FINAL REPORT

FOR

THE FEASIBILITY STUDY ON MEDIUM SIZE DAMS

IN

MASVINGO PROVINCE IN THE REPUBLIC OF ZIMBABWE

DAM SITE INVENTORY

MARCH 1988

JAPAN INTERNATIONAL COOPERATION AGENCY

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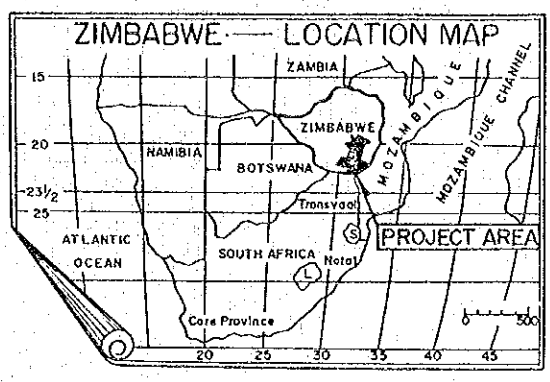
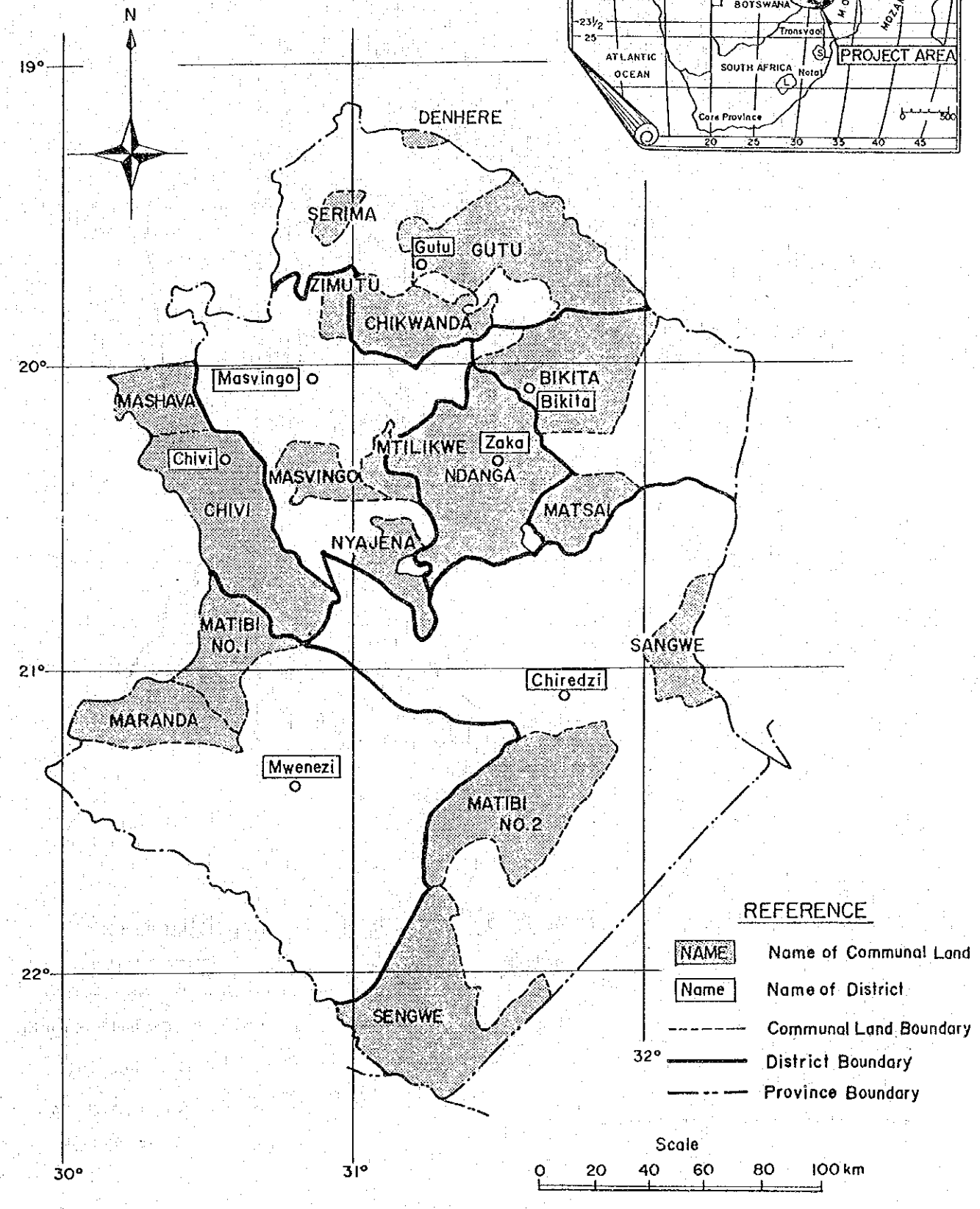
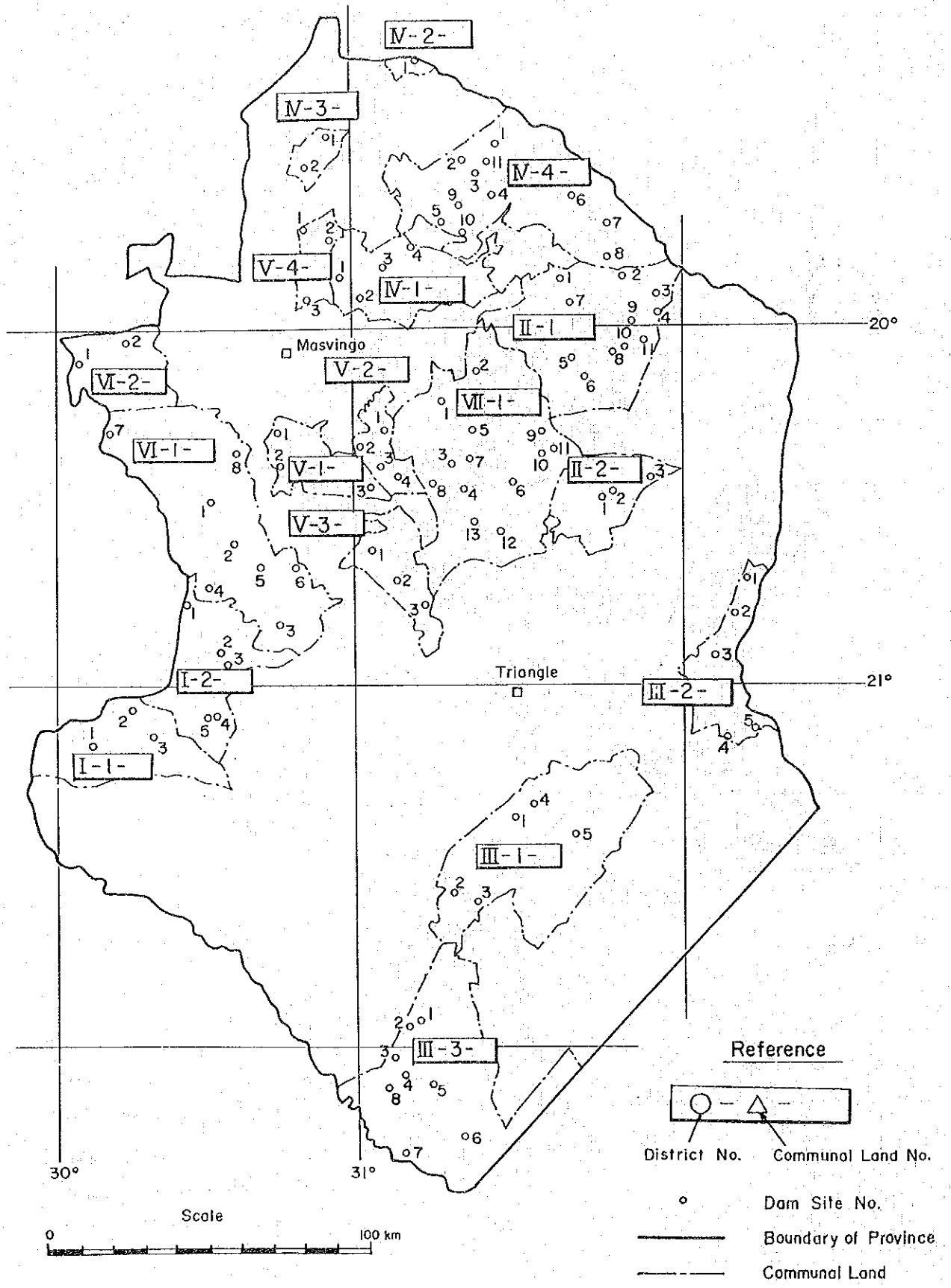
LOCATION MAP





MAP OF POTENTIAL DAM SITES



CONTENTS

LEGEND

Hydrology

Hydrological Zone	:	Runoff area classified by MEWRD
M.A. Rainfall	:	Mean Annual Rainfall
M.A. Runoff	:	Mean Annual Runoff

Reservoir

D.W.S.	:	Dead Water Surface
N.W.S.	:	Normal Water Surface

Agriculture

Natural Region	III:	Region for semi-intensive farming
	IV:	Region for semi-extensive farming
	V:	Region for extensive farming or grazing

Soil	LS:	Loamy Sand
	SL:	Sandy Loam
	L:	Loam
	SCL:	Sandy Clay Loam
	CL:	Clay Loam

Proposed Cropping Pattern

Crops	Case			
	A %	B %	C %	D %
(Summer)				
Maize	60	50	80	55
Groundnuts	20	40	30	40
Vegetables	20	10	10	5
(Winter)				
Wheat	40	40	50	55
Sugar beans	40	40	40	40
Vegetables	20	20	10	5

Visit

Y : Site is visited.

N : Site is not visited.

Class

A : Economic internal rate of return is more than or equal to 0.5

B : Economic internal rate of return is more than zero but less than 0.5

C : Economic internal rate of return is less than zero

No. I-1-1 Name of Dam Cheshanga

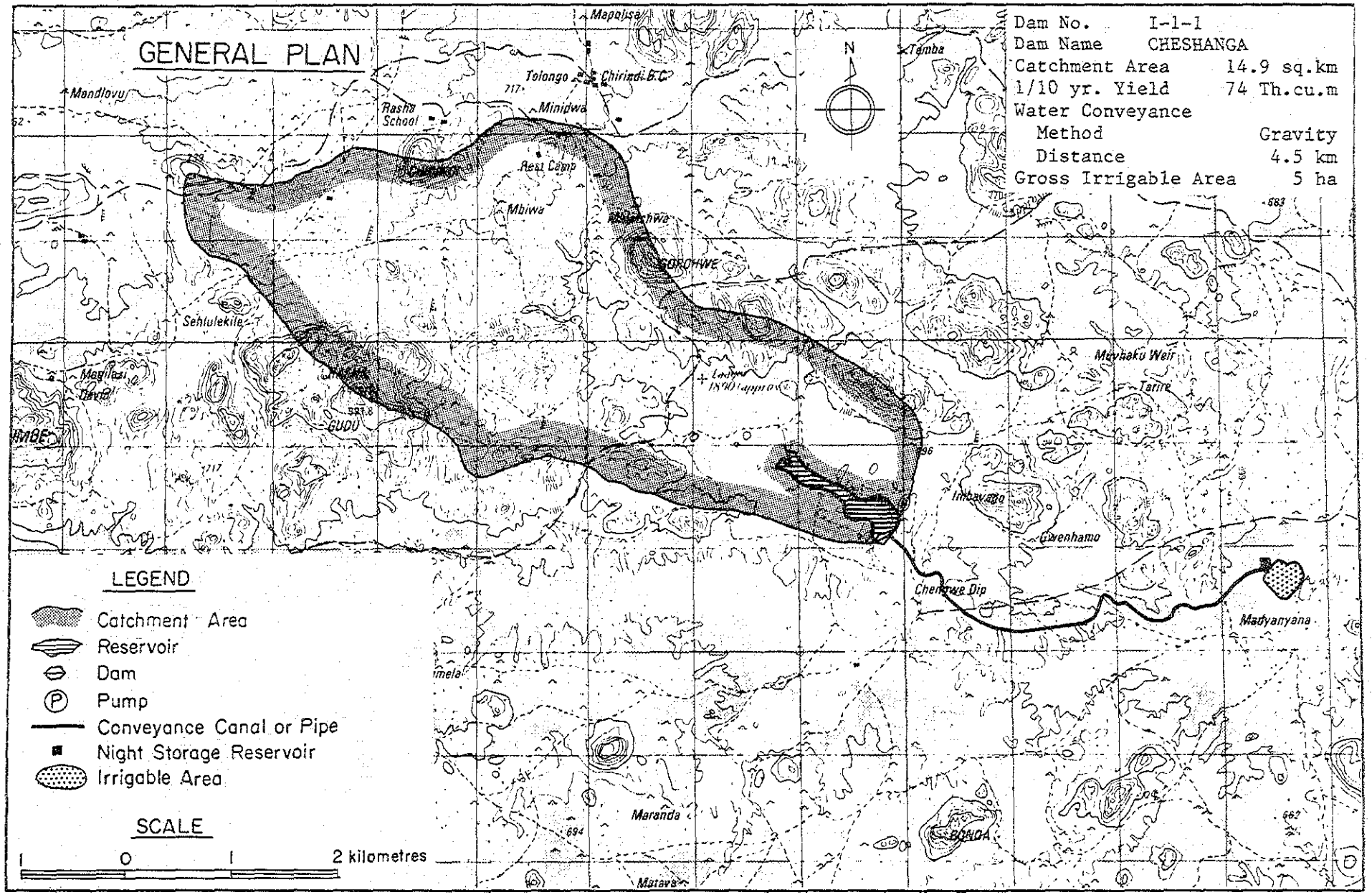
Location	District	Batanai		Communal Land	Maranda
	Map Ref.	2130A1		Coordinates	TM098583
Geology	Gneiss, massive & very hard, few connecting joints				
Hydrology	River	Cheshanga		Hydrological Zone	B-N2
	Catchment Area	14.9	sq.km	M.A. Rainfall	540 mm
	M.A. Runoff	26	mm	Sediment	270 tonnes km^2/yr.
Reservoir	Effective Capacity	0.640	MCM	1/10 Yr. Yield	0.074 MCM
	Dead Capacity	0.060	MCM	D.W.S.	668 m
	Total Capacity	0.700	MCM	N.W.S.	674 m
Dam	Height	14	m	Length	400 m
	Embankment Volume	79 000	cu.m	Spillway	87 m
Agriculture	Natural Region	V		Soil	LS-SL
	Potential Irrigable Area				50 ha
	Proposed Cropping Pattern			D	
Irrigation	Net Irrigable Area 3.7 ha		Dist. 4.5 km by Gravity		
	Topography	Area	Undulated		
		Conveyance	Complicated, two river crossings		
Rural Water Supply	Population	1 332	person		27 cu.m/day
	Livestock	690	unit		31 cu.m/day
Cost and Benefit	Dam	Irrigation Facilities		Total Cost	Class
	Z$ 842 000	Z$ 774 000		Z$ 1 616 000	C
	Annual Increment Benefit	Net Present Value		Economic Internal Rate of Return	
	Z$ 5 854 /year	Z$ 68 000		—	

Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y

Remarks

Present Condition on the Ward

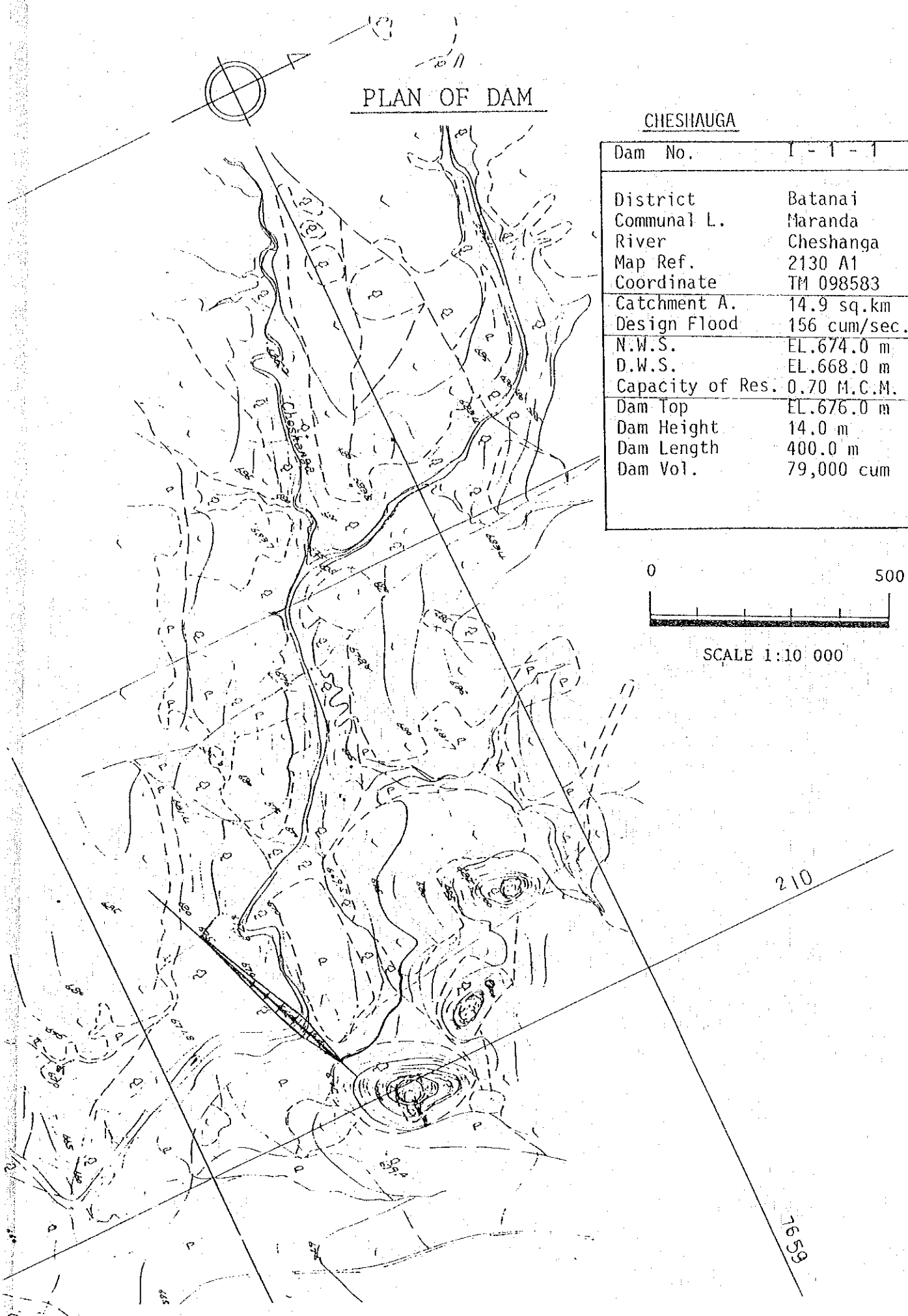
Ward Name	23			Area	9 815 ha
Demography	Population Density			44.4	persons/sq.km
	Family Size			7.0	Persons/household
Agriculture	Arable Area	4 020 ha		Grazing Area	5 795 ha
	Maize	2.6	ha/household	10	bags/ha
	Sorghum	1.1	ha/household	8	bags/ha
	Livestock	1.1	LSUs/household	6.9	LSUs/sq.km
Rural Water Supply	Borehole	0.05	units/sq.km	871	persons/unit
	Well	0.03	units/sq.km	1 452	persons/unit


GENERAL PLAN
Dam No. I-1-1
Dam Name CHESHANGA
Catchment Area 14.9 sq.km
1/10 yr. Yield 74 Th.cu.m
Water Conveyance
Method Gravity
Distance 4.5 km
Gross Irrigable Area 5 ha
N
Mapolisa
Tolongo
Chirindi B.C.
Mandlovu
Rasha School
Minipwa
Real Camp
Mbiwa
GOROHWE
Sehlulekile
Magilazi
GUDU
Muvhaku Weir
Tatire
Inbavazo
Gavenhamo
Chemuwe Dip
Madyanyana
Maranda
BONGA
Matava
LEGEND
Catchment Area
Reservoir
Dam
Pump
Conveyance Canal or Pipe
Night Storage Reservoir
Irrigable Area
SCALE
0
1
2 kilometres

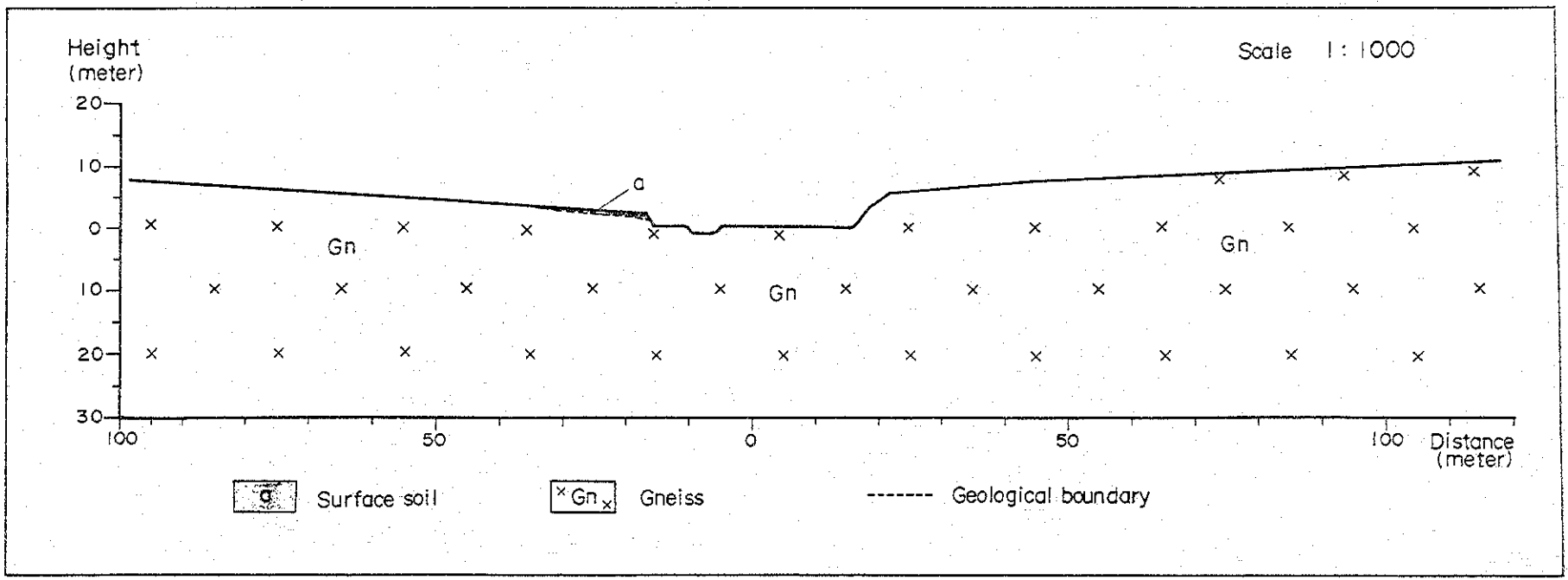
PLAN OF DAM

CHESHAUGA

Dam No.	I - 1 - 1
District	Batanai
Communal L.	Maranda
River	Cheshanga
Map Ref.	2130 A1
Coordinate	TM 098583
Catchment A.	14.9 sq.km
Design Flood	156 cum/sec.
N.W.S.	EL.674.0 m
D.W.S.	EL.668.0 m
Capacity of Res.	0.70 M.C.M.
Dam Top	EL.676.0 m
Dam Height	14.0 m
Dam Length	400.0 m
Dam Vol.	79,000 cum



I-1-1 Cheshauga



The bedrock consists of gneiss, and around the damsite it is massive and very hard and poorly jointed. Soft rocks, which is well jointed trending N80°E direction, are partly distributed, however the thickness of the soft layer seems to be not so deep.

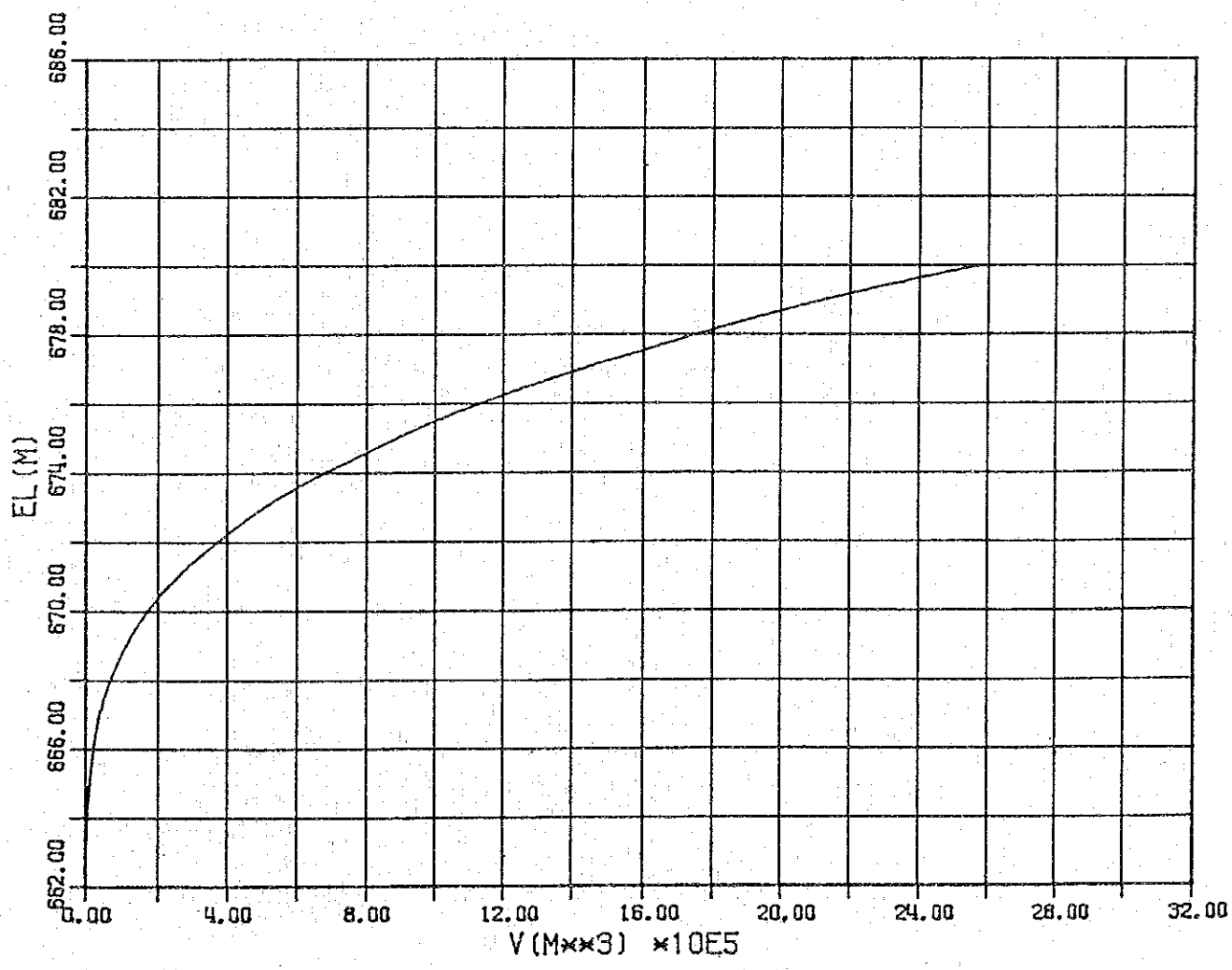
The estimated thickness of unconsolidated deposits is less than 1 meter.

The bedrock is suitable for dam foundations from the geological point of view.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
I-1-1	2130A1	TM	098	583

EL(M)	ΔH(M)	AREA(M2)	AVE(M2)	VOL(M3)	ΣV(1000M3)	NOTE
662.0	0.0	0	0	0	0.00	
665.0	3.0	7500	3750	11250	11.25	
667.5	2.5	23500	15500	38750	50.00	
670.0	2.5	70500	47000	117500	167.50	
672.5	2.5	140000	105250	263125	430.62	
675.0	2.5	223500	181750	454375	885.00	
677.5	2.5	335000	279250	698125	1583.12	
680.0	2.5	462000	398500	996250	2579.37	



No. I-1-2 Name of Dam Sipala

Location	District	Batanai		Communal Land	Maranda
	Map Ref.	2130A2		Coordinates	TM213688
Geology	Gneiss, well jointed, and leakage seems to be great.				
Hydrology	River	(T) Nuanetsi		Hydrological Zone	B-N2
	Catchment Area	22.5	sq.km	M.A. Rainfall	580 mm
	M.A. Runoff	34	mm	Sediment 270	tonnes km^2/yr.
Reservoir	Effective Capacity	1.440	MCM	1/10 Yr. Yield	0.84 MCM
	Dead Capacity	0.090	MCM	D.W.S.	620 m
	Total Capacity	1.530	MCM	N.W.S.	626 m
Dam	Height	12	m	Length	1 000 m
	Embankment Volume	75 000	cu.m	Spillway	115 m
Agriculture	Natural Region	V		Soil	SL
	Potential Irrigable Area				80 ha
	Proposed Cropping Pattern			D	
Irrigation	Net Irrigable Area	4.2 ha	Dist. 1.0 km by Pump, H=19.0 m		
	Topography	Area	Plateau		
		Conveyance	Complicated		
Rural Water Supply	Population	1 359	person		27 cu.m/day
	Livestock	2 930	unit		132 cu.m/day

Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class
	Z$ 1 215 000	Z$ 426 000	Z$ 1 641 000	C
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return	
	Z$ 8 820 /year	Z$ 102 000	—	

Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	N	N	Y	N	N

Remarks

Present Condition on the Ward

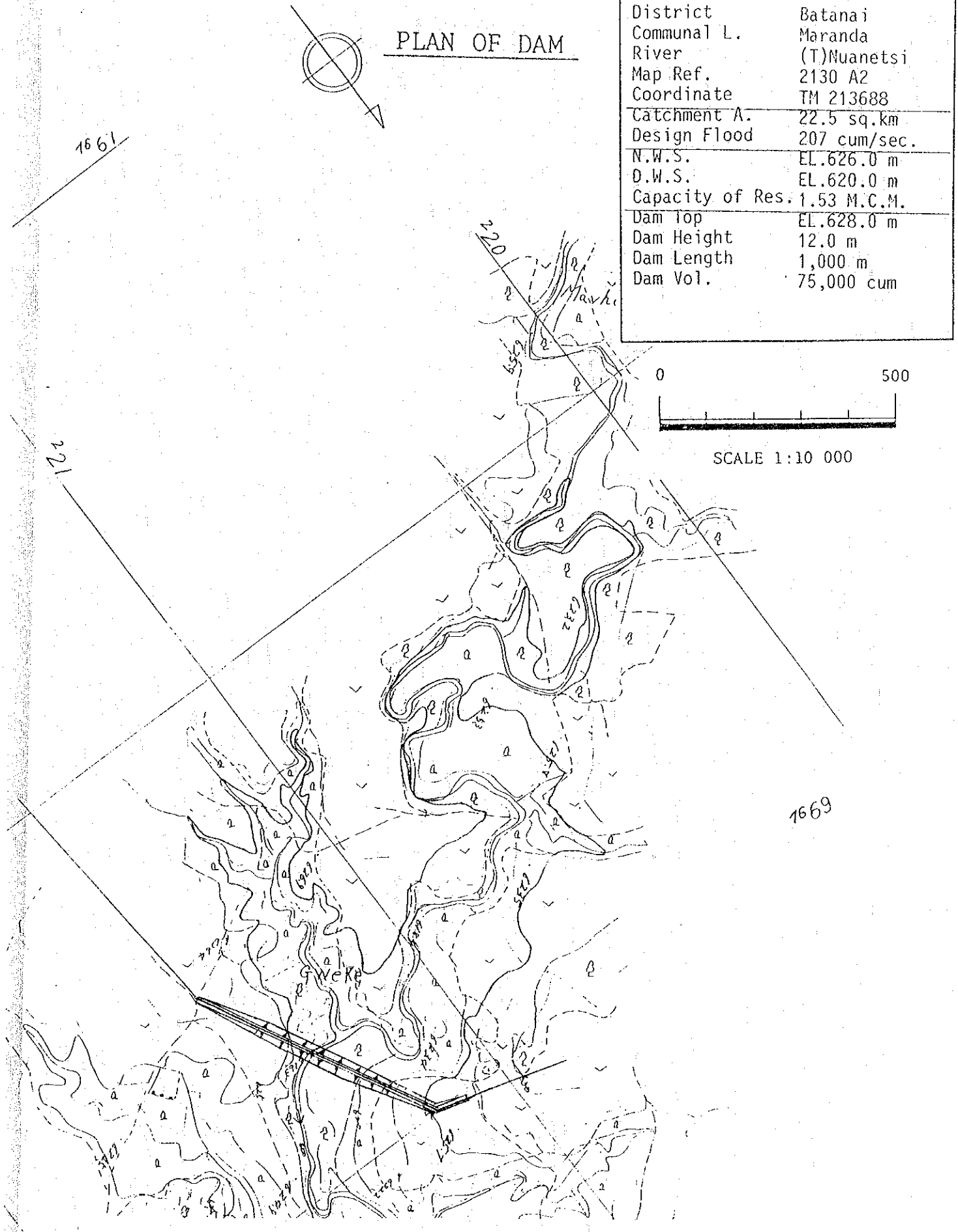
Ward Name	20			Area	8 725 ha
Demography	Population Density			45.3	persons/sq.km
	Family Size			8.4	Persons/household
Agriculture	Arable Area	3 731 ha	Grazing Area		4 994 ha
	Maize	3.2	ha/household	10	bags/ha
	Sorghum	0.8	ha/household	8	bags/ha
	Livestock	5.4	LSUs/household	29.3	LSUs/sq.km
Rural Water Supply	Borehole	0.05	units/sq.km	989	persons/unit
	Well	0.06	units/sq.km	791	persons/unit


GENERAL PLAN
Dam No. I-1-2
Dam Name SIPALA
Catchment Area 22.5 sq.km
1/10 yr. Yield 84 Th.cu.m
Water Conveyance
Method Pumping
Distance 1.0 km
Gross Irrigable Area 5 ha
N
Mukalalwa
Muzondiwa
Mavhevhani
Sipala
Sidakwa
Magomana
Nyongolo
Bambe
Mavhuna
Mzola
Mbazhena
Sikhobo
Ndwambo
Chipwe B.C.
Sipala
Mabudu
LEGEND
Catchment Area
Reservoir
Dam
Pump
Conveyance Canal or Pipe
Night Storage Reservoir
Irrigable Area
SCALE
0
1
2 kilometres

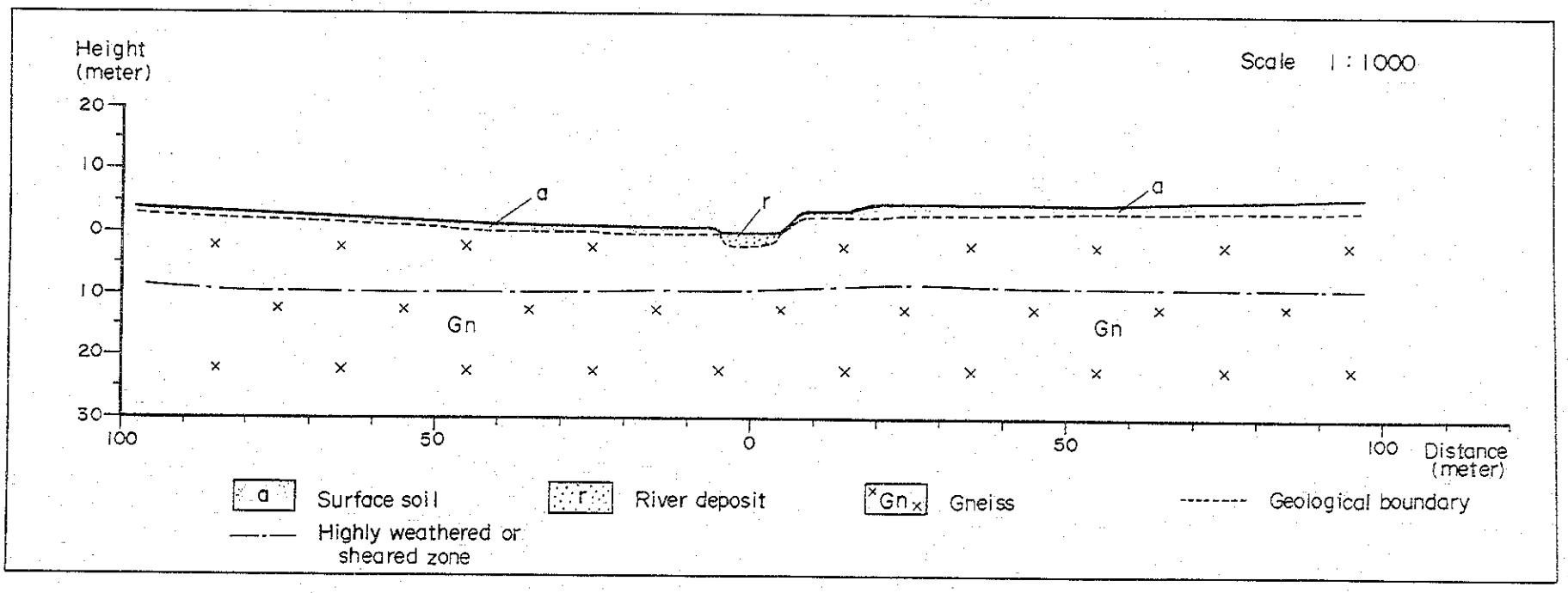
SIPALA

Dam No.	I - 1 - 2
District	Batanai
Communal L.	Maranda
River	(T)Nuanetsi
Map Ref.	2130 A2
Coordinate	TM 213688
Catchment A.	22.5 sq.km
Design Flood	207 cum/sec.
N.W.S.	EL.626.0 m
D.W.S.	EL.620.0 m
Capacity of Res.	1.53 M.C.M.
Dam Top	EL.628.0 m
Dam Height	12.0 m
Dam Length	1,000 m
Dam Vol.	75,000 cum

PLAN OF DAM



I-1-2 Sipala



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

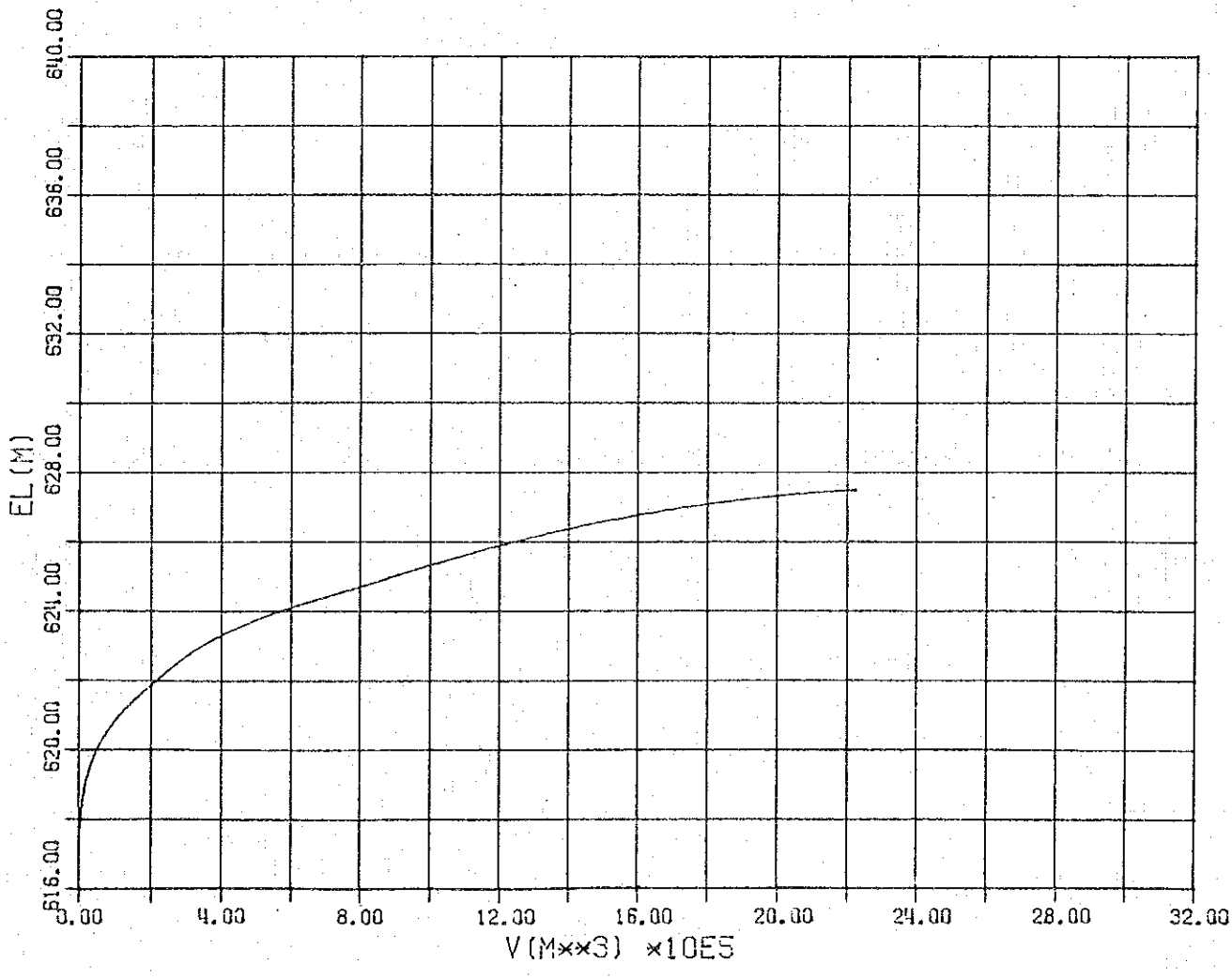
The area is hilly land and appears to be covered by thick surface soil. Many lineaments trending ENE and NS direction are recognized around the damsite.

The bedrock consists of gneiss. It seems that the bedrock is well jointed and leakage through the bedrock is great.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
I-1-2	2130A2	TM	213	688

EL(M)	ΔH(M)	AREA(M2)	AVE(M2)	VOL(M3)	ΣV(1000M3)	NOTE
616.3	0.0	0	0	0	0.00	
617.5	1.2	3500	1750	2100	2.10	
620.0	2.5	35500	19500	48750	50.85	
622.5	2.5	142300	88900	222250	273.10	
625.0	2.5	353600	247950	619875	892.97	
627.5	2.5	712100	532850	1332125	2225.10	



No. I-1-3 Name of Dam Dengenya

Location	District	Batanai		Communal Land	Maranda
	Map Ref.	2130A2		Coordinates	TM291604
Geology	Gneiss, massive and very hard, soils thin				
Hydrology	River	Chiraranya		Hydrological Zone	B-N2
	Catchment Area	21.3	sq.km	M.A. Rainfall	560 mm
	M.A. Runoff	29	mm	Sediment 270	tonnes km^2/yr.
Reservoir	Effective Capacity	0.550	MCM	1/10 Yr. Yield	0.056 MCM
	Dead Capacity	0.090	MCM	D.W.S.	598 m
	Total Capacity	0.640	MCM	N.W.S.	602 m
Dam	Height	10	m	Length	600 m
	Embankment Volume	65 000	cu.m	Spillway	108 m
Agriculture	Natural Region	V		Soil	SCL-SL
	Potential Irrigable Area				30 ha
	Proposed Cropping Pattern			C	
Irrigation	Net Irrigable Area 2.8 ha		Dist. 0.7 km by Pump, H=21.0 m		
	Topography	Area	Undulated		
		Conveyance	Complicated, one river crossing		
Rural Water Supply	Population	621	person		12 cu.m/day
	Livestock	560	unit		25 cu.m/day

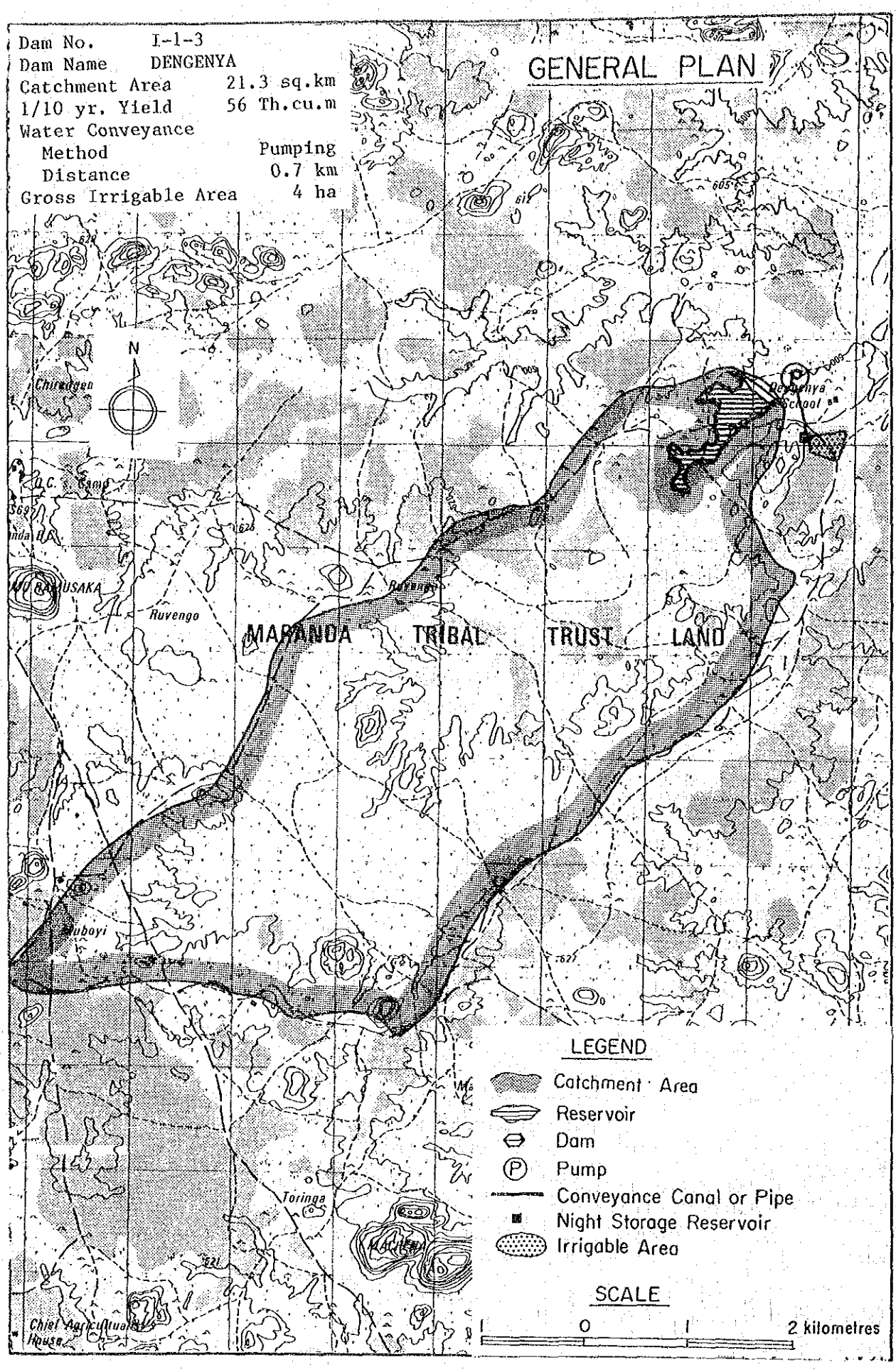
Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class
	Z$ 755 000	Z$ 374 000	Z$ 1 129 000	C
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return	
	Z$ 7 557 /year	Z$ 88 000	–	

Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	N	Y	Y	Y	Y

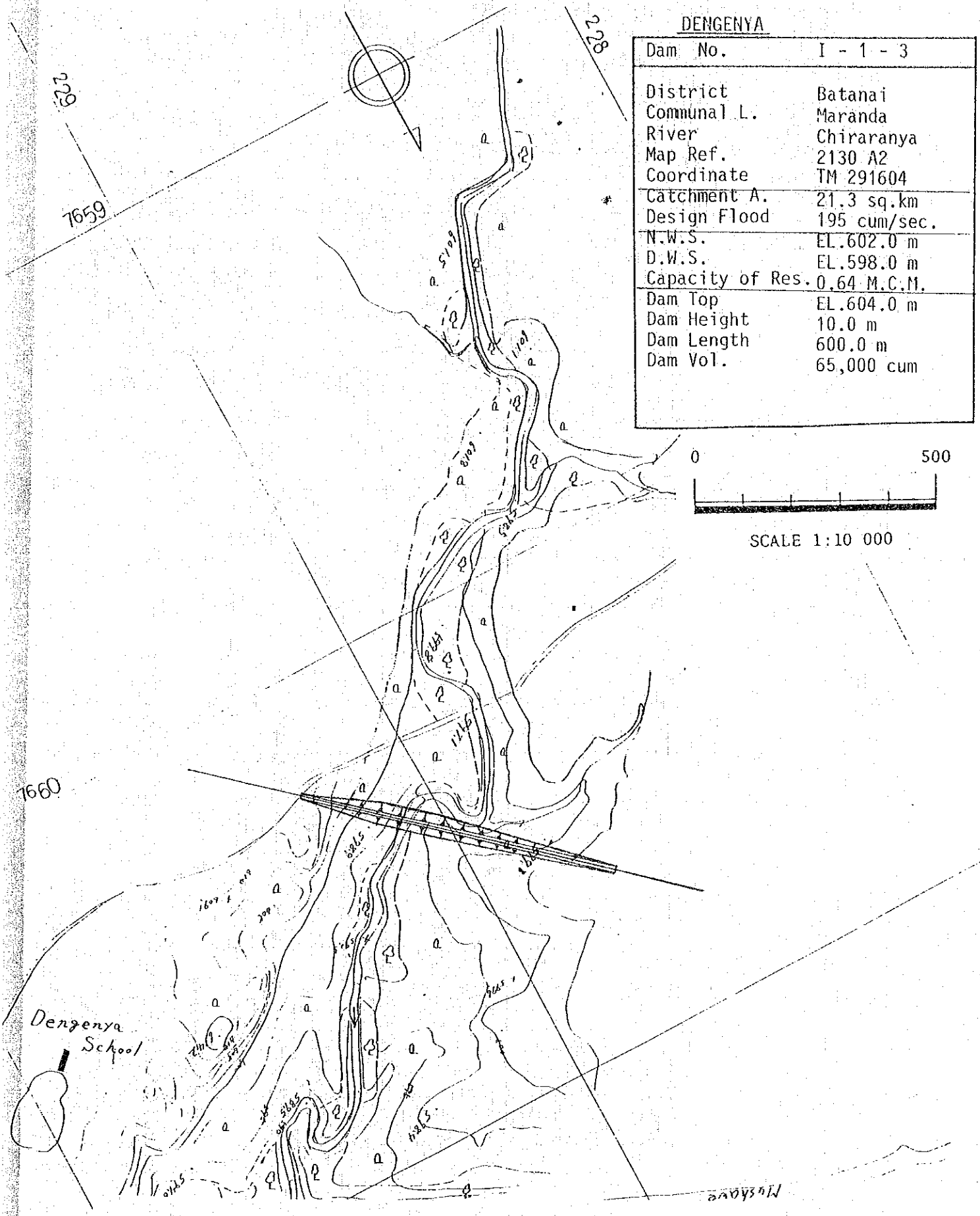
Remarks

Present Condition on the Ward

Ward Name	17			Area	20 625 ha
Demography	Population Density			20.7	persons/sq.km
	Family Size			6.7	Persons/household
Agriculture	Arable Area	9 725 ha	Grazing Area	10 900	ha
	Maize	4.7 ha/household		10	bags/ha
	Sorghum	1.6 ha/household		8	bags/ha
	Livestock	1.8 LSUs/household		5.6	LSUs/sq.km
Rural Water Supply	Borehole	0.02 units/sq.km		853	persons/unit
	Well	N.A units/sq.km		N.A	persons/unit


Dam No. I-1-3
Dam Name DENGENYA
Catchment Area 21.3 sq.km
1/10 yr. Yield 56 Th.cu.m
Water Conveyance
Method Pumping
Distance 0.7 km
Gross Irrigable Area 4 ha
GENERAL PLAN
N
Chirudzen
Dengenya School
A.C.'s Camp
MUBAMUSAKA
Ruvengo
MARANDA TRIBAL TRUST LAND
Mubayi
Toringa
MACHIRA
Chief Agricultural Officer's House
LEGEND
Catchment Area
Reservoir
Dam
Pump
Conveyance Canal or Pipe
Night Storage Reservoir
Irrigable Area
SCALE
0
1
2 kilometres

PLAN OF DAM



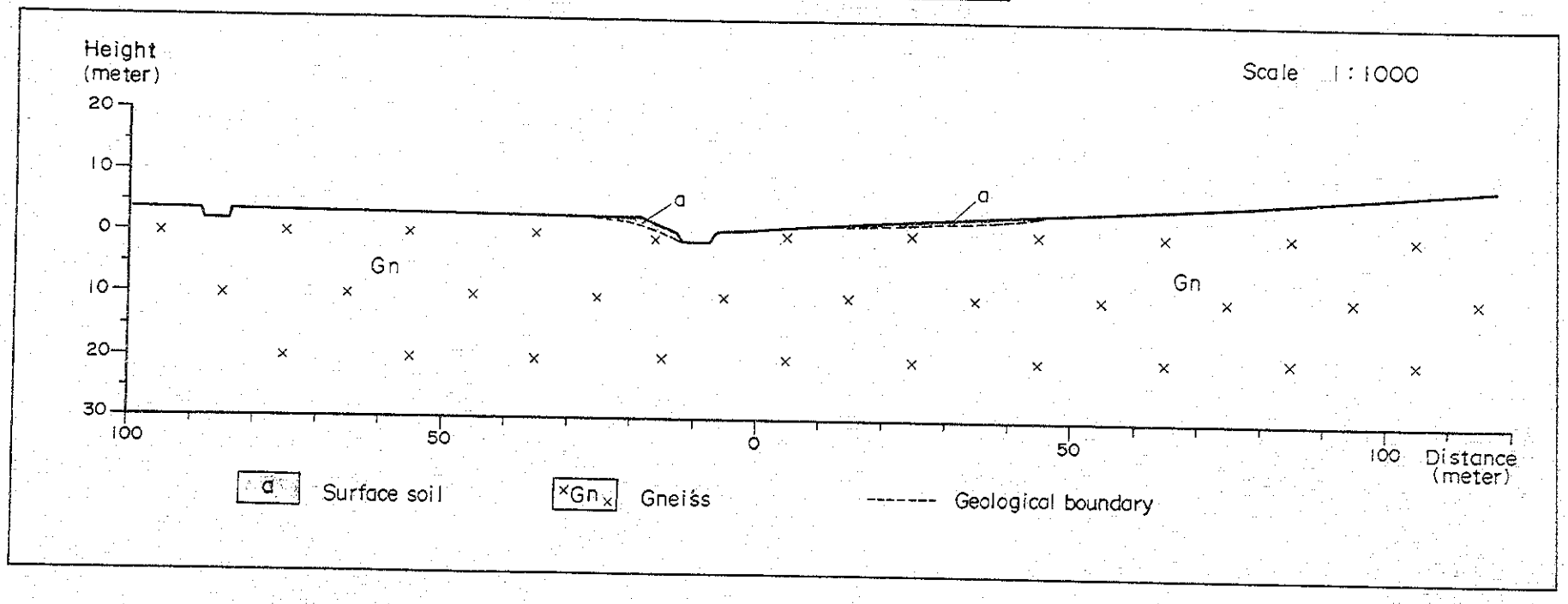
DENGENYA

Dam No.	I - 1 - 3
District	Batanai
Communal L.	Maranda
River	Chiraranya
Map Ref.	2130 A2
Coordinate	TM 291604
Catchment A.	21.3 sq.km
Design Flood	195 cum/sec.
N.W.S.	EL.602.0 m
D.W.S.	EL.598.0 m
Capacity of Res.	0.64 M.C.M.
Dam Top	EL.604.0 m
Dam Height	10.0 m
Dam Length	600.0 m
Dam Vol.	65,000 cum

0 500

SCALE 1:10 000

I-1-3 Dengenya



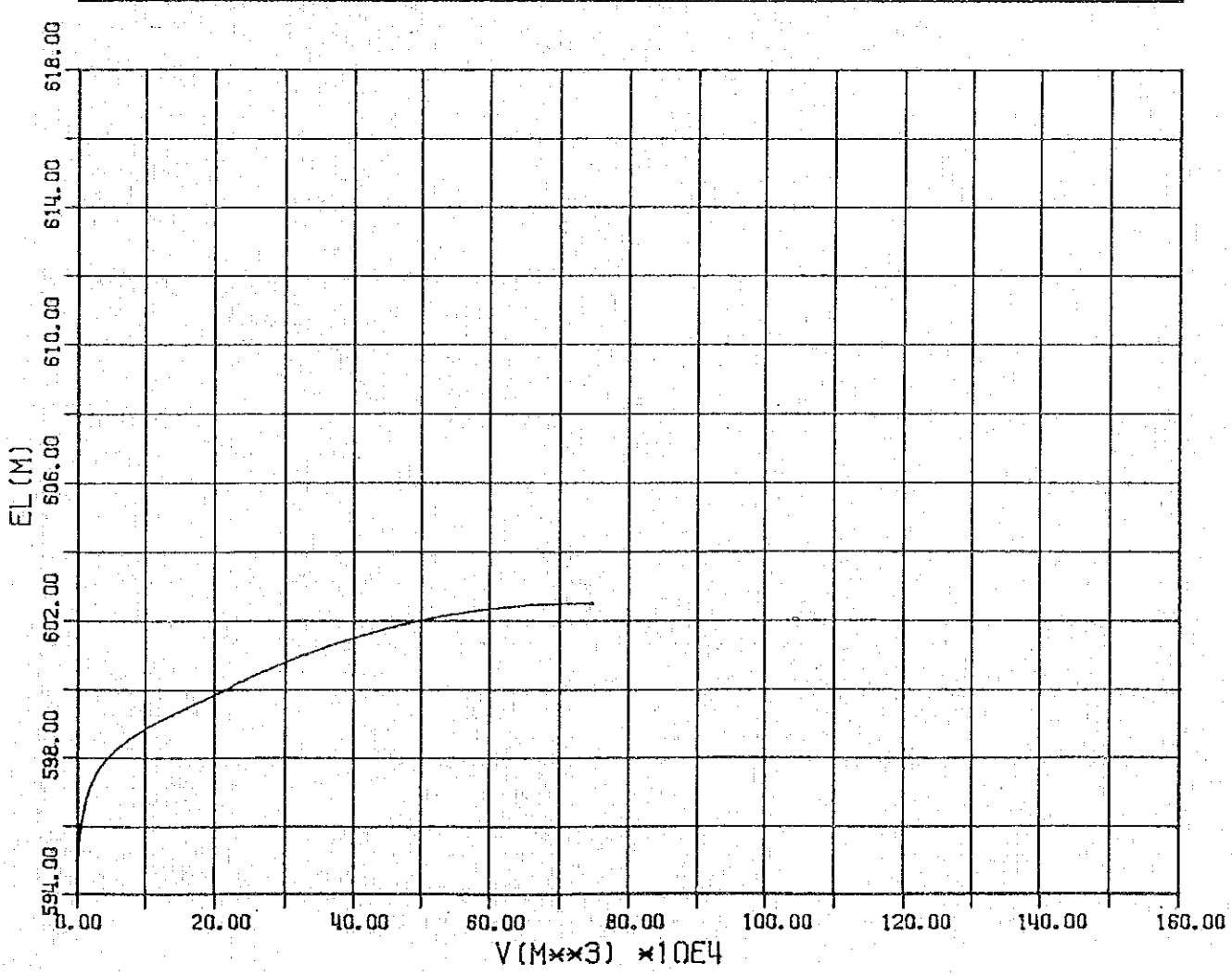
The bedrock consists of gneiss, and around the damsite it is massive, very hard and usually poorly jointed. A part of the bedrock is soft, however the thickness of the soft bedrock seems to be not deep. A photo-lineament trending N45°W direction is recognized about 150 meters down the damsite, however it does not affect dam embankment.

The estimated thickness of unconsolidated deposits is less than 2 meters.

TABLE STØRAGE VØLUME ØF RESERVØIR

NØ	MAP	GRID	VER	HØR
I－1－3	2130A2	TM	291	604

EL(M)	ΔH(M)	AREA(M2)	AVE(M2)	VØL(M3)	ΣV(1000M3)	NØTE
594.0	0.0	0	0	0	0.00	
595.0	1.0	1000	500	500	0.50	
597.5	2.5	19500	10250	25625	26.12	
600.0	2.5	131000	75250	188125	214.25	
602.5	2.5	295400	213200	533000	747.25	



No. I-2-1 Name of Dam Musaverema

Location	District	Batanai		Communal Land	Matibi No.1
	Map Ref.	2030D3		Coordinates	TN397011
Geology	Gneiss, well jointed and soft, leakage seems to be great.				
Hydrology	River	Musaverema		Hydrological Zone	E-L2
	Catchment Area	131.0 sq.km		M.A. Rainfall	580 mm
	M.A. Runoff	34 mm		Sediment	270 tonnes km^2/yr.
Reservoir	Effective Capacity	4.260 MCM		1/10 Yr. Yield	0.801 MCM
	Dead Capacity	0.520 MCM		D.W.S.	675 m
	Total Capacity	4.780 MCM		N.W.S.	680 m
Dam	Height	10 m		Length	1 000 m
	Embankment Volume	105 000 cu.m		Spillway	338 m
Agriculture	Natural Region	V		Soil	SCL
	Potential Irrigable Area				150 ha
	Proposed Cropping Pattern				C
Irrigation	Net Irrigable Area 40.1 ha		Dist. 1.9 km by Gravity		
	Topography	Area	Complicated		
		Conveyance	Complicated, one river crossing		
Rural Water Supply	Population	1 338 person			27 cu.m/day
	Livestock	845 unit			38 cu.m/day

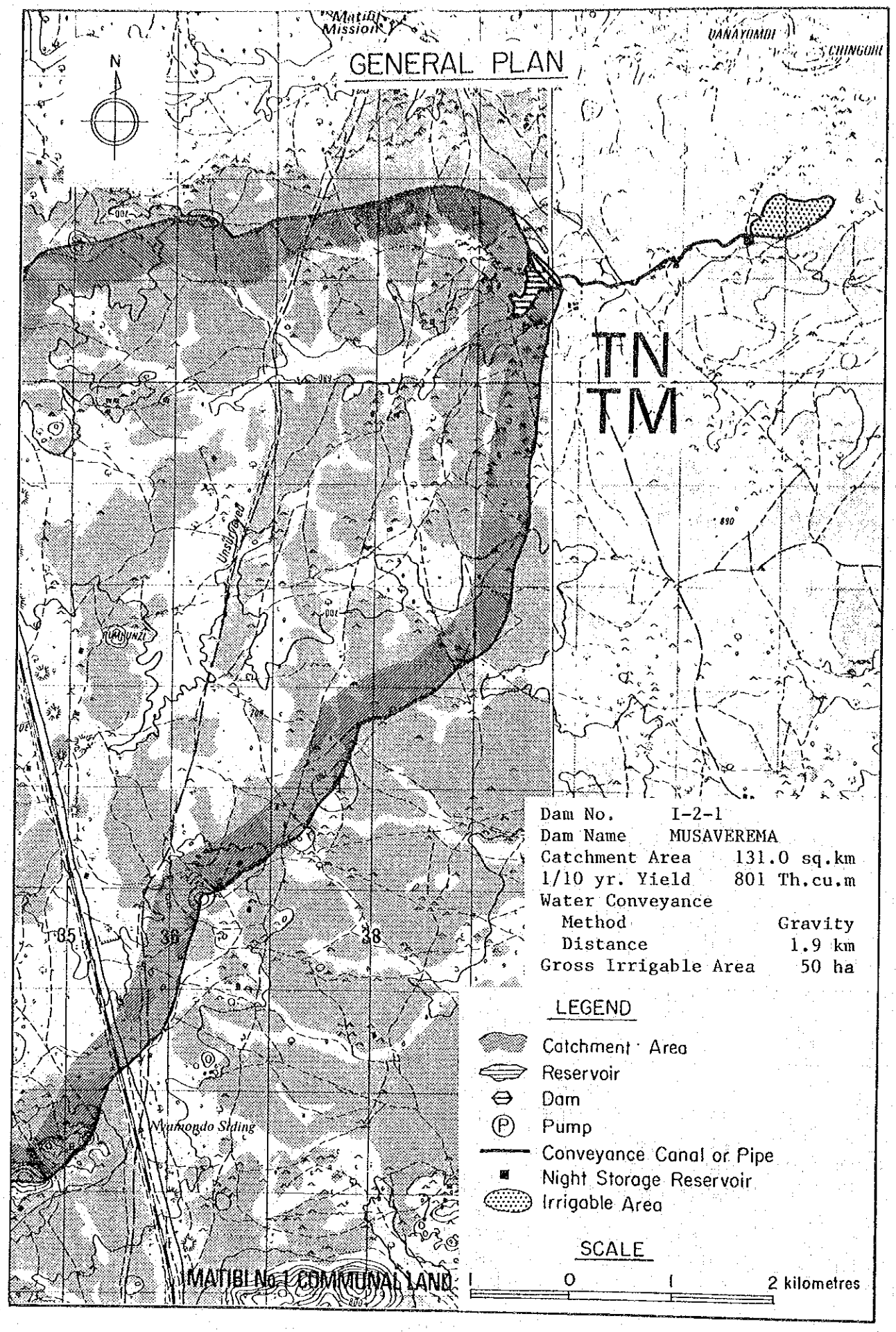
Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class
	Z$ 1 745 000	Z$ 687 000	Z$ 2 432 000	A
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return	
	Z$ 115 927/year	Z$ 348 000	8.9 per cent	

Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	N	N	Y	N	N

Remarks

Present Condition on the Ward

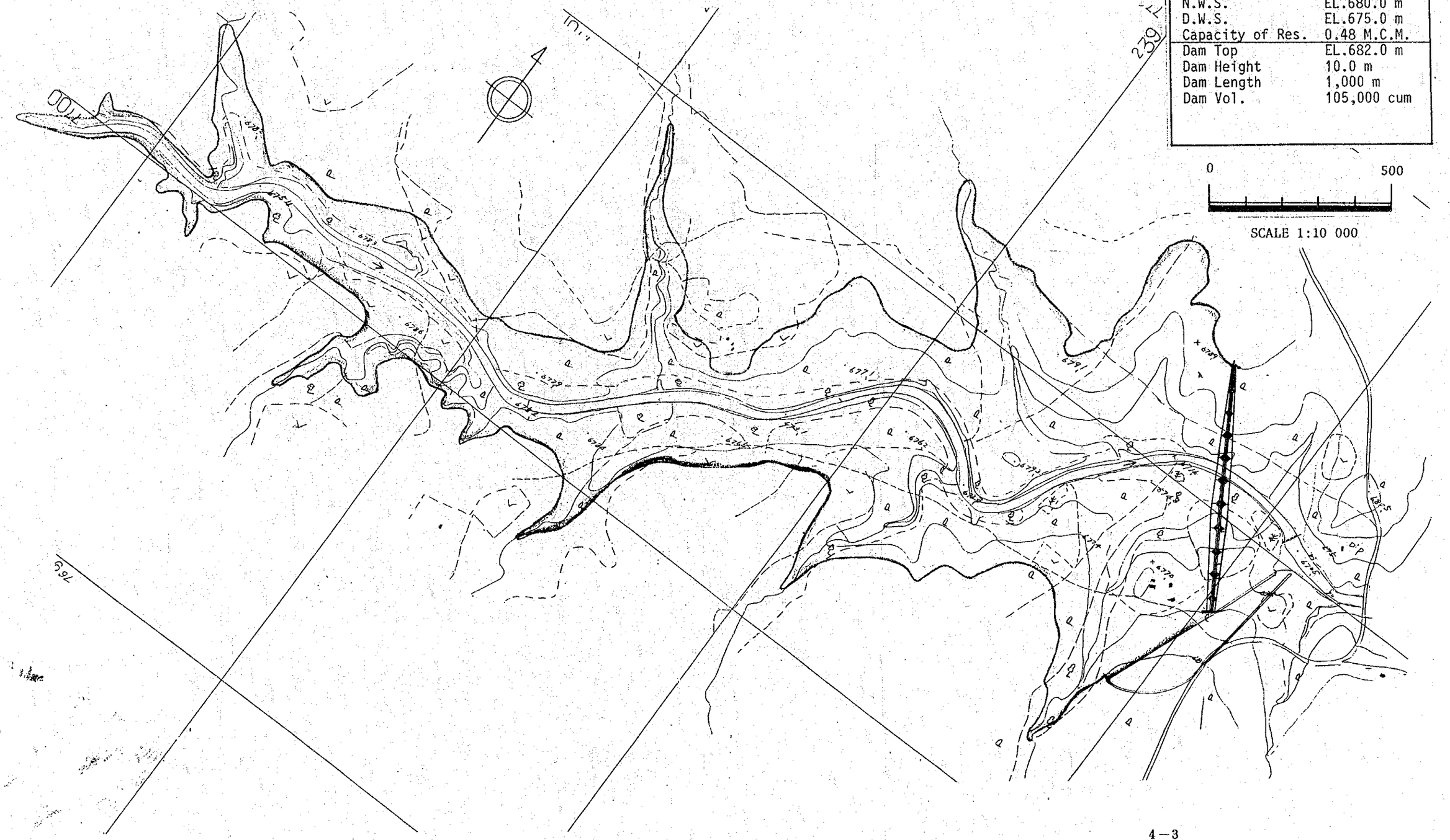
Ward Name	9		Area	8 950 ha
Demography	Population Density			44.6 persons/sq.km
	Family Size			6.9 Persons/household
Agriculture	Arable Area	4 123 ha	Grazing Area	4 827 ha
	Maize	3.2 ha/household		10 bags/ha
	Sorghum	1.4 ha/household		8 bags/ha
	Livestock	2.6 LSUs/household		16.9 LSUs/sq.km
Rural Water Supply	Borehole	0.06 units/sq.km		779 persons/unit
	Well	0.03 units/sq.km		1 332 persons/unit


GENERAL PLAN
N
Matibi Mission
CHINGOMI
TN
TM
Unsurveyed
MUNUNZI
Nyamongo Siding
MATIBI No. 1 COMMUNAL LAND
Dam No. I-2-1
Dam Name MUSAVEREMA
Catchment Area 131.0 sq.km
1/10 yr. Yield 801 Th.cu.m
Water Conveyance
Method Gravity
Distance 1.9 km
Gross Irrigable Area 50 ha
LEGEND
Catchment Area
Reservoir
Dam
Pump
Conveyance Canal or Pipe
Night Storage Reservoir
Irrigable Area
SCALE
0
1
2 kilometres

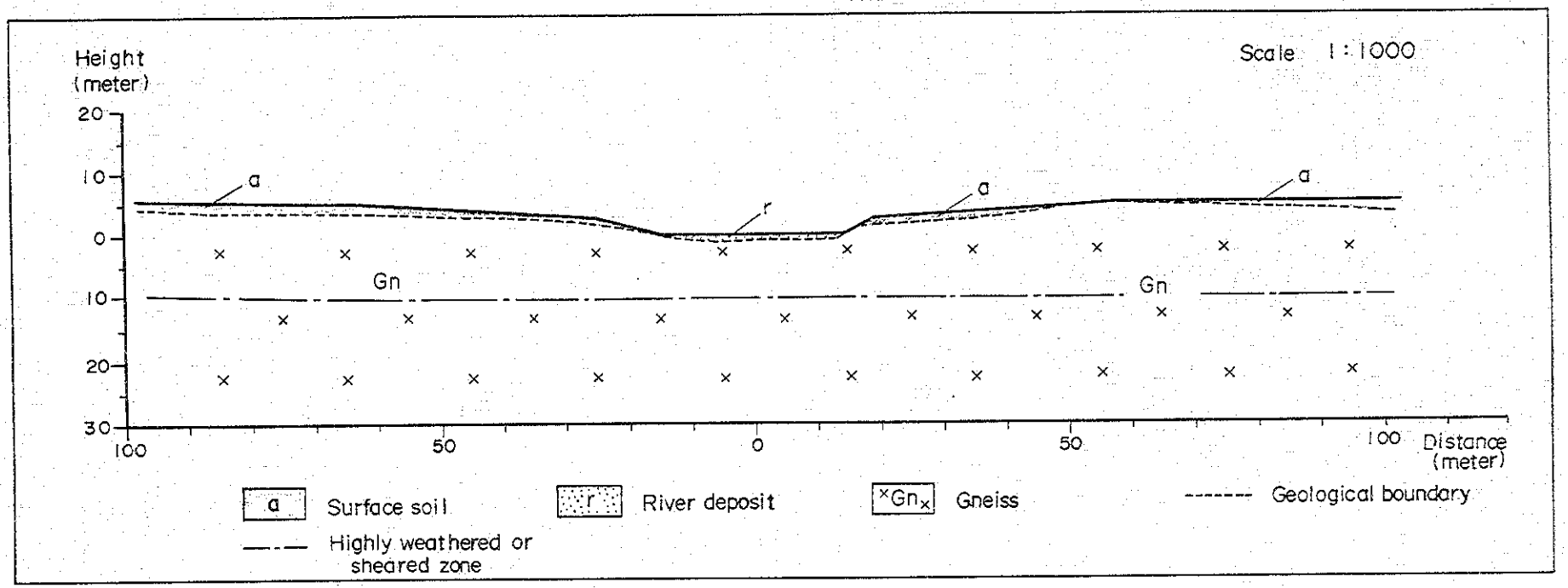
MUSAVEREMA

PLAN OF DAM

Dam No.	I - 2 - 1
District	Batanai
Communal L.	Matibi No.1
River	Musaverema
Map Ref.	2030 D3
Coordinate	TN 397011
Catchment A.	131.0 sq.km
Design Flood	609.0 cum/sec
N.W.S.	EL.680.0 m
D.W.S.	EL.675.0 m
Capacity of Res.	0.48 M.C.M.
Dam Top	EL.682.0 m
Dam Height	10.0 m
Dam Length	1,000 m
Dam Vol.	105,000 cum



I-2-1 Musaverema



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

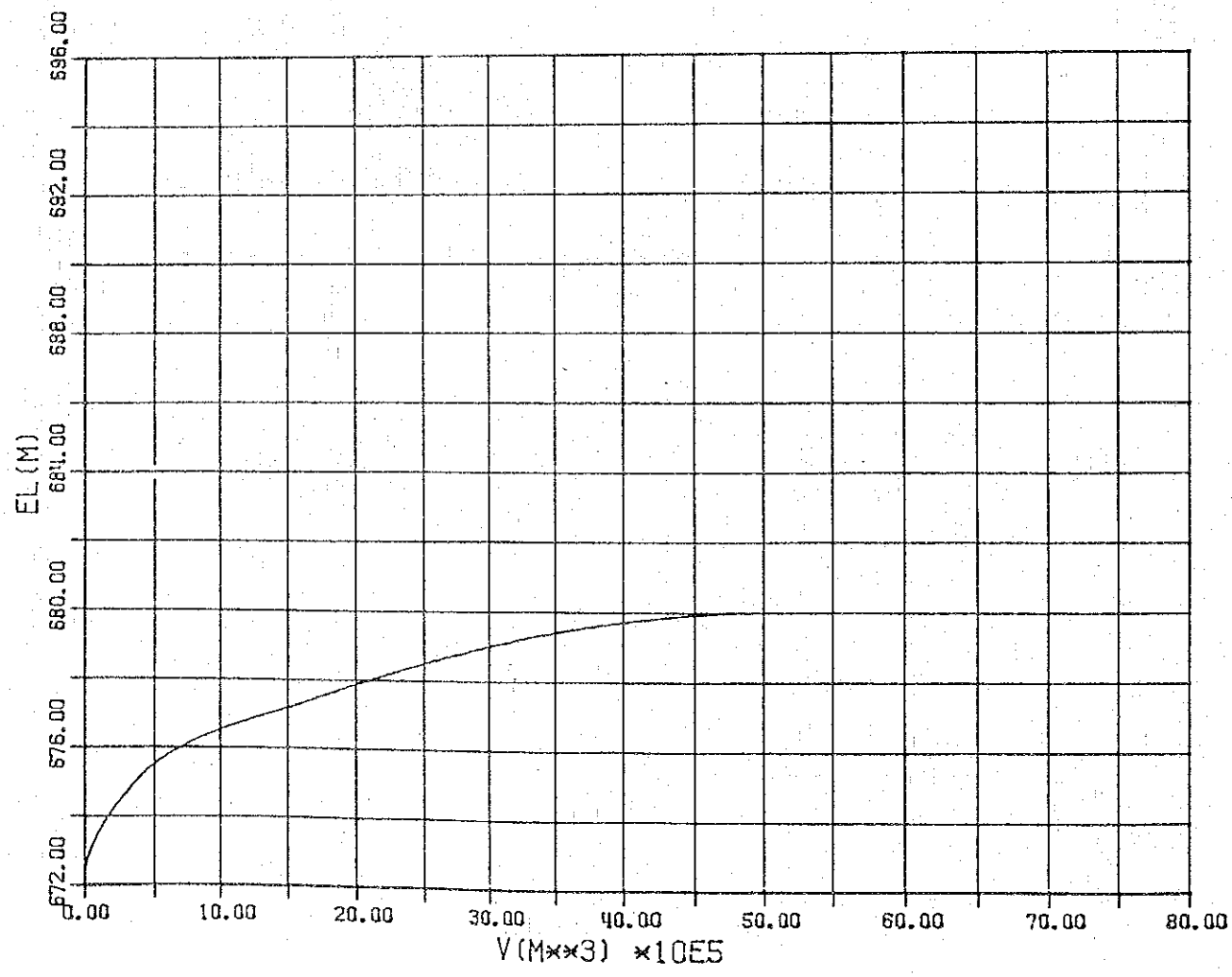
The area is very flat land, and the Musaverema River forms shallow and wide flood plane and flows relatively straight.

The bedrock consists of gneiss. Because photographic textures and lineations are recognized around the damsite, it seems that the bedrock is well jointed and soft, and leakage through the bedrock is great.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
I-2-1	203003	TN	397	010.5

EL.(M)	ΔH(M)	AREA(M2)	AVE(M2)	VOL.(M3)	ΣV(1000M3)	NOTE
672.0	0.0	0	0	0	0.00	
672.5	0.5	35300	17650	8825	8.82	
675.0	2.5	246400	140850	352125	360.95	
677.5	2.5	850500	548450	1371125	1732.07	
680.0	2.5	158579	121814	3045375	4777.45	



No. I-2-2 Name of Dam Zvirikure

Location	District	Batanai		Communal Land	Matibi No.1
	Map Ref.	2030D3		Coordinates	TM500868
Geology	Gneiss, massive and very hard. Abundant lineaments are recognized above the site.				
Hydrology	River	Chivaka		Hydrological Zone	E-L2
	Catchment Area	25.0	sq.km	M.A. Rainfall	650 mm
	M.A. Runoff	51	mm	Sediment	270 tonnes km^2/yr.
Reservoir	Effective Capacity	2.450	MCM	1/10 Yr. Yield	0.447 MCM
	Dead Capacity	0.100	MCM	D.W.S.	625 m
	Total Capacity	2.550	MCM	N.W.S.	635 m
Dam	Height	17	m	Length	510 m
	Embankment Volume	199 000	cu.m	Spillway	121 m
Agriculture	Natural Region	IV		Soil	SL
	Potential Irrigable Area				30 ha
	Proposed Cropping Pattern			D	
Irrigation	Net Irrigable Area 22.4 ha			Dist. 2.4 km by Gravity	
	Topography	Area		Undulated	
		Conveyance		Complicated	
Rural Water Supply	Population	1 608	person		32 cu.m/day
	Livestock	480	unit		22 cu.m/day

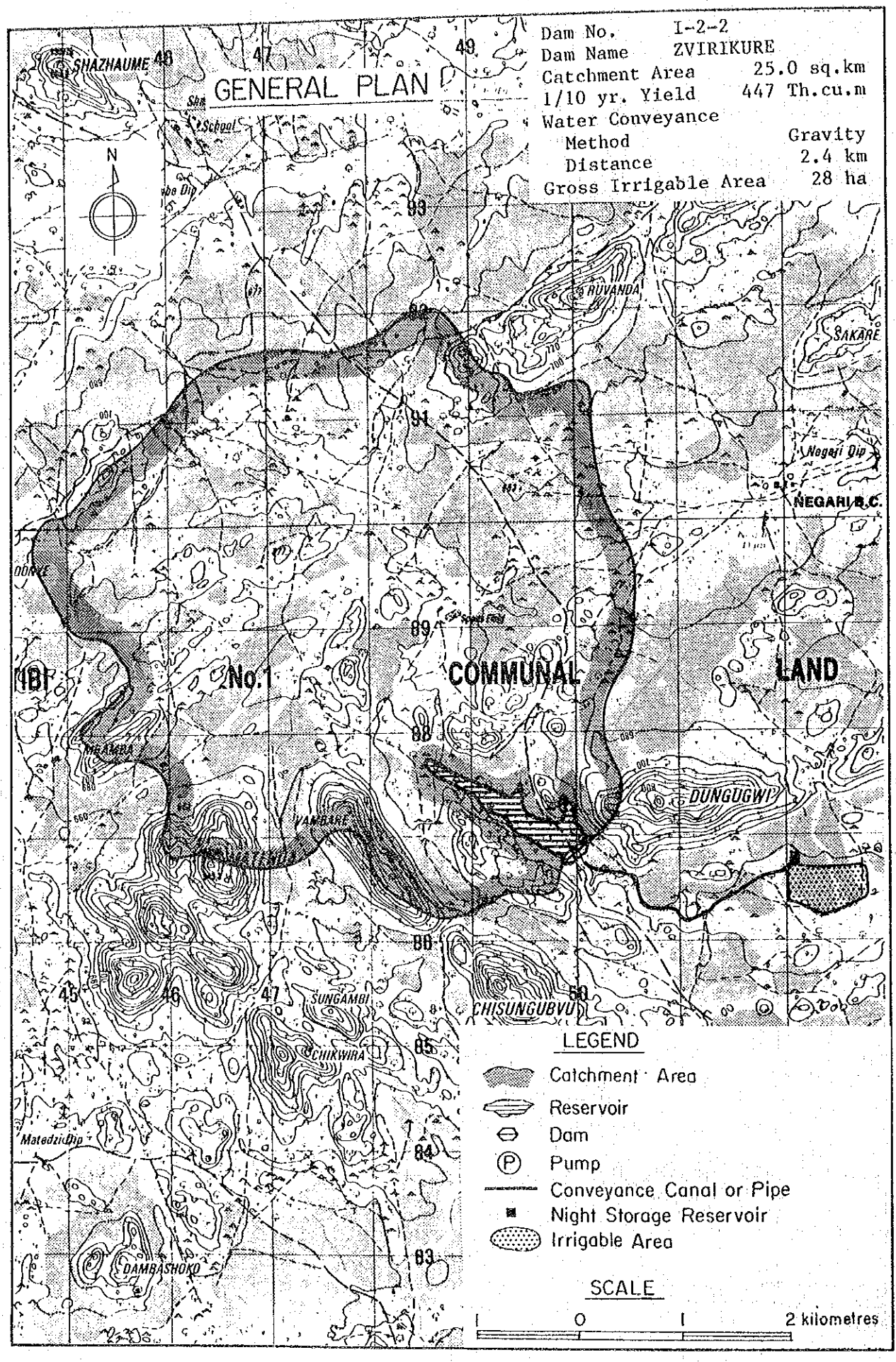
Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class
	Z$ 1 966 000	Z$ 653 000	Z$ 2 619 000	B
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return	
	Z$ 50 796 /year	Z$ 591 000	2.1 per cent	

Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
	Y	Y	Y	Y	Y

Remarks

Present Condition on the Ward

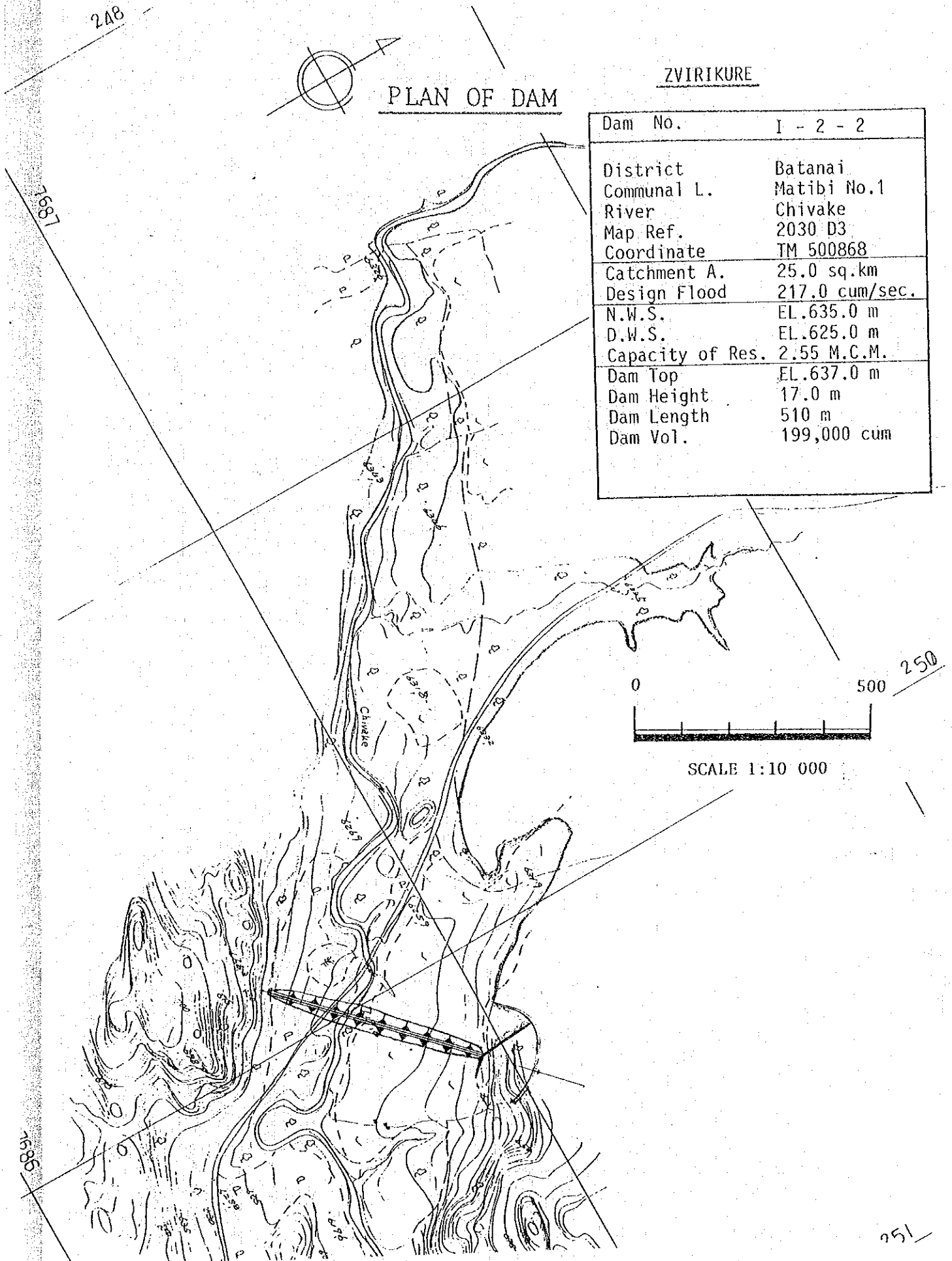
Ward Name	1, 3			Area (4 625 + 9 562) ha	
Demography	Population Density			53.6	persons/sq.km
	Family Size			7.5	Persons/household
Agriculture	Arable Area (2 125 + 4 230) ha			Grazing Area (2 500+5 332) ha	
	Maize	2.7	ha/household	10	bags/ha
	Sorghum	1.0	ha/household	8	bags/ha
	Livestock	1.4	LSUs/household	9.6	LSUs/sq.km
Rural Water Supply	Borehole	0.05	units/sq.km	976	persons/unit
	Well	0.03	units/sq.km	2 228	persons/unit


GENERAL PLAN
Dam No. I-2-2
Dam Name ZVIRIKURE
Catchment Area 25.0 sq.km
1/10 yr. Yield 447 Th.cu.m
Water Conveyance
Method Gravity
Distance 2.4 km
Gross Irrigable Area 28 ha
SHAZHAUME
RUVANDA
SAKARE
Negari Dip
NEGARI R.C.
No.1
COMMUNAL
LAND
MEAMBA
VAKWARE
DUNGUGWI
CHISUNGUBVU
SUNGAMBI
CHIKWIRA
Matedzi Dip
DAMBASHOKO
LEGEND
Catchment Area
Reservoir
Dam
Pump
Conveyance Canal or Pipe
Night Storage Reservoir
Irrigable Area
SCALE
0
1
2 kilometres

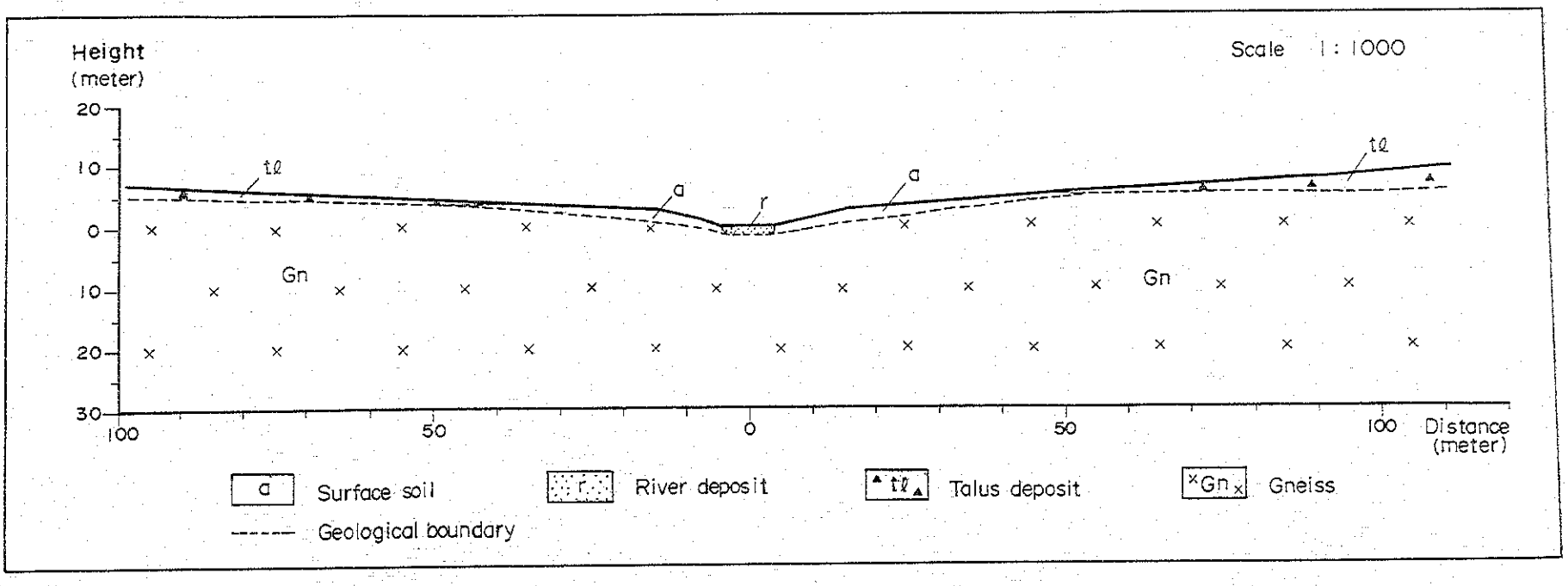
PLAN OF DAM

ZVIRIKURE

Dam No.	I - 2 - 2
District	Batanai
Communal L.	Matibi No.1
River	Chivake
Map Ref.	2030 D3
Coordinate	TM 500868
Catchment A.	25.0 sq.km
Design Flood	217.0 cum/sec.
N.W.S.	EL.635.0 m
D.W.S.	EL.625.0 m
Capacity of Res.	2.55 M.C.M.
Dam Top	EL.637.0 m
Dam Height	17.0 m
Dam Length	510 m
Dam Vol.	199,000 cum



I-2-2 Zvirikure



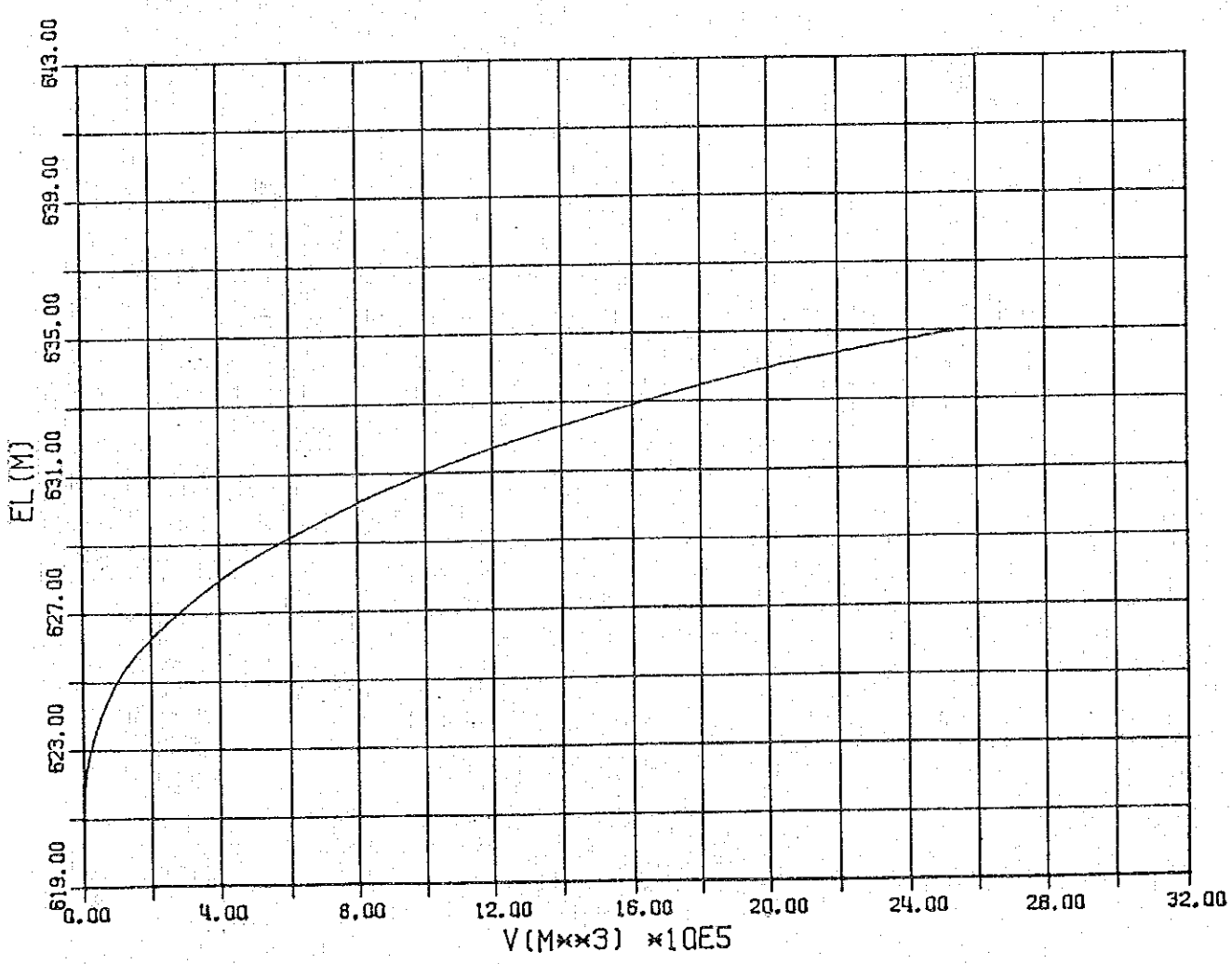
The bedrock consists of gneiss, and around the damsite it is very hard and poorly jointed. Abundant photo-lineaments trending N60°W and N30°E direction are recognized, and one of them runs across the damsite. Leakage through the bedrock seems to be large.

Talus deposits are distributed on both banks, and the estimated thickness of them is maximum 5 meters. The riverbed deposits seems to be maximum 3 meters thick.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
1-2-2	203003	TM	500	868

EL(M)	ΔH(M)	AREA(M2)	AVE(M2)	VOL(M3)	ΣV(1000M3)	NOTE
619.8	0.0	0	0	0	0.00	
622.5	2.7	9034	4517	12196	12.20	
625.0	2.5	60849	34942	87354	99.55	
627.5	2.5	132094	96472	241179	340.73	
630.0	2.5	211369	171732	429329	770.06	
632.5	2.5	342316	276843	692106	1462.16	
635.0	2.5	538319	440318	1100793	2562.96	



No. I-2-3 Name of Dam Chingami

Location	District	Batanai		Communal Land	Matibi No.1
	Map Ref.	2030D3		Coordinates	TM528822
Geology	Gneiss, massive and very hard.				
Hydrology	River	Shache		Hydrological Zone	E-L2
	Catchment Area	36.2	sq.km	M.A. Rainfall	650 mm
	M.A. Runoff	51	mm	Sediment	270 tonnes km^2/yr.
Reservoir	Effective Capacity	1.160	MCM	1/10 Yr. Yield	0.277 MCM
	Dead Capacity	0.140	MCM	D.W.S.	598 m
	Total Capacity	1.300	MCM	N.W.S.	602 m
Dam	Height	12	m	Length	600 m
	Embankment Volume	102 000	cu.m	Spillway	152 m
Agriculture	Natural Region	IV		Soil	L-C
	Potential Irrigable Area				150 ha
	Proposed Cropping Pattern			C	
Irrigation	Net Irrigable Area 13.9 ha		Dist. 1.7 km by Pump, H=22.0 m		
	Topography	Area	Slightly sloping		
		Conveyance	Slightly sloping, one river crossing		
Rural Water Supply	Population	1 287	person		26 cu.m/day
	Livestock	570	unit		26 cu.m/day

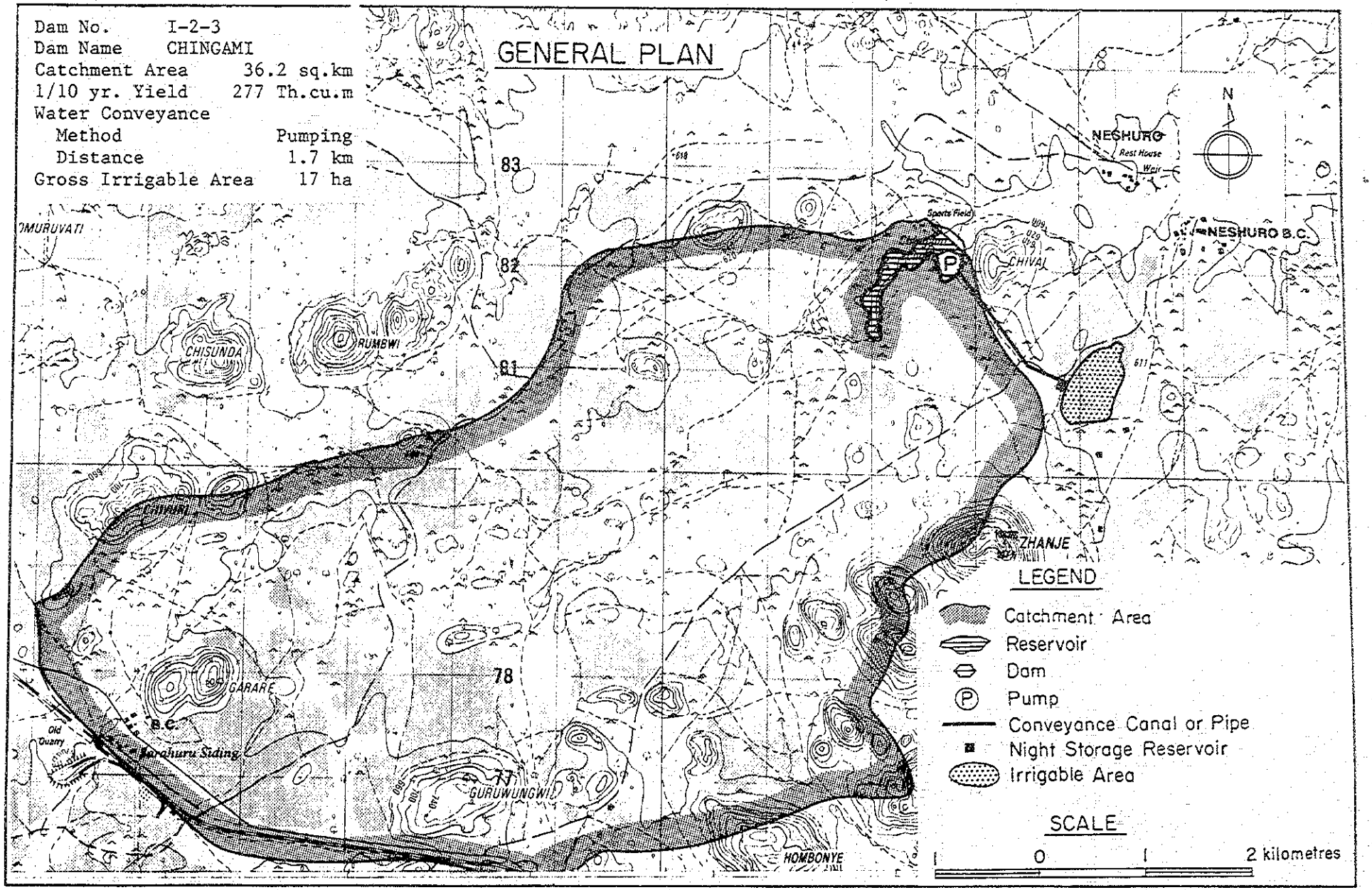
Cost and Benefit	Dam	Irrigation Facilities	Total Cost	Class
	Z$ 1 118 000	Z$ 962 000	Z$ 2 080 000	B
	Annual Increment Benefit	Net Present Value	Economic Internal Rate of Return	
	Z$ 45 021 /year	Z$ 523 000	1.3 per cent	

Visit	Dam Engineer	Geologist	Irrigation Engineer	Agronomist	Economist
		Y	Y	Y	Y

Remarks

Present Condition on the Ward

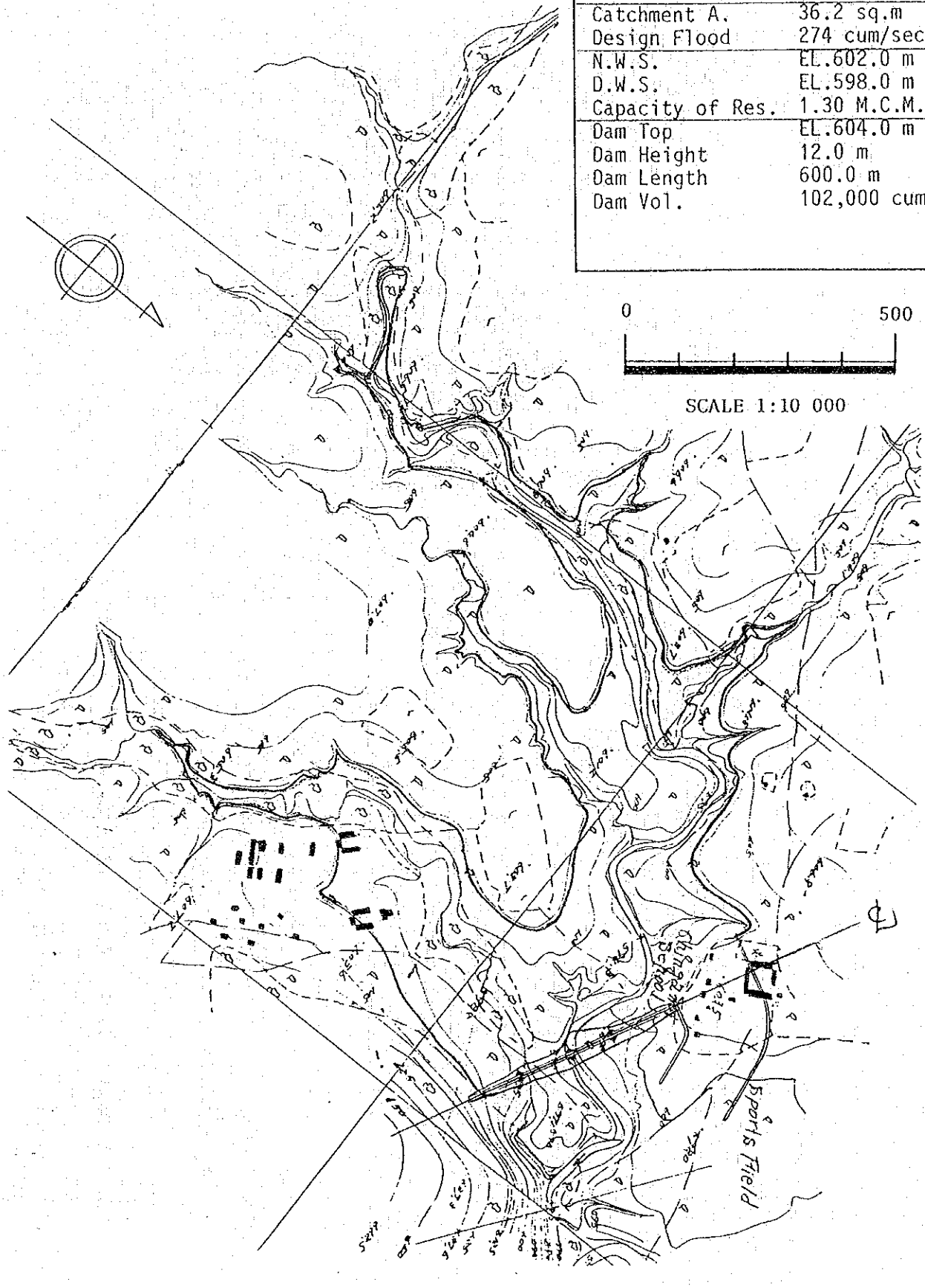
Ward Name	4			Area	8 628	ha
Demography	Population Density				42.9	persons/sq.km
	Family Size				7.1	Persons/household
Agriculture	Arable Area	4 312	ha	Grazing Area	4 316	ha
	Maize	3.8	ha/household		10	bags/ha
	Sorghum	1.1	ha/household		8	bags/ha
	Livestock	1.9	LSUs/household		11.4	LSUs/sq.km
Rural Water Supply	Borehole	0.09	units/sq.km		463	persons/unit
	Well	0.01	units/sq.km		3 705	persons/unit


Dam No. I-2-3
Dam Name CHINGAMI
Catchment Area 36.2 sq.km
1/10 yr. Yield 277 Th.cu.m
Water Conveyance
Method Pumping
Distance 1.7 km
Gross Irrigable Area 17 ha
GENERAL PLAN
N
NESHURO
Rest House
Weir
NESHURO B.C.
Sports Field
CHIVAI
MURUVATI
CHISUNDA
RUMBWI
CHIHARI
ZHANJE
GARARE
B.C.
Old Quarry
Karahuru Siding
GURUWUNGWI
HOMBONYE
83
82
81
78
77
LEGEND
Catchment Area
Reservoir
Dam
Pump
Conveyance Canal or Pipe
Night Storage Reservoir
Irrigable Area
SCALE
0
1
2 kilometres

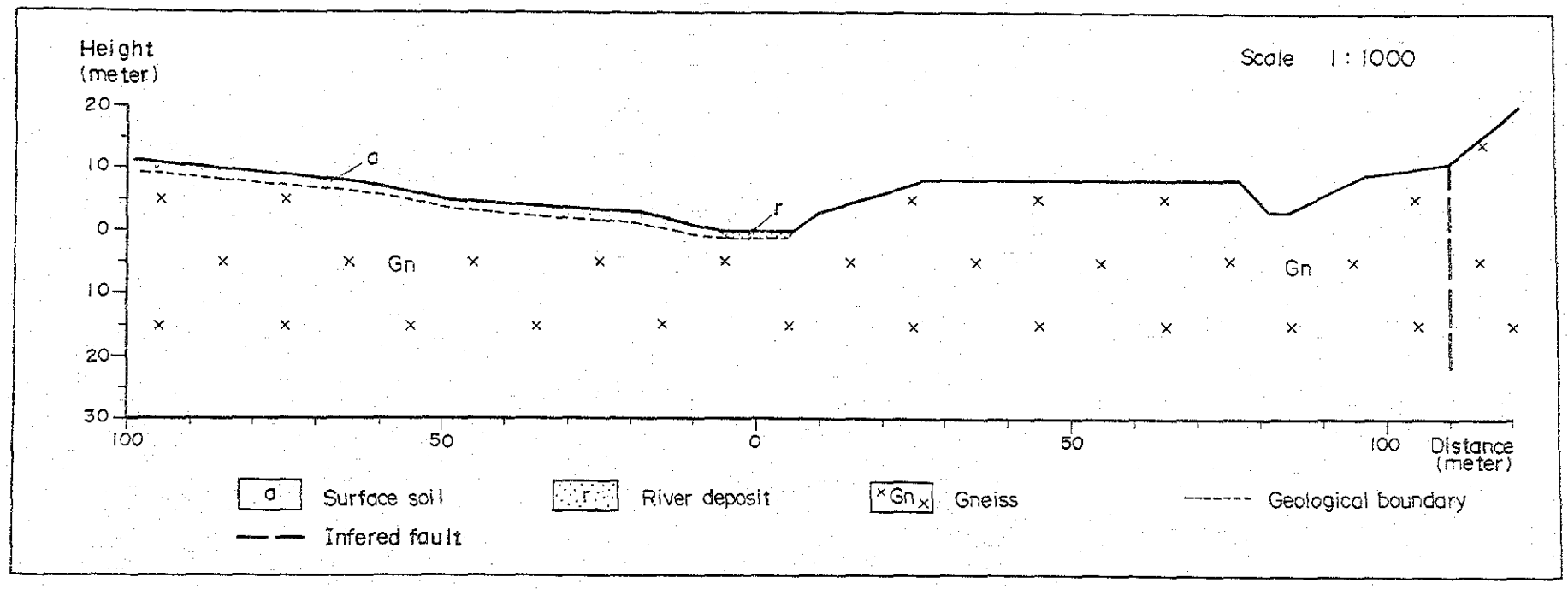
CHINGAMI

PLAN OF DAM

Dam No.	I - 2 - 3
District	Batanai
Communal L.	Matibi No.1
River	Shache
Map Ref.	2030D3
Coordinate	TM528822
Catchment A.	36.2 sq.m
Design Flood	274 cum/sec.
N.W.S.	EL.602.0 m
D.W.S.	EL.598.0 m
Capacity of Res.	1.30 M.C.M.
Dam Top	EL.604.0 m
Dam Height	12.0 m
Dam Length	600.0 m
Dam Vol.	102,000 cum



I-2-3 Chingami



The bedrock consists of gneiss, and it is massive, very hard and poorly jointed.

A small scale lineament, which intersects the damsite in about 90°, is recognized on airphotos. It seems that leakage through the bedrock is small and bearing strength in the foundation strata is in the safety side for the dam embankment.

The surface soil of the right bank of the damsite seems to be maximum 3 meters thick.

TABLE STORAGE VOLUME OF RESERVOIR

NO	MAP	GRID	VER	HOR
I－2－3	2030D3	TM	528	822

EL(M)	ΔH(M)	AREA(M2)	AVE(M2)	VOL(M3)	ΣV(1000M3)	NOTE
591.5	0.0	0	0	0	0.00	
592.5	1.0	3500	1750	1750	1.75	
595.0	2.5	20500	12000	30000	31.75	
597.5	2.5	73000	46750	116875	148.62	
600.0	2.5	233500	153250	383125	531.75	
602.5	2.5	468000	350750	876875	1408.62	
605.0	2.5	916500	692250	1730625	3139.25	
607.5	2.5	1331000	112374	2809375	5948.62