

A Case Study on Development Exaction for Collector Distributor Road Construction in Bangkok

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INTRODUCTION

Thailand has so far favoured the public-funding, free-access approach to infrastructure provision. In a significant policy shift in recent years, however, the government has sought to expand the role of the beneficiary payment principle. Of the several forms of urban infrastructure which can be emplaced from the principle, collector-distributor roads have been selected as the subject of this paper.

The paper will present the results of a case study undertaken to demonstrate a possible application of the development exaction technique to finance the construction of collector-distributor roads in newly urbanizing areas of Bangkok. The paper draws on material prepared for the Study of Options for Financing Infrastructure Expansion, (SOFIE), carried out for the Urban Development Coordination Division of the Office of the National Economic and Social Development Board (NESDB), Bangkok, by Planning and Development Collaborative International (PADCO Inc.), in Washington, D.C., and the Land Institute Foundation (LIF), Bangkok in 1991.

The SOFIE Report identified five development strategies which could increase private sector infrastructure financing and improve cost recovery from direct beneficiaries of public services. With that approach the government can pursue its policy objectives along several financing methods simultaneously. The five development strategies are termed as follows:

- Growth Management;
- Development Coordination;
- Strategic Sites;
- Development Opportunities; and
- Criteria-based Allocation.

Seven beneficiary payment mechanisms, taken from an initial list of internationally recognized options for infrastructure financing, were determined to be appropriate for use in Thailand. These were:

- local government property taxes;

- user charges;
- development exactions;
- development impact fees;
- betterment levies;
- land readjustment; and
- excess condemnation.

The first three were already in use, and betterment levies (special assessment) and land (pooling) readjustment were given priority for early adoption. It can be assumed that any of these seven financing mechanisms could be implemented in Thailand under the right set of circumstances and with effective leadership. Each of the seven options would need to be institutionalized through a development strategy for its effective application to specific situations in Thailand (see table 1). All seven mechanisms should be available for use by local and national agencies, either as part of a development strategy or as targeted solutions to an immediate situation demanding government action. Table 2 (below) indicates typical patterns of how local and national agencies in other countries finance the construction and operations of basic infrastructure.

TABLE 1. FINANCING METHODS FOR DEVELOPMENT STRATEGIES

	Property Taxes	User Charges	Development Exactions	Development Fees	Betterment Levies	Land Readjustment	Excess Condemnation
Growth Management	x		x	x	x	x	
Development Coordination	x	x		x	x		x
Strategic Sites	x	x	x	x	x	x	x
Development Opportunities	x			x	x		
Criteria-based Allocation	x	x		x	x		

Source: SOFIE, 1991.

TABLE 2. TYPICAL PATTERNS OF INFRASTRUCTURE FINANCING

	Property Taxes	User Charges	Development Exactions	Development Fees	Betterment Levies	Land Readjustment	Excess Condemnation
1. Roads							
a) Primary	b	o					c
b) Secondary	b			c	c	c	c
c) Local	b		b	b	b	c	c
2. Water							
a) Supply	b						c
b) Demand	c	o	b	c	b	c	
3. Sewerage							
a) Collection	c	o	b	c	b	c	
b) Treatment	b	o	b	o	b	c	
c) Sludge Disposal	c	o		b			
4. Drainage							
a) Collection	c	o	b	c	b	c	
5. Electricity (Local Systems)	b	o	c		c		
6. Solid Waste	b	o	b	o	o		
a) Collection	b	o		b		c	
b) Disposal							
7. Open Space/ Recreation	b	o	c	b	o	c	c
8. Facilities							
a) Administrative	b						c
b) Educational	b	o	c	b	b		c
c) Youth and Sports	c	o	c	b	b		c
d) Health Clinics		o			o		c

Source: SOFIE, 1991

Note: c = Capital Costs

o = Operating Expenses

b = Both

Among the existing options for financing infrastructure expansion, development exactions have recently played a major role in the newly urbanizing areas of Bangkok. These are regulations imposed on a private developer to provide on-site infrastructure as a precondition to development approval. Since local governments have little capacity to finance infrastructure, the provision of facilities by the private sector will be an accepted cost of development. The costs are either passed through to homebuyers who bear a disproportionate share of the costs, or indirectly financed by the private banking system.

Development exactions for on-site infrastructure require legal authority to negotiate with developers regarding tradeoffs between site approval and infrastructure provision. In Thailand, these have been regulated in private land subdivision projects through the enforcement of Revolutionary Party Decree No. 286, since 1972. The law authorizes the

Committee for the Control of Land Subdivision (CCLS) to formulate the minimum regulatory standards and other requirements that those projects should meet in order to be permitted and approved.

Within the preliminary determination of its appropriation according to three primary criteria, (i.e., efficiency, equity, and implementability), the scope of this study will cover the selection of a suitable project site from within the urban fringe areas of Bangkok and the preparation of a draft scheme for the construction of a collector-distributor road network, along with related public utility service lines on the site, and project cost recovery from the benefiting landowners. The draft scheme will be to design, explain, and justify the project so that it can be accepted by the Bangkok Metropolitan Administration (BMA) for presentation to the landowners of the project site. The draft scheme will be modified as appropriate, to obtain a majority of landowner support for its implementation by the BMA.

This paper is presented in five parts. The first part explains the need for the advanced construction of collector-distributor road networks and the related public utility service lines in urban fringe areas so as to improve the urban expansion process of the metropolis. The second part describes the development exaction technique for financing the construction of the infrastructure network, the existing land subdivision control, and the roles of private land subdivision projects in the metropolitan development. Part three describes the site selected for the case study, and this is followed by a consideration of development exactions as alternative techniques for constructing the proposed infrastructure network. Finally, the fifth part outlines the draft scheme for the proposed development exaction pilot project and its pre-feasibility study.

The Need for Collector - Distributor Roads

Traffic congestion, with its related serious air pollution, is the most visible and widely encountered problem in Bangkok. Numerous studies of transportation situations within the metropolis identify specific problems related to the patterns of rapid development and unplanned growth of Bangkok, together with the lack of a mass transit system. Its uni-directional flow of traffic into the central area is combined with limited road networks and the existence of superblocks with inadequate internal circulation, thereby creating intense congestion which now exceeds the capacity of major transportation arteries.

For the preparation of the Seventh National Economic and Social Development Plan (1992 - 1996), the seventh Plan Urban and Regional Transport Study (SPURT), which was submitted to NESDB by Halcrow Fox Associates, Pak-Poy & Kneelione Pty, Ltd., and Asian Engineering Consultants Corp., Ltd. in 1990, identified the outstanding weakness of the road network, insufficient road hierarchy, and the lack of collector-distributor roads. The study therefore recommended the construction of 400 km of collector-distributor roads, and it was expected that a simple collector-distributor system inside the superblock (diameter of 4 km) could cause a reduction of 18 per cent in main road traffic and 8 per cent in the total traffic volume.

The responsibility for constructing collector-distributor roads lies with the BMA as the local authority, but due to inadequate technical resources for the magnitude of the task, the authority has left the planning and provision of collector-distributor roads and parcel access in private hands. These elements of urban infrastructure have been emplaced in housing estates on a scale only sufficient to ensure their marketability. The estates have been developed with irregular boundaries and unique, circuitous road alignments designed for land

parcel access, and with little or no consideration for through traffic.

With the emplacement of urban infrastructure in unrelated micro-environments, developments produce costly externalities and spillover effects. These economic abstractions embrace diverse forms of damage, including congestion, environmental degradation, deteriorating service standards, etc. On the other hand, these abstractions also have a nasty habit of materializing in the form of imperative and expensive projects. The amounts of capital required for necessary infrastructure expansion will be so proportionately large that network considerations must influence decisions about infrastructure currently made by developers within the narrow scopes of each development.

With reference to expanding the supply of affordable housing, the "Bangkok Land and Housing Market Assessment," submitted to NESDB by PADCO Inc. and LIF in 1990, also called for an entirely new approach to planning and development:

Ideally, when new housing developments are proposed, the local government should regulate the layout of both main roads and distributor streets. The general plans for the outlying provinces and undeveloped areas of the BMA should have a circulation element specifying the alignment of the roads. All development should be based on these planned layouts, and the provision of water, electric, and other services should follow the circulation scheme. Even if each developer builds the roads, they can be designed so that they "add-up."

This would, of course, require that the government have the authority to regulate residential development, prohibiting construction unless an acceptable road system servicing suburban Bangkok could be developed with an adequate road system.

Any attempt to expand developer contributions to urban infrastructure networks will depend on the timeliness of local plans, as they would provide an official reference for the review, approval, and enforcement of subdivision projects. Through the preparation of local plans, which express in documents and area-wide records an adequate network of road and other facilities extended across the land, developers can cooperate in extending network facilities, one subdivision after another, and thus contribute to the overall infrastructure efficiency.

Development Exaction Technique

Development exactions or subdivision regulations require a developer to provide on-site infrastructure as a pre-condition to a project's approval by a public agency. The costs are passed on to purchasers who bear a portion of the costs of the public infrastructure. Development exactions through subdivision regulations are defined in law, although there is flexibility to negotiate an agreement with the developer on specific infrastructure to be provided. On-site infrastructure such as roads, drains, and open recreation spaces are common exactions.

Subdivision regulations in Thailand were first introduced in the Revolutionary Party Decree No. 286, in 1972. The law authorized the formation of the CCLS, who issue permits for private land subdivision projects. Regulations for the benefit of health, safety, communications, and town planning shall cover all or any of the following items:

- The minimum width, length, and area of each new plot;
- The system and standards of various types of roads, footpaths, and pathways

- within subdivision areas, and their connections to roads outside the area;
- The drainage system; and
- Systems and standards of public utilities and services, as necessary.

This control system of subdivision regulations has operated fairly effectively, and a large amount of network infrastructure has been constructed within the private land subdivision project, at no cost to the government. This is not to ignore reported deficiencies, including substandard construction, right of way controversies, drainage problems, a lack of connections to network lines for water and waste disposal, and tardy or denied local government assumption of infrastructure operation and maintenance^{4/}. Many subdivision deficiencies are traceable to planning defaults by local governments legally responsible for providing plans covering large development areas.

Even under existing procedures, subdivision regulations could provide greater levels of infrastructure if linked to a development strategy such as growth management or strategic sites. With sufficient time to prepare local plans, local governments could use the subdivision review and approval process to negotiate with developers the type and level of infrastructure which is to be provided, including segments of collector-distributor roads. This would be accomplished either by the CCLS or, ideally, through the delegation of authority from the CCLS to the BMA and other responsible urban governments.

Due to various factors, attempts to introduce viable planning practices into traditional administrative systems have so far achieved only modest results. One important contributing factor has been the problem of integrating planning and budgeting, which has not been as cohesive as was hoped. Local plans should, however, solve this lack of coordination among sectoral programmes, which has significantly exacerbated the haphazard and inefficient urban development patterns which have emerged.

The Case Study

As the site for a case study would provide a practical opportunity to explore the impacts and implications of cost recovery mechanisms in situations where additional infrastructure, especially collector-distributor roads, might improve the efficiency of future development, the site selection in this case was guided by the following criteria:

- requirements of new infrastructure (collector-distributor roads) for the support of new development;
- strong development pressure in the area;
- availability of current government plans or proposals for infrastructure improvement;
- distributed private ownership of land parcels; and
- general representativeness of area conditions.

After considering several alternative blocks, through site visits and discussions with planning and infrastructure officials, the region bounded by Lat Phrao, Ramkhamhaeng, Rama IX, and Ratchadaphisek Roads was selected. The BMA Planning Division endorsed this block as an area featuring serious infrastructure deficiencies and showing great potential for further intensive development. The block is currently undergoing significant residential and commercial development along its major road edges. In addition, the Ekkamai-Ram Indra Expressway running north and south provides a ground-level main road which will stimulate land and building development along its length and within the block.

Recognizing serious road network deficiencies, the BMA Planning Division proposed a collector-distributor road through this block to intersect with the ground level road of the

expressway. This BMA planning, plus a pocket of open land and some heavy development pressure, made the interior section of this region a good case study. Specifically, the study embraces the area northeast of the intersection of Pracha Uthit Road and the Lat Phrao Canal, an area including a large pocket of vacant land to be crossed by a collector-distributor road proposed by the BMA Planning Division.

The location of the site is about 2.0 km south from Lat Phrao Road and about 2.5 km northwest from Ramkhamhaeng Road. The region spans about 1,040 m from north to south and about 1,400 m across the northern boundary down to about 900 m across the southern boundary. It covers an area of 127.7 ha in 181 land parcels with 117 owners. The land parcels range from 100 m² building plots up to a 66 rai (10.6 ha) parcel. Most of the land is held in parcels of over 5 rai (0.8 ha) and the ten largest landowners own half of the site. Six of the ten largest landowners are a group or syndicate, since they have an address on or near the site, and three of them have the same family name. Details regarding private land parcel ownership and distribution are shown in tables 3 and 4 (following).

TABLE 3. LAND OWNERSHIP OF THE CASE STUDY SITE

Site Area (excluding canals and public roads)	798 rai 1 ngan 37 square wah (1,277,384 m ² = 127.7 ha)
Land Parcels	181 parcels (separate titles), including one BMA parcel.
Landowners	117 private owners and one government parcel.

Source: SOFIE, 1991.

TABLE 4. DISTRIBUTION OF LAND PARCELS AND OWNERS

Area	Parcels	Owners
Under 1 rai	84	62
1 to 5 rai	57	40
5 to 10 rai	14	13
10 rai and over	25	22
Total	180	117

Source: Ibid.

Land use and development within the site is shown on the land parcel base map. Most of the site is unused rice farming land with some building development along the western and southern edges. The buildings along Lat Phrao Canal consist of houses and a primary school. These houses and the east-west orientation of the long narrow land parcels reflect the rice farming land use prevalent in most of the site until recent years. The buildings along Pracha Uthit Road include a factory, a sales office, a sports centre and golf-driving range, and a row-house estate. There are also a few large houses on large plots at the northeastern corner of the site. The land parcel map also shows a suburban land subdivision layout on the eastern side of the site, with building plots of 400 m² or more.

Another development on the site is the 12 m concrete road constructed northward from Pracha Uthit Road and then east to connect to Lat Phrao Soi 80. The roadway land had been donated to a developer by the landowners so as to obtain the benefit of public road frontage for their land. The road, which is due to be transferred to the BMA when completed, has already had a significant impact on the value of blind land due to the provision of the public

road connection. It might be noted that the developer's road running east-west across the top of the site is not on the same alignment as the collector-distributor road proposed by the BMA City Planning Division. The BMA road would be located about 80 m south of the developer's road.

The Bangkok Metropolitan General Plan (Ministerial Regulation No. 116, 1992) shows that the site is to be zoned "low density residential" as the major use, with other compatible minor land uses being permitted on up to 10 per cent of the land area. The Department of Town and Country Planning (DTCP) who prepared the Plan, however, has not issued a definition of low density residential use. Apparently, within the department low density is set at an average resident population of 62.5 persons per hectare, which would be equivalent to 12.5 houses per hectare. It is clear that the proposed low density residential zoning for the case study site is not realistic, particularly with respect to the current market value of the land and the building development projects in progress and planned for the area.

In addition, the plan does not show any proposed public roads within the site except for the Ekkamai-Ram Indra Expressway, and the Pracha Uthit Road as a collector-distributor road. The BMA Planning Division had no detailed road layout to support the general alignment of its proposed collector-distributor road, yet the SOFIE consultants were engaged to lay out the proposed road, along with certain additional roads thought necessary to foster the proper development of the entire site.

The objectives of this infrastructure project are as follows:

- to construct the planned network of collector-distributor roads, drains, and bridges so as to open up the site and guide urban development;
- to facilitate and assist the adoption of appropriate financial techniques, (i.e., development exaction), for the unified planning, servicing, and subdivision of some of the new blocks within the site;
- to reconstruct Pracha Uthit Road as a collector-distributor road as shown in the Bangkok Metropolitan General Plan, and to construct the proposed BMA collector-distributor road;
- to recover a portion of the costs from the beneficiaries, through development exaction which reflects the project's benefits to each land parcel; and
- to demonstrate the use of development exaction techniques to finance the construction of collector-distributor roads, and to identify appropriate procedures for its application in the Bangkok Metropolis.

The work already completed includes:

- Field inspections of the site, the surrounding areas, and nearby development projects;
- Assembly of available maps, documents, and data;
- Discussions with BMA city planning officials;
- Discussions with other government officials, (e.g., DTCP and NESDB);
- Preparation of updated cadastral map and list of land parcels and owners;
- Design of collector-distributor road, drain, and bridge layout on the land parcel map;
- Estimation of the costs of roadway land compensation and the collector-distributor road, drainage, and bridge construction; and
- Valuation of each land parcel, both before and after the project.

The planned layout of 7.2 km of collector-distributor roads and drains over the 127.7 ha of the case study site, and two bridges across Lat Phrao Canal, was prepared on a land parcel map. By the road cross sections, there are three types of collector-distributor roads with rights of ways of 20.0 m, 16.0 m, and 14.0 m, and with driveway widths of 14.0 m, 11.0 m,

and 11.0 m, respectively. These roads will have concrete paved surfaces and footpaths, and concrete pipe drains along each side. The two concrete bridges will be 18.0 m wide and 40.0 m long.

The estimated cost of constructing the roads, drains, and bridges is Baht 200.63 million, as shown in table 5 (below). This figure was calculated using current BMA cost rates and adding a 30 per cent contractor's margin plus 4 per cent design and supervision fee. In addition, the compensation cost of acquiring the land for the road right of way, according to the market land value assessed by Thai Engineering and Management Development Co., Ltd., (TEAM D), was estimated at Baht 217.92 million. The two 3 m strips of land required for the widening of Pracha Uthit Road from 14.0 m to 20.0 m were valued at Baht 12,500 per m², while other land to be acquired was valued at an average of Baht 1,450 per m². Thus, the total project land acquisition and construction costs amount to Baht 418.55 million.

TABLE 5. ESTIMATED COST OF INFRASTRUCTURE PROJECT

Infrastructure Elements	Cost (Baht)
Road 1: (20.0 m), 2,400 m length, with 1.2 m drain pipe	50,100,000
Road 2: (16.0 m), 2,000 m length, with 1.0 m drain pipe	29,219,000
Road 3: (14.0 m), 2,800 m length, with 1.0 m drain pipe	33,078,000
Two Bridges: (18.0 m x 40.0 m)	36,000,000
Contractor's Margin (30 per cent of Baht 148,397,000)	44,519,000
Engineering Design and Supervision (4 per cent of Baht 192,916,000)	7,717,000
Sub-total	200,633,000
Roadway Land Acquisition Compensation	217,920,000
Total Project Cost	418,553,000

Source: Ibid.

It is worth noting that the network of proposed collector-distributor roads and bridges will benefit the movement of through traffic as well as local traffic travelling into and out of the site. The widening of Pracha Uthit Road and its bridge will primarily facilitate the flow of through traffic, and the BMA proposed collector-distributor road and bridge would also carry substantial through traffic. This means that the full cost of the Pracha Uthit Road and bridge, and half of the cost of the BMA collector-distributor road and bridge should be financed through the regular BMA road construction programme, rather than through the project financial scheme.

The impact of this infrastructure project on the market value of the case study land was assessed by TEAM D. The report concluded:

In brief, the total value of the property on a vacant land, vacant possession, and undeveloped basis, is approximately Baht 3,326.32 million. The land to be lost for road construction is worth approximately Baht 211.80 million. After the development is completed, the total site would have a value of approximately Baht 10,674.22 million.

This means that the project is estimated to increase the market value of land by an average of 221 per cent. The analysis was made on the assumption of the land being vacant, and the developer's road formation works were not taken into account when estimating the unit value

of each land parcel prior to the construction of the project. This means that the estimated increase in the total land value is significantly greater than the likely actual situation. The adoption of land value taxation and land transaction fees, however, will discourage land holding for the purpose of reaping benefits from future speculative gains and land value increases resulting from the availability and accessibility of infrastructure services, as well as any related spillover effects.

The increase in land value is conceptually the best measure of the project benefit. On the beneficiary payment principle, the project cost should be absorbed by developers and then transmitted to homebuyers. The dedication of these infrastructure facilities to relevant government agencies, instead of allowing them to remain a privately-owned collector-distributor network, is desirable for strengthening land subdivision regulations, because it would make way for the addition of sections which would aid future contributions to the costs of necessary off-site infrastructure developments.

CONCLUSION

This case study demonstrates the possible application of the development exaction technique for financing the construction of a collector-distributor road network in urbanizing areas of Bangkok. With reference to the project site, development pressures were apparent, as was the anticipatory local planning required in order to provide a proper layout of collector-distributor roads and other relating infrastructure. These local plans could have a significant amount of privately financed urban infrastructure, and it could be made even more effective if it were linked to growth management and strategic site strategies incorporated within a locally approved plan.

The observed weakness in localized planning, however, is a derivative of general constraint endowed with a cadre of competent officials, especially management, planning, and technical personnel, and supported with requisite authority and financial amplitude. If local government can competently prepare local plans, and are empowered to adopt them and assume responsibility for subdivision review, approval, and development in conformity with the plans, (similar in concept to those authorized by the Town Planning Act, 1975), then Thailand will be able, effectively and equitably, to enlarge the role of the beneficiary payment principle for financing urban network infrastructure and associated services.

NOTES

^{1/} Archer, 1991.

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Annex 1.

List of Abbreviations

BMA	Bangkok Metropolitan Administration
CCLS	Committee for the Control of Land Subdivision
DTCP	Department of Town and Country Planning
LIF	Land Institute Foundation
NESDB	Office of the National Economic and Social Development Board
PADCO Inc	Planning and Development Collaborative International
SPURT	Seventh Plan Urban and Regional Transport Study
SOFIE	Study of Options for Financing Infrastructure Expansion
TEAM D	Thai Engineering and Management Development

Measurements and Conversions

Area	1 rai	=	1,600 m ² (0.016 ha).
Monetary	26 Baht	=	US\$ 1.00 (June, 1997)