Thailand

Ramindra – At Narong Expressway Construction Project (I) (II)

Report Date: January 2003

Field Survey: December 2002

1. Project Profile and Japan's ODA Loan

Project site: Bangkok

Ramindra – At Narong Expressway

1.1 Background

The percentage coverage of the road network[1] in the Thai capital, Bangkok, is extremely low as compared to other global capitals, moreover, in qualitative terms the network has heterogeneous defects; the width and grade of the roads lacks continuity, there are instances where the shape and positioning of interchanges is inappropriate, and there are zones in which the road density is exceptionally low. In consequence, economic growth, population increases, and the surge in private car traffic has led to increasingly severe traffic congestion in the Bangkok Metropolitan Region(BMR)[2], constraining urban functions in various ways.

The northern region of Bangkok metropolis[3] have witnessed particularly marked population growth relative to the metropolitan region as a whole and by 2007, it is predicted that a third of the city's population will reside in this regions. However, despite a surge in vehicle ownership there are few north-south routes linking this region with the center of the city, and the businesses located between Bang Pa In and Rangsit in northern Bangkok, which transport goods into and out of Klong Toey Port in the south, are recognized to be contributing to traffic congestion.

1.2 Objectives

To meet increased traffic demand accompanying population growth in Bangkok metropolis in the northeast and to ease north-south traffic congestion, the project aimed to expand the north-south

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[1] Road coverage percentage = road surface area/administrative land area × 100 (%)

[2] A region including the areas of Nonthaburi, Samut Prakarn, Samut Sakorn, Phathumthani, and Nakhorn Pathom, plus the Bangkok special zones.

[3] Huai Khwang, Din Daeng, Klong Toey, Wattana, Bang Na, Phrakanong, Suan Luang, Prawet, Chatuchak, Bang Khen, Sai Mai, Laksi, Don Muang, Bang Kapi, Wang Thonglang, Lat Phrao, Bung Kun, Saphan Sung Khan Na Yao (administrative districts as of December 2002)

expressway network as far as the northeast region.

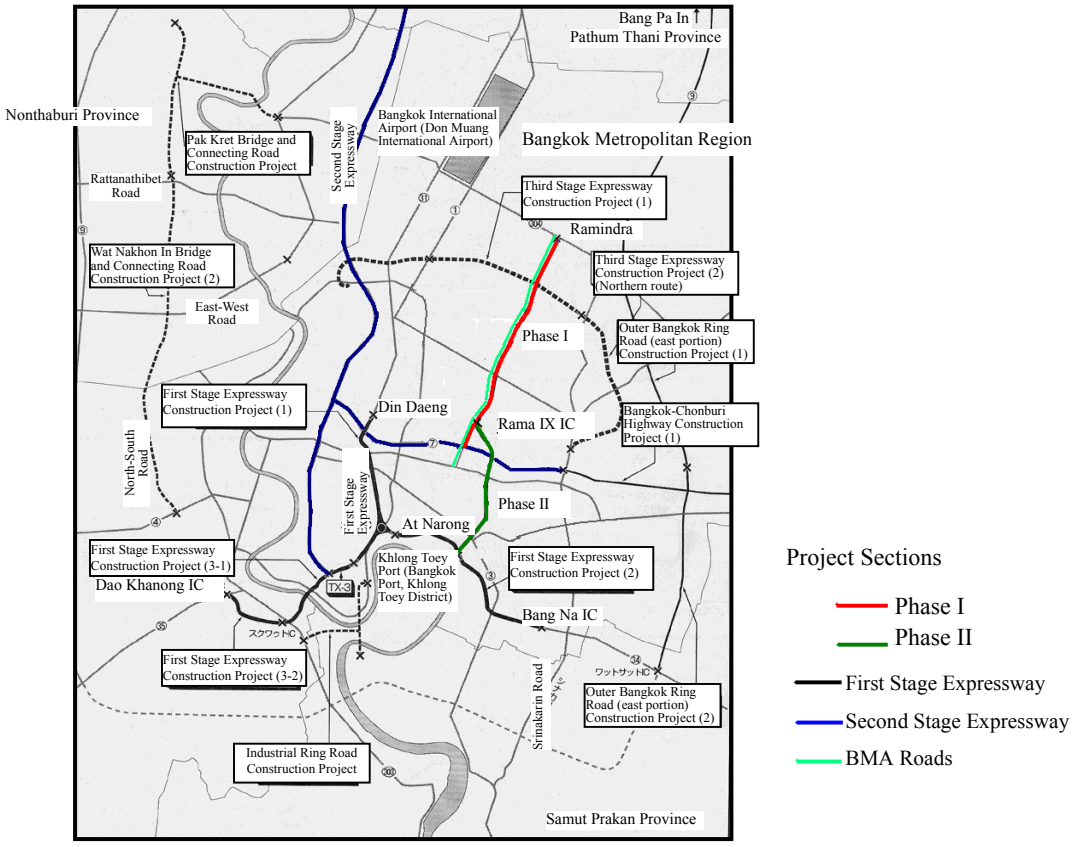
1.3 Project Scope

The project comprised the construction of a toll-expressway linking central Bangkok and the northeast of the city that would connect with the First Stage Expressway and the Second Stage Expressway, forming part of the expressway network. It was implemented in two phases, the first covering the section between Ramindra and the Rama IX Interchange, the second that between the Rama IX Interchange and At Narong. The yen loan provided for all foreign currency costs in Phase I, and all foreign currency costs, all local currency costs for consulting services and part of the civil engineering works costs in Phase II.

Table 1: Full Project Outline

Item	Phase I	Phase II
(1) Expressway (toll)	Section: Ramindra-Rama IX Interchange Extension: 11.5km No. of lanes: 6	Section: Rama IX Interchange-At Narong Extension: 7.2km No. of lanes: 6
(2) Interchanges	1	2
(3) Slip ramps	4	3
(4) Consulting services	Tender evaluation assistance and construction supervision	

Figure 1: Bangkok Expressways



1.4 Borrower/Executing Agency

Expressway and Rapid Transit Authority of Thailand (ETA)

1.5 Outline of Loan Agreement

Item	Phase I	Phase II
Loan Amount Loan Disbursed Amount	14,804 million yen 10,493 million yen	21,850 million yen 15,388 million yen
Exchange of Notes Loan Agreement	August 1991 September 1991	December 1992 January 1993
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	3.0% 25 years (7 years) General untied	
Final Disbursement Date	January 1998	May 2000

2. Results and Evaluation

2.1 Relevance

At appraisal, the Thai government had formulated measures to alleviate traffic congestion and was prioritizing the road sector as an important means of promoting regional economies and of contributing to export promotion under the Sixth National Economic and Social Development Plan (1987-1991), thus the project was relevant in that it was consistent with national policy.

Between 1982 and 1988, the population in the target region grew at an average rate of 5.2% per annum, which was well above the 1.6% growth rate for the metropolitan region, and average annual increases in vehicle registration, at 17.2%, were also exceptionally high leading to forecasts for future traffic congestion. Accordingly, the planned construction, which would expand roads within a low-density 10km mesh[4], was compatible with these growing needs.

Although it was anticipated that the project would meet these needs, it has not fully functioned in achieving this end, thus at this stage it would be difficult to judge that the plans were highly relevant. Two reasons may be cited in this connection. In the first instance, Bangkok Metropolitan Administration (BMA) applied expressway grade[5] to the toll-free side road that was constructed concurrently with and parallel to the section constructed under Phase I of this project, which had a major affect on the project's outcome[6]. In the second instance, the northern end of the section was not linked to another expressway but to the Ramindra Road, which has a relatively high traffic

[4] A region divided into grids at fixed intervals.
[5] Planned to have "6 lanes and 1 elevated interchange out of a total 3", later revised to "2 elevated interchanges".
[6] According to ETA and BMA, problems acquiring land for the potential route (4-4.5km) of the Ekamai-Ramindra Road (a BMA road), which was planned in 1979, resulted in a 1986 Cabinet decision establishing the final route on a 5.5km area (the current position) where land was relatively easy to acquire. With the plans to construct the Ramindra-At Narong expressway along the same route, the Ekamai-Ramindra road was then positioned as a side road. In 1989, instead of the Thai government absorbing the costs of land acquisition, the Cabinet passed a resolution appointing ETA as the executing agency charged with the implementation of everything from land acquisition through construction management, inclusive of the BMA side road. BMA shouldered the construction costs for the side road.

density, thus the use of the project road yielded only limited travel time savings[7].

With regard to the first reason, had the respective executing agencies sufficiently coordinated their respective plans, it is believed that the plans for this project could have been modified. With the second issue, it is perceived that a network, that encompasses the entire metropolitan road system, has to be established[8].

2.2 Efficiency

2.2.1 Project Scope

The project scope comprised construction of an 18.7km toll-expressway between Ramindra and At Narong, construction of interchanges and slip ramps and the provision of consulting services, and was divided into two phases with both being implemented essentially as per the plans.

2.2.2 Implementation Schedule

Phase I appraisal plans (March 1991) envisaged the total implementation schedule (from consultant selection through Phase II completion) to span 52 months between May 1991 and September 1995, however, as a result of the Phase II appraisal (January 1993), this was revised to 61 months, with completion scheduled for June 1996.

Consultant selection actually took place in August 1992. Under the initial plans the expressway was to be opened to traffic upon completion, but the route was actually opened with part of the work still incomplete in October 1996. This would indicate delays of several months as compared to the Phase II appraisal plans, however, according to ETA, the delays may be attributed to hold-ups in consultant selection procedures and the time needed for land acquisition.

Consultants were initially to be selected via direct contracting, however, general competitive bidding was undertaken with the aim of appointing a contractor with greater technical capacity, and this necessitated time-consuming preliminary screening. Moreover, revisions to the Act on Expropriation of Immovable Property caused a surge in land acquisition costs leading to difficulties in fund procurement, and rendering it necessary to respond to complaints filed by deed holders against unacceptable levels of compensation.

These factors combined to push back the opening of the expressway by several months and work was finally completed in April 2000, i.e. an increase of 40 months on the Phase I plans and of 31 months on the Phase II plans. The major delays between the opening of the route to traffic and actual

[7] There are plans to build an expressway (9.5km) linking the Ramindraa-Atnarong route with the Eastern Outer Ring Road. A 1997 F/S projected that this extension would increase traffic on the Ramindra-At Narong route to 52,448 vehicles/day (2011) and it was anticipated that the role of the project would increase upon completion of the extension. However, although ETA's 2002 plans envisage land acquisition to commence in 2007 and for construction to be completed in 2011, priority has in fact been assigned to the Third Stage Expressway, a Mega Project, and the construction start date has yet to be determined.

[8] At appraisal, national/provincial roads, local roads, municipal roads, and expressways were respectively under the jurisdiction of the Department of Highways of the Ministry of Transport and Communications, the Public Works Department of the Ministry of Interior, BMA and ETA, and there was no organization or master plan serving to coordinate the activities of the respective bodies. The Office of the Commission for the Management of Land Traffic (OCMLT) was subsequently established in 1992.

completion of the work were caused by hold-ups in the construction of the Rama IX Interchange. These can predominantly be attributed to protracted negotiations with Bangkok Expressway Co., Ltd. (BECL)[9] regarding the defrayal of construction costs for the ramp that was to connect with the Second Stage Expressway[10]. The extension (Section D) to the Second Stage Expressway was finally completed in March 2000, with the link being completed in April of the same year.

2.2.3 Project Cost

Under Phase I appraisal plans, total project costs were set at 74,048 million yen (Phase I: 37,971 million yen; Phase II: 36,077 million yen) with the yen loan to cover 28,973 million yen, i.e. all foreign currency costs or approximately 39.1% (Phase I: 14,804 million yen; Phase II: 14,169 million yen) and the remaining 45,075 million yen to be covered by the Thai budget. However, changes to the methods of evaluating the land acquisition costs and compensation in June 1991[11] pushed costs up, with the result that project costs were revised to a total of 98,343 million yen (Phase I: 46,286 million yen; Phase II: 52,057 million yen) with the yen loan to cover approximately 37.3% or 36,654 million yen (foreign currency portion: 27,524 million yen; local currency portion: 9,130 million yen) and the remaining 61,689 million yen to be shouldered by the Thai side.

Total project costs actually amounted to 162,851 million yen, with the yen loan covering approximately 15.3% or 25,853 million yen (Phase I: 10,481 million yen; Phase II: 15,372 million yen) and 136,998 million yen being defrayed by the Thai side. The yen loan was used to pay all foreign currency costs during Phases I and II. The huge overrun relative to the Phase II appraisal was predominantly the result of the surge in land acquisition and compensation costs. These costs escalated from the 43,634 million yen (8,556 million baht) planned at Phase II appraisal, to 125,037 million yen (24,000 million baht). Moreover, although it was not possible to confirm whether the portion of costs for the construction of the BMA road had been excluded from the final figure, even with the BMA portion included the initial projection was for 81,597 million yen (16,000 million baht), thus there is no question that this was the primary cause of the cost overrun.

As the above demonstrates, given that project implementation was subject to major delays and the burden of land acquisition costs increased excessively, it would be difficult to aver that the project had a high overall level of efficiency.

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[9] BECL is a private company that operates the Second Stage Expressway under the Build Operate Transfer (BOT) system. BECL shoulders the costs of construction and operation and shares any profits with ETA.

[10] According to BECL they had no prior knowledge of the plans to connect the road and thus no obligation to defray the cost. Strong calls from ETA resulted in their ultimately shouldering part of the cost of the ramp. In exchange, ETA forfeited its share of the profits from the Second Stage Expressway (Section D).

[11] With economic development being accompanied by a surge in land prices in the Bangkok Metropolitan Region, there was a huge gap between the existing ratable value for property taxes, used as the basis for land and compensation calculations, and current market prices, which was hindering land acquisition negotiations. This led to the revision of the Act on Expropriation of Immovable property in 1991 under which current market prices were to be employed as the basis for calculating the value of land to be acquired.

2.3 Effectiveness

2.3.1 Meeting Increased Traffic Demand in the Northeast Regions

As Table 2 illustrates, at 0.91%, average annual population growth in the target region between 1995 and 2001 surpassed that for BMR at 0.36%, and since 1998, residency in the region has amounted to around 40% of the total metropolitan population. During the same period, vehicle registration in BMR grew at an average rate of 6.09% per annum, thus traffic demand is increasing in line with initial predictions.

Table 2: Population in Target Areas (19 administrative districts)

(Unit: people)

District	1995	1996	1997	1998	1999	2000	2001	7-year average
Target region total	2,183,142	2,210,074	2,239,986	2,262,808	2,280,013	2,291,403	2,321,533	2,255,566
Increase (%)	0.20	1.23	1.35	1.02	0.76	0.50	1.31	0.91
BMR population	5,570,743	5,584,963	5,604,772	5,647,799	5,662,499	5,680,380	5,726,203	5,639,623
Increase (%)	(0.24)	0.26	0.35	0.77	0.26	0.32	0.81	0.36
Rate for target region (%)	39.19	39.57	39.97	40.07	40.27	40.34	40.54	39.99

Source: Bureau of Registration Administration, Department of Local Administration, Ministry of Interior

Table 3: Vehicle Registration Numbers

(Unit: vehicles)

Vehicle Registration	1995	1996	1997	1998	1999	2000	2001	7-year average
BMR	3,241,081	3,549,082	3,872,327	4,016,594	4,162,846	4,496,618	4,464,158	3,971,815
Increase (%)	9.38	9.50	9.11	3.73	3.64	8.02	-0.72	6.09
New registrations	106,901	111,143	98,214	34,087	50,664	-	299433	-

Source: The Department of Land Transport, Ministry of Transport and Communications

Annual Average Daily Traffic (AADT) volumes for the project are shown in Table 4. The actual figure for 1997, the year after the road was opened to traffic, was 51,682 vehicles/day, or 48% of the ETA (Technical and Planning Division) 1992 target forecast of 107,631 vehicles/day. From 1998, the impact of the economic crisis also served to depress the figure to between 30-39% of the target level, but there have been signs of a pick up since 2001. The result for 2002 was 56,480 vehicles/day, i.e. an achievement rate of 41.5%. According to ETA data, the 1997 Volume to Capacity ratio (V/C) in the Ramindra-At Narong direction was set at 0.23 and in the At Narong-Ramindra direction at 0.15. These figures were set on the assumption that the completion and opening to traffic of the road

would occur simultaneously, however, the road was actually opened to traffic partially incomplete in 1996, and although the preconditions were not identical since work was finally completed in 2000, there is no denying the low level of the results. As this demonstrates, the project has failed to meet growth in population and traffic demand, thus it cannot be said to be contributing in any major way to the initially conceived objectives.

The primary reason for the lack of growth in traffic volumes is the existence of the BMA side road (completed in February 1997) that was constructed in conjunction with the project expressway. Traffic volumes on the side road were 97,307 vehicles per 12 hours (8,109 vehicles/hour) in 1998 and 164,016 vehicles per 12 hours (13,668 vehicles/hour) in 2001, which represents a substantial difference to the figures for the project road, i.e. 50,833 vehicles per 24 hours (2,118 vehicles/hour) in 1998, 48,820 vehicles per 24 hours (2,034 vehicles/hour) in 2001. As mentioned earlier, the section of the side road constructed during Phase I had six lanes, with two of the three interchanges being elevated. Traveling the rival section on the project road (11.5km) shaves around 10 minutes off the trip during peak hours and around 5 minutes off peak and costs 30 baht (toll). With these results, it is believed that the amount road users are willing to pay is less than 30 baht and that they use the toll-free road instead. Further, road users appear to recognize other roads[12] as being rival routes. According to a survey of 78 project road users who regularly use roads in the area, 64% of respondents use the project road twice a week or less, against no more than 22% using it at least five times a week.

Table 4: AADT on the Ramindra – At Narong Route

(Unit: vehicles/day)

	1996	1997	1998	1999	2000	2001	2002
Planned	102,693	107,631	112,807	118,232	123,918	129,877	136,123
Actual	14,318	51,682	50,833	38,702	37,674	48,820	56,480
Ratio to plan (%)	13.94	48.02	45.06	32.73	30.40	37.59	41.49

Source: ETA

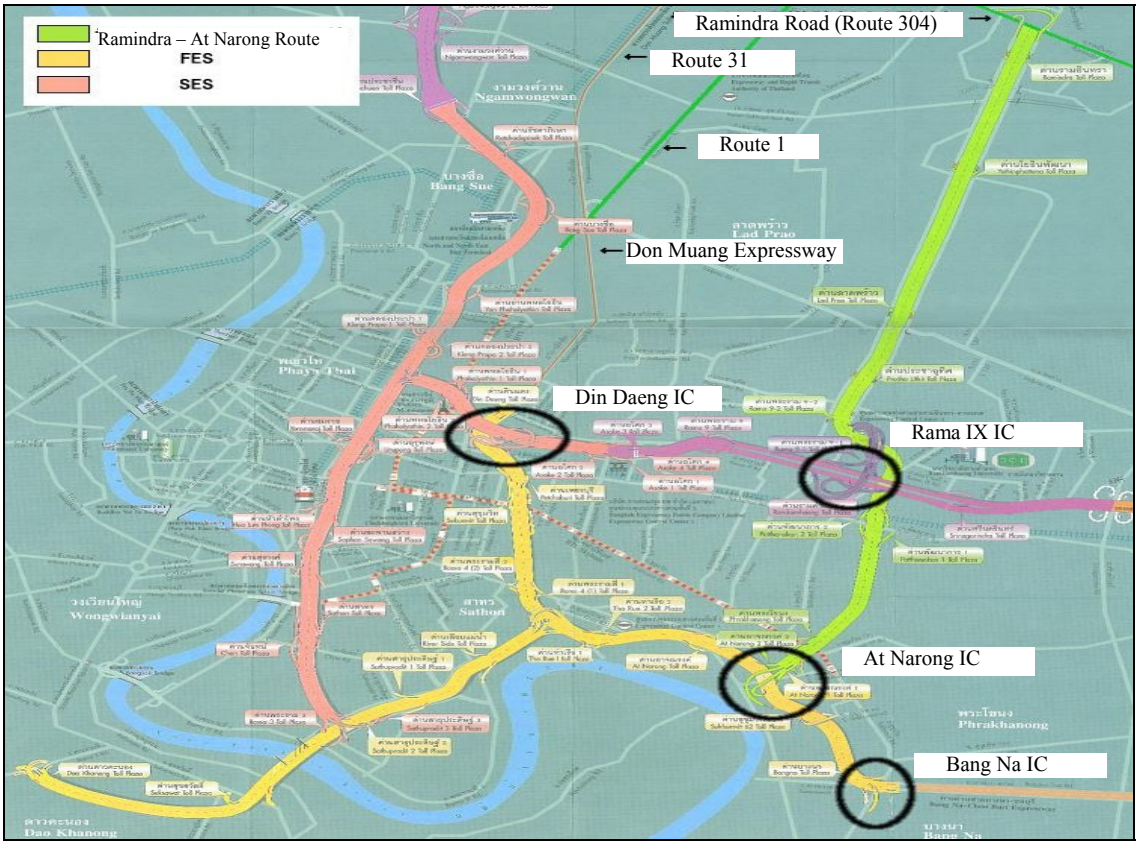
Note 1): 1996 results are the total of the June-December period for the Phase I section and the October-December period for the Phase II section.

The tolls are another problem. Under an agreement with BECL, drivers traveling onto either the First Stage Expressway (yellow line in Fig. 2) or the Second Stage Expressway (purple and pink lines) from the project road (lime green line) are obliged to pay a separate toll. For example, a driver using the project road and the Second Stage Expressway to travel from the Ramindra Road to the Din Daeng area would pay a toll of 95 baht as against a toll of 30 baht on the Don Muang Expressway. Again, using the project road, the First Stage Expressway and the Second Stage

[12] The Don Muang Expressway (28.1km), the Second Stage Expressway (38.5km; 1993), the Bang Pa In – Pak Kret Expressway (32km; 1998), and the Eastern Outer Ring Road (62km; 1999) have been developed.

Expressway to travel between Din Daeng and Bang Na costs 135 baht as compared to 40 baht for solo use of the First Stage Expressway, i.e. using the project road costs upwards of three times more on both routes. Moreover, the project road is also more expensive per kilometer at 3 baht, as against 1 baht on the Eastern Outer Ring Road.

Figure 3: Bangkok Expressway Network



2.3.2 Easing Traffic Congestion on North-South Roads in Bangkok Metropolitan Region

Congestion conditions between 1995 and 2001 on the following seven routes of the main traffic arteries and northeast trunk roads are as shown in Table 6.

① Route 1 (Bang Pa In-Rangsit: Bang Pa In-Rangsit Road)

② Route 1 (Rangsit-Bangkok: Phahonyothin Road)

③ Route 31 (Rangsit-Viphavadi: Viphavadi-Rangsit Road)

④ Route 304 (Ramindra Road)

⑤ Route 3202 (Ramindra-Lad Phrao: Sukhaphiban 1 Road)

⑥ Route 3278 (Minburi-Lad Phrao: Sukhaphiban 2 Road)

⑦ Second Stage Expressway

Since the project road was opened to traffic, overall AADT volumes on the main traffic arteries (① ② ③) have been trending upwards. The V/C ratio between Bang Pa In and Rangsit Road

increased from 0.921 in 1997 to 1.250 in 2001, and on the Phahonyothin Road from 0.665 to 0.726; i.e. traffic conditions are deteriorating on both roads. Given that the Department of Highways (DOH) considers a V/C ratio in excess of 0.8 to indicate “congestion”, the Bang Pa In-Rangsit Road can be considered severely congested. Meanwhile, although there has been no serious traffic congestion on the trunk roads contiguous to the project region (④⑤⑥), recent development in the region has reportedly been accompanied by growth in traffic volumes. Specifically, traffic on the Ramindra Road increased from 39,290 vehicles in 1999 to 116,731 vehicle in 2000, or a year-on-year increase of 192%.

As the above indicates, congestion on trunk roads in the Bangkok Metropolitan Region has not been alleviated to the extent initially anticipated, and it is believed that it will be necessary to wait for the formation of an expressway network before this level of congestion can be eased.

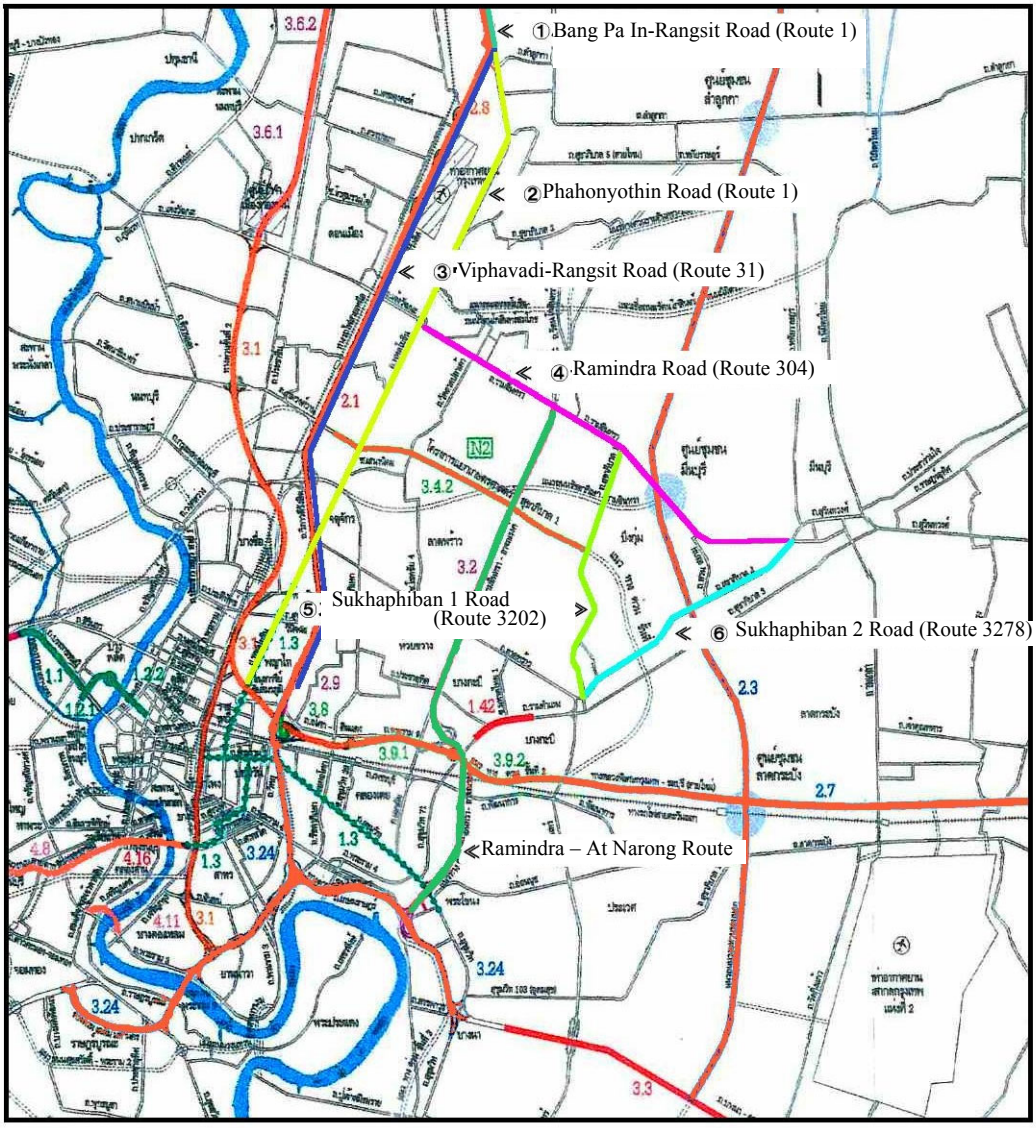


Table 6: Traffic Volumes on Major North-South Arteries in Bangkok Metropolitan Region

(Unit: vehicles/day)

Trunk Road		1995	1996	1997	1998	1999	2000	2001
①	Vehicles	150,386	164,063	188,295	215,313	241,833	267,923	293,637
	V/C	-	0.836	0.921	1.011	1.095	1.175	1.250
②	Vehicles	64,877	70,824	72,584	75,398	77,836	79,987	81,911
	V/C	-	0.653	0.665	0.684	0.700	0.714	0.726
③	Vehicles	237,864	237,864	233,402	-	175,496	198,513	242,486
④	Vehicles	44,840	33,518	-	-	39,290	116,731	102,799
⑤	Vehicles	44,468	54,917	-	-	58,528	60,508	75,279
⑥	Vehicles	17,374	28,459	-	-	32,807	21,358	31,773
⑦	Vehicles	-	153,190	281,728	279,233	138,258	208,683	220,169

Source: DOH, ETA (traffic volumes for ⑦ only)

Note 1): V/C ratios for ③④⑤⑥ or ⑦. are unavailable.

2.3.3 Recalculation of Economic Internal Rate of Return (EIRR)

At appraisal the EIRR was calculated to be 15.6% based on a project life of 30 years, costs comprising construction, consulting service, and maintenance costs, and benefits comprising driving expensest and transport time savings.

Since, during this survey, it was not possible to obtain the necessary data to calculate benefits under the same assumptions as used at appraisal, the following method of recalculation was attempted even though it is not feasible to make a simple comparison with the results of the appraisal calculation. The planned and actual figures for construction, consulting services, and maintenance costs obtained from ETA were converted to economic costs. For benefits, in the first instance actual traffic volumes for 1996-2000 were compared with appraisal projections to obtain forecasts for future traffic volumes, which were then used as the base for calculating driving expenses and transport time savings. The driving expenses saving benefit was assumed to be a speed of 70.56-75.65km/h in the case of project implementation and a speed of 48km/h in the case on non-implementation. The transport time saving benefit was calculated as the difference between a time value of money of 56.8 baht per person (1998) set on the assumption of 2.07 passengers per vehicle and the cost in the case of non-implementation. The resulting EIRR was 2.34%.

2.3.4 Calculation of Financial Internal Rate of Return (FIRR)

At appraisal the FIRR was calculated to be 11.1% based on costs comprising construction, consulting service, and maintenance costs, and benefits comprising revenue from tolls. Similarly, the FIRR was calculated during this survey based on data obtained from the executing agency on construction, consulting service, maintenance and land acquisition costs. In calculating benefit,

actual traffic volumes were used as the basis for calculating future toll revenue on the assumption that traffic volumes would increase progressively until the road reached capacity. The resulting FIRR was a minus figure.

2.4 Impact

2.4.1 Promoting Domestic and Export Industries in North and Northeastern Districts of Bangkok Metropolitan Region

Although not expressly anticipated at the time of appraisal, one of the project's impacts has been to promote domestic and export industries in north and northeastern districts of the Bangkok Metropolitan Region. In interviews with export companies located in the Rangsit, Nava Nakorn, and Bang Pa In Industrial Parks in northern Bangkok, many of those questioned stated that they felt the project road had played a minor role as a goods transport route for companies in the north of the city, thus the project's contribution has been limited. However, as Tables 7 and 8 evidence, in the Bang Khen, Bang Kapi and Lat Phrao areas contiguous to the phase I section incontrovertible changes have been observed in populations and plant numbers. Nevertheless, given the low goal attainment rate of the project, it may be said that it has had limited effect on these factors.

Table 7: Populations in the Three Northeastern Zones

(Unit: people)

District	1995	1996	1997	1998	1999	2000	2001
Bang Khen	302,953	311,766	365,321	377,995	386,308	393,591	404,042
Bang Kapi	280,988	284,935	309,788	315,895	320,539	323,694	329,730
Lat Phrao	135,128	138,467	105,158	106,704	107,372	108,125	109,619
3 zone total	719,069	735,168	780,267	800,594	814,219	825,410	843,391
3 zone increase rate (%)	-	2.24	6.13	2.61	1.70	1.37	2.18
Increase rate in project zones	0.20	1.23	1.35	1.02	0.76	0.50	1.31
BMR population	5,570,743	5,584,963	5,604,772	5,647,799	5,662,499	5,680,380	5,726,203
BMR increase rate	(0.24)	0.26	0.35	0.77	0.26	0.32	0.81
3 zone percentage	12.91	13.16	13.92	14.18	14.38	14.53	14.73

Source: Bureau of Registration Administration, Department of Local Administration, Ministry of Interior

Note 1): The Bang Khen and Bang Kapi zones have been separated since 1998, however, the table was compiled on the basis of pre-1997 administrative districts.

Table 8: Plant Numbers in the Three Northeastern Zones

(Unit: buildings)

District	1995	1996	1998	1999	2000	2001
Bang Kapi	515	526	585	667	655	630
Lat Phrao	184	206	212	227	245	234
Bang Khen	148	165	333	400	415	416
Total	847	897	1,130	1,294	1,315	1,280
3 zone increase rate (%)	-5.26	5.90	25.98	14.51	1.62	-2.66
Bangkok Special Zone (BSZ) total	17,236	17,855	18,120	21,147	21,026	20,207
BSZ increase rate	-12	3.59	1.48	16.71	-0.57	-3.90
3 zone percentage	4.91	5.02	6.24	6.12	6.25	6.33

Source: Bureau of Registration Administration, Department of Local Administration, Ministry of Interior
Note 1): No data exists for 1997.

2.4.2 Promotion of Urban Development

An incidental impact of the project has been to promote urban development in the cities peripheral to the northern region. Until the early 1990s, both the Minburi and Nong Chok districts were agrarian areas with relatively small populations, since 1996, however, the private sector and municipal authorities have been promoting development in these areas[13]. Aside from the impact of the Ramindra-At Narong route, the completion of the BMA side road and the Eastern Outer Ring Road, is believed to have improved the accessibility of these areas to a considerable extent. According to BMA, since the city planning act[14] has not been adequately implemented, development in Bangkok has progressed spontaneously alongside the roads that fan out to the northeast of the city from the right-hand bank of the Chao Phraya River. The urban development in Minburi and Nong Chok represents a similar phenomenon.

2.4.3 Socioeconomic Impacts

2.4.3.1 Relocation / Compensation of Residents

The implementation of this project involved the acquisition of 2,621 blocks of land (Phase I: 1,780 blocks[15]; Phase II: 841 blocks), with 2,746 houses (Phase I: 1,646[16]; Phase II: 1,100) and 2,829 residents (Phase I: 1,666[17]; Phase II: 1,163) receiving compensation. All processes from land acquisition through relocation/compensation were conducted in conformity with the Act on Expropriation of Immovable Property (1990).

[13] 1996 Sub-Center Plan, Minburi/Lam Ban Ta Poo Land Readjustment Project, J1 Road Plan, etc.
[14] 1975 Town Planning Act, 1992 Bangkok City Planning Act, 1999 Bangkok City Planning Act Revision.
[15] Including the BMA side road.
[16] As above.
[17] As above.

2.4.3.2 Environmental Impacts

Observed data from noise, vibration and air pollution monitoring undertaken at five sites[18] are as shown in Table 9. All figures are below the thresholds stipulated by the Pollution Control Department of the Ministry of Natural Resources and Environment, and at present any impact on the environment is limited. In view of the fact that the burden on the environment is expected to increase with future growth in traffic volumes, however, it is crucial that monitoring continue to be undertaken conscientiously.

Table 9-1: Ramindra-At Narong Environmental Monitoring Status (noise/vibration)

Monitoring site	Noise Leq(24hr)dBA			Vibration (mm/scc)		
	1998	2000	2001	1998	2000	2001
Saunrat School	57.53	55.60	57.00	0.835-2.117	0.889-1.520	0.425-1.720
Tararom Village	58.51	52.40	55.30	0.552-0.641	0.298-0.432	0.345-0.465
Orchid Villa Village	55.90	69.20	69.40	0.432-0.522	1.020-2.030	0.375-0.900
Khong Song Kathiam School	64.48	64.10	63.50	0.552-0.641	0.239-0.701	0.275-0.425
Soi Yu Yen	68.81	69.20	62.20	1.163-1.297	1.020-2.920	0.450-1.550
Threshold	70					

Source: ETA

Table 9-2: Ramindra-At Narong Environmental Monitoring Status (air pollution)

Monitoring site	Air pollution								
	TSP 24 hr (mg/m^3)			NO2 1hr (mg/m^3)			SO2 1hr (mg/m^3)		
	1998	2000	2001	1998	2000	2001	1998	2000	2001
Saunrat School	0.100	0.095	0.083	0.016	0.018	0.015	0.020	0.012	0.010
Tararom Village	0.083	0.082	0.054	0.016	0.025	0.013	0.019	0.019	0.011
Orchid Villa Village	0.085	0.094	0.074	0.017	0.030	0.023	0.027	0.027	0.009
Khong Song Kathiam School	0.094	0.127	0.076	0.014	0.040	0.019	0.019	0.019	0.009
Soi Yu Yen	0.156	0.078	0.088	0.024	0.040	0.017	0.025	0.025	0.010
Threshold	0.330			0.320			0.780		

Source: ETA

[18] The following five schools/residential areas located alongside the Ramindra-At Narong route. Saunrat School, Tararom Village, Orchid Villa Village, Khong Song Kathiam school, Soi Yu Yen

2.5 Sustainability

The expressway is managed via a system comprising a hub control center and 34 trans-control units, which are capable of providing round-the-clock emergency response. Pavement, ramps and toll plazas are all in extremely good condition.

In order to ensure the sustainability of project facility operation and maintenance, it is necessary to guarantee a minimum of 25 engineers and workers with a standard level of technical ability and to continue implementing appropriate management and facilities inspections. It is also essential that sufficient financial capability to support these activities be guaranteed.

2.5.1 Organizational Capability

ETA is a public company that was established in November 1972 under the ETA Establishment Act; it is wholly capitalized by the Thai government.

In line with the October 1, 2002 reorganization of ministries and agencies into one cabinet office, 19 ministries and 162 offices/agencies, jurisdiction over ETA was changed from the Ministry of Interior to the Ministry of Transport and Communications. ETA's mandate is to undertake the planning, implementation and maintenance of five expressways[19] and mass rapid transit systems outside the Bangkok Metropolitan Region. ETA having unitary control over the toll roads that have been under DOH jurisdiction to date is currently under planning. As of December 2002, ETA comprised ten departments and three units, and employed 3,388 personnel.

Expressway management is the responsibility of 165 personnel within the Maintenance Department, Expressway Maintenance Division. Of these, 19 staff members employed in Expressway Inspection & Maintenance Section 1 are in charge of the project road. This section is hoping to have secured the required 25 personnel quota by 2004, however, since ETA has been adopting policies to curb staff since 1997, it may prove difficult to achieve this goal.

2.5.2 Technical Capacity

Maintenance is undertaken systematically using a combination of the inspection/maintenance information database and the various manuals (inspection, maintenance, repairs, system use) outlined below.

(1) Where damage is identified as the result of various inspections (routine, normal, special, emergency), information on the grade of the damage, the need for emergency repair and/or special inspection, and so forth is entered into a database. Inspection/repair plans are formulated on the basis of this information, with the plans serving as the base for maintenance activities.

(2) The manual in use was compiled during a 1994 JICA study[20]. The manuals contain details

[19] Stage I (1981, 1983, 1987), Stage II (1993, 1996, 2000), Ramindra-At Narong (1996), Bang Pa In-Pak Kret (1998,1999), Bang Na-Chon Buri (2000)

[20] The study on Inspection and Maintenance Systems for the Expressway in the Kingdom of Thailand (1994)

on the various inspection methods and procedures, damage ratings, safety management, environmental measures and so forth.

(3) Maintenance is undertaken on the basis of the manual compiled during the 2000 JBIC "Special Assistance for Project Sustainability Study on the Maintenance System for Yen Loan Facilities (concrete/steel structures).

According to the executing agency, there are no notable technical problems with maintenance. As mentioned above, not only is maintenance work undertaken systematically, the experience accumulated during the long years of the First Stage Expressway (1978-1988 Yen Loan Project) is also a major factor. However, given that training for younger personnel and programs on special maintenance techniques are not being provided on a periodic basis due to staff shortages, the maintenance status is considered insufficient from the long-term perspective. To address this, there are plans to promote participation in external seminars and to invite external lecturers or other provisional measures.

2.5.3 Financial Status

In terms of ETA's earnings status since project completion, as Table 10 evidences, although the organization posted ordinary profits of 573 million baht and 340 million baht in 1996 and 1997, respectively, it has been bleeding red ink in the three year period from 1998 to 2000, with losses of 70 million baht, 4,161 million baht, and 650 million baht, respectively. This is attributed to sagging profits due to a slowdown in the use of some expressways and an increase in non-operating expenses. This means interest payments on loans, which are non-operating expenses, have been increasing as a result of large-scale investments in construction and the currency crisis, and it is also evident that ETA is crippled by excess liabilities accounting for between 31.9% and 205% of sales. Increases in fixed assets during the 1990s are covered by long-term borrowings. For example, government and domestic loans taken out in 2001 respectively amount to some 340 months and 262 months of earnings, which poses a major burden on the organization's finances. In terms of this project, 7,136 million yen of the 35,682 million yen construction costs were supplied via an interest-free government loan, however, the interest payments on the yen loan portion of 21,409 million yen at 3%, and on the domestic loan portion of 7,136 million yen at 11% represent a considerable burden. By comparison, ETA's liquidity ratio is low at 20.9% (2001) and has fallen dramatically against its pre-appraisal level of 193% (1989), and this has seriously diminished its ability to debts repayment. On the other hand, its debt-equity-ratiohas maintained atat least 19%, which would seem to indicate the absence of any notable problems. However, this is the result of an injection of 7,867 million baht in 1996, thus ETA's financial status cannot be said to be stable. ETA is currently progressing with Third Stage Expressway construction and Mega Project planning, and it is believed that further capital injections will be necessary.

Table 10: Earnings Statement

(Unit: million Baht)

	1996	1997	1998	1999	2000	2001
Operating income (tolls)	1,892.42	2,683.89	2,403.78	2,757.36	3,211.44	3,454.94
Operating expenses	1,475.73	2,245.03	2,444.20	6,847.31	1,699.39	1,953.48
Operating profit	416.69	438.86	-40.42	-4,089.96	1,512.05	1,501.46
Non-operating profit	156.81	-99.09	-29.63	-71.58	-2,162.97	-1,289.86
Non-operating income	156.81	3,107.01	177.90	135.95	145.25	95.13
Interest income	114.70	86.85			14.22	8.47
Govn. subsidy	0	2,970.45				
Non-operating expenses	0	3,206.10	207.53	207.53	2,308.22	1,385.00
Total interest payments	603.32	4,281.07	1,448.39	5,653.76	2,308.22	1,385.00
Percentage of operating profit	31.9%	159.5%	60.3%	205.0%	71.9%	40.1%
Ordinary profit	573.50	339.77	-70.05	-4,161.54	-650.92	211.60
Equity ratio	33.2%	19.3%	19.1%	20.6%	22.0%	22.1%
Current ratio	28.6%	21.4%	26.4%	15.6%	26.7%	20.9%
Ratio to Net Sales	22.0%	16.4%	-1.7%	-148.3%	47.1%	43.5%

Source: ETA

ETA reports that it is currently investigating/implementing various measures aimed at improving its weak financial structure, including increasing traffic volumes, having consumers shoulder toll consumption taxes, and introducing a high-speed open system for toll payments which lead to increasing operating profits , reducing operating expenses by outsourcing, as well as measures to gain reduction and exemption from interest on government loans. Since the government covers any deficits in the event that ETA posts losses (Establishment Act, Article 38), ETA's finances are working out, however, it is hoped that efforts toward further improvement will be made in order to ensure the sustainability and future development of this project.

3. Feedback

3.1 Lessons Learned

It is essential to identify risks which may affect the effectiveness of the project at the project planning stage.

The lack of sufficient inter-organization coordination involved in roads construction resulted in the construction of multiple roads with overlapping goals, which diminished the effectiveness of this project. It is crucial that all parties involved in the project, including JBIC, undertake countermeasures which would prevent such risk at the planning stage.

3.2 Recommendations

Strengthen the function of OCMLT

There is a need to devise efficient plans for future expressways in Bangkok Metropolitan Region and to formulate policies to prevent the fomentation of futile competition between existing roads, which can be achieved via the effective functioning of OCMLT, established in 1992 (see footnote on P.4).

Comparison of Original and Actual Scope

Item	Plan	Actual
① Project Scope		
1. Expressway construction		
(1) Phase I		
1) Extension		
2) No. of lanes		
3) Section	11.5km	11.934km
	6	As left
4) Interchanges	Ramindra Road-Rama IX Interchange	As left
5) Slip ramps	1 (Ramindra)	2 (Ramindra, Lat Phrao)
6) Toll plazas	4	5 (+ Yothin Patana)
	4	5 (+ Yothin Patana)
(2) Phase II		
1) Extension	7.2km	6.865km
2) No. of lanes	6	6
3) Section	Rama IX Interchange-At Narong interchange	As left
4) Interchanges	2 (Rama IX Road, At Narong)	As left
5) Slip ramps	3	As left
6) Toll plazas	4	5 (+ Pattanakarn 2, +At Narong 2)
2. Consulting services		
1) Project engineer	385M/M	93M/M
2) Local staff	2,250M/M	4,188M/M
② Implementation Schedule	Phase I May 1991 – Sep. 1995 Appraisal (52 months) Phase II May 1991 – Jun. 1996 Appraisal (61 months)	Aug. 1992 – Apr. 2000 (92 months)
③ Project Cost		
Foreign currency	Phase I appraisal 28,973 million yen	24,123 million yen
	Phase II appraisal 27,524 million yen	
Local currency	Phase I appraisal 45,075 million yen	138,728 million yen
	Phase II appraisal 9,130 million yen	
	(Local currency: baht)	(Local currency: baht)
Total	Phase I appraisal 74,048 million yen *	162,851 million yen **
	Phase II appraisal 98,343 million yen **	
ODA loan portion	Phase I appraisal 28,973 million yen	25,881 million yen ***
	Phase II appraisal 36,654 million yen	
Exchange rate	1 baht = 5.1 yen	1 baht = 5.3 yen

* Excluding BMA road construction costs.

** Not possible to confirm whether BMA road construction costs have been excluded.

Third Party Evaluator's Opinion on
Ramindra-At Narong Expressway Construction Project (I) (II)

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Relevance

This project (Ramindra-At Narong Expressway) was anticipated to meet the needs of urban growth resulting from the settlement of new communities in the northeastern part of Bangkok particularly Bangkhen, Lat Phrao and Wang Thong Lang areas. Also, this project was expected to serve as a connecting route to Don Muang Airport, the Northern and Northeastern Regions of the country especially when Vibhavadi Rangsit Highway was flooded. It can be said that this project assisted in meeting the needs of the new communities to certain extent. However, at this early stage, the impact of this project was not evident. This is due to the fact that along this project 's corridor, there exists a competitive route, which is Pradit Manutham Road. This new six-lane road was constructed concurrently with and in parallel to this project. Due to its at-grade feature and no control of access, Pradit Manutham Road provides high accessibility to motorists especially those who reside along this road. Thus, initially this road had higher impact on land development as well as community expansion than the Ramindra-At Narong Expressway project. Subsequently, the anticipation of this project to be utilized as a connecting route to Don-Muang Airport as well as to the Northern and Northeastern Regions was not met due to several factors. Firstly, the flooding problem along the Vibhavadi Rangsit has been rectified. Secondly, as previously mentioned that along this project's corridor there exists Pradit Manutham Road running parallel to this project. There is no substantial difference in travel time between these two routes, but one undenial fact is that this project is a toll road while motorists need not to pay to use Pradit Manutham Road. Thus, motorists prefer to use Pradit Manutham Road rather than this project. Thirdly, even though this project can connect to both First Stage and Second Stage Expressway, the north end of this project is merged into Ramindra Road. Therefore, commuters have to travel through Ramindra Road as a linkage to the northern part of the country. The inconvenience in travelling makes it unattractive to commuters as compared to other routes.

Impact

One main reason that this project failed to meet the expectation of easing the north-south congestion is that the overall travel feature of this project is unattractive. The unattractive feature is due mainly to the high generalized cost (which include both travel time and toll fee) as the north end of this project ends at Ramindra Road. Motorists who need to travel to northern and northeastern areas not only have to pay the toll fee, but must also travel on Ramidra Road for another 4-6 km, irrespective of motorists traveling through the Laksi Intersection and further to Phahon Yothin Road or going through Minburi area to gain access to the Outer Ring Road. Moreover, even for traveling to the surrounding areas such as Bangkhen and Lat Phrao, motorists still prefer to use Pradit Manutham Road instead of this project because not only Pradit Manutham Road has higher accessibility, but it is also a toll free road. Thus, there is no doubt that traffic volume of Pradit Manutham Road is 4 times higher than this project. Nonetheless, it can be expected that in the future when this project is connected to the Third Stage Expressway and the Outer Ring Road, it may attract more traffic to this project. One obvious note about this project which can be clearly observed is the high impact on land development along this project. The population growth rate, perhaps, could reflect this kind of impact. Certain areas like Bangkhen District had the population growth rate of 2.7% per year while growth rates of 1.8% and 1.3% per year were also noticed in Bangkapi and Lat Phrao Districts, respectively. These growth rates are approximately 3 times higher than the average population growth rate of entire Bangkok area. Presently, the environmental impact of this project was not evident yet. As stipulated by the Pollution Control Department, the observed level of noise, vibration and air quality were still below the threshold limit. These might be due to the low traffic volume and also small number of high-rise buildings to impede wind circulation which is unlike the situation in the inner area of Bangkok.