No.

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF HIGHWAYS

THE STUDY ON ARTERIAL ROAD NETWORK DEVELOPMENT PLAN FOR SULAWESI ISLAND AND FEASIBILITY STUDY ON PRIORITY ARTERIAL ROADS IN SOUTH SULAWESI PROVINCE

FINAL REPORT

VOLUME 2 : FEASIBILITY STUDY

MARCH 2008

NIPPON KOEI CO., LTD.
KRI INTERNATIONAL CORP.
ALMEC CORPORATION

INO
JR
07-013

COMPOSITION OF FINAL REPORT

Volume 1: Master Plan Study (Summary and Main)
Volume 2-1: Feasibility Study (Summary and Main)
Volume 2-2: Feasibility Study (Drawings)
Volume 2-3: Feasibility Study (EIA & Public Consultation)

CURRENCY EXCHANGE RATE

Following currency exchange rates were adopted in this report unless otherwise stipulated.

(1) Indonesia Rupiah vs. US Dollar
Selling rate of Bank Indonesia on May, 16 2007
USD 1= IDR 9,322

(2) Indonesia Rupiah vs. Japanese Yen
Selling rate of Bank Indonesia on May, 16 2007
JPY 1 = IDR 77.55

Preface

In response to the request from the Government of Republic of Indonesia, the Government of Japan decided to conduct the Study on Arterial Road Network Development Plan for Surlawesi Island and the Feasibility Study on Priority Arterial Roads in South Sulawesi Province, and entrusted the Study to the Japan International Cooperation Agency (JICA).

JICA sent the Study team, headed by Mr. Hiroki SHINKAI of Nippon Koei Co., Ltd. and organized by Nippon Koei Co., Ltd., KRI International Corporation, and ALMEC Corporation to Indonesia four times from December 2006 to March 2008.

The Study team had a series of discussions with the officials concerned of the Directorate General of Highways (Bina Marga), Ministry of Public Works and Regional Planning and Development Agency (Bappeda), South Sulawesi Province and conducted related studies. After returning to Japan, the Study team conducted further studies and completed this final report.

I hope that this report will contribute to the promotion of the plan and to the enhancement of amity between two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Indonesia, especially the counter part agencies of Directorate General of Highways, Ministry of Public Works and Regional Government of South Sulawesi Province for their close cooperation throughout the Study.

March, 2008

Takashi KANEKO

Vice President

Japan International Cooperation Agency

March 2008

Mr. Takashi KANEKO
Vice President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Submittal

Dear Sir,

We are pleased to submit to you the report on the Study on Arterial Road Network Development Plan for Sulawesi Island and Feasibility Study on Priority Arterial Roads in South Sulawesi Province in Indonesia. The report compiled all findings obtained through the study from December 2006 to March 2008 in Indonesia conducted by Nippon Koei Co. Ltd., KRI International Corporation and ALMEC Corporation in accordance with the contract with Japan International Cooperation Agency (JICA).

The Study consists of the master plan study on road network development covering 6 provinces in Sulawesi Island and the feasibility study on priority arterial roads in South Sulawesi Province.

The master plan formulates the comprehensive road network system based on the analysis of existing and future socio/economic framework, environment and road conditions in Sulawesi and proposes the realistic and practical implementation plan, taking into consideration possible financial plan aiming at the year of 2024.

The feasibility study on the high priority 5 project roads, including Trans Sulawesi Mamminasata Road from Maros to Takalar, concludes that the projects will be technically and economically feasible and acceptable from the environmental aspects and will contribute to the enhancement of economic development of South Sulawesi. Therefore, the Study team recommends earlier implementation of the projects.

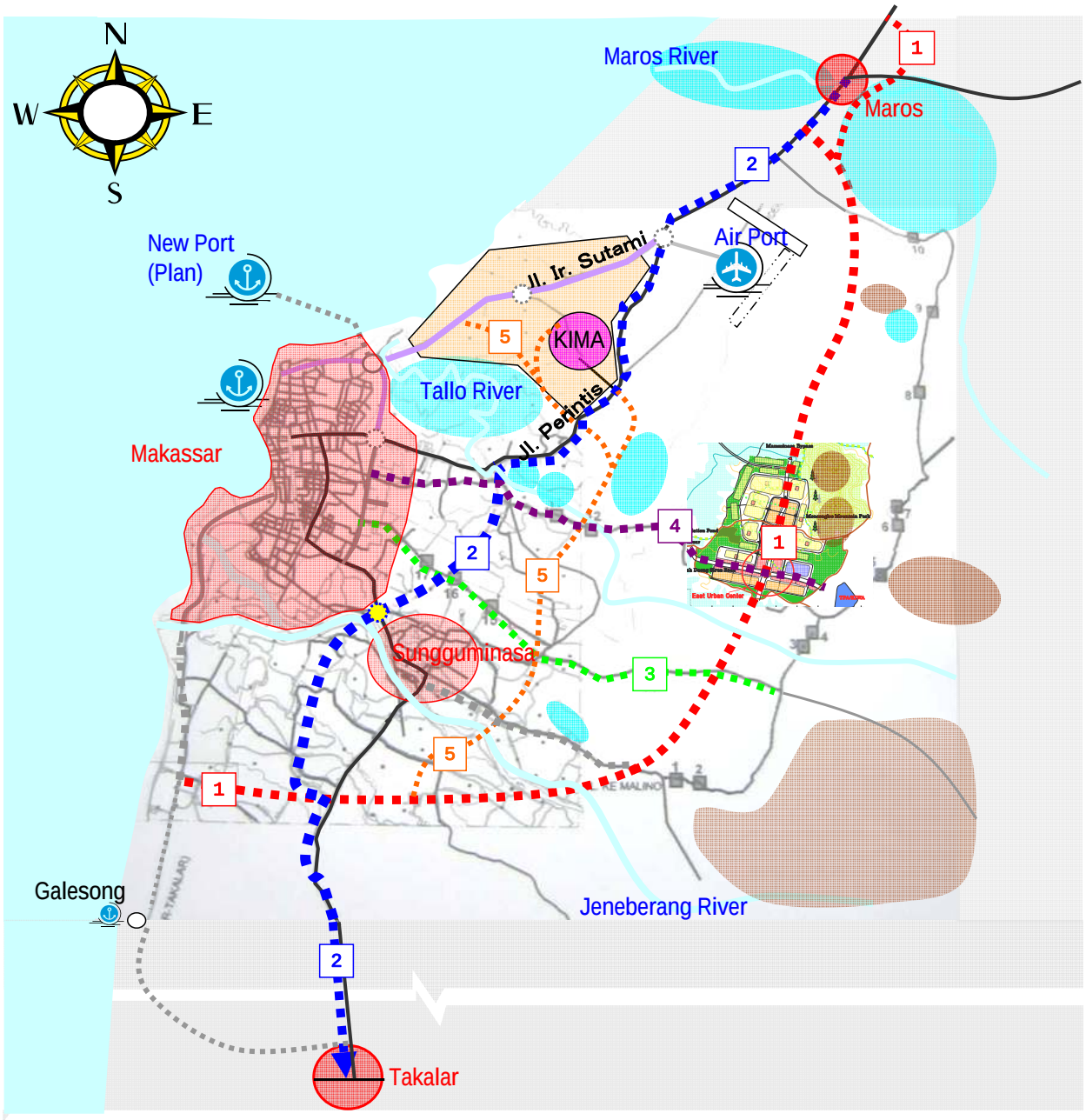
We wish to express our sincere gratitude to your agency, including the JICA experts concerned, and also wish to express our deep appreciation to the government of Indonesia, especially the counterpart agencies of the Directorate General of Highways of Ministry (Bina Marga), Public Works and Regional Planning and Development Agency (Bappeda) of South Sulawesi Province for their close cooperation and assistance extended to us during the study.

We hope this report will contribute to the development of the Republic of Indonesia.

Very truly yours,

Hiroki SHINKAI

Leader of the Study Team



		No.	Name of Road Links	Length (km)
F/S	------	1	Mamminasa Bypass	49.1
	------	2	Trans-Sulawesi Road Mamminasata Section	58.0
	------	3	Hertasning Road	4.9
	------	4	Abdullah Daeng Sirua Road	15.3
Pre-F/S	------	5	Outer Ring Road	20.4
			Total:	147.7

- Mountain
- Hill (4000ha), appropriate for a satellite city (New Residential Area Development)
- Wet low land
- Rivers
- Dense Urban Area

The Study on Arterial Road Network Development for Sulawesi Island and Feasibility Study on Priority Arterial Road Development for South Sulawesi Province

LOCATION MAP (F/S)

- Toll Road (Jl Tol Ir Sutami)
- Existing National Roads
- Existing Other Roads
- Other Planned Roads

FINAL REPORT

VOLUME 2 : FEASIBILITY STUDY

TABLE OF CONTENTS

CHAPTER 3 TRANSPORT PLANS

CHAPTER 4 DEVELOPMENT TREND AND POSSIBLE DEVELOPMENT SCENARIOS ALONG THE STUDY ROUTE CORRIDOR

FINAL REPORT

VOLUME 2 : FEASIBILITY STUDY

LIST OF FIGURES

CHAPTER 1 INTRODUCTION

CHAPTER 2 EXISTING CONDITIONS OF THE STUDY AREA

ALONG THE STUDY ROUTE CORRIDOR

CHAPTER 5 TRAFFIC SURVEY AND TRAFFIC DEMAND FORECAST

CHAPTER 6 NATURAL CONDITION SURVEYS AND ANALYSIS

CHAPTER 8 ENVIRONMENTAL CONSIDERATIONS

CHAPTER 9 COST ESTIMATE AND PROJECT EVALUATION

CHAPTER 10 IMPLEMENTATION PLAN

FINAL REPORT

VOLUME 2 : FEASIBILITY STUDY

LIST OF TABLES

CHAPTER 7 ENGINEERING STUDY

CHAPTER 8 ENVIRONMENTAL CONSIDERATIONS

CHAPTER 9 COST ESTIMATE AND PROJECT EVALUATION

CHAPTER 10 IMPLEMENTATION PLAN

FINAL REPORT

VOLUME 1 : FEASIBILITY STUDY

LIST OF ABBREVIATIONS

A

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Office
ADT	Average Daily Traffic
AC	Asphalt Concrete
ACP	Asphalt Concrete Pavement
ADB	Asian Development Bank
ADS Rd.	Abdullah Daeng Sirua Road
AL	Amenity Level
AMDAL	Analisis Mengenai Dampak Lingkungan Hidup
ANDAL	Analisis Dampak Lingkungan (Environmental Analysis)
AP	Angkasa Pura (Aviation Service)
AP2B	Load Dispatching Center
APBD	Anggaran Pendatapatan dan Belanja Daerah (*Local Budget of Income and Expenditure*)
APBN	Anggaran Pendatapatan dan Belanja Nasional (*National Budget of Income and Expenditure*)
ASDP	Angkutan Sungai, Danau dan Penyeberangan (*Inland Ferry Service*)
ASEAN	Association of Southeast Asian Nations
ASKINDO	Asosiasi Kakao Indonesia (Indonesian Cacao Association)
ASTM	American Society for Testing and Materials
AusAID	Australian Agency for International Development

B

BALAI BESAR	Regional Office of DGH

BAPEDALDA	Badan Pengelolaan dan Pengendalian Dampak Lingkungan Daerah (*Environmental Impact Management Agency*)
BAPPEDA	Badan Perencanaan Pembangunan Daerah (*Regional Planning and Development Agency*)
BAPPEDAL	Badan Pengendalian Dampak Lingkungan
BAPPENAS	Badan Perencanaan dan Pembangunan Nasional (*National Planning and Development Agency*)
B/C	Benefit/Cost Ratio
BDF	Bio-Diesel Fuel
BDS	Business Development Services
BH	Bore Hole
BIMP-EAGA	Brunei Darussalam, Indonesia, Malaysia and Philippines – East Asian Growth Area
BINA MARGA	Directorate General of Highways
BKPRS	Badan Kerja Sama Pembangunan Regional Sulawesi (Sulawesi Regional Development Cooperation Board)
BKSP	Badan Kerja Sama Pembangunan (*Development Cooperation Body*)
BKSPMM	Badan Kerja Sama Pembangunan Metropolitan Mamminasata (*Mamminasata Metropolitan Development Cooperation Body*)
BMG	Badan Meteorologi dan Geofisika (*Meteorology and Geophysics Agency*)
BMS	Bridge Management System
BOT	Built-Operate-Transfer
BP	Bypass
BPJT	Indonesian Toll Road Authority
BPN	Badan Pertanahan Nasional (*National Land Agency*)
BPPM	Badan/Biro Pengelola Pembangunan Mamminasata (*Mamminasata Development Management Agency/Bureau*)
BPPMD	Badan Promosi dan Penanaman Modal Daerah (*Regional Promotion and Investment Board*)
BPS	Badan Pusat Statistik (*Central Bureau of Statistics*)
BTS	Base Transceiver Station

C

CBD	Central Business District
CBR	California Bearing Ratio
CCC	Celebes Convention Center
CCC or 3C	Creative, Clean, Coordinated
CDM	Clean Development Mechanism
CESA	Cumulative Equivalent Standard Axle
CL	Comfort Level
CNO	Crude Coconut Oil
CPB	Cocoa Pod Borer
CTSB	Cement Treated Sub Base

D

DAK	Dana Alokasi Khusus (Special Allocation Fund)
DAU	Dana Alokasi Umum (General Allocation Fund)
DC	Double Circuit
DCF	Discount Cash Flow Method
DCP	Dynamic Cone Penetrometer
DGAC	Directorate General of Air Communication
DGH	Directorate General of Highways
DGLT	Directorate General of Land Transportation
DINAS PRASWIL	Regional Infrastructure Agency
DINAS PU	Dinas Pekerjaan Umum (Regional Public Works)
DP	Development Plan
DPUP	Departemen Pekerjaan Umum, Pengariran (*Irrigation Public Works Agency*)
DSM	Demand Side Management
DTV	Design Traffic Volume

E

EIA	Environmental Impact Assessment

EINRIP	Eastern Indonesia National Road Improvement Project
EIRR	Economic Internal Rate of Return
EIRTP	Eastern Indonesia Region Transportation Project
EASL	Equivalent Standard Axle
ESCAP	Economic and Social Commission for Asia and Pacific
EU	European Union

F

FAO	Food and Agriculture Organization (of the United Nations)
FEZ	Free Economic Zone
FIRR	Financial Internal Rate of Return
FOB	Free on Board
FS or F/S	Feasibility Study

G

GBHN	Garis Besar Haluan Negera (*State Policy Guideline*)
GDP	Gross Domestic Product
GIS	Geographical Information System
GMTDC	Gowa Makassar Takalar Development Center
GOI	Government of Indonesia
GOJ	Government of Japan
GPS	Global Positioning System
GRDP	Gross Regional Domestic Product
GT	Gross Ton

H

Ha	Hectare
HCM	Highway Capacity Manual
HSPK	Main Activity Unit Price Harga Satuan Pokok Kegiatan
HRS	Hot Rolled Sheet
HSD	High Speed Diesel
HLRIP	Heavy Loaded Road Improvement Project

I

IBRD	International Bank for Reconstruction and Development
IC	Interchange
IEE	Initial Environment Examination
IHCM	Indonesian Highway Capacity Manual
IMF	International Monetary Fund
IP	Implementation Plan
IPP	Independent Power Producer
IRMS	Integrated Road Management System
IS	Intersection
ISPs	Internet Service Providers

J

JBIC	Japan Bank for International Cooperation
JC	Junction
Jembatan	Bridge
JICA	Japan International Cooperation Agency
JL	Jalan (Road / Steet)
JST	JICA Study Team

K

K A-ANDAL	Kerangka Acuan – ANDAL
KAB or Kab.	Kabupaten (Regency)
KANWIL	Kantor Wilayah (*Regional Office*)
KAPET	Kawasan Pengembangan Ekonomi Terpadu (*Integrated Economic Development Area*)
KEC, or Kec.	Kecamatan (District)
KIROS	Kawasan Industri Maros (*Maros Industrial Estate*)
KIMA	Kawasan Industri Makassar (*Makassar Industrial Estate*)
KITA	Kawasan Industri Takalar (*Takalar Industrial Estate*)
KIWA	Kawasan Industri Gowa (*Gowa Industrial Estate*)
KSDA	Kantor Semberdaya Alam

KSO	Joint Operation Scheme

L

L&M	Large and Medium Enterprise
LRT	Light Rail Transit

M

MB	Mamminasa Bypass
MBP	Mamminasa Bypass Project
MBT	Mobile, Bus, Truck
MCA	Multi Criteria Analysis
MCM	Million Cubic Meter
MDGs	Millennium Development Goals
MICE	Meeting, Incentive, Convention, Exhibition
ML	Minimum Level
MOC	Ministry of Communication
MOF	Ministry of Finance
MOT	Ministry of Transport
MoU	Memorandum of Understanding
M/P, MP	Master Plan
MRR	Middle Ring Road
MRT	Mass Rapid Transit
MSRI	Ministry of Settlement and Regional Infrastructure
MST	Muatan Sumbut Terbulat (Maximum Axle Load)

N

NAC	National Activity Center
NGO	Non-Government Organization
NJOP	Tax Object Selling Value Nilai Jual Objek Pajak
NPV	Net Present Value

O

OD	Origin/Development

O/D	Origin/Destination
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
O&M	Operation and Maintenance
ORR	Outer Ring Road

P

P2JJ	Perencanaan dan Pengawasan Jalan dan Jembatan (Design and Supervision Road/Bridge)
PA	Prioritized Area
PAP	Project-Affected Persons
PC	Pre-stressed Concrete
PC	Public Consultation
PCC	Portland Cement Concrete
PCCP	Portland Cement Concrete Pavement
PCU	Passenger Car Unit
PD	Presidential Decree
PDAM	Perusahaan Daerah Air Minum (Regional Water Supply Company)
PFI	Private Finance Initiative
PIP	Public Investment
PKL	Pusat Kegiatan Lokal (*Local Activity Center*)
PKN	Pusat Kegiatan Nasional (*National Activity Center*)
PKW	Pusat Kegiatan Wilayah (*Regional Activity Center*)
PLN	Perusahaan Listrik Nasional (*National Electric Company*)
PMU	Project Management Unit
PPP	Public Private Partnership
Pre-FS	Pre-feasibility Study
PRASWIL	Infrastructure Agency
PROPENAS	Program Pembangunan Nasional

	(*National Development Program*)
PT	Perseroan Terbatas
	(*Company Limited*)
PT. PELINDO	PT. Pelabuhan Indonesia
	(*Indonesian Port Service Company*)
PT. PELNI	PT. Pelayaran Nasional Indonesia
	(*Indonesian National Shipping Company*)
PU	Department of Public Works

Q

R

R&D	Research and Development
RAC	Regional Activity Center
RC	Reinforced Concrete
RCA	Revealed Comparative Advantage
Rd.	Road
RDB	Red Data Book
RDS	Road Design System
RKL	Rencana Pengelolaan Lingkungan
RKP	Rencana Kerja Pemerintah
	(*Government Action Plan*)
ROI	Return on Investment
RoRo	Roll on, Roll Off
ROW	Right of Way
RPJMD	Rencana Pembangunan Jangka Menengah Daerah
	(*Mid-term Regional Development Plan*)
RPJMN	Rencana Pembangunan Jangka Menengah Nasional
	(*Mid-term Nasional Development Plan*)
RPJP	Rencana Pembangunan Jangka Panjang
	(*Long-term Development Plan*)
RPL	Rencana Pemantauan Lingkungan
RRR (3R)	Reduce, Reuse, Recycle
RRSP	Road Rehabilitation Sector Project

Rp	Rupiah (Indonesian Currency)
RSP	Regional Spatial Plan
RTEPC (P3ED)	Regional Training and Promotion Export Center (*Pusat Pelatihan Promosi Export Daerah*)
RTR(WN)	Rencana Tata Ruang (Wilayah Nasional) (*(National) Spatial Plan*)
RTR Plau	Rencana Tata Ruang Plau (*Island Spatial Plan*)

S

SAIDI	System Average Interruption Duration Index
SC	Single Circuit
SEA	Strategic Environmental Assessment
SH	Stakeholder
SIMTAP	Sistem Informasi Manajemen Satu Atap (*One Stop System Management*)
SITRAMP	The Study on Integrated Transportation Master Plan for Jabotabek
SME	Small and Medium Enterprises
SPC	Special Purpose Company
SPT	Standard Penetration Test

T

TDM	Traffic Demand Management
TDS	Total Dissolved Solids
TELKOM	PT. Telekomunikasi Indonesia, Tbk
TEU	Twenty-foot Equivalent Unit
TIC	Tourism Information Center
TOR/EIA	Terms of Reference EIA
TPA	Tempat Pembuangan Akhir (*Land Fill Site*)
TSMRP	Trans-Sulawesi Mamminasata Road Project
TS	Trans-Sulawesi
TSSS	Transport Sector Strategy Study
TTC	Travel Time Cost

U

UFW	Unaccounted-for-water
UKL	Environmental Management Plan
UN	United Nations
UNHAS	University of Hasanuddin
UPL	Environmental Monitoring Plan
UPT	Unit Pelaksana Teknis (*Technical Implementor Unit*)

V

VAT	Value Added Tax
VCR	Volume Capacity Ratio
VDF	Vehicle Damage Factor
VOC	Vehicle Operation Cost
VSD	Vascular Streak Dieback

W

WB	World Bank
WTO	World Trade Organization

X, Y, Z

EXECUTIVE SUMMARY

(1) Background

The development of Eastern Indonesia (KTI) has been one the priority policies of the GOI to reduce the disparity between Western Indonesia (KBI) and KTI. To support the regional development in KTI, strategic importance of infrastructure has been identified as one of the priority measures for linking different regions and for poverty reduction.

The GOI requested the GOJ to provide technical assistance in carrying out the Study on Arterial Road Network Development Plan for Sulawesi Island and Feasibility Study on Priority Arterial Roads in South Sulawesi Province. In response to this request, the GOJ conducted the Study in line with "The Northeastern Indonesia Regional Development Program" and "The South Sulawesi Province Regional Development Program" undertaken by JICA.

The Study has been implemented with the following objectives:

i) To formulate the Sulawesi Island arterial road master plan;

ii) To prepare an action plan for implementation of the arterial road development; and

iii) To conduct Feasibility Study on Priority Arterial Roads in South Sulawesi Province.

(2) Study Roads

The Study covers the following four (4) feasibility roads and one (1) pre-feasibility study roads in the Mamminasata Metropolitan Area.

Table S.1 List of Feasibility Study Road

	No.	Name of Road/Road Section		Length (km)	Function	Administrative Status
F/S	1	Mamminasa Bypass		49.1	Arterial	- #
	2	Trans-Sulawesi Road Mamminasata Section (Total: 58 km)	Maros-Middle Ring (Perintis Kemerdekaan Road)	19.6	Arterial (Primary)	National
			Middle Ring Road	7.3	Arterial (Secondary)*	- **
			Middle Ring Road Access	8.6	Arterial (Secondary)*	- **
			Middle Ring Road Access-Takalar	22.5	Arterial (Primary)	National
	3	Hertasning Road (Section D Only)		4.9	Arterial (Secondary)*	Province
	4	Abdullah Daeng Sirua Road (Excluding Section B)		15.3	Arterial (Secondary)*	Makassar/ - #
Pre-F/S	5	Outer Ring Road		20.4	Arterial	- #
			Total:	147.7	km	

Notes: * Proposed function
** Proposed to be national road in future (strategic road)
# Proposed to be provincial road (strategic road)

(2) Future Development Plan for Mamminasata Metropolitan Area

Mamminasata's economy highly depended on *the manufacturing industry* and *trade, restaurant & hotel sectors* as of 2005 and these would still remain the mainstays in GRDP share even towards 2020.

Table S.2 GRDP Projection: Moderate Scenario

(1993 constant price, million Rp.)

Industry	2005		2010		2020		CAGR
	GRDP	(%)	GRDP	(%)	GRDP	(%)	(%)
Agriculture	665,608	13.3	760,568	10.1	1,043,014	7.5	3.0%
Mining & Quarrying	43,315	0.9	60,255	0.8	106,426	0.8	6.2%
Manufacturing Industry	1,046,325	20.9	1,420,147	18.8	2,616,181	18.8	6.3%
Electricity, Gas & Water Supply	139,965	2.8	214,245	2.8	436,259	3.1	7.9%
Construction	331,526	6.6	748,859	9.9	931,910	6.7	7.1%
Trade, Restaurants & Hotel	1,188,170	23.8	1,862,851	24.7	3,664,500	26.4	7.8%
Transportation & Communication	572,739	11.5	876,742	11.6	1,724,664	12.4	7.6%
Finance, Leasing & Business Services	366,918	7.3	622,097	8.2	1,472,730	10.6	9.7%
Services	643,829	12.9	979,567	13.0	1,910,794	13.7	7.5%
Total	4,998,395	100.0	7,545,331	100.0	13,906,478	100.0	7.1%

Source: Integrated Spatial Plan for Mamminasata Metropolitan Area (Main Report)

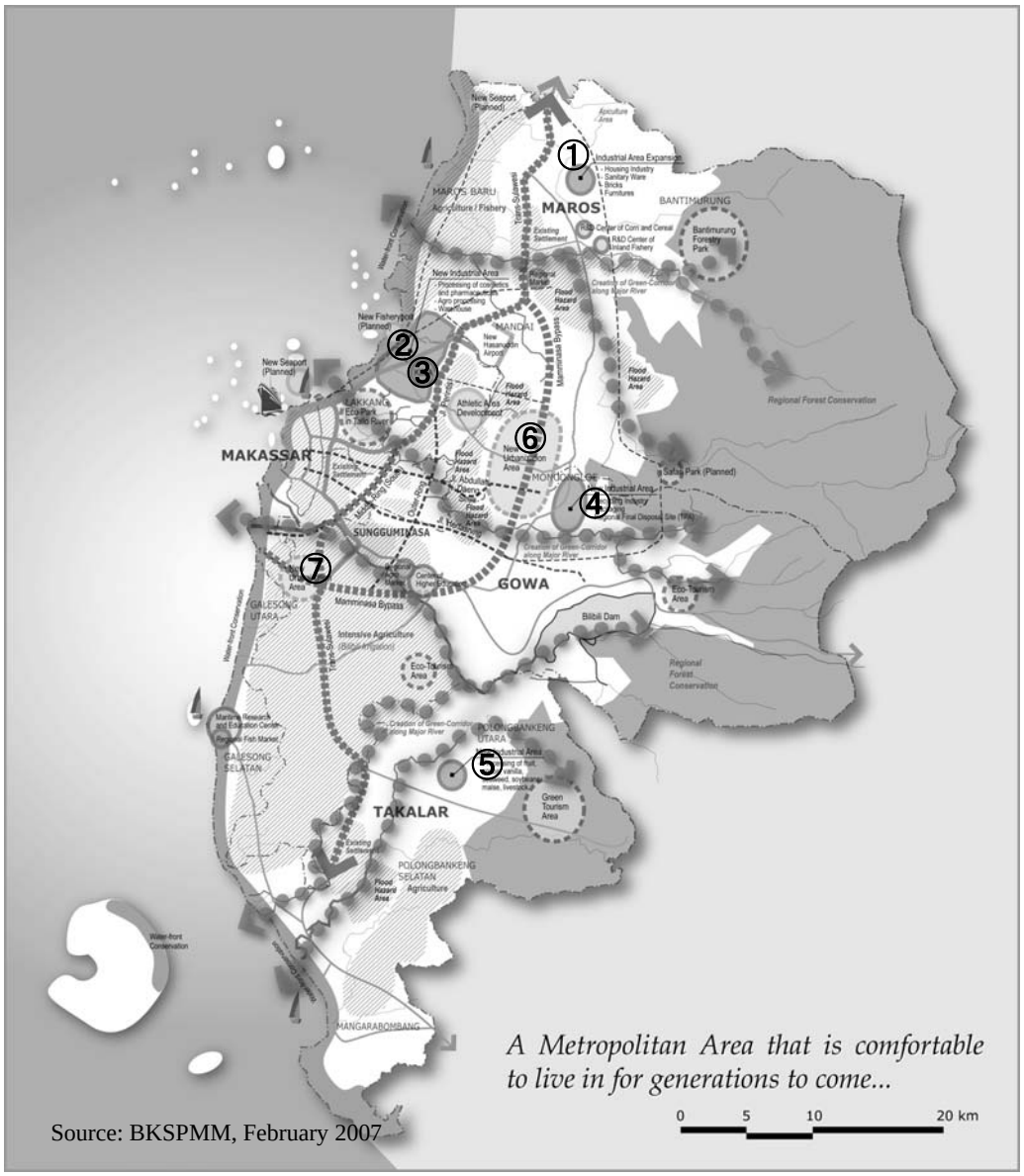
There are about 180 medium and large enterprises in Mamminasata, many of which are located in the existing KIMA (*Kawasan Industri Makassar*) industrial estate. KIMA was opened in late 1988 between Hasanuddin International Airport and Soekarno Hatta Seaport. Its original area was 192 ha and the current plan is 703 ha.

The Mamminasata Metropolitan Development Cooperation Board (MMDCB) recently has renewed a future development plan for the area, under the cooperation of JICA. There are five industrial areas and two new urbanization areas envisaged in the plan as strategic development areas as illustrated in Table S.3 and Figure S.1.

Table S.3 Outline of Future Industrial Areas and Urbanization Areas

Area Type	Name of Area	Location	Remarks
Industrial Area	① KIROS	Maros	Housing Industry, Sanitary Ware, Bricks, Furniture
	② KIMA2	Makassar, Maros	Processing of Cosmetics and Pharmaceuticals, Agro-processing, Warehouse
	③ KIMA (expansion)	Makassar	Agro-processing, Furniture, Electronics, etc.
	④ KIWA	Gowa	Recycling Industry, Packaging, Regional Final Disposal Site (TPA)
	⑤ KITA	Takalar	Processing of Fruit, Cocoa, Vanilla, Seaweed, Soybeans, Maize and Livestock
New Urbanization Area	⑥ To be named	Gowa, Maros	Residence, Business, Governmental Offices
	⑦ To be named	Takalar	Residence, Business

Source: JICA Mamminasata Study



Source: BKSPMM, February 2007

Note: ① — ⑦ are correspond to the numbers in Table S.2.

Figure S.1 Mamminasata Metropolitan Area Development Plan

(4) Traffic Demand Forecast

The traffic volume on most sections of arterials road including the F/S roads will increase about 2 times in year 2023 from the present. The F/S and Pre-F/S will play an important role to meet the traffic demands in the future. Figure S.2 shows the present traffic and the year 2023 traffic with project case in the Mamminasata Metropolitan Area.

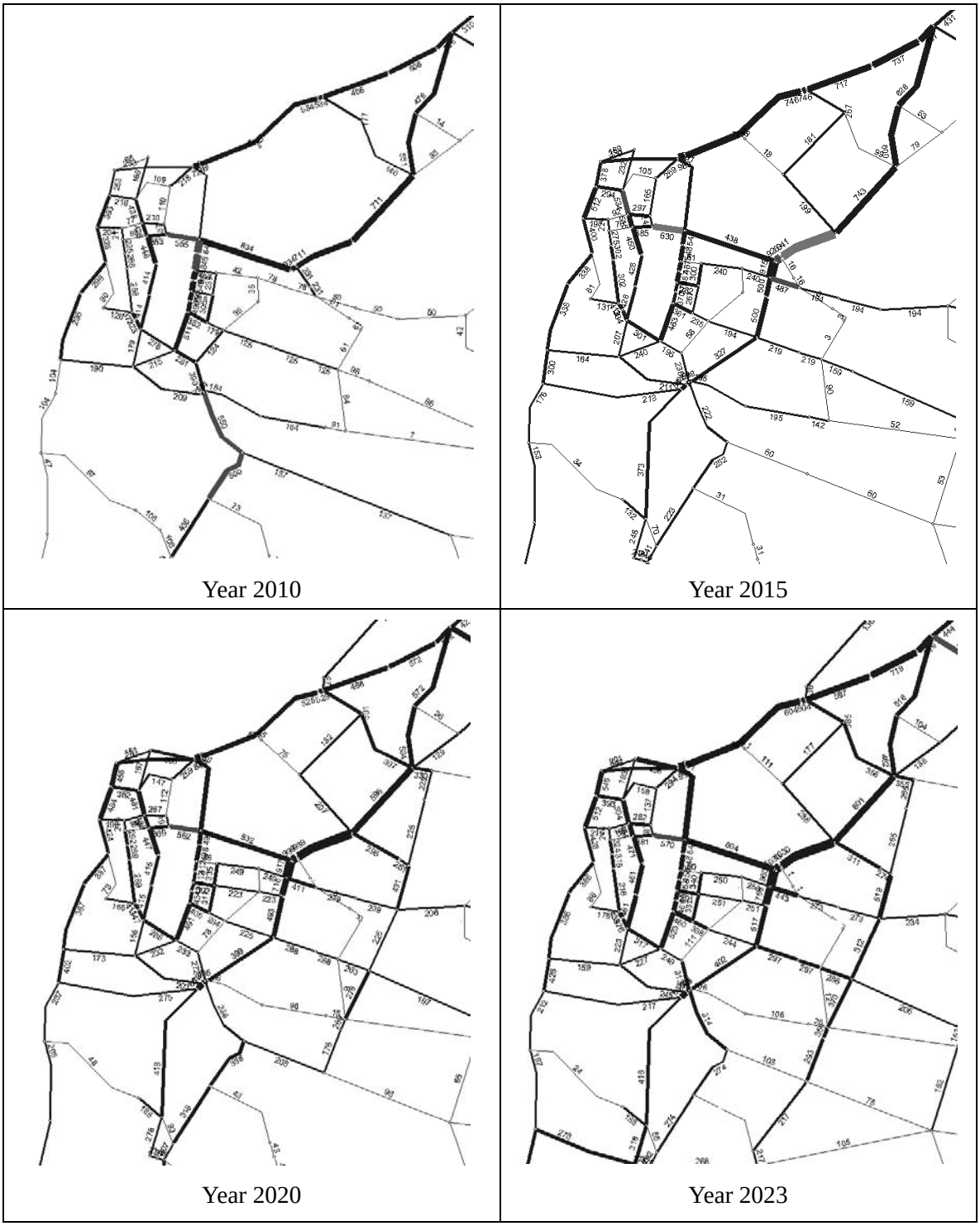
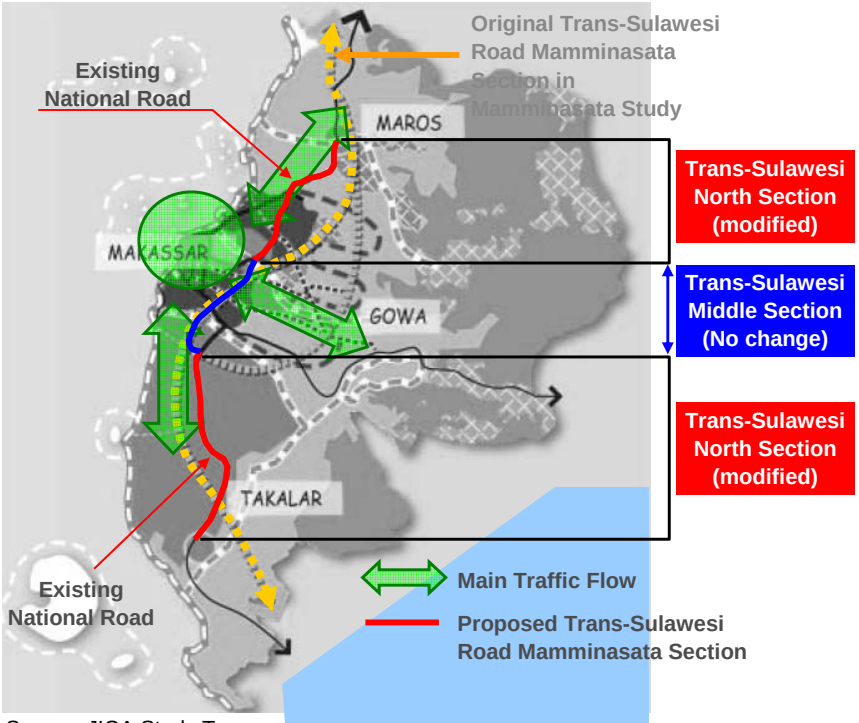


Figure S.2 Traffic Demand Forecast in Mamminasata Metropolitan Areas (With Project Case)

(5) Road Route of Trans-Sulawesi Mamminasata Road

The originally planned route of the Trans-Sulawesi Mamminasata Section was a new road running in parallel with the existing Trans-Sulawesi route (national road) in the Mamminasata Plan.

However, the north and south sections were modified, taking difficulty in land acquisition and resettlement, traffic flow, topography (Tallo River basin and swamp) and required road function into consideration, to use the existing national roads (Figure S.3). The middle section comprised of the Middle Ring Road and its southern extension over the Jeneberang River, which is the same asThe original route of the south section between Sungguminasa and Takalar Town in the Mamminasata Spatial Plan was a new route running in parallel with the existing national road.



Source: JICA Study Team

Figure S.3 Modification of Route of Trans-Sulawesi Mamminasata Section

(6) Location of Satellite Towns and Position of Mamminasa Bypass

The Study Team set up an appropriate location of Satellite Town at the west foot of Mt. Moncongloe, at the boarder of Maros and Gowa Regencies. The original location of the Mamminasa Bypass was along the existing Kabupaten road passing behind Mt. Moncongloe. But it was moved to the front of mountain in the Inception Report stage (Figure S.4).

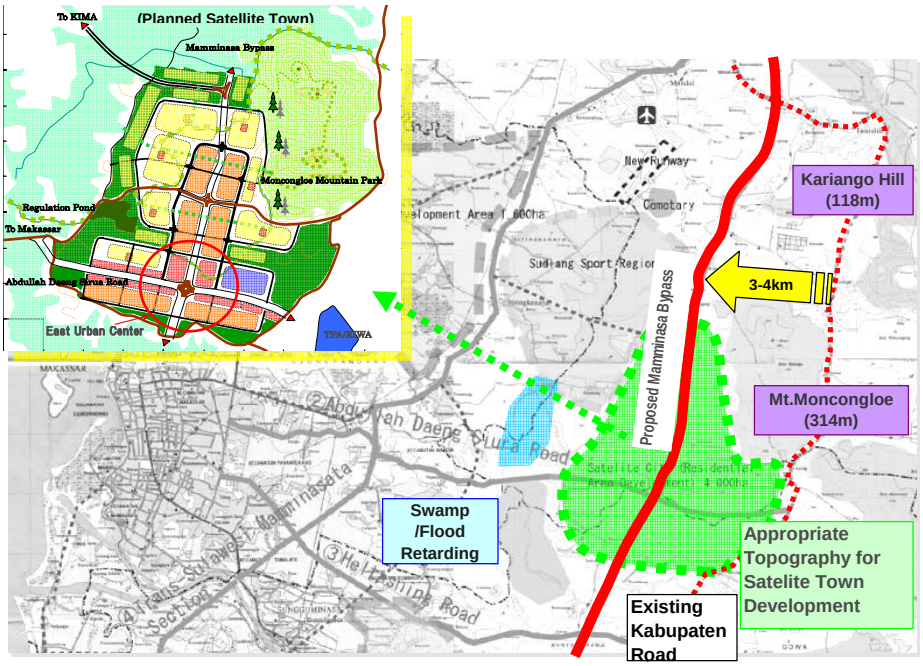


Figure S.4 Location of Proposed Satellite Town and Mamminasa Bypass

(7) Development Concept of the F/S Roads

1) Trans-Sulawesi Road Mamminasata Section (Maros – Takalar)

The development concept of the Trans-Sulawesi Mamminasata Road from Maros to Takalar through the middle ring road is the existing national road widening and new road construction as summarized in the following table.

Table S.4 Development Concept of Trans-Sulawesi Mamminasata Road

No.	Section	Classification				Traffic Volume		Number of Lanes		Develop-ment Plan	ROW Width (m)	Current Staus of ROW Acquisition	Planned Interchanges (IC)
		Length (km)	Function	Administrative Status	Type / Class	2006	2023	Exsting	Plan				
A	Maros - Jl.Tol.Ir.Sutami IC	8.7	Arterial (Primary)	National	Types II / Class I	23000-30000	53000-54000	4	6	Widening	42	Not yet	Jl.Ir.Sutami
	Jl.Tol.Ir.Sutami IC-Middle Ring Road (Jl.Perintis)**	10.9	Arterial (Primary)	National	Types II / Class I	29000-62000	60000-100000	4	6-8	Widening	42	On-going	
B	Middle Ring Road	7.3	Arterial (Secondary)*	*	Types II / Class I	-	46000-52000	-	6	New Road	40-42	On-going	Jl.Sultan Alauddin
C	Middle Ring Road Access	8.6	Arterial (Secondary)*	*	Types II / Class I	-	47000	-	4	New Road	40	Not yet	-
D	Middle Ring Road Access-Takalar	22.5	Arterial (Primary)	National	Types II / Class I	13000-36000	30000-47000	2	4	Widening	30	Not yet	-
	Total:	58.0 km											

Notes: * Proposed status after construction
** DGH started 6-lane widening and complete it by 2010

2) Mamminasa Bypass

The development objective of Mamminasa Bypass is to induce a new satellite town at about 15 km east of Makassar City, at the Kabupaten Gowa and Maros border. The development concept of

Mamminasa Bypass is to construct a new 4-lane road with a wide median (10 m for a widening space in the future) as in the following table.

Table S.5 Development Concept of Mamminasa Bypass

Section	Length (km)	Classification			Traffic Volume 2023(pcu)	Number of Lanes		Development Plan	ROW Width (m)	Bridge
		Function	Administrative Status	Type / Class		Existing	Plan			
South	16.7	Arterial * (Secondary)	Provincial **	Type II / Class I	20000 - 44000	-	4	New Road	40	Jeneberang River (L=154m)
Middle	19.7	Arterial * (Secondary)	Provincial **	Type II / Class I	15000 - 23000	-	4	New Road	40	-
North	12.6	Arterial * (Secondary)	Provincial **	Type II / Class I	11000 - 33000	-	4	New Road	40	Maros River (L=126m)
Total:	49.1 km									

Notes: * Proposed function
* Proposed administrative status is provincial strategic road

3) Hertasning Road and Abdullah Daeng Sirua Road

Both Hertasning and Abdullah Daeng Sirua roads are radial roads of the Makassar Metropolitan Areas. The planned road is a 4-lane highway with median.

(8) Costs Estimate and Economic Evaluation

The estimated economic cost (excluding VAT and inflation) are as given the following table.

Table S.6 Project Cost of the F/S Roads

Target Road	Length (km)	Economic Cost (Rp. Million)
R1: Mamminasa Bypass	48.6	854,521
R2: Trans-Sulawesi Mamminasata	47.3	
- Non-Toll		1,175,761
- Toll Expressway*		1,382,835
R3: Hertasning Road	4.9	76,310
R4: Abdullah Daeng Sirua Road	14.6	271,692

Note: * For a review for possibility of the project implementation by PPP.

Economic viability is very high for all F/S roads. Trans-Sulawesi Mamminasata Road (non-toll and phasing construction case) and Hertasning Road indicate the higher EIRR of 30.2% and 33.8% respectively. NPV of Trans-Sulawesi Mamminasata Road is the highest among FS Roads.

Table S.7 Economic Evaluation Results for F/S Road

Target Roads	Evaluation Indicators		
	EIRR	NPV (Rp. million) (*)	B/C (*)
R1: Mamminasa Bypass	22.4%	171,550	1.97
R2: Trans-Sulawesi Mamminasata Road			
-(Non-Toll) 2013 simultaneous open	28.5%	768,273	2.30
-(Non-Toll) Phasing	30.2%	721,063	2.45
-(Toll Expressway)	26.7%	648,842	2.07
R3: Hertasning Road	33.8%	122,258	3.51
R4: Abd. Daeng Sirua Road	31.0%	110,466	1.96

Source: JICA Study Team
(*) Discount Rate = 15%

(9) Financial Evaluation for the Middle Ring Road Section of Trans-Sulawesi Road

A comparison of toll revenue and project cost of the toll expressway shows that Financial Internal Rate of Return (FIRR) will be at 6.5% without any subsidies or other financial support from the Government. In general, a toll road project with such a low financial return should be implemented under the conventional public investment as indicated in the following table.

S.8 Financial Viability and Category of Financing Scheme

		Economic Feasibility		
		Good EIRR>18%	Marginal 12% - 18%	Bad EIRR< 12%
Financial Viability	Good FIRR>20%	BOT*	BOT*	-
	Marginal 10%-20%	PPP**	PPP**	-
	Bad FIRR<10%	Public Finance	Public Finance	-

Note: As FIRR of the project was estimated at 6.5%, it is categorized into Public Finance.

In order to attract a private sector to investment, it is necessary to achieve the minimum 20% of FIRR through the Government subsidy on the initial investment. However, the necessary Government subsidy is estimated at 72.0% (Rp. 523,078 Million) of the total investment cost including the Land Acquisition. As this percentage of government subsidy is too high comparing with the normal PPP scheme, the project is recommended to be implemented under public finance.

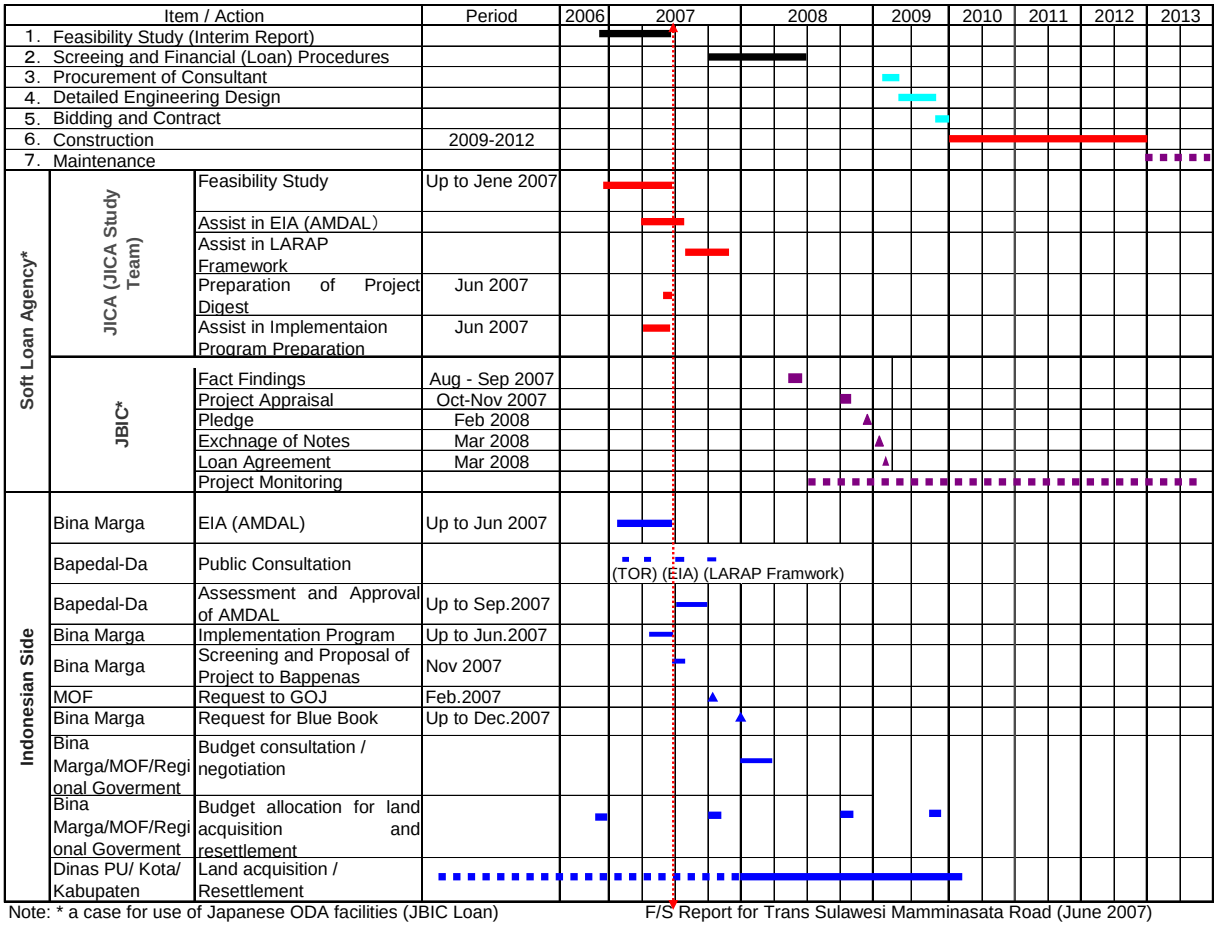
(10) Environmental Considerations

EIA (AMDAL) report including environmental management and monitoring plans on the Trans-Sulawesi Mamminasata Road Project was approved by the Governor of South Sulawesi Province in September 2007. EIA (AMDAL) report including environmental management and monitoring plans on the Mamminasa Bypass, Hertasning Road and Abdullah Daeng Sirua Road was completed and under approval procedure.

(11) Implementation Plan for the F/S and Pre-F/S Road Projects

Trans-Sulawesi Mamminasata Road

The Trans-Sulawesi Mamminasata Road Project should be implemented in two phases: Phase 1 for Sections B and C (Middle Ring Road and its southern extension), and Phase 2 for Section A (Maros-Jl.Tol.Ir.Sutami IC) and Section D (Sungguminasa – Takalar) to provide sufficient time. Figures S.5 and S.6 show planned implementation plan and schedule.

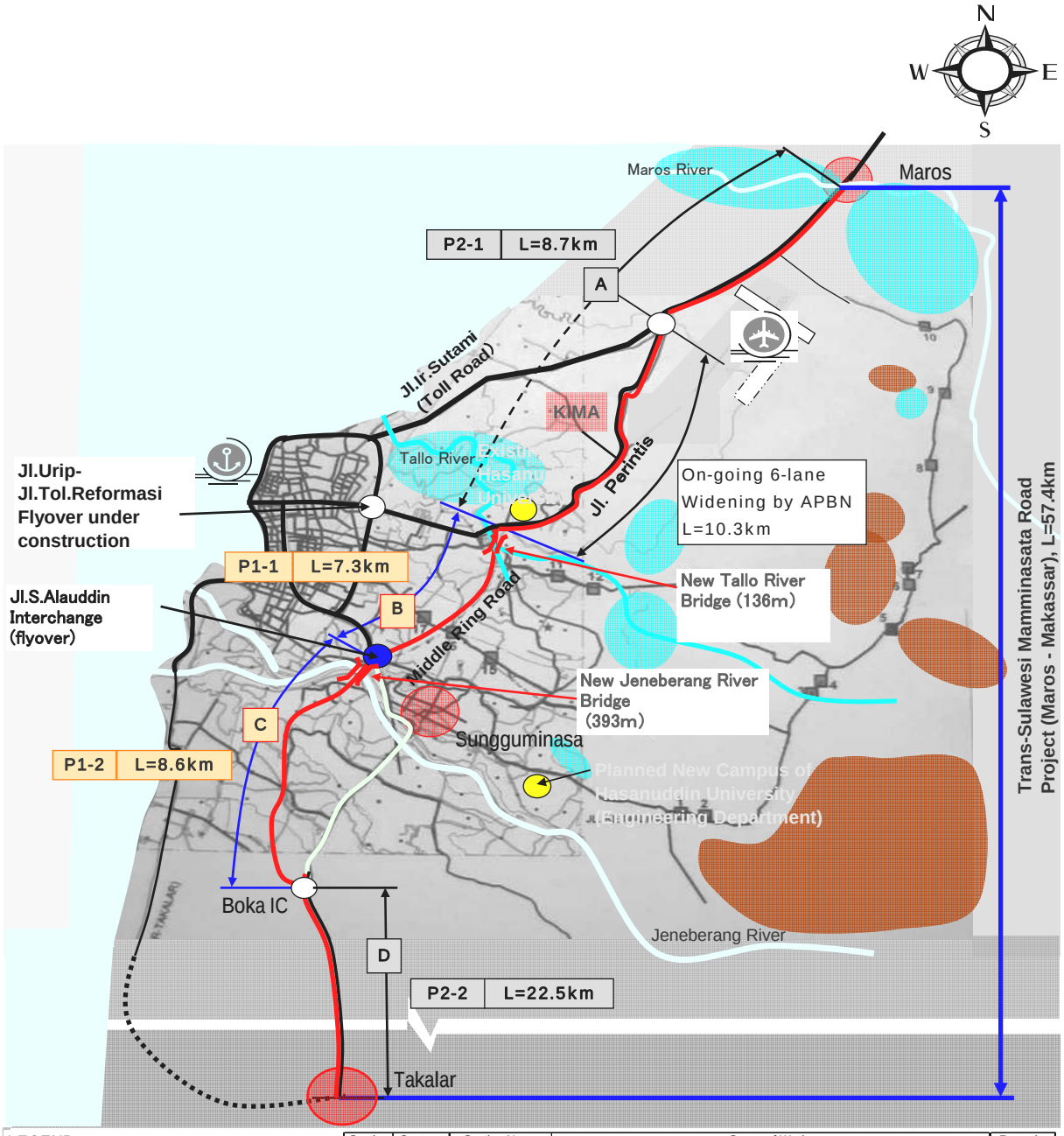


Note: * a case for use of Japanese ODA facilities (JBIC Loan) F/S Report for Trans Sulawesi Mamminasata Road (June 2007)

Figure S.5 Implementation Schedule and Action Plan for Trans-Sulawesi Mamminasata Road Project Phase 1 (Case for Japanese ODA Facility)

Mamminasa Bypass, Hertasning Roads, Abdullah Daeng Sirua Road and Outer Ring Road

All these FS roads (Mamminasa Bypass, Hertasning Roads and Abdullah Daeng Sirua Road) and Pre-F/S road (Outer Ring Road) will be implemented and completed by the year 2023. The implementation schedule of projects will differ by priority of sub-section of each road link, financing sources and availability of budgets. As to the anticipated or assumed financial sources and implementation schedule, refer to Section 10.5 of Summary Report.



Section No.	Contract Package No.	Section Name	Scope of Works							Remarks
			Length (km)	Number of Lanes		Roadway	Pavement	Flyover Interchange	Major River Bridge (m)	
				Existing	Plan*					
A	P2-1	Maros - Jl.Ir.Sutami IC	8.7	4	6	Widening	Concrete Pavement			
		Jl.Ir.Sutami IC-Middle Ring Road (Jl.Perintis)	-	4	6 (8)	On-going Widening by GOI (APBN)	Concrete Pavement			Only pedestrian bridges
B	P1-1	Middle Ring Road	7.3	-	6 (8)	New Road	Concrete Pavement	Jl.Sultan Alauddin IC	Tallo River Bridge (136m)	
C	P1-2	Middle Ring Road Access	8.6	-	4 (6)	New Road	AC Pavement	-	Jeneberang River Bridge (393m)	
D	P2-2	Boka IC -Takalar (national road)	22.5	2	4	Widening	AC Pavement	-		
		Total:	47.1							

Note: the figure in ( ) shows a future plan.

Figure S.6 Implementation Plan B for Trans-Sulawesi Mamminasata Road

(12) Conclusion and Recommendations

1) Trans-Sulawesi Mamminasata Road

The Study Team identified that the Trans-Sulawesi Mamminasata Road (TSMR) is the highest priority road link among four the F/S roads. The F/S for the Trans-Sulawesi Mamminasata Road (the TSMR) has shown that the TSMR Project is highly viable in both technical and economic aspects (EIRR: 28.5-30.2%). Therefore, it is recommended that the Project be implemented at an earliest date for the benefit of national and regional economy by public financing. It will directly contribute to the development of the Mamminasata Metropolitan Area by:

- improving the present urban road network
- coping with the increasing traffic demand
- enhancing regional development.
- supporting logistic flow for inducing trade, investment and industrial development.

It also will indirectly contribute to:

- expanding development to the whole eastern regions of Indonesia
- reducing poverty and regional development gaps.

The current progress of ROW acquisition for the Middle Ring Road (Section B) is approximately 60-70%. The Project should be implemented in two phases: Phase 1 for Sections B and C (Middle Ring Road and its southern extension), and Phase 2 for Section A (Maros-Jl.Tol.Ir.Sutami IC) and Section D (Sungguminasa - Takalar) to provide the sufficient time for land acquisition and resettlement.

2) Mamminasa Bypass, Hertasning Road and Abdullah Daeng Sirua Road

The feasibility study for Mamminasa Bypass has shown that the Project is viable on both technical and economic aspects (EIRR: 22.4%). The Study Team identified that Mamminasa Bypass is the second highest priority road link among four F/S roads. Mamminasa Bypass should be constructed as a new road. The appropriate route is at passing through appropriate topography and location where a new satellite town can be developed.

The north section of Mamminasa Bypass should be planned as a bypass for Maros Town while avoiding a planned flood retarding basin of the Maros River. The southern route should be connected to Jl.Tj.Metro Bunga where many development projects have been in progress or under planning. It will directly contribute to the development of the Mamminasata Metropolitan Area by:

- inducing a new satellite town at the east of Makassar City and the west foot of Mt.

Moncongloe, where flood free 4,000 ha of land could be available for regulated urban development.

- enhancing regional development, especially contributing to the development of KIWA (planned new industrial area of Gowa Regency).

The MB Project should be implemented in phases. The middle part of Mamminasa Bypass should be constructed in the first phase since it is an arterial road for a planned new satellite town.

A separate study should be conducted for establishment of a satellite town development plan. The private sector should be encouraged to participate in the required infrastructure construction, including access road for the new satellite town development.

The regional governments should control housing and other development on the route of Mamminasa Bypass and the planned new town area to secure the land for these developments.

3) Hertasning Road

The Hertasning Road construction project is an ongoing development project by South Sulawesi Government. It is divided into four sections, Sections A, B, C and D. Section A has already been completed and Section B is under construction. The detailed design for Section C has been completed. Implementation of the Hertasning Road Project (the HRP) should be continued under South Sulawesi Province as a provincial strategic road since it is an arterial road of the Mamminasata Metropolitan Area.

Hertasning Road has the following functions:

- Direct access road from the east suburbs to the Makassar City center as one of the radial roads.
- A main access road to TPA (new final waste disposal area planned at Pattallassang in Gowa Regency).
- Enhancement of regional development, especially contributing to the development of KIWA (new industrial area of Gowa Regency).
- A short cut route for the Bili-bili Dam and Malino.

A stage construction approach might be applied for Sections C and D of HRP taking tight budget required for both ROW acquisition and construction into consideration. The 1st Stage is widening of the existing 4.5m travelway (carriageway) to a 7.0 m standard road. The 2nd stage is further widening from 2-lanes to 4-lanes with a median.

4) Abdullah Daeng Sirua Road

The Abdullah Daeng Sirua Road construction project is an on-going project of Makassar City.

This is the direct access road from the Makassar City center to the planned new satellite town and the new industrial area of Gowa Regency (KIWA).

As the F/S for the Abdullah Daeng Sirua Road has verified that the Project is viable on both technical and economic aspects, the project should be continued for the benefit of national and regional economy with a financial assistance of the central government.

5) Outer Ring Road

The Outer Ring Road is one of the important links in the Mamminasata Metropolitan Area arterial road network and its expected functions are as follows:

- Ring road to contribute to harmonizing urban development
- Logistic route for the coming in and out traffic from/to the southern area of the South Sulawesi Province to/from KIMA, Makassar Port, new industrial areas along Jl.Tol.Ir.Sutami
- Connection between the north educational center and the south educational center.

The northern section between Jl.Tol.Ir.Sutami and Jl. Perintis Kemerdekaan through New Industrial Area (Kawasan Pergudangan dan Industri Parangloe Indah) is under construction by a private investor and be completed as it planned. The route of on-going north section should keep a 500-700 m buffer zone between the Tallo River and the on-going north section to avoid negative effects to the river environment.

As the project is vital on both technical and economic aspects, it is recommended to conduct a feasibility study for implementation including EIA for its implementation.

6) Recommendation on Establishment of Coordination Committee for Project Implementation of the F/S Roads

The Study Team understands that good cooperation and coordination between the central governments (Bappenas, MOF and MPW) and regional governments (South Sulawesi Province, Makassar City and Regencies of Maros, Gowa and Takalar) are very important for implementation of the F/S road projects as these are part of the arterial road network for the Mamminasata Metropolitan Area.

The Study Team recommends establishment of a “Project Implementation Committee for Arterial Road Network Development for the Mamminasata Metropolitan Area”. The committee, comprised of the representatives of concerned central and regional governments, holds periodic meetings for monitoring progress of the project implementation, discusses on problems and measures to solve and takes required actions for smooth implementation of the projects.

CHAPTER 1 INTRODUCTION

1.1 Background

In Indonesia, the quality of life and social welfare has been significantly improved due to the recent development policies, while regional disparity has appeared as a new problem. Particularly between Western Indonesia (KBI) and Eastern Indonesia (KTI), the disparity is quickly getting serious being one of the major issues for the Government of the Republic of Indonesia (hereinafter referred to as "GOI") to tackle. The development of KTI has been advocated in the past National Development Plans and also in the new National Mid-Term Development Plan 2005-2009. To support the regional development in KTI, strategic importance of infrastructure has been identified as one of the priority measures for linking different regions and for poverty reduction.

Under these circumstances, the Government of Japan (hereinafter referred to as "GOJ") has introduced and the South Sulawesi Regional Development Program to orientate the development of entire KTI. In the light of this initiative, development of intercity roads as well as urban radial/circumferential roads is proposed in South Sulawesi Province to accelerate the economic development in a balanced manner.

For entire Sulawesi, a master plan for arterial road development is needed to support the sustainable economic development of the island. The plan should include an investment plan with a balance between new construction and maintenance of existing facilities considering the limited resources, and efficient and effective policies for transport network development.

Addressing to the above, the GOI requested the GOJ to provide technical assistance in carrying out the Study on Arterial Road Network Development Plan for Sulawesi Island and Feasibility Study on Priority Arterial Roads in South Sulawesi Province (hereinafter referred to as "the Study"). In response to this request, the GOJ has conducted in close cooperation with the relevant authorities concerned of the GOI.

The Study was conducted in line with the objectives of "The Northeastern Indonesia Regional Development Program" and "The South Sulawesi Province Regional Development Program" undertaken by the GOJ. The F/S on Priority Arterial Roads in South Sulawesi Province is one of the South Sulawesi regional programs as illustrated in the following figure.

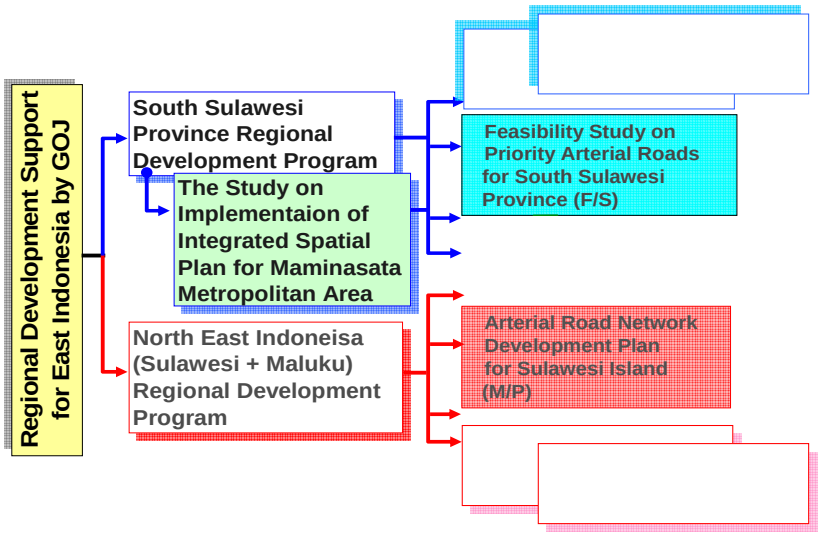


Figure 1.1.1 Concept of Regional Development Support for East Indonesia by GOJ

1.2 Study Objectives

The major objectives of the Study are:

i) To formulate the Sulawesi Island arterial road master plan.

ii) To prepare an action plan for implementation of the arterial road development.

iii) To conduct Feasibility Study on Priority Arterial Roads in South Sulawesi Province.

In particular, the Study is expected to contribute to the acceleration of economic and social development (poverty reduction) in the region.

1.3 Study Area and Study Roads

The study area for the feasibility study covers the South Sulawesi province with a focus on the Mamminasata Metropolitan Area. The feasibility study route and road sections, which were selected from the proposed priority roads in the Integrated Spatial Plan for Mamminasata Metropolitan Area and agreed in this inception stage after site reconnaissance and discussions with the central and provincial government agencies concerned, are as follows:

i) Mamminasa Bypass
ii) Trans-Sulawesi Road Mamminasata Section (Maros-Takalar through Perintis Kemerdekaan Road and Middle Ring Road)
iii) Hertasning Road
iv) Abdullah Daeng Sirua Road

In addition to the above four roads, a pre-feasibility study was conducted on the Outer Ring Road as proposed by the South Sulawesi government and Makassar City and agreed between the Directorate General of Highways and JICA on 28th December 2006.

1.4 Study Schedule and Work Flow

The entire work period of the Study is expected to be sixteen months, beginning with the preparatory work in December 2006 in Japan and completing with the submission of the Final Report in March 2008. The Study is composed of Part I - Sulawesi Island Arterial Road Network Development Plan (Master Plan) and Part II - Feasibility Study on Priority Arterial Roads in South Sulawesi province. Part I and Part II shall be undertaken simultaneously. The Study is divided into four stages: Preparatory work in Japan, the first and second studies in Indonesia, and the final study in Japan. **Figure 1.2** illustrates the overall work schedule.

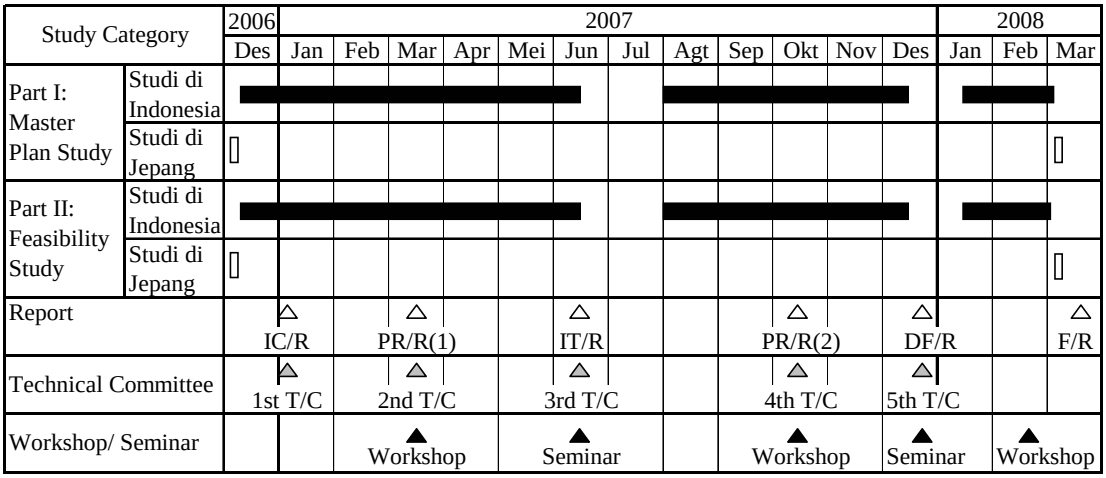


Figure 1.4.1 Overall Study Schedule

The work flow of the F/S is shown in **Figure 1.4.2**.

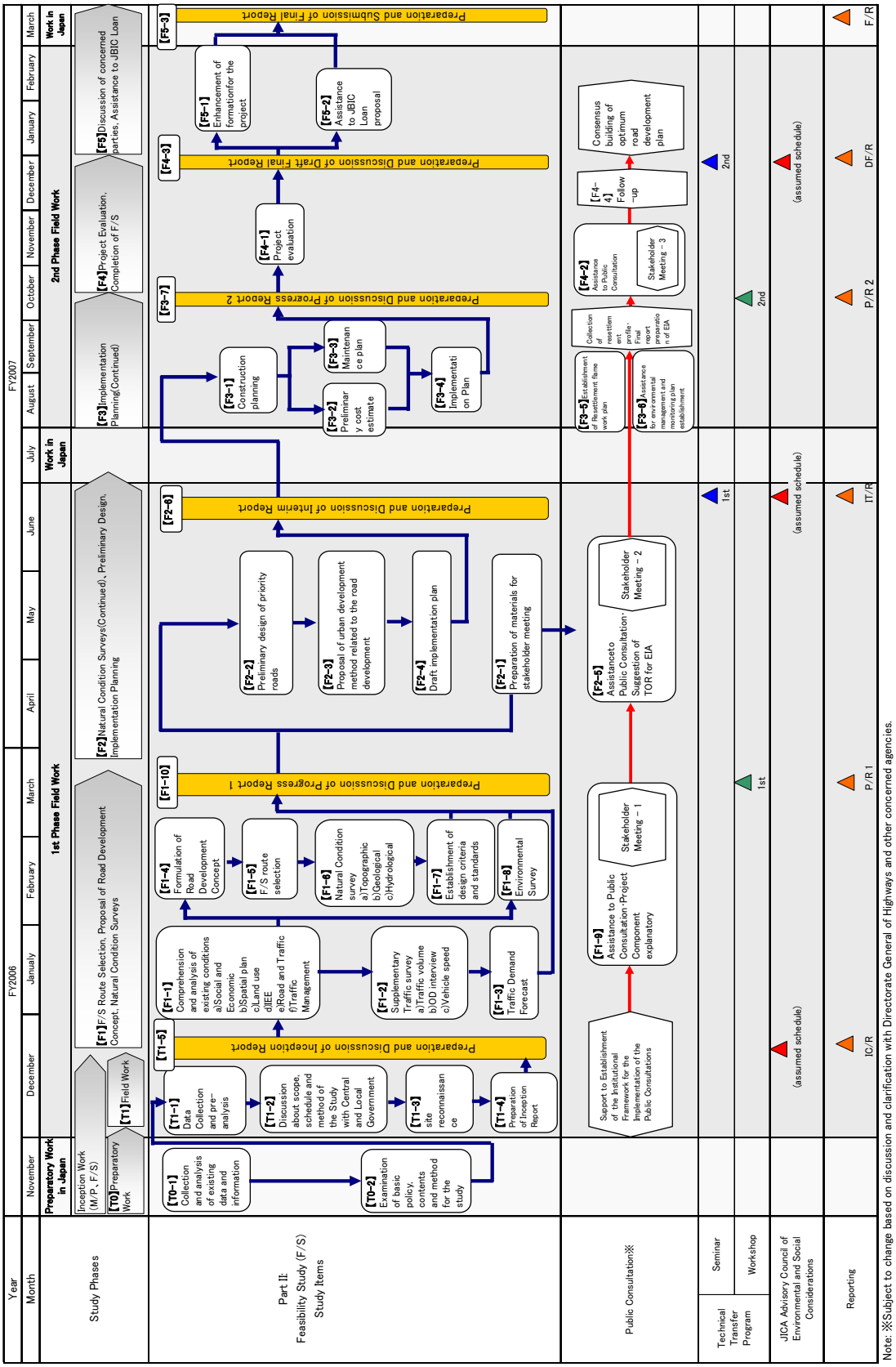


Figure 1.4.2 Work Flow of the Feasibility Study

1.5 Major Meetings, Presentations, Consultations and Workshop/Seminar

Major meetings, presentations, consultations and Seminars/workshops held through the F/S are as listed in **Table 1.5.1**.

Table 1.5.1 Major Meetings, Presentations, Consultations and Workshop/Seminar Held through the F/S

Date	Activity	Participants	Outcome
Milestone Meetings			
January 9, 2007	Technical Committee at Bina Marga	Technical Committee members, JICA Indonesia Office, JICA Study Team	Presentation of Inception Report and approval of the scope and methodology of the Study
March 6-7, 2007	Workshop 1 at Makassar	Technical Committee members, JICA Makassar Field Office, JICA Study Team, Provincial Government (North Sulawesi, Gorontalo, Central Sulawesi, Southeast Sulawesi, West Sulawesi, South Sulawesi), Working Team South Sulawesi Province	1st Day: Presentation on the M/P. Presentation by each province on development plan. Presentation and discussion on environmental survey. 2nd Day: Presentation and discussion on the FS road route selection, road and bridge development concept and environmental considerations.
June 7, 2007	Seminar 1 for the F/S at Makassar	Technical Committee Members, Working Team Members, JICA Indonesia Office, JICA Study Team	Presentation and consultation on Interim Report and Trans-Sulawesi Mamminasata Road Implementation Plan.
September 10-11, 2007	Workshop 2 at Makassar	Technical Committee members, JICA Makassar Field Office, JICA Study Team, Provincial Government (North Sulawesi, Gorontalo, Central Sulawesi, Southeast Sulawesi, West Sulawesi, South Sulawesi), Working Team South Sulawesi Province	1st Day: Presentation on the M/P. Presentation by each province on road development plan. Presentation and discussion on environmental considerations. 2nd Day: Presentation and discussion on the preliminary design of FS roads and environmental considerations.
November 5, 2007	Technical Committee at Bina Marga	Technical Committee Members, JICA Indonesia Office, JICA Study Team	Presentation and consultation on Progress Report (2).
December 13, 2007	Seminar 2 for the F/S at Makassar	Technical Committee Members, Working Team Members, City/Regency Governments, Public representative, JICA Indonesia Office, JICA Study Team	Presentation on Draft Final Report of the F/S and Stakeholder Meetings
December 18, 2007	Technical Committee Meeting at Bina Marga	Technical Committee Members, Working Team Members, JICA Indonesia Office, JICA Study Team	Presentation and consultation on Draft Final Report
Presentation and Discussion with Agencies Concerned			
January 16, 2007	South Sulawesi Working Team Meeting at Dinas Prasarana	South Sulawesi Working Team members (Bappeda, PU, Spatial Plan, Bappedalda of Province, Makassar, Gowa, Maros and Takalar), JICA Study Team	Presentation and discussion on Inception Report.
February 6, 2007	Stakeholders Meeting on FS Road route selection and public consultation preparation at Dinas Bappeda Office	Central Bina Marga (Bipran and Bintek), South Sulawesi Working Team members (Bappeda, PU, Spatial Plan, Bappedalda of Province, Makassar, Maros and Takalar), JICA Study Team	Presentation and discussion on alternative route selection for the Trans-Sulawesi Mamminasata and public consultation preparation.
February 19, 2007	FS Roads Route Selection Meeting at Gowa Bupati Office	Bupati, Bappeda, Dinas PU, Bappedalda, Tata Ruang of Kabupaten Gowa, Dinas Prasarana, JICA Study Team	Presentation and discussion on alternative routes for Mamminasa Bypass and Trans-Sulawesi Mamminasata.
February 21,	FS Road Route	Bappeda, Dinas PU, Tata Ruang of	Presentation and discussion on alternative

Date	Activity	Participants	Outcome
2007	Selection Meeting at Maros Bappeda	Kabupaten Maros, JICA Study Team	routes for Mamminasa Bypass and Trans-Sulawesi Mamminasata.
February 22, 2007	FS Roads Route Selection Meeting at Takalar PU	Dinas PU/Takalar, JICA Study Team	Presentation and discussion on alternative routes for Mamminasa Bypass and Trans-Sulawesi Mamminasata.
February 28, 2007	FS Roads Route Selection Meeting at Makassar PU	Bappeda, Dinas PU, Bappedalda, PDAM, Tata Ruang of Makassar, JICA Study Team	Presentation and discussion on alternative routes of Mamminasa Bypass, Trans-Sulawesi Mamminasata and Abdullah Daeng Sirua Road.
March 2, 2007	FS Roads Route Selection Meeting at Dinas Prasarana	Bappeda, Dinas Prasarana, Tata Ruang, JICA Study Team	Presentation and discussion on alternative routes of Mamminasa Bypass, Trans-Sulawesi Mamminasata and Abdullah Daeng Sirua Road.
March 13, 2007	Working Team Meeting at Bina Marga	Working Group Members, JICA Study Team	Presentation and discussion on Progress Report No.1.
April 26, 2007	South Sulawesi Working Team Meeting at Bappeda, South Sulawesi Province	South Sulawesi Working Team members (Bappeda, PU, Spatial Plan, Bappedalda of Province, Makassar, Gowa, Maros and Takalar), JICA Study Team	Presentation and discussion on work schedule from April to June 2007 and route selection for the Outer Ring Road.
May 15, 2007	Outer Ring Road Route Selection Meeting at Gowa Bupati Office	Bupati, Bappeda, Dinas PU, Bappedalda, Tata Ruang of Kabupaten Gowa, Dinas Prasarana, JICA Study Team	Presentation and discussion on alternative routes for the Outer Ring Road
May 22, 2007	Outer Ring Road Route Selection Meeting at Makassar City Mayer's Office	Mayer, Bappeda, Dinas PU, Bappedalda, Tata Ruang of Kabupaten Gowa, Dinas Bina Marga, Balai Bear, JICA Study Team	Presentation and discussion on alternative routes for the Outer Ring Road
May 31, 2007	South Sulawesi Working Team Meeting at Bappeda, South Sulawesi Province	South Sulawesi Working Team members (Bappeda, PU, Spatial Plan, Bappedalda of Province, Makassar, Gowa, Maros and Takalar), Bina Marga, Balai Besar, JICA Study Team	Presentation and discussion on outline of Interim Report, route selection of the Outer Ring Road and implementation plan for the Trans-Sulawesi Mamminasata Road Project
November 1, 2007	South Sulawesi Working Team Meeting at Bappeda, South Sulawesi Province	South Sulawesi Working Team members (Bappeda, PU, Spatial Plan, Bappedalda of Province, Makassar, Gowa, Maros and Takalar), JICA Study Team	Presentation and discussion on Progress Report (2)

1.6 Organization for the Study

1.6.1 Organization

The Study organization established as shown in the following figure. Technical Committee of GOI was formed for the Study to ensure its efficient conduct under the initiative of the Indonesian side. Working teams was established in relation to the M/P and the F/S as the Study executing body as well.

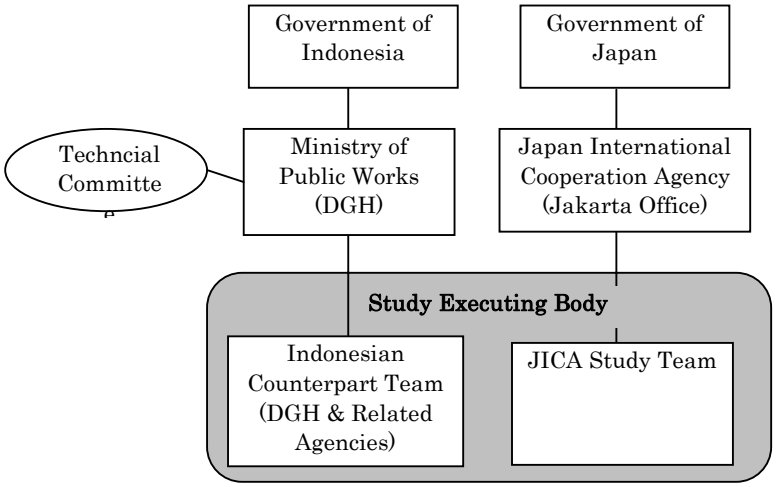


Figure 1.6.1 Organization of the Study

1.6.2 Study Team

The JICA Study Team is composed of the following members:

Mr. Hiroki Shinkai	**Team Leader**/Transport Planning
Mr. Isamu Asakura	**Deputy Team Leader**/Regional Development
Mr. Takashi Shoyama	Road Planning 1
Mr. Takashi Shimizu	Road Planning 2
Mr. Naoaki Sonobe	Road Planning 3
Mr. Hajime Koizumi	Development Strategy/Spatial Development Planning
Mr. Kenji Tanaka	Urban Planning/Land use Planning
Mr. Takeshi Yamashita	Regional Economy
Mr. Takuya Okada	Industrial Promotion
Mr. Isamu Koike	Trade/Distribution
Mr. Shubun Endo	Transport Facility Survey
Mr. Hideo Arikawa	Traffic Demand Forecast
Mr. Jamaluddin Rahim	Traffic Survey
Mr.Yuichi Koda	Environmental & Social Consideration 1
Mr. Takehiko Ogawa	Environmental & Social Consideration 2
Ms. Akiko Urago	Environmental & Social Consideration 3
Ms. Keiko Nagai	Public Consultation 1
Ms. Dorothea Agnes Rampisela	Public Consultation 2
Mr. Shigeru Konda	**Deputy Team Leader**/Road Planning 2/Maintenance
Mr. Narihiro Morisaki	Natural Condition (Hydraulics/Hydrology)
Mr. Takayasu Nagai	Road Design 1/Natural Condition (Topography)
Mr. Sthapit Naresh	Road Design 2
Mr. Takeshi Yoshida	Bridge Design/Natural Condition (Geology)

Mr. Masayoshi Iwasaki	Implementation Planning /Funding/Institutional Study
Mr. Masahito Homma	Economic & Financial Analysis
Mr. Ippei Iwamoto	Construction Planning/Cost Estimation/Coordination 1
Mr. Hiroaki Ueyama	Construction Planning/Cost Estimation/Coordination 2

1.6.3 Technical Committee

The Technical Committee consisted of the following officials from the respective ministries and agencies:

Chief: Ir. Sri Apriatini Soelardi, MM/Ir. Taufik Widjoyono, MSc. Director of Planning, Directorate General of Highways, Ministry of Public Works

Secretary: Ir. Harris H. Batubara, MEng/Dr. Max Antameng, MA. Sc. Chief of Sub-Directorate of General Planning, Director of Planning, Directorate General of Highways, Ministry of Public Works

Member: Ir. Nurden Manurung, MM. Director of Freeways and Urban Roads, Directorate General of Highways, Ministry of Public Works

Ir. Frankie Tayu, Director of Technical Guidance, Directorate General of Highways, Ministry of Public Works

Ir. R.Bambang Goeritno Soekamto, MSc, MPA. Chief of Planning and Foreign Cooperation Bureau, Ministry of Public Works

Ir. U.Hayati, Triastuti, MSc, Director of Transportation, National Development Agency

Ir. Arifin Rudiyanto, MSc, Ph.D. Director of Regional Development 1, National Development Agency

Drs. Suroyo Alimoeso, Director of Road Transportation Traffic, Directorate General of Land Transportation, Ministry of Transportation

Dr. H.S.Ruslan, SE. Chief of Regional Development Planning Agency, South Sulawesi Province*

Ir. H. Iriantosyah Kasim DM, MSi, Chief of Provincial Infrastructure Agency, South Sulawesi Province*

Note:* only for the feasibility study on Priority Arterial Roads for South Sulawesi Province

1.6.4 Working Team

The JICA Study team and Indonesian counterpart jointly conducted the Study. In this context, DGH established the Working Team consisted of the following officials from the concerned agencies:

Coordinator: Ir. Harris H. Batubara, MEng. Sc. Chief of Sub-Directorate of General Planning, Directorate General of Highways, Ministry of Public Works

Secretary: Drs. Edi Prasetyo Hs. Section Chief of Road Network Development, Sub-Directorate of General Planning, Directorate General of Highways, Ministry of Public Works

Member: Ir. Arief Witjaksono, MEng.Sc. Chief of Sub-Directorate of Urban Road and Bridge Planning, Directorate of Freeways and Urban Roads, Ministry of Public Works

Ir. Jany Augustin, MSc. Chief of Sub-Directorate of Environmental Engineering, Directorate of Technical Guidance, Directorate General of Highways, Ministry of Public Works

Ir. Sumito, Chief of General Planning, Planning and Foreign Cooperation Bureau, Ministry of Public Works

Ir. Aryawan S.P, MSi, Chief of Sub-Directorate of Road Transportation, National Development Agency

Ir. Abdul Muis, MEng Sc. Chief of Sub-Directorate of Road Transportation Traffic, Directorate General of Land Transportation, Ministry of Transportation

Ir. H. Nurdin Samalia, Msi. Chief of Sub-Agency of Technical Affairs, Infrastructure Agency, South Sulawesi Province/Head of Balai Besar VI Jalan Nasional (Representative office of Central Government in Sulawesi)*

Note:* only for the feasibility study on Priority Arterial Roads for South Sulawesi Province

1.6.5 Provincial Working Team for Feasibility Study on Priority Roads for South Sulawesi

The Working Team established in South Sulawesi Province for Feasibility Study consisted of the following agencies and members:

Coordinator: Dr. H. S. Ruslan, SE, MS, Chief of Regional Development Planning Agency, South Sulawesi Province

Secretary: Ir. H. Iriantosyah Kasim, DM, MSi, Chief of Provincial Infrastructure Agency, South Sulawesi Province

Member: Ir. H. Syarifuddin Pattiwiri, MSi, Chief of Spatial Planning Bureau, South Sulawesi Province

Ir. H. Tan Malaka Guntur, MSi, Chief of Bappedalda, South Sulawesi Province

H. M. Anis Kama, SH, MH, MSi, Chief of Bappeda, Kota. Makassar

Ir. H. Kusaiyyeng, MSi, Chief of Public Works, Kota Makassar

Drs. H. M. Thamrin Ramli, MSi, Chief of Bappeda, Kab. Maros

Drs. H. Anshar Syarif, MM, Chief of Public Works, Kab. Maros

Drs. H. Baharuddin Mangka, MSi, Chief of Bappeda, Kab. Gowa

Ir. H. Muh. Amin Yacct, MSi, Chief of Public Works, Kab. Gowa

Ir. H. A. Jen Syarif Riva, MSi, Chief of Bappeda, Kab. Takalar

Ir. H. Nirwan Nesrullah, MSi, Chief of Public Works, Kab. Takalar

Ir. H. M. Nasser Parawarsa, Chief of Directorate of Natural Resources Development and Regional Infrastructure

Ir. H. Faisal Lukman, MT, Chief of Sub-Bureau of Regional Infrastructure