

No. II-1-7

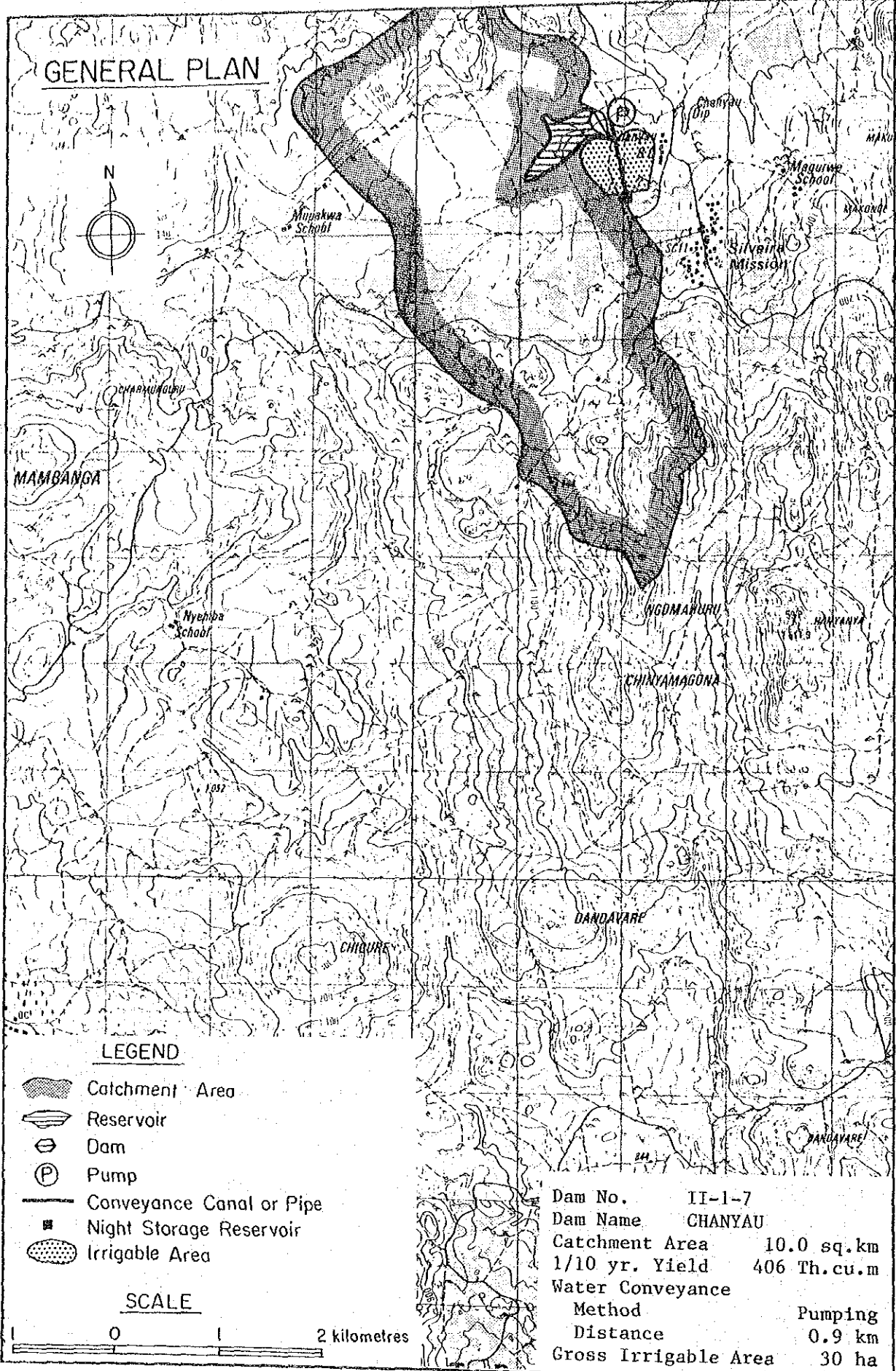
Name of Dam Chanyau

Location	District Bikita		Communal Land Bikita		
	Map Ref. 2031B1		Coordinates UN618871		
Geology	Granite, surface soil is deep, outcrops are very few, poorly jointing.				
Hydrology	River Chiwaka		Hydrological Zone E-S4		
	Catchment Area 10.0 sq.km		M.A. Rainfall 880 mm		
	M.A. Runoff 140 mm		Sediment 310 tonnes km ² /yr.		
Reservoir	Effective Capacity 1.290 MCM		1/10 Yr. Yield 0.406 MCM		
	Dead Capacity 0.050 MCM		D.W.S. 999 m		
	Total Capacity 1.340 MCM		N.W.S. 1 009 m		
Dam	Height 18 m		Length 650 m		
	Embankment Volume 133 000 cu.m		Spillway 67 m		
Agriculture	Natural Region III		Soil SCL-CL		
	Potential Irrigable Area		60 ha		
	Proposed Cropping Pattern		A		
Irrigation	Net Irrigable Area 23.9 ha		Dist. 0.9 km by Pump, H=25.0 m		
	Topography	Area	Slightly sloping		
		Conveyance	Gently sloping		
Rural Water Supply	Population 1 470 person		29 cu.m/day		
	Livestock 3 290 unit		148 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class
	Z\$ 2 364 000		Z\$ 1 027 000	Z\$ 3 391 000	B
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	
	Z\$ 89 538/year		Z\$ 1 041 000	3.2 per cent	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	N	Y	Y	Y
Remarks					








Present Condition on the Ward

Ward Name	13		Area		ha
Demography	Population Density			persons/sq.km	
	Family Size			Persons/household	
Agriculture	Arable Area		ha	Grazing Area	
	Maize		ha/household	bags/ha	
	Sorghum		ha/household	bags/ha	
	Livestock		LSUs/household	LSUs/sq.km	
Rural Water Supply	Borehole		units/sq.km	persons/unit	
	Well		units/sq.km	persons/unit	

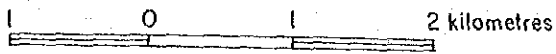
GENERAL PLAN



LEGEND

-  Catchment Area
-  Reservoir
-  Dam
-  Pump
-  Conveyance Canal or Pipe
-  Night Storage Reservoir
-  Irrigable Area

SCALE

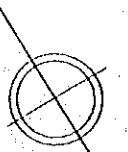


Dam No.	II-1-7
Dam Name	CHANYAU
Catchment Area	10.0 sq.km
1/10 yr. Yield	406 Th.cu.m
Water Conveyance	
Method	Pumping
Distance	0.9 km
Gross Irrigable Area	30 ha

PLAN OF DAM

CHANYAU

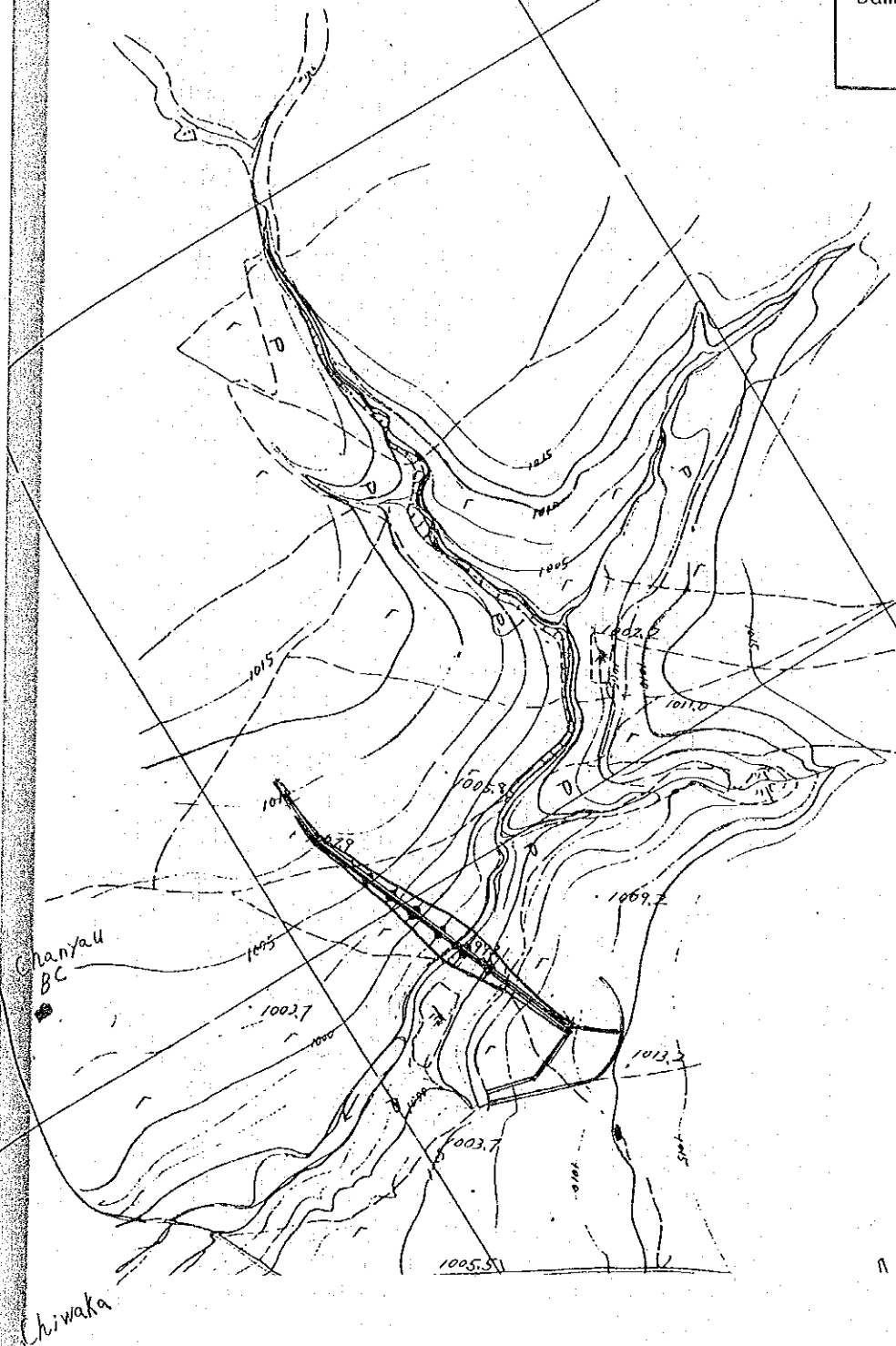
Dam No.	II- 1 - 7
District	Bikita
Communal L.	Bikita
River	Chiwaka
Map Ref.	2031 B1
Coordinate	UN 618871
Catchment A.	10.0 sq.km
Design Flood	120 cum/sec
N.W.S.	EL.1,009.0 m
D.W.S.	EL. 999.0 m
Capacity of Res.	1.34 M.C.M.
Dam Top	EL.1,011.0 m
Dam Height	18.0 m
Dam Length	650 m
Dam Vol.	133,000 cum



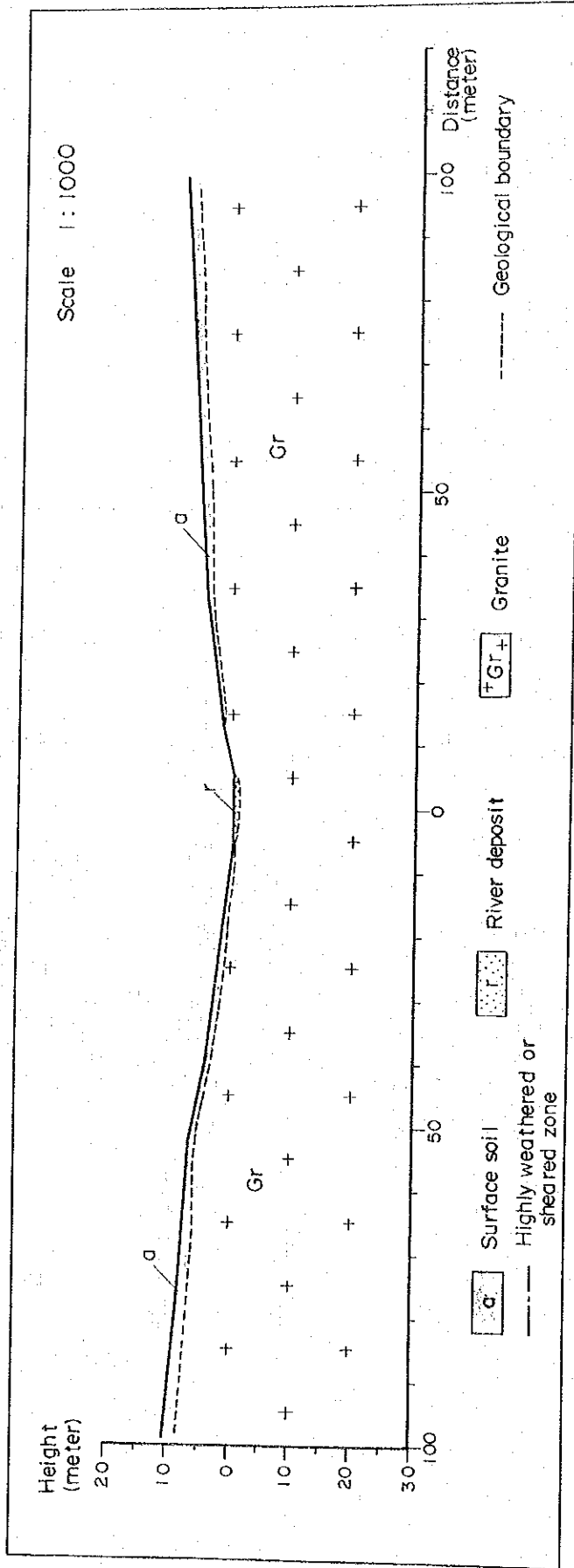
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II-1-7 Chanyau



The ground survey was not carried out in this area, therefore the topographical and the geological conditions were studied from existing data.

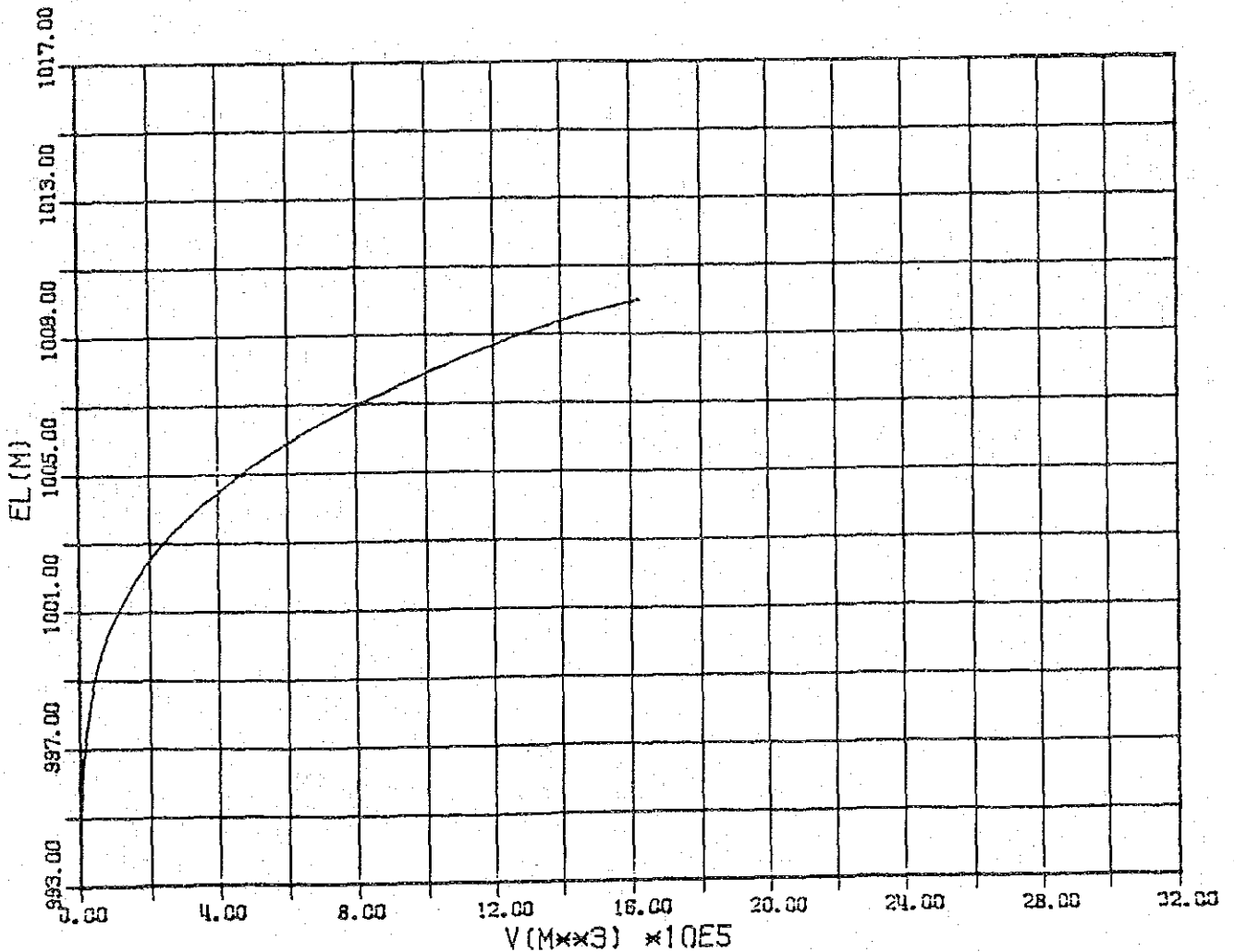
The area is very flat land and slopes gently towards the Chiwada River that forms shallow valley and relatively wide flood plane. Outcrops are very few in this area.

The bedrock consists of granite, and it seems to be hard and poorly jointed from the airphoto-reading.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
II-1-7	2031B1	UN	618	871

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
993.1	0.0	0	0	0	0.00	
995.0	1.9	2820	1410	2679	2.68	
997.5	2.5	11646	7233	18083	20.76	
1000.0	2.5	26794	19220	48050	68.81	
1002.5	2.5	76459	51627	129066	197.88	
1005.0	2.5	138736	107598	268994	466.87	
1007.5	2.5	218493	178615	446536	913.41	
1010.0	2.5	350228	284361	710901	1624.31	



No. II-1-8

Name of Dam Beta

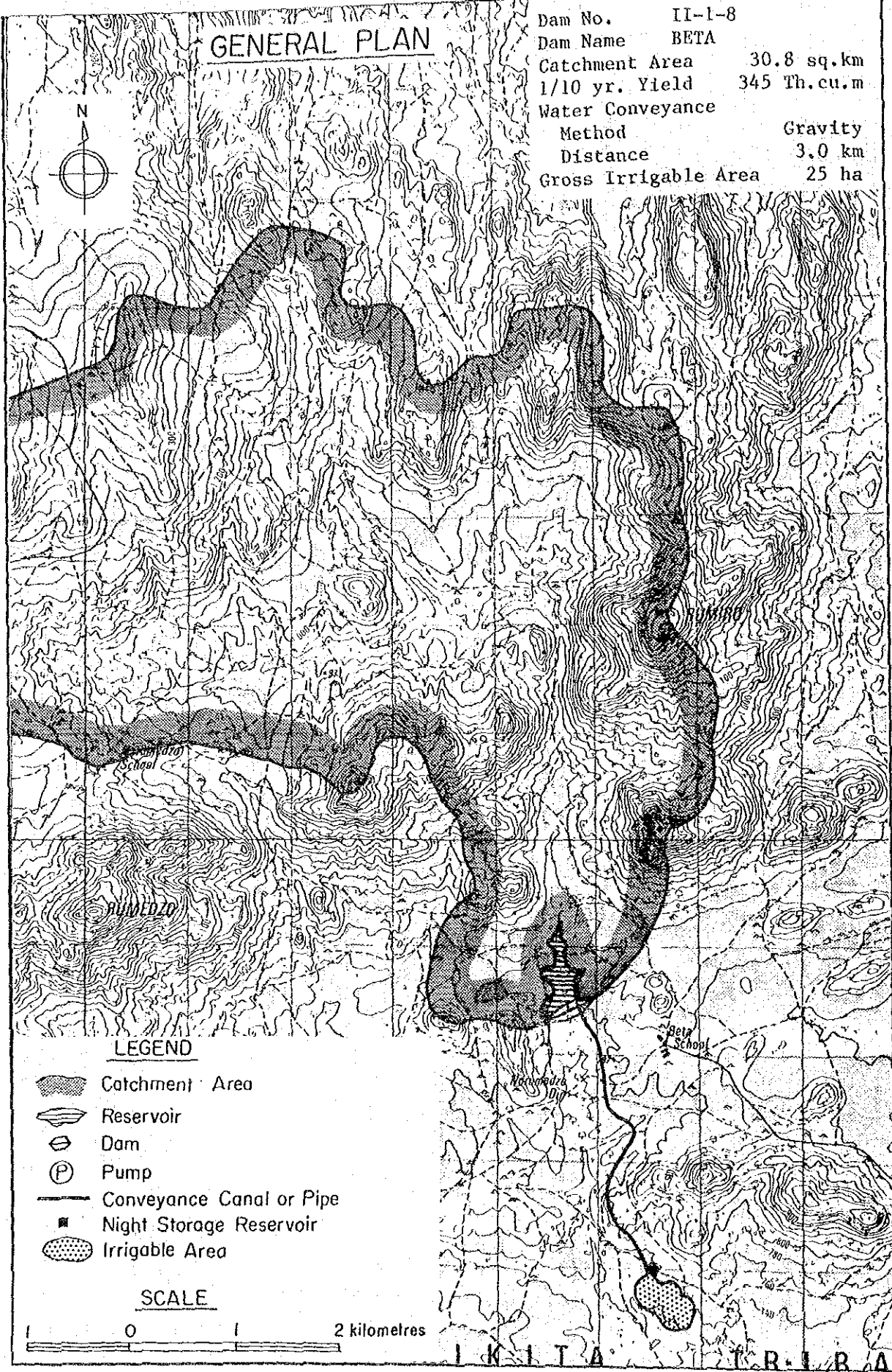
Location	District	Bikita		Communal Land	Bikita		
	Map Ref.	2031B2		Coordinates	UN747784		
Geology	Granite, highly weathering, at the surface changed into boulders.						
Hydrology	River	Chinyamakava		Hydrological Zone	E-S3		
	Catchment Area	30.8	sq.km	M.A. Rainfall	880	mm	
	M.A. Runoff	112	mm	Sediment	310	tonnes km ² /yr.	
Reservoir	Effective Capacity	0.520	MCM	1/10 Yr. Yield	0.345 MCM		
	Dead Capacity	0.140	MCM	D.W.S.	796	m	
	Total Capacity	0.660	MCM	N.W.S.	802	m	
Dam	Height	18	m	Length	450 m		
	Embankment Volume	104 000	cu.m	Spillway	139 m		
Agriculture	Natural Region	IV		Soil	SL		
	Potential Irrigable Area					100	ha
	Proposed Cropping Pattern	B					
Irrigation	Net Irrigable Area 20.3 ha		Dist. 3.0 km by Gravity				
	Topography	Area	Steep slope				
		Conveyance	Complicated, one river crossing				
Rural Water Supply	Population	1 116	person	22	cu.m/day		
	Livestock	2 515	unit	113	cu.m/day		
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class		
	Z\$ 1 119 000	Z\$ 705 000		Z\$ 1 824 000	B		
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return			
	Z\$ 42 653/year	Z\$ 496 000		3.4 per cent			
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist		
	Y	Y	Y	Y	Y		
Remarks	Water right .. 6 km (No. 9578/9258)						

Present Condition on the Ward








Ward Name	16		Area	11 300 ha	
Demography	Population Density		37.2 persons/sq.km		
	Family Size		7.0 Persons/household		
Agriculture	Arable Area	9 200	ha	Grazing Area	2 100 ha
	Maize	2.7	ha/household	15	bags/ha
	Sorghum	0.3	ha/household	17	bags/ha
	Livestock	9.5	LSUs/household	50.3	LSUs/sq.km
Rural Water Supply	Borehole	0.04	units/sq.km	1 050	persons/unit
	Well	0.12	units/sq.km	323	persons/unit

GENERAL PLAN

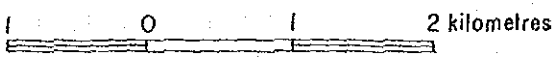
Dam No.	II-1-8
Dam Name	BETA
Catchment Area	30.8 sq.km
1/10 yr. Yield	345 Th.cu.m
Water Conveyance	
Method	Gravity
Distance	3.0 km
Gross Irrigable Area	25 ha



LEGEND

-  Catchment Area
-  Reservoir
-  Dam
-  Pump
-  Conveyance Canal or Pipe
-  Night Storage Reservoir
-  Irrigable Area

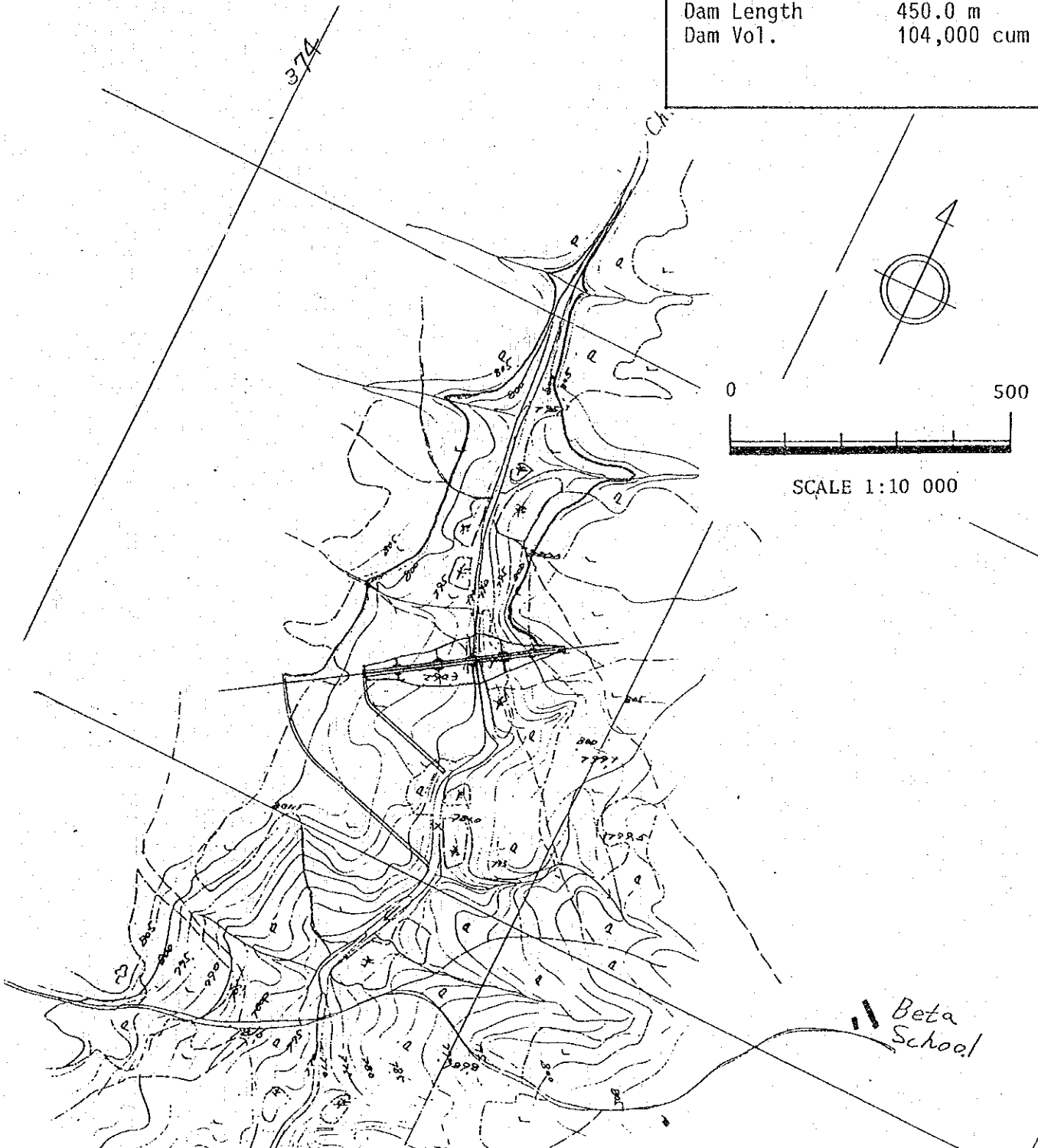
SCALE



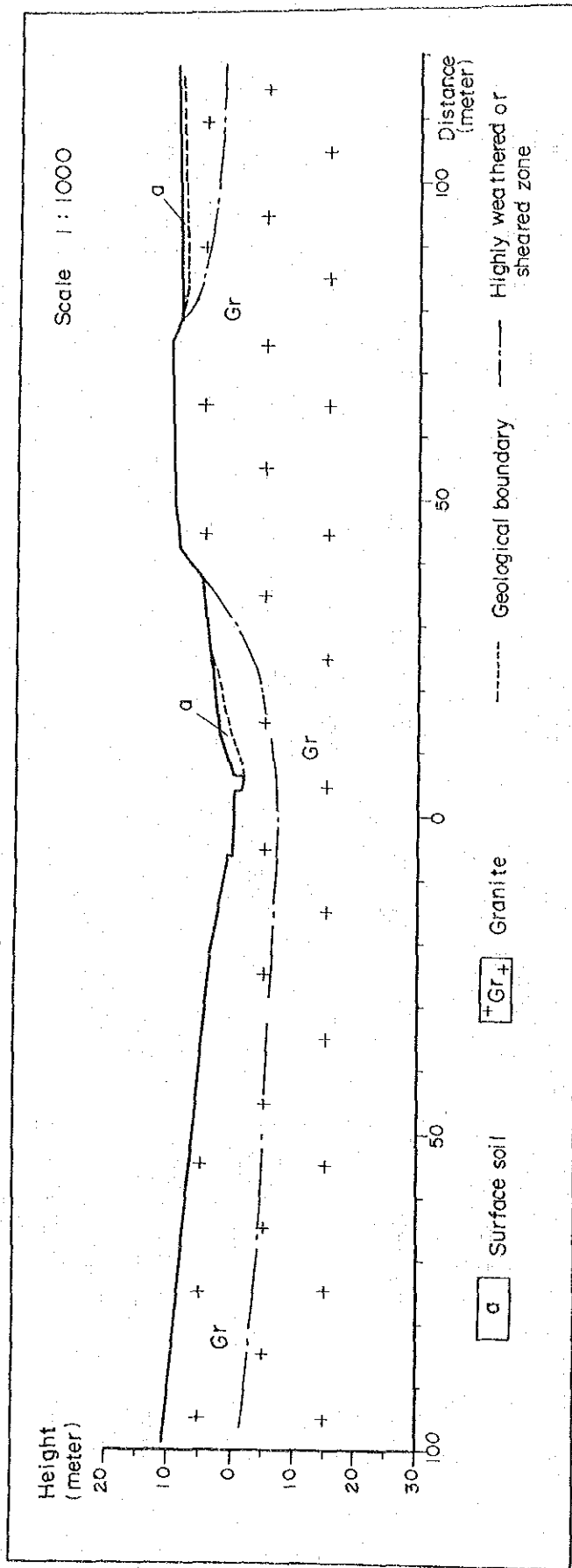
BETA

PLAN OF DAM

Dam No.	II- 1 - 8
District	Bikita
Communal L.	Bikita
River	Chinyamakava
Map Ref.	2031B2
Coordinate	UN747784
Catchment A.	30.8 sq.m
Design Flood	250 cum/sec.
N.W.S.	EL.802.0 m
D.W.S.	EL.796.0 m
Capacity of Res.	0.85 M.C.M.
Dam Top	EL.804.0 m
Dam Height	18.0 m
Dam Length	450.0 m
Dam Vol.	104,000 cum



II-1-8 Beta



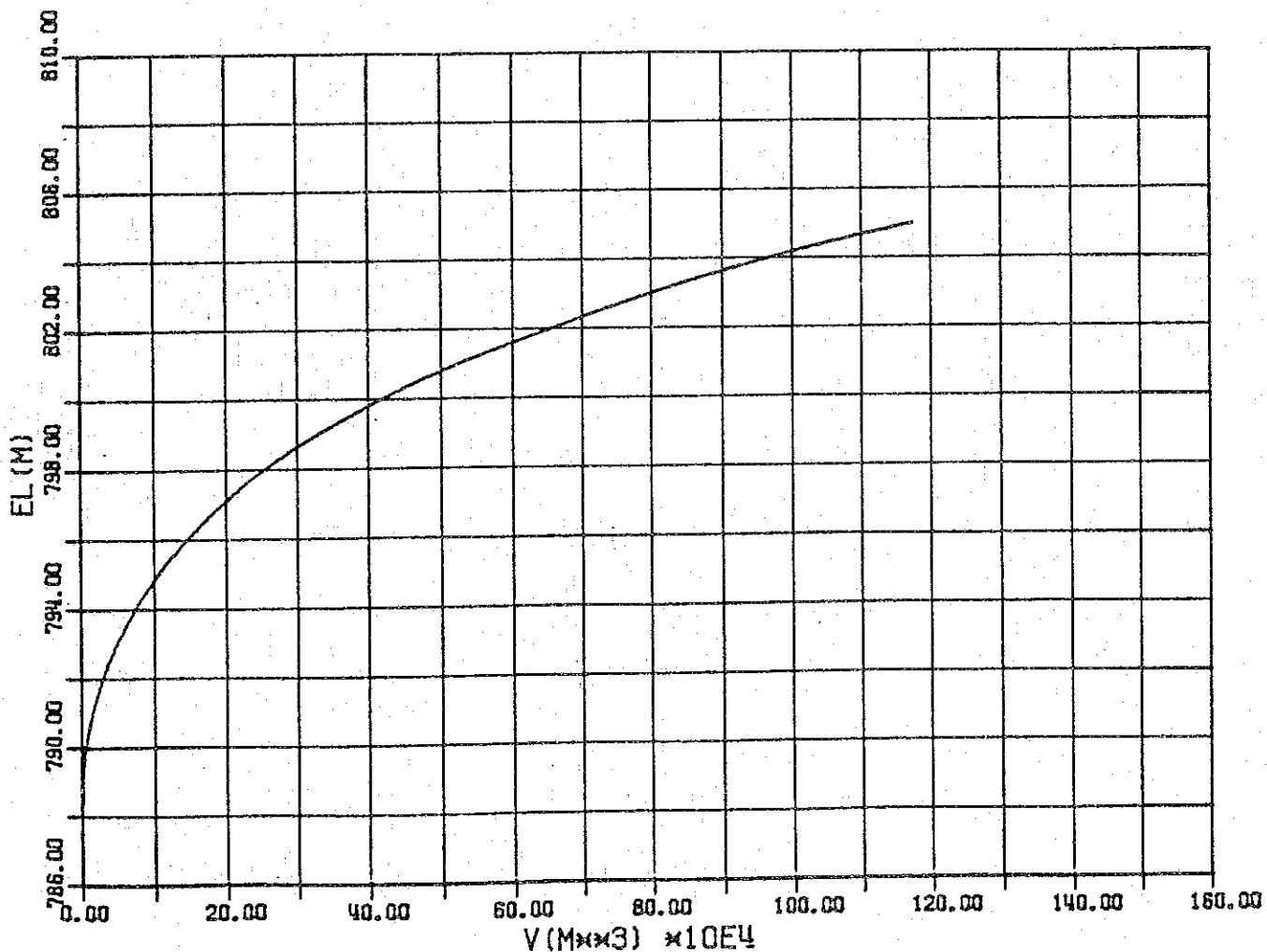
The Chinyamakava river which is perennial forms a narrow valley and a rolling slope. The bedrock consists of porphyritic granite. It is well jointed, and partly it has been changed into boulders by highly weathering and shearing. Joints are dominant at intervals of 100 to 50 centimeters, and they trend N60°E direction. It seems that the thickness of highly weathering layer is more than 10 meters and leakage through the bedrock is large.

The estimated thickness of unconsolidated deposits seems to be maximum 1 meter at the riverbed and maximum 2 meters at the damsite.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HØR
II-1-8	2031B2	UN	747	784

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
786.0	0.0	0	0	0	0.00	
787.5	1.5	620	310	465	0.46	
790.0	2.5	3800	2210	5525	5.99	
792.5	2.5	22300	13050	32625	38.61	
795.0	2.5	30900	26600	66500	105.11	
797.5	2.5	61600	46250	115625	220.74	
800.0	2.5	94700	78150	195375	416.11	
802.5	2.5	149000	121850	304625	720.74	
805.0	2.5	213000	181000	452500	1173.24	



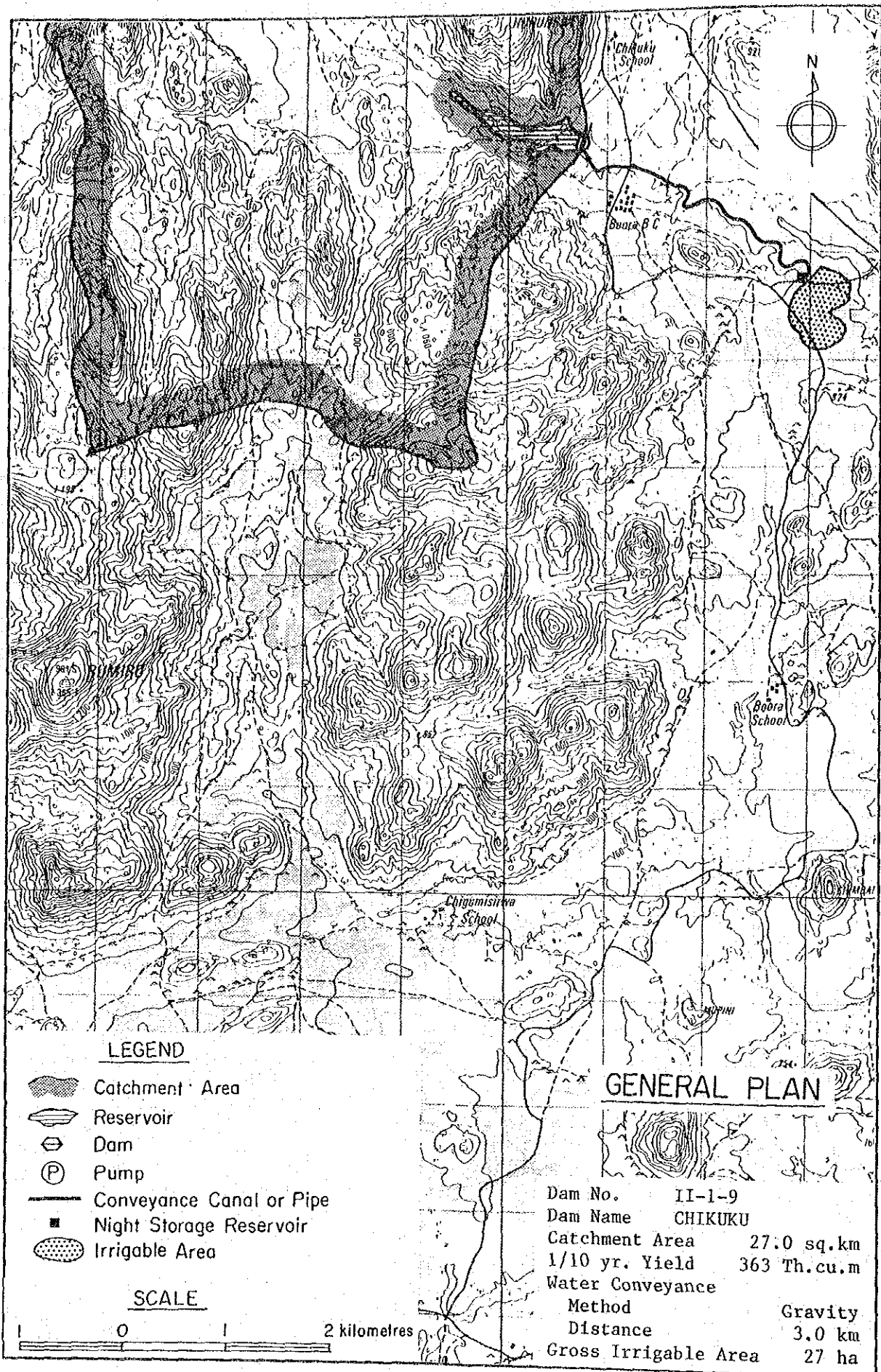
No. II-1-9

Name of Dam Chikuku

Location	District	Bikita		Communal Land	Bikita	
	Map Ref.	2031B2		Coordinates	UN807871	
Geology	Granite, many photo-lineations are recognized around the damsite, well jointed and leakage seems to be great.					
Hydrology	River	Msaizi		Hydrological Zone	E-S2	
	Catchment Area	27.0 sq.km		M.A. Rainfall	820 mm	
	M.A. Runoff	112 mm		Sediment	310 tonnes km ² /yr.	
Reservoir	Effective Capacity	1.040 MCM		1/10 Yr. Yield	0.363 MCM	
	Dead Capacity	0.120 MCM		D.W.S.	817 m	
	Total Capacity	1.160 MCM		N.W.S.	826 m	
Dam	Height	18 m		Length	310 m	
	Embankment Volume	93 000 cu.m		Spillway	127 m	
Agriculture	Natural Region	IV		Soil	SL	
	Potential Irrigable Area					100 ha
	Proposed Cropping Pattern					B
Irrigation	Net Irrigable Area	21.4 ha		Dist.	3.0 km by Gravity	
	Topography	Area	Generally level			
		Conveyance	Complicated			
Rural Water Supply	Population	1 909 person			38 cu.m/day	
	Livestock	1 742 unit			78 cu.m/day	
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class	
	Z\$ 1 553 000	Z\$ 710 000		Z\$ 2 263 000	B	
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return		
	Z\$ 45 196/year	Z\$ 525 000		2.2 per cent		
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist	
	Y	N	Y	Y	Y	
Remarks						

Present Condition on the Ward

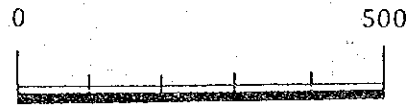
Ward Name	17		Area	3 421 ha	
Demography	Population Density		190.9 persons/sq.km		
	Family Size		9.6 Persons/household		
Agriculture	Arable Area	3 011 ha		Grazing Area	410 ha
	Maize	1.1 ha/household		22 bags/ha	
	Sorghum	0.1 ha/household		12 bags/ha	
	Livestock	4.4 LSUs/household		87.1 LSUs/sq.km	
Rural Water Supply	Borehole	0.12 units/sq.km		1 633	persons/unit
	Well	1.61 units/sq.km		119	persons/unit



PLAN OF DAM

CHIKUKU

Dam No.	II- 1 - 9
District	Bikita
Communal L.	Bikita
River	Masaizi
Map Ref.	2031 B2
Coordinate	UN 807871
Catchment A.	27.0 sq.km
Design Flood	228 cum/sec
N.W.S.	EL.826.0 m
D.W.S.	EL.817.0 m
Capacity of Res.	1.16 M.C.M.
Dam Top	EL.828.0 m
Dam Height	18.0 m
Dam Length	310 m
Dam Vol.	93,000 cum



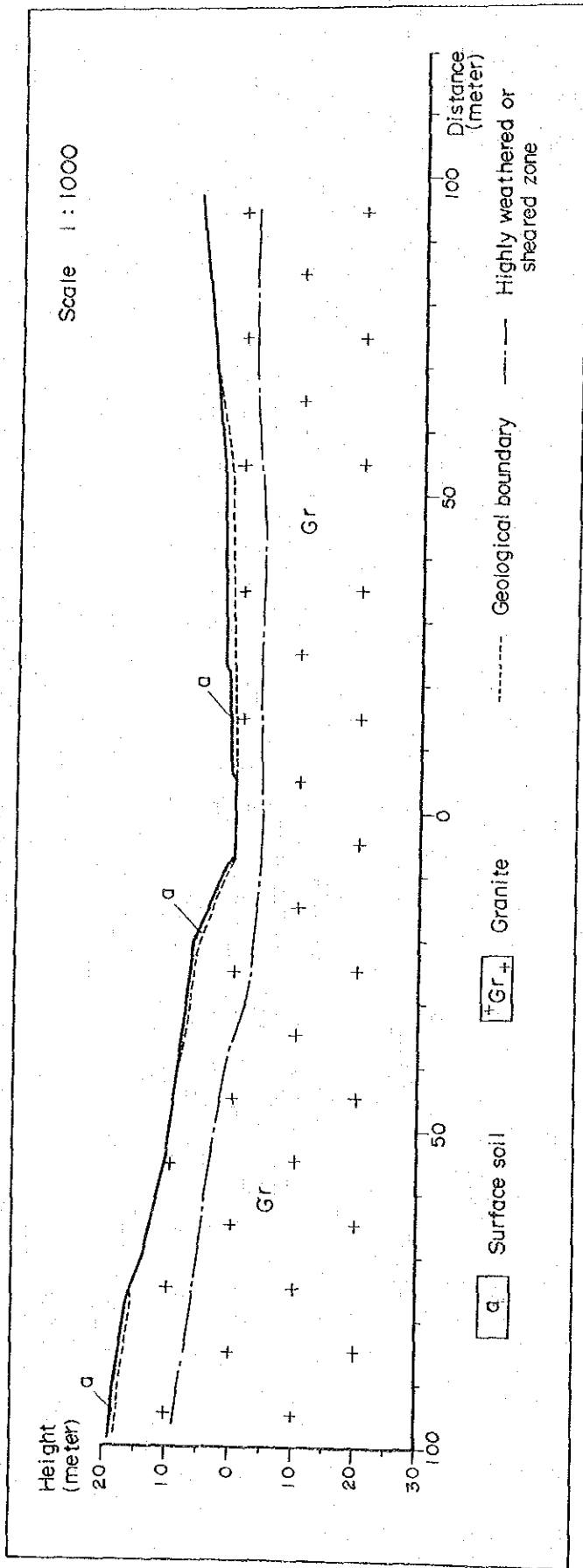
SCALE 1:10 000

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Chikuku
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II-1-9 Chikuku



The ground survey was not carried out in this area, therefore the topographical and the geological conditions were studied from existing data.

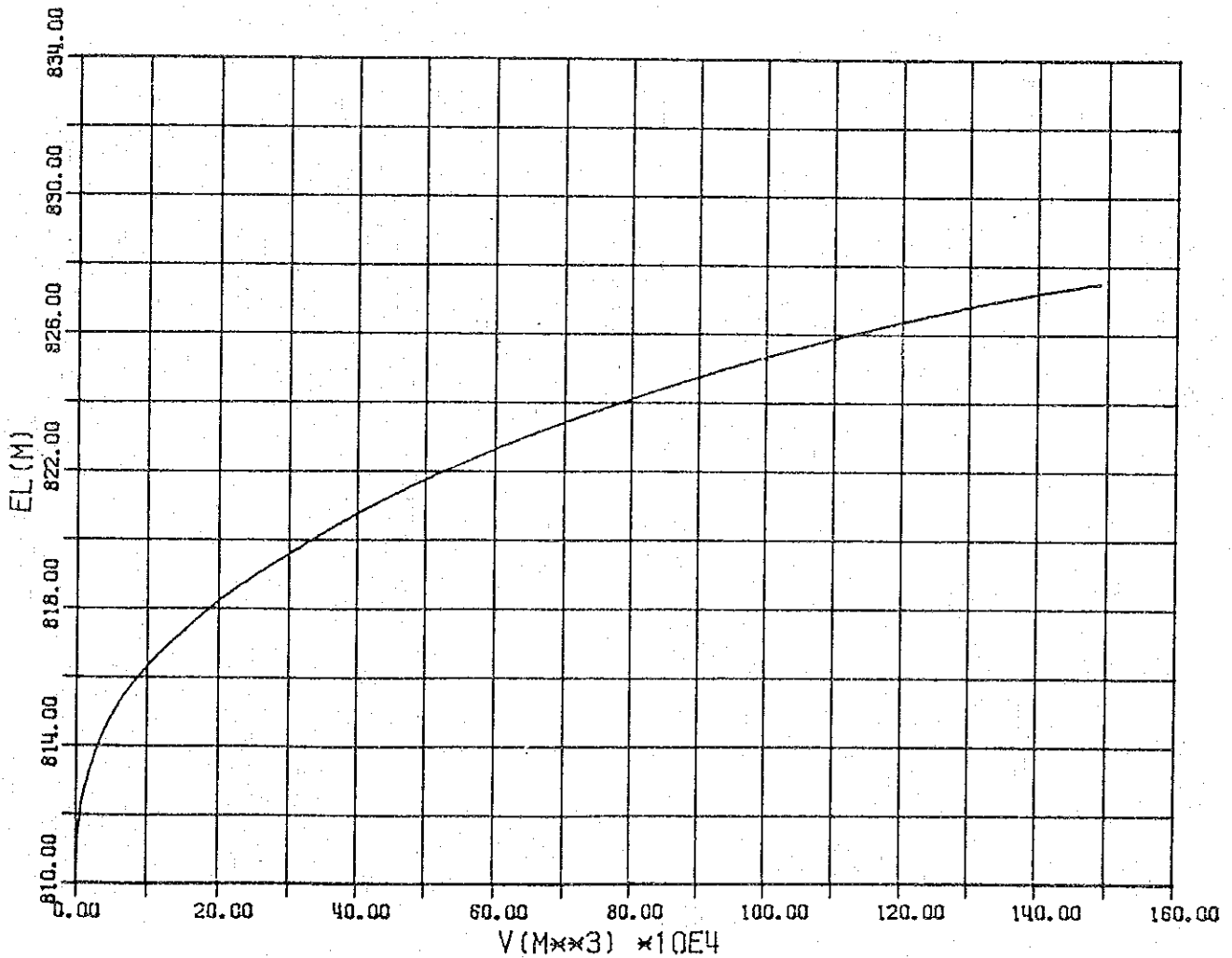
The area is hilly land and the Msaizi River forms relatively wide, deep and straight valley. Outcrops around the damsite are abundant.

The bedrock consists of granite. Because many photographical textures and lineations are recognized around the damsite, it seems that the bedrock is well jointed and leakage through the bedrock is large.

TABLE STORAGE VOLUME OF RESERVOIR

NØ	MAP	GRID	VER	HØR
II-1-9	2031B2	UN	807	871

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
810.0	0.0	0	0	0	0.00	
812.5	2.5	7500	3750	9375	9.37	
815.0	2.5	27400	17450	43625	53.00	
817.5	2.5	56600	42000	105000	158.00	
820.0	2.5	83200	69900	174750	332.75	
822.5	2.5	117000	100100	250250	583.00	
825.0	2.5	170300	143650	359125	942.12	
827.5	2.5	266800	218550	546375	1488.50	



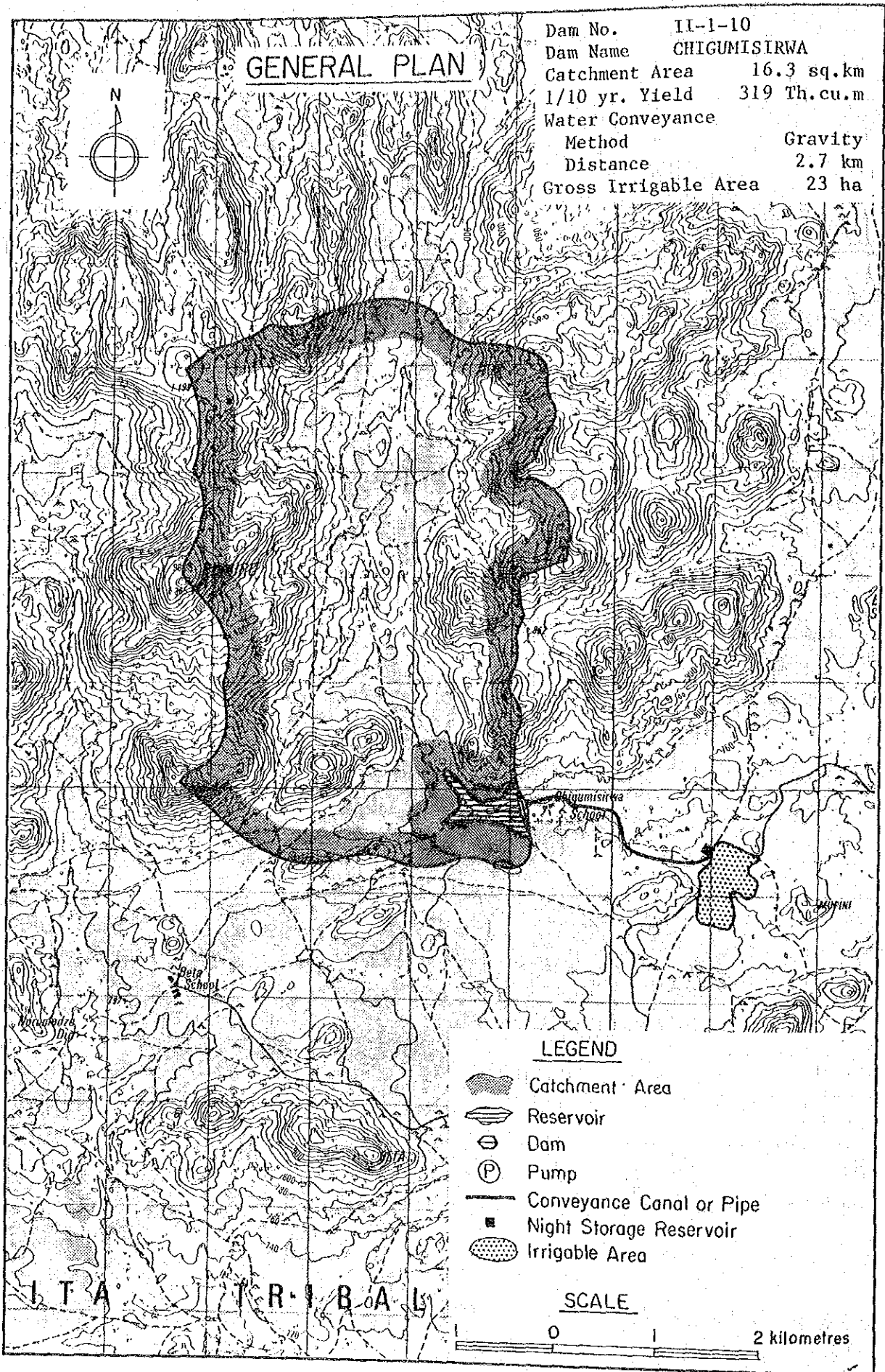
No. II-1-10

Name of Dam Chigumisirwa

Location	District Bikita		Communal Land Bikita		
	Map Ref. 2031B2		Coordinates UN791799		
Geology	Granite, massive and very hard, the thickness of terrace is estimated to be 4 metres.				
Hydrology	River Dove		Hydrological Zone E-S2		
	Catchment Area	16.3 sq.km	M.A. Rainfall	800 mm	
	M.A. Runoff	103 mm	Sediment	310 tonnes km ² /yr.	
Reservoir	Effective Capacity	1.430 MCM	1/10 Yr. Yield	0.319 MCM	
	Dead Capacity	0.070 MCM	D.W.S.	783 m	
	Total Capacity	1.500 MCM	N.W.S.	791 m	
Dam	Height	15 m	Length	600 m	
	Embankment Volume	81 000 cu.m	Spillway	91 m	
Agriculture	Natural Region IV		Soil SL		
	Potential Irrigable Area			60 ha	
	Proposed Cropping Pattern B				
Irrigation	Net Irrigable Area 18.8ha		Dist. 2.7 km by Gravity		
	Topography	Area	Complicated and undulated		
		Conveyance	Complicated		
Rural Water Supply	Population 1 116 person		22 cu.m/day		
	Livestock 2 515 unit		113 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class
	Z\$ 853 000		Z\$ 632 000	Z\$ 1 485 000	A
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	
	Z\$ 49 812/year		Z\$ 579 000	5.9 per cent	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward

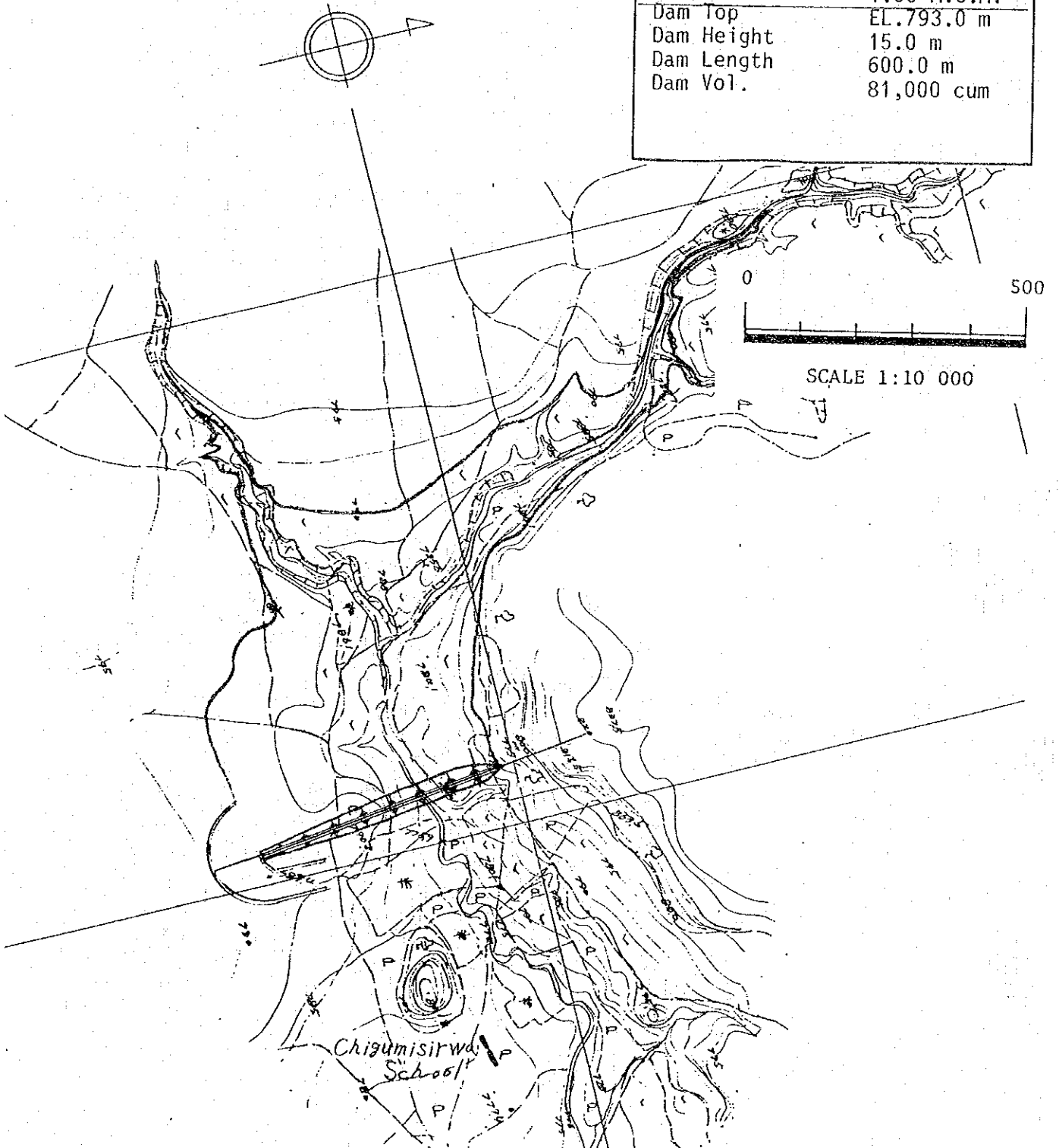
Ward Name	16		Area	11 300 ha	
Demography	Population Density		37.2 persons/sq.km		
	Family Size		7.0 Persons/household		
Agriculture	Arable Area 9 200 ha		Grazing Area 2 100 ha		
	Maize	2.7 ha/household	15 bags/ha		
	Sorghum	0.3 ha/household	17 bags/ha		
	Livestock	9.5 LSUs/household	50.3 LSUs/sq.km		
Rural Water Supply	Borehole	0.04 units/sq.km	1 050 persons/unit		
	Well	0.12 units/sq.km	323 persons/unit		



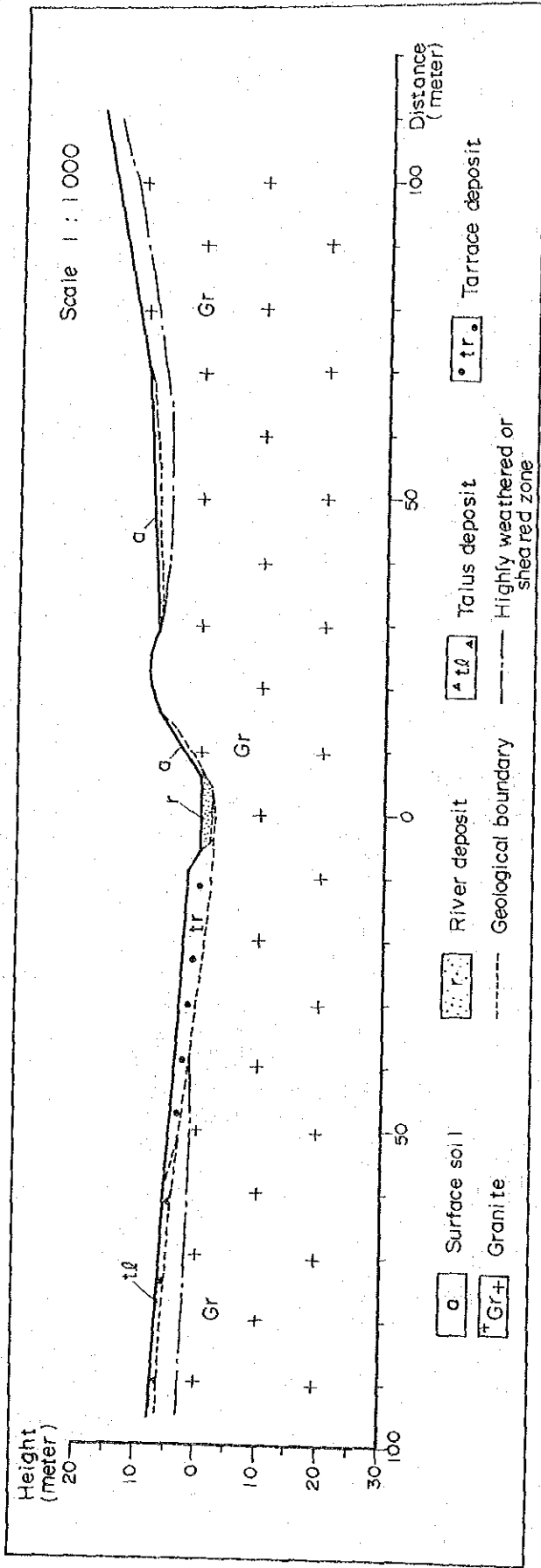
CHIGUMISIRWA

PLAN OF DAM

Dam No.	II- 1 -10
District	Bikita
Communal L.	Bikita
River	Dove
Map Ref.	2031B2
Coordinate	UN791799
Catchment A.	16.3 sq.m
Design Flood	163 cum/sec.
N.W.S.	EL.791.0 m
D.W.S.	EL.783.0 m
Capacity of Res.	1.50 M.C.M.
Dam Top	EL.793.0 m
Dam Height	15.0 m
Dam Length	600.0 m
Dam Vol.	81,000 cum



II-1-10 Chigumisirwa



The Dove River forms relatively narrow valley and gentle slopes at the both banks. A river terrace is distributed at the left bank and it is 70 to 50 meters wide and about 4 meters thick.

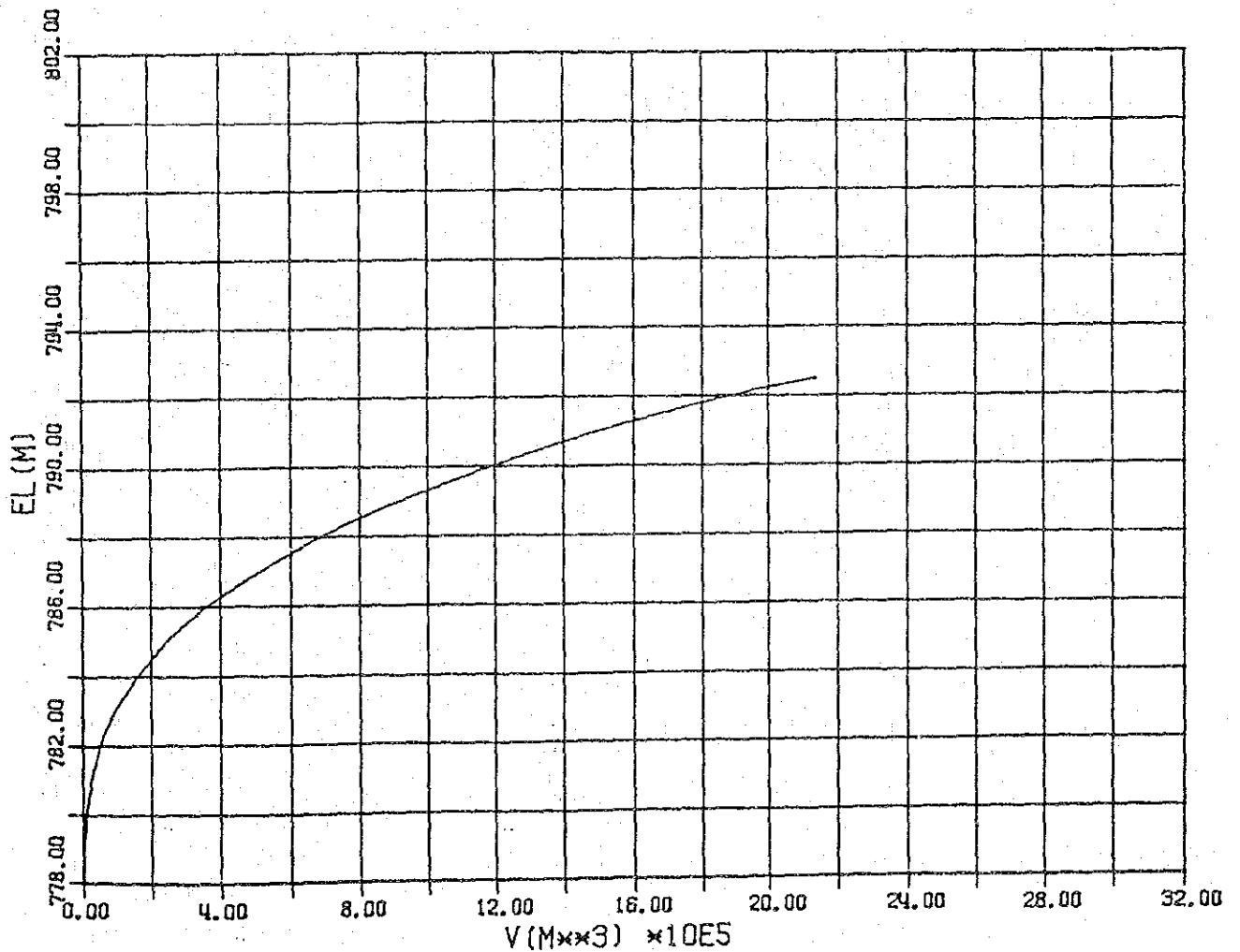
The bedrock consists of porphyritic granite, and it is usually massive and very hard, however at the left bank it is well jointed by highly weathering. The thickness of the weathered layer seems to be less than 3 meters.

The thickness of unconsolidated deposits seems to be maximum 2 meters at the riverbed. Partly the weathered rocks are distributed, however leakage through the bedrock seems to be small because of closed joints.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HQR
II-1-10	2031B2	UN	791	799

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
778.0	0.0	0	0	0	0.00	
780.0	2.0	9500	4750	9500	9.50	
782.5	2.5	37000	23250	58125	67.62	
785.0	2.5	104000	70500	176250	243.87	
787.5	2.5	174000	139000	347500	591.37	
790.0	2.5	302000	238000	595000	1186.37	
792.5	2.5	457000	379500	948750	2135.12	



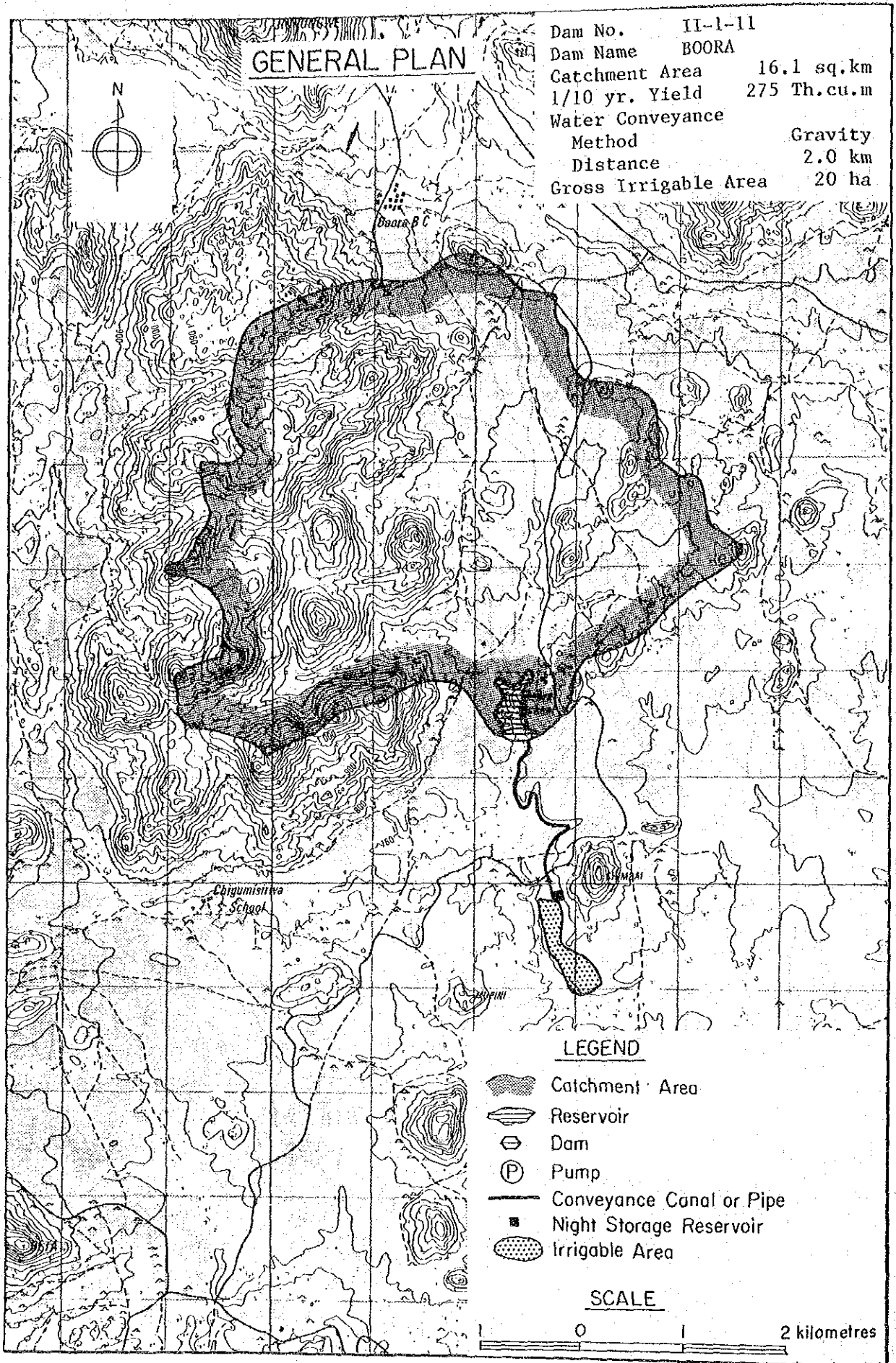
No. II-1-11

Name of Dam Boora

Location	District Bikita		Communal Land Bikita		
	Map Ref. 2031B2		Coordinates UN825814		
Geology	Granite, highly, weathering, has been changed boulders or soils.				
Hydrology	River (T) Dove		Hydrological Zone E-S2		
	Catchment Area	16.1 sq.km	M.A. Rainfall	780 mm	
	M.A. Runoff	95 mm	Sediment	310 tonnes km ² /yr.	
Reservoir	Effective Capacity	1.130 MCM	1/10 Yr. Yield	0.275 MCM	
	Dead Capacity	0.070 MCM	D.W.S.	757 m	
	Total Capacity	1.200 MCM	N.W.S.	766 m	
Dam	Height	18 m	Length	660 m	
	Embankment Volume	161 000 cu.m	Spillway	91 m	
Agriculture	Natural Region IV		Soil		
	Potential Irrigable Area			60 ha	
	Proposed Cropping Pattern B				
Irrigation	Net Irrigable Area 16.2ha		Dist. 2.0 km by Gravity		
	Topography	Area	Undulated		
		Conveyance	Complicated		
Rural Water Supply	Population 1 909 person		38 cu.m/day		
	Livestock 1 742 unit		78 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class
	Z\$ 3 096 000		Z\$ 498 000	Z\$ 3 594 000	C
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	
	Z\$ 34 410 /year		Z\$ 400 000	-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	N	N
Remarks					

Present Condition on the Ward

Ward Name	17		Area	3 421 ha		
Demography	Population Density		190.9 persons/sq.km			
	Family Size		9.6 Persons/household			
Agriculture	Arable Area		3 011 ha		Grazing Area	410 ha
	Maize	1.1 ha/household			22	bags/ha
	Sorghum	0.1 ha/household				bags/ha
	Livestock	4.4 LSUs/household			87.1	LSUs/sq.km
Rural Water Supply	Borehole		0.12 units/sq.km		1 633 persons/unit	
	Well		1.61 units/sq.km		119 persons/unit	



BOORA

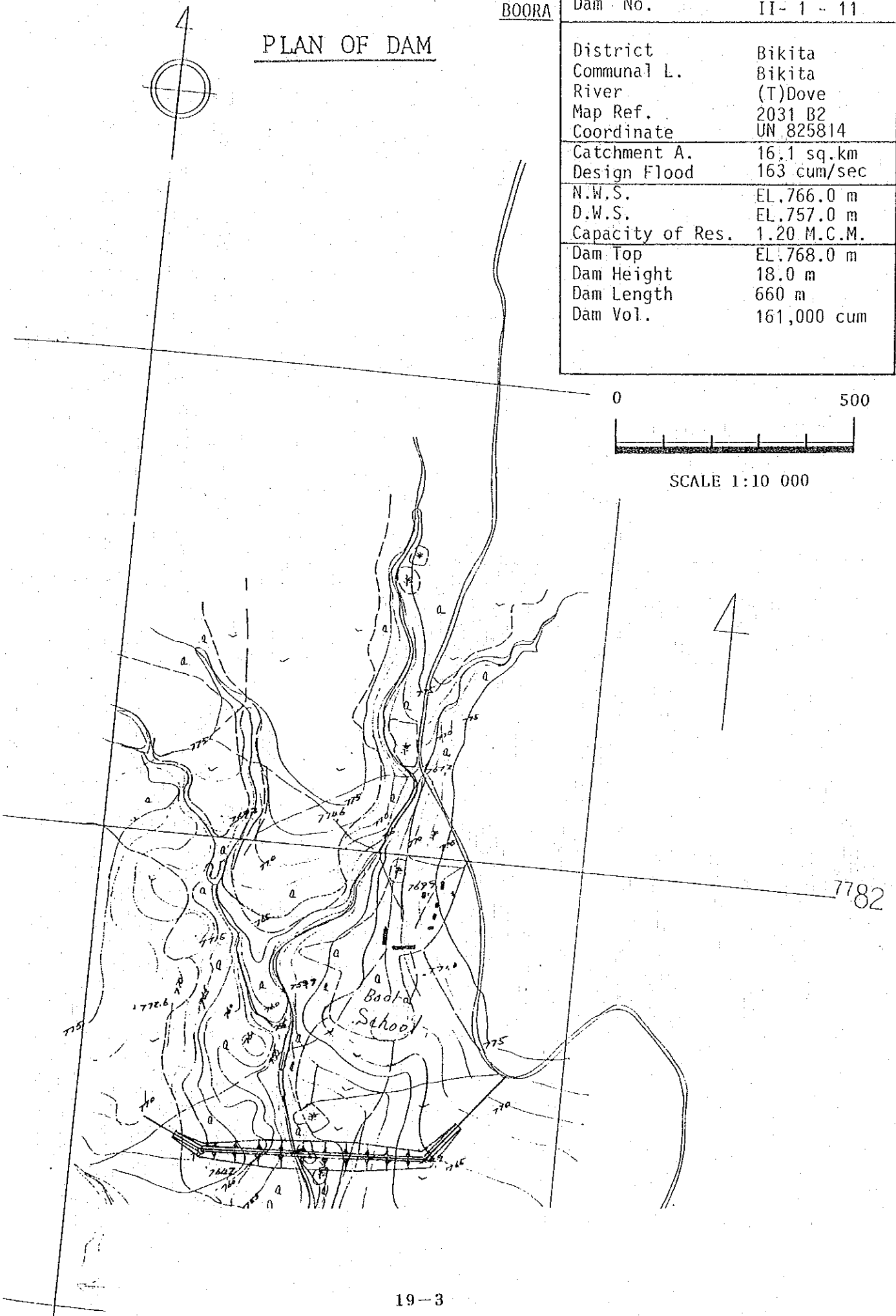
PLAN OF DAM

Dam No.	II- 1 - 11
District	Bikita
Communal L.	Bikita
River	(T)Dove
Map Ref.	2031 B2
Coordinate	UN 825814
Catchment A.	16.1 sq.km
Design Flood	163 cum/sec
N.W.S.	EL.766.0 m
D.W.S.	EL.757.0 m
Capacity of Res.	1.20 M.C.M.
Dam Top	EL.768.0 m
Dam Height	18.0 m
Dam Length	660 m
Dam Vol.	161,000 cum

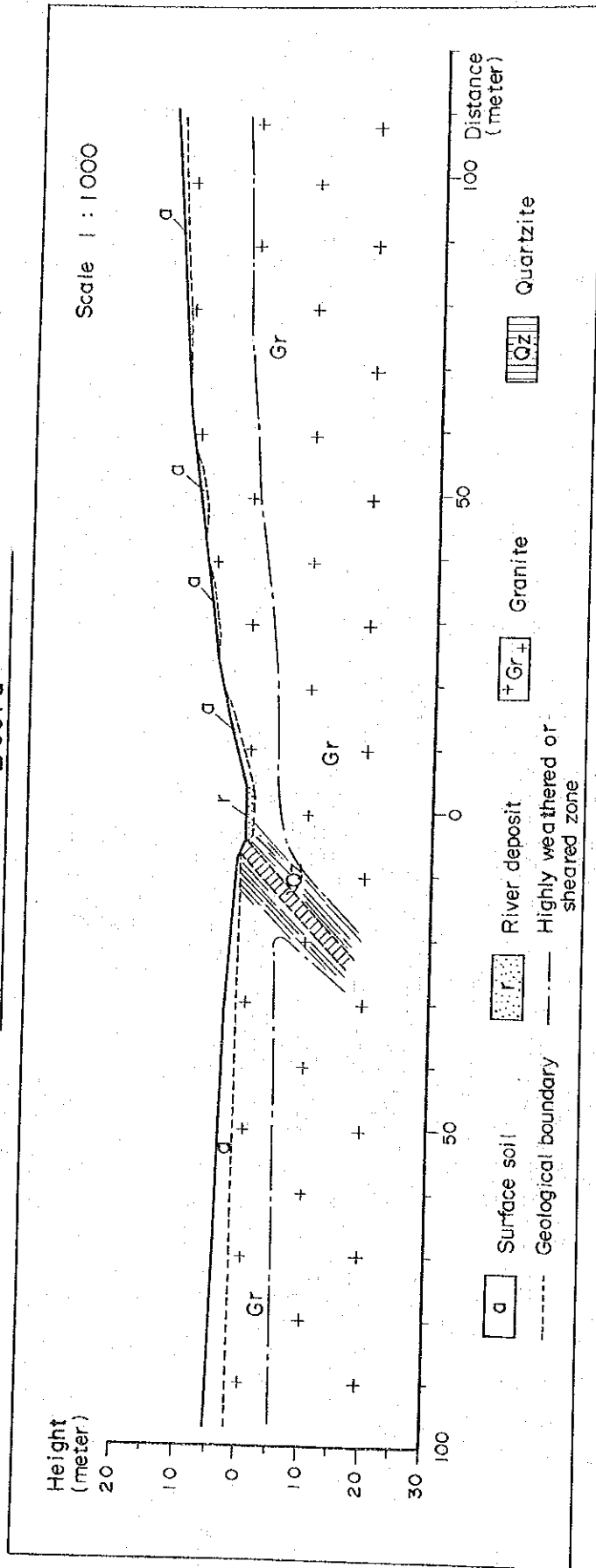
0 500



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II-1-11 Boora



The river forms a narrow valley and slopes gently.

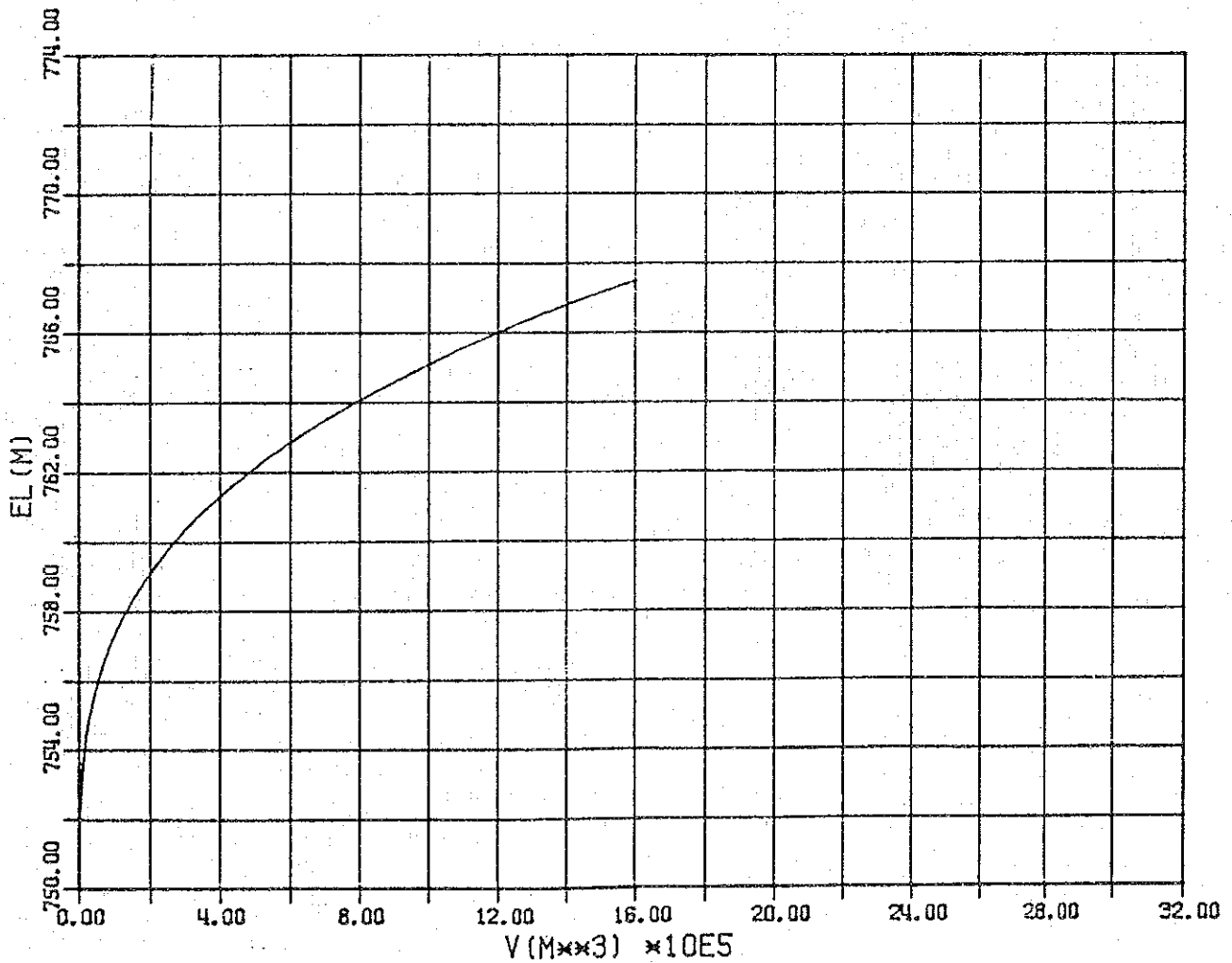
The bedrock consists of granite, and it is well jointed and soft by highly weathering, and has been changed into boulders or quartz rich sands. It seems that the thickness of weathered layers is more than 10 meters, and leakage through the bedrock is large.

The thickness of unconsolidated deposits seems to be maximum 2 meters at the riverbed and maximum 4 meters at the both banks.

TABLE STORAGE VOLUME OF RESERVOIR

NØ	MAP	GRID	VER	HØR
II-1-11	2031B2	UN	825	814

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VØL (M ³)	ΣV (1000M ³)	NOTE
750.0	0.0	0	0	0	0.00	
752.5	2.5	4000	2000	5000	5.00	
755.0	2.5	15333	9667	24166	29.17	
757.5	2.5	45000	30167	75416	104.58	
760.0	2.5	84000	64500	161250	265.83	
762.5	2.5	140000	112000	280000	545.83	
765.0	2.5	205000	172500	431250	977.08	
767.5	2.5	293500	249250	623125	1600.21	



No. II-2-1

Name of Dam Mashoko

Location	District Bikita		Communal Land Matsai		
	Map Ref. 2031B4		Coordinates UN709346		
Geology	Granite and the dyke of dolerite. Granite highly weathering, dyke and surrounding rock has been changed boulders.				
Hydrology	River Chenyere		Hydrological Zone E-S1		
	Catchment Area	27.2 sq.km	M.A. Rainfall	640 mm	
	M.A. Runoff	48 mm	Sediment	320 tonnes km ² /yr.	
Reservoir	Effective Capacity	0.890 MCM	1/10 Yr. Yield	0.248 MCM	
	Dead Capacity	0.130 MCM	D.W.S.	651 m	
	Total Capacity	1.020 MCM	N.W.S.	656 m	
Dam	Height	14 m	Length	450 m	
	Embankment Volume	63 000 cu.m	Spillway	127 m	
Agriculture	Natural Region V		Soil SL-SCL		
	Potential Irrigable Area		120 ha		
	Proposed Cropping Pattern C				
Irrigation	Net Irrigable Area 14.6 ha		Dist. 1.4 km by Gravity		
	Topography	Area	Flat		
		Conveyance	Slightly sloping		
Rural Water Supply	Population	1 152 person	23 cu.m/day		
	Livestock	1 290 unit	58 cu.m/day		
Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class	
	Z\$ 1 792 000	Z\$ 375 000	Z\$ 2 167 000	B	
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return		
	Z\$ 45 310/year	Z\$ 527 000	2.5 per cent		
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	N	N
Remarks					

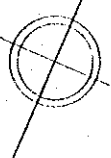
Present Condition on the Ward

Ward Name	2		Area	15 300 ha
Demography	Population Density		38.4	persons/sq.km
	Family Size		5.0	Persons/household
Agriculture	Arable Area	2 648 ha	Grazing Area	11 483 ha
	Maize	1.5 ha/household	7	bags/ha
	Sorghum	0.6 ha/household	7	bags/ha
	Livestock	3.4 LSUs/household	25.9	LSUs/sq.km
Rural Water Supply	Borehole	0.09 units/sq.km	420	persons/unit
	Well	0.05 units/sq.km	734	persons/unit

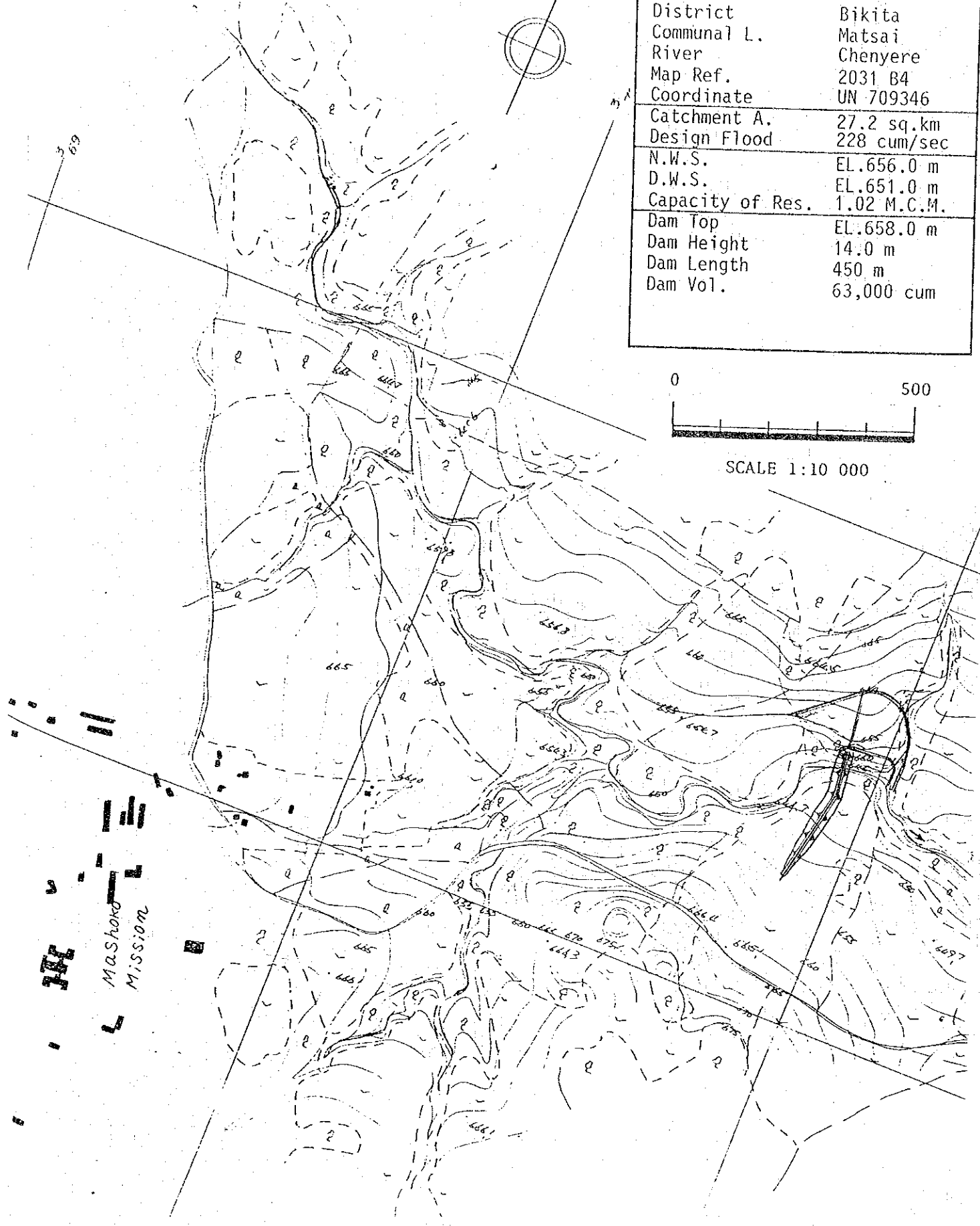
PLAN OF DAM

MASHOKO

Dam No.	II- 2 -1
District	Bikita
Communal L.	Matsai
River	Chenyere
Map Ref.	2031 B4
Coordinate	UN 709346
Catchment A.	27.2 sq.km
Design Flood	228 cum/sec
N.W.S.	EL.656.0 m
D.W.S.	EL.651.0 m
Capacity of Res.	1.02 M.C.M.
Dam Top	EL.658.0 m
Dam Height	14.0 m
Dam Length	450 m
Dam Vol.	63,000 cum

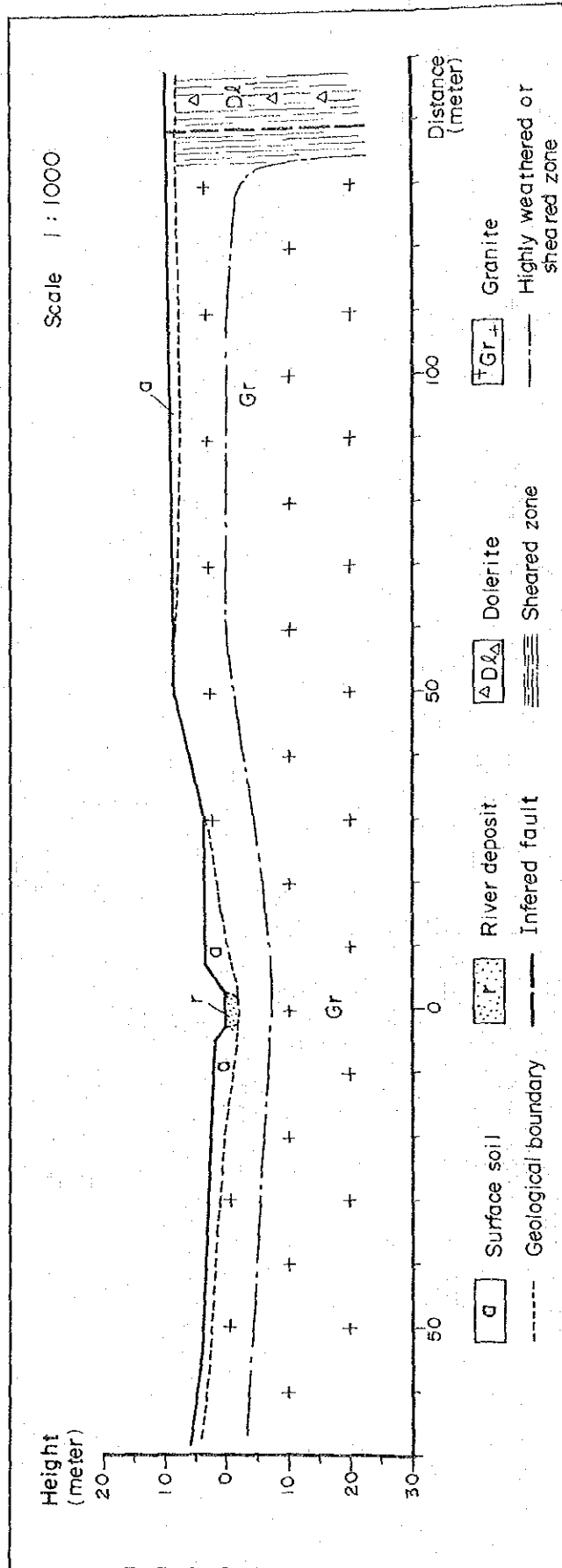


SCALE 1:10 000



MASHOKO
MISSION

II-2-1 Mashoko



The Chenere River forms a narrow valley and gentle slopes. Outcrop around the damsite is very few and small granite domes, called "dwalas", are sporadically exposed.

The bedrock consists of granite and dolerite dyke. The former is mostly massive, however very soft by highly weathering.

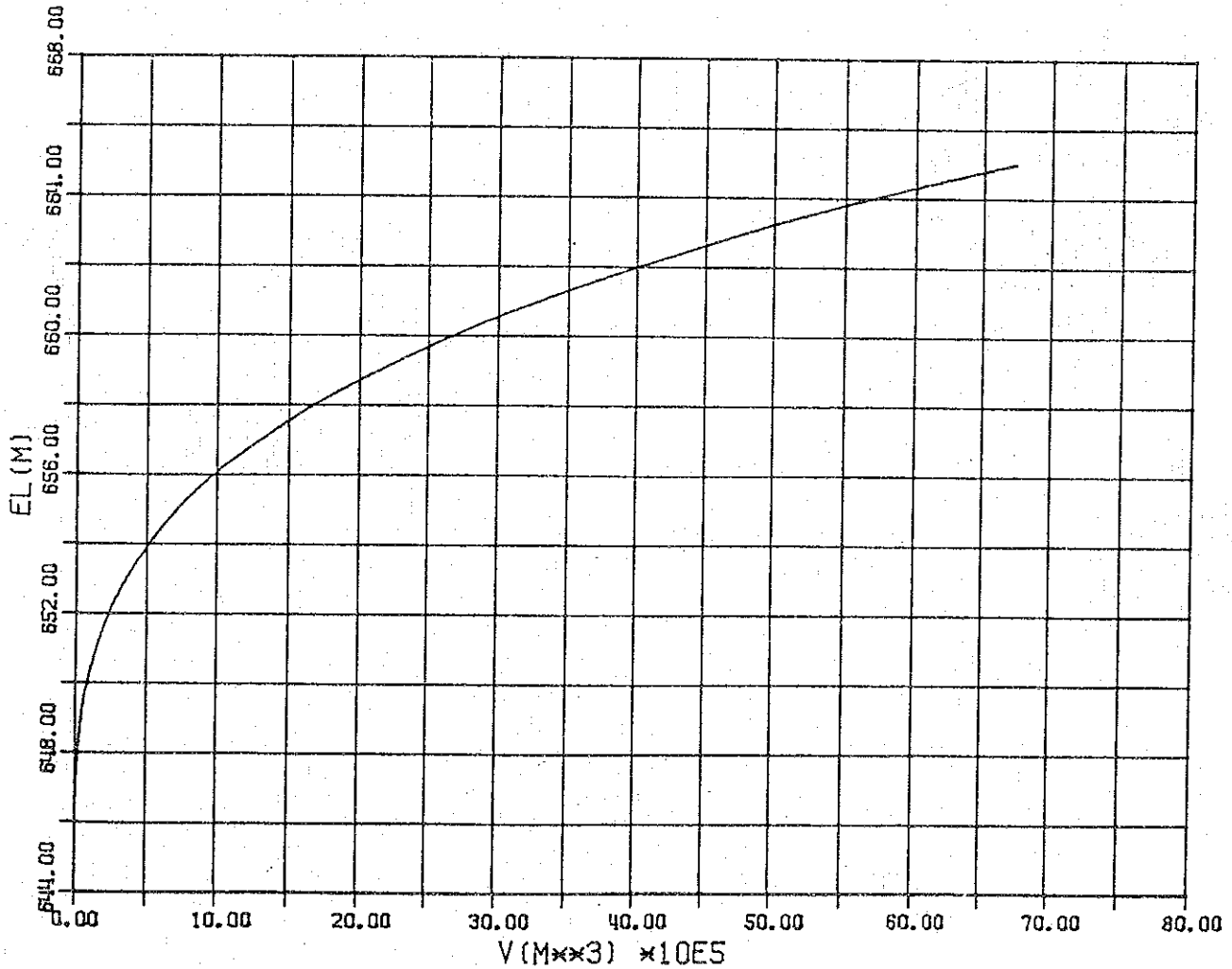
The latter is about 80 meters wide and surrounding rocks have been changed into boulders. It seems that leakage through the bedrock is considerably large and bearing strength in the foundation strata is small. Foundation treatment seems to be necessary for the dam embankment.

The thickness of unconsolidated deposits is maximum 2 meters at the riverbed and maximum 4 meters at both banks.

TABLE STORAGE VOLUME OF RESERVOIR

NØ	MAP	GRID	VER	HØR
II-2-1	2031B4	UN	709	346

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VØL (M ³)	ΣV (1000M ³)	NOTE
644.0	0.0	0	0	0	0.00	
645.0	1.0	60	30	30	0.03	
647.5	2.5	7900	3980	9950	9.98	
650.0	2.5	47500	27700	69250	79.23	
652.5	2.5	119100	83300	208250	287.48	
655.0	2.5	223100	171100	427750	715.23	
657.5	2.5	385800	304450	761125	1476.35	
660.0	2.5	570400	478100	119524	2671.60	
662.5	2.5	808600	689500	172374	4395.35	
665.0	2.5	1059300	933950	2334875	6730.23	



V (M³) × 10⁵

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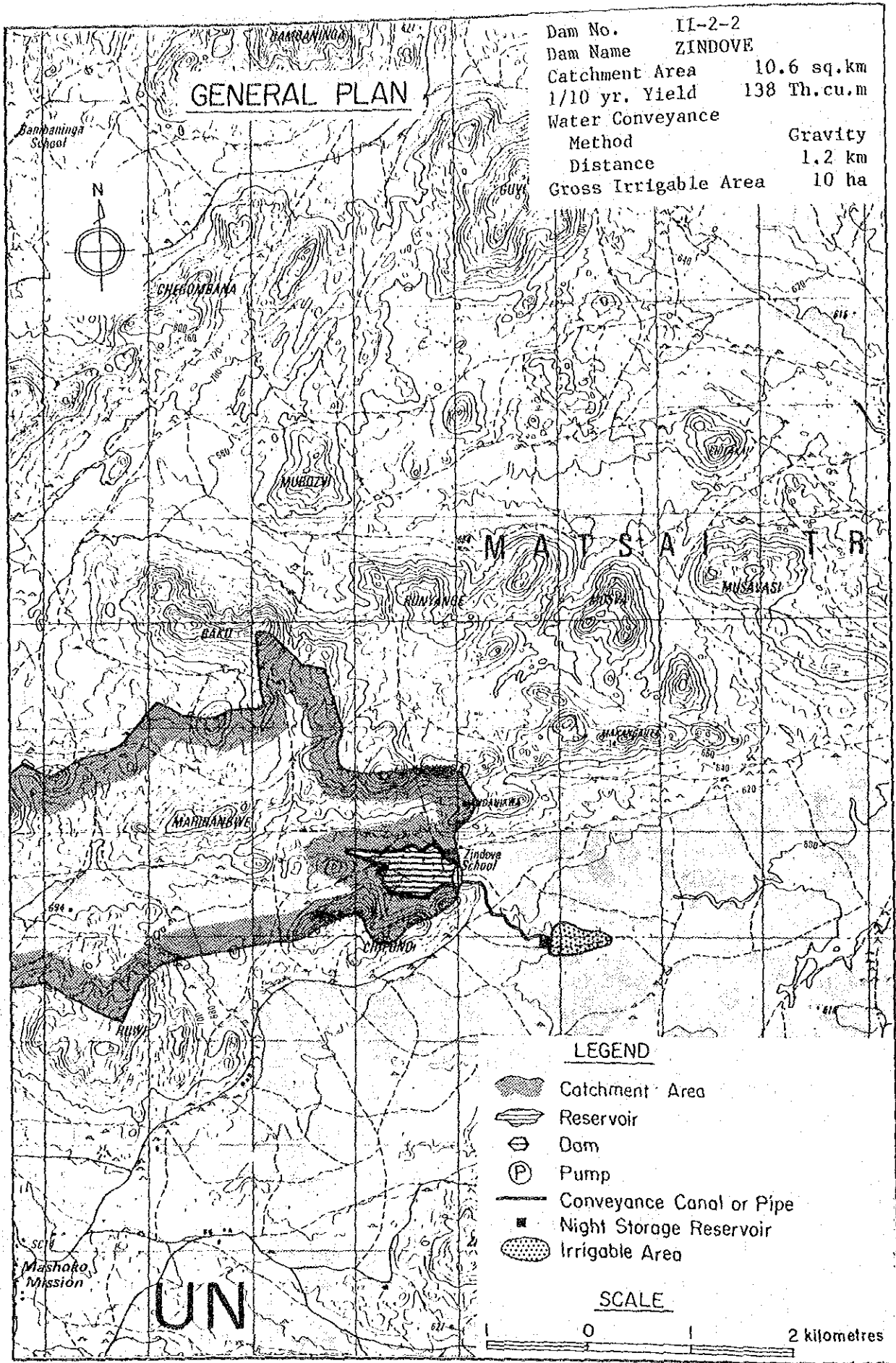
No. II-2-2

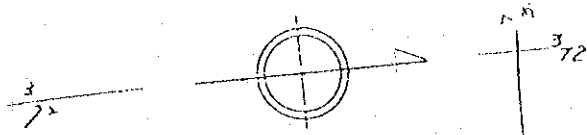
Name of Dam Zindove

Location	District Bikita		Communal Land Bikita		
	Map Ref. 2031B4		Coordinates UN740375		
Geology	Granite and the dyke of dolerite, dolerite and surrounding rock have been changed into boulders.				
Hydrology	River Mazuka		Hydrological Zone E-S3		
	Catchment Area 10.6 sq.km		M.A. Rainfall 630 mm		
	M.A. Runoff 45 mm		Sediment 320 tonnes km ² /yr.		
Reservoir	Effective Capacity 0.880 MCM		1/10 Yr. Yield 0.138 MCM		
	Dead Capacity 0.050 MCM		D.W.S. 632 m		
	Total Capacity 0.930 MCM		N.W.S. 640 m		
Dam	Height 15 m		Length 300 m		
	Embankment Volume 49 000 cu.m		Spillway 71 m		
Agriculture	Natural Region V		Soil SL-SCL		
	Potential Irrigable Area		50 ha		
	Proposed Cropping Pattern C				
Irrigation	Net Irrigable Area 8.1 ha		Dist. 1.2 km by Gravity		
	Topography	Area		Very flat	
		Conveyance		Slightly sloping	
Rural Water Supply	Population 1 152 person		23 cu.m/day		
	Livestock 1 290 unit		58 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class
	Z\$ 615 000		Z\$ 277 000	Z\$ 892 000	B
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	
	Z\$ 21 409 /year		Z\$ 249 000	3.6 per cent	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward

Ward Name	2		Area 15 300 ha	
Demography	Population Density		38.4 persons/sq.km	
	Family Size		5.0 Persons/household	
Agriculture	Arable Area 2 648 ha		Grazing Area 11 483 ha	
	Maize 1.5 ha/household		7 bags/ha	
	Sorghum 0.6 ha/household		7 bags/ha	
	Livestock 3.4 LSUs/household		25.9 LSUs/sq.km	
Rural Water Supply	Borehole 0.09 units/sq.km		420 persons/unit	
	Well 0.05 units/sq.km		734 persons/unit	

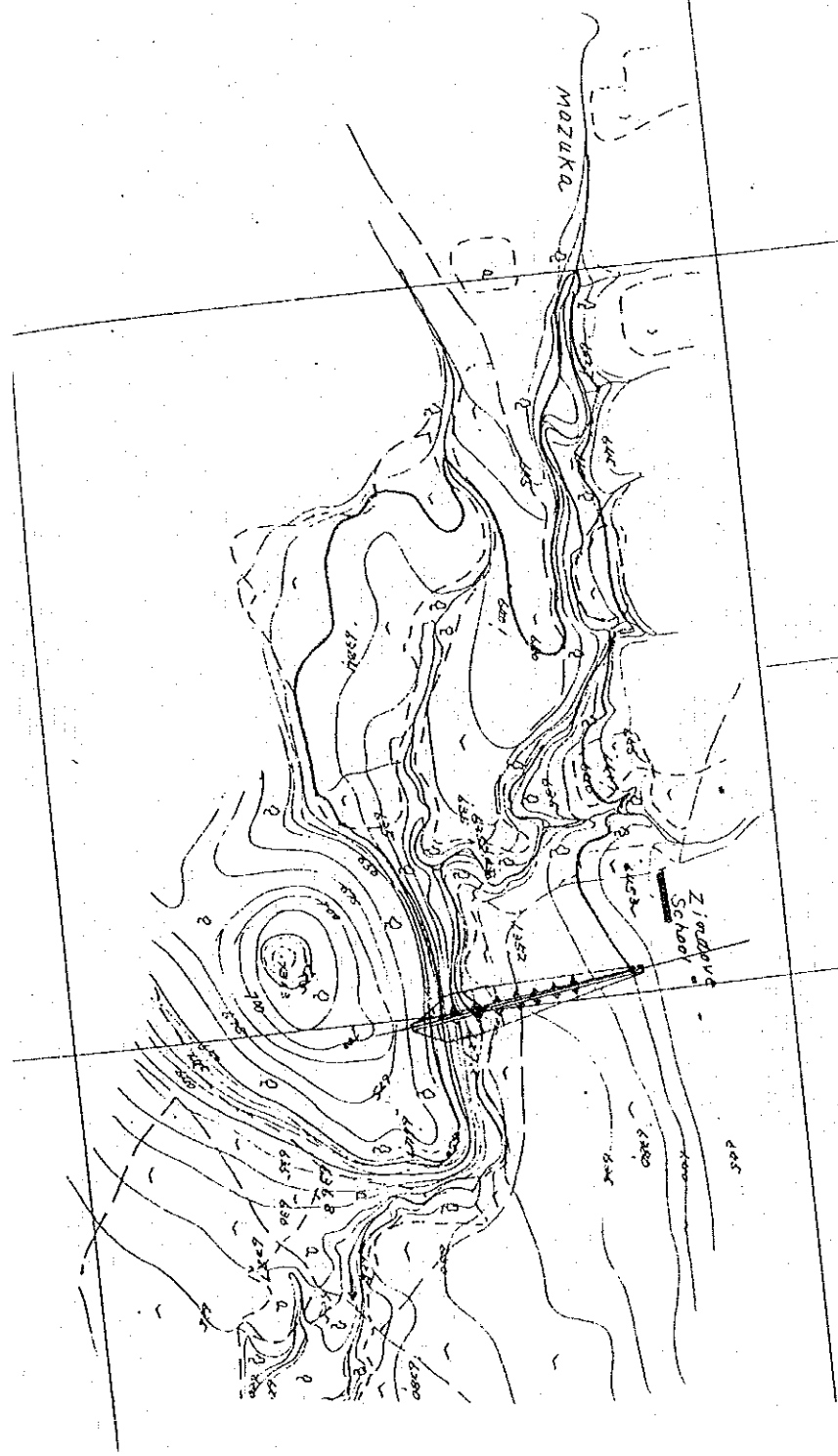
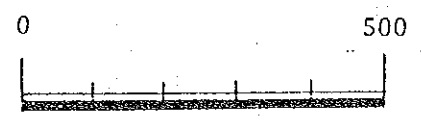




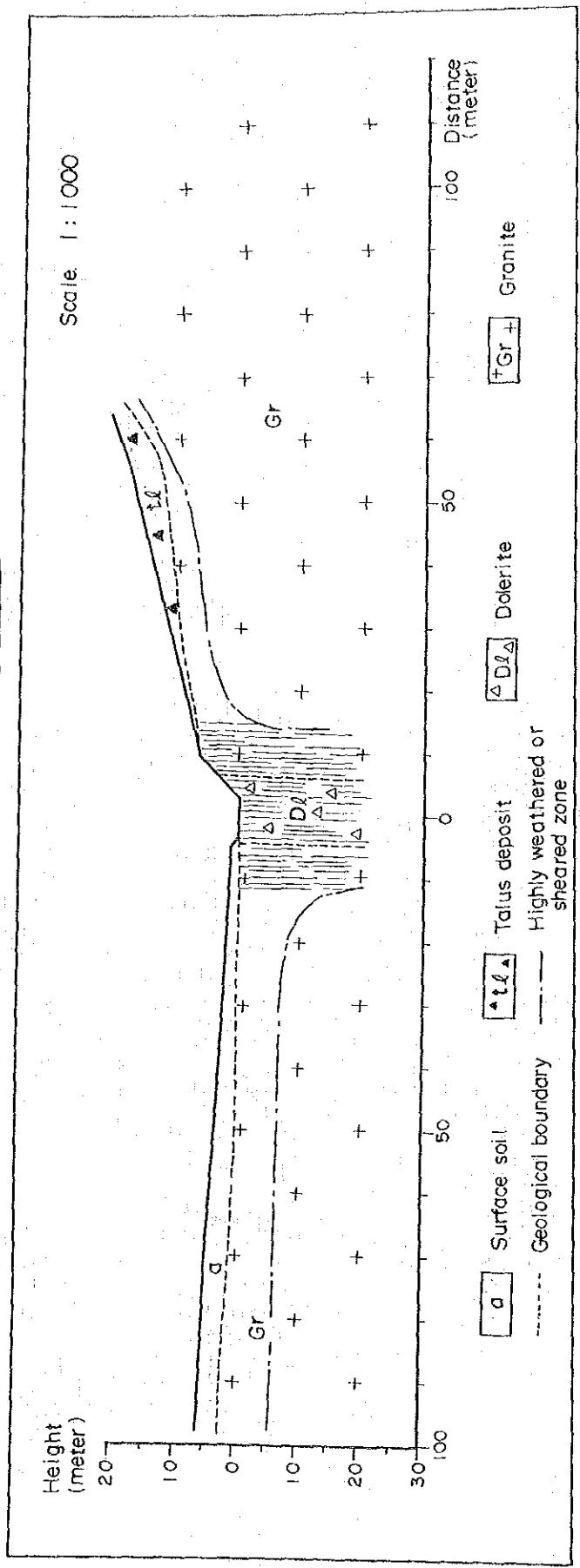
PLAN OF DAM

ZINDOVE

Dam No.	II- 2 - 2
District	Bikita
Communal L.	Matsai
River	Mazuka
Map Ref.	2031 B4
Coordinate	UN 740375
Catchment A.	10.6 sq.km
Design Flood	128 cum/sec
N.W.S.	EL.640.0 m
D.W.S.	EL.632.0 m
Capacity of Res.	0.93 M.C.M.
Dam Top	EL.642.0 m
Dam Height	15.0 m
Dam Length	300 m
Dam Vol.	49,000 cum



II-2-2 Zindove



The Mazuka River forms a narrow valley and relatively gentle slopes.

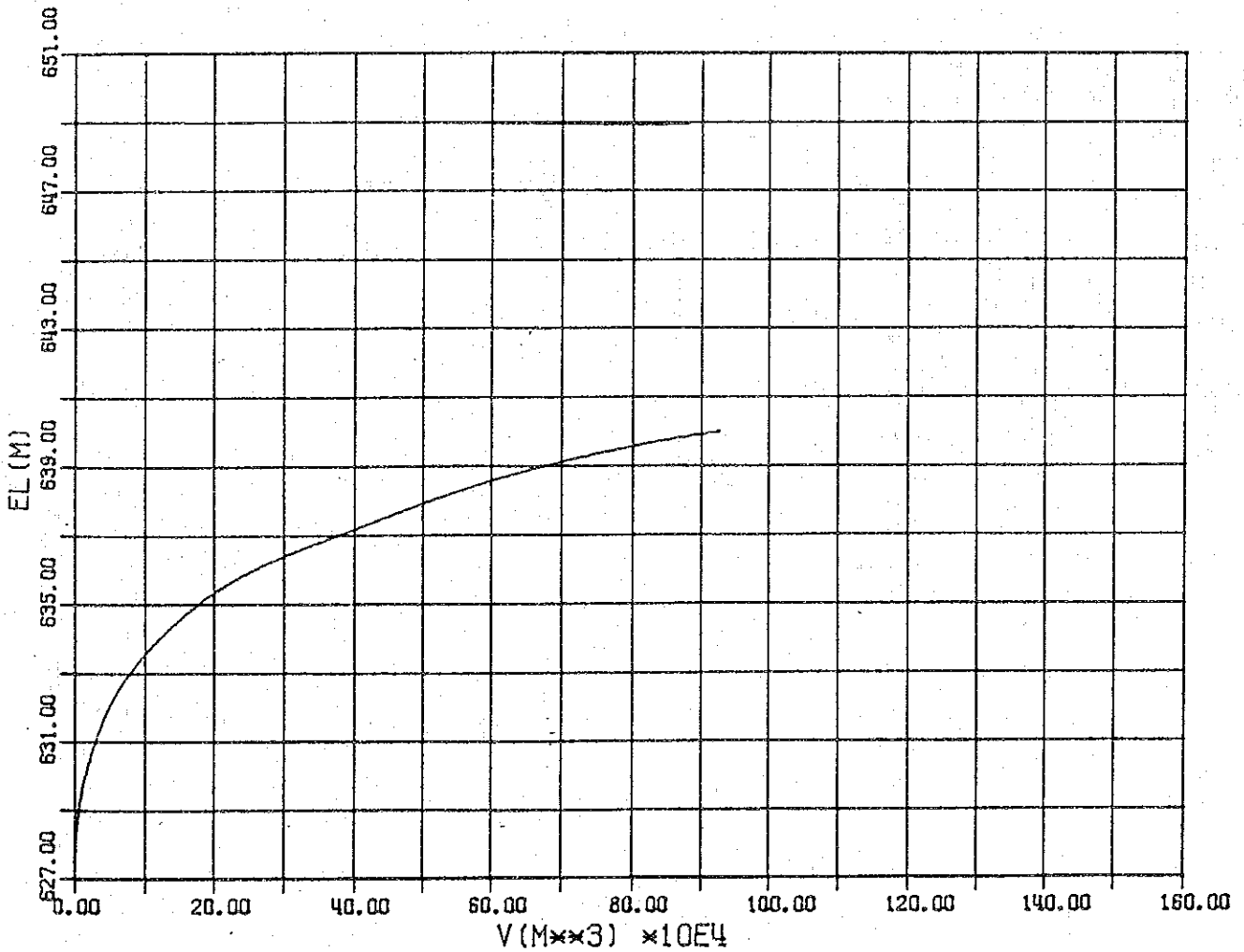
The bedrock consists of granite and dolerite dyke. The former is mostly hard, and it is well jointed. The latter is about 10 meters wide and surrounding rocks have been changed into boulders and very soft rock. It seems that leakage through the bedrock is very large and bearing strength in the foundation strata is small, therefore foundation treatment is necessary for the dam embankment.

The thickness of unconsolidated deposits is less than 1 meter at the riverbed and maximum 5 meters at both banks. Talus is distributed at the right bank and it consists of gravels.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
II-2-2	2031B4	UN	740	375

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
627.2	0.0	0	0	0	0.00	
627.5	0.3	2000	1000	300	0.30	
630.0	2.5	9500	5750	14375	14.68	
632.5	2.5	27500	18500	46250	60.93	
635.0	2.5	64500	46000	115000	175.92	
637.5	2.5	148000	106250	265625	441.55	
640.0	2.5	239500	193750	484375	925.92	



No. II-2-3








Name of Dam Mafaune

Location	District	Bikita		Communal Land	Matsai
	Map Ref.	2031B4		Coordinates	UN855398
Geology	Granite and the dyke of dolerite, highly weathering and shearing.				
Hydrology	River	Chiremwaremwa		Hydrological Zone	E-S3
	Catchment Area	34.6	sq.km	M.A. Rainfall	590 mm
	M.A. Runoff	36	mm	Sediment	320 tonnes km ² /yr.
Reservoir	Effective Capacity	0.340	MCM	1/10 Yr. Yield	0.112 MCM
	Dead Capacity	0.160	MCM	D.W.S.	560 m
	Total Capacity	0.500	MCM	N.W.S.	562 m
Dam	Height	9	m	Length	500 m
	Embankment Volume	31 000	cu.m	Spillway	149 m
Agriculture	Natural Region	V		Soil	CL
	Potential Irrigable Area				50 ha
	Proposed Cropping Pattern				C
Irrigation	Net Irrigable Area	6.6 ha	Dist. 4.0 km by Gravity		
	Topography	Area	Slightly sloping		
		Conveyance	Complicated		
Rural Water Supply	Population	389	person	8	cu.m/day
	Livestock	3 890	unit	175	cu.m/day
Cost and Benefit	Dam	Z\$ 449 000		Irrigation Facilities	Z\$ 717 000
	Annual Increment Benefit	Z\$ 20 517 /year		Net Present Value	Z\$ 239 000
	Total Cost	Z\$ 1 166 000		Economic Internal Rate of Return	2.2 per cent
					Class
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward

Ward Name	3		Area	14 600 ha	
Demography	Population Density		38.9	persons/sq.km	
	Family Size		4.6	Persons/household	
Agriculture	Arable Area	2 452	ha	Grazing Area	12 148 ha
	Maize	0.2	ha/household	10	bags/ha
	Sorghum	0.2	ha/household	8	bags/ha
	Livestock	4.6	LSUs/household	38.9	LSUs/sq.km
Rural Water Supply	Borehole	0.12	units/sq.km	334	persons/unit
	Well	-	units/sq.km	-	persons/unit

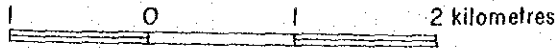
LEGEND

-  Catchment Area
-  Reservoir
-  Dam
-  Pump
-  Conveyance Canal or Pipe
-  Night Storage Reservoir
-  Irrigable Area

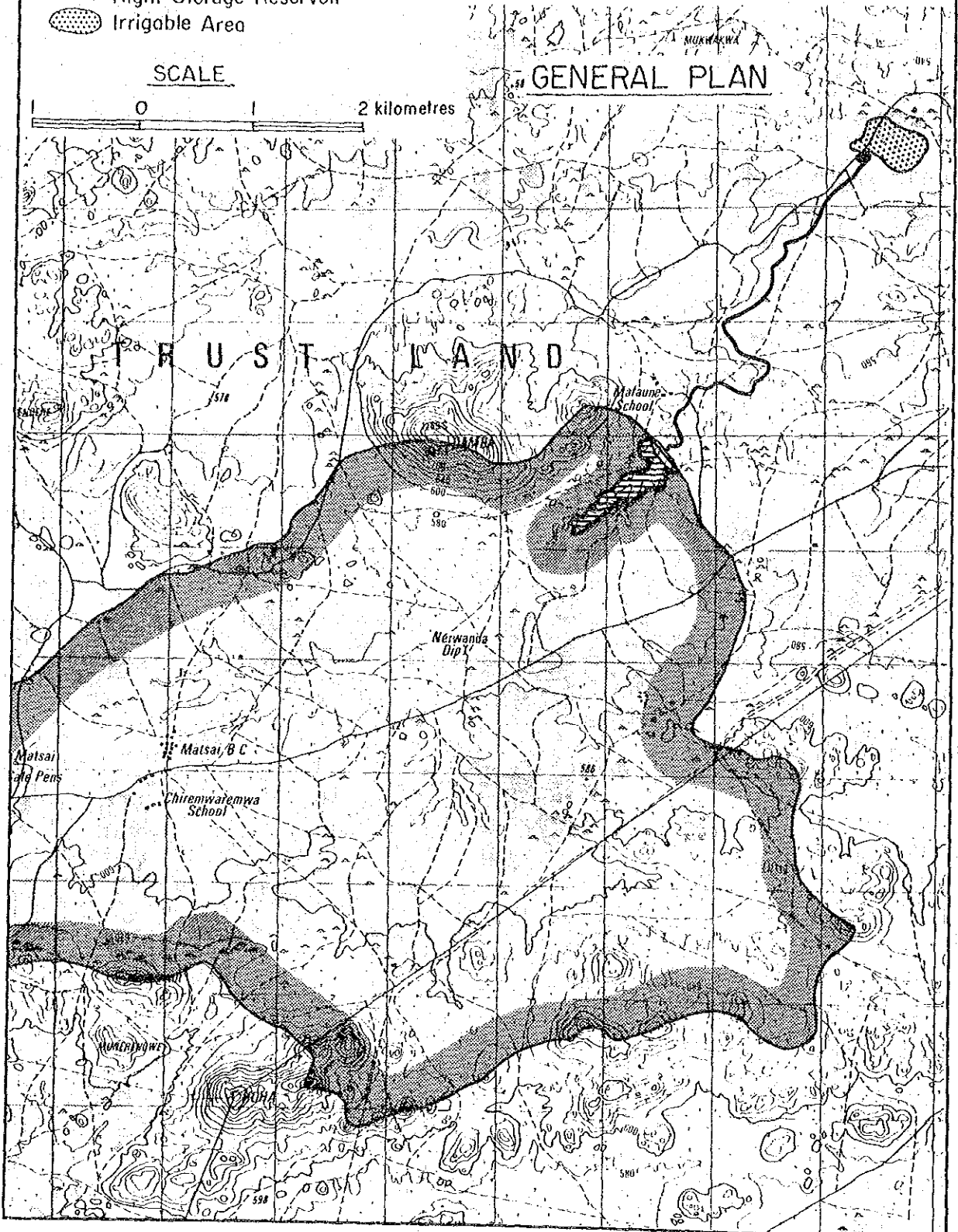
Dam No. II-2-3
 Dam Name MASAUNE
 Catchment Area 34.6 sq. km
 1/10 yr. Yield 112 Th. cu. m
 Water Conveyance
 Method Gravity
 Distance 4.0 km
 Gross Irrigable Area 8 ha



SCALE



GENERAL PLAN



PLAN OF DAM



MAFAUNE

Dam No.	II- 2 - 3
District	Bikita
Communal L.	Matsai
River	Chiremwaremwa
Map Ref.	2031 B4
Coordinate	UN 855398
Catchment A.	34.6 sq.km
Design Flood	269 cum.sec
N.W.S.	EL.562.0 m
D.W.S.	EL.560.0 m
Capacity of Res.	0.50 M.C.M.
Dam Top	EL.564.0 m
Dam Height	9.0 m
Dam Length	500 m
Dam Vol.	31,000 cum

0 500



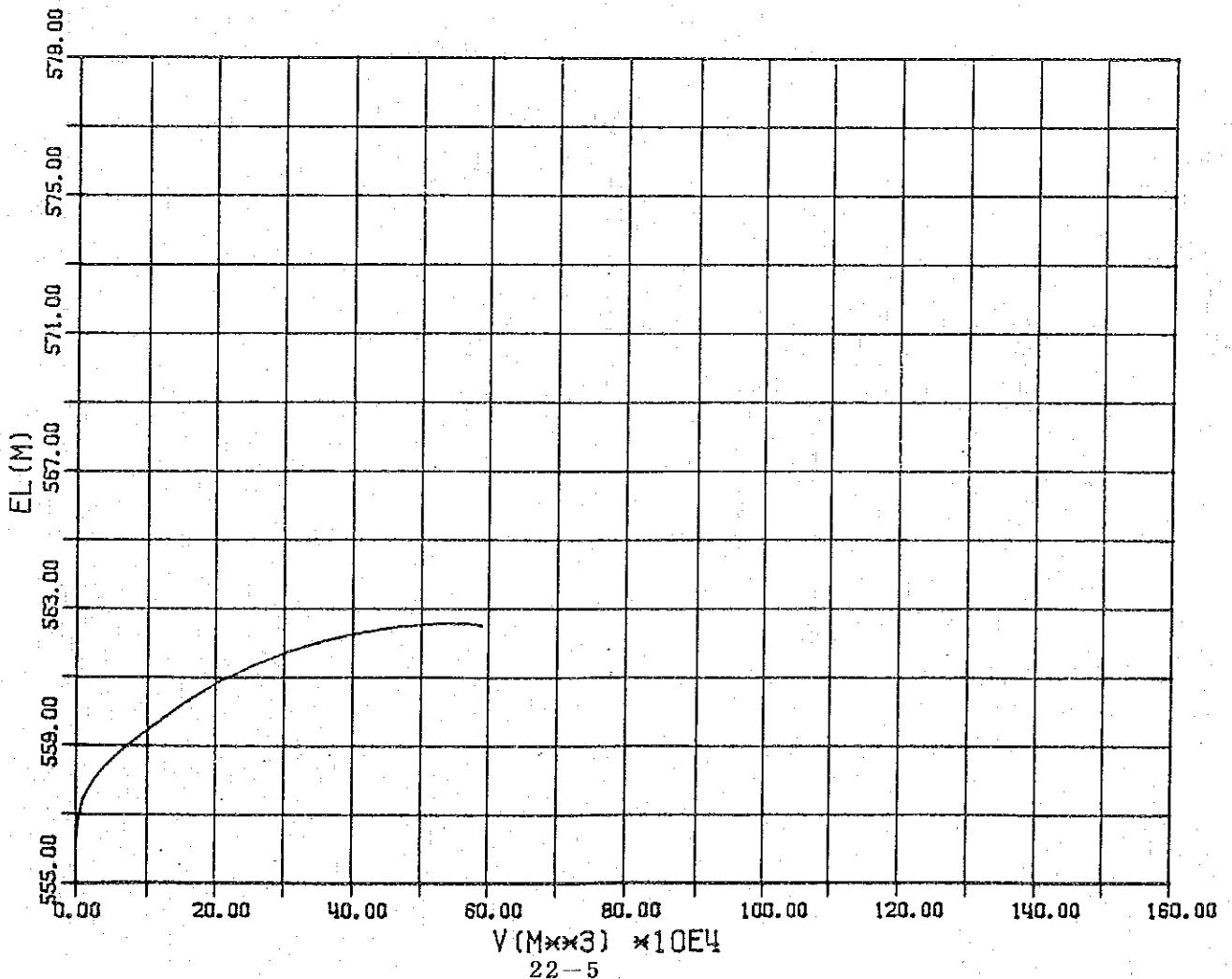
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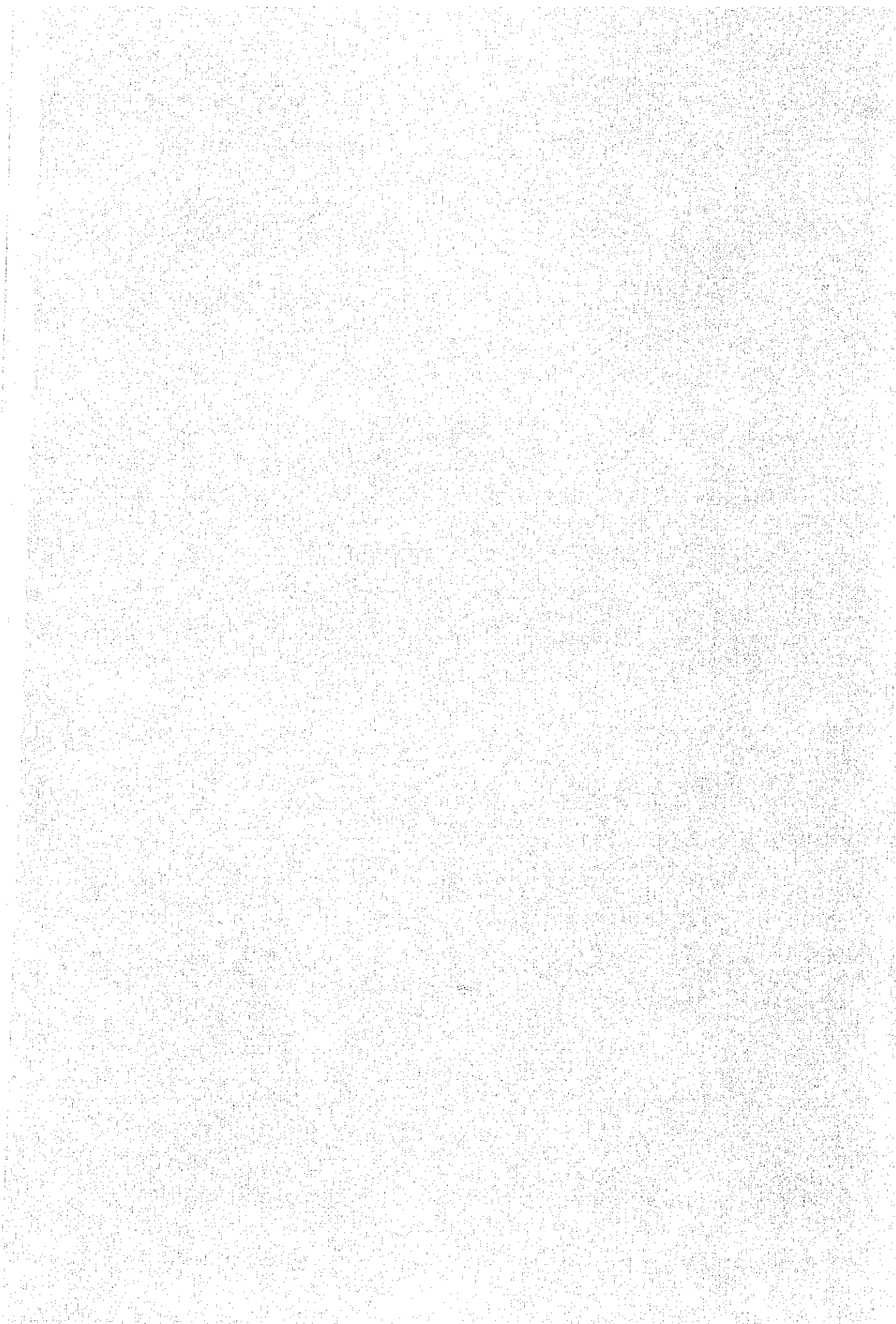


TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
II-2-3	2031B4	UN	855	398

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
555.0	0.0	0	0	0	0.00	
557.5	2.5	8700	4350	10875	10.87	
560.0	2.5	91200	49950	124875	135.75	
562.5	2.5	271200	181200	453000	588.75	





No. III-1-1

Name of Dam Majijimba

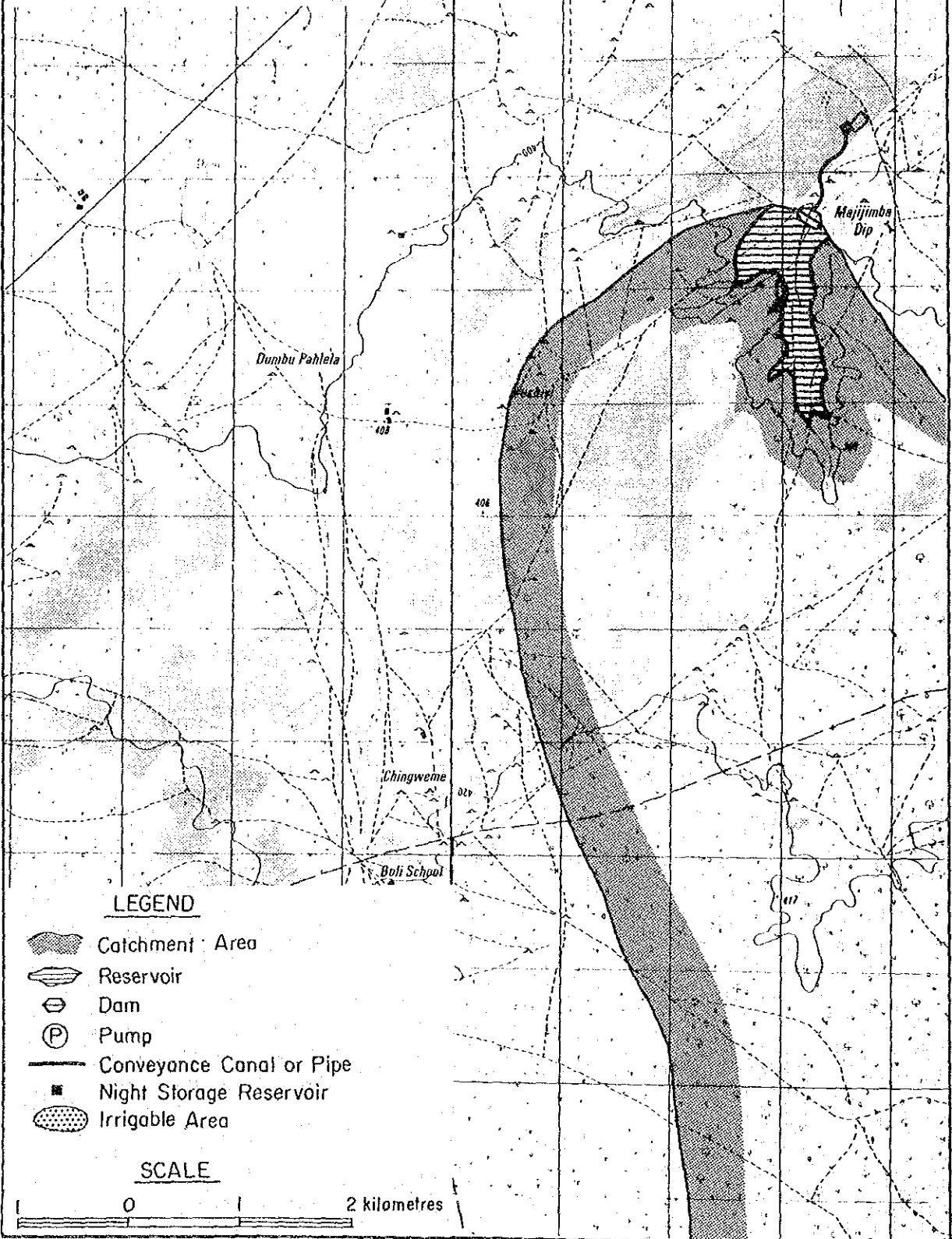
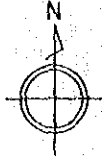
Location	District Gaza Komanani		Communal Land Matibi No.2		
	Map Ref. 2131A4		Coordinates UM433376		
Geology	Granite, surface soil is very deep, outcrops are not found around the damsite.				
Hydrology	River (T) Makambi		Hydrological Zone E-L1		
	Catchment Area 84.3 sq.km		M.A. Rainfall 500 mm		
	M.A. Runoff 19 mm		Sediment 45 tonnes km ² /yr.		
Reservoir	Effective Capacity 1.570 MCM		1/10 Yr. Yield 0.016 MCM		
	Dead Capacity 0.080 MCM		D.W.S. 396 m		
	Total Capacity 1.650 MCM		N.W.S. 398 m		
Dam	Height 5 m		Length 1 000 m		
	Embankment Volume 35 000 cu.m		Spillway 258 m		
Agriculture	Natural Region V		Soil CL		
	Potential Irrigable Area			100 ha	
	Proposed Cropping Pattern C				
Irrigation	Net Irrigable Area 0.8 ha		Dist. 1.0 km by Gravity		
	Topography	Area	Very flat		
		Conveyance	Slightly sloping		
Rural Water Supply	Population 1 400 person		28 cu.m/day		
	Livestock 520 unit		23 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class
	Z\$ 1 473 000		Z\$ 198 000	Z\$ 1 671 000	C
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	
	Z\$ 6 330 /year		Z\$ 74 000	-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	N	N	Y	N	N
Remarks	Storage ratio = 1.0				

Present Condition on the Ward








Ward Name	3		Area 25 000 ha	
Demography	Population Density		28.0 persons/sq.km	
	Family Size		10.7 Persons/household	
Agriculture	Arable Area 8 000 ha		Grazing Area 17 000 ha	
	Maize 2.3 ha/household		7 bags/ha	
	Sorghum 3.8 ha/household		11 bags/ha	
	Livestock 4.0 LSUs/household		10.4 LSUs/sq.km	
Rural Water Supply	Borehole 0.02 units/sq.km		1 167 persons/unit	
	Well - units/sq.km		- persons/unit	

Dam No. III-1-1
 Dam Name MAJIJIMBA
 Catchment Area 84.3 sq.km
 1/10 yr. Yield 16 Th.cu.m
 Water Conveyance
 Method Gravity
 Distance 1.0 km
 Gross Irrigable Area 1 ha

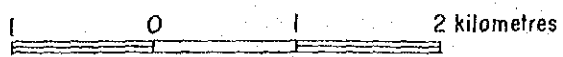
GENERAL PLAN



LEGEND

-  Catchment Area
-  Reservoir
-  Dam
-  Pump
-  Conveyance Canal or Pipe
-  Night Storage Reservoir
-  Irrigable Area

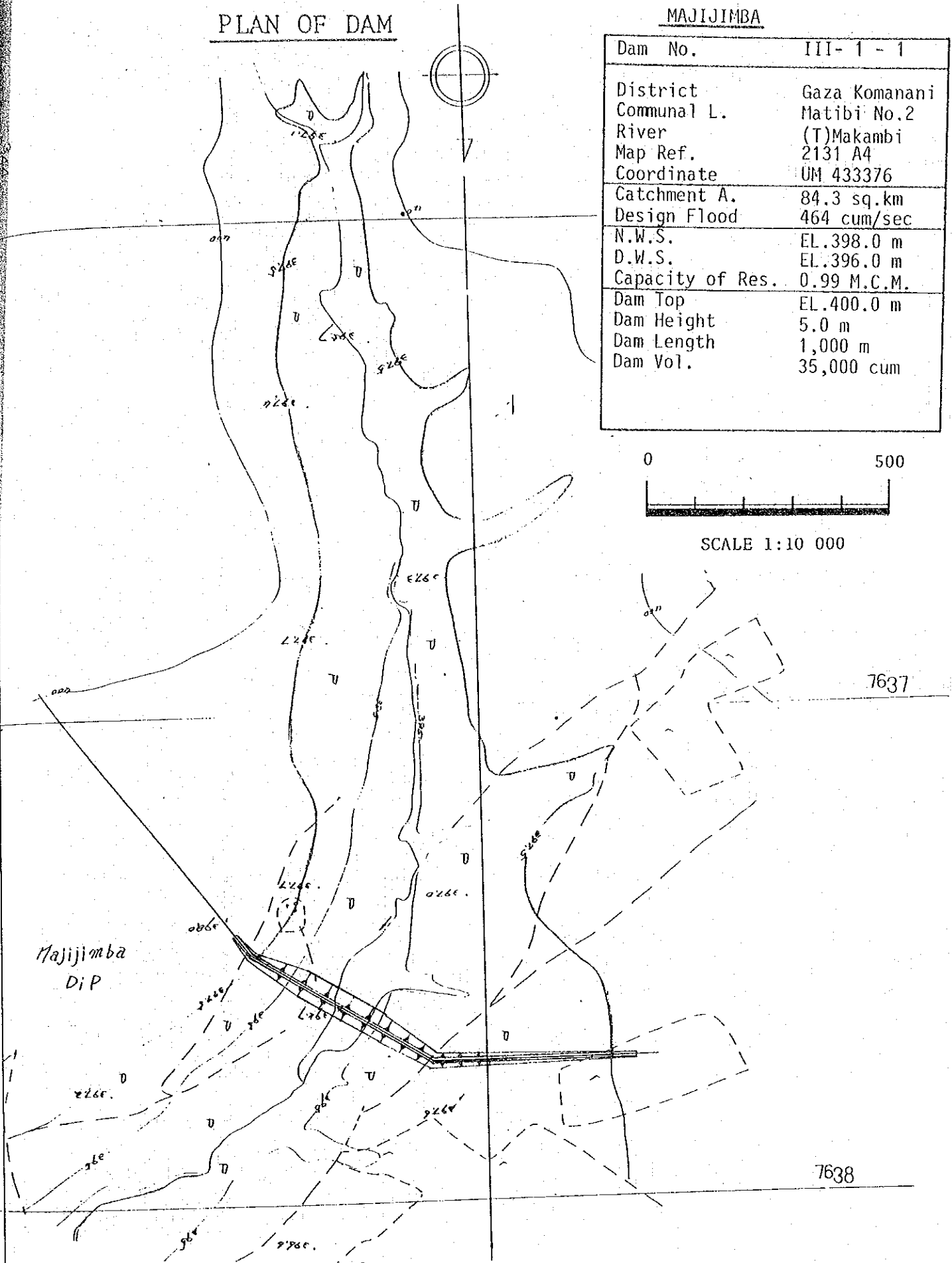
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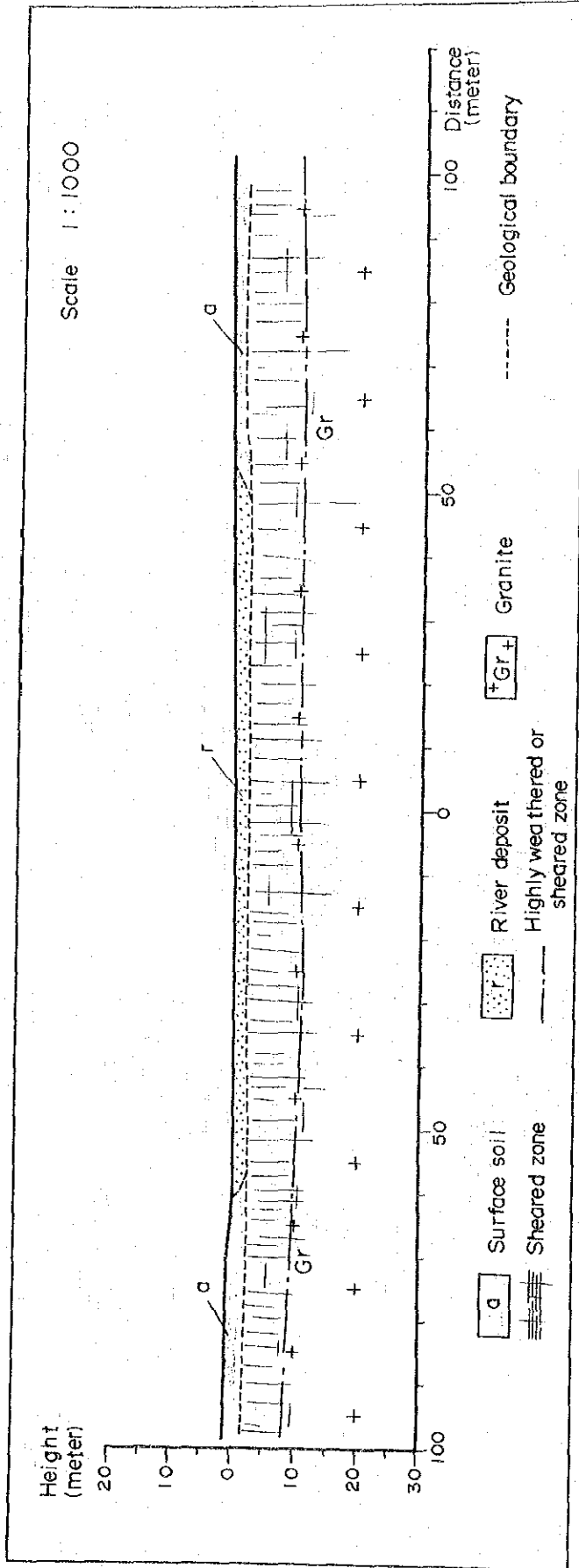
PLAN OF DAM

MAJIJIMBA

Dam No.	III- 1 - 1
District	Gaza Komanani
Communal L.	Matibi No.2
River	(T) Makambi
Map Ref.	2131 A4
Coordinate	UM 433376
Catchment A.	84.3 sq.km
Design Flood	464 cum/sec
N.W.S.	EL.398.0 m
D.W.S.	EL.396.0 m
Capacity of Res.	0.99 M.C.M.
Dam Top	EL.400.0 m
Dam Height	5.0 m
Dam Length	1,000 m
Dam Vol.	35,000 cum



III-1-1 Majijimba



The ground survey was not carried out in this area, therefore the geophysical survey were studied from existing data.

The area is very flat land and outcrops are very few. The Makambi River forms wide, very shallow valley and flows straight.

The bedrock consists of granite. Because the river is very shallow and outcrops are not found, it seems to be difficult to find a damsite in this area.

No. III-1-2

Name of Dam Chanyenga

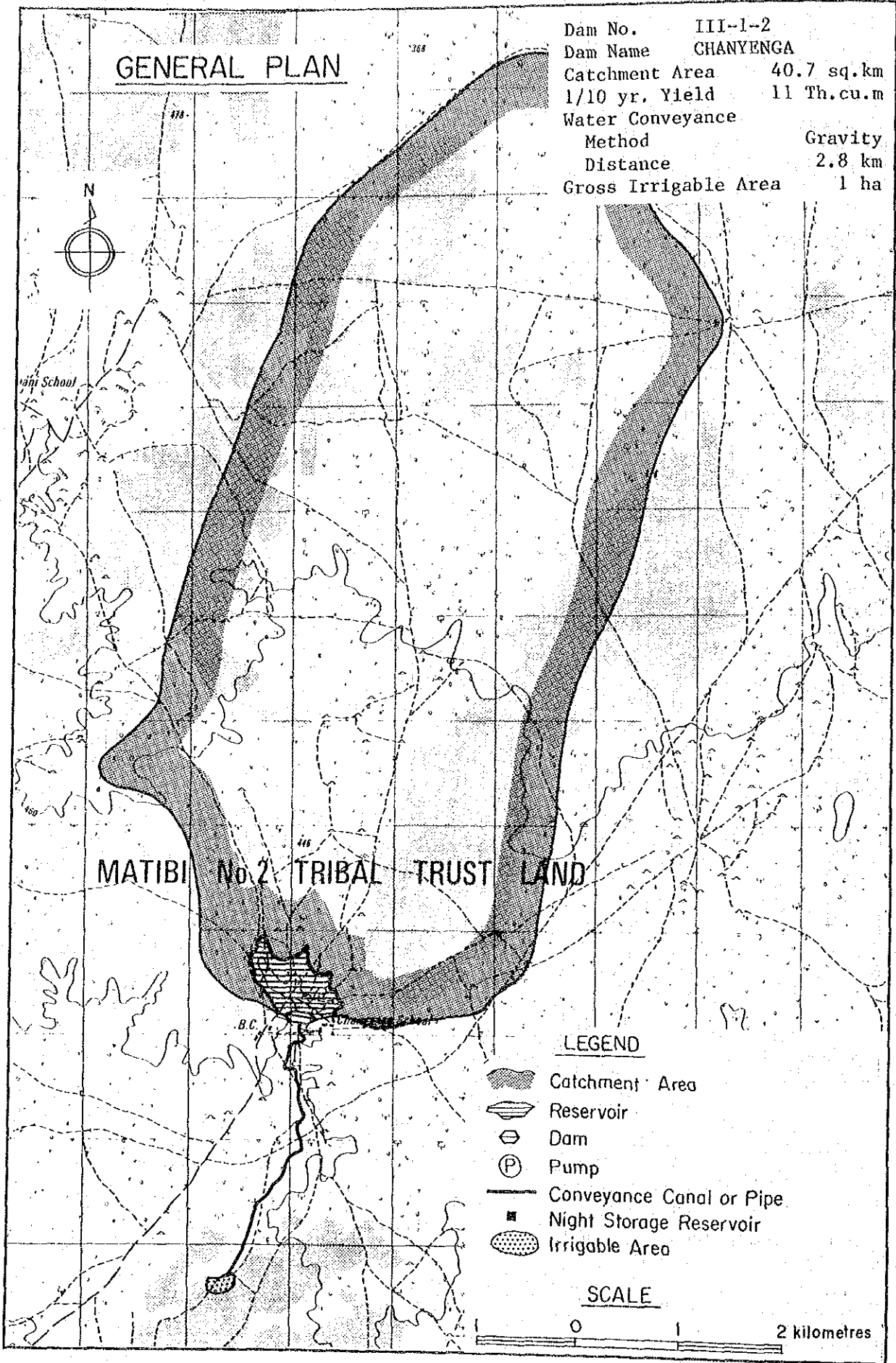
Location	District Gaza Komanani		Communal Land Matibi No.2		
	Map Ref. 2131C2		Coordinates UM241122		
Geology	Basalt, highly weathering and fracturing.				
Hydrology	River Chanyenga		Hydrological Zone B-N1		
	Catchment Area 40.7 sq.km		M.A. Rainfall 460 mm		
	M.A. Runoff 13 mm		Sediment 45 tonnes km ² /yr.		
Reservoir	Effective Capacity 0.590 MCM		1/10 Yr. Yield 0.011 MCM		
	Dead Capacity 0.010 MCM		D.W.S. 439 m		
	Total Capacity 0.060 MCM		N.W.S. 442 m		
Dam	Height 7 m		Length 700 m		
	Embankment Volume 26 000 cu.m		Spillway 166 m		
Agriculture	Natural Region V		Soil CL		
	Potential Irrigable Area			150 ha	
	Proposed Cropping Pattern C				
Irrigation	Net Irrigable Area 0.6 ha		Dist. 2.8 km by Gravity		
	Topography	Area	Flat		
		Conveyance	Slightly sloping		
Rural Water Supply	Population 1 980 person		40 cu.m/day		
	Livestock 575 unit		26 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class
	Z\$ 1 716 000		Z\$ 541 000	Z\$2 257 000	C
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	
	Z\$ 2 659 /year		Z\$ 31 000	-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	N	N
Remarks					

Present Condition on the Ward

Ward Name	8		Area 15 400 ha	
Demography	Population Density		39.6 persons/sq.km	
	Family Size		10.1 Persons/household	
Agriculture	Arable Area 5 000 ha		Grazing Area 10 400 ha	
	Maize 1.5 ha/household		7 bags/ha	
	Sorghum 3.1 ha/household		11 bags/ha	
	Livestock 2.9 LSUs/household		11.5 LSUs/sq.km	
Rural Water Supply	Borehole 0.03 units/sq.km		1 220 persons/unit	
	Well - units/sq.km		- persons/unit	








GENERAL PLAN

Dam No. III-1-2
 Dam Name CHANYENGA
 Catchment Area 40.7 sq.km
 1/10 yr. Yield 11 Th.cu.m
 Water Conveyance
 Method Gravity
 Distance 2.8 km
 Gross Irrigable Area 1 ha

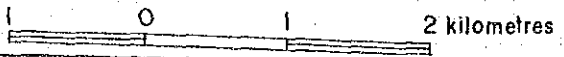


MATIBI No. 2 TRIBAL TRUST LAND

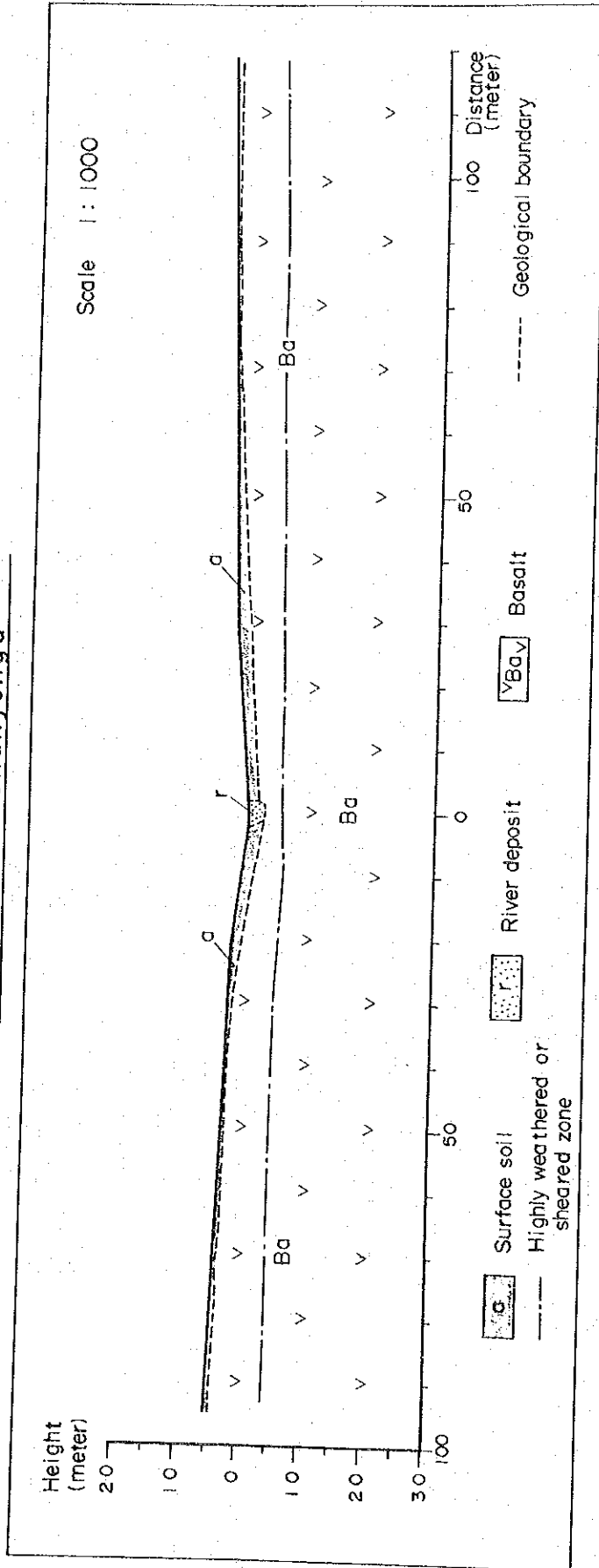
LEGEND

-  Catchment Area
-  Reservoir
-  Dam
-  Pump
-  Conveyance Canal or Pipe
-  Night Storage Reservoir
-  Irrigable Area

SCALE



III-1-2 Chanyenga



The Chanyenga River around the damsite forms a broad and very shallow valley. The bedrock consists of basalt. It is very soft and has been changed into boulders and patches by highly weathering. The depth of weathered layer is more than 5 meters. It seems that leakage through the bedrock is very large. The estimated thickness of unconsolidated deposits is maximum 3 meters at the riverbed and maximum 2 meters at the damsite.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HCR
III-1-2	2131C2	UM	241	122

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
437.0	0.0	0	0	0	0.00	
437.5	0.5	3090	1545	773	0.77	
440.0	2.5	50457	26774	66934	67.71	
442.5	2.5	169599	110028	275070	342.78	
445.0	2.5	374333	271966	679915	1022.69	

