Republic of the Philippines

Metro Manila Strategic Mass Rail Transit Development (I), (II), (III)[1]

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Field Survey: November 2008-July 2009

1. Project Profile and Japan's ODA Loan

Location of Project Site

Line 2 train running near Santolan Station

1.1 Background

In order to improve the traffic condition in Metro Manila (consisting of 17 cities and towns with a land area of 636 ㎢ and population of 11.55 million as of 2007), which mostly relays on the road transport, the Light Rail Transit (LRT) Line 1 which traverses between the northern and southern parts of the Metropolitan central area was constructed with the Belgian commercial loan, and its operation commenced in December 1984. However, due to the increased number of registered vehicles and traffic volume reflecting the economic growth since early 90th the traffic congestion in Metro Manila was reaching to the critical level (the average running speed of about 18 km/hr). Since December 1995, the in-flow traffic to the city center has been controlled to tackle the worsened traffic condition and air pollution caused by exhausted gas. The economic loss due to traffic congestion has been substantial.

The early development of the mass public transport system, which is safe, comfortable, economical, punctual and clean, has been anticipated to resolve the worsened road transport condition, and planning of construction of elevated railway network, which is free from at-grade traffic congestion has been promoted. Particularly, the Line 2, which connects with the northern/southern parts of the city and will serve as a

[1] The ex-post evaluation for this project was jointly conducted with the Philippines' National Economic and Development Authority..

commuting line for the people living in the suburb was considered as the priority line from the viewpoint of the congestion level and traffic volume.

1.2 Objective

The project objective is to ease traffic congestion and improve the urban environment by improving traffic and transport conditions in Metro Manila, which is mainly relied on the road transportation mode, through construction of a new mass transit line (Line 2). The location of the project site is shown in Figure 1.

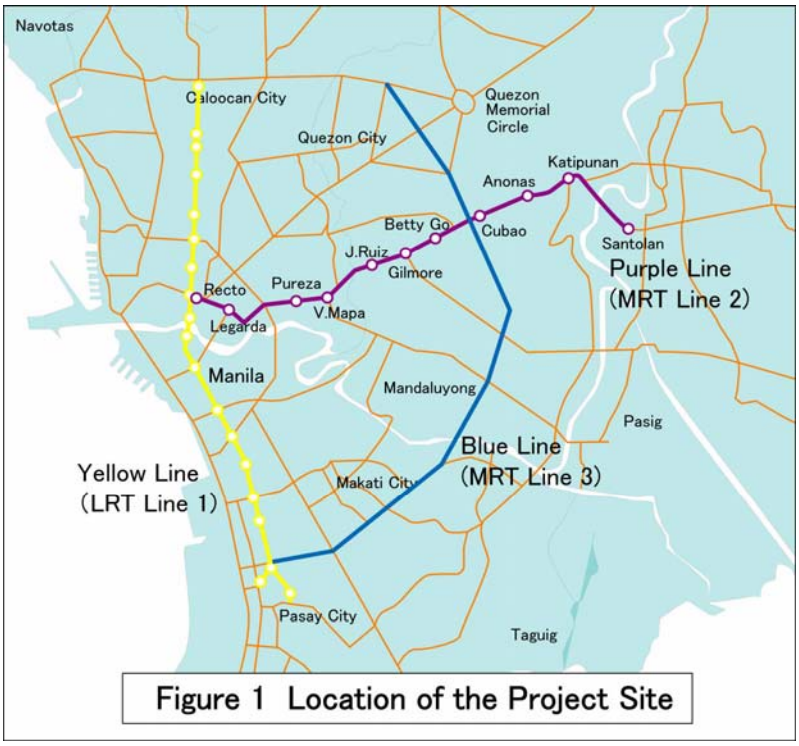

Figure 1 Location of the Project Site

1.3 Borrower/Executing Agency

Philippines Light Rail Transit Authority (LRTA) (I)/LRTA

Government of the Republic of the Philippines (II) (III)/LRTA

1.4 Outline of Loan Agreement

Loan Amount/Disbursed Amount	(I) 24.712 billion yen/20.586 billion yen (II) 26.344 billion yen/26.107 billion yen (III) 23.668 billion yen/13.476 billion yen Total 74.724 billion yen/60.169 billion yen
Exchange of Notes/Loan Agreement	(I) March 1996/ March 1996 (II) March 1997/ March 1997 (III) September 1998/ September 1998

Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	(I) 2.7%; Consultant: 2.3% 30 years (10 years); Consultant: 30 years (10 years), General Untied (II) 2.7%; Consultant: 2.3% 30 years (10 years); Consultant: 30 years (10 years), General Untied (III) 0.75% 40 years (10 years); General Untied
Date of（Disbursement）Completion	（I） July 26, 2005 （II） June 26, 2003 (III) July 26 2005
Main Contractors	(I）Sumitomo Shouji (Japan)、Hanjin Engineering and Construction Co. Ltd (Korea）/ C. Ito (Japan) （II）Hanjin Engineering and Construction Co. Ltd.（Korea）/ C. Ito(Japan)、(II, III) Toshiba (Japan) / Balfour Beatty Group (UK) / Korea Rolling Stock Corporation (Korea) / Marubeni (Japan)
Consultant Services	（I）DeLeuw Cather International (US)/ Sir William Halcrow (UK) / Katahira & Engineers International
Feasibility Study	F/S by the Philippines Government (August 1991)

2. Evaluation Results (Rating: C)

2.1 Relevance (Rating: a)

2.1.1 Relevance at the time of appraisal

This project was included in the National Medium-term Development Plan (1993-1998) and was also listed as a one of “flagship projects” nominated by President Ramos. Thus, the project is consistent with the Government investment strategies and policies. The forecasted number of passengers at the first operational year (2001) was 580,000 passengers per day, connecting with the existing line 1 and line 3 under construction.

2.1.2 Relevance at the time of evaluation

The basic task of the current Mid-Term Philippines Development Plan (MTPDP, 2004-2010) is to fight poverty, particularly focusing on spurring economic growth and creating jobs. In the 2008 State of the Nation Address, President Arroyo reconfirmed six priorities and objectives of the MTPDP. The infrastructure development is one of priorities and within the infrastructure program priority will be given to five regions including central Luzon. With the development of infrastructure, linkage among each region in the country will be strengthened and transport of freight/passengers was planned to be made faster, safely and with lower costs. This project is still one of priorities under the Updated Metro Manila Traffic and Transport Management Plan (revised Metro Manila

Traffic and Transport Management Plan). Numbers of passengers (passengers/ day) for the past four years are 114,800 (2005), 130,300 (2006), 145,000 (2007), and 160,500 (2008), and these are much less than expected. If the Line 2, in which a train has a capacity of 1,650 passengers, should not has been constructed, the road traffic with at least 16,000 vehicles per day (1,600 vehicles per hour) might has been generated and thus areas along the project corridor would has been severely congested all day long

The objective of the subject project is consistent with the government development policies at the time of appraisal and at ex-post evaluation and the project is highly relevant to national development needs.

2.2 Efficiency (Rating: b)

2.2.1 Outputs

The project description and output are shown in Table 1. Regarding the civil works, the area for the train depot was forced to be reduced due to unsuccessful negotiations for land acquisition with some property owners. Other items have been completed as planned.

Platform of Santolan Station

Line 2 track near Anonas Station

Table 1 Project Description and Output

Item	Plan	Actual	Reasons for changes
① Depot	approximately 18,000 ㎡	Approximately 12,400 ㎡	The area for the train depot was forced to be reduced due to unsuccessful negotiations for land acquisition with some property owners.
② Substructure	line length 13.863km	as planned	
③ Superstructure	12.333km	as planned	
④ Stations/fare collection system	10 on viaduct and 1 underground	as planned	
⑤ Vehicles	4 cars x 18 trains ＝72 cars	as planned	
⑥ Ancillary facilities	signals, communications	as planned	

⑦ Tracks	gauge 1.435m	as planned	
⑧ Consulting services （assistance in bidding and system mobilization, construction supervision, assistance for operation and planning.	Foreign : 692M/M、 Local: 1,719M/M、 Local staff: 804M/M	Foreign : 901 M/M、 Local: 2,482 M/M、 Local staff: 1,086 M/M	Due to extension of the construction period, the term of supervision contract was also extended.

Note: Phase I covers costs for depot, substructures and consulting services. Phase II and III cover costs for superstructure, stations/fare collection system, vehicles, ancillary facilities, tracks and consulting services.

2.2.2 Project period

The planned project period at time of appraisal (Phase I) was from March 1996 (L/A signed month) to May 2001 (civil work completion date) with a total period of five years and three months. The actual period was from March 1996 to October 2004 (civil work completion date) with a total period of eight years and eight months, resulting in about three years and five months delay at 165% compared with the planned period. The actual completion date for each item is as follows: Depot completed (October 2002), Substructure completed (February 2003), Superstructure/stations completed (October 2004), fare collection system/vehicles/ancillary facilities completed (October 2004). Consulting services covering Phases I, II, III completed in July 2005. The main reasons for delay are as follows: 1) took more time than expected for negotiations (including securing the replacement for illegal settlers after relocation) on land acquisition. Originally, the land acquisition/resettlement was scheduled for February through September 1996. However, actually it was implemented from March 1997 through September 2002, 2) took more time to investigate and survey overhead and underground utilities (electric cables, gas, water pipes) before commencement of construction, since no as-built plans were available, 3) took more time to negotiate Package 4 contract (fare collection system, vehicles, ancillary facilities, tracks) and 4) design change (location of Santolan station, location of substructures for Pureza station, structures for station entrance, viaduct structures, crossing structures along Quezon).

2.2.3 Project cost

The estimated total project cost at appraisal (Phase I) was 102.771 billion yen and the total loan amount was 74.724 million. The actual total project cost was 87.99 billion yen and the loan amount disbursed was 60.17 billion yen. Comparing with the estimated project cost made at appraisal in March 1996, the actual project cost was 14% less in Japanese yen, and was about 6% higher in Peso base. However, the loan amount disbursed

was about 20% less than expected. Cost for the depot was decreased due to reduced areas. Costs for substructure, stations, fare collection systems, vehicles, ancillary facilities and tracks were substantially increased (3.3 times). Cost for consulting services was doubled since the assignment period was extended. In peso, the project cost is higher than planned. However, in Japanese yen, the project cost was decreased since the exchange rate for Japanese yen was higher than planned.

Table 2: Project Cost (Planned and Actual)

Plan			Actual		
Item	million yen	million peso	Item	million yen	million peso
Depot	5,572	1,393	Depot	3,401	1,052
Substructure	15,560	3,890	Substructure	12,761	3,947
Superstructure	9,404	2,351	Superstructure/stations	19,902	6,156
Stations/fare collection system	7,040	1,760	Fare collection system/vehicle/Ancillary facilities/tracks	23,808	7,364
Vehicle	15,840	3,960			
Ancillary facilities	8,975	2,244			
Tracks	3,524	881			
Consulting services	3,129	782	Consulting services	5,150	1,593
Price contingencies	4,084	1,021			
Physical contingencies	7,000	1,750			
Land acquisition	18,536	4,634	Land acquisition	12,680	3,922
Interest during construction	4,107	1,027	Interest during construction	5,593	1,730
			Taxes/levies	4,613	1,427
Total	102,771	25,693	Total	87,908	27,191

Note: 1P = 4 yen at appraisal, 1P = 3.233 (average exchange rate during implementation)

The project cost was within the estimated cost, but the project period substantially exceeded the planned period. Thus, the efficiency is considered to be moderate.

2.3 Effectiveness (Rating: b)

2.3.1 Number of passengers

The actual number of passengers/day is about one-third of the planned. Reasons for

less passengers are: 1) the line length served is short and the line is not extended to the area where more passengers are expected (Masinag); and 2) connection with other lines (lines 1 and 3) is inconvenient. Thus, diversion from the road transport (bus and jeepney) has not taken place. The expected diversion rate was 50%.

Table 3: Number of Passengers

Year	Number of passengers/day	
	Planned	Actual
2005	434,000	114,800
2006	477,400	130,300
2007	525,000	145,000
2008	577,610	160,500

Source: LRTA

2.3.2 Number of Running Trains

It was planned that a train consisting of four cars would be operated every three minutes for the forecasted 570,000 passengers per day, at the time when the Line 2 would be fully operational (expected in 2000). Currently, a train is operated every five minutes during peak hours.

Table 4: Number of Running Trains

Year	Number of running train/day (peak hours)
2005	11.2
2006	11.5
2007	12
2008	11

Source: LRTA

2.3.3 Load Factor

The load factor indicates that it is still about 40% even in four years after opening to public and this result hints that there is still allowance to the capacity.

Table 5: Load Factor

Year	%
2005	31
2006	31
2007	34
2008	39

Source: LRTA

2.3.4 Internal rate of return

The financial internal rate of return (FIRR) at the appraisal stage was estimated using construction and maintenance costs as cost, and the fare revenue as quantitative benefits. The FIRR was estimated at 3.8%. In the estimation of fare revenue, it was assumed that the fare was flat with 11 peso for all sections, and that about 50% of the existing traffic demand along the corridor would divert to Line 2. At this post evaluation, the following assumptions were made: i) construction cost is actually spent costs; ii) regarding the maintenance cost and fare revenue, those for 2005-2008 are actual cost and those for the remaining project period are reestimated. The recalculated FIRR is 3.35%.

The economic internal rate of return (EIRR) at the appraisal stage was estimated using construction and maintenance costs as cost, and reduction of time cost and savings of vehicle operation cost as quantitative benefits. EIRR was estimated at 16.3%. In the estimation of EIRR at the post evaluation stage, the following assumptions were made: i) construction cost is actually spent cost; ii) regarding the maintenance costs, those for 2005-2008 are actual costs and those for the remaining project period are reestimated, iii) time cost and vehicle operating costs were increased taking into consideration the price escalation. The recalculated EIRR is 15.35%.

Table 6: Internal Rate of Return (%)

	At appraisal	At ex-post evaluation
FIRR (%)	3.8	3.35
EIRR (%)	16.3	15.35

2.3.5 Qualitative impact

From the beneficiary survey, it was confirmed that the project contributes to alleviation of traffic congestion in Metro Manila (particularly along Magsaysay and Aurora Blvd.) and promotion of the economic development along the corridor. Regarding the improvement of the living environment of the corridor due to easement of traffic flow, 48% of respondents of the beneficiary surveys perceive that the air quality was improved and 37% of respondents recognize that the traffic noise was improved. Thus, positive impacts by the project was confirmed.

2.4 Impact

2.4.1 Benefits to the people in the project affected area

Under the post evaluation, beneficiary surveys were undertaken at 11 stations and their vicinity by interviews. The number of respondents at each station is about 330 with a total of 3,604 respondents. According to the classification of respondents by sex, 51%

were female and 49% male. Major findings through surveys are as follows:

1) Contribution to assuage traffic jams in Metro Manila: 91% of respondents believe that LRT2 has contributed.
2) Easement of traffic congestion along roads parallel to LRT2: 86% of respondents were of the opinion that LRT2 has allayed the traffic jam.
3) Enhancement of accessibility: enhanced: to their work place (24%), social services (24%), and markets/shops/trading centers (22%).
4) Decrease of travel time: , 99% admitted positive answer and 60% indicated that the decrease was more than 16 minutes.
5) Transport cost: 97% admitted that the transport cost was reduced.
6) Appropriateness of fare: 57% of respondents perceive that the fare is high
7) Increase of fare: Among respondents who indicated the fare is reasonable, 84% suggest fare increase of 2 peso.
8) Riding comfort: 96% indicate positive answer.
9) Promotion of local economic activities: 83% perceive that local economic activities were increased.
10) Expansion of business chances: 72% perceive that business chances were increased.
11) Increase of family income: 84% indicated that income was increased.

Train depot near Santolan Station

Inside of Anonas Station

2.4.2 Environmental and social impact

Forty-eight (48)% of survey respondents perceive that the air quality was improved and 35% receive that there is no change. Regarding the noise level, 37% perceive that it was improved and 38% indicated that there is no change. From these results, the project contributes to some extent to improvement of urban environment, which is one of development objectives.

The land area for a depot was reduced to 12.4 ha from the original 23.4 ha. Although it was expected that there would be 145 property owners subject of right of way acquisition, the actual number of owners involved was 120 and 63 owners have been fully paid so far. Remaining 57 owners have been partially paid or are subject to expropriation process or for payment. During the beneficiary surveys, 275 indicated that their properties were affected by the project. Types of properties affected by the project are as follows: houses (55%); and lot (23%). To the question whether or not compensation was properly made, 92% of respondents indicated negative answer.

Therefore, this project has brought certain effects, and its effectiveness is moderate.

2.5 Sustainability (Rating: b)

2.5.1 Executing agency (Philippines Light Rail Transit Authority: LRTA)

Philippines Light Rail Transit Authority (LRTA) was the project executing agency and has been operating and maintaining the Line 2.

2.5.1.1 Operation and maintenance system

The operation and maintenance had been directly implemented by the Line 2 Operations and Engineering Department of LRTA from its partial operation in April 2004,, which consists of Station Operation Division, Train Operations Division, Traffic Control Division, Safety Section, Operations Training Section, Maintenance Audit Section and a maintenance contractor. The number of employees is about 330. However, since the number of passengers was not as originally expected and the financial status was worsened, from June 16, 2007 maintenance works have been entrusted to a private enterprise (Telefonica Pacific Autre Porte Technology Global, Inc.) for more cost efficient O&M.

2.5.1.2 Technical capacity in operation and maintenance

The objective of the training program of LRTA is to learn the required knowledge, which is needed to undertake the job under his/her responsibility. Simultaneously, the training is designed to enhance the quality and capacity of each staff and lead to the promotion in the future. Manuals regarding operation and maintenance include the following documents:

- Operation and maintenance manuals
- Instructions and circulations
- Parts catalogue
- As-built plans

Issues concerning maintenance are availability of materials. Reasons for

difficulties of securing parts are: some parts are specially ordered items and not available in the market and suppliers are limited.

LRTA currently implements a localization program of parts to sustain the running condition of the 14 operational train sets. A resource database was also created that lists suppliers of spare parts, which are cost-effective to LRTA. Whenever possible, modification of parts is resorted to further reduce cost. A Research and Development Unit was created to undertake research for possible substitutes for obsolete spare parts.

2.5.1.3 Financial status on operation and maintenance

1) Income Statement of Line 2

The balance sheet of Line 2 is shown in Table 9.

Table 9 Income Statement of Line 2

Unit: million peso

	Net revenue	Operating expenses	Profit	Farebox ratio
2005	563	511	52	1.10
2006	643	582	61	1.10
2007	749	730	19	1.02
2008	815	756	59	1.08

Note: Farebox ratio＝revenue/railway operating expenses(excluding depreciation)

The income statement indicates that the revenue barely covers costs for operating expenses. About one billion peso will be needed for major rehabilitation works, which are expected to take place within ten years after the first operational year (2012). Moreover, repayment of yen loan started in 2006 and from 2009 about 3.3 billion yen would required every year. Since it is considered difficult to finance these costs under the current critical financial condition of LRTA, further injection of subsidies from the central government is expected. At the appraisal stage, the fare was expected to be flat rate (11 peso). Since its operation in 2003, the fare structure (12-15 peso depending on the travel distance with an average fare of 13.5 peso) has been maintained Comparing with fare of buses and jeepneys operated along the corridor, in case of riding of the whole section (14km), the LRT 2 fare is set much lower. In case of riding the average travel distance (7-8km), the LRT2 fare is lower than those of buses by 2-3 peso. Although amendment of fare needs to be approved by the government, it should be considered that the fare is increased by at least 2-5 peso for medium/long travel.

Table 10 Fares by Transport Mode

Length (km)	Jeepney	Bus (ordinary)	Bus (aircon)	LRT2
1-5 km	8.2	9	12	12
8km	13.1	14.85	18.6	13
14km	21.5	26.55	31.8	15

Note: fare as of December 15, 2008

2) Financial status of LRTA

The loss and income statement of LRTA is shown in table 11.

Table 11 Loss and Income Statement of LRTA

Unit: million peso

Year	Revenue	Operating profit	Net income
2001	1,147.0	△206.4	△967.2
2002	1,211.9	△156.3	△1,529.3
2003	1,256.7	△269.4	5,348.1
2004	1,659.8	△56.4	△1,463.6
2005	2,057.9	△118.0	114.4
2006	2,230.5	△2,271	400.4
2007	2,449.6	△1,327	1,058.2

Note: The reason for substantial increase of net income for 2003 is due to provision of subsidy (5.569 billion peso) from the government.

The operating profit from the operation of Lines 1 and 2 has been continuously in a deficit. Reasons for plus net income in certain years are due to foreign exchange gain and injection of subsidies from the government.

The balance sheet of LRTA is shown in Table 12.

Table 12 Balance Sheet of LRTA

Unit: million peso

Year	Assets	Liabilities	Capital
2001	18,692	23,593	△4,901
2002	26,522	33,399	△6,877
2003	38,670	40,287	△1,817
2004	42,781	45,828	△3,047
2005	46,074	46,031	43
2006	45,989	45,027	962
2007	46,349	44,141	2,208

Assets are mainly fixed assets (land, buildings, structures and equipment). About

90% of liabilities are long-term debt (including yen loan) and as of December 2007 there is about 44.1 billion peso liabilities. An act to increase authorized capital, which was under discussion in Congress at appraisal has not passed yet. The equity is only 2.2 billion peso.

2.5.2 Operation and Maintenance status

Depot, Electronics, and tracks: Upon completion, some items which needed modification or refinement were found. The cost for modification and refinement was high and it also required some special technical solution. However, all the necessary modifications were completed by contractors. Some problems were also found with respect to the power supply system, overhead contact system, facilities and structures. However, all the necessary modification and improvement work has been completed by contactors. The most critical issue is that currently, only 14 trains out of 18 trains are in good running condition and four trains are down due to unavailability of spare parts and other reasons. Maintenance is classified generally into preventative and corrective maintenance, and special repairs. Preventive maintenance is regularly undertaken and includes inspection, cleaning, lubrication, testing and replacement of parts. Vehicles, tracks, electric/mechanical facilities, and buildings are regularly maintained. Corrective maintenance is undertaken each time when equipment or systems have failed and created a faulty condition. Special repairs are unforeseen and not directly happen as a result of negligence by employees and suppliers. It is performed as needed.

The fare revenue from Line 2 under this project is much less than expected, and thus the financial status of LRTA is in critical condition. Problems on future operation and maintenance are foreseen. The sustainability of this project is low.

3. Feedback

3.1 Conclusion

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

3.2 Lessons learned

As lessons learned through this project, thee issues are listed.

1) The project for construction of a urban mass transit system generally requires a huge initial capital investment. Since the project could not be viable depending on only fare revenue, it is considered that provision of capital investment and subsidies from the

government is inevitable. At the preparation and appraisal stages, detailed financial analysis and financial planning (dissolution of an excess of debt, planning of debt returning, strengthening of management fundamentals) should be made and an Action Plan for the government assistance should be developed. During the project implementation, the action plan needs to be strictly monitored so that the proposed actions are implemented as planned.

2) Due to difficulties of obtaining spare parts, four trains are not currently operational. At the project preparation stage, the following should be investigated: availability of spare parts locally; and how to obtain spare parts if locally unavailable. When the equipment is purchased, spare parts needs to be purchased at the same time and the required number and items of spare parts should be included in the contract for the purchase of equipment.

3) There are few riders in Betty Go and J.Ruiz stations. These stations entail costs during construction and additional O&M costs. These could have been avoided if a more in-depth travel demand analysis was conducted during the FS preparation.

3.3 Recommendations

As recommendations, three issues are listed.

1) Vehicles and some equipment have customized specifications, and thus spare parts are not locally available. As a result, spare parts need to be imported and these costs are very high. Specifications should be more general as much as possible so that spare parts are locally available and rectification during breakdown can be done locally. A clause on an appointment of local agents should be clearly specified in the bidding document and in a contract so that the after-service can be easily available.

2) In the process of the economic and financial analysis, the operation and maintenance costs needed every year during the operation stage are considered as ”cost”. However, costs for major rehabilitation, which are required once in several years are not included as “cost”. In order to operate trains efficiently, safely and economically, required costs need to be considered as “cost”.

3) As noted under the financial status of LRTA particularly in its O&M, it indicates that the revenue barely covers cost for operating expenses and it requires a continuous support from the government. It is being recommended to consider an increase in fare by at least P2 as a result of the beneficiary survey conducted for the project.

Comparison of the Planned and Actual Figures

Item	Plan	Actual
- Depot - Substructure - Superstructure - Stations/fare collection system - Vehicles - Ancillary facilities - Tracks	approximately 18,000 ㎡ line length 13.863km 12.333km 10 on viaduct and 1 underground 4 cars x 18 trains ＝72 cars signals, communications gauge 1.435m	Approximately 12,400 ㎡ as planned as planned as planned as planned as planned as planned as planned
- Consulting services （assistance in bidding and system mobilization, construction supervision, assistance for operation and planning.	Foreign : 692M/M、 Local: 1,719M/M、 Local staff: 804M/M	Foreign : 901 M/M、 Local: 2,482 M/M、 Local staff: 1,086 M/M
Term	March 1996 (L/A) – May 2001 (Project completed) 5 years 3 months (63 months)	March 1996 (L/A) – October 2004 (Project completed) 8 years 8 months (104 months)
Project costs Foreign currency Local currency Total Yen loan	102.771 billion yen 61.612 billion yen 41.160 billion yen 74.724 billion yen	87.99 billion yen 60.170 billion yen 27.738 billion yen 60.170 billion yen

Note: Phase I covers depot, substructure, and consulting services. Phases II and III cover superstructure, stations, fare collection system, vehicles, ancillary facilities, tracks and consulting services.