Socialist Republic of Viet Nam

Ex-Post Evaluation of Japanese ODA Loan Project
Transport Infrastructure Development Project in Hanoi

External Evaluator: Yasuhiro Kawabata, Sanshu Engineering Consultant

0. Summary

Objectives of the project were to alleviate traffic congestion and to enhance the logistics' efficiency in Hanoi city by constructing and improving roads and intersections, which caused bottlenecks in road traffic, thereby contributing to development of regional economy and improvement of urban environment. The project has been highly relevant to the development plans and needs of Vietnam, as well as Japan's ODA policies. The current through traffic at three intersections, which was counted by simple traffic count surveys under the ex-post evaluation study, is 66,000 - 82,000 vehicles/day, which exceeded the highway capacity for a 4-lane highway, and it is very high. It is possible that heavier traffic jam than what it is at the time of ex-post evaluation would have occurred around each intersection if the project should not have been implemented. It is also considered that the project has been contributing to alleviation of traffic congestion to some extent in a short term as an impact of the project. Thus, the project has largely achieved its objectives, and the effectiveness and impact are high. Actual outputs differ from the originally planned project scope. Changes made are due to revisions of project plans of Hanoi People's Committee (HPC) after signing of the Loan Agreement and to the results of detail designs, and they are considered appropriate. The project cost was higher than planned, and the project period was significantly longer than planned. Therefore, efficiency of the project is considered low. No major problems have been observed in the institutional, technical and financial aspects, therefore sustainability of the project effect is considered high.

In light of the above, this project is evaluated to be satisfactory.

1. Project Description

Projection Location Nga Tu So Intersection

1.1 Background

At the appraisal time, the capital city Hanoi had a population of 2.5 million, and was the largest city in the northern Vietnam. The economy of Hanoi city had been rapidly growing since adoption of the Doi Moi policy[1] in 1986. The growth rate of real GDP of Hanoi city in 1997 was about 13%, which was higher than the national average (9%). However, migration of population into the existing urban area and concentration of economic activities had more advanced with the rapid economic growth, and the city had a mix of residential, commercial and industrial districts with sprawling urban area, resulting in deterioration of urban environment. Under such circumstances, Japan International Cooperation Agency (JICA) conducted the Special Assistance for Project Formation (SAPROF), selected the high priority urban infrastructure projects, and identified the subject project as an ODA loan project, since the subject project aimed to advance development of the transport infrastructure in Hanoi city.

1.2 Project Outline

Objectives of the project were to alleviate traffic congestion and to enhance the logistics' efficiency in Hanoi city by constructing and improving roads and intersections, which cause bottlenecks in road traffic, thereby contributing to development of regional economy and improvement of urban environment. The location of the project site is shown in Figure 1.

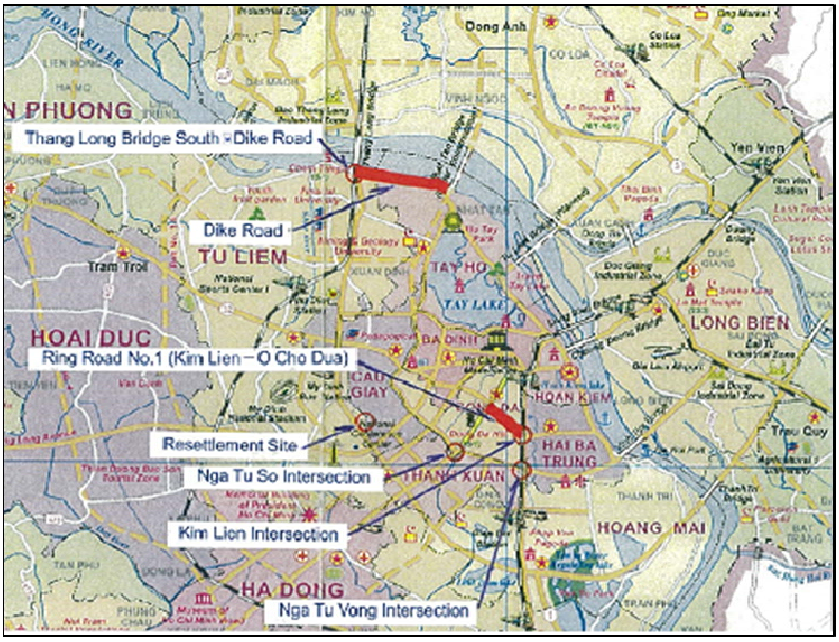

Figure 1 Location of Project Site

[1] Reforms aiming to create a new trend in the economical and social philosophy aspects.

Loan Approved Amount/ Disbursed Amount	12,510 million yen/8,389 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 1999/March 1999
Terms and Conditions	- For civil work and procurement Interest Rate: 1.80%, Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: general untied - For Consulting services Interest Rate: 0.75% Repayment Period: 40 years (Grace Period: 10 years) Conditions for Procurement: bilateral tied
Borrower / Executing Agency(ies)	Socialist Republic of Viet Nam /Hanoi People's Committee (HPC)
Final Disbursement Date	January 2011
Main Contractor (Over 1 billion yen)	Mitsui-Sumitomo Construction Co./Vinaconex (Vietnam)(JV), Song Hong Construction Corp.(Vietnam)/Vinaconex (Vietnam)(JV), Taisei Construction Co.
Main Consultant (Over 100 million yen)	Japan Bridge and Structure Institute Inc.
Feasibility Studies, etc.	Special Assistance for Project Formulation for the Infrastructure Development Project in Hanoi Capital Region, 1998
Related Projects (if any))	Technical Cooperation: ・The Comprehensive Urban Development Programme in Hanoi City by JICA , 2004.1-2007.3 ・The Project for Improving Public Transportation in Hanoi by JICA, 2011.7 - 2014.6 Other International Organizations: ・Hanoi Urban Transport Development Project by World Bank, 2007-2013

2. Outline of the Evaluation Study

2.1 External Evaluator

Yasuhiro Kawabata, Sanshu Engineering Consultant

2.2 Duration of Evaluation Study

The Ex-Post Evaluation was conducted during the following period.

Duration of the Study: October 2013 – September 2014

Duration of the Field Study: December 7 – December 14, 2013, March 16 – 22, 2014

3. Results of the Evaluation (Overall Rating: B[2])

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance to the Development Plan of Vietnam

In the "Socioeconomic Development Strategy (1991-2000)", which was effective at the appraisal time (1998), the following targets were set: i) double the income within 10 years; ii) increase investment for infrastructure development; iii) create employment opportunities in the high-productive jobs; and iv) promote foreign direct investment. In 1997, "A Revised Master Plan for Hanoi Metropolitan Land Use Plan targeting for 2020" was issued, and countermeasures for agendas (including improvement of urban transport network) to be addressed were recommended to improve deteriorating urban environment and enhance the urban functions.

In the “10-Year Socioeconomic Development Strategy (2011-2020),” which was adopted in January 2011, the following agendas were set as priorities: 1) establishment of the market economy system aiming at the socialism society; 2) development of human resources; 3) development of infrastructure, particularly in the transport and urban development sectors. In the “5-Year Socioeconomic Development Plan (2011-2015),” which discusses the above mentioned 10-Year Socioeconomic Development Strategy more in detail, it is stated that the comprehensive target for 5 years is to establish the foundation for the industrialized country by 2020, and is also suggested that the urban transport system is rapidly developed as a part of the target.

As mentioned above, at both appraisal and ex-post evaluation stages, the implementation of the project was relevant to the development policies of the Vietnamese Government.

3.1.2 Relevance to the Development Needs of Vietnam

With the rapid economic growth after adopting the Doi Moi policy in 1986, in capital city Hanoi, migration of population into the existing urban areas and concentration of economic activities had advanced, and thus the urban environment had been deteriorated. Moreover, traffic volume had rapidly increased and the population density had gone up so that the development of urban infrastructure including roads, water supply and sewage system could not catch up with the demand. Thus, the urban function was heavily inhibited. Particularly, the road network was fundamentally as what was developed in the French colonization era, and the road width in the old urban area was as narrow as it was. Thus, roads could not accommodate the traffic increase caused by the rapid increase of motorbikes and other vehicles so that heavy traffic congestion had occurred in some intersections in the city center. Consequently, construction/improvement of intersections and widening/improvement of urban city roads with narrower roadway were considered

[3] ③: High, ② Fair, ① Low

the urgent issues to be addressed.

In Hanoi city, as of the ex-post evaluation stage (2013), population is still increasing (2.6 times[4] of that of the year 2000), and the number of vehicles has been increasing rapidly (4.8 times of that of the year 2000 regarding automobiles, and 2.7 times of that of 2000 regarding motorbikes). Thus, the traffic congestion has been worsened. In order to alleviate congestion and promote healthy urban development, in "the Transport Plan targeting for 2020 in Hanoi" issued by the Vietnamese Government in 2008, construction of 5 routes of urban railway/metro lines was proposed, and construction of some routes has commenced. Until the development of urban railway network has been completed, HPC is planning to promote use of bus transport in order to alleviate traffic congestion. However, the share of bus transport among urban transport modes is currently about 10%, and use of private transport modes including motorbikes and private cars still occupies about 80% - 90%, resulting in a major factor for traffic congestion.

Recently, heavy traffic congestion has occurred in intersections in the city center due to increase of traffic caused by the rapid increase of motorbikes and other vehicles, and thus, construction/improvement of intersections and widening/improvement of urban city roads were considered urgent issues to be addressed. The project aiming at alleviation of traffic congestion, therefore, was relevant to the development needs at both appraisal and ex-post evaluation stages.

3.1.3 Relevance to Japan's ODA Policy

In the Country Assistance Strategy for Vietnam (1994-1999), which was valid at the appraisal time, the Japanese Government intended to give a priority to assist in development of infrastructure (particularly power and transport sectors), which supports attraction of foreign investment needed for the export-oriented economic growth, the development of human resources and institutional reforms needed for transition to market economy, and the improvement of living (urban) environment. Since objectives of the project were to contribute to development of regional economy and improvement of urban environment by constructing and improving roads and intersections, which caused bottlenecks in road traffic, the project was relevant to the assistance policies of the Japanese Government.

Accordingly, the project has been highly relevant to the Vietnamese development plan, development needs, as well as Japan's ODA policy. Therefore its relevance is high.

[4] In 2008, Hanoi city annexed neighboring provinces and the area was expanded. Thus, population was doubled at once.

3.2 Effectiveness[5] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

At the appraisal time, operation and effect indicators were not established for the project. The basic operation and effect indicator to examine the quantitative effect with respect to improvement of intersections and development of roads included in the project is traffic volume. However, since the baseline data and the projected traffic volume at the planning stage, and actual figures at the project completion were not available, traffic counting was briefly undertaken during the ex-post evaluation study. At three intersections and along Dike Road, which are major project components, and where a traffic counting by videos is feasible, through traffic[6] passing an underpass or flyovers constructed in the project and through traffic on service roads were counted by type of vehicle during the morning peak hour (from 7:00 AM to 8:00 AM) on January 7 through January 10, 2014. Regarding the traffic volume of Dike Road, the cross sectional traffic volume of a 4-lane road (2 lanes for each direction) was counted by type of vehicle. Based on the surveyed results, the peak-hour traffic volume was converted to the daily traffic volume (in passenger car unit) referring to the relevant data and information available.

Table 1 Daily Traffic Volume

Unit: Passenger Car Unit (vehicles/day)

Intersection/road	Peak-Hour Traffic in 2014		Daily Traffic Volume in 2014		Total Traffic Volume in 1999
	Through Traffic volume	Total Traffic Volume including side roads	Through Traffic volume	Total Traffic Volume including side roads	
Kim Lien Intersection	10,800	15,800	67,400	98,600	58,600
Nga Tu Vong Intersection	10,500	14,100	65,800	87,900	43,000
Nga Tu So Intersection	13,100	17,100	81,600	106,800	65,000
Dike Road	3,500	n.a.	21,900	n.a.	n.a.

Note 1: Conversion rates to passenger car unit: bicycle/motorbike 0.5, passenger car/taxi 1.0, public bus 2.5, private bus 2.0, truck 2.5 (Source: TCXDVN 104: "2007 Urban roads - Specifications for design")
Note 2: Peak hour factor: 0.16 (Source: The Comprehensive Urban Development Program in Hanoi Capital City - Urban Transport Sector)
Note 3: Traffic volume in 1999 is the results surveyed by HPC's Transportation Department

The daily traffic volume shown in the above table indicates how much three intersections and a road under the project, currently handle traffic volume. The through traffic volume at 3 intersections is between 66,000 and 82,000 vehicles/day, which exceeds the highway capacity for a 4-lane highway (about 50,000 vehicles/day). The result indicates that the congestion time per day is longer than before. Even though the

[5] Sub-rating for Effectiveness is to be put with consideration of Impact.

[6] Through traffic means traffic volume passing an underpass (a road at the excavated lower level of a grade separated intersection), or a flyover (an upper level road that crosses over an intersection).,

road sections with higher traffic volume at three intersections were grade separated under the project, at-grade roads crossing the target flyovers or an underpass are also heavily trafficked arterial roads and are heavily congested. It is supposed that much worse traffic congestion than current condition could have occurred around these intersections if it were not for the project implementation. Thus, contribution of the project is considered high.

There are two points to be noted regarding the transport condition in Hanoi: 1) travel of trucks in the city center is allowed only during the period from 10:00 PM to 5:00 AM in order to alleviate traffic congestion during day time; and 2) currently, about 80-90% (on an absolute number basis) of vehicles in the city are motorbikes, and the share of cars (passenger cars) is still low. However, as economy grows, the conversion rate from motorbikes to passenger cars by citizens will become higher year by year so that traffic congestion will be further worsened.

3.2.2 Qualitative Effects

At the appraisal time, alleviation of traffic congestion and improvement of logistic efficiency by the project was anticipated. Although the traffic congestion at intersections under the project has been alleviated, traffic congestion likely occurs at other intersections since there are a lot of intersections beside three intersections in Hanoi.

In addition, contribution to improvement of urban environment such as alleviation of traffic noise and air pollution at three intersections was also anticipated. It is considered that noise level was lowered at least in one direction at each intersection by elimination of stopping and starting at intersections because of construction of a grade separation. However, since the traffic volume of at-grade roads crossing flyovers or an underpass has been increasing every year, no residents around the project sites recognize that improvement was made on the traffic noise. Regarding air pollution, emission of polluted materials from motorbikes was a problem. Its main causes could be: i) old motorbikes and cars, which exhaust more polluted materials are still running; and ii) high sulfur fuel causing air pollution is still sometimes used. (Source: Current Condition of Environmental Pollution in Vietnam (Abstract of 2009 Report)) Thus, contribution to alleviation of traffic noise and air pollution by the project is considered minimal.

3.3 Impact

3.3.1 Intended Impacts

Even though it is a limited impact, alleviation of traffic congestion is considered contribution by the project. As economy has grown, the Vietnamese Government has planned to construct the urban railway system and other modes to alleviate traffic

congestion in Hanoi city, and some of the route sections have been already under construction at the time of ex-post evaluation. However, until the urban railway system has been developed to some degree, promotion of plans aiming at tackling the traffic congestion is essential in the short term, such as grade separation of intersections connecting arterial roads and development of bus lanes. The subject project has contributed to the alleviation of traffic congestion in the short-term aspect.

However, since only the grade separation of intersections connecting arterial roads or the development of bus lanes cannot fundamentally resolve the city-wide traffic congestion, part of the important ring roads and radial roads need to be upgraded to partially access-controlled highways[7] or to viaducts in the medium- and long term. Thus, regarding intersections and roads, which were constructed/improved under the project and partially contributed to the alleviation of traffic congestion, the planning and designs for further improvement and/or reconstruction should be later considered taking into account the development plan for the future transport network in Hanoi.

3.3.2 Other Impacts

(1) Impacts on the natural environment

At the appraisal time, no remarkable environmental impacts were anticipated since the project scope including 10 subcomponents under the project was considered “small work”. Thus, the environmental category was classified as “B”. However, since the original plan of constructing a flyover crossing over National Road No.1 at Kim Lien intersection was changed to the plan of constructing an underpass passing through National Road No.1, resubmission of a feasibility study (F/S) and an environmental impact assessment (EIA) was required. The preliminary EIA was approved by Ministry of Natural Resources and Environment (MONRE) on October 11, 2002 and the final EIA was approved by 2006 before commencement of construction work. Moreover, since a flyover was to be added to Nga Tu So intersection, a new EIA was required and it was approved by MONRE on October 1, 2003. Concerns/issues pointed out in the EIA included traffic management during construction, disposal of waste soils, excavation method, and construction waste materials. According to the executing agency, these concerns/issues were handled during the project implementation according to the manner stated in the EIA. Since the project is basically improvement and rehabilitation of the existing facilities, there is no case in which the environmental condition after the project was worsened than before the project.

(2) Land Acquisition and Resettlement

[7] Highway to which entrance and exit are provided only at limited locations (interchanges).

Regarding land acquisition and resettlement planned at appraisal, resettlement totaling 1,540 households was anticipated with the following distribution: 150 households for improvement of Nga Tu So intersection, 90 households for improvement of Dike Road, and 1,300 households for improvement of Ring Road No.1 (Kim Lien - O Cho Dua). According to the plan, although no additional land acquisition was required, a lot with a total area of 45.3 ha surrounded by Ring Road No.3 and Hoa Lac Highway was to be secured as a resettlement site for residents. Resettlement was to be undertaken for three years from year 2000 to year 2002, and monitoring on living condition after resettlement was required.

After the project commenced, the detail designs were undertaken, and the project scope was changed based on the results of double check on the field condition including traffic condition and due to revision of plans of relevant projects by HPC. Consequently, the estimated quantities on land acquisition and resettlement were revised. According to the report by the executing agency, the actual land area acquired under the project was 63.13 ha, which was larger than planned, and the number of resettled households was 1,792. The total amount of compensation paid was about 1,586 billion VND (Vietnamese Dong).

Table 2 Land Acquisition/Resettlement

Subcomponent	Land Area (ha)	Land Area acquired (ha)	Number of resettled households received compensation	Number of resettled households	Compensation paid (billion VND)
Kim Lien Intersection	6.13	0	-	-	16.489
Nga Tu Vong Intersection	4.69	0.31	180	82	75.820
Nga Tu So Intersection	9.44	3.30	892	881	733.497
Thang Long Bridge South - Dike Road and Dike Road	19.15	3.91	402	10	21.446
Kim Lien－O Cho Dua	5.94	5.01	931	819	685.202
Infrastructure development for resettlement site	56.40	50.6	731	-	53.680
Pedestrian Overbridges	0.35	0	-	-	-
Total	102.10	63.13	2,835	1,792	1,586.134

Source: Responses to the Questionnaire

Note 1: "Resettled households received compensation" mean households who received compensation for loss or damage of houses and/or asset including resettlement.

Land acquisition and resettlement activities were implemented according to the laws and decrees in Vietnam during 2001 – 2006 (original plan was from 2000 to 2002) due to the following reasons: 1) preparation of a new Resettlement Action Plan (RAP) was required since major design changes were made on some subcomponents after detail designs were completed; and 2) more time than expected was needed for negotiations on alternative lands and amount of compensation since the project is located in the city

central district. Regarding resettlement on Nga Tu Vong Intersection, Thang Long Bridge South - Dike Road and Dike Road among subcomponents included in the project, the planned resettlement site to be developed under the project had not been completed yet at the time of commencement of civil work for these interchanges/road (as of 2002) due to delay of the project implementation. As a result, residents moved to other resettlement sites which had been completed.[8] On the other hand, almost 100% of households resettled due to construction of Nga Tu So Intersection and improvement of Kim Lien - O Cho Dua Road received compensation and moved to the resettlement site (apartments), which was developed under the project after 2005. According to the executing agency, residents could move into the new apartment with lower price, and they are satisfied with the arrangements. The Japanese ODA loan portion for the project covered only infrastructure development of the resettlement site (clearing of the site, installation of roads, power lines, water supply/sewage system), and the housing complex in the site was constructed with local funds of HPC.

Resettlement Site

(3) Other Positive and Negative Impacts

None.

Since the projected traffic volume at the planning stage and data on actual volume were not available, no comparison between actual volume and baseline/benchmark data could be made. The through traffic volume at 3 intersections, which was counted through the simple surveys at the time of the ex-post evaluation study, was between 66,000 and 82,000 vehicles/day, which exceeds the highway capacity for a 4-lane highway, and is quite high. If the project should not have been implemented, much worse traffic congestion than the current congestion would have occurred around these intersections. In addition, it is considered that the project contributes to some degree to alleviation of

[8] The information on number of residents moved to other resettlement sites was not available.

traffic congestion in a short term as a project impact.

The project has largely achieved its objectives. Therefore, the effectiveness and impact is high.

3.4 Efficiency (Rating: ①)

3.4.1 Project Outputs

The original and actual output of the project is shown in Table 3.

Table 3 Comparison of Output (original and actual)

	Project Scope at Appraisal	Project Scope at Project Completion
Civil work	(1) Improvement of intersections 1) Kim Lien Intersection (construction of a flyover across National Road No.1) 2) Nga Tu Vong Intersection (construction of a flyover across National Road No.1) (4-lane, length: 365m) 3) Nga Tu So Intersection (improvement of an at-grade intersection and installation of signals) including tunnels for pedestrians and a technical tunnel (2) Construction of a mini-bypass 1) Thang Long Bridge South - Dike Road section (3) Improvement of city roads 1) Dike Road (Thang Long Bridge South – Ring Road No. 2) (length: 3.6km) 2) Ring Road No. 1 (Kim Lien - O Cho Dua section) (pavement of about 1.2km section, utility conduit, lighting) 3) Tran Khat Chan Street 4) Lang Trung/Lieu Giai Street 5) Hoang Quoc Viet Street (4) Infrastructure development of the resettlement site 1) Infrastructure development of the resettlement site (clearing of the site, installation of roads, power lines, water supply/sewage system)	(1) Improvement of intersections 1) Kim Lien Intersection (construction of an underpass passing under National Road No.1) (length: 645m) 2) Nga Tu Vong Intersection (construction of a flyover along National Road No.1) (4-lane, length: 250m) 3) Nga Tu So Intersection (improvement of an at-grade intersection and construction of a flyover across Ring Road No.2 (4-lane, length: 441m) including tunnels for pedestrians and a technical tunnel (2) Construction of a mini-bypass 1) Thang Long Bridge South - Dike Road section - as planned (3) Improvement of city roads 1) Dike Road (Thang Long Bridge South – Ring Road No. 2) – almost as planned (length: 4.2km) 2) Ring Road No. 1 (Kim Lien - O Cho Dua section) – almost as planned (length: 1.9km) 3) Tran Khat Chan Street – deleted from the project 4) Lang Trung/Lieu Giai Street - deleted from the project 5) Hoang Quoc Viet Street - deleted from the project (4) Infrastructure development of the resettlement site 1) Infrastructure development of the resettlement site - as planned (5) Installation of pedestrian overbridges – additional work: 18 pedestrian overbridges were planned. However, only 17 units have completed.
Consulting services	・Detail design ・Assistance in tendering (preparation, evaluation) ・Construction supervision and assistance in environmental countermeasures Foreign experts: 291M/M (140M/M (project management)	Original scope of work: as planned However, input was substantially increased due to revisions of outputs and substantial extension of the project period.

	+74M/M (detail designs & supervision) + 77M/M (planning and designs of the resettlement site) Local experts: 517M/M Technical assistants: not mentioned. Administrative: not mentioned.	

Main revisions made on the scope of the work after the detail designs and the reasons for revisions are as follows:

(1) The original plan of constructing a flyover crossing over National Road No.1 at Kim Lien intersection was changed to the plan of constructing an underpass passing through National Road No.1. Main reasons for the design change are as follows: 1) it is difficult to widen the existing National Road No. 1 in order to construct a flyover; and 2) if a flyover should be constructed, it needs to cross over the viaduct for a railway line (future plan), resulting in the roadway with very high elevation.

(2) After reviewing the projected traffic volume at Nga Tu So intersection, it became clear that an at-grade intersection could not handle the traffic volume since the traffic volume increased much more than originally planned. Thus, the original plan was changed to a flyover.

(3) Improvement of Tran Khat Chan Street, Lang Trung Street - Lieu Giai Street, and Hoang Quoc Viet Street was implemented with local funds of HPC since the improvement work needed to be done ahead of the original schedule so that these streets were dropped from the project's financing portion.

(4) After the SAPROF study was conducted, importance of traffic safety measures was recognized. (The risk that citizens cross arterial roads at locations without traffic signals was noted.) Thus, it was agreed that pedestrian overbridges would be constructed at 18 sites.

The scope of work and bill of quantities for 7 subcomponents, which were included in the original project scope, were also revised based on the results of detail designs.

Kim Lien Intersection (Underpass)　　Nga Tu Vong Intersection (Flyover)

As mentioned above, actual outputs differ from the originally planned project scope. Changes made are due to the revisions of project plans of Hanoi People's Committee (HPC) after signing of the Loan Agreement and to the results of detail designs, and they are considered appropriate.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The estimated project cost at appraisal was 19,054 million yen (1,891.9 billion VND (Vietnamese Dong)), of which the total Japanese ODA loan was 12,510 million yen. The actual project cost was 22,132 million yen (of which the total Japanese ODA loan was 8,389 million yen, and is higher than planned (equivalent to 116% of the planned cost). However, the actual project cost in local currency was 2,904.8 billion VND and is equivalent to 152% of the planned cost.

Table 4 Comparison of Project Cost (Planned and Actual)

Item	Planned (at appraisal)				Actual (million VND)		
	ODA loan (million yen)	Own fund (million yen)	Total (million yen)	Total (billion VND)	ODA loan	Own fund	Total
・Civil Work	8,848	0	8,848	878.52	852,400	217,546	1,069,946
1. Kim Lien Intersection (construction of)	2,100	0	2,100	208.51	249,600	45,488	295,088
2. Nga Tu Vong Intersection (construction of flyover)	2,100	0	2,100	208.51	39,000	10,890	49,890
3. Nga Tu So Intersection (improvement of at- grade intersection)	287	0	287	28.50	145,900	28,963	174,863
4. Thang Long Bridge South - Dike Road	700	0	700	69.50	76,300	11,131	87,431
5. Dike Road (Thang Long Bridge South - Ring Road)	1,008	0	1,008	100.08			
6. Ring Road No.1 (Kim Lien－O Cho Dua)	416	0	416	41.30	68,800	4,244	73,044
7. Tran Khat Chan Street	294	0	294	29.19	-	-	-
8. Lang Trung Street - Lieu Giai Street	220	0	220	21.84	-	-	-
9. Hoang Quoc Viet Street	29	0	29	2.88	-	-	-
10. Development of infrastructure of resettlement site	1,694	0	1,694	168.20	158,800	78,040	236,840
11. Installation of pedestrian overbridges - additional work	-	-	-		114,000	38,790	152,790
Price escalation	600	0	600	59.57	-	-	-
Contingency	946	0	946	93.93	-	-	-
・Consulting services	1,290	0	1,290	128.08	183,300	0	183,300

・Compensation for resettlement	0	4,879	4,879	484.43	0	1,586,134	1,586,134
・Management	0	497	497	49.35	-	-	-
・Tax	0	1,168	1,168	115.97	-	-	-
・Interest during construction	826	0	826	82.01	65,438	0	65,438
Total	12,510	6,544	19,054	1,891.87	1,101,138	1,803,680	2,904,818
					in Japanese yen		22,132 million yen

Source: Planned figures (project appraisal documents), Actual figures (the executing agency's responses to the questionnaire)

Exchange rates (at appraisal): 1 US$ =140 yen, 1 US$ =13,900VND (Vietnamese dong), 1 VND＝ 0.01 yen, 1 yen ＝99.29VND

Exchange rates (actual): Since the actual project cost (ODA loan portion) is 1,101.1 billion VND in local currency, and the disbursed amount of loan in Japanese yen is 8,389 million yen, the average exchange rate is 1VND=0.007619 yen.

Note 1: The interest during construction includes service charges.

The total project cost approved by the Vietnamese Government on April 26, 2000, was 1,933 billion VND (19,330 million yen in Japanese yen). After the project commenced, the project scope was revised based on the results of detail designs and due to revisions of project plans of HPC. Main reasons for increase or decrease of the project cost are as follows:

1) A planned flyover at Kim Lien intersection was changed to an underpass.
2) A planned at-grade intersection at Nga Tu So intersection was changed to a flyover.
3) Since the roadway width of Ring Road No.1 (Kim Lien－O Cho Dua section) was widened to 50m through improvement work, public work such as water supply, sewage system and lighting facilities was increased.
4) Public work (development of roads, power lines, water supply and sewage system) was increased for infrastructure development in the resettlement site.
5) Pedestrian overbridges were installed at 18 sites as part of traffic safety measures.
6) Increase of compensation for resettlement.
7) Substantial extension of the project period.
8) Improvement of Tran Khat Chan Street, Lang Trung Street - Lieu Giai Street, and Hoang Quoc Viet Street was dropped from the Japanese ODA financing portion due to changes of project plans of HPC.

3.4.2.2 Project Period

The original project period planned at appraisal was from March 1999 (signing of the Loan Agreement) to June 2004 (completion of civil work) with a total period of 64 months. The actual project period was from March 1999 to December 2013 (first field study by the post evaluation team) with a total period of 178 months, which is equivalent to 278% of the plan and significantly higher than planned.

Table 5 Comparison of Project Period (Original Plan and Actual)

	Plan (at L/A signing)	Actual
Selection of Consultants	Not mentioned.	2000.10 - 2001.7
Detail design	Not mentioned.	Undertaken for each subcomponent during 2001-2007.
Land Acquisition	Not mentioned.	Implemented for each subcomponent during 2001 - 2006
Bidding for Civil Work	Not mentioned.	Implemented during 2001 - 2009
Civil Work	1999.10 - 2004.6	2002.11 - 2010.12
1. Kim Lien Intersection (original construction plan of a flyover was changed to the plan of an underpass)	2000.7 - 2002.7	2006.7 - 2009.9
2. Nga Tu Vong Intersection (construction of a flyover)	2000.7 - 2002.7	2002.3 - 2006.12
3. Nga Tu So Intersection (improvement of an at-grade intersection)	2001.10 - 2003.6	2005.4 - 2007.7
4. Thang Long Bridge South - Dike Road	2002.7 - 2004.6	2002.11 - 2006.9
5. Dike Road (Thang Long Bridge South – Ring Road No.2)	2002.7 - 2004.6	2002.11 - 2003.12
6. Ring Road No.1 (Kim Lien－O Cho Dua)	2000.7 - 2002.6	2005.10 - 2008.11
7. Infrastructure Development of Resettlement Site	1999.10 - 2001.6	2005.12 - 2010.12
8. Installation of Pedestrian Overbridges – additional work		2009.10 - 2013.12 (17 sites completed)
Consulting Services	1999.07 – 2004.9	2001.07 - 2010.12

Source: Project appraisal documents, Project Completion Report, Responses to the Questionnaire

Main reasons for extension of the project period are as follows:

1) After singing of the Loan Agreement, consultant selection was delayed by more than two years due to process of interval clearance in Vietnam.
2) It took a longer time to secure an approval for an EIA report and a revised F/S report by relevant agencies especially regarding the Kim Lien intersection, and also for a F/S report regarding the infrastructure development in the resettlement area.
3) As discussed above, it took a longer time to undertake land acquisition activities for all the subcomponents.
   i) Kim Lien intersection: extension of the construction period by 16 months due to delay of land acquisition.
   ii) Nga Tu So intersection: Construction of pedestrian tunnels was delayed due to land acquisition problems.
   iii) Construction of a Mini-bypass: Construction period was extended due to delay of land acquisition.
   iv) Kim Lien – O Cho Dua section: Construction period was extended due to delay of

land acquisition and undertaking of studies on countermeasures for cultural heritage conservation during the construction.

v) The construction period was substantially delayed due to the lack of capacity of the contractor, who was in charge of infrastructure development of the resettlement site.

vi) Installation of pedestrian overbridges: Installation of 18 units of pedestrian overbridges was added to the project in 2007. After commencement of the construction work (in October 2009), residents objected to location for some overbridges. In addition, inconvenience that foundation of some overbridges comes in contact with the underground public utilities was found. Thus, only 17 overbridges out of 18 units were completed by the time of first field survey by the ex-post evaluation team.

Thang Long Bridge South - Dike Road

Dike Road

The project cost exceeded the plan, while the project period significantly exceeded the plan. Therefore, efficiency of the project is low.

3.4.3 Results of Calculations of Internal Rates of Return (IRR)

The Economic Internal Rate of Return (EIRR) for the whole project calculated at appraisal was 19.8%. Recalculation of EIRR at the ex-post evaluation stage was not made, since the relevant information and date on costs and benefits to calculate the EIRR at completion of the project was not provided by the executing agency.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

Transport Infrastructure Maintenance Project Management Unit (PMU) of Hanoi People's Committee (HPC)'s Transportation Department is responsible for operation and maintenance of infrastructure completed under the project, including programming of the annual maintenance plans and budget planning. The PMU is responsible for operation and

maintenance of a highway network with a total length of 1,900km including national roads, provincial roads and other roads within Hanoi city. The total number of staff of the PMU is about 65, and among which about 40 staff are engineers or technicians. All the maintenance work in the field, including daily maintenance work (including inspection of the road conditions), periodic maintenance and major rehabilitation work, is entrusted to the state-owned company under Transportation Department and a joint-stock company and the PMU is supervising these companies. The maintenance work for three intersections and Ring Road No.1 (Kim Lien－O Cho Dua section) except Dike Road completed under the project is undertaken by a state-owned company (Hanoi Transport Infrastructure Company) with a total number of about 540 staff. Maintenance of Dike Road is undertaken by a joint-stock company (Hanoi Transport Construction Company No.2) with a total number of about 300 staff.

Maintenance of plants, lighting and drainage facilities is undertaken by HPC'c Construction Department; and maintenance of traffic signals by HPC's Police Department in coordination with HPC's PMU.

Ring Road No.1(Kim Lien - OCho Dua section)

3.5.2 Technical Aspects of Operation and Maintenance

All 40 technical staff of Transport Infrastructure Maintenance PMU have a qualification of university graduate or above. According to the PMU, the technical capability of each technical staff of the PMU (management, engineers, and technicians) is considered appropriate and the number of staff allocated is also considered sufficient. All the staff regularly take the internal training implemented by Transport Department and the training programs offered include the following subjects: new technology on maintenance work, new materials/equipment used for maintenance work, and project management. Overseas training (including in Japan) is also implemented and staff have been sent to overseas. Various guidelines and manuals are well prepared including followings: Transport Infrastructure Management and Maintenance Standards; Construction and Maintenance Work Unit Price; Maintenance Work Measurement and

Acceptance Standards, and Routine Maintenance Manual.

Hanoi Transport Infrastructure Company, which is responsible for maintenance of three intersections and Ring Road No.1 (Kim Lien－O Cho Dua section), has about 540 staff. Among the total staff, about 170 are professional staff and the remaining 370 are technicians/workers. Professional staffs are graduates of graduate school or 4-5 year university or 3-year college and most of them are engineers. The staff regularly take the internal training or training program offered by the external institutes. The training programs which staff regularly take include the general modules (fire fighting, safety management and control at job sites, security measures, company's regulation and operational manuals and others), and specific and particular modules (bridge and road maintenance and others), which are offered corresponding to specialty of each staff. The company makes effort to improve technical capacity of the staff through recruiting qualified professionals and undertaking training program regularly.

According to Transport Infrastructure Maintenance PMU, technical capacity of the staff of Hanoi Transport Construction Company No.2, which is responsible for maintenance of Dike Road, and the training program to improve technical capacity are considered appropriate.

3.5.3 Financial Aspects of Operation and Maintenance

Expenditures for routine maintenance disbursed from the Hanoi city's general budget for above mentioned three intersections and Kim Lien – O Cho Dua section for the past 3 years is shown in Table 6.

Table 6 Expenditures disbursed for Routine Maintenance Work

Unit: million Vietnam Dong

Intersection/Road	Expenditure		
	2011	2012	2013
1) Kim Lien Intersection	1,200	2,300	3,000
2) Nga Tu Vong Intersection	50	550	70
3) Nga Tu So Intersection	1,800	2,500	3,200
4) Kim Lien－O Cho Dua	10	12	15

Source: Transport Infrastructure Maintenance PMU
Note 1: Routine maintenance includes daily inspections, clearing and small repairs.

The reason for higher maintenance cost for Kim Lien intersection is that the subject project road is an underpass passing under National Road No.1 and thus costs for assigning securities and for operating equipment such as surveillance cameras are needed. Regarding the maintenance cost for Nga Tu So intersection, the subject project road is a

flyover crossing over Ring Road No.2, and in addition underground passages for pedestrians and cyclists are constructed under the at-grade intersection to connect all directions. Thus, it causes higher maintenance costs than those for other items for allocation of security guards, maintenance of fire extinguishers, operation and maintenance of surveillance cameras, and maintenance of other facilities. The operation and maintenance costs for the above mentioned two intersections include those for training and on-the-job training on road safety and fire prevention for security guards and management staff.

Expenditures disbursed from the HPC's general budget for periodic maintenance for above mentioned three intersections and Kim Lien – O Cho Dua section for the past 3 years is shown in Table 7.

Table 7 Expenditures disbursed for Periodic Maintenance Work

Unit: million Vietnam Dong

Intersection/Road	Expenditure		
	2011	2012	2013
1) Kim Lien Intersection	3,000	-	1,200
2) Nga Tu Vong Intersection	-	450	800
3) Nga Tu So Intersection	-	-	800
4) Kim Lien－O Cho Dua	200	100	100

Source: Transport Infrastructure Maintenance PMU

Expenditure accrued in 2011 with respect to Kim Lien Intersection is construction cost for the additional retaining wall to prevent inflow of rain water into the underpass section, while, expenditure accrued in 2013 is for repainting of retaining wall. Expenditure accrued in 2012 with respect to Nga Tu Vong Intersection is costs for repainting of markings on the pavement, and that accrued in 2013 is for repainting of retaining wall. Expenditure accrued in 2011 with respect to Kim Lien Intersection is costs for removing median barriers on roadway, while those accrued in 2012 and 2013 are both for repainting of markings on the pavement.

According to Transport Infrastructure Maintenance PMU, the present maintenance budget (needed for routine operation and maintenance) allocated to three intersections and Kim Lien – O Cho Dua section is considered sufficient. Regarding the budget needed for periodic maintenance, since the quality of infrastructure constructed under the project is high, the expenditure is minimal and budget is appropriately allocated as needed.

3.5.4 Current Status of Operation and Maintenance

Regarding the regular inspection of equipment/device/infrastructure installed or constructed under the project, existence or non-existence of irregularities is checked

through visual inspection as part of daily routine maintenance work. Since water leakage from the excavated side-walls was found at a few spots in half a year after the project completion at Kim Lien intersection, repair was made during the defect liability period (2009 - 2011) and the project was officially handed over to the executing agency. Although seepages have been still found at other spots during the rainy season, Transport Infrastructure Maintenance PMU has conducted repair work as a part of routine maintenance work. The ex-post evaluation team conducted ocular inspection of intersections, roads, resettlement sites and additional pedestrian overbridges under the project, and found no particular problems.

No particular problems are found in the maintenance management system and the technical skills for intersections and roads constructed by the project, and the maintenance budget is appropriately allocated. From the ocular inspection during the field surveys, no major damage nor defect on equipment and infrastructure installed or constructed under the project was observed.

No major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance system. Therefore sustainability of the project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

Objectives of the project were to alleviate traffic congestion and to enhance the logistics' efficiency in Hanoi city by constructing and improving roads and intersections, which caused bottlenecks in road traffic, thereby contributing to development of regional economy and improvement of urban environment. The project has been highly relevant to the development plans and needs of Vietnam, as well as Japan’s ODA policies. The current through traffic at three intersections, which was counted by simple traffic count surveys under the ex-post evaluation study, is 66,000 - 82,000 vehicles/day, which exceeded the highway capacity for a 4-lane highway, and it is very high. It is possible that heavier traffic jam than what it is at the time of ex-post evaluation would have occurred around each intersection if the project should not have been implemented. It is also considered that the project has been contributing to alleviation of traffic congestion to some extent in a short term as an impact of the project. Thus, the project has largely achieved its objectives, and the effectiveness and impact are high. Actual outputs differ from the originally planned project scope. Changes made are due to revisions of project plans of Hanoi People's Committee (HPC) after signing of the Loan Agreement and to the results of detail designs, and they are considered appropriate. The project cost was higher

than planned, and the project period was significantly longer than planned. Therefore, efficiency of the project is considered low. No major problems have been observed in the institutional, technical and financial aspects, therefore sustainability of the project effect is considered high.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

It is recommended to conduct regular traffic counting, at the same location and at same time of the year, along ordinary roads and at intersections. The traffic volume is a fundamental data for planning and programming its yearly maintenance and management work, and for preparation of future road development plans. Therefore, the Maintenance Division in charge should conduct traffic counts, analyze and store the data, and utilize them for future planning.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

(1) Thorough appraisal taking into consideration rapidly changing urban condition

Under the project, the project period was extended due to substantial revisions on the project scope. In the large-scale infrastructure projects in the urban area, the project scope could be changed in order to respond to rapidly changing urban traffic condition. At the appraisal time, it is needed to thoroughly appraise/confirm the plans of relevant infrastructure projects in the discussions with the borrower country taking into account the risk of rapidly changing traffic condition.

(2) Undertaking of detailed confirmation studies due to substantial changes of the project scope

When major changes were made on the project scope after detail designs like under this project, detailed confirmation studies should be undertaken. It is essential to consider revisions on the project plan/program and target numbers (value) of indicators based on the review results on the project scope, projects costs, project period and monitoring indicators. In such a case, since there may be the possibility of the need for revision on environmental and social considerations aspects, it is needed to review whether or not the project tackles the issue appropriately at the detailed confirmation study.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1. Output 1) Civil Work	(1) Improvement of intersections 1) Kim Lien Intersection (construction of a flyover across National Road No.1) 2) Nga Tu Vong Intersection (construction of a flyover across National Road No.1) (4-lane, length: 365m) 3) Nga Tu So Intersection (improvement of an at-grade intersection and installation of signals) including tunnels for pedestrians and a technical tunnel (2) Construction of a mini-bypass 1) Thang Long Bridge South - Dike Road section (3) Improvement of city roads 1) Dike Road (Thang Long Bridge South – Ring Road No. 2) (length: 3.6km) 2) Ring Road No. 1 (Kim Lien - O Cho Dua section) (pavement of about 1.2km section, utility conduit, lighting) 3) Tran Khat Chan Street 4) Lang Trung/Lieu Giai Street 5) Hoang Quoc Viet Street (4) Infrastructure development of the resettlement site 1) Infrastructure development of the resettlement site (clearing of the site, installation of roads, power lines, water supply/sewage system)	(1) Improvement of intersections 1) Kim Lien Intersection (construction of an underpass passing under National Road No.1) (length: 645m) 2) Nga Tu Vong Intersection (construction of a flyover along National Road No.1) (4-lane, length: 250m) 3) Nga Tu So Intersection (improvement of an at-grade intersection and construction of a flyover across Ring Road No.2 (4-lane, length: 441m) including tunnels for pedestrians and a technical tunnel (2) Construction of a mini-bypass 1) Thang Long Bridge South - Dike Road section - as planned (3) Improvement of city roads 1) Dike Road (Thang Long Bridge South – Ring Road No. 2) – almost as planned (length: 4.2km) 2) Ring Road No. 1 (Kim Lien - O Cho Dua section) – almost as planned (length: 1.9km) 3) Tran Khat Chan Street – deleted from the project 4) Lang Trung/Lieu Giai Street - deleted from the project 5) Hoang Quoc Viet Street - deleted from the project (4) Infrastructure development of the resettlement site 1) Infrastructure development of the resettlement site - as planned (5) Installation of pedestrian overbridges – additional work: 18 pedestrian overbridges were planned. However, only 17 units have completed.
2) Consulting Services	・Detail designs ・Assistance in tendering (preparation, evaluation) ・Construction supervision and assistance in environmental countermeasures Foreign experts: 291M/M (140M/M (project management) +74M/M (detail designs & supervision) + 77M/M (planning and designs of the resettlement site) Local experts: 517M/M Technical assistants: not mentioned. Administrative: not mentioned.	Original scope of work: as planned However, input was substantially increased due to revisions of outputs and substantial extension of the project period.

2. Project Period	March 1999 -June 2004 (64 months)	March 1999 -December 2013 (178 months)
3. Project Cost Amount paid in Foreign currency	9,176 million yen	Unknown
Amount paid in Local currency	9,878 million yen	Unknown
Total	19,054 million yen	22,132 million yen
Japanese ODA loan portion	12,510 million yen	8,389 million yen
Exchange rate	1VND = 0.010 yen (As of October 1998)	1VND = 0.007612 yen (Average between March 1999 and December 2013)