No. 1

Ministry of Works, Housing and Communications
The Republic of Uganda

BASIC DESIGN STUDY REPORT
ON
THE PROJECT
FOR
IMPROVEMENT OF INTERSECTIONS
AT
KAMPALA URBAN INTERFACE SECTIONS OF TRUNK ROAD
IN
THE REPUBLIC OF UGANDA

August 1998

JAPAN INTERNATIONAL COOPERATION AGENCY
NIPPON KOEI CO., LTD.
JAPAN ENGINEERING CONSULTANTS CO., LTD.

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PREFACE

In response to a request from the Government of Republic of Uganda, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Intersections at Kampala Urban Interface Sections of Trunk Road and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Uganda a study team from 15 June to 5 July, 1998.

The team held discussions with the officials concerned of the Government of Uganda, and conducted a field study at the study area. After the team returned to Japan, further studies were made, and as the result, the present report was finalized.

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

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

August, 1998

Kimio Fujita
President
Japan International Cooperation Agency

August 1998

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Improvement of Intersections at Kampala Urban Interface Sections of Trunk Road in the Republic of Uganda.

This study was conducted by Nippon Koei Co., Ltd. in association with Japan Engineering Consultants Co., Ltd., under a contract to JICA, during the period from 6 May 1998 to 31 August 1998. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Uganda and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

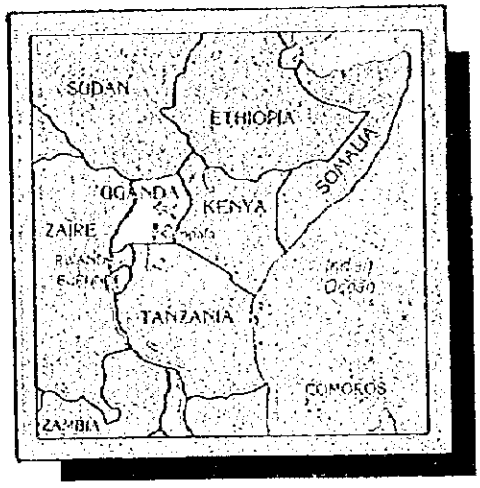
Very truly yours,

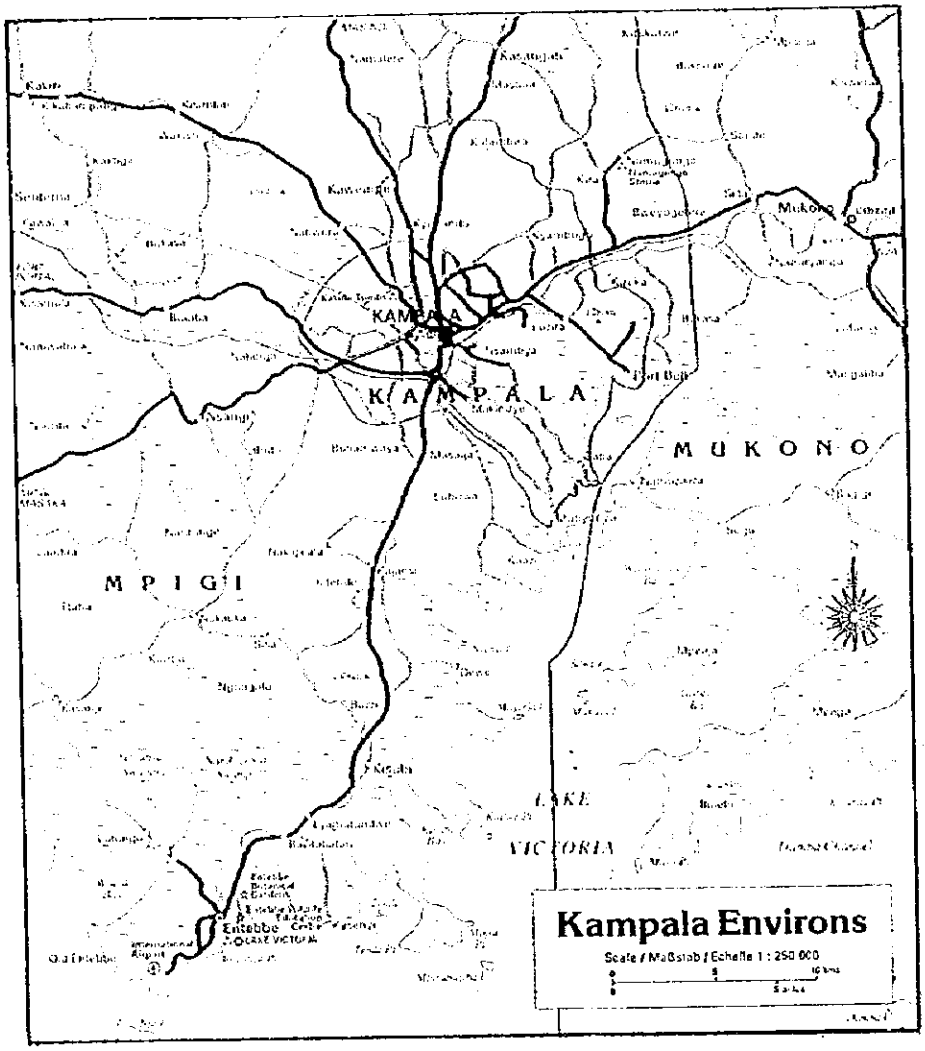
K. Matsuda

Katsuyoshi Matsuda

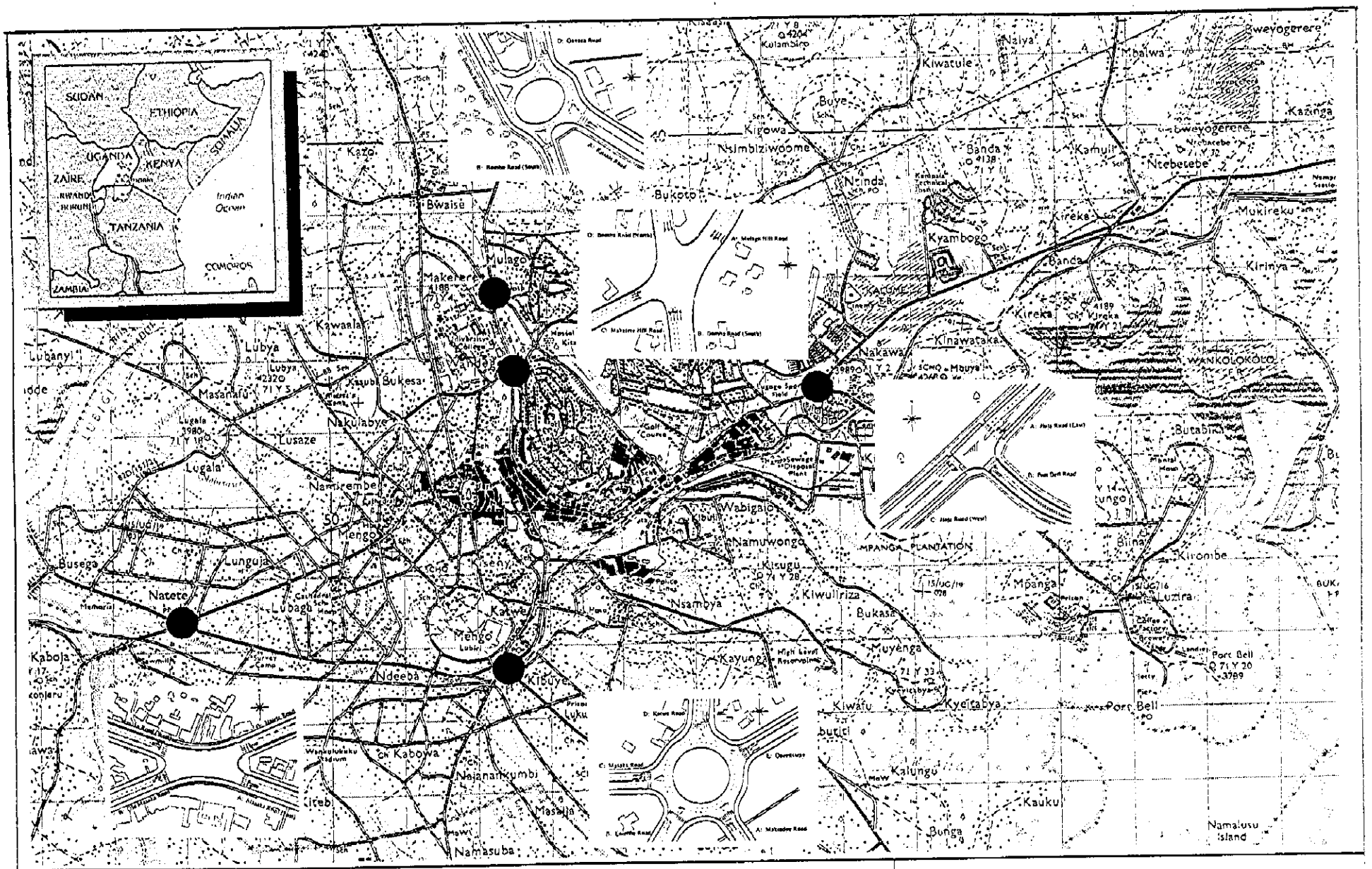
Project Manager,
Basic Design Study Team on
The Project for Improvement of
Intersections at Kampala Urban Interface
Sections of Trunk Road in Uganda

Nippon Koei Co., Ltd.
in association with
Japan Engineering Consultants Co., Ltd.





Basic Design Study on the Project for Improvement of Kampala Urban Interface Sections of Trunk Road in Uganda	Location Map (1)



Basic Design Study on the Project for Improvement of Kampala Urban Interface Sections of Trunk Road in Uganda

Location Map (2)

ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
A/P	Authorization to Pay
B/A	Bank Arrangement
CIF	Cost, Insurance, Freight
E/N	Exchange of Notes
EU	European Union
FOB	Free on Board
GOU	Government of Uganda
IDA	International Development Association
JICA	Japan International Cooperation Agency
KCC	Kampala City Council
kgf	kilogram force
KN	Kilo Newton
MOF	Ministry of Finance
MOWHC	Ministry of Works, Housing and Communications
MOWTC	Ministry of Works, Transport and Communications
N	Newton
N/P	Notice to Proceed
NRA	National Resistant Army
PIP	Public Investment Plan
P/Q	Prequalification
UEB	Uganda Electric Board
UPS	Uninterruptible Power System

TABLE OF CONTENTS

1. BACKGROUND OF THE PROJECT

Uganda, located at the equator, has a total area of 241,139 km^2. The land is mostly fertile potentially available for crop and livestock production.

As the city of Kampala is located at high elevation and the lakeside of Victoria, the city enjoys a mild climate with 22°C of annual average temperature. There are two rainy seasons in Uganda. The rainy seasons in Kampala area are from March to May and from September to November.

The total population in Uganda was approximately 17 million, according to the latest census taken in 1991. Ninety percent (90%) of the population live in rural areas. The population of Kampala city, covering the whole administrative division of Kampala District, was more than 774,000 in 1991. Population density of the city is 46 persons/ha.

The national economy of Uganda is steadily recovering and stabilized since president Museveni's National Resistance Army (NRA) took power in 1986. As security was gradually restored, the Government began the implementation of its policy to develop an independent, integrated, and self-sustaining economy. Particular emphasis was placed on developing human capital through investment in education, health and other socio-economic infrastructure development. Donors played a particularly large part in rehabilitating the country's road infrastructure.

The content of the Grant Aid Request by the Government of Uganda was determined based on the high priority project selected in the Feasibility Study of Improvement of Trunk Road at Kampala Urban Interface Sections carried out by JICA from February 1997 to November 1997. The content of Grant Aid Request submitted by the Government of Uganda in December 1997 consisted of bottleneck junction improvement scheme and road section improvement scheme. However, only the junction improvement scheme was adopted to be implemented under Japan's Grant Aid programme through the scrutinizing by the Government of Japan. The junction improvement scheme consists of improvement of following junctions:

- Natete Junction
- Makerere Junction
- Kibuye Junction
- Port Bell Junction
- Wandegeya Junction

2. CONTENTS OF THE PROJECT

2.1 Objectives of the Project

The Public Investment Plan (PIP) 1996 - 97 is Uganda's Public Sector Investment program. It is a three year rolling plan which is updated annually as part of the budget process. It lists Uganda government highest priority projects for the next 3 years along with expenditure estimates for each project. These are the projects for which donor funding is being sought during the plan period. The plan aims at achieving the following nation's development targets:

- Promote economic growth and reduce domestic poverty,
- Sustain macro economic stability, and
- Improve effectiveness/efficiency of government services.

In the above context, the Government of Uganda is placing high priority on the development of road sector. In the Ten Year Road Sector Development Program, which is a national level road development master plan for 1996/97 - 2005/6, prepared by MOWTC in 1996, the Government of Uganda set forth the following development targets:

- To satisfy current and future travel demand,
- To provide road maintenance sufficient to protect the road investment,
- To rehabilitate the main road network, with priority to heavy loaded links,
- To upgrading road sections as required to meet traffic demand and reduce traffic accidents,
- To construct new links where justified to relieve traffic congestion,
- To establish effective programme administration through organizational structure, appropriate financing, sound traffic management, and polices supportive of market needs, and
- To develop the local construction industry.

To attain the above targets, road improvement in the city of Kampala, where nation's 2/3 (two-thirds) of traffic concentrate and the traffic situation is most chaotic and serious, is urgent. The requested project fully complies with the objectives of the nation's road development programme and constitutes a significant portion of the programme.

The Feasibility Study of Improvement of Trunk Roads at Kampala Urban Interface Sections, which is a comprehensive road development study for the city, was conducted within the context of the Ten Year Road Sector Development Program of Uganda. The requested project, filtered and selected as one of the high priority projects by the above study, will be the first project of this type and will give initiative to the succeeding road development projects in the city.

2.2 Basic Concept of the Project

2.2.1 Outline of the Request by Uganda

The Project aims at improving five junctions at the Kampala Urban Interface Section of the Trunk Road, with the recognition that the junctions are major causes of urban traffic chaos in the city of Kampala. The outline of the objective junctions is described below:

Table 2.1 Outline of Project Junctions

Junctions	Present Issues	Traffic Inflow (1997) *A.M. Peak Hours	Area of the Project Site (sq. m)
Natete Junction	- Queuing delay - Intrusion of pedestrians	3,902	9,000
Makerere Junction	- Queuing delay - Traffic accidents	5,565	6,300
Kibuye Junction	- Queuing delay - Pavement deterioration	5,618	8,200
Port Bell Junction	- Queuing delay - Traffic accidents	7,793	5,800
Wandegeya Junction	- Queuing delay - Traffic accidents - Intrusion of pedestrians	8,679	13,000

A.M. Peak Hours: 7:30 - 9:30

The main components of the Project are as follows:

- Increase of the junction capacity through improvement of geometry and provision of additional lanes,
- Installation of traffic signals, lighting and lane markings,
- Provision of pedestrian crossings and sidewalks, and
- Improvement of drainage.

2.2.2 Principles to Formulate Scheme Outline

The principles adopted for the formulation of the scheme outline are described below:

- The scale and content of the Project are decided so as to minimize the additional land acquisition and relocation,
- The Project has to be designed not only to enhance the traffic capacity but to enhance the safety levels of road users,
- The Project has to be designed so as to minimize the cost as much as possible via adoption of any measure to minimize the cost,
- The traffic signal system to be introduced has to be one that is easy to maintain to minimize labor and maintenance costs, and
- The Project has to be designed and implemented within the scope of Japan's Grant Aid Scheme.

2.3 Basic Design

2.3.1 Design Concept

(1) Natural Conditions

As most of Uganda is fairly flat, with mountains only in the extreme east, extreme west, and close to the Rwanda border, the bulk of the country enjoys the same tropical climate, with temperatures averaging about 26°C during the day and 16°C at night. The hottest months are from December to February, when the daytime range is 27°C to 29°C. The rainy seasons in the south are from April to May and October to November, the wettest month being April. In the north, the wet season is from April to October and the dry season is from November to March. During the wet seasons, the average rainfall is 175 mm per month. Humidity is generally low outside the wet seasons.

The temperatures of major city in Uganda and rainfall data is shown in Table 2.2 - 2.5.

Table 2.2 Temperature in Uganda

	1996		~ 1996	
	Max (Daily Average)	Min (Daily Average)	Max (Daily Average)	Min (Daily Average)
Entebbe	26.3°C	17.3°C	25.9°C	17.1°C
Fort Portal	25.2°C	13.2°C	25.3°C	12.8°C
Gulu	29.4°C	16.9°C	29.2°C	16.9°C
Kabala	23.4°C	10.4°C	23.2°C	10.1°C
Mbarara	26.4°C	13.3°C	26.3°C	14.0°C
Tororo	28.9°C	15.2°C	28.7°C	16.2°C

Table 2.3 Rain Fall Data 1974 - 96

Year	Annual Total
1974	948.6
1975	1019.8
1976	1263.3
1977	1134.4
1978	1454.3
1979	1220.9
1980	1423.2
1981	1141.2
1982	-
1983	1092.3
1984	739.9
1985	1009.4
1986	926.9
1987	1029.9
1988	1427.4
1989	1289.2
1990	1028.0
1991	1411.6
1992	850.5
1993	969.7
1994	1114.0
1995	1052.5
1996	1176.8

Table 2.4 Characteristics of Rain Fall in Kampala

		1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Jan	Total	75.5	36.9	47.7	102.5	8.3	78.2	36.1	73.3	-	52.5	19.4	123.8	18.1	78.9	105.5	19.2	76.4	39.2	55.8	46.6	33.2	6.7	131.1
	Average	2.4	1.2	1.5	3.3	0.3	2.5	1.2	2.4	-	1.7	0.6	4.0	0.6	2.5	3.4	0.6	2.5	1.3	1.8	1.5	1.1	0.2	4.2
	Max	18.1	11.2	16.0	50.6	4.0	25.3	27.5	34.2	-	40.5	8.0	39.5	10.3	30.5	44.0	11.0	20.1	25.2	34.0	22.2	17.0	6.7	54.4
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Feb	Total	45.1	79.2	140.8	0.0	124.1	127.5	27.2	37.9	-	13.0	7.6	15.5	24.5	7.3	42.7	83.6	18.5	64.7	33.4	23.3	43.6	46.0	14.4
	Average	1.5	2.6	4.5	#DIV/0!	4.0	4.1	0.9	1.2	-	0.3	0.2	0.5	0.8	0.2	1.4	2.7	0.6	2.1	1.1	0.8	1.4	1.5	0.5
	Max	20.5	17.5	31.8	0.0	51.3	45.9	8.2	17.2	-	3.2	2.0	15.5	10.6	4.2	15.5	59.3	9.4	21.8	13.6	17.7	25.7	30.0	5.5
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar	Total	71.2	125.1	167.5	188.5	119.7	169.6	162.8	103.2	-	64.5	73.2	106.3	99.2	19.6	161.5	196.3	221.9	86.6	54.1	154.3	26.6	166.4	168.5
	Average	2.3	4.0	5.4	6.1	3.9	5.7	5.3	3.3	-	2.1	2.4	3.4	3.2	0.6	5.2	3.5	7.2	2.8	1.7	5.0	0.9	5.4	5.4
	Max	20.2	47.5	54.4	54.5	51.6	52.5	51.3	23.4	-	22.0	34.0	45.0	23.4	3.6	31.0	22.8	38.9	26.7	28.3	50.0	17.7	61.6	55.0
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apr	Total	125.2	100.2	186.7	169.9	186.4	153.6	214.5	76.8	-	108.2	0.0	137.2	111.4	191.6	307.4	97.7	0.0	328.3	161.0	129.7	161.5	198.9	83.8
	Average	4.0	3.3	6.2	5.7	6.2	5.1	7.2	2.6	-	3.6	#DIV/0!	4.6	3.7	6.4	10.2	3.3	#DIV/0!	10.9	5.4	4.3	5.4	6.6	2.8
	Max	30.5	24.4	34.2	31.9	46.5	50.9	45.5	25.3	-	39.6	0.0	37.8	27.2	36.4	64.4	25.4	0.0	54.4	36.6	40.3	50.5	60.0	30.4
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
May	Total	82.9	109.3	90.3	153.8	206.9	154.4	105.1	200.8	-	108.7	55.7	188.9	219.8	72.6	37.7	174.1	94.3	142.8	120.3	167.9	74.6	188.6	286.1
	Average	2.7	3.5	2.9	5.0	6.7	5.0	3.4	6.5	-	3.5	1.8	6.1	7.1	2.3	1.2	5.6	3.0	4.6	3.9	5.4	2.4	6.1	9.2
	Max	18.0	19.6	15.0	51.0	52.2	31.3	43.0	42.9	-	41.8	12.6	47.0	39.0	22.8	20.8	5.0	26.5	22.2	50.8	43.2	36.4	47.6	110.0
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jun	Total	86.1	108.5	88.7	105.7	62.3	84.3	98.7	29.8	-	72.1	31.6	20.4	33.0	96.3	53.9	51.1	19.9	56.2	82.4	77.4	34.4	32.4	51.8
	Average	2.8	3.6	3.0	3.5	2.1	2.8	3.3	1.0	-	2.4	1.1	0.7	1.1	3.2	1.8	1.7	0.7	1.9	2.7	2.6	1.1	1.1	1.7
	Max	47.6	39.0	52.1	49.0	17.0	43.5	48.3	16.5	-	42.2	15.8	6.2	15.8	43.7	23.8	15.1	5.8	26.7	21.0	15.1	18.7	14.1	30.5
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jul	Total	165.4	35.7	27.0	0.0	54.2	58.5	41.7	50.9	-	80.9	33.7	61.1	44.8	47.0	101.6	36.0	35.0	19.3	83.9	22.7	70.1	89.7	65.9
	Average	5.3	1.2	0.9	#DIV/0!	1.7	1.9	1.3	1.6	-	2.6	1.1	2.0	1.4	1.5	3.3	1.2	1.1	0.6	2.7	0.7	2.3	2.9	2.1
	Max	58.3	8.2	9.3	0.0	13.4	16.7	13.0	20.8	-	37.0	13.5	29.0	19.7	25.0	49.5	19.0	21.0	7.7	22.7	20.7	26.0	36.2	44.9
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aug	Total	60.4	81.0	80.0	163.6	123.6	46.4	149.4	77.7	-	88.1	92.3	50.8	1.6	98.6	150.4	58.6	103.0	77.4	90.8	17.0	92.3	42.4	31.6
	Average	1.9	2.6	2.6	5.3	4.0	1.5	4.8	2.5	-	2.6	3.0	1.6	0.1	3.2	4.9	1.9	3.3	2.5	2.9	0.5	3.0	1.4	1.0
	Max	39.8	24.5	27.4	50.5	51.4	17.1	51.0	30.0	-	37.5	37.5	21.6	1.6	46.7	50.5	19.6	48.5	25.0	33.2	6.7	31.0	42.4	10.0
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sep	Total	72.0	141.1	146.6	46.6	88.8	50.8	163.5	181.5	-	188.4	33.6	68.1	49.3	85.6	135.1	93.4	109.8	103.3	0.0	134.0	86.9	152.9	124.3
	Average	2.3	4.6	4.7	1.5	2.9	1.6	5.3	5.9	-	5.9	1.1	2.2	1.6	2.8	4.4	3.0	3.5	3.3	#DIV/0!	4.3	2.8	4.9	4.0
	Max	18.7	20.4	38.6	16.6	32.5	19.0	47.5	32.0	-	51.6	18.6	24.8	18.4	18.5	43.2	35.2	37.8	62.7	0.0	78.3	22.1	32.5	30.1
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oct	Total	57.8	83.1	88.3	119.1	160.3	58.2	97.0	132.8	-	135.3	61.1	77.2	59.6	111.9	93.4	178.7	92.1	194.6	0.0	128.2	221.2	128.5	62.4
	Average	1.9	2.7	2.8	3.8	5.2	1.9	3.1	4.3	-	4.4	2.0	2.5	1.9	3.6	3.0	5.8	3.0	6.3	#DIV/0!	4.1	7.1	4.1	2.0
	Max	28.0	19.4	21.7	20.5	37.6	21.5	28.2	30.0	-	31.9	17.3	30.0	12.4	21.4	15.6	21.4	21.0	68.0	0.0	40.5	69.3	35.5	21.0
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nov	Total	76.8	57.7	125.8	0.0	187.4	148.7	255.7	32.9	-	127.0	256.8	152.5	153.4	131.6	124.4	228.0	135.5	202.6	85.4	40.6	169.5	0.0	114.5
	Average	2.5	1.9	4.1	#DIV/0!	6.0	4.8	8.2	1.1	-	4.1	8.5	4.9	4.9	4.2	4.0	7.4	4.4	6.5	2.8	1.3	5.5	#DIV/0!	3.7
	Max	17.0	21.0	27.0	0.0	28.2	36.1	51.9	16.8	-	35.0	34.6	41.5	33.0	55.5	19.4	56.5	45.6	56.2	26.9	19.8	36.0	0.0	25.4
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dec	Total	30.2	62.0	73.9	84.7	129.3	90.7	71.5	143.6	-	70.6	74.9	7.6	112.2	88.9	113.8	162.5	121.6	96.6	83.4	28.0	101.0	0.0	42.4
	Average	1.0	2.0	2.4	2.7	4.2	2.9	2.3	4.6	-	2.3	2.4	0.2	3.6	2.9	3.7	5.2	3.9	3.1	2.7	0.9	3.3	#DIV/0!	1.4
	Max	12.3	28.8	39.1	28.3	38.8	19.4	29.0	38.1	-	28.5	15.6	2.0	47.0	48.2	37.6	39.0	40.0	34.1	24.3	12.7	33.6	0.0	12.0
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Annual Total		948.6	1019.8	1263.3	1134.4	1451.3	1220.9	1423.2	1141.2	-	1092.3	739.9	1389.4	926.9	1029.9	1427.4	1286.2	1028.0	1411.6	850.5	969.7	1114.0	1052.5	1176.8
Annual Average		2.6	2.8	3.4	#DIV/0!	3.9	3.3	3.9	3.1	-	3.0	#DIV/0!	2.7	2.5	2.8	3.9	3.5	#DIV/0!	3.8	#DIV/0!	2.6	3.0	#DIV/0!	3.2
Annual Max		58.3	47.5	54.4	54.5	52.2	52.5	51.9	42.9	-	51.6	37.5	47.0	47.0	55.5	64.4	59.3	48.5	68.0	50.8	78.3	69.3	61.6	110.0
Annual Min		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 2.5 Relation between Rain Fall and Water Level of Lake Victoria

Station	Kampala		Entebbe		
Year	Date	Rainfall	Date	Gage W.L.	Sea Level
1973	-	-	-	-	-
1974	Jul. 8	58.3	Jan. 8	11.79	1135.22
1975	Mar. 19	47.5	Jan. 5	11.63	1135.06
1976	Mar. 27	54.4	May 31	11.72	1135.15
1977	Mar. 18	54.5	-	-	-
1978	Mar. 11	52.2	May 11	12.19	1135.62
1979	Mar. 16	52.5	May 23	12.60	1136.03
1980	Mar. 1	51.3	May 26	12.05	1135.48
1981	Mar. 6	42.9	May 30	11.70	1135.13
1982	-	-	-	-	-
1983	Sep. 11	51.6	May 30	11.67	1135.10
1984	Aug. 7	37.5	May 14	11.65	1134.93
1985	May 7	47.0	May 31	11.49	1134.92
1986	Dec. 8	47.0	May 19	11.39	1134.82
1987	Nov. 26	55.5	Jun. 22	11.42	1134.85
1988	Apr. 16	54.4	Jun. 1	11.55	1134.98
1989	Feb. 6	59.3	May 28	11.69	1134.12
1990	Feb. 22	48.5	June. 13	12.08	1135.51
1991	Oct. 18	68.0	June. 18	11.90	1135.33
1992	May 1	50.8	May 27	11.50	1135.39
1993	Sep. 18	78.3	Jun. 28	11.45	1134.88
1994	Oct. 2	69.3	Dec. 29	11.12	1134.55
1995	Mar. 6	61.6	Jun. 3	11.37	1134.80
1996	May 24	86.5	May 28	11.51	1134.91

Note: 0 m of Gage W.L. is 1,123,432 at Sea level

(2) Social Condition

a) Traffic Condition

i) Road Network

Road is the largest sector of transport. The total road length in Kampala city is 212 km and these roads are classified into three main groups; trunk road, urban road and community road. The road network in the city consists of eight (8) radial roads extending from the central area of the city. The road network in the city does not have circular roads and/or

bypasses which divert concentration of traffic from the radial roads. This fact has resulted in unnecessary road congestion in the central area of the city. Most of the major junctions in the city are of roundabout shape with few exceptions. These low capacity junctions on the road network are impeding smooth urban traffic flow.

ii) Ongoing Road Development Project

Regarding road development in Kampala city, several bi-lateral and multi-lateral international agencies have been assisting in the rehabilitation and development. Fig. 2.1 shows past and on-going road development projects financed by international agencies. These projects include:

- First Urban Program (I) (II)

  The road component of the program includes maintenance of road and drainage. A total cost of US$39.5 million has been financed by IDA, EU and KCC. A total of 384 km of urban street have been maintained by the program.

- DCC Car Park Project

  The project aims at construction of 500 car parking spaces for the purpose of reducing roadside parkings. Total cost required for the project is about Ush. 2,500 million. KCC is the implementation agency of the Project.

- Kampala – Entebbe Road Project

  34 km of road improvement work was completed in 1998 with the assistance from EU. The total project cost is about US$7.5 million.

In addition to the ongoing projects described above, several other projects are in the planning stages of preparation, and some of them are committed to be implemented by donor agencies. These projects include:

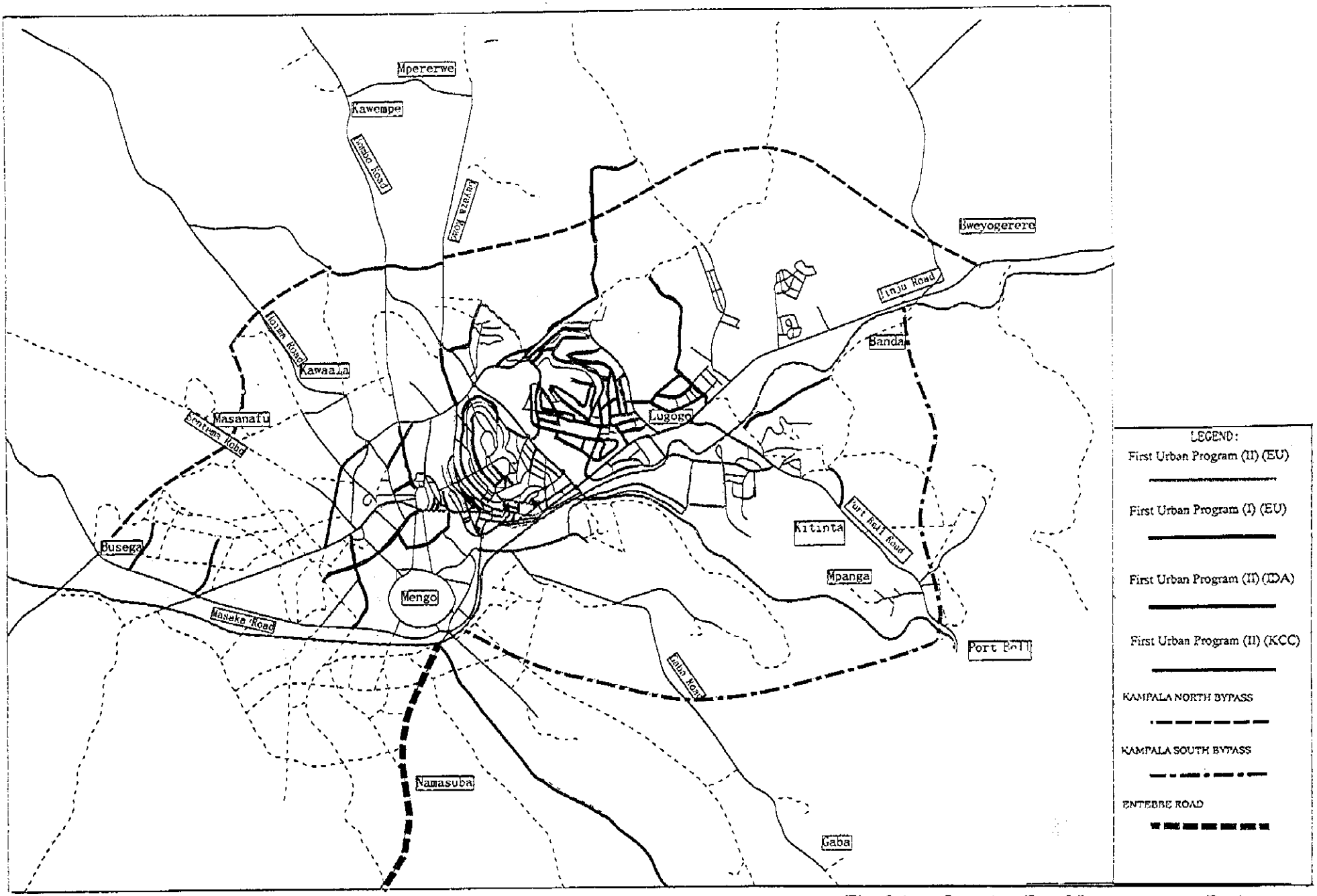


Fig. 2.1 Ongoing Road Improvement Project

- Kampala Southern Bypass

  A feasibility study was completed by EU in 1996. It recommends construction of a 4-lane road with grade separated roundabouts at the Masaka Road, Jinja Road, Gaba Road and Makindye Road junctions. EU has committed to finance the road. However, a delay in implementation is expected due to difficulty in land acquisition alone the route.

- Kampala Northern Bypass

  A comparative study of a possible northern bypass and the fully designed southern bypass was undertaken by consultants to EU in 1996. This route has less difficulty in land acquisition than Kampala Southern Bypass. The EU's decision on whether to proceed with the original southern bypass or the northern alternative is thought to be imminent.

As the sites of the captioned junction improvement are located away from those of the above mentioned ongoing projects, there seems to be no direct influence to the Project.

b) Land Ownership System

There is no modern land ownership system in Uganda. The land in Uganda is rather desorderly used although there is a nominal cadastre system in the nation. This fact has resulted in difficulties in land acquisition especially in the cases of public undertakings.

In order to avert the difficulties in land acquisition, the Project is recommended to be designed within the existing right-of-way. The widths of right-of-way for major roads in Kampala are of 30 m for national trunk road and of 15 m for urban streets.

c) Public Security Problem

The public security condition in Uganda is relatively well. However, as the project sites are located near busy streets and

congested market areas, there is some possibilities that unexpected troubles may happen during the construction. Security services by the Ugandan side during the construction is required.

(3) Circumstances of Construction Conditions

a) Labor condition

In Uganda, official wage rates and other regulations are being stipulated. The skill of construction workers in Uganda is at the level that simple work items can be undertaken by themselves under the supervision of veteran supervisors.

Wage rates for representative work items are shown in Table 2.6.

Table 2.6 Unit Wage Rates for Representative Work Items

Item	Unit	Rate (US$)
Foreman	Man/Day	30.0
Common Labor	"	10.0
Operator	"	20.0
Driver	"	10.0
Pavement worker	"	13.5
Concrete worker	"	13.5
Carpenter	"	10.0

b) Procurement Condition of Construction Material

Due to geographic constraints, most of the imports in Uganda are transported via Kenya. This has resulted in higher prices of materials and construction equipment. In order to reduce the project cost, it is recommended that materials and equipment required for the Project should be of local products in Uganda as much as possible. Unit rates for major construction materials in Uganda are listed in Table 2.7.

Table 2.7 Unit Rates for Major Construction Materials

Item	Unit	Rate (US$)
Deformed Bar	ton	28,800 (yen)
Portland Cement	ton	180.00
Petroleum	liter	0.99
Diesel	liter	0.81
Straight Asphalt	ton	405.00

c) Procurement Condition of Construction Equipment

Although there is no rental shop of construction equipment in Kampala city, some of the construction equipment are available at local contractors in Uganda. The unit rental rates for major construction equipment available in Uganda are listed in Table 2.8:

Table 2.8 Unit Rates for Major Construction Equipment

Item	Unit	Rate (US$)
Back Hoe (0.6 m^3)	hour	74.76
Dump Truck (11 t)	hour	47.45
Motor Grader (3.1 m)	day	111.76
Road Roller (11 - 12 t)	day	91.66
Tyre Roller (8 - 28 t)	day	185.53
Asphalt Sprayer (200 l)	day	53.56

4) Applicability of Local Contractors

i) Capability of Local Contractors

During the stage of the Feasibility Study carried out by JICA, the following sub-contractors were recommended by MOWTC as qualified local contractors capable of executing major road improvement works in Uganda.

- SPENCON SERVICES LTD.
- SKANSKA JENSEN LTD.
- ROKO CONSTRUCTION LTD.

ii) Recommendation of Sub-contractor Method

According to the survey results obtained during the

Feasibility Study, it was judged that some of the contractors in Uganda are provided with skillful construction workers and equipment to carry out some types of civil works in the road development projects. As a matter of fact, in some road improvement projects in the city, local contractors are performing construction works with the supervision of foreign engineers dispatched from donor countries.

In addition, it is expected that cooperation between Japanese contractors and Ugandan's in the implementation of the Project will produce great benefits to Ugandan contractors via technical transfer by Japanese contractors and engineers.

iii) Items of Work to be Undertaken by Local Contractors

Following work items are recommended to be undertaken by local contractors.

- Pavement works for pedestrian ways,
- Installation of traffic sign and safety board, and
- Plantation at junctions and construction of flower beds.

The items of work to be undertaken by local contractors was selected through a comparison of costs among possible methods of implementation by work item.

5) Capability of Executing Agency for Maintenance and Operation Works

MOWHC, the executing agency of the Project, administers all the trunk roads in the city. However, their annual budget and number of engineers to spare is not sufficient. It is inevitable for MOWHC to undertake some of the works relating to the Project in cooperation with KCC. Especially, in the field of traffic signal management, coordination between MOWHC and KCC is recommended.

6) Construction Schedule

The construction schedule was prepared taking the following factors into consideration:

- Rainfall pattern (dray and rainy seasons) at the sites,
- Period required for the procurement of materials and equipment,
- Customs clearance procedure in Kenya,
- Selection of possible field works and adoption of most appropriate construction method in rainy seasons, and
- Safety measures.

The construction works will be carried out from 1 April 1999 to 31 March 2000, which corresponds to Japanese 1999 fiscal year. Major work items to be undertaken during the period are as follows:

- Mobilization,
- Earth work/Facility works,
- Pavement works,
- Traffic signal works, and
- Demobilization.

2.3.2 Basic Design

(1) Whole Scheme

The whole scheme of the Project is described below:

- Improvement of Geometry

Natete Junciton (9,000 m^2)

To remodel the existing junction into a signalized one, providing right/left turning lanes and storage lanes.

Makerere Junction (6,300 m^2)

To increase the junction capacity with the provision of additional straight lanes to make the total number of lanes at 3. Furthermore, additional exit lanes for each arm will be introduced.

Kibuye Junction (8,200 m^2)

To increase the capacity of existing rotary junction with the

provision of additional lanes to make total number of lanes at 3 for each arm. The number of entry lanes will be increased at 2 for each arm.

Port Bell Junction (5,800 m^2)

To remodel the existing T shaped junction into signalized one with the installation of storage lanes for each arm.

Wandegeya Junction (13,000 m^2)

To remodel existing junction into signalized one with the provision of additional right/left turning lanes and storage lanes.

- Drainage System (5,700 m^2)

To provide covered concrete culverts for the disposal of water on the pavement and provide open drainage outside the pedestrian ways for each junction. The road drainage will be connected to the ends of the existing drainage channel.

- Traffic Safety

Traffic Signals

Traffic signals, both for vehicles and pedestrians, with uninterruptible power system, will be installed at Natete, Port Bell and Wandegeya junctions. In addition, the street lights will be installed in the vicinity of these signalized junctions.

Flower Beds (4,200 m)

On the boundaries of carriageways and pedestrian walks flower beds will be introduced to prevent intrusion of pedestrians into the carriageways.

Road Marking (2,300 m)

For the promotion of traffic safety, roadside markings will be placed at each arm of the junction.

(2) Design Condition

(a) Design Standard

As there exists no intersection design standard clearly stipulated in Uganda, the designing of junctions was carried out referring to Japanese standard. Pavement design was conducted on the basis of Japanese standard with reference to AASHTO.

(b) Geometric Design Standard

Following criteria were adopted by reference to the Japanese Design Manual, because there is no significant difference between Japanese Standard and AASHTO.

Design Component	Standard	AASHTO
Road Classification	Urban Arterials	Urban Arterials
Design Speed	60 km/hr	40 ~ 60 mph
Minimum Radius	R = 150 m	-
Number of Lanes	2	-
Lane Width (Main)	3.5 m	10 ~ 20 ft.
Lane Width (Semi)	3.0 m	10 ft.

(c) Intersection Design

Intersection traffic analysis was carried out applying vehicle turning movement data obtained during the Feasibility Study and "OSCADY 3" and "ARCADY 3", computer soft developed in UK. Those results were reconfirmed by the Japanese intersection traffic analysis method. The traffic volume for each junction during the peak hours of traffic is shown in Fig. 1.1.

(d) Criteria for Adoption of Traffic Signal

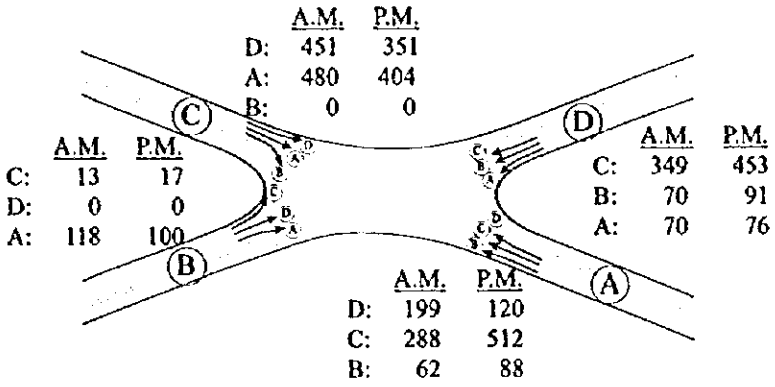
The criteria of selection of signal type were introduced as below, taking the function to be provided into consideration:

- To be overhang type, for easy recognition by drivers,
- To be easily after cared, easy procurement of parts in case of malfunction,
- To be easily handled/adjusted by engineers in Uganda,
- To be robustly structured to cope with unstable electrical

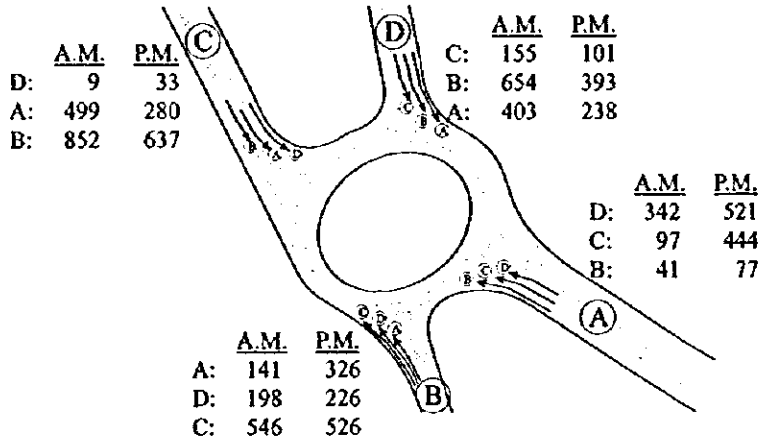
voltage in Uganda, and

- To be provided with uninterruptible power system.

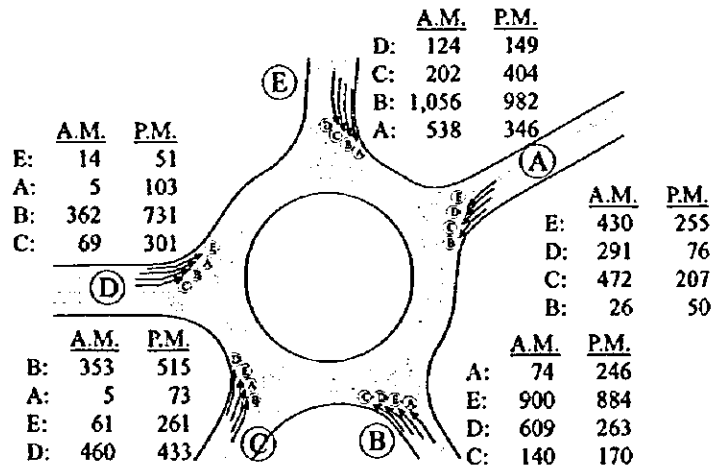
Natete Junction



Makerere Junction



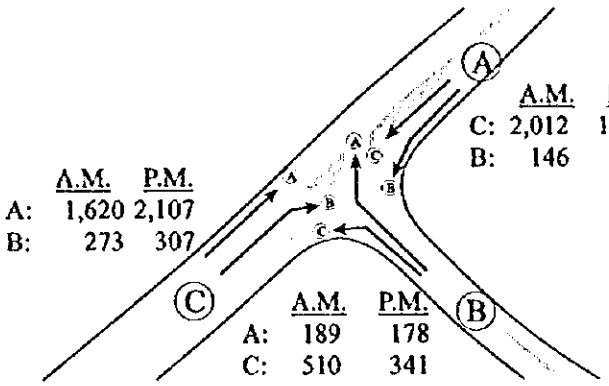
Kibuye Junction



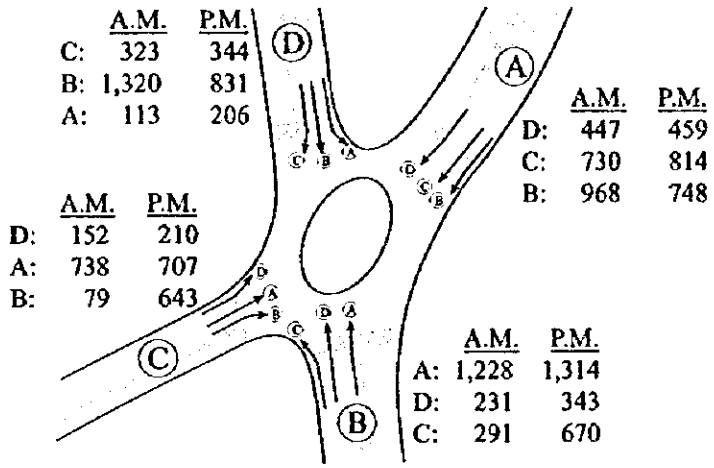
AM: 7:30 -	9:30
PM: 16:30 -	18:30

Fig. 2.2 (1) Turning Movement at Junction (1997)

Port Bell Road/Jinja Road Junction



Wandegeya Junction



AM: 7:30 -	9:30
PM: 16:30 -	18:30

Fig. 2.2 (2) Turning Movement at Junction 1997)

(e) Traffic Light Design

Traffic light design was carried out on the basis of Japanese Standard. The conformity of Japanese Standard to the International Standard is being approved.

(f) Pavement Design

Pavement design was carried out with reference to Japanese Pavement Design Standard, after a comparison study with AASHOTO. In general, there is a tendency that the pavement thickness calculated by the Japanese Standard has a higher value than that by AASHOTO. However, it is known that Japanese Standard is more suitable to be adopted in pavement designs where the available traffic data is very limited.

(g) Unit Weight of Materials

The unit weights of materials applied are as follow:

Steel	:	77 KN/m^3 (7,850 kgf/m^3)
Reinforced concrete	:	27 KN/m^3 (2,500 kgf/m^3)
Concrete	:	27 KN/m^3 (2,500 kgf/m^3)
Asphalt concrete	:	22 KN/m^3 (2,300 kgf/m^3)

(h) Material Strength

The strengths of materials applied are as follows:

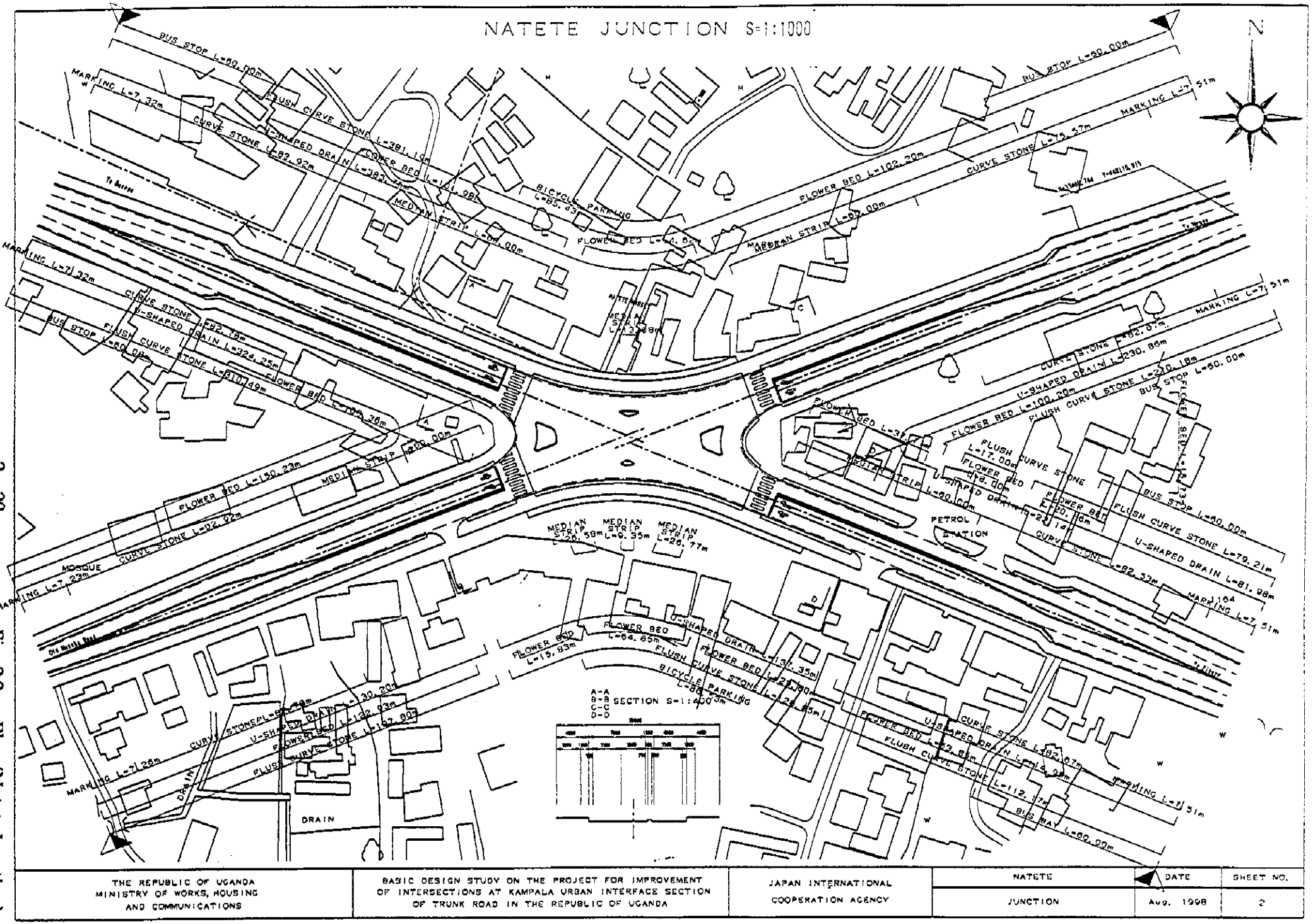
Concrete (A) (28 days)	:	23,000 N/cm^2 (240 kgf/cm^2)
Concrete (B) (28 days)	:	20,600 KN/cm^2 (210 kgf/cm^2)

(3) The Basic Design

Based on the above scheme and the design criteria introduced, the basic designs were carried out for following items:

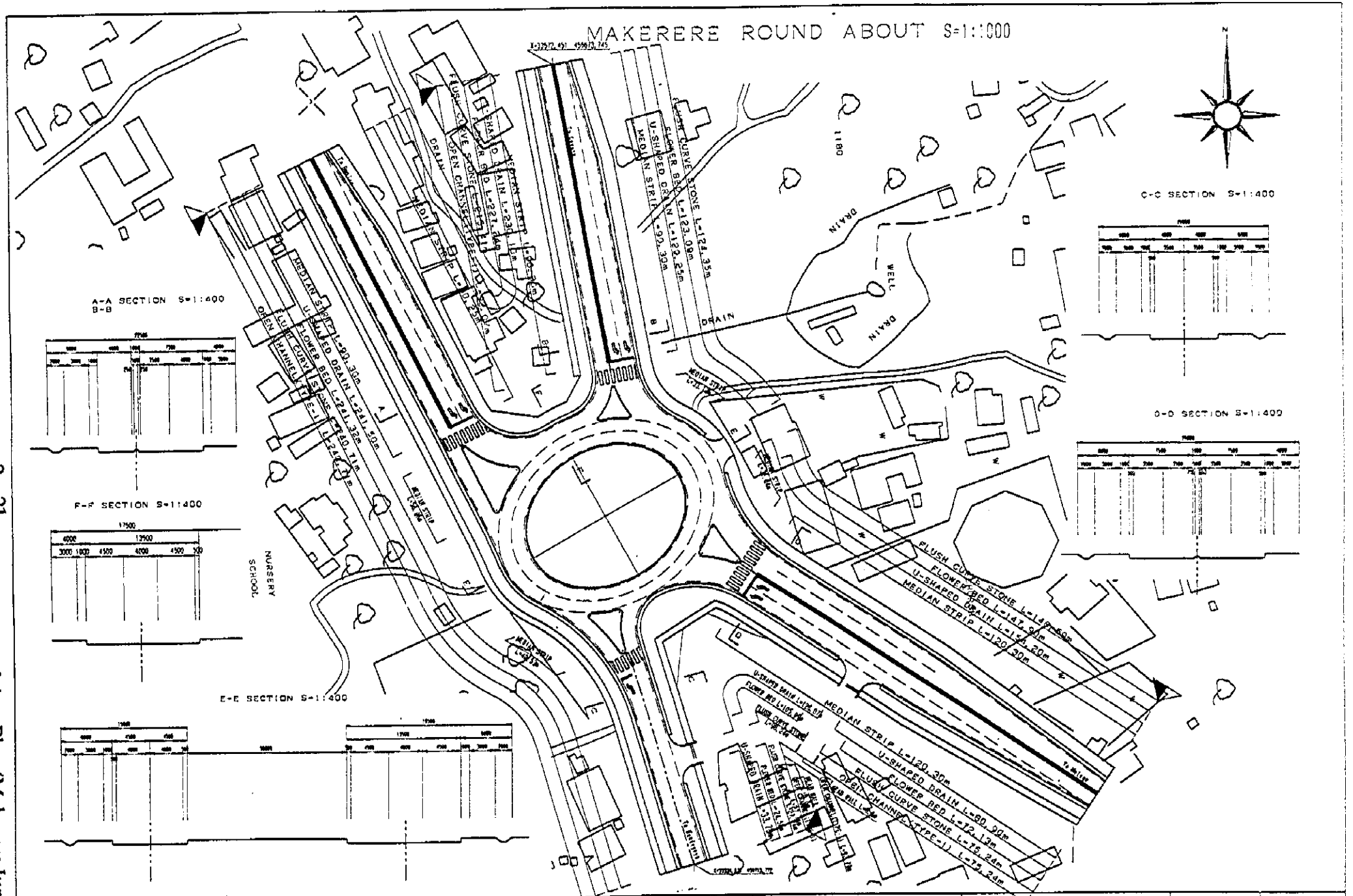
- Intersection plan,
- cross section design,
- Structure design, and
- Traffic signal, and street lighting design.

The above are shown in Fig. 2.3 ~ 2.21.



THE REPUBLIC OF UGANDA MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS	BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF INTERSECTIONS AT KAMPALA URBAN INTERFACE SECTION OF TRUNK ROAD IN THE REPUBLIC OF UGANDA	JAPAN INTERNATIONAL COOPERATION AGENCY	NATETE JUNCTION	DATE Aug. 1998	SHEET NO. 2

Fig. 2.3 Plan (Natete Junction)



THE REPUBLIC OF UGANDA
MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS

BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF INTERSECTIONS AT KAMPALA URBAN INTERFACE SECTION OF TRUNK ROAD IN THE REPUBLIC OF UGANDA

JAPAN INTERNATIONAL COOPERATION AGENCY

MAKERERE ROUND ABOUT	DATE: Aug. 1998	SHEET NO.: 3

Fig. 2.4 Plan (Makerere Junction)

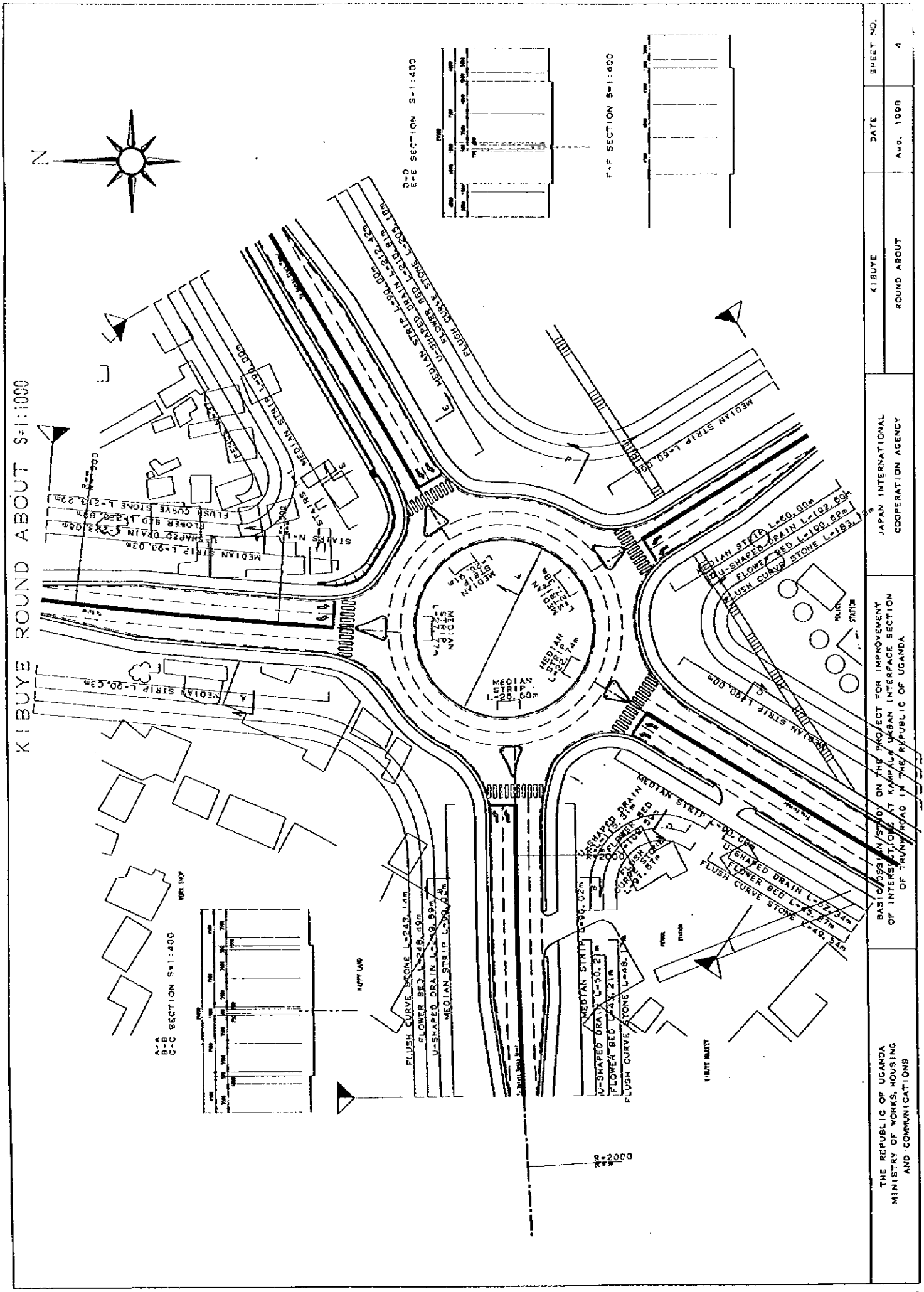


Fig. 2.5 Plan (Kibuye Junction)

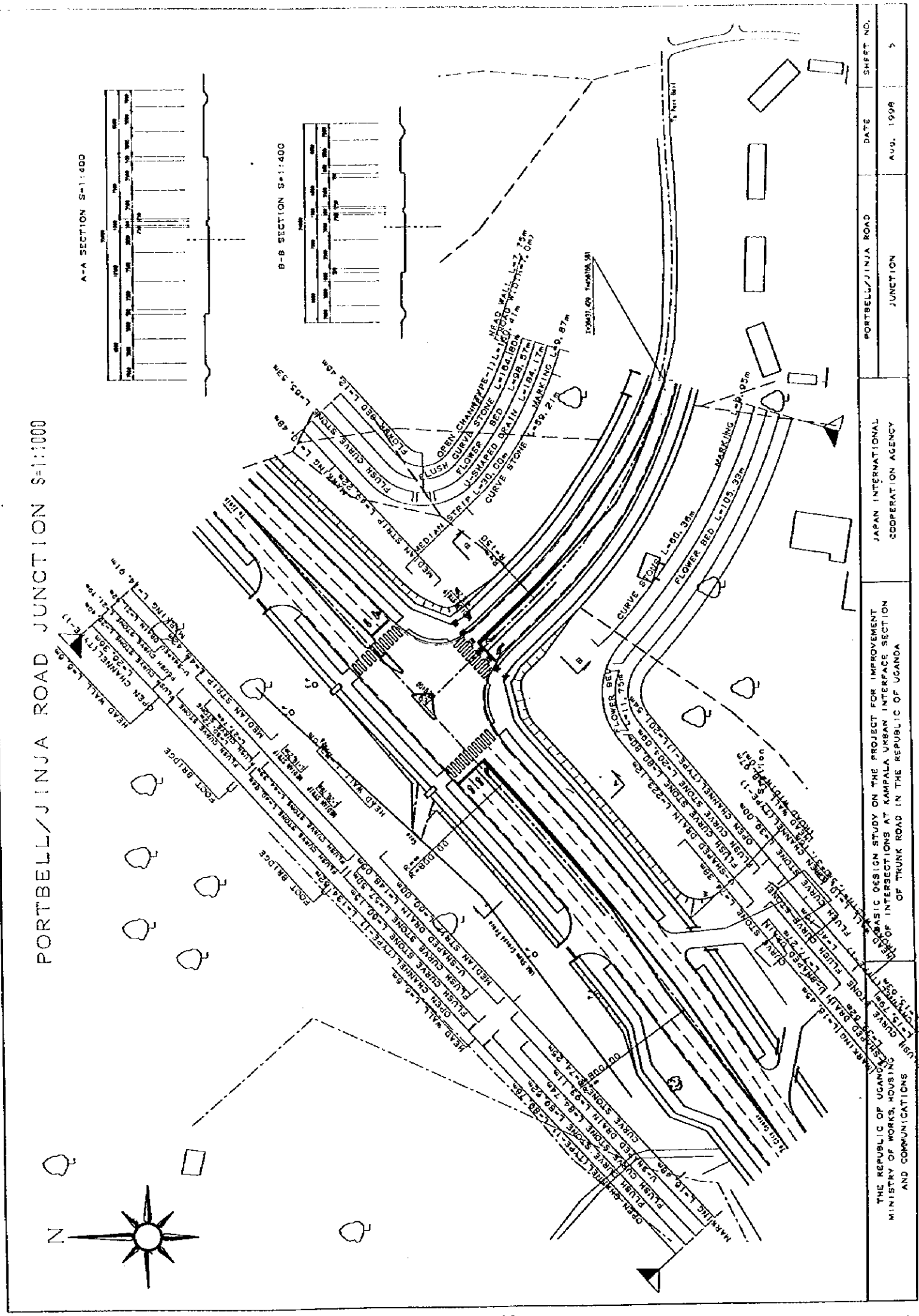


Fig. 2.6 Plan (Port Bell Junction)

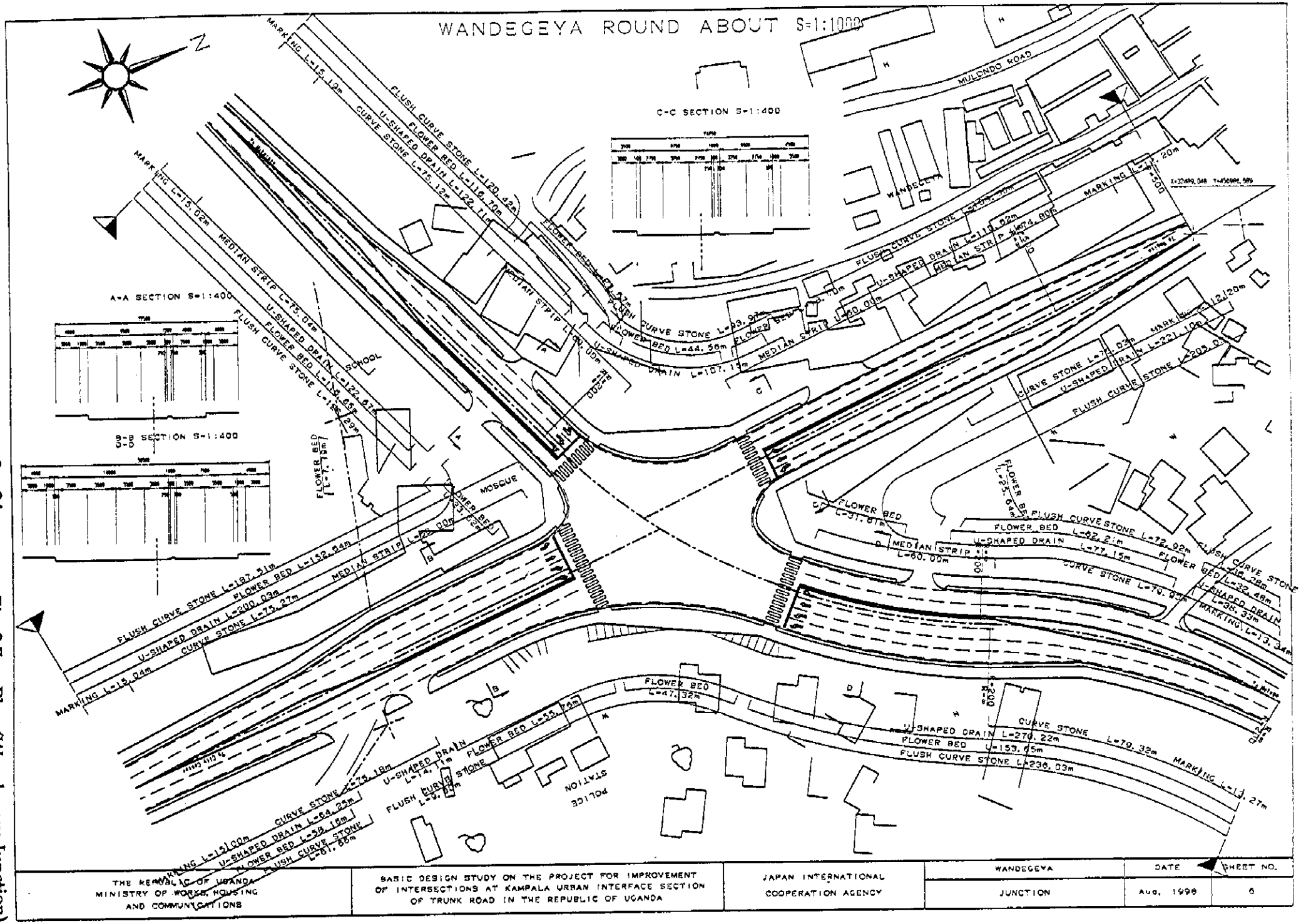
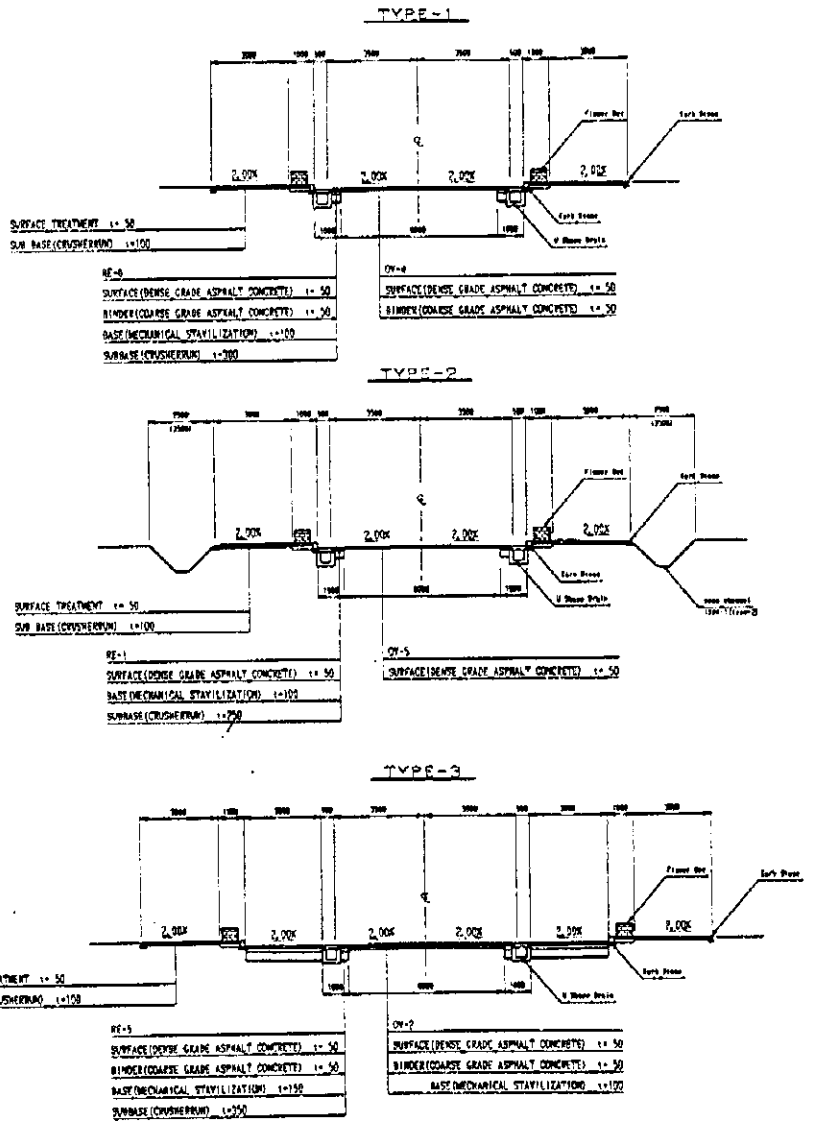


Fig. 2.7 Plan (Wandegeya Junction)

TYPICAL CROSS SECTION S=1:100



THE REPUBLIC OF UGANDA MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS	BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF INTERSECTIONS AT KAMPALA URBAN INTERFACE SECTION OF TRUNK ROAD IN THE REPUBLIC OF UGANDA	JAPAN INTERNATIONAL COOPERATION AGENCY		DATE	SHEET NO.
			TYPICAL CROSS SECTION	Aug. 1998	7

Fig. 2.8 Typical Cross Section

PAVEMENT STRUCTURE S=1:20

Reconstruction Type

A-Traffic

Re-3 Design C.B.R 12% and 20%

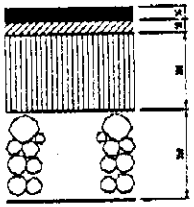
Surface (dense grade asphalt concrete)

Base (Mechanical stabilization)

Sub base (crusherrun)

B-Traffic

Re-4 Design C.B.R 2%



Surface (dense grade asphalt concrete)

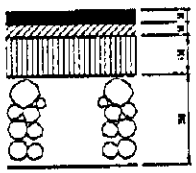
Binder (coarse grade asphalt concrete)

Base (Mechanical stabilization)

Sub base (crusherrun)

B-Traffic

Re-5 Design C.B.R 4%



Surface (dense grade asphalt concrete)

Binder (coarse grade asphalt concrete)

Base (Mechanical stabilization)

Sub base (crusherrun)

Overlay Type

Ov-1

Surface (dense grade asphalt concrete)

Binder (coarse grade asphalt concrete)

Base (Mechanical stabilization)

Ov-2

Surface (dense grade asphalt concrete)

Binder (coarse grade asphalt concrete)

Base (Mechanical stabilization)

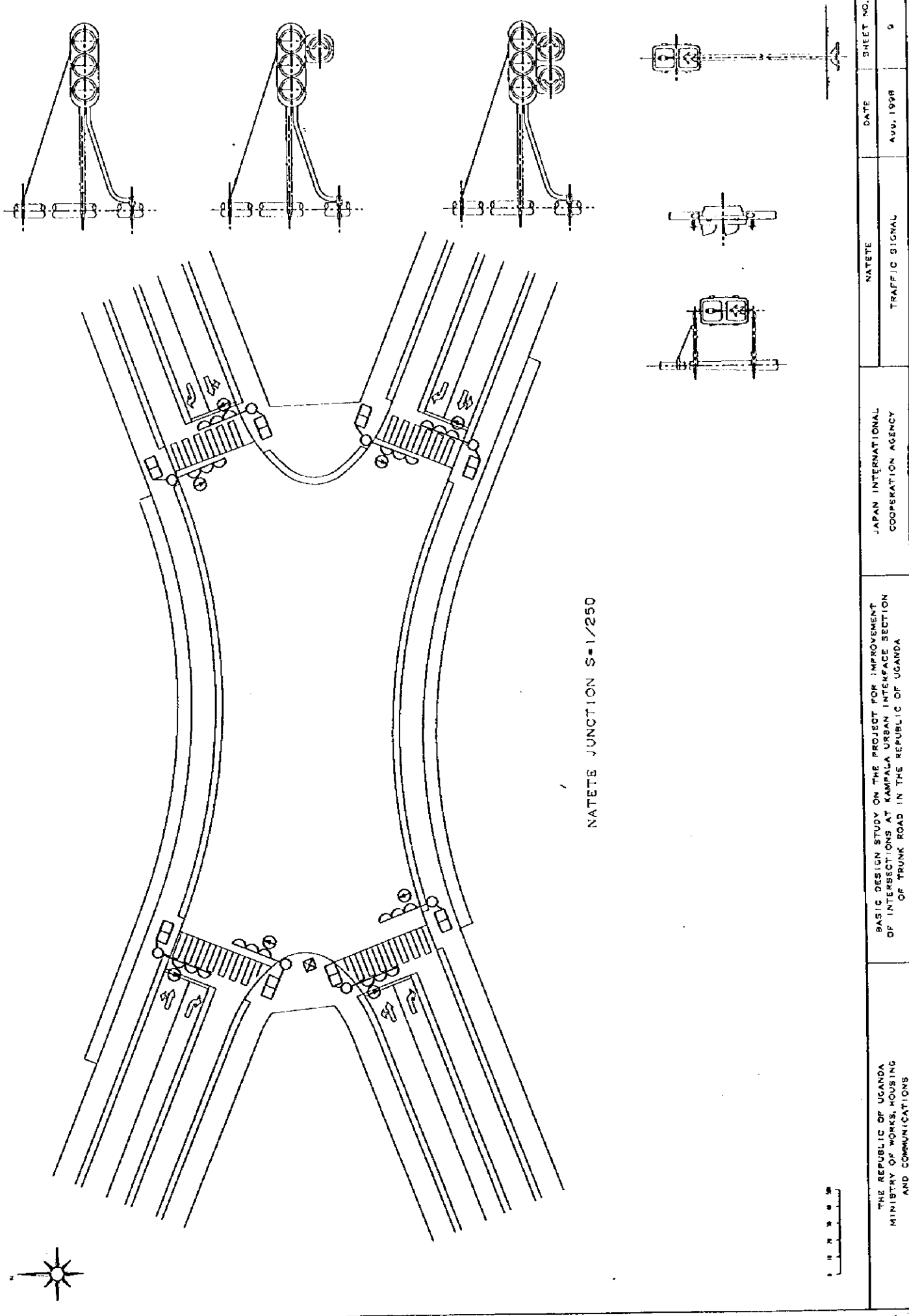
Ov-5

Surface (dense grade asphalt concrete)

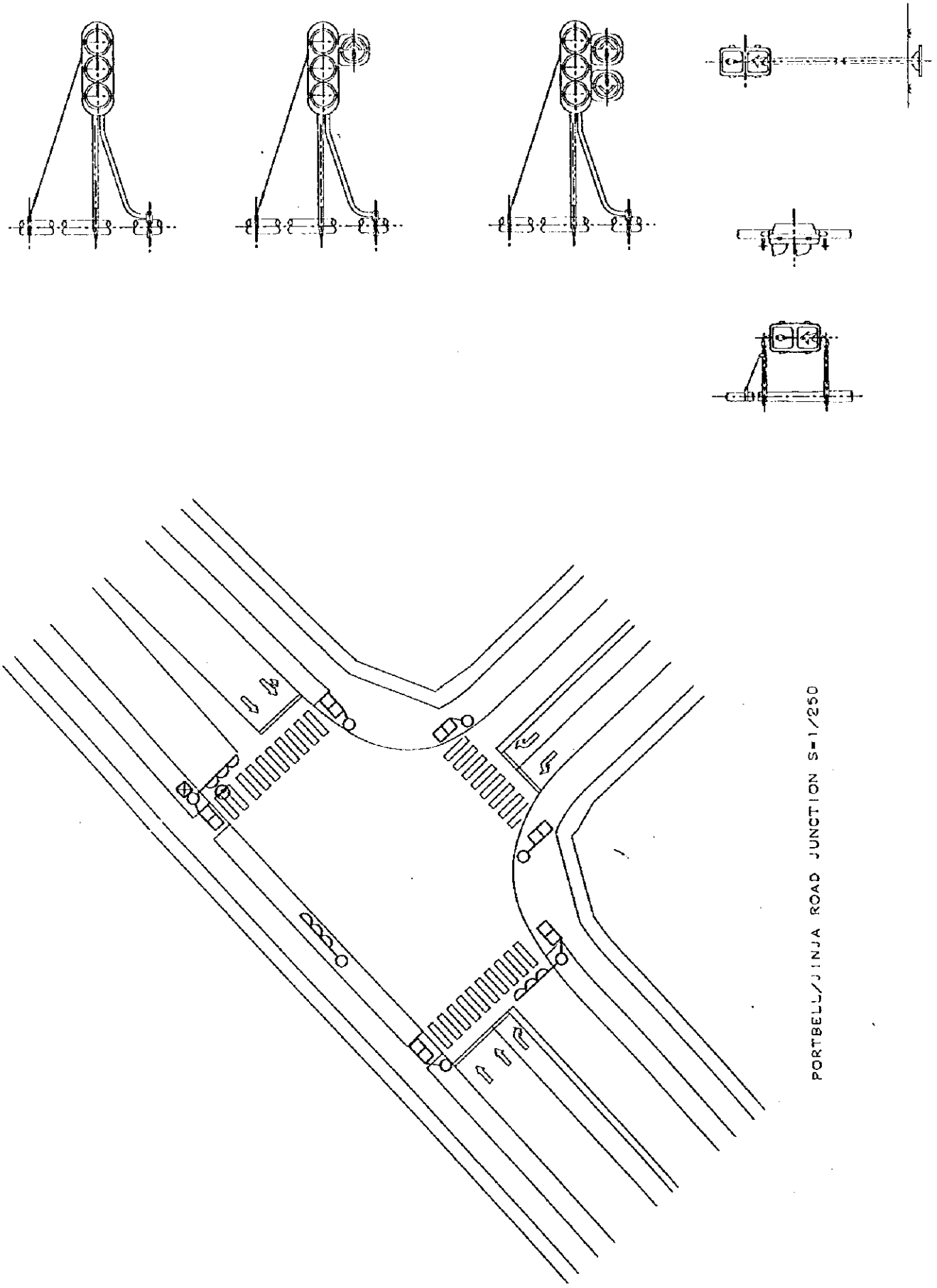
	Type of Pavement:	
	Reconstruction	Overlay
Natete	Re-5	Ov-2
Makerere	Re-4	Ov-1
Kibuye	Re-5	Ov-2
PortBell/JinjaRoad	Re-3	Ov-5
Wandegeya	Re-4	Ov-1
JinjaRoad	Re-5	Ov-2

Fig. 2.9 Pavement Structure

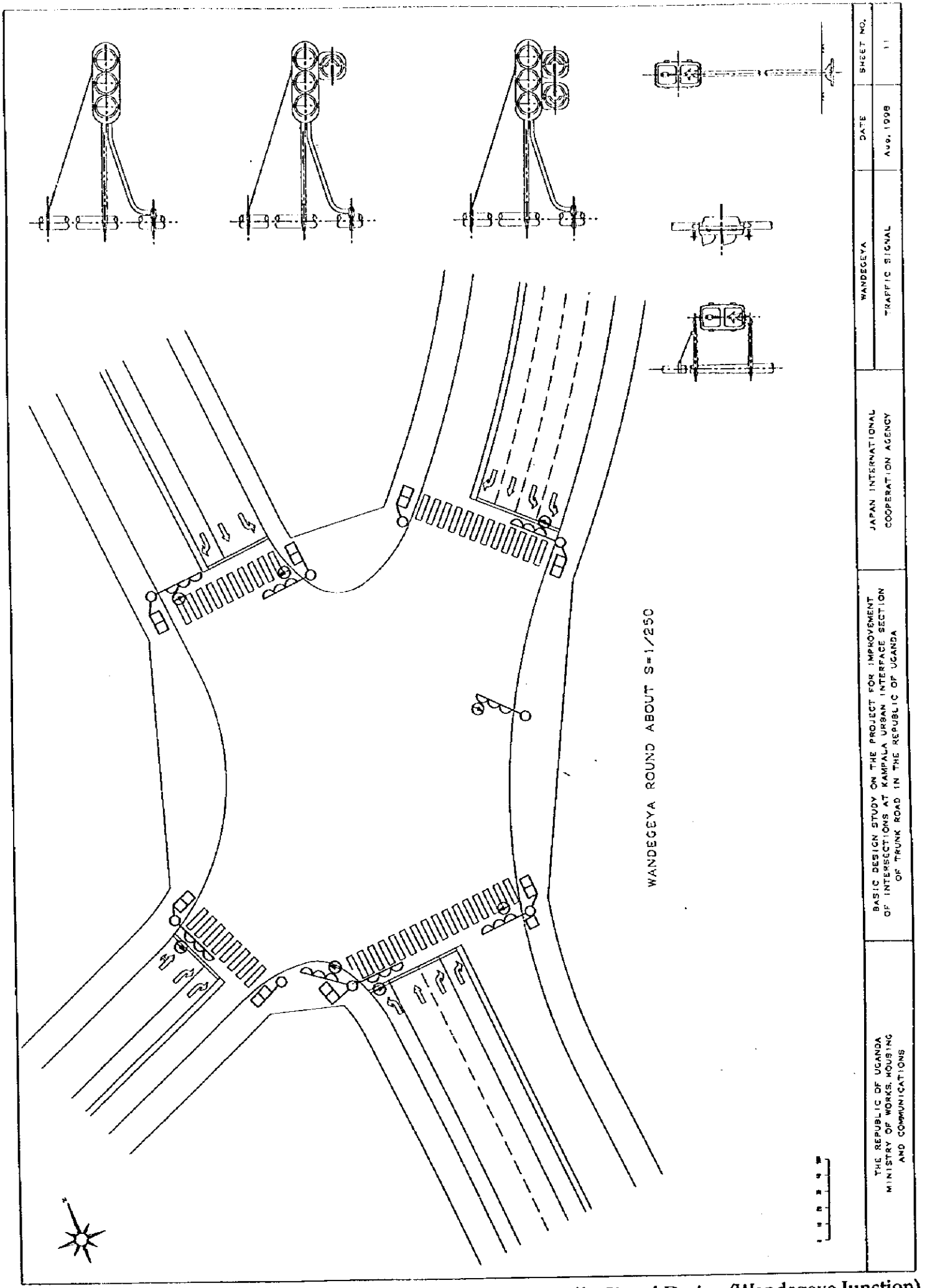
THE REPUBLIC OF UGANDA MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS	BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF INTERSECTIONS AT KAMPALA URBAN INTERFACE SECTION OF TRUNK ROAD IN THE REPUBLIC OF UGANDA	JAPAN INTERNATIONAL COOPERATION AGENCY		DATE	SHEET NO.
			PAVEMENT STRUCTURE	Aug. 1998	8



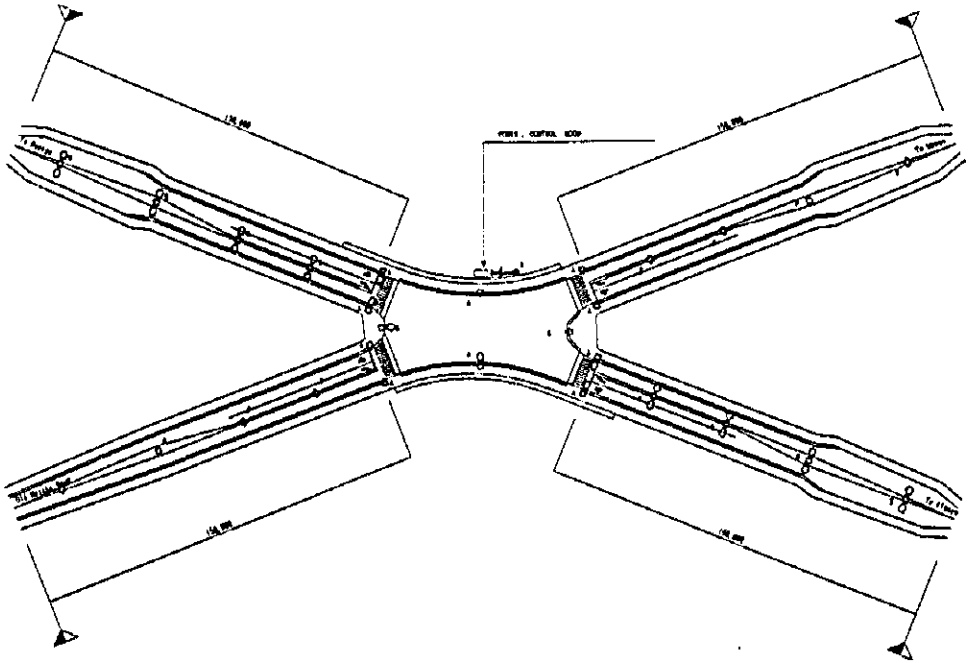
2 - 27 Fig. 2.10 Traffic Signal Design (Natete Junction)



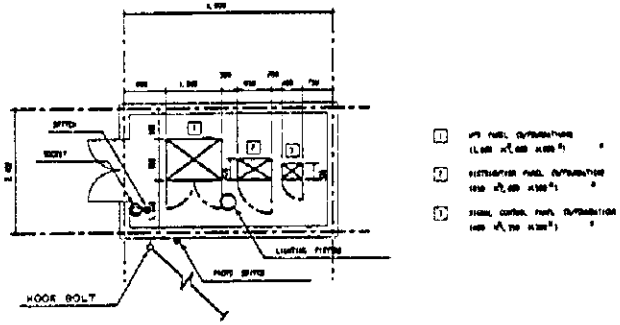
2 - 28 Fig. 2.11 Traffic Signal Design (Port Bell Junction)



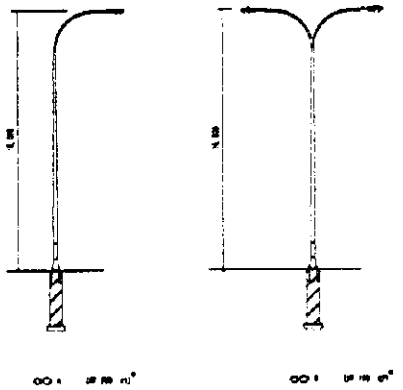
2 - 29 Fig. 2.12 Traffic Signal Design (Wandegeya Junction)



NATETE JUNCTION S=1:1000

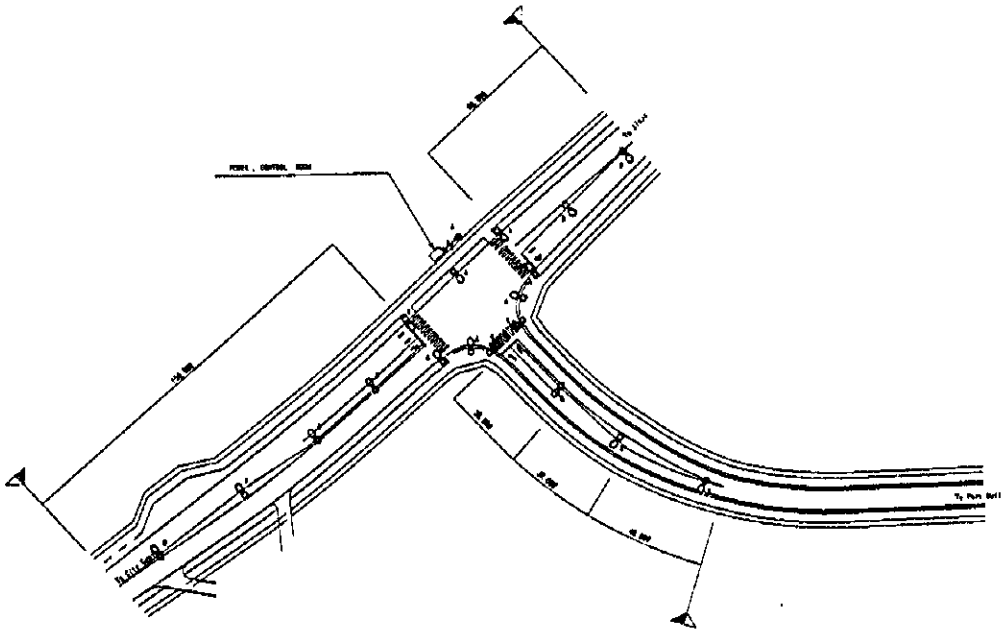


POWER , CONTROL ROOM S=1/50

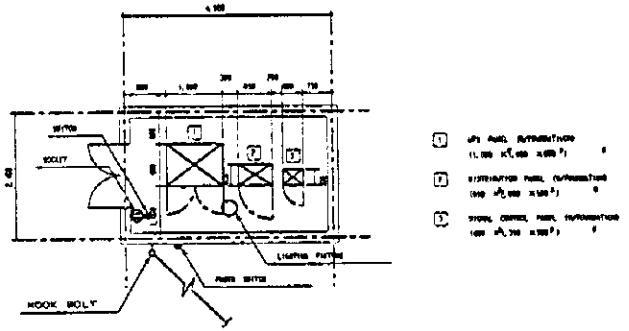


THE REPUBLIC OF UGANDA MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS	BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF INTERSECTIONS AT KAMPALA URBAN INTERFACE SECTION OF TRUNK ROAD IN THE REPUBLIC OF UGANDA	JAPAN INTERNATIONAL COOPERATION AGENCY	NATETE	DATE	SHEET NO.
			STREET LIGHT	Aug. 1998	17

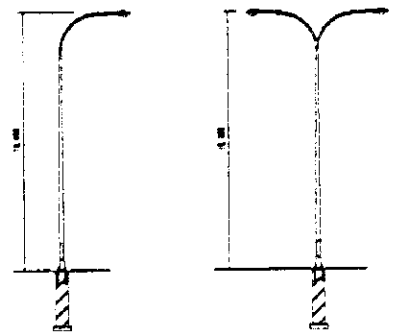
2 - 30 Fig. 2.13 Street Light Design (Natete Junction)



PORTBELL/JINJA ROAD JUNCTION S=1:1000

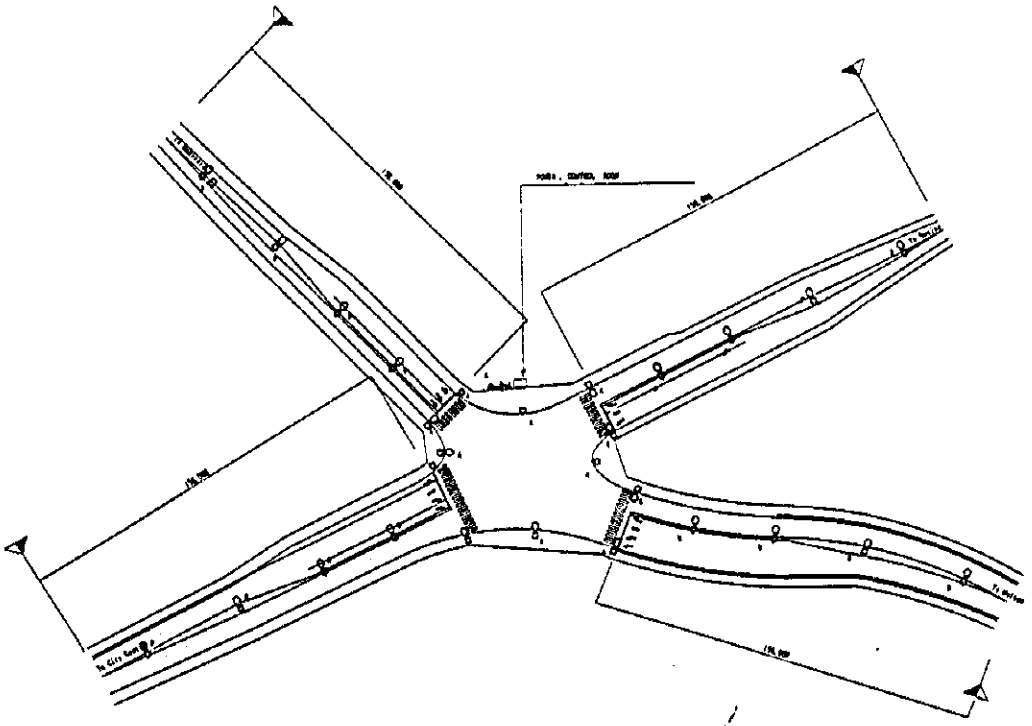


POWER , CONTROL ROOM S=1/50

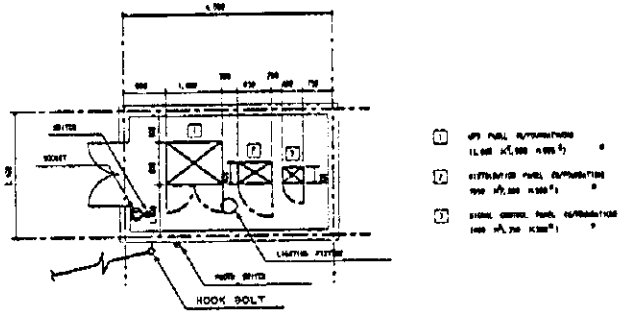


THE REPUBLIC OF UGANDA MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS	BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF INTERSECTIONS AT KAMPALA URBAN INTERFACE SECTION OF TRUNK ROAD IN THE REPUBLIC OF UGANDA	JAPAN INTERNATIONAL COOPERATION AGENCY	PORTBELL/JINJA ROAD STREET LIGHT	DATE Aug. 1998	SHEET NO. 13

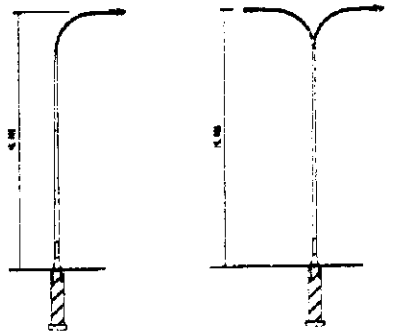
2 - 31 Fig. 2.14 Street Light Design (Port Bell Junction)



WANDEGEYA ROUND ABOUT S=1:1000



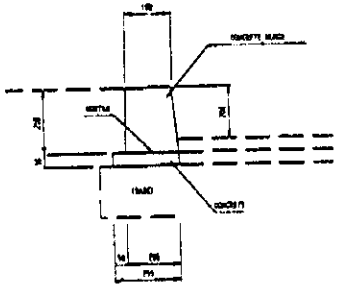
POWER . CONTROL ROOM S=1/50



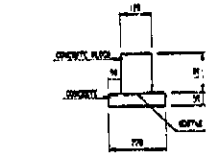
THE REPUBLIC OF UGANDA MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS	BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF INTERSECTIONS AT KAMPALA URBAN INTERFACE SECTION OF TRUNK ROAD IN THE REPUBLIC OF UGANDA	JAPAN INTERNATIONAL COOPERATION AGENCY	WANDEGEYA	DATE	SHEET NO.
			STREET LIGHT	Aug. 1999	14

2 - 32 Fig. 2.15 Street Light Design (Wandegeya Junction)

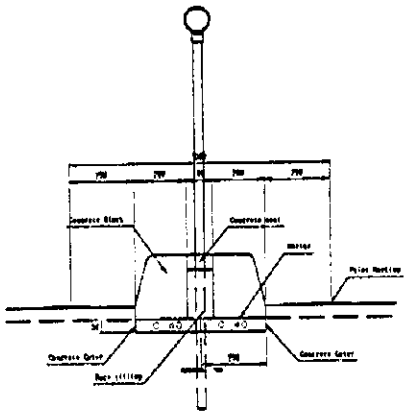
KERB STONE S=1:20



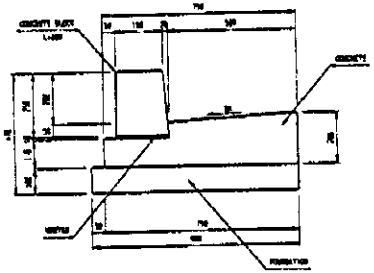
FLUSH KERB STONE S=1:20



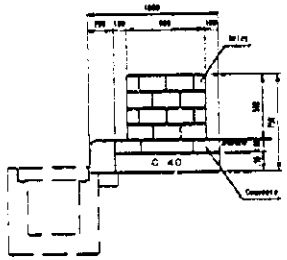
Median strip S=1:20

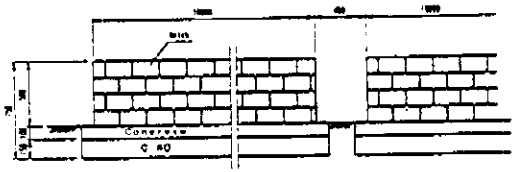


L-SIDE DITCH S=1:20



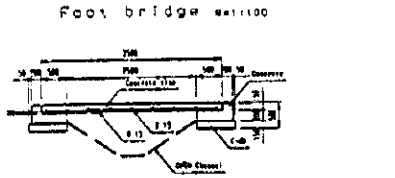
Flower bed S=1:40

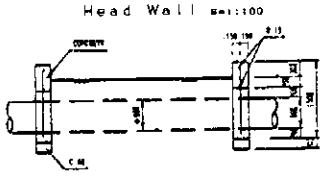


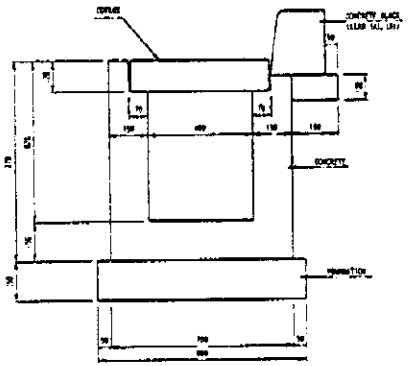


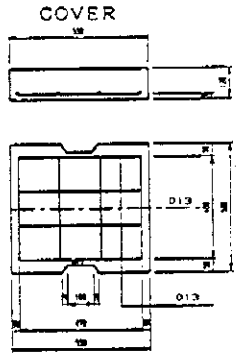
THE REPUBLIC OF UGANDA MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS	BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF INTERSECTIONS AT KAMPALA URBAN INTERFACE SECTION OF TRUNK ROAD IN THE REPUBLIC OF UGANDA	JAPAN INTERNATIONAL COOPERATION AGENCY	STRUCTURE DWG (1/7)	DATE: Aug. 1998 / SHEET NO.: 15

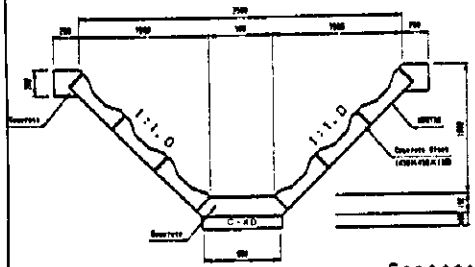
Fig. 2.16 Structure Design (1)

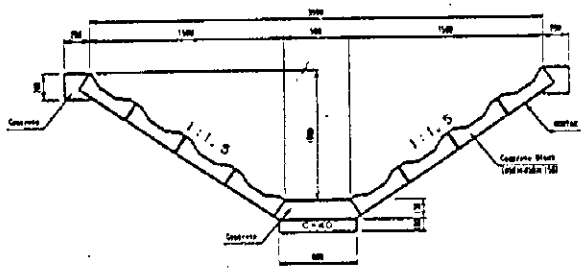


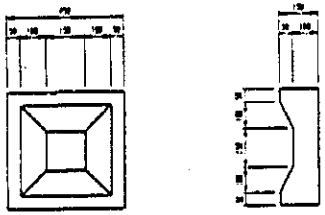


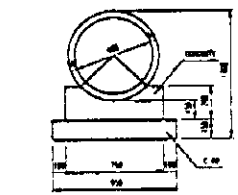


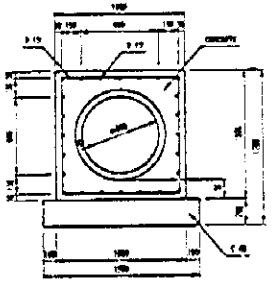








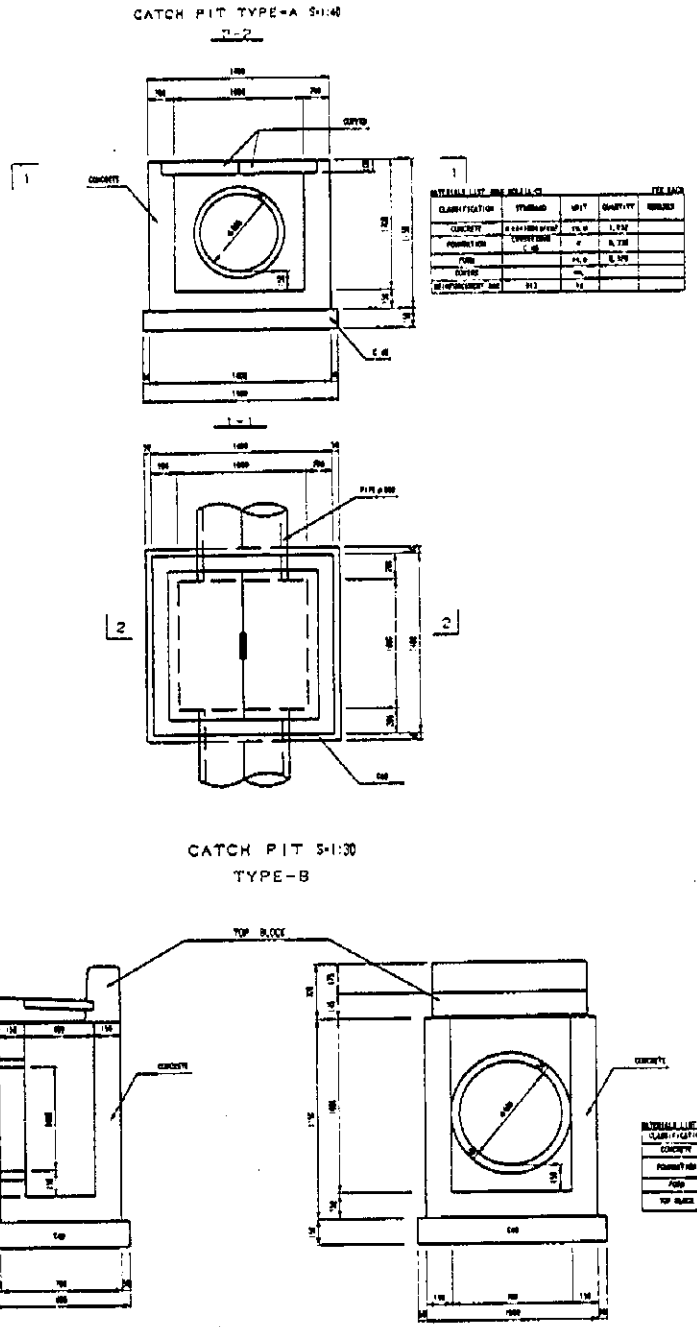


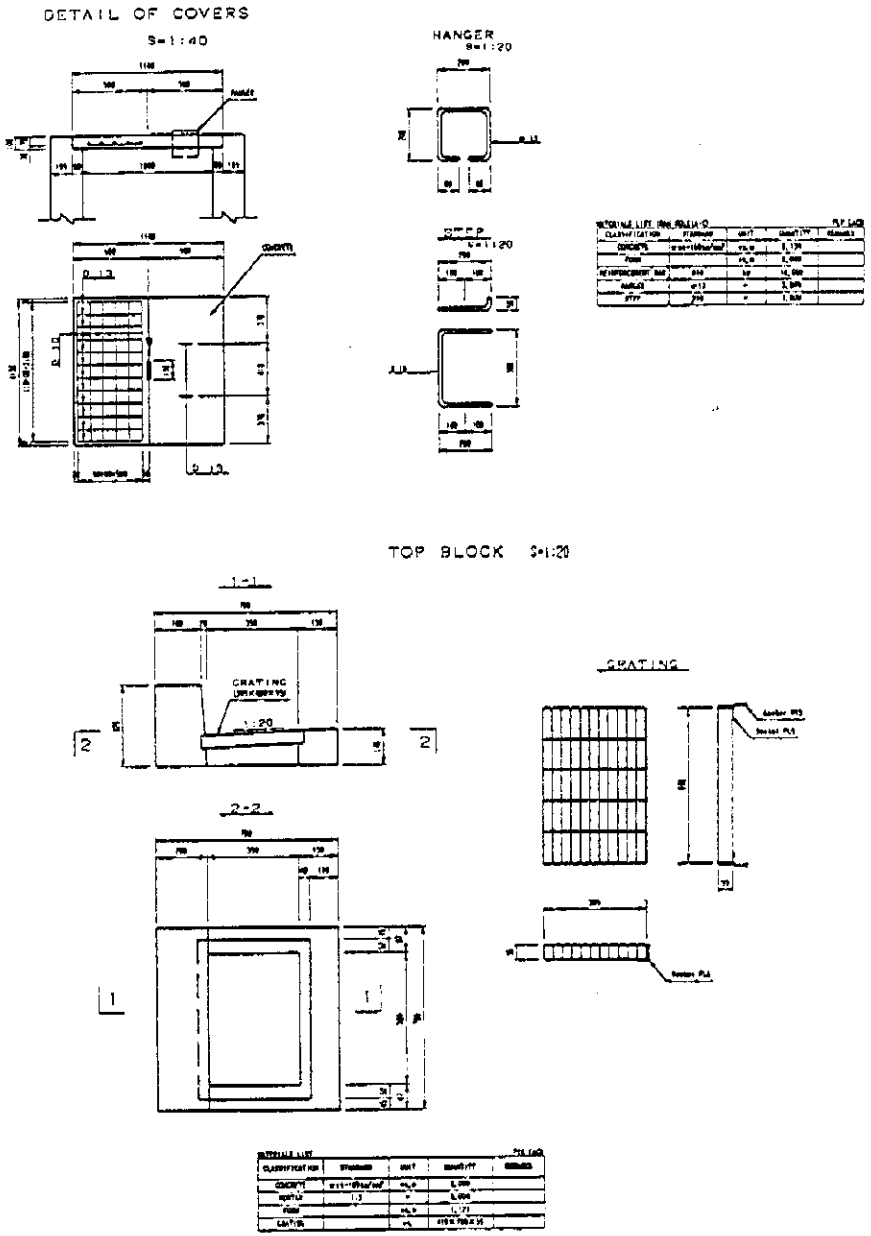


THE REPUBLIC OF UGANDA MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS	BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF INTERSECTIONS AT KAMPALA URBAN (INTERFACE SECTION OF TRUNK ROAD IN THE REPUBLIC OF UGANDA	JAPAN INTERNATIONAL COOPERATION AGENCY	STRUCTURE DWG (2/7)

DATE	SHEET NO.
Aug. 1998	19

Fig. 2.17 Structure Design (2)



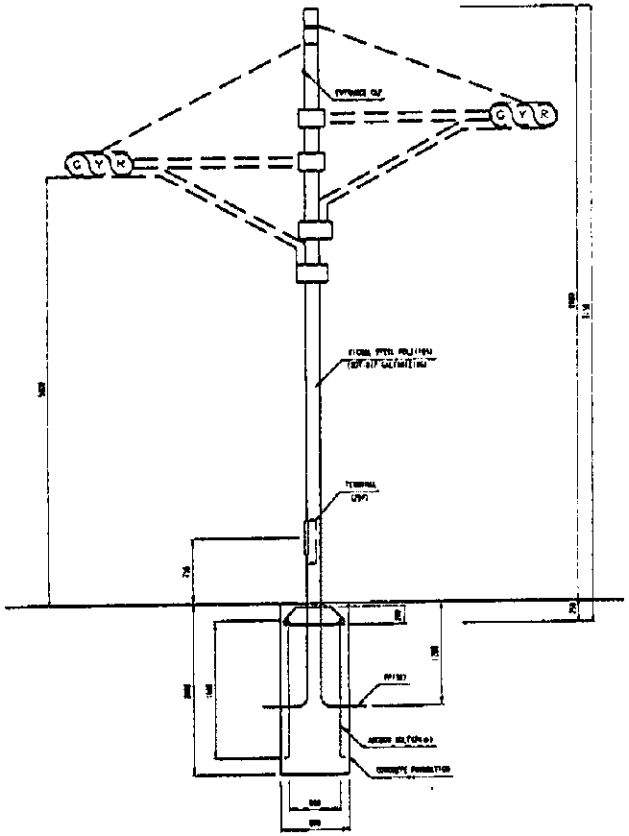


THE REPUBLIC OF UGANDA MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS	BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF INTERSECTIONS AT KAMPALA URBAN INTERFACE SECTION OF TRUNK ROAD IN THE REPUBLIC OF UGANDA	JAPAN INTERNATIONAL COOPERATION AGENCY	STRUCTURE DWG (3/7)

DATE	SHEET NO.
Aug. 1998	17

Fig. 2.18 Structure Design (3)

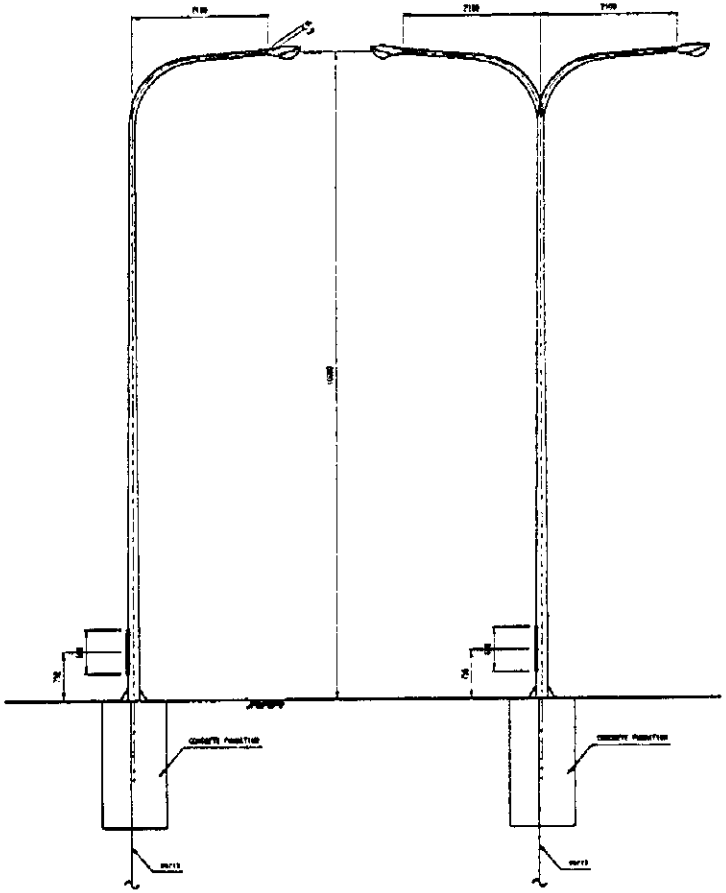
Traffic Signal S=1:60



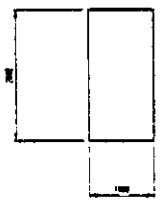
Road Lighting S=1:60

L-TYPE

T-TYPE



Concrete foundation



THE REPUBLIC OF UGANDA MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS	BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF INTERSECTIONS AT KAMPALA URBAN INTERFACE SECTION OF TRUNK ROAD IN THE REPUBLIC OF UGANDA	JAPAN INTERNATIONAL COOPERATION AGENCY	STRUCTURE DWG (6/7)	DATE Aug. 1998	SHEET NO. 18

Fig. 2.19 Structure Design (4)

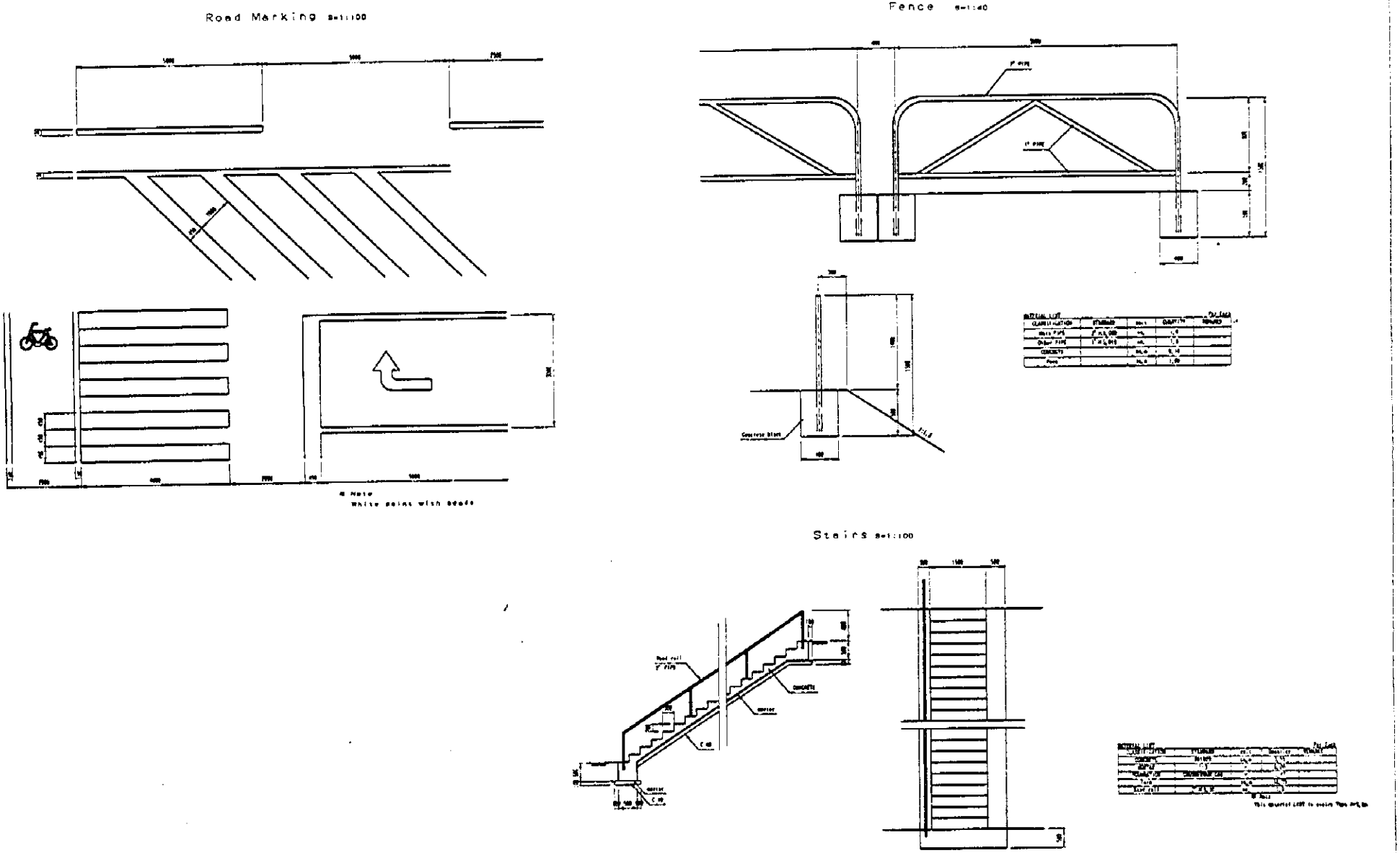


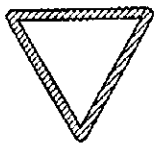
Fig. 2.20 Structure Design (5)

THE REPUBLIC OF UGANDA MINISTRY OF WORKS, HOUSING AND COMMUNICATIONS	BASIC DESIGN STUDY ON THE PROJECT FOR IMPROVEMENT OF INTERSECTIONS AT KAMPALA URBAN INTERFACE SECTION OF TRUNK ROAD IN THE REPUBLIC OF UGANDA	JAPAN INTERNATIONAL COOPERATION AGENCY		DATE / SHEET NO.
			STRUCTURE DWG (5/7)	Aug. 1998 / 19

REGULATORY SIGNS TYPICAL DETAILS
S=1/20

ROAD NARROWS ON LIGHT SIDES AHEAD

SIMILAR TO STOPPING PLACES FOR BUSES



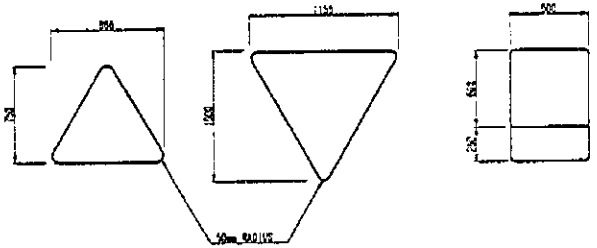
JUNCTION AHEAD

PEDESTRIAN CROSSING AHEAD

RED

BLACK

SIGN DIMENSIONS
S=1/20



DIRECTION SIGN TYPICAL DETAILS
S=1/20

STANDARD SIGNS

CAPITALS	TILE WIDTH	LOWER CASE	TILE WIDTH	NUMERALS & PUNCTUATION MARKS ETC	TILE WIDTH
A	142	a	111 (104)	1	84
B	148	b	129	2	125
C	151	c	107	3	136
D	150	d	119	4	128
E	136	e	118 (103)	5	130
F	121	f	79	6	129
G	158	g	117 (110)	7	107
H	156	h	119	8	126
I	73	i	55	9	129
J	95	j	71	10	145
K	138	k	114	1/4	130
L	118	l	83	1/2	126
M	166	m	173	3/4	182
N	148	n	119	"	71
O	158	o	115 (107)	'	57
P	134	p	120		58
Q	161	q	120	(	115
R	148	r	80 (87)	)	115
S	146	s	100 (98)	,	47
T	118 (113)	t	84	-	58
U	157	u	120 (107)		
V	133 (127)	v	107		
W	193 (198)	w	160 (154)	.	88
X	130	x	110	/	82
Y	128 (125)	y	106 (104)	1 3/4	29
Z	119	z	93		

NOTES :-
1, STROKE WIDTH IS 25mm AND THE TILE HEIGHT IS 200mm.

2, THE FIGURES IN BRACKETS ARE THE TILE DIMENSIONS TO BE USED IN THE FOLLOWING CASES:-

WHEN T, V OR Y IS FOLLOWED BY a, c, e, g, o, q, s, u, w OR y SPECIAL TILES OF LESSER WIDTHS ARE USED FOR BOTH THE UPPER CASE AND THE LOWER CASE LETTERS.

WHEN THE CAPITAL W IS FOLLOWED BY ANOTHER CAPITAL THE SPECIALLY INCREASED TILE WIDTH IS USED.

NOTES :-
1, ALL DIMENSIONS ARE IN MILLIMETRES.

2, ALL SIGNS ARE 3mm ALUMINIUM PLATES WITH REFLECTIVE MATERIALS, PLASTIC WASHERS REQUIRED.

3, ALL SIGN SUPPORTS AND FITTINGS SHALL BE IN GALVANISED MILD STEEL.

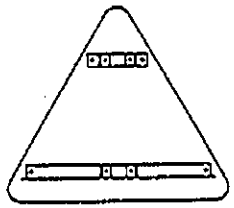
4, THE ENDS OF BOLTS SHALL BE BANNERED.

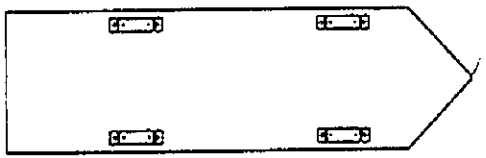
5, ALL WHITE, RED, BLUE AND YELLOW PARTS ON SIGNS SHALL BE OF RETRO-REFLECTIVE MATERIAL.

6, THE WIDTHS OF SIGN BORDERS ARE TO BE :-

RED BORDERS TO STANDARD SIGNS	- 75mm
RED STRIPES ON COUNT DOWN SIGNS	- 75mm
RED BORDER TO PRIORITY TRIANGULAR	-100mm
RED BORDER TO PROHIBITORY SIGN	- 50mm
RED BORDER TO CRUCIFORM LEVEL 'X'	- 50mm
WHITE BORDER TO PRIORITY OCTAGONS	- 50mm
WHITE 250mm HIGH WHITE LETTERING	
YELLOW STRIPES ON HAZARD SIGNS	-100mm
BLACK STRIPES ON HAZARD SIGNS	-200mm

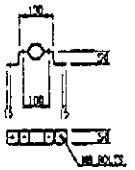
TYPICAL FIXING DETAIL
S=1/10



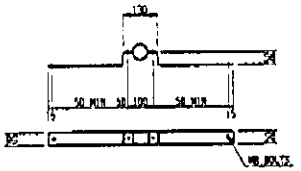


FIXING BRACKET DETAIL
S=1/10

TYPE-A



TYPE-B



STIFFENING TO SIGNS
S=1/10

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Fig. 2.21 Structure Design (6)

3. IMPLEMENTATION PLAN

3.1 Implementation Plan

3.1.1 Implementation Concept

The External Aid Coordination Department, Ministry of Finance (MOF) is responsible for the administrative matters of the project implementation and the Ministry of Works, Housing and Communications (MOWHC) is responsible for the technical matters of the project implementation. Hence, MOF shall engage in the coordination, adjustment, preparation, etc. of the administrative matters on the Grant Aid and technical cooperation agreed between the two countries. While MOWHC shall be responsible for management, supervision, and maintenance of the Project.

A Japanese consultant will be involved in the following services as the Engineer on behalf of the Government of Uganda:

- Detailed engineering design including preparation of the tender documents,
- Pre-construction activities for the prequalification, and
- Construction supervision.

A Japanese contractor to be selected by open tender according to Japan's Grant Aid Scheme shall undertake the construction in accordance with the work scheme and schedule of the Project.

The contractor is responsible for maintenance of the completed works until final acceptance.

Taking into account that the Project will be implemented under Japan's Grant Aid Scheme, the implementation concepts are introduced as below:

- Maximize the procurement of local labors, materials and equipment in Uganda so as to increase employment opportunities, to facilitate technology transfer, and to exert positive impact to the local economy.
- Establish good communication between the Government of Uganda, the consultant and the contractor for the project implementation as smooth as possible.

- Prepare a practical construction plan considering the local rainfall pattern, period required for materials and equipment procurement, and application of appropriate construction methods.

- Establish a coordinated maintenance organization with Kampala City Council (KCC).

- Dispatch mechanical experts after the completion.

3.1.2 Implementation Conditions

Special considerations for the project implementation are described below:

- Labor Low

  The contractor shall administer labors properly under adequate safety control and prevent conflict with local labors in accordance with the prevailing government laws in Uganda.

- Tight Security at Project Sites

  Special security measures to be provided by the government agency concerned shall be requisite to secure the project personnel and properties.

- Religious and Local Restriction

  Besides national and public holidays, there are religious or local traditional holidays in Uganda. These localities shall be taken into account in the estimation of workable days.

- Custom Clearance

  Because the nation is landlocked, most of the foreign materials and equipment required for the Project have to be imported via Kenya, where it require several days to clear customs. The Government of Uganda require a guarantee of transmittal of materials and equipment to be imported from Kenya in advance.

- Traffic Management during the Construction Period

  It is requested that the implementation of the Project should be undertaken without interrupting the traffic movement at the sites. Cooperation with the traffic police and KCC is imperative.

- Establishment of Implementation Order

  It is important to establish an implementation order for a smooth execution of the Project. Especially, as the five (5) project sites are independently located within the city, establishment of efficient implementation schedule is quite important.

3.1.3 Scope of Works

The scope of works, which the Japanese Government and the Uganda Government are respectively responsible, is described below:

(1) Works and Facilities to be Provided by Japanese Government

- Earth work at five junctions,
- Drainage works at five junctions,
- Pavement works at five junctions,
- Installation of traffic safety facilities,
- Installation of traffic signals and street lights at Natete, Port Bell and Wandegeya junctions,
- Establishment of a camp yard and a project office,
- Transportation of materials and equipment from Japan and/or third countries, and
- Consulting works.

(2) Works and Facilities to be Provided by Ugandan Government

- Site clearance and relocation of utilities,
- Drainage water management,
- Installation of utilities,
- Acquisition of borrows pits, camp yard and land clearance,
- Banking arrangement with authorized foreign exchange bank in Japan,
- Issuance of visa, certificates necessary for the execution of the Project to consultant and contractor,

- To ensure tax exemption for consultant and contractor, and
- To protect the project sites and provision of security facilities.

3.1.4 Consultant Supervision

(1) Schedule of the Consulting Services

The project shall be commenced with the signing of an Exchange of Notes (E/N), pertaining to the engineering services for the detailed design between the Governments of Japan and Uganda. The contract for the detailed design shall be concluded between MOWHC and the Japanese consultant who will provide the following engineering services within the limits of the Grant Aid:

(a) Detailed Design Phase

The consultant shall carry out the detailed engineering design of the 5 (five) junctions in compliance with specifications and concepts of the basic design. The contents of the design are as follows:

- Design criteria and standards,
- Design reports,
- Drawings,
- Quantity and cost estimate,
- Construction planning, and
- Tender and relevant documents.

(b) Pre-construction Phase

After signing of an Exchange of Notes (E/N) pertaining to the engineering service for the constructions supervision and the construction, MOWHC shall select a Japanese contractor who will implement the project through an open tender. The consultant shall assist MOWHC on the following tasks;

- Bid announcement,
- Prequalification of contractors,
- Pre-bid conference and site inspection,
- Tender and tender evaluation, and
- Contract negotiation.

(c) Construction Supervision Phase

The engineering services for construction supervision will begin with the issuance of a Notice of Proceed (N/P) to the Contractor by MOWHC.

The consultant shall perform his duties in accordance with criteria and standards applicable to the construction works and shall exercise the powers vested in him as the Engineer under the contract to supervise the field works by the contractor.

The consultant within his capacity as the Engineer shall directly report to MOWHC about the filed activities and shall issue field memo or letters to the contractor regarding the various matters, including progress, quality, safety and payment of the Project.

(2) Staffing

The required staff and their responsibilities at the detailed design and construction stages are described below:

(a) Team Leader

Responsible for all aspects of consulting services during the detailed design and construction stages.

(b) Road Design Engineer

Responsible for the detailed design of junction structures including the drainage structures, pedestrian ways, bus stops and so on.

(c) Facility Engineer

Responsible for the detail design of road facilities.

(d) Traffic Signal Specialist

Responsible for the detail design of traffic signal system and road lighting.

(e) Survey Engineer

Responsible for topographic survey and analysis of hydrological and geotechnical data.

(f) Construction Planner/Cost Estimator

Responsible for the preparation of detailed implementation plan including a review of the cost estimated at the basic design stage.

(g) Material Engineer

Responsible for the quality control for the materials to be used for the structures during the construction.

(h) Resident Engineer

As the resident engineer in Kampala city, responsible for supervising the construction work.

(3) Construction Schedule

(a) Preparation works

With the issuance of a Notice to Proceed, contractor shall initiate the preparation works. These include mobilization of construction materials and equipment, labor and opening of the base camp for construction. Especially, opening of the base camp at Bugolobi, total area of about 11,000 square meters, is very essential for the smooth implementation of the Project.

(b) Provision of Utilities at the Project Sites

Provision of electricity, waters and other utilities necessary for the construct work has to be done prior to the initiation of the construction.

(c) Construction Works

Construction Management and Implementation Order

As all the project junctions are located at vital points of urban traffic in the city of Kampala, the construction works have be

carried out without interrupting daily traffic flow. This will be done under well-designed method of traffic management system organized by the contractor and MOWHC in affiliation with KCC and Traffic Police, in which the safety of vehicles and pedestrians as well as that of project personnel must be guaranteed.

The construction work shall be initiated with the widening works of the junction centers, followed by the reconstruction of existing road sections which access to junctions.

Quality Control

The quality control of the work shall be carried out by the Japanese contractor. Examination of qualities of products by each item of construction work will be executed by the Japanese engineer who will be assigned to the Project especially for this purpose.

(d) Electricity Supply to Traffic Signals and Lights

Electricity supply to the traffic signals, road lights and the related facilities shall be borne by Ugandan side.

(e) Maintenance Works of Junctions

The maintenance work of improved junctions by the Project shall be borne by MOWHC and KCC according to their administrative responsibilities.

3.1.5 Procurement Plan

(1) Procurement Plan of Construction Materials

The construction materials to be used for the Project are mostly available in Kampala, with exception of such electric facilities as traffic signals and lightnings which will be procured via either Japan or third countries after the evaluation of the products in terms of their quality, function, and applicability as explained below:

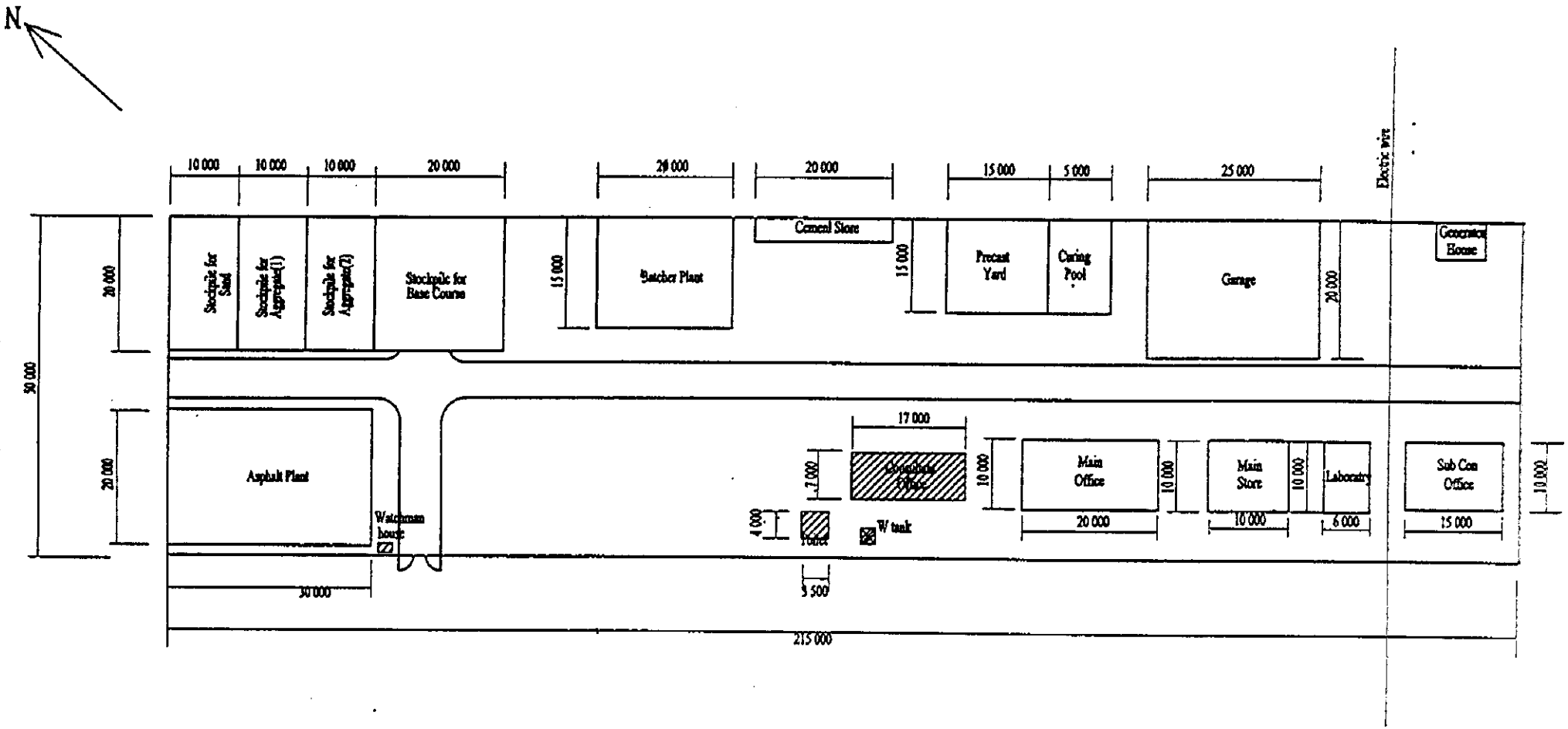


Fig. 3.1 Ground Camp General Plan

Construction Order

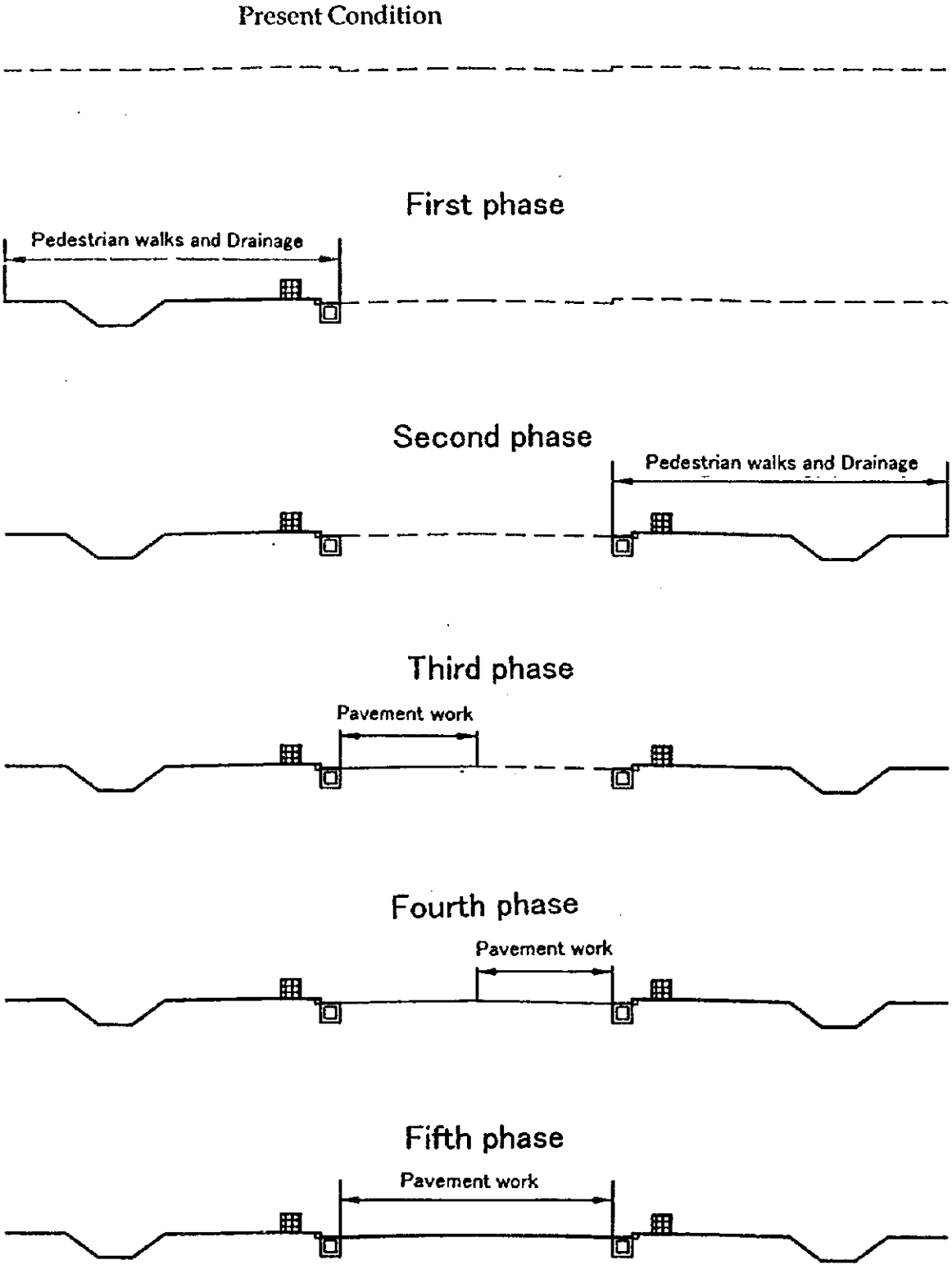


Fig. 3.2 Construction Order

Table 3.1 Procurement of Major Construction Materials

Item	Procurement in Uganda	Procurement in Third Countries	Procurement in Japan
Cement	O		
Reinforcing bar	O		
Asphalt	O		
Concrete admixture		O	
Sand & gravel	O		
Timber	O		
Gasoline	O		
Traffic signal			O
Electric device			O
Traffic light		O	

Criteria of selecting the model of electric devices

The selection of the electric devices to be adopted was conducted adopting "a scoring method" with the assignment of "certain values" for each item of evaluation as exemplified below:

(Points to e remarked)

Satisfy the requirement	:	2 points
Satisfy the requirement with some conditions	:	1 point
Not satisfying the requirement	:	0 point

Table 3.2 Evaluation of Traffic Signals

Items to be Evaluated		Model T-A	Model T-B	Model T-C
Temperature Resistance	Condition	-20°C ~ 60°C	-20°C ~ 60°C	-20°C ~ 60°C
	Point	2	2	2
Visibility	Condition	Hang-over	Pole type	Pole type
	Point	2	1	1
Height Adjustability	Condition	Adjustable	Adjustable	Fixed
	Point	2	1	1
Maintenability	Condition	Good	Good	Good
	Point	2	2	2
Experience in East African Countries	Condition	Dar es Salaam	None	None
	Point	2	0	0
Price	Condition	Moderate	Reasonable	Moderate
	Point	1	2	1
Total Point		11 (adopted)	8	7

Model T-A : Manufactured in Japan
Model T-B : Manufactured in Singapore
Model T-C : Manufactured in Germany

Table 3.3 Evaluation of Uniterruptible System

Items to be Evaluated		Model U-A	Model U-B	Model U-C
Temperature Resistance	Condition	0°C ~ 40°C	0°C ~ 60°C	0°C ~ 40°C
	Point	2	2	2
Frequency Range	Condition	47.0 ~ 53.0 Hz	47.5 ~ 52.5 Hz	47.0 ~ 63.0 Hz
	Point	2	2	2
Voltage Range	Condition	230 ~ 250 V	198 ~ 264 V	184 ~ 276 V
	Point	1	2	2
Durability	Condition	260 minutes	180 minutes	9 minutes
	Point	2	1	0
Maintenability	Condition	Very Easy	Easy	Easy
	Point	2	1	1
Price	Condition	Moderate	Reasonable	Moderate
	Point	1	1	1
Total Point		10 (adopted)	9	8

Model U-A : Manufactured in Japan
Model U-B : Manufactured in Japan
Model U-C : Manufactured in France

Table 3.4 Evaluation of Street Light

Items to be Evaluated		Model T-A	Model T-B	Model T-C
Pole Material	Condition	Aluminum	Aluminum	Aluminum
	Point	2	2	2
Durability	Condition	Stabilizers installed inside poles	Stabilizers installed inside poles	Stabilizers installed inside poles
	Point	2	2	1
Maintenability	Condition	Very Easy	Very Easy	Easy
	Point	2	2	1
Price	Condition	Moderate	Reasonable	Moderate
	Point	0	2	1
Total Point		6	8 (adopted)	5

Model T-A : Manufactured in Japan
Model T-B : Manufactured in Taiwan
Model T-C : Manufactured in Singapore

(2) Procurements of Construction Equipment

Most of the construction equipment is available at Ugandan contractors as shown in Table 3.5. However, such construction equipment as asphalt finisher and asphalt plant, although they are available in Uganda with conditions, are recommended to be procured in Kenya for operational reasons.

Table 3.5 Procurement of Construction Equipment

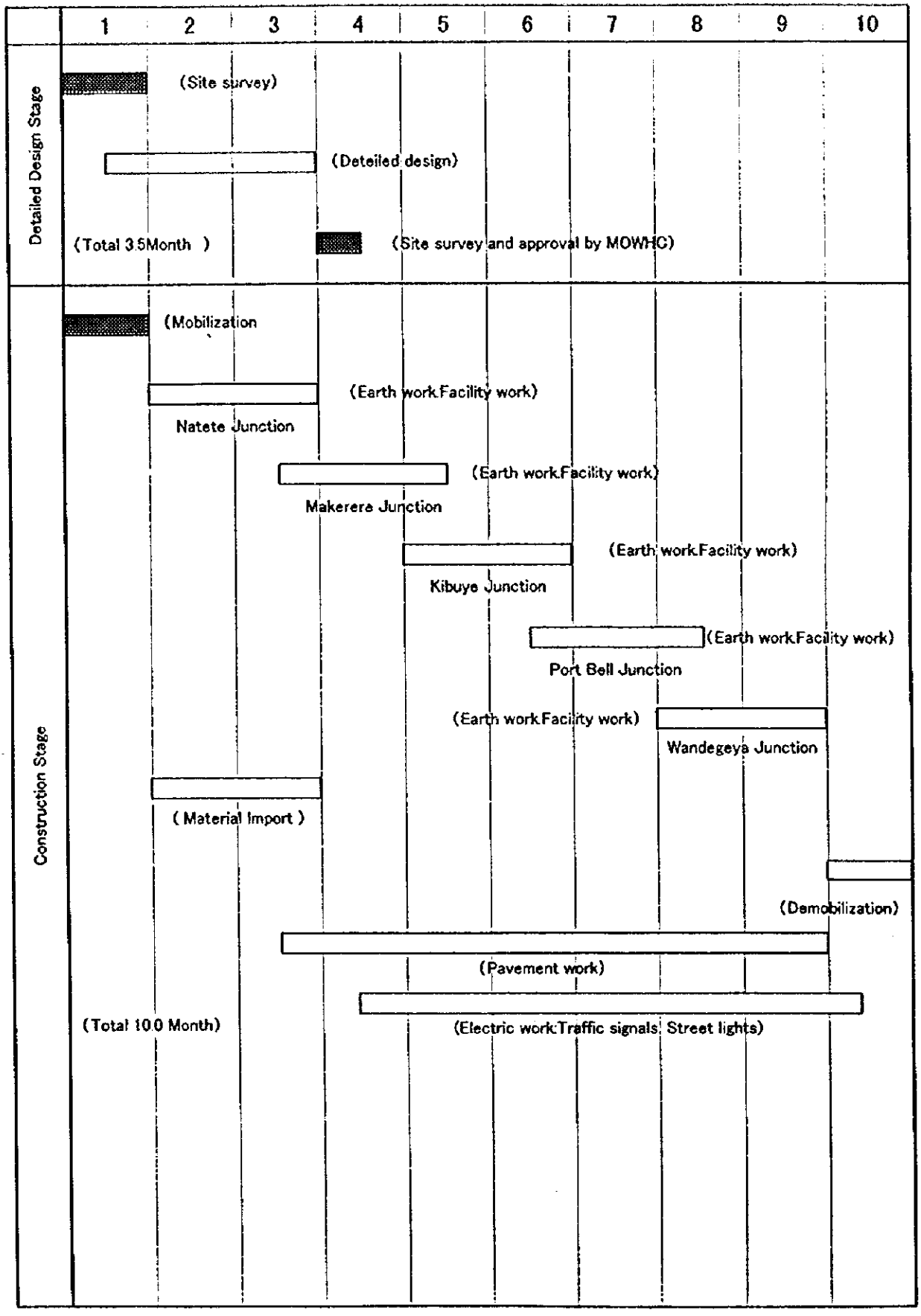
Item	Capacity	Procurement in Uganda	Procurement in Kenya
Bulldozer	15 t	O	
Power Shovel	1.4 m^3	O	
Dump Truck	8 t	O	
Backhoe	0.6 m^3	O	
Vibration Roller	3 - 4 t	O	
Load Roller	10 t	O	
Motor Grader	3.1 m	O	
Asphalt Spray	2,000 lit	O	
Concrete Mixer	3 m^3	O	
Tractor	40 t	O	
Power Generators (1)	75 kVA	O	
Power Generators (2)	100 kVA	O	
Compressor	7 m^3/min	O	
Lane Maker	2 lit/min.	O	
Asphalt Finisher	80 m^3/h		O
Concrete Plant	50 m^3/h		O

3.1.6 Implementation Schedule

After signing the Exchange of Note for the detailed design, the project implementation will officially commence. The detailed design will take a 3.5 month period including one month site survey. After the detailed design completed, the Notes for the construction and the engineering services for construction supervision are exchanged by the two Governments, and pre-construction activities such as Prequalification (P/Q) of the contractors, selection of the contractors, contract award, and so on will follow and take about a 1.5 month period.

Following those, construction will commence and take a ten months period to complete the Project. The total implementation period is, therefore, estimated to be 15 months as shown in Table 3.3.

Fig. 3.4 Overall Inplementation Schedule



3.1.7 Obligations of Recipient Country

The following measures should be undertaken by the Government of Uganda on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project.
2. To secure the land for the execution of the Project.
3. To clear the sites prior to the commencement of the construction.
4. To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement (B/A), namely the advising commission of the "Authorization to Pay (A/P)" and payment commission.
5. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Uganda and prompt international transportation therein of the materials and equipment for the Project purchased under the Grant Aid.
6. To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Uganda with respect to the supply of the products and services under the verified contracts.
7. 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 Uganda and stay there for the performance of their work.
8. To provide necessary permissions, licenses, and other authorizations for implementing the Project, if necessary.
9. To maintain and use properly and effectively the facilities constructed under the Project.
10. To bear all the expenses other than those to be borne by the Japan's Grant Aid within the scope of the Project.
11. To coordinate and solve any issues related to the Project which may be

raised from third parties or inhabitants in the Project area during implementation of the Project.

12. To secure the safety of Japanese nationals including other personnel engaged in the Project and to provide tight security against riot, insurrection, civil commotion, rebellion, and usurped power.

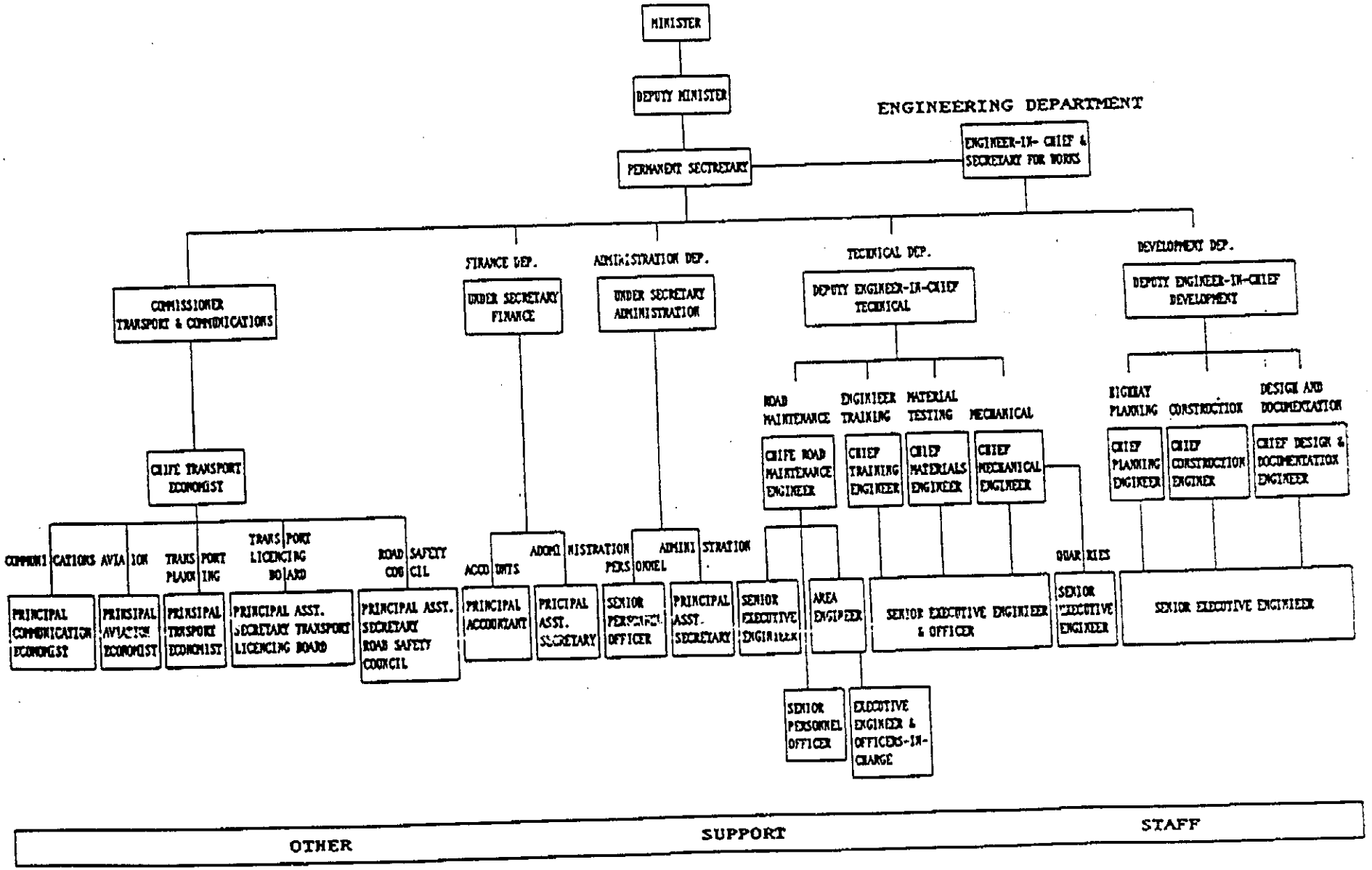


Fig. 3.3 Organization Chart of MOWHC

3.2 Operation and Maintenance Plan

3.2.1 Operation and Maintenance Organization

The Development Department, Ministry of Works, Housing and Communications (MOWHC) is the government agency responsible for the execution of the Project as its organizations is shown in Fig. 3.3. The number of staff members of MOWHC is as follows:

Planning Design, Doc. Section	:	31
Construction Section	:	18
Mechanical Section	:	160

The maintenance work of roads in Kampala city is carried out by the Road Maintenance Section of Kampala City Council (KCC). The organization chart of each Maintenance Section is shown in Fig. 3.4 and 3.5 respectively.

3.2.2 Operation and Maintenance Plan for Improved Junction

(1) Operation and Maintenance Plan of Traffic Signals

As recommended in the Feasibility Study, it is prerequisite for MOWHC to strengthen the maintenance capability and to reinforce traffic legislation, institutional build-up and to promote traffic education. In order to accomplish these targets, it is recommended for MOWHC to establish "Traffic Signal Maintenance Unit" in their organization.

However as far as operation and maintenance of traffic signals are concerned, MOWHC intends to activate the existing system to meet a short-term requirement. At present KCC is maintaining traffic signals in the city in cooperation with Uganda Electricity Board (UEB). It is rational to utilize those accumulated technical skills by KCC and UEB for the Project. MOWHC and KCC have already and mutually agreed to this point. At present Traffic and Electrical Section of City Engineer and Surveyor's Department in KCC is in charge of operation and maintenance of traffic signals and street lights in the city.

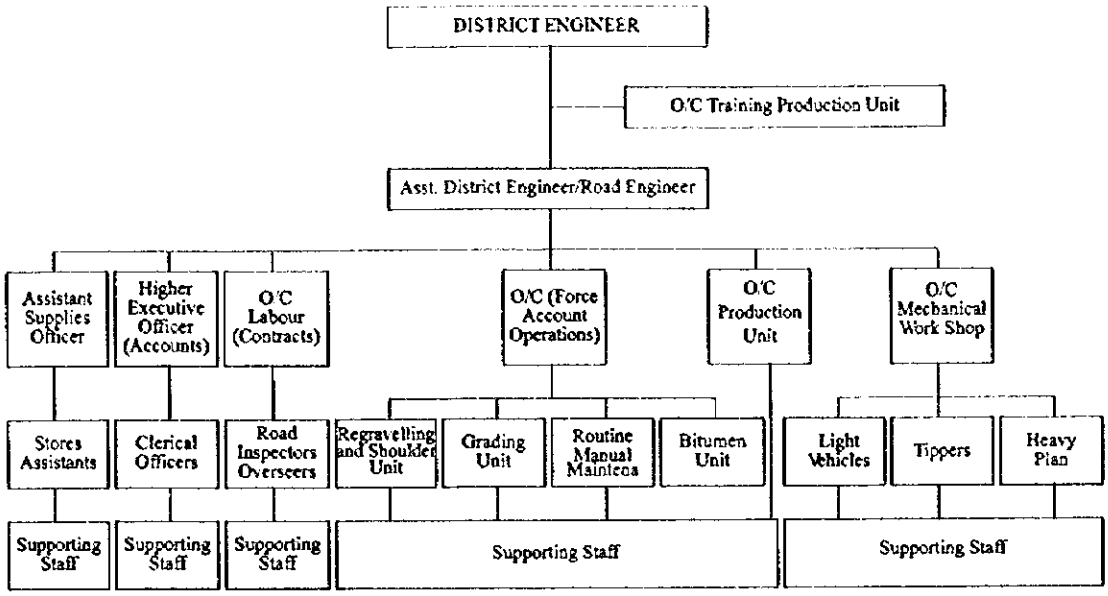


Fig. 3.4 Organisation Chart of Road Maintenance Section – MOWHC

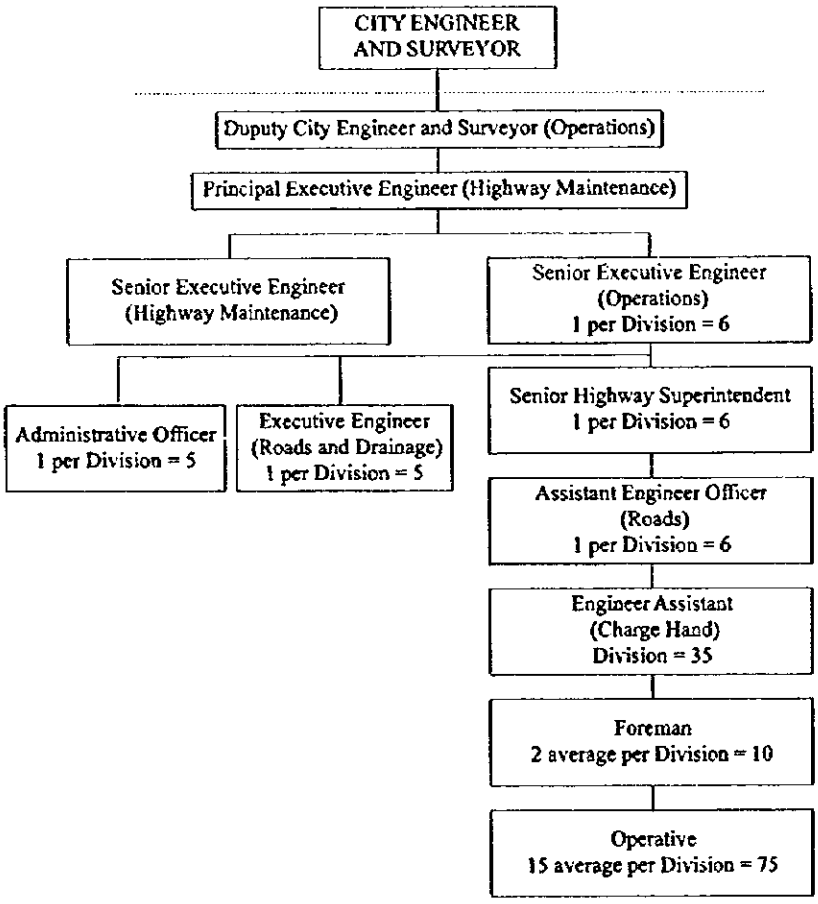


Fig. 3.5 Organisation Chart of Road Maintenance Section - KCC

(2) Operation and Maintenance Schedule

The operation and maintenance works will be carried out in accordance with the work schedule shown in Table 3.5.

Table 3.5 Operation and Maintenance Schedule

Category	Frequency	Main Work Item	Content of Works
Pavement	3 times/year	Pavement Surface	Repairing of ruts cracks and pot holes
Drainage	2 times/year	- Under drain	Removal of deposit
		- Open drain	Removal of deposit
Traffic Signals	2 times/year	- Bulbs	Cleaning
		- Electrical Equipment	Inspection
Street Light	2 times/year	- Bulbs	Cleaning
		- Electrical Equipment	Inspection
Traffic Safety	1 time/year	Road marks	Repainting

The above work shall be undertaken by the maintenance sections of MOWCH and KCC in a coordinated manner.

3.2.3 Necessity of Technical Cooperation

As a matter of fact, the number of local government staff at a middle class is very limited in Uganda and this situation is not exceptional to MOWHC and KCC, especially to the Traffic Signal Division. With this situation, it is opportune to transfer various technology to middle class the local government staff during the project implementation. The transfer of technology will be conducted according to the following scheme:

(1) Overseas Training in Japan

- Intersection design technique
- Traffic signal control technique
- Intersection management technique
- Intersection operation/maintenance technique

(2) On the Job Training

a) Construction management of the intersection improvement project
   - Quality control method

- Progress control method
- Safety control method

b) Intersection operation and maintenance
- Intersection operation technique
- Intersection maintenance technique

3.2.4 Maintenance Cost

Based on the maintenance work plan proposed in this section, the periodical maintenance costs were estimated as shown in Table 3.6.

Table 3.6 Estimated Maintenance Cost

Unit: Million Ush.

Category of Maintenance Work	Frequency	Estimate Cost
Pavement	3 times/year	7.2
Drainage	2 times/year	4.8
Traffic Signal	2 times/year	4.8
Traffic Light	2 times/year	4.8
Traffic Safety Facility	1 time/year	2.4
Overlay	Every 10 years	322.0

Annual maintenance cost to be required by MOWHC is estimated at 24 million Ush., which is equivalent to 0.6% of annual budget of MOWHC in 1997. Overlay work will be carried out at ten years intervals and the cost is estimated at 322 million Ush.

4. PROJECT EVALUATION AND RECOMMENDATION

4.1 Project Effect

The Project aims to improve the urban traffic condition in Kampala city. The five (5) junctions are located on national trunk roads in Kampala city. Therefore, the Project is expected to produce various effects to the socio-economy of the region as explained below:

(1) Direct Effect

With the completion of the Project, traffic flow in urban area of Kampala city will be streamlined. Especially, queuing delays at the junctions will be greatly relieved. According to the results of the Feasibility Study proceeded by this Basic Design Study, total amount of direct benefit, which is the sum of vehicle operation cost saving and travel time cost saving, is estimated at about 700 million Ush.

The economic evaluation calculated in the Feasibility Study is as follow:

- Internal Rate of Return : 19.6%
- Benefit Cost Ratio : 1.50
- Net Present Value : 1,936 million Ush.

(2) Indirect Effect

In addition, the Project is expected to produce varieties of indirect effects both in tangible and intangible forms as explained below:

- Reduction of Traffic Accidents

  Segregated pedestrian ways and signaled road crossings as well as streamlined intersection traffic flow will contribute to the reduction of traffic accidents near the junctions.

- Improvement of Public Transport Operation

  With the introduction of bus bays and designation of bus stop areas near the junctions, the operation of public transport will be greatly improved.

- Improvement of Environment Condition

  Reduced queuing delays and waiting time will contribute to foster good intersection environment through such effects as reduction of exhausted gas, noise, and vibration levels.

- Promotion of Socio-economic Activities

  It is expected that the improved road traffic condition by the Project will promote the efficiency of urban activities through such effects as reducing commuting time and realized better accessibility to market areas and business center.

- Fostering of Local Construction Industry

  The Project is expected to promote the level of construction industry in Uganda by extending occasions to the local industry to be involved the Project.

- Incentiveness to Strengthening of Road Maintenance Capability

  The maintenance method to be demonstrated by the Project will contribute to over-all upgrade of road maintenance capability in Uganda.

(3) Verification of Effects and Impact

- Traffic Volume

  Traffic volume at major arms of the 5 junctions is in the range of 150 ~ 500 vehicles per lane, which is deemed to be still under-saturation level in terms of traffic engineering view point. However, disorderly usage pattern of present junctions and mixture of traffic among vehicles and pedestrians there are lowering actual capacities to the level that causes great traffic delays at each junction.

  In the mean while, judging from the present tendency of traffic increase in the city, which is as high as 10% per annum, complete saturation of traffic in near future is expected.

  For these reasons, it can be concluded that the effect to be

produced by the Project is extremely great.

- Beneficiary Population

  The total beneficiary population based on 1991 census data is estimated at about 17 million and the breakdown is as follows:

Inhabitants in Kampala	:	774,000
Inhabitant in other parts of Uganda	:	15,897,000
Total Beneficiary Population	:	16,671,000

4.2 Recommendation

The project aims to improve major bottleneck junctions in Kampala city and the impact of the Project on the urban traffic flow is expected to be great. The Project coincides with the Government's objects and strategies set force in the Public Investment Plan and Ten Year Road Section Development Program.

Moreover, it is presumed that the project would be implemented without any special problems in Japan's Grant Aid system and will be maintained properly by Ugandan side after completion of the Project. Considering the project scheme and the enumerated impact and effects derived from the project implementation, it is concluded that the project implementation through the cooperation of the Japan's Grant Aid Program would be very meaningful and thus its early implementation is most desirable.

Appendix-1 Member List of the Survey Team

Team Leader	Kenji KIYOMIZU	Japan International Cooperation Agency, Development Specialist
Chief Consultant/ Road Traffic Planner	Katsuyosi MATSUDA	Nippon Koei Co., Ltd.
Construction Planner/ Cost Estimator (1)	Isao INUZUKA	Nippon Koei Co., Ltd.
Construction Planner/ Cost Estimator (2)	Nobuo TSUCHIHASHI	Japan Engineering Consultants Co., Ltd.

Appendix-2 Survey Schedule

Field Survey (June 15 - July 5, 1997)

Day	Date	Week	Activities	Stay
1	15 June	Mon	Transferred from Tokyo to London	London
2	16 June	Tue	Transferred from Long to Kampala	Airplane
3	17 June	Wed	Study Team arrived at Entebbe	Kampala
4	18 June	Thu	Courtesy call to Embassy of Japan in Uganda and MOWHC, Explanation of Inception Report	"
5	19 June	Fri	Site Survey	"
6	20 June	Sat	Site Survey	"
7	21 June	Sun	Site Survey and Team Meeting	"
8	22 June	Mon	Discussion on the Minutes of Discussion with MOWHC and KCC	"
9	23 June	Tue	Discussion on the Minutes of Discussion with MOWHC and KCC, and preparation of Minutes of Discussion	"
10	24 June	Wed	Signing of the Minutes of Discussion, and Site Survey	"
11	25 June	Thu	Report to Embassy of Japan in Uganda, Study Team Leader, Kiyomizu transferred from Kampala to Nairobi, Study Team Members, Matsuda/Inuzuka continued Site Survey	Nairobi/ Kampala
12	26 June	Fri	Study Team Leader, Kiyomizu reported at JICA office in Nairobi and transferred to London, Study Team Members continued Site Survey	Airplane/ Kampala
13	27 June	Sat	Study Team Leader, Kiyomizu transferred to Tokyo, Study Team Members continued Site Survey	Airplane/ Kampala
14	28 June	Sun	Study Team Leader, Kiyomizu arrived at Tokyo, Study Team Members had Team Meeting	Tokyo/ Kampala
15	29 June	Mon	Preparation of Technical Notes, and Site Survey	Kampala
16	30 June	Tue	Preparation of Technical Notes, and Site Survey	"
17	1 July	Wed	Discussion on Technical Notes with MOWHC and KCC, and Site Survey	"
18	2 July	Thu	Signing on Technical Notes at MOWHC	"
19	3 July	Fri	Study Team Members, Matsuda/Inuzuka transferred from Kampala to London	Airplane
20	3 July	Sat	Study Team Members, Matsuda/Inuzuka transferred from London to Tokyo	"
21	5 July	Sun	Study Team Members, Matsuda/Inuzuka arrived at Tokyo	Tokyo

Appendix-3 List of Party Concerned in the Recipient Country

Name	Position	Agency
Mr. Mwedde. J	Ag. Engineer in Chief	Ministry of Works, Housing and Communication
Mr. Okiror. J	Ag. ACE (HPDD)	"
Mr. Mubiru. E	Principle Exec. Engineer	"
Mr. Kekeeto. J	Principle Staff Surveyor	"
Mr. Magala. G	Civil Engineer (HPDD)	"
Mr. Kinyera. S	Deputy City Engineer	Kampala City Council
Mr. Waiswa. N	Principal Engineer	Kampala City Council

Appendix-4 Minutes of Discussion

Minutes of Discussions
on
the Basic Design Study
on
the Project for Improvement of Intersections
at
Kampala Urban Interface Section of Trunk Road
in
the Republic of Uganda

In response to a request from the Government of the Republic of Uganda (hereinafter referred to as "GOU"), the Government of Japan has decided to conduct a study on the Project for Improvement of Intersections at Kampala Urban Interface Sections of Trunk Road (hereinafter referred to as "the Project') in Uganda and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA") succeeding to the study results of "The Feasibility Study of Improvement of Trunk Road at Kampala Urban Interface Sections" which had been also conducted by JICA. After the assessment of the data and information obtained through the study, JICA has prepared the Draft Study Report on the Project.

In order to explain and consult the Government of Uganda on the components of the Draft Study Report, JICA sent to Uganda a study team headed by Mr. Kenji KIYOMIZU, Development Specialist, JICA (hereinafter referred to as "the Team"), which is scheduled to stay in the country from 18 June to 3 July, 1998.

As a result of discussion, both parties confirmed the main items described on the attached sheets.

Kampala, 24 June, 1998

Mr. Kenji KIYOMIZU
Leader
Study Team
Japan International Cooperation
Agency

Eng. J.G. Mwedde, Ag. EIC/DE
For: Permanent Secretary
Ministry of Works, Housing and
Communication

Eng. S. Kinyera
Deputy City Engineer & Surveyor
City Engineer & Surveyor's Department
Kampala City Council

ATTACHMENT

1. OBJECTIVE

The Project aims at improving five (5) junctions at Kampala Urban Interface Section of Trunk Road, with the recognition that the junctions are major causes of chaotic urban traffic flow in the city of Kampala.

2. PROJECT SITE

The site of the Project is shown in Annex-1.

3 PROJECT IMPLEMENTING AGENCY

The Ministry of Works, Housing and Communications (MOWHC), its old name is Ministry of Public Works, Transport and Communications (MOWTC), is the responsible and executing organization for the Project. The organization chart of the Agency is shown in Annex-2.

4. DRAFT BASIC DESIGN

The Government of Uganda has in principal agreed to the components of the Draft Study Report proposed by the Team.

5. JAPAN'S GRANT AID SYSTEM

The Government of Uganda has understood the system of Japan's Grant Aid explained by the Team as described in Annex-3.

6. SCHEDULE OF THE STUDY

The Government of Uganda confirmed that relocation of utilities and demolition of buildings located on the right-of-ways shall be completed by the Government of Uganda at latest before commencement of construction works for the smooth implementation of the Project.

7. NECESSARY MEASURES TO BE TAKEN BY THE GOVERNMENT OF UGANDA

The Government of Uganda will take necessary measures described in Annext-4 for smooth implementation of the Project, on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

8. FURTHER SCHEDULE OF THE STUDY

JICA will complete the Study report and forward it to the Government of Uganda by September, 1998.

9. OTHER RELEVANT ITEMS

1) GOU assured completion of site clearance before the execution of the Project. These include relocation of such utilities as water main, power cables and telephone lines, and demolition of buildings located on the project sites. The latter includes temporary structures such as butchery shops at Natete Junction, an old public toilet at Wandegeya Junction and concrete terrace to a restaurant at Makerere Junction. In addition, GOU agreed to take measures to stop further land development nearby the sites to avert further problems of site preparation.

2) GOU agreed to shift the location of the proposed pedestrian bridge construction plan at Port Bell Junction considering the proposal of the junction improvement layout made by the Team, in which the signalized pedestrian crossings are being proposed to be introduced.

3) GOU assured that Kampala City Council(hereinafter referred as"KCC") should undertake maintenance works of the three (3) signalized junctions, which will be carried out through strengthening of existing signal maintenance unit of KCC and in cooperation with MOWHC.

4) GOU and the Team agreed on the traffic signal types to be introduced in the following respects:

- to be overhang type
- to be easily maintained with easy procurement of parts
- to be easily adjustable/programmable
- to be provided with stabilizers and butteries with maximum of 8 hour duration.

5) GOU assured to provide a construction yard at Bugolobi Depot instead of the one at Lugogo for the reason that the former is better facilitated with utilities and has wider area. The Team agreed with it after the inspection of the site.

6) The Team confirmed that there exists no conflict between the captioned junction improvement project and EU(European Union) proposed Kampala Bypass construction project, since beginning and end points of both south and north bypasses by EU are proposed at the places which are some distant away from the sites of 5 junctions.

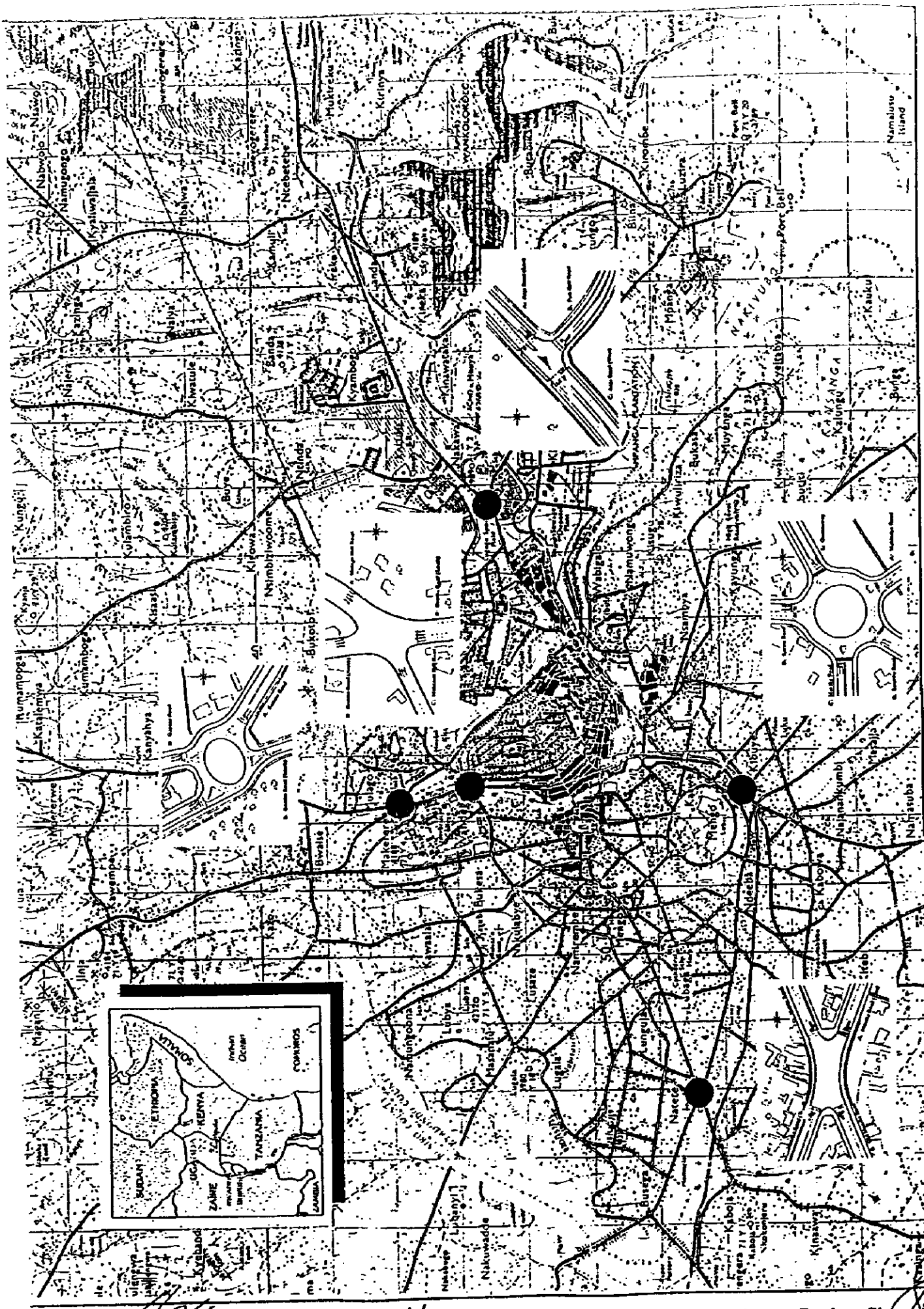
7) GOU assured to provide all the updated unit cost data for the estimation of the project cost, and agreed with the necessity of cost estimation by lump sum method on the basis of quotation from local contractors for comparison purpose.

8) The Team requested GOU of taking measures to prompt the customs clearance at the Kenyan boarder as well as local tax clearance. .
GOU assured that there is no delay at the customs clearance at the boarder as experienced by past road development projects sponsored by foreign donors.

9) GOU assured the provision of security during the construction.

10) GOU requested to the Government of Japan for provision of traffic signal equipment at 3 other signal junctions in the downtown of Kampala City, which are either absolutely old or have been knocked down. The Team promised to convey the request to the JICA Headquarter in Tokyo.

11)GOU requested once again to the Government of Japan to undertake road development projects at Natete and Gaba Roads, of which road sections were requested at the same time with the five (5) junction improvement projects but have not been adopted by the Japan's Grant Aid Scheme at this time. The Team promised to convey the request to JICA Headquarter in Tokyo.



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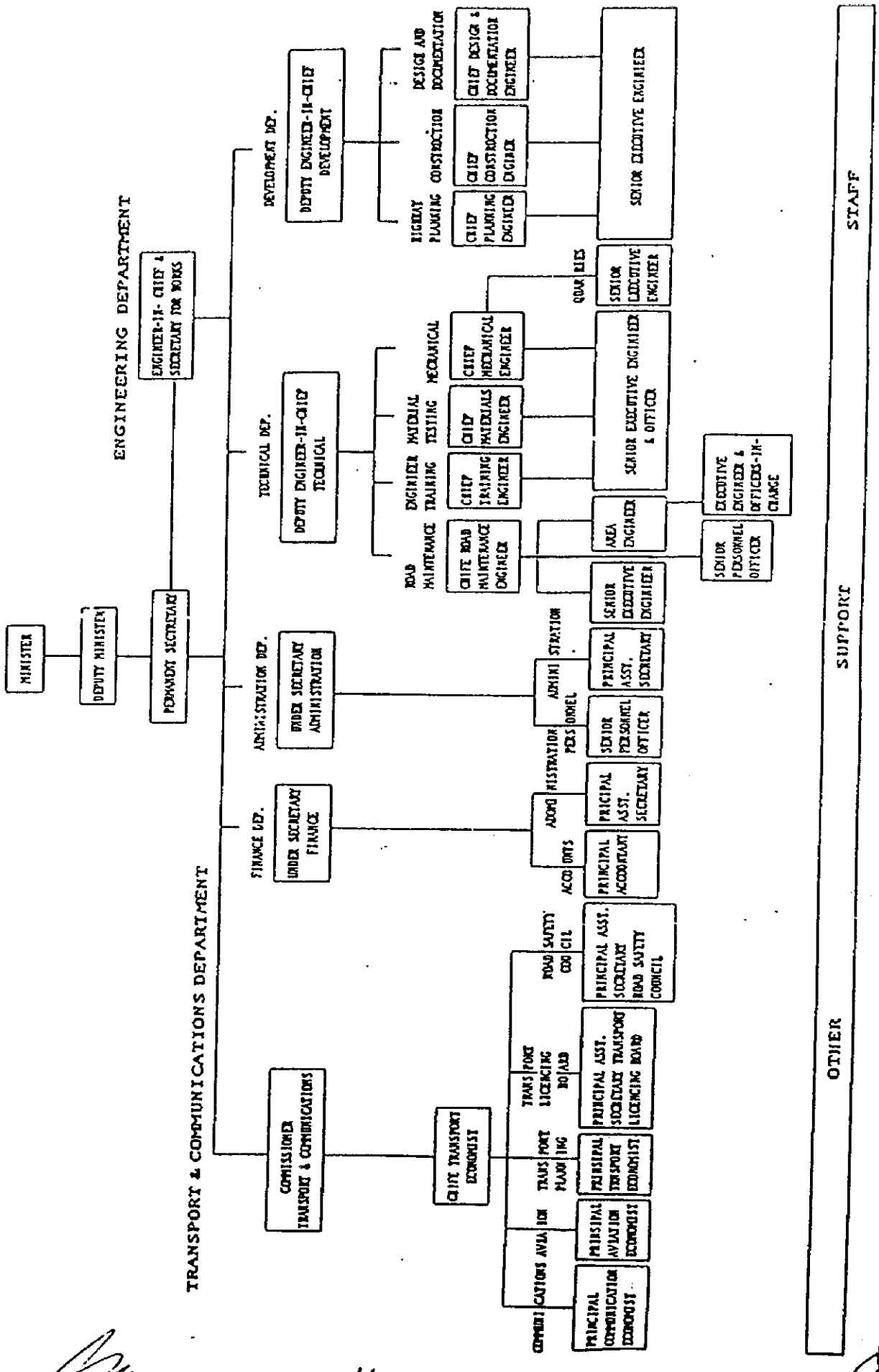
Annex-1 Project Site

Annex-2 Organization of Ministry of Works, Transport and Communications, MOWTC (Present MOWHC)



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Annex-3 Japan's Grant Aid Scheme

1. Grant Aid Procedures

1) Japan's Grant Aid Program 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 Government of Japan and recipient country)

2) 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 it is eligible or not 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 Program, based on the Basic Design Study report prepared by JICA, and the result are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes 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 (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 Japanese Government. The contents of the Study are as follows:

a) 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.

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

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

d) Preparation of a basic design of the Project.

e) 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 guideline 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 selected firm(s) 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 and also to avoid undue any delay in implementation should the selection process be repeated..

3. Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program 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. Grant Aid is not supplied through the donation of materials as such.

2) 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.

3) "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 weather, 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.

4) 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 the 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 or Japanese nationality.)

5) Necessity of "Verification"

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

6) Undertaking 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:

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

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

(3) To secure buildings prior to the procurement in case the installation of the equipment.

(4) 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.

(5) 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.

7) "Proper Use"

The recipient country is required to maintain and use 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.

8) "Re-export"

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

9) 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 an authorized foreign exchange 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 the Bank in Japan presents payment requests under an authorization to pay issued by the Government of the recipient country or its designated authority.

Annex-4 Necessary Measures to be undertaken by the Government of Uganda

The following necessary measures should be undertaken by the Government of Uganda on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project.
2. To secure the land for the execution of the Project, such as land for approach road, bridge construction, working areas, storage yard and others.
3. To clear the sites prior to the commencement of the construction.
4. To bear commissions to the Japanese bank for its banking services based upon the Banking Arrangement.
5. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Uganda and prompt internal transportation of the materials and equipment for the Project purchased under the Grant Aid.
6. To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Uganda with respect to the supply of the products and services under the verified contracts.
7. 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 Uganda and stay therein for the performance of their work.
8. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
9. To maintain and use properly and effectively the facilities constructed under the Project.
10. To bear all the expenses other than those to be borne by the Japan's Grant Aid within the scope of the Project.
11. To assign exclusive counterpart engineers and technicians for the Project.
12. To coordinate and solve any issues related to the Project, which may be raised, from third parties or inhabitants in the Project area during the implementation of the Project.

PARTICIPANTS LIST

UGANDAN SIDE

Mr. Mwedde. J	Ag. Engineer in Chief, MOWHC
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Mr. Mubiru. E	Principle Exec. Eng. MOWTC
Mr. Kekeeto. J	Principle Staff Surveyor. MOWTC
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Mr. Watanabe. M		Secretary, Embassy of Japan
Mr. Sasaoka. Y		Aid Advisor, JICA

Appendix-5 Other Relevant Data

Technical Notes

Technical notes .

The Basic Design
on
the project for the improvement of intersections
at
Kampala Urban Interface Section of Trunk Road
in
the Republic of Uganda

Further to the Minutes of Discussion signed by both sides on the 24th June, 1998, this technical note has been prepared by the Study Team to confirm various criteria/ condition to be applied to the study.

After a series of discussion s with the concerned officials Of the Government of Uganda and the Study team, both sides have finally agreed and confirmed the main items described in the attachments.

This agreement is subject to final approval by JICA Headquarters.

Kampala, 3rd July, 1998.

Mr. Katsuyoshi Matsuda
Chief Consultant
Basic Design Study Team
JICA.

Eng. J. Mwedde, Ag. EIC/DE
For. Permanent Secretary
Ministry of Works, Housing
And Communication.

Eng. S Kinyera
Deputy City Engineer & Surveyor
City Engineer &Surveyor's
Department
Kampala City Council

ATTACHMENT

1. PROJECT DESCRIPTION

The project consists of improvement works at five junctions in Kampala Urban Interface Section of Trunk Roads as described below.

1) Natete Junction: Remodelling of the existing rotary junction into signalized one.

2) Makerere Junction: Improvement of the existing rotary junction.

3) Kibuye Junction: Improvement of the existing rotary junction.

4) Port Bell Junction: Remodelling the existing T-shaped junction into signalized one.

5) Wandegeya Junction: Remodelling of the existing rotary junction into signalized one.

Contents of the project are being described in 1. 3.2. of the Basic Design Study Report.

2. Applicable Design Standards

a) Geometric Design Standard

The standard adopted in the design of roads / junctions are based on the Uganda road design standard and Japanese road design standard for urban roads.

The specific design category of the road design criteria applicable is grade 4, First Class in terms of Japanese design criteria, which is a design standard for national roads in urban areas in Japan

b) Pavement Design Standard

It was considered reasonable to adopt Japanese Pavement Design Standard due to the fact that it provides a higher factor of safety in design. A comparison study shows that there were some differences in the design output between Japanese Standards and ASHOTO.

C) Others

In order to be consistent in design, Japanese standard will be adopted for the design of concrete structure for drainage, foundation of traffic signals and street lights. This project does not involve large construction works as bridges and/ box culverts.

3. Modification of lane Width at Northern Arm of Wandegeya Junction.

The lane width of the Northern arm of Wandegeya junction, where the right-of- way is constrained by the existing buildings located on both sides will be changed to 3.25m for nearside lane and 2.75m for storage lane respectively from originally proposed 3.5m and 3.0m in the

Feasibility Study. The main reason for the above change is that the original lane width proposed during the Feasibility Study results in extremely narrow pedestrian way at critical points at building frontage. The reduction of carriageway width by 0.25 metre for both nearside and storage lanes are within the allowable limit prescribed in the Japanese Geometric Standards.

4. Power supply to Traffic Signals.

Due to unstable power supply in Uganda , traffic signals to be installed by the project have to be provided with emergency power supply devices (battery type) in them. The maximum time of the supply by the battery will be 8 hours, reflecting the present maximum period of power failure in Kampala. However there exist some ongoing electricity supply improvement projects in Uganda, there are some possibilities of reducing the duration of power failure, which will result in adoption of shorter duration of the batteries.

5. Confirmation of Potential Development Plan Affecting the Project.

The Government of Uganda agreed to shift the location of the proposed pedestrian bridge construction which was proposed near Port Bell Junction considering the proposal of the Junction improvement layout made by the study team , in which the signalized pedestrian crossings are being introduced. If there is any new proposal regarding the junction improvement project, Government of Uganda will provide the information to the study team prior to the initiation of the detailed design study.

6. Condition of Non-working Tracffic Signals

Regarding item 10 of the minutes of discussions held on 24th June, 1998 the study team visited the 3 (three) junctions for which provision of traffic signal equipment was requested by the Ugandan Gonvernment. The study team found that those signals were completely broken down and of very old model and hence needed replacement.

(6)


JICA