



Figure 2-9 General Plan of Cuacua Bridge

2-14





2-15



Figure 2-11 General Plan of Chueza Bridge

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

In the rainy season at the bridge sites, construction conditions worsen due to rising water levels in the rivers and access road surfaces become saturated and unstable causing access problems and delays to the construction. Therefore, the construction period for substructures will be planned for the dry season (April to November) and erection of superstructure will be planned to take place during the rainy seasons. However, the Chueza bridge superstructure construction requires good accessibility, so the superstructure construction is planned for the dry season.

Site management will be headquartered at the Nicuadala base office, which is near to all the other sites and easy accessible to telecommunication. A temporary site yard, warehouse and barrack will be constructed for each site. Temporary facilities include a concrete batch plant, material storage house, motor pool, site office, RC pile fabrication & storage yard, and a PC concrete girder fabrication and storage yard.

2-2-4-2 Implementation Conditions

(1) Payment for Labor

No special conditions for labor law are specified in Mozambique. The minimum wage rate will be paid at the current rate and will be adjusted for inflation.

(2) Safety measure

Fence for the protection against robbery and accident will be installed around the site for the construction office and stock yard for the construction material. The security guards are placed at the security post near the exit of the office. Security guards shall guard the construction office or stock yard for 24 hours with three rotations..Safety rope shall be installed between the existing road and the construction site to avoid the entry of vehicles or local peoples. In addition, safety rope shall be installed at the both side of the detour road. Information boards for the construction and the detour shall be set up in front of the construction site to protect traffic and local peoples and traffic guard are placed.

(3) Duty Exception and VAT Refund

The budget for the VAT refund is to be allocated for each project by ANE, which will come from the Road Fund. The procedure for applying for this refund is simplified and the contractors are requested to submit the required documents to ANE for approval.

2-2-4-3 Scope of Works

Scope of Works for each party is indicated in Table 2-4. Construction site acquisition, including temporary facilities, is the responsibility of the recipient country. The removal of existing facilities shall be performed by donor only in the event that the new bridge alignment passes over the existing facility. However, removal of existing temporary Bailey bridges will be done by the recipient country.

 Table 2-4 Scope of Works undertaken by the Japanese Government and Mozambique side

		1
	Works and Facilities to be Provided by the	Works and Facilities to be provided by the
	Japanese Government	Mozambique side
-	Construction and reconstruction of the 5bridges selected for the basic design including approach road, slope and riverbed protections.	- Free provision of site (land) for construction, temporary facilities other construction activities required in
-	Licungo III and Shueza	- Removal of temporary bridges that are
-	Installation and removal of temporary facilities (working yard, local office and site office)	Licungo II, Licungo III and Cuacua II, and existing bridge that is Cuacua I.
-	Safety measures required in the execution of works.	- Development and approval of environmental control plan.
-	Procurement, import, and transport of equipment/ materials required for the reconstruction works and re-export of imported equipment.	 Maintenance of roads and bridges Payment of bank services charges for banking arrangement (B/A) and authorization to pay (A/P)
-	Consulting services for detailed design, preparation of tender documents, assistance to Mozambique side in tender process, and construction supervision.	- Exemption of consultants and contractors from taxes, customs duties and other levies charged in Mozambique for execution of construction works.

2-2-4-4 Construction Supervision

Construction supervision includes managing quality, time schedules and safety at the construction sites. Quality management will involve implementation of procedures to monitor the construction materials to ensure compliance with specified quality requirements, and procedures to monitor the construction to ensure that the structure complies with the design documents and to acceptable levels of accuracy and quality. This monitoring will include reviewing mill sheets from material suppliers, site material test reports and regular construction inspections to ensure the precision of the constructed structure. Time schedule control will include reviewing the progress of the works through weekly progress meetings and by identifying "critical path" work items, which must be completed on the scheduled dates for the project to be finished by the completion date specified in the grant aid system. If problems arise during the construction, the problems will be presented to the responsible parties and they will be required to take necessary counter measures to correct the problems, including providing a plan to recover the lost construction time. Safety management will include monitoring to ensure that the Contractors provide continuing safety education to the workers and that the Contractors perform routine inspections to verify safety on site.

In consideration of the length of construction period and the separate construction sites, a consultant supervision team will be provided, including a full time site manager, and site engineers. The organization for the construction supervision is shown in Table 2-5.

	Nationality	Specialty	Remarks
Site Manager	Japan	Bridge Engineer	Full time assignment for the construction period, for
			documentation, reporting & management of site
Site Engineer	South Africa	Civil Engineer	Full time assignment for the construction period, management for
	Mozambique	-	technical, safety & time schedule aspects

 Table 2-5 Construction Supervision

2-2-4-5 Procurement Plan

Most of the construction material for bridge work will be imported from foreign countries to Mozambique, due to lack of domestic production, as well as the low quality of local products. Sources of materials are shown in Table 2-6.

Itom		Source [*]		Remarks						
nem	MZ	JPN	SA							
Material				-						
Aggregates				South African cement for the superstructure						
Cement				Not available in Mozambique						
Reinforcing bars				Not available in Mozambique						
Prestressing tendons				Not available in Mozambique						
Steel material				High price in SA						
Steel formwork				Not available in Mozambique						
Plywood				Available at local market						
Asphalt				Available at local market						
Fuel, oil				Available at local market						
Bearings, expansion joints				Not available in Mozambique						
Steel handrail, guardrail				Not available in Mozambique						
Heavy Equipment, Vehicle		•	•	•						
Road Equipment				Available at local market						
Excavation Equipment				Difficulty of good quality						
~				equipment at local market						
Cranes				Difficulty of good quality						
Pile drivers				Difficulty of good quality						
				equipment at local market						
Concrete plants				Difficulty of good quality						
				equipment at local market						
Generators				Difficulty of good quality						
Equipment for prostrogging				Difficulty of good guality						
Equipment for prestressing				equipment at local market						
Vehicles				Available at local market						
Furniture, Office & Testing	Equipmen	it								
Office equipment				Available at local market						
Telecommunication				Available at local market						
Furniture				Available at local market						
Container house				Difficulty of procurement at						
				local market						
Test equipment				Difficulty of good quality						
				equipment at local market						

 Table 2-6 Procurement Sources of the Major Construction Materials

*) MZ : Mozambique, JPN : Japan, SA : South Africa

2-2-4-6 Quality Control Plan

The quality control plan for material and the constructed structure are shown in Table 2-7.

	Item	Content	Frequency
Material	Aggregate	Particle, specific	One test report for every 250 m3
Inspection		gravity, hardness,	at each quarry site.
		stability	
	Cement	Particle, specific	One test report for every 30 tone
		gravity, strength	for each supplier
	Rebar	Strength, bending	One test report for every diameter
		Q. 1	from each lot
	PC tendon	Strength	One test report from each lot
	Asphalt	Needle penetration,	One test report from every lot
	F 1 1 4 1	Viscosity, softening	
	Embankment soll	Particle, specific	from each nit
		gravity, consolidation,	nom each ph
		nlastic/liquid limit	
		CBR	
Product	Fresh concrete	Consistency.	One test report for every 5 m ₃ , at
Inspection		Temperature	site
- F	Hardened	Strength, unit weight	Two test reports for every 30 m3,
	concrete		specimens tested at 7 & 28 days
	Asphalt mix	Temperature, asphalt	One test report for every 30 tons,
	_	content	at site
	Pavement base	Site density	One test for every 25 m2, at site
	layer		
	Bearing strata for	Location, bearing	At all foundations, one test report
	pile	capacity	for one pile in each pile group
	girder	Dimension,	Measurements recorded for each
		straightness	gırder
	pile	Dimension,	Measurements recorded for each
		straightness	pile
	Foundation,	Dimension, location,	Measurements recorded for each
	substructure	Dimension leastion	Necessary and a stars
	superstructure	elevation	5m along the alignment
	Asphalt	Thickness flatness	Thickness recorded for every 100
	navement	elevation	m ² and flatness & elevation
	puromone		recorded at every 5m along the
			alignment

Table 2-7 Quality Control Plan

2-2-4-7 Implementation Schedule

Consultant will carried out the project based on the contract between the consultant and Government of Mozambique. Site survey will be carried out before the implementation of the detailed design to collect data which did not available at the basic design stage. Detailed design for the bridges will be started immediately after the site survey. Thereafter, tender document will be prepared and support the Government of Mozambique to carry out the tender for the selection of contractor. The contractor selected through the bidding shall contract with the government of Mozambique and start construction after the issuance of notice to proceed from the consultant.

Implementation schedule for the project are shown in Table 2-8.



Table 2-8 Implementation Schedule of the Project

2-3 Obligations of the Recipient Country

Obligations of the recipient country for this project are indicated below:

2-3-1 Common Items of Japanese Grant Aid Scheme

- To secure land necessary for the site of the Project(for camp yard and restore of materials and equipment)
- To clear, level and reclaim the land prior to commencement of the Project
- To open a bank account in name of the Government in bank in Japan (B/A) and issue the authorization to pay (A/P)
- To ensure all the expenses and prompt execution for unloading, customs clearance
- To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the verified contacts
- To accord Japanese nationals, whose services may be required in connection with the supply of the products and services under the verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work
- To ensure proper maintenance, management and preservation of the facilities provided by Japan's Grant Aid

2-3-2 Special Items of the Project

- Demolition of existing Cuacua Bridge structures after the completion of the new bridge
- Removal of the existing Bailey bridges at Licungo , Licungo , Cuacua and Cuacua Bridges on a timely manner respectively
- Arrangement of temporarily traffic closure for about 1.5 months during the superstructure construction work at Licungo bridge
- Implementation of countermeasures to pass the impossible crossing points of shallow river beds even in the rainy season during the construction work
- Preparation and approval of the Environmental Management Plan
- Implementation of road improvement project relating to the Project (N322, N324, R640)

2-4 Project Maintenance Plan

The following maintenance works items shall be performed together with routine maintenance work done for the road network system:

- i) Routine inspection and maintenance inspections will be performed to check the condition of handrails, guardrails, drainage systems and scour protection for foundations. In case damage is found or the channel is blocked by debris, appropriate repair or cleaning will be done to correct the condition.
- Periodic inspection and maintenance inspections will be performed every 5 years, at minimum, to check the condition of pavements, identify concrete surface cracking. In case cracking or corrosion is found, a more detailed inspection shall be planned to make evaluate the damage and plan appropriate repairs to correct the damage

Maintenance works for the Project bridges are summarized in Table 2-9.

Work Item	Frequency	Location	Work				
Drainage Cleaning	2 times per annum	Removal of deposit					
Slope Surface	2 times per annum	Embankment surface	Cleaning of slope				
Handrail Painting	every 5 years	Licungo II/III	Repainting of handrail				
Scouring Protection	after flooding	River bed and embankment	Repair for damaged portion				
Pavement Resurfacing	every 5 years	Asphalt pavement	Overlay, repair of pothole, etc.				

Table 2-9 Maintenance Works for Project Bridges

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

Table 2-10 shows provisional estimated project costs, however, these costs are subject to further review and adjustment by the government of Japan to secure Grant approval.

 Table 2-10 Project Cost to be Borne by Japan's Grant Aid (Million Japanese Yen)

Items	Amount
Project Cost	1,820
Construction Cost(Bridges and Approach Roads)	1,663
Detailed Design and Construction Supervision	157

Table2-11 Project Cost to be Borne by Mozambique	Side
--	------

Items	Cost (Thousand Metica)	Yen Equivalent (Million Yen)
Removal of Existing Bridge (Cuacua)	212.6	1.0
Removal of Bailey bridge (Licungo & 、 Cuacua &)	467.8	2.2
Payment of bank services charges for bank arrangement(B/A) and authorization to pay (AP)	510.3	2.4
Total	1,190.7	5.6

The project cost is estimated based on the following conditions:

—Estimate Time	: End of October 2005
—Exchange Rate*	: 1.0 US\$=110.42 Yen
	: 1.0 Metica=4.7 Yen (0.0047 Yen)

-Construction Period : 27.5 months

* The currency of Mozambique was devaluated to 1/1,000 in January 2006. In this report, the devaluated rate of the local currency is used as shown above. () means the rate of the local currency at the estimate time.

The Project is implemented under the Japan's Grant Aid Scheme. The above project costs will be revised by the Japanese Government before the signing of the Exchange of Notes (E/N).

2-5-2 Maintenance Cost Estimation

Maintenance cost is estimated 748 million Meticas as an annual basis based the works as shown in Table 2-9.

2-6 Other Relevant Issues

Following issues shall be taken into consideration during the implementation of the Project;

- i) Confirmation of road improvement plan of Route 322, in order to secure passage of vehicle during rainy season.
- ii) Removal of current temporary bridges by Mozambique Government corresponding to the Project progress.
- iii) Environment management plan enforcement, especially social impact protection measures come from labor force concentration in rural communities.
- iv) Security of detouring access road for Licungo III and Chueza bridges.

CHAPTER 3

Project Evaluation and Recommendations

Chapter 3 Project Evaluation and Recommendations

3-1 Project Effect

Project effect is summarized in Table 3-1.

Current situation and	Countermeasures	Direct effects and their	Indirect effects and				
problems	by the Project	level	their level				
Possibility of collapse	Replacement of	Higher security of traffic	-Vitalization of local				
due to aging and damage	temporary bridge	movement	industries by				
End traffic closure	and/or new bridge	No traffic closure during	connecting with				
during flood season	construction	rainy season	major trunk road				
Vehicle speed and		No limitation on vehicle	network system				
weight limit		speed and weight	-Easier access to				
Restriction of		Establishment of safer	regional capital as				
socio-economic		and smoother transport	well as educational				
activities in rural area		facility	and medical centers				

Table 3-1 Project Effect

In order to confirm the Project effect, it is recommended to continue traffic count survey. Base line survey for the Project was conducted for 5 locations along with the Project road sections, which are listed in Appendix 5.

3-2 Recommendations

The following issues shall be quantified in order to be certain of the effects of the project:

(1) Improvement and maintenance for road sections, including the project bridge

Where bridge improvement work is a limited point area project, without improvements to adjacent roads, no effective benefit is expected from the project. Phase I, of Roads III, will be finished by the end of 2006 and improvements to routes N322, N324 and R640 are planned from Phase II. The budgets for those projects are derived from donor financing. At this moment, the donor's name is not finalized. Prompt action by Mozambique government will be required to ensure that those improvement projects are implemented, as planned.

(2) Coordination of these improvements with the Sena Railway project

The rehabilitation project for the Sena Railway is being implemented with capital from the government of India and IDA. The project is expected to be completed by 2009. National highway 324 runs parallel to the Sena railway on the left bank of the Zambezi River and will be a key access road for implementation of the Sena railway project. National highway 324 improvement project shall be closely coordinated with the Sena Railway project.

(3) Technical cooperation and coordination with the other donors

The project could be implemented independently however the bridge is a part of the road network therefore the coordination with the other donors who has relationship with the relevant road network is important.

{ Appendices }

- 1 . Member List of the Study Team
- 2 . Study Schedule
- 3. List of Parties Concerned in the Recipient Country
- 4 . Minutes of Discussions
- 5 . Results of Traffic Volume Count
- 6 . Results of Geological Investigation
- 7. Results of Hydrological Study
- 8 . Chire Bridge Plan

Assignment	Name	Organization						
Toom Loador	Katsuyosi SUDO	JICA Mozambique Office						
	Kimio FUKAZAWA	JICA Mozambique Office						
Project Coordinator	Yoshimoto KOYANAGI	Grant Aid Management						
		Department, JICA						
Chief Consultant	Yusuke KAJIMURA	International Division, Chodai Co.,						
		Ltd.						
Bridge Planner I	Yasusi HIGA	International Division, Chodai Co.,						
		Ltd.						
Bridge Planner II	Hiroaki UEYAMA	Transport Engineering Division,						
		Nippon Koei Co., Ltd.						
Natural Condition	Masaharu FUJISIMA	International Project Department,						
Survey		Mitsui Consultants Co., Ltd.						
Construction Plan	Yosinori UCHIUMI	International Division, Chodai Co.,						
/Cost Estimate		Ltd.						
Interpreter	Saho TODA	Pioneer						

Appendix 1. Member List of the Study Team

		Construction Plan /Cost Estimate (UCHIUMI)											Travel to Mozambiane		Travel to Mozambique	Data collection	Data collection	Data collection	Data collection	Data collection	Data collection	Data collection	Data collection	Travel to Quelimane		Mocuba Labo visit	Site visit (Licungo)	Same as chief	Same as chief	
	Consultant	Natural Condition Survey (FUJISHIMA)	puto ding									sza, Zuwazue, Chire)	congo)			uba)			unt survey, topo survey	t preparation	t preparation		Data analysis, report	Data analysis, report	Data analysis, report	Data collection Mocuba				
		Bridge Planner II (UEYAMA)		ding	otiation					Data analysis	Site inspection (Chue	Site investigation (Li	- -	Data analysis	Data collection (Moc	Data analysis	Data analysis	Site survey, traffic co	Data analysis, Report	Data analysis, Report		(Licungo)	(Licungo)	quarry site visit						
		Bridge Planner I (HIGA)		zambique zambique, Meeting with ANE, JICA Ma 1 ANE, Data collection, Sub-contract bid	with ANE, JICA Mion, Sub-contract bi	with ANE, JICA M ion, Sub-contract bi	ion, Sub-contract bi	tion, Sub-contract r	iputo, ANE, MOFA									E, Data collection			(E, Data collection	E, Data collection	E, Data collection	E, Data collection	(E, Data collection)	ane	ata analysis	Bridge inspection	Bridge inspection	n (Zuwazue, Chire), d
2005)		Chief Consultant (KAJIMURA)	lozambique lozambique, Meeting w		zambique, Meetin 1 ANE, Data collec	n ANE, Data collec	h ANE, Data Colle	of Japan, JICA N	ges		za bridges	24 01020				OJ, JICA Maputo	Meeting with AN	Data analysis	Data analysis	Meeting with AN	Meeting with AN	Meeting with AN	Meeting with AN	Meeting with AN	Travel to Quelim	Team meeting, D	Mocuba Labo visit	Data analysis	Bridge inspection	Bridge inspectior
October 14,		Interpreter (TODA)	Travel to Mo	Travel to Mc	Meeting with	Meeting with	with Embassy) Licungo brid	idges	zue and Chue				۲ •	keporting to E					_		_	_	_	/					
m August 21 to	ICA	Project Coordinator (KOYANAGI)	/	/		Travel to Mozambique	ambique, Meeting	limane, Site visit to	acua and Chire br	, Site visit to Zuwa	uto	r meeting	ME	•	nutes of meeting, F	Travel to Japan	Travel to Japan													
elegation (fro	J	Team Leader (SUDO)	_	/	/		Travel to Moz	Travel to Que	Site visit to C	Travel to Tete	Travel to Map	Preparation fo	Meeting with		Signing of Mi					_			_	_	_					
1 st D		ate	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Ē	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	
		Ď	8/21	22	23	24	25	26	27	28	29	30	31		9/1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

Appendix 2. Study Schedule

	I Condition Construction Plan urvey /Cost Estimate (SHIMA) (UCHIUMI)	ection Same as chief	-		Maputo Same as chief	ection Same as chief	ection Same as bridge	ection Same as bridge	planner	ection Same as bridge	planner	ection Data analysis	ection Data analysis	Data analysis	Data analysis	Site investigation	(Chire, Zuwazue)	Data analysis	Travel to Quelimane	Data analysis	Meeting with ANE,	data collection		Travel to South	Africa	Data collection	
	Natura S (FUJ	Data coll Gurue			Travel to	Data coll	Data coll	Data coll		Data coll		Data coll	Data coll					uto									
Consultant	Bridge Planner II (UEYAMA)	visit					survey for Chire,	survey for Cuacua,	road section	vey for Licungo					Aaputo			ing to EOJ, JICA Map	0						/	/	/
	Bridge Planner I (HIGA)	Cuacua), quarry site		n meeting	rt preparation	Licungo)	Meeting on soil Zuwazue	Meeting on soil s	inspection of Caia-Golongoza	Meeting on soil sur				a analysis	, Reporting to JICA N	, Data analysis	, Data analysis	of Discussion, reporti	rt preparation	rt preparation				/			
	Chief Consultant (KAJIMURA)	Bridge inspection (Data analysis	Data analysis, team	Data analysis, repo	Bridge inspection (Data analysis, report	Inspection of road	Caia-Golongoza	Data analysis,	report	Data analysis	Travel to Maputo	Team meeting, data	Meeting with ANE	Meeting with ANE	Meeting with ANE	Signing of Minute	Data analysis, repo	Data analysis, repo	Travel to Japan	Travel to Japan		,			
	Interpreter (TODA)																										
ICA	Project Coordinator (KOYANAGI)																										
ſ	Team Leader (SUDO)																			_							
	late	Fri	Sat	Sun	Mon	Tue	Wed	Thu		Fri		Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	~ Sun	Mon		Tue	
	D	16	17	18	19	20	21	22		23		24	25	26	27	28	29	30	10/1	0	З	4	~ 6	10		11	ç

		JICA	Consultant				
Date		Team Leader	Chief Consultant	Bridge Planner I	Interpreter		
		(FUKAZAWA)	(KAJIMURA)	(HIGA)	(TODA)		
3/11	Sat	Travel to Mozambique					
12	12 Sun Travel to Mozambique						
13	Mon	Meeting with AN	E, MOFA, EOJ and JIC	CA Maputo			
14	Tue	Meeting with ANE					
15 Wed Meeting with ANE							
16	16 Thu Meeting with ANE, Preparation for M/D signing						
17	Fri	Signing of M/D, Reporting to EOJ and JICA Maputo					
18	Sat		Report preparation				
19	Sun		Travel to Japan				
20	Mon		Travel to Japan				

2nd Delegation (from March 11 to March 20, 2006)

Organization	Name	Position
Ministry of Foreign Affairs and Cooperation	Mr. Hermenegildo Jose Caetano	Head of Department for North, Central and South Asia
Ministry of Public	Ms. Francisca Muzuana	Cabinet of Assistance and Supervising
Works and Housing	Mr. Miguel Coanai	Cabinet of Assistance and Supervising
	Mr. Antonio Mirasse	Provincial Director, Zambezia
		Province
	Mr. Rodorigues V.	Provincial Director, Tete Province
	Horories	
National Roads	Mr. Ibraimo Remane	General Director
Administration (ANE)	Mr. Nelson Nunes	Director of National Roads
	Mr. Calado Ouana	Head of Engineering Department
	Mr. Elias Anlaue Paulo	Project Director
	Mr. Evalisto Mussupai	Bridge Sector
	Mr. Basilio E.A. Nzunga	Bridge Sector
	Mr. Sertorio Siquela	Bridge Sector
	Mr. Silvester Elias	Representative of Zambezia Province
	Mr. Freitas Edveth	Representative of Tete Province
	Ms. Angelica Aguilera	Social and Environment Unit
	Ms. Emilia Tembe	Coordinator
	Mr. Belmira Sarmento	Lawyer
National Directory of	Mr. Delario Sengo	Vice Director, DNA
Water (DNA)	Mr. Leonado Chambe	Head of Department DPOPH/DAS
Institute of National	Mr. Nunu	Chief of Custodio Vicente
Meteorology(INA)		
Administration of	Mr. John Abido	Sector of Hidrometria, Mocuna
Regional Water (ARA)		
Others	Mr. Antonio Nunaveia	Director of Education and Culture,
		Morrumbala
	Mr. Albano Stunguane	Village councilor near Chire River

Appendix 3. List of Parties Concerned in the Recipient Country

Appendix 4. Minutes of Discussions

4-1 Preliminary Study M/D (September 1, 2005)

Minutes of Discussions on the Basic Design Study on the Project for Improvement of Bridges in Zambezia and Tete Provinces in the Republic of Mozambique

In response to the request from the Government of the Republic of Mozambique (hereinafter referred to as "Mozambique"), the Government of Japan decided to conduct a Basic Design Study on the Project for Improvement of Bridges in Zambezia and Tete Provinces (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Mozambique the Basic Design Study Team (hereinafter referred to as "the Team"), " headed by Mr. Katsuyoshi Sudo, Deputy Resident Representative, JICA Mozambique Office, and is scheduled to stay in the country from August 22 to October 10, 2005.

The Team held discussions with the concerned officials of the Government of Mozambique and conducted a field survey. In the course of the discussions and the field survey, both sides have confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Maputo, September 1, 2005

Katsuyoshi Sudo Leader Basic Design Study Team Japan International Cooperation Agency

nu-h-

Ibraimo Remane Director General National Roads Administration (ANE) The Republic of Mozambique

ATTACHMENT

1. Objective of the Project

The objective of the Project is to construct /rehabilitate the bridges and resolve serious traffic bottlenecks on roads network to contribute economic development in Zambezia and Tete Provinces.

Project Site

The Project site covers Zambezia and Tete Provinces, shown in Annex-1.

3. Responsible and Implementing Organizations

The responsible agency is the Ministry of Public Works and Housing.

The implementing agency is National Roads Administration.

- The organization charts are shown in Annex-2-1 and 2-2 respectively.

4. Target Bridges

As a result of the series of discussions, the bridges listed in Annex-1 are requested for the field study by the Government of Mozambique.

The final components of the Project will be decided after further studies, and JICA will assess the appropriateness of the request and will report to the Government of Japan.

Regarding Zuwazue Bridge, large scale project beyond Grant Aid scheme might be required because of the hydrological condition of Zuwazue River. Appropriate structure /method to solve this situation at this site shall be carefully studied.

5. Criteria for Prioritization of Bridges

The both sides agreed that the criteria, which is shown in Annex-3, will be applied for the prioritization of target bridges.

6. Japan's Grant Aid Scheme

(1) The Mozambican side understands the Japan's Grant Aid scheme and the necessary measures to be taken by the Government of Mozambique explained by the Team as described in Annex-4.

(2) The Mozambican side promised to take necessary measures, as described in Annex-5, for smooth implementation of the Project as a condition for the Japan's Grant Aid to be implemented.

7. Schedule of the study

(1) The consultants will proceed to further studies in Mozambique by October 10, 2005.

(2) JICA will prepare the draft report and dispatch a mission to Mozambique in order to explain its contents in February 2006.

(3) When the contents of the report is accepted in principle by the Government of Mozambique, JICA will complete the final report and send it to the Government of Mozambique by April 2006.

M (3)

8. Other Relevant Issues

6

(1) The both sides confirmed that the Mozambican side has withdrawn the Lugela and Roupa bridges from the original request based on the reason those bridges are already on implementation process for reconstruction by Mozambican side.

(2) The Mozambican side shall take countermeasures, such as installation of temporary facilities, to make it possible to pass the crossing point of shallow river bed even in the rainy season during construction work.

(3) If the location of the new bridge is different from that of the existing bridge, the Mozambican side agreed to remove the existing bridges after completion of the new bridges.

(4) The Mozambican side shall make the Environmental Management Plan to minimize the adverse environmental effect during construction and operation period of new bridges, and get the approval of Environmental Management Plan from the Ministry of Environment (MICOA) by the end of February 2006. For the task conducted by the Mozambican side, JICA will provide preliminary general drawings of planned bridges by the end of December 2005.

(5) It has been confirmed that the Mozambican side is responsible for coordination with the related agencies for smooth reimbursement of VAT (Value Added Tax) which will be imposed in Mozambique with respect to the procurement of the products and services in the Project

(6) The Mozambican side shall take full responsibility for clearance of mines in case of the risk of them based on the contents of the draft report of the study.

(7) The Mozambican side shall submit answers to the Questionnaire, which the Team handed to the Mozambican side, by September 30, 2005.

(8) The Mozambican side shall provide necessary number(s) of counterpart personnel to the Team during the period of their studies in Mozambique. Project Site



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MINISTRY OF PUBLIC WORKS & HOUSING

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ROADS NATIONAL ADMINISTRATION

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Organization Chart



Employees	Civil Engineering	Others	Total
Graduated	65	8	73
Technicians	21	3	24
Total	86	11	97

TOTAL of Emplyees:

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Criteria for Prioritization of Target Bridges

(1) Current Situation and Development Plan for Access Roads

- 1) Road development policy of the Government of Mozambique
 - 1- Five or Ten Years Development Plan
 - Roads III (The Mozambique Roads and Bridges Management and Maintenance Programme)
 - 3- Integrated Road Sector Strategy for Mozambique
- Socio Economic Factor (Industrial and Agricultural Production, Population, etc.)
- Average Daily Traffic Volume (Present and Future Traffic Demand, if any)
- (2) Current Situation of Existing Bridges
 - 1) Existence and Type of bridge
 - 2) Bridge opening
 - 3) Deterioration rate
 - 4) Bridge width
 - 5) Substructure condition

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JAPAN'S GRANT AID

The Grant Aid Scheme provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

Japan's Grant Aid Scheme is executed through the following procedures.

Application	(Request made by the recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by the Cabinet)
Determination of	(The Note exchanged between the Governments of Japan and recipient
Implementation	country)

Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study) using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Scheme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes (E/N) signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

(1) Contents of the study

The aim of the Basic Design Study (hereafter referred to as "the Study") conducted by JICA on a requested project (hereafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.

- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.

- Confirmation of items agreed on by both parties concerning the basic concept of the Project.

- Preparation of a basic design of the Project.

- Estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of the Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA. The consultant firm(s) used for the Study is (are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3.Japan's Grant Aid Scheme

(1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

(2) "The period of the Grant Aid" means the one fiscal year, which the Cabinet approves, the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed. However, in case of delays in delivery, installation or construction due to unforeseen factors such as national disaster, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

(3) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, consulting, constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(4) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(5) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following:

a) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction,

b) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,

c) To secure buildings prior to the procurement in case the installation of the equipment,

d) To ensure all the expenses and prompt excursion for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,

e) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,

f) To accord Japanese nationals, whose services may be required in connection with the supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(6) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(7) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(End)

No	Items	To be covered by Grant Aid	To be covered by Recipient Side
	To secure land	0, 01011110	•
2	To clear, level and reclaim the site when needed		•
3	To construct gates and fences in and around the site	•	
4	To construct the parking lot	3	
5	To construct temporary roads		
	1) Within the site	•	
	2) Outside the site		•
6	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site	N	VA.
	b. The drop wiring and internal wiring within the site	•	
	c. The main circuit breaker and transformer		· · · · · · · · · · · · · · · · · · ·
	2) Water Supply		
	a. The city water distribution main to the site	N	/A .
	h The supply system within the site (receiving and elevated tanks)		
	3) Drainase		
	a The also dealers use in (the starm around athem to the site)		
	a. The city dramage main (for storm, sewer and others to the site)	R	/A
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	•	
	4) Telephone System		
	 The telephone trunk line to the main distribution frame/panel (MDF) of the building 	N	/A
	b. The MDF and the extension after the frame/panel		
7	To bear the following commissions to the Japanese bank for banking services		
	Dased upon the D/A		
	1) Advising commission of A/P		
0	2) Payment commission		
•	to ensure unloading and customs clearance at port of disentoarkation in recipient		
	1) Marine (Air) transportation of the products from Japan to the recipient country	•	
	2) Tax exemption and custom clearance of the products for this project at the port		
	of disembarkation		
	3) Internal transportation from the port of disembarkation to the project site	•	
9	To accord Japanese nationals whose service may be required in connection with		•
1	the supply of the products and the services under the verified contact, such		
	facilities as may be necessary for their entry into the recipient country and stay		
10	therein for the performance of their work.		
10	to exempt japanese nationals from customs duties, internal taxes and other fiscal		•
	of the products and services under the verified contracts		
11	To maintain and use properly and effectively the facilities constructed and		
	equipment provided under the Grant Aid		•
12	To bear all the expenses, other than those to be borne by the Grant Aid necessary		•
	for construction of the facilities as well as for the transportation and installation		-
	of the equipment		

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Major Undertakings to be taken by Each Government

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

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4-2 Draft Report Explanation M/D (September 30, 2005)

Minutes of Discussions on the Basic Design Study on the Project for Improvement of Bridges in Zambezia and Tete Provinces______ in the Republic of Mozambique

In August 2005, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Basic Design Study Team on the Project for Improvement of Bridges in Zambezia and Tete Provinces (hereinafter referred to as "the Project") to the Republic of Mozambique (hereinafter referred to as "Mozambique"), and through discussions, field survey and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult with the officials concerned of the Government of Mozambique on the components of the draft report, JICA sent to Mozambique the Basic Design Explanation Team (hereinafter referred to as "the Team"), headed by Mr. Kimio Fukazawa, Deputy Resident Representative of the JICA Mozambique Office, from June 11 to 18, 2006.

As a result of the discussions, both sides confirmed the main items described in the attached sheets.

Maputo, June 15, 2006

Kimio Fukazawa Leader Basic Design Study Team Japan International Cooperation Agency

Ibraimo Remane Director General National Roads Administration (ANE) The Republic of Mozambique

ATTACHMENT

-----1. Contents of the Draft Report

The Mozambican side agreed and accepted in principle the contents of the Draft Report explained by the Team.

However, regarding the bridge width of Chire and Chueza Bridges, the Mozambican side strongly requested to modify the design from one to two traffic lanes, taking into consideration the Minutes of Technical Issues signed on September 30, 2005 as well as recently published new Road Sector Strategy 2007-2011, May 2006.

The Japanese side made explanation on this issue that basic design policy on bridge geometry was determined based on the current traffic volume as well as other technical studies.

Both sides finally agreed that upon the further request of possibility of two lanes modification of bridge width by the Mozambican side, the Team takes note on the Mozambican side request and will transfer it to JICA headquarters.

2. Japan's Grant Aid Scheme

The Mozambican side reconfirmed the Japan's Grant Aid scheme and the necessary measures to be taken by the Government of Mozambique explained by the Team as described in Annex-4 and Annex-5 of the Minutes of Discussions (M/D) signed by both sides on September 1, 2005.

3. Schedule of the Study

JICA will complete the Final Report in accordance with the confirmed items and send it to the Mozambican side by August 2006.

4. Other Relevant Issues

(1) The Mozambican side shall get the approval of the Environmental Management Plan from the Ministry of Environment (MICOA) by the end of September, 2006.

(2) The Mozambican side explained that the road section from Morrumbala to Kambulatsisi of N322 is planned to be improved as national corridor into all-weather two lanes gravel surface road during 2010 - 2011.

(3) The Mozambican side shall demolish the existing Cuacua I Bridge after the completion of the new bridge.

(4) In regard to Licungo II, Licungo III, Cuacua I and Cuacua II Bridges, the Mozambican side shall remove the existing Bailey bridges on a timely manner respectively.

(5) The Mozambican side shall make vehicle traffic closure of Licungo II Bridge for about 1.5 months during superstructure construction work.

(6) The Mozambican side shall take countermeasures, such as installation of temporary concrete panels, to make it possible to pass the crossing points of shallow river beds even in the rainy season during the construction work.

(7) The Mozambican side agreed to exempt customs duties with respect to the materials and products for the Project. In regard to VAT (Value Added Tax), the Mozambican side shall take necessary budgetary arrangement based on the cost estimation of the Draft Report for the smooth reimbursement.

Count
Volume
f Traffic
Results o
pendix 5.
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end)	
(weekday and week	
Traffic Count Results	
Table	

		Licungo			Cuacua			Chire			Zuwazue			Cheza	
	Week day	Week end	Sum	Week day	Week end	Sum	Week day	Week end	Sum	Week day	Week end	Sum	Week day	Week end	Sum
passanger car	2	5	7	1	2	3	11	8	19	32	21	53	0	3	3
Pick-up truck	23	14	37	б	5	5	2	3	5	9	15	21	10	5	12
Small bus	6	5	14	0	0	0	0	0	0	0	0	0	0	0	0
Bus	0	3	3	0	0	0	2	0	2	0	0	0	0	0	0
Truck (2axles)	15	16	31	1	5	9	5	2	7	3	L	10	17	8	25
Truck (3axles)	0	3	3	0	1	1	2	7	6	0	9	9	1	0	1
Bicycle & Motorcycle	200	240	440	427	508	935	343	317	660	2,024	2,834	4,868	194	244	438
Pedestrians	170	208	378	412	488	006	322	310	632	1,051	669	1,750	208	237	445
Other	0	0	0	16	4	20	4	6	12	0	0	0	0	1	1
Total	419	494	913	860	1010	1,870	691	656	1,347	3,116	3,582	6,698	430	495	925

Appendix 6. Results of Geological Investigation

Geological investigation consists of borehole drilling, standard penetration test, soil sampling and laboratory tests. The results of borehole drilling and standard penetration test are shown in the following pages.



Bore hole drilling machine



Sample example taken

• <u>Licungo II Bridge</u>

BH.No	Coordinate	Elevation (m)
BH1	X=8090911, Y=295503	EL=24.5



BH.No	Coordinate	Elevation (m)
BH1	X=8091107、Y=295852	EL=25.6
BH2	X=8091158、Y=295931	EL=24.6
BH3	X=8091189、Y=295909	EL=24.2



• Chire Bridge

BH.No	Coordinate	Elevation (m)
BH1	X=-8068161、Y=-0748395	EL=34.30
BH3	X=8068161、Y=-0748182	EL=34.00



• Cuacua I Bridge

BH.No	Coordinate	Elevation (m)
BH1	X=-8009559、Y=-0786831	EL=18.10
BH2	X=-8009424、Y=-0786690	EL=18.00



• Cuacua II Bridge

BH.No	Coordinate	Elevation (m)
BH1	X=-8008446、Y=-0786099	EL=17.90



• Chueza Bridge

BH.No	Coordinate	Elevation (m)
BH1	X=-8174030, Y=-0660885	EL=154.10
BH2	X=-8174017, Y=-0660816	EL=152.50



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Name	Catchment area	River length	Ground elevation at	Inclination of river	Probable (year)	Design discharge	Velocity (m/s)	High water level	Water depth	Bridge opening	Remarks
	(KM2)	(KM)	ortage sue (m)			(S/CM)		(m)	(III)		
					100	5,590	4.2	EL+25.3	6.3	307.0	Existing
Licungo	10010		EL+19.0	1/1,800	50	4,752	3.9	EL+24.9	5.9	305.0	Bridge
	21,004 را :میسیور	276			10	3,140	3.4	EL+23.8	4.8	293.6	(EL+29.5)
	(Lucungo Pivar area)				100	5,590	-	EL+25.3	13.3	75.3	Existing
Licungo			EL+12.0	1/1,800	50	4,752	-	EL+24.9	12.9	73.5	Bridge
					10	3,140	-	EL+23.8	11.8	68.1	(EL+28.5)
					100	1,610	3.3	EL+17.4	6.9	113.2	Existing
Cuacua	1,375		EL+10.5	1/3,000	50	1,326	3.0	EL+16.7	6.2	110.7	Bridge
	(Zambezia	110			10	824	2.6	EL+15.9	5.4	107.8	(EL+19.0)
	River area)				100	1,610	1	EL+17.4	5.4	39.6	Existing
Cuacua			EL+12.0	1/3,000	50	1,326	1	EL+16.7	4.7	34.6	Bridge
					10	824	ı	EL+15.9	3.9	30.3	(EL+18.5)
	1,375				100	6,362	5.0	EL+33.8	11.8	225.8	
Chire	(Zambezia	15	EL+22.0	1/1,800	50	5,571	4.9	EL+33.2	11.2	207.8	
	River area)				10	3,955	4.8	EL+31.6	9.6	166.0	
	1,375				100						Existing
Zuwazue	(Zambezia	35	EL+41.0	1/3,000	50	214	2.1	EL+44.5	4.0	43.2	Bridge
	River area)				10						(EL+44.5)
	360				100	1,089	5.1	EL+154.9	2.9	111.4	
Chueza	(Zambezia	32	EL+152.0	1/420	50	954	4.8	EL+154.7	2.7	108.0	
	River area)	_			10	677	4.3	EL+154.4	2.4	103.0	

Table 7-1 Results of Hydrological Study

Appendix 7. Results of Hydrological Study





Appendix 8. Chire Bridge Plan



