APPENDICES

1. Member List of the Study

Appendix 1 Members of the Study Team

1-1 Preliminary Study (From December 16, 2004 to January 16, 2005)

A	Takasi KATO	Leader	Japan International Cooperation Agency
B	Shigehiko Sugita	Project Coordinator	Japan International Cooperation Agency
C	Toshio ICHIKAWA	Chief Consultant/ Bridge/Road Planner	Nippon Koei Co., Ltd.
D	Kazumasa TADA	Bridge Designer	Nippon Koei Co., Ltd.
E	Yashushi HIGA	Natural Condition Survey Engineer I (Topography / Geology),	Chodai Co., Ltd.
F	Natsuko TOTSUKA	Natural Condition Survey Engineer II (River /Hydrology)	Nippon Koei Co., Ltd.
G	Jun MORISHITA	Construction and Procurement Planner/ Cost Estimation Engineer	Chodai Co., Ltd.

1-2 Draft Report Explanation (From May 15, 2005 to May 23, 2005)

A	Tatsuya Murase	Leader	Japan International Cooperation Agency
B	Toshio ICHIKAWA	Chief Consultant/ Bridge/Road Planner	Nippon Koei Co., Ltd.
C	Kazumasa TADA	Bridge Designer	Nippon Koei Co., Ltd.

2. Study Schedule

2-1 Preliminary Study Mission Schedule

Date		Week	Leader	Project Coordinator	Chief Consultant/ Bridge・Road Planner	Bridge Design	Survey Engineer Ⅱ (Topo./Geology)	Survey Engineer Ⅱ (River/Hydrology)	Construction Planner /Cost Estimate
M	D		Takashi KATO	Shigehiko SUGITA	Toshio ICHIKAWA	Kazumasa TADA	Yasushi HIGA	Natsuko TOTUKA	Jun Morishita
			Plan	Plan	Plan	Plan	Plan	Plan	Plan
12	16	Thu.	Courtesy Call on JICA, Ministry of Transport and Public Works and National Road Aurhority Inception report meeting		Courtesy Call on JICA, Ministry of Transport and Public Works and National Road Aurhority Inception report meeting				
	17	Fri.		Investigation of Bridge Sites (Lilongwe－Balaka－Salima)					
	18	Sat.		Investigation of Bridge Sites (Salima－Nkhotakota－Bwanje Valley—Salima)					
	19	Sun.		Investigation of Bridge Sites(Salima～Mangochi—Bakaka—Lilongwe)					
	20	Mon.		Discussion with Ministry of Transport and Public Works and NRA	Discussion with Ministry of Transport and Public works and National Road Authority (NRA)				
	21	Tus.		Discussion with Ministry of Transport and Public Works and NRA	Discussion with Ministry of Transport and Public works and National Road Authority			Office Works	Office Works
	22	Wen.		Preparation of M/D	Preparation of M/D		Investigation	Investigation	Investigation
	23	Thu.	Signing of M/D	Signing of M/D	Signing of M/D		Investigation	Investigation	Investigation
	24	Fri.		Movement to Zambia	Investigation	Office Works	Investigation	Office Works	Office Works
	25	Sat.		Movement	Office Works	Investigation	Investigation	Office Works	Office Works
	26	Sun.			Office Works	Investigation	Investigation	Office Works	Office Works
	27	Mon.			Office Works	Office Works	Investigation	Office Works	Office Works
	28	Tus.			Office Works	Investigation	Investigation	Investigation	Investigation
	29	Wen.			Office Works	Investigation	Investigation	Investigation	Investigation
	30	Thu.			Office Works	Office Works	Investigation	Office Works	Investigation
	31	Fri.			Office Works	Office Works	Office Works	Office Works	Office Works
1	1	Sat.			Meeting	Meeting	Meeting	Meeting	Meeting
	2	Sun.			Office Works	Office Works	Investigation	Office Works	Office Works
	3	Mon.			Office Works	Office Works	Office Works	Office Works	Office Works
	4	Tus.			Investigation	Office Works	Investigation	Office Works	Office Works
	5	Wen.			Office Works	Office Works	Office Works	Office Works	Office Works
	6	Thu.			Office Works	Office Works	Investigation	Office Works	Office Works
	7	Fri.			Office Works	Office Works	Office Works	Office Works	Office Works
	8	Sat.			Office Works	Investigation	Investigation	Office Works	Office Works
	9	Sun.			Office Works	Office Works	Office Works	Office Works	Office Works
	10	Mon.			Courtesy Call on JICA, Ministry of Transport and Public Works				

2-2 Basic Design Draft Explanation Mission Schedule

days	date		Leader JICA Malawi ffice Mr. Tatsuya MURASE	Chief Consultant/ Bridge and Road Planner Mr. Toshio ICHIKAWA	Bridge Designer Mr. Kazumasa TADA
1	5/16	Mon	Meeting at JICA Malawi Office, Courtecy Call on Ministry of Transport and Public Works / National Road Authority (Stay at Lilongwe)		
2	5/17	Tue	Explanation of Basic Design Draft Report to Ministry of Transport and Public Works / National Road Authority Discussion on M/D (Stay at Lilongwe)		
3	5/18	Wed		Visit to Project Site (Stay at Lilongwe)	
6	5/19	Thu		Discussion with Ministry of Transport / National Road Authority (Stay at Lilongwe)	
7	5/20	Fri	Signing of M/D	Signing of M/D Data and Reference Collection, Report to JICA Malawi Office (Stay at Lilongwe)	
8	5/21	Sat		Project Site Investigation (Stay at Salima)	
9	5/22	Sun		Lilongwe(08:20)(QM181)→Lusaka(10:10) (Stay at Lusaka)	
10	5/23	Mon		Courtesy Call on Embassy of Japan in Zambia (Stay at Lusaka)	

3. List of Parties Concerned in the Recipient Country

Appendix 3 List of Parties Concerned in the recipient Country

3-1 Preliminary Study（December 16,2004 – January 16,2005）

(1) Embassy of Japan in Zambia

Mr. Tomoyuki ZAITSU	First Secretary

(2) JICA Malawi Office

Mr. Takashi KATO	Chief Representative
Mr. Takayuki UCHIYAMA	Representative
Mr. Tom Mtenji	Programme Officer

(3) Ministry of Transport and Public Works

Mr. Francis B. Chinsinga	Secretary for Transport and Public Works
Mr. L.M. Chirwa	Deputy Secretart
Mr. Anthony Livuza	Director of Administration and Finance
Mr. Collins K. Kumangirana	Director Roads
Mr. Kelvin Mphonda	Civil Engineer
Mr. Gomdwe N.B.T	Civil Engineer
Mr. Haneda J. Harawa	Sr. Technical Officer
Mr. Adams Chavula	Chief of Customer Service Unit, Meteorological Services
Mr. T. I. Masimbi	Materials Superintendent
Mr. Stanley D.K. Jere	Chief Materials Technician

(4) National Road Authority :NRA

Mr. Dauphin E. Makako	Chief Engineer
Mr. Maxwell Y. Kachiwala	Operation Director
Mr. Benjamin Kapoteza	Technical Director (Urban Road Division)
Mr. C. Zanbezi	Technical Director (Procurement)
Mr. A. Mnthini	Technical Director (Central Road Division)
Mr. P. Kasakatira	Technical Director (Central Road Division)
Mr. L.S. Siwande	Transport Engineer
Mr. Peter S. Makwinja	Environmental Planner
Mr. Cyril Kamkwamba	Project Engineer
Mr. Okendeni Kondowe	Project Engineer (Planning)
Mr. C.M. Mtawali	Senior Engineer (Development Project)

(5) NRA Lilongwe Office

Mr. Amos Phiri	Zone Engineer (CRD)

(6) Ministry of Water Development, Water Resources Department

Mr. Sydney M. Mainala	Director of Water Resources
Mr. W.P.C. Chipeta	Chief Water Resources Development Officer, Surface Water Division
Mr. Kalua	Chief Hydrologist, Surface Water Division
Mr. Kaunda	Hydrologist, Surface Water Division

(7) Ministry of Agriculture, Irrigation Department

Mr. S. C. W Maweru	Director of Irrigation Services

(8) Ministry of Natural Resources and Environmental Affairs

Mr. Y. Kaukutu	Geologist, Geological Survey Department

(9) Salima Police Station

Mrs. Kachemwe	Traffic Officer

(10) Salima District Hospital

Mr. M.N. Chimkhuzi	Assistant Health Officer
Mr.N.A. Makina	Assistant Human Resource Management Officer

3-2 Draft Report Explanation Mission（15 May,2005 – 23 May,2005）

(1) Embassy of Japan in Zambia

Mr. Tomoyuki ZAITSU	First Secretary

(2) JICA Malawi Office

Mr. Takashi KATO	Chief Representative
Mr. Takayuki UCHIYAMA	Representative
Mr. Tom Mtenji	Programme Officer

(3) Ministry of Transport and Public Works

Mr. Francis B. Chinsinga	Secretary for Transport and Public Works
Mr. Anthony Livuza	Director of Administration and Finance
Mr. Collins K. Kumangirana	Director of Roads
Mr. Mike Msale	Deputy Director of Road
Mr. Kelvin Mphonda	Civil Engineer
Mr. Gomdwe N.B.T	Civil Engineer
Mr. Jone Ndola	Civil Engineer
Mr. T.K. Masimbi	Sr. Material Technician
Mr. E.G. Machila	Material Technician

(4) National Road Authority：NRA

Mr. Maxwell Y. Kachiwala	Operation Director
Mr. A. Mnthini	Technical Director (Central Road Division)
Mr. P. Kasakatira	Technical Director (Central Road Division)
Mr. L.S. Siwande	Transport Engineer
Mr. Peter S. Makwinja	Environmental Planner
Mr. Okendeni Kondowe	Project Engineer (Planning)
Mr. F. Dimu	Senior Engineer (Development Project)

(5) Ministry of Environmental Affair

Ms. T.G. Mbale	Principal Env. Officer (Environment Dept)

4. Minutes of Discussions (M/D)

4-1 Preliminary Study (December 23, 2004)

Minutes of Discussions

on the Basic Design Study

on the Project for the Reconstruction of M5 Bridges between Balaka and Salima

in the Republic of Malawi

In response to a request from the Government of the Republic of Malawi (hereinafter referred to as " Malawi "), the Government of Japan decided to conduct a Basic Design Study on the Project for the Reconstruction of M5 Bridges between Balaka and Salima (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Malawi the Preparatory Study Team headed by Mr. Kyojin MIMA, Director of Project Management Group II, Grant Aid Management Division, JICA, and was scheduled to stay in the country from July 14, 2004 to August 10, 2004.

JICA also sent to Malawi the Basic Design Study Team headed by Mr. Takashi KATO, Resident Representative, JICA Malawi Office, and is scheduled to stay in the country from December 15, 2004 to January 10, 2005.

The Team held discussions with the concerned officials of the Government of Malawi and conducted a field survey of the study area.

In the course of discussions and field survey, both sides confirmed the main items described in the attached sheets.

Lilongwe, December 23, 2004

Mr. Takashi Kato

Leader
Basic Design Study Team
Japan International Cooperation Agency
Japan

Mr. Francis B. Chinsinga

Principal Secretary
Ministry of Transport and Public Works
Republic of Malawi

Mr. Maxwell Y. Kachiwala

Operations Director
National Road Authority
Republic of Malawi

ATTACHMENT

1. Objective of the Project

The objective of the Project is to reconstruct four (4) bridges between Balaka and Salima on the M5 road.

2. Project Sites

From Balaka to Salima on the M5 road.
The Project sites are shown in Annex-1.

3. Responsible and Implementing Organizations

The responsible organization is the Ministry of Transport and Public Works.
The implementation organization is the National Road Authority (hereinafter referred to as "NRA").
The organization chart of implementing organization is shown in Annex-2.

4. Items Requested by the Government of Malawi

As the result of discussions, the project components were confirmed as below:
- Redesign and reconstruction of four (4) bridges between Balaka and Salima section of the M5 road.
  (1) Angoni Culvert
  (2) Nanyangu Culvert
  (3) Nankokwe Bridge
  (4) Luwadzi Bridge

JICA will assess the appropriateness of the request and will report to the Government of Japan.

5. Japan's Grant Aid Scheme

(1) The Malawian side understood the Japan's Grant Aid scheme and the necessary measures to be taken by the Government of Malawi explained by the Team as described in Annex-3.
(2) The Malawian side promised to take necessary measures, as described in Annex-4, for smooth implementation of the Project as a condition for the Japan's Grant Aid to be implemented.

6. Schedule of the Study

(1) The consultant members of the Team will proceed with further studies in Malawi by January 10, 2005.
(2) JICA will prepare the Draft Basic Design Study Report in English and dispatch a mission to Malawi in order to explain its contents in May 2005.
(3) In case the contents of the Draft Basic Design Study Report are accepted in principle by the Government of Malawi, JICA will complete the Final Report and send it to the Malawian side by the end of June 2005.

7. Other Relevant Issues

(1) The Malawian side shall make necessary arrangements in consultations with the affected communities / persons to acquire the necessary land for the project before July 2005.

(2) The Government of Malawi shall provide a budget for relocation of services and shall pay compensation for the land required for the project before the commencement of the construction works.

(3) The Team explained the outline of the JICA Environmental and Social Considerations Guidelines (hereinafter referred to as "the JICA Guidelines") to the Malawian side. The Malawian side took the JICA Guideline into consideration, and shall complete the necessary procedures for the Project before July 2005. The team will support the Malawian side for their formulation of the mitigation plans to reduce environmental and social impacts when the project is implemented.

(4) The Malawian side understood that the applicable bridge design will be determined based on the results of further study of existing bridges, live loads, and river characteristics, etc.

(5) Both sides basically agreed that if the existing bridge is considered to be removed, the Malawian side shall demolish the existing bridge by the designated time which will be proposed in the Draft Basic Design Study Report.

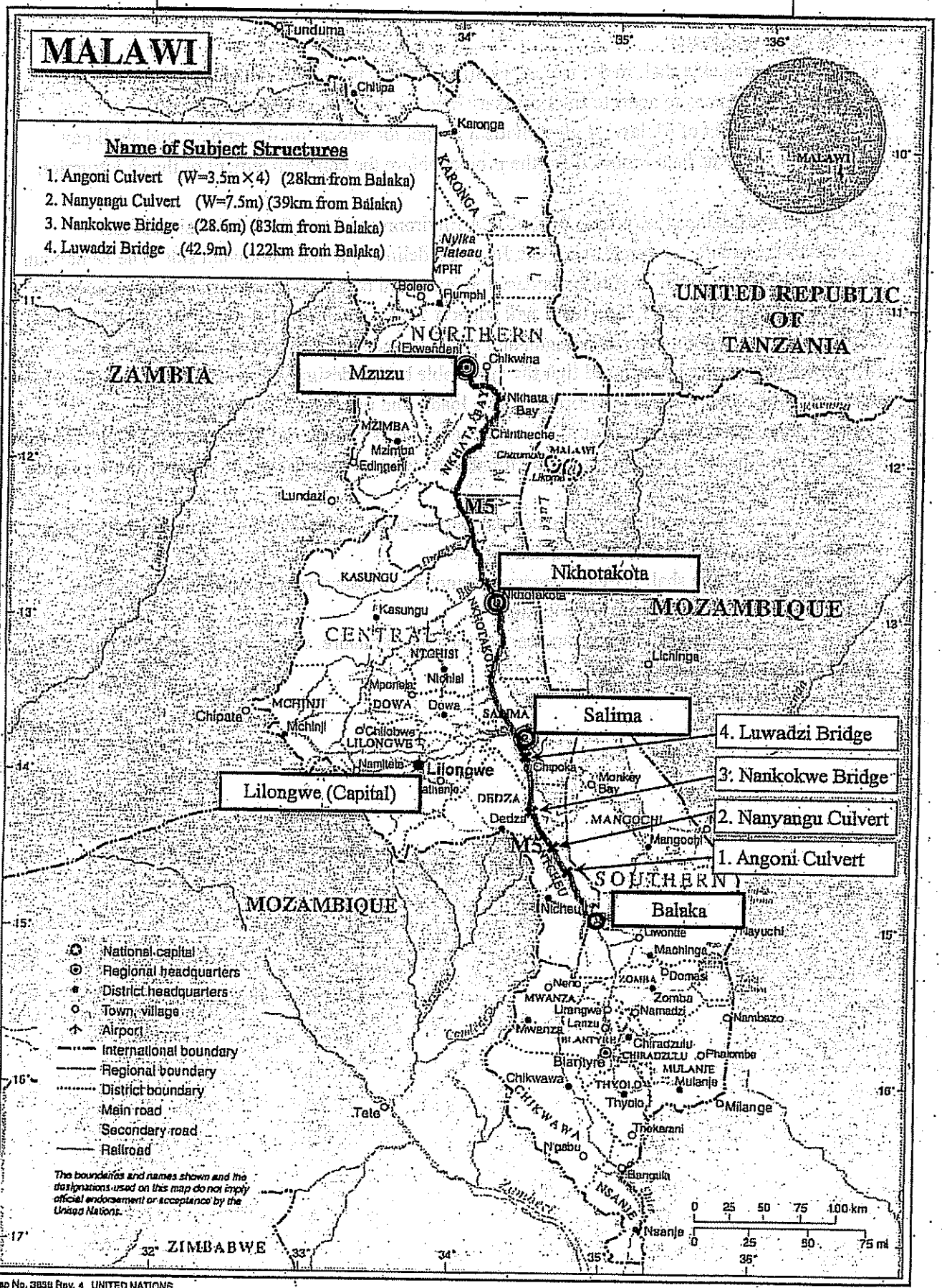
(6) The Malawian side shall provide necessary permissions, licenses and other authorizations for smooth implementation of the Project, as required.

(7) The Malawian side shall provide necessary numbers of counterpart personnel to the Team during the period of their studies in Malawi.

(8) The Malawian side shall submit answers to the Questionnaire, which the Team handed to the Malawian side, by January 7, 2005.

(End)

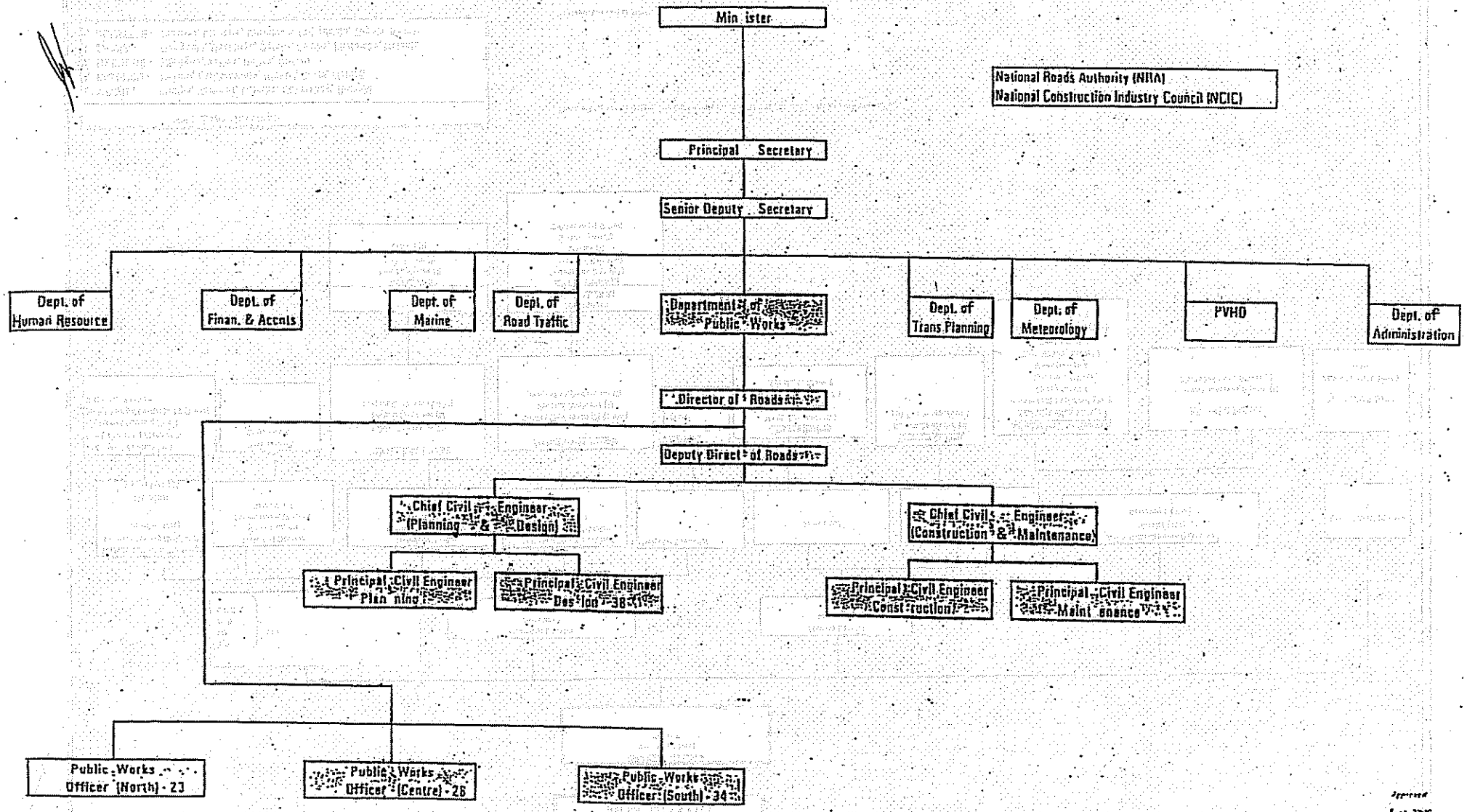
The Project for the Reconstruction of M5 Bridges between Balaka and Salima in the Republic of Malawi



Map No. 3858 Rev. 4 UNITED NATIONS
June 2004

Department of Peacekeeping Operations
Cartographic Section

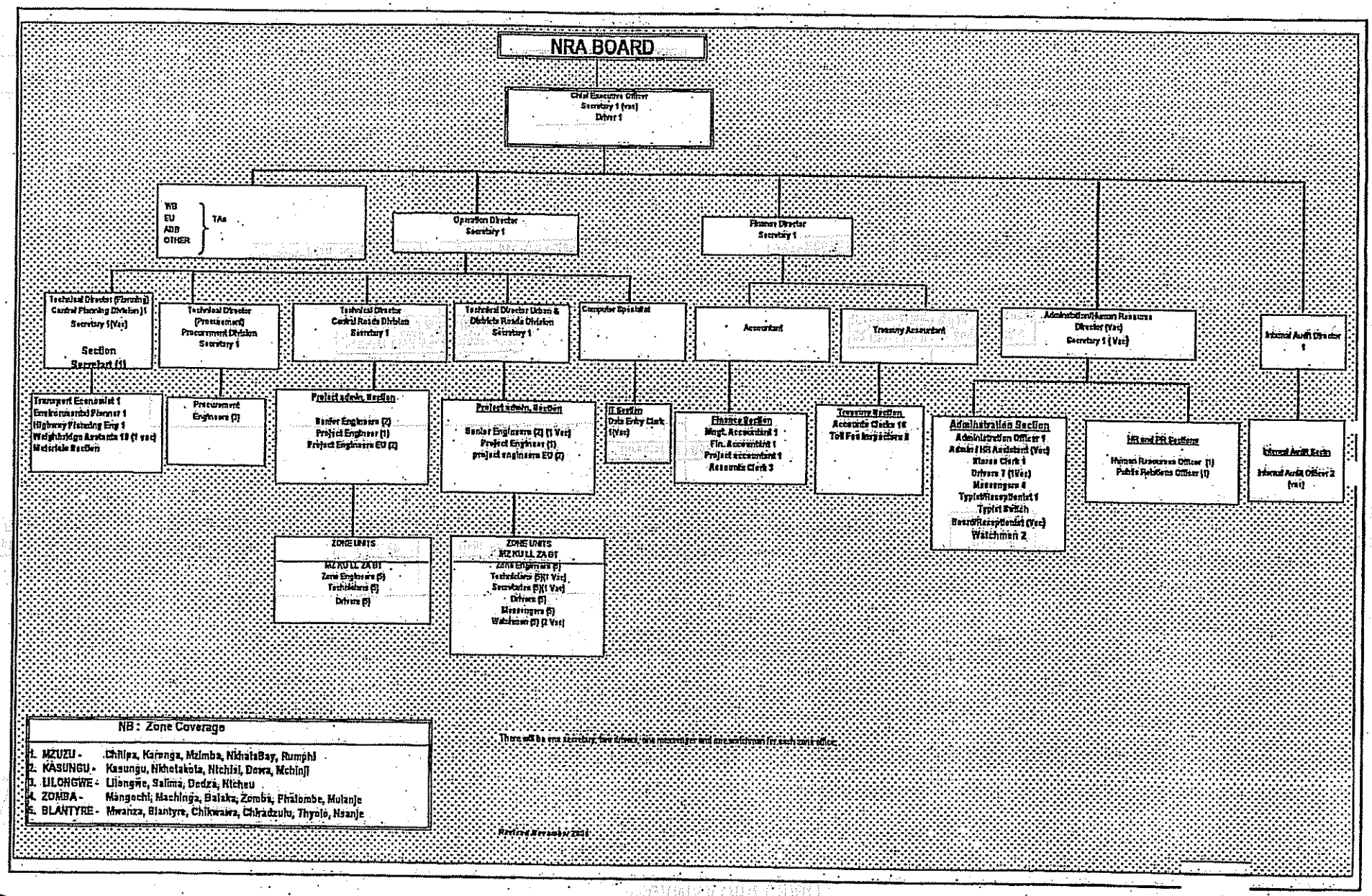
MINISTRY OF TRANSPORT AND PUBLIC WORKS
ORGANISATION CHART



Approved
Sept 2010

ANNEX - 2

NRA ORGANOGRAPH



ADMINISTRATION

ANNEX - 2

Annex-3

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 Implementation	(The Note exchanged between the Governments of Japan and recipient 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.

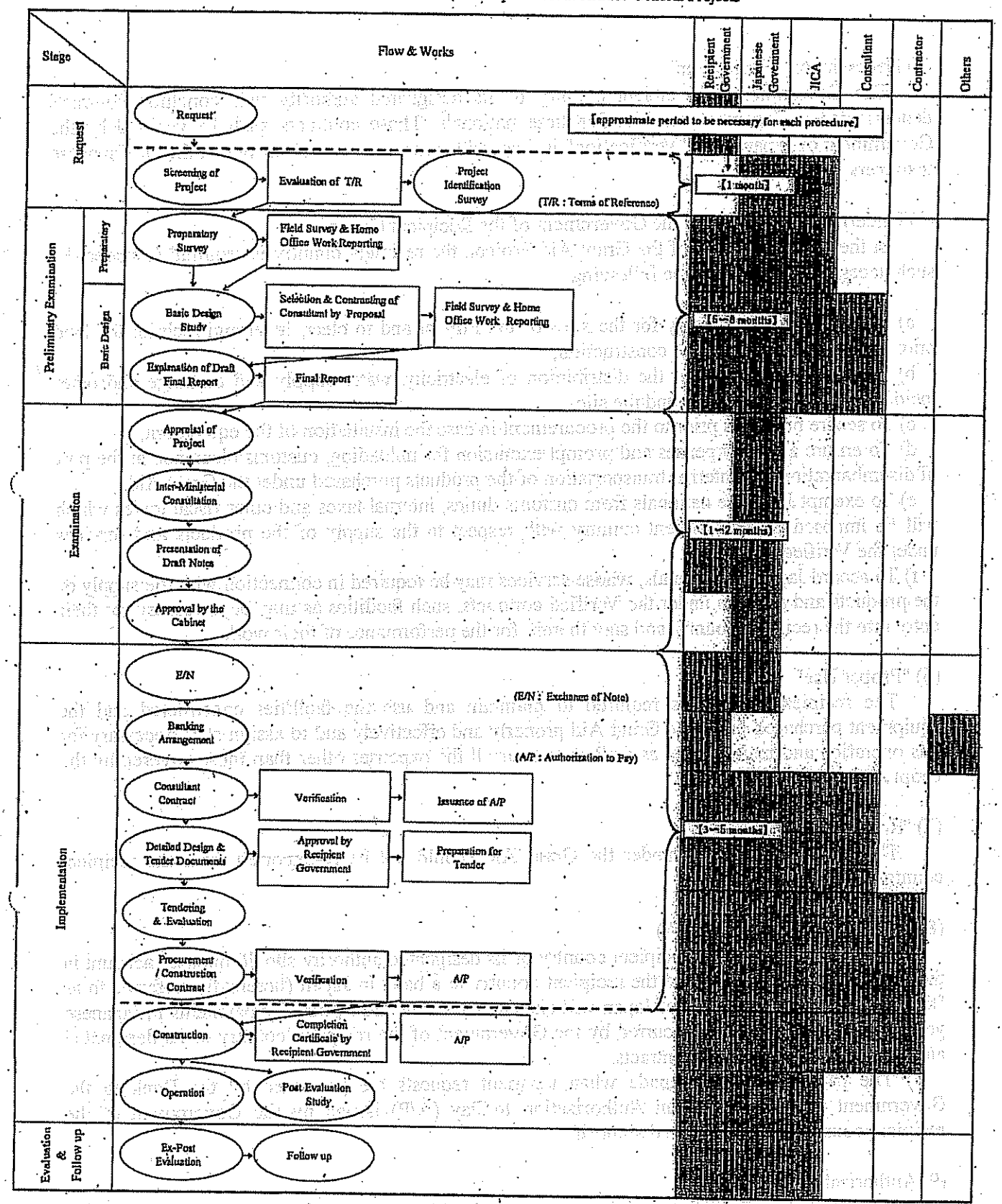
(9) Authorization to Pay (A/P)

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

(End)

Attached: Flow Chart of the Procedures of Japan's Grant Aid for General Projects

Flow Chart of the Procedures of Japan's Grant Aid for General Projects



Annex-4

Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences for the construction yard	●	
4	To construct the parking lot	●	
5	To construct temporary roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the buildings	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		●
	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	
	b. The supply system within the site (receiving and elevated tanks)	N/A	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others to the site) to the site	N/A	
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4) Gas Supply		
	a. The city gas main to the site	N/A	
	b. The gas supply system within the site	N/A	
	5) Telephone System		
	a. The telephone trunk line to the site		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture	N/A	
	b. Project equipment	N/A	
8	To bear the following commissions to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
10	To accord Japanese nationals whose service may be required in connection with 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 therein for the performance of their work.		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts		●
12	To maintain and use properly and effectively the facilities constructed under the Grant Aid		●
13	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		●

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

4-2 Draft Report Explanation (May 20, 2005)

Minutes of Discussions
on the Basic Design Study
on the Project for Reconstruction of M5 Bridges between Balaka and Salima
in the Republic of Malawi
(Explanation on the Draft Report)

In December 2004, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Basic Design Study Team on the Project for Reconstruction of M5 Bridges between Balaka and Salima (hereinafter referred to as "the Project") to the Republic of Malawi (hereinafter referred to as "Malawi"), 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 Malawi on the components of the Draft Report, JICA sent to Malawi the Basic Design Explanation Team (hereinafter referred to as "the Team"), headed by Mr. Tatsuya Murase, Deputy Resident Representative of the JICA Malawi Office, from May 15 to 22, 2005.

In the course of the discussions, both sides confirmed the main items described in the attached sheets.

Lilongwe, May 20, 2005

村瀬達哉

Mr. Tatsuya Murase

Leader
Basic Design Explanation Team
Japan International Cooperation Agency
Japan

Mr. Francis B. Chimsinga

Principal Secretary
Ministry of Transport and Public Works
Republic of Malawi

Mr. Maxwell Y. Kachiwala

Acting Chief Executive Officer
National Road Authority
Republic of Malawi

ATTACHMENT

1. Contents of the Draft Report

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

2. Japan's Grant Aid Scheme

The Malawian side reconfirmed the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Malawi explained by the Team as described in Annex-3 and Annex-4 of the Minutes of Discussions (M/D) signed by both sides on December 23, 2004.

3. Schedule of the Study

JICA will complete the Final Report in accordance with the confirmed items and send it to the Malawian side by July 2005.

4. Other Relevant Issues

(1) The Malawian side shall allocate the budget in the fiscal year of 2005 and 2006 for undertakings to be done on a timely manner by the Malawian side, which were shown in Annex-4 of the M/D signed by both sides on December 23, 2004.

(2) Both sides confirmed that the Project will have no significant negative impact on the environment and neighboring society. The Malawian side shall examine the Project components according to the EIA code in Malawi and shall obtain the approval for reconstruction of four bridges from the Ministry of Mines, Natural Resources and Environment by the end of July 2005.

(3) Both sides agreed that the contractor of the Project can utilize the bailey bridges at Nankokwe and Luwadzi for detouring roads during the construction period without lease payment and shall return them to the Malawian side after completion of the Project.

(4) The Malawian side shall remove the wreckage of old bridges, culvert parts, etc which may hamper the river flow, after completion of the new bridges.

(5) The Malawian side shall provide police security for the Project camp yard, the personnel and supervisor for traffic control around the Project sites.

(6) The Malawian side requested the Team to carry out the counterpart training in Japan on the bridge maintenance management system as technical cooperation by JICA, and the Malawian side understood that another official request will be needed to the Japanese side through the JICA Malawi Office.

end

5. Initial Environmental Examination

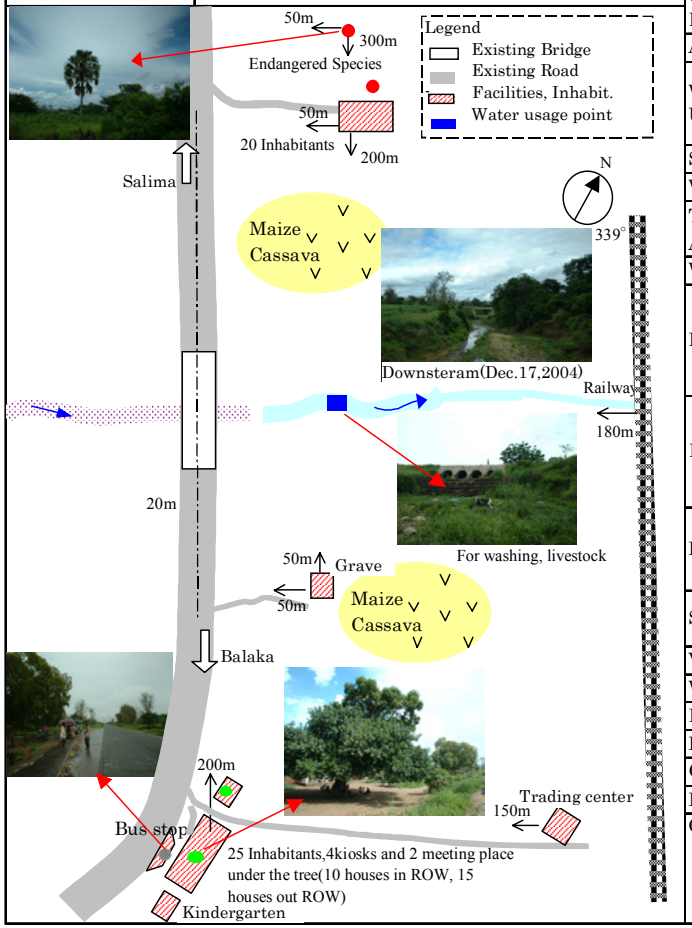
(IEE)

Angoni Culvert　Check Sheet（**Down-stream**）

Environmental and social check worksheet on each bridge

Name of Bridge1: **Angoni Culvert** **DOWNSTREAM** (Temporary existing pipe culvert (width 16.5*length 19.3*height 2.6m))

SURVEY DATE	:29 Dec. 2004, 6 Jan. 2005	LOCATION NAME	ANGONI CULVERT	LAT:S14°36'58.3"	LNG:E34°44'20.9"	ALT:638m
WEATHER	:SHOWER/CLOUDY	SURVEY AREA	600*200m=12ha (included river area, 300m each side from center of bailey bridge, 100m each side from center of existing road)			
SURVEYOR	:HIGA/MAKWINJA					
SKETCH	:HIGA (no scale)					



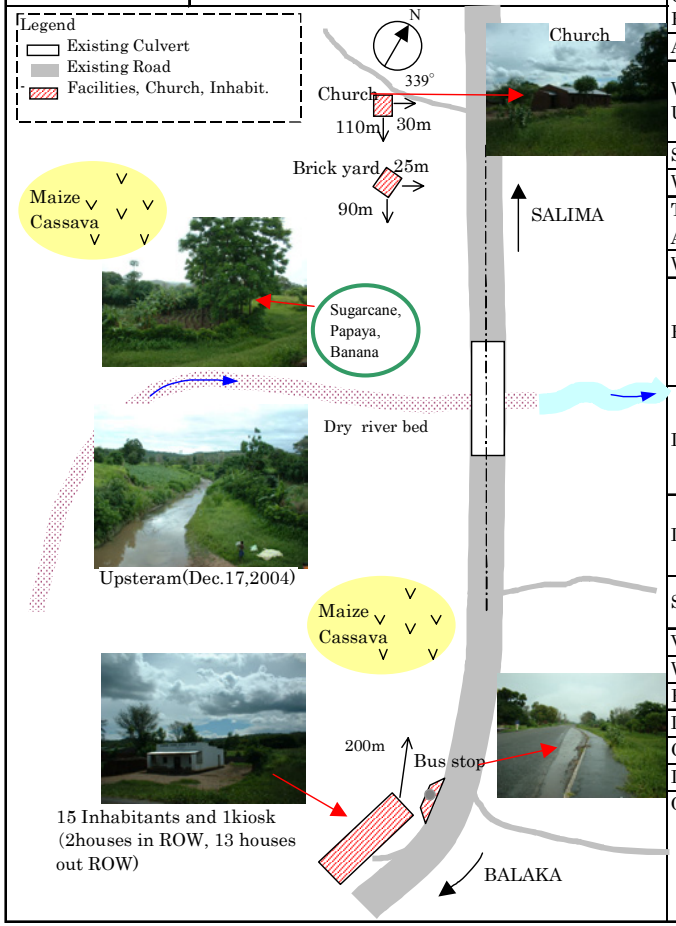
CONDITION OF EACH ENVIRONMENTAL ITEM		**DOWN STREAM**
AIR POLLUTION		No relation
WATER POLLUTION	River Dimension	See Topographic map
	Flow	No flow (puddles in river , visual survey, Dec.17,2004)
	Turbidty,PH, COD	———
SOIL POLLUTION		No relation
WASTE		Quarry (Sharape, +10km distance), Borrow and Gravel Pit (Kalungama, +5km distance)
TRAFFIC ACCIDENT AND SECURITY SITUATION		Interview with Salima traffic police station (see interview result)
WATER USAGE		Washing, Water place for livestock
BIODIVERSITY	Animal Diversity	Interview with NRA Environmental Specialist and local inhabitant
	Vegetation	Maize, Cassava, Banana, Papaya, Sugar cane
	Endangered Species	Nonexistent
INHABITATION	In the right of the way	10 (200m Balaka side)
	Out of ROW	35 (200m Salima and Balaka side)
	Main industry of inhabitant	Small-scale farming, Kiosk,Trading
LAND USE		Farm land, inhabitation, Livestock's grazing area
	NP/Wildlife Reserve & Forest	Nonexistent
SOCIAL INFRASTRUCTURE		Bus stop, Meeting place, Kindergarten (250m Balaka side), Trading center, Kiosk(mini-bar & cafe)
VULNERABLE SOCIAL GROUPS		Nonexistent
WATER RIGHTS		Nonexistent
FISHERIES RIGHTS		Nonexistent
LOCAL CONFLICT		Nonexistent
CULTURAL HERITAGE		Nonexistent
INFECTIOUS DISEASES HIV/AIDS		Interview with administration in Salima District Hospital (see interview result)
OTHERS (Disaster)		Road pavement, road embankment and river edge were eroded and scoured by flood in 2003.

Angoni Culvert Check Sheet（**Up-stream**）

Environmental and social check worksheet on each bridge

Name of Bridge1: **Angoni Culvert** **UPSTREAM** (Temporary existing pipe culvert （width 16.5*length 19.3*height 2.6m))

SURVEY DATE	:29 Dec. 2004, 6 Jan. 2005	LOCATION NAME	ANGONI CULVERT	LAT:S14°36'58.3"	LNG:E34°44'20.9" ALT:638m
WEATHER	:SHOWER/CLOUDY	SURVEY AREA	600*200m=12ha (included river area, 300m each side from center of bailey bridge, 100m each side from center of existing road)		
SURVEYOR	:HIGA/MAKWINJA				
SKETCH	:HIGA (no scale)				



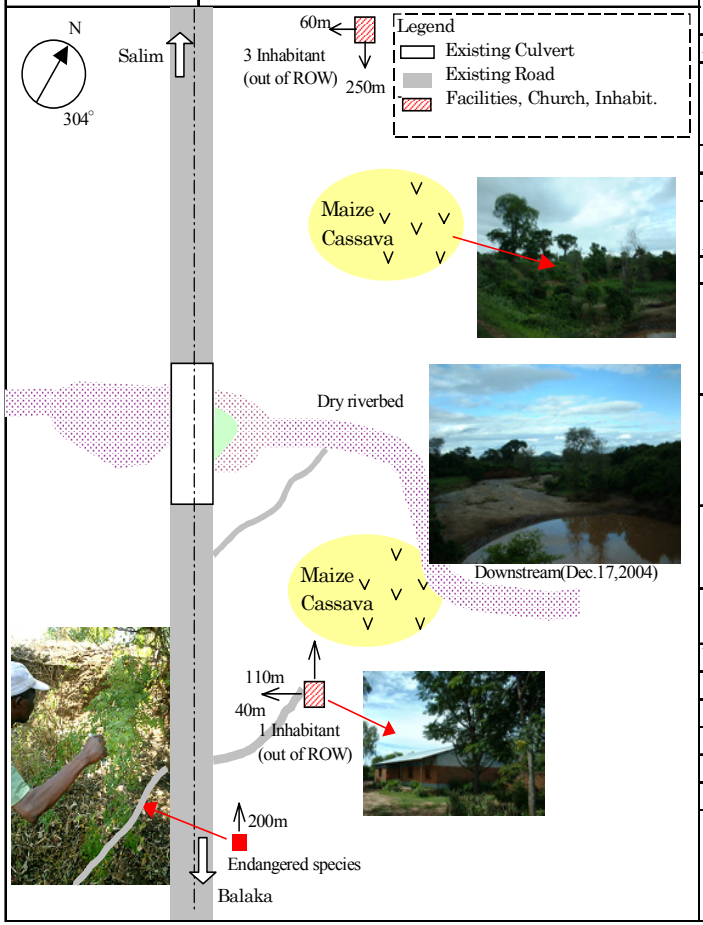
CONDITION OF EACH ENVIRONMENTAL ITEM		**UPSTREAM AREA**
AIR POLLUTION		No relation
WATER POLLUTION	River Dimension	See Topographic map
	Flow	No flow （puddles in river , visual survey, Dec.17,2004)
	Turbidty,PH, COD	———
SOIL POLLUTION		No relation
WASTE		Quarry （Sharape, +10km distance), Borrow and Gravel Pit (Kalungama, +5km distance)
TRAFFIC ACCIDENT AND SECURITY SITUATION		Interview with Salima traffic police station (see interview result)
WATER USAGE		Washing, Water place for livestock
BIODIVERSITY	Animal Diversity	Interview with NRA Environmental Specialist and local inhabitant
	Vegetation	Maize, Cassava, Banana, Papaya, Sugar cane
	Endangered Species	Nonexistent
INHABITATION	In the right of the way	2 (200m Balaka side)
	Out of ROW	13 (200m Balaka side)
	Main industry of inhabitant	Small-scale farming
LAND USE		Farm land, inhabitation, Livestock's grazing area
	NP/Wildlife Reserve & Forest	Nonexistent
SOCIAL INFRASTRUCTURE		Church(110m Salima side), Brick yard(90m Salima side), Bus stop(200m Balaka side)
VULNERABLE SOCIAL GROUPS		Nonexistent
WATER RIGHTS		Nonexistent
FISHERIES RIGHTS		Nonexistent
LOCAL CONFLICT		Nonexistent
CULTURAL HERITAGE		Nonexistent
INFECTIOUS DISEASES HIV/AIDS		Interview with administration in Salima District Hospital (see interview result)
OTHERS (Disaster)		Road pavement, road embankment and river edge were eroded and scoured by flood in 2003.

Nanyangu Bridge　Check Sheet（**Down-stream**）

Environmental and social check worksheet on each bridge

Name of Bridge 2: **Nanyangu Culvert　DOWNSTREAM** (Temporary pipe culvert, width 7.5*length 20.5*height 6.0m)

SURVEY DATE	:29 Dec. 2004, 6 Jan. 2005	LOCATION NAME	NANKOKUWE CULVERT	LAT:S14°36'58.3"	LNG:E34°44'20.9"	ALT:638m
WEATHER	:SHOWER/CLOUDY	SURVEY AREA	600*200m=12ha (included river area, 300m each side from center of bailey bridge, 100m each side from center of existing road)			
SURVEYOR	:HIGA/MAKWINJA					
SKETCH	:HIGA(No scale)					



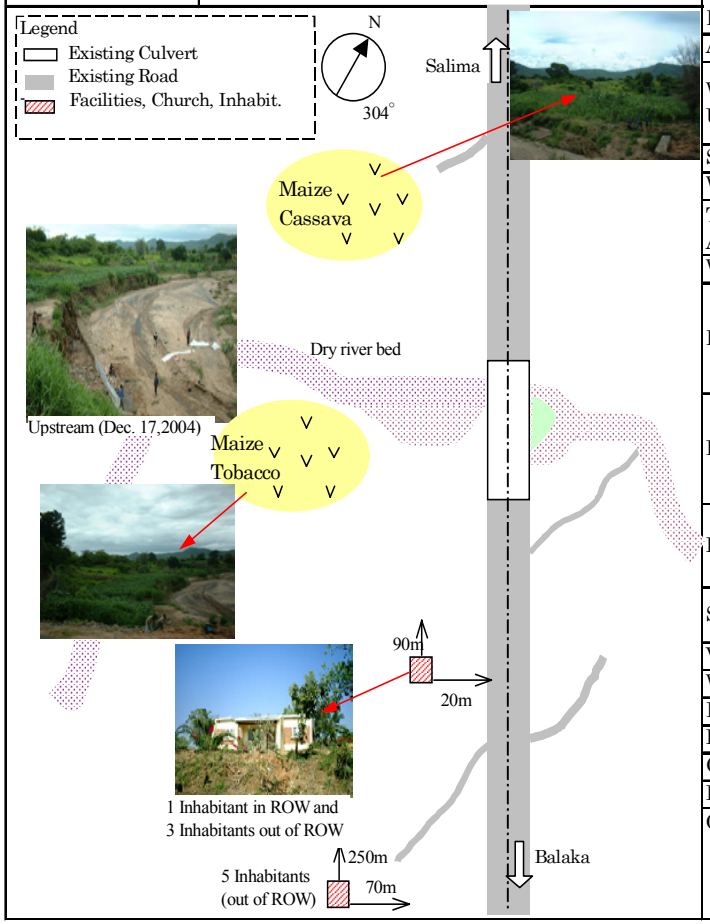
CONDITION OF EACH ENVIRONMENTAL ITEM		DOWNSTREAM AREA	
AIR POLLUTION		No relation	
WATER POLLUTION	River Dimension	See Topographic map	
	Flow	No flow due to dry	
	Turbidty,PH, COD	———	
SOIL POLLUTION		No relation	
WASTE		Quarry (Sharape, +30km distance), Borrow and Gravel Pit (Chingamba, +5km distance)	
TRAFFIC ACCIDENT AND SECURITY SITUATION		Interview with Salima traffic police station (see interview result)	
WATER USAGE		Irrigation	
BIODIVERSITY	Animal Diversity	Interview with NRA Environmental Specialist and local inhabitant	
	Vegetation	Maize, Cassava, Banana, Tobacco	
	Endangered Species	Nonexistent	DELBERIGEA MELANOXYLON under the Malawi list (+200m Balaka side)
INHABITATION	In the right of the way	0	
	Out of ROW	3(250m Salima side), 1(110m Balaka side)	
	Main industry of inhabitant	Small-scale farming (maize, cassava, banana)	
LAND USE		Farm land, inhabitation, Livestock's grazing area	
	NP/Wildlife Reserve & Forest	Nonexistent	
SOCIAL INFRASTRUCTURE		School(+350m Salima side)	
VULNERABLE SOCIAL GROUPS		Nonexistent	
WATER RIGHTS		Nonexistent	
FISHERIES RIGHTS		Nonexistent	
LOCAL CONFLICT		Nonexistent	
CULTURAL HERITAGE		Nonexistent	
INFECTIOUS DISEASES HIV/AIDS		Interview with administration in Salima District Hospital (see interview result)	
OTHERS(Disaster)		River edge was eroded and scored by flood 2001. River protection by gabion is under construction.	

Nanyangu Culvert　Check Sheet（**Up-stream**）

Environmental and social check worksheet on each bridge

Name of Bridge 2: **Nanyangu Culvert UPSTREAM** (Temporary pipe culvert, width 7.5*length 20.5*height 6.0m)

SURVEY DATE	:29 Dec. 2004, 6 Jan. 2005	LOCATION NAME	NANKOKUWE CULVERT	LAT:S14°36'58.3"	LNG:E34°44'20.9"	ALT:638m
WEATHER	:SHOWER/CLOUDY	SURVEY AREA	600*200m=12ha (included river area, 300m each side from center of bailey bridge, 100m each side from center of existing road)			
SURVEYOR	:HIGA/MAKWINJA					
SKETCH	:HIGA(No scale)					



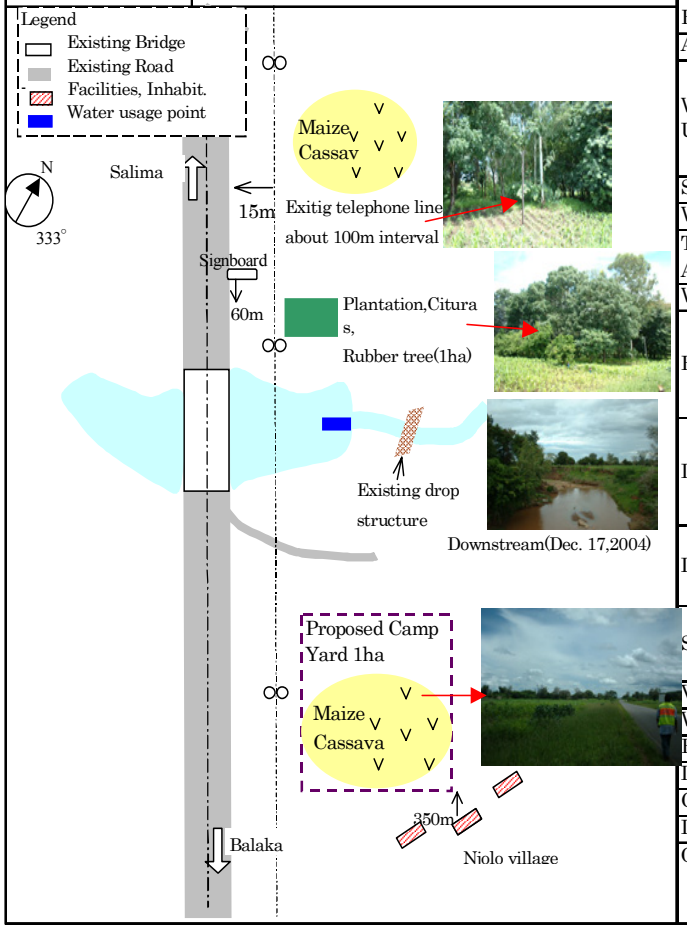
CONDITION OF EACH ENVIRONMENTAL ITEM		**UPSTREAM AREA**
AIR POLLUTION		No relation
WATER POLLUTION	River Dimension	See Topographic map
	Flow	No flow (Dec. 17,2004)
	Turbidty,PH, COD	———
SOIL POLLUTION		No relation
WASTE		Quarry (Sharape, +30km distance), Borrow and Gravel Pit (Chingamba, +5km distance)
TRAFFIC ACCIDENT AND SECURITY SITUATION		Interview with Salima traffic police station (see interview result)
WATER USAGE		Irrigation
BIODIVERSITY	Animal Diversity	Interview with NRA Environmental Specialist and local inhabitant
	Vegetation	Maize, Cassava, Banana, Tobacco
	Endangered Species	Nonexistent
INHABITATION	In the right of the way	1 (90m Balaka side
	Out of ROW	8 (90～250m Balaka side)
	Main industry of inhabitant	Small-scale farming (maize, cassava, banana, tobacco)
LAND USE		Farm land, inhabitation, Livestock's grazing area
	NP/Wildlife Reserve & Forest	Nonexistent
SOCIAL INFRASTRUCTURE		Nonexistent
VULNERABLE SOCIAL GROUPS		Nonexistent
WATER RIGHTS		Nonexistent
FISHERIES RIGHTS		Nonexistent
LOCAL CONFLICT		Nonexistent
CULTURAL HERITAGE		Nonexistent
INFECTIOUS DISEASES HIV/AIDS		Interview with administration in Salima District Hospital (see interview result)
OTHERS(Disaster)		River edge was eroded and scored by flood_2001. River protection by gabion is under construction.

Nankokw Bridge　Check Sheet（**Down-stream**）

Environmental and social check worksheet on each bridge

Name of Bridge 3:**Nankokwe Bridge DOWNSTREAM** (33m Temporary Bailey Bridge , existing bridge was settled by flood)

SURVEY DATE	:29 Dec. 2004, 6 Jan. 2005	LOCATION NAME	
WEATHER	:SHOWER/CLOUDY	SURVEY AREA	
SURVEYOR	:HIGA/MAKWINJA		
SKETCH	:HIGA(No scale)		



NANKOKUWE BRIDGE	LAT:S14°17'28.4"	LNG:E34°31'21.4" ALT:537m
600*200m=12ha (included river area, 300m each side from center of bailey bridge, 100m each side from center of existing road)		

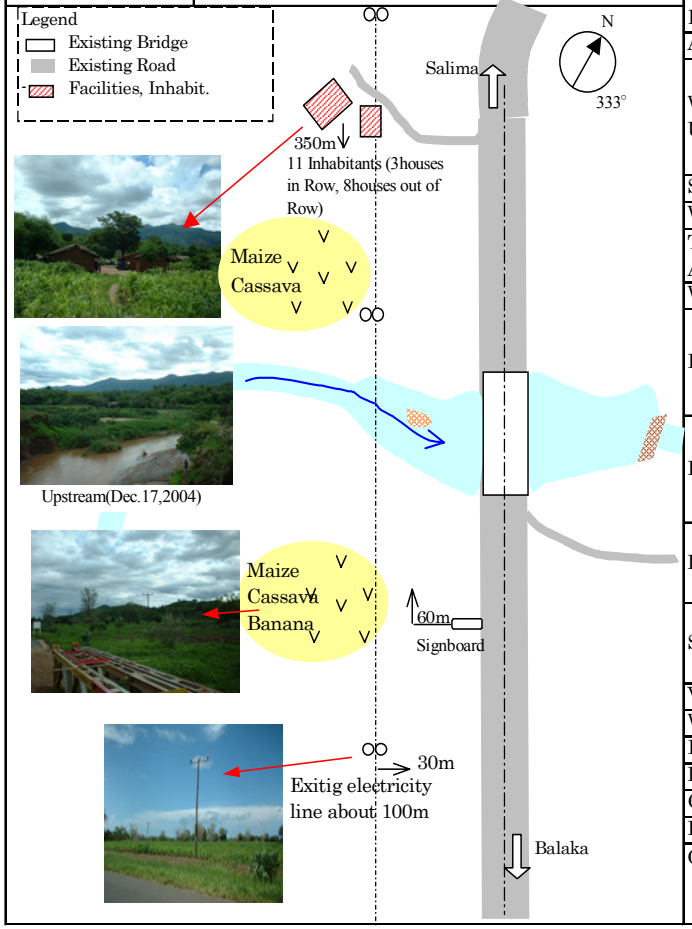
CONDITION OF EACH ENVIRONMENTAL ITEM		**DOWNSTREAM AREA**
AIR POLLUTION		No relation
WATER POLLUTION	River Dimension	See Topographic map
	Flow	Q= width 15m*depth 1.0m*1.0m/s=15m^3/s (23rd Dec. visual survey)
		Q= width 15m*depth 1.5m*2.0m/s=45m^3/s (24th Dec., visual survey)
	Turbidty,PH, COD	―――
SOIL POLLUTION		No relation
WASTE		Quarry (Kapiri, +10km distance), Borrow and Gravel Pit (Njolo, +5km distance)
TRAFFIC ACCIDENT AND SECURITY SITUATION		Interview with Salima traffic police station (see interview result)
WATER USAGE		Irrigation, Washing, Water place for livestock
BIODIVERSITY	Animal Diversity	No relation
	Vegetation	Maize, Cassava, Plantation (2ha)
	Endangered Species	Nonexistent
INHABITATION	In the right of the way	0
	Out of ROW	0
	Main industry of inhabitant	Small-scale farming (maize, cassava, banana), Carving(sell crafts along M5)
LAND USE		Farm land, inhabitation, Livestock's grazing area
	NP/Wildlife Reserve & Forest	Nonexistent
SOCIAL INFRASTRUCTURE		Telephone line, Drop structure in river, Grave and Bus stop (600m Salima side)
VULNERABLE SOCIAL GROUPS		Nonexistent
WATER RIGHTS		Nonexistent
FISHERIES RIGHTS		Nonexistent
LOCAL CONFLICT		Nonexistent
CULTURAL HERITAGE		Nonexistent
INFECTIOUS DISEASES HIV/AIDS		Interview with administration in Salima District Hospital (see interview result)
OTHERS(Disaster)		Due to Flood 2001 exiting pier was settled and river edge has been eroded and scoured.

Nankokw Bridge　Check Sheet（**Up-stream**）

Environmental and social check worksheet on each bridge

Name of Bridge 3:**Nankokwe Bridge UPSTREAM** (33m Temporary Bailey Bridge , existing bridge was settled by flood)

SURVEY DATE	:29 Dec. 2004, 6 Jan. 2005	LOCATION NAME	NANKOKUWE BRIDGE　LAT:S14°17'28.4"　LNG:E34°31'21.4"　ALT:537m
WEATHER	:SHOWER/CLOUDY	SURVEY AREA	600*200m=12ha (included river area, 300m each side from center of bailey bridge, 100m each side from center of existing road)
SURVEYOR	:HIGA/MAKWINJA		
SKETCH	:HIGA(No scale)		



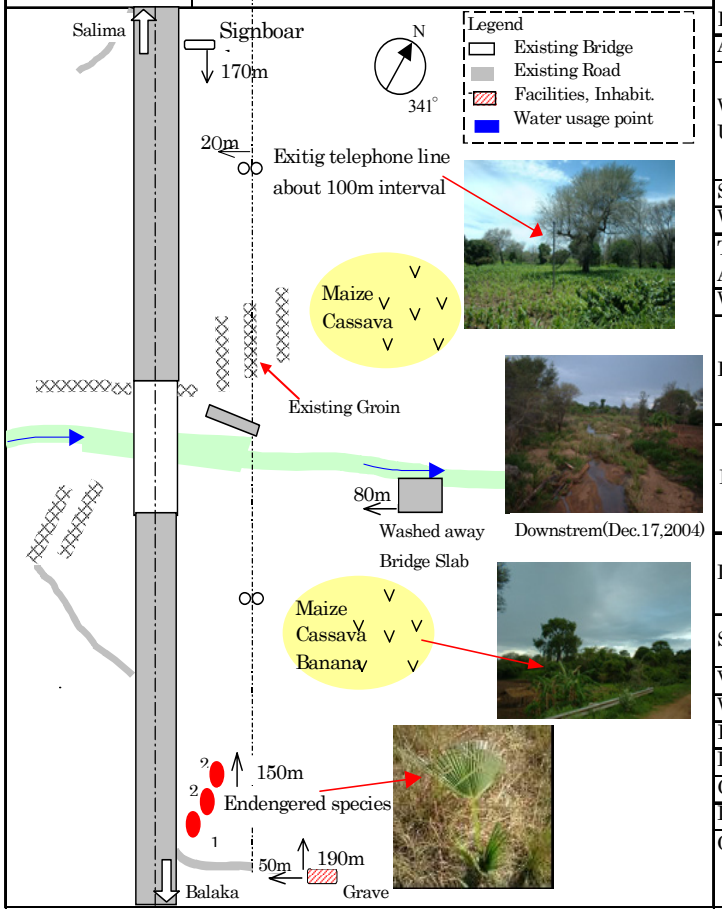
CONDITION OF EACH ENVIRONMENTAL ITEM		**UPSTREAM AREA**
AIR POLLUTION		No relation
WATER POLLUTION	River Dimension	See Topographic map
	Flow	Q= width 15m*depth 1.0m*1.0m/s=15m^3/s (23rd Dec. visual survey)
		Q= width 15m*depth 1.5m*2.0m/s=45m^3/s (24th Dec., visual survey)
	Turbidty,PH, COD	———
SOIL POLLUTION		No relation
WASTE		Quarry (Kapiri, +10km distance), Borrow and Gravel Pit (Njolo, +5km distance)
TRAFFIC ACCIDENT AND SECURITY SITUATION		Interview with Salima traffic police station (see interview result)
WATER USAGE		Irrigation, Washing, Water place for livestock
BIODIVERSITY	Animal Diversity	No relation
	Vegetation	Maize, Cassava, Banana
	Endangered Species	Nonexistent
INHABITATION	In the right of the way	3 (350m Salima side)
	Out of ROW	8 (350m Salima side)
	Main industry of inhabitant	Small-scale farming (maize, cassava, banana), Carving(sell crafts along M5)
LAND USE		Farm land, inhabitation, Livestock's grazing area
	NP/Wildlife Reserve & Forest	Nonexistent
SOCIAL INFRASTRUCTURE		Electricity line, Kiosk & Bus stop (700m Salima side), Hospital and Mua Mission (Mua Mt Salima side)
VULNERABLE SOCIAL GROUPS		Nonexistent
WATER RIGHTS		Nonexistent
FISHERIES RIGHTS		Nonexistent
LOCAL CONFLICT		Nonexistent
CULTURAL HERITAGE		Nonexistent
INFECTIOUS DISEASES HIV/AIDS		Interview with administration in Salima District Hospital (see interview result)
OTHERS(Disaster)		Due to Flood 2001 exiting pier was settled and river edge has been eroded and scoured.

Luwadge Bridge　Check Sheet（**Down-stream**）

Environmental and social check worksheet on each bridge

Name of Bridge 4:**Luwadzi Bridge DOWNSTREAM** (55m Temporary Bailey, existing bridge was washed away by flood)

SURVEY DATE	:29 Dec. 2004, 6 Jan. 2005	LOCATION NAME	:LUWADZI BRIDGE	LAT:S12°57'27.6"	LNG:E34°29'25.8"	ALT.:500m
WEATHER	:SHOWER/CLOUDY	SURVEY AREA	600*200m=12ha (included river area, 300m each side from center of bailey bridge, 100m each side from center of existing road)			
SURVEYOR	:HIGA/MAKWINJA					
SKETCH	:HIGA(No scale)					



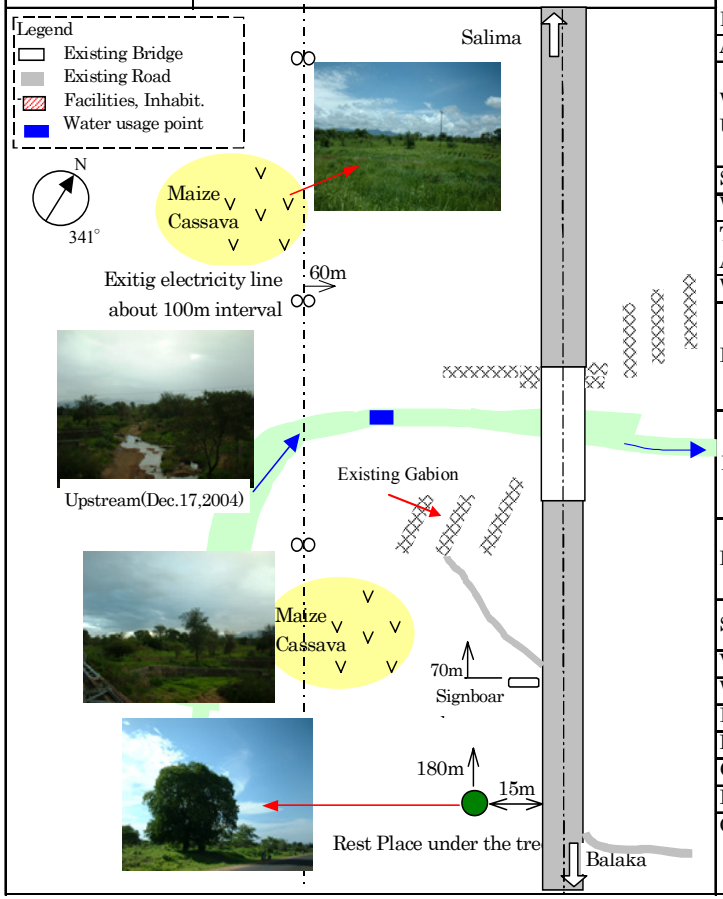
CONDITION OF EACH ENVIRONMENTAL ITEM		**DOWNSTREAM AREA**
AIR POLLUTION		No relation
WATER POLLUTION	River Dimension	See Topographic map
	Flow	Q= width 5m*depth 0.3m*0.5m/s=0.75m^3/s (23rd Dec. 2004, visual survey)
		Q= width 15m*depth 1.3m*2.0m/s=39m^3/s (30th Dec. 2004, visual survey)
	Turbidty,PH, COD	―――
SOIL POLLUTION		No relation
WASTE		Quarry (Kapiri, +30km distance), Borrow and Gravel Pit (Ngwena, +5km distance)
TRAFFIC ACCIDENT AND SECURITY SITUATION		Pick up car hit bailey bride at night Dec.16,2004 (Deceased 1, Victim 1) Interview with Salima traffic police station (see interview result)
WATER USAGE		Irrigation, Washing, Water place for livestock
BIODIVERSITY	Animal Diversity	No relation
	Vegetation	Maize, Cassava, Banana
	Endangered Species	①HYPHAENE CRINITA and ②ALBIZA ANTHELEMINTICA under the Malawi list (150m Balaka side)
INHABITATION	In the right of the way	0
	Out of the right of the w	0
	Main industry of inhabitant	Small-scale farming (maize, cassava, banana)
LAND USE		Farm land, inhabitation, Livestock's grazing area
	NP/Wildlife Reserve & Forest	Nonexistent
SOCIAL INFRASTRUCTURE		Grave(190m Balaka side), Telephone line
VULNERABLE SOCIAL GROUPS		Nonexistent
WATER RIGHTS		Nonexistent
FISHERIES RIGHTS		Nonexistent
LOCAL CONFLICT		Nonexistent
CULTURAL HERITAGE		Nonexistent
INFECTIOUS DISEASES HIV/AIDS		Interview with administration in Salima District Hospital (see interview result)
OTHERS (Disaster)		Due to Flood 2000, existing bridge slab was washed way and its pier was settled. River edge has been eroded and scored

Luwadge Bridge　Check Sheet（**Up-stream**）

Environmental and social check worksheet on each bridge

Name of Bridge 4:**Luwadzi Bridge UPSTREAM** (55m Temporary Bailey ,existing bridge was washed away by flood)

SURVEY DATE	:29 Dec. 2004, 6 Jan. 2005	LOCATION NAME	:LUWADZI BRIDGE	LAT:S12°57'27.6"	LNG:E34°29'25.8"	ALT.:500m
WEATHER	:SHOWER/CLOUDY	SURVEY AREA	600*200m=12ha (included river area, 300m each side from center of bailey bridge, 100m each side from center of existing road)			
SURVEYOR	:HIGA/MAKWINJA					
SKETCH	:HIGA(No scale)					



CONDITION OF EACH ENVIRONMENTAL ITEM		**UPSTREAM AREA**
AIR POLLUTION		No relation
WATER POLLUTION	River Dimension	See Topographic map
	Flow	Q= width 5m*depth 0.3m*0.5m/s=0.75m³/s (23rd Dec. 2004, visual survey)
		Q= width 15m*depth 1.3m*2.0m/s=39m³/s (30th Dec. visual survey)
	Turbidty,PH, COD	———
SOIL POLLUTION		No relation
WASTE		Quarry (Kapiri, +30km distance), Borrow and Gravel Pit (Ngwena, +5km distance)
TRAFFIC ACCIDENT AND SECURITY SITUATION		Pick up car hit bailey bride at night Dec.16,2004 (Deceased 1, Victim 1) Interview with Salaam traffic police station (see interview result)
WATER USAGE		Irrigation, Washing, Water place for livestock
BIODIVERSITY	Animal Diversity	No relation
	Vegetation	Maize, Cassava, Banana
	Endangered Species	No relation
INHABITATION	In the right of the way	0
	Out of ROW	10 (300 m Balaka side)
	Main industry of inhabitant	Small-scale farming (maize, cassava, banana, ground nut)
LAND USE		Farm land, inhabitation, Livestock's grazing area
	NP/Wildlife Reserve & Forest	Nonexistent
SOCIAL INFRASTRUCTURE		Rest place under tree, Electricity line, School (550m Balaka side), Waterwell & Mosque(350m Salima side)
VULNERABLE SOCIAL GROUPS		Nonexistent
WATER RIGHTS		Nonexistent
FISHERIES RIGHTS		Nonexistent
LOCAL CONFLICT		Nonexistent
CULTURAL HERITAGE		Nonexistent
INFECTIOUS DISEASES HIV/AIDS		Interview with administration in Salima District Hospital (see interview result)
OTHERS (Disaster)		Due to Flood 2000, existing bridge slab was washed way and its pier was settled. River edge has been eroded and scored

Mitigation Plans

Environmental Impact Items	Potential Environmental Impacts	Mitigation Plans	Institutional Responsibilities	Cost Estimate(MK)	Comments
Before Construction（In Basic Design・Detailed Design）					
Traffic accidents and Security situation	Increase risk of traffic accidents due to increased traffic volume	Plan and design considering smooth traffic of vehicles, bicycles and pedestrians. Safety and preventive measure of accident - Safety alignment of road (Vertical and horizontal grade, horizontal curve radius etc.) - Installation of traffic safety facilities (traffic board, road marking, railing・guardrail etc.) - Proper drainage plan（horizontal・vertical grade, drain ditch, side ditch, etc.） - Secure the safety side walk (required width, mount-up type)	JICA study team (checked by MOTPW and NRA)	0	All mitigation plans are considered in the Design
Water quality・Water Usage	- Risk of water pollution in the rivers - Inconvenience to use the existing water supplies	Plan, design and construction plan to protect deterioration of water and maintaining water usage - Secure the access to water usage points such as washing place (installation of stairs) - Selection of foundation type to minimize deterioration of water by waste material due to construction works - Construction in dry season or low water level - River diversion if necessary	JICA study team (checked by MOTPW and NRA)	0	
Biodiversity	Increased risk of negative impacts to biodiversity	Plan and design in consideration with preservation of precious biodiversity - Inspection and confirmation of area growing precious plants from topographic survey - Selection of road alignment and bridge location avoiding the area growing precious plants - Plan of detour road and temporary road for construction avoiding the area growing precious plants	JICA study team (checked by MOTPW and NRA)	0	

Environmental Impact Items	Potential Environmental Impacts	Mitigation Plans	Institutional Responsibilities	Cost Estimate(MK)	Comments
Removal of Inhabitation	Relocation of the existing houses and facilities	Plan and design not to relocate the existing houses and facilities - Inspection and confirmation of scale and location of houses - Selection of road alignment and bridge location avoiding the removal of inhabitant - Plan of detour road and temporary road for construction avoiding the removal of inhabitant - Plan of temporary facilities yards avoiding the removal of inhabitant	JICA study team (checked by MOTPW and NRA)	0	All mitigation plans are c0nsidered in the Design
Social Infrastructures	Relocation of the existing religious facilities, meeting places, electric and telephone lines	Plan and design considering the existing social infrastructures - Confirmation of location and scale of the facilities from topographic map data - Selection of road alignment and bridge location not to relocation and removal - Plan of detour road and temporary roads to avoid environmental impact - Plan of temporary facilities such as camp yard, store area of materials to avoid environmental impact	JICA study team (checked by MOTPW and NRA)	0	
Disposal of construction waste	Increased construction waste due to demolition of existing structures	Disposal plan of construction waste(waste soil, concrete, asphalt boulder etc.) - Control of construction waste to minimize - Reuse of construction waste to new bridges - Selection of proper disposal area (utilization of borrow pit, quarry site, soil disposal site etc.)	JICA study team (checked by MOTPW and NRA)	0	

Environmental Impact Items	Potential Environmental Impacts	Mitigation Plans	Institutional Responsibilities	Cost Estimate(MK)	Comments
Natural・Flood Disasters	Risk of damage to structures by natural/flood disaster	Plan and design of counter measures of river bed change, local scouring around piers, bank erosion to prevent from disaster - Secure of flow capacity at bridges (location of bridge, bridge length, span arrangement etc.) - Stability of river bank and river bed (drop structure, spur dike, bank and river bed protection) - Protection of erosion on the slope of road embankment	JICA study team (checked by MOTPW and NRA)	0	All mitigation plans are c0nsidered in the Design
During Construction					
Noise and Vibration	Noise and vibration during the construction period	Construction plan to minimize environmental impact against habitants near site due to noise and vibration - Reconfirm the surrounding condition near sites (density of habitant, presences of public facilities - Explanation and advertise to local habitants (construction object, period, scale etc.) - Selection of low noise and vibration machine. - Proper operation and maintenance of heavy equipment. - Minimize to use heavy equipment at night. -Counter measures to reduce noise and vibration(anti-noise wall, etc, if necessary)	-Contractor (MOTPW and NRA supports if necessary)		Primary impacts that are mitigatable
Air Pollution	Increased dust and air pollution due to construction works.	Preventive measures of air pollution due to construction works - Periodical water sprinkling and dust measure due to construction equipment and dump tracks - Cover to prevent dropping mud, stones from dump tracks - Instruction and training to operators and drivers of heavy equipment and dump trucks (speed limitation, minimum idling, washing facilities, etc.)	-Contractor		

Environmental Impact Items	Potential Environmental Impacts	Mitigation Plans	Institutional Responsibilities	Cost Estimate(MK)	Comments
Water quality・ Water Usage	Increased waste water and mud due to construction works	Execution of construction avoiding environmental impact to local inhabitant due to waste water an mud from construction works - Inspection and reconfirmation of water usage - Constriction plans reducing deterioration of water and mud and proper measures (settling pond, river diversion etc., if necessary) - Protect to leaking oil from heavy equipment with proper instruction and training	-Contractor		Primary impacts that are mitigatable
Traffic Congestion due to vehicles for construction and traffic security	Increase risk of traffic accidents due to increased traffic volume for construction works	Secure of smooth traffic operation and safety on the existing roads, detour roads and temporary road for construction - Explanation and advertise to local habitants (construction object, period, scale etc.) - Installation of barricade, traffic control boards - Arrange traffic management polices - Safety instruction to operator of equipment and driver of dump tracks	-Contractor (MOTPW and NRA supports if necessary)		
Disposal of construction waste	Increased construction waste from construction works	Proper disposal of waste (mud and concrete fragments) during construction - Classify and volume (quantity) of waste - Reduce waste produced from construction - Recycle of waste (river bank protection, spur dike, part of embankment etc.) - Proper disposal plan of waste	-Contractor		
Temporary facilities for construction	Risk of negative environmental impacts to surrounding area	Plan of temporary facilities to minimize environmental impact to surrounding area - Explanation and advertise to local habitants (construction object, period, scale etc.) - Installation of a fence for security if necessary	-Contractor (MOTPW and NRA supports if necessary)		

Environmental Impact Items	Potential Environmental Impacts	Mitigation Plans	Institutional Responsibilities	Cost Estimate(MK)	Comments
Instruction and training for social environment	Risk of negative environmental impacts from bad behavior of employee	Instruction and training about environmental impact to relating all staffs - Disposal of garbage and waste from construction sites, camp yard, accommodation - Health control, prevention of an epidemic disease (Malaria, HIV/AIDS)	-Contractor		Primary impacts that are mitigatable
After Construction					
Demolish of temporary facilities・Clearing	Risk of negative environmental impacts due to demolish of temporary facilities and clearing sites	Demolish plan of temporary facilities after construction to minimize environmental impact to surrounding area - After demolish of Camp yard, store houses for materials, the land should be cleared at original condition. -Waste (wood, concrete, steel, re-bar etc.) from demolish of temporary facilities should be recycled or disposed properly.	-Contractor	Costs are included in Contract Amount of Contractor	
Demolish of detour road・temporary roads for construction	Risk of negative environmental impacts due to demolish of detour road and construction road	Demolish plan of detour and temporary road after construction to minimize environmental impact to surrounding area - After demolish of detour roads, temporary roads for construction, the land should be cleared at original condition. - Waste (disposal soil, boulder etc.) from demolish of detour roads and temporary roads for construction should be recycled or disposed properly.	-Contractor		

Monitoring Plans

Proposed Mitigation Measure	Parameters to be Monitored	Measurements (Incl. method & equipment)	Location	Frequency of Measurement	Institutional Responsibilities	Cost Estimate(MK)
Pre-Construction						
Removal of Inhabitation for permanent and temporary structures (if necessary)	Location, number, and size of house relocated and compensated	Inspection and survey of relocated and demolished property	Nanyang Culverts (if necessary because house exists in ROW)	Prior to commencement of construction works	- MOTPW and NRA -District commissioner -Contractor	50,000
Land taken for permanent and temporary structures	Location and area of land taken and compensated	Inspection and survey of relocated and demolished property	Luwadzi Br., Nankokwe Br.,Nanyang and Angoni Culverts	Prior to commencement of construction works	- MOTPW and NRA -District commissioner -Contractor	
Relocation and reconstruction of social infrastructures	Location, number, and scale of social infrastructures for permanent and temporary structures	Inspection and survey of relocated and rebuild social infrastructures	Luwadzi Br., Nankokwe Br.,Nanyang and Angoni Culverts	Prior to commencement of construction works	- MOTPW and NRA -District commissioner -Contractor	
During Construction						
Noise and Vibration (if required or unacceptable level)	Noise and vibration levels based on environmental standard	Measuring and investigation of noise and vibration levels at center and boundary of the work site based on the environmental standard	Luwadzi Br., Nankokwe Br.,Nanyang and Angoni Culverts	Once or when required	MNREA MOTPW and NRA (supported by contractor if necessary)	

Proposed Mitigation Measure	Parameters to be Monitored	Measurements (Incl. method & equipment)	Location	Frequency of Measurement	Institutional Responsibilities	Cost Estimate(MK)
Air pollution (if required or unacceptable level)	Dust level based on environmental standard	Observation and investigation of dust levels in the areas where there are sensitive receivers and precious floras	Luwadzi Br., Nankokwe Br.,Nanyang and Angoni Culverts	Once or when required	MNREA MOTPW and NRA (supported by contractor if necessary)	250,000
Water quality (if required or unacceptable level)	Taking samples and water quality level based on environmental standard (e.g., pH, electrical conductivity, dissolved oxygen)	Measuring and investigation of water quality level in the river and at water usage places	Luwadzi Br., Nankokwe Br.,Nanyang and Angoni Culverts	Once or when required	MNREA MOTPW and NRA (supported by contractor if necessary)	
Biodiversity	Healthy and damaged to biodiversity (e.g., precious flora, vegetation, tree)	-Monitoring and inspection of state of biodiversity	Luwadzi Br., Nankokwe Br.,Nanyang and Angoni Culverts	Once or when required	MNREA MOTPW and NRA (supported by contractor if necessary)	
Traffic safety	Condition of traffic congestion and safety operation	Monitoring and inspection of traffic management and safety facilities	Luwadzi Br., Nankokwe Br.,Nanyang and Angoni Culverts	Once a month	Contractor MOTPW and NRA	
Construction waste	Condition of disposal and recycle of construction waste	Monitoring and inspection of management for disposal and recycle of construction waste	Luwadzi Br., Nankokwe Br.,Nanyang and Angoni Culverts	Once a month	Contractor	

Proposed Mitigation Measure	Parameters to be Monitored	Measurements (Incl. method & equipment)	Location	Frequency of Measurement	Institutional Responsibilities	Cost Estimate(MK)
Security of temporary facilities	Security situation of temporary facilities (e.g., camp yard, guard fence, stock place)	Monitoring and inspection of management for temporary facilities	Luwadzi Br., Nankokwe Br.,Nanyang and Angoni Culverts	Once a month	Contractor	
Employee education	Contents of lecture and training for social environment (e.g., staff health control, disposal of garbage and waste)	Monitoring and inspection of lecture and training	All staff	Once a month	Contractor	
Civil appeal (if required)	Number and content of complaint made by local resident	Monitoring and inspection of the action taken quickly and the amicable settlement	Luwadzi Br., Nankokwe Br.,Nanyang and Angoni Culverts	When appeal arise	-Contractor -District commissioner - MOTPW and NRA	
After Construction						
Demolish and demobilization of temporary facilities including detour and construction roads	- Circumstances of the used land - Condition of disposal of waste	Monitoring and inspection of the demolish and cleaning plan to minimize environmental impact to surrounding area	Luwadzi Br., Nankokwe Br.,Nanyang and Angoni Culverts	After demolish and transfer	Contractor	50,000