

Republic of Indonesia

Ex-Post Evaluation of Japanese ODA Loan Project
Urban Arterial Roads Improvement in Metropolitan and Large Cities Project

Takako Haraguchi, International Development Associates

1. Project Description



Project site



Pramuka Flyover alongside toll road (left)
(Jakarta)

1.1 Background

Traffic congestion of the Jakarta metropolitan area is becoming worse year by year. The government has made efforts to improve the urban traffic conditions by taking various measures including development of expressways (toll roads) and improvement of intersections. However, the increase in urban population and vehicles has worsened the traffic: at the time of the appraisal of this project, many arterial roads had daily traffic of 40,000 to 100,000 vehicles. With the further population increase, the traffic congestion in Jakarta and its surroundings was expected to be extremely serious in near the future. On the other hand, widening and new construction of arterial roads were difficult due to land acquisition and other problems. Under such circumstances, there was an increasing need to develop more grade-separated crossings

1.2 Project Outline

The objective of this project is to ensure smooth traffic in metropolitan and large cities around Jakarta by constructing flyovers/ underpasses at six intersections where traffic congestion is heavy, and by providing engineering services for the toll road traffic information system, thereby contributing to the economic development of the region.

Approved Amount/Disbursed Amount	12,558 million yen / 7,906 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	January 1998 / January 1998
Terms and Conditions	Interest Rate: 2.7% (2.3% for Consulting Services) Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied
Borrower/ Executing Agency	Republic of Indonesia / Directorate General of Highways, Ministry of Public Works
Final Disbursement Date	February, 2008
Main Contractor (Over 1 billion yen)	Obayashi Corporation (Japan) / PT. Wijaya Karya (Indonesia) / PT. Hutama Karya (Indonesia)
Main Consultant (Over 100 million yen)	Pacific Consultants International (Japan)
Feasibility Studies, etc.	Feasibility Study by Indonesian Consultant, 1997
Related Projects (if any)	-

2. Outline of the Evaluation Study

2.1 External Evaluator

Takako Haraguchi, International Development Associates Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: January 2009 – November 2010

Duration of the Field Study: April 1, 2010 – April 10, 2020 and May 9, 2010 – May 26, 2010

2.3 Constraints during the Evaluation Study

Comparative assessment of effectiveness was difficult because only limited quantitative information were available about both before and after the project. As for the ex-post data, no organization practiced regular measurement of basic indicators such as traffic volume of the project sites: the evaluator used data measured by an on-going JICA technical cooperation project as part of the project activities together with the data measured in the travel speed survey conducted for the ex-post evaluation, though those data did not fully cover the indicators needed for the evaluation.

3. Results of the Evaluation (Overall Rating: A)

3.1 Relevance (Rating: a)

3.1.1 Relevance with the Development Plan of Indonesia

The objective of this project is in line with Indonesia's development policies at the time of the

appraisal as well as the ex-post evaluation. The Sixth Five Year Development Plan (Repelita VI: 1994-1998) planned and implemented urban road development in 30 target cities including the Jakarta metropolitan area. In the Medium-term National Development Plan (RPJM: 2010-2014), the national development plan at the time of the ex-post evaluation, specific policy objectives such as improvement of national roads (19,370km), construction of ring roads bypasses (37km) and construction of flyovers and underpasses (11km), to maintain and increase road capacity.

3.1.2 Relevance with the Development Needs of Indonesia

At the appraisal of this project, as mentioned in *1.1 Background*, there was a high demand for flyovers or underpasses on congested junctions to alleviate the worsening traffic congestions in the Jakarta metropolitan area. At the time of the ex-post evaluation, both urban population and the number of registered motor vehicles continue to increase: the population of the JABODETABEK area¹ grew by 140% from around 17 million in 1990 to around 24 million in 2008, at the annual average growth rate of approximately 2%. Traffic continues to heavily depend on road transport, which accounts for 98% of transport in the area. The motor vehicle registrations sharply increased by approximately 370% from 3,160 thousand in 2000 to 12,160 thousand in 2008, at the annual average growth rate of approximately 18%). Under such circumstances, traffic congestions are worsening and needs for grade-separate crossings are increasing as already described in *1.1 Background*.

At the planning stage, there was another concern on the worsening of traffic on toll roads following the planned full opening of the inner and outer ring roads in 2000 but without provision of proper traffic information. Therefore, it was relevant to include some works for the introduction of the toll road traffic information system. At the time of the ex-post evaluation, too, it was seen that vehicles on toll roads were increasing as fast as those on public highways, thus the development needs for toll roads were still high. However, the component of the toll road traffic information system was excluded from this project due to the following reasons: first, it became premature to introduce the information system within the project period because of the delays of the construction of the outer ring road, following the Asian currency crisis that happened in 1997 (the outer ring road has not been fully open till now); second, the Directorate General of Highways (DGH) or Ministry of Public Works, the executing agency of this project, became no longer responsible for toll roads after the reorganization of central government ministries in 2002². Those reasons are rational and thus the exclusion of the component is considered relevant.

¹ JABODETABEK is a name given to the Jakarta metropolitan area. It consists of the initial letters of each of the municipalities/ regencies included in the area – Jakarta, Bogor, Depok, Tangerang and Bekasi. The area used to be called JABOTABEK without Depok, but was expanded later.

² Directorate General of Regional Infrastructure of the Ministry of Public Works became responsible for toll roads.

3.1.3 Relevance with Japan's ODA Policy

The country assistance strategy for Indonesia (agreed in 1994) held the improvement of industrial infrastructure as one of the five priority areas, and assistance in the transportation sector was positioned in the area. In that way, this project was consistent with the Japan's ODA policy at the time of the appraisal.

This project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Efficiency (Rating: b)

3.2.1 Project Outputs

(1) Construction of flyovers and underpasses

The originally-planned outputs of this project were completed mostly as planned except a few details. In addition, more flyovers and underpasses were constructed using the unused balance of the Japanese ODA loan. Finally, the number of intersections covered by this project increased from six (in the original plan) to thirteen.

Table 1: Planned and actually-constructed flyovers and underpasses

Name	Location	Planned		Actual			
		No. of lanes ¹⁾	Length	No. of lanes ¹⁾	Length	Year of completion	Package No.
Originally-planned							
Cikokol Flyover	Tangerang	4x1FO	430m	4x1FO	630m ²⁾	2002	1
Suprpto Flyover	Jakarta	3x2FO	500m	3x2FO	1,556m ³⁾	2007	2
Pramuka Flyover and Underpass	Jakarta	3x2FO, 1UP	550m	3x2FO	840m	2005	3
Tanjun Barat Flyover	Jakarta	3x2FO	500m	3x2FO			
Raya Bogor Flyover	Jakarta	2x2FO	700m	4x1FO			
Bekasi Flyover	Bekasi	4x1FO	500m	4x1FO, 1 bridge, UP	1,800m	2004	4
Additionally-constructed							
Cut Meutia Flyover ⁴⁾	Bekasi			4x1FO, 3 bridges	1,350m	2009	5
Ciputat Flyover ⁵⁾	Tangerang			4x1FO, approach road	1,325m	2008	6
Arief Rahman Hakim Flyover	Depok			4x1FO, approach road	1,150m	2008	7
Sudirman Flyover ⁵⁾	Tangerang			4x1FO	350m	2008	8
Cileduk Underpass	Tangerang			4x1UP	425m	2008	9
Semplak Underpaass ⁵⁾	Bogor			4x1UP, widening	1,725m	2008	10
Cikarang Flyover ⁵⁾	Bekasi			2x1FO, surface improvement	1,900m	2008	11

Source: DGH

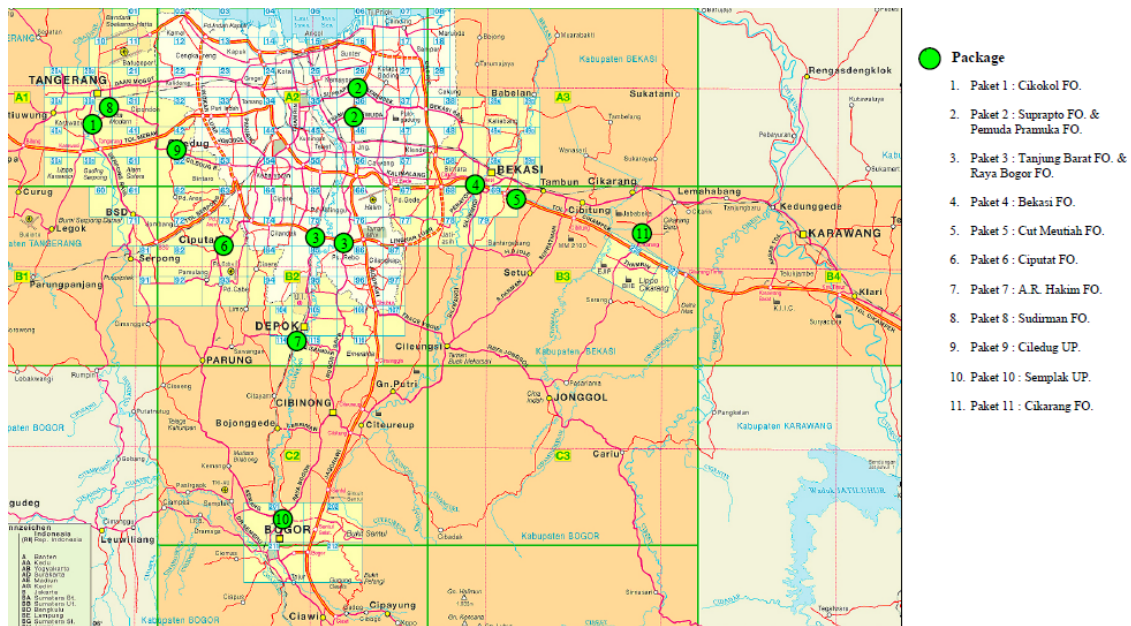
Notes: 1) FO: flyover; UP: underpass; 2FO means two flyovers.

2) Including a loop ramp constructed with the flyover.

3) Including a loop ramp constructed with Suprpto FO and two loop ramps with Pramuka FO.

4) For Cut Meutia FO, this project did design only, and the construction was carried out by the Indonesia government using their own budget.

5) Ciputat FO, Sudirman FO, Semplak UP and Cikarang FO were not completed by the closure of the loan agreement (February 2008) but all completed within the same year using the budget from the Indonesian government.



Source: DGH

Figure 1: Map of the intersections where flyovers or underpasses were constructed

The major changes in the project outputs and the reasons for the changes are as follows:

- Additional construction of a bridge and an underpass with Bekasi Flyover: they were developed with the flyover in an integrated manner to alleviate the congestion around an exit of a toll road, and this addition is considered as justifiable.
- Unconstructed ramp of Suprpto Flyover: as the land was not cleared³, a loop ramp to approach the flyover was not constructed. According to the executing agency, the project consultant and the Special Capital Territory of Jakarta (DKI Jakarta) (the agency in charge of land acquisition for this flyover), the absence of a ramp has not seriously affected the traffic so far, though it would be a problem in case of further traffic increase (possibly in five years).
- Cancellation of Pramuka Undrapass: the underpass was cancelled to avoid a large-scale land acquisition, and is thus justifiable.
- Design modification of Raya Bogor Flyover from 2 lanes x 2 flyovers to 4 lanes x 1 flyover: the design was modified to the one that could reduce the number of piers to avoid a large-scale land acquisition, and is thus justifiable.
- Construction of additional flyovers and underpasses at seven intersections: with the unused balance of the Japanese ODA loan (see 3.2.2.2 *Project Cost*), additional flyovers and underpasses were constructed at intersections that were given high priority, after the

³ The land has not been cleared yet, because several residents are fighting over land ownership in court (see also 3.4.2 *Other Positive and Negative Impacts* for details).

originally-targeted ones, by DGH to handle the growing traffic demand. This addition is considered to be justifiable.



Ciputat Flyover (Tangerang City)



Semplak Underpass (Bogor City)

(2) Consulting services for flyovers and underpasses

The work volume of the services such as the review of the detailed design, tender assistance and construction supervision increased following for the construction of additional flyovers and underpasses. Also, detailed design and preparation of the implementation plan for the urgent improvement of Sudiyatmo Toll Road⁴ (access road to the Jakarta International Soekarno-Hatta Airport) were added to the consulting services.

(3) Engineering services for the toll road traffic information system

As mentioned in *3.1.2 Relevance with the Development Needs of Indonesia*, this component was excluded from this project, and was incorporated into Tanjung Priok Access Road Construction Project (1) (another Japanese ODA loan project based on the loan agreement signed in March 2005)⁵.

3.2.2 Project Inputs

3.2.2.1 Project Period

In the appraisal, the project period was planned to be 72 months from November 1997 (signing date on the loan agreement) to October 2003⁶. The actual project duration spent for the original scope was significantly longer than planned – 120 months from January 1998 (signing date on the loan agreement) to December 2007, or 167% of the plan. The completion date of the

⁴ This addition was in response to an urgent request to take a measure against the obstructed access to the airport due to a flood. The construction works were carried out by the Indonesian government and completed in 2008.

⁵ The detailed design for the system was made as part of Tanjung Priok Access Road Construction Project (1). The construction works are included in Tanjung Priok Access Road Construction Project (2).

⁶ This project defines the completion date as the completion date of construction works and consulting services.

entire project including the additional outputs was August 2008.

The biggest factor for the overrun was the delays in land acquisition for Suprpto Flyover and Pramuka Flyover, which were constructed as Package 2. The land acquisition process for this package took 129 months (April 1997-December 2007) as against the planned 12 months (April 1997-March 1998) in the following circumstances: first, the commencement of the land acquisition was postponed from 1997 to 2002 due to the design modification to minimize the land area to be acquired and its approval⁷; second, the acquisition process itself faced great difficulties because consent was not obtained from some residents who claimed ownership of the land (see 3.4.2 *Other Positive and Negative Impacts* for details). As a result, the entire duration of the construction works, including all packages, were also largely prolonged (90 months as against the planned 36 months). Nevertheless, the construction works of the additional packages took only 23 months as the project further tried to avoid land acquisition and the target intersections were all located outside Jakarta, where land issues are less serious than Jakarta.

Other reasons for delays pointed out by the executing agency include organizational changes following changes of government and poor performance of contractors (Package 2); delays in approval of tender results (additional packages); and delays in relocation of utilities (additional packages).

Table 2: Plan and actual periods of land acquisition and construction

	Planned at appraisal	Actual
Land acquisition for 6 original sites (Packages 1-4)	April 1997-March 1998 (12 months)	April 1997-December 2007 (129 months)
Construction works for 6 original sites (Packages 1-4)	January 2000-October 2003 (36 months)	July 2000-December 2000 (90 months)
Construction works for 7 additional sites (Packages 5-11)	-	October 2006-October 2008 (23 months)

Note: The actual periods spent for land acquisition for the additional sites was not available as they are reported together with those for the original sites.

Source: DGH

3.2.2.2 Project Cost

The planned total project cost estimated at the appraisal was 16,743 million yen, and the actual cost was lower than planned at 13,490 million yen. The Japanese ODA loan approved amount was 12,580 million yen, but the disbursed amount was much lower at 7,960 million yen. The major reason for the decrease in the project cost was the depreciation of the local currency. As most of the construction cost was spent in local currency, the fluctuation of exchange rates

⁷ The original design included four loop ramps for Suprpto Flyover and two loop ramps and one underpass for Pramuka Flyover. However, the number of loop ramps was reduced to two at each flyover to minimize the land area to be acquired.

strongly affected this project.

Although the project cost was lower than planned, the project period was significantly longer than planned, therefore efficiency of the project is fair.

3.3 Effectiveness (Rating: a)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators

To measure how smooth the traffic became after the construction of flyovers/overpasses, the evaluator tried to collect a set of indicators, namely, hourly traffic inflows and outflows at an intersection (and its ratio to design capacity), congestion lengths, and pass time/ pass speed. However, the data collected were very limited: a complete set of data, including the baseline data at the time of the appraisal, the planned value (target) and the actual value at the time of the ex-post evaluation, was not available for any of the 13 locations under this project⁸. Also, many of the data presented at the time of the appraisal lacked the information on the basis of measurement, thus making comparison with the ex-post data difficult.

Table 3 shows the data that were comparable in any way. With the rapid increase in traffic⁹, the travel speed around intersection is a little lower than the baseline. However, it is inferred that without this project, the same volume of traffic would have flown into the roads that had three or four less lanes than with the project, and thus the traffic would have been much worse than it is now. In this way, the evaluator decided that the project was effective even with the indicators showing a worsening trend, if it was logically inferred that the trend would have been even worse without the project¹⁰.

⁸ According to the executing agency and transportation officials of a municipal government, although they are in charge of conducting traffic surveys, locations are limited and in some cases surveys are not regularly conducted. They also said that compared to surveys for project planning such as feasibility studies, surveys after the completion of the project are relatively inadequate.

⁹ For example, the 24-hour weekday traffic around Bekasi Flyover increased from approximately 57,000 vehicles in 2000 to 92,000 vehicles in 2008 (excluding motorcycles). For reference, the 24-hour weekday traffic at some points in Tokyo where congestion is particularly bad is: approx. 75,000 vehicles around Shimo Takaido, Suginami Ward, along the national highway No.20; and approx. 82,000 vehicles around Tsuruma, Machida City, on the national highway No.16 (2005).

¹⁰ For example, the rapid travel speed survey conducted at the time of the ex-post evaluation showed that the average speed to travel from Enggano Street to Cawang Junction on the longitudinal arterial in the center of Jakarta (Suprpto Flyover and Pramuka Flyover are located on the mentioned section), decreased from 28.5km/h in 2000 (before the project) to 19.8km/h in 2008 (after the project).

When considering benefits to people and the socio-economy of the region, the fact that vehicles can now pass the concerned junction in shorter time does not mean the achievement of the project objective, if roads ahead of the junction are as congested as before. From this viewpoint, it is desirable to check whether travel time and speed improved on surrounding roads as well (i.e., to assess a link effect or a network effect). Such an assessment however requires a large-scale survey that was impossible in the framework of this ex-post evaluation. Therefore, this evaluation solely focused on a more direct effect of the project, namely, the extent of alleviation of congestions at the intersections covered by the project.

Table 3: Traffic volume and travel speed at the intersections under the project

Site	Indicator (unit)	Baseline (1994 or 2000 with “*”)	Actual (2008 for traffic volume = 1-4 years after completion. 2010 for travel speed)
Suprpto	Traffic volume (PCU/h)	N-S 7,700 E-W 5,800	N-S N.A. E-W 6,912
	Average travel speed (km/h)	*N-S 24.0 E-W N.A.	N-S 22.4 E-W N.A.
Pramuka	Traffic volume (PCU/h)	N-S 7,600 E-W 7,800	N-S N.A. E-W 8,240
	Average travel speed (km/h)	*N-S 29.3 E-W N.A.	N-S 23.7 E-W 26.2
Bekasi	Traffic volume (PCU/h)	N-S 2,856 E-W N.A.	N-S 7,860 E-W N.A.
	Average travel speed (km/h)	N-S N.A. E-W N.A.	N-S 45-60 E-W N.A.
Cikarang	Traffic volume (PCU/h)	*N-S 3,919 E-W N.A.	N-S 5,450 E-W N.A.

Notes: 1) In all sites mentioned in this table, flyovers are built in a north-south direction, and the north-south traffic was all measured on flyovers.
2) Both traffic volume and speed are about peak hours (average of traffic at 7:00-8:00 hours and 18:00-19:00 hours).

Sources: Appraisal document (for baseline data as of 1994); The Study on Integrated Transportation Master Plan for JABODETABEK (SITRAMP) (JICA technical cooperation) (for baseline data as of 2000); JABODETABEK Urban Transport Policy Integration Project in Indonesia (JICA technical cooperation) (for actual data as of 2008); travel speed survey at the time of the ex-post evaluation (for actual data as of 2010); Road Office of Bekasi City (for travel speed on Bekasi Flyover).

3.3.1.2 Results of Calculations of Internal Rate of Return (IRR)

The EIRR of the flyover/underpass components calculated for the appraisal ranged from 23% to 40% by intersection. The cost items included the construction cost, routine maintenance cost and periodic repair cost, and the benefit items included vehicle operation cost saving and travel time saving. At the time of the ex-post evaluation, EIRR was not recalculated due to unavailability of sufficient data for any of the intersections.

3.3.2 Qualitative Effects

(1) Improvement of traffic

As a result of the beneficiary survey conducted at the time of the ex-post evaluation, 97% of the 96 respondent drivers who passed the flyovers/ underpasses developed by the project said the traffic improved after this project. The common answers about time saving and cost saving with the project were 10-15 minutes and 10,000-20,000 Rupiah (approx. 100-200 yen) per month, respectively (answers from drivers to other questions related to road conditions are shown in 3.5 Sustainability).

In the interviews with residents and shops around the project sites, 98% of the 28 respondents said that the flyovers or underpasses constructed by the project were capable of handling the current traffic (3.4 Impact describes other answers from residents and shops, related to environmental impacts).

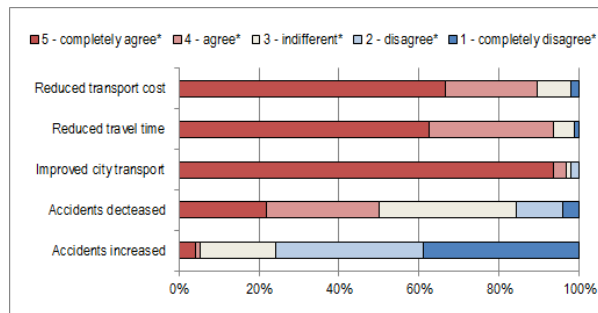


Figure 2: Changes that happened after this project (answers from 96 drivers)

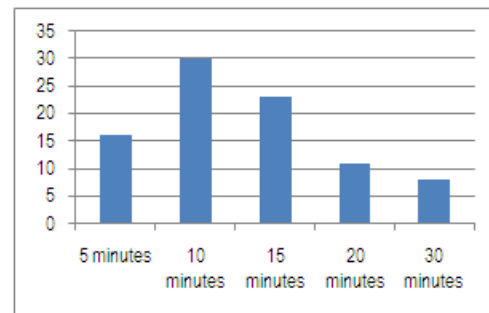


Figure 3: Time saving by flyovers/underpasses (answers from 88 drivers)

According to some municipalities where the project sites are located (Departments of Public Works of DKI Jakarta and Bekasi City, Depok City and Bogor City of West Java Province), the flyovers and underpasses significantly improved the traffic: although all of them said that quantitative measurement of the improvement was difficult, some examples were raised such as flyovers or underpasses at highway-railway intersections (Arief Raman Hakim Flyover and others), which clearly shortened travel time by eliminating the waiting time at railroad crossings. All of the interviewed municipalities said they planned projects to develop surrounding roads together with this project. DKI Jakarta and Bekasi City implemented some of them¹¹, which have brought combined effects on traffic improvement. On the other hand, Bogor City and Depok City said they have not yet implemented their plans due to budgetary constraints. Also, a municipality pointed out that there was a difficulty coordinating road development designs between DGH and the municipality, because their development plans were not adequately shared.

(2) Improvement of convenience in surrounding areas

In the beneficiary survey, 82% of the 28 interviewed residents or shops around the flyovers or underpasses said the environment around the project site improved after the project. Specific positive changes they mentioned include the improvement of traffic on existing roads with the flyover or underpass, better scenery and improved security, though some respondents also mentioned negative changes such as streets that are now more crowded with mini buses and motorcycles waiting for their customers under the flyovers.

This project has largely achieved its objective, therefore its effectiveness is high.

¹¹ The interviewed municipality mentioned some cases of completed construction or improvement works for roads near the site of this project, including construction of Yos Sudarso Flyover in the north of Suprpto Flyover and Panjaitan Underpass in the south of Pramuka Flyover (implemented by DKI Jakarta), improvement of Kali Malang Street and widening and improvement of Pukayan Jaya Street, both connecting to Bekasi Flyover (implemented by Bekasi City).

3.4 Impact

3.4.1 Intended Impacts

The gross regional domestic products (GRDPs) are increasing at annual growth rates around 6% in 2004-2008 in all municipalities or regencies where the sites of this project are located. As the flyovers and underpasses constructed by this project are all connected to important artery roads in respective region, they are contributed to have been contributed to the mentioned economic growths.

As a particular case, Cikarang Flyover, located on a road to connect major industrial parks in JABODETABEK and toll roads, contributes to the transport of raw materials and products (from parts factories in one industrial park to assembly factories in another industrial park¹², or between factories and the Tanjung Priok Port or other regions of the country via toll roads).

3.4.2 Other Impacts

(1) Impacts on environment

For all of the project sites, the environmental impact assessment (EIA) was approved by the Environmental Impact Management Agencies of the concerned municipalities before the start of the construction works.

The environmental measures taken by the project during the construction include: control of dusts by providing water (e.g., sprinkler spraying); measures against noises such as getting the public understanding by providing information on the construction schedule and introducing special construction methods (e.g., according to the project, the pre-boring method was introduced in all construction sites, and then complaints from residents about noise stopped); river protection from waste water inflow from the construction sites; and installation of pumping systems to underpasses. Also, as the traffic management and safety measures, the project installed signs, lamps and barricades during the construction and placed the roads in service as soon as the construction works were finished. To ensure smooth progress of the construction on narrow streets or the site where buildings were closely-built, the project did not use cranes but ion girders to place materials. For residents in particular, the project provided information on the construction kept watchmen at the sites all the time.

Monitoring of air quality at the project sites is not conducted. For reference, the results of the regular monitoring by DKI Jakarta (2008) shows that values of nitrogen dioxide (NO₂) and sulfur dioxide (SO₂) are within the standards, while total suspended particles (TSP) exceeded

¹² For example, an interviewee working with an automobile electric parts manufacturer in the JABODEKA Industrial Park said that the transport of their products to Japanese or other automobile factories in the East Jakarta Industrial Park became smoother after Cikarang Flyover had improved the traffic flow to get on the toll road.

the standard in some locations mainly due to emissions from industries¹³.

As a result of the interviews with nearby residents conducted at the time of the ex-post evaluation, 24, 24 and 16 persons out of 28 respondents said there were no negative changes on air, noise and vibration, respectively, after the project. These numbers are much larger than the numbers of respondents who said environment was worsened (1 person about air, 3 persons about noise and 1 person about vibration).

Table 4: Performance of land acquisition and compensation

(2) Land acquisition and resettlement

As this project was to be implemented in large cities, the JICA side carefully examined land acquisition issues on all proposed sites and excluded the sites that either (i) required a large-scale new land acquisition or (ii) required land acquisition but negotiations with residents had not shown progress, from the scope of the loan.

Also, the government of Indonesia secured 2.6 billion Rupiah as compensations for illegal settlers in the fiscal 1997 budget, and to carry out the compensation in a prompt manner.

Pkg	Municipality/ regency in charge	Land area acquired (m ²)	Compensation (million Rupiah)
1	DKI Jakarta	None	None
2	DKI Jakarta	55,430	60,442
3	DKI Jakarta	None	1,700
4	Bekasi City	N.A.	5,750
6	Tangerang Kab.	15,320	30,000
7	Depok City	15,745	29,437
8	Tangerang City	1,461	N.A.
9	Tangerang Kab.	2,136	N.A.
10	Bogor City	N.A.	N.A.
11	Bekasi City	None	None
Total		90,092	127,329

Notes: "Kab."=Kabupaten (Regency); "Total" includes available data only (the amount mentioned by DKI Jakarta (approx. 90 billion Rupiah) was bigger than the figures in the table.

Sources: DGH, project consultant.

The actual performance of land acquisition and compensation is shown in Table 4. The acquisition and compensation plan was made and implemented by the Department of Public Works of each responsible local government based on the agreement with DGH. Compensation was funded from respective local government budget. The project did not develop resettlement sites, and affected people received compensation and moved themselves in accordance with laws of Indonesia.

Overall, the compensation amount increased mainly because the numbers of land/ property owners and residents increased over a prolonged period of time, from the appraisal to the execution of land acquisition, due to delays in project implementation following design modifications. (see 3.2.2.1 *Project Period* for details of the delays).

As described in 3.2.2.1, land acquisition was extremely difficult in some packages. The followings are the outlines of those difficulties, which are different from each other in timing and situation:

¹³ According to DKI Jakarta, *Laporan Status Lingkungan Hidup Provinsi DKI Jakarta 2008*, NO₂ was measured at 17.92-91.80µg/m³ (standard: less than 92.00µg/m³/24 hours); SO₂ was measured at 6.596-10.015µg/m³ (standard: 260µg/m³/24 hours); and TSP was measured at 142-378µg/m³ (standard: less than 230µg/m³/24 hours).

- Suprpto Flyover (Package 2): (i) the company that had agreed to contribute their land subject to the acquisition sold that land to another company, and the new owner (company) refused to provide the land; (ii) the construction of one loop ramp had to be given up due to unsettled ownership problems such as a number of people claiming ownership of a same piece of land (and fighting each other in court).
- Pramuka Flyover (Package 2): after all the construction works were completed, a resident claimed ownership of the land surrounded by a loop ramp. As the Ministry of Public Works had been regarded as the owner of that land in the construction stage, the Ministry and the resident were fighting over in court. The resident blocked the ramp so that vehicles could not pass. Therefore, approaches to the flyover are limited at present.
- Ciputat Flyover (Package 6): as the land acquisition was not completed, the right of way on one side was narrower than planned.

Some common characteristics or situations were observed in the sites where land acquisition was difficult: first, both Suprpto Flyover and Pramuka Flyover (Package 2) had problems in acquiring land for loop ramps, which tended to be larger than straight sections; second, in case of Ciputat Flyover (Package 6), the flyover itself is curved, and it was the land for widening the existing road section under the curved part of the flyover where the problem in land acquisition arose. In all the other cases, the project acquired narrow stripes of land mainly for widening existing roads, where, according to concerned local governments, negotiations with residents were hard (most of the disputes were over the amount of compensation that was paid in accordance with rules and regulations, and some of the cases were brought to court) but kept at a controllable level. Finally, all issues were solved by the start of the construction works.

(3) Other positive and negative impacts

- (i) Decrease in railroad accidents: according to the executing agency, the construction of Semplak Underpass eliminated a level crossing with railroad (the Jakarta-Bogor line) and so did accidents at the crossing (specific data were not available). On the other hand, the Indonesian Railway Company, the railway operator, pointed out that even without underpasses, people continue to cross the railroad and thus accidents could not be eliminated.
- (ii) Impact on informal sector: before the project, many street vendors used to do business on road shoulders and carriageways around the project sites. In the beneficiary survey at the ex-post evaluation, some interviewees said their income decreased because traffic jams were reduced by this project (8 out of 18 valid responses). No measures such as income restoration for informal sector seemed to be taken.

As stated above, this project has supported economic activities in the Jakarta metropolitan area. There existed a big problem of land acquisition. However, as it was an inhibiting factor to the implementation process and the degree of completion of this project, the evaluation rating of effectiveness was not downgraded.

3.5 Sustainability (Rating: a)

3.5.1 Structural Aspects of Operation and Maintenance

Particular problems were not observed. The operation and maintenance (O&M) of the flyovers and underpasses built on national roads (Suprpto, Pramuka, Tanjung Barat, Raya Bogor, Bekasi, Cut Meutia, Ciputat and Semplak) were carried out by the Project Unit of Preservation of Jakarta Metropolitan Roads under the Directorate of Freeways and Urban Roads of DGH, the directorate that was directly in charge of the implementation of this project. From 2010, this Project Unit is under the command of the Balai Jakarta (Jakarta project office), while still having coordination with the Directorate of Freeways and Urban Roads. A maintenance team consists of six Road Managers, each in charge of 269km¹⁴.

The O&M of the flyovers and underpasses built on local roads (Cikokol, Sudirman and Cileduk in Tangerang City, Arief Rahman Hakim in Depok City and Ciakrang in Bekasi City) are under responsibility of the City Department of Public Works (DPUK) of respective cities.

3.5.2 Technical Aspects of Operation and Maintenance

Technical problems on O&M were not seen, either. In case of the flyovers and underpasses under the responsibility of DGH, a maintenance team of engineers, technicians and skilled workers is organized under each Road Manager. According to DGH, the number of and capabilities of those staffs are sufficient¹⁵. As for the flyovers and underpasses under local O&M responsibilities, DPUKs explained that similar routine maintenance works to those for other arterial roads are given without any technical problems. This was confirmed on the site visits for the ex-post evaluation.

3.5.3 Financial Aspects of Operation and Maintenance

Upon completion of the project, the executing agency roughly estimated the total annual O&M cost for the 11 flyover/underpass packages under this project to be 3,610 million Rupiah, assuming that 0.5% of the construction costs would be required annually. The executing agency also reported that the actual amount expended (shown below) were sufficient for the O&M of each package.

¹⁴ The unit length will be 544km in 2011 after the planned inclusion of Puncak and Cianjur in West Java Province.

¹⁵ 16 engineers and 19 technicians are in charge of the O&M of this project.

The accurate cost estimation for O&M of highways, including the flyovers and underpasses developed by this project, is based on the unit cost per kilometer and the actual conditions of the road. The conditions of each road section are reported in June and October every year, and then the O&M budget is decided. In 2009, 10 out of the 13 flyovers/ underpasses were designated as the subject of the O&M works, and the total O&M expenses for them was 1,195 million Rupiah, which accounted for 33% of the rough estimation mentioned above.

The budget allocated for each site ranged from approximately 8 million Rupiah (cleaning of drainage channels at Cikarang Flyover) to approximately 315 million Rupiah (replacement of joints at Tanjung Barat Flyover). The flyovers/underpasses not taken up as the O&M subject were considered to be in good conditions. Repair works that cost more than 50 million Rupiah are outsourced by tender.

The O&M cost for flyovers/ underpasses under DPUKs are funded from local budget. In case of Depok City, for example, the Department of Public Works of the City said that they spend approximately 4.5 million Rupiah while 8 million Rupiah is required annually.

The O&M funding sources are national budget (for roads and bridges under DGH) and local budget (for those under DPUKs). Although the above-mentioned O&M expenses are far below the estimated amount, in practice they are deemed acceptable considering that the budget is allocated if necessity for O&M is confirmed by the inspection results and that costs are kept low by outsourcing high-cost maintenance works.

3.5.4 Current Status of Operation and Maintenance

According to DGH, there are no serious problems on the conditions of the flyovers/ underpasses after they were put in operation. In general, maintenance works consist of the following three stages: (i) inspection (routine, periodic and special or urgent); (ii) maintenance (cleaning, replacement of damaged traffic facilities, minor repair of pavement and drainage facilities, etc.); and (iii) repair (re-pavement, repair of structures, etc.). While DGH stated that such a system was minimum required, no big problems have arisen so far.

It was observed on the site visits for the ex-post evaluation that structures and facilities in all project sites were relatively in good conditions. On Bekasi Flyovers where traffic is extremely heavy and Ciakrang Flyovers where industrial parks were located nearby and thus heavy vehicles pass a lot, the road surface seemed more damaged than others, though serious damages and deterioration were not found. A prompt response by O&M agencies to a problem was observed: at Semplak Underpass (maintained by DGH), the problems of loss of an iron drain cover and water leakage from the side wall found on the first site visit in April were already fixed on the second visit in May (the Department of Public Works of Bogor City found the problems and informed DGH).

In the beneficiary survey with 96 drivers, 98% said the surface conditions of the flyover or underpass that each of them passed were very good or good, and 99% said that the surface was kept in the same conditions as it had been at the completion.

No major problems have been observed in the operation and maintenance system, therefore sustainability of this project is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

While the efficiency of this project is fair due to implementation delays, the other evaluation items all satisfy the criteria for high marks. On relevance, the objective of this project is consistent with development policies and needs. On effectiveness and impacts, although the project did not eliminate traffic congestions due to the rapid increase in traffic volume, the expanded road capacity limited further aggravation of traffic jams and thus contributed to the economic development. High satisfaction of road users with the project was also observed. On sustainability, no problems are seen in the system and the practice of O&M.

In the light of above, this project is evaluated to be (A) highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

DGH is recommended to continue its efforts to solve the problem on the loop ramp at Pramuka Flyover (blocked by a resident who are claiming over title of the land). As for the problem on the unconstructed loop ramp at Pramuka Flyover (due to multiple ownership claimed), even though it might be difficult for DGH to directly intervene the matter, it is expected that negotiation about the acquisition and the construction be started as soon as the land title is decided.

In order to maximize the benefits of this project, it is effective to develop roads and flyovers/ underpasses around the project sites as well. Therefore, DGH is recommended to keep communications with local government in charge of those development works, provide necessary information on related projects give advises on development plans, and make future development plans in an coordinated manner with plans of local governments.

4.2.2 Recommendations to JICA

It is recommended that JICA keep in contact with DGH about the progress of the land issues described above.

As for the development of surrounding road networks mentioned above, in case where local

governments of the JABODETABEK area (except Jakarta) lack development budgets, JICA is expected to consider assisting them as well as possibilities of other funding sources¹⁶.

4.3 Lessons Learned

(1) Minimization of land acquisition in urban road projects

Since land acquisition issues in flyover/underpass construction projects in a large city affect not only owners/residents of the concerned lands but also urban traffic as a whole, it is important to keep efforts to minimize the lands to be taken as this project did.

In particular, when a project needs to take larger area of land than the one for straight roads, as in the case of construction of loop ramps or curved flyovers, the design adequacy in the light of the traffic situations and the feasibility of the land acquisition should be carefully reconciled in order to avoid a kind of difficulties faced by this project (i.e., due to re-design, long time passed since the agreement on the land issue was reached, and thus the situation of the site changed from the situation in the appraisal stage).

(2) Elaboration of construction methods in urban road projects

In order to ensure smooth progress of the construction works in areas where buildings and traffic are dense, the construction methods that were effective in this project (such as pre-boring method and erection girders) can be considered.

(3) Effect measurement in flyover construction projects

In this ex-post evaluation, use of the following two types of indicators, depending on the degree of their directness, was considered for the measurement of effects of flyovers/underpasses (i.e., smoothened traffic):

- (i) Measurement of the direct effect (outcome) – alleviation of traffic congestions at the project intersections (indicators for this include the ratio of traffic volume to designed capacity, congestion lengths and pass time)
- (ii) Measurement of the achievement of the project objective – traffic improvement of the area as a whole (indicators for this is difficult to collect during a short-term study, but a minimum set including traffic volumes and travel speeds on the road where the flyover was built and on some connecting roads was considered)

¹⁶ JICA, the World Bank and the Asian Development Bank (ADB) are major donor agencies in Indonesia's road sector. Recent road sector assistance from the World Bank and ADB is directed mainly to rural road development and administration reform (e.g., strengthening of local governments' financing and management capacity). When considering assistance by JICA, possibilities of providing sub-loans from the central government to local governments should be carefully examined.

As already mentioned, however, data were available only on very limited part of the indicators in the first category: the baseline data were not fully available and the ex-post data were not collected by any organizations. Meanwhile, the second category indicators measure effects that cannot only be attributed to this project but to many other factors such as land use patterns, urban development situation, and traffic policies. Also, a short-term study can neither set the baseline nor collect the performance data in the second category. Therefore, it was unavoidable that this ex-post evaluation only collected qualitative information (i.e., interview survey results).

When planning a similar project in future, one should clearly state the baseline data of the first category in the appraisal documents. The documentation should also include the information on whether those data are the ones regularly measured by the executing agency or other organizations, or they cannot be collected without separate studies such as feasibility studies. These notes will be useful for making a data collection plan for future monitoring and evaluation works¹⁷. In case of road projects in the JABODETABEK area, it was learned from this ex-post evaluation that separate studies are needed to collect necessary data. This point should be noted when planning and evaluating a project in this area.

¹⁷ With the data for all of the three kinds of indicators under the first category, evaluation of fuel-saving effects and CO₂ reduction effects, which were not possible in this ex-post evaluation, can be done.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1. Project Outputs		
Construction of flyovers	6 flyovers	Original: mostly same as plan. Additional: 5 flyovers and 2 underpasses
Consulting services on flyover construction	Foreign engineers 184M/M Local engineers 720M/M F/S review, detailed design, tender assistance.	Foreign engineers 396.21M/M Local engineers 1,533.35M/M Additional: detailed design and preparation of implementation plan for urgent improvement of Sudiyatmo Toll Road.
Engineering services on toll road traffic information system	Foreign engineers 80M/M Local engineers 60M/M F/S review, detailed design, tender assistance	Cancelled.
2. Project Period	November 1997 – October 2003 (72 months)	January 1998 – December 2007 (120 months)
3. Project Cost		
Amount paid in Foreign currency	8,039 million yen	5,000 million yen
Amount paid in Local currency	8,704 million yen (167,385 million Rupiah)	8,490 million yen (666,640 million Rupiah)
Total	16,743 million yen	13,490 million yen
Total ODA loan portion	12,558 million yen	7,906 million yen
Exchange rate	1 Rupiah = 0.052 yen (As of April 1997)	1 Rupiah = 0.013 yen (Average between 1997 and 2006)

Third party opinion

28 October 2010

Urban Arterial Roads Improvement

Aristides Katoppo

Jakarta traffic has become so jammed that the president asked for a study to move the capital. The vice president suggested about 18 steps to alleviate the problem. The president was irked that critics decried the use of police escorts that created even more extensive snarl- up in its wake. It is not hard to get car and motorbike users to appreciate fly-overs and under passes to help untangle the massive snarl-ups. The “Urban Arterial Roads Improvement Project” clearly demonstrated its usefulness as an essential and necessary component to bring relieve. And even though there is some joking that these fly-overs and underpasses only makes you reach the next traffic jam ten to fifteen minutes earlier, most welcome it with high praise.. Everybody agrees that: the more of these, the better. It is rare in project experience that disbursement is less, closer to half of agreed loan (12,5 to 7,69 million yen).It is also exceptional that the scope of construction doubled (from original 6 to plus 5 additional flyovers and 2 underpasses). There were extraordinary happenings and changed circumstance: financial crises in Asia in the late nineties and when the Rupiah crashed and devalued drastically. Nevertheless, it is a tribute to both partners that despite turbulent political turmoil and economic/financial crises, the project was completed with such high positive output.