

CURRENT SITUATION AND ISSUES ON AREA DEVELOPMENT ALONG URBAN RAILWAY IN BANGKOK

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バンコクでは、M-MAPに基づいて509Kmの都市鉄道の整備が進められているが、既にスプロールの市街地が整備されている場合が多く、我が国のような沿線開発と一体化した都市鉄道整備が出来ていない。本稿では、タイの土地所有・鉄道事業に関わる法制度、行政制度などを広くレビューし、沿線開発と一体化した都市鉄道整備が出来ない理由を明らかにする。また、沿線開発と一体化した都市鉄道整備の実施可能性、その場合に具体的に解決しなければならない課題などを議論する。

Regarding M-MAP, urban railway of 509 km is being promoted in Bangkok. Unfortunately, urban areas are being developed as sprawl. Furthermore, urban railway improvement integrated with railway development as in Japan has not been done. In this study, legal system, administrative system, etc. related to land ownership and railway business in Thailand are widely reviewed and clarified the reason why urban railway improvement which can be integrated with railway development are not be able to apply. In addition, the possibility of implementing urban railway improvement integrated with railway development, issues to be specifically solved in that case are discussed.

Key Words : *TOD, Urban Railways, Land Development*

1. INTRODUCTION

Bangkok Metropolitan Area (BMA), the capital of Thailand, is surrounded by five vicinities including Nakhon Pathom, Pathum Thani, Nonthaburi, Samut Prakan and Samut Sakhon. Bangkok and its surrounding provinces, or so-called Bangkok Metropolitan Region (BMR), cover an area of 7,758 sq.km. Traffic congestion has been one of major issues that the BMR has been facing due to the

growth of urbanization, motorization and population. Since 1960 the BMR has been gradually facing car dependency because the government policy had been focused on road-based infrastructure developments in the early periods [1]. For example, The Greater Bangkok Plan B.E.2533 (1990) and The Litchfield Plan (1960) recommended Bangkok to depend on cars followed an American style. Also, public transport services are insufficient to satisfy

the demand. Therefore, urban railway, which is one of mass transit system, has been introduced to BMR so as to alleviate traffic congestion.

Land area developments along railway corridors are significant to realize rail-based city. As known, main purpose to introducing urban railways into the auto dependent city such as BMR is to shift travel demand from automobiles to rail-based system. Unfortunately, there has not been such coordination between urban railway developments and area developments in the case of BMR. Without providing livable communities that are compact and walkable in the areas along urban railway corridors, travel demand is not found to have significantly shift from using automobiles to urban railways. In this research, the reasons why such coordination never implemented in BMR were investigated and interpreted. To achieve the goal, current situations of area developments along urban railways in BMR were captured. Also, laws and regulations, administration system, subsidy system, etc. were investigated in order to identify barriers to develop areas along railway corridors.

2. OVERVIEW OF URBAN RAILWAY DEVELOPMENT IN BANGKOK

(1) Existing Urban Railways

In the early 1970's, Thai government was first recommended to develop the plan of elevated bus system that was converted to the elevated train in the later. Fig. 1 shows the five existing lines of urban railways in Bangkok Metropolitan Region. The current network has been operated for a total distance of 108.55 km.

a) BTS Skytrain

The first elevated train, namely the Bangkok Mass Transit System (BTS Skytrain) is operated by Bangkok Mass Transit System Public Company Limited (BTSC) under 30 years' concession approved by the Bangkok Metropolitan Administration (BMA). This concession was signed between BMA and BTSC on April 9, 1992 that is the largest mass transit project to be entirely privately financed in the world .

When the BTS Skytrain started its service in 1999, it ran a total distance of 23.5 km with 2 lines: Sukhumvit Line and Silom Line. The original Sukhumvit Line served with 17 stations between Mo Chit and On Nut stations while Silom Line, which serves along the central business district (CBD) of BMR, ran between National Stadium and Saphan Taksin stations with 8 stations. The lines interchange at Siam stations.

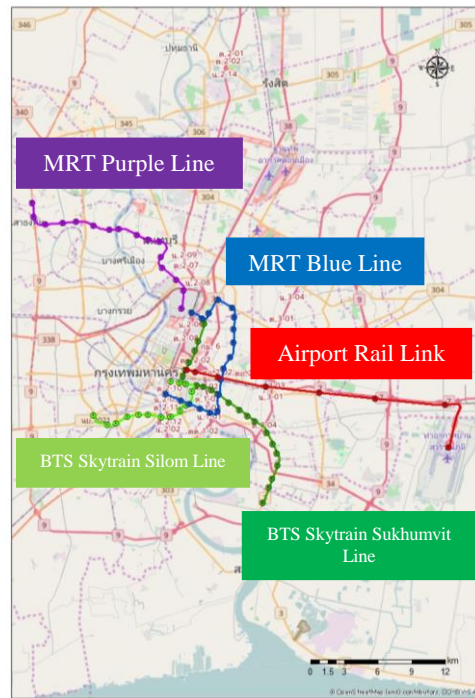


Fig. 1 Existing Urban Railway Lines in BMR

The first extension of BTS Skytrain funded by Bangkok Metropolitan Administration was began the construction on 13 December 2005 with completion expected within 2 years. BMA decided to extend 2.2 km of Silom Line from Saphan Taksin station to Wongwian Yai station. Unfortunately, some problems regarding the signaling system pushed back the schedule and the extension finally opened on 15 May 2009.

Still, the second extension of BTS Skytrain of 5.25 km from On Nut station to Bearing station was funded by BMA. It was started construction in August 2006 and opened on 12 August 2011.

The third extension of a 5.25 km with 4 stations from Wongwian Yai station to Bang Wa station began construction in 2011. However, all of 4 stations were not opened at the same time. Pho Nimit station opened on 12 January 2013 while Talat Phlu station began it services on 14 February 2013. On the other hand, the rest of 2 stations opened on 5 December 2013.

b) MRT Blue Line

The Metropolitan Rapid Transit (MRT), known as MRT Blue Line, opened in 2004 as the second mass rapid transit system in Bangkok that is operated by Bangkok Metro Public Company limited (BMCL) under 25 concession granted by the Mass Rapid Transit Authority of Thailand (MRTA). However, BMCL were not required to take responsibility for whole project as BTS Skytrain. With regard to the concession, most civil infrastructure (approximately 80%) were funded by the MRTA and the BMCL

responded around 20% including services, maintenance and operation.

When the MRT Blue Line started its service in 2004, it run a total distance of 20.8 km with 18 stations. It starts running from Bang Sue station to Hua Lamphong via Rama 9 Road, Sukhumvit Road and Rama 4 Road. Passengers can make a transfer between BTS Skytrain and MRT Blue Line at Chatchak (Mo Chit), Sukhumvit (Asok) and Silom (Sala Daeng) stations.

c) Airport Rail Link

The Airport Rail Link (ARL), known as the third mass rapid transit system, is owned by State Railway of Thailand (SRT) and operated by SRT electrified Train (SRTE), which is SRT subsidiary.

Airport Rail Link began construction in July 2005 and started its services in 2010. The ARL-System operates on the dedicated tracks on the eastern Red Line corridor of the State Railway of Thailand (SRT) parallel but elevated upon the existing SRT eastern rail services. The ARL run a total distance of 28.6 km with 8 stations. This line directly connects to downtown by serving passengers from Suvarnabhumi Airport at airport station to Phayathai station where passengers can conveniently make a transfer to BTS Skytrain Line. On the other hand, it has also interchange with the MRT Blue Line at Makkasan station, which locates on Petchaburi intersection.

d) MRT Purple Line

In August 2016, the MRT Purple Line is the fourth line of urban railway, which serves between the northwestern suburbs and southern area of BMR. On the other hand, this line is the second line operated by BEM under 30 concession granted by the Mass Rapid Transit Authority of Thailand (MRTA). The MRT Purple Line run a total distance of 20.94 km with 16 stations. Passengers can make a transfer to the MRT Blue Line at Bang Sue station.

Train depot consists of operation control center, main workshop, administration office and stabling yard for this extension locates near Khlong Bang Phai station.

(2) Under Construction

As stated above, the current network has been operated for a total distance of 108.55 km. Under construction of each line are illustrated in Fig. 2.

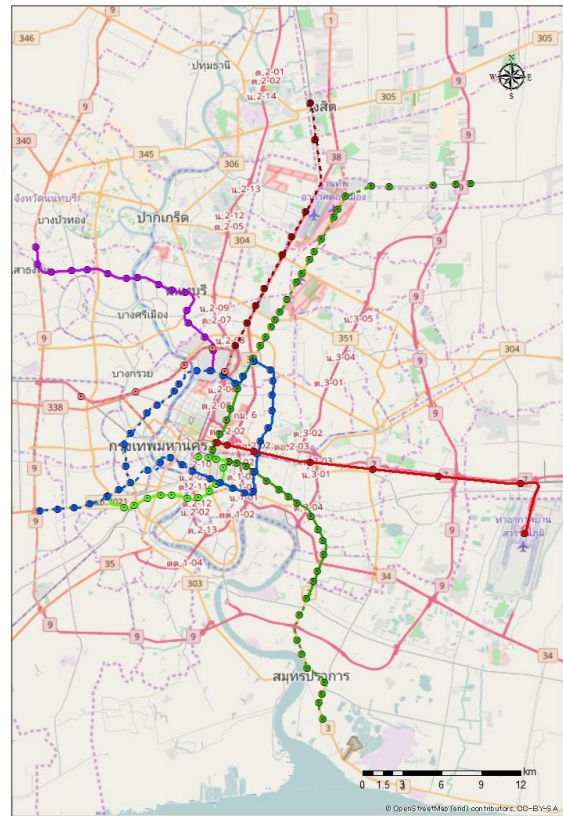


Fig. 2 Under Construction Lines

3. OVERVIEW OF STRUCTURE OF RAILWAY TRANSPORTATION

The structure of railway transportation in Thailand generally is divided into 3 levels based on roles and responsibilities including regulators, infrastructure providers and operators as illustrate in Fig. 3.

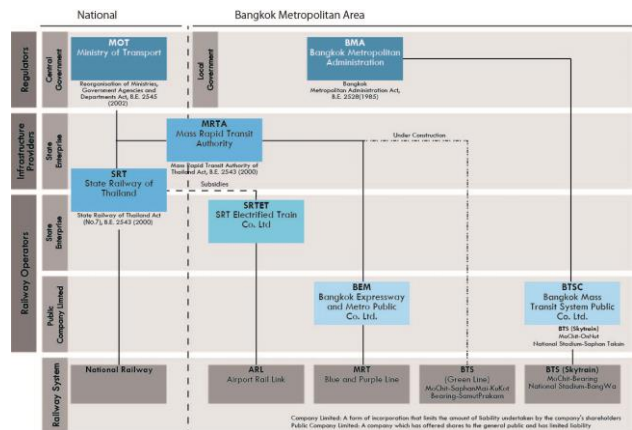


Fig. 3 Railway Transportation Structure

From the figure, there are 3 levels of railway transport structure both the National and Bangkok Metropolitan Area. As seen, regulators belong to upper level, whereas railway infrastructure providers

and operators are at the middle level and the lower level, respectively. At the national level, Ministry of Transport (MOT), the former Ministry of Communications, is the ministry of the Government of Thailand responsible for the development, construction, and regulation of the nation's land, marine, and air transportation systems. The MOT is composed of ministry departments and profit-making state enterprises. There are 2 State Enterprises under supervision of Ministry of Transport including State Railway of Thailand (SRT) and Mass Rapid Transit Authority of Thailand (MRTA).

(1) State Railway of Thailand and SRT Electrified Train Co. Ltd.

The State Railway of Thailand is the state-owned railway infrastructure and operator for the National Railway, which is the main business of this enterprise. Regarding the historical view, the SRT was founded as the Royal State Railways of Siam (RSR) in 1890. The first part of the North Line operated by the SRT was started in 1891. In 1896, the construction of the railway line from Bangkok - Nakhon Ratchasima was partly successful enough to launch. Since 1951, State Railway of Thailand (SRT) has been a Thai state enterprise by the authority of the State Railway of Thailand Act B.E. 2494 (1951).

In accordance with the State Railway of Thailand (No.7) Act B.E. 2543 (2000), Section 3: the following paragraph (10) and paragraph (11) shall be added after paragraph (9) in Section 9 of State Railway of Thailand (No.6) Act B.E. 2535 (1992). Paragraph (10) allow the SRT perform the business involving mass rapid transit and other business involving mass rapid transit. On the other hand, Paragraph (11) allow to cooperate with other companies for the benefits of the SRT.

Consequently, the SRT has become the major shareholder of SRT Electrified Train Co. Ltd. (SRTET) that has specifically responsible for Airport Rail Link (ARL) service between the downtown of Bangkok and Suvarnabhumi Airport and the other mass transit services under the supervision of SRT in the future.

(2) Mass Rapid Transit Authority of Thailand and Bangkok Expressway and Metro Public Co., Ltd.

The MRTA is providers of railway infrastructures for both Bangkok and other provinces. In accordance with the Announcement of the National Executive Council No. 290 dated 27 November 1972 was released to establish the Expressway Authority of Thailand due to construct "Expressway" consisting

of express ways and mass rapid transit System that are already proceeded by the Expressway and Rapid Transit Authority of Thailand.

The Royal Decree Establishing the Metropolitan Rapid Transit Authority B.E. 2535 (1992) was announced to establish a state enterprise under the supervision of the Office of Prime Minister to be responsible for the conduct of the Mass Rapid Transit Project in Bangkok and its vicinities. However, the Metropolitan Rapid Transit Authority has got the certain limitation to implement its legal authorities and resulting in the inflexibility and inefficiency on services.

Later, the Royal Decree Establishing the Mass Rapid Transit Authority of Thailand Act, B.E. 2543 (2000) was announced on 1 December 2000 establishing Mass Rapid Transit Authority of Thailand, with abbreviation "MRTA" in task of improving the authority and the duties of the Metropolitan Rapid Transit Authority to be able to operate the transit business more systematic and efficient.

The MRTA is under the supervision of the Office of Prime Minister and has its purposes as the following: Operate the mass rapid transit in Bangkok and its vicinity including in other provinces or between provinces in accordance with the Royal Decree.

As stated, the MRT Blue Line and Purple Line are the responsibility of the MRTA that have been operated by Bangkok Expressway and Metro Public Co., Ltd. (BEM). The BEM (the former is Bangkok Metro Public Co., Ltd.), which is only private sector company that won a bid in MRTA's concession contract, is the amalgamation between Bangkok Metro Public Co., Ltd. (BMCL) and Bangkok Expressway Public Co., Ltd. (BECL) that transferred all rights, duties, assets, liabilities, etc. to the BEM. The major shareholders are listed as below:

- ① CH Karnchang Public Co., Ltd. (29.98%)
- ② Mass Rapid Transit Authority (8.22%)
- ③ Krung Thai Asset Management Public Co., Ltd. (6.85%)

As MRTA's concessionaire, BEM provides M&E equipment, including electrical trains, signaling systems, SCADA, communication, PSD, etc. Furthermore, 5 companies are the subsidiaries of BEM.

Bangkok Metro Networks Limited (BMN), a subsidiary of the BEM, has right to operate commercial development business in the MRT stations including advertising (18 stations and 19 trains), telecommunications and retail spaces (11 stations and 1 park and ride building).

(3) Bangkok Metropolitan Administration and Bangkok Mass Transit System Public Co. Ltd.

On the other hand, Bangkok Metropolitan Administration (BMA) is organized in accordance with the BMA Act 1985 that is responsible for the management of the city of Bangkok including transport services. For many years, traffic congestion in Bangkok has been one of the main problems of the city. Therefore, a governor of Bangkok, Major General Chamlong Srimuang, announced to the public that BMA would accept any proposal from the private sector to develop from scratch the mass rapid system. The Tanayong Public Company Limited proposed and became the developer of the Thanayong Project, the former name of the BTS project.

Above mentioned, The Bangkok Mass Transit System (BTS Skytrain) is operated by Bangkok Mass Transit System Public Company Limited (BTSC) under 30 years' concession approved by the Bangkok Metropolitan Administration (BMA). This concession was signed between BMA and the Thanayong Public Company Limited, which is the former of the BTSC, on April 9, 1992 that is the largest mass transit project to be entirely privately financed in the world. Then, commercial operation of the BTS SkyTrain began in December 1999. In 2012, BTSC signed a 30-year operating & maintenance (O&M) contract covering all Green Line extensions under the purview of the Bangkok Metropolitan Administration (BMA).

4. CURRENT SITUATION AND PROBLEMS OF LAND DEVELOPMENT ALONG RAILWAY LINES IN BANGKOK

(1) Current Situation of Land Development

The theoretical concepts of land development along urban railway corridors in Bangkok are developed based on transit-oriented development (TOD) and land area readjustment. Both of them aim to share the same desire of making an environmental friendly transport system to use land resources more efficiently, reduce private vehicle trips, promote non-motorized travel, and increase transit ridership. In order to use land resources more efficiently, providing livable communities that are compact and walkable in the areas along urban railway corridors are the critical point.

a) Transit-Oriented Development (TOD)

a-1) TOD Conceptual Study of MRT Orange Line (Taling Chan – Min Buri)

The section of Taling Chan and Min Buri consists of 29 stations along 37.5 km. Most stations locate on road network while areas along the corridors are mixed of residential and commercial area. Thus, it is difficult to acquire private land lots for developing based on TOD concepts excluding Din Daeng station and MRTA Depot. In addition to Din Daeng station and MRTA Depot, there are land lots belonging to National Housing Authority that are possible to desire for TOD.

① Din Daeng Station

Land lot belonging to National Housing Authority near Din Daeng Station has divided into 7 zones as shown in Fig. 4.



Fig. 4 Seven Zones' Development Plan

② MRTA Depot

MRTA Depot located on Rama 9 Road covers an area of 562 Rai. The development plan is shown in Fig. 5.



Fig. 5 Development Plan at MRTA Depot

a-2) TOD Conceptual Study of MRT Orange Line (Taling Chan – Min Buri)

A depot of MRT Pink Line located on Ramkhamhaeng Road, which covers an area of 267 Rai, has been proposed the TOD development as follow.

- Service Apartment

- Commercial mall, Restaurants, Retail shops, Clinics and Superstores
- Office buildings
- Park & Ride

The development plan shown in Fig. 6 has performed based on the criteria as below.

- Condition 1: MRTA's subsidiary + NHA
- Condition 2: NHA leases the MRTA's subsidiary-owned land



Fig. 6 Development Plan at Min Buri Station

a-3) TOD Conceptual Study of MRT Purple Line: Khlong Bang Phai Station

A depot of MRT Purple Line, which covers an area of 14 Rai, has been proposed the TOD development as follow.

- Service Apartment
- Commercial mall, Restaurants, Retail shops, Clinics and Superstores
- Park & Ride

The development plan shown in Fig. 7 has performed based on the criteria as below.

- Condition 1: MRTA's subsidiary + NHA
- Condition 2: NHA leases the MRTA's subsidiary-owned land
- Condition 3: MRTA's subsidiary



Fig. 7 Development Plan at Khlong Bang Phai Station
a-4) TOD Conceptual Study of MRT Green Line:

Bang Phing Station

A depot of MRT Green Line, which covers an area of 18 Rai, has been proposed the TOD development as follow.

- Service Apartment
- Commercial mall, Restaurants, Retail shops, Clinics and Superstores
- Office buildings
- Park & Ride

The development plan shown in Fig. 8 has performed based on the criteria as below.

- Condition 1: MRTA's subsidiary + NHA
- Condition 2: NHA leases the MRTA's subsidiary-owned land
- Condition 3: MRTA's subsidiary



Fig. 8 Development Plan at Bang Phing Station

b) Land Area Development

In Thailand, the Department of Public Works and Town and Country Planning was asked to apply this method for making city planning under the Land Readjustment Act B.E 2547 (2004). With regard to this Act, land readjustment will be only occurred if there are being to cooperation between the private sector and the private sector or the private sector and the public sector.

Up until now, there are no any sources of land readjustment cooperation among the owners of immovable property being located along the railway transit network in Bangkok. However, we can find more than 6 approved projected for land readjustment other provinces in Thailand, including Nan, Lampang, Phisanulok, Supanburi, Yala and Narathiwat. In addition, these 6 trail projects have been launched to promoting the land readjustment system in Thailand.

Previous researches indicated that land being located nearby railway transit network has become an attractive location for various projects, e.g. residential projects, commercial projects and so on, which lead to increase land value [5].

These developments have been doing by various

private investors. In addition, real estate developers purchased land lots along the railway transit corridors and then renovated or constructed new buildings such as condominium, office building, department store, etc.

In term of land development invested by railway operator, some information shows that BTS is developing their adjacent areas along BTS Skytrain such as 4-star hotel, condominium by the same process as shown in Fig. 9. This process is not based on land readjustment system like the case of Japan because the existing and operating railway lines are being served in high density areas of Bangkok, e.g., inner city and urban fringe.

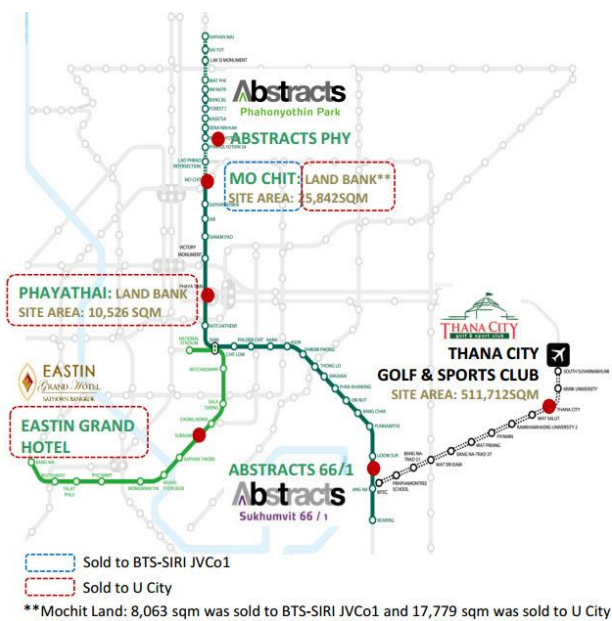


Fig. 9 Property Development of BTSC¹

(2) Problems of Land Development

As stated, private properties are acquired for constructing urban railway structures and so on such as stations, tracks, depot, etc. Therefore, each land expropriation is conducted under the provisions of Acts. In Thailand, there are two main laws govern the land acquisition, namely Expropriation of Immovable Property Act B.E. 2530 (1987) and Procurement of Immovable Property for Public Transportation Affair Act B.E. 2540 (1997). The Expropriation of Immovable Property Act B.E. 2530 (1987) deals with the project that requires the acquisition of immovable property. While, Procurement of Immovable Property for Public Transportation Affair Act B.E. 2540 (1997) is required for the use of immovable property without acquisition.

In accordance with the Expropriation of Immova-

ble Property Act B.E. 2530 (1987), the Sections for land acquisition are stated as below.

- Section 5, In the case where there is necessary for the State to acquire any immovable property for the provision of any necessary public utilities or national defenses, for the acquisition of natural resources, for town and city planning, for the development of agricultures, industries or land reforms, or for other public purposes, the Royal Decree on demarcation of the area to be expropriated is enacted to the expropriation.
- Section 6, The Royal Decree on demarcation of the area to be expropriated shall consist of the followings:
 - (1) Purposes of the expropriation;
 - (2) Expropriation officer;
 - (3) Demarcated area to be expropriated as necessary

Every land expropriation for each line, the Royal Decree on demarcation of the area to be expropriated is necessarily enacted to the expropriation as stated in the Section 5 and 6. In accordance with the Section 4 of the Royal Decree on Demarcation of the Area to be Expropriated, the immovable properties are acquired for the purposes of mass rapid transit business operation involving in the construction of mass rapid transit system, park and ride buildings and other business involving mass rapid transit.

As explained above, immovable properties in the area to be expropriated is only for specific purposes, meaning that, MRTA is probably not able to use these properties for other purposes that were not indicated in the Royal Decree such as practicing business even if these benefits will be returned to the government later. Furthermore, the number of properties being subjected to expropriation must generate impacts on communities as few as possible.

On the other hand, the stations of BTS Skytrain and ARL are probably able to do such business. This reason because their construction was done on land lots belonging to BMA and SRT.

On the top of that, it can be claimed that Acts and Royal Decrees aim to procure land for public purposes by both acquisition and without acquisition depending on each case. However, these Acts and Royal Decrees do not seem to be related to the land acquisition for land area development along urban railway corridors.

(3) Land and Building Tax Law

Comparing the taxation system related to land in Thailand with Japan, in Thailand, property tax for land and buildings for residential property is tax exempted, inheritance tax and tax on profit on sale

¹<http://www.btsgroup.co.th/>

are extremely lower than in Japan. As a result, there are many large landowners even now, there is almost no need to sell the land at the time of inheritance, the liquidity of the land is very low, there is a situation that the supply of land does not proceed.

Nowadays, there are plans in the Thai government for a new property tax law that will replace the current building and land tax and local land tax. The new tax system is presented in Fig. 10.

1		Ceiling tax rate 0.2%		
Agriculture	Asset value	Tax rate	Annual tax burdens	
	≤ 50 Mn. baht	Exempted	-	
	> 50-100 Mn. baht	0.05%	25-50 thousand baht	
			100 thousand baht	
			100 thousand baht	
2		Ceiling tax rate 0.5%		
Residential	Asset value	Tax rate	Annual tax burdens	
	≤ 5 Mn. baht	0.03%	1.5 thousand baht	
	> 5-10 Mn. baht	0.05%	2.5-5 thousand baht	
			10 thousand baht	
			10 thousand baht	
3		Ceiling tax rate 2.0%		
Commercial and Industrial	Asset value	Tax rate	Annual tax burdens	
	≤ 20 Mn. baht	0.3%	60 thousand baht	
	> 20-50 Mn. baht	0.5%	100-250 thousand baht	
			350-700 thousand baht	
			350-700 thousand baht	
4		Ceiling tax rate 5.0%		
Un-utilized land	If a land remains un-utilization: tax rate will be increased 0.5% every 3 years			
	Year 1-3	2.0%	Year 10-12	3.5%
	Year 4-6	2.5%	Year 13-15	4.0%
	Year 7-9	3.0%	Year 16-18	4.5%
			Year 19-21	5.0%

Source: EIC analysis based on data from the Ministry of Finance (last updated March 21st, 2017)

Fig. 10 New tax system in Thailand²

5. POSSIBILITY OF LAND DEVELOPMENT ALONG RAILWAY LINES IN BANGKOK

As stated in previous chapter, the theoretical concepts of land development along railway lines in Bangkok are developed based on transit-oriented development (TOD) and land area readjustment, which large areas of land are needed. Thus, current situation of total of vacant land along the railway lines that were proposed for land are development projects will be observed.

(1) Current Situation of Vacant Land Lots along Railway Lines in Bangkok

Based on the TOD Conceptual Study, the total number of vacant land areas along 3 lines of MRTs including MRT Orange Line, Pink Line and Yellow Line were observed as shown in Fig. 11 to Fig. 13.

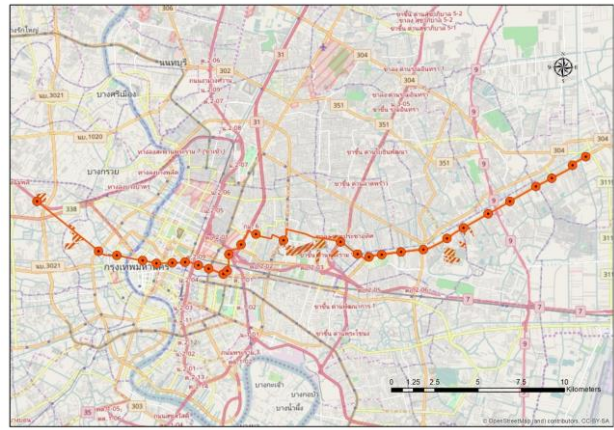


Fig. 11 Vacant Land along MRT Orange Line

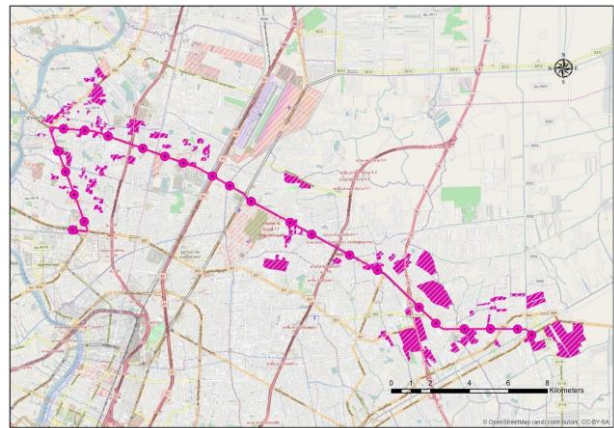


Fig. 12 Vacant Land along MRT Pink Line

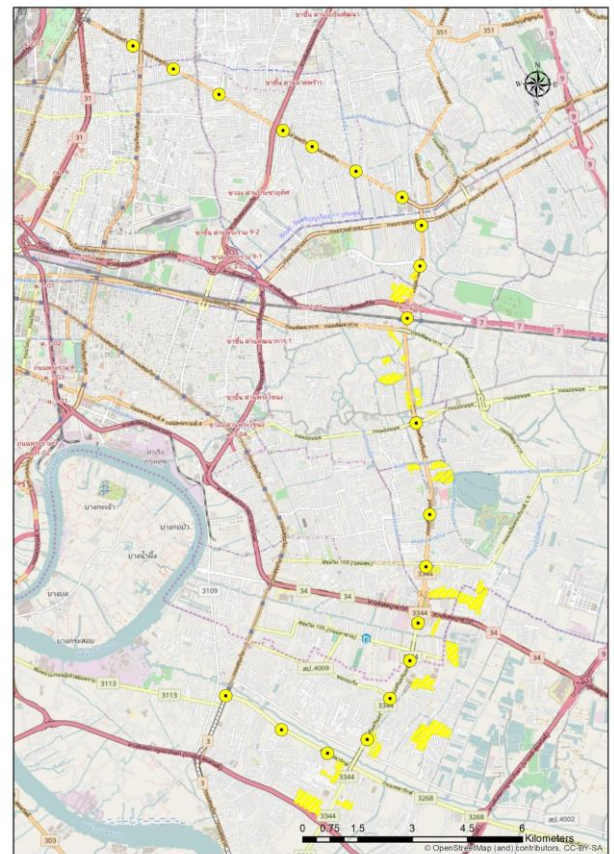


Fig. 13 Vacant Land along MRT Yellow Line

²https://www.scbeic.com/en/detail/file/product/3443/ep2v3crl17/Note_EN_land-and-building-tax_20170419.pdf

The largest parcel of each line is presented as below.

- MRT Orange Line: 0.608 sq.km near Thailand Cultural Centre Station
- MRT Pink Line: 1.330 sq.km near Khannayao Station
- MRT Yellow Line: 0.450 sq.km near Sri Bearing Station

In addition, there are 2 pieces of vacant land locating near stations of the MRT Pink Line that sizes are larger than 1 sq.km. From the figures, areas along the 3 corridors have been urbanized especially MRT Orange Line and MRT Yellow Line. Thus, it is impossible to secure vacant lands for the large scale of land area development projects.

(2) Possibility of Land Development along Railway Lines in Bangkok

In order to improve the accessibility to the railway lines, it is thought to promote the land readjustment project based on the Land Readjustment Law 9) established in Thailand in 2004 along the line that has already been developed. Until now, there are no examples of land readjustment projects in the target area and as mentioned above. There is one project under planning for MRT Purple Line, so the analyze of current situation is impossible. Therefore, the results of the intention survey about the land readjustment project along the PL conducted in the past are shown. In this result, about 60% of residents agreed to implement and the percentage of inhabitants who expressed intention to participate in the association was relatively high, 40% on average. There are many problems for concrete implementation.

6. CONCLUSIONS

In this study, the development of public transpor-

tation has begun in the suburbs of the city in Bangkok, Thailand. However, that development of land along the railway line has not progressed, as well as the low liquidity of the land. It is pointed out that land use restrictions are weak and subdivision development is carried out.

On the other hand, from an institutional viewpoint, railway operators cannot develop in the land that was exported for the railway business. Although development by NHA and related real estate companies etc. has also been planned and implemented. It pointed out that its scale is very limited and has not been developed along railway lines.

Since urbanization has already proceeded along these lines, he stated that it is a realistic policy to implement land rebuilding projects and improve them.

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