	30	35	40	45		50	
Rental Income		3	3	36	36	135	135	213	964	952	939	1,382	1,975	2,280	2,569	2,574	2,579	2,584	2,589	2,594	161,539
- Rental rate	800 bt/Sq.m/month							(1.00)	(1.00)	(1.00)	(1.00)	(1.32)	(1.75)	(2.01)	(2.66)	(3.52)	(4.05)	(5.35)	(7.08)	(7.08)	129,575
- Profit from REIT								0	720	707	694	1,059	1,548	1,789	2,530	3,520	4,380	5,881	7,887	7,887	129,575
NHA'S Facilities		3	3	36	36	135	135	213	245	245	245	324	427	491	650	859	988	1,306	1,727	1,727	31,964
- Housing A	0 bt/unit/month																				
- Inflation rate		(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)	
- C1 for Returnee	1,500 bt/unit/month			5	5	43	43	84	96	96	96	127	169	194	256	339	390	516	682	682	12,571
- Inflation rate	15% 3 every year	(1.00)	(1.00)	(1.00)	(1.00)	(1.15)	(1.15)	(1.15)	(1.32)	(1.32)	(1.32)	(1.75)	(2.31)	(2.66)	(3.52)	(4.65)	(5.35)	(7.08)	(9.36)	(9.36)	
- C1 for New Comer	140 bt/sq.m/month			4	4	24	24	46	53	53	53	71	93	107	142	188	216	286	378	378	1,933
- Inflation rate	15% 3 every year	(1.00)	(1.00)	(1.00)	(1.00)	(1.15)	(1.15)	(1.15)	(1.32)	(1.32)	(1.32)	(1.75)	(2.31)	(2.66)	(3.52)	(4.65)	(5.35)	(7.08)	(9.36)	(9.36)	
- Parking	1,500 bt/car/month			4	4	24	24	46	53	53	53	71	93	107	142	188	216	286	378	378	6,966
- Inflation rate	15% 3 every year	(1.00)	(1.00)	(1.00)	(1.00)	(1.15)	(1.15)	(1.15)	(1.32)	(1.32)	(1.32)	(1.75)	(2.31)	(2.66)	(3.52)	(4.65)	(5.35)	(7.08)	(9.36)	(9.36)	
- Housing Sub Total		3	3	12	12	71	71	147	168	168	168	222	294	337	446	590	678	896	1,185	1,185	21,875
- Commercial	550 bt/sq.m/month			24	24	64	64	67	77	77	77	101	134	154	204	269	310	410	542	542	10,089
- Inflation rate	15% 3 every year	(1.00)	(1.00)	(1.00)	(1.00)	(1.15)	(1.15)	(1.15)	(1.32)	(1.32)	(1.32)	(1.75)	(2.31)	(2.66)	(3.52)	(4.65)	(5.35)	(7.08)	(9.36)	(9.36)	
Loan from Financial Agency		265	413	963	1,445	1,185	1,756	545	629												7,199
Own Fund		111	167	402	584	495	709	228	251												
Investment from Govt.																					
Total Revenue by each year		378	583	1,401	2,066	1,814	2,600	986	1,844	952	939	1,382	1,975	2,280	2,280	3,179	4,379	5,368	7,187	9,614	171,687
Inflation of Expenditure		1.05	1.09	1.14	1.19	1.25	1.30	1.36	1.42	1.49	1.55	1.94	2.41	3.01	3.75	4.67	5.82	7.25	9.03	9.03	
Constructing Expense		369	557	1,341	1,947	1,651	2,365	759	838	0	0										9,828
Interest during Construction		7	23	24	82	29	101	13	42	0	0										
Payment for Loan from Financial Agency				44	44	201	201	392	392	468	468	468	468	468	468	268					14,050
- Repayment for Principal	Debt F 0.70			10	11	47	50	97	101	124	130	166	212	271	346	236					7,199
- Public Agency				10	11	47	50	97	101	124	130	166	212	271	346	236					1,194
- Private Agency																					
- Payment for Interest (a)				34	33	153	151	295	291	344	338	302	256	197	122	31					6,850
- Public Agency	5.00% per year			34	33	153	151	295	291	344	338	302	256	197	122	31					6,850
- Private Agency																					
Management		1	1	13	13	33	33	49	56	56	57	74	97	113	148	194	226	296	389	389	7,285
- Managing cost	20% of Rental Fee	1	1	7	7	27	27	43	49	49	49	65	86	98	130	172	198	261	345	345	6,393
- Land Rent	B 14 / wah2 / month			5.5	5.8	6.0	6.3	6.6	6.9	7.2	7.5	9.4	11.7	14.5	18.1	22.6	28.1	35.1	43.7	43.7	892
- Tax																					
- Transfer Fee																					
- Local Improvement Tax : under calculation																					
Total Expenditure		376	581	1,422	2,086	1,913	2,699	1,214	1,328	525	525	542	565	581	616	462	226	296	389	389	31,462
Investment		-375	-580	-1,365	-2,029	-1,680	-2,465	-773	-880												-10,148
Expenditure		-376	-581	-1,422	-2,086	-1,913	-2,699	-1,214	-1,328	-525	-525	-542	-565	-581	-616	-462	-226	-296	-389	-389	-31,482
Income		378	583	1,401	2,066	1,814	2,600	986	1,844	952	939	1,382	1,975	2,280	3,179	4,379	5,368	7,187	9,614	9,614	172,669
Cash Flow		-373	-578	-1,386	-2,050	-1,779	-2,565	-1,001	-363	427	414	840	1,410	1,699	2,563	3,917	5,142	6,891	9,225	9,225	131,040
Accumulated Cash Flow		-373	-951	-2,336	-4,387	-6,165	-8,730	-9,731	-10,094	-9,667	-9,253	-8,699	-7,184	-5,699	-4,184	-2,645	-1,094	59,394	91,182	131,040	

(2) Sensitivity Analysis

Setting the financial evaluation in the previous section is the Base Case, the Study also has examined the sensitivity analysis by fluctuating the fundamental conditions, such as hike of house rent, provision of own fund, profit from the commercial development, increasing of inflation, and increasing of moving-out residents.

1) Case-1: Rents for returning residents, new residents, parking, and commercial floor is raised by 15% every 10 years.

Comparing with the revenue from the NHA housing units, the floor rents of the commercial development is large. Consequently FIRR and financial balance is similar to the Base Case. On the other hand, the hike of housing rents is fundamental to autonomously maintain the housing facilities, especially rents for the ordinary income returning households set at one-third of the market price.

- Required period to turn the financial balance in a year to a surplus: 9 years

- Required period to turn the cumulative financial balance to a surplus: 21 years
- FIRR: 5.7% in a 30 years period, 8.2% in a 40 years, 9.2% in a 50 years

2) Case-2: Funds is provided by External Resources without any Own Fund

Reflecting the revenue of the commercial development, the financial balance in a year turns to the surplus in the 9th year.

- Required period to turn the financial balance in a year to a surplus: 9 years
- Required period to turn the cumulative financial balance to a surplus: 23 years
- FIRR: 4.9% in a 30 years period, 7.7% in a 40 years, 8.9% in a 50 years

3) Case-3: Decreasing of Revenue from the Commercial Development

As presented in the previous two cases, the revenue from the commercial development is the main driving force for the redevelopment. Provided that the required period to turn the financial balance in a year is 9 years and the cumulative is 30 years, the maximum possible reduction of the revenue from the commercial development has been estimated at 30%. Assumed factors to reduce the floor rent are decreasing of the floor rent and increasing of management cost. Upon those circumstances, FIRR has been estimated as below.

- FIRR: 1.5% in a 30-year period, 5.3% in a 40 years, 6.9% in a 50 years

4) Case-4: Increasing of Inflation

When the inflation rate of loan funds for governmental and private bodies increases from 5% to 10%, financial situation is strongly affected as the required period for the surplus in a year is 11 years and FIRR for a 30-year period is 2.0%.

- Required period to turn the financial balance in a year to a surplus: 11 years
- Required period to turn the cumulative financial balance to a surplus: 28 years
- FIRR: 2.0% in a 30 years period, 6.0% in a 40 years, 7.6% in a 50 years

5) Case-5: Increasing of Moving-out Residents

Increasing of moving-out residents from 15% to 50% does not affect the financial situation, because the house rents from new residents increase revenue, while the rising of compensation fee.

- Required period to turn the financial balance in a year to a surplus: 9 years
- Required period to turn the cumulative financial balance to a surplus: 21 years
- FIRR: 6.3% in a 30 years period, 8.6% in a 40 years, 9.6% in a 50 years

6) Case-6: Adopting all modified conditions in the previous five cases.

Applying all the modified conditions in the previous five cases, the required period for the surplus in a year is 23 years and the cumulative is 40 years.

Sensitivity analysis of the six cases is presented in Table 10.23.

Table 10.23: Sensitivity Analysis of the Base Case and Alternative Five Cases

Case	Condition					Required Years for the Surplus in a Year (Year)	Required Years for the Surplus in the Cumulative (Year)	FIRR		
	Hike of House Rents	Provision of Own Fund	Revenue from Commerce Develop.	Inflation Rate	Moving-out Ratio			Project Life 30 Years	Project Life 40 Years	Project Life 50 Years
Base Case	15%/3year	30%	800	5.0%	15%	9	21	6.6%	8.9%	9.8%
Case 1	15%/10year	30%	800	5.0%	15%	9	21	5.7%	8.2%	9.2%
Case 2	15%/3year	0%	800	5.0%	15%	9	23	4.9%	7.7%	8.9%
Case 3	15%/3year	30%	-30%	5.0%	15%	9	28	1.5%	5.3%	6.9%
Case 4	15%/3year	30%	800	10.0%	15%	11	27	2.2%	6.1%	7.7%
Case 5	15%/3year	30%	800	5.0%	50%	9	21	6.3%	8.6%	9.6%
Case 6	15%/10year	0%	-30%	10.0%	15%	23	40	-11.9%	0.1%	3.4%

Note: Unit for the "revenue from commercial develop." is Baht/m²/month.

(3) Conclusion

Reflecting that the house rents for the ordinary income returning households is set at 1,500 baht/m²/month which is around one-fourth, the NHA housing project does not secure the financial balance.

On the other hand, the commercial balance maintains the profit of the redevelopment, by distributing the dividend to the non-profitable projects, such as housing and public facilities. Deducting the revenue from the commercial development by 30%, the required period for a surplus in a year is still 9 years, which is the next year of the completion of investment.

10.3 ECONOMIC EVALUATION

(1) General

Economic evaluation of the Din Daeng Community Redevelopment Plan has been performed for Economic Internal Rate of Return (EIRR), Net Present Value (NPV) and Benefit Cost Ratio (B/C) in comparison with “with-project” and “without-project” cases. Moreover, in order to evaluate the risk factors involved in execution of the Project, which might reduce benefit, in other words reduce the rate of return, sensitivity analyses has also been carried out.

(2) Assumed Conditions for Economic Evaluation

The economic evaluation has been performed based on the following conditions:

1) General Conditions

- Economic useful life of the Plan (project life) is set at 50 years.
- A standard conversion factor (SCF) 0.94 and a construction conversion factor (CCF) 0.88 are used to convert financial prices to economic prices in local currency, according to the guideline issued by economic section of BPPP, RID.
- Discount rate is set at 12% per annum.
- Transfer payments such as compensation, taxes and interests are not to be counted.

2) Cost Items

Initial cost and operation and maintenance cost are assumed to include the following items.

- Project cost: i) Survey, design and planning expenses, ii) Land clearance cost, and iii) Construction costs; and
- Operation & maintenance cost for buildings, road and utilities.

3) Benefit Items

Benefit accrued by implementation of the Plan are assumed to be the following items.

- Value created by new building facility;
 - Gross profit generated at the commercial facility

- House rent revenue from new residential units
- Benefit created by new BMA city hall;
 - Benefit generated by reduction in overall trip generation by municipal employees and visitors to the city hall
- Increase of land value in the surrounding area of Din Daeng Community induced by improvement of urban feature by the Plan; and
- Benefit on improved transport systems (mitigation of traffic load) in the surrounding area by creation of access to the new commercial facility in the Plan.

(3) Economic Evaluation

As a result of cash flow analyses by different discount rates, indicators of economic evaluation, EIRR, NPV, B/C, have been obtained as summarized in Table 10.24.

Table 10.24: Economic Evaluation Indicators

Discount Rate	8%	10%	12%
Present Value of Total Cost (million Baht)	10,173.6	8,792.9	7,676.7
Present Value of Total Benefits (million Baht)	16,135.6	11,356.2	8,255.6
NPV (million Baht)	5,962.0	2,563.4	578.9
B/C	1.59	1.29	1.08

(4) Sensitivity Analysis

In the cost estimate of buildings, which accounts for most of the whole cost, about 10% safety allowance has been included in the base case. This fact implies that EIRR in base case has as much as 10% safety allowance.

Consequently, an examination was carried out to see how variation in the profit from the commercial floor, which will provide most of the profit, will influence the rate of return. A sensitivity analysis in this respect was attempted by diminishing the floor rent by 10%. The result indicates that EIRR will drop to 12.01%, which, only slightly exceeds the assumed discount rate 12%. This minor deficit will quite easily be outweighed by the benefits created by improvement of living environment for residents, though this benefit cannot be quantified.

In summary, implementation of the Plan can be justified from the viewpoint of the various economic benefits that it will create.

Table 10.25: Summary of Sensitivity Analysis

Case	EIRR
Base case	12.9%
Drop of profit from commercial floor, by -10%	12.0%
(Reference)	
Reduction of building construction cost, by -10%	13.5%
Reduction of building construction cost, by -10% and Drop of profit from commercial floor, by -10%	12.6%

10.4 INITIAL ENVIRONMENTAL EXAMINATION

10.4.1 Results of the Initial Environmental Examination

Based on the existing environmental condition and the facilities to be developed in the Plan, the preliminarily identified potential impact on environment has been assessed. The major environmental concerns may include traffic congestion which would induce air and noise pollution, disposal of wastewater and solid waste as well as socioeconomic aspects.

The results of the initial environmental examination are summarized in Table 10.26. Of 13 examination items, nine require mitigation in the construction phase and six in the operation phase. The nine items in the construction phase will be worked out by the contractor and some of the operation phase will be managed by related Government Agencies, such as the Department of Public Cleansing and the Department of Drainage and Sewerage in a normal manner. The remaining typical items to be considered are described below:

- Recreational area: The Plan will increase recreational area including sport facilities and park;
- Transportation: traffic congestion after the development is examined in Section 10.4.2; and
- Public health: The plan provides the public spaces including public health facilities.

The results from this initial environmental examination are studied in detail through the Environmental Impact Assessment, which will be submitted to OEPP for approval prior to the start of the redevelopment. It will be performed according to the Enhancement and Conservation of National Environmental Quality Act, B.E. 2535, section 46.

Table 10.26: Result of Initial Environmental Examination

Items of Examination	Necessity of Mitigation Measure	Remarks
1) Topography, Geology, Seismology and Groundwater	None	
2) Storm Water and Wastewater	Yes	CP: Provision of temporary settling basin and septic tank.
3) Solid Waste	Yes	CP: Collection and disposal of waste from demolition and construction materials. OP: Campaign for reduction of waste and separation of waste
4) Air Quality	Yes	CP: Suppression of fugitive dust
5) Noise Level	Yes	CP: Suppression of noise by fence and wet piling. OP: Reduction of the traffic congestion.
6) Hydrology/Drainage System/Flood Control	Yes	CP: Provision of waste disposal spots in the construction sites OP: Regular checking of drain channels
7) Land Use	None	
8) Transportation	Yes	CP: Provision of regulating signs and warning signs. OP: Provision of traffic signal
9) Utility	None	
10) Socioeconomic	Yes	CP: Relocation of residents
11) Historical and Archaeology	None	
12) Recreation Area	Yes	CP & OP: Maintaining of recreational area
13) Public Health	Yes	CP: Employing the security and accident prevention measures OP: Provision of public health facilities and medical personnel

Note: CP - Construction Phase, OP - Operation Phase

10.4.2 Examination on Traffic Load by the Project

Traffic demand forecast has been performed to evaluate traffic impact in and around the DC area in the year 2011, following transport models developed by OCMLT, BECM, and URMALP.

Methods of traffic analysis are illustrated in Figure 10.4 and the details of the analysis are described in the appendix.

Figure 10.4: Methods of Traffic Analysis

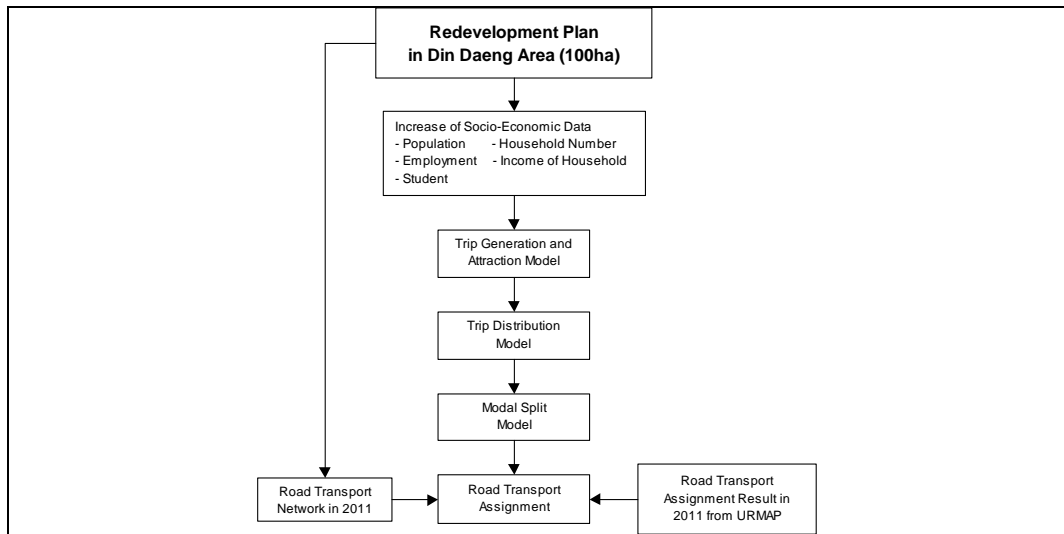
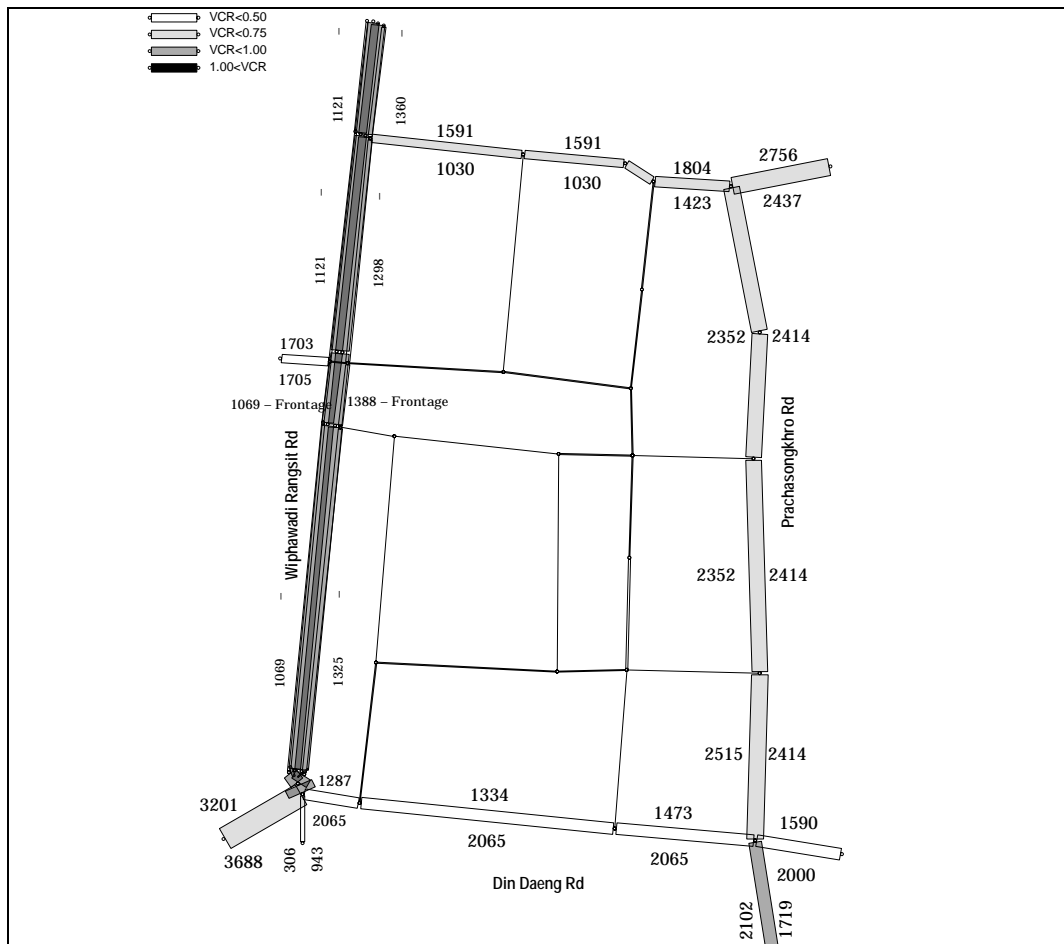


Figure 10.5: Calculation Result of Congestion Ratio around the Study Area



Furthermore, at the major intersections around the DC area, the saturation degree is estimated to be less than 1.0 as shown in Figure 10.6.

Figure 10.6: Saturation Degree at Three Major Intersections

