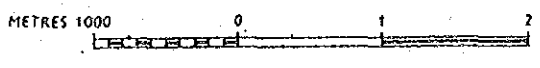


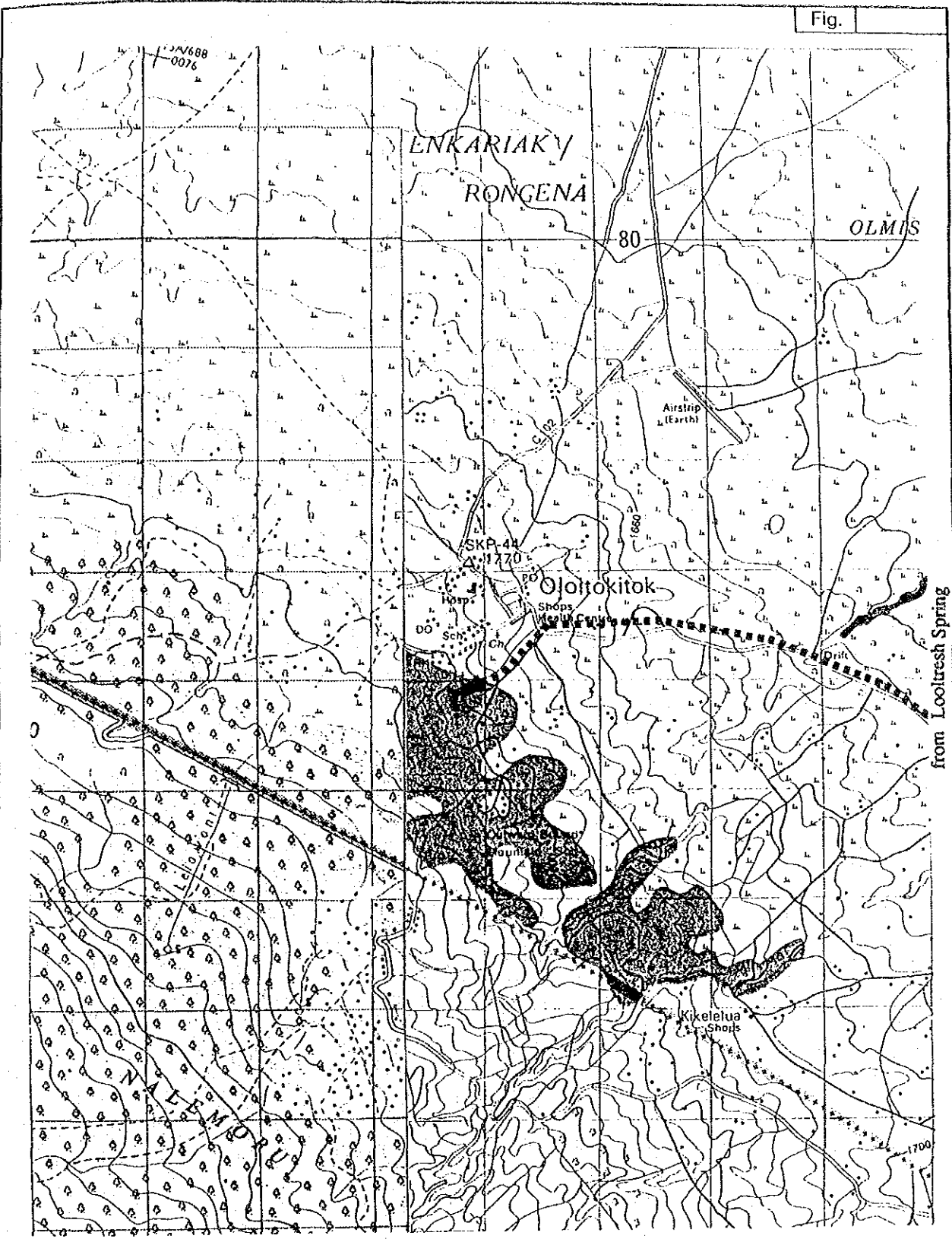
U- 87 Kendu Bay

R 648.1 116/3 1HD



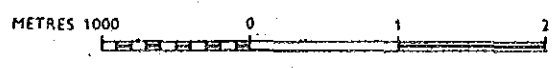
THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2	National Water Master Plan							
3	URBAN WATER SUPPLY							
4	Code No. 710	U- 88				Rate		Jul-92 25.2
5	-----							
6	Name of Urban:	Oloitokitok	LGL Notice No:					
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:	Kajiado	Locataion :	711.1		Odomongi		
10	Map (1/50,000):	182/3	Coordinates X:		37°30'	Y:	S 02°55'	
11	Sub-basin Code:	3G	Elevation (El. m):					
12	-----							
13	Existing Facilities							
14	Raw Water Source:	Nol-Turesh Spring	River No					
15	Raw Water System:	H (m)=	L (m)=					
16	Treatment:	Capacity (m3/d)		150				
17	Distribution System:							
18	-----							
19				1990	2000	2010		
20	-----							
21	Projected Population	(no)		4,300	12,900	24,500		
22	Residential Demand	(m3/d)		533	1,633	3,170		
23	Non-residential Demand	(m3/d)		89	266	506		
24	Livestock Demand	(m3/d)		76	199	358		
25	Industrial Demand	(m3/d)		0	0	0		
26	Total Demand	(m3/d)		698	2,098	4,034		
27	Area Served (estimated net)	(ha)		32	96	183		
28	-----							
29	Future Development Plan							
30	Raw Water Source:	Nol-Turesh Spring	River No:					
31	Raw Water System:	H (m)=	340 L (m)=	8,300				
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost			1990	2000	2010	Total	
36	Incremental Capacity	(m3/d)		547.7	1,400.8	1,935.2	3,883.7	
37	Source Works	(US\$'000)		6.7	13.6	17.4	37.7	
38	Pump Cost	(US\$'000)		12.7	17.6	20.2	50.5	
39	Raw Water Main	(US\$'000)		358.6	418.3	447.8	1,224.7	
40	Treatment	(US\$'000)		303.9	511.6	604.7	1,420.2	
41	Storage	(US\$'000)		52.2	87.8	102.8	242.7	
42	Distribution	(US\$'000)		256.9	513.8	693.0	1,463.7	
43	Miscellaneous (20%)	(US\$'000)		198.2	312.5	377.2	887.9	
44	Admi. & Engineering	(US\$'000)		118.9	187.5	226.3	532.7	
45	Contingency	(US\$'000)		261.6	412.5	497.9	1,172.0	
46	Total Cost	(US\$'000)		1,569.7	2,475.3	2,987.2	7,032.2	
47	Cost per Capita	(US\$/c)		365.0	287.8	257.5		
48	Cost per ha	(US\$/ha)		48,881.5	38,541.4	34,483.3		
49	Cost per m3	(US\$/m3)		2.9	1.8	1.5	1.8	
50	-----							
51	Present Value of Water at DF=10 %			1990	2000	2010	Total	
52	Direct O & M Costs	(US\$'000)		78.5	123.8	149.4		
53	Capital Costs	(US\$'000)		161.7	255.0	307.7		
54	Total Annual Cost	(US\$'000)		240.2	378.7	457.0		
55	Unit Cost per m3	(US\$/m3)		1.2	0.7	0.6		
56	-----							
57	Remarks:							
58								
59								
60								
61								
62								
63	-----							



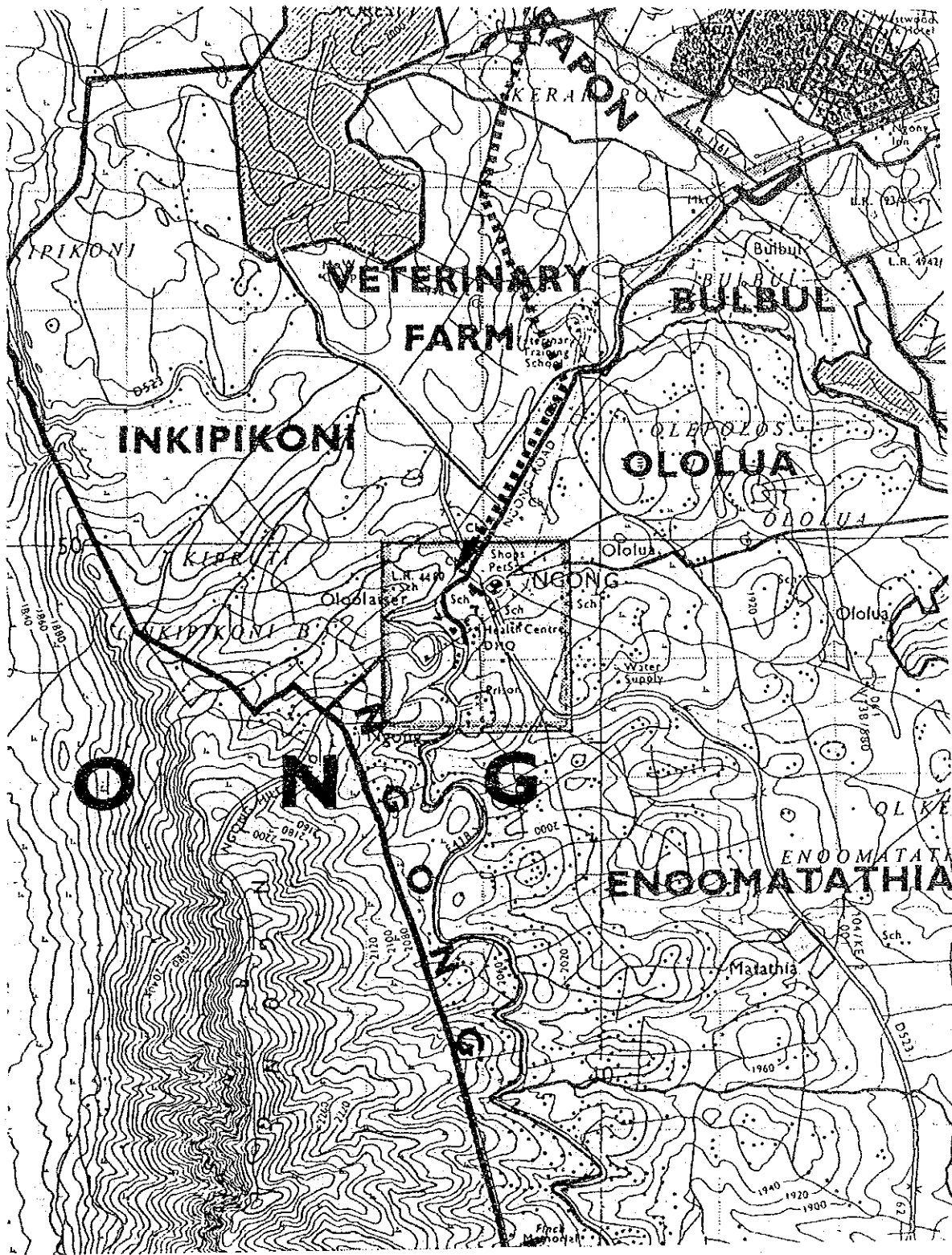
U- 88 Oloitokitok

R 711.1 182/3 3G



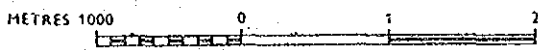
THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2						National Water	Master Plan	
3			URBAN WATER SUPPLY					Feb-92
4	Code No.	710	U- 89			Rate		25.2
5	-----							
6	Name of Urban:		Ngong		LGL Notice No:			
7	Organization:							
8	Per Capita GRDP in 1988 (guess):				712.1		Ngong	
9	District:		Kajiado	Locataion :				
10	Map (1/50,000) :		148/3	Coordinates X:		36°38'	Y:	S 01°21'
11	Sub-basin Code:		2H	Elevation (El. m):				
12	-----							
13	Existing Facilities							
14	Raw Water Source:		Borcholes			River No		
15	Raw Water System:		H (m)=	L (m)=				
16	Treatment:			Capacity (m3/d)		350		
17	Distribution System:							
18	-----							
19					1990	2000	2010	
20	-----							
21	Projected Population		(no)		16,100	44,700	81,800	
22	Residential Demand		(m3/d)		1,994	5,660	10,583	
23	Non-residential Demand		(m3/d)		334	925	1,694	
24	Livestock Demand		(m3/d)		286	693	1,197	
25	Industrial Demand		(m3/d)		0	0	0	
26	Total Demand		(m3/d)		2,614	7,278	13,474	
27	Area Served (estimated net)		(ha)		120	334	611	
28	-----							
29	Future Development Plan							
30	Raw Water Source:		Kerarapon Spring			River No:		
31	Raw Water System:		H (m)=	120 L (m)=		5,300		
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost				1990	2000	2010	Total
36	Incremental Capacity		(m3/d)		2,264.4	4,663.8	6,195.7	13,123.9
37	Source Works		(US\$'000)		19.5	33.6	41.6	94.7
38	Pump Cost		(US\$'000)		7.4	12.1	14.9	34.4
39	Raw Water Main		(US\$'000)		296.5	360.9	395.5	1,052.9
40	Treatment		(US\$'000)		654.0	908.0	1,012.8	2,574.9
41	Storage		(US\$'000)		110.3	200.9	266.8	578.0
42	Distribution		(US\$'000)		961.9	1,708.7	2,216.5	4,887.0
43	Miscellaneous (20%)		(US\$'000)		409.9	644.8	789.6	1,844.4
44	Admi. & Engineering		(US\$'000)		246.0	386.9	473.8	1,106.6
45	Contingency		(US\$'000)		541.1	851.2	1,042.3	2,434.6
46	Total Cost		(US\$'000)		3,246.7	5,107.0	6,253.8	14,607.5
47	Cost per Capita		(US\$/c)		201.7	178.6	168.6	
48	Cost per ha		(US\$/ha)		27,003.4	23,911.0	22,572.0	
49	Cost per m3		(US\$/m3)		1.4	1.1	1.0	1.1
50	-----							
51	Present Value of Water at DF=10 %				1990	2000	2010	Total
52	Direct O & M Costs		(US\$'000)		162.3	255.3	312.7	
53	Capital Costs		(US\$'000)		334.4	526.0	644.1	
54	Total Annual Cost		(US\$'000)		496.7	781.4	956.8	
55	Unit Cost per m3		(US\$/m3)		0.6	0.5	0.4	
56	-----							
57	Remarks:							
58								
59								
60								
61								
62								
63	-----							



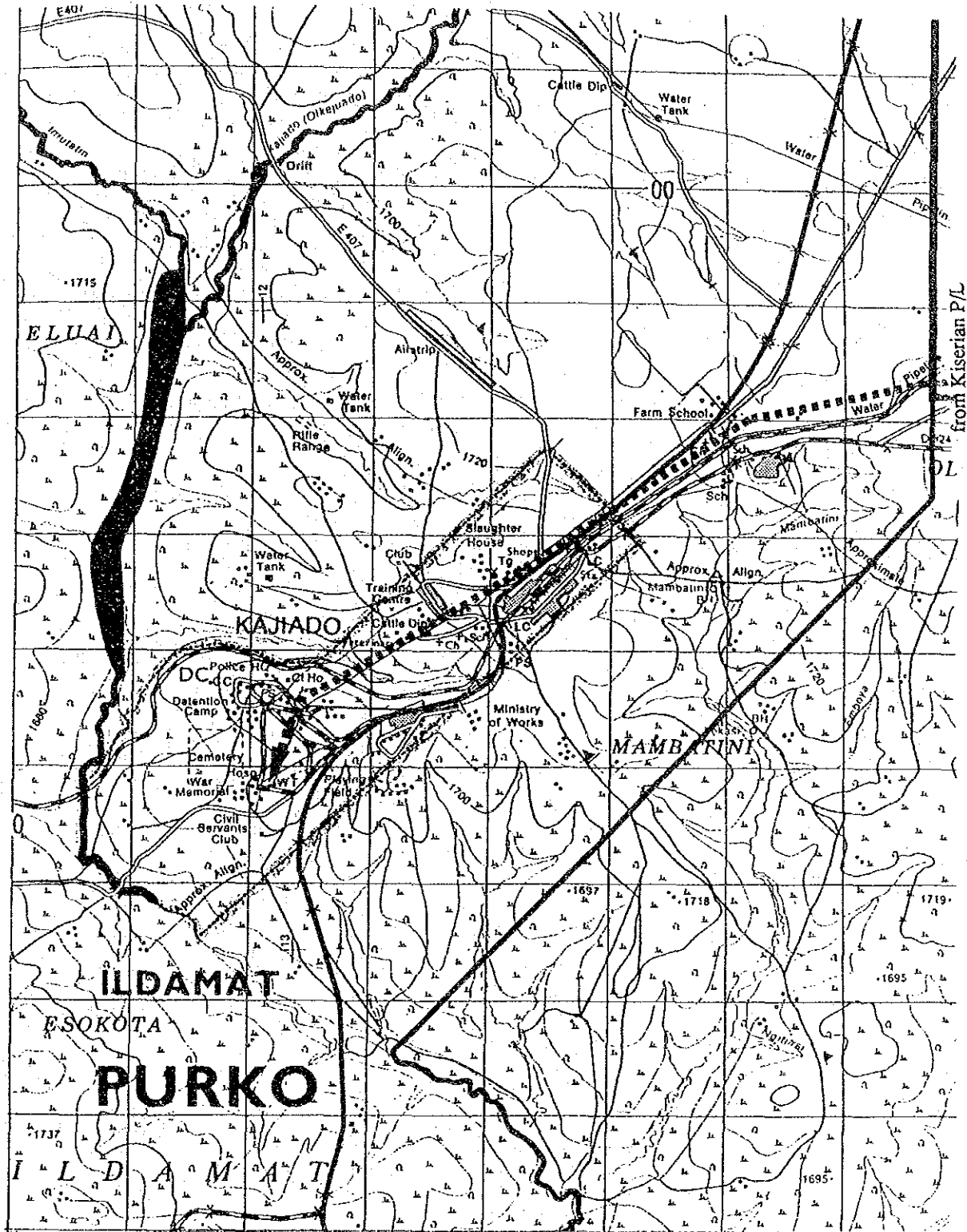
U- 89 Ngong

U 712.1 148/3 2H



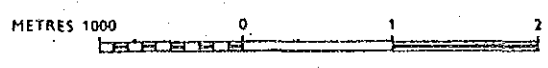
THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2					National Water Master Plan			
3			URBAN WATER SUPPLY					Feb-92
4	Code No.	710	U- 90			Rate		25.2
5	-----							
6	Name of Urban:	Kajiado		LGL Notice No:				
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:	Kajiado	Locataion :	713.1		Ildamat		
10	Map (1/50,000) :	161/4	Coordinates X:		36°46'		Y:	S 01°52'
11	Sub-basin Code:	3FA	Elevation (El. m):					
12	-----							
13	Existing Facilities							
14	Raw Water Source:	Boreholes & Nol-Turesh			River No			
15	Raw Water System:	H (m)=	L (m)=					
16	Treatment:	Capacity (m3/d)			150			
17	Distribution System:							
18	-----							
19				1990	2000	2010		
20	-----							
21	Projected Population		(no)	6,000	17,900	34,100		
22	Residential Demand		(m3/d)	743	2,267	4,412		
23	Non-residential Demand		(m3/d)	124	371	706		
24	Livestock Demand		(m3/d)	106	278	499		
25	Industrial Demand		(m3/d)	0	0	0		
26	Total Demand		(m3/d)	973	2,916	5,617		
27	Area Served (estimated net)		(ha)	45	134	255		
28	-----							
29	Future Development Plan							
30	Raw Water Source:	Kiserian P/L			River No:			
31	Raw Water System:	H (m)=	0 L (m)=	53,000				
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost			1990	2000	2010		Total
36	Incremental Capacity		(m3/d)	823.3	1,942.3	2,701.1		5,466.7
37	Source Works		(US\$'000)	9.1	17.4	22.3		48.9
38	Pump Cost		(US\$'000)	0.0	0.0	0.0		0.0
39	Raw Water Main		(US\$'000)	2,430.2	2,861.7	3,096.3		8,388.3
40	Treatment		(US\$'000)	383.0	605.9	712.4		1,701.2
41	Storage		(US\$'000)	66.0	102.9	118.9		287.8
42	Distribution		(US\$'000)	358.5	710.9	967.8		2,037.3
43	Miscellaneous (20%)		(US\$'000)	649.4	859.8	983.5		2,492.7
44	Admi. & Engineering		(US\$'000)	389.6	515.9	590.1		1,495.6
45	Contingency		(US\$'000)	857.2	1,134.9	1,298.3		3,290.4
46	Total Cost		(US\$'000)	5,143.0	6,809.4	7,789.7		19,742.2
47	Cost per Capita		(US\$/c)	857.2	572.2	480.8		
48	Cost per ha		(US\$/ha)	114,780.1	76,623.6	64,387.9		
49	Cost per m3		(US\$/m3)	6.2	3.5	2.9		3.6
50	-----							
51	Present Value of Water at DF=10 %			1990	2000	2010		Total
52	Direct O & M Costs		(US\$'000)	257.2	340.5	389.5		
53	Capital Costs		(US\$'000)	529.7	701.4	802.3		
54	Total Annual Cost		(US\$'000)	786.9	1,041.8	1,191.8		
55	Unit Cost per m3		(US\$/m3)	2.6	1.5	1.2		
56	-----							
57	Remarks: Kiserian dam is under construction.							
58								
59								
60								
61								
62								
63	-----							



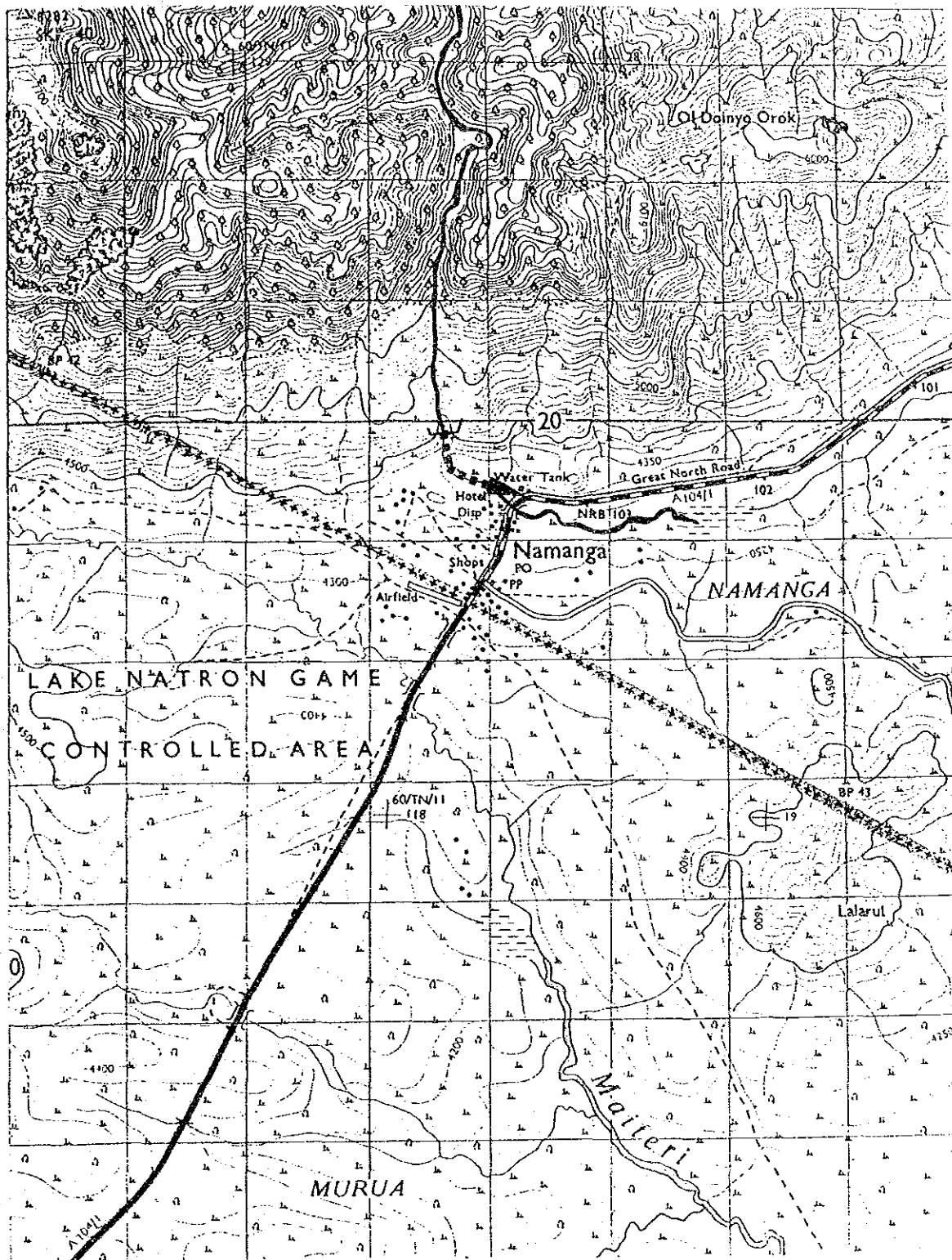
U- 90 Kajiado

U 713.1 161/4 3FA



THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
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a	b	c	d	e	f	g	h	i
2						National Water Master Plan		
3			URBAN WATER SUPPLY					Jul-92
4	Code No.	710	U-91			Rate		25.2
5	-----							
6	Name of Urban:	Namanga		LGL Notice No:				
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:	Kajiado	Locataion :	713.5		Namanga		
10	Map (1/50,000) :	181W/2	Coordinates X:		36°49'		Y:	S 02°33'
11	Sub-basin Code:	3N	Elevation (El. m):					
12	-----							
13	Existing Facilities							
14	Raw Water Source:	Namanga Spring		River No				
15	Raw Water System:	H (m)=	L (m)=					
16	Treatment:	Capacity (m3/d)		100				
17	Distribution System:							
18	-----							
19				1990	2000	2010		
20	-----							
21	Projected Population		(no)	4,800	14,400	27,300		
22	Residential Demand		(m3/d)	595	1,823	3,532		
23	Non-residential Demand		(m3/d)	99	297	565		
24	Livestock Demand		(m3/d)	85	222	399		
25	Industrial Demand		(m3/d)	0	0	0		
26	Total Demand		(m3/d)	779	2,342	4,496		
27	Area Served (estimated net)		(ha)	36	108	204		
28	-----							
29	Future Development Plan							
30	Raw Water Source:	Namanga Spring		River No:				
31	Raw Water System:	H (m)=	0 L (m)=	800				
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost			1990	2000	2010	Total	
36	Incremental Capacity		(m3/d)	678.6	1,563.8	2,153.5	4,395.9	
37	Source Works		(US\$'000)	7.9	14.8	18.8	41.5	
38	Pump Cost		(US\$'000)	0.0	0.0	0.0	0.0	
39	Raw Water Main		(US\$'000)	35.6	41.2	44.2	121.1	
40	Treatment		(US\$'000)	343.6	542.0	638.0	1,523.6	
41	Storage		(US\$'000)	59.1	92.8	107.9	259.8	
42	Distribution		(US\$'000)	286.8	573.5	770.7	1,631.0	
43	Miscellaneous (20%)		(US\$'000)	146.6	252.9	315.9	715.4	
44	Admi. & Engineering		(US\$'000)	88.0	151.7	189.6	429.2	
45	Contingency		(US\$'000)	193.5	333.8	417.0	944.3	
46	Total Cost		(US\$'000)	1,161.0	2,002.7	2,502.2	5,665.9	
47	Cost per Capita		(US\$/c)	241.9	208.6	194.0		
48	Cost per ha		(US\$/ha)	32,388.6	27,934.9	25,973.3		
49	Cost per m3		(US\$/m3)	1.7	1.3	1.2	1.3	
50	-----							
51	Present Value of Water at DF=10 %			1990	2000	2010	Total	
52	Direct O & M Costs		(US\$'000)	58.1	100.1	125.1		
53	Capital Costs		(US\$'000)	119.6	206.3	257.7		
54	Total Annual Cost		(US\$'000)	177.6	306.4	382.8		
55	Unit Cost per m3		(US\$/m3)	0.7	0.5	0.5		
56	-----							
57	Remarks:							
58								
59								
60								
61								
62								
63	-----							



LAKE NATRON GAME CONTROLLED AREA

Namanga

NAMANGA

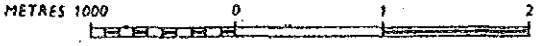
MURUA

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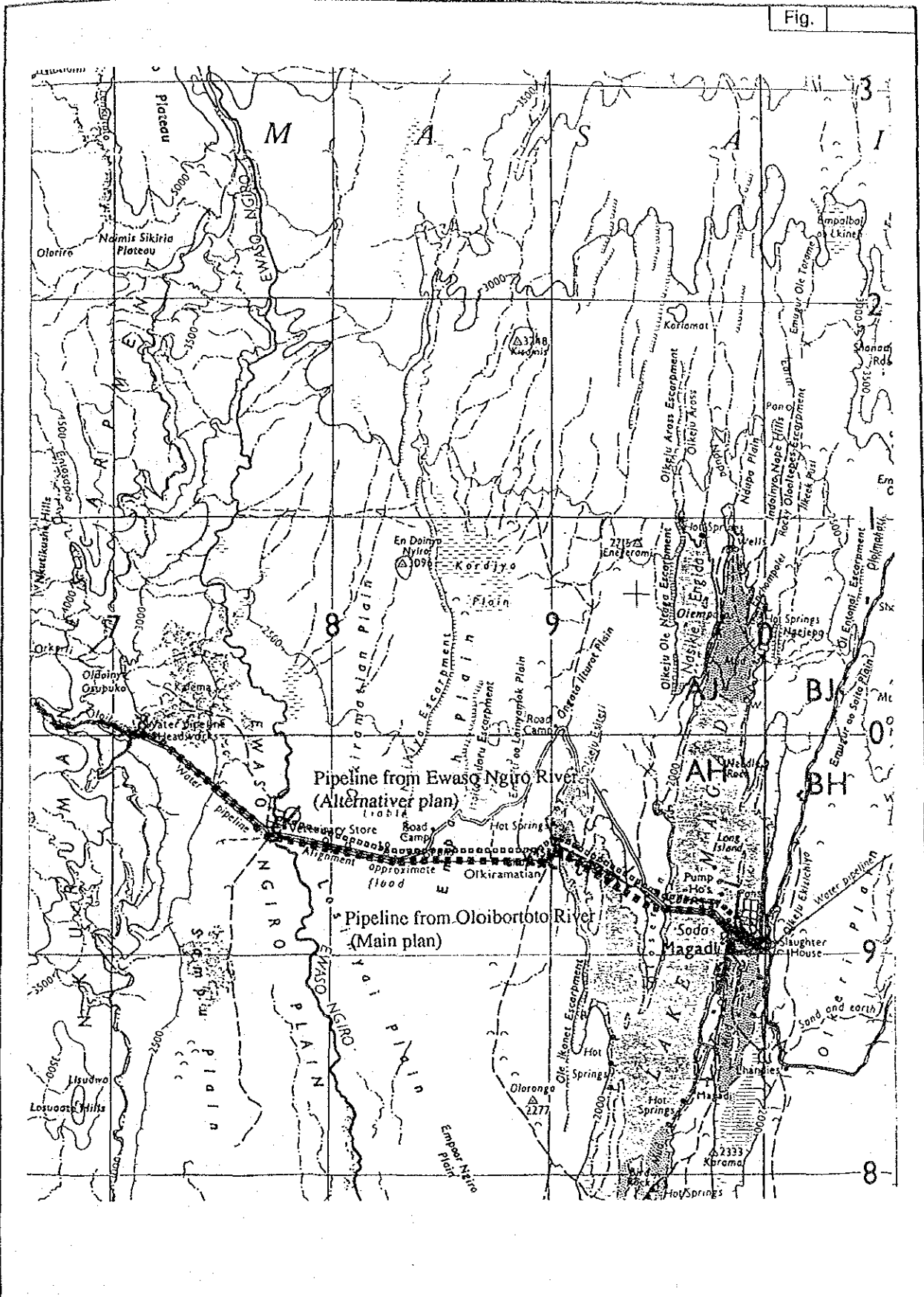
U- 91 Namanga

R 713.5 181W/2 3N



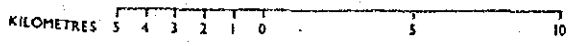
THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2	National Water Master Plan							
3	URBAN WATER SUPPLY							
4	Code No. 710	U- 92				Rate		Feb-92 25.2
5	-----							
6	Name of Urban:	Magadi	LGL Notice No:					
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:	Kajiado	Locataion :	714.1		Magadi		
10	Map (1/50,000):	160/4	Coordinates X:		36°18'		Y:	S 01°55'
11	Sub-basin Code:	2H	Elevation (El. m):					
12	-----							
13	Existing Facilities							
14	Raw Water Source:	Oloibortoto river	River No					
15	Raw Water System:	H (m)=	L (m)=					
16	Treatment:	Capacity (m3/d)		400				
17	Distribution System:							
18	-----							
19				1990	2000	2010		
20	-----							
21	Projected Population	(no)		2,800	8,400	16,000		
22	Residential Demand	(m3/d)		347	1,064	2,070		
23	Non-residential Demand	(m3/d)		58	173	330		
24	Livestock Demand	(m3/d)		50	130	233		
25	Industrial Demand	(m3/d)		69	117	148		
26	Total Demand	(m3/d)		524	1,484	2,781		
27	Area Served (estimated net)	(ha)		21	63	119		
28	-----							
29	Future Development Plan							
30	Raw Water Source:	Oloibortoto river	River No:					
31	Raw Water System:	H (m)=	0 L (m)=	34,000				
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost			1990	2000	2010	Total	
36	Incremental Capacity	(m3/d)		123.9	959.8	1,297.4	2,381.0	
37	Source Works	(US\$'000)		2.2	10.3	12.9	25.3	
38	Pump Cost	(US\$'000)		0.0	0.0	0.0	0.0	
39	Raw Water Main	(US\$'000)		1,269.2	1,598.9	1,688.2	4,556.3	
40	Treatment	(US\$'000)		124.8	417.1	491.1	1,033.0	
41	Storage	(US\$'000)		20.5	71.8	84.4	176.7	
42	Distribution	(US\$'000)		167.3	334.6	454.1	955.9	
43	Miscellaneous (20%)	(US\$'000)		316.8	486.5	546.1	1,349.5	
44	Admi. & Engineering	(US\$'000)		190.1	291.9	327.7	809.7	
45	Contingency	(US\$'000)		418.2	642.2	720.9	1,781.3	
46	Total Cost	(US\$'000)		2,509.1	3,853.2	4,325.4	10,687.6	
47	Cost per Capita	(US\$/c)		896.1	688.1	569.1		
48	Cost per ha	(US\$/ha)		119,992.1	92,137.2	76,209.1		
49	Cost per m3	(US\$/m3)		20.3	4.0	3.3	4.5	
50	-----							
51	Present Value of Water at DF=10 %			1990	2000	2010	Total	
52	Direct O & M Costs	(US\$'000)		125.5	192.7	216.3		
53	Capital Costs	(US\$'000)		258.4	396.9	445.5		
54	Total Annual Cost	(US\$'000)		383.9	589.5	661.8		
55	Unit Cost per m3	(US\$/m3)		8.5	1.7	1.4		
56	-----							
57	Remarks:	Demand up to year 2010 could be met by expansion of existing system (water source : Oloibortoto river).						
58		Alternatively water abstraction from Ewaso Ngiro river is also practicable after the construction of						
59		Oldorko dam.						
60								
61								
62								
63	-----							



U- 92 Magadi

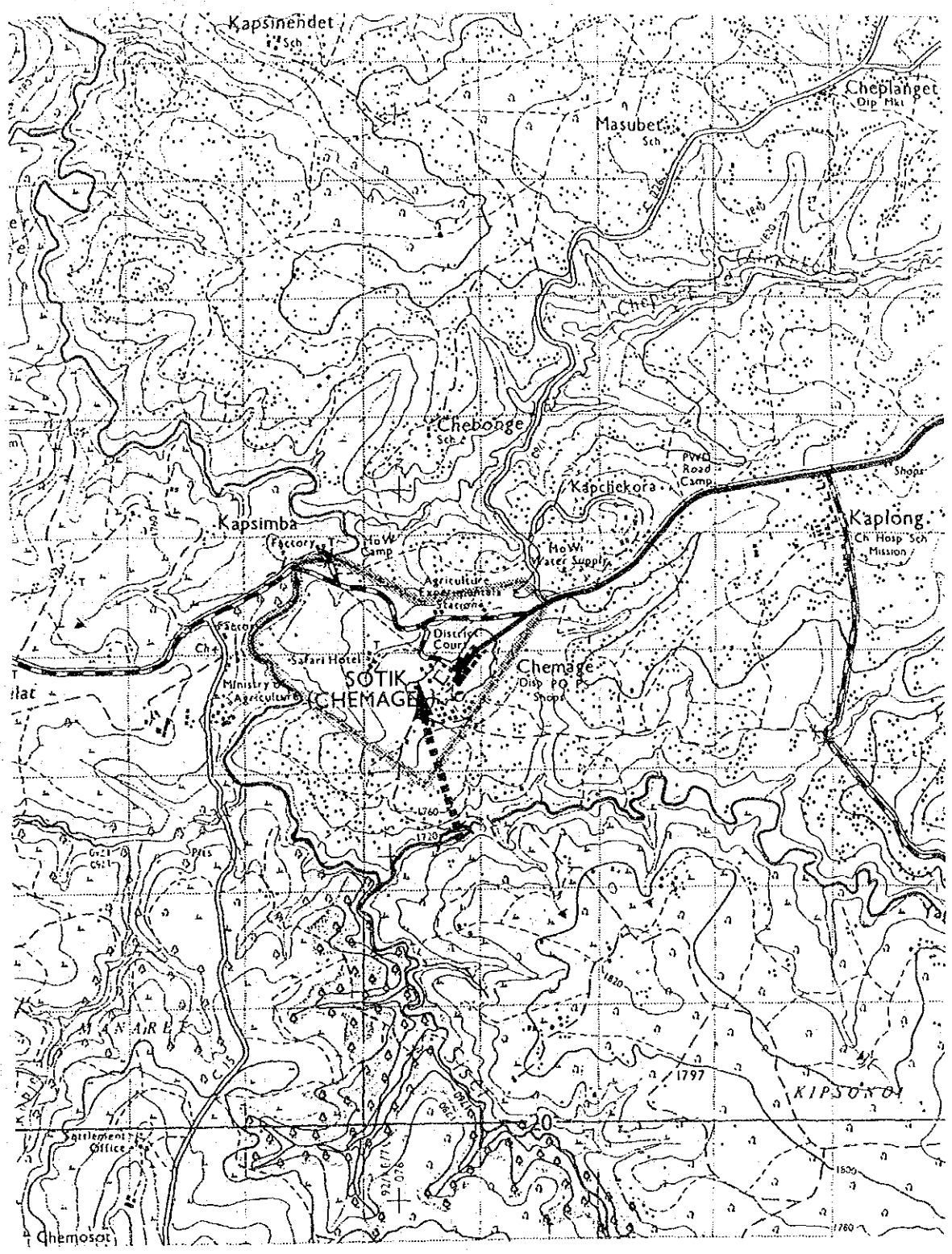
R 714.1 160/4 2H



THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

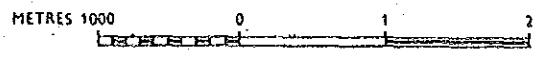
a	b	c	d	e	f	g	h	i
2	National Water Master Plan							
3	URBAN WATER SUPPLY							
4	Code No.	720	U- 93			Rate		Feb-92 25.2
5	-----							
6	Name of Urban:	Sotik		LGL Notice No:				
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:	Kericho	Locataion :	723.1		Keplctudo		
10	Map (1/50,000) :	131/1	Coordinates X:		35°07'		Y:	S 00°40'
11	Sub-basin Code:	1JF	Elevation (El. m):					
12	-----							
13	Existing Facilities							
14	Raw Water Source:			River No				
15	Raw Water System:	H (m)=	L (m)=					
16	Treatment:	Capacity (m3/d)		150				
17	Distribution System:							
18	-----							
19				1990	2000	2010		
20	-----							
21	Projected Population	(no)		6,000	11,200	16,600		
22	Residential Demand	(m3/d)		743	1,418	2,148		
23	Non-residential Demand	(m3/d)		124	231	342		
24	Livestock Demand	(m3/d)		30	56	88		
25	Industrial Demand	(m3/d)		398	738	1,062		
26	Total Demand	(m3/d)		1,295	2,443	3,640		
27	Area Served (estimated net)	(ha)		45	84	124		
28	-----							
29	Future Development Plan							
30	Raw Water Source:	Kipsonoi river		River No:				
31	Raw Water System:	H (m)=	70 L (m)=	1,100				
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost							
36	Incremental Capacity	(m3/d)		1990	2000	2010	Total	
37	Source Works	(US\$'000)		1,145.3	1,148.0	1,196.4	3,489.6	
38	Pump Cost	(US\$'000)		11.7	11.7	12.1	35.6	
39	Raw Water Main	(US\$'000)		4.3	4.2	4.2	12.7	
40	Treatment	(US\$'000)		53.4	53.4	53.8	160.5	
41	Storage	(US\$'000)		459.3	459.9	470.3	1,389.5	
42	Distribution	(US\$'000)		79.0	79.1	80.9	239.0	
43	Miscellaneous (20%)	(US\$'000)		358.5	310.7	322.6	991.7	
44	Admi. & Engineering	(US\$'000)		193.2	183.8	188.8	565.8	
45	Contingency	(US\$'000)		115.9	110.3	113.3	339.5	
46	Total Cost	(US\$'000)		255.1	242.6	249.2	746.9	
47	Cost per Capita	(US\$/c)		1,530.4	1,455.7	1,495.1	4,481.2	
48	Cost per ha	(US\$/ha)		255.1	279.9	276.9		
49	Cost per m3	(US\$/m3)		34,155.4	37,486.2	37,074.3		
50	-----							
51	Present Value of Water at DF=10 %							
52	Direct O & M Costs	(US\$'000)		1990	2000	2010	Total	
53	Capital Costs	(US\$'000)		76.5	72.8	74.8		
54	Total Annual Cost	(US\$'000)		157.6	149.9	154.0		
55	Unit Cost per m3	(US\$/m3)		234.2	222.7	228.7		
56	-----							
57	Remarks:							
58								
59								
60								
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62								
63	-----							

Fig.



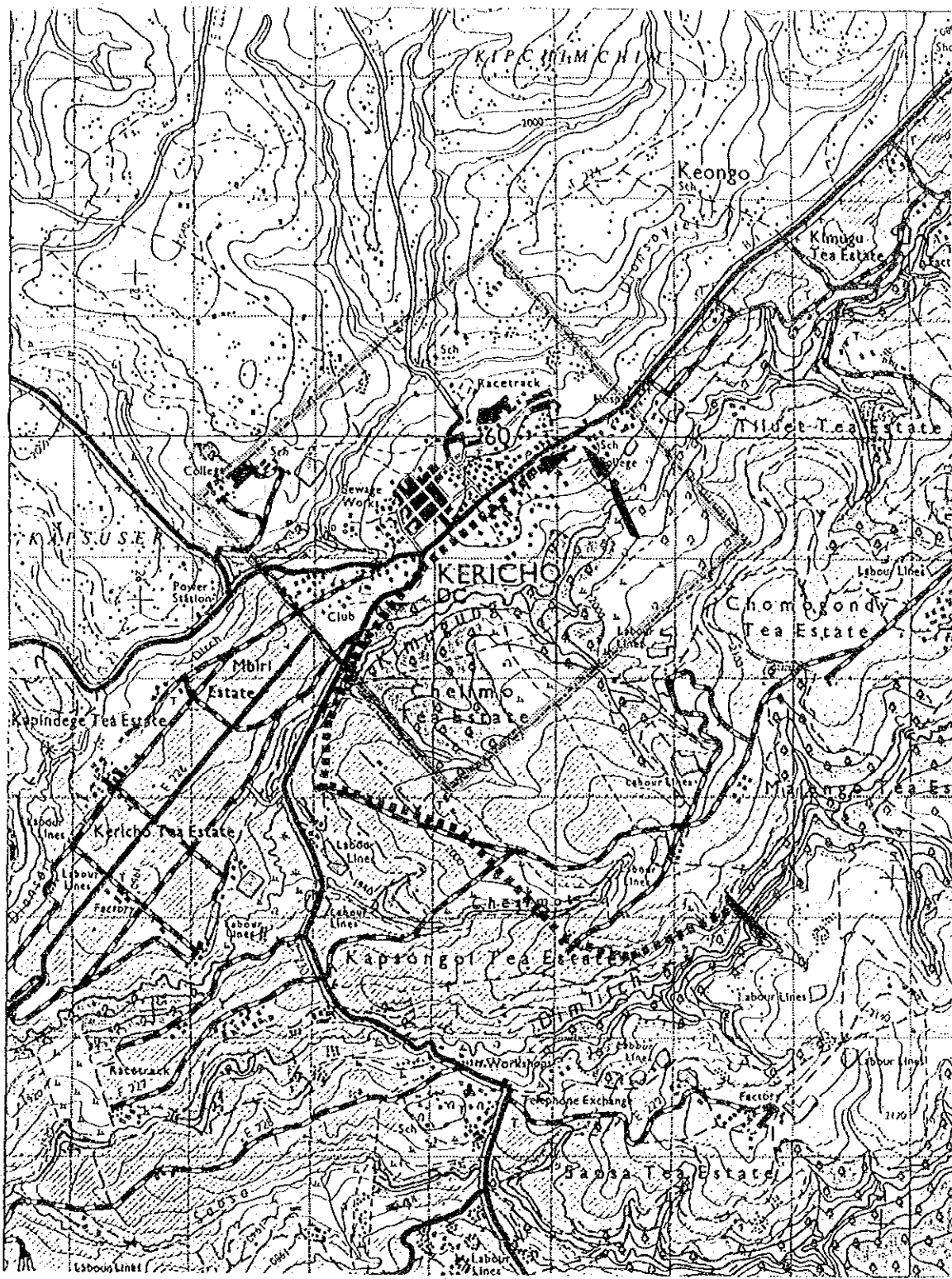
U- 93 Sotik

U 723.1 131/1 1JF



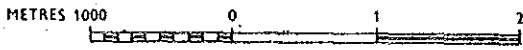
THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2						National Water Master Plan		
3			URBAN WATER SUPPLY					Feb-92
4	Code No.	720	U- 94			Rate		25.2
5	-----							
6	Name of Urban:		Kericho			LGL Notice No:		
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:		Kericho	Locataion :	725.5		Kericho Township	
10	Map (1/50,000) :		117/4	Coordinates X:		35°16'	Y:	S 00°20'
11	Sub-basin Code:		IJC	Elevation (El. m):				
12	-----							
13	Existing Facilities							
14	Raw Water Source:		River			River No		
15	Raw Water System:		H (m)=	L (m)=				
16	Treatment:			Capacity (m3/d)		2850		
17	Distribution System:							
18	-----							
19						1990	2000	2010
20	-----							
21	Projected Population		(no)		41,200	88,700	145,000	
22	Residential Demand		(m3/d)		5,104	11,232	18,759	
23	Non-residential Demand		(m3/d)		854	1,838	3,004	
24	Livestock Demand		(m3/d)		205	447	773	
25	Industrial Demand		(m3/d)		1,871	3,457	4,961	
26	Total Demand		(m3/d)		8,034	16,974	27,497	
27	Area Served (estimated net)		(ha)		308	662	1,083	
28	-----							
29	Future Development Plan							
30	Raw Water Source:		Dimlitch Dam, Kimugung Dam			River No:		
31	Raw Water System:		H (m)=	60 L (m)=		8,300		
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost				1990	2000	2010	Total
36	Incremental Capacity		(m3/d)		5,183.7	8,940.0	10,523.7	24,647.4
37	Source Works		(US\$'000)		128.4	146.7	61.9	337.0
38	Pump Cost		(US\$'000)		8.5	13.7	16.1	38.3
39	Raw Water Main		(US\$'000)		584.1	706.3	752.5	2,043.0
40	Treatment		(US\$'000)		947.2	1,138.0	1,070.8	3,156.0
41	Storage		(US\$'000)		223.2	385.0	453.2	1,061.5
42	Distribution		(US\$'000)		2,461.4	2,837.8	3,363.6	8,662.8
43	Miscellaneous (20%)		(US\$'000)		870.6	1,045.5	1,143.6	3,059.7
44	Admi. & Engineering		(US\$'000)		522.4	627.3	686.2	1,835.8
45	Contingency		(US\$'000)		1,149.2	1,380.1	1,509.6	4,038.8
46	Total Cost		(US\$'000)		6,895.0	8,280.5	9,057.3	24,232.9
47	Cost per Capita		(US\$/c)		167.4	174.3	160.9	
48	Cost per ha		(US\$/ha)		22,409.8	23,343.3	21,542.3	
49	Cost per m3		(US\$/m3)		1.3	0.9	0.9	1.0
50	-----							
51	Present Value of Water at DF=10 %				1990	2000	2010	Total
52	Direct O & M Costs		(US\$'000)		344.8	414.0	452.9	
53	Capital Costs		(US\$'000)		710.2	852.9	932.9	
54	Total Annual Cost		(US\$'000)		1,054.9	1,266.9	1,385.8	
55	Unit Cost per m3		(US\$/m3)		0.6	0.4	0.4	
56	-----							
57	Remarks:		Source works include the construction of 2 small dams.					
58								
59								
60								
61								
62								
63	-----							



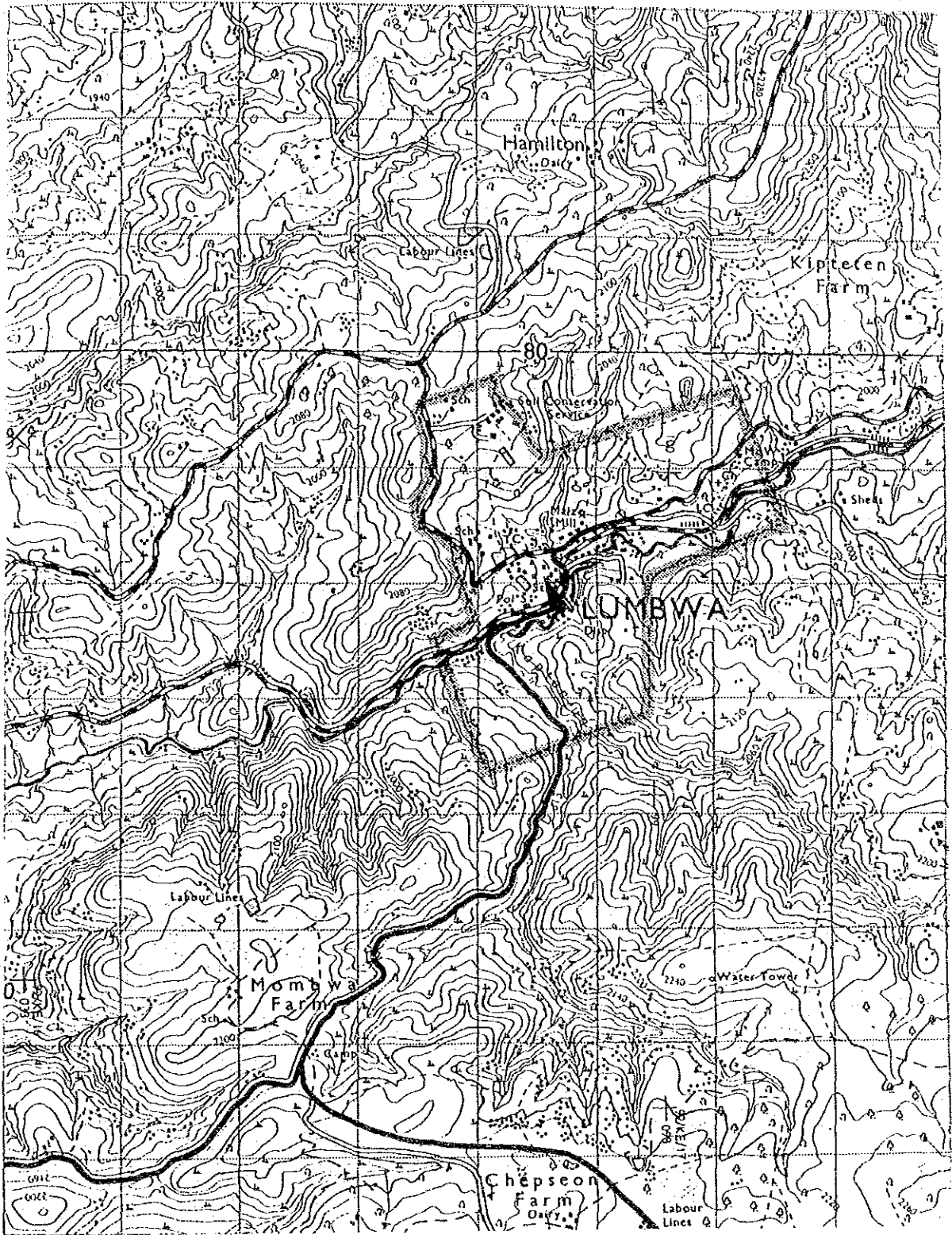
U- 94 Kericho

G 725.5 117/4 1JC



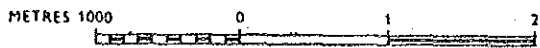
THE STUDY
ON
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JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2	National Water Master Plan							
3	URBAN WATER SUPPLY							
4	Code No. 720	U-95				Rate		Feb-92 25.2
5	-----							
6	Name of Urban:	Kipkelion	LGL Notice No:					
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:	Kericho	Locataion :	726.1		Kipkelion		
10	Map (1/50,000):	117/2	Coordinates X:		35°28'	Y:		S 00°12'
11	Sub-basin Code:	1GC	Elevation (El. m):					
12	-----							
13	Existing Facilities							
14	Raw Water Source:	Kipkelion R.	River No					
15	Raw Water System:	H (m)=	L (m)=					
16	Treatment:	Capacity (m3/d)		115				
17	Distribution System:							
18	-----							
19				1990	2000	2010		
20	-----							
21	Projected Population	(no)		2,200	4,800	7,800		
22	Residential Demand	(m3/d)		273	608	1,009		
23	Non-residential Demand	(m3/d)		46	98	160		
24	Livestock Demand	(m3/d)		11	24	41		
25	Industrial Demand	(m3/d)		0	0	0		
26	Total Demand	(m3/d)		330	730	1,210		
27	Area Served (estimated net)	(ha)		16	36	58		
28	-----							
29	Future Development Plan							
30	Raw Water Source:	Nyando river	River No:					
31	Raw Water System:	H (m)=	20 L (m)=	0				
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost			1990	2000	2010	Total	
36	Incremental Capacity	(m3/d)		214.5	400.3	480.3	1,095.1	
37	Source Works	(US\$'000)		3.3	5.3	6.1	14.8	
38	Pump Cost	(US\$'000)		1.1	1.3	1.4	3.8	
39	Raw Water Main	(US\$'000)		0.0	0.0	0.0	0.0	
40	Treatment	(US\$'000)		174.6	253.3	281.7	709.6	
41	Storage	(US\$'000)		29.2	43.2	48.2	120.7	
42	Distribution	(US\$'000)		131.4	155.3	179.2	466.0	
43	Miscellaneous (20%)	(US\$'000)		67.9	91.7	103.3	263.0	
44	Admi. & Engineering	(US\$'000)		40.8	55.0	62.0	157.8	
45	Contingency	(US\$'000)		89.7	121.0	136.4	347.1	
46	Total Cost	(US\$'000)		538.1	726.1	818.4	2,082.7	
47	Cost per Capita	(US\$/c)		244.6	279.3	272.8		
48	Cost per ha	(US\$/ha)		32,751.7	37,397.4	36,530.8		
49	Cost per m3	(US\$/m3)		2.5	1.8	1.7	1.9	
50	-----							
51	Present Value of Water at DF=10 %			1990	2000	2010	Total	
52	Direct O & M Costs	(US\$'000)		26.9	36.3	40.9		
53	Capital Costs	(US\$'000)		55.4	74.8	84.3		
54	Total Annual Cost	(US\$'000)		82.3	111.1	125.2		
55	Unit Cost per m3	(US\$/m3)		1.1	0.8	0.7		
56	-----							
57	Remarks: Alternatively water could be taken from Malaget river on north. Its relative merit should be assessed in comparison with the plan of pump-up from Nyando river.							
58								
59								
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61								
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63	-----							



U- 95 Kipkelion

R 726.1 117/2 1GC



THE STUDY
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b	c	d	e	f	g	h	i
National Water Master Plan							
URBAN WATER SUPPLY							
Code No. 720		U- 96			Rate		Feb-92 25.2

Name of Urban:	Londiani		LGL Notice No:				
Organization:							
Per Capita GRDP in 1988 (guess):							
District:	Kericho	Locataion :	727.1	Londiani		Y:	S 00°10'
Map (1/50,000) :	118/1	Coordinates X:		35°36'			
Sub-basin Code:	1GC	Elevation (El. m):					

Existing Facilities							
Raw Water Source:	Londiani R.		L (m)=		River No		
Raw Water System:	H (m)=		Capacity (m3/d)		120		
Treatment:							
Distribution System:							

			1990	2000	2010		

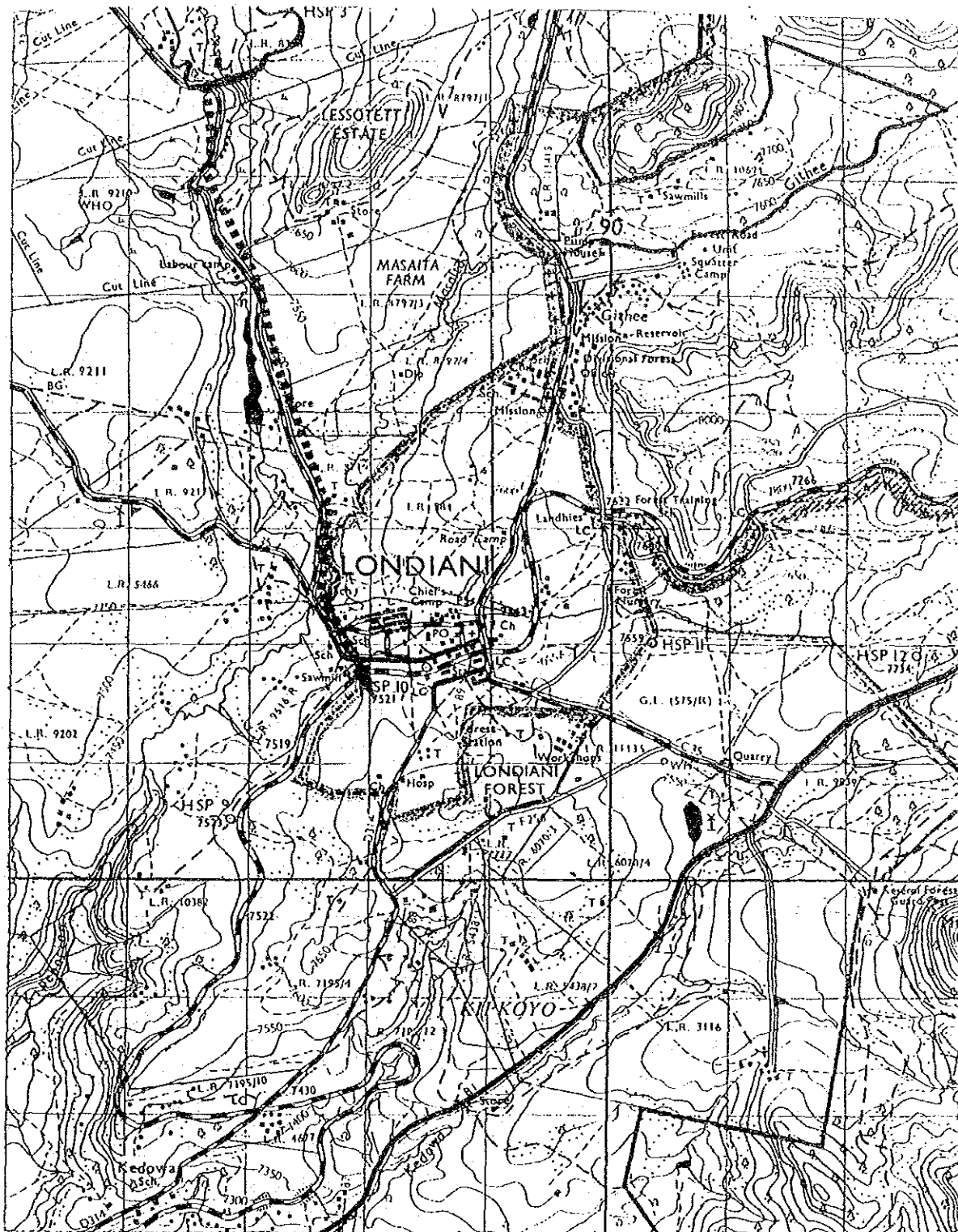
Projected Population	(no)		3,200	6,900	11,300		
Residential Demand	(m3/d)		396	874	1,462		
Non-residential Demand	(m3/d)		66	143	233		
Livestock Demand	(m3/d)		16	35	60		
Industrial Demand	(m3/d)		26	46	61		
Total Demand	(m3/d)		504	1,098	1,816		
Area Served (estimated net)	(ha)		24	52	84		

Future Development Plan							
Raw Water Source:	Londiani dam		0 L (m)=		River No:		
Raw Water System:	H (m)=				6,200		
Treatment:							
Distribution System:							

Incremental Capital Cost			1990	2000	2010	Total	
Incremental Capacity	(m3/d)		384.4	593.3	718.2	1,695.9	
Source Works	(US\$'000)		5.2	7.2	8.3	20.6	
Pump Cost	(US\$'000)		0.0	0.0	0.0	0.0	
Raw Water Main	(US\$'000)		256.3	270.8	278.4	805.4	
Treatment	(US\$'000)		247.3	318.2	354.8	920.3	
Storage	(US\$'000)		42.1	54.7	61.1	157.9	
Distribution	(US\$'000)		191.2	221.1	262.9	675.1	
Miscellaneous (20%)	(US\$'000)		148.4	174.4	193.1	515.9	
Admi. & Engineering	(US\$'000)		89.1	104.6	115.8	309.5	
Contingency	(US\$'000)		195.9	230.2	254.8	680.9	
Total Cost	(US\$'000)		1,175.5	1,381.1	1,529.1	4,085.6	
Cost per Capita	(US\$/c)		367.3	373.3	347.5		
Cost per ha	(US\$/ha)		49,189.4	49,981.4	46,534.0		
Cost per m3	(US\$/m3)		3.1	2.3	2.1	2.4	

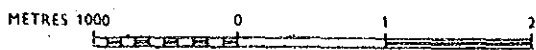
Present Value of Water at DF=10 %			1990	2000	2010	Total	
Direct O & M Costs	(US\$'000)		58.8	69.1	76.5		
Capital Costs	(US\$'000)		121.1	142.2	157.5		
Total Annual Cost	(US\$'000)		179.9	211.3	233.9		
Unit Cost per m3	(US\$/m3)		1.3	1.0	0.9		

Remarks: Source works cost does not include the cost of Londiani dam, which should be added separately (see Sectoral Report M).							



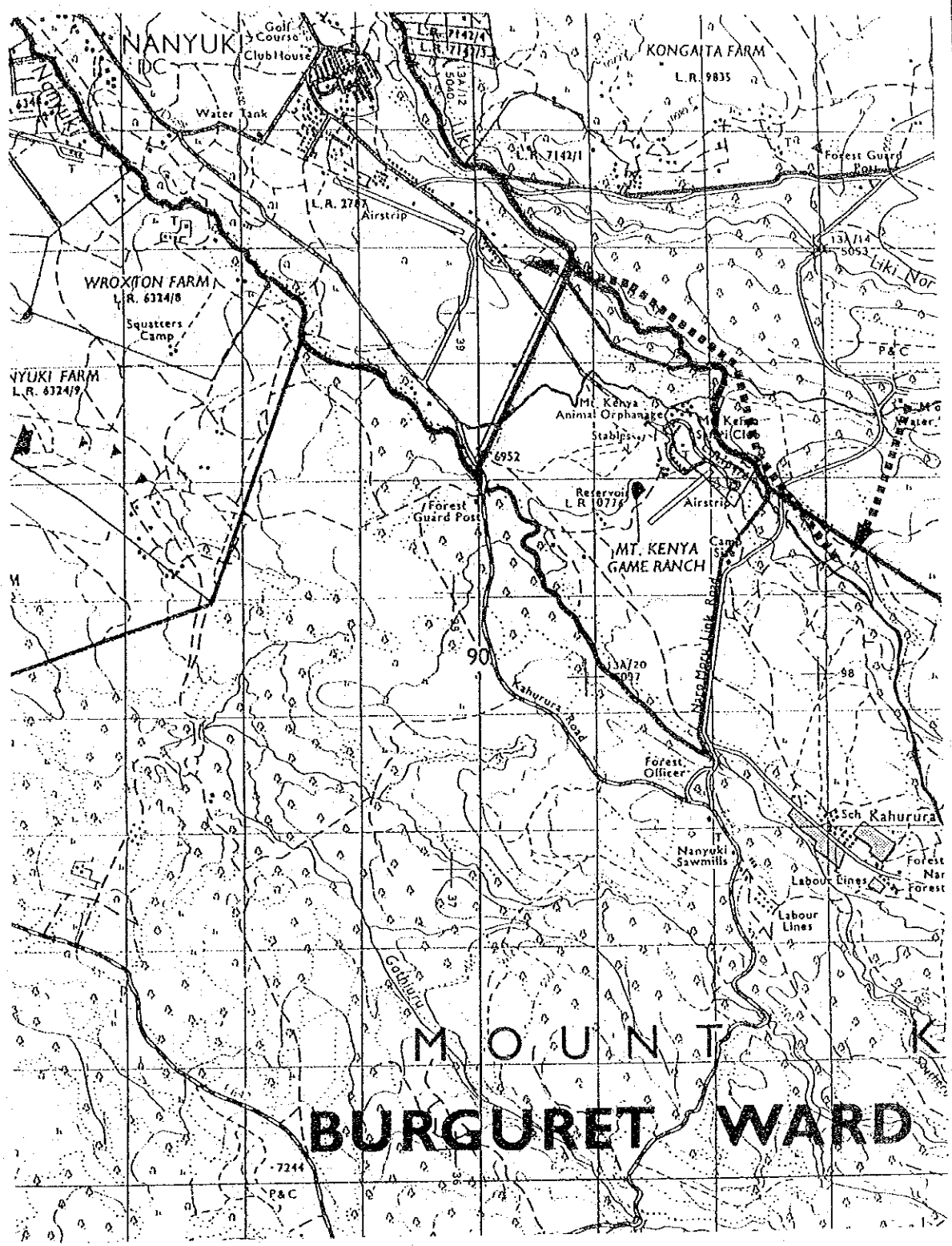
U- 96 Londiani

U 727.1 118/1 1GC



THE STUDY
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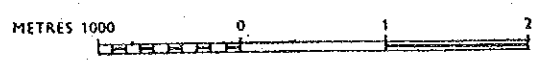
a	b	c	d	e	f	g	h	i
2	National Water Master Plan							
3	URBAN WATER SUPPLY							
4	Code No. 730		U-97			Rate		Feb-92 25.2
5	-----							
6	Name of Urban:		Nanyuki		LGL Notice No:			
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:	Laikipia	Locataion :	731.5		Nanyuki		
10	Map (1/50,000) :	107/3	Coordinates X:		37°05'	Y:		N 00°01'
11	Sub-basin Code:	5BE	Elevation (El. m):					
12	-----							
13	Existing Facilities							
14	Raw Water Source:		Nanyuki River			River No		
15	Raw Water System:		H (m)=		L (m)=			
16	Treatment:				Capacity (m3/d)	2720		
17	Distribution System:							
18	-----							
19					1990	2000	2010	
20	-----							
21	Projected Population		(no)	25,100	63,600	114,900		
22	Residential Demand		(m3/d)	3,109	8,053	14,865		
23	Non-residential Demand		(m3/d)	520	1,317	2,381		
24	Livestock Demand		(m3/d)	255	664	1,646		
25	Industrial Demand		(m3/d)	605	1,133	1,654		
26	Total Demand		(m3/d)	4,489	11,167	20,546		
27	Area Served (estimated net)		(ha)	187	475	858		
28	-----							
29	Future Development Plan							
30	Raw Water Source:		Liki river			River No:		
31	Raw Water System:		H (m)=		0 L (m)=	5,600		
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost			1990	2000	2010	Total	
36	Incremental Capacity		(m3/d)	1,769.3	6,678.1	9,378.8	17,826.2	
37	Source Works		(US\$'000)	16.2	44.0	56.7	117.0	
38	Pump Cost		(US\$'000)	0.0	0.0	0.0	0.0	
39	Raw Water Main		(US\$'000)	296.2	428.7	485.4	1,210.3	
40	Treatment		(US\$'000)	577.7	1,039.9	1,152.5	2,770.1	
41	Storage		(US\$'000)	98.5	287.6	403.9	790.0	
42	Distribution		(US\$'000)	1,499.6	2,300.1	3,064.8	6,864.5	
43	Miscellaneous (20%)		(US\$'000)	497.7	820.1	1,032.7	2,350.4	
44	Admi. & Engineering		(US\$'000)	298.6	492.0	619.6	1,410.2	
45	Contingency		(US\$'000)	656.9	1,082.5	1,363.1	3,102.5	
46	Total Cost		(US\$'000)	3,941.4	6,494.9	8,178.7	18,615.0	
47	Cost per Capita		(US\$/c)	157.0	168.7	159.4		
48	Cost per ha		(US\$/ha)	21,027.0	22,589.7	21,348.5		
49	Cost per m3		(US\$/m3)	2.2	1.0	0.9	1.0	
50	-----							
51	Present Value of Water at DF=10 %			1990	2000	2010	Total	
52	Direct O & M Costs		(US\$'000)	197.1	324.7	408.9		
53	Capital Costs		(US\$'000)	406.0	669.0	842.4		
54	Total Annual Cost		(US\$'000)	603.0	993.7	1,251.3		
55	Unit Cost per m3		(US\$/m3)	0.9	0.4	0.4		
56	-----							
57	Remarks:							
58								
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63	-----							



MOUNT
BURGURET WARD

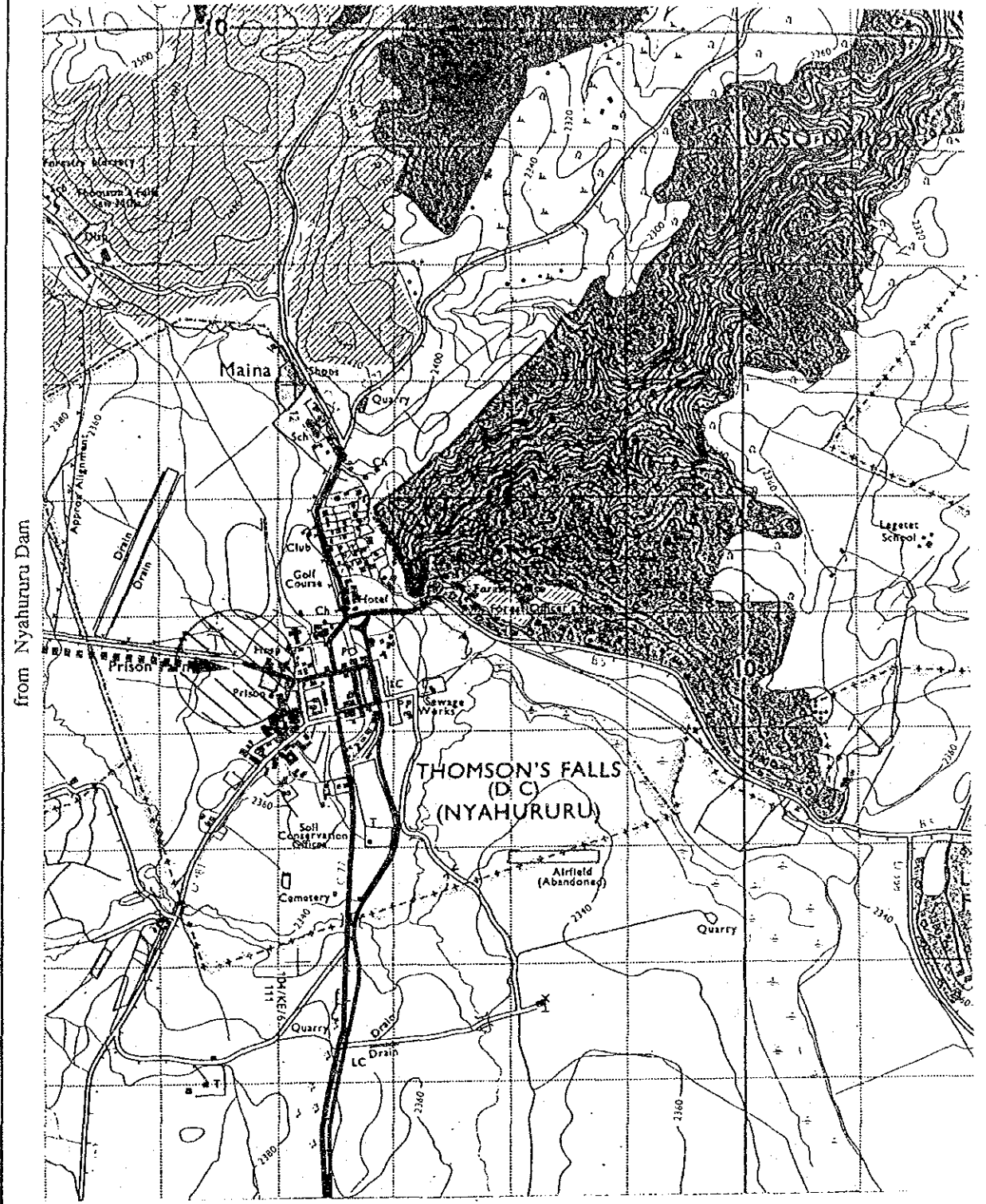
U- 97 Nanyuki

U 731.5 107/3 5BE



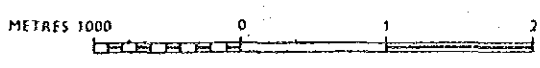
THE STUDY
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a	b	c	d	e	f	g	h	i
2	National Water Master Plan							
3	URBAN WATER SUPPLY							
4	Code No. 730		U- 98			Rate		Jul-92 25.2
5	-----							
6	Name of Urban:		Nyahururu		LGL Notice No:			
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:	Laikipia	Locataion :	733.9			Nyahururu Township	
10	Map (1/50,000) :	105/4	Coordinates X:		36°22'		Y:	N 00°04'
11	Sub-basin Code:	5AA	Elevation (El. m):					
12	-----							
13	Existing Facilities							
14	Raw Water Source:		Nyahururu Stream /Equator Streams		River No			
15	Raw Water System:		H (m)=		L (m)=			
16	Treatment:		Capacity (m3/d)		2490			
17	Distribution System:							
18	-----							
19				1990	2000	2010		
20	-----							
21	Projected Population	(no)		14,200	36,000	60,000		
22	Residential Demand	(m3/d)		1,759	4,559	7,763		
23	Non-residential Demand	(m3/d)		294	745	1,244		
24	Livestock Demand	(m3/d)		144	376	859		
25	Industrial Demand	(m3/d)		445	825	1,189		
26	Total Demand	(m3/d)		2,642	6,505	11,055		
27	Area Served (estimated net)	(ha)		106	269	448		
28	-----							
29	Future Development Plan							
30	Raw Water Source:		Nyahururu dam + Borehole		River No:			
31	Raw Water System:		H (m)=	0	L (m)=	645,000	4,400	
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost			1990	2000	2010	Total	
36	Incremental Capacity	(m3/d)		152.0	3,862.5	4,550.0	8,564.5	
37	Source Works	(US\$'000)		1.5	17.3	19.6	38.5	
38	Pump Cost	(US\$'000)		0.0	0.0	0.0	0.0	
39	Raw Water Main	(US\$'000)		255.2	3,004.5	3,549.6	6,809.3	
40	Treatment	(US\$'000)		141.6	838.6	898.9	1,879.1	
41	Storage	(US\$'000)		23.4	166.3	196.0	385.7	
42	Distribution	(US\$'000)		848.4	1,302.4	1,433.8	3,584.6	
43	Miscellaneous (20%)	(US\$'000)		254.0	1,065.8	1,219.6	2,539.4	
44	Admi. & Engineering	(US\$'000)		152.4	639.5	731.7	1,523.7	
45	Contingency	(US\$'000)		335.3	1,406.9	1,609.8	3,352.1	
46	Total Cost	(US\$'000)		2,011.7	8,441.5	9,659.1	20,112.3	
47	Cost per Capita	(US\$/c)		141.7	387.2	402.5		
48	Cost per ha	(US\$/ha)		18,970.4	51,851.7	53,891.8		
49	Cost per m3	(US\$/m3)		13.2	2.2	2.1	2.3	
50	-----							
51	Present Value of Water at DF=10 %			1990	2000	2010	Total	
52	Direct O & M Costs	(US\$'000)		100.6	422.1	483.0		
53	Capital Costs	(US\$'000)		207.2	869.5	994.9		
54	Total Annual Cost	(US\$'000)		307.8	1,291.6	1,477.8		
55	Unit Cost per m3	(US\$/m3)		5.5	0.9	0.9		
56	-----							
57	Remarks:	Boreholes and Nyahururu dam are possible water sources. It was assumed that the urban centre would						
58		equally depend on these two water sources.						
59		Source works cost does not include the cost of Nyahururu dam, which should be added separately						
60		(see Sectoral Report M).						
61								
62								
63	-----							



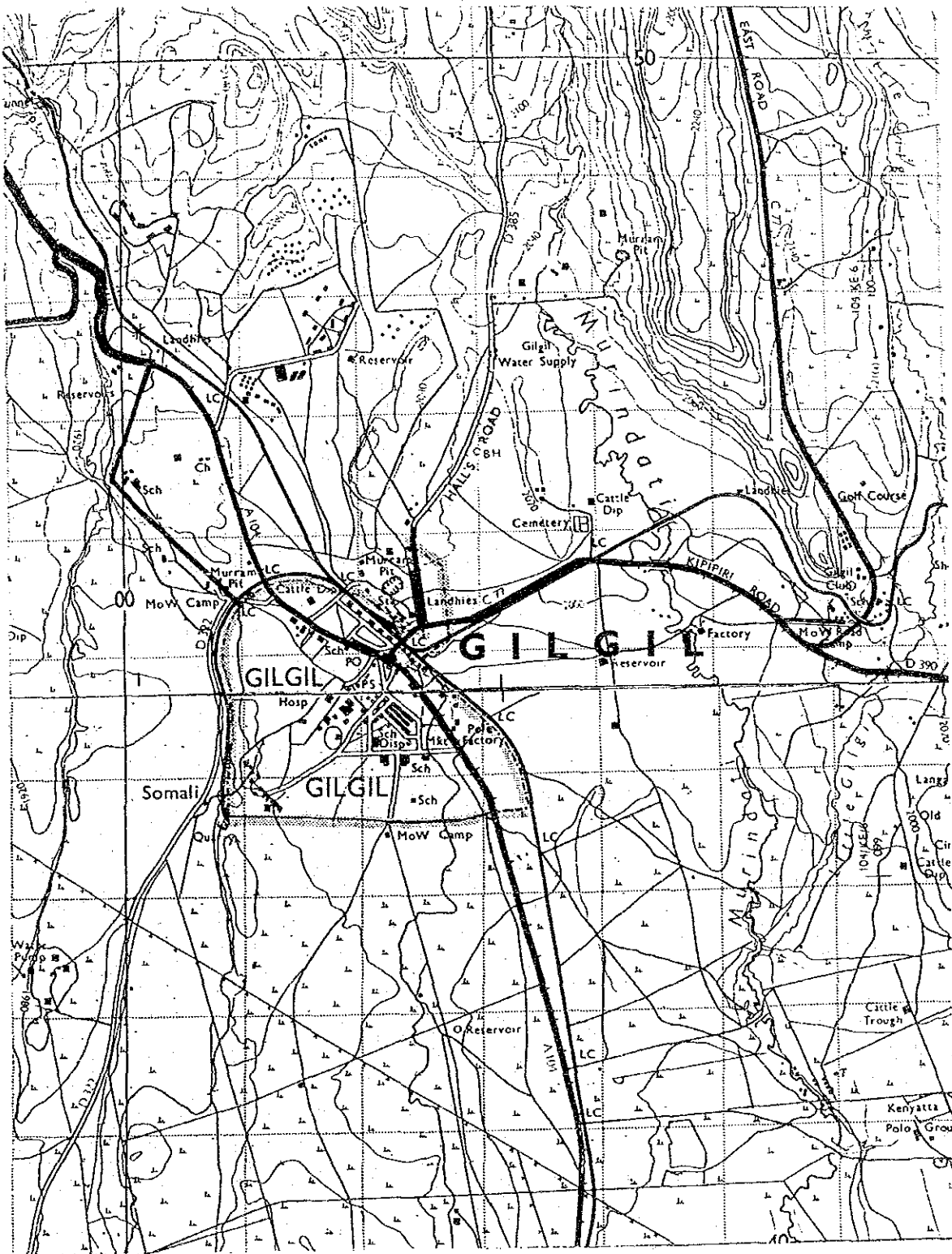
U- 98 Nyahururu

U 733.9 105/4 5AA



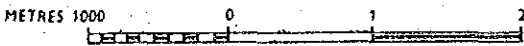
THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2	National Water Master Plan							
3	URBAN WATER SUPPLY							
4	Code No. 740	U- 99				Rate		Feb-92 25.2
5	-----							
6	Name of Urban:	Gilgil	LGL Notice No:					
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:	Nakuru	Locataion :	743.2			Gilgil	
10	Map (1/50,000) :	119/4	Coordinates X:		36°20'		Y:	S 00°29'
11	Sub-basin Code:	2GA	Elevation (El. m):					
12	-----							
13	Existing Facilities							
14	Raw Water Source:	Molendat River	River No					
15	Raw Water System:	H (m)=	L (m)=					
16	Treatment:	Capacity (m3/d)		778				
17	Distribution System:							
18	-----							
19				1990	2000	2010		
20	-----							
21	Projected Population	(no)	14,600	39,900	73,800			
22	Residential Demand	(m3/d)	1,809	5,052	9,548			
23	Non-residential Demand	(m3/d)	303	825	1,529			
24	Livestock Demand	(m3/d)	68	209	649			
25	Industrial Demand	(m3/d)	145	254	339			
26	Total Demand	(m3/d)	2,325	6,340	12,065			
27	Area Served (estimated net)	(ha)	109	298	551			
28	-----							
29	Future Development Plan							
30	Raw Water Source:	Turasha P/L & Malewa Dam	River No:					
31	Raw Water System:	H (m)=	0 L (m)=	0				
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost		1990	2000	2010	Total		
36	Incremental Capacity	(m3/d)	1,546.6	4,015.8	5,724.5	11,286.9		
37	Source Works	(US\$'000)	0.0	0.0	0.0	0.0		
38	Pump Cost	(US\$'000)	0.0	0.0	0.0	0.0		
39	Raw Water Main	(US\$'000)	0.0	0.0	0.0	0.0		
40	Treatment	(US\$'000)	538.9	852.9	983.9	2,375.7		
41	Storage	(US\$'000)	92.2	137.2	149.6	379.1		
42	Distribution	(US\$'000)	872.3	1,511.5	2,025.3	4,409.1		
43	Miscellaneous (20%)	(US\$'000)	300.7	500.3	631.8	1,432.8		
44	Admi. & Engineering	(US\$'000)	180.4	300.2	379.1	859.7		
45	Contingency	(US\$'000)	396.9	660.4	833.9	1,891.2		
46	Total Cost	(US\$'000)	2,381.4	3,962.5	5,003.6	11,347.4		
47	Cost per Capita	(US\$/c)	163.1	156.6	147.6			
48	Cost per ha	(US\$/ha)	21,841.1	20,972.1	19,764.3			
49	Cost per m3	(US\$/m3)	1.5	1.0	0.9	1.0		
50	-----							
51	Present Value of Water at DF=10 %		1990	2000	2010	Total		
52	Direct O & M Costs	(US\$'000)	119.1	198.1	250.2			
53	Capital Costs	(US\$'000)	245.3	408.1	515.4			
54	Total Annual Cost	(US\$'000)	364.4	606.3	765.6			
55	Unit Cost per m3	(US\$/m3)	0.6	0.4	0.4			
56	-----							
57	Remarks:	Source works cost does not include the cost of Malewa dam, which should be added separately						
58		(see Sectoral Report M).						
59								
60								
61								
62								
63	-----							



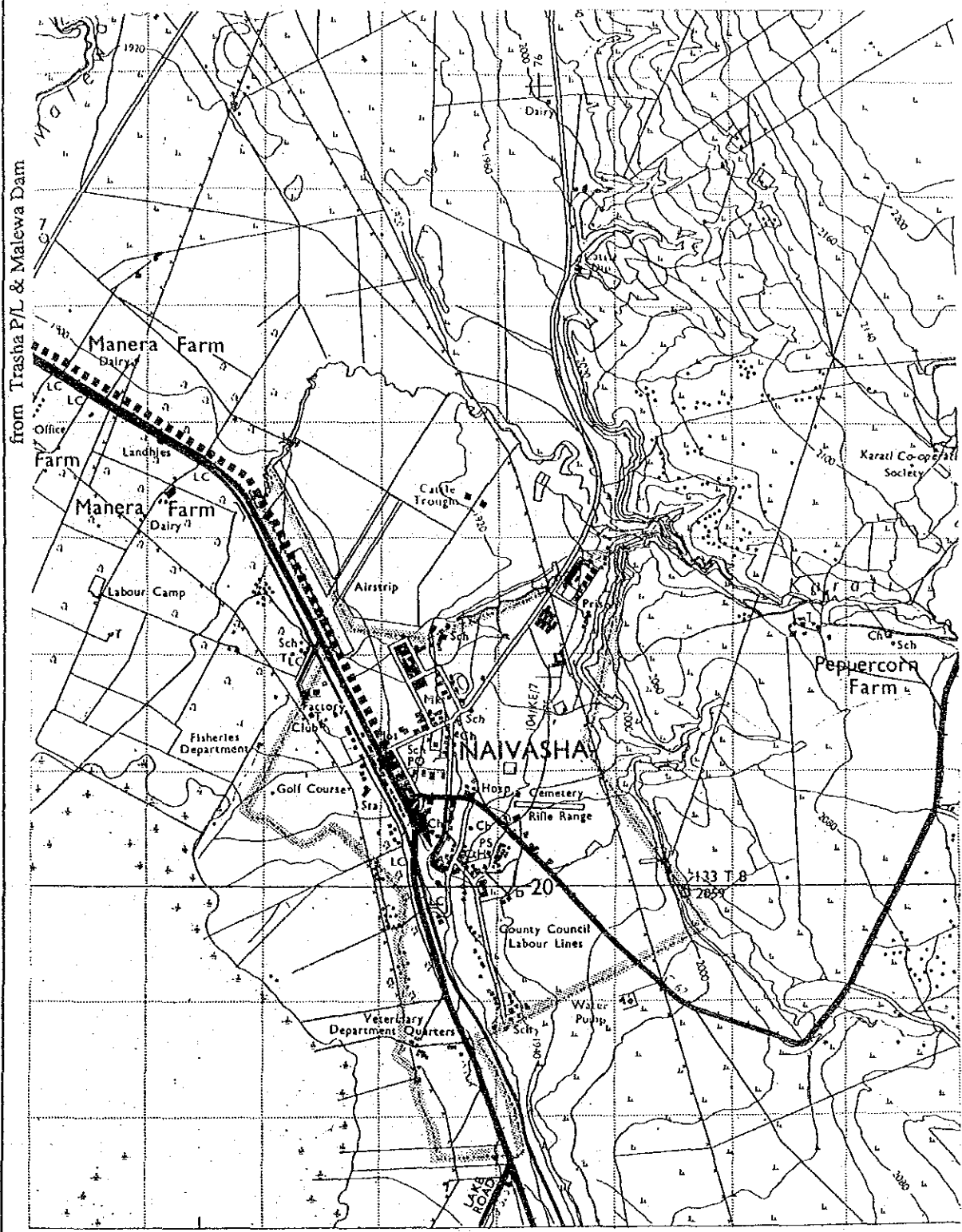
U- 99 Gilgil

R 743.2 119/4 2GA



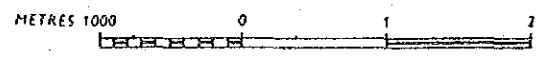
THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2	National Water Master Plan							
3	URBAN WATER SUPPLY							
4	Code No. 740		U- 100			Rate		Feb-92 25.2
5	-----							
6	Name of Urban:		Naivasha		LGL Notice No:			
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:		Nakuru	Locataion :	744.1		Naivasha	
10	Map (1/50,000) :		133/2	Coordinates X:		36°27'	Y:	S 00°42'
11	Sub-basin Code:		2GD	Elevation (El. m):				
12	-----							
13	Existing Facilities							
14	Raw Water Source:		Boreholes			River No		
15	Raw Water System:		H (m)=	L (m)=				
16	Treatment:			Capacity (m3/d)		2100		
17	Distribution System:							
18	-----							
19					1990	2000	2010	
20	-----							
21	Projected Population		(no)		38,500	105,000	194,500	
22	Residential Demand		(m3/d)		4,769	13,296	25,163	
23	Non-residential Demand		(m3/d)		798	2,175	4,031	
24	Livestock Demand		(m3/d)		180	552	1,712	
25	Industrial Demand		(m3/d)		404	729	1,018	
26	Total Demand		(m3/d)		6,151	16,752	31,924	
27	Area Served (estimated net)		(ha)		288	784	1,453	
28	-----							
29	Future Development Plan							
30	Raw Water Source:		Turasha P/L & Malewa Dam			River No:		
31	Raw Water System:		H (m)=	0 L (m)=		30,300		
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost				1990	2000	2010	Total
36	Incremental Capacity		(m3/d)		4,051.2	10,600.4	15,172.8	29,824.4
37	Source Works		(US\$'000)		0.0	0.0	0.0	0.0
38	Pump Cost		(US\$'000)		0.0	0.0	0.0	0.0
39	Raw Water Main		(US\$'000)		1,977.5	2,755.0	3,202.1	7,934.6
40	Treatment		(US\$'000)		856.1	1,078.6	1,543.8	3,478.5
41	Storage		(US\$'000)		174.5	456.5	653.4	1,284.4
42	Distribution		(US\$'000)		2,300.1	3,972.9	5,347.1	11,620.1
43	Miscellaneous (20%)		(US\$'000)		1,061.6	1,652.6	2,149.3	4,863.5
44	Admi. & Engineering		(US\$'000)		637.0	991.6	1,289.6	2,918.1
45	Contingency		(US\$'000)		1,401.4	2,181.5	2,837.1	6,419.9
46	Total Cost		(US\$'000)		8,408.2	13,088.7	17,022.3	38,519.2
47	Cost per Capita		(US\$/c)		218.4	196.8	190.2	
48	Cost per ha		(US\$/ha)		29,244.3	26,355.7	25,468.0	
49	Cost per m3		(US\$/m3)		2.1	1.2	1.1	1.3
50	-----							
51	Present Value of Water at DF=10 %				1990	2000	2010	Total
52	Direct O & M Costs		(US\$'000)		420.4	654.4	851.1	
53	Capital Costs		(US\$'000)		866.0	1,348.1	1,753.3	
54	Total Annual Cost		(US\$'000)		1,286.5	2,002.6	2,604.4	
55	Unit Cost per m3		(US\$/m3)		0.9	0.5	0.5	
56	-----							
57	Remarks:	Source works cost does not include the cost of Malewa dam, which should be added separately						
58		(see Sectoral Report M).						
59								
60								
61								
62								
63	-----							



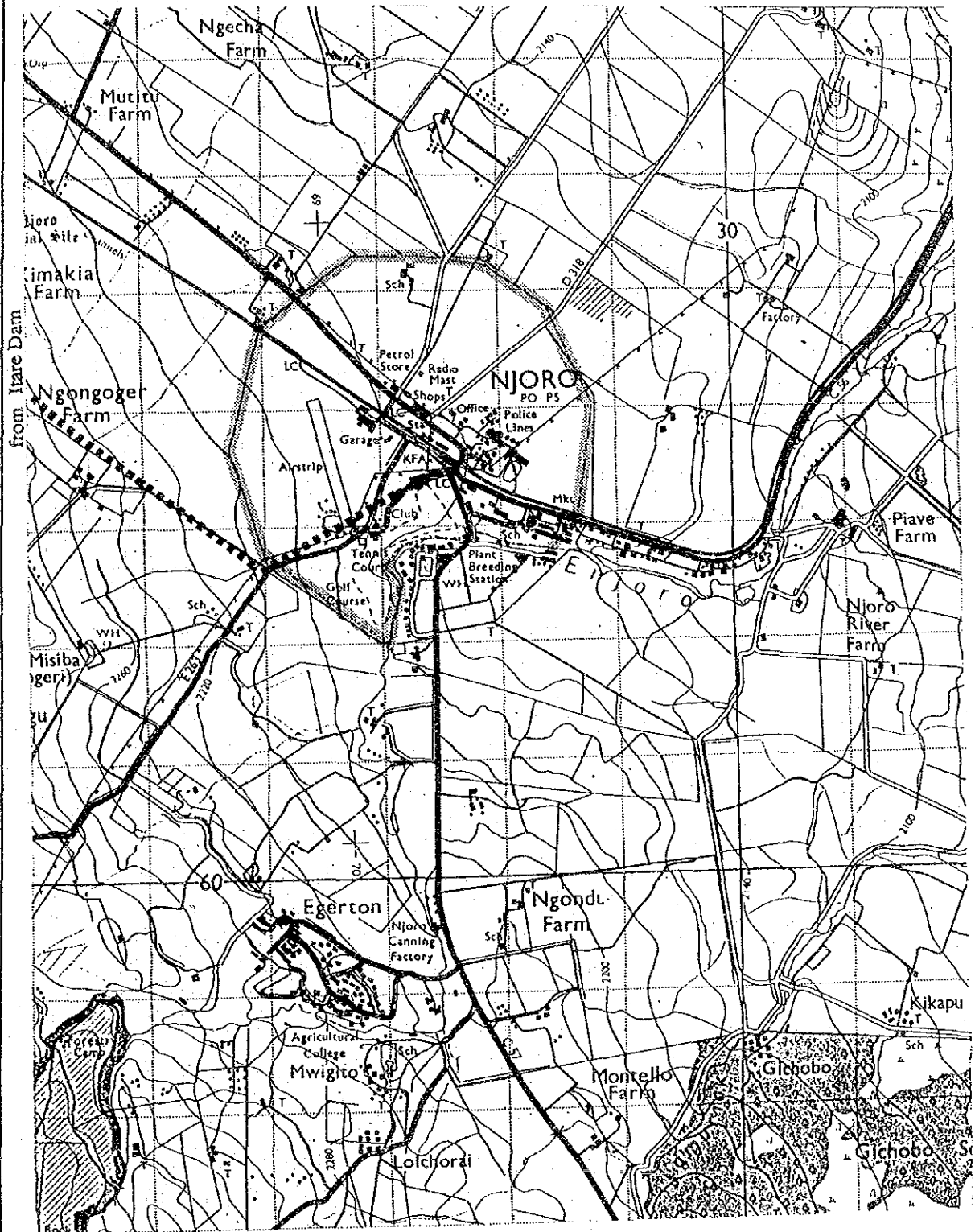
U-100 Naivasha

U 744.1 133/2 2GD



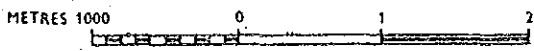
THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2	National Water Master Plan							
3	URBAN WATER SUPPLY							
4	Code No. 740		U- 101			Rate		Feb-92 25.2
5	-----							
6	Name of Urban:		Njoro		LGL Notice No:			
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:		Nakuru	Locataion :	746.1		Njoro	
10	Map (1/50,000) :		118/4	Coordinates X:			35°57'	Y: S 00°19'
11	Sub-basin Code:		2FC	Elevation (El. m):				
12	-----							
13	Existing Facilities							
14	Raw Water Source:		Boreholes			River No		
15	Raw Water System:		H (m)=	L (m)=				
16	Treatment:			Capacity (m3/d)		440		
17	Distribution System:							
18	-----							
19					1990	2000	2010	
20	-----							
21	Projected Population		(no)		9,100	24,900	46,000	
22	Residential Demand		(m3/d)		1,127	3,153	5,951	
23	Non-residential Demand		(m3/d)		189	514	953	
24	Livestock Demand		(m3/d)		42	131	405	
25	Industrial Demand		(m3/d)		105	201	299	
26	Total Demand		(m3/d)		1,463	3,999	7,608	
27	Area Served (estimated net)		(ha)		68	186	344	
28	-----							
29	Future Development Plan							
30	Raw Water Source:		Itare Dam			River No:		
31	Raw Water System:		H (m)=	350 L (m)=		67,100		
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost				1990	2000	2010	Total
36	Incremental Capacity		(m3/d)		1,023.3	2,535.7	3,609.3	7,168.3
37	Source Works		(US\$'000)		10.8	21.3	27.7	59.8
38	Pump Cost		(US\$'000)		24.6	34.6	45.0	104.2
39	Raw Water Main		(US\$'000)		3,190.3	3,858.4	4,236.3	11,284.9
40	Treatment		(US\$'000)		432.0	691.1	814.0	1,937.1
41	Storage		(US\$'000)		74.4	115.8	155.4	345.7
42	Distribution		(US\$'000)		543.7	943.9	1,260.6	2,748.2
43	Miscellaneous (20%)		(US\$'000)		855.1	1,133.0	1,307.8	3,296.0
44	Admi. & Engineering		(US\$'000)		513.1	679.8	784.7	1,977.6
45	Contingency		(US\$'000)		1,128.8	1,495.6	1,726.3	4,350.7
46	Total Cost		(US\$'000)		6,772.7	8,973.6	10,357.8	26,104.2
47	Cost per Capita		(US\$/c)		744.3	568.0	490.9	
48	Cost per ha		(US\$/ha)		99,660.2	76,051.9	65,733.2	
49	Cost per m3		(US\$/m3)		6.6	3.5	2.9	3.6
50	-----							
51	Present Value of Water at DF=10 %				1990	2000	2010	Total
52	Direct O & M Costs		(US\$'000)		338.6	448.7	517.9	
53	Capital Costs		(US\$'000)		697.6	924.3	1,066.9	
54	Total Annual Cost		(US\$'000)		1,036.2	1,373.0	1,584.7	
55	Unit Cost per m3		(US\$/m3)		2.8	1.5	1.2	
56	-----							
57	Remarks:	Source works cost does not include the cost of Itare dam, which should be added separately						
58		(see Sectoral Report M).						
59								
60								
61								
62								
63	-----							



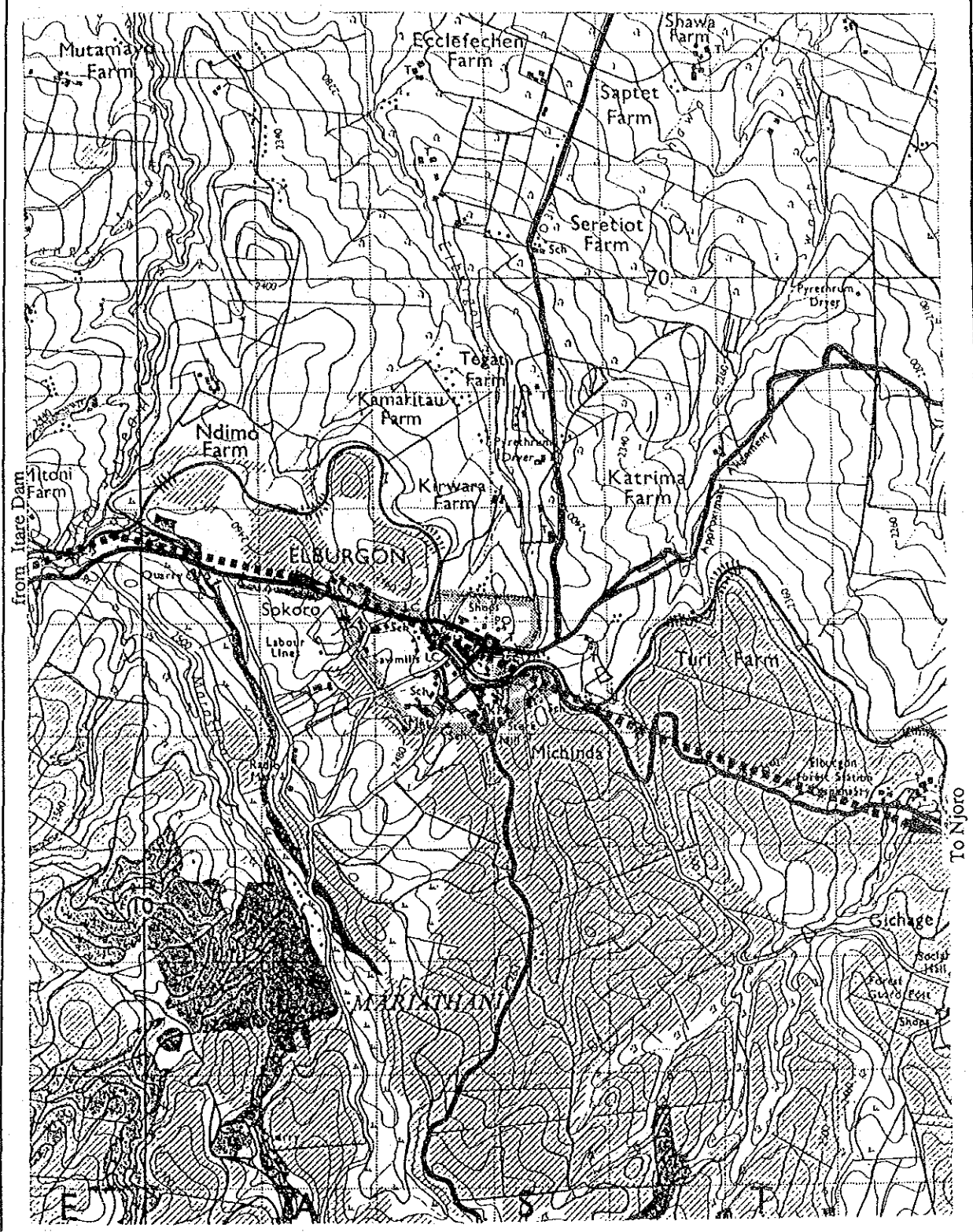
U-101 Njoro

U 746.1 118/4 2FC



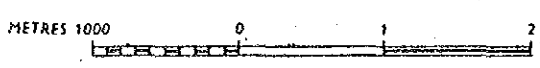
THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2						National Water Master Plan		
3			URBAN WATER SUPPLY					Feb-92
4	Code No. 740		U- 102			Rate		25.2
5	-----							
6	Name of Urban:		El BURGON		LGL Notice No:			
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:		Nakuru	Locataion :	747.3		El Burgon	
10	Map (1/50,000):		118/4	Coordinates X:		35°50'	Y:	S 00°15'
11	Sub-basin Code:		2EC	Elevation (El. m):				
12	-----							
13	Existing Facilities							
14	Raw Water Source:		Boreholes			River No		
15	Raw Water System:		H (m)=	L (m)=				
16	Treatment:			Capacity (m3/d)		410		
17	Distribution System:							
18	-----							
19					1990	2000	2010	
20	-----							
21	Projected Population		(no)		12,400	33,900	62,700	
22	Residential Demand		(m3/d)		1,536	4,293	8,112	
23	Non-residential Demand		(m3/d)		257	701	1,298	
24	Livestock Demand		(m3/d)		58	178	551	
25	Industrial Demand		(m3/d)		102	191	278	
26	Total Demand		(m3/d)		1,953	5,363	10,239	
27	Area Served (estimated net)		(ha)		93	253	468	
28	-----							
29	Future Development Plan							
30	Raw Water Source:		Itare Dam			River No:		
31	Raw Water System:		H (m)=	350 L (m)=		49,200		
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost				1990	2000	2010	Total
36	Incremental Capacity		(m3/d)		1,543.1	3,409.5	4,876.2	9,828.8
37	Source Works		(US\$'000)		14.7	26.6	34.7	76.0
38	Pump Cost		(US\$'000)		24.6	34.6	45.0	104.2
39	Raw Water Main		(US\$'000)		2,528.5	3,057.2	3,396.4	8,982.1
40	Treatment		(US\$'000)		538.3	793.6	924.6	2,256.4
41	Storage		(US\$'000)		92.1	146.8	210.0	449.0
42	Distribution		(US\$'000)		740.8	1,284.5	1,720.6	3,745.9
43	Miscellaneous (20%)		(US\$'000)		787.8	1,068.7	1,266.3	3,122.7
44	Admi. & Engineering		(US\$'000)		472.7	641.2	759.8	1,873.6
45	Contingency		(US\$'000)		1,039.9	1,410.6	1,671.5	4,122.0
46	Total Cost		(US\$'000)		6,239.3	8,463.8	10,028.8	24,731.9
47	Cost per Capita		(US\$/c)		503.2	393.7	348.2	
48	Cost per ha		(US\$/ha)		67,377.0	52,713.8	46,629.0	
49	Cost per m3		(US\$/m3)		4.0	2.5	2.1	2.5
50	-----							
51	Present Value of Water at DF=10 %				1990	2000	2010	Total
52	Direct O & M Costs		(US\$'000)		312.0	423.2	501.4	
53	Capital Costs		(US\$'000)		642.6	871.8	1,033.0	
54	Total Annual Cost		(US\$'000)		954.6	1,295.0	1,534.4	
55	Unit Cost per m3		(US\$/m3)		1.7	1.0	0.9	
56	-----							
57	Remarks: Source works cost does not include the cost of Itare dam, which should be added separately							
58	(see Sectoral Report M).							
59								
60								
61								
62								
63	-----							



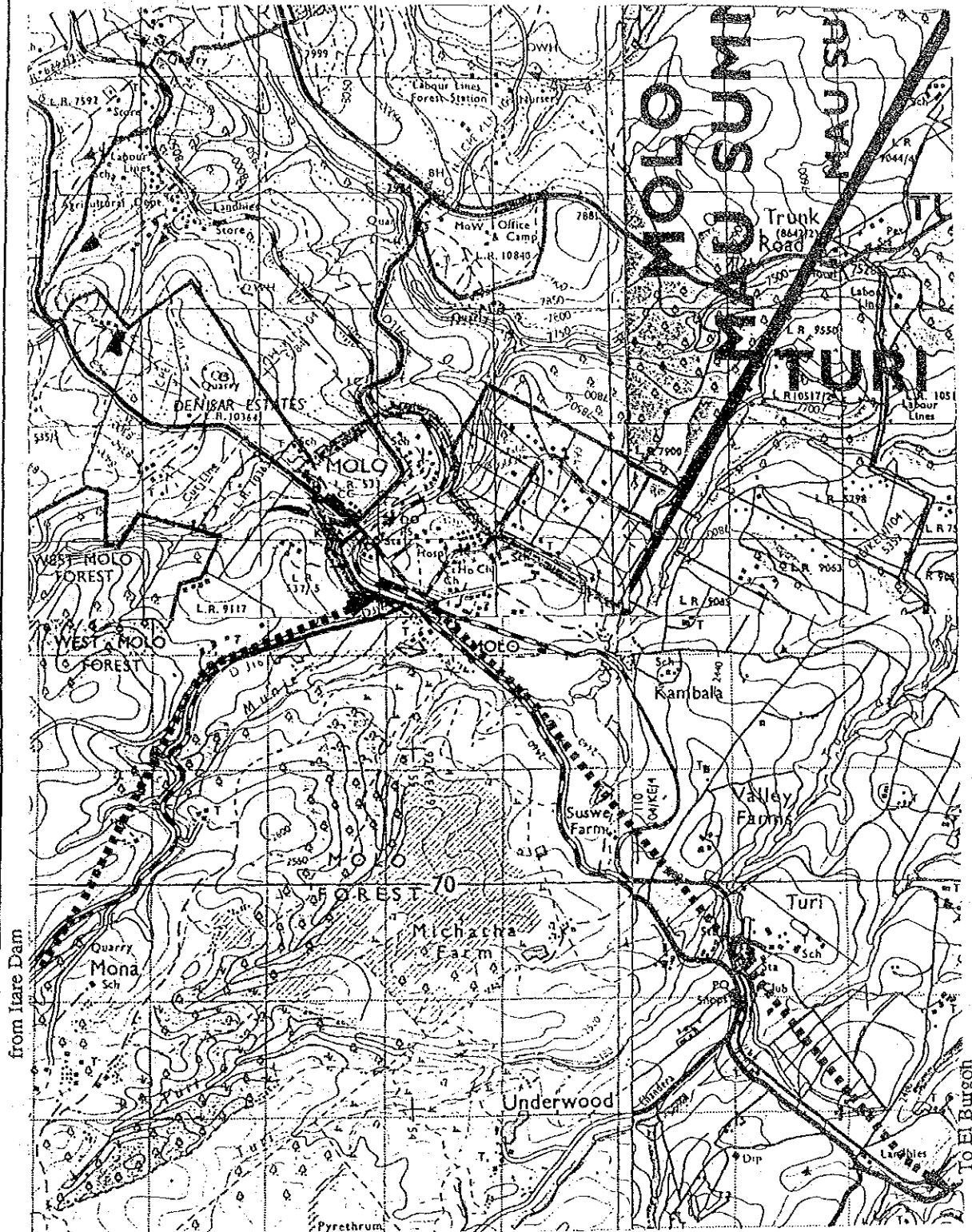
U-102 El Burgon

R 747.3 118/4 2EC.



THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2	National Water Master Plan							
3	URBAN WATER SUPPLY							
4	Code No. 740		U- 103			Rate		Feb-92 25.2
5	-----							
6	Name of Urban:		Molo		LGL Notice No:			
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:		Nakuru	Locataion :	747.5		Molo South	
10	Map (1/50,000):		118/1	Coordinates X:		35°42'	Y:	S 00°14'
11	Sub-basin Code:		1EG1	Elevation (El. m):				
12	-----							
13	Existing Facilities							
14	Raw Water Source:		Boreholes			River No		
15	Raw Water System:		H (m)=	L (m)=				
16	Treatment:			Capacity (m3/d)		400		
17	Distribution System:							
18	-----							
19					1990	2000	2010	
20	-----							
21	Projected Population		(no)		10,900	29,800	55,100	
22	Residential Demand		(m3/d)		1,350	3,773	7,129	
23	Non-residential Demand		(m3/d)		226	616	1,141	
24	Livestock Demand		(m3/d)		51	156	485	
25	Industrial Demand		(m3/d)		186	347	504	
26	Total Demand		(m3/d)		1,813	4,892	9,259	
27	Area Served (estimated net)		(ha)		81	223	411	
28	-----							
29	Future Development Plan							
30	Raw Water Source:		Itare Dam			River No:		
31	Raw Water System:		H (m)=	350 L (m)=		36,900		
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost				1990	2000	2010	Total
36	Incremental Capacity		(m3/d)		1,413.2	3,079.2	4,366.1	8,858.6
37	Source Works		(US\$'000)		13.7	24.6	32.0	70.3
38	Pump Cost		(US\$'000)		24.6	34.6	45.0	104.2
39	Raw Water Main		(US\$'000)		1,863.0	2,230.4	2,462.4	6,555.9
40	Treatment		(US\$'000)		514.0	757.5	883.6	2,155.1
41	Storage		(US\$'000)		88.2	132.6	188.0	408.8
42	Distribution		(US\$'000)		651.2	1,129.2	1,511.5	3,291.9
43	Miscellaneous (20%)		(US\$'000)		630.9	861.8	1,024.5	2,517.2
44	Admi. & Engineering		(US\$'000)		378.6	517.1	614.7	1,510.3
45	Contingency		(US\$'000)		832.8	1,137.6	1,352.4	3,322.8
46	Total Cost		(US\$'000)		4,997.0	6,825.3	8,114.2	19,936.6
47	Cost per Capita		(US\$/c)		458.4	361.1	320.7	
48	Cost per ha		(US\$/ha)		61,388.0	48,357.1	42,946.2	
49	Cost per m3		(US\$/m3)		3.5	2.2	1.9	2.3
50	-----							
51	Present Value of Water at DF=10 %				1990	2000	2010	Total
52	Direct O & M Costs		(US\$'000)		249.9	341.3	405.7	
53	Capital Costs		(US\$'000)		514.7	703.0	835.8	
54	Total Annual Cost		(US\$'000)		764.5	1,044.3	1,241.5	
55	Unit Cost per m3		(US\$/m3)		1.5	0.9	0.8	
56	-----							
57	Remarks:	Source works cost does not include the cost of Itare dams, which should be added separately						
58		(see Sectoral Report M).						
59								
60								
61								
62								
63	-----							

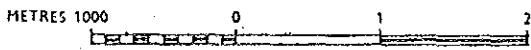


from Itare Dam

To El Bugon

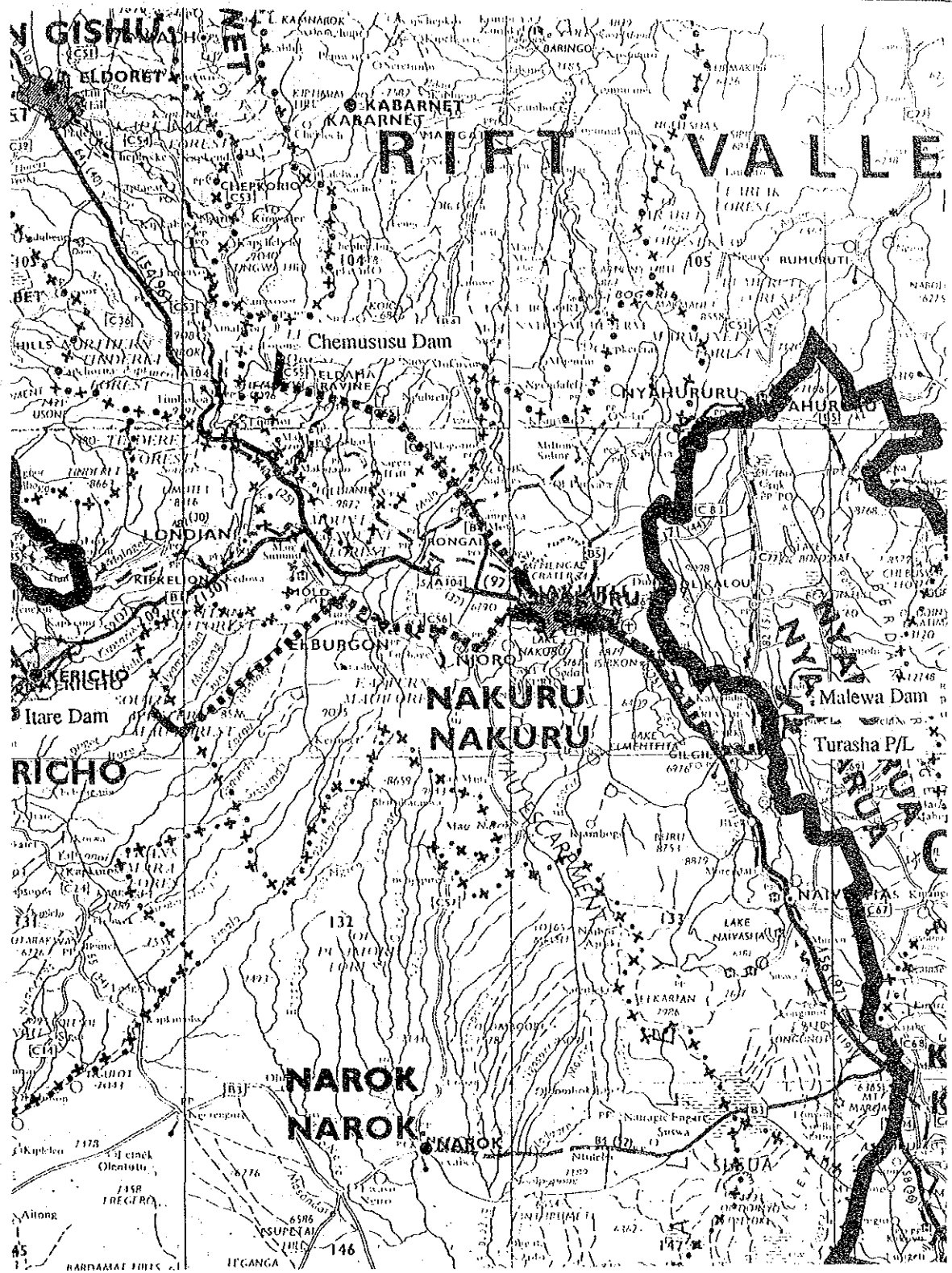
U-103 Molo

U 747.5 118/1 2EG1

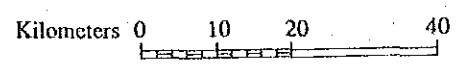


THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i	
2	National Water Master Plan								
3	URBAN WATER SUPPLY								
4	Code No. 740		U-104			Rate		Feb-92 25.2	
5	-----								
6	Name of Urban:		Nakuru		LGL Notice No:				
7	Organization:								
8	Per Capita GRDP in 1988 (guess):								
9	District:		Nakuru	Locataion :	749		Nakuru Municipality		
10	Map (1/50,000) :		119/3	Coordinates X:		36°04'	Y:	S 00°17'	
11	Sub-basin Code:		2FC	Elevation (El. m):					
12	-----								
13	Existing Facilities								
14	Raw Water Source:		Borehole /Shallow Well(3nos.)			River No			
15	Raw Water System:		H (m)=	L (m)=					
16	Treatment:		Capacity (m3/d)			19830			
17	Distribution System:								
18	-----								
19					1990	2000	2010		
20	-----								
21	Projected Population		(no)		172,200	469,500	869,900		
22	Residential Demand		(m3/d)		21,331	59,450	112,543		
23	Non-residential Demand		(m3/d)		3,569	9,730	13,886		
24	Livestock Demand		(m3/d)		803	2,470	5,899		
25	Industrial Demand		(m3/d)		8,920	15,163	19,390		
26	Total Demand		(m3/d)		34,623	86,813	151,718		
27	Area Served (estimated net)		(ha)		1,286	3,506	6,496		
28	-----								
29	Future Development Plan								
30	Raw Water Source:		Turasha P/L + Malewa Dam + Itare Dam					River No:	
31	Raw Water System:		H (m)=	350	L (m)=	90,500			
32	Treatment:								
33	Distribution System:								
34	-----								
35	Incremental Capital Cost				1990	2000	2010	Total	
36	Incremental Capacity		(m3/d)		14,793.3	52,190.2	64,904.9	131,888.3	
37	Source Works		(US\$'000)		79.9	205.6	242.1	527.5	
38	Pump Cost		(US\$'000)		24.6	34.6	45.0	104.2	
39	Raw Water Main		(US\$'000)		9,458.3	18,032.2	20,539.7	48,030.2	
40	Treatment		(US\$'000)		1,505.2	5,310.3	6,604.1	13,419.6	
41	Storage		(US\$'000)		637.1	2,247.7	2,795.2	5,680.0	
42	Distribution		(US\$'000)		10,287.8	17,761.8	23,921.3	51,970.9	
43	Miscellaneous (20%)		(US\$'000)		4,398.6	8,718.4	10,829.5	23,946.5	
44	Admi. & Engineering		(US\$'000)		2,639.1	5,231.1	6,497.7	14,367.9	
45	Contingency		(US\$'000)		5,806.1	11,508.3	14,294.9	31,609.4	
46	Total Cost		(US\$'000)		34,836.7	69,049.9	85,769.5	189,656.1	
47	Cost per Capita		(US\$/c)		202.3	232.3	214.2		
48	Cost per ha		(US\$/ha)		27,089.6	31,100.5	28,683.8		
49	Cost per m3		(US\$/m3)		2.4	1.3	1.3	1.4	
50	-----								
51	Present Value of Water at DF=10 %				1990	2000	2010	Total	
52	Direct O & M Costs		(US\$'000)		1,741.8	3,452.5	4,288.5		
53	Capital Costs		(US\$'000)		3,588.2	7,112.1	8,834.3		
54	Total Annual Cost		(US\$'000)		5,330.0	10,564.6	13,122.7		
55	Unit Cost per m3		(US\$/m3)		1.0	0.6	0.6		
56	-----								
57	Remarks:	Chemususu dam is also incorporated in this Nakuru system.							
58		Source works cost does not include the cost of Malewa, Itare and Chemususu dams, which should be added							
59		separately (see Sectoral Report M).							
60									
61									
62									
63	-----								



U-104 Nakuru G 749.0 119/3 2FC

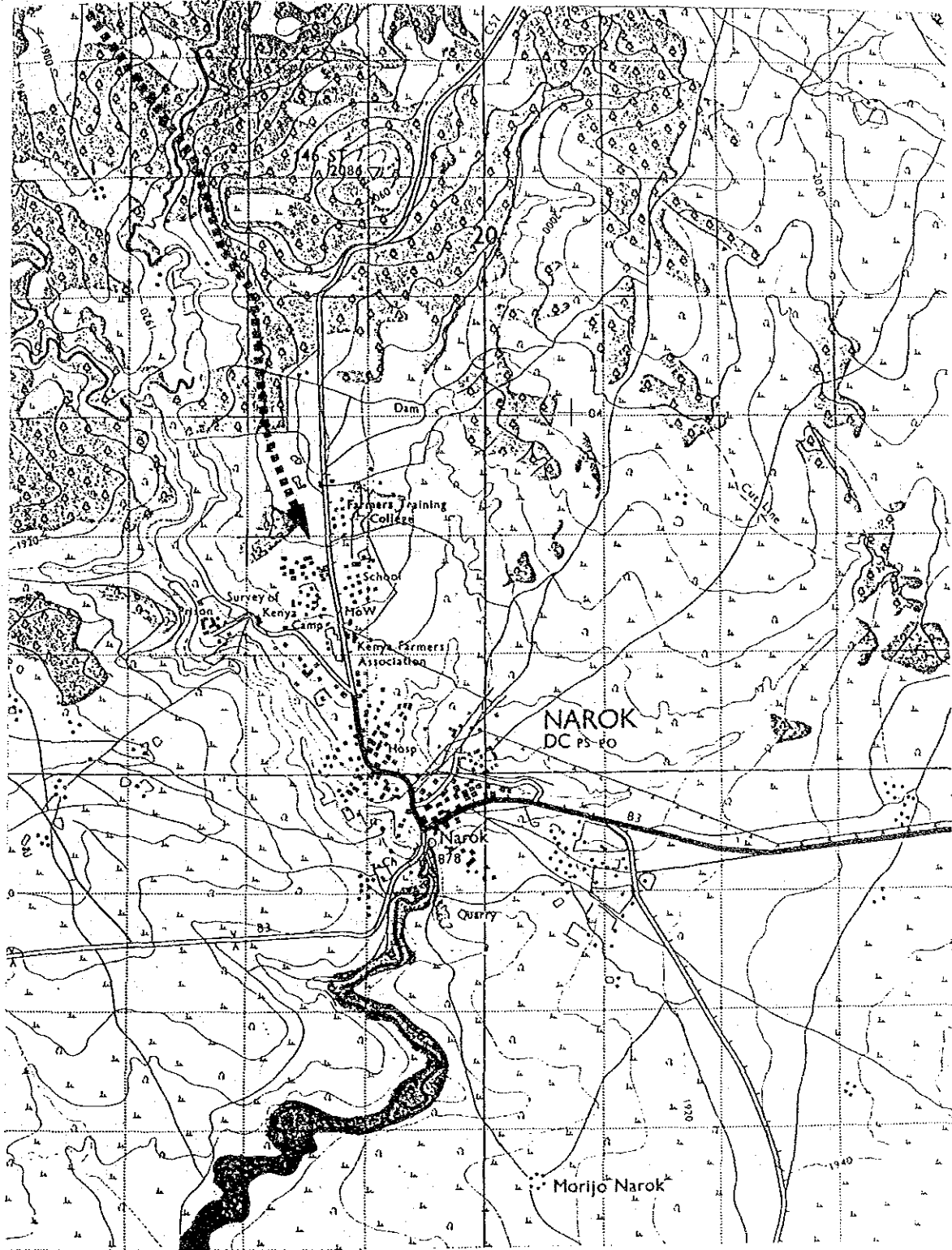


THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2					National Water Master Plan			
3			URBAN WATER SUPPLY					Feb-92
4	Code No.	750	U-105			Rate		25.2
5	-----							
6	Name of Urban:		Narok		LGL Notice No:			
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:		Narok	Locataion :	752.1		Lower Melili	
10	Map (1/50,000) :		146/2	Coordinates X:		35°53'	Y:	S 01°05'
11	Sub-basin Code:		2KA	Elevation (El. m):				
12	-----							
13	Existing Facilities							
14	Raw Water Source:		Engare Narok River			River No		
15	Raw Water System:		H (m)=	L (m)=				
16	Treatment:		Capacity (m3/d)			1050		
17	Distribution System:							
18	-----							
19					1990	2000	2010	
20	-----							
21	Projected Population		(no)		12,000	42,800	85,700	
22	Residential Demand		(m3/d)		1,487	5,420	11,087	
23	Non-residential Demand		(m3/d)		249	885	1,775	
24	Livestock Demand		(m3/d)		234	724	1,351	
25	Industrial Demand		(m3/d)		114	211	303	
26	Total Demand		(m3/d)		2,084	7,240	14,516	
27	Area Served (estimated net)		(ha)		90	320	640	
28	-----							
29	Future Development Plan							
30	Raw Water Source:		Upper Narok Dam			River No:		
31	Raw Water System:		H (m)=	0 L (m)=		14,900		
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost				1990	2000	2010	Total
36	Incremental Capacity		(m3/d)		1,033.5	5,156.1	7,276.9	13,466.4
37	Source Works		(US\$'000)		10.9	36.2	46.9	94.0
38	Pump Cost		(US\$'000)		0.0	0.0	0.0	0.0
39	Raw Water Main		(US\$'000)		709.7	1,046.8	1,175.7	2,932.2
40	Treatment		(US\$'000)		434.4	945.3	1,070.1	2,449.7
41	Storage		(US\$'000)		74.8	222.1	313.4	610.2
42	Distribution		(US\$'000)		716.9	1,840.1	2,563.0	5,120.0
43	Miscellaneous (20%)		(US\$'000)		389.3	818.1	1,033.8	2,241.2
44	Admi. & Engineering		(US\$'000)		233.6	490.9	620.3	1,344.7
45	Contingency		(US\$'000)		513.9	1,079.9	1,364.6	2,958.4
46	Total Cost		(US\$'000)		3,083.4	6,479.3	8,187.8	17,750.5
47	Cost per Capita		(US\$/c)		256.9	210.4	190.9	
48	Cost per ha		(US\$/ha)		34,406.9	28,169.4	25,557.0	
49	Cost per m3		(US\$/m3)		3.0	1.3	1.1	1.3
50	-----							
51	Present Value of Water at DF=10 %				1990	2000	2010	Total
52	Direct O & M Costs		(US\$'000)		154.2	324.0	409.4	
53	Capital Costs		(US\$'000)		317.6	667.4	843.3	
54	Total Annual Cost		(US\$'000)		471.8	991.3	1,252.7	
55	Unit Cost per m3		(US\$/m3)		1.3	0.5	0.5	
56	-----							
57	Remarks:	Source works cost does not include the cost of Upper Narok dam, which should be added separately						
58		(see Sectoral Report M).						
59								
60								
61								
62								
63	-----							

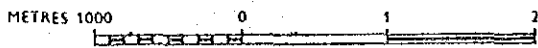
from Upper Narok Dam

Fig.



U-105 Narok

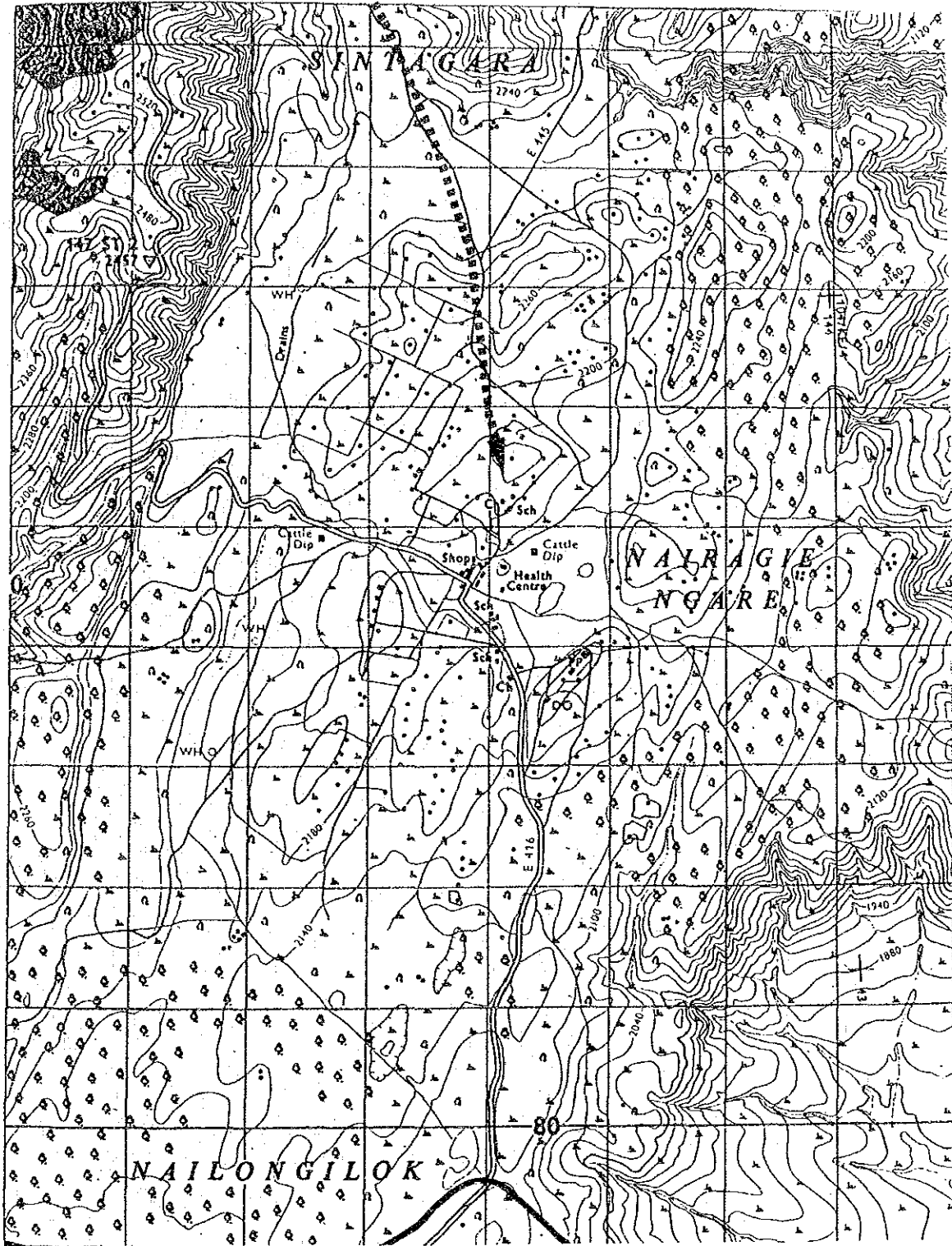
U 752.1 146/2 2KA



THE STUDY
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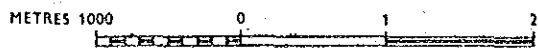
a	b	c	d	e	f	g	h	i	
2						National Water Master Plan			
3			URBAN WATER SUPPLY					Feb-92	
4	Code No. 750		U- 106			Rate		25.2	
5	-----								
6	Name of Urban:		Nairagic Ngare		LGL Notice No:				
7	Organization:								
8	Per Capita GRDP in 1988 (guess):								
9	District:	Narok	Locataion :		752.5		Keekonyoike		
10	Map (1/50,000):	147/1	Coordinates X:			36°10'	Y:	S 01°03'	
11	Sub-basin Code:	2H	Elevation (El. m):						
12	-----								
13	Existing Facilities								
14	Raw Water Source:		Lolongo Stream/Dam			River No			
15	Raw Water System:		H (m)=		L (m)=				
16	Treatment:		Capacity (m3/d)			50			
17	Distribution System:								
18	-----								
19						1990	2000	2010	
20	-----								
21	Projected Population		(no)			500	1,400	2,500	
22	Residential Demand		(m3/d)			62	177	323	
23	Non-residential Demand		(m3/d)			10	29	51	
24	Livestock Demand		(m3/d)			10	24	39	
25	Industrial Demand		(m3/d)			0	0	0	
26	Total Demand		(m3/d)			82	230	413	
27	Area Served (estimated net)		(ha)			4	10	19	
28	-----								
29	Future Development Plan								
30	Raw Water Source:		Nasampolai river			River No:			
31	Raw Water System:		H (m)=		0 L (m)=		5,000		
32	Treatment:								
33	Disiribution System:								
34	-----								
35	Incremental Capital Cost					1990	2000	2010	Total
36	Incremental Capacity		(m3/d)			31.9	148.3	183.2	363.4
37	Source Works		(US\$'000)			0.8	2.5	3.0	6.3
38	Pump Cost		(US\$'000)			0.0	0.0	0.0	0.0
39	Raw Water Main		(US\$'000)			174.2	189.1	192.2	555.5
40	Treatment		(US\$'000)			53.3	139.5	158.6	351.4
41	Storage		(US\$'000)			8.2	23.0	26.4	57.7
42	Distribution		(US\$'000)			29.9	53.8	65.7	149.4
43	Miscellaneous (20%)		(US\$'000)			53.3	81.6	89.2	224.0
44	Admi. & Engineering		(US\$'000)			32.0	48.9	53.5	134.4
45	Contingency		(US\$'000)			70.3	107.7	117.7	295.7
46	Total Cost		(US\$'000)			422.0	646.1	706.4	1,774.5
47	Cost per Capita		(US\$/c)			843.9	717.9	642.2	
48	Cost per ha		(US\$/ha)			113,005.5	96,125.9	85,993.7	
49	Cost per m3		(US\$/m3)			13.2	4.4	3.9	4.9
50	-----								
51	Present Value of Water at DF=10 %					1990	2000	2010	Total
52	Direct O & M Costs		(US\$'000)			21.1	32.3	35.3	
53	Capital Costs		(US\$'000)			43.5	66.5	72.8	
54	Total Annual Cost		(US\$'000)			64.6	98.8	108.1	
55	Unit Cost per m3		(US\$/m3)			5.5	1.8	1.6	
56	-----								
57	Remarks:								
58									
59									
60									
61									
62									
63	-----								

from Nasampolai River



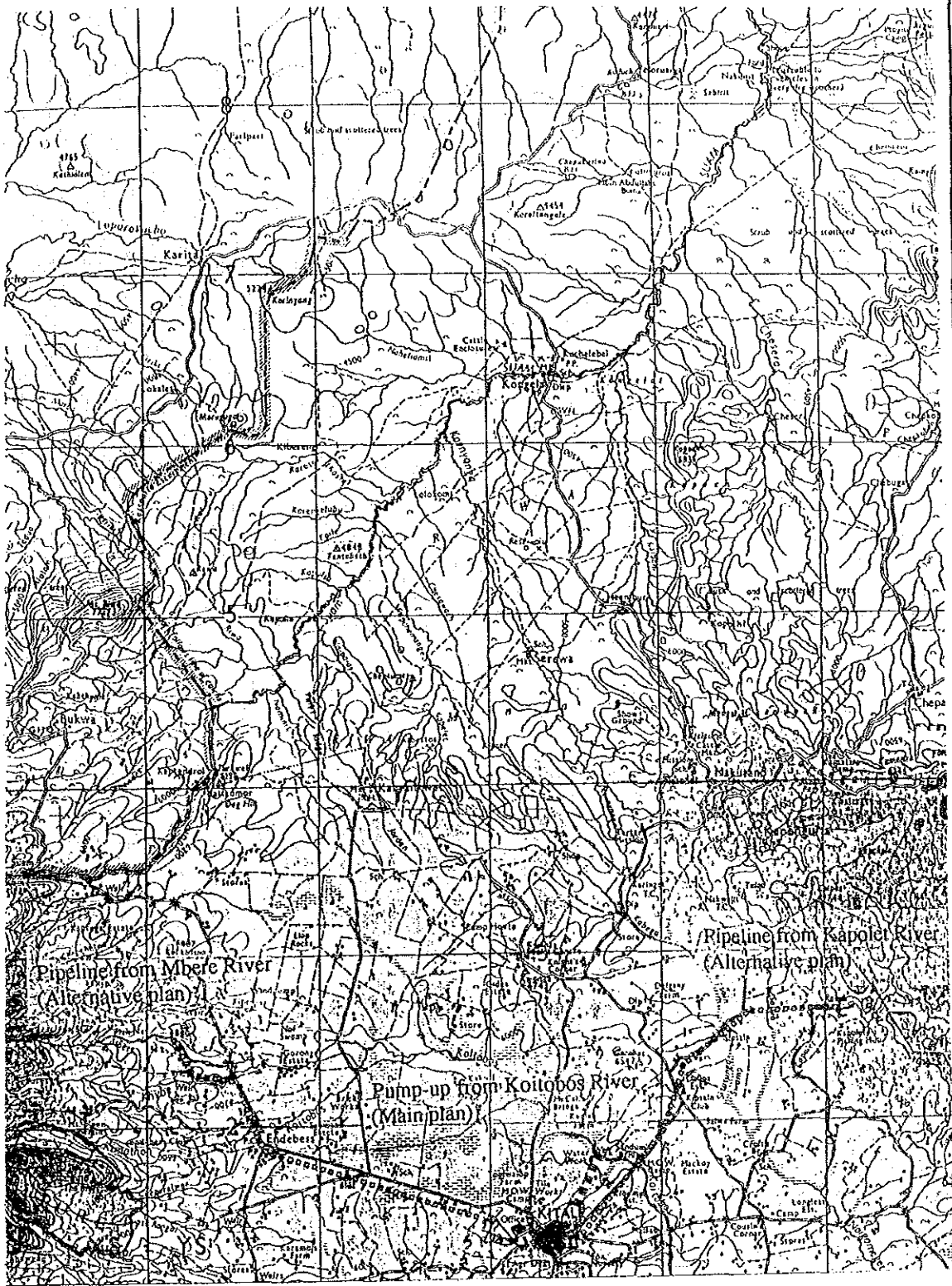
U-106 Nairagie Ngare

R 752.5 147/1 2KB



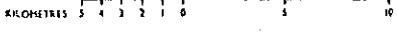
THE STUDY
ON
THE NATIONAL WATER MASTER PLAN
JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2						National Water Master Plan		
3			URBAN WATER SUPPLY					Feb-92
4	Code No. 760		U- 107			Rate		25.2
5	-----							
6	Name of Urban:		Kitale		LGL Notice No:			
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:		Trans Nzoia Locataion :		762.3		Kitale	
10	Map (1/50,000):		75/3	Coordinates X:		35°01'	Y:	N 01°01'
11	Sub-basin Code:		IBG	Elevation (El. m):				
12	-----							
13	Existing Facilities							
14	Raw Water Source:		Koitobos river			River No		
15	Raw Water System:		H (m)=	L (m)=				
16	Treatment:			Capacity (m3/d)		5610		
17	Distribution System:							
18	-----							
19					1990	2000	2010	
20	-----							
21	Projected Population		(no)		56,400	142,300	249,200	
22	Residential Demand		(m3/d)		6,987	18,019	32,240	
23	Non-residential Demand		(m3/d)		1,168	2,949	5,163	
24	Livestock Demand		(m3/d)		175	405	729	
25	Industrial Demand		(m3/d)		1,061	1,973	2,854	
26	Total Demand		(m3/d)		9,391	23,346	40,986	
27	Area Served (estimated net)		(ha)		421	1,063	1,861	
28	-----							
29	Future Development Plan							
30	Raw Water Source:		Koitobos river			River No:		
31	Raw Water System:		H (m)=	80 L (m)=		4,400		
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost				1990	2000	2010	Total
36	Incremental Capacity		(m3/d)		3,780.5	13,955.2	17,640.5	35,376.3
37	Source Works		(US\$'000)		28.7	76.4	91.1	196.3
38	Pump Cost		(US\$'000)		7.8	24.0	29.9	61.7
39	Raw Water Main		(US\$'000)		281.5	448.4	497.6	1,227.4
40	Treatment		(US\$'000)		830.8	1,419.9	1,794.9	4,045.7
41	Storage		(US\$'000)		162.8	601.0	759.7	1,523.5
42	Distribution		(US\$'000)		3,369.5	5,132.0	6,386.6	14,888.1
43	Miscellaneous (20%)		(US\$'000)		936.2	1,540.3	1,912.0	4,388.5
44	Admi. & Engineering		(US\$'000)		561.7	924.2	1,147.2	2,633.1
45	Contingency		(US\$'000)		1,235.8	2,033.3	2,523.8	5,792.9
46	Total Cost		(US\$'000)		7,414.9	12,199.5	15,142.8	34,757.2
47	Cost per Capita		(US\$/c)		131.5	142.0	141.7	
48	Cost per ha		(US\$/ha)		17,604.6	19,017.3	18,968.2	
49	Cost per m3		(US\$/m3)		2.0	0.9	0.9	1.0
50	-----							
51	Present Value of Water at DF=10 %				1990	2000	2010	Total
52	Direct O & M Costs		(US\$'000)		370.7	610.0	757.1	
53	Capital Costs		(US\$'000)		763.7	1,256.5	1,559.7	
54	Total Annual Cost		(US\$'000)		1,134.5	1,866.5	2,316.8	
55	Unit Cost per m3		(US\$/m3)		0.8	0.4	0.4	
56	-----							
57	Remarks:	Pump-up from Koitobos river is tentatively proposed as a main plan. Alternative plans include water						
58		transfer from either Mbere river or Kapolet river. The relative merit should be compared in further studies.						
59								
60								
61								
62								
63	-----							



U-107 Kitale &

G 762.3 75/3 1BG

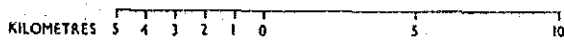


THE STUDY
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a	b	c	d	e	f	g	h	i	
2	National Water Master Plan								
3	URBAN WATER SUPPLY								
4	Code No. 760		U- 108			Rate		Feb-92 25.2	
5	-----								
6	Name of Urban:	Kiminini/Saboti+Spr.Ki						LGL Notice No:	
7	Organization:								
8	Per Capita GRDP in 1988 (guess):								
9	District:	Trans Nzoia	Locataion :	762.4		Kiminini			
10	Map (1/50,000) :	88/2	Coordinates X:		34°57'	Y:		N 00°54'	
11	Sub-basin Code:	1BG	Elevation (El. m):						
12	-----								
13	Existing Facilities								
14	Raw Water Source:	River (Local)				River No			
15	Raw Water System:	H (m)=	L (m)=						
16	Treatment:	Capacity (m3/d)							
17	Distribution System:								
18	-----								
19				1990	2000	2010			
20	-----								
21	Projected Population	(no)		1,700	3,000	4,200			
22	Residential Demand	(m3/d)		211	380	543			
23	Non-residential Demand	(m3/d)		0	62	87			
24	Livestock Demand	(m3/d)		0	8	12			
25	Industrial Demand	(m3/d)		0	0	0			
26	Total Demand	(m3/d)		211	450	642			
27	Area Served (estimated net)	(ha)		13	22	31			
28	-----								
29	Future Development Plan								
30	Raw Water Source:	Kabewyan river				River No:			
31	Raw Water System:	H (m)=	140	L (m)=	23,400				
32	Treatment:								
33	Distribution System:								
34	-----								
35	Incremental Capital Cost			1990	2000	2010	Total		
36	Incremental Capacity	(m3/d)		210.6	239.3	192.5	642.4		
37	Source Works	(US\$'000)		3.3	4.7	4.0	12.0		
38	Pump Cost	(US\$'000)		0.0	3.3	2.5	5.8		
39	Raw Water Main	(US\$'000)		0.0	921.0	903.4	1,824.4		
40	Treatment	(US\$'000)		0.0	186.5	163.5	350.0		
41	Storage	(US\$'000)		0.0	31.4	27.3	58.6		
42	Distribution	(US\$'000)		0.0	179.2	71.7	250.9		
43	Miscellaneous (20%)	(US\$'000)		0.7	265.2	234.5	500.4		
44	Admi. & Engineering	(US\$'000)		0.4	159.1	140.7	300.2		
45	Contingency	(US\$'000)		0.9	350.1	309.5	660.5		
46	Total Cost	(US\$'000)		5.2	2,100.5	1,857.1	3,962.8		
47	Cost per Capita	(US\$/c)		3.1	1,615.8	1,547.6			
48	Cost per ha	(US\$/ha)		410.6	216,361.2	207,227.3			
49	Cost per m3	(US\$/m3)		0.0	8.8	9.6	6.2		
50	-----								
51	Present Value of Water at DF=10 %			1990	2000	2010	Total		
52	Direct O & M Costs	(US\$'000)		0.3	105.0	92.9			
53	Capital Costs	(US\$'000)		0.5	216.4	191.3			
54	Total Annual Cost	(US\$'000)		0.8	321.4	284.1			
55	Unit Cost per m3	(US\$/m3)		0.0	3.7	4.0			
56	-----								
57	Remarks:								
58									
59									
60									
61									
62									
63	-----								



U-108 Kiminini/Saboti+Spr.Kital R 762.4 88/2 1B6



THE STUDY
ON
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JAPAN INTERNATIONAL COOPERATION AGENCY

a	b	c	d	e	f	g	h	i
2	National Water Master Plan							
3	URBAN WATER SUPPLY							
4	Code No. 760	U- 109				Rate		Feb-92 25.2
5	-----							
6	Name of Urban:	Endebess/Kwanza	LGL Notice No:					
7	Organization:							
8	Per Capita GRDP in 1988 (guess):							
9	District:	Trasn Nzoia	Locataion :	763.5		Endebess		
10	Map (1/50,000) :	75/3	Coordinates X:		34°52'		Y:	N 01°05'
11	Sub-basin Code:	1BE	Elevation (El. m):					
12	-----							
13	Existing Facilities							
14	Raw Water Source:	River (Local)				River No		
15	Raw Water System:	H (m)=	L (m)=					
16	Treatment:	Capacity (m3/d)						
17	Distribution System:							
18	-----							
19				1990	2000	2010		
20	-----							
21	Projected Population	(no)	2,800	4,800	6,700			
22	Residential Demand	(m3/d)	347	608	867			
23	Non-residential Demand	(m3/d)	0	99	139			
24	Livestock Demand	(m3/d)	0	14	20			
25	Industrial Demand	(m3/d)	1	2	3			
26	Total Demand	(m3/d)	348	723	1,029			
27	Area Served (estimated net)	(ha)	21	36	50			
28	-----							
29	Future Development Plan							
30	Raw Water Source:	Koitobos river				River No:		
31	Raw Water System:	H (m)=	20	L (m)=	2,400			
32	Treatment:							
33	Distribution System:							
34	-----							
35	Incremental Capital Cost		1990	2000	2010	Total		
36	Incremental Capacity	(m3/d)	347.9	374.9	306.0	1,028.8		
37	Source Works	(US\$'000)	4.8	5.1	4.4	14.2		
38	Pump Cost	(US\$'000)	1.2	1.4	1.3	3.9		
39	Raw Water Main	(US\$'000)	98.1	98.9	96.8	293.8		
40	Treatment	(US\$'000)	233.2	243.7	216.1	692.9		
41	Storage	(US\$'000)	39.6	41.5	36.6	117.7		
42	Distribution	(US\$'000)	167.3	119.5	113.5	400.3		
43	Miscellaneous (20%)	(US\$'000)	108.8	102.0	93.7	304.6		
44	Admi. & Engineering	(US\$'000)	65.3	61.2	56.2	182.7		
45	Contingency	(US\$'000)	143.7	134.7	123.7	402.0		
46	Total Cost	(US\$'000)	862.0	808.0	742.3	2,412.3		
47	Cost per Capita	(US\$/c)	307.8	404.0	390.7			
48	Cost per ha	(US\$/ha)	41,221.9	54,098.6	52,314.4			
49	Cost per m3	(US\$/m3)	2.5	2.2	2.4	2.3		
50	-----							
51	Present Value of Water at DF=10 %		1990	2000	2010	Total		
52	Direct O & M Costs	(US\$'000)	43.1	40.4	37.1			
53	Capital Costs	(US\$'000)	88.8	83.2	76.5			
54	Total Annual Cost	(US\$'000)	131.9	123.6	113.6			
55	Unit Cost per m3	(US\$/m3)	1.0	0.9	1.0			
56	-----							
57	Remarks:							
58								
59								
60								
61								
62								
63	-----							