

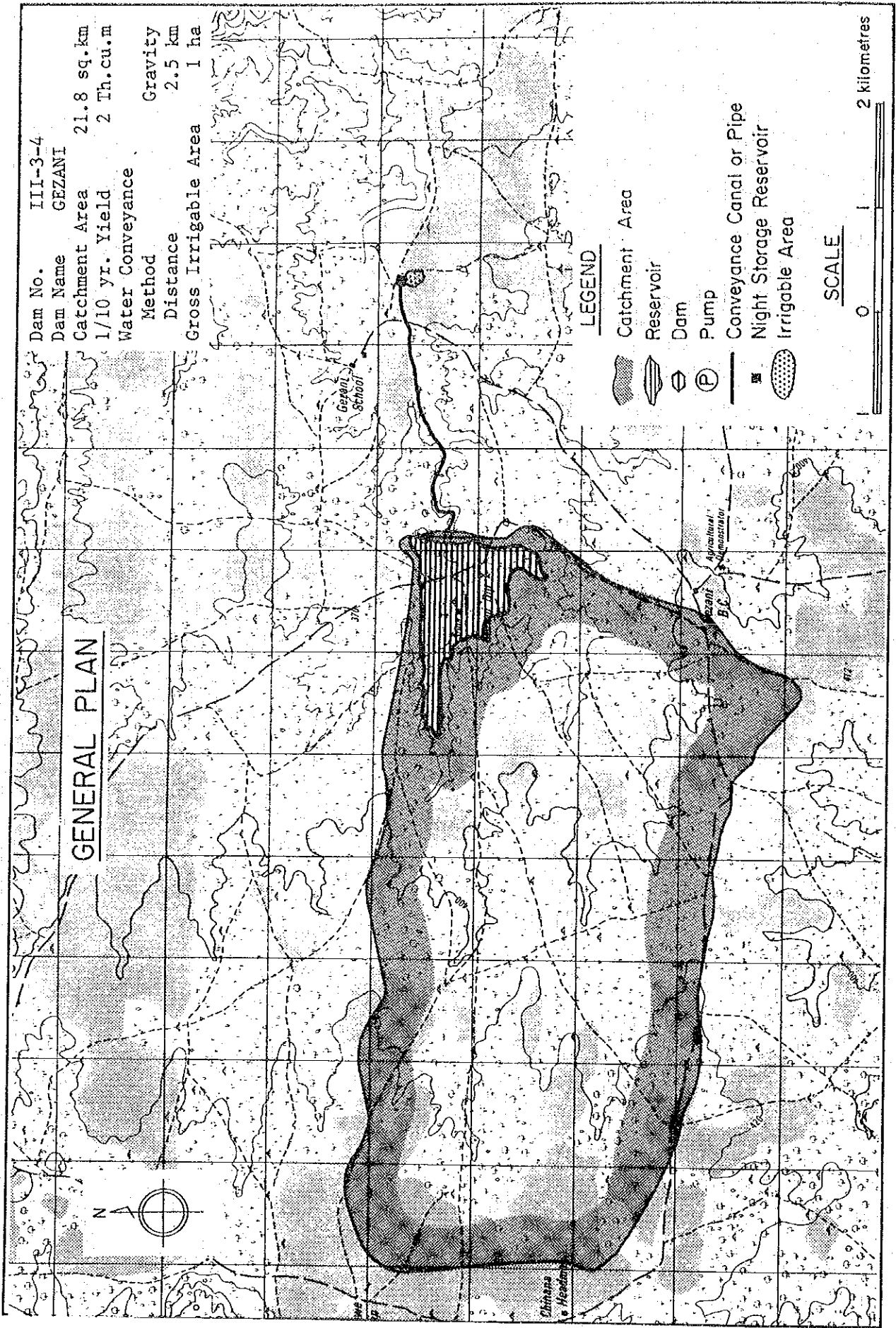
No. III-3-4

Name of Dam Gezani

Location	District	Gaza Komanani		Communal Land	Sengwe
	Map Ref.	2231A1		Coordinates	UL092573
Geology	Basalt, very flat terrain, highly weathered and very soft.				
Hydrology	River	(T) Malibangwe		Hydrological Zone	B-N1
	Catchment Area	21.8	sq.km	M.A. Rainfall	400 mm
	M.A. Runoff	8	mm	Sediment	45 tonnes km ² /yr.
Reservoir	Effective Capacity	1.020	MCM	1/10 Yr. Yield	0.002 MCM
	Dead Capacity	0.030	MCM	D.W.S.	363 m
	Total Capacity	1.050	MCM	N.W.S.	367 m
Dam	Height	9	m	Length	360 m
	Embankment Volume	32 000	cu.m	Spillway	112 m
Agriculture	Natural Region	V		Soil	CL-C
	Potential Irrigable Area				100 ha
	Proposed Cropping Pattern	D			
Irrigation	Net Irrigable Area	0.1 ha	Dist. 2.5 km by Gravity		
	Topography	Area	Flat		
		Conveyance	Slightly sloping, one river crossing		
Rural Water Supply	Population	395	person	8	cu.m/day
	Livestock	910	unit	41	cu.m/day
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z\$ 1 448 000	Z\$ 436 000		Z\$ 1 884 000	C
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	
	Z\$ 1 103 /year	Z\$ 13 000		-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	N	N
Remarks					

Present Condition on the Ward

Ward Name	1		Area	89 000 ha	
Demography	Population Density		7.9	persons/sq.km	
	Family Size		8.8	Persons/household	
Agriculture	Arable Area		9 000 ha	Grazing Area 80 000 ha	
	Maize	1.3	ha/household	7	bags/ha
	Sorghum	3.8	ha/household	11	bags/ha
	Livestock	3.7	LSUs/household	3.4	LSUs/sq.km
Rural Water Supply	Borehole	0.01	units/sq.km	875	persons/unit
	Well	-	units/sq.km	-	persons/unit



Dam No. III-3-4

Dam Name GEZANI

Catchment Area 21.8 sq. km

1/10 yr. Yield 2 Th. cu. m








Water Conveyance Method Gravity

Distance 2.5 km

Gross Irrigable Area 1 ha

GENERAL PLAN

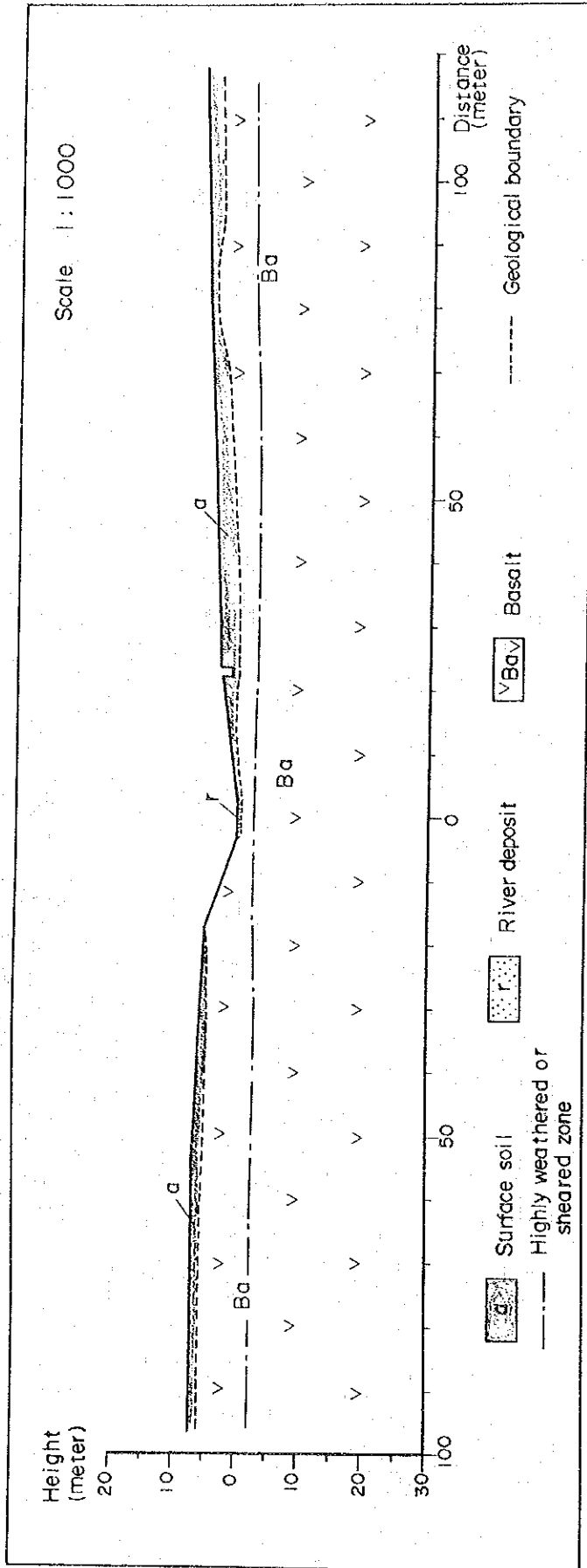
LEGEND

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

SCALE



III - 3 - 4 Gezani



The area is very flat land, and the river forms a narrow and shallow valley.

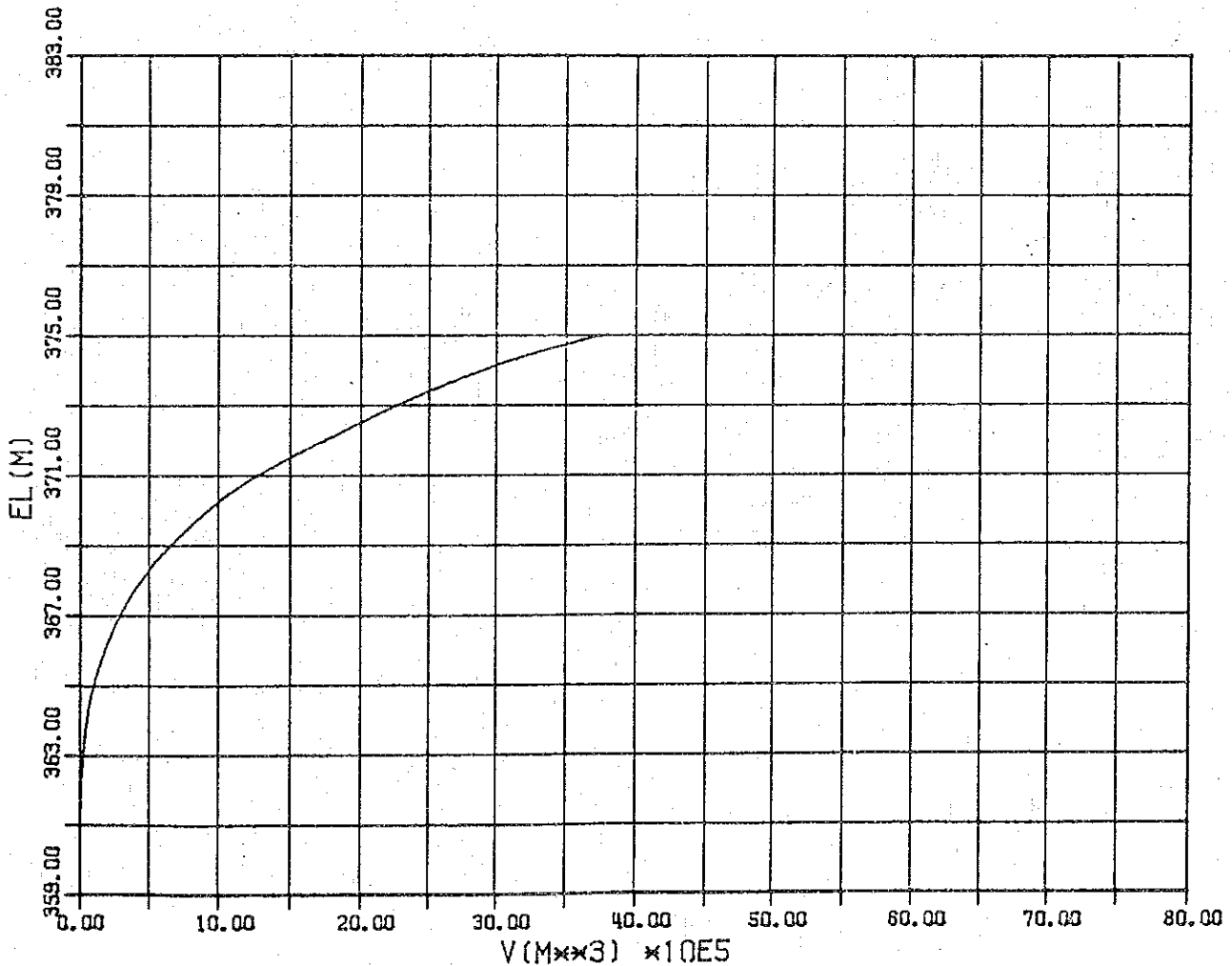
The bedrock consists of basalt, and it has been changed into boulders and soils by highly weathering. The weathering strata seems to be more than 5 meters. It seems that leakage through the bedrock is large and bearing strength in the foundation strata is small.

The estimated thickness of unconsolidated deposits is less than 1 meter at the riverbed and less than 3 meters at both banks.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HØR
III-3-4	2231A1	UL	092	573

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
359.8	0.0	0	0	0	0.00	
360.0	0.2	2000	1000	200	0.20	
362.5	2.5	10000	6000	15000	15.20	
365.0	2.5	56000	33000	82500	97.70	
367.5	2.5	151000	103500	258750	356.45	
370.0	2.5	303000	227000	567500	923.95	
372.5	2.5	550000	426500	106624	1990.20	
375.0	2.5	856000	703000	175749	3747.70	



No. III-3-5

Name of Dam Chomnanga

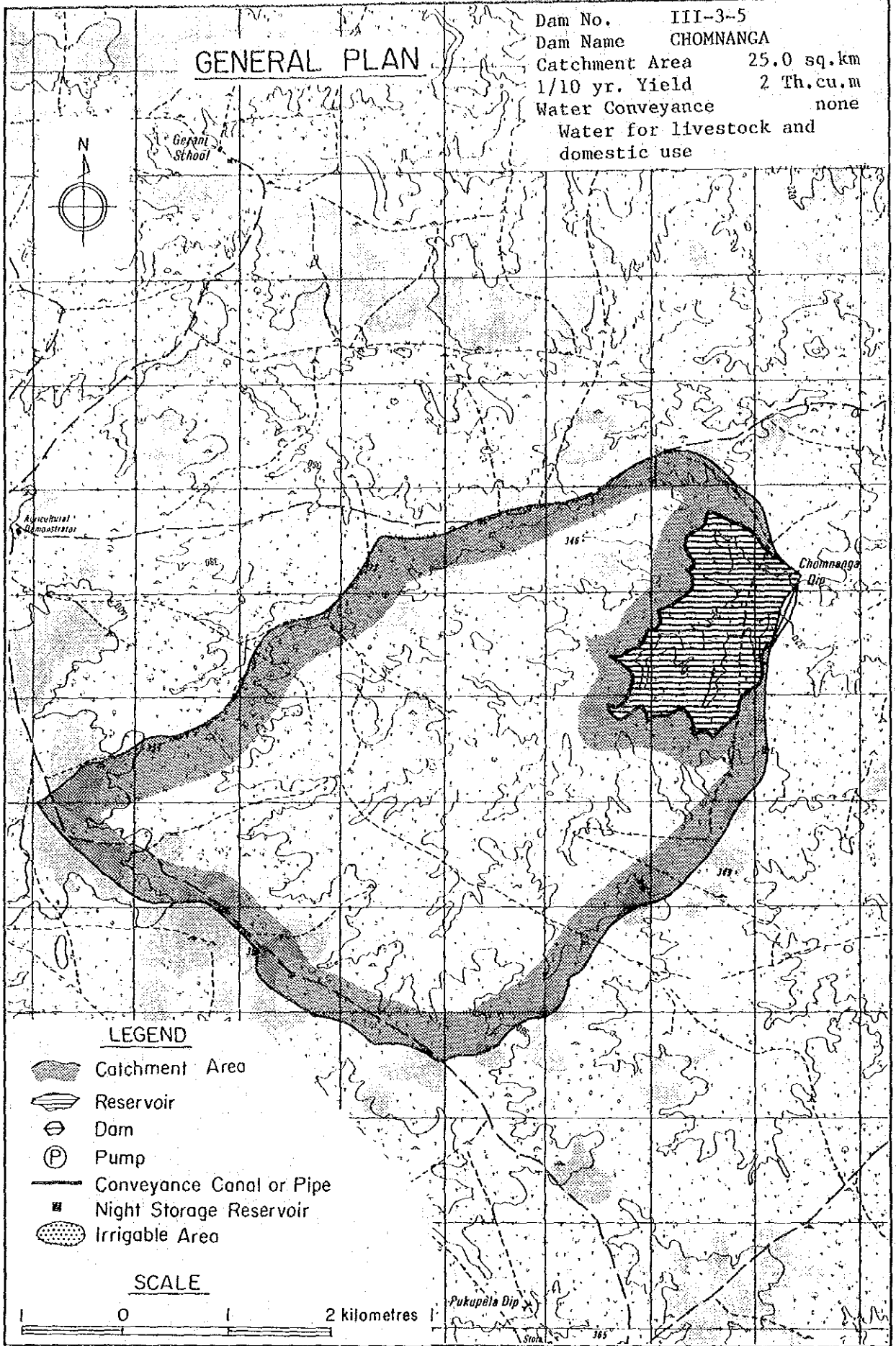
Location	District	Gaza Komanani		Communal Land	Sengwe	
	Map Ref.	2231A1		Coordinates	UL162540	
Geology	Basalt, it is very soft, highly weathering layer seems to be deep and leakage to be great.					
Hydrology	River	(T) Malibangwe		Hydrological Zone	B-N1	
	Catchment Area	25.0	sq.km	M.A. Rainfall	390 mm	
	M.A. Runoff	7	mm	Sediment	45 tonnes km ² /yr.	
Reservoir	Effective Capacity	2.180	MCM	1/10 Yr. Yield	0.002 MCM	
	Dead Capacity	0.020	MCM	D.W.S.	307 m	
	Total Capacity	2.200	MCM	N.W.S.	311.5 m	
Dam	Height	9.5	m	Length	330 m	
	Embankment Volume	38 000	cu.m	Spillway	121 m	
Agriculture	Natural Region	V		Soil	-	
	Potential Irrigable Area				- ha	
	Proposed Cropping Pattern				-	
Irrigation	Net Irrigable Area	-	ha	Dist.	- km by -	
	Topography	Area			-	
		Conveyance				-
Rural Water Supply	Population	810 person			16 cu.m/day	
	Livestock	960 unit			43 cu.m/day	
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class	
	Z\$ 1 836 000	-		Z\$ 1 836 000		
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	C	
	Z\$ 1 018 /year	Z\$ 12 000		-		
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist	
	Y	N	Y	N	N	
Remarks						

Present Condition on the Ward








Ward Name	2		Area	37 000 ha	
Demography	Population Density		16.2	persons/sq.km	
	Family Size		10.0	Persons/household	
Agriculture	Arable Area		4 000 ha	Grazing Area 33 000 ha	
	Maize	1.5	ha/household	7	bags/ha
	Sorghum	3.3	ha/household	11	bags/ha
	Livestock	5.9	LSUs/household	9.6	LSUs/sq.km
Rural Water Supply	Borehole	0.02	units/sq.km	1 000	persons/unit
	Well	-	units/sq.km	-	persons/unit

GENERAL PLAN

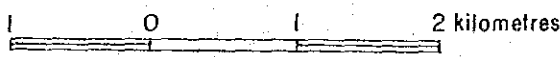
Dam No. III-3-5
 Dam Name CHOMNANGA
 Catchment Area 25.0 sq.km
 1/10 yr. Yield 2 Th.cu.m
 Water Conveyance none
 Water for livestock and domestic use



LEGEND

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

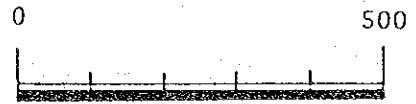
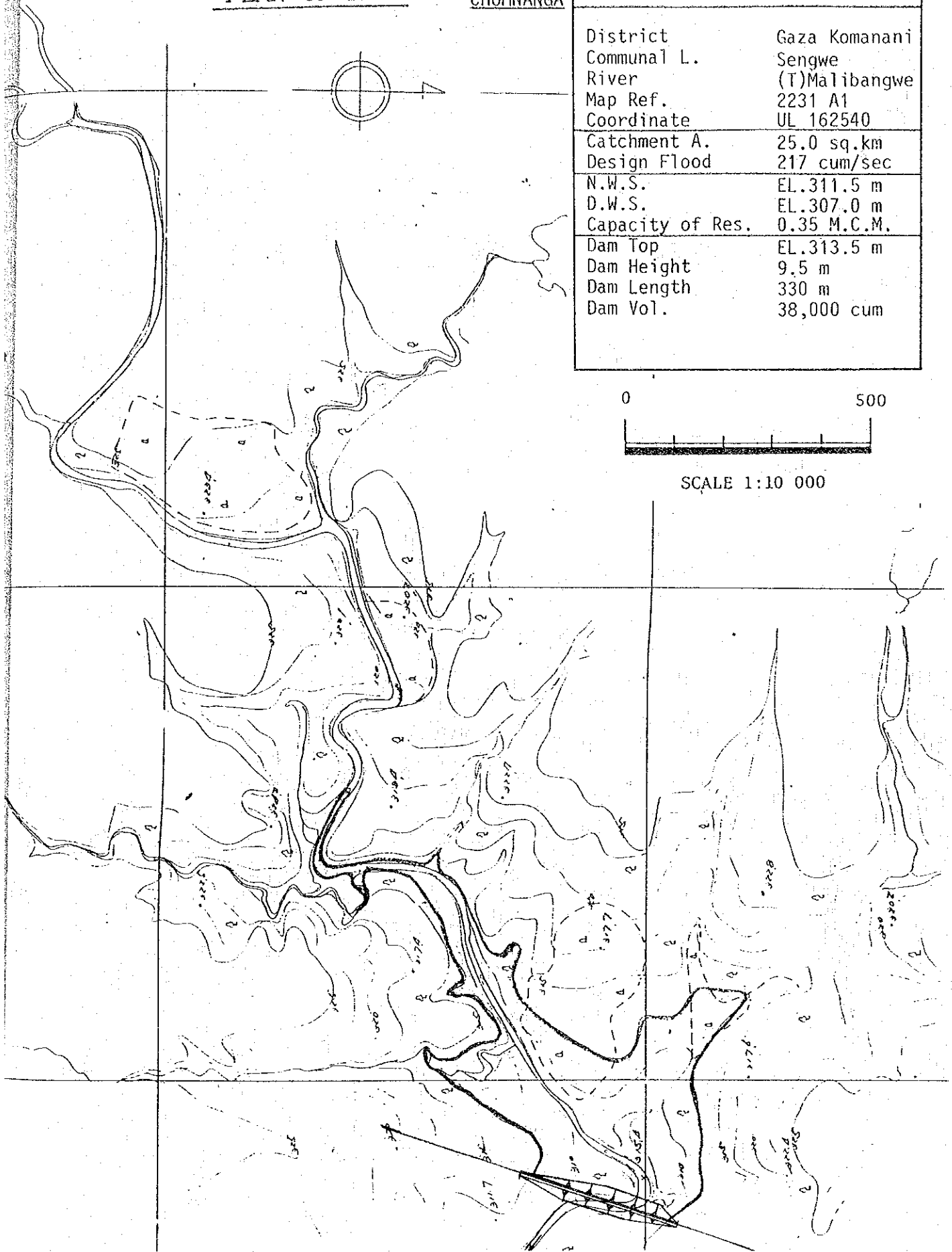
SCALE



PLAN OF DAM

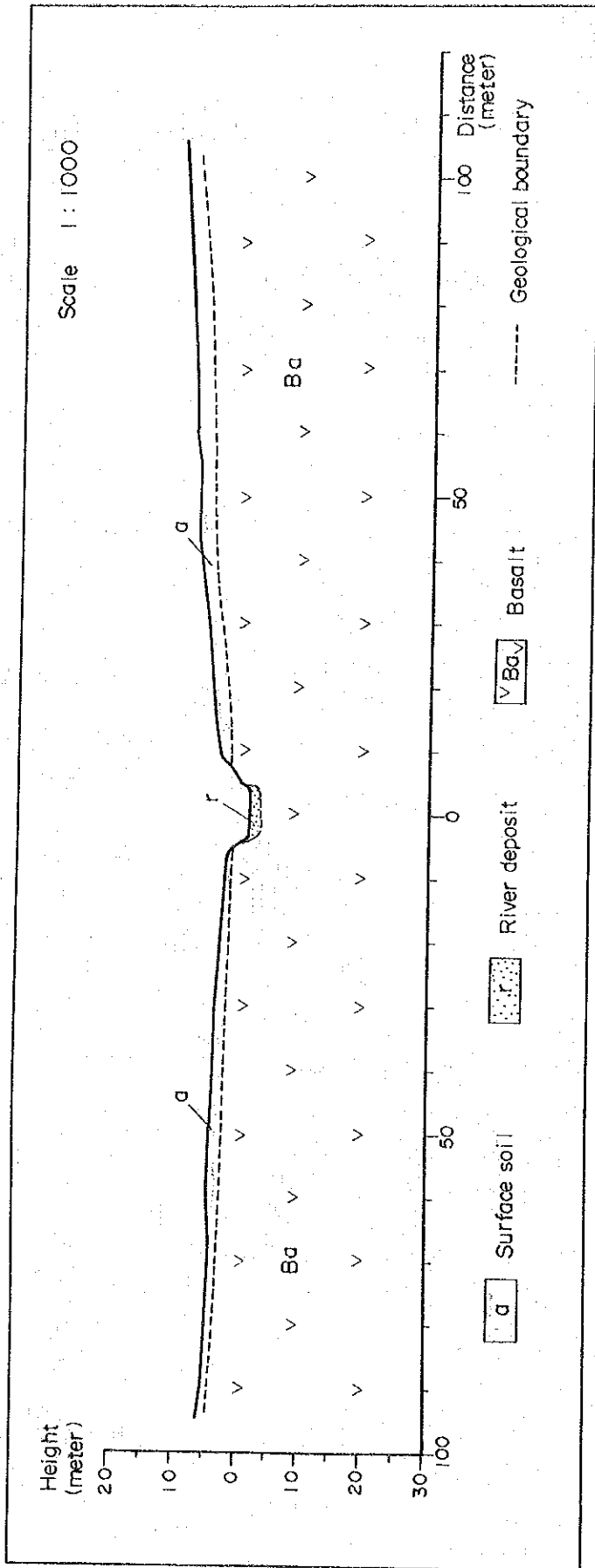
CHOMNANGA

Dam No.	III- 3 - 5
District	Gaza Komanani
Communal L.	Sengwe
River	(T)Malibangwe
Map Ref.	2231 A1
Coordinate	UL 162540
Catchment A.	25.0 sq.km
Design Flood	217 cum/sec
N.W.S.	EL.311.5 m
D.W.S.	EL.307.0 m
Capacity of Res.	0.35 M.C.M.
Dam Top	EL.313.5 m
Dam Height	9.5 m
Dam Length	330 m
Dam Vol.	38,000 cum



SCALE 1:10 000

III-3-5 Chomnanga

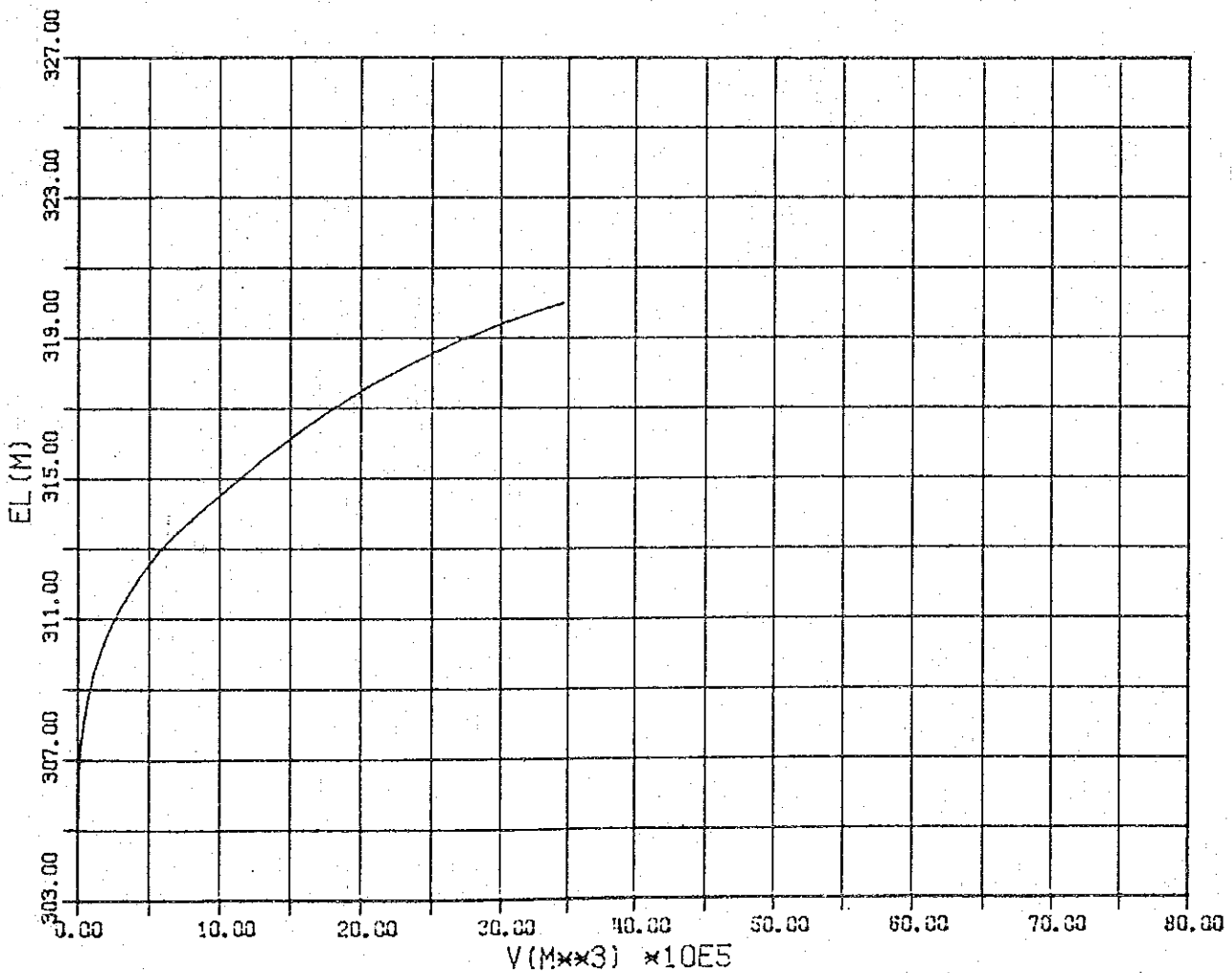


The area is undulated land, and the River forms relatively deep and broad valley. The bedrock consists of basalt, and it is very soft by highly weathering and has been changed into boulders. The estimated thickness of the weathered rock is more than 5 meters. It seems that the leakage through the bedrock is large and bearing strength in the foundation strata is small. The bedrock is less suitable for dam foundations from the geological point of view.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HØR
III-3-5	2231A1	UL	162	540

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VØL (M ³)	ΣV (1000M ³)	NOTE
303.5	0.0	0	0	0	0.00	
305.0	1.5	3000	1500	2250	2.25	
307.5	2.5	18000	10500	26250	28.50	
310.0	2.5	82000	50000	125000	153.50	
312.5	2.5	186000	134000	335000	488.50	
315.0	2.5	335000	260500	651250	1139.75	
317.5	2.5	354000	344500	861250	2001.00	
320.0	2.5	812000	583000	145749	3458.50	



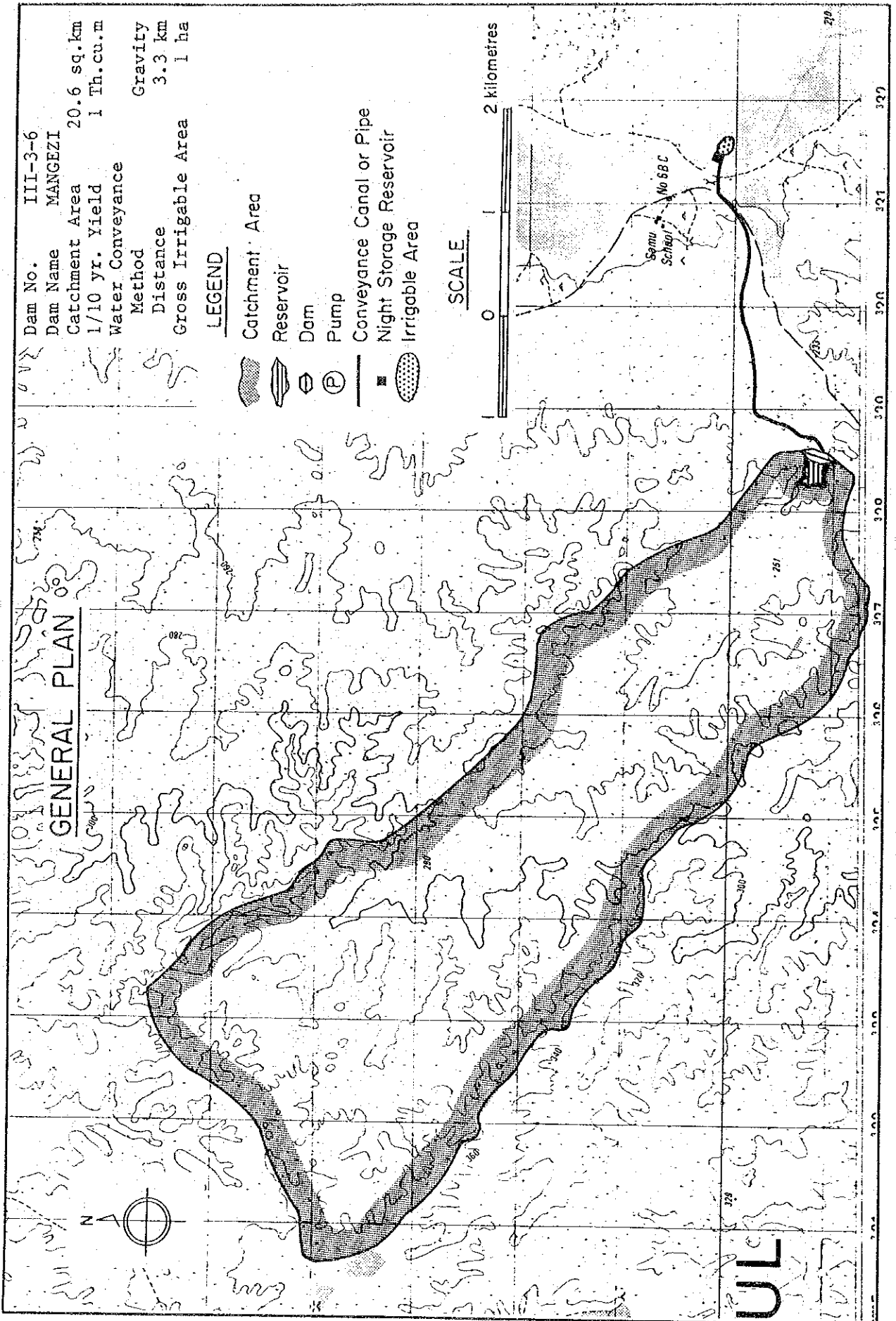
No. III-3-6

Name of Dam Mangezi

Location	District	Zaga Komanani		Communal Land	Sengwe
	Map Ref.	2231A2		Coordinates	UL286392
Geology	Sandstone, it is massive, very hard and poorly jointed.				
Hydrology	River	(T) Nuanetsi		Hydrological Zone	B-N1
	Catchment Area	20.6	sq.km	M.A. Rainfall	360 mm
	M.A. Runoff	5	mm	Sediment	45 tonnes km ² /yr.
Reservoir	Effective Capacity	1.760	MCM	1/10 Yr. Yield	0.001 MCM
	Dead Capacity	0.010	MCM	D.W.S.	233 m
	Total Capacity	1.770	MCM	N.W.S.	233.5 m
Dam	Height	6.5	m	Length	520 m
	Embankment Volume	46 000	cu.m	Spillway	108 m
Agriculture	Natural Region	V		Soil	SL
	Potential Irrigable Area	85 ha			
	Proposed Cropping Pattern	D			
Irrigation	Net Irrigable Area	0.1 ha	Dist. 3.3 km by Gravity		
	Topography	Area	Very flat		
		Conveyance	Slightly sloping		
Rural Water Supply	Population	880	person	18	cu.m/day
	Livestock	950	unit	43	cu.m/day
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z\$ 926 000	Z\$ 554 000		Z\$ 1 480 000	C
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	
	Z\$ 881 /year	Z\$ 10 000		--	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	N	N	Y	N	N
Remarks					

Present Condition on the Ward

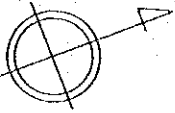
Ward Name	3		Area	34 000 ha	
Demography	Population Density		17.6	persons/sq.km	
	Family Size		10.0	Persons/household	
Agriculture	Arable Area		4 000 ha	Grazing Area 30 000 ha	
	Maize	1.5	ha/household	7	bags/ha
	Sorghum	3.3	ha/household	11	bags/ha
	Livestock	5.4	LSUs/household	9.5	LSUs/sq.km
Rural Water Supply	Borehole	0.02	units/sq.km	1 000	persons/unit
	Well	-	units/sq.km	-	persons/unit



MANGEZI

PLAN OF DAM

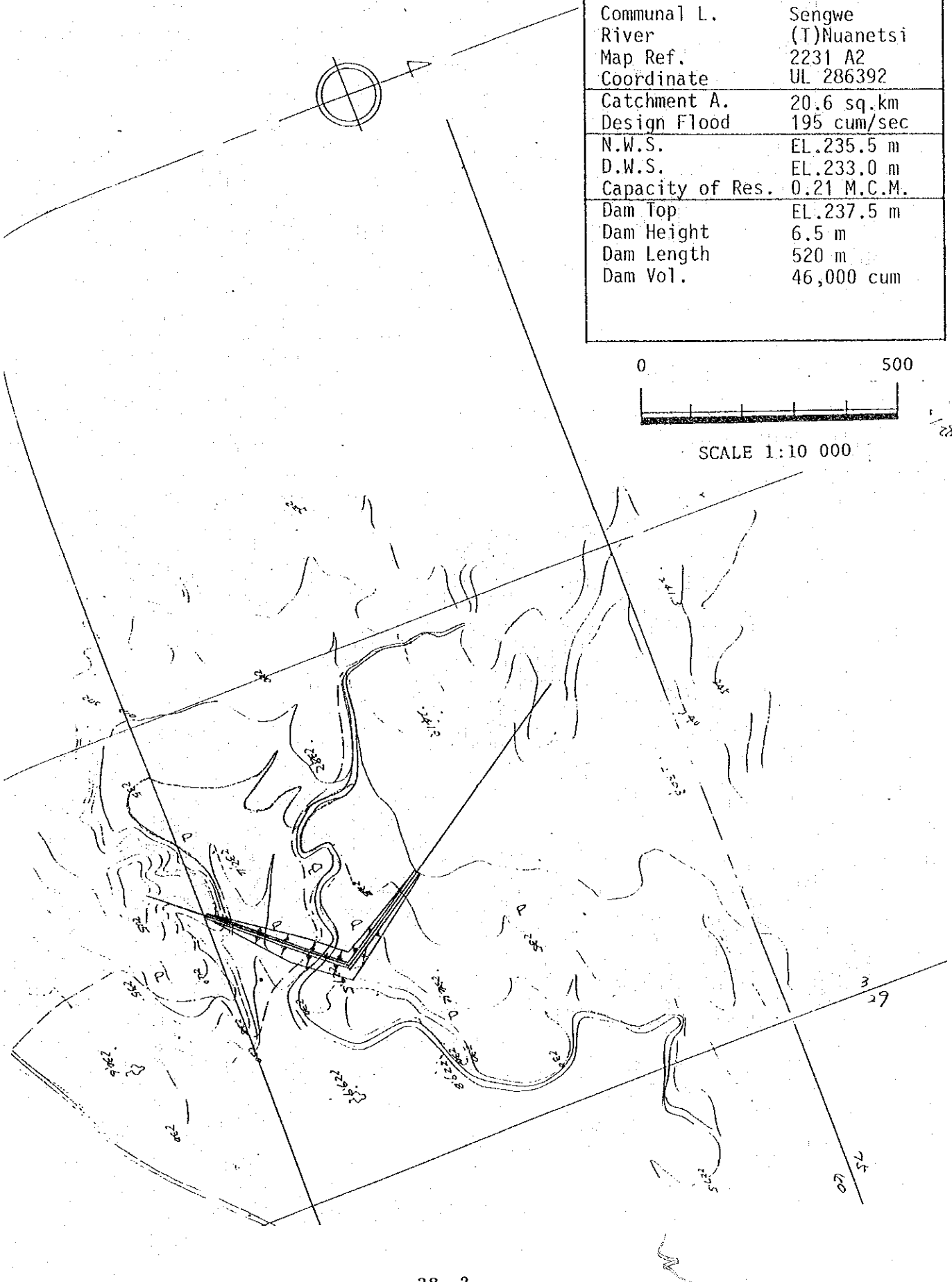
Dam No.	III- 3 - 6
District	Gaza Komanani
Communal L.	Sengwe
River	(T)Nuanetsi
Map Ref.	2231 A2
Coordinate	UL 286392
Catchment A.	20.6 sq.km
Design Flood	195 cum/sec
N.W.S.	EL.235.5 m
D.W.S.	EL.233.0 m
Capacity of Res.	0.21 M.C.M.
Dam Top	EL.237.5 m
Dam Height	6.5 m
Dam Length	520 m
Dam Vol.	46,000 cum



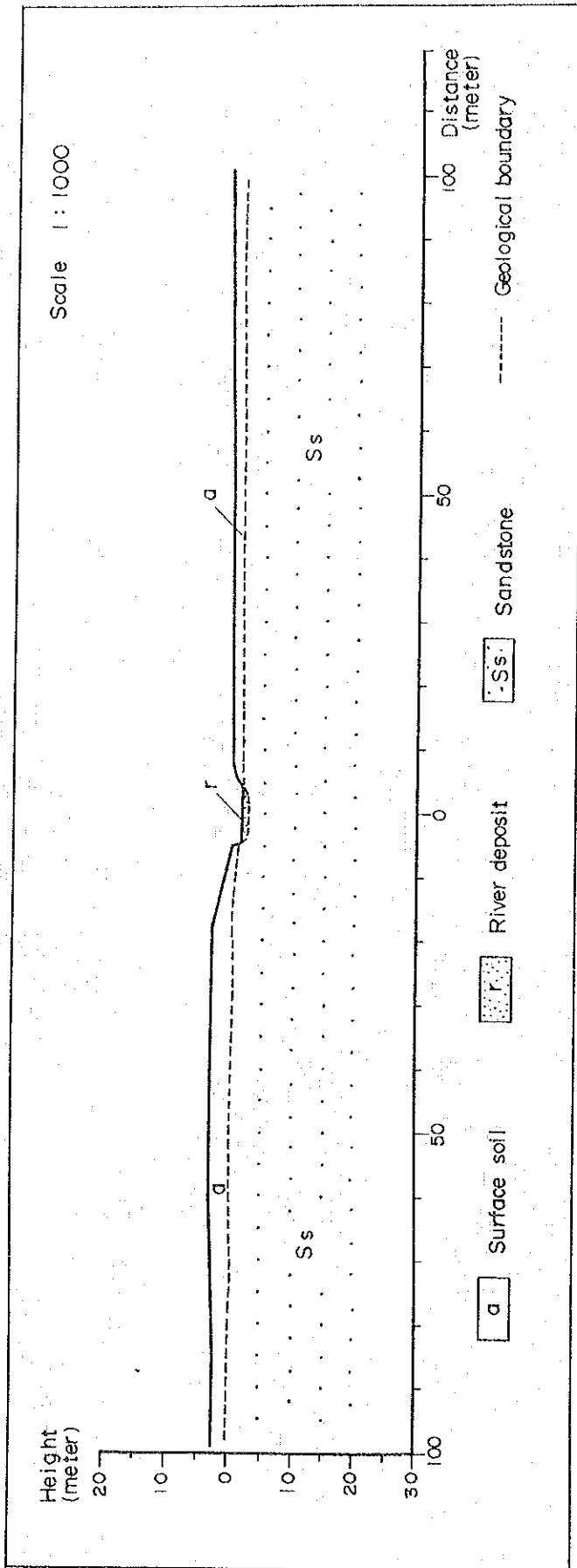
0 500



SCALE 1:10 000



III-3-6 Mangezi

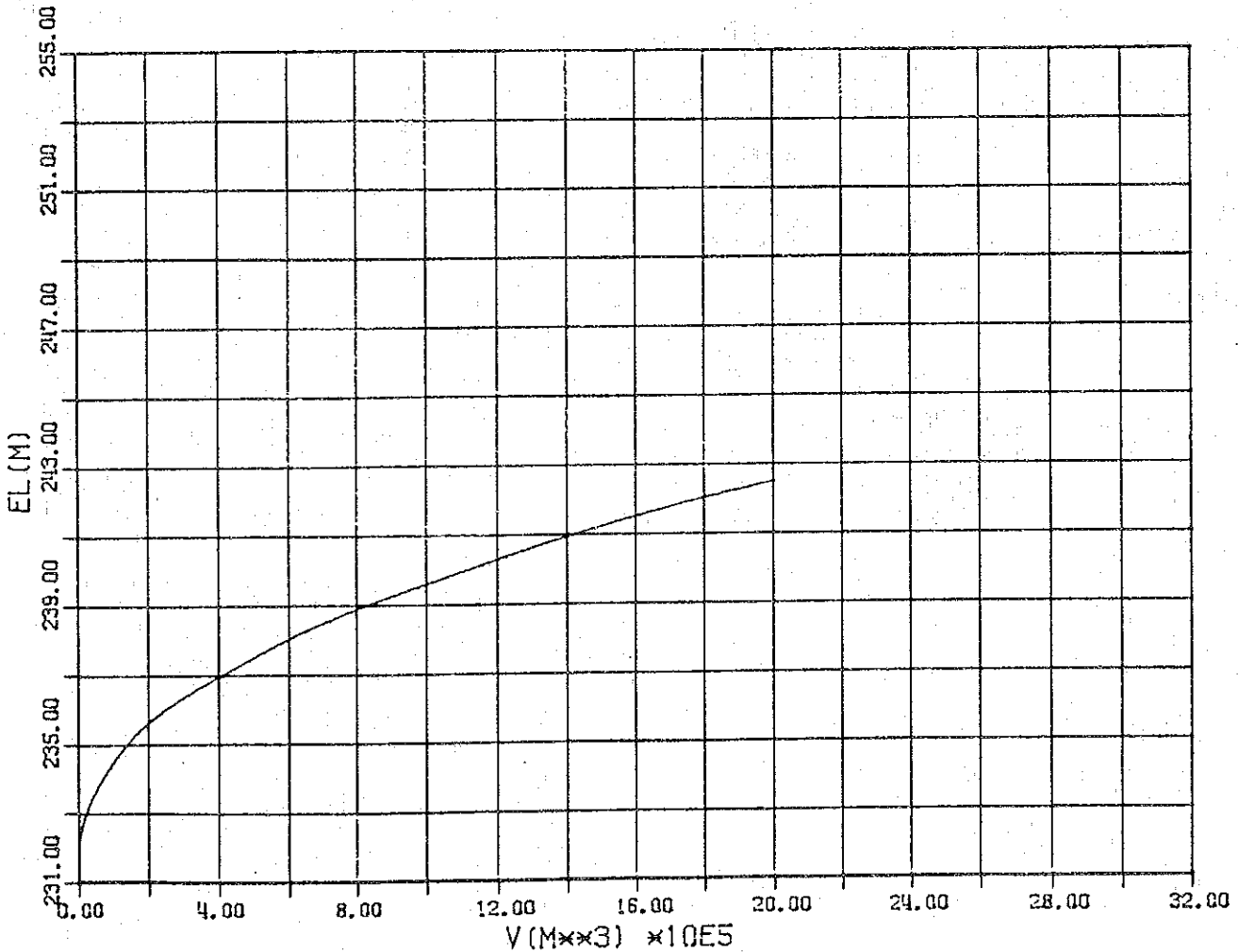


The ground survey was not carried out in this area, therefore the topographical and the geological conditions were studied from existing data. The area is hilly land, and the river system is complicated and variable by the effect of the geological structure. The river forms relatively deep and narrow valley. The bedrock consists of sandstone or conglomerate, and it seems to be massive, very hard and poorly jointed. The bedrock is suitable for the dam foundation from the geological point of view.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
III-3-6	2231A2	UL	286	392

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
231.0	0.0	0	0	0	0.00	
232.5	1.5	11900	5950	8925	8.92	
235.0	2.5	92900	52400	131000	139.92	
237.5	2.5	193600	143250	358125	498.05	
240.0	2.5	298700	246150	615375	1113.42	
242.5	2.5	413000	355850	889625	2003.05	



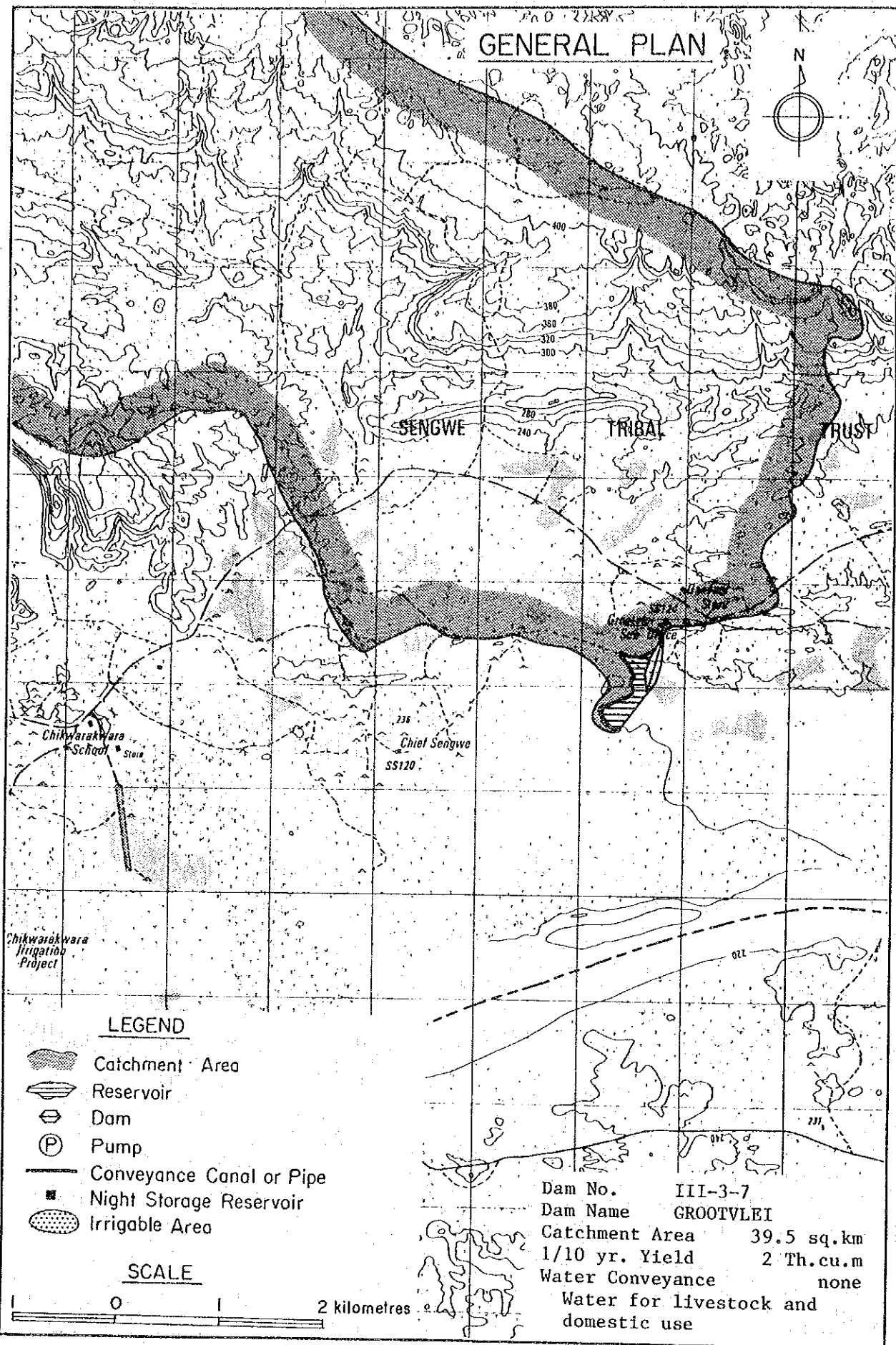
No. III-3-7

Name of Dam Grootvlei

Location	District	Gaza Komanani		Communal Land	Sengwe
	Map Ref.	2231A3		Coordinates	UL086321
Geology	Basalt, it seems to be soft, the surface soil and the sedimentation in the river is very deep.				
Hydrology	River	Doni		Hydrological Zone	B-B1
	Catchment Area	39.5	sq.km	M.A. Rainfall	350 mm
	M.A. Runoff	5	mm	Sediment	45 tonnes km ² /yr.
Reservoir	Effective Capacity	1.240	MCM	1/10 Yr. Yield	0.002 MCM
	Dead Capacity	0.010	MCM	D.W.S.	218 m
	Total Capacity	1.250	MCM	N.W.S.	220 m
Dam	Height	5	m	Length	1 000 m
	Embankment Volume	60 000	cu.m	Spillway	163 m
Agriculture	Natural Region	V		Soil	-
	Potential Irrigable Area	- ha			
	Proposed Cropping Pattern	-			
Irrigation	Net Irrigable Area	-	ha	Dist.	- km by -
	Topography	Area	-		
		Conveyance	-		
Rural Water Supply	Population	340	person		7 cu.m/day
	Livestock	900	unit		41 cu.m/day
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z\$ 1 142 000	-		Z\$ 1 142 000	C
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	
	Z\$ 1 154 /year	Z\$ 13 000		-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	N	N	Y	N	N
Remarks					

Present Condition on the Ward

Ward Name	4		Area	88 179 ha
Demography	Population Density		6.8	persons/sq.km
	Family Size		8.6	Persons/household
Agriculture	Arable Area	9 000 ha	Grazing Area	79 179 ha
	Maize	1.4	ha/household	7 bags/ha
	Sorghum	5.4	ha/household	11 bags/ha
	Livestock	4.4	LSUs/household	3.5 LSUs/sq.km
Rural Water Supply	Borehole	0.01	units/sq.km	857 persons/unit
	Well	-	units/sq.km	- persons/unit



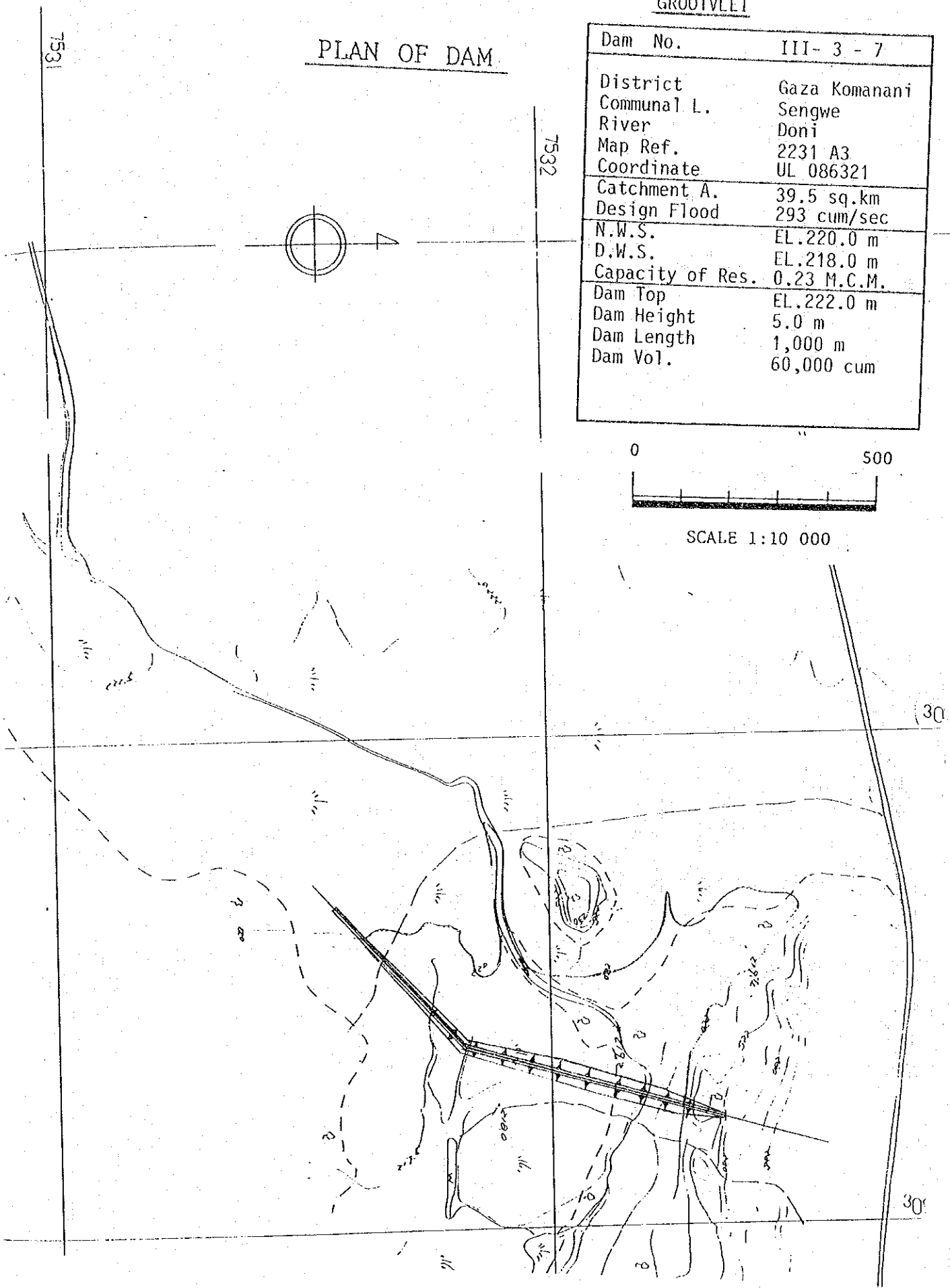
GROOTVLEI

PLAN OF DAM

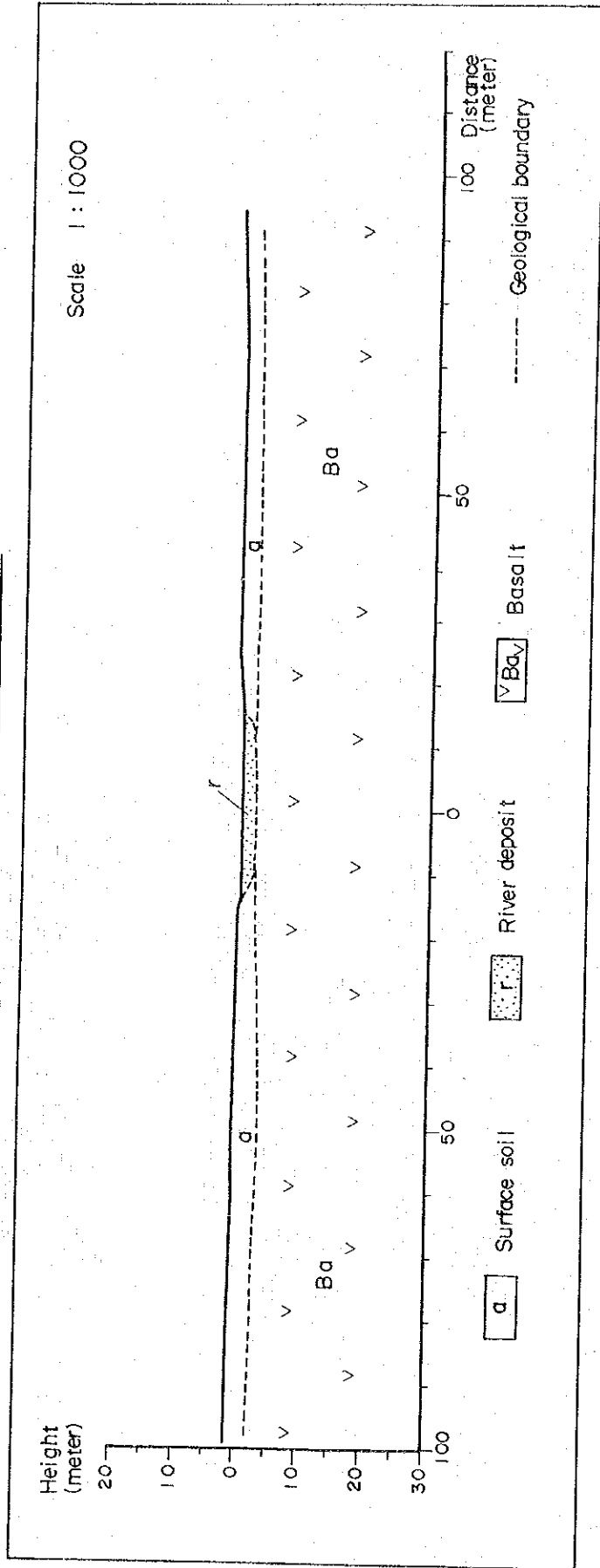
Dam No.	III- 3 - 7
District	Gaza Komanani
Communal L.	Sengwe
River	Doni
Map Ref.	2231 A3
Coordinate	UL 086321
Catchment A.	39.5 sq.km
Design Flood	293 cum/sec
N.W.S.	EL.220.0 m
D.W.S.	EL.218.0 m
Capacity of Res.	0.23 M.C.M.
Dam Top	EL.222.0 m
Dam Height	5.0 m
Dam Length	1,000 m
Dam Vol.	60,000 cum



SCALE 1:10 000



III-3-7 Grootvlei



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

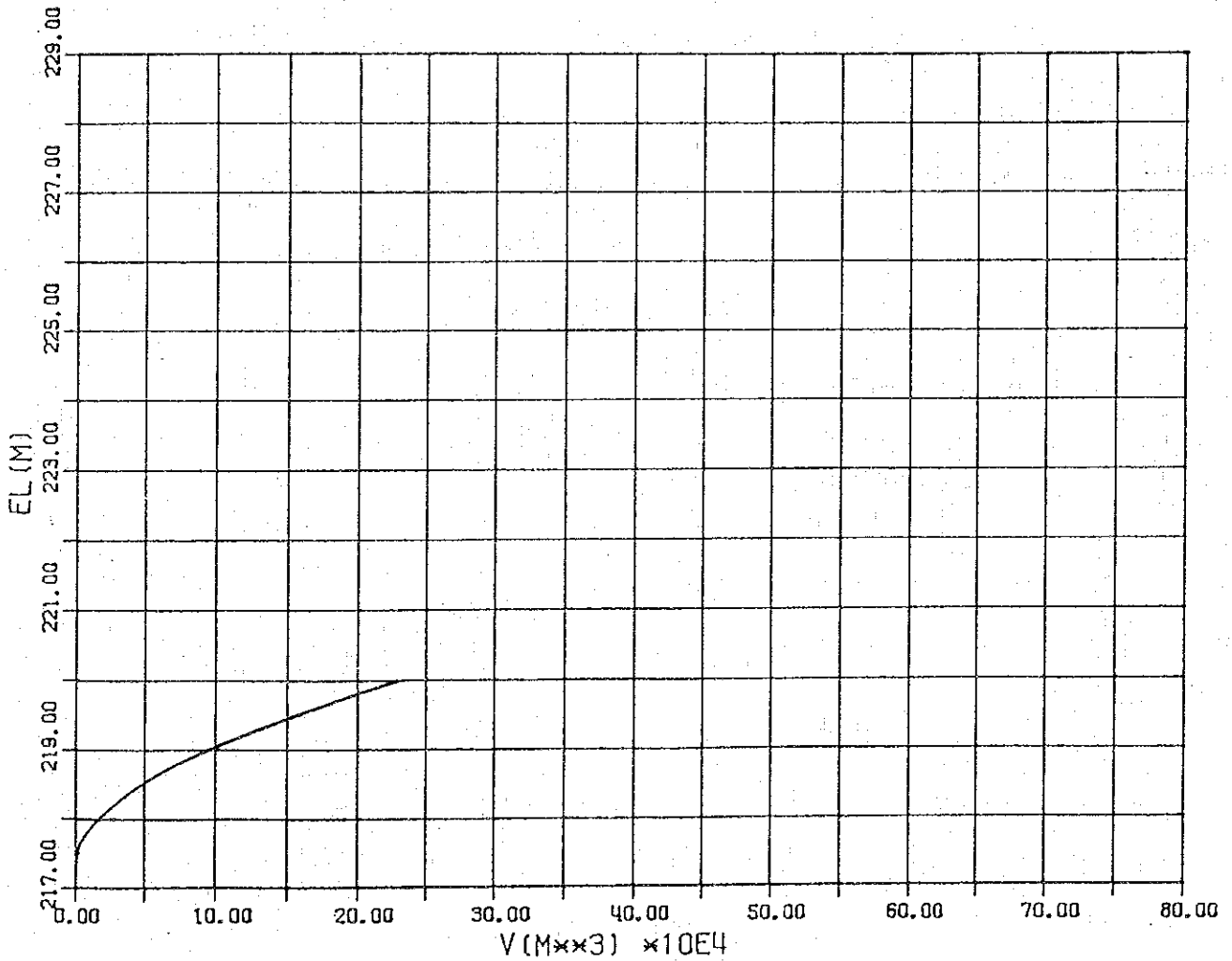
The area is flat land, and the Dove River forms shallow valley and very wide flood plain. Outcrops around the damsite is very few.

The bedrock consists of basalt, and the river is depositing very deep sedimentation. It seems to be difficult to find a damsite in this area.

TABLE STORAGE VOLUME OF RESERVOIR

NØ	MAP	GRID	VER	HØR
III-3-7	2231A3	UL	086	321

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NØTE
217.0	0.0	0	0	0	0.00	
217.5	0.5	5000	2500	1250	1.25	
220.0	2.5	175500	90250	225625	226.87	



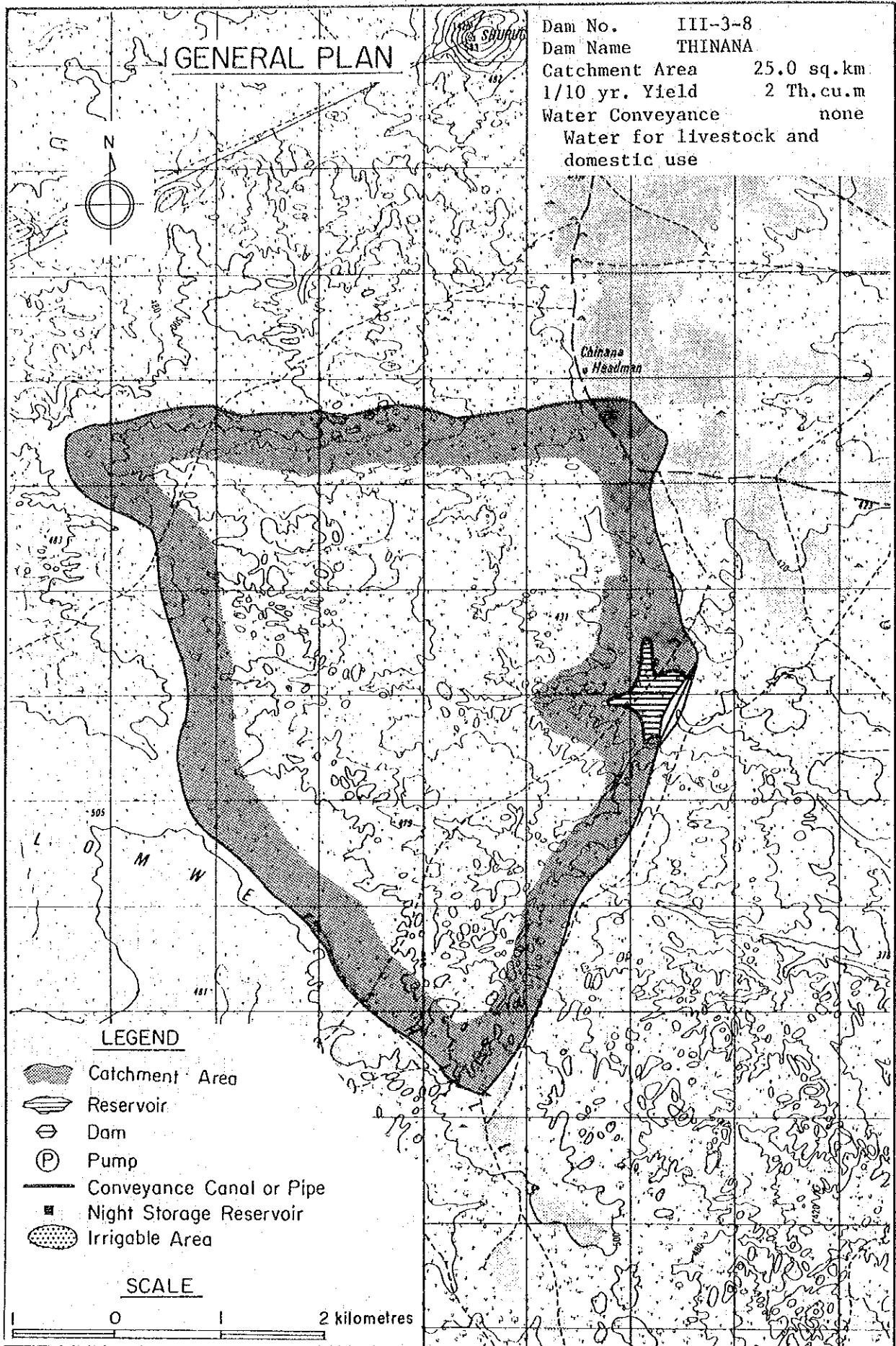
No. III-3-8

Name of Dam Thinana

Location	District	Gaza Komanani		Communal Land	Sengwe
	Map Ref.	2231A1		Coordinates	UL023528
Geology	Conglomerate, flat terrain, massive and hard.				
Hydrology	River	Pesu		Hydrological Zone	B-L3
	Catchment Area	25.0	sq.km	M.A. Rainfall	400 mm
	M.A. Runoff	8	mm	Sediment	45 tonnes km ² /yr.
Reservoir	Effective Capacity	1.400	MCM	1/10 Yr. Yield	0.002 MCM
	Dead Capacity	0.030	MCM	D.W.S.	406 m
	Total Capacity	1.430	MCM	N.W.S.	411 m
Dam	Height	9	m	Length	580 m
	Embankment Volume	44 000	cu.m	Spillway	121 m
Agriculture	Natural Region	V		Soil	-
	Potential Irrigable Area	- ha			
	Proposed Cropping Pattern	-			
Irrigation	Net Irrigable Area	- ha	Dist.	- km by -	
	Topography	Area	-		
		Conveyance	-		
Rural Water Supply	Population	340	person	7	cu.m/day
	Livestock	900	unit	41	cu.m/day
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z\$ 531 000	-		Z\$ 531 000	C
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	
	Z\$ 1 055 /year	Z\$ 12 000		-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks					

Present Condition on the Ward

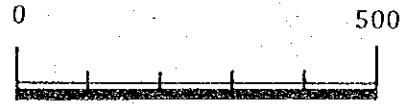
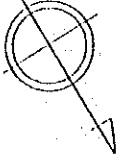
Ward Name	4		Area	88 179	ha
Demography	Population Density		6.8	persons/sq.km	
	Family Size		8.6	Persons/household	
Agriculture	Arable Area		9 000	ha	
	Grazing Area		79 179	ha	
	Maize	1.4	ha/household		7
	Sorghum	5.4	ha/household		11
Rural Water Supply	Livestock	4.4	LSUs/household		3.5
	Borehole	0.01	units/sq.km		857
	Well	-	units/sq.km		-



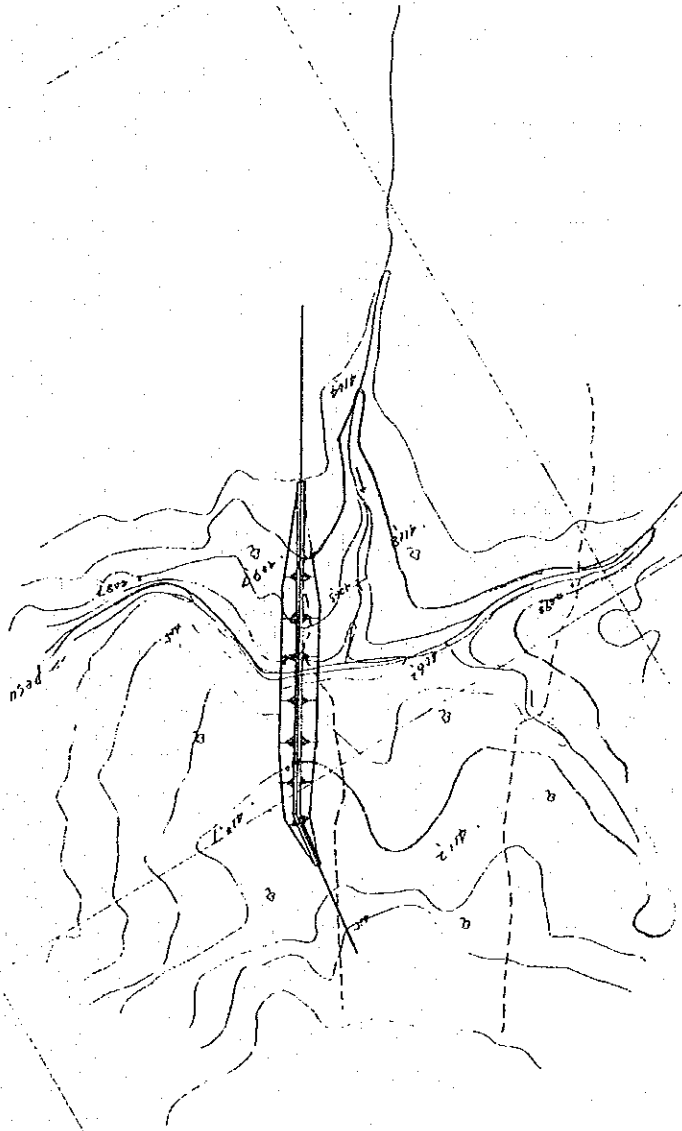
THINANA

PLAN OF DAM

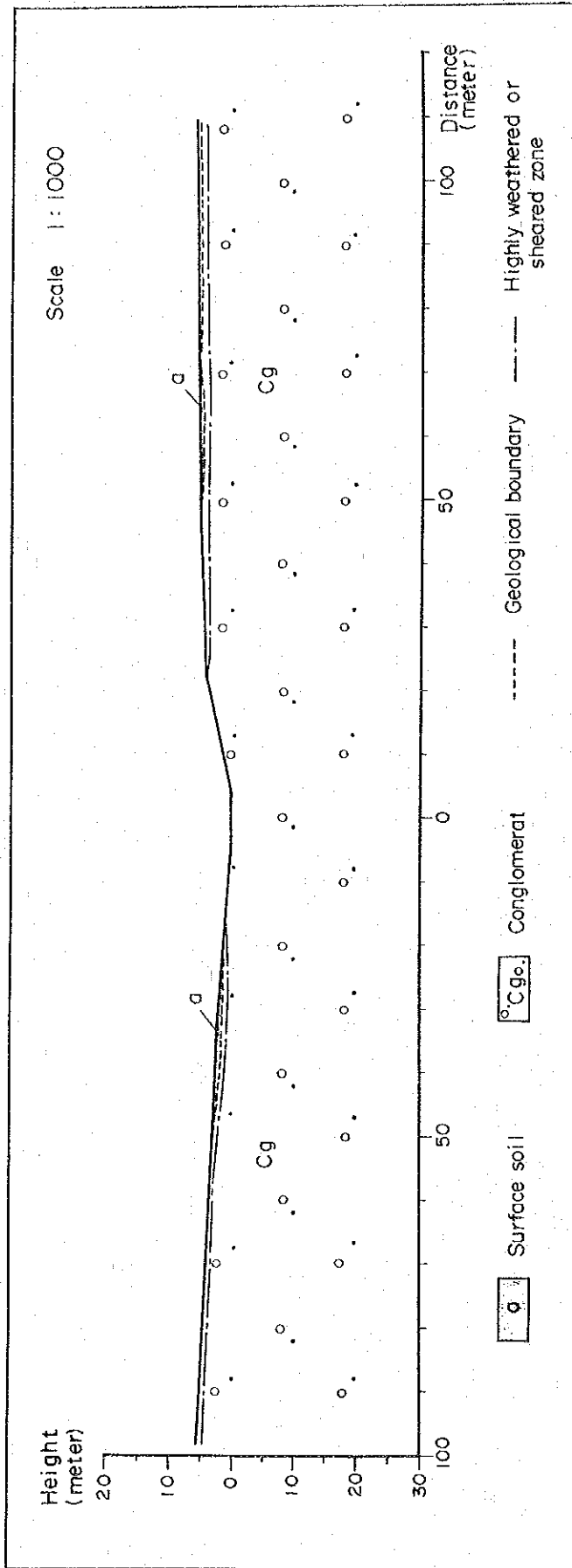
Dam No.	III- 3 - 8
District	Gaza Komanani
Communal L.	Sengwe
River	Pesu
Map Ref.	2231 A1
Coordinate	UL 023528
Catchment A.	25.0 sq.km
Design Flood	217 cum/sec
N.W.S.	EL.411.0 m
D.W.S.	EL.406.0 m
Capacity of Res.	0.40 M.C.M.
Dam Top	EL.413.0 m
Dam Height	9.0 m
Dam Length	580 m
Dam Vol.	44,000 cum



SCALE 1:10 000



III - 3 - 8 Thinana



The area is very flat land, and the river forms a narrow and shallow valley.

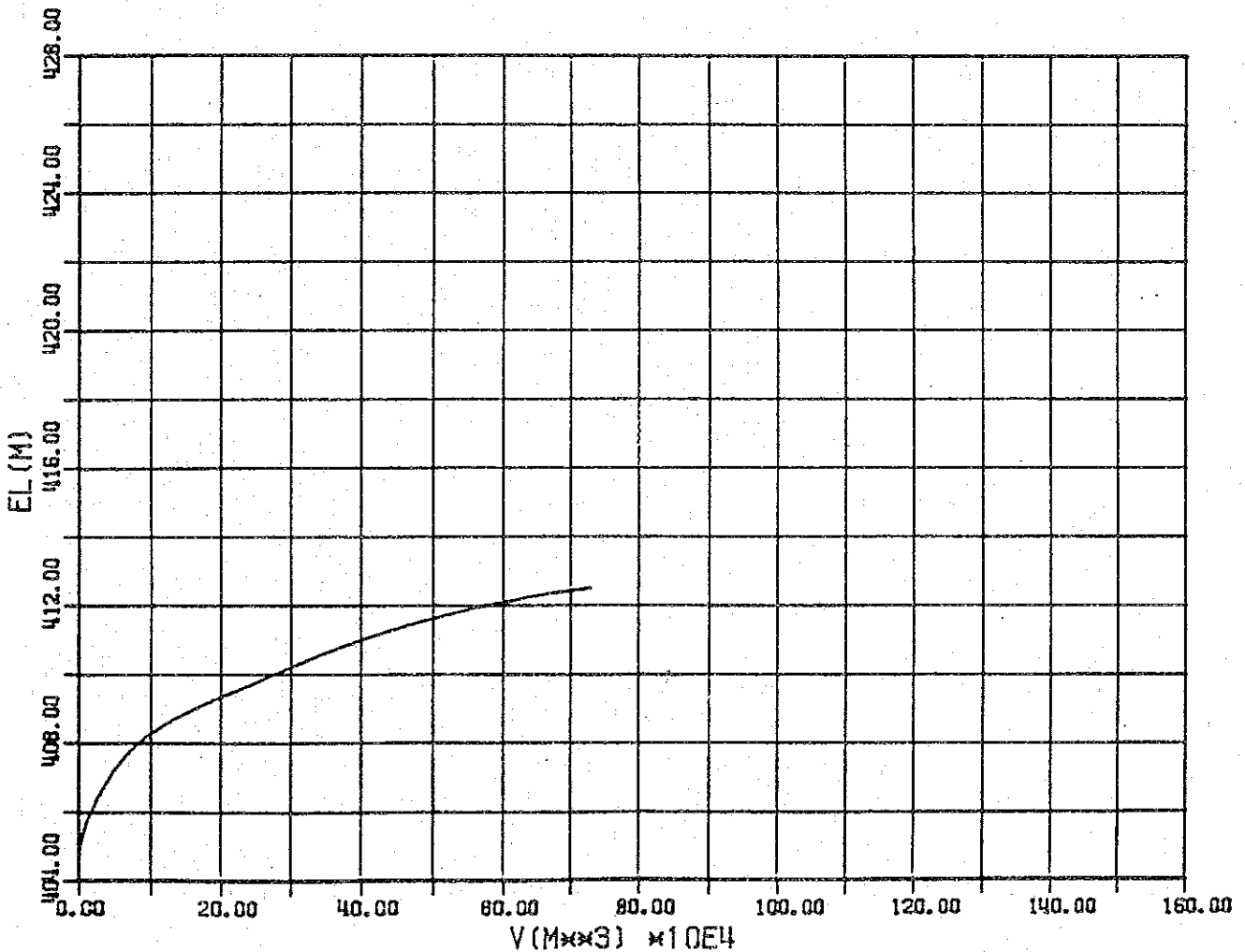
The bedrock consists of conglomerate, and it is very coarse, massive and hard, and it contains gravels maximum 50 centimeters in diameter. Leakage through the bedrock is small and bearing strength in the foundation strata is large. The estimated thickness of unconsolidated deposits is less than 1 meter.

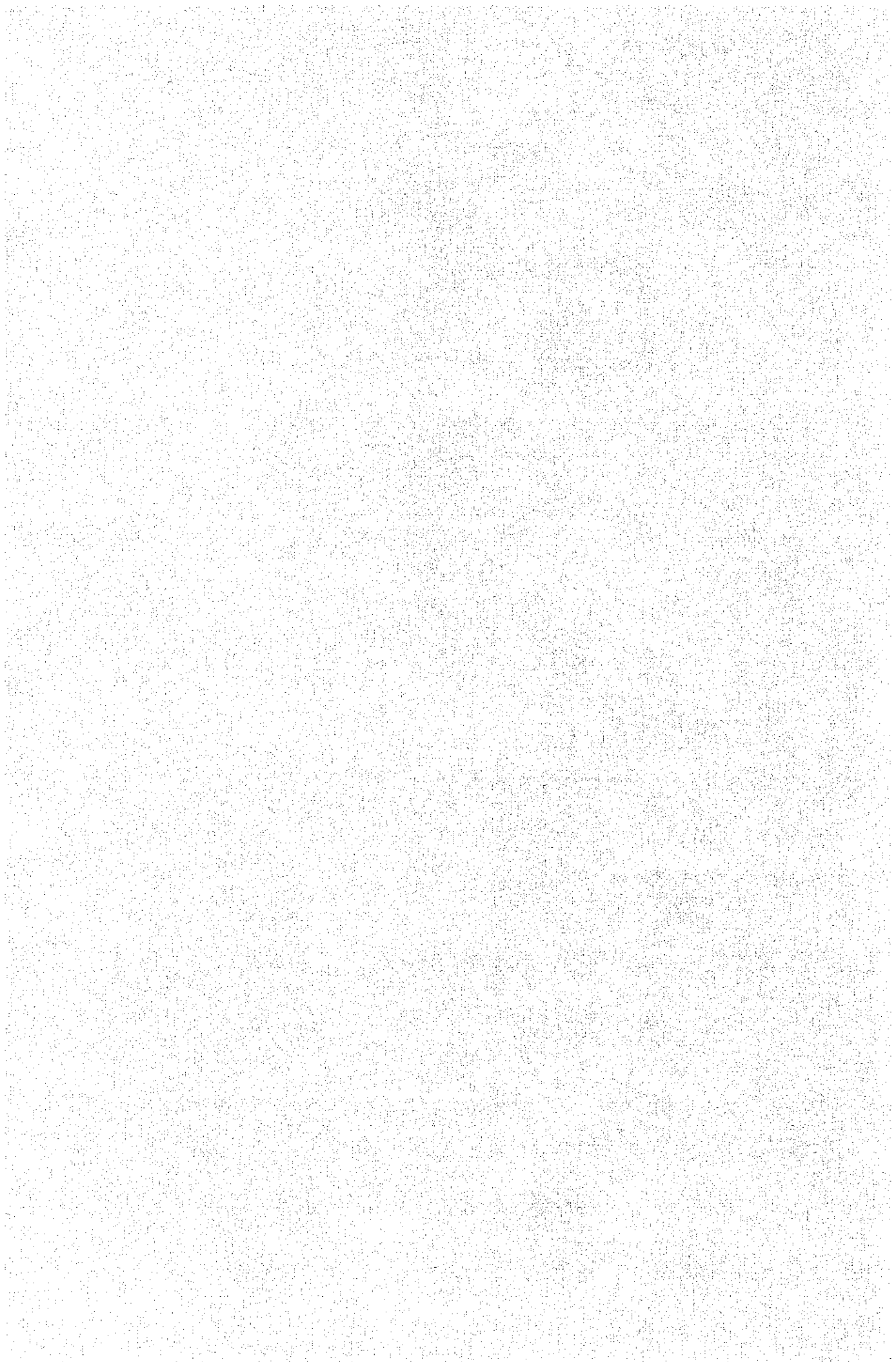
The bedrock in this area is suitable for dam embankments from the geological point of view.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
III-3-8	2231A1	VL	23	528

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
404.0	0.0	0	0	0	0.00	
405.0	1.0	4288	2144	2144	2.14	
407.5	2.5	41013	22651	56626	58.77	
410.0	2.5	132496	86755	216886	275.66	
412.5	2.5	230000	181248	453120	728.78	





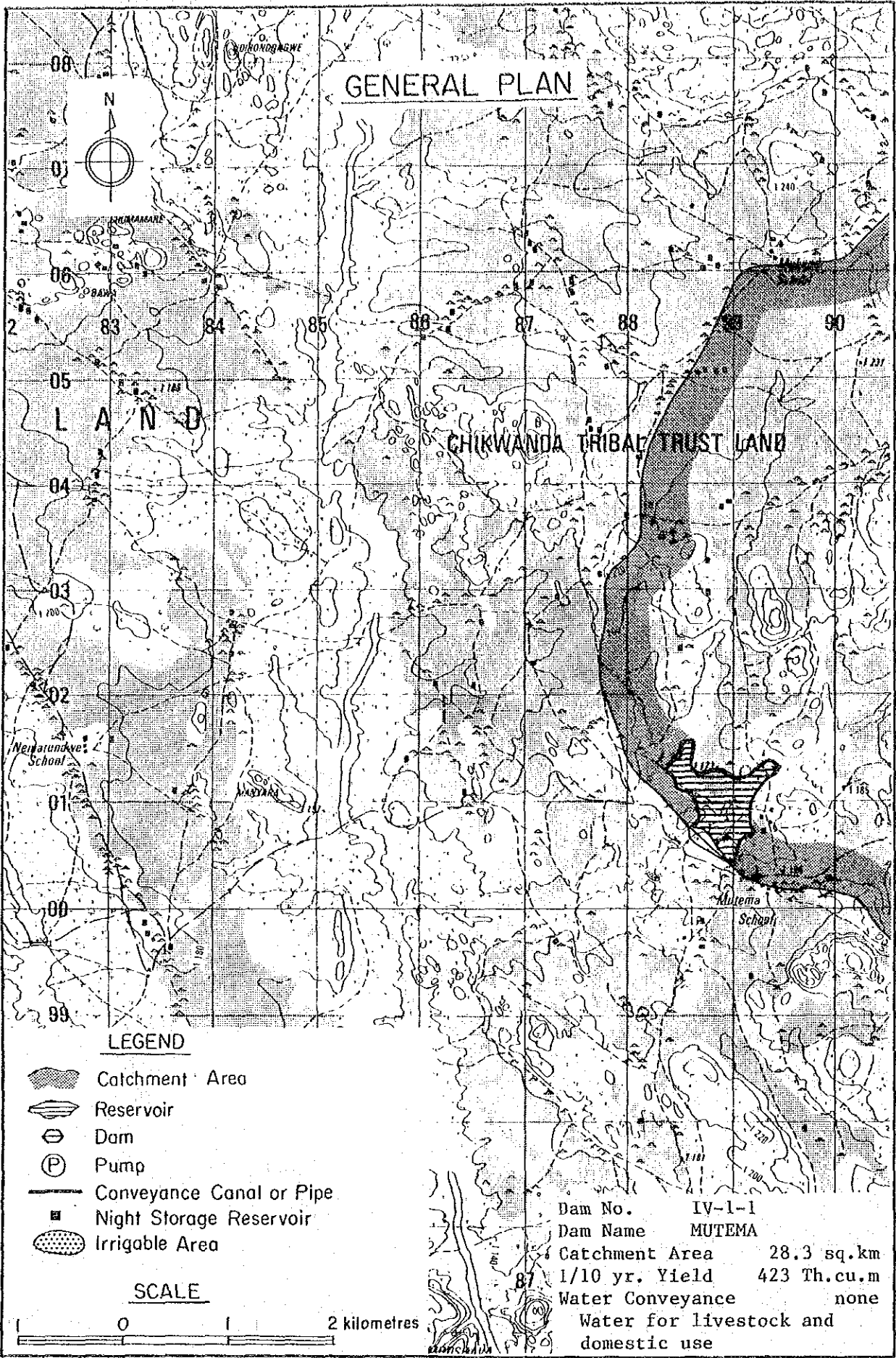
No. IV-1-1

Name of Dam Mutema

Location	District Gutu		Communal Land Chikuwanda		
	Map Ref. 1930D4		Coordinates TP887008		
Geology	Granite, generally massive and hard, however opened joints and cracks are existing.				
Hydrology	River (T) Popoteke		Hydrological Zone E-UT4		
	Catchment Area	28.3 sq.km	M.A. Rainfall	700 mm	
	M.A. Runoff	65 mm	Sediment	60 tonnes km ² /yr.	
Reservoir	Effective Capacity	1.020 MCM	1/10 Yr. Yield	0.423 MCM	
	Dead Capacity	0.030 MCM	D.W.S.	1 160 m	
	Total Capacity	1.050 MCM	N.W.S.	1 168 m	
Dam	Height	14 m	Length	400 m	
	Embankment Volume	82 000 cu.m	Spillway	130 m	
Agriculture	Natural Region IV		Soil -		
	Potential Irrigable Area			- ha	
	Proposed Cropping Pattern -				
Irrigation	Net Irrigable Area - ha		Dist. - km by -		
	Topography	Area	-		
		Conveyance	-		
Rural Water Supply	Population 2 349 person		47 cu.m/day		
	Livestock 460 unit		21 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class
	Z\$ 879 000		-	Z\$ 879 000	B
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	
	Z\$14 223 /year		Z\$165 000	1.6 per cent	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks	Water Control Area				

Present Condition on the Ward

Ward Name	28		Area	5 801 ha
Demography	Population Density		78.3	persons/sq.km
	Family Size		5.0	Persons/household
Agriculture	Arable Area		3 800 ha	Grazing Area 2 048 ha
	Maize	0.7	ha/household	N.A bags/ha
	Sorghum	0	ha/household	N.A bags/ha
	Livestock	N.A	LSUs/household	N.A LSUs/sq.km
Rural Water Supply	Borehole	0.05	units/sq.km	1 513 persons/unit
	Well	0.16	units/sq.km	504 persons/unit










GENERAL PLAN

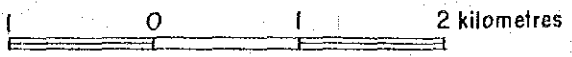
LAND

CHIKWANDA TRIBAL TRUST LAND

LEGEND

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

SCALE



Dam No.	IV-1-1
Dam Name	MUTEMA
Catchment Area	28.3 sq.km
1/10 yr. Yield	423 Th.cu.m
Water Conveyance	none
Water for livestock and domestic use	

MUTEMA

PLAN OF DAM

Dam No.	IV- 1 - 1
District	Gutu
Communal L.	Chikuwanda
River	(T) Pokoteke
Map Ref.	1930 D4
Coordinate	TP 887008
Catchment A.	28.3 sq.km
Design Flood	234 cum/sec
N.W.S.	EL.1,168.0 m
D.W.S.	EL.1,160.0 m
Capacity of Res.	1.05 M.C.M.
Dam Top	EL.1,170.0 m
Dam Height	14.0 m
Dam Length	400 m
Dam Vol.	82,000 cum



SCALE 1:10 000

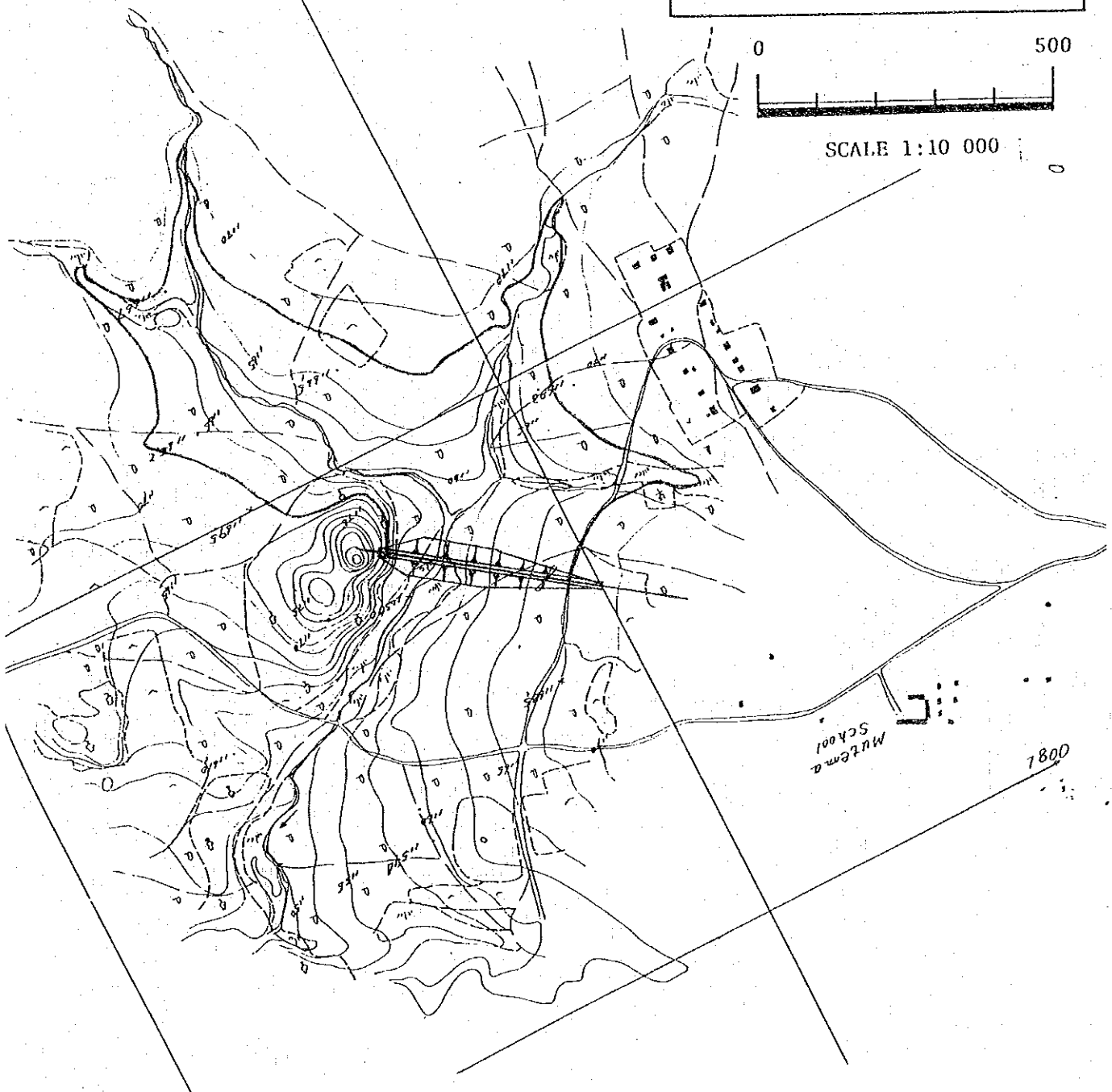
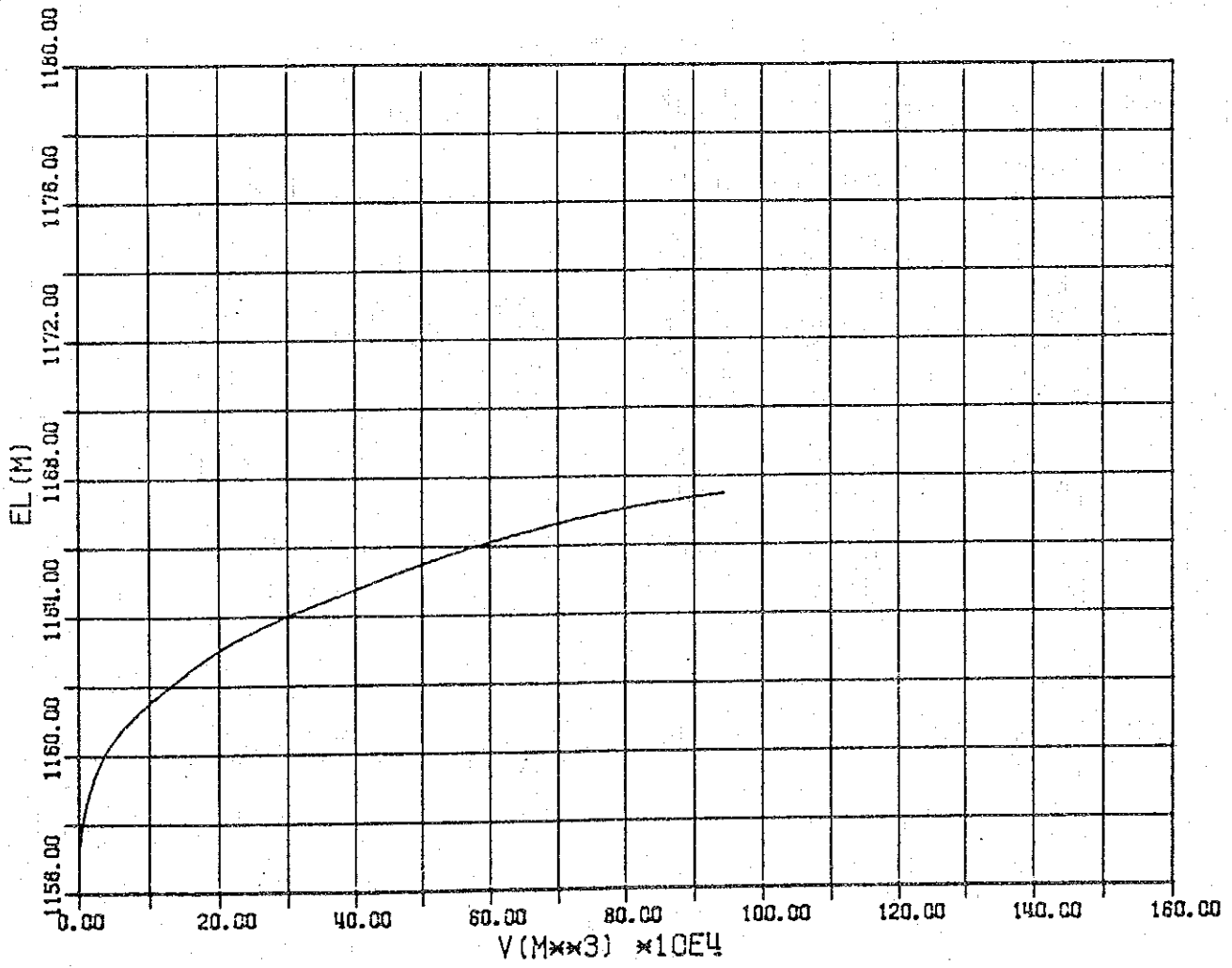


TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HCR
IV-1-1	193004	TP	887	008

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
1156.0	0.0	0	0	0	0.00	
1157.5	1.5	3000	1500	2250	2.25	
1160.0	2.5	24300	13650	34125	36.37	
1162.5	2.5	75500	49900	124750	161.12	
1165.0	2.5	140000	107750	269375	430.50	
1167.5	2.5	270500	205250	513125	943.62	



No. IV-1-2

Name of Dam Gabriel

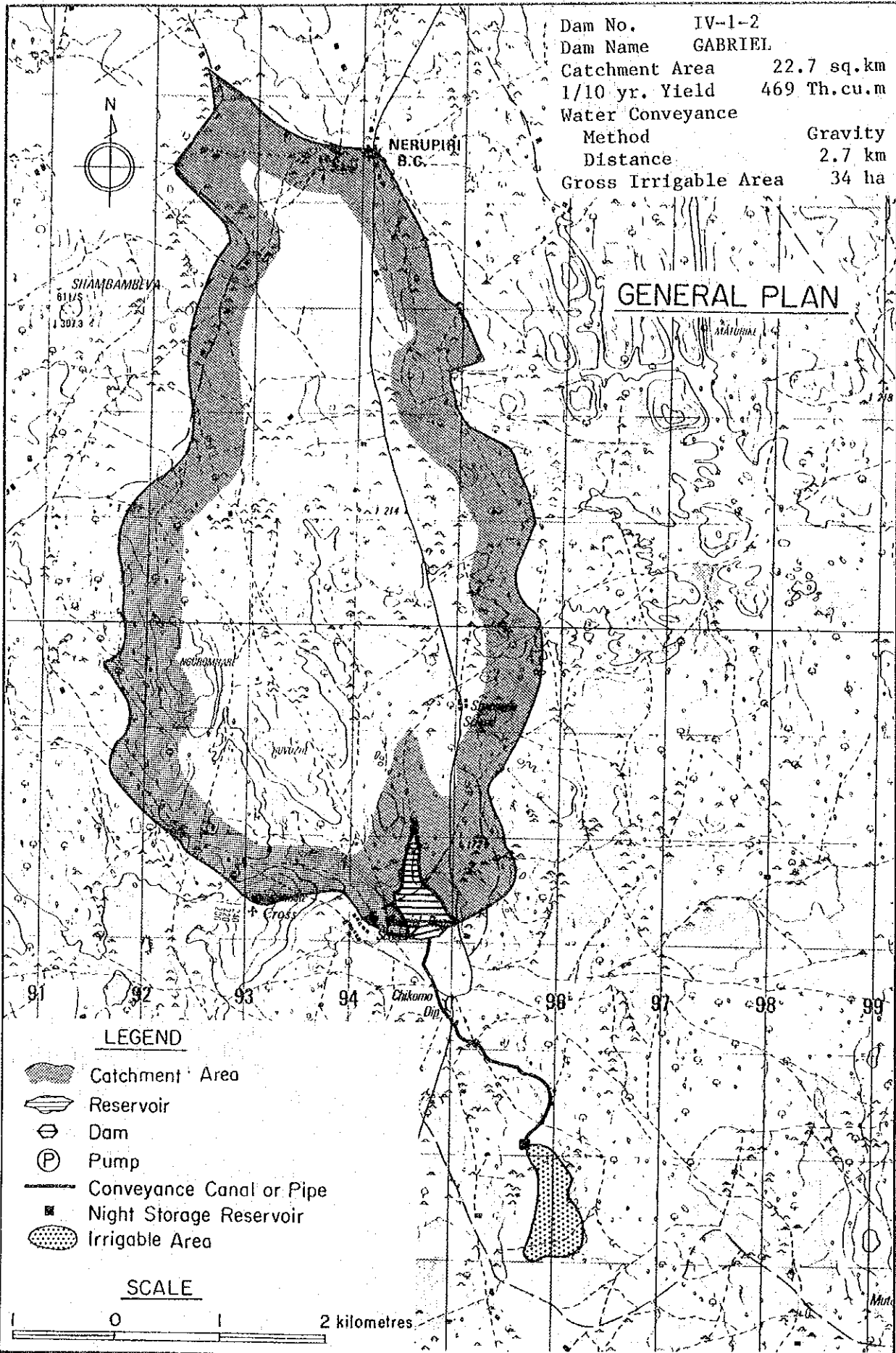
Location	District Gutu		Communal Land Chikwanda		
	Map Ref. 1931C3		Coordinates TN948971		
Geology	Granite, very flat terrain, outcrops very few, surface soils are very deep.				
Hydrology	River (T) Mtilikwe		Hydrological Zone E-UT5		
	Catchment Area 22.7 sq.km		M.A. Rainfall 710 mm		
	M.A. Runoff 69 mm		Sediment 60 tonnes km ² /yr.		
Reservoir	Effective Capacity 2.180 MCM		1/10 Yr. Yield 0.469 MCM		
	Dead Capacity 0.020 MCM		D.W.S. 1 155 m		
	Total Capacity 2.200 MCM		N.W.S. 1 163 m		
Dam	Height 12 m		Length 1 000 m		
	Embankment Volume 162 000 cu.m		Spillway 115 m		
Agriculture	Natural Region IV		Soil SL		
	Potential Irrigable Area		150 ha		
	Proposed Cropping Pattern B				
Irrigation	Net Irrigable Area 27.6ha		Dist. 2.7 km by Gravity		
	Topography	Area		Slightly undulated	
		Conveyance		Slightly sloping, one river crossing	
Rural Water Supply	Population 2 349 person		47 cu.m/day		
	Livestock 460 unit		21 cu.m/day		
Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class	
	Z\$ 1 752 000	749 000	Z\$ 2 501 000	B	
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return		
	Z\$ 60.931 /year	Z\$ 708 000	3.7 per cent		
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	N	N
Remarks	Water control area				








Present Condition on the Ward

Ward Name	28		Area 5 801 ha	
Demography	Population Density		78.3 persons/sq.km	
	Family Size		5.0 Persons/household	
Agriculture	Arable Area 3 800 ha		Grazing Area 2 048 ha	
	Maize 0.7 ha/household		N.A bags/ha	
	Sorghum 0 ha/household		N.A bags/ha	
	Livestock N.A LSUs/household		N.A LSUs/sq.km	
Rural Water Supply	Borehole 0.05 units/sq.km		1 513 persons/unit	
	Well 0.16 units/sq.km		504 persons/unit	

Dam No. IV-1-2
 Dam Name GABRIEL
 Catchment Area 22.7 sq.km
 1/10 yr. Yield 469 Th.cu.m
 Water Conveyance Method Gravity
 Distance 2.7 km
 Gross Irrigable Area 34 ha

GENERAL PLAN



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

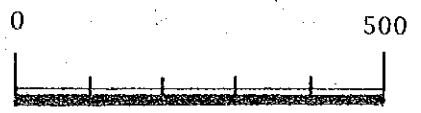
SCALE

0 2 kilometres

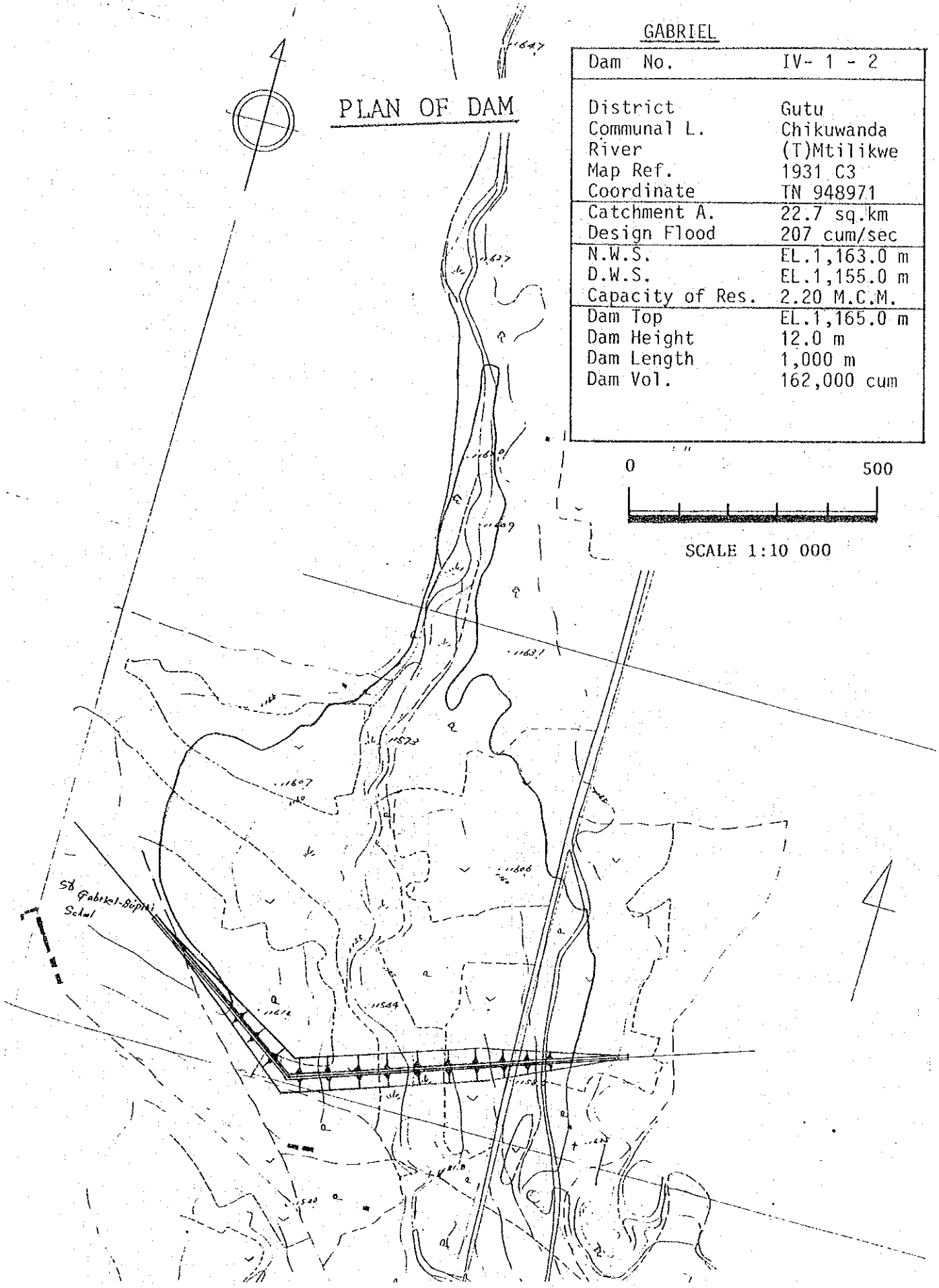
GABRIEL

PLAN OF DAM

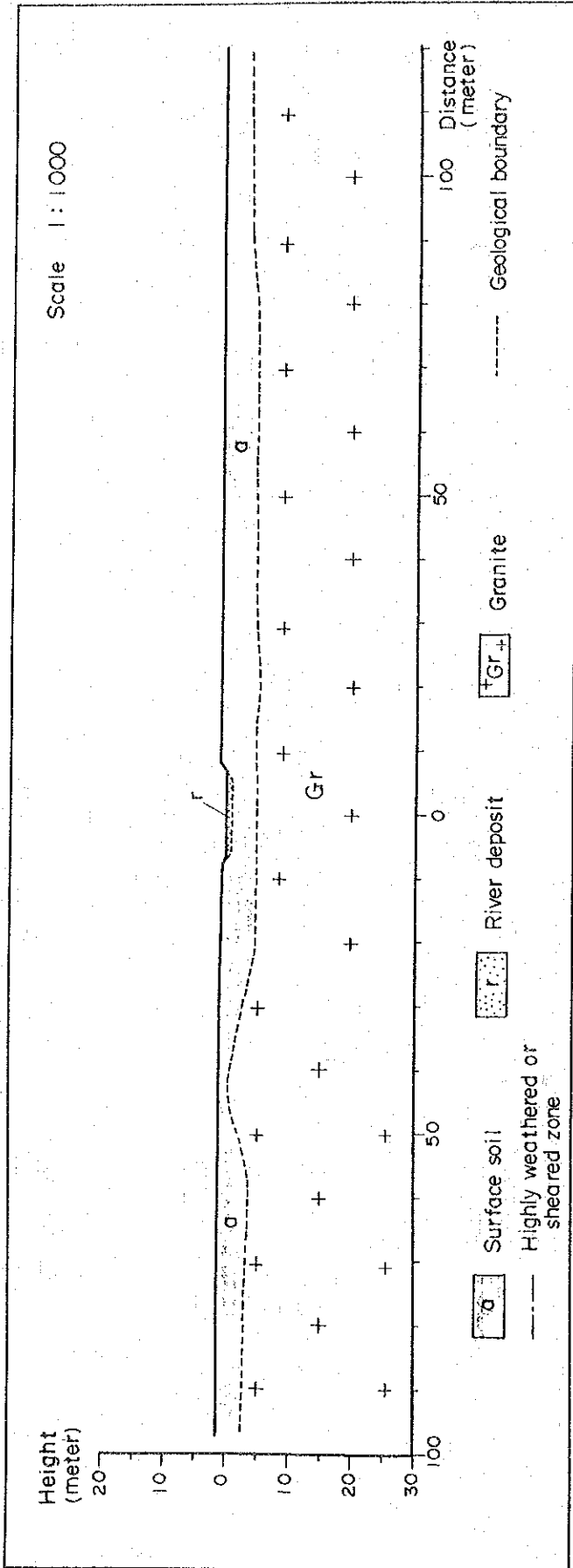
Dam No.	IV- 1 - 2
District	Gutu
Communal L.	Chikwanda
River	(T)Mtilikwe
Map Ref.	1931 C3
Coordinate	TN 948971
Catchment A.	22.7 sq.km
Design Flood	207 cum/sec
N.W.S.	EL.1,163.0 m
D.W.S.	EL.1,155.0 m
Capacity of Res.	2.20 M.C.M.
Dam Top	EL.1,165.0 m
Dam Height	12.0 m
Dam Length	1,000 m
Dam Vol.	162,000 cum



SCALE 1:10 000



IV-1-2 Gabriel

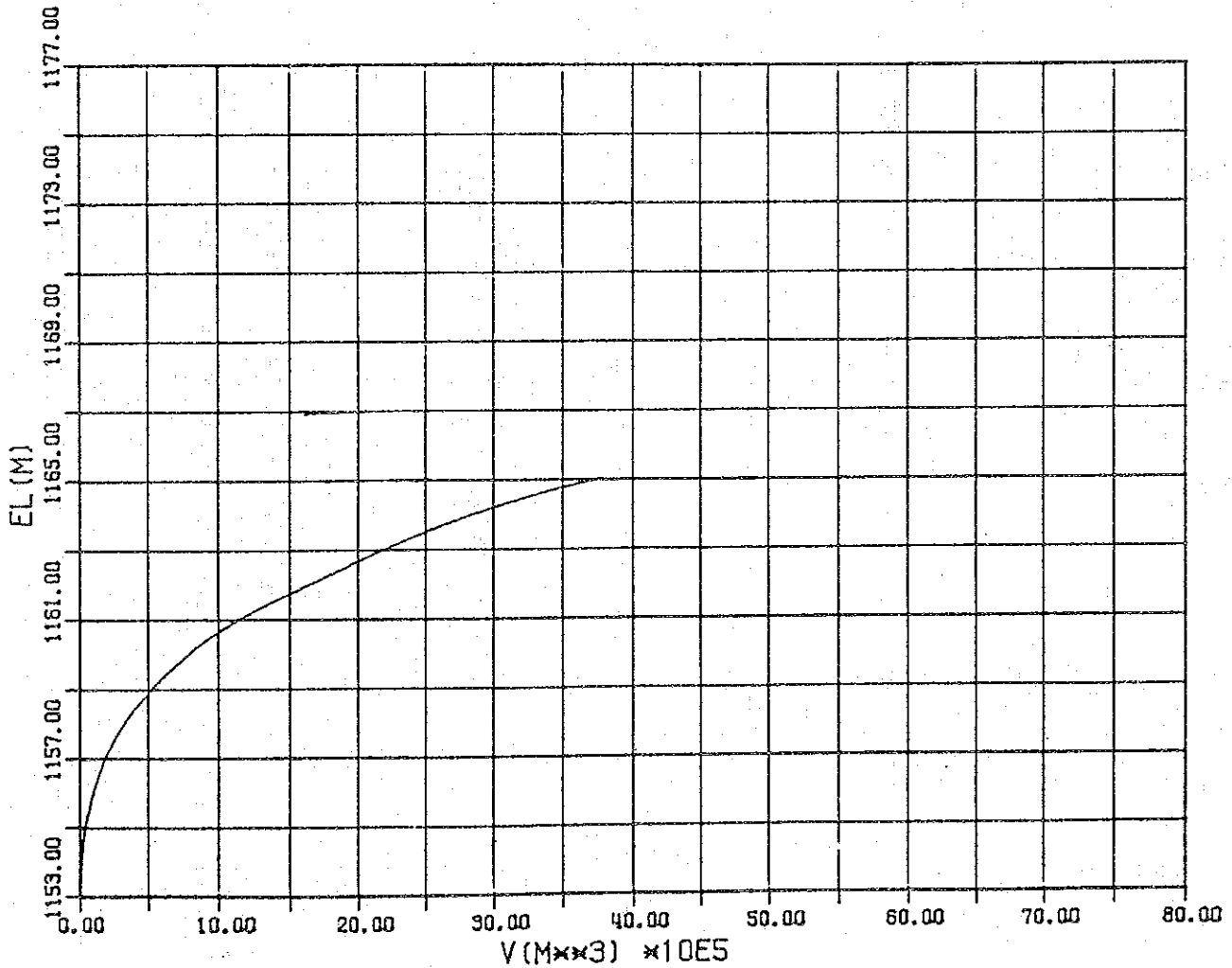


The area is very flat land and outcrops are a few. The river forms a wide flood plane which deposits very soft soils and partly forms marsh. The bedrock consists of granite and it is massive and hard. Unconsolidated deposits being contributed around the damsite consists of cohesive soils, and it seems to be a great depth. The estimated thickness of the surface soil is maximum 5 meters. Settlement and sliding in the foundation strata by embankment load seem to be occur.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HCR
IV-1-2	1931C3	TN	948	971

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
1153.0	0.0	0	0	0	0.00	
1155.0	2.0	39500	19750	39500	39.50	
1157.5	2.5	123500	81500	203750	243.25	
1160.0	2.5	308000	215750	539375	782.62	
1162.5	2.5	586000	447000	111749	1900.12	
1165.0	2.5	866500	726250	1815625	3715.75	



No. IV-1-3

Name of Dam Chimedza

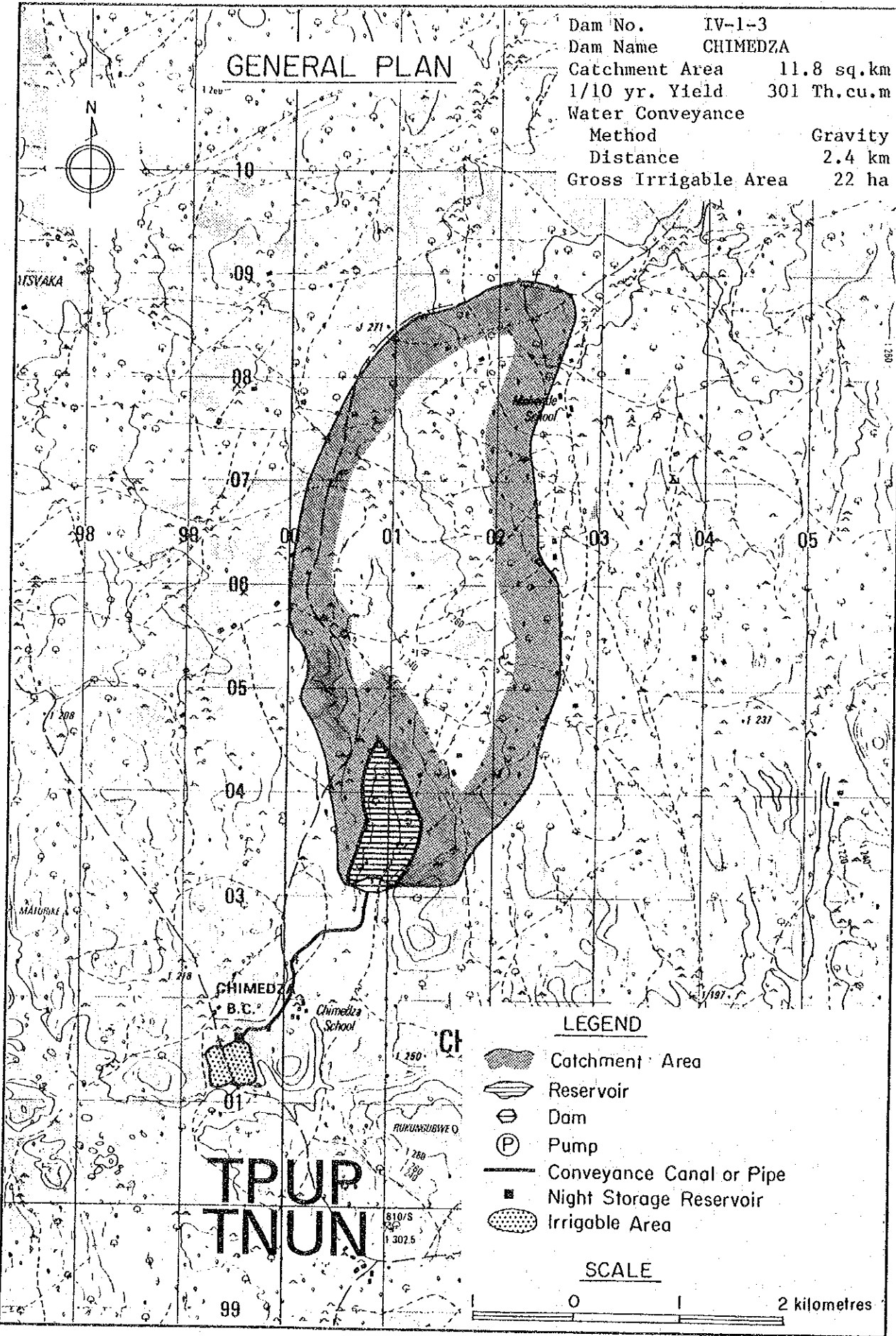
Location	District	Gutu		Communal Land	Chikuwanda
	Map Ref.	1931C3		Coordinates	UP008031
Geology	Granite, generally massive and very hard. Partly weathering. Estimated surface soil is 3 metres.				
Hydrology	River	Sango		Hydrological Zone	E-UT5
	Catchment Area	11.8	sq.km	M.A. Rainfall	730 mm
	M.A. Runoff	75	mm	Sediment	60 tonnes km ² /yr.
Reservoir	Effective Capacity	1.760	MCM	1/10 Yr. Yield	0.301 MCM
	Dead Capacity	0.010	MCM	D.W.S.	1 216 m
	Total Capacity	1.770	MCM	N.W.S.	1 224 m
Dam	Height	11	m	Length	240 m
	Embankment Volume	55 000	cu.m	Spillway	75 m
Agriculture	Natural Region	IV		Soil	SL-L
	Potential Irrigable Area				80 ha
	Proposed Cropping Pattern				A
Irrigation	Net Irrigable Area	17.7 ha	Dist. 2.4 km by Gravity		
	Topography	Area	Flat		
		Conveyance	Slightly sloping, one river crossing		
Rural Water Supply	Population	1 512	person	30 cu.m/day	
	Livestock	796	unit	36 cu.m/day	
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z\$ 589 000	Z\$577 000		Z\$1 166 000	A
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	
	Z\$ 63 066 /year	Z\$ 733 000		9.9 per cent	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y
Remarks	Water Control Area				

Present Condition on the Ward








Ward Name	3		Area	12 608	ha
Demography	Population Density		50.4	persons/sq.km	
	Family Size		6.0	Persons/household	
Agriculture	Arable Area		8 402	ha	Grazing Area
	Maize	1.9	ha/household	N.A	bags/ha
	Sorghum	0	ha/household	N.A	bags/ha
	Livestock	4.7	LSUs/household	39.8	LSUs/sq.km
Rural Water Supply	Borehole	0.03	units/sq.km	1 590	persons/unit
	Well	0.40	units/sq.km	127	persons/unit

GENERAL PLAN

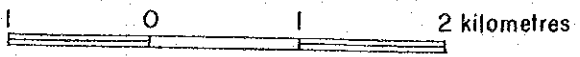
Dam No. IV-1-3
 Dam Name CHIMEDZA
 Catchment Area 11.8 sq.km
 1/10 yr. Yield 301 Th.cu.m
 Water Conveyance Method Gravity
 Distance 2.4 km
 Gross Irrigable Area 22 ha



LEGEND

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

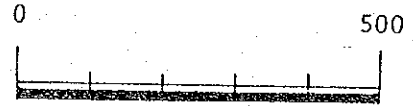
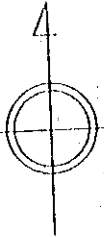
SCALE



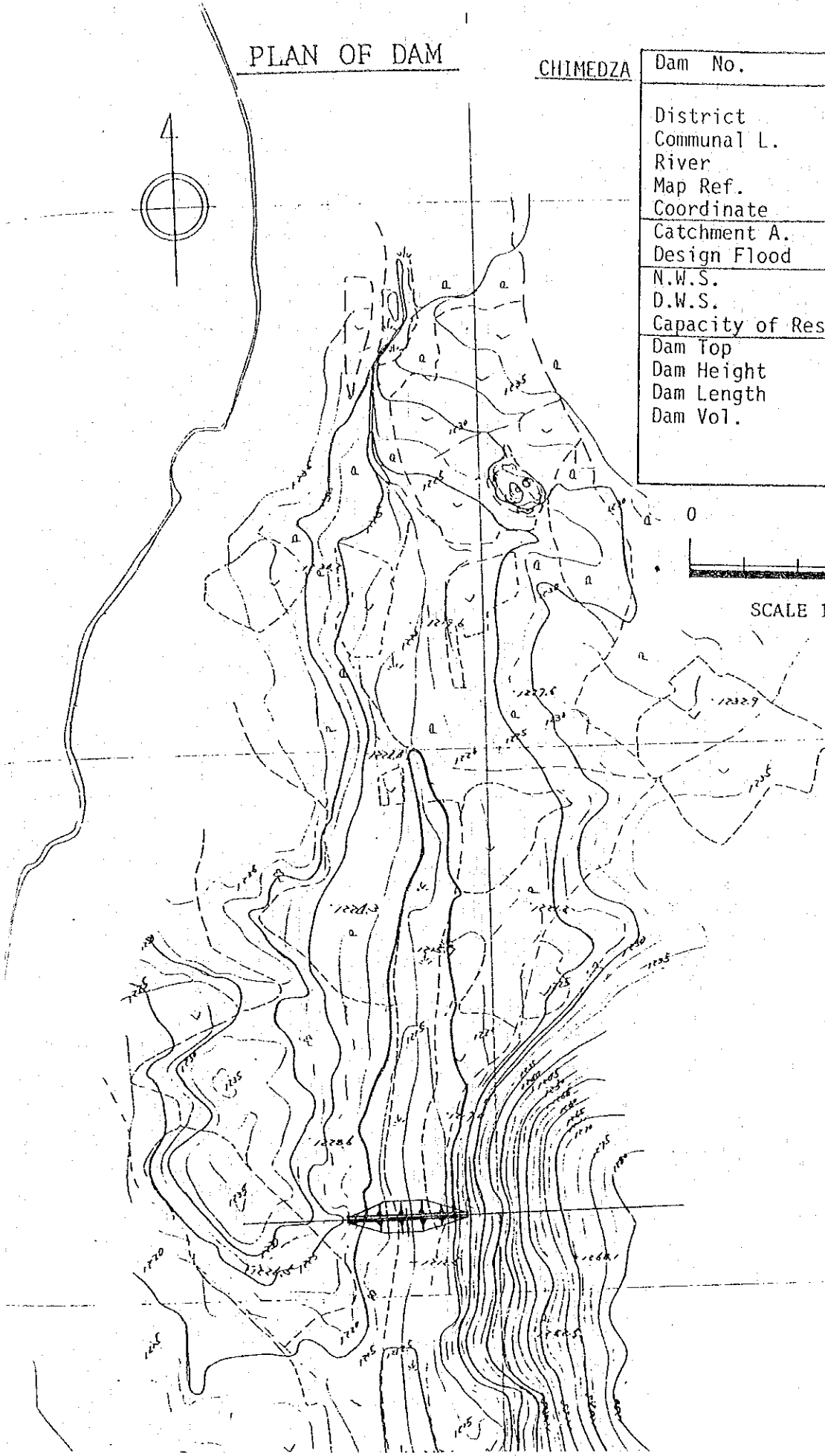
PLAN OF DAM

CHIMEDZA

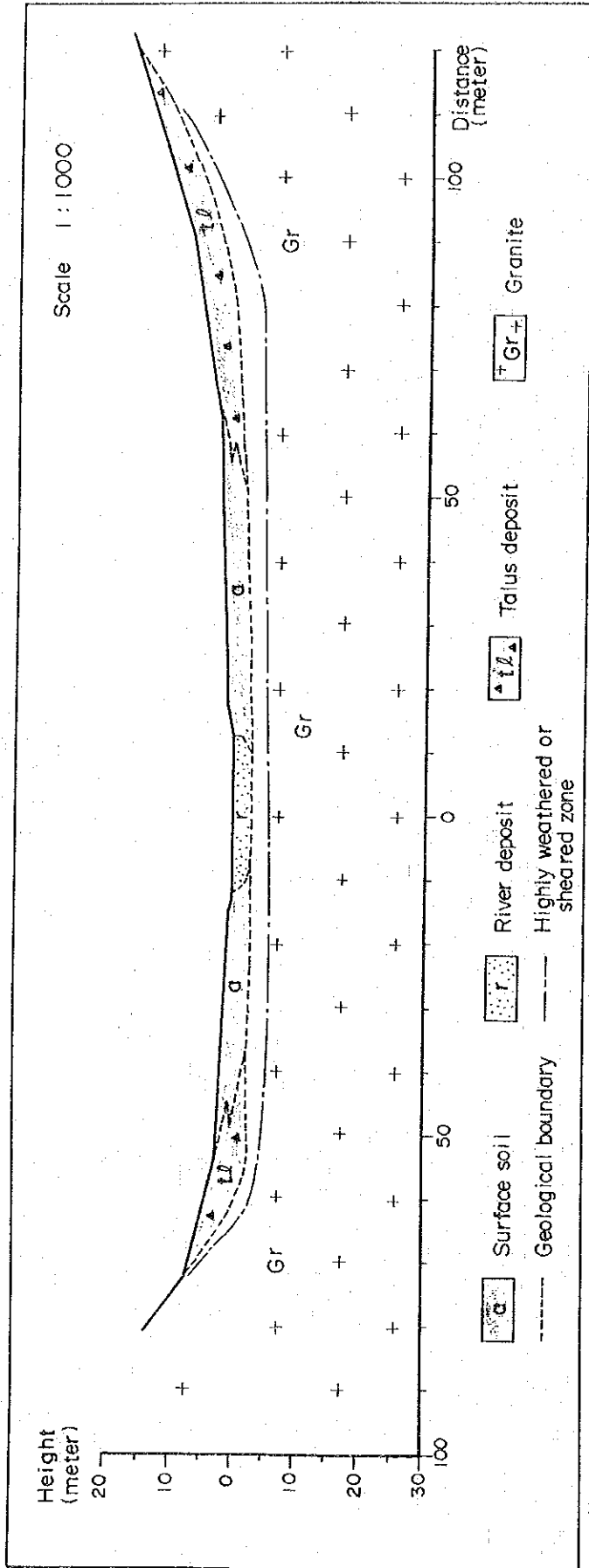
Dam No.	IV- 1 - 3
District	Gutu
Communal L.	Chikuwanda
River	Sango
Map Ref.	1931 C3
Coordinate	UP 008031
Catchment A.	11.8 sq.km
Design Flood	135 cum/sec
N.W.S.	EL.1,224.0 m
D.W.S.	EL.1,216.0 m
Capacity of Res.	1.77 M.C.M.
Dam Top	EL.1,226.0 m
Dam Height	11.0 m
Dam Length	240 m
Dam Vol.	55,000 cum



SCALE 1:10 000



IV-1-3 Chimedza

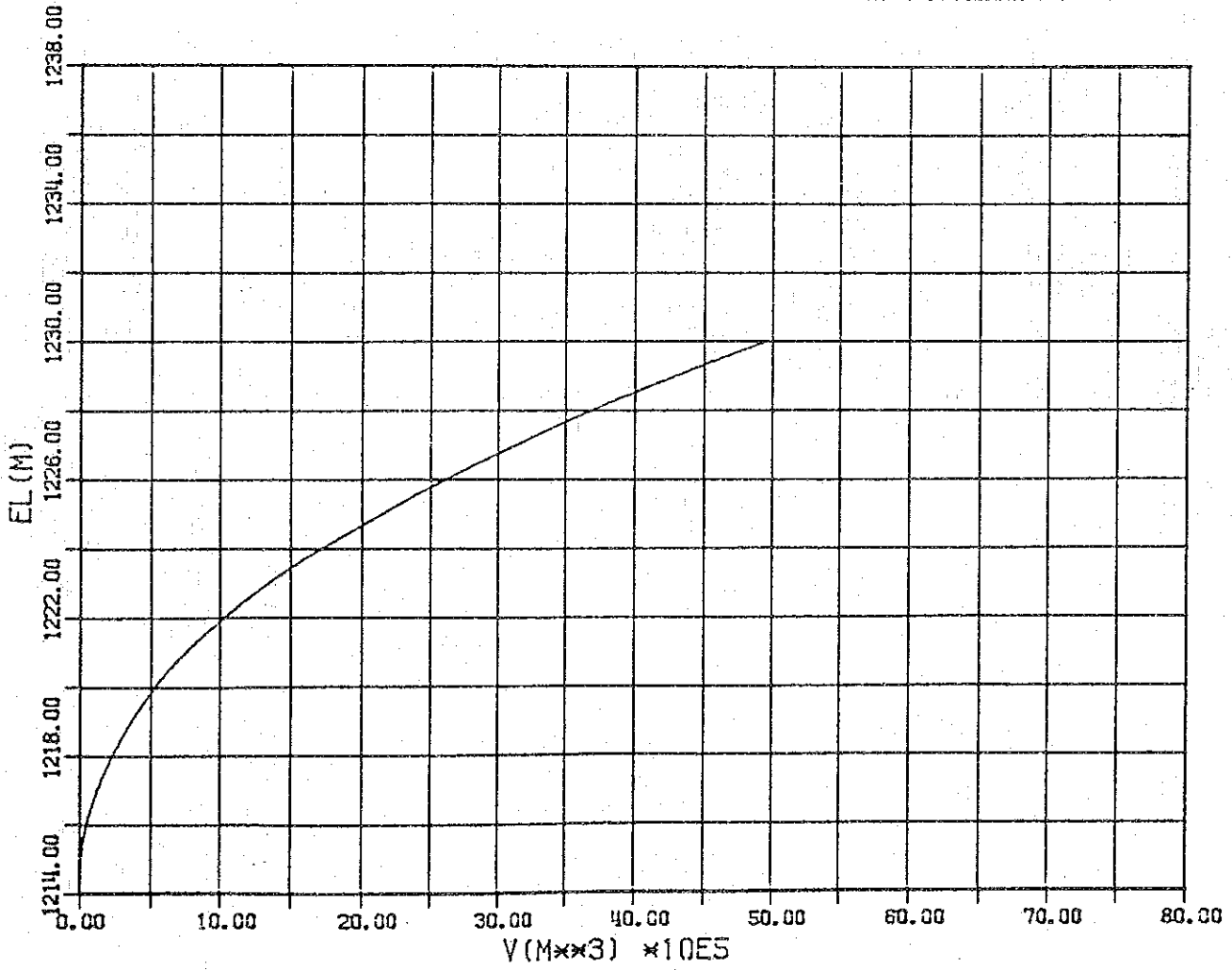


The bedrock consists of granite and it is generally massive and very hard. However it is very soft in the riverbed by highly weathering. The weathering layer is estimated to be 3 to 1 meters thick. Talus including abundant boulders is distributed on both banks, and the estimated thickness of them is about 5 to 2 meters. Flood plain deposit is estimated to be about 3 meters thick.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HCR
IV-1-3	1931C3	UP	008	0.31

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
1214.7	0.0	0	0	0	0.00	
1215.0	0.3	32830	16415	4925	4.93	
1217.5	2.5	93987	63409	158521	163.45	
1220.0	2.5	195648	144818	362044	525.49	
1222.5	2.5	323704	253676	649190	1174.68	
1225.0	2.5	445804	384754	961885	2136.56	
1227.5	2.5	565083	505444	1263608	3400.17	
1230.0	2.5	673138	619111	1547776	4947.94	



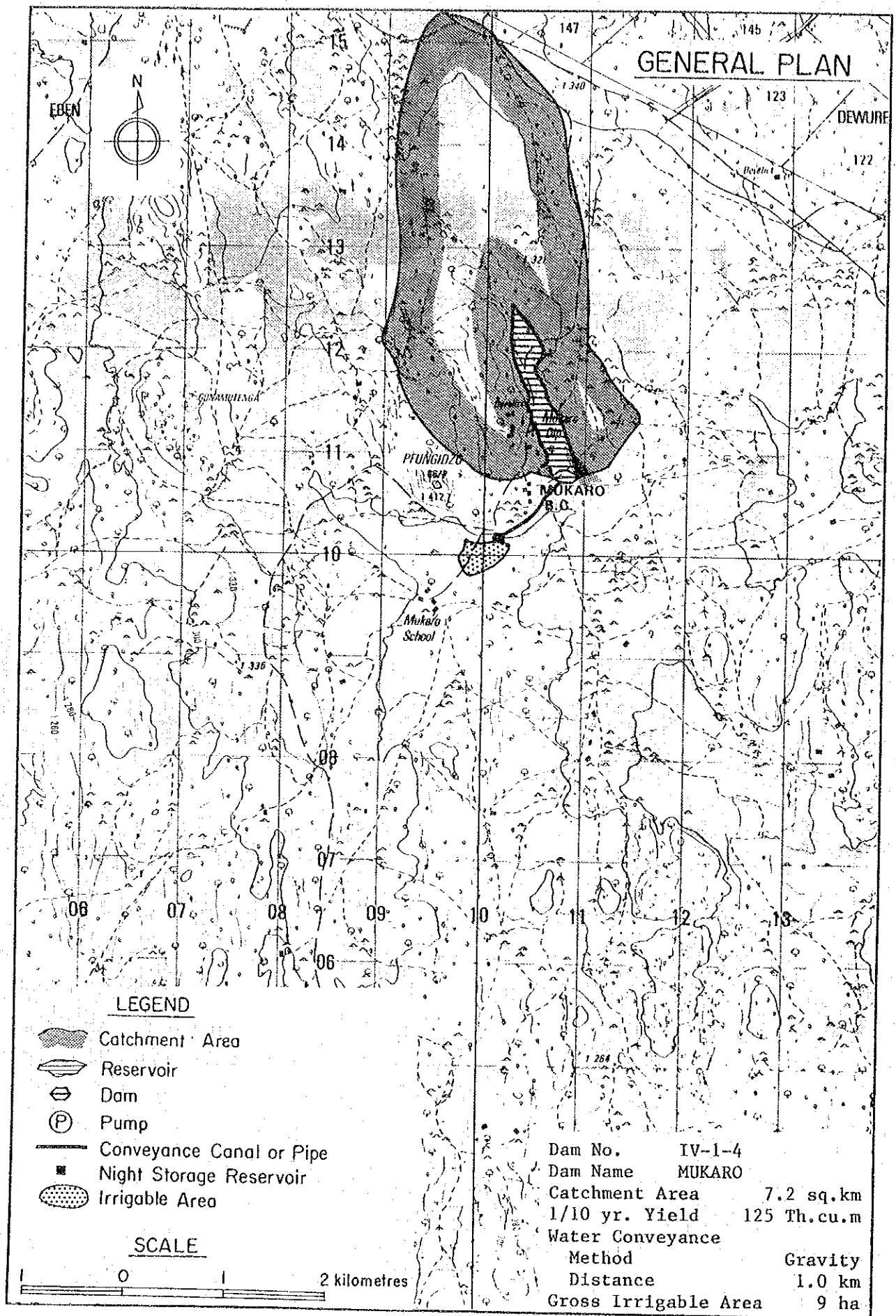
No. IV-1-4

Name of Dam Mukaro

Location	District Gutu		Communal Land Chikuwanda		
	Map Ref. 1931C3		Coordinates UP108108		
Geology	Granite, it seems to be very soft and well jointed from the airphoto-reading.				
Hydrology	River Mazere		Hydrological Zone E-UT5		
	Catchment Area 7.2 sq.km		M.A. Rainfall 760 mm		
	M.A. Runoff 87 mm		Sediment 60 tonnes km ² /yr.		
Reservoir	Effective Capacity 1.240 MCM		1/10 Yr. Yield 0.125 MCM		
	Dead Capacity 0.010 MCM		D.W.S. 1 304 m		
	Total Capacity 1.250 MCM		N.W.S. 1 311.5 m		
Dam	Height 11.5 m		Length 730 m		
	Embankment Volume 82 000 cu.m		Spillway 53 m		
Agriculture	Natural Region IV		Soil SL		
	Potential Irrigable Area		30 ha		
	Proposed Cropping Pattern B				
Irrigation	Net Irrigable Area 7.4 ha		Dist. 1.0 km by Gravity		
	Topography	Area	Slightly sloping		
		Conveyance	Slightly sloping		
Rural Water Supply	Population 1 155 person		23 cu.m/day		
	Livestock 1 025 unit		46 cu.m/day		
Cost and Benefit	Dam		Irrigation Facilities	Total Cost	Class
	Z\$ 1 817 000		Z\$246 000	Z\$2 063 000	
	Annual Increment Benefit		Net Present Value	Economic Internal Rate of Return	C
	Z\$ 18 944 /year		Z\$ 220 000	-	
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	N	N	Y	N	N
Remarks	Water Control Area				

Present Condition on the Ward

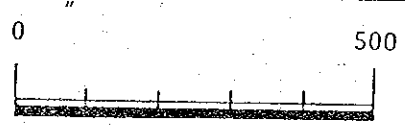
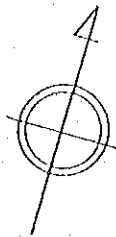
Ward Name	1		Area 11 703 ha	
Demography	Population Density		38.5 persons/sq.km	
	Family Size		5.0 Persons/household	
Agriculture	Arable Area 8 777 ha		Grazing Area 2 926 ha	
	Maize 7.4 ha/household		N.A bags/ha	
	Sorghum 0 ha/household		N.A bags/ha	
	Livestock 2.7 LSUs/household		20.5 LSUs/sq.km	
Rural Water Supply	Borehole 0.03 units/sq.km		1 500 persons/unit	
	Well 0.43 units/sq.km		90 persons/unit	



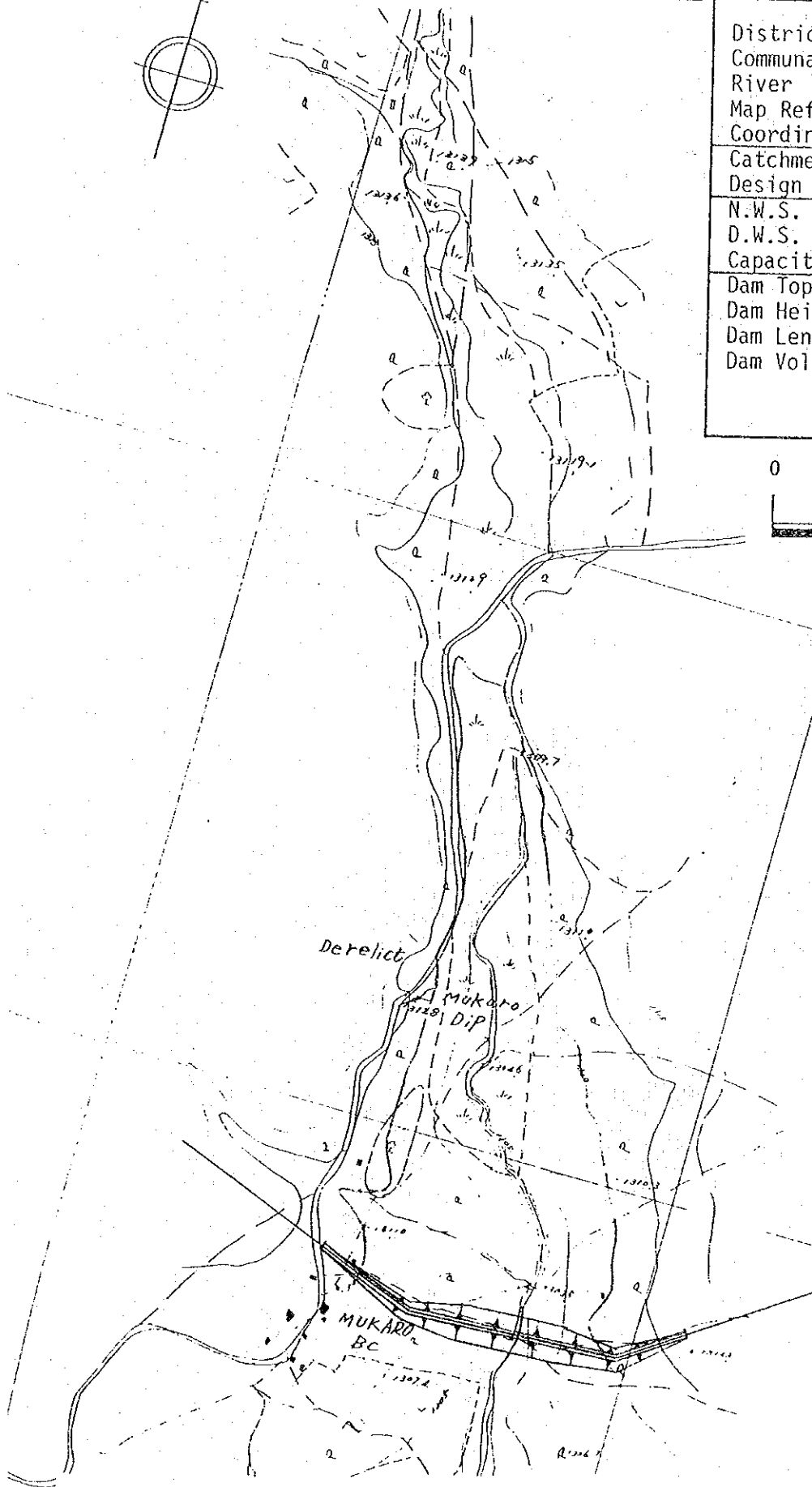
PLAN OF DAM

MUKARO

Dam No.	IV- 1 - 4
District	Gutu
Communal L.	Chikuwanda
River	Mazare
Map Ref.	1931 C3
Coordinate	UP 108108
Catchment A.	7.2 sq.km
Design Flood	96 cum/sec
N.W.S.	EL.1,311.5 m
D.W.S.	EL.1,304.0 m
Capacity of Res.	1.25 M.C.M.
Dam Top	EL.1,313.5 m
Dam Height	11.5 m
Dam Length	730 m
Dam Vol.	82,000 cum



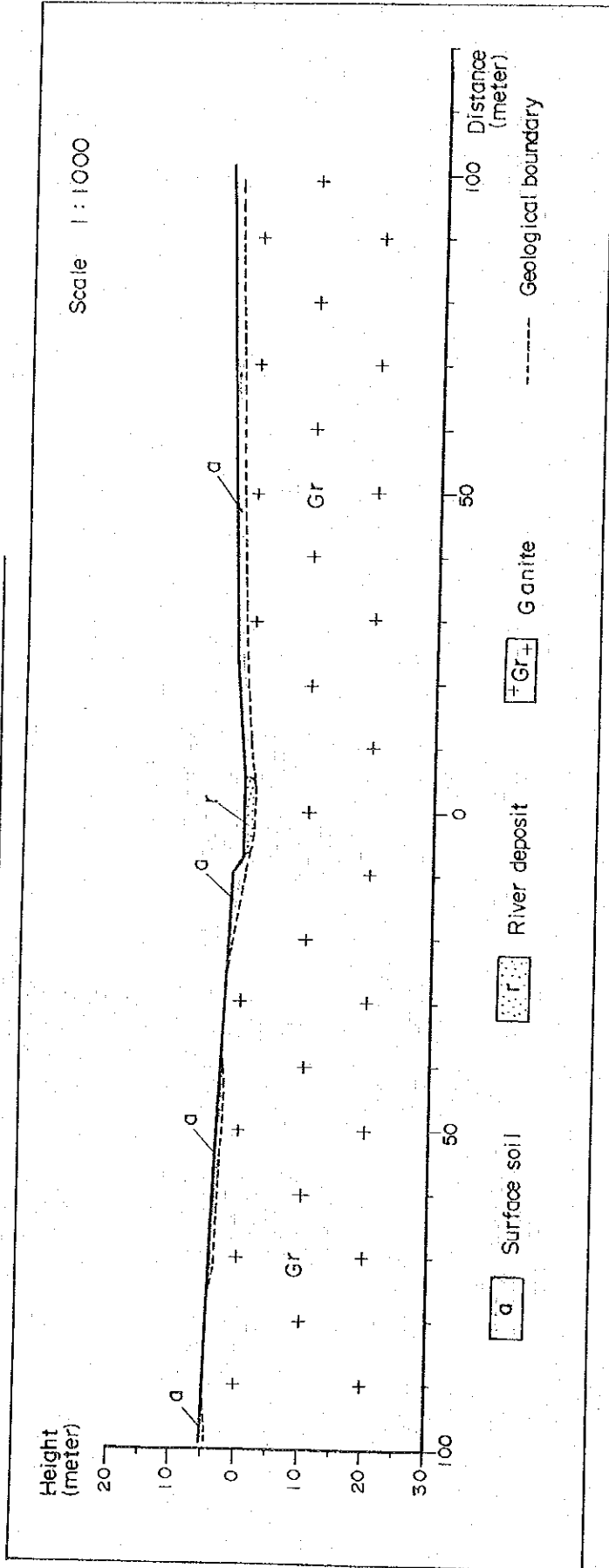
SCALE 1:10 000



7812

7811

IV-1-4 Mukaro



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

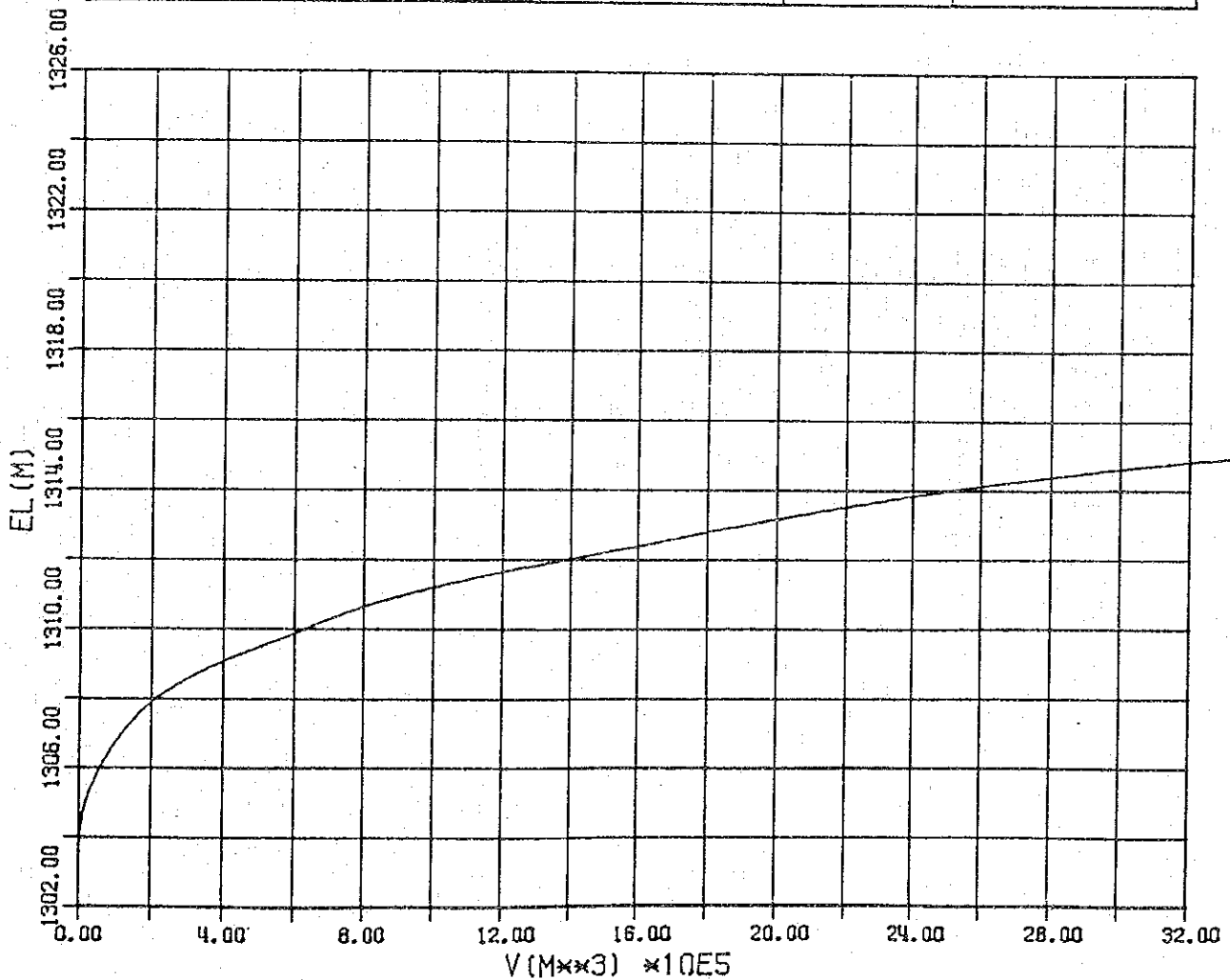
The area is flat land, and the Mazere River forms shallow and wide flood plane.

The bedrock consists of granite. "Dwalas" around the dams site indicate that the bedrock is well jointed and partly has been changed into boulders. Leakage through the bedrock seems to be large.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
IV-1-4	1931C3	UP	108	108

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
1302.0	0.0	0	0	0	0.00	
1302.5	0.5	500	250	125	0.12	
1305.0	2.5	14500	7500	18750	18.87	
1307.5	2.5	99000	56750	141875	160.75	
1310.0	2.5	275000	187000	467500	628.25	
1312.5	2.5	545500	410250	1025625	1653.87	
1315.0	2.5	841000	693250	1733125	3387.00	



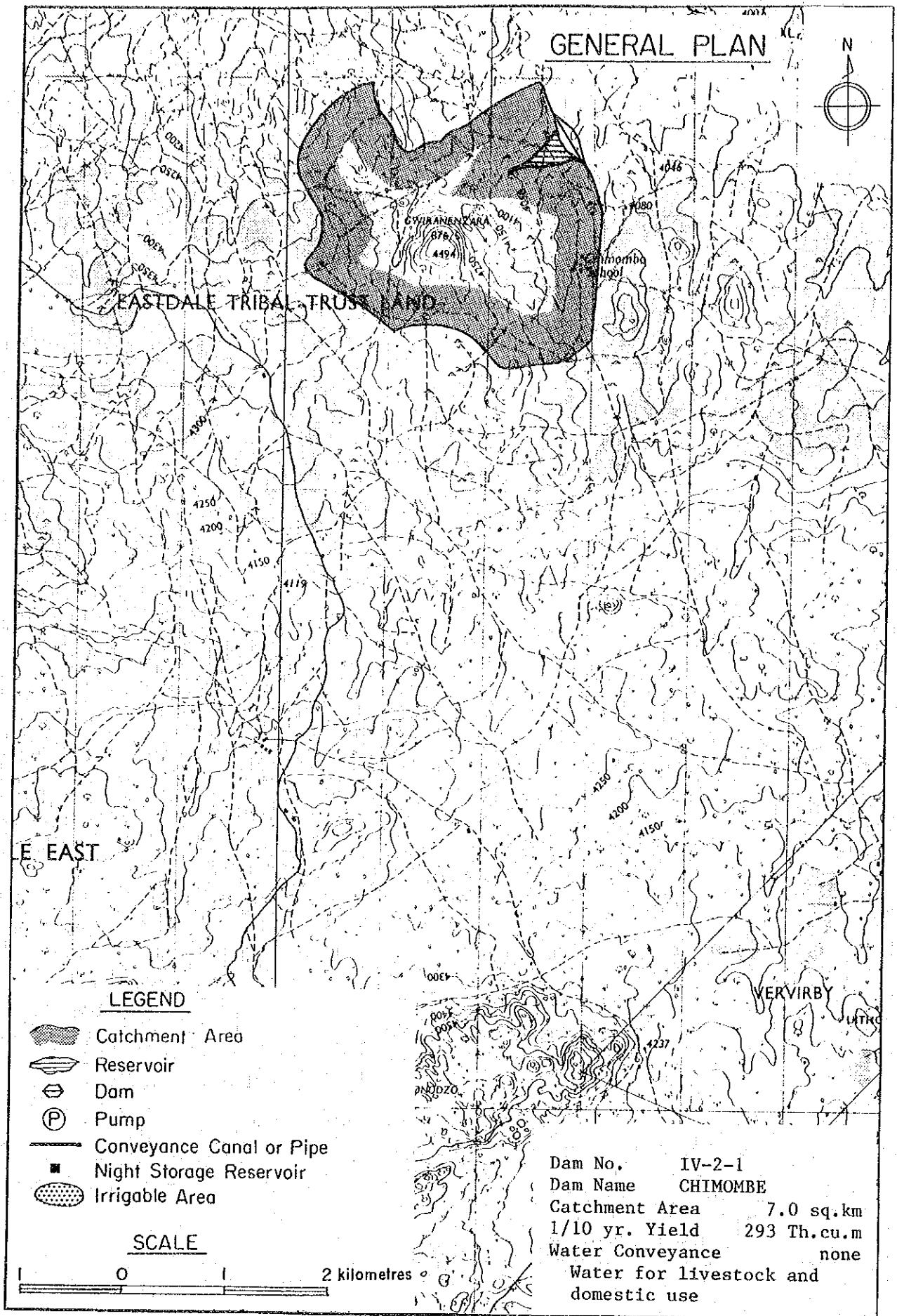
No. IV-2-1

Name of Dam Chimombe

Location	District Gutu		Communal Land Denhere	
	Map Ref. 1931A3		Coordinates UP127694	
Geology	Granite, the surface soil is very deep, it is very difficult to find a damsite from the geophysical point.			
Hydrology	River (T) Nyazvidzi		Hydrological Zone E-S5	
	Catchment Area 7.0 sq.km		M.A. Rainfall 800 mm	
	M.A. Runoff 102 mm		Sediment 330 tonnes km ² /yr.	
Reservoir	Effective Capacity 1.400 MCM		1/10 Yr. Yield 0.293 MCM	
	Dead Capacity 0.030 MCM		D.W.S. 1 226 m	
	Total Capacity 1.430 MCM		N.W.S. 1 236 m	
Dam	Height 17 m		Length 700 m	
	Embankment Volume 94 000 cu.m		Spillway 53 m	
Agriculture	Natural Region III		Soil -	
	Potential Irrigable Area			- ha
	Proposed Cropping Pattern -			
Irrigation	Net Irrigable Area - ha		Dist. - km by -	
	Topography	Area	-	
		Conveyance	-	
Rural Water Supply	Population 2 241 person		45 cu.m/day	
	Livestock 846 unit		38 cu.m/day	
Cost and Benefit	Dam		Irrigation Facilities	
	Z\$ 956 000		-	
	Annual Increment Benefit		Total Cost	
	Z\$ 10 245/year		Z\$ 956 000	
		Net Present Value		
		Economic Internal Rate of Return		
		-		
		Z\$119 000		
Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist
	Y	N	Y	N
Remarks				

Present Condition on the Ward

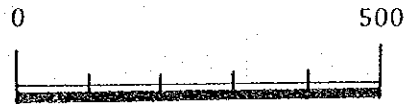
Ward Name	13		Area 7 500 ha	
Demography	Population Density		74.7 persons/sq.km	
	Family Size		4.7 Persons/household	
Agriculture	Arable Area 5 000 ha		Grazing Area 2 500 ha	
	Maize	N.A	ha/household	12 bags/ha
	Sorghum	N.A	ha/household	11 bags/ha
	Livestock	2.6	LSUs/household	42.3 LSUs/sq.km
Rural Water Supply	Borehole	0.04	units/sq.km	1 867 persons/unit
	Well	0.11	units/sq.km	700 persons/unit



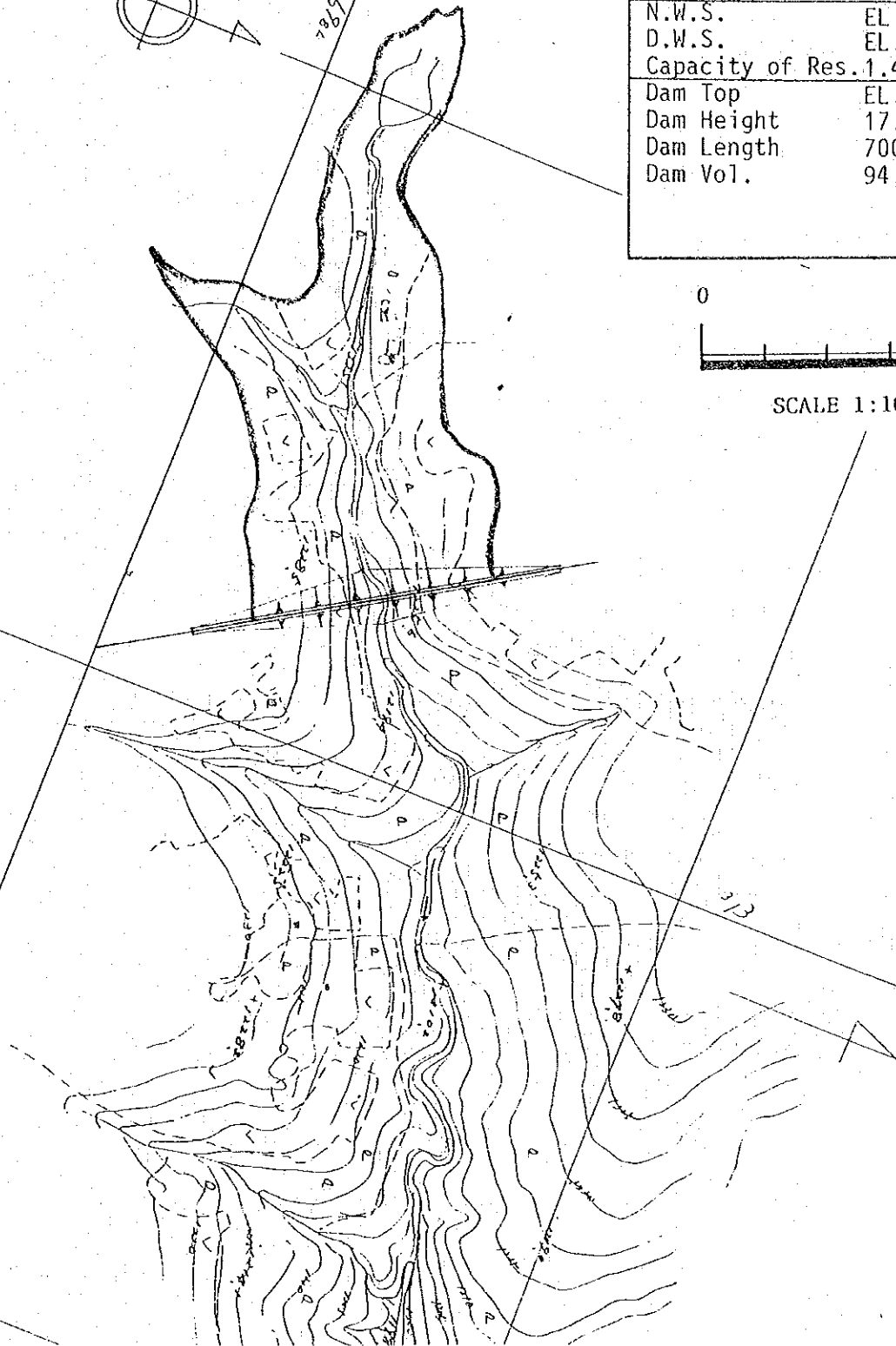
CHIMOMBE

PLAN OF DAM

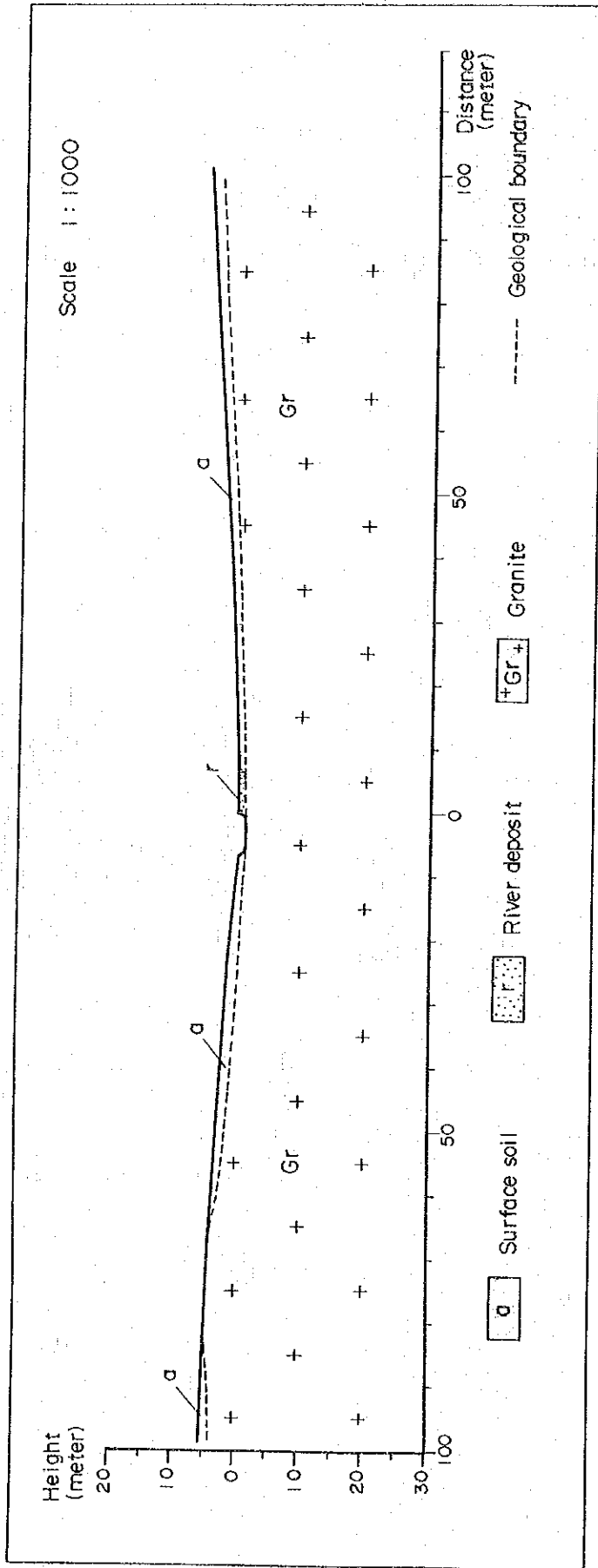
Dam No.	IV- 2 - 1
District	Gutu
Communal L.	Denhere
River	(T)Nyazvidzi
Map Ref.	1931 A3
Coordinate	UP 127694
Catchment A.	7.0 sq.km
Design Flood	95 cum/sec
N.W.S.	EL.1,236.0 m
D.W.S.	EL.1,226.0 m
Capacity of Res.	1.43 M.C.M.
Dam Top	EL.1,238.0 m
Dam Height	17.0 m
Dam Length	700 m
Dam Vol.	94,000 cum



SCALE 1:10 000



IV-2-1 Chimombe



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 undulated land, and the Nyazvidzi River forms relatively deep and wide valley.

The bedrock consists of granite. Outcrops around the damsite are few and thick surface soil is distributed, therefore it is difficult to find a damsite.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HCR
IV-2-1	1931A3	UP	127	694

EL (M)	ΔH (M)	AREA (M ²)	AVE (M ²)	VOL (M ³)	ΣV (1000M ³)	NOTE
1221.0	0.0	0	0	0	0.00	
1222.5	1.5	1500	750	1125	1.12	
1225.0	2.5	13700	7600	19000	20.12	
1227.5	2.5	42300	28000	70000	90.12	
1230.0	2.5	98700	70500	176250	266.37	
1232.5	2.5	162000	130350	325875	592.25	
1235.0	2.5	238400	200200	500500	1092.75	
1237.5	2.5	325300	281850	704625	1797.37	
1240.0	2.5	457800	391550	978875	2776.25	

