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. Cost Estimation Borne by the Recipient Country

6. Other Relevant Data

Appendices 1 Member List of the Study Team

1-1 Field Survey (Mar. 30-'02 ~ May 13-'02)

1 Team Leader: Mr. Shigeru SUGIYAMA
Japan International Cooperation Agency

2 Chief consultant/Road Traffic Planner: Mr. Katsuyoshi MATSUDA
Nippon Koei Co., Ltd.

3 Proof Design Expert: Mr. Katsufumi MATSUZAWA
Nippon Koei Co., Ltd.

4 Highway Designer/Natural Condition Surveyor: Mr. Isao INUZUKA
Nippon Koei Co., Ltd.

5 Highway Designer: Mr. Hiroaki TAKAHASHI
Japan Engineering Consultant Co., Ltd.

6 Road Facility Designer: Mr. Nobuyuki TAGUCHI
Japan Engineering Consultant Co., Ltd.

7 Traffic Management/Traffic Safety Specialist: Mr. Tetsuya MAEDA
Nippon Koei Co., Ltd.

8 Construction Planner/Cost Estimator: Mr. Koichiro SEKI
Nippon Koei Co., Ltd.

1-2 Discussion on Draft Report (Jul. 21-'02 ~ Aug. 31-'02 and Aug. 11~Sep. 1)

1 Leader: Mr. Yoshiro KURASHINA
Japan International Cooperation Agency

2 Chief consultant/Road Traffic Planner: Mr. Katsuyoshi MATSUDA
Nippon Koei Co., Ltd.

3 Highway Designer/Natural Condition Surveyor: Mr. Isao INUZUKA
Nippon Koei Co., Ltd.

4 Construction Planner/Cost Estimator: Mr. Koichiro SEKI
Nippon Koei Co., Ltd.

Appendices 2 Study Schedule

2-1 Field Survey

	Date		Movement	Accommodation	Activities
1	30 Mar.	Sta.	Team Leader Sugiyama, Study Team, Matsuda and Inuzuka leave Tokyo	Airplane	Trip from Tokyo to Kampala
2	31 Mar.	Sun.	Sugiyama, Matsuda and Inuzuka arrive at Kampala	Kampala	Internal Meeting
3	1 Apr.	Mon.		"	Discussion with EOJ, MOWHC, KCC
4	2 Apr.	Tue.		"	Discussion with EOJ, MOWHC, KCC
5	3 Apr.	Wed.		"	Field Survey
6	4 Apr.	Thu.		"	Discussion with MOWHC
7	5 Apr.	Fri.		"	Signing on the Minutes, Report to EOJ
8	6 Apr.	Sat.		"	Field Survey
9	7 Apr.	Sun.	Matsuda and Inuzuka continue leave at Kampala	Nairobi Kampala	Study Team Leader Sugiyama leaves for Nairobi
10	8 Apr.	Mon.		"	Field Survey
11	9 Apr.	Tue.		"	"
12	10 Apr.	Wed.		"	"
13	11 Apr.	Thu.		"	"
14	12 Apr.	Fri.		"	"
15	13 Apr.	Sat.		"	"
16	14 Apr.	Sun.	Study Team Takahashi, Taguchi, Maeda and Seki leave Tokyo	"	Internal Meeting
17	15 Apr.	Mon.	Takahashi, Taguchi, Maeda and Seki arrive at Kampala	"	Internal Meeting
18	16 Apr.	Tue.	Study Team Matsuda, Inuzuka, Takahashi, Taguchi, Maeda and Seki leave at Kampala	"	Field Survey
19	17 Apr.	Wed.		"	"
20	18 Apr.	Thu.		"	Discussion with MOWHC
21	19 Apr.	Fri.		"	Field Survey
22	20 Apr.	Sat.		"	"
23	21 Apr.	Sun.		"	"
24	22 Apr.	Mon.		"	"
25	23 Apr.	Tue.		"	"
26	24 Apr.	Wed.		"	"
27	25 Apr.	Thu.		"	"
28	26 Apr.	Fri.		"	Discussion with EOJ
29	27 Apr.	Sat.		"	Field Survey
30	28 Apr.	Sun.		"	"
31	29 Apr.	Mon.		"	"
32	30 Apr.	Tue.		"	"
33	1 May	Wed.		"	"
34	2 May	Thu.		"	"
35	3 May	Fri.		"	"
36	4 May	Sat.		"	"
37	5 May	Sun.		"	"
38	6 May	Mon.		"	"
39	7 May	Tue.		"	"
40	8 May	Wed.		"	"
41	9 May	Thu.		"	Discussion with EOJ
42	10 May	Fri.		"	Report to EOJ
43	11 May	Sat.	Matsuda, Inuzuka, Takahashi, Taguchi, Maeda and Seki leave Kampala	Airplane	Trip from Kampala to London
44	12 May	Sun.	Matsuda, Inuzuka, Takahashi, Taguchi, Maeda and Seki leave London for Tokyo	Airplane	Trip from London to Tokyo
45	13 May	Mon.	Matsuda, Inuzuka, Takahashi, Taguchi, Maeda and Seki arrive at Tokyo	Tokyo	"

2-2 Explanation of Draft Basic Design Study Report

	Date		Movement	Accommodation	Activities
1	21 Jul	Sun.	Team Leader Kurashina, Study Team, Matsuda leave Tokyo and Inuzuka arrive at Kampala	Airplane Kampala	Trip from Tokyo to Kampala
2	22 Jul	Mon.	Kurashina and Matsuda arrive at Kampala	Kampala	Courtesy call with EOJ, MOWHC, KCC and MOF
3	23 Jul	Tue.		"	Discussion with EOJ, MOWHC, KCC
4	24 Jul	Wed.		"	Discussion with MOWHC,
5	25 Jul	Thu.		"	Discussion with MOWHC and Field Survey
6	26 Jul	Fri.		"	Discussion with MOWHC and Field Survey
7	27 Jul	Sat.		"	Field Survey and Internal Meeting
8	28 Jul	Sun.	Team Leader Kurashina and Matsuda arrive at Nairobi	Nairobi Kampala	Trip from Kampala to Nairobi Field Survey(Inuzuka)
9	29 Jul	Mon.	Kurashina and Matsuda leave Nairobi for London Inuzuka leave Kampala for London	Airplane	Report to JICA Kenya Office
10	30 Jul	Tue.	Team Leader Kurashina, Study Team, Matsuda and Inuzuka leave London for Tokyo	Airplane	Trip from London to Tokyo
11	31 Jul	Wed.	Kurashina, Matsuda and Inuzuka arrive at Tokyo	Tokyo	
.					
1	Aug 11	Sun.	Study Team Matsuda and Seki leave Tokyo	Airplane	Trip from Tokyo to Kampala
2	Aug 12	Mon.	Matsuda and Seki arrive at Kampala	Kampala	Discussion with MOWHC
3	Aug 13	Tue.		"	Courtesy call with EOJ and Discussion with MOWHC
4	Aug 14	Wed.		"	Field Survey
5	Aug 15	Thu.		"	"
6	Aug 16	Fri.		"	"
7	Aug 17	Sat.		"	Internal Meeting
8	Aug 18	Sun.		"	Field Survey
9	Aug 19	Mon.		"	Discussion with MOWHC
10	Aug 20	Tue.		"	Field Survey
11	Aug 21	Wed.		"	"
12	Aug 22	Thu.		"	"
13	Aug 23	Fri.		"	Discussion with MOWHC
14	Aug 24	Sat.		"	Internal Meeting
15	Aug 25	Sun.	Study Team Matsuda leave Kampala for Dubai	Airplane	Field Survey
16	Aug 26	Mon.	Study Team Matsuda leave Dubai for Bangkok	Airplane	Field Survey
17	Aug 27	Tue.	Study Team Matsuda arrive at Tokyo	Kampala	Field Survey
18	Aug 28	Wed.		"	Field Survey
19	Aug 29	Thu.		"	Discussion with MOWHC
20	Aug 30	Fri.	Study Team Seki leave Kampala for Nairobi	Airplane	Report to JICA Kenya Office (Mr. Seki)
21	Aug 31	Sat.	Study Team Seki London for Tokyo	Airplane	Trip from London to Tokyo
22	Sep 1	Sun.	Study Team Seki arrive at Tokyo	Tokyo	

Appendices 3 List of Parties Concerned in the Recipient Country

Embassy of Japan

Miki, Tatsuya	:	Minister-Counsellor
Iwama, Hajime	:	Secretary

JOCV: Japan Overseas Cooperation Volunteers, Uganda Office

Tsugawa, Tomoaki	:	Coordinator
Hashiguchi, Michiyo	:	Coordinator

JICA: Japan International Cooperation Agency Kenya Office

Otsuka, Masaaki	:	Resident Representative
Matsuura, Shinichi	:	Deputy Resident Representative
Yamada Osamu	:	Technical Advisor on Grant Aid Project
Kawanobe, Hiroshi	:	Assistant Resident Representative

MOWHC: Ministry of Works, Housing and Communication

Mr. C.M. Muganzi	:	Permanent Secretary
Eng. W. Lutaaya	:	Engineer in Chief
Mr. B. Kasimbazi	:	Under Secretary
Eng. P. Ssebanakitta	:	Commissioner of Road
Eng. A.O. Mugisa	:	Assistant Commissioner
Eng. A. Onen	:	Principal Engineer of Development
Eng. Charles Sabiiti	:	AG. Principal Engineer of Engineering Department
Eng. Arne Poulsen	:	Road Sector Adviser
Mr. G. Magala	:	Civil Engineer and Coordinator
Mr. Opio Olanyae	:	Senior Engineer and Coordinator
Nelson Omagor	:	Principal Environmental Officer of Environmental Liaison Units

KCC: Kampala City Council

Mr. A. Byandala	:	City Engineer and Surveyor
Mr. R.S. Kinyera	:	Deputy Engineer and surveyor
Mr. G. Mwesigye	:	Surveyor, Town General
Mr. F. Rwego	:	Secretry for works LC-V
Mr. M. Waiswa	:	Principal Electrical Engineer
Mr. F. Lubowa	:	Charman for Works LC-V
Mr. Inaiswa Mnuvwario	:	Principal Electrical Engineer

MOFPE: Ministry of Finance, Planning and Economic Development

Mr. C. M. Kassami	:	Permanent Secretary
Mr. S. Kinyera	:	Deputy Engineer and Surveyor

Appendices 4 Minutes of Discussion

Minutes of Discussions
on the Basic Design Study
on the Project for Improvement of Trunk Roads in Kampala (phase-II)
in the Republic of Uganda
(Explanation on the Draft Final Report)

In April 2001, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Basic Design Study Team on the Project for Improvement of Trunk Roads in Kampala (hereinafter referred to as "the Project") to the Republic of Uganda and through discussions, field survey, and technical examination of the results in Japan, JICA prepared a draft final report of the study.

In order to explain and to consult with the officials concerned of the Government of the Republic of Uganda on the components of the draft final report, JICA sent to the Republic of Uganda the Basic Design Explanation Team (hereinafter referred to as "the Team"), which was headed by Mr. Yoshiro Kurashina, a Deputy Director of the Third Project Management Division, the Grant Aid Management Department, JICA, from July 22 to August 21, 2002.

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

Kampala, July 25, 2002

Yoshiro Kurashina
Leader
Study Team
Japan International Cooperation Agency

Grace James Itazi
Acting Permanent Secretary
Ministry of Works, Housing and Communications

Witness;

Patrick Ocailap
Commissioner
Ministry of Finance, Planning and Economic Development

Witness;

Stephen Kinyera
Deputy City Engineer and Surveyor
Kampala City Council

ATTACHMENT

1. Components of the Draft Final Report

The Ugandan side agreed and accepted in principle the components of the Draft Final Report explained by the Team. The main components are listed as follows and the contents of each component are shown in Annex-1.

(1) Improvement of the Natete Road (From the Bakuli Junction to the Natete Junction, approx. 3.8 km)
(2) Improvement of the Gaba Road (From the Kibuli Junction to the Munyonyo Junction, approx. 7.9 km)
(3) Improvement of the Bakuli, Kibuli and Kabalagala Junction

2. Japan's Grant Aid Scheme

The Ugandan side understands the Japan's Grant Aid scheme and the necessary measures to be taken by the Ugandan side as explained by the Team and described in Annex-3 and Annex-4 of the Minutes of Discussions signed by both sides on April 4, 2002.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed items and send it to the Ugandan side by the end of November, 2002.

4. Other Relevant Issues

4-1. The Ugandan side has already allocated the necessary budget of 3.0 billion Uganda shillings in the fiscal year 2002/2003 for land acquisition, compensation of properties and relocation of public utilities described in clause 7-2 of the Minutes of Discussions signed by both sides on April 4. The schedule and contents of the budget are shown in Annex-2.

4-2. The Ugandan side shall make necessary re-allocation of the balance of 0.9 billion Uganda shillings to secure the above mentioned land clearance within the fiscal year 2002/2003.

4-3. As a condition for the Japan's Grant Aid to be extended, the Uganda side shall complete the payments of compensation and relocation of public utilities, and secure the land clearance as per the following schedule;

- Natete Road : by the end of April in 2003
- Gaba Road: by the end of October in 2003

4-4. The Ministry of Works, Housing and Communications (hereinafter referred to as "MOWHC") completed the required procedures for Environmental Impact Assessment (EIA) and submitted to the National Environmental Management Authority (NEMA). MOWHC will obtain the official approval on the EIA by the end of August, 2002.

4-5. The Ugandan side shall undertake the work items listed in the Annex-1 in addition to those listed in the Annex-4 of the Minutes of Discussions signed by both sides on April 4, 2002.

4-6. The Ugandan side requested the Team to arrange the counterpart training in Japan on the management of the maintenance of the roads under a technical cooperation by JICA. And the Ugandan side understands that another official request for the counterpart training is necessary to be submitted by the Ugandan side to the Japanese side through the Embassy of Japan.

4-7. The Team will hand the draft detailed specifications of the Project to MOWHC in August 2002. Both sides confirmed that the specifications were confidential and should not be duplicated or handed over to any outside party in order to secure the fairness of the Tender concerning the Project.

Annex-1 Major Components of Road Development Plan in the Basic Design Study(Kampala Road Phase II)

Category	Component	Contents	Content of Works to be borne by the Ugandan Government	Remarks
Road Section Improvement	Natete Road (3.8km)	- Reconstruction of Carriageway (3.0 m x 2) - Shoulder (0.5m x 2) - DBST paved pedestrian way with 1.5m-2.25m width along either side or both sides of the road - Bus bays (40m x 3m x 10points) - Traffic signs at critical points of traffic - Roadside drainage system		- Future traffic volume justifies the 3.0m wide carriage way except for Bakuli junction
	Gaba Road (7.9km)	- Pedestrian way with 1.5m-2.25m width in the section of Kibuli jun. - Munyonyo jun. (7.9km) along either side or both sides of the road - Drainage system along the section of Kibuli jun. – 0.75km south of Munyonyo jun. (8.55km) - Bus bays (40m x 3m x 20points) - Traffic signs at critical points of traffic	- Overlay of the carriage way in the section of Kibuli jun.- Munyonyo jun. is expected to be done by the Ugandan side as per the progress of the deterioration of the existing carriage way surface in future. - Reconstruction of carriage ways between Munyonyo jun. to Gaba town (1.3km) is expected to be improved by the Ugandan side in future.	- Smaller traffic volume in the section of Munyonyo jun. - Gaba town, as compared to the rest of the road sections of Gaba road, can not suggest high urgency of improvement as far as near future is concerned. - Judging from the existing pavement condition, there is no necessity of urgent pavement works at carriage way at present. - Ugandan Government has sufficient technical background to carry out pavement works as demonstrated in the last resurfacing of the road in 2001.

Category	Component	Content	Content of Works to be borne by the Ugandan Government	Remarks
Intersection Improvement	Bakuli Junction	- Installation of traffic signals - Reconstruction of carriage ways - DBST paved pedestrian ways with 3.0m width for each access road (50m long) with brick fence - Drainage system - Provision of turning lane for each entrance to the intersection	- Installation of street lights. - Provision of emergent power supply system in the case of power failures such as exclusive lines from the nearest places.	- Regarding street lights, column bases, ducting and precast concrete protection guards shall be constructed by Japanese side. - Provision of street lights at Kibuye junction by Ugandan side in the First Phase of the Plan suggests that Ugandan side has sufficient technical background for the work. - It is estimated that there must be a critical problems in voltage fluctuation in the Ugandan electric supply with extremely high surges in voltage. The causes of the failures of the UPS at Wandegeya and Port Bell junctions have to be identified thoroughly.
	Kibuli Junction	- Installation of traffic signals - Reconstruction of carriage ways - DBST paved pedestrian ways with 3.0m width for each access road (50m long) with brick fence - Drainage system - Provision of turning lanes for each entrance to the intersection	- Installation of street lights. - Provision of emergent power supply system in the case of power failures such as exclusive lines from the nearest power station.	
	Kabalagala Junction	- DBST paved pedestrian ways with 3.0m width for each access road (50m long) with brick wall - Drainage system	- Installation of street lights. - Pavement of the carriage way is expected to be done by the Ugandan side as per the necessity in future.	- Regarding street lights, column bases, ducting and precast concrete protection guards shall be constructed by Japanese side. - One of the major problems of the junction is a mixture of traffic among pedestrians and vehicles.
Others	Plantation of Trees		- Plantation of trees is expected to be done by the Ugandan side.	- Ugandan side has enough experiences and capability for the works.

Annex-2

PROJECT FOR IMPROVEMENT OF TRUNK ROADS IN KAMPALA
IMPLEMENTATION PLAN OF PREPARATION WORKS BY UGANDA GOVERNMENT

Road Project	No.	Activity	JPFY 2002 Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	JPFY 2003 Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Estimated Costs (Million Ushs)	Total (Million Ushs)
Nateete Road																				
	1	Land Clearance																	2,300	
	(a)	Compensation		←						→									2,275	
	(b)	Demolition					←				→								25	
	2	Relocation of Services/utilities																	700	
	(a)	Electricity facilities					←				→								250	
	(b)	Telephone facilities						←		→									200	
	(c)	Water and Sewerage facilities						←		→									250	
																				3,000
Gaba Road																				
	1	Land Clearance																	1,830	
	(a)	Compensation								←						→			1,800	
	(b)	Demolition											←				→		30	
	2	Relocation of Services/utilities																	800	
	(a)	Electricity facilities											←				→		300	
	(b)	Telephone facilities											←			→			200	
	(c)	Water and Sewerage facilities													←	→			300	
																				2,630
																				5,630

Description	UGFY2002/03	UGFY2003/04
Road Project	Nateete and Gaba Roads	Gaba Road
Estimated Cost(million Ushs)	3,000+900=3,900	2,630-900=1,730

JPFY=Japan Financial Year (April-March)
UGFY=Uganda Financial Year (July-June)

Minutes of Discussions

On the Basic Design Study
On the Project for Improvement of Trunk Roads in Kampala
In the Republic of Uganda

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

JICA sent the Basic Design Study Team to the Republic of Uganda from January 17th to February 27th, 2000. Based on the data and information obtained through the above Basic Design Study Team, JICA has prepared the Draft Basic Design Report on the Project.

In order to explain and consult with the officials concerned of the Government of Uganda on the components of the Draft Basic Design Study Report, JICA sent to the Republic of Uganda a study team (hereinafter referred to as "the Team"), which was headed by Mr. Shigeru Sugiyama, Staff of the Third Project Management Division, the Grant Aid Management Department, JICA, and is scheduled to stay in the country from March 31st to May 11th, 2002.

The Team held discussions with the officials of the Government of Uganda directly concerned with the Project and conducted a field survey in the study area.

In the course of discussions and field survey, both sides confirmed the main items described on the attached sheets. The Team will proceed to carry out further work and prepare the Basic Design Study Report.

Kampala, April 4th, 2002

Shigeru Sugiyama
Leader
Study Team
Japan International Cooperation Agency

Charles Muganzi
Permanent Secretary
Ministry of Works , Housing and Communications
Republic of Uganda

Witness;

Emanuel Katwe
Grant Aid Coordinator
Ministry of Finance, Planning & Economic Development
Republic of Uganda

Witness;

Abraham James Byandala
City Engineer and Surveyor
Kampala City Council
Republic of Uganda

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the existing roads in Kampala City to cope with socio-economic development.

2. Project sites

The Project sites are shown in ANNEX -2.

3. Responsible and Implementing Organization

The responsible and Implementing Organization is the Ministry of Works, Housing and Communications (MOWHC) of the Republic of Uganda. The organization chart of MOWHC is shown in ANNEX-1.

4. Draft Basic Design

The Government of the Republic of Uganda has, in principle, agreed to consider components of the Basic Design, based on the Draft Basic Design Study Report explained by the Team, and to revise the components through this survey.

5. Japan's Grant Aid Scheme

5-1. The Ugandan side understands the Japan's Grant Aid scheme explained by the Team, as described in ANNEX-3.

5-2. The Ugandan side will take the 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

6-1. The consultant will proceed to carry out further studies in the Republic of Uganda until May 11th, 2002.

6-2. JICA will prepare the Draft Final Report and dispatch a mission to the Republic of Uganda in order to explain its contents around July, 2002.

6-3. In case the contents of the Report are accepted in principle by the Government of the Republic of Uganda, JICA will complete the Basic Design Study Report and send it to the Government of the Republic of Uganda by the end of November 2002.

7. Other Relevant Issues

7-1. The Team explained that this Study consists of two parts; Part 1 and Part 2. In Part 1, JICA prepared the Draft Basic Design Report, which included a basic concept of the Project and its basic design. In part 2, JICA will prepare the Draft Final Report, which will include the engineering design on the basis of the results of Part 1 of the Study.

7-2. The Government of the Republic of Uganda shall have the budget necessary for land acquisition, compensation of properties, relocation of public utilities and so forth in FY 2002/2003.

7-3. JICA will submit the proposed Draft Road Information Map needed for the preparation

of the Project by May 11th, 2002. In accordance with the Map, MOWHC will make necessary arrangements to secure the cost of the compensation and relocation of public utilities such as electric street lighting facilities, electric power cables, telephone lines and water pipes.

7-4. MOWHC shall confirm the required procedures, with National Environmental Management Authority (NEMA), and further confirm that it will obtain the approval on the environmental laws/regulations to be imposed in implementing the Project. MOWHC shall make necessary to secure the funding for the environmental impact assessment study as required.

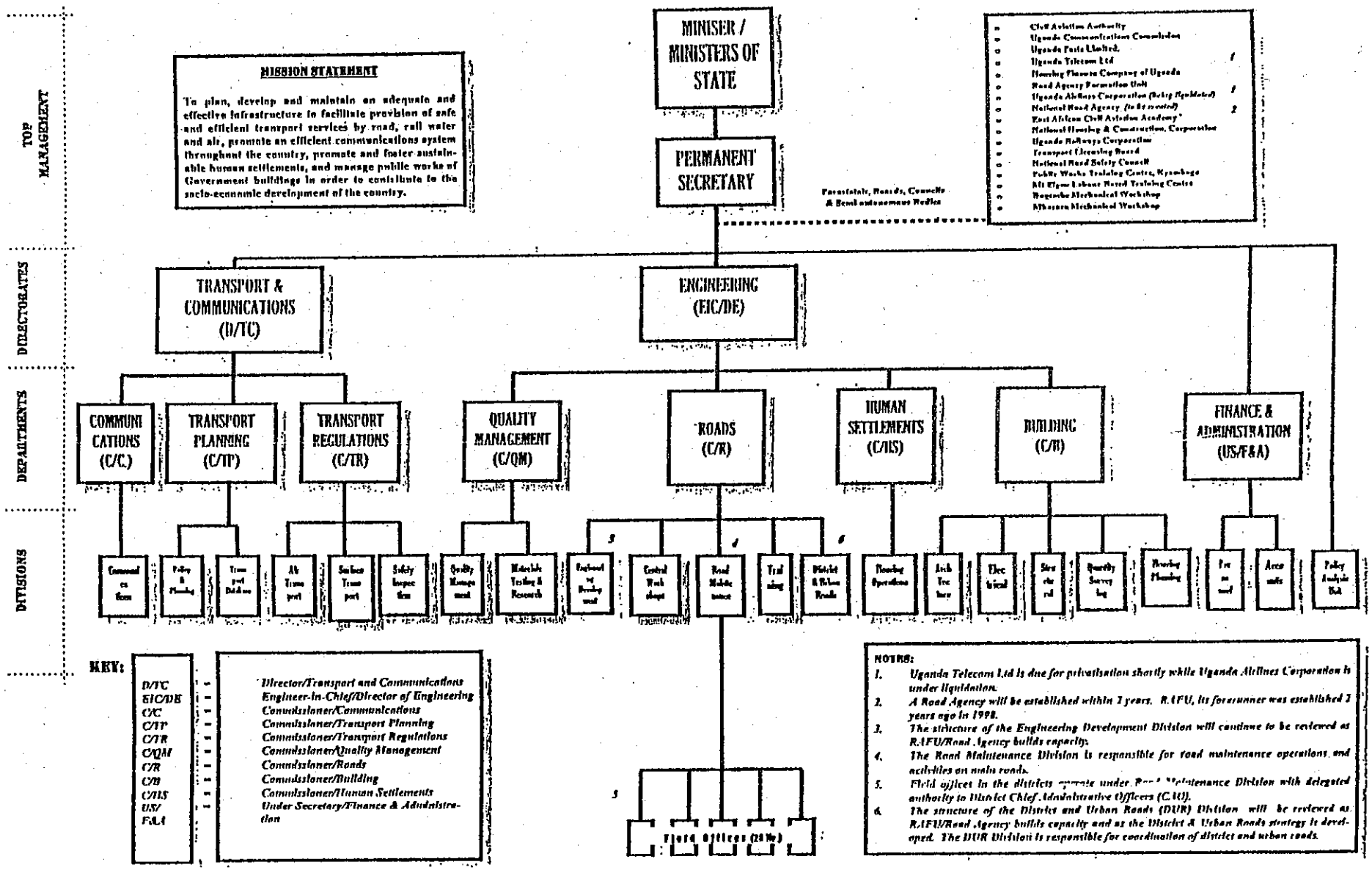
7-5. As a condition for the Japan's Grant Aid to be extended, the Government of the Republic of Uganda shall complete the payment of compensation and relocation of public utilities, and secure the land clearance, and obtain the official approval on the environmental laws/regulations as per the following schedule;

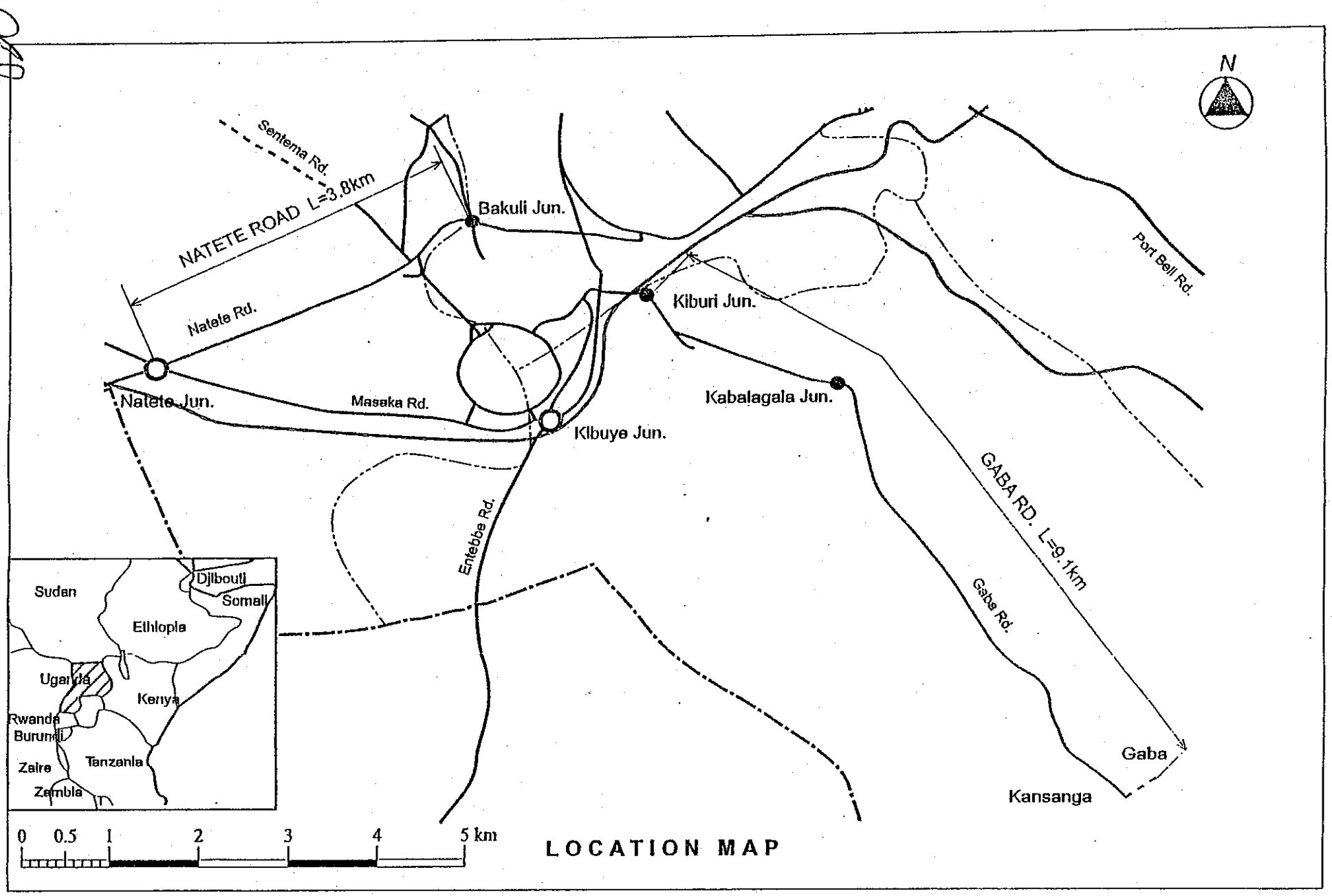
- Natete Road : by the end of May in 2003
- Gaba Road: by the end of November in 2003

MOWHC shall submit the detailed schedule of land preparation upon approval of its budget for 2002/2003.

7-6. MOWHC will closely collaborate with the Kampala City Council (KCC) for smooth implementation of the Project and subsequent proper utilization and upkeep of the facilities constructed under the Project.

STRUCTURE OF MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS




N
Sentema Rd.
NATETE ROAD L=3.8km
Bakuli Jun.
Natete Rd.
Kiburi Jun.
Port Bell Rd.
Natete Jun.
Masaka Rd.
Kabalagala Jun.
Kibuye Jun.
Entebbe Rd.
GABA RD. L=9.1km
Gaba Rd.
Gaba
Kansanga
Sudan
Djibouti
Somali
Ethiopia
Uganda
Kenya
Rwanda
Burundi
Zaire
Tanzania
Zambia
0 0.5 1 2 3 4 5 km
LOCATION MAP

Japan's Grant Aid Scheme

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 a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the 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 smooth 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 (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter 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 requested 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 upon 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 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 consultant 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 consulting 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) consulting 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 natural 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, contracting 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 execution 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 operate and maintain the facilities constructed and 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.

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 in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the building	●	
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		●
	b.The supply system within the site (receiving and/or elevated tanks)	●	
	3) Drainage		
	a.The city drainage main (for storm, sewer and others) to the site		●
	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		●
	b.The gas supply system within the site	●	
	5)Telephone System		
	a.The telephone trunk line to the main distribution frame / panel (MDF) of the building		●
	b.The MDF and the extension after the frame / panel	●	
	6) Furniture and Equipment		
	a.General furniture		●
	b.Project equipment	●	
8	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●

9	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the	●	
	2) Tax exemption and customs 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 services may be required in connection with the supply of the products and the services under the verified contract 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 contract		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided 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)

Appendices 5 Cost Estimation Borne by the Recipient Country

Unit: Million Ushs.

No.	Item	Term I (Natete Road)	Term II (Gaba Road)	Total
1	**Land Clearance Cost**			
	(a) Compensation	2,275	1,800	4,075
	(b) Demolition	25	30	55
	Relocation f Services/utilities			
	(c) Electric facilities	250	300	550
	(d) Telephone facility	200	200	400
	(e) Water and Sewerage facilities	250	300	550
	Sub total	**3,000**	**2,630**	**5,630**
2	**Taxes and custom duties**			
	(a) Fuel	82	62	144
	(b) Others	743	557	1,300
	Sub total	**825**	**619**	**1,444**
3	**Facility**			
	(a) Building	12	9	21
	(b) Street Light, etc.	116	119	235
	(c) Others	12	9	21
	Sub total	**140**	**137**	**277**
4	**Banking fees**	**25**	**19**	**44**
5	**Management fees**	**121**	**91**	**212**
	Grand Total	**4,111**	**3,496**	**7,607**

Appendices 6 Other Relevant Data

(1) Traffic Characteristics of Project Roads

Natete Road

Survey Point	Survey Period	Direction	Motor Cycle 1	Passenger Car 2	Mini Bus 3	Bus 4	Pick Up 5	Truck 2axle 6	Truck 3axle ～Single 7	Truck 3axle ～Artic. 8	Total	Truck 3axle ～9=7+8
N 1	12 hours (daytime)	From Kampala	602	1384	1198	106	285	85	4	3	3667	7
		To Kampala	772	1737	1717	77	382	70	9	2	4766	11
		Both Direction	1374	3121	2915	183	667	155	13	5	8433	18
	12 hours (night time)	From Kampala	255	751	469	27	95	16	8	5	1626	13
		To Kampala	232	501	629	10	88	11	2	3	1476	5
		Both Direction	487	1252	1098	37	183	27	10	8	3102	18
	24 hours	From Kampala	857	2135	1667	133	380	101	12	8	5293	20
		To Kampala	1004	2238	2346	87	470	81	11	5	6242	16
		Both Direction	**1861**	**4373**	**4013**	**220**	**850**	**182**	**23**	**13**	**11535**	**36**
N 2	12 hours (daytime)	From Kampala	316	371	1145	36	125	72	8	4	2077	12
		To Kampala	354	451	829	30	127	93	4	3	1891	7
		Both Direction	670	822	1974	66	252	165	12	7	3968	19
	12 hours (night time)	From Kampala										
		To Kampala										
		Both Direction										
	Estimated 24 hours* (Estimated)	From Kampala	433	508	1569	49	171	99	11	5	2845	16
		To Kampala	485	618	1136	41	174	127	5	4	2591	10
		Both Direction	**970**	**1236**	**2271**	**82**	**348**	**255**	**11**	**8**	**5181**	**19**

Gaba Road

Survey Point	Survey Period	Direction	Motor Cycle 1	Passenger Car 2	Mini Bus 3	Bus 4	Pick Up 5	Truck 2axle 6	Truck 3axle ～Single 7	Truck 3axle ～Artic. 8	Total	Truck 3axle ～9=7+8
G 1	12 hours (daytime)	From Kampala	648	2736	1596	5	594	164	24	0	5767	24
		To Kampala	687	2784	1722	0	682	176	25	2	6078	27
		Both Direction	1335	5520	3318	5	1276	340	49	2	11845	51
	12 hours (night time)	From Kampala	337	1493	686	0	204	68	14	1	2803	15
		To Kampala	294	1070	643	0	141	39	10	2	2199	12
		Both Direction	631	2563	1329	0	345	107	24	3	5002	27
	24 hours	From Kampala	985	4229	2282	5	798	232	38	1	8570	39
		To Kampala	981	3854	2365	0	823	215	35	4	8277	39
		Both Direction	**1966**	**8083**	**4647**	**5**	**1621**	**447**	**73**	**5**	**16847**	**78**
G 2	12 hours (daytime)	From Kampala	578	2629	1398	0	673	205	17	0	5500	17
		To Kampala	549	2797	1776	2	626	152	14	2	5918	16
		Both Direction	1127	5426	3174	2	1299	357	31	2	11418	33
	Estimated 24 hours* (Estimated)	From Kampala	821	3733	1985	0	956	291	24	0	7810	24
		To Kampala	780	3972	2522	3	889	216	20	3	8404	23
		Both Direction	**1600**	**7705**	**4507**	**3**	**1845**	**507**	**44**	**3**	**16214**	**47**
G 3	12 hours (daytime)	From Kampala	242	1314	909	4	345	110	26	4	2954	30
		To Kampala	227	1525	944	6	364	100	42	5	3213	47
		Both Direction	469	2839	1853	10	709	210	68	9	6167	77
	Estimated 24 hours* (Estimated)	From Kampala	344	1866	1291	6	490	156	37	6	4195	43
		To Kampala	322	2166	1340	9	517	142	60	7	4562	67
		Both Direction	**666**	**4031**	**2631**	**14**	**1007**	**298**	**97**	**13**	**8757**	**109**
G 4	12 hours (daytime)	From Kampala	174	232	617	3	107	57	0	0	1190	0
		To Kampala	198	258	645	8	103	60	1	0	1273	1
		Both Direction	372	490	1262	11	210	117	1	0	2463	1
	Estimated 24 hours* (Estimated)	From Kampala	247	329	876	4	152	81	0	0	1690	0
		To Kampala	281	366	916	11	146	85	1	0	1808	1
		Both Direction	**528**	**696**	**1792**	**16**	**298**	**166**	**1**	**0**	**3497**	**1**

(2) Results of Drainage Design

Natete Road

Outlet No.	Location	Check point	Catchment area no	Drainage type		Area A(㎡)	Hydraulic mean depth R(m)	Coefficient of roughness n	Slope i(%)	Velocity V(m/s)	Outflow Q(m³/s)	Peak runoff [Q(m3/s)] 3year	10year	Adoption	Design Q(m³/s)	Safety factor	Remarks
A	no.0+435 ～no.0+456	no.0+435	3-2	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	2.80	2.1	0.1334	0.0036	0.0048	0.0036	0.0047	28.14	
A	Cross2	no.0+435	b-2	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.1168	0.1526	0.1526	0.1983	4.38	
A	no.0+200 ～no.0+435	no.0+120	b-2,1～3,7	B0.40 ×H0.30	0.5	0.165	0.154	0.030	4.00	1.916	0.3162	0.1816	0.2385	0.1816	0.2361	1.34	
A	no.0+120 ～no.0+200	no.0+120	b-2,1～3,7	B0.30 ×H0.40	U Type	0.120000	0.1090909	0.015	2.10	2.2	0.2647	0.1816	0.2385	0.1816	0.2361	1.12	
A	no.0+0 ～no.0+120	no.0+0	b-2,1～3,7	B0.40 ×H0.30	LU Type	0.120000	0.1200000	0.015	6.45	4.1	0.4943	0.1816	0.2385	0.1816	0.2361	2.09	
B	no.0+120 ～no.0+390	no.1+120	a2,b1,5,6	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	6.50	3.2	0.2032	0.1039	0.1362	0.1039	0.1351	1.50	
B	no.0+0 ～no.0+120	no.0+20	a1,a2,b1,4～6	B0.40 ×H0.30	LU Type	0.120000	0.1200000	0.015	6.50	4.1	0.4962	0.1478	0.1902	0.1478	0.1922	2.58	
B	～no.0	no.0-	a1,a2,b1,4～6,x1,x2,x3	B0.40 ×H0.40	LU Type	0.160000	0.1333333	0.015	6.50	4.4	0.7098	0.4678	0.6087	0.4678	0.6082	1.17	
B	Cross1	no.0-	a1,a2,b1,4～6,x1,x2,x3	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.4678	0.6087	0.6087	0.7913	1.10	
D(L)	no.0+470 ～no.0+764	no.0+764	11-1,11-2,12	B0.40 ×H0.30	0.5	0.165	0.154	0.030	2.60	1.5	0.2549	0.0387	0.0512	0.0387	0.0503	5.07	
D(R)	no.0+456 ～no.0+700	no.0+700	C1,9,10-1	B0.30 ×H0.40	U Type	0.120000	0.1090909	0.015	2.10	2.2	0.2647	0.1423	0.1867	0.1423	0.1849	1.43	
D(R)	no.0+700 ～no.0+764	no.0+764	c1,c2,9,10-1,10-2	B0.30 ×H0.40	U Type	0.120000	0.1090909	0.015	2.60	2.5	0.2945	0.2007	0.2633	0.2007	0.2610	1.13	
D	Cross3 (Existing)	no.0+764	c1,c2,9,10-1,10-2	φ0.45 H0.45	Pipe culvert (Corugate)	0.159043	0.1125000	0.024	2.00	1.4	0.2184	0.2007	0.2633	0.2633	0.3423	0.64	Existing Out-let
D	Cross3	no.0+764	a1,a2,b1,4～6,x1,x2,x3	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.2007	0.2633	0.2633	0.3423	2.54	
E	no.0+764 ～no.1+120	no.1+160 (imax)	d,e,13～15	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	7.50	3.4	0.2183	0.1030	0.1357	0.1030	0.1339	1.63	
E	no.1+120 ～no.1+300	no.1+300	d,e,13～16	B0.40 ×H0.30	0.5	0.165	0.154	0.030	6.00	2.3	0.3872	0.1239	0.1634	0.1239	0.1611	2.40	

Natete Road

Outlet No.	Location	Check point	Catchment area no	Drainage type		Area A(㎡)	Hydraulic mean depth R(m)	Coefficient of roughness n	Slope i(%)	Velocity V(m/s)	Outflow Q(m³/s)	Peak runoff [Q(m3/s)] 3year	10year	Adoption	Design Q(m³/s)	Sefety factor	Remarks
E	no.1+300 ～no.1+380	no.1+380	d,e,13～16	B0.40 ×H0.30	U Type	0.120000	0.1200000	0.015	2.40	2.5	0.3015	0.1239	0.1634	0.1239	0.1611	1.87	
F(L1)	no.0+764 ～no.1+20	no.1+215	17,18	B1.00 ×H0.04	L Type	0.027500	0.0275000	0.013	7.50	1.9	0.0528	0.0293	0.1349	0.0293	0.0293	1.80	
F(L1)	no.1+20 ～no.1+420	no.1+420	f1,f2,17～20	B0.40 ×H0.40	U Type	0.160000	0.1333333	0.015	2.50	2.8	0.4402	0.3174	0.4159	0.3174	0.4126	1.07	
F(L2)	no.1+550 ～no.1+880	no.1+550	i2,22	B0.40 ×H0.30	0.5	0.165	0.154	0.030	5.30	2.2	0.3639	0.0482	0.0637	0.0482	0.0626	5.81	
F(L2)	no.1+420 ～no.1+550	no.1+420	g,i2,21,22	B0.40 ×H0.30	U Type	0.120000	0.1200000	0.015	1.50	2.0	0.2384	0.1504	0.1978	0.1504	0.1955	1.22	
F	Cross4 (Existing)	no.0+764	f1,f2,g,i2, 17～22	φ0.60 H0.60	Pipe culvert (Corugate)	0.282743	0.1500000	0.024	2.00	1.7	0.4704	0.4176	0.5480	0.5480	0.7125	0.66	Existing Out-let
F	Cross4	no.0+764	f1,f2,g,i2, 17～22	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.4176	0.5480	0.5480	0.7125	1.22	
F(R1)	no.1+380 ～no.1+420	no.1+420	23	B0.40 ×H0.30	0.5	0.165	0.154	0.030	1.50	1.173	0.194	0.0036	0.0048	0.0036	0.0047	40.95	
F(R2)	no.1+420 ～no.1+540	no.1+420	24	B0.40 ×H0.30	0.5	0.165	0.154	0.030	1.50	1.2	0.1936	0.0118	0.0157	0.0118	0.0154	12.60	
G1	no.1+720 ～no.1+880	no.1+720	h,27	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	7.50	3.4	0.2183	0.0740	0.0980	0.0740	0.0962	2.27	
G1	no.1+640 ～no.1+720	no.1+640	h,27	B0.30 ×H0.40	0.5	0.200	0.167	0.030	7.50	2.773	0.555	0.0433	0.0569	0.0433	0.0563	9.86	
G1	Cross6	no.1+680	h,26,27	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.0519	0.0683	0.0683	0.0888	9.78	
G2	Cross5	no.1+580	i1	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.2193	0.2874	0.2874	0.3736	2.32	
H(L)	no.1+880 ～no.2+630	no.2+630	j-1,j-2,k, 28-1,28-2,29			0.300000	0.1875000	0.015	4.00	4.4	1.3104	0.7433	0.9559	0.7433	0.9662		
H(L)	no.2+630 ～no.2+760	no.2+760	j-1,j-2,k,l, 28-1,28-2,29,30			0.490000	0.2333333	0.015	1.64	3.2	1.5855	0.9465	1.2218	0.9465	1.2304		
H	Cross7	no.2+760	j-1,j-2,k,l, 28-1,28-2,29,30	φ0.80 H0.80	Pipe culvert (Concrete)	0.502655	0.2000000	0.013	2.00	3.7	1.8701	0.9465	1.2218	1.2218	1.5884	1.18	

Natete Road

Outlet No.	Location	Check point	Catchment area no	Drainage type		Area A(㎡)	Hydraulic mean depth R(m)	Coefficient of roughness n	Slope i(%)	Velocity V(m/s)	Outflow Q(m³/s)	Peak runoff [Q(m3/s)] 3year	10year	Adoption	Design Q(m³/s)	Safety factor	Remarks
H(R)	no.1+880 ~no.2+640	no.2+640	31,32	B0.40 ×H0.30	0.5	0.165	0.154	0.030	2.00	1.4	0.2236	0.0682	0.0804	0.0682	0.0887	2.52	
H(R)	no.2+640 ~no.2+760	no.2+760	31,32,33	B0.40 ×H0.30	0.5	0.165	0.154	0.030	1.64	1.2	0.2024	0.0800	0.1060	0.0800	0.1040	1.95	
I(L1)	no.2+760 ~no.3+60	no.3+60	m,34	B0.30 ×H0.40	U Type	0.120000	0.1090909	0.015	1.50	1.9	0.2237	0.1145	0.1504	0.1145	0.1488	1.50	
I(L2)	no.3+60 ~no.3+552	no.3+60	35,36	B0.40 ×H0.30	0.5	0.165	0.154	0.030	1.50	1.2	0.1936	0.0569	0.0755	0.0569	0.0740	2.62	
I(R1)	no.2+760 ~no.3+60	no.3+60	37	B0.40 ×H0.30	0.5	0.165	0.154	0.030	1.50	1.2	0.194	0.0273	0.0362	0.0273	0.0355	5.46	
I(R2)	no.3+160 ~no.3+552	no.3+160	n1,n2,39,40	[illegible]	[illegible]	0.420	0.210	0.015	0.33	1.4	0.5683	0.3555	0.4658	0.3555	0.4621		
I(R2)	no.3+60 ~no.3+160	no.3+60	n1,n2,38,39,40	B0.60 ×H0.50	0.5	0.425	0.247	0.030	4.00	2.6	1.117	0.3646	0.4779	0.3646	0.4739	2.36	
I	Cross8 (Existing)	no.3+60		ϕ0.80 H0.80	Pipe culvert (Corugate)	Swamp area											
J	no.3+552 ~no.3+792	no.3+792	41-1,41-2	B0.40 ×H0.30	0.5	0.165	0.154	0.030	4.35	2.0	0.3297	0.0278	0.0368	0.0278	0.0361	9.13	
K	no.3+552 ~no.3+792	no.3+792	o,42	B0.30 ×H0.30	U Type	0.090000	0.1000000	0.015	4.35	3.0	0.2696	0.1322	0.1730	0.1322	0.1719	1.57	

(3) Results of Drainage Design

Gaba Road

Outlet No.	Location	Check point	Catchment area no	Drainage type		Area A(m²)	Hydraulic mean depth R(m)	Coefficient of roughness n	Slope i(%)	Velocity V(m/s)	Outflow Q(m³/s)	Peak runoff [Q(m3/s)] 3year	10year	Adoption	Design Q(m³/s)	Safety factor	Remarks
A6	no.0+640 ～no.0+980	no.1+640	a/2,7	B0.50 ×H0.35	0.5	0.236	0.184	0.030	3.60	2.0	0.484	0.1735	0.2273	0.1735	0.2256	2.14	
A5	no.0+320 ～no.0+640	no.1+320	a,6-1,6-2,7	B0.40 ×H0.40	U Type	0.160000	0.1333333	0.015	4.00	3.5	0.5568	0.3287	0.4303	0.3287	0.4273	1.30	
A4	no.0+510 ～no.0+550	no.1+510	a,6-1,6-2,7	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	4.50	4.6	1.3025	0.3287	0.4303	0.3287	0.4273	3.05	
A3	no.0+95 ～no.0+450	no.0+200	a,4-1,4-2,5, 6-1,6-2,7	B0.40 ×H0.50	U Type	0.200000	0.1428571	0.015	3.00	3.2	0.6311	0.3702	0.4853	0.3702	0.4812	1.31	
A2	no.0+95 ～no.0+450	no.0+95	a,4-1,4-2,5, 6-1,6-2,7	B0.40 ×H0.50	U Type	0.200000	0.1428571	0.015	4.00	3.6	0.7287	0.3702	0.4853	0.3702	0.4812	1.51	
A1	no.0-140 ～no.0+95	no.0-140	a,3,4-1,4-2,5, 6-1,6-2,7	B0.40 ×H0.60	LU Type	0.240000	0.1500000	0.015	5.00	4.2	1.0100	0.3921	0.5144	0.3921	0.5098	1.98	
B4	no.0+260 ～no.0+980	no.0+260	9-2,10, 11-1,11-2,12	B0.80 ×H0.15	Shallw	0.064236	0.0803137	0.015	3.50	2.3	0.1491	0.0979	0.1297	0.0979	0.1272	1.17	
B3	no.0+200 ～no.0+260	no.0+200	9-1,9-2,10, 11-1,11-2,12	B0.40 ×H0.30	U Type	0.120000	0.1200000	0.015	3.70	3.1	0.3744	0.1442	0.1911	0.1442	0.1875	2.00	
B2	no.0+95 ～no.0+200	no.0+95	9-1,9-2,10, 11-1,11-2,12	B0.40 ×H0.30	U Type	0.120000	0.1200000	0.015	4.00	3.2	0.3893	0.1442	0.1911	0.1442	0.1875	2.08	
B1	no.0-100 ～no.0+95	no.0-100	8,9-1,9-2,10, 11-1,11-2,12	B0.40 ×H0.30	LU Type	0.120000	0.1200000	0.015	1.50	2.0	0.2384	0.1624	0.2152	0.1624	0.2111	1.13	
C(L3)	no.0+980 ～no.1+350	no.1+350	15,16	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	4.00	2.5	0.1594	0.0527	0.0698	0.0527	0.0685	2.33	
C(L2)	no.1+350 ～no.1+400	no.1+400	15,16	B1.00 ×H0.50	0.5	0.625	0.295	0.025	4.00	3.5	2.216	0.0527	0.0698	0.0527	0.0685	32.37	Existing
C(L1)	no.1+400 ～no.1+440	no.1+440	15,16	B0.50 ×H0.50	U Type (Existing)	0.250000	0.1666667	0.015	4.00	4.0	1.0095	0.0527	0.0698	0.0527	0.0685	14.75	Existing
C(R3)	no.0+980 ～no.1+110	no.1+110	13	B0.50 ×H0.35	0.5	0.236	0.184	0.030	7.50	3.0	0.698	0.0109	0.0145	0.0109	0.0142	49.22	
C(R2)	no.1+195 ～no.1+330	no.1+205	b,13	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.50	3.4	0.9708	0.3304	0.4320	0.3304	0.4295	2.26	
C(R1)	no.1+110 ～no.1+435	no.1+435	b,13,14	B0.40 ×H0.40	U Type	0.160000	0.1333333	0.015	4.00	3.5	0.5568	0.3609	0.4723	0.3609	0.4691	1.19	
C	Cross1 (Existing)	no.1+435	b,13,14,15,16	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.4135	0.5421	0.5421	0.7047	1.23	Existing

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Outlet No.	Location	Check point	Catchment area no	Drainage type		Area A(㎡)	Hydraulic mean depth R(m)	Coefficient of roughness n	Slope i(%)	Velocity V(m/s)	Outflow Q(m³/s)	Peak runoff [Q(m3/s)] 3year	10year	Adoption	Design Q(m³/s)	Sefety factor	Remarks
D(L1)	no.1+435 ~no.1+835	no.1+835	19-1,19-2	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	1.36	1.4	0.0930	0.0399	0.0529	0.0399	0.0519	1.79	
D(L2)	no.1+835 ~no.1+990	no.1+835	19-1,19-2	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	1.36	1.4	0.0930	0.0260	0.0345	0.0260	0.0339	2.75	
D(R1)	no.1+435 ~no.1+510	no.1+510	c,17	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	5.20	5.0	1.4002	0.3564	0.4811	0.4811	0.6255	2.24	
D(R1)	no.1+435 ~no.1+835	no.1+835	c,17	B0.40 ×H0.60	U Type	0.240000	0.1500000	0.015	1.36	2.2	0.5268	0.3564	0.4673	0.3564	0.4634	1.14	
D(R2)	no.1+835 ~no.1+980	no.1+835	d,18	B0.40 ×H0.50	U Type	0.200000	0.1428571	0.015	1.36	2.1	0.4249	0.2786	0.3646	0.2786	0.3622	1.17	
D	Cross2 (Existing)	no.1+835	c,d,17,18	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.6351	0.8319	0.8319	1.0815	0.80	
D	Cross2	no.1+835	c,d,17,18	φ0.80 H0.80	Pipe culvert (Concrete)	0.502655	0.2000000	0.013	2.00	3.7	1.8701	0.6351	0.8319	0.8319	1.0815	1.73	
E(L1)	no.2+210 ~no.2+280	no.2+210	26	B1.00 ×H0.04	L Type	0.015000	0.0144231	0.015	2.00	0.6	0.0084	0.0081	0.0107	0.0081	0.0081	1.03	
E(L2)	no.1+990 ~no.2+210	no.1+990	24,25,26	B0.40 ×H0.30	LU Type	0.120000	0.1200000	0.015	2.00	2.3	0.2752	0.0347	0.0460	0.0347	0.0451	6.10	
E(R)	no.1+980 ~no.2+280	no.1+980	e,21,22,23	B0.40 ×H0.50	LU Type	0.200000	0.1428571	0.015	2.00	2.6	0.5153	0.1955	0.2564	0.1955	0.2542	2.03	
E	Cross3 (Existing)		e,21,22,23	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.1955	0.2564	0.2564	0.3334	2.60	Existing
F(L)	no.2+280 ~no.2+440	no.2+440	f,29,30	B0.30 ×H0.30	U Type	0.090000	0.1000000	0.015	1.11	1.5	0.1362	0.0819	0.1073	0.0819	0.1065	1.28	
F	Cross4 (Existing)	no.2+440	f,29,30	φ0.50 H0.50	Pipe culvert (Concrete)	0.196350	0.1250000	0.013	2.00	2.7	0.5340	0.0819	0.1073	0.1073	0.1395	3.83	Existing
F(R)	no.2+280 ~no.2+360	no.2+360	27	B1.00 ×H0.04	L Type	0.015000	0.0144231	0.015	1.82	0.5	0.0080	0.0079	0.0105	0.0079	0.0079	1.01	
F(R)	no.2+360 ~no.2+390	no.2+390	28-1	B1.00 ×H0.04	L Type	0.015000	0.0144231	0.015	1.77	0.5	0.0079	0.0060	0.0079	0.0060	0.0060	1.32	
G(L1)	no.2+440 ~no.2+500	no.2+500	g,33	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	1.50	1.5	0.0976	0.0519	0.0680	0.0519	0.0675	1.45	
G(L2)	no.2+500 ~no.2+740	no.2+500	h,34	B0.50 ×H0.70	U Type	0.350000	0.1842105	0.015	1.50	2.6	0.9252	0.5551	0.7276	0.5551	0.7217	1.28	

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Outlet No.	Location	Check point	Catchment area no	Drainage type		Area A(㎡)	Hydraulic mean depth R(m)	Coefficient of roughness n	Slope i(%)	Velocity V(m/s)	Outflow Q(m³/s)	Peak runoff [Q(m3/s)] 3year	10year	Adoption	Design Q(m³/s)	Safety factor	Remarks
G	Cross5 (Existing)	no.2+500	g,h,33,34	φ0.60 H0.60	Pipe culvert (Corugate)	0.282743	0.1500000	0.024	2.00	1.7	0.4704	0.6071	0.7956	0.7956	1.0343	0.45	Existing Out-Let
G	Cross5	no.2+500	g,h,33,34	φ0.80 H0.80	Pipe culvert (Concrete)	0.502655	0.2000000	0.013	2.00	3.7	1.8701	0.6071	0.7956	0.7956	1.0343	1.81	New Const
G(R2)	no.2+500 ～no.2+640	no.2+500	32-1,32-2	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	1.50	1.5	0.0976	0.0139	0.0184	0.0139	0.0181	5.41	
I(L)	no.2+740 ～no.3+170	no.2+740	i,j,39,40	B0.50 ×H0.60	U Type	0.300000	0.1764706	0.015	3.02	3.6	1.0935	0.6521	0.8531	0.6521	0.8477	1.29	
I	Cross6 (Existing)	no.2+740	i,j,39,40	φ0.70 H0.70	Pipe culvert (Corugate)	0.384845	0.1750000	0.024	2.00	1.8	0.7095	0.6521	0.8531	0.8531	1.1090	0.64	Existing Out-Let
I	Cross6	no.2+740	i,j,39,40	φ0.80 H0.80	Pipe culvert (Concrete)	0.502655	0.2000000	0.013	2.00	3.7	1.8701	0.6521	0.8531	0.8531	1.1090	1.69	New Const
I(R)	no.2+740 ～no.3+170	no.2+740	36,37,38	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	3.02	2.2	0.1385	0.0472	0.0626	0.0472	0.0614	2.26	
J(L)	no.3+170 ～no.3+435	no.3+435	k,43,44	B0.40 ×H0.50	U Type	0.200000	0.1428571	0.015	1.60	2.3	0.4609	0.3009	0.3942	0.3009	0.3912	1.18	
J	Cross7 (Existing)	no.3+435	k,43,44	φ0.70 H0.70	Pipe culvert (Corugate)	0.384845	0.1750000	0.024	2.00	1.8	0.7095	0.3009	0.3942	0.3942	0.5124	1.38	Existing Out-Let
J	Cross7	no.3+435	k,43,44	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.3009	0.3942	0.3942	0.5124	1.69	New Const
J(R)	no.3+170 ～no.3+435	no.3+435	41,42	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	1.60	1.6	0.1008	0.0263	0.0348	0.0263	0.0342	2.95	
K(L1)	no.3+435 ～no.3+600	no.3+600	1,47	B0.40 ×H0.50	LU Type (Existing)	0.200000	0.1428571	0.015	1.67	2.4	0.4709	0.1887	0.2466	0.1887	0.2453	1.92	Existing
K(L)	Cross8	no.3+600	1,47	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.1887	0.2466	0.2466	0.3206	2.71	New Const
K(L2)	no.3+600 ～no.3+720	no.3+720	m,48	B0.40 ×H0.50	LU Type (Existing)	0.200000	0.1428571	0.015	2.10	2.6	0.5280	0.1232	0.1613	0.1232	0.1602	3.30	Existing
K	Cross9 (Existing)	no.3+720	m,48	φ0.60 H0.60	Pipe culvert (Corugate)	0.282743	0.1500000	0.024	2.00	1.7	0.4704	0.1232	0.1613	0.1613	0.2096	2.24	Existing
K(R1)	no.3+435 ～no.3+600	no.3+600	45-1,45-2	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	1.60	1.6	0.1008	0.0164	0.0217	0.0164	0.0213	4.74	
K(R2)	no.3+600 ～no.3+720	no.3+720	1,45-1,45-2,46,47	B0.40 ×H0.40	U Type	0.160000	0.1333333	0.015	2.10	2.5	0.4034	0.2190	0.2867	0.2190	0.2847	1.42	

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Outlet No.	Location	Check point	Catchment area no	Drainage type		Area A(㎡)	Hydraulic mean depth R(m)	coefficient of roughne n	Slope i(%)	Velocity V(m/s)	Outflow Q(m³/s)	Peak runoff [Q(m3/s)] 3year	10year	Adoption	Design Q(m³/s)	Sefety factor	Remarks
L(L)	no.3+740 ～no.4+410	no.4+410	n,o,52,53,54	B0.40 ×H0.50	U Type	0.200000	0.1428571	0.015	4.00	3.6	0.7287	0.4132	0.5417	0.4132	0.5371	1.36	
L(R1)	no.3+720 ～no.4+50	no.4+50	49,50	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	4.40	2.6	0.1672	0.0357	0.0473	0.0357	0.0464	3.60	
L(R2)	no.4+50 ～no.4+400	no.4+400	p,49,50,51	B0.30 ×H0.30	U Type	0.090000	0.1000000	0.015	4.00	2.9	0.2585	0.1219	0.1606	0.1219	0.1585	1.63	
L	Cross10 (Existing)	no.4+400	p,49,50,51	φ0.50 H0.50	Pipe culvert (Concrete)	0.196350	0.1250000	0.013	2.00	2.7	0.5340	0.1219	0.1606	0.1606	0.2088	2.56	Extension
M1(L)	no.4+410 ～no.4+735	no.4+735	57,58	B0.30 ×H0.30	U Type	0.090000	0.1000000	0.015	1.90	2.0	0.1782	0.0296	0.0392	0.0296	0.0384	4.64	
M1(R1)	no.4+400 ～no.4+510	no.4+510	55	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	3.80	2.4	0.1554	0.0109	0.0145	0.0109	0.0142	10.95	
M1(R2)	no.4+510 ～no.4+735	no.4+735	q,55,56	B0.30 ×H0.40	U Type	0.120000	0.1090909	0.015	1.90	2.1	0.2518	0.1506	0.1979	0.1506	0.1958	1.29	
M1	Cross11	no.4+735	q,55,56	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.1506	0.1979	0.1979	0.2572	3.38	New Const
M2～M6	Cross12～16	no.4+735		φ0.80 H0.80	Pipe culvert (Concrete)	Swamp area											0.90x2Add
M7(L)	no.5+215 ～no.6+150	no.5+215	r,s,76,77,78	B0.60 ×H0.70	U Type	0.420000	0.2100000	0.015	2.00	3.3	1.3990	0.7672	1.0049	0.7672	0.9973	1.40	
M7(R)	no.5+215 ～no.6+150	no.5+215	73,74,75	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	2.50	2.0	0.1260	0.0928	0.1229	0.0928	0.1206	1.05	
M7	Cross17	no.5+215	73,74,75	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.0928	0.1229	0.1229	0.1598	5.43	
N(L)	no.6+150 ～no.6+360	no.6+360	t,81,82	B0.40 ×H0.40	U Type	0.160000	0.1333333	0.015	1.39	2.1	0.3282	0.1854	0.2426	0.1854	0.2411	1.36	
N	Cross18 (Existing)	no.6+360	t,81,82	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.1854	0.2426	0.2426	0.3154	2.75	Extension
N(R)	no.6+150 ～no.6+360	no.6+360	79,80	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	1.39	1.5	0.0940	0.0208	0.0276	0.0208	0.0271	3.47	

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Outlet No.	Location	Check point	Catchment area no	Drainage type		Area A(㎡)	Hydraulic mean depth R(m)	Coefficient of roughness n	Slope i(%)	Velocity V(m/s)	Outflow Q(m³/s)	Peak runoff [Q(m3/s)] 3year	10year	Adoption	Design Q(m³/s)	Safety factor	Remarks
O(L)	no.6+360 ～no.6+600	no.6+600	u,85,86	B0.40 ×H0.50	U Type	0.200000	0.1428571	0.015	0.70	1.5	0.3049	0.1900	0.2488	0.1900	**0.2470**	1.23	
O	Cross19 (Existing)	no.6+600	u,85,86	φ0.60 H0.60	Pipe culvert (Corugate)	0.282743	0.1500000	0.024	2.00	1.7	0.4704	0.1900	0.2488	0.2488	**0.3235**	1.45	Existing
O(R)	no.6+360 ～no.6+600	no.6+600	83,84	B0.80 ×H0.15	shallow	0.064236	0.0803137	0.015	0.70	1.0	0.0667	0.0238	0.0316	0.0238	**0.0310**	2.15	
P(L)	no.6+600 ～no.6+900	no.6+900	v,89,90-1,90-2	B0.40 ×H0.60	U Type	0.240000	0.1500000	0.015	0.70	1.6	0.3779	0.2540	0.3327	0.2540	**0.3302**	1.14	
P	Cross20 (Existing)	no.6+00	v,89,90-1,90-2	φ0.70 H0.70	Pipe culvert (Corugate)	0.384845	0.1750000	0.024	2.00	1.8	0.7095	0.2540	0.3327	0.3327	**0.4325**	1.64	Existing
P(R)	no.6+600 ～no.6+900	no.6+900	87,88-1,88-2	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	0.70	1.0	0.0667	0.0341	0.0451	0.0341	**0.0443**	1.51	
Q(R)	no.6+900 ～no.7+40	no.7+35	91-1,91-2,91-3	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	1.00	1.2	0.0797	0.0224	0.0297	0.0224	**0.0292**	2.73	
R(L)	no.6+900 ～no.7+200	no.7+200	w,x,94,95	B0.50 ×H0.60	U Type	0.300000	0.1764706	0.015	0.60	1.6	0.4874	0.3165	0.4146	0.3165	**0.4115**	1.18	
R	Cross21 (Existing)	no.7+200	w,x,94,95	φ0.60 H0.60	Pipe culvert (Corugate)	0.282743	0.1500000	0.024	2.00	1.7	0.4704	0.3165	0.4146	0.3165	**0.4115**	1.14	Existing
R(R)	no.7+40 ～no.7+200	no.7+200	92,93	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	0.60	1.0	0.0617	0.0159	0.0210	0.0159	**0.0206**	2.99	
S(L1)	no.7+200 ～no.7+480	no.7+480	y,101,102	B0.50 ×H0.70	U Type	0.350000	0.1842105	0.015	0.55	1.6	0.5602	0.3391	0.4441	0.3391	**0.4409**	1.27	
S(L2)	no.7+480 ～no.7+620	no.7+480	z,103～105	B0.40 ×H0.50	U Type	0.200000	0.1428571	0.015	0.55	1.4	0.2702	0.1699	0.2227	0.1699	**0.2209**	1.22	
S	Cross22 (Existing)	no.7+480	y,z,101～105	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.5091	0.6668	0.5091	**0.6618**	1.31	Existing
S(R1)	no.7+200 ～no.7+480	no.7+480	92,93	B0.80 ×H0.15	shallow	0.064236	0.0803137	0.015	0.55	0.9	0.0591	0.0278	0.0368	0.0278	**0.0361**	1.64	
S(R2)	no.7+480 ～no.7+620	no.7+480	99100	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	0.55	0.9	0.0591	0.0159	0.0210	0.0159	**0.0206**	2.87	
T(R1)	no.7+620 ～no.7+820	no.7+820	106,107	B0.80 ×H0.15	Shallow	0.064236	0.0803137	0.015	0.55	0.9	0.0591	0.0278	0.0368	0.0278	**0.0361**	1.64	

Gaba Road

Outlet No.	Location	Check point	Catchment area no	Drainage type		Area A(㎡)	Hydraulic mean depth R(m)	Coefficient of roughness n	Slope i(%)	Velocity V(m/s)	Outflow Q(m³/s)	Peak runoff [Q(m3/s)] 3year	10year	Adoption	Design Q(m³/s)	Safety factor	Remarks
T(R2)	no.7+820 ～no.7+920	no.7+920	106,107	B0.40 ×H0.30	LU Type	0.120000	0.1200000	0.015	0.30	0.9	0.1066	0.0278	0.0368	0.0278	0.0361	2.95	
T	Cross23	no.7+920	106,107	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.0278	0.0368	0.0368	0.0479	18.15	
T(L1)	no.7+620 ～no.8+150	no.8+150	aa,ab,106,107 110,111,112	B0.50 ×H0.70	U Type	0.350000	0.1842105	0.015	1.00	2.2	0.7554	0.5267	0.6908	0.5267	0.6848	1.10	
T(L2)	no.8+150 ～no.8+243	no.8+150	ac,113	B0.30 ×H0.40	U Type	0.120000	0.1090909	0.015	1.00	1.5	0.1826	0.0954	0.1247	0.0954	0.1240	1.47	
T	Cross24 (Existing)	no.8+150	aa,ab,ac,106,107, 110,111,112,113	φ0.60 H0.60	Pipe culvert×2(Concrete)	0.282743	0.1500000	0.024	2.00	1.7	0.9407	0.6221	0.8155	0.8155	1.0602	0.89	Existing Out-Let
T	Cross24 (Add)	no.8+150	aa,ab,ac,106,107, 110,111,112,113	φ0.60 H0.60	Pipe culvert (Concrete)	0.282743	0.1500000	0.013	2.00	3.1	0.8683	0.6221	0.8155	0.8155	1.0602	0.82	D0.6x1Add
											1.8090				1.0602	1.71	