The control of the	Marie   Mari			Total		Thick	Thickness of main	Aquifer		Groundwater	r Depth		Specific	Depth		Plain C	asıng	Performed	Casing .	Depth
17   17   17   17   17   17   17   17	This continue		- FEE	Ē.	Lithology	-		Total	Man	FIRS SITUCK	Startic	Yield	Capacity	of Pump	Diameter	From	ġ	From	ı—	of Bottom
Control   Cont	Column   C		<del></del> -	Ê				Thickness.	Supply	(C.L.m)	(G.Lm)	(ks)	(m2/day)	Intake	(mm)	(C.LII)	(C.Lii)	(G.Lm)	<u> </u>	of Cassing
Vol. 0. statistics         450.0. statistics	10.00   10.0		u-Kum	8.30	Sundstone	30.00	25.00	23.00	35.00	30,00	<u> </u>	ķ	55.00	Bile	100	000			4	
The continue	Total controls         Ann. A surface         Ann. A		M-Rural	8	sandstone	45.00	55.00	0.00	8.8	90,04	7.10	1.17	1.88	61,00	150	000				2.46
## 5.000 scheler	March   Marc	•	A-Kura	8	sandstone	40.00 0.00	70,00	30.00	00'0	40.00	25.00	 ;;	2.43	65.00	ø	800				000
## 0.00 chief	0.00         China         10.00         10.00         10.00         10.00         10.00         10.00         10.00         10.00         10.00         10.00         10.00         10.00		ayya.	8 3	X S	8.00	27.00	800	8.00	17.00	.80 08.4	0.91	1.26	67,00	<u>S</u>	0.0				62.78
## 50.00 cells	## 500 celes   500		shya 1	8.8	schist	8,99	888	8.5	83	85	18.20	8	(4)	57.80	S	80				55.79
6.00 celes (e.g. 100 oct.) (a) 0.00 oct.) (b) 0.00 oct.) (c) 0.00	6.00 celes (e.g. 1)		ahan.	3 5	Schist.	88	38	3.8	300	9,6	9 9	3 5	00,191	27.00	130	8				27.40
March   Marc	March   Marc		shva	8	schie	30.00	8	2 2 2	8 9	3 5	2.5	8 8	y 4	8	2 5	8 8				8,48
4.00. So civit         3.00. S	4. Max on this state of the state	, ,	E. 13	8	Khis	3,00	55.00	00.01	5.00	00'0	99.5	3 8	<u>.</u>	288	3 5	3 8				3 3
4. Sass deviler         13.00         61.00         61.00         61.00         61.00         61.00         62.00	4. State entire         10.00         6.10	-	Z,LA	9000	schist	53.00	9	0	23.00	100	1.65	2	3 :	86.6	3 5	3 8				9
a. 50.00 estile         13.75 gradie         13.75 grad	a. 5. May a partie         C. 1.0.         51.52 partie         C. 1.0.	c	. ag	54,86	schist	30.00	42.00	12.00	30.00	18.20	10.60	2,10	383.00	8 2	Ş	38				26
L. C.	Month of the control of the	- 6	a de	5.82	granite	5	2	39.63	12.19	12.19	9	63	0.63	3	Ş	38				200
th         6,000 profile         35,00         55,00	th         60.00 exists         10.00 exists		io!		schist	30.00	53.30	23.30	30.00	90	8	22	0,0	3	Ş	88				35.00
## 6500 civil 5100 5100 1500 1500 1500 1500 1500 150	4, 6, 500 coloris         5, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10	Ċ	olog		schist	30.00	25.00	25.00	000	8	9	5	8	2,3	3 5	3 8				97.67
## 6500 winds \$110 \$170 \$170 \$170 \$170 \$170 \$170 \$170	## 5550 wind		ploa		oranie	92.92	25.00	00 61	20.51	2	Ş		ě	5	3,5	3 8				2,5
6.00 parties         1.00 parties<	400         Series         199         100<				- Chipse	200	5	3 5	200	200	3 5	3 5		3.75	ġ,	8				29.60
## 5500 sand   1,50   1,00   4,00   1	## 500 small   1,00   1				Action 1	3 6	3 5	3 5	3 5	3 6	2	, i	<del>-</del>	3	00.	000				32,30
## 4-300 gardine   1,000   4,000   1,5	4.000         Small         110         5.000         1.50         <	_			granice	2	88	2 6	000	3.	2	ó	3.40	1	947	8				45,00
41-30 granite 1300 4,000 1300 1300 1430 4430 1000 1000 1000 1	14.50 granite 1500 1500 1500 1500 1500 1500 1500 150		# A		Zi.N	8	3.5	8.5	2,00	8	10.45	S;	5.42	53.50	152	000				42,80
13.00 anied 15.00	25.35 granite 15.00 13.00 13.00 13.00 13.00 14.75 2.00 11.00 13.00 10.00	•	다		granite	8	8	2.10	8	<u>ક</u>	8	<del>4</del> જુ	20.50	39.43	891	00'0				41.50
3.55.3 granife         13.00         2.100         13.00	33.53 granite         13.00	ō.	ata		Sand	15.00	8	8	8.0	15.00	14.75	ä	8 =	38.88	891	00'0				20.34
25.55 granite 4500 1200 2000 4500 1310 1515 1510 1515 1518 1518 1518 1518 15	35.55 granifie 4.00 12.00 6.00 13.00 13.0 13.0 13.0 13.0 13.0 13.0	•	eta eta		granite	8.5	21.09	8.09	5 1.8	3.8	0.50	033	0.76	28.60	152	000			- 1	26.77
2535 grante 6.00 23.00 12.00 6.00 12.00 4.00 12.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13	25.35 grante 6.00 21.00 12.00 6.00 12.00 4.00 12.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13	ᇗ	¥		granite	8	26.60	22.70	8	3.50	1.10	ž	10,10	15,35	168	000				32.25
12.53 granie 6.00 23.00 1770 0.00 5.60 3.10 13.1 13.4 13.4 13.5 179 0.00 4.00 4.00 5.00 4.00 4.00 4.00 4.00	25.53 grante         5.600         3.540         17.00 grante         5.600         3.540         17.00 grante         5.600         3.540         17.00 grante         5.600	•	atta		granite	8	15.8	8.8	8:31	8	2.20	8	4.57	27.30	25	0.0				27.10
44.10 granie 550, 304, 52.10 0.00 5.50 2.10 2.10 15.00 880, 25.0 0.00 8.60 6.60 6.60 80.00 4.10 granie 50.00 8.00 12.10 granie 50.00 12.10 granie 50.00 12.10 0.00 12	44.10 gmmile 5300 3040 23.10 0.00 55.9 12.0 2.19 13.00 35.0 219 0.00 6.66 6.69 6.60 5.00 4.00 4.00 4.00 4.00 4.00 4.00 4.0	ō.	sta		granite	8.8	23.88	12.00	000	8.8	3.50	7	34.80	7.97	219	000				000
4.50 granie 6.00 8.00 15	4,300 granisis 6,50 (a.0) (a.0		HTH H		granite	82.00	30,60	25.10	0.0	5.50	2.30	2,19	13,00	38.00	219	800				900
4.50 gannile 15.50 23.35 0.85 15.80 10.00 9.50 6.60 13.00 13	4.00 granie 15.9 10.00 0.59 15.00 15.0 10.00 15.0 15.0 15.0 15.0 15	<b>a</b>	#		2ranite	9.00	8.8	2,00	8	8.9	8.8	2.18	29,62	37.60	219	00.0				25.00
4.400 grantile         13.50         23.53         15.30         12.55         13.50         13.50         13.50         23.53         15.30         12.55         13.50         13.50         12.55         13.50	44.00 smaller 1350 22.33 8.84 5.345 15.30 12.35 15.30 12.3 18.34 39.00 168 0.00 14.15 14.15 41.00 26.00 26.00 22.00 20.0	75	4		granite	9,50	9.0 8.0	0.50	000	9.50	9,0	8.	14,70	39.52	891	000				24.32
School Printie         1,000         265.00         7,39         24,72         15.2         0.00         1,00         26.2           9,600 Smule         1,000         15.00         1,000         15.00         1,000         15.00         1,000	2666 granite         3590 achiet         3560 partie         3590 achiet         3560 partie         3590 achiet         1500 achiet	т.	2		granite	15,50	25.35	9,85	25,35	15.50	12.25	22	8.24	39.00	891	000				9
18.00 schist         11.00         25.00         14.00         25.00         11.00         25.00         18.00 schist         10.00         25.00         18.00 schist         10.00         25.00         18.00 schist         10.00         25.00         17.40         25.00         17.40         25.00         18.00 schist         18.00 schiot         18.00 schist         18.00 schiot         18.00	18.00 schist         11.00         25.00         14.00         25.00         11.00         25.00         14.00         25.00         14.00         25.00         15.00         25.00         15.00         25.00         15.00         25.00         15.00         25.00         15.00         25.00         15.00         25.00         15.00         25.00         15.00         25.00         15.00         25.00         15.00		2		granite	8	26.60	22.70	8.6	8.	3.8	0.95	7.39	24.72	152	000				36.36
18.00 granist   7.00   15.00	SLOS granie         7.00         15.00         5.00         15.00		419		schist	8.1	3 8	8,4	25.88 8.88	87	7.60	8	13,80	32.50	168	000				0 18
51.17 granite         30.60         51.17 granite         30.60         51.17 granite         4.00         1.30         0.30         0.30         1.30	51.77 granise         10.60         51.17 granise         10.60         51.17 granise         10.60         51.17 granise         4.00         12.40         4.5		eta	_	granite	7,00	15.8	8.8	15,00	8,2	2,45	73	21.40	8	168	000				145
44.30 granise 10.00 45.00 10.00 10.00 10.00 10.27 8.59 44.19 156 0.00 15.00 15.00 26.50 26.50 26.50 26.50 26.50 26.50 26.50 25.00 10	4430 granite 10.00 43.00 10.00 10.00 10.00 12.7 8.59 44.19 156 0.00 13.00 13.00 26.3	~	eta		granite	30,60	51.17	20,57	80	30,60	26.00	0.34	1,36	8	168	000				8
30.00 granite         4.50         24.00         19.50         4.50         25.0         31.00         30.40         15.0         10.00         30.40         15.0         30.40	30.06 granite         4.50         24.00         19.50         4.50         4.50         23.0         31.00         30.40         156         0.00         10.30         30.40           44.06 granite         19.00         22.00         19.00         11.40         30.00         13.00         10.00         0.00	7	4	3	gneiss	10.00	8.8	33,00	10.00	801	000	1.27	8	4	3	8			٠.	3 5
4400 gravite         1900 4200         2100 1900 11.00         1900 11.00         11.00         3100 81.00         450 150 000         022 000         022 000         022 000         022 000         022 000         022 000         020 000	4400 gravite         19,00         42,00         19,00         19,00         19,00         11,40         3,00         43,50         156         0,00         1,1,10         0,00<	2	4		granite	4,50	24.00	19.50	25	65	2.50	330	31.00	0.00	¥ \$	8				2 9 9
50.00 greets         30.50 precis         40.50 precis         40.00 p.50 p.50 p.50 p.50 p.50 p.50 p.50	36.00 greens         30.50 preiss         40.50 of 20.00         40.50 of 20	×	負		granite	19.00	87.0	8:8	00,61	19,00	6	8	83,60	53.50	95	800				8 6
38.00 granite         22.00         4.80         22.00         16.00         12.78         1.55         8.47         37.00         156         0.00         14.51         25.00         25.00         25.00         25.00         17.00         25.00         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.20         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.20         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         15.00         30.00         <	38.00 granite         22.00         28.00 granite         22.00         12.00         12.70<	2	ą		greiss	30.50	90.0	9.50	800	0.00	7.50	22	4.76	48.30	0	8				ŞŞ
28.00 igneous roc 22.00 27.20 4.80 22.00 17.00 7.10 0.40 1.83 26.50 156 0.00 5.00 5.00 77.00 17.00 26.00 17.00 26.00 17.	28.00 granule         20.00 gr	7	ııa		granise	22.00	28.8	\$ 8	22.00	16,00	12.78	1.55	8.47	37.00	156	80				25.65
36.00 granite         20.00         28.00         8.00         20.00         13.10         33.50         156         0.00         13.10         26.00           38.00 granite         12.00         30.00         12.00         12.00         12.00         13.10         25.00	36.00 granite         20.00         28.00         8.00         20.00         13.10         33.50         156         0.00         13.10         26.30           38.00 granite         12.00         30.00         12.00         12.00         12.00         13.10         25.30           48.10 granite         12.00         20.00         13.00         23.00		434		igneous roc	22.8	27.20	4.80	22,00	17.80	7.10	9	1.83	26.50	156	000				} } !
38.00 granite         12.00         30.00         18.00         12.00         30.00         12.50         25.00	38.00 granite         12.00         30.00         18.00         12.00         30.00         12.50         25.00	7	113		granite	20.00	28.00	8,00	20.00	20,00	16.40	20	21.10	33.50	156	000				2 2
48.10 granite 23.00 36.00 13.00 23.30 0.76 4.66 47.00 156 0.00 20.10 20.10 37.50 25.50 25.00 25.	48.10 granite 23.00 36.00 13.00 23.30 0.76 4.66 47.00 136 0.00 20.10 37.30 25.00 25.	×	<b>#</b>		granite	12,00	30.00	8.00	12,00	12.00	2.50	080	2.82	38.00	156	80				3 5
25.25 grecus roc         3.00         2.00         3.00         4.00         24.50         156         0.00         5.50         5.50         2.50	25.25 grecus roc         3.00         2.00         19.00         3.00         4.00         0.95         4.10         24.50         156         0.00         5.50         5.50         2.50         2.50         2.50         2.50         2.50         2.50         2.50         2.50         2.50         2.50         2.50         2.50         2.50         2.50         3.50         2.50         2.50         3.50         3.50         2.50         3.50         2.50         3.50 <td>*</td> <td>#</td> <td></td> <td>granite</td> <td>23.88</td> <td>88</td> <td>13.00</td> <td>23.00</td> <td>30.00</td> <td>23.30</td> <td>0.76</td> <td>404</td> <td>80.63</td> <td>156</td> <td>8</td> <td></td> <td></td> <td></td> <td>27.50</td>	*	#		granite	23.88	88	13.00	23.00	30.00	23.30	0.76	404	80.63	156	8				27.50
38.60 granite         16.00         32.00         16.00         16.22         16.00         37.00         16.00         27.00         17.00         16.0         27.00         37.00         16.0         27.00         37.00         16.0         27.00         37.00         16.0         27.00         37.00	38.60 granite         16.00         32.00         16.00         16.20         16.00         16.20         16.00         16.20         16.00         16.20         16.00		58		igneous roc	8.	8	19.00	3.0	8	8,	0.95	4 5	24.50	28	8				25.00
\$0.000 granitie         15.47         40.50         24.03         40.50         15.47         20.00         15.47         20.00         15.40         0.15         0.42         0.00         15.6         0.00         0.00         15.00         3.00	\$0.000 granite         15.47         40.50         24.03         40.50         15.47         14.00         0.15         0.42         0.00         156         0.00         0.00         0.00         15.00 <t< td=""><td></td><td>ats.</td><td></td><td>granite</td><td>16.00</td><td>32.00</td><td>90.9</td><td>16.32</td><td>8.00</td><td>9.55</td><td>9</td><td>54.70</td><td>37,70</td><td>156</td><td>800</td><td></td><td></td><td></td><td>3100</td></t<>		ats.		granite	16.00	32.00	90.9	16.32	8.00	9.55	9	54.70	37,70	156	800				3100
18.10 greeks         9.00         9.00         2.40         0.47         2.78         17.00         156         0.00         5.00	18.10 geneixs         9.00         9.00         9.00         2.40         0.47         2.78         17.00         156         0.00         5.00		4		granite	15.47	40.50	24.03	60,50	15,47	9.4	0.15	0.42	000	736	00'0				3.50
40,000 sand` 24,00 35,00 8.00 24,32 24,00 11,30 1,30 6,73 24,00 158 0,00 25,10 25,10 37,30 35,40 greiss 9.90 35,40 25,50 9.90 8,70 0,66 2.19 34,70 156 0,00 15,50 15,50 15,00 15,50 31,00 34,40 greiss 18,00 25,00 18,00	40,000 sand` 24,00 32,00 8.00 24,32 24,00 11,30 1,30 6,73 24,00 158 0,00 25,10 25,10 37,30 35,40 greiss 9.90 35,40 25,50 9.90 9.80 8.70 0,646 2.19 34,70 156 0,00 15,50 15,50 31,00 34,40 gravitis 18,00 24,00 16,00 18,00 10,00 10,00 10,00 10,00 10,00 15,00 10,0		1		gneix	8	8.8	8	8.00	8	6 6	0.47	2.78	12.00	156	000				88
35.40 greiss 9.90 35.40 25.50 9.90 8.70 0.66 2.19 34.70 156 0.00 15.50 15.00 31.00 31.00 34.40 grains 18.00 35.40 25.50 9.90 9.80 8.70 0.66 2.19 34.70 156 0.00 15.50 15.50 31.00 31.00 31.00 31.00 15.50 15.50 15.60 31.00 15.50 15.60 31.00 15.50 15.60 31.00 15.50 15.60 31.00 15.50 15.60 31.00 15.50 15.60 31.00 15.50 15.50 35.50 15	35.40 greiss 9.90 35.40 25.50 9.50 8.70 0.66 2.19 34.70 156 0.00 15.50 15.00 31.00 34.40 25.50 9.50 8.70 0.66 2.19 34.70 156 0.00 15.50 15.50 31.00 15.40 25.60 25.60 25.60 15		큪		sand`	848	32,00	8: 8:	24.32	8.	1.30	ደ	6.73	8	158	000				37.30
344-05 garmine         18.00         34,00         18.00         18.00         18.00         18.00         19.00         10.00         10.00         15.60           31.00 sand@grave         13.00         23.00         13.00         13.00         13.00         13.00         13.00         13.00         13.00         13.00         13.00         13.00         13.00         13.00         13.00         13.50         13.00         13.50<	34-40 granting         18.00         34.00         18.00         18.00         18.00         18.00         19.00		ata		gneiss	8.6 6.	35.40	S S	8.6	8.6	8.70	990	2:19	34.70	156	000				81.8
31,000 sand` 13,000 12,000 13,000 13,00 19,75 2,23 77,10 27,000 156 0,000 11,01 11,01 22,05 32,00 sand 12,00 28,00 12,00 12,00 13,50	31.00 sand`         13.00 Library         14.00	*	ā	4	Shrhite	8.8	8	8	808	8	6.45	2.40	7.	34,70	156	000				15,60
3200 sand 12.00 28.00 16.00 12.80 10.00 10.00 26.00 156 0.00 13.50 23.55 23.55 48.00 26.00 15.50 10.50 12.77 24.17	32200 sand 12,00 28.00 16,00 12.80 10.00 10.50 2.10 0.00 26.00 156 0.00 13,50 23,53 23,53 45.00 15.00 15.00 15.77 12,77 24,17	9	2	8	sand`	8	8	0,00	3.8	8	27.01	7	7.10	22.08	156	000				28.05
45.00 sand` 15.00 25.00 10.00 15.00 10.20 2.25 48.60 25.00 156 0.00 12.77 12.77 24,17 24,17 24,17 24,17 24,17 24,17 24,17 21.00 25.00 25.00 10.50	45.00 sanddgrave 15.00 25.00 10.00 15.00 10.20 10.20 2.25 48.60 25.00 156 0.00 12.77 12.77 24.17	5	5	32.00	Sand	12.00	28.00	16.00	12,80	25.8	10.50	2.10	8	26,00	156	000				28.07
51.00 general 8.50 51.00 42.50 51.00 8.50 4.37 3.10 18.20 45.10 255 0.00 10.50 0.00 20.00 21.40 general 9.00 18.50 9.00 18.00 9.20 18.00 8.70 0.00 18.00 9.20 18.00 9.20 18.00 9.20 18.00 9.20 18.00 9.20 18.00 9.20 18.00 9.20 18.00 9.20 9.20 9.20 9.20 9.20 9.20 9.20 9	51.00 greins 8.50 51.00 42.50 51.00 8.50 43.7 3.10 18.20 45.10 255 0.00 10.50 0.00 21.40 greins 9.00 18.00 9.20 18.00 8.75 0.26 2.19 0.00 155 0.00 9.20 14.60 45.00 granite 15.50 36.20 20.00 36.20 15.50 15.50 8.70 0.60 1.80 37.50 205 0.00 6.05 23.80		ato		sandekgrave	8.8	8 8	000	15.8	10,20	10.20	2.25	48.60	23.00	156	800			-	24,17
21-40 gretis 9,00 18,00 9,00 18,00 8,00 8,75 0,26 2,19 0,00 155 0,00 9,20 14,60 45,00 granite 15.50 36,20 20,00 36,20 15,50 8,70 0,60 1,80 32,50 0,00 6,05 5,00 5,00 5,00 5,00 5,00 5	21-40 grenius 9,000 18,000 8,000 8,75 0,26 2,19 0,000 9,200 9,200 14,600 45,000 grannite 15.50 36,20 20,000 6,05 6,05 23,80		414		RDC108	8.50	81.8	42.50	81.8	8.50	4.37	3.10	18,20	45.10	255	8		:		24,00
45.00 granite 15.50 36.20 20,00 15.50 8.70 0.60 1.80 32.50 204 0.00 4.04 4.04	45.00 granite 15.50 36.20 20.00 36.20 15.50 8,70 0.60 1.80 37.50 205 0,00 6,05 6,05 23.80		arta.		goeiss	8	8.8	8.00	18,00	8	8.75	0,26	9	800	155	0.00				14.60
			: :		granite	15.50	36.20	20.00	36.20	15.50	8.70	990	08	37.50	205	000		-		08.22

Colorado	The part of the		27 2124	Breekele	Die Gal	Total	Tirbology	Thick	Thickness of main Aq	Aquiter	+	Groundwater First Struck	Sair		Capacity	of Pump	Diameter	From	2	From	2	of Bottom
Mail   Colore   Mail   Color	March   Colone   Laborator			No			1600	(C.Lm)		Thickness	Aiddn:	9	(O.tm)	(%)	m2/day)	Intake (G.1m)	(mm)	(C.Lm)	9	ij	0,	ទីដូ
Marie   Company   Marie   Ma	March   Colored   Colore	<b>.</b>	Ľ		Chiputa	1	gnerss	3	30.00	15.60	1		7.50	09'0 0	7,60	8.55	35					
Column   C	Marie   Company   Marie   Ma				Gipato.			8.20	33.75	25.5			00	2 5	\$ 3	26.45	2 3					
185   150	Marie   Mari				Giputa		SUC:	9 6	25	3 5			3 5	į 6	1 4	3 5	3 5	-				
Mar.	Marie   1500   Column   1,000   Paris   1,000   1,00		7.		3 A A		gramic	000	5 4	8 5			90.6	99	9	8	Š					
March   Septem   1,500 parts	March   Colonia   Coloni					1.	oranie.	32.00	32.00	000			80	8	04,01	42.40	32					
150   150	West   Colore   Col						oranie	16.20	28.5	26.65			2,68	2	8.89	37.55	205					
1879         1889 <th< td=""><td>  No.   Colored   Colored</td><td></td><td></td><td></td><td>O Comments</td><td></td><td>Puez</td><td>8.20</td><td>24.00</td><td>15,80</td><td></td><td></td><td>9.60</td><td>5.</td><td>25.60</td><td>33,00</td><td>26</td><td></td><td></td><td></td><td></td><td></td></th<>	No.   Colored				O Comments		Puez	8.20	24.00	15,80			9.60	5.	25.60	33,00	26					
1589   1587   Order   1500 parts   1500 pa	1859   1854   Colored   1850			•	e de la constante de la consta			7.20	8,8	38,80			4,55	0.50	· I.10	43.80	38					
1869   1869	Main State				O Primeter			19.20	52.00	32.80			15 25	3.30	19,40	000	38					
950 2525 Chem 24.00 pennit 24.00 pennit 25.00 14.00 12.00 14.00 15.00 15.0 15.0 15.0 15.0 15.0 15.0	March   Marc				Chimata			20.00	30,00	10.00			1.30	ر د	17.90	27.50	<u>8</u>					
10.00   1.00	March   Colone   1,000 parille   1,000   1,0							200	400	8			4.50	8	8.64	23,00	8					
10.000   25.55   Cycles   10.000   10	10,000, 20,000   10				i de la constantina della cons			3.20	24.00	20.80			3.70	8	7,02	23.00	30					
1967 5752 Octava	10,000, 20,000   10							2.00	74.00	12.00	•		8	8	5.27	29,60	8					
909 273. Opens. 1100 profiles. 1400 1100 1100 1100 1100 1100 1100 110	10,000, 10,0				The state of	3 5		2	5	12			4	0.0	000	30.00	50					
100   100	10.00   10.0					3 9		3 5	3	2			9	Ş	28.55	10.00	9					
March   Colone   March   Mar	988 7524 Opens 1100 graine 100 1200 0 100 1200 0 100 1200 1200 12				made i	40.00		3.4	3	30.64			3 :	3 5	26.1.	300	3 5					
350 274    374	985 720. Organia 4.00 parinis 700 4100 10.				Quipate Quipate	8.58		8	8	27.00			9	7.70	3,80	3,67	3 5					
935 2757 Chem. 4440 gamile 203 4400 104 105 105 104 1440 1440 144 1450 164 104 105 105 105 105 105 105 105 105 105 105	987 272. Objest 4400 gamie 50.0 1500 1500 1504 1430 1430 1430 150 150 150 150 150 150 150 150 150 15				Chipata	31.8		8.	8	8			3.45	Q C	15.80	28.62	2					
300         232-55         Othern         44-0 graphe         15/5         270         15/0	3992 1274         Ohjean         44.00 grainer         15.00 12.00 <t< td=""><td></td><td></td><td></td><td>Oipata</td><td>8.3</td><td></td><td>20.50</td><td>90.00</td><td>19.50</td><td></td><td></td><td>14,30</td><td>4</td><td>1.</td><td>36.30</td><td><u>8</u></td><td></td><td></td><td></td><td></td><td></td></t<>				Oipata	8.3		20.50	90.00	19.50			14,30	4	1.	36.30	<u>8</u>					
910 7777 Chique 4.00 provide 4.00 1750 1150 4.50 4.00 126 2.00 0.05 124 0.00 1110 1110 1110 1110 1110 1110 111	910 CTYS         Chipan         24.5 printle         10.5 st. 24.0         11.0         11.0         12.9         12.9         11.0         11.0         11.0         12.9         12.9         11.0         11.0         11.0         12.9         12.9         11.0         11.0         12.9         12.9         12.9         11.0         12.9 <t< td=""><td></td><td></td><td></td><td>Chibata</td><td>44.44</td><td></td><td>8,00</td><td>37.80</td><td>8.8</td><td></td><td></td><td>3.6</td><td>0.50</td><td>171</td><td>8.8</td><td><u>88</u></td><td></td><td></td><td></td><td></td><td></td></t<>				Chibata	44.44		8,00	37.80	8.8			3.6	0.50	171	8.8	<u>88</u>					
910 2775 Chipana         Carielli Chipana         4,00 Chipana         1,40 Chipana         4,00	Signature   Compare   Co				Chicata	27.50		10.55	27.00	16.55			720	0.50	2,70	25.50	891					
The color of the	Fig. 1971   Chains					24.45	-	٤	24.50	20.50			2.60	8	3	23.30	219					
1972   2747   Chipana   4400 granife   200   1700   1300   420   400   1500	913 2747 Oligae 400 profile	Ì			tindin)	2		8 8	2	200			Ş	2	28.80	6 9	89.					
997 CT 11 Chipum 4400 graine 900 2500 1200 1200 1200 1200 1200 1200 12	991 2741 Chipae 4400 granie 450 2100 1200 1200 1200 1200 1200 1200 12	ΟI		2		3 8	٠.	3 5	8 8	38			00.	3 8	20.02	8	84					
9915 2077 Chique 4400 granie 1200 2100 1500 1500 1500 1500 1500 1500	915 2012 Olivan 4400 gamine 100 200 200 100 200 100 200 200 100 200 2	3-		14		30.4		3 3	8.7	8			200	3 5	00.04	3 6	20 7					
915 2077 Chipasa 4,000 grantie 700 2100 1500 1200 1200 750 265 154 154 1500 1205 1000 1000 1000 1000 1000 1000	994 CTF Chause 4.00 granie 12.00 15.	3.		<u> </u>	Q.ipse	8		8.6	8	8.8			3	07.7	07:1	3.74	90					
9915 2308 Chipana 4200 grantic 7100 72200 12500 12500 1250 1154 5055 1545 1545 1565 1560 15000 1	1915 2007         Chipasa         3000 granife         1700 12.00         12.00 12.00         17.00 12.00 <th< td=""><td>.7</td><td></td><td>7 2</td><td>Chipata</td><td>84400</td><td></td><td>2.8</td><td>8.13</td><td>86</td><td></td><td></td><td>2.0</td><td>2.63</td><td>19.80</td><td>30.23</td><td>891</td><td></td><td></td><td></td><td></td><td></td></th<>	.7		7 2	Chipata	84400		2.8	8.13	86			2.0	2.63	19.80	30.23	891					
2307         Chiquas         42.00 gravine         12.00         17.00         5.00         12.00	2307         Chipasa         4,000 granife         12,00         17,00         12,00         1,00         6.54         3,00         27,7         0,00         6.00 </td <td>3</td> <td></td> <td>308</td> <td>Chipeta</td> <td>30.60</td> <td></td> <td>7.8</td> <td>22,00</td> <td>15.80</td> <td></td> <td></td> <td>5.70</td> <td><del>.</del>.</td> <td>16.7</td> <td>26.85</td> <td>168</td> <td></td> <td></td> <td></td> <td></td> <td></td>	3		308	Chipeta	30.60		7.8	22,00	15.80			5.70	<del>.</del> .	16.7	26.85	168					
2.2.6.2.         Chippas         54,00 granife         8.50         41,00 granife         8.50         12,00 granife         9.50         12,00 grani	2.2.2.2. Chipasa         3.5.0 parale         3.4.0 par			307	Chroats	817		5.8	17.00	2.00			<u>~</u>	0.50	1.54	39.00	273					
2.3.11         Chiqua         35.50 sand`         6.45         1.40         2.00         1.50<	23.11         Onload         35.50 and/dgyme         6.50 14.00         7.50 14.00         6.50 14.00<			262	Chiceta	61,0		8,50	<del>4</del>	32.50			6.50	2	6.56	38.00	273					
2310         Chipara         4700 grantie         550         21.00         1.00         2.38         8.50         41.00         1.00         2.38         8.50         41.00         1.00         2.30         41.00         1.00         5.00         40.00         60.00         60.00         60.00         60.00         50.00         2.20         2.20         paralie         1.00         1.00         1.00         2.20         1.00         2.00         1.00         2.00         1.00         2.00         1.00         2.00         1.00         2.00         1.00         2.00         1.00         2.00         1.00         2.00         1.00         2.00         1.00         2.00         1.00         2.00         1.00         2.00         1.00 <t< td=""><td>23.10         Chipana         47.00 grantie         5.00         2.00         1.10         2.38         8.20         41.00         1.60         3.80         3.00</td></t<> <td></td> <td></td> <td>31.1</td> <td>O O</td> <td>35.50</td> <td></td> <td>٠.</td> <td>841</td> <td>7.50</td> <td></td> <td></td> <td>9,9</td> <td>8</td> <td>21.50</td> <td>34.50</td> <td>219</td> <td></td> <td></td> <td></td> <td></td> <td></td>	23.10         Chipana         47.00 grantie         5.00         2.00         1.10         2.38         8.20         41.00         1.60         3.80         3.00			31.1	O O	35.50		٠.	841	7.50			9,9	8	21.50	34.50	219					
2266         Chipara         2260         Chipara         2260         Chipara         2260         Farante         130         150         140         150         150         150         150         150         150         250         140         250         250         250         250         250         250         250         250         250         250         250         250         250         250         250         250         250         1400         150 <td>2546         Chysia         25.00 grantie         150         1400         150</td> <td></td> <td></td> <td>Ç</td> <td>, C</td> <td>50 74</td> <td></td> <td></td> <td>26.00</td> <td>21.00</td> <td></td> <td></td> <td>0</td> <td>2 38</td> <td>8.50</td> <td>8</td> <td>961</td> <td></td> <td></td> <td></td> <td></td> <td></td>	2546         Chysia         25.00 grantie         150         1400         150			Ç	, C	50 74			26.00	21.00			0	2 38	8.50	8	961					
2409.         Chipara         2500 grande         1000         130         100         130         100         130         100         130         130         240         100         130         130         130         100         100         130         130         130         100	2.00         Chipata         2.00         Stanta print         1.00			246	Ç.	8		8	15.00	4.00			8	2.60	14.20	27.00	219					
2106         Chipata         3220         Carrier         13.00         28.50         168         0.00         5.00	Chippen   Chip			8		3 8			2	8			7 10	8	803	24.00	219	٠				÷
Chippea	2113         Chipata         1,000 gandife					3 5			3 5	3 5			8	5	0. 4	8	30					
2163 Chippea 22.40 genitic 12.00 15.00 15.00 12.00 4.00 15.0 15.0 15.0 15.0 15.0 15.0 15.0 1	Chipman   22-40 sanddgrawe   12.00   15.00			916	and a	3 5			3 8	3			8	3	9	\$	3					
Libbara 22.50 ganning 12.50 ga	List Chipma 3.2.59 grantic 12.00 [18.00 6.00 18.00 1.00 1.00 1.00 1.00 1.00 1.00	· .		3 3		3 3	-		3 5	3 5			3 8			00 61	871					
Chipsel	2164         Chipuat         32.90 granite         8.00         15.00         2.00 <td></td> <td>7</td> <td></td> <td></td> <td>₹ :</td> <td></td> <td></td> <td>3 :</td> <td>3</td> <td></td> <td></td> <td>3 :</td> <td>2 6</td> <td></td> <td></td> <td>3 3</td> <td></td> <td></td> <td></td> <td></td> <td></td>		7			₹ :			3 :	3			3 :	2 6			3 3					
2160         Chipata         30,00 grantie         12.00         18.00         17.00         18.00         17.00         21.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         4.00         1.00         4.00         1.00         4.0	2160         Chiqua         30,000 granite         12.00         18.00         12.00         11.10         0.23         1.73         25.00         150         0.00         4.00         4.00         4.00         10.00           2150         Chiqua         4.00         granite         9.00         16.00         7.00         18.70         1.00         15.00         15.00         4.00         4.00         20.00           2140         Chiqua         4.02         granite         14.00         17.00         14.00         16.00         16.00         15.00         4.00         4.00         4.00         20.00           2142         Chiqua         52.50         granite         14.00         17.00         14.00         10.00         4.60         28.60         16.00         4.00         4.00         20.00           2111         Chiqua         55.50         granite         14.50         17.00         14.00         10.00         4.60         28.00         16.00         4.00         4.00         20.00         15.00         20.00         15.00         20.00         15.00         20.00         15.00         20.00         15.00         20.00         15.00         20.00         11.00 <td< td=""><td></td><td>•</td><td>9</td><td>O. Parts</td><td>32.50</td><td></td><td>80.8</td><td>3.88</td><td>8.7</td><td></td><td></td><td>3</td><td>20</td><td>2.5</td><td>3</td><td>8</td><td></td><td></td><td></td><td></td><td></td></td<>		•	9	O. Parts	32.50		80.8	3.88	8.7			3	20	2.5	3	8					
2139         Chipata         3440 gravite         9,00         16,00         7,00         1,11         5.56         30,00         195         0,00         8,00         8,00         20,00         21,40         Chipata         24,40 gravite         9,00         16,00         1,00	2139         Chipata         344.0 granite         9.00         16.00         7.00         12.00         6.75         1.11         5.56         30.00         195         0.00         4.00         27.00           2140         Chipata         2.21.0         Chipata         2.21.0         1.00         1.00         1.00         4.00         2.00         2.10         2.00         2.00         4.00         1.00         4.00         1.00         4.00         1.00         4.00         1.00         4.00         1.00         4.00         1.00         4.00         1.00         4.00         1.00         4.00         1.00         4.00         1.00         4.00         1.00         4.00         1.00         4.00         1.00         4.00         1.00         4.00 <td< td=""><td></td><td>•</td><td>8</td><td>O. Part</td><td>30,00</td><td></td><td>2:0</td><td>9</td><td>9.00</td><td></td><td></td><td><u>0</u></td><td>0.23</td><td>1.73</td><td>3,8</td><td>Š</td><td></td><td></td><td></td><td></td><td></td></td<>		•	8	O. Part	30,00		2:0	9	9.00			<u>0</u>	0.23	1.73	3,8	Š					
2140 Chipata 4,025 greits 4,50 8,00 3,50 8,00 4,50 16,50 3,00 38,70 37,92 219 0,00 4,00 4,00 21,03 21,42 Chipata 5520 grantile 14,00 17,00 3,00 17,00 14,00 10,50 4,60 28,60 50,50 168 0,00 21,03 21,03 21,13 Chipata 52.50 grantile 14,00 17,00 3,00 17,00 14,00 10,00 4,60 28,60 50,50 168 0,00 21,30 15,00 15,00 21,13 Chipata 52.50 grantile 14,00 17,00 3,00 17,00 12,00 5,00 2,00 0,00 10,00 10,00 12,	2140         Chipata         4,025 grelis         4,50         8,00         4,50         1,50			139	Chiputa	¥ 3		8	<u>8</u>	8.			6.75	=	5.56	30.00	193					
2142         Chipata         52.50 granite         14,00         17,00         14,00         10,00         4,60         28,60         50.50         168         0,00         21,03         21,03           2111         Chipata         55.00 granite         14,50         15.00	2142         Chipata         52.50 granife         14,00         17,00         14,00         17,00         14,00         17,00         14,00         17,00         14,00         17,00         14,00         16,00         28,60         505.0         168         0,00         15,00         45,00           2111         Chipata         52.50 granife         14,50         16,00         15,00         16,00         15,00         15,00         45,00           2113         Chipata         52.50 granife         14,00         17,00         10,00         20,00         16,00         21,30         21,30         46,00           2013         Chipata         34,00 granife         16,00         17,00         20,00         20,10         0.00         12,00         24,00           2143         Chipata         34,00 granife         16,00         17,00         20,00         20,10         0.00         12,00         24,00           2143         Chipata         34,00 granife         10,00         17,00         20,00         12,00         0.00         11,00         13,00         13,00         13,00         13,00         13,00         13,00         13,00         13,00         13,00         13,00         12,00			. 041	Chipata	50,0		\$	8,8	3,50			8.9	8	38.70	37.92	219					
2111         Chipata         55.00 granite         14.50         15.00         12.70         2.70         16.30         50.00         15.00	2111         Chiputa         55.00 granite         14.50         15.00         14.50         15.00         15.00         15.00         15.00         45.00           2111         Chiputa         52.50 granite         14.50         15.00         14.50         16.00         16.00         16.00         15.00         15.00         15.00         15.00         44.31           2113         Chiputa         52.50 granite         14.00         17.00         17.00         16.00         20.00         16.00         17.00         16.00         17.00         16.00         17.		-	142	Orionta	52.50		8	2,8	3.8			10.8	3	28.60	50.50	89					
2402         Chipata         52.50 grantic         17.00         17.00         14.00         10.50         4.60         28.60         50.50         168         0.00         21.30	2113         Chiputa         52.50 granite         14.00         17.00         14.00         16.90         4.60         28.60         50.50         17.30         21.30         44.31           2602         Chiputa         24.00 sand         5.00         12.00         7.00         12.00         20.00         12.00         21.30         44.31           2602         Chiputa         24.00 sand`         5.00         12.00         20.00         12.00         20.00         12.00         24.00           2143         Chiputa         5.00 sreiss         12.00         20.00         12.00         20.00         12.00         12.00         24.00           2771         Chiputa         5.00 sreiss         18.00         17.00         12.00         1		. • :		C	\$5.00		14.50	16.00	1.50			12.70	2.70	16.30	50.00	<u> 8</u>					
2602 Chiputa 24,00 sand 3500 12,00 700 12,00 5,00 2.90 2.60 201,00 20,80 20,80 12,00 12,00 12,00 12,00 20,80 2.10 0.00 29,20 168 0.00 11,90 11,90 11,90 21,43 Chiputa 46,00 greiss 18,00 21,00 10,00 10,00 12,10 0.00 29,20 168 0.00 11,90	2602 Chipmas 24.00 sand 5.00 12.00 7.00 12.00 20.00 20.00 20.00 20.00 20.00 12.00 12.00 24.00 20		•	2		5	-	14.00	12.00	8			800	3	28.60	\$0.50	891					
CPT 1 Chipus 3400 sanidiggrave 3.00 20.00 1700 20.00 3.00 0.00 2.10 0.00 29.20 168 0.00 11.90 11.50 11	Chipman   St.		• •	,04		24.00		8	900	2.00			2.90	2.60	201.00	20,80	219					
### Chiputa 46.00 greiss 18.00 21.00 18.00 10.00 7.50 1.30 7.41 43.00 150 0.00 6.00 6.00 6.00 6.00 1881.4 Chiputa 46.00 greiss 18.00 21.00 21.00 18.00 10.00 7.50 1.30 7.41 43.00 150 0.00 5.00 5.00 7.00 1881.4 Chiputa 66.00 limeatone 30.00 21.00 20.00 21.00 12.00 1	CTT   Chiputa   45,00 greets   18.00   15.00					2	•		2000	2.00			800	2 10	000	29.20	891					
1933-4 Chippus 6300 limestone 6300 23.00 17.00 23.00 6300 12.00 14.0 14.2 56.00 150 0.00 3.00 3.00 130. 130. 130. 130. 130	SSL-1-1 Chipped   Color   Co				(H)	2 4	•		2	2			5	ÇX.	7.41	43.00	150					
1881-A Chipput 00.00 Illimestone 0.00 12.00 17.00 12.0	1881-A         Chipput         Octoo Limitatione         Color Data         Color D		•	5	Sapra	3 5	,,,,	3 5	3 8				130	X 7 C	2	<b>9</b>	150					
1933-A. Chippata Journal Immessione 30,000 23,000 23,000 23,000 35,000 3	1932-A Chiputa Julio Limestone 33.00 35.00 35.00 15.00			V-1991		888		3 8	3 8	3 8			24.5	-	. 5	45.00	9					
1932-4 Chippin 4-000 delimentation 53,00 25,00 35,00 13,00 1	1932-4 Chipata delico intestone 35.00 2.00 35.00 2.00 12.00 10.00 0.00 15.00 12.00 15.00 1			4	Chipate	3		8000	3 3	3 8			3 .	3	38	3 5	3 5					
1927-C Chiputa 46,00 dolomite 19,00 21,00 3,00 19,00 12,00 1020 1,00 0,00 41,00 13-0 0,00 12,00 12,00 12,00 1,00 1,00 1,00	1927-C Chiputa 45,00 dolomite 19,00 21,00 3,00 19,00 12,00 10,00 0,00 41,00 13-0 0,00 1,00 1,00 1,00 1,00 1,00 1,00 1,			1935-⊁	Chipata	3		33.00	32.8	8.8			3	3:	3 :	3.5	2 5	: :	÷			
CPT 2 Chiputa 25.00 schist 14.00 18.00 4.00 14.00 8.00 5.00 2.27 19.60 27.50 15.0 0.00 5.00 5.00 5.00 5.00 5.00 5	CPT'2 Chipum 25,00-schist 14,00 18,00 4,00 14,00 8,00 5,00 2,27 19,50 2759 150 0,00 5,00 2,900 29,00 1,00 1,00 1,00 1,00 1,00 1,00 1,00			1927-C	Oipire	8.8		86	2,0	8			10.20	8	8	3	2					
3957 Chipped 34,00 sand 17.00 20,00 3.00 17.00 17.00 6.50 0.65 2.20 0.00 150 0.00 3.00 3.00 3.00 3.00 3.14 Chipped 35,00 sanite 17.00 19.00 2.00 17.00 10.00 8.00 15.20 15.20 24.60 150 0.00 6.60 6.60 3.11 Chipped 8.00 15.00 15.00 15.00 0.00 6.00 6.00 4.00 4.00 4.00 4.00 4	1997         Chipata         34,00 sand         17.00         20.00         17.00         17.00         17.00         17.00         17.00         17.00         17.00         17.00         17.00         10.00         2.00         17.00         10.00         2.00         17.00         10.00         2.00         15.20         2.40         150         0.00         6.60         6.60         6.60         6.60         6.60         6.60         6.60         45.00           3132         Chiputa         58.00         greiss         27.00         27.00         24.00         24.00         4.00         4.00         4.00         4.00         45.00	1	-	CPT2	Origina	8,8	-:	84	8.8	8			8.8	7.77	9.6	27.50	20					
3134 Chippan 35,00 granite 17,00 19,00 2,00 17,00 10,00 8,60 2,00 15,20 34,60 15,0 0,00 6,60 6,60 13,0 13,0 15,0 0,00 4,00 4,00 13,0 13,0 15,0 0,00 4,00 4,00 13,0 13,0 15,0 15,0 15,0 15,0 15,0 15,0 15,0 15	3134 Chipma 35.00 granite 17.00 19.00 2.00 17.00 10.00 8.60 2.00 15.20 34.60 150 0.00 6.60 6.60 35.00 3132 Chipma 58.00 greiss 27.00 28.00 1.00 27.00 24.00 24.00 24.00 45.00		٠.	1007	Chicata	34,00		17.00	20.00	3.8		:	6.50	0.65	22	8	150					
3.32 Chimas ce no made 37.00 38.00 100 24.00 21.55 0.62 6.24 47.30 150 0.00 4.00 4.00	3132 Chipata 58.00 gneiss 27.00 28.00 1.00 27.00 21.55 0.62 6.34 47.30 150 0.00 4.00 4.00 45.00			3134	O. C.	33.00		17.00	19.00	28			8	8	15.20	8				٠.		:
	AND	-			Ç.	8		27.00	28.00	8			21.55	0.62	6.34	47,30	8					

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Depth	of Bottom	of Casing	18.81 18.81	8.8	45,70	29,4	2 2 2 2 3	3 3	56.10	2 2	34.73	23.88	19.28	24,00	\$4.00	8	50.00	30.00	90.30	54.00	49.20	8,5	37.70	32.50	37.00	43.00	35,80	99°66	8,3	3.8	35,00	29,00	32.35	36,98	28.9	8.8	8 2	30.5	9	8.00	13.00	18.00	21,00	200	9,1	20:00	39.00	16,50	000	8	35	8	8	22,00	¥ 3
asing	2	(G.Lm)	059	36.66	45.70	19.65	58.30 58.30	9 9	2 2	28.20	34.73	23,00	9.28	24.00	¥ 8	\$1.00	50.00	20,00	90.87	54.00	49.20	8:	37,70	32.50	37.00	43.00	35.80	39,00	96,00	3.8	35,00	29,00	32.35	36.00	38.92	8.5	3 5	8 8	12.00	8	5.00	18.00	21,00	15,00	44,00	20.00	39.00	16.50	000	0.00	3	000	8	35,00	9.00
Perforated C	From	(C.L.m)	25.01	8	9,10	8	8 5	0.40	2 :	3	0.0	8.	9	8.0 8.0	24,00	3.00	11,40	25,00	19.00	15.00	22.50	8,5	37,70	200	9.30	5,35	35,80	900	60,94	31.00	35.00	11.50	32.35	21.08	ကို လ	8	8 5	3 8	000	8.8	2.00	15.00	18.00	8,9	21.00	7,80	3.60	8	000	800	00'9	8 6	800	96	34.00
ău.	8	(C.Lm)	0.50	8	9.10	8	8 3	3 6	2 5	9 4	0.0	8.8	8	8,8	54.00	8	3	25,00	8.6	15,00	22.50	81.8	37,70	8.00	8.3	5,35	35,80	39,00	8,8	31,8	35.00	11,50	32,35	11.08	8.30	8	3 5	3 8	Ś	5.83	2.8	5.8	18.00	8	21.8	7.80	8:	8	800	8	8	8	000	3.65	0.00
PlanCas	From	(C.L.m)	000	800	800	00.0	8 8	9.6	8 8	8 8	3	8.0	8	8	800	900	000	800	000	000	00'0	9.00	80	800	9.0	9.0	800	8	000	800	0.00	9.0	0,0	000	8	8 8	3 8	3 8	8	80	000	800	0.00	90,0	800	000	800	8	000	80	8	8	8	8	8
	Diameter	-	8	3	50	89	<u> </u>	2	8	2 3	ð	168	168	168	202	<u> </u>	168 80	168	30	3	<u>\$</u>	156	156	255	8	156	. 95		85	<u>\$</u>	552	156	8	36	<u>\$</u>	2	/ ·	<u> </u>	8 8	8	8	8	<u>8</u>	<u>8</u>	152	891	30	o O	٥	<b>o</b>	<b>8</b> 8	ò'	Ċ;	8	202
Depth	of Pump D	7.5		30.00	8,8	86	8 5	32.00	3270	8 5	3	20.00	15.67	8.63	25.00	54,00	48.50	48,50	42.50	47.30	53,40	26.50	31.45	30.00	25.20	32,00	25.50	24.8	36.00	24.8	24.00	27.50	30.00	31.50	06,30	26,20	3 5	36	2000	06.04	85.00	47.00	49.00	\$4,30	4,20	8,00	37.00	19:00	3.0	29.00	3.	8	37.80	33,70	29.40
-		(т2/дау)	5.90	3	6979	85.8	2 8	37.0	į,	20.00	20.20	1.92	% 51.8	8	6.57	4.15	7.96	3	3,4	8.	59.60	2.34	0.87	13,10	76,80	800	11.60	800	154.00	5.47	8,X	89.90	105.00	0.30	62.00		07.6	3 5	3	949	1.98	20.10	18.6	0,39	219	2.38	5.84	12.20	000	0.71	2	003	0.95	0,74	281.00
S		(s <sub>A</sub> )	7.80	소 오	3,60	2	2 8	8 8	2.5	8 5	2	9	8	8	2.10	0.80	8	08'0	3.30	080	8:	9	0.20	8	1.20	5 2	20.	0.80	99.	20.1	ġ.	2, 8	2.50	8	3	2 6	0777		1 40	2	0.50	8	2.00	27,0	8	990	12	8	0.02	0.19	0.71	100	9	8 0	3,70
Ceptil	State	(G.L.m)	9	S	97.9	4.42	À .	4 6	05.2	5 5	2.20	8.8	5.57	2. 3.	5.40	23,50	00'61	27.50	5.50	3.40	31,00	8,00	05,11	\$95	5.75	3,88	4	5. 2.	4 13	4.6	3.50	8	425	7.05	2,23	3 5	3 5	2 5	90	9	8.8	84	6.50	8,8	2.26	16.20	9.50	3.80	15.00	5,50	10.80	8	2.5	200	9.70
noundwater	ust Struck	(G.L.m)	000	12.20	9.10	8	3.5	8 8	8.5	8 9	25.50	8	ş. 8	8. 04.	19.00	8	35.88	29.00	28	8,8	31.00	12,00	13,85	6.20	8.80	000	00.6	80	£17.	10.50	8	9.50	270	24.60	2 :	3 8	3 5	88	8	17.20	9	8,8	17.00	8	8,9	19.00	28	8	23.00	8.28	8	8	8 :	8	16.00
~	Main	Supply		30,50	21.30	æ ;	8 8	8.8	0.51 0.51	8 5	250	10.8	8.0	9.7	28.00	32,35	36.00	33,00	22.00	25.00	31,00	12,00	13.85	10,22	8,14	13,10	15,00	5.0	10,50	950	10,00	25	5.20	31.20	2.5	8 8	20.02	8 8	8	31.50	28.00	32.00	32.00	90.04	40.50	22.8	¥ 8	11,0	23,00	13.00	 8 	8	8	841	16.00
Lquiter	Total	Thickness	2005	0.70	18.30	8	3.5	9	9.5	3 5	3	2.00	8	9.8	31.00	29.00	25.00	00'1	8,5	2,8	29.00	96.4	14,0	21.50	18.20	20,90	22.80	26.00	20.50	20.50	23.00	200	24,00	\$60	22.00	3 3	3 5	8.5	300	8,4	8,	10.00	10.00	34,00	8,4	20,00	0.61	2.00	8,8	8	8	8	다 다	00,41	24.00
ess of main /	to Total	(G.Lm)	24.00	41.20	27.45	8	8.8	9.6	9 1	2 2	2400	90.0	900	24.00	20:00	800	20.00	90,04	20,00	8	80.00	8,8	38,00	31.50	35.40	8	37,80	8	31.00	3:8	33.8	05.61	8	31.20	8	8 8	3 8	3 5	8	31.50	8	<b>4</b> 8	85:08	90.04	88	42.00	34.8	8	31.00	8	8	8 2	2000	28.00	70.00
Thickn	From	(G.Lm)	800	30.50	9.10	8	8 8	8 6	88	2 5	06.61	8	9.00	8. 8.	86	8	255,00	3000	8	8.00	81.8	87	23.83	0.0	17.20	13.10	15.00	10.00	10.50	10.50	10.00	12.50	5.20	24.60	8	8 8	3 5	38	8	17.20	88.8	37.8	32.00	8	40.50	8	8 8	8	23.88	28	2.8	8:	9 :	8	16.00
	Lithology		JIST .	2	sand .	₽.	2	<b>2</b> 1	5	ante	שוצב	Z	72	arite	anite	2	'n	Pdxtone	5	ğ	nd`	nd`	nd`	20	sand	nd`	Sent	nd`	adegrave	sand`	addggrave	nd`	5	and	, pure	Mudstone	nd.c.grave	nmestore pessite	- sic	nite Total	EDICE.	nice	Anite	arite	artzite	nestone	quartzite	mite	mite	anite	CIXS	anite anite	anite	anite	undegrave
Torat		Ê			45,70 sa																																		070	50.50	20.00	49.00	51.00	8.8	45.00 g.	50,00	39.00	21,00 gr	31.00	8.63	48.80	00'69	(8) (8)		٠.
	District		Deca	thuch	ipula	- Pats	entd.	upata	ripeta	200	ribata	ribera	- Date	space.	Hpeta	ama.	uma.	ama.	ama.	· suuo	- GMG	THE STATE OF THE S	arna	-ama	ama.	tama	- Wille	ema.	ama	APPA.	iama	ama	ame	nama.	ema	arma		auto	w.kc	wuke	anke	auke	anke	auko	nuke	auke	Petauko	touke	tauke	tanke	tuske	tavice	tauke	tanke	tauke
	Borchole		1														÷																														2630 Per			1				:	
	Input No B		-		3945 333												3957 193			4.												4.7			3975				1.								3988 263			- 0					
L	-		J									4													*	¥÷.		,,,									-																		
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Q.	3	of Bottom	រូដ្ឋ																																																		36.00
de i Del	avious	2 .	(0.1.0)	57.40	74.75	995	16.00	36.35	33.00	8.	18,75	46.25	49.60	16,90	33,30	7.8	8,1	22.70	00.00	63.50	30.00	20.00	0,40	35,10	24.50	80.00	32.00	38	2,00	10,42	3,5	000	000	8	000	27,40	8	20.00	27.25	40.22	2.75	13.75	30,20	0.00	55.95	96.	06.4	000	2 2	20,41	20.01 20.05	0.4	36.83
Bartonant C	Carrie de la carri	From	(E)	8.5		9	909	10.35	22,80	8	8.50	12.95	16.70	\$.00	18,60	5.70	30,13	30.11	12:93	47.60	8.00	8.8	0.40	8.8	12.80	18,00	8.	8	8	8	<u> </u>	9 5	2 6	3	000	1.75	8	8	8	2	2 6	8	15,20	0000	000	9.0	9,60	8 5	2 5	200	3 S 5 ×	4	8 6
	H	9 . (	E-1	00'51		9	16.00	10.35	22.80	8,11	8,50	12,95	6.70	8	8.8	5.70	8:	8711	12.93	47.60	18,00	80%	0.40	8,8	12,80	8.8	<u>5</u>	2.8	3.8	8	200	88	3 8	8 %	8	1.75	8	29:00	250	9 5	9 6	3 5	15.20	8.0	8	8	19.00	8 8	8 6	200	3 ×		8.8
Tall Care		From		000	3 8	8 8	8	8	8	80	000	000	800	000	000	800	000	00'0	85	0,0	8.0	80	80	800	000	800	8	8	8	8	8	88	3 8	88	8	000	80	000	8.0	8 8	3 8	3 6	88	90'0	8	00'0	000	8 6	8 8	3 5	3 6	3 5	38
-	1		(ww)	126	8 3	3 %	8	156	156	202	137	\$. \$	156	156	\$ <u>5</u>	156	202	612	202	38	50.	168	202	168	168	Ş	8	ģ	<b>30</b>	ž	891	0 5	8 6	÷ 39	210	168	₹	612	35	95	8 \$	3 %	3 5	8.	•	<u>\$</u>	9 <u>5</u>	<u>\$</u>	95	<u>6</u>	ç ş	3 5	35
1			intake G.L. m)	53,00	200	80.07	45,00	42.00	38,00	64,00	18.00	30,00	8:15	38,40	43.80	31,00	26.20	38.00	56.50	00'0	30,00	26.85	ô00 0	35:00	24,00	49.50	8,00	8.13	25.00	4.15	28,20	32.90	2 <del>2</del> 2	25.14	8	33,70	8	39.50	8	0.4	0/00	2 St	5.75	34,0	20,60	48.00	31.20	5.3	00.65	08.7.	35	200	3.8
		Capacity	m.Z/dBy)	13.20	`	20	98.0	11.20	15,70	0. 4	86.40	12,20	5,87	121	2.17	0.93	690	90,50	2.54	0.27	8,61	00'61	8.	56.90	3.76	5.3	8.	0.86	3,5	3.79	2.55	7.61		8.07	0.74	8,0	1.28	0.95	0.82	2000	5/ io	8 5	9	30,70	42,50	1,62	4	8	20.2	0.7	) ; ) ;		6.79
֓֝֟֝֟֝֟֝֟֝֟֝֟֝֟֝֟֝֟֝֟֝֟֝֟֝	_	Υied Sied		3.43	\ 	> 9	9	2.10	9	0.20	3.00	3.10	8.	0.50	6	0.0	0.1	3,50	3	0.20	8	2.80	52.0	4.28	0.50	9.9	8	0,33	0.85	22	0.62	3 8	26.0	2.0	81.0	4 30	0.4	0.30	0,38	8.70	3	9 6	0.15	3.38	4.0	0,75	8	8 6	2 5	2 5	7.0	4 6	8.8
	ud do	Salle C	(C.L.m)	00'8	ş, e	3 8	8,5	3,08	24.70	13.30	3.20	9,10	7.50	2.75	8.5	30%	11.45	8	2.10	11.20	8	7.8	7,00	929	12.50	9.50	4.70	6,80	2,80	370	8	8 8	8 6	4.30	10.0	8	8	10.50	8	0.4	9	2 5	3 5	8	3,8	8.10	3	2,5	3,	9 8	2 5		08.4
	Poundwater	inst Sinick	(C.Lm)	00'51	3 8	3 8	25	6.50	24.50	10,30	3.20	15.8	8	08.4	5	8	14,20	3,00	35	3	24.00	8	16,00	12.00	5.00	12.00	8	8	8.8	37.8	\$,00	88	88	3 8	8	9.00	8	10.50	8	<b>3</b>	3 5	3 8	38	3,0	2,0	14.00	8	08.9	20,20	200	3 8	3	6.20 6.20
		Main	Supply (G.Lm)	00'6	3 8	20.01	36.8	8	8.0	10,30	16.00	25.00	8	4.80	3.90	8.8	:420	3.0	14,80	12,00	44.00	8	8,0	12,00	15,00	30.00	8.8	20,00	30,00	37,80	8	8 8	000	25.5	8	4 03.4	800	800	28.00	20.00	\$ 5	2 6	306	15,00	12,38	4.00	8:	8 3	20.20	604	3.5	2	6,20
	Guiter		Thickness (m)	<b>00</b> "1:	3 8	3 5	8	35.50	15.50	54.70	12.80	¥ 8	8,8	31.20	29,10	22.00	6,80	00.00	45,00	67,00	86,80	8'91	00'01	8.8	05.	2,00	3.0	8	8	8,8	380	88	8 8	8 9	28,60	30,00	32,70	29.50	36,00	38.00	8 8	3 5	200	90.00	26.00	22,08	9,9	2 2 2 3	2020	20.01	812	5	8 6
,	Thekiness of main Aq			00:00	8 8	3 6	8	200	80.09	80.83	9.9	8.8	20.00	36.00	3	30.00	21.00	8	9000	79,00	8	8 8	29.00	17.00	90'91	35,00	<b>8</b> =	27.	35.00	3	8	88	8.8	8 8	99 17	8 98	35.70	8	38.00	8 8	8 8	3 S	24.00	5,00	38,00	38.08	8	3 3 3	3 3	3 3	3 5	3	* & 3 8
4.5	IPCK	-		19.00	8 8	3 8	36.8	8	24,50	10.30	320	12.00	8	4.80	8	8	14.20	8	14.80	12,8	80%	9.00	00 61	12:00	15.00	30,00	88	20.00	8	37.80	8	8.8	8 8	12.00	00.0	8.8	8	10.50	8	2000	3 8	3 8	38	2,0	2.08	14,00	19.00	9	20.20	6.07	3 5	200	2 3 2 3 3 3
	.1	Lithology		greins	granite	ans.	Frank	ranite	granite	neiss	ranite	gravel	nvcl.	Prathie	33.000	Enthite	pranic	CTICINS	granite	Printe	granite	granite	gneiss	granite	gramite	clay	puex	clay	clay	schist	granite	grunite	clay	Mudstone	granute	granite	grunite	granite	ranite	muite	grante	Enciss.	ranke	grande	runite	gneiss	granite	the iss	gheiss	greiss	granite	ramac	granic
	-		£	70.00													-											_	-		-		٠.	30																			8.8
		Pierro	il.	Penake	ctauke	canto	Parante	otanke	Petauke	otauke.	CARAC	Petauke	Ctanke	Canake	Petanke	ctauke	emoke	vrmuke	cunke	chunke	Penance	Potauke	Ctauke	ctauke	Petanto	ctauke	ctanice	ctauke	cannic	canke	clauke	COMPAN	Cunke	Petanke	Peranke.	rtanke	Petanke.	euuko.	-contro	ctanke.	Petaulo	refaulto	Primake	vennake	Petauke	otauke	Petanke	Petanke	Petanke	Petroke	Petauke	CHANKE	Petunke
		 યુ	<u> </u>				SIS		· :.																						:																						333
		Input No		1885	Ξ.	7.	30			-			. :													٠.	150							40204			1		- 1							404				ž.			6504
-	-			-																																																	

Column   C	Input No By	Borehole	Disaice	Total	- Introduced	(Juci	Thickness of main	Aquifer	2	Croundwater Fig. Smuth	Depth	3	Specific	Depth		Plain Casi	설	Perforated Ci	Poung	Depth
1,11,11   1,11	2	 }	*.	Ē	LAUNCOS.	(G.Lm)	(C.1a)	Thickness	Supply	(C.Lm)	(G.1m)	(%)	Capacity (m2/day)	of Pump Intake	Diameter (mm)	(C.Lm)	C. T.	From (C.Liii)		f Bottom f Casing
Outlier 1515 graves 1500 1500 1500 1500 1500 1500 1500 150	4	ľ	Chadiza	0	granite	6.00	27,00	78.00 78.00	00% 100%	00'9	8:	133	- f.ĵ	100	8	000	16.10	9		
Objective 1000 parties (1500 p	φ.	_	Chadiza	32,25	granite	8.8	8.8	18,00	8.8	3,5	3.50	3	4,86	30.90	156	000	08'01	10.80	23.50	S S S
Outlier 1000 prints 1,000 print	<b>.</b>	- •	Chadiza	5.30	granite	8 9	8 8 8 8	8 9	8	16,00	8	0,24	0.52	1 8	156	0.0	21.10	21:10	36,00	36,00
Outlier (500 gravers) 1050 1050 1050 1050 1050 1050 1050 105	- 4		Charliza	26.95	guens	5.4	8 5	3 6	0 4 0 5	5.5	8 6	1 5	86.0	8, E	207	88	8.8	8.8	8,5	8
Owier 100 present 5.00 table 5.00 table 5.00 table 5.00 table 5.00 table 5.00 present 5.00 prese	~	•	Chadiza	30.50	en rite	10.50	8	05.0	<u> </u>	05.0	3,6	88	į	3 8	95	8 8	3 8	3 8	8 5	8 5
Outside 1700 grantes 110 grant	201	Ψ'	Chadiza	8.8	igneous roc	ຕ 8	8.4	21.00	23,00	28.00	22	030	123	43,00	55.	000	23.10	23,10	28.60	28,60
Outline 1500 provide 1539 5429 5500 1510 1510 1510 1510 1510 1510 151	٠.	٠,	Chadiza	17.10	granite	920	17,00	7.80	920	9,20	8	တ္တ ဝ	3,05	16.50	205	000	11,50	11.50	17,00	17,00
Outline 1,000 provine 1,120 1,200 1,	9 (		Chadaza	3.5	gramite	21.50	27.00	20,00	21.50	21.50	8.	S.	0.86	35,00	Ģ	8	80	000	90.14	41.00
Outlier 1000 graves (100 100 100 100 100 100 100 100 100 10	, ,		Chadiza	8 8	granite	12.50	39.50	27,00	12.50	12.50	7.70	0.80	2,63	34,00	₹ \$	0.0	96.99	06'91	33,26	33.26
Outlies 1500 graves 1100 1500 1500 1500 1500 1500 1500 150			STATE OF THE PARTY	3 5	Smule	900	57.73	97.5	0581		3,76	<u>으</u>	7.02	8	Š	8	6.00 00.90	8.00	00.0	9009
Outside         1100         1200	ν.		Chadiza	8 8	granate	8 3	37.80	87.5	00.9	8	8	0.70	2.07	33.20	 %	000	2	8	31.50	31.50
Owalies State Printing State Printing State Stat	v		Charles	000	granite	8.8	8,8	964	8.5	8	2.50	9 1	191	27.00	156	0.00	10,63	10.63	22:23	22,23
Owalian         5,5,5,0 priming         5,5,0 priming         5,5,				2 5	Crante	86.6	32.00	8 5	15.52	00,01	8 9	9	4	31.20	8	000	23 75	23,73	34,80	34,80
Owinise 2.00 prints (1.00 prints) (1.00 prin			Chicago	20,74	granice	3 2	2,5	06.7	20.00	20.02	7,62	0.7	2.57	31.18	3	00	8	0.00	0000	37.50
Outlies 1000 primits (1000 primits)			Contract.	? ?	granic	3	8 8	3 2	3 5	07.0	9.35	550		35.60	503	8	4.25	423	0.00	4.25
Owigins         310.90 grains         450.00         250.00         450.00 <th< td=""><th></th><td></td><td>Audia.</td><td>2 2</td><td>Simula Stanis</td><td>3.5</td><td>3 8</td><td>26.5</td><td>86.5</td><td>9.5</td><td>3 9</td><td>2 4</td><td>0.4</td><td>9.4</td><td>9</td><td>8</td><td>8.</td><td>8</td><td>8.</td><td>8</td></th<>			Audia.	2 2	Simula Stanis	3.5	3 8	26.5	86.5	9.5	3 9	2 4	0.4	9.4	9	8	8.	8	8.	8
Owing 1100 and 1500 parts 400 2100 2100 2100 400 400 400 1100 110	. ŕ.			3 5	gramet amnite	3 5	8 8	252	3 5	08.0	3 8	2 9	3.02	9 2	136	8	9	02.	26.30	26.30
Challes         51.00 said         80.0 1100 said <th></th> <td>-</td> <td>hadiza</td> <td>33.60</td> <td>granite</td> <td>8</td> <td>8 8</td> <td>90 9</td> <td>28.50</td> <td>5 4</td> <td>3 8</td> <td>8 8</td> <td>65.0</td> <td>8 5</td> <td>8 8</td> <td>8 8</td> <td>8 8</td> <td>8,2</td> <td>3.8</td> <td>8</td>		-	hadiza	33.60	granite	8	8 8	90 9	28.50	5 4	3 8	8 8	65.0	8 5	8 8	8 8	8 8	8,2	3.8	8
Lundian 45.00 granie 44.00 56.70 1270 56.70 21.00 11.0	. 45	_	Nation.	8	Sund	8	5100	13.00	8 2	8	3 7	3 5	\$ 5	27.5	507	88	2 6	27.0	0.50	979
Lunchida: 45.69 granife: 20.00 15.00		-	undazi	\$ 70	gnanite	4	86.70	12.70	56.70	28.00	21.00	2	5 T	\$5.20	£ 5	88	3 5	8 4	86	8 6
Limidati	óca	_	12mpun*			14,10	16.00	8.	16,00	14.10	13.90	9	2.	00.14	152	8 8	9	25.	2 × ×	2 5
Lumbais	O.		(zehun)		granite	20,00	35.00	15.00	20,00	8,35	9,35	8	3.42	39.08	195	8	38	00	4.14	A 14
Lange	vo i		Lundazi		schist	01.61	3.5	2,3	2,8	19.10	8.55	Ġ.	0.87	51.50	150	00.0	20.02	20,00	3,	\$6,6
Lumbaria 25.00 granie 20.00 1.5 cm s. 1.5 cm s	σi		Cundazi		sandstone	8 5	20.50	10.55	202	8 0 0	8	0.30	1.52	27.50	168	000	8	2,00	9.00	8,8
Limitaria 2200 grafista (200 g	^ 0		Landara.		Stanie In in	8 8	83	22.00	8,5	20.00	5.80	2 2	900	38.40	38	800	23.40	23,40	38.40	38.40
Limibal 1955 greits 1650 1000 1140 1000 1150 1150 1150 1150 11	. 41	• •-	J. P. C. L. C.		Statistic of the second	3 5	2 2	<u> </u>	3 5	98	070	3 .	8,8	9,50	×.	900	8	8	25.50	X 8
Landaci	Ñ		undazi		gneiss	9	800	3.6	3000	3 9	020	g =	90	3 6	Š	88	8 8	8 9	96.50	\$ 8 \$ 8
Lamilati         52.50 granise         14.85         19.50         3.66         4.15         0.33         47.30         156         0.00         16.40         16.40         15.83           Lamilati         42.00 greeiss         22.00 greeiss         22.00 greeiss         22.00         18.60	ø		undezi		granite	2	906	7.80	800	1.20	2	0	0.40	28.86	3 5	3 6	2,72	, t	86	8 8
Lumilati         40,00 greetiss         22,00         38,00         22,00         8,15         0,77         1,98         95,00         156         0,00         18,45         95,00         156         0,00         18,45         95,00         156         0,00         18,45         95,00         156         0,00         18,45         95,00         156         0,00         18,45         95,00         156,00         20,00         156,00         156,00         17,70         1,45         0,40         0,93         158         0,00         15,11         11,10         17,10         15,00 <th>0</th> <td></td> <td>Jumplezi</td> <td></td> <td>granic</td> <td>14.85</td> <td>19.50</td> <td>3.65</td> <td>19.50</td> <td>14,85</td> <td>9,6</td> <td>0 13</td> <td>0.33</td> <td>47,80</td> <td>32</td> <td>000</td> <td>6.40</td> <td>9</td> <td>12.83</td> <td>3 2</td>	0		Jumplezi		granic	14.85	19.50	3.65	19.50	14,85	9,6	0 13	0.33	47,80	32	000	6.40	9	12.83	3 2
Lundasis         4,000 greenis         23,000         33,000         13,000         14,500         14,50         18,53         19,50         15,50         10,50         23,000         23,	Ø i		andaz.	_	gneiss	8 11	38.00	8,9	38,00	22.00	8,15	0.72	861	39,50	*	800	8.45	18,45	30.00	30.00
Lundaria 40.00 gravita 25.00 25.00 15.00 16.00 16.40 10.40 1	ġ,		czepun		Chelks	8 2	33.00	0.0	33.00	33	14.50	0.53	1,83	39.50	156	000	50.69	20.69	37,00	37.8
Lundari 3500 granite 2100 3700 1500 2100 2103 38.70 150 00.0 11.10 27.33   Lundari 3500 granite 2100 3700 1500 2100 2103 2.40 0.30 0.34 0.20 156 0.00 11.10 27.33   Lundari 4300 granite 2100 3700 1500 2100 2100 0.30 0.30 0.30 0.30 0.30 0.00 0.30 0.00 0.30 0.00 0.30 0	<b>5</b> 4	-	TOTAL ST		Silver Si	8 8	8.8	8 8	8 8	# 8 !	9	74.	07.1	39.50	<u>8</u>	000	20,30	20.30	33.00	838
Lumidati 42.00 gratisis 20.00 37.00 12.00 10.55 0.50 0.50 0.50 0.50 0.50 0.50	1	•	Anthritis :		STREET	3 5	3.5	3 8	3 5	2 5	3 5	9 6	0.93	38.70	<u>\$</u> ;	8	으 : ::	1.10	27.35	27.33
Lumbari 44.70 greess 13.00 granie 15.00 15	. <del>.</del>	-	ne (us)		one ice	8 8	3 8	9 5	3 8	5.5	2 1	2 6	2 0	37.00	8	8	8	9:36	9.60	8
Lunduzi         33.00 granite         15.00         50.00         15.00         77.0         63.5         15.0         50.00         15.00	Š	-	- Pullazi		energy energy	808	30.00	3.5	300	3 8	( Y	3 5	55.	27.5	8 8	000	8	8	36.10	오 오
Lumbari         47.00 granite         18.00         15.00         18.00         15.00         18.00         15.00         18.00         15.00         18.00         15.00         18.00	ď,		undazi		granite	15.00	8	15.00	8	7.70	170	3 6	5	35	Š	88	2 5	<u>6</u> 6	20.00	20.00
Lumbaci         34.50 gretiss         8 (x)         33.80         8 (x)         2.35         0.60         1.74         32.20         1.56         0.00         1.73         3.75         2.75         2.75         2.75         1.75         0.00         1.74         3.75         1.75         3.75         3.75         3.75         3.75         1.75         3.75<	×		umlazi		granite	8.8	35.00	17.00	8.8	14.00	4.40	0.00	89.0	45.50	}	88	3 5	5 S	3 5	7 2
Lunduci 37.30 gnetis, 2.35 37.50 14.15 37.50 2.35 1.60 0.33 1.21 25.20 205 0.00 5.70 5.70 5.70 Lunduci 28.00 granie 10.00 25.50 18.50 25.50 10.00 4.50 0.70 1.11 26.00 205 0.00 11.35 11.50 17.35 Lunduci 29.80 granie 10.00 25.50 18.00 2.70 0.40 2.70 0.40 2.70 0.40 2.70 11.10 11.10 11.10 16.80 Monae 48.00 gnetis 18.00 40.00 22.00 40.00 18.00 9.43 0.60 3.75 100 0.00 28.00 28.00 48.00 18.00 9.43 0.60 3.75 100 0.00 28.00 28.00 48.00 18.00 9.43 0.60 3.75 100 0.00 28.00 28.00 48.00 18.00 0.40 11.01 36.75 100 0.00 28.00 28.00 48.00 18.00 0.40 11.01 36.75 100 0.00 38.00 38.00 26.00 37.50 10.00 0.00 38.00 38.00 26.00 37.51 15.0 0.00 31.00 48.00 18.00 19.80 0.35 1.80 0.00 31.00 31.00 31.00 43.00 18.00 0.00 32.00 0.00 31.00 31.00 31.00 31.00 43.00 18.00 0.00 32.00 0.00 31.00 31.00 31.00 43.00 12.00 0.00 31	×		undazi		gneiss	8	33.80	25.80	33.80	8	2,35	9	1.74	32.20	35	8	8	8	366	3 5
Lumbasi         28.00 granite         10.00         25.50         10.00         4.50         0.70         1.11         26.00         205         11.35         11.50         17.33           Lumbasi         29.80 granite         8.70         26.80         8.70         2.70         205         0.00         11.10         11.10         16.80           Monze         40.50         20.80         2.70         0.40         5.76         2.70         205         0.00         11.10         11.10         16.80           Monze         40.50         20.00         24.00         30.00         5.00         5.76         2.70         205         0.00         11.10         11.10         16.80         17.00         16.80         17.00	×	_	Aumdauzi.		gnetas	2,35	37.50	14.15	37.50	2.35	09.1	0.33	5	25.20	502	8	1 70	9, 1	523	
Lumbati         29.00 granite         8.70         26.80         8.70         2.70         0.40         5.76         2.70         20.5         0.00°         11.10         11.10         16.80           Morace         32.00 granite         8.70         24.00         3.00         3.10         6.18         0.88         28.50         100         20.00         20.00         32.00           Morace         40.50 granits         36.00         40.00         18.00         9.43         0.60         3.74         28.50         100         0.00         20.00         32.00           Morace         40.50 granits         36.00         40.00         18.00         9.43         0.60         3.74         28.50         100         0.00         28.00         32.00           Kalomore         42.00 quartrile         26.00         35.00         16.80         0.53         7.81         25.75         100         0.00         31.00         31.00         31.00         48.00         31.00         48.00         31.00         48.00         31.00         48.00         30.00         48.00         31.00         48.00         31.00         31.00         31.00         31.00         31.00         31.00         31.00	× :	<b>.</b>	undazi		granic	10.00	25.50	15.50	25.50	00'01	4.50	0,0	=======================================	26,00	202	800	1.35	9	7.35	
Montac         35,00 within         600         30,00 within         600         20,00 within         20,00 within         0,88         28,50 within         100 within         20,00 within	. :		umlazi		granite	8,70	26.KO	02.8 10.8	26.80	8.70	5	o. 8	5.76	2,70	202	300	11.10	0.1	16.80	97.91
Montac         40.00         40.00         18.00         40.00         18.00         40.00         28.00         40.00           Montac         48.00 gradis         36.00         40.00         18.00         6.15         0.30         1.01         36.75         100         0.00         36.00         48.00           Kalomo         48.00 gradis         36.00         48.00         18.00         16.80         6.15         7.81         25.75         150         0.00         31.00         43.00           Kalomo         56.00         8.00         35.00         48.00         13.57         0.18         0.41         18.75         150         0.00         43.00           Kalomo         56.00 basalt         14.00         26.00         13.50         40.00         15.00         43.00           Kalomo         43.00 basalt         14.00         26.00         26.00         5.88         1,35         4.46         36.75         150         0.00         18.00         43.00           Kalomo         43.00 basalt         26.00         26.00         26.00         26.00         26.00         26.00         37.50         31.00         43.00           Kalomo         43.00 basalt	~ ;		Yours		xchix.	8	89	2400	30,00	000	3.10	8	0.88	28.50	5	800	20.00	20,00	32,00	32.00
Montes         48.00 grains         36.00 dat.         48.00 grains         36.00 dat.         36.00 d	₹ 2		fonze		Shorts	8	8	22,00	90'07	8.8	9,43	3	3.74	28.50	<u>8</u>	30 0	28:00	28,00	00:07	40,00
Nationary         42,00 quartitie         25,00 duartitie         25,00 duartitie<		:	Aonze	-, -	Enclar.	8	<b>4</b> :	8	8	98 8 8	6.15	9	<u>5</u>	36.75	001	800	36,00	8.8	8,00	<del>\$</del>
Kalomo         60.30 gnelius         48.00 48.00 48.00 48.00 13.57 0.18 0.41 58.75 150 0.00 48.50 48.50 60.30           Kalomo         30.00 busult         14.00 26.00 12.00 26.00 5.00 13.50 1.35 1.00 28.00 17.50 150 0.00 18.00 19.00 19.00           Kalomo         43.00 sehist         26.00 13.00 24.00 13.50 24.00 13.50 0.00 11.00 13.00 11.00 13.00 11.00 13.00 11.00 13.00 11.00 13.00 11.00 13.00 11.00 13.00 11.00 13.00 13.00 13.00 13.00 13.50 13.00	i •		Calomo	-	quartzite	26.00 26.00	8,8	8	33.80	26.00	10,89	0.53	7.8	25.23	8	800	31.00	8	00.14	43.00
Kalomo         30,000 busult         14,00         26,00         12,00         26,00         32.5         1,00         28,00         17,50         150         0,00         18,00         30,00           Kalomo         43,00 schist         26,00         36,00         26,00         35,00         1,35         4,46         36,75         150         0,00         31,00         43,00           Kalomo         43,00 schist         24,00         35,00         24,00         35,00         31,00         31,00         43,00           Kalomo         49,50 quartzite         28,00         30,00         4,00         31,50         49,50         49,50	-	7	Nomo		gneins	4X.00	26.00	8.00	26.00	48.00	13.57	0.18	0.4!	58.75	32	8	8,50	05.84	00.50	9
Kalomo 45.00 senist 25.00 30,00 4.00 38,00 26.00 5,98 1,35 4.46 36,75 150 0,00 31,00 43,00 Kalomo 42.00 websis 25.00 31,00 11,00 31,00 43,00 Kalomo 45,50 quarteit 28.00 40,00 12.00 28.00 0,00 4,00 5,00 31,60 25,75 100 0,00 37,50 45,50 45,50	~ .	- ′	Piomo		basalt	3.	26.00	12,00	26.00	8	3,25	8	28.00	17.50	150	000	8.8	00.81	30.00	800
National 43.00 schill 24.00 33.00 11.00 33.00 24.00 3.95 0.58 8.08 20.25 150 0.00 31.00 43.00 43.00 Kalona 49.50 quartite 28.00 40.00 12.00 28.00 0.00 4.00 5.00 31.60 25.75 100 0.00 37.50 49.50 49.50		-	Omo		schist.	8.8	8	8	38,00	26.00	5.98	1,3	4.46	36.75	. 051	800	8	31,00	43.00	8,6
Advance 49,30 quartitie 28,00 40,00 12,00 28,00 0,00 4,00 5,00 31,60 25,75 100 0,00 37,50 37,50 49,50		T (	Momo		ACTI ST	3	80.0	8:	33.00	8	3.95	0.58	80°8	202	8	8	31,8	31.8	43.00	43,00
		_	Calomo	_	quartzite	28.00	40.00	12.00	28.00	800	8	8	3:.8	25.73	8	00.0	37.50	37,50	49.50	49.50

£	E C	60 1	83	2,00	00'0	3 8	3 8	8	8	8	90.	8	00.6	800	00'00	8	00'0	80.60	8. 8.	00'01	8.5	300	3 5	20:01	00:17	38.00	90,04	30,00	900	8 8	200	48.00	8,3	88	8 6	32.8	40.00	00'87	00'09	8:3	8 8	8 ( )	45.00	8.4	77,00	36,00	8 8	35.	8 2	35.70
i)dəç;		of Casing																								٠																								
Clising	9	ô J	l																																															35.70
Perforated	Hon	(C.Lm)	l																																															288
ຸ່	3	(G.Lm)	28.00	25.00	28.00	8 8	3 8	3 5	3 8	3 8	8	877	30	\$0.00	3	9	90.04	25.65	18.00	8.8	8 8	8 6	8 6	3 2	8 8	8	24.8	8,8	8 8	8 8	3 8	36.00	36.00	24.00	88	2,58	28.0	36.00	8.4	8 3	8.5	3 2	33.00	32.00	90,09	90.04	9,50	26.05	3 8	
Plain Cas	From	(C.Lm)	000	8	800	8 8	3 8	3 8	3 8	88	8 8	8 8	80	8	80	000	000	8	0.00	00'0	83	000	0 0	3 8	8 8	8	8	000	8	8 8	3 8	88	80	8 6	88	3 8	8	0.00	800	9:0	8 8	3 8	} 8	000	000	000	00'0	200	3 8	88
	Diameter	(EE)	<u> </u>	8	8	8 8	3 \$	3 8	3 8	ξ	3 5	3 9	. 8	8	8	150	ž.	150	S	8	8	8	8 8	3 8	3 8	8	8	8	ਲ ਵ	8 5	<u>Ş</u> <u>\$</u>	3	<u>8</u>	충 :	8 9	8 8	Si	8	8	<u>8</u> :	8 8	3 €	3 S	<u> </u>	. <del>2</del>	50	99	<u> </u>	2 5	3 3
Depth	of Pump			34.00	34.00	5.5	8 4 6	777	6.0	5 Y	2000	95.86	74.00	000	45,00	42,25	47.75	36,75	36,75	23.00	25,75	28.50	3.8	2 2	71.26	17.50	31.25	28,50	3,0	52.25	3 5	2,4	17.50	8	2 2	8 8	8	36,75	47,75	31.25	% 8.8	3 £	3 5	35.73	50.50	8,00	23,00	2013	8 8	55.8 8.88
<u> </u>		(m2/day)	99	7.26	<u>.</u>	1380,00	\$ 3	0 i	\$0.5 -		16	4 77	ì	200	0	×6.1	9	1,82	27.76	223	4	8	336	3 5	3 6	9,	19.4	8	8	1.07	3 5	8	235.00	~i	800	9 8	2.83	18.70	 0	3.72	<b>3</b> 9	9 9	2 2	5.5	8	14.0	3.63	9000	660	15.30
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Thickness of main /	2	(G.Lm)	- W	8	8	32,00	8; 8;	37.00	8 8	8 8	8 6	3 8	3 8	8 8	38.00	80.00	42.00	31.00	8	33.00	8.8	8,4	3 8	8 8	8 6	8 2	9	8	90,08	X	3 8	8.8 8.9	8	3.8	8 8	8 8	8	3	84.00	<b>1</b> 8	8.8	8.8	8.8	3 3	20.07	32.00	25,08	8,0	8.8	8 8 8 8
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04176		(C.L.m)		3 8	900	48.20	38,00	36.00	50.50	21,80	00.61	8	36.88	0.00	68,30	000	1966 1967	300	000	8	00,64	00'70	76,00	000	8 8	20,00	36	8 5	35.55	88	32.	8	30,65	30,60	30.50	8.8	3 5	25.00	000	\$ 56. 00	68,55	000	63.00	30,00	29:00	37.80	35.80	25.50	98.90	0000	3 8	3 8	88	;
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Plain Ca		(C.L.m)	1	88	8	80	80	8	000	8:	000	86	800	8 6	000	88	3 8	3 8	3 8	38	3 8	3 6	38	38	3 8	3 8	8	8	000	000	8	800	8	86	8 8	88	88	8	8	00	80	800	800	00:0	8	8	8	8 8	8 8	3 8	3 8	88	8 8	:
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Groundwater	Kings Commit	(C.Lm)	15.00	8	29,00	12.20	300	20,02	8 8	3 8	3 5	8.6	3 8	3 8	3 4	24.00	2000	3	8	19.00	16.33	27.00	9	35	25.00	21.10	27.40	12.50	12.00	12.80	88	15.00	8 8	38	14.00	8.5	26.00	8	26.00	0.48 X	8	1700	8.	0,5	8 8	8.2	3 8	3 2	3 4	27.89	9	21.70	36.68	
	disk	Supply		8	60.00	8	800	70.02	8.62	3 5	3 5	3 5	3 2	3 6	200	24.00	32.00	4	36.00	28.00	8	33.00	20.00	29.00	8	8,00	35,00	40.00	36.00	18,00	8,	8 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	8 8	8 8	8	87.7	8.2	23.8	32,33	0.23.	87	8	86,00	27.8	3 8	3 8	3 5	3 8	38	8.8	8	8	8,8	
Aquifer	Total	Thickness	82	57.40	31,00	47,80	8 8	00.01	8 8	3 8	3 8	3.8	3 8	3 5	38	25.00	33.00	26.00	21.00	800	27.72	000	9.00	21.00	41,00	24.80	7.60	9,00	24,00	6.00	8	8 8	200	3 8	8	9:21	8.9	809	200	o S.	8	28.00	8	9 8 N 8	3 5	3 5	3 2	2,40	. 5 1	8.8	20.00	58.70	7.00	
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Š	of Pump Intake	Ç																																														
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	District	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Choma	O	S S	O G	₹ 0	og O	G E	o o	o O	T .		Kalomo	Kulom	Kalomo	Kulom	Eola :	O S	N Table	Kalomo	Kulomo	Kulon	Kalon.	FOLK Y	Katomo	Xalon	Kalon	Kalon	Kalomo	Z Z	Kalomo	Kalomo	Kalor .	Kalomo	X	Kalon	Kulon	Kalomo	Walon .	Kalon	Kalomo	Offi	Kalomo	Kalomo	Kalomo		Valanta
	<b>(4)</b>	9	2861	7881	2883	8	8	282	285	8	3107-1	7-4907	274	25	627	1-856	508-3	8	3 5	3 4	516	3	1624	1618	8 4	8	\$	188	989	\$		_	_		* io.					1.0	X-25.14			• • •		2023-0		2000
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Column   C	Edeci - Senso		2000	9	100	× ×	TIN SCIENCE										
March   Marc	_	_	5	2				S. Carrier		Capacity	of Pump	Diameter	- Loui	8	From	9	of Bottom
8.00 partie: 3,40 miles   8.00 partie: 3,40	Ê		(5.1.5) E-1.1		Thickness	Ajdday (	(C.L.m)	(C.Lm)	- 11	m2/day)	make	(mm)	(G.Lm)	(C.L.m)	(G.L.m)	(G.Lm)	of Casing
9500 parier 1540 1500 1250 1250 1250 1250 1250 1250 125	37.		3:00	18,80	300		82	235	077	24.70			000	100	17.0%	K.C.K.	18-19
### 800 profile	ş		24,40	80.00	25.60	000	24.40	7.60	80	4	9	20	800	8	88	300	9 6
### 1979   Parties   No. No. 1970   Parties   No. No. 1970   Parties   No.	ŝ		3.8	32.80	18,00	32.00	13.70	7,60	000	0,15	28.00	95	000	20.41	8		2
March   Marc	4		9.70	8.8	36.30	8.00	9.70	250	-	3.25	99.95	95	000	909	20.51	25. 4	
5000         Printing         MAGO         5000         STOTA         1200         CATO         TOTA         CATO         STOTA         CATO         CATO <t< td=""><td>ğ</td><td>~</td><td>36.60</td><td>20.00</td><td>33.40</td><td>36.60</td><td>36.66</td><td>27.70</td><td>-1.</td><td>61.4</td><td>3,</td><td>30</td><td>800</td><td>28:00</td><td>28.00</td><td>900</td><td></td></t<>	ğ	~	36.60	20.00	33.40	36.60	36.66	27.70	-1.	61.4	3,	30	800	28:00	28.00	900	
%500 profiles         \$500 pro	શ્		30,00	8,0	30.00	000	30.00	27.73	8	67.70	8.8	5	000	27.00	22.00	909	25
1,500 meta-sedim   1,500 meta-	\$5		65.00	75.00	8	65.00	8.8	22.00	8	2.27	21.00	33	0.00	63.10	63.10	75.00	75.0
Colon Statemarch   Author	88		21.60	8,8	21.12	48.00	21,8	12.25	8	23.00	8.	8	000	45.80	45.80	58.00	35
6400 granices   1,370   4,500   1,321   0,000   1,330   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500   0,500	క్ష		40.50	800	29.50	40.59	40.59	23,18	2,80	6.42	800	254	000	0,0	0,0	000	3
Column   C	\$		13.70	42.00	13.28	0.0	13,70	8.	60	0.50	00.09	150	8	000	200	20.27	,
8600 series, 1500 solds 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000	Ę		12,00	94.00	25.00	12.00	2.8	10.15	070	0.43	62.00	150	000	5	25	2 2	
6500 cities (2.00	8		39.00	8.8	26.00	39.00	39.00	26.20	9	9	0065	5	88	0000	3 5	3 5	7 6
6500 silvane	26		8.8	8	21.00	\$ 26	8	2.25	000	25.00	3 5	3 5	3 8	3	3	00.02	0.00
6470 einlineer 2000 6500 6500 2000 2000 2000 2000 6500 1000 1000 2000 2000 2000 2000 2000 2	\$		16.00	65.00	40.00	3	2	5	3 6	\$ -	3 5	3 9	38	3 9	3 3	20.0	0.0
6,70 widel         7,00 wi	\$		000	88.88	( V	Ş	5	2	3	200	3 5	2 :	3 8	3 :	9	20:00	20.0
1.50 walker	4		\$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00	3	3 5	2	3 5	6.6	2	3	8.5	0.5	8	0000	10.00	35,00	35.0
Color granter         7,200 area         7,20	į		(X)*91.	2) (8)	20.7	00.00	1.200	8	200	0 4	44.00	S	9 0	2	31,80	0X,14	*10
4000 Symmile	Ċ		72.00	75.00	8	3,5	3.3	2	8	00 600	29,00	130	00'0	6.1.K)	0.10	25,00	25.0
64.00 straining         54.40 stra	જું	-	9.	3	8.8	48.00 00.84	3,00	3.	09'0	13	00'09	50	00.0	7.28	7.28	X	×
Sign service action (Section 2009) (	<b>3</b>		8,47	33.8	8	30,80	24.00	27.8	8	8.13	45.8	150	000	16.00	90.90	31.00	0.5
50.00 strait         45.00 strain         45.00 strain<	2		8,8	30.8	2,00	30.00	8.8	o'::	2.27	96	42.70	150	000	5	8	15.70	£ 9%
6.500 granie; 14.50 4.500 10.00 10.00 10.00 14.00 11.0 10.0 14.0 11.0 11	Š		24,00	32.50	8.50	32.50	24.00	14.20	20	80.20	\$0.00	55	800	5	5	5	Š
65.00 granie 11.45	?		82.8	8.9	10.00	800	45.00	8	0.10	800	8	153	8	88	, X	2 5	46.94
CODO graniste         74.40         60.00         14.60         61.6         64.60         64.80         150         60.00         14.40         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150         150	λ		1.50	8,3	11.50	11.50	11.50	80.	2.50	6.63	8	ģ	5	1 2 2	200	3 5	
450   Serial   700   450   450   1000   700   350   565   568   570   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155   155	જ		24,40	90.00	35.60	0.00	24,40	34.60	0.10	0,40	48.80	9	000	3	9 9	20.04	9 6
1,500 printing   1,500   1,523   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,500   1,5	67.		2,00	36.00	29.00	0001	3.8	8,8	50.	8,08	57,00	20	86		-	26.5	2.5
97.00 garmlife         24.50         18.70         45.00         18.70         24.00         18.70         45.00         18.70         45.00         18.70         50.00         18.70         50.00         45.00         18.70         18.70         50.00         45.00         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70         18.70	₹.		00,01	14.93	1,93	13,00	13.80	8,50	0.31	800	8	55	8	6.25	92.9	2.5	2 2
80.00 sand 30.0	5		2430	43.00	18,70	63,00	24.30	8 17	ង	5.02	87	150	8.0	95,	4.50	05.01	9
N3.00 sundknown         45.00         10.30         0.55         1.50         78.00         15.00         0.00         42.00         15.00         0.00         42.00         15.00         0.00         42.00         15.00         0.00         42.00         15.00         0.00         42.00         15.00         0.00         42.00         15.00         0.00         0.00         0.00         15.00         15.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00	8		30,00	70.00	90,00	8	30.00	18.00	9,0	81.50	65,00	š	8	15.00	15.00	42.70	2.23
3.30 limestone 17,00 31,30 li 18,50 27,00 11,00 11,00 13,00 31,30 30,00 15,00 000 000 000 000 000 000 000 000 000	8		8.	80.00	35.00	8.8	45.00	10.30	\$6,0	1.50	78,00	8	000	42.00	42,00	80.20	80.2
5000 schist         11,000         45,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11,000         11	ri		7,00	33,50	18.50	27.8	2,00	<u>2</u> 8	6.70	32.20	30.00	150	0.0	9.20	80	000	9.2
21000 guarante 12.00 21.00 36.00 21.00 11.60 22.0 8.52 73.00 1150 0.00 14.00 14.00 19.00 10.00 15.00 0.00 14.00 14.00 15.00 0.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.	Š,		8	8	340	8	2,8	6.20	8,	3,35	8	55.	800	7.40	000	000	4.7
20.00 quarticite 12.00 21.00 12.00 12.00 12.00 13.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 1			20.00	89	36,00	20,00	20,00	8	2,80	8.52	73,00	150	90.0	14.00	14,00	59.00	8
Q.000 cachist         12.00 ca			128	21.00	9.60	5.8 12.8	12,00	S.	2.50	8	18.00	150	0.0	5.00	15.00	21.00	0.17
9,000 schist 35,00 60,00 24,00 46,00 36,00 100 13,00 13,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 15,00 1			877	24.00	8	8.8	8	7.57	8.	0000	21.00	85	0.0	17.00	12,00	24.00	24.0
45.00 timestone 17.00 44.00 26.40 36.50 17.60 70.0 6.60 950.00 42.60 150 0.00 10.00 14.50 45.00 within 20.00 within 24.00 36.00 12.00 13.00 12.00 35.0 77.60 85.00 15.0 0.00 24.00 24.00 25.00 45.00 85.00 15.0 0.00 24.00 24.00 25.00 45.00 85.00 15.0 0.00 24.00 25.00 45.00 15.0 0.00 15.0 0.00 24.00 25.00 45.0 15.0 0.00 15.0 0.00 24.00 25.0 15.0 0.00 15.0 0.00 25.0 15.0 15.0 0.00 15.0 0.00 15.0 0.00 25.0 15.0 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.00 15.0 0.			36.00	8	24.00	00'04	88	218	8	8.6	54,00	33	000	33,00	33,00	39,00	36
42.00 schist 24,00 36,00 12,00 33,00 24,00 15,20 33,0 79,60 36,00 15,0 0.00 24,00 24,00 25,00 20,00 0.00 0.00 0.00 0.00 0.00 0.00	_	_	17.88	<b>1</b> 8	26.40	36,50	3.6	8	8	950,00	42.60	20	80	10.00	000	34.50	3
QXXXX         Strict         18.30         36.60         18.30         36.60         18.30         14.90         1.39         3.54         48.80         150         0.00         7.00         25.30           CXXXX         School Schist         27.40         45.70         18.30         30.50         13.70         40.00         15.00         0.00         7.00         23.30           CXXX         School Schist         15.20         11.00         0.36         15.00         10.20         45.00         15.00         10.00         7.00         10.00         23.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         10.30         40.30         1			24.00	36.8	8	33.00	24,00	15.20	3.50	79,60	8.8	150	80	24.00	2400	2.00	0.7
QCOD schist         27.40         45.70         18.30         30.50         27.40         45.70         18.30         30.50         27.40         45.70         150         0.00         22.00         22.00         40.30           65.00 schist         9.10         47.70         36.60         15.00         10.20         45.00         150         0.00         7.00         16.10           65.00 schist         15.20         36.60         15.00         11.00         0.24         12.8         48.80         15.0         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         16.10         0.00         1			13.30	8	18.30	36.60	18.30	14.90	3	3.54	08.80	150	0.00	7.00	7.8	25:30	2
OLOW Schist         9,10         47,70         36,60         15,00         9,10         47,70         36,60         15,00         10,20         45,00         150         0,00         7,00         16,10           55,00         51,20         31,20         31,20         31,20         31,20         10,20         10,20         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,00         10,		32	27.40	45.70	\$. 2.	30,50	27.40	13.70	<del>4</del> 8	0.80	45,70	150	800	22.8	8	00.00	40.3
CALON Schillst         15.20         51.80         36.60         15.20         11.00         0.56         1.28         48.80         150         0.00         18.30         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         27.00         0.00         0.00         27.00         0.00         0.00         27.00         0.00         0.00         27.00         0.00         0.00         27.00         0.00         0.00         27.00         0.00         27.00         0.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.00         27.		4	2.10	2/ //	36.60	8:38	0.10	3.	2.00	10.20	45,00	150	000	2.8	7.8	16.10	16.1
77.80 schist 25.40 55.00 25.60 13.50 25.40 12.00 2.13 5.56 45.00 150 0.00 27.00 27.00 13.00 13.00 14.00 18.00 16.70 18.00 16.70 16.00 24.00 15.00 16.70 16.00 24.00 16.70 16.00 24.00 16.70 16.70 16.00 16.70 16.00 16.70 16.70 16.00 16.70 16.70 16.00 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.70 16.7			13.20	51.80	36.60	30.50	15.20	8	\$ \$	1.28	48,80	50	800	18,30	000	000	18.3
42.00 limestone 18.00 36.00 18.00 30.00 18.00 16.70 6.00 247.00 42.00 150 0.00 21.00 21.00 34.00 34.00 32.00 15.00 18.00 36.00 18.00 36.00 18.00 36.00 18.00 32.00 18.00 32.00 18.00 32.00 18.00 32.00 18.00 32.00 18.00 32.00 18.00 18.00 32.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00 18.00		24	25,46	8	33.65	33,80	3	51 8	2.13	5,56	45,00	50	000	27.8	27.00	33.00	33.0
32.00 schisst 15,00 32.00 17,00 15,00 8,00 0,90 33.80 22,00 14,30 14,30 24,30 77,50 15,00 10,00 14,30 24,30 77,30 70,00 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30 14,30		_	8.8	8	8	30,00	8:8	16,70	8	247,00	42,00	3	00'0	8	21.00	8	36.0
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-	District	- Comment	Lusaka-Urbar	Lusaka-Urbaz	Language Urbar	Lucaka-Urbar	Lusuka-Urbar	Lustice-Urber	Lusaka-Urbur	Lusaka-Urbas.	Lusaka-Urbur	Lunaka-Urban	Lucaka-Oroan	Lastin-Urba	Lawste-Urber	Luxuka-Urbai	Lunaka-Crbui	Luneka-Orban	Lucakae Urbus	Lusaka-Urbur	Lunaka-Urbur	Lusaka-Urba	Lusaka-Urbar	Less Cross	Lusaka-Urber	Lusaka-Urbar	Lusaka-Urbur	Lusaka-Urbar	Lusaka-Urbar	Lusaka-Urbar	Lucka-Urbar	Lucka-Urba	Luxuku-Urbur	Lusuka-Urbar	retro-execution	manka-Cross	Lusuica Urbur	Luraka-Urbar	Lusaka Urba	Lyculta-Cyber	Lusuka-Orbur Lusuka-Urbur	Lustaka-Urbar	usaka-Urba	Laraka Urban	Market Urber	Lisuxa-Cron
	Borchole				7					3371-1	3326-2	3226-1	1305.	12X2-1		ĕ,	321.7-	816	500	3243-1	3.88.5	1638-1	3188-1	2028-6	2787.2	3142-1	3154-1	28962	38	2809-2	1-808	262.5	27872	2793-1	2293		ដ្ឋិ	7214	1282	۶. ۶ د د	926	9	-	i.	1212	
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Thic	From	(O.L-m)	17.70	23.70	12.20	e :	8 8	88	8	10.70	7.50	8,20	00.6	30.50	8	30.50	30,50	200	24.40	7,60	20.02	811	24.40	8	800	200	30.50	0.00	20.00	5 5 5 5 5	24.45	8.8	3.00	88	8.55 5.50 5.50 5.50	5.00	1.30	12.20	23.50	0.9	25	15,00	25.80	3.	9.0	27.40	0.30	30.00	8.50
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Town	Dept	€	20:00	80.00	5.70	85	8 8	3 50	800	5.5	35.00	0,0	30.00	75.00	8,8	80.09	χ. 8 :	3 8	28	20.00	8	20.8	8	8 8 8 8	3 5	800	8	40.00			3 8		•				\$5.00	•		3, 4 3, 5	2 5	8	33.0	800	35.0	50.00	\$ ;	4 5	8 8
	District	- A	Lusuka-Orbar	Lusako-Urbar	Chome	Lusaka-Urbar	Ndola-Urban	Mobile Cross	Lucaka-Urbu	Mazabaka	Adola-Urbus	Mazabuku	Ndola-Urban	Lusakar-Urbas	Luenshye	Lunaxa-Urbar	Lunethal-Urbu	The crash	Tuesday Jehne	Mazabaka	Lusaka-Urber	Lusaku-Urba	Lusaka-Urbar	Lusaka-Urbar	Nacional Communication of the	Lucation of their	Lusaka-Urbar	Lusales-Urbar	Lusaica-Orbar	Lusaka-Crbs	Lusaka-Orası Lusaka-Örber	Ndole-Urban	Kabwe-Urbar	Kabwe-Urbur	Note: Urban	Curaka-Crow	Lusaka-Urbur	Lunaka-Urbar	Lusaka-Urba	Ndok-Urban	Mazabuka	Ndola-Urban	Ndola-Urban	Ndola-Urban	Ndolu-Urban	Luxatu-Urban	<b>∀</b> 2#	Mumbwa	Mumbwa
	-왕		100	4.43-1	4182-1	4.44-1	٠.	42375		4147-1	4185-1	240011	4151-1	4149	4161-1	4:83-1	149-1	- 000	1.68.1	3510-7	4135-1	47274	366229	3			3974-2	4172-1	4203-1	0.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.799. 3.	4,684	7-202-1	4205-1	1-623	283	100	4153-1	4116-3	366226	41.59-1	2.65	4158-1	4177-1	373512	373511	4187-1	4175-1	MUMOI	MCM02 MCM03
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-			Total		T. C.	The above of many						, a,			<u> </u>				
Input No Bo	Borchole	District	to d	Listhology	From	ŀ	Tage L	十	Ser Contact			Special Constitution	1000	_L_	2	3.12	ייייייייייייייייייייייייייייייייייייייי	Z IIIZ	w.A.
	Š	.1	Ê		(G. L.m.)	Ê	Thickness		(G.Lm)	(O.L.m)	ŝ	(m2/day)	Intake	(mm)	(G. L. m.)	(G.L.m)	(G.Liii)	(G.L.m.)	of Caxing
DW. 584	MOMOA M	Mumbwa	37.00	pos	18.00	90'X	(II)	100 X	- 00 XI	- 80 6	900	000	- (配) (配)	. S	000	. Q	( <del>7</del>		(III.
		Mumbwa	5,8		30.00	36.8	8 8	3000	27.00	10.77	8	8 8	38.98	8 8	88	200	9	300	3.5
		Митриа	37.00	•	12,00	18,00	90.9	18.00	12,00	6.20	8	8	30.00	8	8	3	25.60	37,40	37.40
	_	Mumbwa	49.00		15,00	900	15,00	3,00	12,00	10.46	30	25,30	39,00	55	8	37,70	37,70	49.10	49.10
	MB101 M	Mumbus	8.5		25.00	27.00	8	8	25.00	21.16	7.	378.00	30,00	8	80	26.10	26.10	37.00	37.00
4480 WB		Mumbwa	200		88	8.8	8 8	200	8 8	2 5	7	8 8	8 8	ន្ទ	8 8	86	86	800	30,00
		Musenhees	3 8	gramme	9.5	8 6	3 5	300	3.5	0/% Y	2 5	5 5	3 5	<u> </u>	8 8	8.80	98.	90.00	30.00
		Mumbera	37.00	schist	885	24.8	3 8	15.00	3 8 2	3 2 2	7 0		3 8	3 5	8 8	8 t	£ £	8 6	8.74
		Mumbwa	8	schix	\$2,00	86.00	8	52.00	2700	39.66	3	0.38	8 8	3 8	88	5.65	45.60	8 8	86
		Mumbwa	37.00	schist	21.00	24.00	3.00	24,00	21.80	6,8	5	5.33	800	8	8	26.30	26.30	37.70	37.70
		Mumbwa	96.99	schist	41.00	46.00	200	8.8	4.8	24.14	0.05	0.0	90.00	8	8	54.80	54.80	66.40	3.
	MB003 M	Mumbwa	8.1.	gneiss	18.00	8	8	38,00	8	7.10	0.75	5.63	24,00	55	0,0	20.00	20.00	31.40	31.40
		Mumbwa	28.0	schist	8.	8	9.00	48.00	30,00	18,30	<u> </u>	800	54,00	50	8	46.80	46,80	58.40	58.40
200 / MB	MISOCO MO	Mumbwa	9 4	SCALS.	8,8	8 8	8.8	8 8	ş. Ş.	2	٠ ا	8,00	25.00	<u>S</u>	8	8.	4.8	15,40	15,40
	:	Mundan	3 5	quartale	3.5	8	207	3 3	8 8	9	2 :	34,7×	8	8	8	24.60	24.60	8,0	5.45 Of
		Wanners	3 5	quartene	3 5	8 9	86	80.64	25.08	2 :	0 5	8	8,1	<u> </u>	8 6	10.70	0.70	22.30	17.30
		Mumban	3 4	operation of the contract of t	3 5	3 8	3 8	3 5	3 5	3 5	2 8	3 8	8 8	2 5	8 8	8.6	<b>3</b> 5	30.5	900
		Virmbun	00.0	chist	20.00	8 8	88	3 8	8 8	17.80	3 5	3 8	8 8	3 Ş	3 8	8 9	8 8	24 4	02.5
		Mumbwa	37.00	Const	18:00	24.00	909	2400	18.00	90	8 8	88	88	9	3 8	200	) -	1	9 5
1.		Mumbwa	8	Sie	8	18.00	4.8	8	00.1	8.03	2 2	9	24.00	3 9	3 8	1 ½ 2 §	<b>?</b>	3 6	3 6
		Mumbwa	49.00		24.00	30.00	6.00	24.00	24,00	17.80	0.28	7.7	8.3	5	8	38.00	9	04.04	4 64
		Mumbwa	43.00	SNAGS	27.80	43.00	00°91	27.00	27.08	24.30	0.16	1,63	36.00	8	000	31.60	4	43.00	63.00
- 1	××	Mumbwa	43,00		24.00	33.00	8	33.00	24.88	17.82	8	8.97	8,8	8	8.0	32.00	07:1	3.5	3
200		Mumbwa	900		22.00	8	8.4	8	22.00	12.40	9	<u> </u>	877	Š	8	37.60	07.11	49.00	00'67
500 Mile		Mumbwa	200		8	8 9	8	8	2.0	<u>Ş</u>	8	2	36,00	20	000	32,00	9( <u>:</u>	43.00	87.
ASH MBIO		MURIONS	3 8	quartitie	82.8	8 8	8 8	27.00	27.8	37,66	8 6	208,00	37.73	8	8	27.00	1.40	68.40	68:40
2.7		Mumber	8 8		8.55	3 8	3 5	8 6	34.45	2.5	000	2 5	8.2	2 5	8 8	2161	9:	900	30.50
4513 1975		Members	45.00		0000	8 8	88	8 8	8	3 2	2 2	3 4	2000	8 5	3 8	0.00	08.0	35.10	35.10
		Mumbwa	8	_	8	8	8	25	8	88	3.25	200	42.70	3 5	3 8	88.	3 5	3 5	3,50
		Mumbwa	90,30	schist.	25.90	48,80	12,90	48.80	8	3.6	2.55	17.50	8,80	š	8 8	12.30	17.70	8	9
		Mumbwa	8	quartzite	8	8.62	4 8	29:00	88	9 9	8.75	800	36,00	152	000	9.0	99'8	27.90	7.8
4517 3160		Mumbwa	8 8	quertzie	년 6 년 6	ដូ ដ	9.5	6,5	8	8	8	173,00	8.15 8.15	8	8	8	3.8	<u>2</u>	21.00
		Mumbers	3 8	Neural Presentance	20,02	3 5	8 5	8 8	8 8	8 8	8 9	25.50	88	Š.	8	17.50	17.50	S S	23.50
		Mumbwa	8 8		3	3 8	9 5	3 %	₹ \$	3 8	3 5	2 5	2000	2 5	8 8	) () ()	88	2 2	11.20
	7	Mumbers	65.00		5.00	89	800	8.8	30,30	3.75	28	17.70	3 5	3 5	3 8	2 9	8 6	2 5	Q 5
		Mumbwa	75.30	schist	21.00	75.00	4.00	46.51	8	8,	6.20	000	2,0	8	8	21,00	8	87.00	27.00
4523 3334		Mumbwa	8.5	Kchist	3 :	\$ :	9	8.80	5	5. 5.	0.20	90	48,80	<u>8</u>	000	21.70	9,10	30.80	30,80
		Momowa	0,2	KCDIK	8 8	8.5	35.10	800	8 :	8	12	078	28,00	8	8	15,00	5.00	8,7	14,00
4526 3131-1		Mumbres	8 8	Shart.	24.00	8 8	2 5	8 8	2 2	2 2	9 4	0000	36,60	8 5	88	8 8	8.5	8.92	8 8
		Mumbra	33.55	Schic	8	2 2	13.8	2,00	860	3 6	9	8.96	27.60	<u> </u>	3 8	9 6	0 S	8 8	8,75
4528 3174-1	. d.	Mumbwa	31.10	schist	8	21,30	20,30	2	8	13	8	2,80	39.72	ន្ត	88	7.30	8 12	28.30	28.50
- 3.		Mumbwa	97.K	schist	1 70	13.20	11.50	13.20	2	0.70	8	61,70	27.60	ភ	8	5	17.70	27.10	27.10
		Mumbwa	S :	schiat	Ä	£1:3	21.75	23.00	1.25	1,15	8	28,80	27.8	8	8	7.70	20,70	8,8	28,88
		Mumbra		KChix	36.80	25.00	18.40	36.60	27.40	20.40	11 22	96.60	20.00	8	80	6,50	-05,0	00:09	90.09
4532 25050		Mumbwe	9,5		800	8	800	8 9	800	8	0.3	2	00.04	8	8	0.0	6.70	12.50	12.30
100		Mumbwa	3 8	Imestone	3 S	3 5	3 8	3 3	9 9	8 8	4 8	23.8	\$ £	8	88	2 2 2	26.70	44,20	64.20
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4536 3174-5	, ;,	Mumbwa	31,10	schist	8	2 2	2030	21.30	8	3.	3 <del>4</del>	14.80	3 5 3 5	} <u>\$</u>	3 8	> 5 > 6	<b>≥</b> 5	35.95	00'67 64
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Ī	-	(C.L.m)	2 1	3 5	3.5	00.81	8	20.00	58.40	0014	0.75	9 0 0 0	A	000	2.5	3 2	200	3 8	3.5	20.5	C#177	23,70	39.62	15.00	8.8	9.60	\$0.30 \$	800	39.50	8, 5	25.00	20,00	3 6	8.74	25.00	00.00	8	25.00	57.00	00.00	12,00	8	39,00	200	88	8.5	90.00	300	2047	2,70	5.70	5.8	8.8	30.00	27.00
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1	Diameter	(mm)	20	8	2 5	3 9	3 5	<u> </u>	3 5	3	3 5	2 5	2	25	2 5	3	2	2	38	<u>.</u>	150	150	150	150	150	8	. 150	150	150	150	<u>5</u>	150	0 <u>5</u> 1	051	2 5	3 5	\$ 9	9	95	150		200	<u>\$</u>	150	<u>8</u>	130	152	132	130	33	130	35		821	150
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Special	Capacity	(m2/day)	12,00	2.73	634.00	0.126	3 4	3 8	20.5	0/11	260	60:1	34.66	39.30	32.8	65.30	000	3.89	** **	6.15	3.8	9.6	12.70	245.00	990	90.0	5.76	9,0	10.50	٠.																						13,60			
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Thickness of main Aquifer	9	Ê	100	83	85,00	68.00	8.8	8									٠.		÷																		8 8												•						24.0
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	District		Mumber	Mumbwa	Mumbwa	Mumbwa	Mumbwa	Mumbwa	Mumbwa	Mumbwa	Mumbwa	Mumbwa	Mumbwa	Mumbwa	Mumbwa	Munbwa	Mumbwu	Mumbwa	Mumbwe	Mumbwa	Mumbun	Mumbbe	Mambee	Contract	Screen	Z 1000	Second	Screnic	Some	Serenio	Screnic	Serenio	Screnze	Serenje	Screnic	Screen	Serenje	Screnje	XTON	Someting	Kabany The	Kabwe-Rural	Kubwe-Urbar	Kubwe-Urba	Micushi	Mkushi	Kabwe-Rural	Kabwe-Ranal	Kabwe-Urbu	Kabwe-Lirhar	Kahwes Irhur	Kabwe-Urbai	K obsect Jrhos		Kabwe-Urbu
	Rombole			2678-1	3813	2516	<b>X</b> 38	2526	ğ	2068	1897	1806	1833	1-12-1	1646	1645	4	1642	1.96	917-5	0.46-1						3 2 2	2002		2250-6							202																		200211
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02 Hd	Borehole	District	Depth	Lithology	From	01	Total	Main	First Struck	Static	Yield	Capacity	of Pump	Diameter	From	2	From From	3	of Bottom
	ŝ.		Ê		(G.L.m)	(C.Lm)	Thickness	Supply	(C.L.m)	(O-1-0)	ŝ	(m2/day)	Intake	(mm)	(G.L.n)	(G.Lm)	(G.Lii)	(C.L.a)	of Casing
							(E)	(C.t.m)	1		•		(G.1m)						(E. 10)
3	2005	Kabwe-Urbar	8.8		22.23	30.00	1.77	30.00	Ì	800	0.70	8.28	\$30	Š	80	12°	20.71	33.00	3300
4592	2016	Kabwe-Urbin	86.00		30.00	8.5	<u>.</u>	800		3.30	0.23	0.57	84,00	150	80	27.00	8,00	35,00	35.00
4593	2003-0	Kabwe-Urbar	80.00	Send	000	80.8	8.0	0.0		15,30	0.12	0,32	48,00	50	80	8.8	8	21.00	21,00
\$ \$	20:1	Kabwo-Urbar	20.00		800	8.6	800	800		8	0.80	4,07	47,00	55	800	3.00	8	21,00	2,0
565	2002	Kubwe-Urbar	42.00		8 8 8	24,00	8	24.00		17.80	9	6.17	39.00	150	0.0	8.8	8.5	23,00	23.00
\$5	1877	Kabwe-Urbar	\$5.00	limestone	12.00	2.8	8.8	2.8	8.4	8:	8	8,8	8,8	150	8	8	8,81	21.00	21.80
1654	362911	Kabwe-Urbar	28.00		8.4	30,00	16.40	20.00		98	28.	7.27	24.8	150	0,0	8	15.20	23.10	23.10
4598	3673-1	Kabwe-Urber	8		30.00	8.3	15.00	45.00		6.70	0.87	5.8	42.70	150	8.0	8.20	24.30	32,50	32.50
\$ \$	3673-2	Kubwe-Rural	8		28.00	67.8	39.8	28.00		7.60	0.31	0.72	45.00	3	8.0	24.40	0.0	33.50	33.50
8	142532	Kabwe-Urbar	36,60		0.00	27.40	800	27,40		0.0 0.0	8.	5.08	34.00	55	8	9.10	05.81	36.60	8.8
96	32714	Kabwe-Rural	48,80		14.10	30.50	16,40	30.50		97:1	22	90.0	08.04	50	800	12.20	18.10	30.50	30.50
4602	<u>-</u>	Kabwe-Rural	70,00		24.70	8.8	20.30	24,70		6.40	8	4.76	48.80	150	0.00	3.6	24.40	32,00	32,00
Ş	700.4	Xubsuc-Crhav	00.00		6.6	4.60	800	14.60		4.50	4.5	3	45.00	\$	8	13.50	5	V7 24	47.56

DB. 36

# **DB-4**

# Current Water Use Data

- DB-4-1 Water Supply Project Data Records
- DB-4-2 Water Rights by Province

DB-4-1 Water Supply Project Data Records

Name of Project: LUSAKA WATER SUPPLY

Township: VARIOUS

Record No.: 1

District: LUSAKA-URBAN

Province: LUSAKA

General

Managing Body: Population Served: Company

900,000

Total Population:

1,200,000

Design Capacity:

210,000

Current Supply:

190,000

Future Supply: 495,000

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION b) RAPID FILTER

From:

c)

Chemical Treatment:

a) CHLORINE Other: LIME

b)

State of Operation:

**FULL TIME** 

To:

Reasons:

a)

c)

Other:

Other:

Condition of Treatment Facility: POOR

Comments:

Distribution System:

Piped supply: 500,000

Communal supply: 400,000

Secondary Water Use:

Irrigation:

Industrial water:

Water Tariff Structure:

MAJOR CUSTOMERS METERED

Planned Rehabilitation:

Describe:

YES

Lusaka Water Supply Project funded by (ADB). The project will rehabilitate

the boreholes, booster pumps and the distribution system.

Planned Expansion:

YES

Describe:

Kafue River water supply.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder: LUSAKA CITY COUNCIL

Tributary:

KAFUE

River:

KAFUE Amount: 180000

Type of Intake Facility: PUMPS

Dam type: Weir type:

Dam height:

Dam length:

Capacity:

Weir height:

Weir length: Pump lift:

Intake rate:

Pump type: Pumping rate:

Other Facility:

Power:

Name of Facility:

Condition of Intake Facility: FAIR

Comments:

**REHABILITATED 1986** 

Groundwater Project

Name of Wellfield:

VARIOUS

Number of Wells:

Total Production:

100,000

Name of Project: LUANGWA WATER SUPPLY Township: LUANGWA Record No : 2

District: LUANGWA

Province: LUSAKA

General

DWA Managing Body:

Population Served: 1,100

Total Population: 2.000

Design Capacity:

550

**Current Supply:** 550

Future Supply: --

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION b) RAPID FILTER

Other: DISINFECTING Chemical Treatment:

a) CHLORINE

Other:

b) ALUM

State of Operation:

PART TIME

From: 05

To: 20

Reasons: a) CHEMICALS

Other: ADEQUATE

b) LABOUR

c) FUNDS

Condition of Treatment Facility: FAIR

Comments:

Distribution System :

Piped supply: 166 Irrigation:

Communal supply: 8

Secondary Water Use: Water Tariff Structure:

**FLAT RATE** 

Industrial water: 38

Planned Rehabilitation:

NO

Describe:

Planned Expansion:

NO

Describe:

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length:

Intake rate:

Pump type:

**SUBMERGIBLE** 

Pump lift:

Power: 31.0 KW

Pumping rate:

10 L/SEC

Other Facility:

Name of Facility:

Condition of Intake Facility: FAIR

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

Name of Project! NDOLA CITY COUNCIL

Township: NDOLA

Record No.: 3

District: NDOLA-URBAN

Province: COPPERBELT

General

Managing Body:

COUNCIL

Population Served:

600,000

Total Population:

620,000

Design Capacity:

212.800

Current Supply:

147,000

Future Supply:

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION

Other: CHLORINATE

b) RAPID FILTER

Chemical Treatment:

a) CHLORINE Other: LIME

b) ALUM

State of Operation:

**FULL TIME** 

Irrigation:

From:

To:

Reasons:

a)

c)

Other:

Condition of Treatment Facility: POOR

Comments:

Distribution System:

Piped supply: 450,000

Communal supply: 150,000 Industrial water:

Secondary Water Use: Water Tariff Structure:

MAJOR CONSUMERS METERED

Planned Rehabilitation:

YES

Describe:

Two of the water treatment plants are in a deplorable state and are therefore

in need of rehabilitation - works to be financed by the World Bank.

Planned Expansion:

YES

Describe:

Bwana Mkubwa Water Supply Project has been designed and all paperwork

has been done, but only awaiting funding for the work to start off.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

KAFUBU River:

Amount: **KAFUE** 

Type of Intake Facility: DAM

Dam type:

CONCRETE

Dam height: '4M' Weir height:

Dam length: 165M

Capacity:

Weir type:

Pump type: CENTRIFUGAL

Weir length: Pump lift:

Intake rate: Power:

375.0 KW

Pumping rate:

948.0 L/SEC

Other Facility:

**5 HIGH LIFT PUMPS** 

Name of Facility:

Condition of Intake Facility : FAIR Comments :

Groundwater Project

Name of Wellfield:

**MISUNDU - KANYANJE** 

Number of Wells:

21

Total Production:

100,000

Name of Project: CHILLABOMBWE M. COUNCIL Township: Chililabombwe Record No.: 4

District: NDOLA-RURAL

Province: COPPERBELT

General

Managing Body:

COUNCIL

Population Served: Design Capacity:

25,000 14,400 Total Population: 87,000 Current Supply:

4.175

Future Supply:

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION

b) RAPID FILTER

Chemical Treatment:

Other: a) CHLORINE

Other: H. LIME

b) ALUM

State of Operation:

PART TIME

From: 05

To: 19

Reasons:

a)

c)

Other: HIGH DEMAND & LOW SUPPLY

Condition of Treatment Facility: POOR

Comments: OLD AGE OF MACHINERY

Distribution System:

Piped supply: 17,000 Irrigation:

Communal supply: 8,000

Secondary Water Use: Water Tariff Structure:

**FLAT RATE** 

Industrial water:

Planned Rehabilitation:

Describe:

YES

To replace old pumps with new ones. Change both gravity and pumping

mains with durable ones.

Planned Expansion:

YES

Describe:

To increase the number of pumps and construction of another water

reservoir.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

50M

Tributary:

River:

Amount:

Type of Intake Facility: **PUMP** 

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length: Pump lift:

Intake rate: Power:

Pump type: HARLANDAM

Pumping rate:

76.0 L/SEC

Other Facility:

Name of Facility:

Condition of Intake Facility:

**POOR** 

Comments:

OLD AGE OF MACHINERY

**Groundwater Project** 

Name of Wellfield:

Number of Wells:

Total Production:

19,000

Name of Project: CMC-KAFUE WATER WORK Township! CHINGOLA Record No.: 5

District: CHINGOLA Province: COPPERBELT

General

Managing Body: COUNCIL

Population Served: 218,000 Total Population:

Design Capacity: 30,000 Current Supply: 220,000 Future Supply: 6,000

Water Treatment

Water Treatment Facility: a) SEDIMENTATION b) RAPID FILTER c)

Other:

218,000

Chemical Treatment: a) CHLORINE b) ALUM

Other: LIME, MAGNO

State of Operation: FULL TIME From: To:

Reasons: a) b) c)
Other:

Condition of Treatment Facility: POOR Comments:

Distribution System: Piped supply: 206,608 Communal supply: 11,392
Secondary Water Use: Irrigation: Industrial water:

Water Tariff Structure: FLAT RATE

Planned Rehabilitation: NO
Describe:

Planned Expansion: YES

Describe: Phase II & III are each planned to produce 30,000m³/day.

Surface Water Project

Water Right No: Date of Issue: Name of Holder:

Tributary: River: KAFUE Amount: 90,000

Type of Intake Facility: PUMP

Dam type: Dam height: Dam length: Capacity:
Weir type: Weir height: Weir length: Intake rate:

Weir type: Weir height: Weir length: Intake rate:
Pump type: B2250 Pump lift: 2M Power: 50.0 KW

Pumping rate: 320.0 L/SEC
Other Facility:

Name of Facility:
Condition of Intake Facility: FAIR Comments: MODIFIED INTAKE

Groundwater Project

Name of Wellfield:
Number of Wells:
Total Production:

Additional Information

Underdeveloped t/ships & peri-urban areas have a total of 108 wells planned project not on due to lack of funds to drill wells & equip wells. The other information was referred to the Ministry of E&WD. Paid No.751543. Dated 10.11.93

Name of Project: KITWE CITY COUNCIL

Township: KITWE

Record No.: 6

District: KITWE

Province: COPPERBELT

General

Managing Body:

COUNCIL

Population Served: Design Capacity:

222,000 81.800

Total Population:

400,000 Current Supply: 54.550

Future Supply: 113.586

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION b) RAPID FILTER

Chemical Treatment:

Other: a) CHLORINE

b) ALUM

State of Operation:

Other: LIME PART TIME

From: 05

To: 12

Reasons:

a) SPARES

b) FUNDS

c)

Other: INSUFFICIENT PUMP

Condition of Treatment Facility: POOR

Comments: PUMPS OUTLIVED USE

Industrial water:

Distribution System:

Piped supply: 156,000 Irrigation:

Communal supply: 66,000

Secondary Water Use:

Water Tariff Structure:

**FLAT RATE** 

Planned Rehabilitation:

YES

Describe:

Rehabilitation of the water treatment plants, rising mains, reservoirs and

distribution mains.

Planned Expansion:

YES

Describe:

New water works to supply a further 32 million litres per day.

Surface Water Project

Water Right No:

Date of issue:

Name of Holder:

Tributary:

**KAFUE** 

River:

KAFUE

Amount:

Type of Intake Facility: PUMP

Dam type:

Dam height:

Dam length:

Capacity: Intake rate:

Power:

Weir type: Pump type: SNR 14

Weir length: Weir height: Pump lift:

Pumping rate:

353.0 L/SEC

**PUMP TYPE SNA14** 

Other Facility: Name of Facility:

HARLAND

Condition of Intake Facility: POOR

Comments:

**Groundwater Project** 

Name of Wellfield:

Number of Wells:

Total Production:

13M

Additional Information

Mwambashi is another small treatment centre with design capacity of 18000m<sup>3</sup>/day and water supply 600m<sup>3</sup>/day. Water treatment facility is sedimentation & rapid filter, chemicals are chlorine, aluminium sulphate & lime, Operation

Name of Project: WATER SUPPLY IMPROVEMENT Township: LUANSHYA Record No.: 7

Province: COPPERBELT District: LUANSHYA

General

COUNCIL Managing Body:

120,000 Population Served:

Total Population: 200,000

13,900 Design Capacity:

Current Supply: 12,400

Future Supply: 27,600

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION b) RAPID FILTER

c)

Other:

Chemical Treatment:

a) CHLORINE

b) ALUM

Other: HYDRATE LIME

State of Operation:

**FULL TIME** 

From:

To:

Reasons:

a)

b)

c)

Other:

Condition of Treatment Facility: POOR

Comments:

Distribution System:

Piped supply: 118,800

Communal supply: 1,200

Secondary Water Use:

Irrigation: **FLAT RATE**  Industrial water:

Water Tariff Structure:

Planned Rehabilitation:

YES

Describe:

Pumps and motors. Flow recorders. Filter nozzles and valves. Chemical

dosers. Raw water pipe from Kafubu River. Distribution system.

Planned Expansion:

Describe:

Raw water pipe capacity from Kafubu River. Pump capacity at Kafubu River.

Sedimentation, filtration, chemical doser, treated water storage reservoirs and

distribution capacities.

Surface Water Project

Water Right No: 2199

Date of Issue:

Name of Holder: LUANSHYA M. COUNCIL

Tributary: BEERHALL/S.

KAFUBU River:

Amount: 2.875

Type of Intake Facility: DAM

**EARTH FILL** Dam type:

Dam height: 8M

Dam length: 381M

Weir type: BROAD CRES

Weir height: 3M

Weir length: 31M

3M

Total Production:

Pump lift:

Capacity: Intake rate: 22,300 55.0 KW Power:

491,500

Pump type: CENTRIFUGAL Pumping rate:

70.0 L/SEC

Other Facility:

MIKOMFWA

Name of Facility:

Comments: Condition of Intake Facility: **POOR** 

Groundwater Project

Name of Wellfield:

Number of Wells:

Additional Information

Existing infrastructure badly runs due to lack of spares and regular maintenance. Replacement done only when complete breakdown, some equipment so old rendered obsolete. As a result lower performance capacity causing erratic supply.

Name of Project: CHILILABOMBIVE T/SHIP Township: KAMENZA Record No.: 8

District: CHILILABOMBWE Province: COPPERBELT

General

Managing Body: MINE

Population Served: 28,000 **Total Population:** 80,000

Design Capacity: 50,000 Current Supply: 30.000 5,000 Future Supply:

Water Treatment

Water Treatment Facility: a) SEDIMENTATION

Other: OPEN SAND

a) CHLORINE Chemical Treatment: b)

Other:

State of Operation: **FULL TIME** From: To:

Reasons: a) Ы c) Other:

Condition of Treatment Facility: GOOD Comments:

Distribution System: Piped supply: 28,000

Communal supply : --Secondary Water Use: Irrigation: 2,000 Industrial water: 8,000

Water Tariff Structure: FLAT RATE

Planned Rehabilitation: YES

Describe: Filter bed rehabilitation.

Planned Expansion: Describe: Increase raw water to WTP by pumping U/G water from No. 1 Shaft.

Surface Water Project

Water Right No: Date of Issue: Name of Holder:

Tributary: River: Amount:

Type of Intake Facility: PUMP

Dam type: Dam height: Dam length: Capacity: Weir type: CONCRETE Weir height: 5M Weir length: 30M Intake rate:

Pump type: SUBMERGIBLE Pump lift: 3M Power: 60.0 KW

Pumping rate: 120.0 L/SEC Other Facility:

Name of Facility:

Condition of Intake Facility: GOOD Comments:

Groundwater Project

Name of Wellfield: Number of Wells: Total Production:

Additional Information

1. At present all water is drawn from Kafue River at 7km away. 2. Mine farm & golf club is supplied with both raw water for irrigation & potable water which is pressured, sand filtered & chlorinated. 3. To increase supply, U/G

Name of Project: KONKOLA TOWNSHIP WATER Record No.: 9 Township: KONKOLA

Province: COPPERBELT District: CHILILABOMBWE

General

MINE Managing Body:

**Total Population:** 3.000 3,000 Population Served:

10,000 **Current Supply:** 10.000 Future Supply: 10,000 Design Capacity:

Water Treatment

a) SLOW FILTER Water Treatment Facility:

Other:

a) CHLORINE b) Chemical Treatment:

Other:

To: From: State of Operation: **FULL TIME** c) Reasons: a) b)

Other:

Condition of Treatment Facility: GOOD Comments:

Piped supply: Distribution System:

Irrigation: Secondary Water Use:

**FLAT RATE** Water Tariff Structure:

YES Planned Rehabilitation:

Pipeline and pumps updated recently. Commissioning in progress. Describe:

Communal supply: --

Industrial water:

NO Planned Expansion:

Describe:

Surface Water Project

Date of Issue: Name of Holder: Water Right No:

River: Amount: Tributary:

Type of Intake Facility:

Dam length: Capacity: Dam type: Dam height: Weir length: 30M Intake rate:

Weir type: Weir height: 5M Power: 30.0 KW Pump type: SUBMERSIBLE Pump lift: 5M

40.0 L/SEC Pumping rate:

Other Facility:

Name of Facility:

Condition of Intake Facility: GOOD Comments:

Groundwater Project

Name of Wellfield: Total Production: Number of Wells:

Additional Information

Water is drawn from Mingomba stream and pumped 4km away to a water treatment plant, close to Konkola. During severe drought water from Lubengele dam is used. Water is treated prior to shifting it to intake pumps. No problems

Name of Project: NCHANGA

District: CHINGOLA

Township: MINE Record No.: 10

Province: COPPERBELT

General

Managing Body:

MINE

Population Served:

100,000

**Total Population:** 

Design Capacity:

45,000

Current Supply: 45.000 Future Supply:

Water Treatment

Water Treatment Facility:

a) RAPID FILTER

Chemical Treatment:

a) CHLORINE

b

State of Operation:

Other:

Other:

To:

Reasons:

**FULL TIME** a)

b)

c)

Other:

Condition of Treatment Facility: FAIR

Comments:

Distribution System: Secondary Water Use:

Piped supply: 100,000

Communal supply: --

From:

Irrigation:

Industrial water:

Water Tariff Structure:

Planned Rehabilitation:

YES

Describe:

Filters overhaul and pump overhaul.

Planned Expansion:

YES

Describe:

To double capacity.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder: ZCCM

10M

Tributary:

**KAFUE** 

River:

**KAFUE** 

Amount:

Type of Intake Facility: PUMP

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length: Pump lift:

Intake rate:

Pump type: WORTHINGTON

Condition of Intake Facility:

120.0 L/SEC

Pumping rate: Other Facility:

Name of Facility:

KAFUE PUMP CHANT GOOD

Power: 600.0 KW

Groundwater Project

Name of Wellfield:

UNDERGROUND WATER SUPPLY

Comments:

Number of Wells:

Total Production:

70,000

Name of Project: MUFULIRA MINE

Township:

Record No.: 11

District: MUFULIRA

Province: COPPERBELT

General

Managing Body:

MINE

Population Served: Design Capacity:

110,000 67.000

Total Population :

Current Supply:

48,000

b) ALUM

Future Supply: 80,000

Water Treatment

Water Treatment Facility:

a) SLOW FILTER

b) RAPID FILTER

c)

Chemical Treatment:

Other: a) CHLORINE

Other:

State of Operation:

FULL TIME

From:

To:

Reasons:

a)

c)

Other: Condition of Treatment Facility: GOOD

Comments: LACK OF RAW INPUT WATER

Distribution System:

110,000 Piped supply: 53,000 Inigation:

Communal supply: --Industrial water:

Secondary Water Use: Water Tariff Structure:

**FLAT RATE** 

Planned Rehabilitation:

YES

Describe:

Replacement of obsolete pump sets and rehabilitation of degremont filters.

Planned Expansion:

Describe:

Expansion of floculation tanks from current 28,000m<sup>3</sup>/day to 40,000m<sup>3</sup>/day

to meet demand.

Surface Water Project

Water Right No: 2125

Tributary: MUFULIRA

Date of Issue: 01/01/92

Name of Holder: ZCCM

River:

**KAFUE** 

Amount:

40,000

Type of Intake Facility: DAM

Dam type:

Weir type:

Dam height: Weir height:

Dam length: Weir length: Capacity:

Pump lift:

Intake rate:

265.0 KW

Pump type: WEIR

Pumping rate:

125.0 L/SEC

Other Facility:

15M

Power:

Name of Facility:

**MUFULIRA MINE WATER** 

Condition of Intake Facility:

GOOD

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Industrial

Total Production:

90,000

Additional Information

(lower dolomite aquifer) 18,500m³/day - 2 year average

Domestic water supply

(various aquifer & service water) 67,164m3/day

Name of Project: CHIBULUMA MINE Township: KALULUSHI Record No.: 12

District: KALULUSHI Province: COPPERBELT

General

Managing Body: MINE & COUNCIL

Population Served: 30,000 Total Population: 150,000

Design Capacity: 18 Current Supply: 11 Future Supply: 34

Water Treatment

Water Treatment Facility: a) PRESS. FILTER b) c)

Other:

Chemical Treatment: a) CHLORINE b)

Other: LIME

State of Operation: FULL TIME From: To:

Reasons: a) b) c)
Other:

Condition of Treatment Facility: FAIR Comments: NO PROPER TREATMENT

The state of the s

Distribution System: Piped supply: 20,000 Communal supply: 10,000

Secondary Water Use: Irrigation: -- Industrial water: --

Water Tariff Structure: ALL METERED

Planned Rehabilitation: YES

Describe: Construction of rapid sand filters.

Planned Expansion: NO

Describe:

Surface Water Project

Water Right No: Date of Issue: Name of Holder:

Tributary: River: Amount:

Type of Intake Facility: DAM

Dam type: Dam height: Dam length: Capacity: Weir type: Weir height: Weir length: Intake rate:

Pump type: Pump lift: Power:
Pumping rate:
Other Facility:

Name of Facility:
Condition of Intake Facility:
Comments:

Groundwater Project

Name of Wellfield: ZCCM CHIBULUMA MINE

Number of Wells: Total Production: 18

**Additional Information** 

Kalulushi. M. Council gets its water from ZCCM and it is under ground water supply. This water is not properly treated and there is need for Council to have its own water works. ZCCM may close the mine anytime it feels production

Name of Project: NKANA NEW & OLD WATER Township: VARIOUS Record No.: 13

District: KITWE

Province: COPPERBELT

General

Managing Body:

MINE

146.062 Population Served:

**Total Population:** 

72,727 Design Capacity:

**Current Supply:** 

81,818

Future Supply: 100,000

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION

b) RAPID FILTER

c)

Chemical Treatment:

Other: a) CHLORINE

b) ALUM

Other:

From:

To:

State of Operation: Reasons:

**FULL TIME** 

**b**)

c)

a)

Other:

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply: 134,412

Communal supply: 11,650

Secondary Water Use:

Water Tariff Structure:

Irrigation: 25,394

Industrial water:

Planned Rehabilitation:

Describe:

YES

Uprating of new water treatment plant and raw water intake at Kafue Pump

Station (replacement of existing pumping facilities).

Planned Expansion:

Describe:

Uprating of raw water pumps at Kafue and expansion of the new water

treatment plant. Also uprating of pumping facilities at N.W.T.P.

Surface Water Project

Water Right No: 2705

Date of Issue:

Name of Holder: ZCCM

Tributary:

River:

Amount: KAFUE

Type of Intake Facility: WEIR

Dam type:

Dam height:

Dam length:

Pump lift:

Capacity:

Weir type: GRAVITY OV

Weir height: 4M

Weir length: 12M

Intake rate:

166.5 KW

Power:

Pump type: CENTRIFUGAL

621.8 L/SEC

Pumping rate:

Other Facility: Name of Facility:

Condition of Intake Facility: FAIR

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

Name of Project: MAKOMA WATER WORKS Township: MINE Record No.: 14

District: LUANSHYA Province: COPPERBELT

General

Managing Body: MINE

Population Served: 90,000 Total Population: 90,000

Current Supply: Design Capacity: 36.368 33,000 Future Supply: 50,000

Water Treatment

a) SEDIMENTATION b) RAPID FILTER Water Treatment Facility:

Other: COAGULATION

b) ALUM Chemical Treatment: a) CHLORINE

Other: LIME

FULL TIME State of Operation: From:

Reasons:

a) b) ċ)

Other:

Condition of Treatment Facility: GOOD Comments:

Distribution System: Secondary Water Use:

Communal supply: --Piped supply: 90,000 Irrigation: 18,000 Industrial water: 24,000

Water Tariff Structure: **FLAT RATE** 

Planned Rehabilitation:

NO

Describe:

Planned Expansion: YES

Describe: Additional three filters under construction.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

To:

Halle Dall at the second

Tributary:

River:

Amount:

Type of Intake Facility: WEIR

Dam type: Dam height: Dam length: Capacity: Weir type: RECTANGULAR Weir height: 6M Weir length: Intake rate: 30M

Pump type: WEIR X 3

Pump lift: Power:

Pumping rate: Other Facility:

369.0 L/SEC

Name of Facility:

Condition of Intake Facility: GOOD Comments: **REGULAR MAINTENANCE** 

Groundwater Project

Name of Wellfield:

Number of Wells: Total Production:

Additional Information

Ground water is obtained from mine shaft No. 28. An approximate flow of 900m per day is pumped to the 112 water works.

Record No.: 15 Township: Name of Project: MASAITI Province: COPPERBELT District:

General

Managing Body: DWA Total Population: 3,000 Population Served: 2,000

Current Supply: Future Supply: 1,533 1,125 Design Capacity: 1,460

Water Treatment

a) SLOW FILTER Water Treatment Facility:

Other: a) CHLORINE Chemical Treatment:

Other:

**FULL TIME** From: To: State of Operation:

¢} a) Reasons:

Comments: Condition of Treatment Facility: FAIR

Other:

Piped supply: 1,850 Communal supply: 150 Distribution System: Industrial water: Secondary Water Use: Irrigation: 337

Water Tariff Structure: MAJOR CONSUMERS METERED

Planned Rehabilitation: YES Resanding of filters. Replacement of 1 no. SNC 11/2 pump for the Boma. Describe:

Replacement of A.C. 5" rising main to farm institute with A.C. 6" pipes.

YES Planned Expansion:

Purchase of SNB4 new pump for wet well. Expansion of distribution system Describe: to cater for surrounding villages.

Surface Water Project

Date of Issue: Name of Holder: Water Right No:

Amount: Tributary: KAFULAFUTA

Type of Intake Facility:

Capacity: Dam length: Dam height: Dam type: Intake rate: Weir length: Weir height: Weir type:

Power: 19.0 KW Pump type: WEIR-SNB4 Pump lift: 4M

Pumping rate: 10.0 L/SEC Other Facility:

Name of Facility: WET WELL Condition of Intake Facility: **FAIR** Comments:

Groundwater Project

Name of Wellfield: Number of Wells: Total Production:

Record No. : 16 Name of Project: KAMFINSA Township:

District: Province: COPPERBELT

General

Managing Body: DWA

Population Served: 6.000

Total Population: 8,400

Design Capacity: 3.470 Current Supply: 2.670 Future Supply: 3,650

Water Treatment

Water Treatment Facility: a) SEDIMENTATION b) RAPID FILTER

Other:

Chemical Treatment: a) CHLORINE b) ALUM

Other:

State of Operation: **FULL TIME** To: 6)

Reasons: a) Other:

Condition of Treatment Facility: FAIR Comments:

Distribution System :

Piped supply: 6,000 Communal supply: --Secondary Water Use: Irrigation: 800 Industrial water:

Water Tariff Structure:

**ALL METERED** 

Planned Rehabilitation:

YES

Describe:

Replacement of 2 no. SNB4 pumps and 2 no. 50 HP motors for low lift,

Ċ)

Power:

repair to dam spillway, replacement of 2 no. 50 HP motors for high lift.

Planned Expansion:

YES

Describe:

Improve distribution system.

Surface Water Project

Water Right No: Date of Issue: Name of Holder:

Tributary: KAMFINSA River:

Type of Intake Facility:

Dam type: EARTH Dam height: 12M Dam length: 200M Capacity:

Weir type: Weir height:

Weir length: Intake rate:

Pump lift:

Pump type: Pumping rate: Other Facility:

Name of Facility: WATER FLOW BY GRAVITY

Condition of Intake Facility: GOOD Comments:

**Groundwater Project** 

Name of Wellfield: Number of Wells: Total Production:

Additional Information

Water flows by gravity through a pipe to the sedimentation tank.

Township: Name of Project: KASUMBALESA

Record No.: 17

District:

Province: COPPERBELT

General

Managing Body:

200 Population Served:

DWA

Total Population: 625

138

Current Supply:

Future Supply:

145

Water Treatment

Design Capacity:

Water Treatment Facility:

a) NONE Other:

b)

50

Chemical Treatment:

a) CHLORINE

b)

To: 20 From: 06

State of Operation: Reasons:

Other: PART TIME

a) ADEQUATE

b)

c)

Other: Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply:

Secondary Water Use:

Irrigation: **FLAT RATE**  Communal supply: --Industrial water:

Water Tariff Structure:

Planned Rehabilitation:

YES

Describe:

Replacement of rotten timber tank slab, replacement of tanks, painting of

tankstand and tanks.

Planned Expansion:

YES

Describe:

Drilling of another borehole and equipping it with a submersible pump.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

**PUMP** Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length: Pump lift:

Intake rate: Power:

2.0 KW

Pump type: PLEUGER

Pumping rate:

1.0 L/SEC

Other Facility:

Name of Facility:

**BOREHOLE EQUIPPED** 

Condition of Intake Facility:

Comments:

**PUMP HOUSE VANDALISED** 

Groundwater Project

Name of Wellfield:

KASUMBALESA

Number of Wells:

Total Production:

58M

138

Name of Project: MOKAMBO

Township:

Record No.: 18

District:

Province: COPPERBELT

General

Managing Body:

DWA

Population Served: Design Capacity:

500 430

Total Population:

2,600 Current Supply: 160

Future Supply:

Water Treatment

Water Treatment Facility:

a) NONE Other:

b)

c)

Chemical Treatment:

a) CHLORINE

b)

b)

State of Operation:

Other: **PART TIME** 

From: 05 To: 20

c)

Reasons:

a) ADEQUATE

Other:

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply: 500 Irrigation:

Communal supply: --Industrial water:

Secondary Water Use: Water Tariff Structure:

MAJOR CONSUMERS METERED

Planned Rehabilitation:

Describe:

YES

Purchase of 2 no. submersible pumps including starters. Provision of another

borehole to be equipped with submersible pump.

Planned Expansion:

YES

Describe:

Extension of distribution pipeline including water meters.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility:

Dam type:

Weir type:

Dam height:

Dam length:

Capacity:

Pump type: PLEUGER

Weir height:

Weir length:

Intake rate:

Pump lift:

36M

Power: 3.0 KW

Pumping rate:

3.0 L/SEC

Other Facility:

Name of Facility:

B/HOLE FIT SUB, P

Condition of Intake Facility: FAIR

Comments:

Groundwater Project

Name of Wellfield:

**MOKAMBO** 

Number of Wells:

Total Production:

690

Name of Project: SAKANIA

Township:

Record No. : 19

District:

Province: COPPERBELT

General

Managing Body: Population Served:

DWA 200

Total Population:

1.155

Design Capacity: 285

Current Supply: 130 Future Supply: 300

Water Treatment

Water Treatment Facility:

a) NONE Other:

b)

c)

Chemical Treatment:

a) CHLORINE

b)

Other:

State of Operation: Reasons:

PART TIME

From: 05:30 To: 20 c)

b)

a) ADEQUATE Other:

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply: 152

Communal supply: 48

Secondary Water Use:

Irrigation:

Industrial water:

MAJOR CONSUMERS METERED

Water Tariff Structure:

Planned Rehabilitation:

Describe:

Purchase of 2 no. submersible pumps. Painting of tanks and tankstand.

Procurement of 200m armoured cable. Replacement of A.C. rising main with

GF pipes.

Planned Expansion:

Describe:

YES

Extension of the distribution system to cater for Kamalasha compound.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Power:

Weir type:

Weir height:

Weir length: Pump lift:

Intake rate:

4.0 KW

Pump type: PLEUGER

Pumping rate:

2.5 L/SEC

Other Facility:

Name of Facility:

**BOREHOLE EQUIPPED** 

Condition of Intake Facility:

**FAIR** 

Comments:

Groundwater Project

Name of Wellfield:

**SAKANIA SITE 1&2** 

Number of Wells:

Total Production:

21M

500

Name of Project: TSHINSENDA Township: Record No.: 20 Province: COPPERBELT District: General

Managing Body: DWA

Population Served: Total Population: 500 150

Current Supply: Design Capacity: Future Supply:

Water Treatment

Water Treatment Facility: a) NONE b)

Other: a) CHLORINE **b**) Chemical Treatment:

Other:

N/O To: State of Operation: From:

Reasons: **b**) a) c)

Other: NO DIESEL TO RUN ENGINE

Condition of Treatment Facility: POOR Comments:

Distribution System: Piped supply: Communal supply: --Secondary Water Use: Irrigation: Industrial water:

Water Tariff Structure: **FLAT RATE** 

Planned Rehabilitation: NO

Describe:

Planned Expansión: NO

Describe:

Surface Water Project

Water Right No: Date of Issue: Name of Holder:

Tributary: River: Amount:

Type of Intake Facility:

Dam length: Dam height: Dam type: Capacity:. Weir type: Weir height: Weir length: Intake rate:

Pump type: GROUNDFOS Pump lift: 48M Power: 7.0 KW

Pumping rate: 1.8 L/SEC

Other Facility: DIESEL ENG. EQUIP Name of Facility:

Condition of Intake Facility: **FAIR** Comments:

Groundwater Project

Name of Wellfield: **TSHINSENDA** Number of Wells: Total Production: 216

A 4 4 4 5 1

Additional Information

Intend to hand over the scheme to Immigration and Customs Department.

Name of Project: MULUNGUSHI RIVER

Township: KABWE

Record No.: 21

District: KAWBE-URBAN

Province: CENTRAL

General

Managing Body:

COUNCIL

Population Served:

120,000

Total Population:

200,000

Design Capacity:

37,500

**Current Supply:** 

18,000

Future Supply: 40,000

Water Treatment

Water Treatment Facility:

a) RAPID FILTER

b) Other: CLARIFLOCU

Chemical Treatment:

a) CHLORINE

b) ALUM

Other: LIME

State of Operation:

**FULL TIME** 

From:

To:

Reasons:

a)

c)

Other: Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply :

Secondary Water Use:

Irrigation:

Communal supply: --

Water Tariff Structure:

FLAT RATE

Planned Rehabilitation:

YES

Describe:

Repair of clarifier.

Planned Expansion:

Describe:

Increase water storage reservoirs.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

MULUNGUSHI

Amount:

Industrial water:

Type of Intake Facility: DAM

Dam type: CONCRETE

Dam height: 16M

Dam length: 470M

Capacity:

Weir type:

Weir height:

Weir length:

Intake rate:

Pump type: Pumping rate:

Other Facility:

Name of Facility:

Condition of Intake Facility: FAIR

Pump lift:

Power:

Name of Wellfield:

Comments:

Groundwater Project

KALULU WELL FIELD

Number of Wells:

**Total Production:** 

Additional Information

Kabwe has 2 sources of water supply, i.e., surface water & groundwater. The above information has been for surface water source. The groundwater source (boreholes) has safe yield capacity of 45 million I/day but only 9 million I/day

Township: CHIBOMBO Name of Project: CHIBOMBO WATER SUPPLY Record No.: 22 District: KABWE-RURAL Province: CENTRAL

General

Managing Body: COUNCIL

Population Served: 1,000 Total Population:

Design Capacity: Current Supply: 120 120 Future Supply:

Water Treatment

Water Treatment Facility: a) NONE b)

Other:

a) NONE Chemical Treatment: b) Other:

**FULL TIME** State of Operation: To: From:

Reasons: a) b) c)

Other:

Condition of Treatment Facility: FAIR Comments:

Distribution System: Piped supply: Communal supply: --Secondary Water Use: Irrigation: Industrial water:

Water Tariff Structure: FLAT RATE

Planned Rehabilitation: YES

Describe: Recassing of the existing borehole and provision of 5 ~ hand pumps to existing wells.

YES Planned Expansion:

The Council has allocated an area for development such as residential, Describe:

commercial and industrial premises which will require increased supply once

they have been fully developed.

Surface Water Project

Water Right No: Date of Issue: Name of Holder:

Tributary: River: Amount:

Type of Intake Facility:

Dam type: Dam height: Dam length: Capacity: Weir type: Weir height: Weir length: Intake rate:

Pump type: Pump lift: Power: Pumping rate:

Other Facility: Name of Facility: Condition of Intake Facility:

Comments:

Groundwater Project

Name of Wellfield: CHIBOMBO TOWNSHIP

Number of Wells: Total Production:

Additional Information

Recasing of existing borehole & provision of 5 hand pumps to existing wells is planned. Council has allocated an area for residential, commercial & industrial development - increased water supply will be required.

Name of Project: KAPIRI MPOSHI WATER Township: Record No.: 23
District: KABWE-RURAL Province: CENTRAL

General

Managing Body: COUNCIL

Population Served: 8,000 Total Population: 40,000

Design Canacity: Current Supply: Future Supply:

Design Capacity: Current Supply: Future Supply

Water Treatment

Water Treatment Facility: a) SLOW FILTER b) c)
Other:

Chemical Treatment: a) CHLORINE b)

Chemical Treatment: a) CHLORINE b)
Other:

State of Operation: FULL TIME From: To:
Reasons: a) b) c)

Reasons: a) b) c)
Other:

Condition of Treatment Facility: FAIR Comments:

Distribution System: Piped supply: 4,000 Communal supply: 200

Secondary Water Use: Irrigation: -- Industrial water: -- Water Tariff Structure: FLAT RATE

Planned Rehabilitation: YES

Describe: YES

Filters, old distribution lines.

Planned Expansion: YES

Describe: Filers, storage tanks, intake, distribution system.

Surface Water Project

Water Right No: Date of Issue: Name of Holder:
Tributary: River: Amount:

Tributary: River: Amount

Type of Intake Facility: DAM

Dam type: EARTH Dam height: Dam length: Capacity: 1,000,000
Weir type: Weir height: Weir length: Intake rate:

Pump type: CENTRIFUGAL Pump lift: Power: Pumping rate:

Other Facility:
Name of Facility:
Condition of Intake Facility: FAIR Comments:

Groundwater Project

Name of Wellfield:
Number of Wells:
Total Production:

Additional Information

Another earth dam of 8m3 capacity is needed.

Township: MINE/CHOWA Record No.: 24 Name of Project: MAKULULU WATER FIELD

District:

Province: COPPERBELT

General

Managing Body:

MINE

Population Served:

20,000 Design Capacity: 21,000

Total Population: **Current Supply:** 

50.000 16000

Future Supply:

Water Treatment

Water Treatment Facility:

a) NONE Other:

**b**)

c)

Chemical Treatment:

a) CHLORINE

State of Operation:

Other: PART TIME

From: 05

To: 10

Reasons:

a)

b) Other: INSUFFICIENT WATER

Condition of Treatment Facility: GOOD

Comments:

Distribution System:

Piped supply: 20,000

Communal supply: 30,000

Secondary Water Use:

Water Tariff Structure:

Irrigation:

Industrial water:

FLAT RATE

Planned Rehabilitation:

YES

Describe:

Replacement of borehole pumps of two per year,

Planned Expansion:

Describe:

NO

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Pump type:

Weir height:

Weir length: Pump lift:

Intake rate:

Pumping rate:

Other Facility:

Name of Facility:

Condition of Intake Facility:

Comments:

Power:

Groundwater Project

Name of Wellfield:

KALULU WATER WELLS

Number of Wells:

10

Total Production:

8,404

January Berger

Township: Record No.: 25 Name of Project: CHISAMBA

Province: CENTRAL District: KABWE-RURAL

General

Managing Body: DWA

Total Population: 15,000 Population Served: 8,996

Current Supply: 3.416 Future Supply: Design Capacity:

Water Treatment

b) c) a) NONE Water Treatment Facility:

Other:

a) CHLORINE **b**) Chemical Treatment:

Other:

To: State of Operation: **PART TIME** From:

a) POWER Reasons: b) FUNDS c) Other:

Condition of Treatment Facility: GOOD Comments:

Piped supply: Communal supply: 392 604 Distribution System: Industrial water: Irrigation: Secondary Water Use:

YES Planned Rehabilitation: Rehabilitate water tank and distribution system.

Describe:

Planned Expansion: Drill an extra borehole and equip it with submersible pump. Describe:

Surface Water Project

Name of Holder: Water Right No: Date of Issue:

River: Amount: Tributary:

Type of Intake Facility:

Dam length: Capacity: Dam height: Dam type: Weir length: Intake rate: Weir type: Weir height:

Pump lift: Power: Pump type: Pumping rate: Other Facility:

Name of Facility: Condition of Intake Facility: Comments:

Groundwater Project

Name of Wellfield: **Total Production:** Number of Wells:

Additional Information

New borehole has been drilled to supplement the water shortage & some funds being sort to alleviate the problem. The elevated tanks are leaking, some maintenance on it are to be done when funds are ready.

Name of Project: MUMBWA

Township:

Record No. : 26

District: MUMBWA

Province: COPPERBELT

General

Managing Body:

DWA

Population Served: Design Capacity:

16,000

Current Supply:

Total Population: 12,7821

1,934

Future Supply:

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION b) RAPID FILTER

c)

Chemical Treatment:

a) CHLORINE

b) ALUM

State of Operation:

**PART TIME** 

From: 07

Reasons:

a) FUNDS Other:

Other:

Other:

c)

Condition of Treatment Facility: GOOD

Comments:

Distribution System:

Piped supply: 9,007

Communal supply: 3,504

Secondary Water Use: Water Tariff Structure: Irrigation: FLAT RATE Industrial water:

Planned Rehabilitation:

NO

Describe:

Planned Expansion:

NO

Describe:

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

CHIBILA River:

KAFUE

Amount:

Type of Intake Facility: WEIR

Dam type: EARTH FILL

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length: Pump lift:

Intake rate: Power:

Pump type: Pumping rate:

Other Facility:

Name of Facility: Condition of Intake Facility: FAIR

Comments:

Groundwater Project

Name of Wellfield:

MUMBWA WELL FIELDS

Number of Wells:

5

Total Production:

230

**Additional Information** 

- Rehabilitation is being taken place by Nicholas & Partners (International) Ltd. funded by (ADF) five towns.

- Minor works to be completed by the Contractor.

Name of Project: MKUSIII

Township:

Record No.: 27

District: MKUSHI

Province: COPPERBELT

General

Managing Body:

DWA

12,154

Total Population: 68,188

Population Served: Design Capacity:

Current Supply:

Future Supply:

Water Treatment

Water Treatment Facility :

a) SEDIMENTATION

b) SLOW FILTER

Chemical Treatment:

a) CHLORINE

b) ALUM

State of Operation:

PART TIME

From: 06

To:

Reasons:

a) FUNDS

**b**)

c}

Other:

Other:

Other:

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply: 9,996

Communal supply: 2,158

Secondary Water Use:

Irrigation:

Industrial water:

Water Tariff Structure:

FLAT RATE

Planned Rehabilitation:

Describe:

NO

NO

Planned Expansion:

Describe:

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder: DWA

Tributary:

River:

**OTHER** 

Amount:

Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length:

Intake rate:

Pump type: Pumping rate:

Other Facility:

Name of Facility:

Pump lift:

Power:

45.0 KW

Condition of Intake Facility: FAIR

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

Additional Information

A weir has proposed to raise the water level at the channel intake. Design of the same was made in 1991/92, but the project is a non-starter due to non-availability of funds.

Name of Project: SERENJE Township: Record No.: 28 District: SERENJE Province: COPPERBELT General Managing Body: DWA Population Served: 14,000 Total Population: 104,042 Design Capacity: Current Supply: Future Supply: Water Treatment Water Treatment Facility: a) SEDIMENTATION b) RAPID FILTER c) Other: Chemical Treatment: a) CHLORINE b) ALUM Other: State of Operation: PART TIME From: To: Reasons: a} **b**) c) Other: Condition of Treatment Facility: Comments: Distribution System: Piped supply: Communal supply: --Secondary Water Use: Irrigation: Industrial water: Water Tariff Structure: Planned Rehabilitation: Describe: Planned Expansion: Describe: Surface Water Project Water Right No: Date of Issue: Name of Holder: Tributary: River: Amount: Type of Intake Facility: Dam type: Dam height: Dam length: Capacity: Weir type: Weir height: Weir length: Intake rate: Pump type: Pump lift: Power: Pumping rate: Other Facility: Name of Facility: Condition of Intake Facility: Comments: ... Groundwater Project

Name of Wellfield: Number of Wells:

Total Production:

### **Additional Information**

Sedimentation tank is small for the storage.

Name of Project: MWINILUNGA

Township: MWINILUNGA

Record No.: 29

District: MWINILUNGA

Province: NORTH WESTERN

General

Managing Body:

DWA

Population Served:

2,658

**Total Population:** 

14,000

Design Capacity: 5,011 Current Supply:

1.911

Future Supply: 5.011

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION b) RAPID FILTER

¢)

Other:

Chemical Treatment:

a) CHLORINE

b) ALUM

Other:

State of Operation:

PART TIME

To: 22

Reasons:

a) POWER

b)

ċ)

Other: SAVE POWER & MACHINERY

Condition of Treatment Facility: FAIR

Comments:

Distribution System :

Piped supply: 2,322

Communal supply: 336

Secondary Water Use:

Irrigation:

Industrial water:

From: 06

Water Tariff Structure:

MAJOR CONSUMER METERED

Planned Rehabilitation:

YES

Describe:

Control panel to be rehabilitated & new pump sets treated water & new

flyghts pumps for raw water.

Planned Expansion:

YES

Describe:

To increase the plant capacity and supply lines & tanks.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary: WEST LUNGA

River:

KAFUE

Amount:

Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir fength: Pump lift:

Intake rate: Power:

Pump type: FLYGT

Pumping rate:

WEST INTAKE

Other Facility:

Name of Facility:

FAIR

Comments:

**Groundwater Project** 

Condition of Intake Facility:

Name of Wellfield:

Number of Wells:

Total Production:

Name of Project: ZAMBEZI

Township:

Record No.: 30

District: ZAMBEZI

Province: NORTH WESTERN

General

Managing Body:

**DWA** 

Population Served: Design Capacity:

2,748

5,962

Total Population:

Current Supply:

1,600

Future Supply: 7.000

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION b) RAPID FILTER

Other: HYDRATE LIME

Chemical Treatment:

a) CHLORINE

b) ALUM:

State of Operation:

**FULL TIME** 

From:

To:

Reasons:

a) Other:

Other:

c)

Industrial water: --

Condition of Treatment Facility:

Comments:

Distribution System:

Piped supply: 2,544

Communal supply: 204

Secondary Water Use: Irrigation:

**FLAT RATE** 

Water Tariff Structure:

Planned Rehabilitation:

YES

Describe:

Plant needs new flexible pipe from intake to treatment plant, and pumps need

proper servicing, and control panel needs repair.

Planned Expansion:

YES

Describe:

Extend supply to farm institute & other area that demand.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

River: ZAMBEZI Amount:

Type of Intake Facility:

Tributary: ZAMBEZI

Dam type:

Dam height:

Dam length:

Capacity:

Pump type:

Weir type:

Weir height:

Weir length:

Intake rate:

Pump lift:

Power:

Pumping rate: Other Facility:

Name of Facility:

Condition of Intake Facility:

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

### Additional Information

The river has a lot of sand and changes course in the dry season. Thereby making the distance from the intake to the water very long. More rubber suction pipes are needed.

Name of Project: KABOMPO

Township:

Record No.: 31

District: KABOMPO

Province: NORTH WESTERN

General

Managing Body:

DWA

Population Served: Design Capacity:

4.758

4,147

Total Population:

Current Supply:

2,088

Future Supply: 4,200

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION

**b) RAPID FILTER** 

Chemical Treatment:

a) CHLORINE

**b**)

State of Operation:

Other: **FULL TIME** 

Other:

From:

To:

Reasons:

a)

b)

c)

Other:

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply: 1,908

Cómmunal supply: 2,742

Secondary Water Use:

Irrigation:

Industrial water:

Water Tariff Structure:

MAJOR CONSUMERS METERED

Planned Rehabilitation:

YES

Describe:

Service raw water pumps & treated water pumps and control panel.

Planned Expansion:

NO

Describe:

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary: KABOMPO

River:

ZAMBEZI

Amount:

Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Pump type:

Weir type:

Weir height:

Weir length:

Intake rate:

Pumping rate:

Other Facility:

Name of Facility:

Pump lift:

Power:

Condition of Intake Facility:

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

Township: MUFUMBWE Record No.: 32 Name of Project: MUFUMBWE

District: MUFUMBWE Province: NORTH WESTERN

General

Managing Body: DWA

Population Served: 1.452 Total Population: 3.000

Design Capacity: Current Supply: 432 134 Future Supply:

Water Treatment

Water Treatment Facility: a) NONE

Other:

Chemical Treatment: a) CHLORINE

Other:

State of Operation: PART TIME -From : 15 To: 24 Reasons: a) POWER b) FUNDS c)

Other: FUNDS NOT ENOUGH

Condition of Treatment Facility: FAIR Comments:

Distribution System: Piped supply: 612 Communal supply: 804 Secondary Water Use: Irrigation: Industrial water:

Water Tariff Structure: FLAT RATE

Planned Rehabilitation: YES

Describe: Rehabilitation of electrical fittings at plant and the rehabilitation of pipe distribution network.

Planned Expansion: YES Describe:

Drill more borehole & expand the control panel, set up more tanks, more

supply points, increase network piping.

Surface Water Project

Water Right No: Date of Issue: Name of Holder:

Tributary: River: Amount:

Type of Intake Facility:

Dam type: Dam height: Dam length: Capacity: Weir type: Weir height: Weir length: Intake rate:

Pump type: Pump lift: Power: Pumping rate: Other Facility:

Name of Facility: Condition of Intake Facility: Comments:

**Groundwater Project** 

Name of Wellfield: MUFUMBWE

Number of Wells: 2 Total Production: 600 -

Additional Information

The river is about 15km away from the township. Power is supplied by a diesel generator.

Name of Project: KASEMPA

Townshio:

Record No.: 33

District: KASEMPA

Province: NORTH WESTERN

General

Managing Body:

DWA

Total Population: 2.148

13,126

Population Served: Design Capacity:

2,938

**Current Supply:** 

873

Future Supply: 2,938

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION

b) RAPID FILTER

c)

Chemical Treatment:

Other: a) CHLORINE

b) ALUM

Other: **FULL TIME** 

From:

To:

State of Operation: Reasons:

a)

b)

c)

Other:

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply: 2,028

Communal supply: 120

Secondary Water Use:

Irrigation:

Industrial water:

Water Tariff Structure:

MAJOR CONSUMERS METERED

Planned Rehabilitation:

YES

Describe:

Plant is in good condition, only distribution network needs to be

rehabilitated.

Planned Expansion:

YES

Describe:

Expand water treatment work & intake, expand pipe network.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary: LUFUPA

River:

KAFUE

Amount:

Type of Intake Facility:

Dam type:

Weir type:

Dam height:

Dam length:

Capacity:

Weir height:

Weir length:

Intake rate: Power:

Pump type:

Pumping rate:

Other Facility:

Pump lift:

Name of Facility: Condition of Intake Facility:

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

Name of Project: NAMUSHAKENDE Township: Record No.: 34
District: MONGU Province: WESTERN

General

Managing Body: DWA

Population Served: 3,098 Total Population: 3,098

Design Capacity: 432 Current Supply: 177 Future Supply:

Water Treatment

Water Treatment Facility: a) NONE b) c)

Other:
Chemical Treatment: a) CHLORINE b)

Chemical Treatment: a) CHLORINE b)
Other:

State of Operation: PART TIME From: 08 To:

Reasons: a) ADEQUATE b) c)

Other:
Condition of Treatment Facility: GOOD Comments:

Condition of Treatment Facility. Good

Distribution System: Piped supply: 218 Communal supply: 2,810

Secondary Water Use: Irrigation: I Industrial water:
Water Tariff Structure: ALL METERED

Planned Rehabilitation: NO

Planned Expansion: NO

Describe:

Surface Water Project

Describe:

Water Right No: Date of Issue: Name of Holder:
Tributary: River: Amount:

Type of Intake Facility:

Dam type: Dam height: Dam length: Capacity: Weir type: Weir height: Weir length: Intake rate: Pump type: Pump lift: Power:

Pump type: Pump lift:
Pumping rate:
Other Facility:
Name of Facility:

Condition of Intake Facility: Comments:

Groundwater Project

Name of Wellfield: NAMUSHAKENDI WELLFIELD

Number of Wells: 2 Total Production:

Additional Information

The metering of all the consumers is still in progress.

Name of Project: LUKULU

Township:

Record No.: 35

District: LUKULU

Province: WESTERN

General

Managing Body:

DWA

Population Served:

2,965

Total Population:

5,000

Design Capacity:

800

Current Supply:

600

Future Supply:

Water Treatment

Water Treatment Facility:

a) NONE Other:

b)

Chémical Treatment :

a) CHLORINE

b)

State of Operation:

Other: PART TIME

b)

To: c)

a) ADEQUATE Reasons: Other:

Condition of Treatment Facility: GOOD

Comments:

Distribution System:

Piped supply: 1,565

Communal supply: 1,400 Industrial water:

From:

Secondary Water Use: Water Tariff Structure:

Irrigation: **ALL METERED** 

Planned Rehabilitation:

NO

Describe:

NO

Planned Expansion: Describe:

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Pump type:

Weir height:

Weir length:

Intake rate:

Pumping rate:

Other Facility:

Name of Facility:

Pump lift:

Power:

Condition of Intake Facility:

Comments:

Groundwater Project

Name of Wellfield:

LUKULU WELLFIELD

Number of Wells:

**Total Production:** 

791

Additional Information

All consumers will be metered meanwhile the metering exercise is in progress.

Name of Project: KALABO Record No.: 36 Township: Province: WESTERN District: KALABO

General

Managing Body: DWA

Population Served: 14,400 Total Population: 14,400

Design Capacity: Current Supply: 1,824 888 Future Supply:

Water Treatment

a) PRESS. FILTER Water Treatment Facility: c)

Other:

Chemical Treatment: a) CHLORINE b)

Other:

State of Operation: **PART TIME** From: 10 To: Reasons: a) ADEQUATE b) c)

Other:

Condition of Treatment Facility: GOOD Comments:

Distribution System: Piped supply: 10,400 Communal supply: 4,000 Irrigation: Industrial water:

Secondary Water Use: Water Tariff Structure:

Planned Rehabilitation: NO

Describe:

Planned Expansion: NO

Describe:

Surface Water Project

Water Right No: Date of Issue: Name of Holder:

Tributary: **LWANGINGA** River: Amount:

Type of Intake Facility: **PUMP** 

Dam type: Dam height: Dam length: Capacity: Weir type: Weir height: Weir length: Intake rate:

Pump type: GRUNDFOS

Pump lift: . 10M Power: 30.0 KW

Pumping rate: 8.0 L/SEC Other Facility:

Name of Facility:

Condition of Intake Facility: GOOD Comments:

Groundwater Project

Name of Wellfield: Number of Wells: Total Production:

Additional Information

The scheme pumps water from Luanginga River. The province has been exempted from water rights. The metering exercise is in progress. The idea is to meter every consumer.

Name of Project: KAOMA

Township:

Record No.: 37

District: KAOMA

Province: WESTERN

General

Managing Body:

DWA

Population Served:

7,150

Design Capacity: 1.591 Total Population:

Current Supply:

7,150 1,614

Future Supply:

Water Treatment

Water Treatment Facility:

a) NONE Other:

**b**)

c)

Chemical Treatment:

a) CHLORINE

**b**)

State of Operation:

Other: **FULL TIME** 

To:

Reasons:

a)

b)

c)

Other:

Condition of Treatment Facility: GOOD

Comments:

Distribution System:

Piped supply: 5,500 Irrigation:

Communal supply: 1,650 Industrial water:

From:

Secondary Water Use: Water Tariff Structure:

ALL METERED

Planned Rehabilitation:

Describe:

NO

Planned Expansion:

NO

Describe:

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length: Pump lift:

Intake rate: Power:

Pump type: Pumping rate:

Other Facility:

Name of Facility:

Condition of Intake Facility:

Comments:

Groundwater Project

Name of Wellfield:

KAOMA WELLFIELD

Number of Wells:

**Total Production:** 

Additional Information

Metering of consumers is still in progress. The idea is to meter all consumers.

Name of Project: SENANGA Township: Record No.: 38

District: SENANGA Province: WESTERN

General

Managing Body: DWA

Population Served: 8,300 Total Population: 8,300

Design Capacity: 1,336 Current Supply: 1,429 Future Supply:

Water Treatment

Chemical Treatment:

Water Treatment Facility: PRESS. FILTER b) c)

Other:

a) CHLORINE b)

Other:

State of Operation: PART TIME From: 13 To:

Reasons: a) ADEQUATE b) c)
Other:

Communal supply: 2,000

Industrial water:

Condition of Treatment Facility: GOOD Comments:

Distribution System: Piped supply: 6,300 Secondary Water Use: Irrigation: --

Water Tariff Structure: ALL METERED

Planned Rehabilitation: NO

Describe:

Planned Expansion: NO

Describe:

Surface Water Project

Water Right No: Date of Issue: Name of Holder:

Tributary: River: ZAMBEZI Amount:

Type of Intake Facility: PUMP

Dam type: Dam height: Dam length: Capacity: Weir type: Weir height: Weir length: Intake rate:

Pump type: GRUNDFOS & KSB Pump lift: 9M Power: 37.0 KW

Pump type: GRUNDFOS & KSB Pump titt: 9M Power: 37.0 KW

Pumping rate: 42.0 L/SEC Other Facility:

Name of Facility:

Condition of Intake Facility: Comments:

Groundwater Project

Name of Wellfield:
Number of Wells:
Total Production:

Additional Information

The scheme pumps water from Zambezi River. The province was exempted from water rights. All the consumers will be metered. Meanwhile the metering exercise is in progress.

Name of Project: SESHEKE

Township:

Record No.: 39

District: SESHEKE

Province: WESTERN

General

Managing Body:

DŴA

Population Served:

7.610

Total Population:

7.610

886 Design Capacity:

**Current Supply:** 915 Future Supply:

Water Treatment

Water Treatment Facility:

a) PRESS FILTER

b)

Chemical Treatment:

a) CHLORINE

b)

State of Operation:

**PART TIME** 

From: 09

To:

Reasons:

a) ADEQUATE

**b**}

c)

Other:

Other:

Other:

Condition of Treatment Facility: GOOD

Comments:

Distribution System:

Piped supply: 4,610

Communal supply: 3,000

Secondary Water Use:

Irrigation:

Industrial water:

Water Tariff Structure :

**ALL METERED** 

Planned Rehabilitation:

Describe:

NO

Planned Expansion:

NO

Describe:

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

**PUMP** 

ZAMBEZI

Amount:

Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length:

Intake rate:

Pump type: GRUNDFOS & KSB

32.0 L/SEC

Pumping rate:

Other Facility:

Name of Facility: Condition of Intake Facility: Pump lift: 13M Power:

22.0 KW

Groundwater Project

Name of Wellfield:

Comments:

Number of Wells:

Total Production:

### Additional Information

The scheme pumps water from Zambezi River. The province was exempted from water rights. The scheme's consumers are all being metered, but the metering is still in progress.

Name of Project: LIVINGSTONE

Township: LIVINGSTONE

District: LIVINGSTONE

Province: SOUTHERN

General

Managing Body:

COUNCIL

Population Served: Design Capacity:

80,000 65,000 Total Population:

100,000

Current Supply:

20,000

Future Supply: 65,000

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION

b) RAPID FILTER

From:

Chemical Treatment:

a) CHLORINE Other: LIME

b) ALUM

State of Operation:

**FULL TIME** 

Other:

Irrigation:

Other:

To:

Reasons:

a)

b)

c)

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply: 60,000

2.000

Communal supply: 20,000 Industrial water:

6,000

Secondary Water Use: Water Tariff Structure:

**MAJOR CONSUMERS METERED** 

Planned Rehabilitation:

YES

Describe:

Rehabilitation of the treatment plant to increase capacity and rehabilitation of

water tanks through lift pumps.

Planned Expansion:

YES

Describe:

To site and service areas within town and Ind. Area on Giear North Station.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary: MARAMBA

River:

ZAMBEZI

Amount:

Type of Intake Facility: PUMP

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length: Pump lift:

Intake rate: Power:

Pump type: 200/250 SP

Pumping rate:

200.0 L/SEC

Other Facility:

Name of Facility:

105.0 KW

LIVINGSTONE PUMP FAIR

Comments:

**Groundwater Project** 

Condition of Intake Facility:

Name of Wellfield:

SENKOBO/SIMWAMI

Number of Wells:

Total Production:

**Additional Information** 

Interview DJM/M. Luzanga 17/6/94

Wells/borehole serve smaller townships, supply is only communal wells or standings. -- Water Works Supervisor, Mr. Peter Pelekamoyo

Name of Project: MAZABUKA TOWNSHIP

Township: MAZABUKA

Record No.: 41

District: MAZABUKA

Province: SOUTHERN

General

Managing Body:

DWA

Population Served:

39,430

Total Population: 40,360

2,500 Design Capacity:

Current Supply:

5,600

Future Supply: 5,800

Water Treatment

Water Treatment Facility:

a) SLOW FILTER

c)

Chemical Treatment:

a) CHLORINE

b) ALUM

State of Operation:

Other: **FULL TIME** 

From:

To:

Reasons:

a)

c)

Other:

Other:

Condition of Treatment Facility: POOR

Comments:

Distribution System:

Piped supply: 33,000 Irrigation:

Communal supply: 8,000 Industrial water:

Secondary Water Use: Water Tariff Structure:

**FLAT RATE** 

Planned Rehabilitation:

YES

Describe :

Rehabilitation of pumps/motors, rehabilitation of switch panel, rehabilitation

of filters.

Planned Expansion:

YES

Describe:

Construction of bigger capacity storage tank.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder: MAZABUKA. D. COUNCIL

Tributary:

River:

KAFUE

Amount:

200

100 KW

Type of Intake Facility:

Dam type:

Dam height:

Dam length: Weir length: Capacity:

Weir type: Pump type: AUXILIARY Weir height: Pump lift: Intake rate: Power:

Pumping rate:

160.0 L/SEC

Other Facility: Name of Facility:

WATER TREATMENT

Condition of Intake Facility:

**FAIR** 

Comments:

Groundwater Project

Name of Wellfield:

RESEARCH, KABOBOLA, LUSUMPUKO

Number of Wells:

Total Production:

3,500

Name of Project: NAMALUNDU WATER SUPPLY Township: NAMALUNDU Record No.: 42

District: MAZABUKA

Province: SOUTHERN

**General** 

Managing Body:

ZESCO

Population Served:

5.575

Total Population: 5575

Design Capacity:

801

Current Supply:

2,500

Future Supply:

Water Treatment

Water Treatment Facility:

a) RAPID FILTER

b)

Chemical Treatment:

a) CHLORINE

b)

State of Operation:

**FULL-TIME** 

From:

To:

Reasons:

a) Other:

Other:

Other:

b)

c)

Condition of Treatment Facility: GOOD

Comments:

Distribution System: Secondary Water Use:

Piped supply: 2,124 Irrigation: 119

Communal supply: 3,451

Industrial water:

Water Tariff Structure:

Planned Rehabilitation:

YES

Describe:

Replacement of old supply pipes to the homes from the distribution mains

and upgrading of one line to camp.

Planned Expansion:

Describe:

NO

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

KAFUE

Amount:

Type of Intake Facility: DAM

Dam type: ROCK FILL Weir type:

Dam height: 50M

Weir height:

Dam length: 380M

Capacity:

Weir length: Pump lift:

intake rate: Power:

Pump type:

Pumping rate:

**POWER STATION** 

Other Facility:

Name of Facility: Condition of Intake Facility:

GOOD

Comments:

**Groundwater Project** 

Name of Wellfield:

Number of Wells:

**Total Production:** 

**Additional Information** 

The dam was built for hydro power production not specifically for domestic water supply.

Name of Project: MONZE WATER SUPPLY Township: MONZE Record No.: 43

District: MONZE Province: SOUTHERN

General

Managing Body: COUNCIL

Population Served: 21,990 Total Population: 36,961

Design Capacity: 5,540 Current Supply: Future Supply:

Water Treatment

Water Treatment Facility: a) SEDIMENTATION b) SLOW FILTER c)

Other:

Chemical Treatment: a) CHLORINE b) ALUM

Other:
State of Operation: FULL TIME From: To:

Reasons: a) b) c)

Other:

Condition of Treatment Facility: FAIR Comments:

Comment of Treatment Facility . 17111.

Distribution System: Piped supply: 10,652 Communal supply: 11,338

Secondary Water Use: Irrigation: -- Industrial water: -- Water Tariff Structure: FLAT RATE

Planned Rehabilitation: YES

Describe: Rehabilitation of township's water supply is currently in progress.

Planned Expansion: NO

Surface Water Project

Water Right No: Date of Issue: Name of Holder: MONZE. D. COUNCIL

Tributary: MAGOYE River: EARTH FILL DAM Amount:

Type of Intake Facility: DAM

Dam type: BARTH FILL Dam height: 10M Dam length: 130M Capacity: 1,040,000 Weir type: Weir height: Weir length: Intake rate:

Pump type: SUBMERSIBLE Pump lift: 6M Power: 75.0 KW

Pumping rate: 976.0 L/SEC
Other Facility:

Name of Facility:
Condition of Intake Facility: FAIR Comments:

Colletion of Image 1 127mily

Groundwater Project

Describe:

Name of Wellfield:
Number of Wells:

Total Production:

Name of Project: CHOMA TOWNSHIP WATER Township: CHOMA Record No.: 44

Province: SOUTHERN District: MAZABUKA

General

Managing Body: COUNCIL

Population Served: 6,250 Total Population: 10,000

Design Capacity: Current Supply: 129,600 Future Supply: 200,000

Water Treatment

Water Treatment Facility: a) SEDIMENTATION b) SLOW FILTER

Other:

Chemical Treatment: a) CHLORINE

b) ALUM

Other:

State of Operation: **FULL TIME** From: To: Reasons: b) c)

Other: A LOT OF LEAKAGE

Condition of Treatment Facility: FAIR Comments:

Distribution System: Piped supply: 21,000 Communal supply: --Secondary Water Use: Irrigation: Industrial water:

Water Tariff Structure: **FLAT RATE** 

Planned Rehabilitation: YES

The rehabilitation work will include the changing of filters at Zesco Plant and Describe:

replacement of pumps at the same plant.

Planned Expansion: NO

Describe:

Surface Water Project

Water Right No: Date of Issue: Name of Holder: CHOMA D. COUNCIL Tributary: River: Amount:

Type of Intake Facility:

Dam type: CONCRETE Dam height: Dam length: 2M Capacity: Weir type: Weir height: Weir length: Intake rate:

Pump type: Pump lift:

Power: Pumping rate: 864.0 L/SEC

Name of Facility: Condition of Intake Facility: FAIR Comments:

Groundwater Project

Other Facility:

Name of Wellfield: Number of Wells: **Total Production:** 

Additional Information

Choma has 2 major sources of water supply, i.e., Choma Dam which is located 7km from town & Munzuma Dam which is situated 21km from the T/ship. Munzuma is the major dam which supplies to 3/4 of the population. Nutrient enrichment

Name of Project: SIAYONGA

Township: SIAYONGA

Record No.: 45

District: SIAVONGA

Province: SOUTHERN

General

Managing Body:

COUNCIL

Population Served:

20.000 Design Capacity: 3600

**Total Population: Current Supply:** 

25,000 3,600

Future Supply: 5,400

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION

**b) SLOW FILTER** 

c)

Chemical Treatment:

Other: a) CHLORINE

b) ALUM

State of Operation:

Other: **FULL TIME** 

From:

To:

Reasons:

a)

b)

c)

Condition of Treatment Facility: GOOD

Other:

Comments:

Distribution System:

Piped supply: 20,000

Secondary Water Use: Water Tariff Structure: Irrigation: **ALL METERED**  Communal supply: 5,000 Industrial water:

Planned Rehabilitation:

Describe:

Planned Expansion:

Describe:

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary: L. KARIBA

River:

ZAMBEZI

Amount:

Type of Intake Facility:

Dam type: ARC

Dam height:

Dam length:

Capacity:

Weir type:

Pump type: KSB

Weir height:

Weir length: Intake rate:

Total Production:

Pump lift:

Power:

45.0 KW

Pumping rate:

42.0 L/SEC

Other Facility:

Name of Facility:

Condition of Intake Facility: GOOD

Groundwater Project

Name of Wellfield:

Number of Wells:

Comments:

Additional Information

Information on water rights is not available.

Name of Project: NAMWALA

Township: NAMWALA Record No.: 46

District: NAMWALA

Province: SOUTHERN

General

Managing Body:

DWA

Population Served:

10,000 Total Population:

Design Capacity:

Current Supply:

Future Supply:

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION

b) RAPID FILTER

Chemical Treatment:

a) CHLORINE

b) ALUM

State of Operation:

PART TIME

From: 18

To: 12

Reasons:

a) SPARES

b) FUNDS

c) ADEQUATE

Other:

Other:

Other:

Condition of Treatment Facility: POOR

Comments:

Distribution System:

Piped supply: 7,000 Irrigation:

Communal supply: 3,000 Industrial water:

Secondary Water Use: Water Tariff Structure:

MAJOR CONSUMERS METERED

Planned Rehabilitation:

YES

Describe:

Planning to improve distribution network and storage resources, improve

metering and improve low and high lift pumping units.

Planned Expansion:

YES

Describe:

Planning to extend the distribution to Massele compound [council residential

compound].

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary: NAMWALA

River:

**KAFUE** 

Amount:

Type of Intake Facility: OTHER

Dam type: ROCK FILL

Dam height:

Dam length:

Capacity:

Weir type:

Weir height: Pump type: KSB CENTRIFUGAL

Weir length:

Intake rate:

Pump lift:

Power:

Pumping rate:

14.0 L/SEC

Other Facility:

Name of Facility:

Condition of Intake Facility: POOR

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

Name of Project: ZIMBA

Township: ZIMBA

Record No.: 47

District: KALOMO

Province: SOUTHERN

General

Managing Body:

DWA

Population Served: 15,000

Total Population: 20,000

Current Supply: 600 Future Supply:

Water Treatment

Design Capacity:

Water Treatment Facility:

a) SEDIMENTATION b) SLOW FILTER

Chemical Treatment:

Other: a) CHLORINE

b) ALUM

Other: **FULL TIME** 

From:

To:

State of Operation: Reasons:

a)

b)

c)

Other:

Comments:

Distribution System:

Condition of Treatment Facility: GOOD

Communal supply: 10,000

Secondary Water Use:

Irrigation:

Industrial water:

Water Tariff Structure:

**FLAT RATE** 

Piped supply: 5,000

Planned Rehabilitation:

YES

Describe:

Addition of 1 no. slow sand filter. Construction of 1 no. staff house - Railway Dam Intake. Filling of 4 no. pump sets - Treatment Plant Raw Water Intake (Nandukulu). Repair of 2 no. high level water distribution tanks and others.

Planned Expansion:

Describe:

Addition of 2 no. high level tanks i.e., 1 no. treatment plant and 1 no. supply tank for treasure compound which experience water shortage due to its geographical location. Replace the existing wornout reticulation network.

Expand the volume of the existing dams which are silted.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

River:

Amount:

Type of Intake Facility: DAM

Dam type: EARTH

Tributary:

Dam height: 5M

Dam length: 500M

377,725 Capacity:

Power:

Weir type: EARTH Pump type: CENTRIFUGAL

Condition of Intake Facility:

Weir height: 4M

Weir length: 200M Pump lift: 1M

Intake rate:

Pumping rate:

54.0 L/SEC

FAIR

Other Facility:

Name of Facility:

MECH/ELECT OPERATION

Comments:

REHABILITATED 1993

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

Additional Information

Need to sink departmental borehole at water works to supplement the existing scheme infrastructures (dams) of which I dries in summer. De-silting the existing earth dams to gain higher volume. Expand treatment works, i.e., the

Name of Project: CHIRUNDU

Township:

Record No.: 48

District:

Province: SOUTHERN

General

Managing Body:

DWA

Population Served:

180

**Total Population:** 

Design Capacity:

Current Supply:

Future Supply:

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION: b) RAPID FILTER

Chemical Treatment:

a) CHLORINE

b) ALUM

State of Operation:

Other: PART TIME

Other:

From: 05

To: 22

Reasons:

a) SPARES

b) FUNDS

c) ADEQUATE

Other: Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply: 80 Irrigation:

Communal supply: 100 Industrial water:

Secondary Water Use: Water Tariff Structure:

**FLAT RATE** 

Planned Rehabilitation:

YES

Describe:

Change of intake (size), replacement of branch network/extension,

replacement of backwashing tanks and clear well tank roof to be replaced.

Planned Expansion:

YES

Describe:

Extension of branch network to communal consumers, building of an office

block, closed staff houses, stores.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

ZAMBEZI

Amount:

Type of Intake Facility: **PUMP** 

Dam type:

Dam height: Weir height:

Dam length:

Capacity:

Weir type:

Weir length:

Intake rate:

Pump type: KSB 2 STORA

Pump lift:

Pumping rate:

144.0 L/SEC

Power: 22.0 KW

Other Facility:

KSB SINGLE STAGE **RAW WATER PUMPS** 

Name of Facility: Condition of Intake Facility:

POOR

Comments:

NO PUMP HOUSE

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

Additional Information

- Treatment plant unfenced. - No office block or closet. - No staff houses. - Back washing tanks needs replacement. - No spare parts, e.g., G.I. pipes in general fittings. - Floating drums at suction point. Stand point taps needs

Name of Project : GWEMBE

Township:

Record No.: 49

District: GWEMBE

Province: SOUTHERN

General

Managing Body:

DWA

Population Served:

4,800

Design Capacity:

Total Population:

Current Supply:

400

Future Supply:

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION

b) SLOW FILTER

c)

Chemical Treatment:

Other: a) CHLORINE

b) ALUM

State of Operation:

**PART TIME** 

From: 04

To: 21

Reasons:

a) ADEQUATE

b)

c)

Communal supply: 3,200

Industrial water:

Other:

Other:

Condition of Treatment Facility: GOOD

Comments:

Distribution System:

Piped supply: 1,600

Secondary Water Use:

Irrigation:

Water Tariff Structure:

FLAT RATE

Planned Rehabilitation:

Describe:

Planned Expansion:

NO

Describe:

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

7M

Total Production:

WATER AFFAIRS

Tributary:

River:

Amount:

Type of Intake Facility:

Dam type: EARTH

Dam height: 6M

Dam length: 200M

Capacity: 72,000

Intake rate:

Weir type:

Pump type: CENTRIFUGAL

Weir height:

Weir length: Pump lift:

Power: 30.0 KW

Pumping rate:

15.0 L/SEC

Other Facility:

Name of Facility:

SINGONIA DAM

Condition of Intake Facility:

FAIR

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Additional Information

Second intake facility: = 35-earth, = 36-5.5m, = 37-150m, = 38-6000m<sup>3</sup> approx.

= 43-centrifugal, = 44-6m, = 45-3.6Kw, 46-9 litres/second.

= 48 Gwembe Dam

Name of Project: SINAZONGWE Township: Record No.: 50 District: SINAZONGWE Province: SOUTHERN General Managing Body: DWA Population Served: Total Population: Design Capacity: 56,000 **Current Supply:** 112,000 Future Supply: 100,000 Water Treatment Water Treatment Facility: a) SEDIMENTATION b) RAPID FILTER Other: Chemical Treatment: a) CHLORINE b) ALUM Other: State of Operation: PART TIME From: 06 To: 20 Reasons: a) ADEQUATE Other: Condition of Treatment Facility: GOOD Comments: Distribution System: Communal supply: --Piped supply: Secondary Water Use: Irrigation: Industrial water: Water Tariff Structure: **MAJOR CONSUMERS METERED** Planned Rehabilitation: YES Describe: Backwashing tanks need replacement. Planned Expansion: Describe: The service tank too small for growing township and population. Surface Water Project Water Right No: Date of Issue: Name of Holder: Tributary: River: LAKE KARIBA Amount: Type of Intake Facility: Dam type: Dam height: Dam length: Capacity: Weir type: Weir height: Weir length: Intake rate: Pump type: Pump lift: 20M Power: Pumping rate: Other Facility: Name of Facility: Condition of Intake Facility: FAIR Comments:

#### Groundwater Project

Name of Wellfield: Number of Wells:

Total Production:

Name of Project: MANSA DISTRICT C.

Township: MANSA

Record No.: 51

District: MANSA

Province: LUAPULA

General

Managing Body:

COUNCIL

Population Served: Design Capacity:

45.000

1,944

Total Population: Current Supply:

105,000

6,480

Future Supply: 36,000

Water Treatment

Water Treatment Facility:

a) SLOW FILTER

Chemical Treatment:

a) CHLORINE

b)

State of Operation:

**PART TIME** 

Other:

Other:

From: 06

To: 18

Reasons:

a) SPARES

b) FUNDS

c)

Other: LACK OF WATER FROM RIVER

Condition of Treatment Facility:

Comments: TOO OLD & OUT DATED

Distribution System:

Piped supply: 37,500

Communal supply: 7,500

Secondary Water Use:

Water Tariff Structure:

Irrigation:

Industrial water:

Planned Rehabilitation:

Describe:

Pumping equipment, started and controls, storage filtration system,

reticulation network.

Planned Expansion:

YES

YES

Describe:

Construction of a weir, new pumping equipment of a bigger capacity storage,

facilities, sinking of boreholes reticulation system construction of new

treatment facilities.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder: MANSA D. COUNCIL

Tributary: NAMWANDWE

River:

MANSA

Amount:

Type of Intake Facility: OTHER

Dam type:

Dam height: Weir height: Dam length: Weir length: Capacity:

Weir type:

Pump lift:

Intake rate:

Pump type: SUBMERSIBLE

Pumping rate:

53.3 L/SEC

Power: 50.0 KW

Other Facility:

**SUMP 3 WATER WELLS** 

Name of Facility:

Condition of Intake Facility:

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

Name of Project: NCHELENGE Township: Record No.: 52

District: NCHELENGE Province: LUAPULA

General

Managing Body: DWA

2,680 Population Served:

**Total Population:** 5,100

Design Capacity:

1,210 **Current Supply:** 

Future Supply:

c)

Water Treatment

a) PRESS, FILTER Water Treatment Facility: b) .

Other:

a) CHLORINE b) Chemical Treatment:

Other:

State of Operation:

Reasons:

To: From: b)

a) Other:

Condition of Treatment Facility: FAIR Comments:

Distribution System: Secondary Water Use: Irrigation:

Piped supply:

Communal supply: --Industrial water:

Water Tariff Structure: **FLAT RATE** 

Planned Rehabilitation:

YES

Describe:

Introduction of pressure filters completion.

Planned Expansion:

Describe:

NO

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility: DAM

Dam type:

Dam height: Weir height: Dam length:

Capacity:

Weir type:

Pump type: SURFACE CENTRIFUGAL

Weir length: Pump lift:

Intake rate: Power:

15.0 KW

Pumping rate:

14.0 L/SEC

Other Facility: Name of Facility:

Condition of Intake Facility: FAIR

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

7M

Name of Project: CHIENGE

Township:

Record No.: 53

District:

Province: LUAPULA

General

Managing Body:

DWA

Population Served: Design Capacity:

300

Total Population:

810

Current Supply:

36

Future Supply:

Water Treatment

Water Treatment Facility:

a) NONE

**b**}

c)

Chemical Treatment:

Other: a) CHLORINE

b) ALUM

Other:

State of Operation:

**PART TIME** 

From: 06

To: 20

Reasons:

a) LABOUR

b) FUNDS

c)

Other:

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Secondary Water Use:

Piped supply: 110

Communal supply: 190

Water Tariff Structure:

Irrigation: **FLAT RATE**  Industrial water:

Planned Rehabilitation:

Describe:

Planned Expansion:

NO

NO

Describe:

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

River:

Amount:

Type of Intake Facility: PUMP

Dam type:

Tributary:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length:

Intake rate:

Pump type: SURFACE CENTRIFUGAL 5.0 L/SEC

Pump lift:

Power:

Pumping rate:

Other Facility:

Name of Facility:

Condition of Intake Facility:

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

**Total Production:** 

Name of Project: KAWAMBWA Township: KAWAMBWA Record No.: 54 District: KAWAMBWA Province: LUAPULA General Managing Body: DWA Population Served: 6,250 Total Population: 10,000 Design Capacity: Current Supply: 1,440 Future Supply: Water Treatment Water Treatment Facility: a) NONE b) Other: a) CHLORINE Chemical Treatment: b) Other: State of Operation: **FULL TIME** From: To: Reasons: a) **b**) c) Other: Condition of Treatment Facility: FAIR Comments: Communal supply: 2,600 Distribution System: Piped supply: Secondary Water Use: Irrigation: Industrial water: Water Tariff Structure: MAJOR CONSUMERS METERED Planned Rehabilitation: NO Describe: Planned Expansion: ÝES Describe: Increase water production. Surface Water Project Water Right No: Date of Issue: Name of Holder: Tributary: River: Amount: Type of Intake Facility: Dam type: Dam height: Dam length: Capacity: Weir type: Weir height: Weir length: Intake rate : Pump type: SURFACE CENTRIFUGAL Pump lift: 7M Power: 18.5 KW Pumping rate: 16.0 L/SEC Other Facility: Name of Facility: Condition of Intake Facility: FAIR Comments : Groundwater Project

Name of Wellfield:

Number of Wells: **Total Production:** 

#### **Additional Information**

Production from the spring source has dwindled from the original 281/s to 161/s. Water supply is limited to 10 hours per day.

Township: MWENSE Record No.: 55 Name of Project: MWENSE

Province: LUAPULA District: MWENSE

General

Managing Body: DWA

Population Served: 2,760

Total Population: 4,681

Current Supply: 1,580 Future Supply: Design Capacity:

Water Treatment

State of Operation:

a) SEDIMENTATION b) RAPID FILTER c) Water Treatment Facility:

Other:

a) CHLORINE b) ALUM Chemical Treatment:

Other:

**FULL TIME** To: From:

Reasons: a) Other:

Comments: Condition of Treatment Facility: FAIR

Distribution System:

Piped supply: 2,360 Communal supply: 400 Industrial water:

c)

Secondary Water Use: Irrigation: MAJOR CONSUMERS METERED Water Tariff Structure:

NO

Planned Rehabilitation:

Describe:

Planned Expansion:

NO

Describe:

Surface Water Project

Name of Holder: Date of Issue: Water Right No:

Amount: Tributary: River:

Type of Intake Facility: WEIR

Dam height: Dam length: Capacity: Dam type:

Weir length: 8M Intake rate: 2,600 Weir height: 1M Weir type: Pump lift: Power: 22.0 KW Pump type: FLYGT

25.0 L/SEC Pumping rate: Other Facility:

Name of Facility:

Condition of Intake Facility: Comments: FAIR

Groundwater Project

Name of Wellfield: Total Production: Number of Wells:

Additional Information

Though operation is 24 hours, water supply is limited to 18 hours.

Name of Project: SAMFYA

Township: SAMFYA Record No.: 56

District: SAMFYA

Province: LUAPULA

General

Managing Body:

DWA

Population Served: Design Capacity:

6,900

Total Population: Current Supply:

11,000 1.700

Future Supply:

Water Treatment

Water Treatment Facility:

a) SLOW FILTER

**b**)

Chemical Treatment:

a) CHLORINE

b)

From:

Other:

Other:

State of Operation: Reasons:

**FULL TIME** 

6)

To:

a)

Other:

Ċ)

Condition of Treatment Facility: GOOD

Comments:

Distribution System: Secondary Water Use: Piped supply: 4,500 Irrigation:

Communal supply: 2,400

Industrial water:

Water Tariff Structure:

MAJOR CONSUMERS METERED

Planned Rehabilitation:

Describe:

Planned Expansion:

YES

Describe:

Increase water production.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility: PUMP

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length:

Intake rate:

Pump type: SURFACE CENTRIFUGAL 25.0 L/SEC

Pump lift:

Power:

5.5 KW

Pumping rate: Other Facility:

Name of Facility: Condition of Intake Facility:

FAIR

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

Additional Information

Storage facilities amount to 1600m3 and are hardly filled. Water supply is limited to 12 hours per day.

Name of Project: MUSONDA FALLS

Township: POWER STATION

Record No.: 57

District: MWENSE

Province: LUAPULA

General

Managing Body: Population Served: ZESCO

500 22

800 Total Population:

Current Supply:

Future Supply: 500

Water Treatment

Design Capacity:

Water Treatment Facility:

a) NONE

b)

c)

Chemical Treatment:

Other: a) NONE

b)

106

Other:

State of Operation:

PART TIME

From: 06

To: 08

Reasons:

a) ADEQUATE

h

c)

Other: SMALL RANK CAPACITY

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply:

Communal supply: 500

Industrial water:

Secondary Water Use:

Water Tariff Structure:

Planned Rehabilitation:

Describe:

Irrigation:

YES Underground tank leaking. Bus requires standby tank before work plan

proceeds to repair and add filtration and chlorination.

Planned Expansion:

YES

Describe:

Expand current capacity of tank. Complete filtration and chlorination plant to

increase user numbers vigorously.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary: LIFUBU

River:

LUONGO

Amount:

Type of Intake Facility:

WEIR

Dam type:

Dam height:

Dam length:

Capacity:

Weir type: MASONRY

Weir height: 6M

Weir length: 115M

Intake rate:

Pump type: GRUNDEOS

Pump lift:

Power:

7.5 KW

Pumping rate:

Other Facility:

Name of Facility:

Condition of Intake Facility: FAIR

Groundwater Project

Name of Wellfield:

Comments:

Number of Wells:

Total Production:

Additional Information

Luapula (Musonda in particular) is prone to water borne diseases like cholera, diarrhoea, typhoid & dysentery.

Name of Project: KASAMA WATER SUPPLY Township: KASAMA Record No.: 58

District: KASAMA Province: NORTHERN

General

Managing Body: COUNCIL

Population Served: 49,795 Total Population: 241.840

Current Supply: Design Capacity: 72,096 12,000 Future Supply: 21,600

Water Treatment

Water Treatment Facility: a) SLOW FILTER ... b) RAPID FILTER

Other:

Chemical Treatment: a) CHLORINE **b**)

Other:

State of Operation: **FULL TIME** From: Reasons: a) b)

Other:

Condition of Treatment Facility: FAIR Comments:

Distribution System: Piped supply: 35,780

Secondary Water Use: Irrigation:

Communal supply: 14,014 Industrial water: 1,500

To:

**c**)

Water Tariff Structure: FLAT RATE

Planned Rehabilitation: YES

Describe:

Improvements of water reticulation network in the township.

Planned Expansion:

YES

Describe: Uprate water mains to Mulenga Hill. Lay new mains for development areas

like Chikumanind, Kambotore, etc.

Surface Water Project

Water Right No: Date of Issue: Name of Holder:

Tributary: LUKUPA River: Amount:

Type of Intake Facility: **PUMP** 

Dam type: Dam height: Dam length: Capacity: Weir type: Weir height: Weir length: Intake rate:

Pump type: KSB-DEEPWELL Pump lift: 58M Power:

Pumping rate: 70.0 L/SEC Other Facility: 2 SAME TYPE

Name of Facility: **LUKUPA WATER** 

Condition of Intake Facility: GOOD Comments:

Groundwater Project

Name of Wellfield: Number of Wells: Total Production:

Additional Information

Name of Project: MPIKA WATER SUPPLY Township: BOMA/TAZARA Record No.: 59

Province: NORTHERN District: MPIKA

General

COUNCIL Managing Body:

120,000 Total Population: 13,200 Population Served:

1,500 Future Supply: 6,000 **Current Supply:** 2,500 Design Capacity:

Water Treatment

c) a) SLOW FILTER Water Treatment Facility:

Other:

b) a) CHLORINE Chemical Treatment:

Other:

To: From: PART TIME State of Operation: c) ADEQUATE b) LABOUR a) SPARES

Reasons: Other: PLANT HAS OVER STAY

Comments: Condition of Treatment Facility: POOR

Piped supply: 12,000

Communal supply: 1,200 Distribution System: Industrial water: Irrigation: Secondary Water Use:

**FLAT RATE** Water Tariff Structure:

YES Planned Rehabilitation: Overhauling the two existing plants, upgrading distribution lines including Describe:

gadgets like valves, construction of service reservoirs & expansion of

improving reservoirs.

YES Planned Expansion:

To extend or construct three more slow sand filters, expansion of the intake Describe:

weir installation of two more pumps at the two plants.

Surface Water Project

Name of Holder: MPIKA D. COUNCIL Date of Issue: Water Right No:

4,500 Amount: **MWAMFUSHI** River: Tributary: MALASHI

Type of Intake Facility: DAM

Capacity: Dam length: 10M Dam type: CONCRETE Dam height: 2M Intake rate: Weir length: 5M

Weir type: ROCK FILL Weir height: 3M 380.0 KW Power: Pump lift:

Pump type: ROTORDYNAM Pumping rate:

Other Facility: Name of Facility:

Comments: Condition of Intake Facility: POOR

Groundwater Project

Name of Wellfield: Total Production: Number of Wells:

Additional Information

Mpika mainly depends on surface water supply though in some villages wells have been dug by the local people.

Name of Project: KAPUTA

Township:

Record No.: 60

District: KAPUTA

Province: NORTHERN

General

Managing Body:

DWA

Population Served:

1,780

Total Population: 8.000 74

Design Capacity: 415 **Current Supply:** 

Future Supply: 1,200

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION **b) SLOW FILTER** 

Chemical Treatment:

a) CHLORINE

Other:

Other:

b) ALUM

State of Operation:

PART TIME

From: 07

To: 18

Reasons:

a) FUNDS

b)

c)

Other: PIPES CLOGGED BY CAL

Condition of Treatment Facility: POOR

Comments:

Distribution System:

Piped supply: 820

Communal supply: 960

Industrial water:

Secondary Water Use: Water Tariff Structure: Irrigation:

**FLAT RATE** 

Planned Rehabilitation:

YES

Describe:

Planned but no funds. Overhaul diesel engines, Repair sedimentation & filter

tanks. Resanding of filters.

Planned Expansion:

YES

Describe:

Planned but no funds. Augmentation of network. Increase production

capacity by installation of bigger pumps & motors. Electrification of scheme.

Increase reservoir capacity and making elevated tank.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder: DIRECTOR WATER A

Tributary:

River:

Amount:

Type of Intake Facility: PUMP

Dam type:

Dam height:

Dam length: Weir length:

Capacity:

Weir type:

Weir height:

Intake rate:

Pump lift:

Pumping rate:

Pump type: KSB E7A 65

100.0 L/SEC

3M

Power: 11.0 KW

Other Facility:

PUMP RUN ENG ST2

Name of Facility:

KAPUTA WATER SUPPLY

Condition of Intake Facility:

**POOR** 

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

Additional Information

The water supply scheme is very old still operating using diesel engines. It has proved to be a very expensive scheme to run. The scheme generally is with a lot of problems. Very poor pressure distribution. Most of the houses

Township: MPULUNGU Record No.: 61 Name of Project: MPULUNGU WATER SUPPLY

Province: NORTHERN District: MBALA

General

DWA Managing Body:

Total Population ! 8,946 6.354 Population Served:

Future Supply: 3,500 Current Supply: 1,150 1,944 Design Capacity:

Water Treatment

a) SEDIMENTATION b) SLOW FILTER c) Water Treatment Facility:

Other:

a) CHLORINE b) ALUM Chemical Treatment:

Other:

PART TIME State of Operation: b) Reasons:

Other: INSUFFICIENT STORAGE

Condition of Treatment Facility: FAIR Comments:

Piped supply: 3,390 Distribution System:

Communal supply: 555 Industrial water: irrigation: Secondary Water Use:

**FLAT RATE** Water Tariff Structure:

Planned Rehabilitation: YES Repair existing intake pump unit and install stand-by unit. Due to low water Describe:

lake level, improve intake.

Planned Expansion:

Irish aid to construct an additional w/supply from a river and additional Describe:

From: 06

To: 18

c)

storage tanks.

Surface Water Project

Name of Holder: Date of Issue: Water Right No :

Amount: River: Tributary:

Type of Intake Facility: PUMP

Capacity: Dam length: Dam height: Dam type: Intake rate : Weir length: Weir height: Weir type:

Pump lift: Power: 37.0 KW Pump type: KSB (FRANCE) 5M

Pumping rate: Other Facility:

Name of Facility:

THE TOP INTAKE BE LO Condition of Intake Facility: FAIR Comments:

Groundwater Project

Name of Wellfield: Total Production: Number of Wells:

Additional Information

Though the scheme is recently rehabilitated under the World Bank Programme. The scheme still experiences insufficient water due to low pumping capacity, therefore some outlying villages & new consumers cannot be connected due to

Name of Project: MPOROKOSO

Township: MPOROKOSO

Record No.: 62

District: MPOROKOSO

Province: NORTHERN

Current Supply:

#### General

Managing Body:

DWA

Population Served: Design Capacity:

Total Population: 1,500

6,000

430

Future Supply:

#### Water Treatment

Water Treatment Facility:

a) SLOW FILTER

Chemical Treatment:

a) CHLORINE

From: 01

To: 20

State of Operation:

Other: PART TIME

Other:

Reasons:

a) FUNDS

b)

c)

Other: PUMP NOT IN GOOD SHAPE

Condition of Treatment Facility: POOR

Comments: THE SCHEME IS OLD

Distribution System:

Piped supply: 873 Irrigation:

Communal supply: 627 Industrial water:

Secondary Water Use: Water Tariff Structure:

**FLAT RATE** 

Planned Rehabilitation:

YES

Describe:

At district level, we need to replace the 6" ~ AC pipes with 8" ~ AC pipes

of bigger diameter due to age, 2nd standby units, chlorination, resanding.

Planned Expansion:

YES

Describe:

Establishing of new water inake at Mutotoshi River and extension of

reticulation system.

#### Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

**DIRECTOR WATER A** 

Tributary:

River:

Amount:

### Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Weir type: CONCRETE

Weir height: 1M

Weir length: 50M

Intake rate:

Pump type: KSB/RAPID

Condition of Intake Facility:

Pump lift:

Power: >37.0 KW

Pumping rate:

Other Facility:

**EQUIP. TOO OLD** 

Name of Facility:

WATER AFFAIRS

**POOR** 

**MUCH WATER LILLIES** 

#### Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

### Additional Information

The intake is very small as compared to the township water demand. Often dries up towards dry seasons, There is need to establish new intake at Mutotoshi River where water is in abundance & a perennial river, 2. boreholes

Name of Project: LUWINGU

Township: LUWINGU

Record No.: 63

District: LUWINGU

Province: NORTHERN

General

Managing Body:

DWA

Population Served: Design Capacity:

7,500

1,555

Total Population: Current Supply:

12,000 1,100

Future Supply: 2,652

Water Treatment

Water Treatment Facility:

a) SLOW FILTER

b)

Chemical Treatment:

a) CHLORINE

b)

To: 15

State of Operation:

PART TIME

Other:

Other:

Reasons:

a) SPARES

b)

c)

Other: INADEQUATE TREATMENT

Condition of Treatment Facility: POOR

Comments: 11KM OF PUMP IS PVC

From: 06

Distribution System:

Piped supply: 3,000

Communal supply: 4,500 Industrial water:

Secondary Water Use:

Irrigation:

Water Tariff Structure:

**FLAT RATE** 

YES

Planned Rehabilitation: Describe:

Replacement of 10" PVC pipes with 10" steel pipes on the rising main.

Repair of leaking elevated braithwaite tank. Installation of standby pumpsets.

Planned Expansion:

YES

Describe:

Construction of an extra slow sand filter. Replace low capacity pumps at

treatment works with higher capacity pumps.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder: DEPT. WATER AFFAIRS

Tributary:

River:

Amount:

Type of Intake Facility: PUMP

Dam type:

Dam height:

Dam length:

Capacity:

Weir type: CONCRETE

Weir height:

Weir length:

Intake rate:

Pump type: KSB

Pump lift:

Power: 55.0 KW

Pumping rate:

Other Facility:

DIRECT PIPE TO R

Name of Facility:

LUFUBU INTAKE

Condition of Intake Facility:

FAIR

Groundwater Project

Name of Wellfield:

Number of Wells:

Comments:

Total Production:

Additional Information

The 10 inch rising main consisting mainly of PVC pipes has frequent bursts & need replacing PVC with steel pipes/AC pipes. The 3 pumping stations have no standby facilities each having only one pump & one MOTPT. The scheme can

Name of Project: ISOKA

Township: ISOKA

Record No.: 64

District: ISOKA

Province: NORTHERN

General

Managing Body:

DWA

Population Served:

10,000

Total Population:

15,000

Design Capacity:

1.512

Current Supply:

800

Future Supply: 3,024

Water Treatment

Water Treatment Facility:

a) NONE Other: b)

c)

Chemical Treatment:

a) CHLORINE

b)

.

State of Operation:

Other: FULL TIME

From:

To:

Reasons:

a) Other: b)

c)

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply:

.

Communal supply: 7,420
Industrial water: --

Secondary Water Use: Water Tariff Structure:

**FLAT RATE** 

Planned Rehabilitation:

YES

Describe:

Replacement of bisser pumping units 55kW motor by the Irish aid to Zambia

at water treatment plant.

Planned Expansion:

YES

Describe:

Extension of the distribution network to the new Isoka Township boundary

which will extend to more than four villages.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility: OTHER

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length: Pump lift: Intake rate:

Power:

55.0 KW

Pump type: KSB 65-250 Pumping rate:

.

Other Facility:

14.0 L/SEC

Other racinty.

PUMP WILL 28.8M3

Name of Facility:

OLD SCHEME TANK

Condition of Intake Facility: FAI

Comments:

**Groundwater Project** 

Name of Wellfield:

**NEW INTAKE SOURCE** 

Number of Wells:

Total Production:

1,200

Additional Information

Isoka has 2 intakes; the old scheme & the spring drainage. Both are in fair condition. The reticulation system needs a complete augmentation including extending to outlying villages.

Name of Project: NAKONDE WATER SUPPLY Township: KANYALA/MWENZO Record No.: 65

District:

Province: NORTHERN

General

Managing Body:

DWA

Population Served: Design Capacity:

9,900 831

Total Population: Current Supply:

20,000 731

Future Supply: 1,041

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION b) SLOW FILTER

c) AERATION

Chemical Treatment:

a) CHLORINE

b) ALUM

State of Operation:

**FULL TIME** 

From:

To: c)

Reasons:

a)

Other:

Other:

Other:

Condition of Treatment Facility: FAIR

Comments:

b)

Distribution System:

Piped supply: 3,000

Communal supply: 6,900

Secondary Water Use:

Irrigation:

Industrial water:

Water Tariff Structure:

FLAT RATE

Planned Rehabilitation:

YES

Describe:

Resanding of slow sand filters, standby pump units at Raw Water and High

Lift Pump houses, replace deformed Braithwater tank plates.

Planned Expansion:

YES

Describe:

A new distribution system between treatment works and Mwenzo, to supply

Rasichila, and Malange villages. Replace aged 2" Asbestos pipe.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Total Production:

Type of Intake Facility:

Dam type: EARTH DAM

Dam height: 3M

Dam length: 76M

Capacity:

Weir type:

Pump type: KSB E7A

Weir height:

Weir length:

Intake rate:

Pumping rate:

Other Facility:

Name of Facility:

**POOR** 

Pump lift:

Power:

55.0 KW

Groundwater Project

Condition of Intake Facility:

Name of Wellfield:

Number of Wells:

Comments:

Additional Information

The Braithwaite storage tank requires immediate attention whose leak's contributes to more than 30% losses of water at Mwezso reservoir. Standby pump units are needed at both intake & treatment works. All valves require attention,

Name of Project: CHINSALI

Township: CHINSALI Record No.: 66

District: CHINSALI

Province: NORTHERN

General

Managing Body:

DWA

Population Served:

3,280

Total Population: 8,000

Design Capacity:

1,685

Current Supply: 1,447

Future Supply: 3,280

Water Treatment

Water Treatment Facility:

a) SLOW FILTER

**b**)

Chemical Treatment:

a) CHLORINE

State of Operation:

Other: PART TIME

Other:

From: 06 To: 18

c)

Reasons:

a)

b) Other: INSUFFICIENT PUMPS

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply: 1,870 Irrigation:

Communal supply: 1,410

Industrial water:

Secondary Water Use: Water Tariff Structure:

**FLAT RATE** 

Planned Rehabilitation:

YES

Describe:

Resanding of filters. Provide standby pumping facilities.

Planned Expansion:

Describe:

Augmentation of network to cover new development areas and some council

houses currently not supplied.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility: PUMP

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length: 1M Intake rate:

Pump type: KSBVI65-26 Pumping rate:

Other Facility:

Name of Facility:

Pump lift:

Power:

33.0 KW

Condition of Intake Facility: FAIR

Comments:

**Groundwater Project** 

Name of Wellfield:

Number of Wells:

Total Production:

Additional Information

The scheme was constructed in 1976. Pumps were replaced with higher capacity pumps at intake 7.5kw motors while the clear water tank replaced with 30kw motors & KSB E7A pumps. Most valves need to be replaced. The aged asbestos The state of the s

Name of Project: CHAMA

Township:

Record No.: 67

District: CHAMA

Province: EASTERN

General

Managing Body:

DWA

3.000 Population Served: Design Capacity:

3,700 Total Population:

Current Supply:

23

Future Supply:

Water Treatment

Water Treatment Facility:

a) NONE Other:

b)

c)

Chemical Treatment:

a) CHLORINE

**b**)

To: 08

State of Operation:

Other: PART TIME

Reasons:

a) FUNDS

b)

c)

Other:

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply: 1,800 Irrigation:

Communal supply: 1,200

From: 06

Industrial water:

Secondary Water Use: Water Tariff Structure:

Planned Rehabilitation:

YES

Describe:

Acquisition of more borehole pumps. Repair of leakage in the reticulation

network.

Planned Expansion:

YES

Describe:

Proposal to run borehole pumps on solar energy. Acquisition of bigger high

lift pumps.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length:

Intake rate:

Pump type:

Pump lift:

Power:

Pumping rate:

Other Facility:

Name of Facility:

Condition of Intake Facility:

Comments:

Groundwater Project

Name of Wellfield:

BOREHOLE 1, 3, 7, 8, 9 & 10

Number of Wells:

Total Production:

666

Additional Information

Although the supply to consumers is for 2 hours & less, the pumps, i.e., lowlist operate for 7 hours. This is due to the fact that there are only 2 borehole out of 6 equipped with pumps. Water tariff is metered & unmetered connection

Name of Project: LUNDAZI

Township:

Record No.: 68

District: LUNDAZI

Province: EASTERN

General

Managing Body:

DWA

Population Served:

10,000 Design Capacity:

Total Population: Current Supply:

10.000 900

Future Supply:

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION b) SLOW FILTER

c)

Chemical Treatment:

Other: a) CHLORINE

b) ALUM

State of Operation:

**PART TIME** 

From: 06

To: 15

Reasons:

a) FUNDS

Other:

b)

c)

Other:

Condition of Treatment Facility: POOR

Comments:

Distribution System:

Piped supply: 5,500

Communal supply: 4,500

Secondary Water Use:

Water Tariff Structure:

Irrigation:

Industrial water:

Planned Rehabilitation:

Describe:

YES

lines need to have the 3/4" G.T. pipes replaced with 3" A.C. pipes.

Planned Expansion:

YES Acquisition of bigger pumps, thereafter, extension of reticulation network to

Replacement of sand in slow sand filters. Some portions of the distribution

new areas being developed.

Surface Water Project

Describe:

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility: DAM

Dam type: EARTH

Dam height: 9M

Dam length: 250M

Capacity:

Weir type:

Weir height:

Weir length:

Intake rate:

Pump type: FLYGT (SUBM)

Pump lift: **7M**  Power:

30.0 KW

Pumping rate:

25.0 L/SEC

Other Facility:

Name of Facility:

Condition of Intake Facility: POOR

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Total Production:

Additional Information

Although consumers receive water for only 9 hours a day, the lowlift pump actually runs for over 20 hours a day.

Name of Project : CHADIZA

Township:

Record No.: 69

District: CHADIZA

Province: EASTERN

General

Managing Body:

DWA

Population Served:

Total Population: 4.000

Design Capacity:

Current Supply:

Future Supply:

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION

**b) SLOW FILTER** 

c)

Chemical Treatment:

a) CHLORINE

b) ALUM

900

State of Operation:

Other: PART TIME

From: 05

To: 09

Reasons:

a) FUNDS

b)

c)

Other:

Other:

Condition of Treatment Facility: FAIR

Comments:

Distribution System:

Piped supply:

Communal supply: --

Secondary Water Use:

Irrigation:

Industrial water:

Water Tariff Structure:

Planned Rehabilitation:

YES

Describe:

Replacement of ball valves and pressure ring rubbers in the raising main.

Repair of high level tanks that are leaking.

Planned Expansion:

Describe:

To lay distribution lines to the open air prison and the new compound east of

the township.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Total Production:

Type of Intake Facility:

WEIR

Dam type:

Dam height:

Dam length:

Capacity:

Weir type: BUTTRESS

Weir height: 9M

Weir length:

Intake rate:

Pump type: SUBMERSIBLE

Pump lift:

Power:

Pumping rate:

Other Facility: Name of Facility:

**NSADZU** 

Condition of Intake Facility:

Comments:

Groundwater Project

Name of Wellfield:

Number of Wells:

Additional Information

Although the supply to consumers is about 10 hours a day, the lowlift pumps run for over 20 hours a day.

Name of Project: KATETE

Township:

Record No.: 70

District: KATETE

Province: EASTERN

General

Managing Body:

DWA

Population Served: Design Capacity:

2,500

Total Population: 7,500 Current Supply:

200

Future Supply:

Water Treatment

Water Treatment Facility:

Reasons:

a) NONE Other:

Chemical Treatment:

a) CHLORINE

State of Operation:

Other: **PART TIME** 

b)

From: 06

To: 12

a) FUNDS Other:

Condition of Treatment Facility: GOOD

Comments:

Distribution System: Secondary Water Use: Piped supply: 2,406

Communal supply: 94

Irrigation:

Industrial water:

Water Tariff Structure:

Planned Rehabilitation:

YES

Describe:

Acquisition of enough water metres and fittings to metre all consumers.

Planned Expansion:

Describe:

Proposal to construct a dam or identification of additional well field.

Acquisition of booster pumps.

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

Tributary:

River:

Amount:

Type of Intake Facility:

Dam type:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Pump type:

Weir length: Pump lift:

Intake rate: Power:

Pumping rate:

Other Facility:

Name of Facility:

Condition of Intake Facility:

Comments:

Groundwater Project

Name of Wellfield:

BOREHOLE 1, 4, 8, 11, 15

Number of Wells:

6

Total Production:

220

Additional Information

Although actual supply to consumers is only 6 hours, the borehole pumps run for almost 24 hours a day. Only a third of the township population receive the supply. On water tariff none of the given options satisfy the existing

Name of Project: PETAUKE

Township: PETAUKÉ

Record No.: 71

District: PETAUKE

Province: EASTERN

General

Managing Body:

DWA

Population Served:

11,327 535

Total Population: Current Supply:

20,000 647

Future Supply: 2,500

Water Treatment

Design Capacity:

Water Treatment Facility:

a) AERATION

b)

c)

Chemical Treatment:

a) CHLORINE

b)

State of Operation:

PART TIME

From: 05

To: 08

Reasons:

a)

Other:

Other:

b)

c)

Other: INADEQUATE LOW LIFT C

Condition of Treatment Facility: POOR

Comments:

Distribution System: Secondary Water Use: Piped supply: 10,031

Communal supply: 1,296

Irrigation:

Industrial water:

Water Tariff Structure:

**FLAT RATE** 

Planned Rehabilitation:

YES

Describe:

90m³/hr high lift motor and pump. New submersibles for five boreholes.

Overhauling the distribution mains due to under size.

Planned Expansion:

YES

Describe:

New residentials and township expansions are not yet served ideally from the supply. Complete new scheme design and construction works are required.

Present scheme designed for 3,500 persons as compared to present

population of 11,000 persons.

Surface Water Project

Water Right No:

Date of Issue:

River:

Name of Holder:

Amount:

Type of Intake Facility:

Dam type:

Tributary:

Dam height:

Dam length:

Capacity:

Weir type:

Weir height:

Weir length:

Intake rate:

Pump type:

Pumping rate:

Other Facility:

Name of Facility:

Pump lift:

Power:

Condition of Intake Facility:

Comments:

Groundwater Project

Name of Wellfield:

NYIKA VALLEY

Number of Wells:

Total Production:

726

Additional Information

Urgent attention needed for water demand is higher than design capacity. The water works require expansion & township high level tanks & distribution mains to be expanded. Calcium to be trapped at water works

Name of Project: NYIMBA

Township:

Record No.: 72

District:

Province: EASTERN

General

Managing Body:

DWA

Population Served:

5000

**Total Population:** 

11377 162

Design Capacity: 675 **Current Supply:** 

Future Supply: 1350

Water Treatment

Water Treatment Facility:

a) SEDIMENTATION b) SLOW FILTER

Chemical Treatment:

a) CHLORINE

b) ALUM

State of Operation:

Other: PART TIME

Irrigation:

Other:

To: 20

Reasons:

a) FUNDS Other:

b)

c)

Condition of Treatment Facility: GOOD

Comments:

Distribution System:

Piped supply: 4317

From: 14

Communal supply: 683 Industrial water:

Secondary Water Use:

Water Tariff Structure:

Planned Rehabilitation:

Describe:

Planned Expansion:

Describe:

Surface Water Project

Water Right No:

Date of Issue:

Name of Holder:

River:

Amount:

Type of Intake Facility: DAM

Tributary:

Dam type: MASONRY

Dam height:

Dam length:

Capacity:

Weir type:

Pump type: CENTRIFUGAL

Weir height:

Weir length:

Intake rate:

Pump lift:

Power:

Pumping rate:

54.0 L/SEC

Other Facility:

**EARTH COMPACT** 

Name of Facility:

2 GENER. & 4 PUMPSET GOOD

Comments:

**Groundwater Project** 

Condition of Intake Facility:

Name of Wellfield:

Number of Wells:

Total Production:

85M

Additional Information

Reticulation line needed to 4 compounds. A big steel tank needed for future use as population grows. Evacuation of trunkmain to areas above. Construction of new office block & 2 staff houses. 4 boreholes required near

DB-4-2 Water Rights by Province

# LUSAKA PROVINCE WATER RIGHTS

NO.		DATE	HOLDERNAME	STATU	<u>s</u>		TRIBUTARY	RIVER	1	AMOUNT
196		The second second	IGNATIUS.H. MUCHANG			· E	BUYUNI	CHALIMBANA	1	600
256			NOEL.M. MATONGO	TRUE		1	BUYUNI	CHALIMBANA	1	150
237			MORESTER FARMS LTD	TRUE			CHILONGA	CHALIMBANA	1	
308		1 4 March 1 1 2 2 2	RUTH ENDAENDA		4 1 1 1		KACECELUKA	CHALIMBANA	1	200
322			CHILSE WILLIAM PHIRI	TRUE		J	KAPILYOMBA	CHALIMBANA	1	2500
128			K.J. ADAMS	FALSE		1	UNNAMED	CHALIMBANA	1	91
129			CHALIMBANA GOVERN.F	FALSE		•	CHALIMBANA	CHONGWE	1	1364
148			CHALIMBANA TRAINING	TRUE			CHALIMBANA	CHONGWE	1	540
177			ZAMBIA CATTLE DEV.LTD	J	4.4	_	the state of the s	CHONGWE	1	1295
183			ZAMBIA CATTLE DEV.LTD			L	CHALIMBANA	CHONGWE	1	200
184			CHRISTOFFEL ANDREIES				CHALIMBANA	CHONGWE	-	400
191			CLARA ANDREA KYRIAC				CHALIMBANA	CHONGWE	1	900
217			ZAMBIA CATTLE DEV LTD					CHONGWE	1	250
220			DAPHIE.S. KANOSO				CHALIMBANA	CHONGWE		850
226		and the second of the second	SILVER RIVERS RANCH		0.00		CHALIMBANA	CHONGWE.	1	1136
			JOHANNES .T. PIETERSE			1		CHONGWE	1	150
228			JOHN F.W. FYUU	FALSE	<u> </u>		CHALIMBANA	CHONGWE		1364
229			UNIVERSITY FARM	FALSE		•	CHALIMBANA	CHONGWE	1	
231	1				1	10		the second secon	1	8000
233	1		PETER SIKAULU	TRUE	<u> </u>			CHONGWE	1	230
234			TEDDY N SAKALA	TRUE		L		CHONGWE	1	200
237			FENELLA.M.W.PESTEL	FALSE		<u></u>		CHONGWE	1	200
247			RUTH ENDAENDA	FALSE			CHALIMBANA	CHONGWE	1	600
247			CHAINDA DAIRY ZAMBIA		1	1	CHALIMBANA	CHONGWE	1	500
257			MITI CHIFIRE				CHALIMBANA	CHONGWE	1	1000
279			HINDU ASSOCIATION	FALSE			CHALIMBANA	CHONGWE	1	250
289			WATERGREEN LTD	FALSE			CHALIMBANA	CHONGWE	1	1625
289			WATERGREEN LTD	FALSE		-	CHALIMBANA	CHONGWE	1	2700
289			WATERGREEN LTD		11	1	CHALIMBANA	CHONGWE	1	1625
289		The state of the s	WATERGREEN LTD	FALSE		<u>.                                    </u>	CHALIMBANA	CHONGWE	1	2700
290			DAPHINE .S. KANOSO		11	10		CHONGWE	1	850
292			JAHANNES GERHARDUS	4_ 4_ 4_	12		CHALIMBANA	CHONGWE	1	250
293		4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	G.F.W.FYNN		12		CHALIMBANA	CHONGWE	1	4000
294			DONALD B. BELL-CROSS	TRUE	12	<u>-</u>		CHONGWE	1	1200
301	2.0		EXCHANGE FARM LTO	TRUE			CHALIMBANA	CHONGWE	1	1000
1274	4.0		S.M. SHANKER			L	CHALIMBANA	CHONGWE	1	455
354	1.0		JAN GEORGE BERDER				CHALIMBANA	CHONGWE	1	1200
200			ZESCO LTD				CHAMBA	CHONGWE	_1	45
2304	4.0	12/12/85	MALAMBO.B. NGANDU				CHINGA	CHONGWE	1	350
198	8.0	11/1/73	ZAMANGLÓ INDUST, CÓ	FALSE	12	10	CHIPILIPILI	CHONGWE	1	Ó
207	5.0		L.A. BANDA				KANAKANTAPA	CHONGWE	1	25
299	1.0	4/13/84	KARUBWE HOLDINGS LT	TRUE	12	10	KARUBWE	CHONGWE	1	3600
2149	9,0	11/14/84	KAPOSHI FARM	TRUE	12	10	KASENGE	CHONGWE	1	600
2992	2.0	11/14/84	CHIBOTE FARM LTD	TRUE	12	10	KASENGE	CHONGWE	1	300
2350	0.0	11/10/79	MAXWELL KANEMA	FALSE	12	10	LWIMBA	CHONGWE	1	90
2390	0.0	11/16/90	MAXWELL KANEMA	FALSE	11	10	LWIMBA	CHONGWE	1	90
1405		9/10/71	BUNTUNGWA CO-OP SO	FALSE	12	10	NGWERERE	CHONGWE	1	181
1860		11/22/72	B.J. STUART IRWIN	TRUE	12	10	NGWERERE	CHONGWE	1	800
1878			KASISI AGRICULTURE SC					CHONGWE	1	1135
2354							NGWERERE	CHONGWE	1	4120
2523						,	NGWERERE	CHONGWE	1	7000
2638							NGWERERE	CHONGWE	1	800
	2.0		GALAUNIA FARMS LTD				NGWERERE	CHONGWE	1	6000

# LUSAKA PROVINCE WATER RIGHTS

NO.	DATE	HOLDERNAME	STATU	Ś	Π	TRIBUTARY	RIVER	16	AMOUNT
3259.0	5/21/87	KALIBBA FARMS	FALSE	12	10	NGWERERE	CHONGWE	1	250
3326.0		HANSHEER WALTER	1	<del></del>		NGWERERE	CHONGWE	1	100
3360.0		BRIAN J.S. IRWIN	20 Miles 20		10.0	NGWERERE	CHONGWE	1	600
4039.0		AIRPORT FARMS LTD				NGWERERE	CHONGWE	1	7000
1860.0	4 4 5 5 5 5	BRIAN .J.S. IRWIN	2 3 42			NGWERERE	CHONGWE	1	1400
835.0		F. JONBERT			1	UNNAMED	CHONGWE	1	113650
2786.0		YWCA LUSAKA BRANCH		12		<u> </u>	CHONGWE	1	240
1976.0		FRANK DUN NOHOLOVU	FALSE		-	KACHETA	KACHETA	1	455
2133.0		WALKOVER ESTATES LT		12		UNNAMED	KAPILYOMBA	1	2000
3730.0		INDIA MUSOKOTWANE	TRUE			UNNAMED	KARUBWE	31	100
1969.0		CENTRAL AFRICAN MOT	FALSE			CHAMBA	NGWERERE	1 4	15
3539.0		PETER .C. KASOLO	TRUE		1	CHAMBA	NGWERERE		
2655.0		MINISTRY OF DEFENCE	TRUE			CHINGAMOTI		1	300
3307.0		LEONARD T. NGWISHA				CHINGAMOTI	NGWERERE	11	400
2913.0							NGWERERE	1	60
		GALAUNIA FARMS LTD.				CHINGAMOTI	NGWERERE	[1]	400
2524.0		DANIEL.H. LUZONGO				MUMPILO	NGWERERE	1	90
2158.0		DONALD 8. BELL-CROSS				UNNAMED	NGWERERE	1	6
2734.0		PATSON.D.M. LOMBE				UNNAMED	NGWERERE	1	750
1770.0		DIRECTOR WATER AFFAI			<u> </u>		ZAMBEZI	1	1000
2236.0		CHILAO MPATISHA FAMI			1	CHONGWE	ZAMBEZI	1	600
3158.0		JONAS MATIVENGA		<u> </u>	•	CHONGWE	ZAMBEZI	-1	1000
3458.0		HOWARD.P.GLASSPOOL		-: .		CHALIMBANA		1	300
1879.0		BRIAN RAYMOND BOWE				CHAMBA		1	45
2022.0		JOHN MIKE				CHONGWE		1	25
3987.0	4/10/93	DEPT OF RESETTLEMEN				CHONGWE		1	3500
2482.0	11/16/79	A.A.SALAMA				KABULONGA DAM		1	580
2515.0		JOSEPH.C. TEMBO				KALIKILIKI DAM		1	500
2958.0	11/14/84	MINISTRY YOUTH & SPO	FALSE	12	10	NGWERERE		1	4000
3474.0	12/7/88	ROMANCE CHANDA SAM	TRUE	12	10	NGWERERE		3	100
3560.0	11/7/89	NGWERERE FARM ENTE	TRUE	12	10	NGWERERE	the Control of the Control of	1	280
1834.0	11/22/72	H,E.JOHNSON	FALSE	11	10	CHITUMBA	CHUNGA	2	230
2331.0	11/26/82	LAYU MULIMBA	FALSE	11	10	MAYUKUYUKU	CHUNGA	2	500
2439.0	5/18/87	MUSAFWA.J. STANLEY	TRUE	11	10	MAYUKUYUKU	CHUNGA	2	200
1582.0	8/30/68	R.J. CHIVERS	TRUE	11		MUMPILO	CHUNGA	2	146
1768.0	11/11/77	SELIANO JINYA BANDA					CHUNGA	2	23
1720.0		F.D. NDHLOVU				MUPILU	CHUNGA	2	23
3401.0		ZAMBIA NATIONAL SERVI				MUSOPELO	CHUNGA	2	1000
1835.0		H.E.JOHNSON					CHUNGA	2	125
2498.0		CHUNGA RANCHES LTD					CHUNGA	2	1000
2395.0		BENSON MACHI SITUMB			L 1	NAMALOMBWE	CHUNGA	2	300
2572.0		FLETCHER.M. SIZIBA				NAMALOMBWE	CHUNGA	2	300
3135.0		NICHOLAS.P. BOBO				NAMALOMBWE	CHUNGA		
3414.0		MZANYWA SOLOMON M				NAMALOMBWE	CHUNGA	2	30000
1590.0		H.E. JOHNSON				NAMALOMBWE	and the second s	2	50
2497.0		CHUNGA RANCHING LTD					CHUNGA	2	273
1848.0		RODGERS,M.M.MUMBI					CHUNGA	2	1000
1822.0		J. H. PATEL					CHUNGA	2	140
2223.0						NAMALOMBWE	CHUNGA	2	130
		FRANCIS.D, KAMPUNI					CHUNGA	2	250
1662.0							CHUNGA	2	545
1795.0						· ···	CHUNGA	2	23
3452.0 1320.0		LIVINGSTON J.C.NGULUB					CHUNGA	2	300
4 7 1 1 1 1 1	12/4/60	DAVID .F. QUIRK	FALSE	11	10	UNNAMED	CHUNGA	2	45