

Japan International Cooperation Agency (JICA)  
National Development Planning Agency (BAPPENAS)  
Republic of Indonesia

# **THE STUDY ON INTEGRATED TRANSPORTATION MASTER PLAN FOR JABOTABEK (PHASE I)**



**FINAL REPORT  
VOLUME IV : REVIEW OF JORR PROJECT  
JANUARY 2001**

**PACIFIC CONSULTANTS INTERNATIONAL  
ALMEC CORPORATION**

Japan International Cooperation Agency (JICA)  
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The exchange rates applied in this Study are:

US\$ 1.00 = Rp. 7950

Japanese Yen 1 = Rp. 75

(As of the end of September 2000)

## PREFACE

In response to the request from the Government of the Republic of Indonesia, the Government of Japan decided to conduct the Study on Integrated Transportation Master Plan for JABOTABEK (Phase 1) and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Isamu Gunji of Pacific Consultants International Co., Ltd. and consisting of members from Pacific Consultants International Co., Ltd. and Almec Corporation to Indonesia, twice between March 2000 and January 2001. In addition, JICA set up an advisory committee headed by Dr. Haruo Ishida, Professor of Tsukuba University between March 2000 and January 2001, which examined the study from specialist and technical points of view.

The team held discussions with the officials concerned of the Government of the Republic of Indonesia and conducted field surveys in the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this study and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the team.

January 2001



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Kunihiko Saito  
President  
Japan International Cooperation Agency

January 2001

Mr. Kunihiro Saito  
President  
Japan International Cooperation Agency

**Subject: Letter of Transmittal**

Dear Sir,

We are pleased to submit herewith the Final Report of "The Study on Integrated Transportation Master Plan for JABOTABEK (Phase I)".

The report contains results of the study which was carried out by Pacific Consultants International in association with Almec Corporation between March 2000 and January 2001. The report consists of Summary, Main Text, Review of MRT Project and Review of Jakarta Outer Ring Road.

The Summary briefly illustrates the findings of the entire study. The Main Report is comprised of 10 Chapters and presents current transport profiles, conceptual master plan and selected short term projects. Review of MRT Project discusses a policy direction to realize the Fatmawati-Monas MRT project. Review of Jakarta Outer Ring Road deals mainly with financial and institutional arrangements required to implement the suspended sections of the project. Necessary policy measures and actions should be taken so as to realize the "down-to-earth" blueprint in a timely manner.

We wish to express grateful acknowledgement to the personnel of your Agency, Ministry of Foreign Affairs, Advisory Committee, Ministry of Land, Infrastructure and Transport and Embassy of Japan in Indonesia, and also officials of National Development Planning Agency (BAPPENAS) and counterpart personnel who assisted the Study Team. The Study Team sincerely hopes that the result of this study will contribute to the urban transport development in Jabotabek.

Yours faithfully,

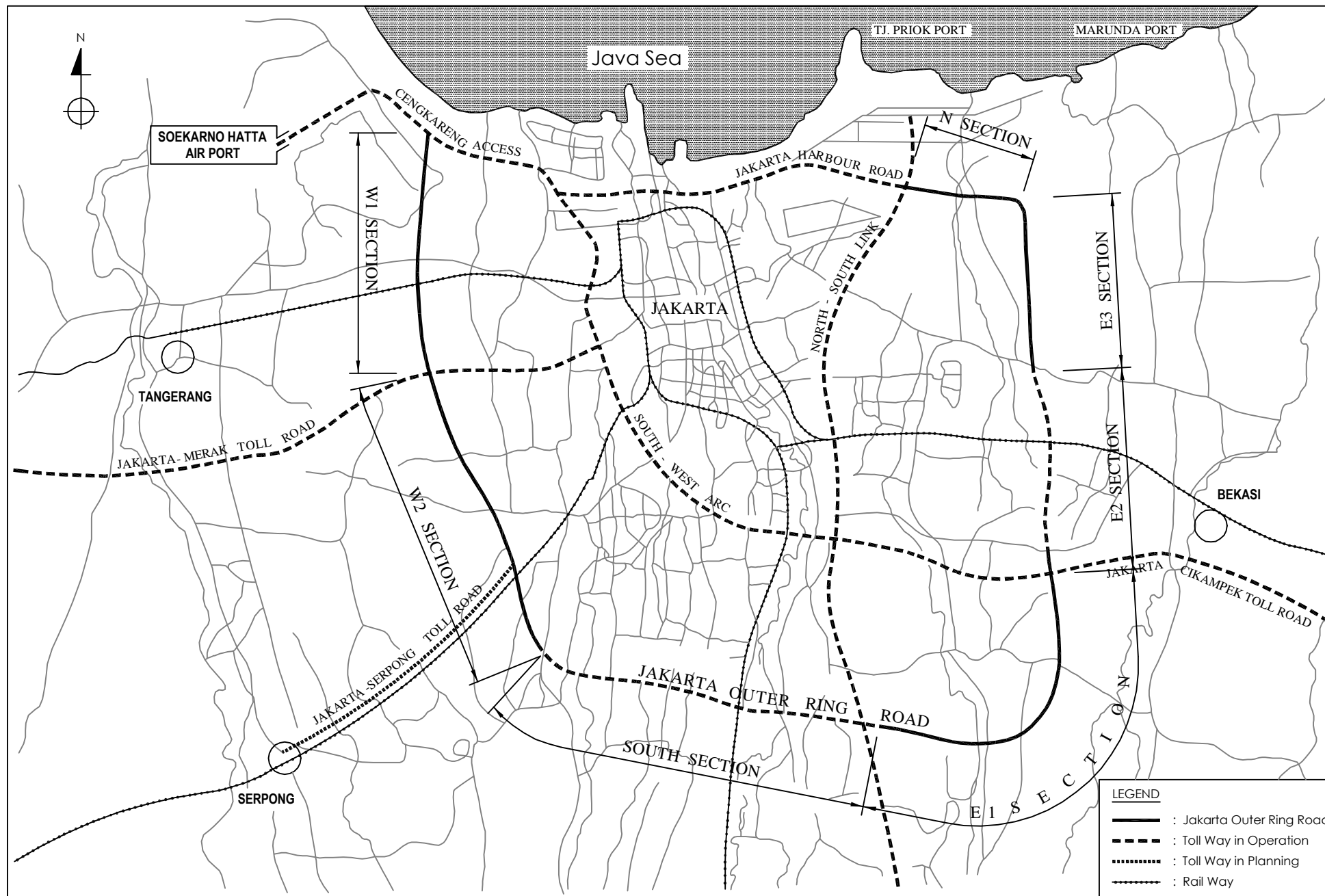


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Isamu Gunji  
Team Leader, JICA Study Team  
The Study on Integrated Transportation Master Plan  
for JABOTABEK (Phase I)

## Abbreviation/Acronyms and Glossary of JORR

Abbreviation/Acronyms	English
AASHTO	American Association of State Highway and Transportation Officials
ASAP	As soon as possible
BOT	Build - Operate - Transfer
Botabek	Bogor, Tangerang, Bekasi
CCTV	Closed Circuit Television
D/D	Detailed Design
D/P	Definitive Plan
DBC	Design Build Contract
DF/R	Draft Final Report
DKI Jakarta	Special Capital City Jakarta
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
F/C	Foreign Currency
FIRR	Financial Internal Rate of Return
GDP	Gross Domestic Product
GOI	Government of Indonesia
GOJ	Government of Japan
GRDP	Gross Regional Domestic Product
i.e.:	it est (that means)
IBRA	Indonesian Bank Restructuring Agency
IBRD	International Bank for Reconstruction and Development
IC	Interchange, Intersecting Tollway Facility with non tollway
IRR	Internal Rate of return
ITS	Inteligent Transport System
JABOTABEK	Jakarta, Bogor, Tangerang, Bekasi
JBIC	Japan Bank for International Cooperation
JC	Junction, Intersecting Facility between tollway
JICA	Japan International Cooperation Agency
JIUT	Jakarta Intra Urban Tollway
Jl.	Street
JORR	Jakarta Outer ring Road
L/C	Local Currency
PP	Government Regulation
ROW	Right of Way, Border of a road or the area occupied by a road
Rp	Indonesian Rupiah
Sta	Station, Name of 1 km mileage
SYL	Special Yen Loan (Miyasawa Fund)
TOR	Term of Reference
VAT	Value Added Tax
WB	The world Bank Group



Project Location Map

## ***Executive Summary***



## Executive Summary: Review Result of JORR Project

### (1) JORR Project Configuration, Technical and Environmental Aspects

The Study Team reconfirmed the following JORR project system configuration and its major project elements are defined, in principle, as comprising Sections W1, W2, S, E1, E2 and E3 as shown in Table 1.1. The section N, which had been a constituent of the original JORR project, was excluded from the confirmed configuration due to difficulty in land acquisition. In substitution of the section N, Jl. Cakung Cilincing Raya, Jl. Ampera/Jl. Cilincing and Jl. Sulawesi are upgraded for reinforcing accessibility between Tanjung Priok Port and JORR.

**Table 1.1 Location and Length of Sections**

Section	Extent	Length (Km)
W1	Sta. 0+000 to Sta. 7+350 = 7,350m	7.4
W2	Sta. 7+350 to Sta. 19+555 = 12,205m	12.2
S	Sta. 19+555 to Sta. 32+450 = 12,895m	12.9
E1	Sta. 32+450 to Sta. 44+950 = 12,500m	12.5
E2	Sta. 9+200 (44+950) to Sta. 18+700 = 9,500m	9.5
E3	Sta. 18+700 to Sta. 23+450 = 4,750m	4.8
	Sub-Total	59.3
	Jl. Cakung Cilincing Raya L=3.7km Jl. Jampea/Cilincing L=3.3km Jl. Sulawesi L=0.3km	

Source: JICA Study Team compilation

The project engineering base cost was prepared for a closed toll system, which is applied to the existing operational sections of S and E2, and the system was planned to comprise a basic traffic information and control system covering the JORR as a preferred toll road operation and management.

The results of the previous EIA studies were reviewed and it was confirmed that an EIA (AMDAL) has been carried out for each JORR section. The results were approved by the Central AMDAL Commission organized by the Ministry of Public Works up to the year 1997.

### (2) Project Base Costs (all resources) Constant 2000 prices

Total JORR project base cost in constant 2000 prices are estimated at **Rupiah 6,015.4 billion** with such breakdown as:

- **Engineering Base Cost = Rp.5,100.9 billion**
- **Land Acquisition and Compensation = Rp.511.1 billion**
- **Taxes and Duties = Rp.403.4 billion**

Details of the above are presented in Table 2.1

**Table 2.1 Summary of Engineering Base Cost**

No	Items	F/C	L/C	Total	
		Mil. Yen	Mil. Rupiah	Mil. Yen	Mil. Rupiah
1	Construction Civil Works	17,056	2,094,619	44,984	3,373,800
2	Equipment Installation	13,194	78,918	14,246	1,068,450
3	Physical Contingency	2,365	213,408	5,211	390,825
4	Consulting Engineering Services for Civil Works	2,006	40,617	2,548	191,100
5	Consulting Engineering Services for Equipment Installation	900	8,293	1,021	76,575
6	Sub-Total of Engineering Base Cost	35,531	2,435,855	68,009	5,100,675
	F/C & L/C Rates	0.522	0.478		
7	Land Acquisition; Compensation; Administration & Utility Relocation	0	464,600	6,195	464,600
	Add: 10% of Physical Contingency	0	46,500	620	46,500
8	Duty and Levies on Imports	0	113,400	1,512	113,400
9	Ppn(VAT)	0	290,000	3,876	290,000
10	Sub-Total of GOI Contribution		914,500	12,193	914,500
11	Grand-total of Project Base Cost	35,531	3,350,355	80,202	6,015,175

F/C,L/C Rates		F/C	L/C
1	Construction Civil Works	0.379	0.621
2	Equipment Installation	0.926	0.074
2	Physical Contingency	0.454	0.546
3	Consulting Engineering Services for Civil Works	0.787	0.213
4	Consulting Engineering Services for Traffic Managing Systems	0.892	0.108

Source: JICA Study Team computations

Notes:

- 1) Construction Works consists of Civil Works and Equipment Installation Works
- 2) Contingency is 10% of the Civil Works and 5% of the Equipment Installation Works
- 3) Conversion Rates  
 Yen 106 = US\$ 1.0 = Rupiah 7,950  
 Yen 1.0 = Rupiah 75

### (3) Traffic Demand Forecast for JORR

The Jakarta Outer Ring Road Tollway is expected to absorb a considerable amount of traffic volume in future. Total On-ramp volume may reach around 465,000 vehicles per day in 2005 and continue to grow to 678,000 vehicles per day in 2015.

The future sectional volumes as projected in Table 3.1 suggest that generally up to the year 2015 demand can be adequately accommodated by a six-lane cross section.

**Table 3.1 JORR Sectional Traffic Volume**

Section	Average Sectional Volume (pcu/day - two way)	
	Yr 2005	Yr 2015
W1	55,975	76,585
W2	39,831	63,214
S	71,339	108,203
E1	21,738	44,649
E2	62,080	89,567
E3	48,928	85,337

Source : JICA Study Team

**(4) Project Economic Internal Rate of Return (EIRR)**

The economic internal rate of return (**EIRR**) of the project is estimated at **28.9%**, and which is based on the economic project cost, benefits from savings in vehicle operation costs and time costs and the proposed project implementation schedule shown in Figure 4.1.

**(5) Return on Investment (or Project Internal Rate of Return)**

The project's ROI provides, since it is calculated in constant prices, a fundamental measure of the project's inherent capacity to generate a return. Traffic demand on the JORR was estimated using a distance proportional model of Rp.330/km, and the revenue was estimated accordingly.

A standard project life cycle of 25 years was assumed. Hence, given a JORR project implementation duration of 6 years, **ROI was estimated at 6.55%**, when the implementing entity is the beneficiary of revenue streams generated by sections S and E2 and covers the O&M cost for these sections.

It was necessary to test the selected base case against the inherent demand error margins and to see what impact such inherent estimation margins of plus/minus 20%, and to see what impact such inherent estimation margins would have on the project's ROI. The results are:

- **In the worst case the Project's ROI will be 2.78% and in the best case some 11.57%.**

In summary, under the most optimistic assumption the JORR project will generate a return on investment in the order of magnitude of 11.6 percent, which is well below the current Indonesian lending rate of around 16.5 percent. It is self-evident that such ROI cannot meet commercial financing terms & conditions.

**(6) Investment or Capital Requirement Estimations**

Total capital requirements for the selected JORR project base case are estimated at:

- Rupiah 7,133.2 billion in current prices, **equivalent to Yen 95,109.3 million at an exchange rate of 1Yen to 75 Rupiah**
- **About 5.8% of this total, equivalent to Rupiah 414.6 billion represents IDC costs.**

**The total capital requirements, therefore, amounts to Rupiah 7,547.8 billion.**

**(7) Project Structure**

The following project structure is recommended, in view of the low project's ROI of around 6.55%, as shown in Table 7.1.

**(8) Cash Flow Projections and Debt Service Capability**

The cash flow projections and debt service capability of the JORR project was established based on the above fundamental assumptions. The results show that the project is fully capable of meeting long-term debt service under the following assumption:

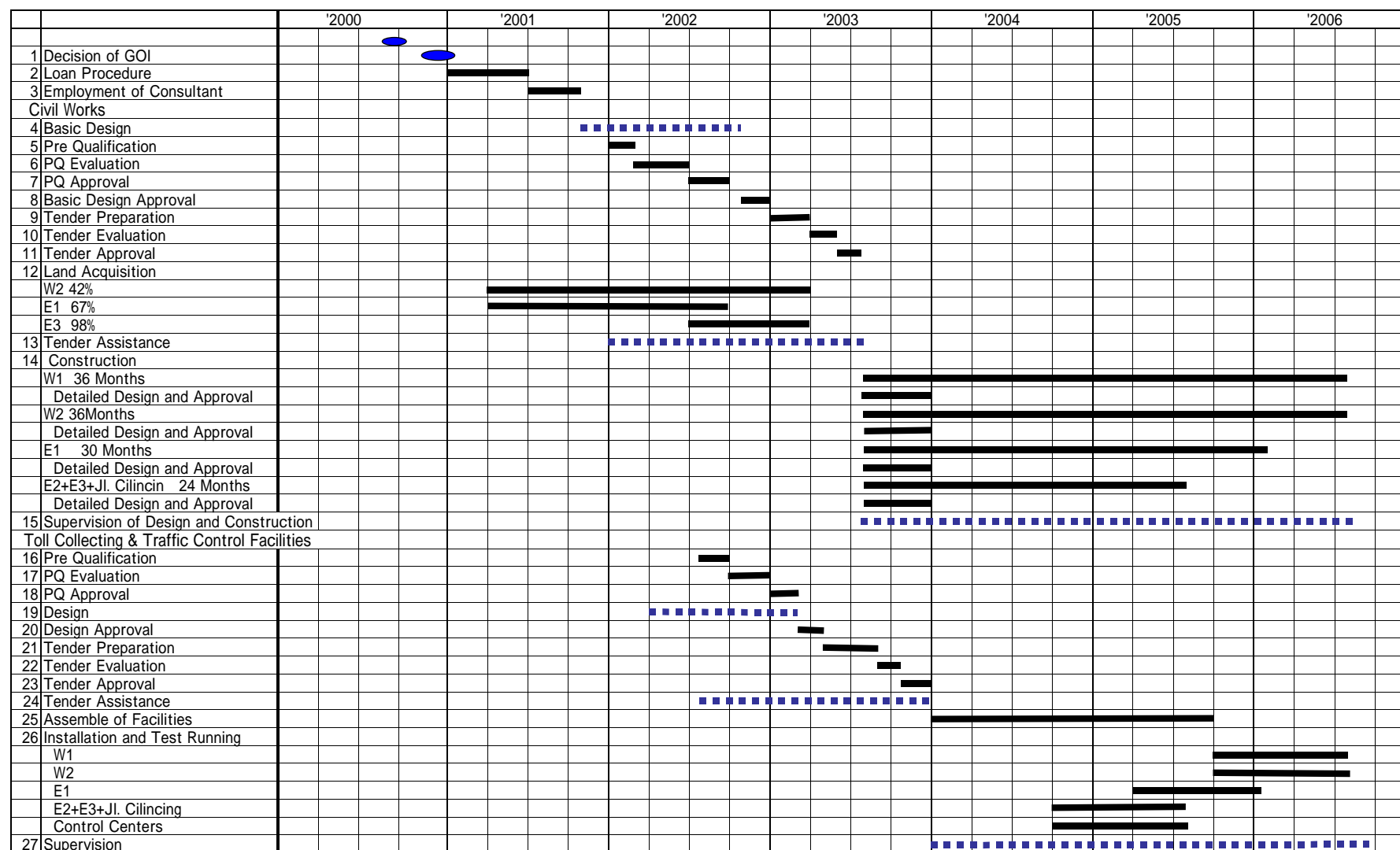


Figure 4.1 Proposed JORR Project Implementation Schedule

- As indicated above, the implementing entity is the beneficiary of revenue streams already generated by the S and E2 sections
- There is only one long-term loan, which is sovereign guaranteed. The loan terms and conditions are duration  $n = 40$  years, interest rate to the GOI 0.75% and a grace period on principal repayment of 10 years
- On-lending conditions from the GOI are 40 years repayment period, interest rate of 5% and a grace period for repayment of principal of 10 years.

The cash flow and debt service analysis shows a positive accumulated net cash flow after long-term financing of about Rupiah 821.3 billion in the year 2005. Hence, there will be no need to finance working capital requirements.

Furthermore, if the JORR project is implemented in the suggested fashion, there will be no need for short-term bridging financing.

**Table 7.1 Definition of Project Structure for Implementing Entity**

(Unit : all figures are in current prices)		
Parameter	Structure	Comments
<b>Equity to Debt Structure</b>	43.3% : 56.7%	1.) Cashflow to indicate whether this structure allows for high enough debt coverage ratio. If not, equity portion will need to be increased. 2.) It appears to be best to target an as high as possible equity share with a view to reduce the interest during construction load.
<b>Equity Structure</b>	43.3% = 3,088.2 billion Rp. of which: 1.) 830.8 billion Rp. in kind for existing JORR assets. 2.) 2,257.4 billion Rp. in cash.	1.) "Equity in kind" in form of a debt for equity swatch. However, this is cash flow neutral. 2.) However, the debt-for-equity swatch does not address the issue of outstanding liabilities of the old concessionaires.
<b>Debt Structure</b>	56.7% = 4,045.1 billion Rp. To be financed from long-term confessional ODA loan with: <b>Terms &amp; conditions of lender to GOI:</b> $n = 40$ years (10 years grace) $i = 0.75\%$ p.a. <b>On-lending terms to implementing entity:</b> $n = 40$ years (10 years grace) $i = 5.0\%$ p.a.  <b>HOWEVER:</b> Liabilities tied to the D/E swatch will have to be covered somehow.  Short-term working capital for 2006 will have to be added	Depending on the results of the FIRR and the cashflow, on-lending terms may have to be adjusted, in order to minimize the need for short-term bridging financing and in order to optimize the net cashflow after long-term financing.  Amount and terms for covering such liabilities need to be established.  Not included in long-term loan. Financing to be secured from operational income.

Source: JICA Study Team.

Note: Please consult with Chapter 8, Table 8.2, on the question of outstanding liabilities of the old concessionaires.

## **(9) Strategic Implementation Options**

There are, in principle, four strategic scenarios on how to proceed with JORR project realization, they are:

- **Strategic scenario 1.** This option entails that P.T. Jasa Marga implements the JORR project out of its own resources and merit
- **Strategic scenario 2.** Entails that P.T. Jasa Marga teams up with a domestic private sector partner under a new concessionaire agreement.
- **Strategic scenario 3.** Entails that P.T. Jasa Marga teams up with on overseas private sector strategic partner under a new concessionaire agreement. (of course, a combination of scenarios 2 and 3 is also possible), and
- **Strategic scenario 4.** P.T. Jasa Marga implements the JORR project with the assistance of a long-term sovereign guaranteed ODA loan that is extended under “best available” terms & conditions.

These scenarios were assessed with the following results:

### **1) Strategic Scenario 2 and 3.**

The JICA Study Team is of the considered opinion that the quick realization of this approach is highly unlikely for the following reasons. The JORR is a very capital-intensive project with a relatively modest project specific ROI of only 6.55 percent (constant price base), or 11.6 percent under the best of circumstances, namely an underestimation of demand by 20 percent and an overestimation of base cost by also 20 percent. It is very difficult to imagine how either domestic and/or overseas private capital could come up with the necessary financing, either on a cash and/or loan basis.

There is no long-term capital market in Indonesia from commercial banks, which are anyway under restructuring. Financing the JORR at around 16 percent interest per year is, under the given ROI, unrealistic.

### **2) Strategic Scenario 1.**

This option is indeed a possibility. However, it has also strong demerits, which cannot be dismissed easily. First, the JORR capital requirements are much too large for P.T. Jasa Marga to be shouldered alone. Hence, it is likely that P.T. Jasa Marga would have to implement the JORR section by section, in order to minimize risk and reduce strongly capital requirements through phasing over time. Since there is no long-term capital market in Indonesia, P.T. Jasa Marga would have to finance the sections at market rates of around 16 percent per year with term money that does not match the life cycle of the project. It is likely that such approach would render the individual sections not viable from a financial point of view. In short, the Study Team considers this option possible, but not representing an optimal approach to the question at hand

### **3) Strategic Scenario 4.**

The Study Team considers this option has the most merits and the most viable one. This is so because lending terms could be matched to the life cycle of the project at the lowest possible interest rate for both, the GOI and the implementing entity, since the on-lending rate is determined by the GOI and could be determined flexibly, reflecting project risk conditions. In addition, the JORR could be

implemented in the shortest time possible and in one piece. The project risk could be hedged against through proper risk distribution among the stakeholders, and the issues pertaining to the existing JORR assets and related liabilities of the old concessionaires could be addressed to a certain degree.

In short, the Study Team considers this option has the highest level of merits.

## **(10) Conclusions & Recommendations**

The following is recommended in conclusion:

- 1) The JORR project should be realized as soon as possible to prevent further economic losses not only in transport sector but also in other industrial sectors.
- 2) The JORR project is most suitable for a public sector project, because of its high economic IRR (28.9%) but small financial IRR (6.6%).
- 3) The JORR project is estimated to accommodate relatively high traffic demand, and therefore it brings about the steady toll revenue. Unlike general infrastructure projects, the JORR is a revenue producing project and the revenue can be used solely for its operation/maintenance expenses and the loan repayment without further investments or expenses by the GOI.
- 4) If it is a decisive policy for the GOI to pursue the private sector participation into the JORR investment the GOI should deliberate how to impose on the private sector the responsibility to maintain safety and expressway function of the JORR as a public facility.
- 5) The JORR project is not going to be the last toll road project in Jabotabek. Hence, the GOI should investigate and establish appropriate toll road development policies such as:
  - a) Toll road master plan that comprises a basic structure of the metropolitan toll roads
  - b) Toll road law that allows for a transparent and suitable toll rate adjustment mechanism. This will greatly contribute to foreseeing a firm financial performance in future
  - c) Standardization of “authorization agreement” and “concession agreement” which takes due account of private sector participation.

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