GOVERNO DO ESTADO DO CEARÁ
SECRETARIA DOS RECURSOS HÍDRICOS

PROJETO BÁSICO DO VERTEDOURO DO LAGO CATU E DA BARRAGEM CINZENTA

VOLUME 2 ANEXOS

TOMO II

GEONORTE

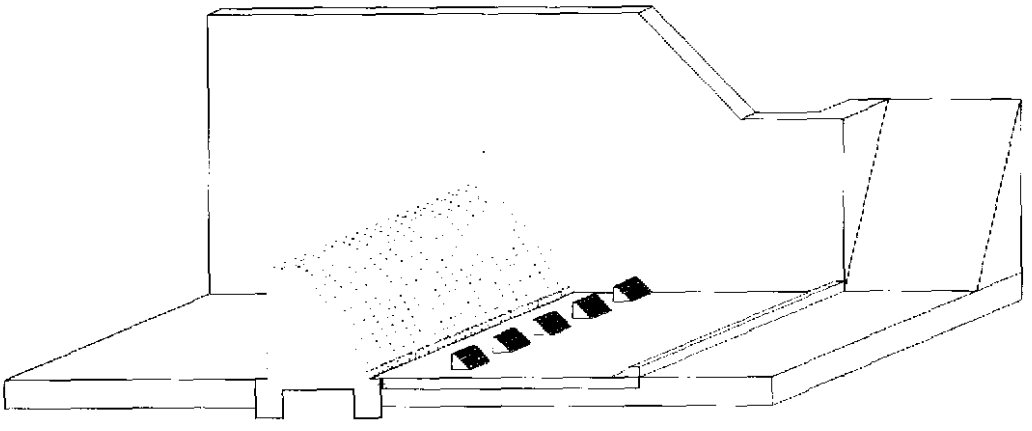
FORTALEZA- CE
SETEMBRO DE 1995

GOVERNO DO ESTADO DO CEARÁ

SECRETARIA DE RECURSOS HÍDRICOS DO ESTADO DO CEARÁ - SRH

SHR

PROJETO BÁSICO DO VERTEDOURO DO LAGO CATU E DA BARRAGEM CINZENTA



VOLUME 2 : ANEXOS

TOMO II

Geonorte

0076/02/02/D

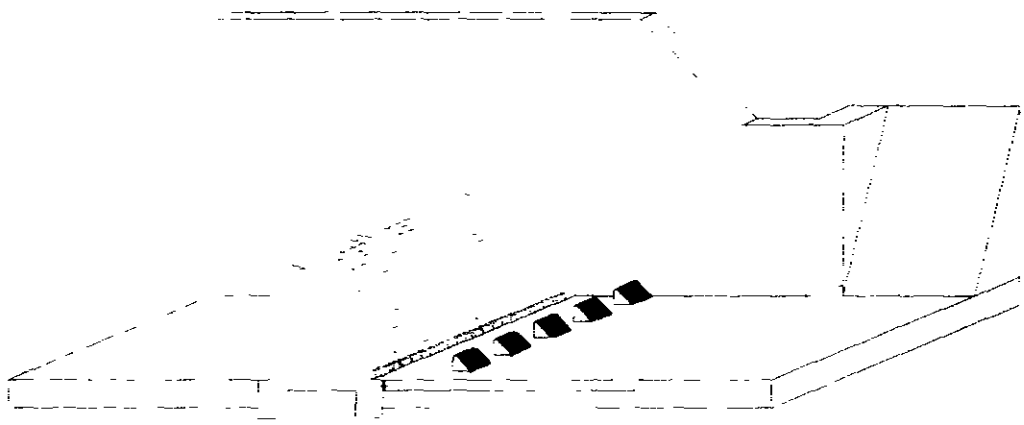
A - SETEMBRO/1995

GOVERNO DO ESTADO DO CEARÁ

SECRETARIA DE RECURSOS HÍDRICOS DO ESTADO DO CEARÁ - SRH

SHR

PROJETO BÁSICO DO VERTEDOURO DO LAGO CATU E DA BARRAGEM CINZENTA



VOLUME 2 : ANEXOS

TOMO II

Geonorte

FORTALEZA - SETEMBRO/1995

ANEXO C - PROJETO BÁSICO DO VERTEDOURO NO LAGO CATU

C \WINWORD\RELATORI\A204295 DOC

SUMÁRIO

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Sevenano, 900 - Vila União - Fone 272 4777 Fax 272 7799 - CEP 60.420-180 - Fortaleza - Ceará
C.G.C. 07.542.392/0001-60 - C.G.F. 06.013.384-8

DESENHOS

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Forta'eza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

ELEMENTOS TOPOGRÁFICOS

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

- Projeto Geométrico Horizontal do Vertedouro

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

GEONORTE LTDA DIA 21-09-95 HORA 23 03 20 FOLHA No 001

CLIENTE .: 005 SRH - SECRET DE RECURSOS HIDRICOS TRECHO : 01 T-204/95
OBRA 002 BARRAGEM DO LAGO CATU - VERTEDOURO LOCAL AQUIRAZ-CE

PROJETO GEOMETRICO HORIZONTAL

SUB-TRECHO 10 EIXO DO VERTEDOURO

NOME	ESTACA	NORTE	ESTE	LINHA	RAIO	EXTENSAO
50	0	100036 737	50101 155	TANGENTE	-	30 130
49	1+10 130	100055 211	50124 956			

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

- Projeto Geométrico Vertical do Vertedouro

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60.420-180 - Fortaleza - Ceará
C.G.C. 07.542.392/0001-60 - C.G.F. 06.013.384-8

GEONORTE LTDA DATA 21-09-95 HORA 23 04 03 FOLHA No 001

CLIENTE 005 SRH - SECRET DE RECURSOS HIDRICOS TRECHO 01 T-204/95
OBRA 002 BARRAGEM DO LAGO CATU - VERTEDOURO LOCAL AQUIRAZ-CE

PROJETO GEOMETRICO VERTICAL

SUB-TRECHO . 10 EIXO DO VERTEDOURO

NOME	ESTACA	COTA	RAMPA (%)	RAIO VERTICAL	EXTENSAO
P1	0	4 000			
			0 00000	-	30 130
P2	1+10 130	4 000			

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

- Cubação

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4[illegible] - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

GEONORTE LTDA D A 21-09-95 HORA 12 57 41 FOLHA No 001

CLIENTE 005 SRH - SECRET DE RECURSOS HIDRICOS TRABALHO 01 P-204/95
OBRA 002 BARRAGEM DO LAGO CATU - VERTEDOURO LOCAL AQUIRAZ-CE

VOLUME TERRENO X PROJETO

REFERENCIA 10 DIXO DO VERTEDOURO

ESTACA	AREAS CORTE	AREAS ATERRO	AREAS ACUM CORTE	AREAS ACUM ATERRO	SEMI DISTANCIA	VOLUMES CORTE	VOLUMES ATERRO	VOLUMES ACUM CORTE	VOLUMES ACUM ATERRO
0	23.9	0.0	47.7	0.0					
					0.0	3178.0	0.0	3178.0	0.0
1	145.1	0.0	313.6	0.0					
					5.0	1466.3	0.0	4644.3	0.0
1 + 0.00	42.4	0.0	469.2	0.0					

AREA TOTAL DE CORTE 469.2 m2
AREA TOTAL DE ATERRO 0.0 m2

VOLUME TOTAL DE CORTE 4644.3 m3
VOLUME TOTAL DE ATERRO 0.0 m3

GEONORTE LTDA topoGRAPH

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001 60 - C G F 06 013 384-8

ANEXO D - PROJETO BÁSICO DA BARRAGEM CINZENTA

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 1377 - Fax 272 7799 - CEP 60.420-180 - Fortaleza - Ceará
C.G.C. 07.542.392/0001-60 - C.G.F. 06.013.384-8

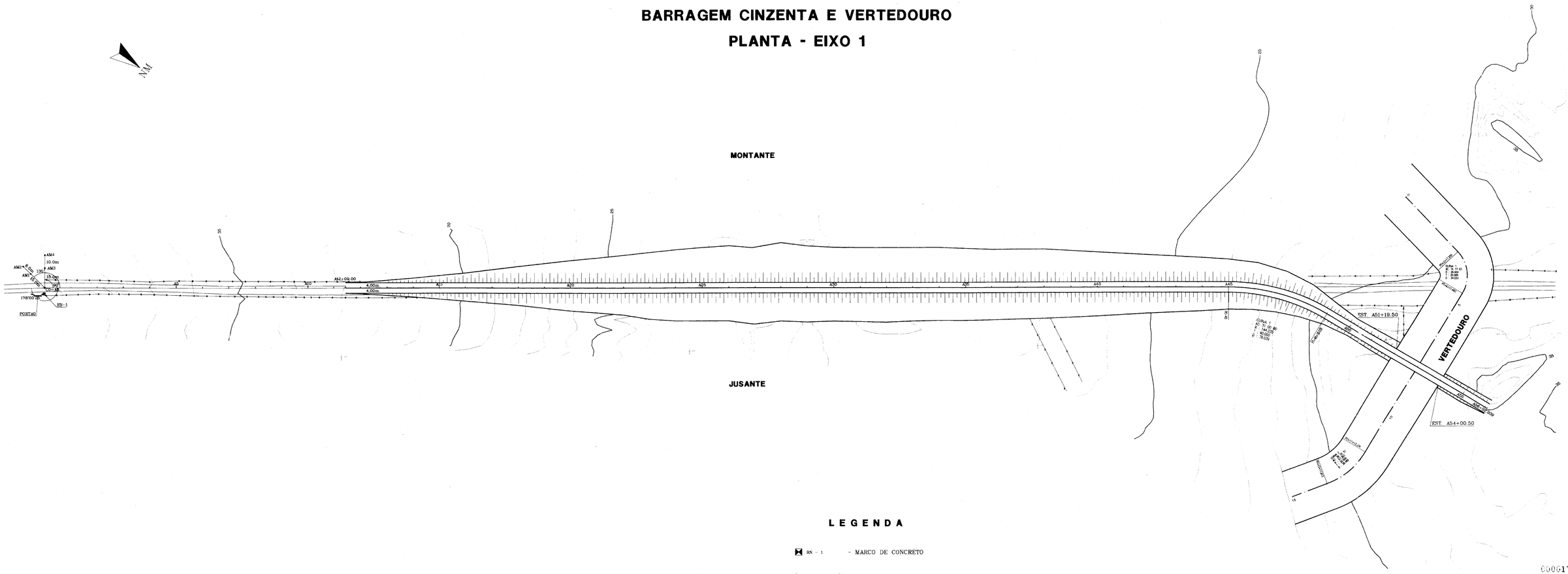
SUMÁRIO

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

DESENHOS

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Sevenano 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60.420-180 - Fortaleza - Ceará
C.G.C. 07.542.392/0001-60 - C.G.F. 06.013.384-8

BARRAGEM CINZENTA E VERTEDOURO
PLANTA - EIXO 1



LEGENDA

- RN - 1 — MARCO DE CONCRETO
- A0 — A5 — ESTAQUEAMENTO DO EIXO DA BARRAGEM CINZENTA
- 0 — 5 — EIXO DO CANAL VERTEDOURO
- OFFSET DA BARRAGEM CINZENTA
- 100 — CURVA DE NIVEL

8000617

S.R.H - SECRETARIA DE RECURSOS HIDRICOS

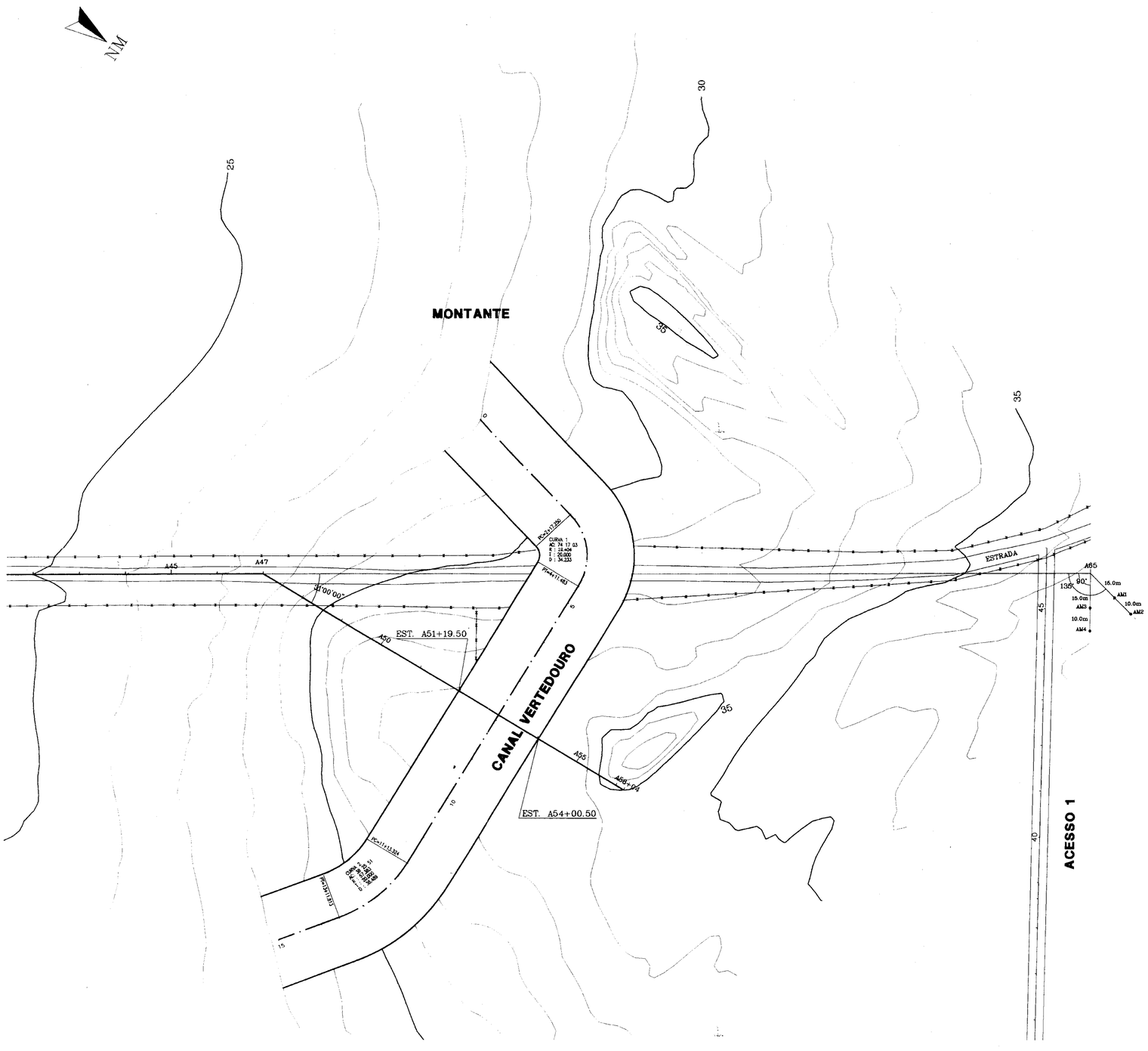
BACIA HIDROGRAFICA DO RIO CATU AQUIRAZ / CE	DESENHO: J.W.C.C
	DATA: SET/95
PROJETO BASICO PLANTA GERAL DA BARRAGEM E VERTEDOURO	DESENHO: 01
	ESCALA: 1:1000

RESPONSAVEIS TECNICOS DA GEONORTE

JOSE DE RIBAMAR PINHEIRO BARBOSA - CREA CE. 2916/D

Geonorte

PLANTA GERAL DO VERTEDOURO



LEGENDA

B0 ..... B5 - ESTAQUEAMENTO DO EIXO VERTEDOURO

25 25 - CURVA DE NIVEL

000018

S.R.H - SECRETARIA DE RECURSOS HIDRICOS

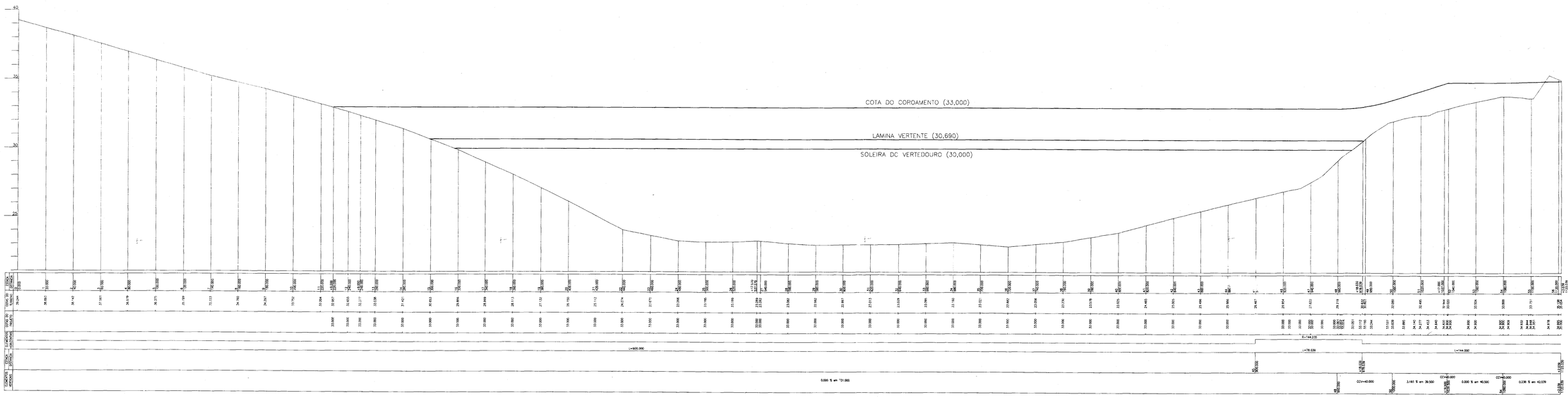
BACIA HIDROGRAFICA DO RIO CATU AQUIRAZ / CE	DESENHO: J.W.C.C
	DATA: SET/95
PROJETO BASICO PLANTA GERAL DO VERTEDOURO	DESENHO: 02
	ESCALA: 1:1000

RESPONSAVEIS TECNICOS DA GEONORTE

JOSE DE RIBAMAR PINHEIRO BARBOSA - CREA CE. 2918/D

Geonorte

PERFIL LONGITUDINAL DA BARREGEM CINZENTA



060612

S.R.H - SECRETARIA DE RECURSOS HIDRICOS

BACIA HIDROGRAFICA DO RIO CATU
AQUIRAZ / CE

DESENHO: J.W.C.C
DATA: SET/95
ESCALA: H=1:1000 V=1:100

PROJETO BASICO
PERFIL LONGITUDINAL DO BARRAGEM CINZENTA

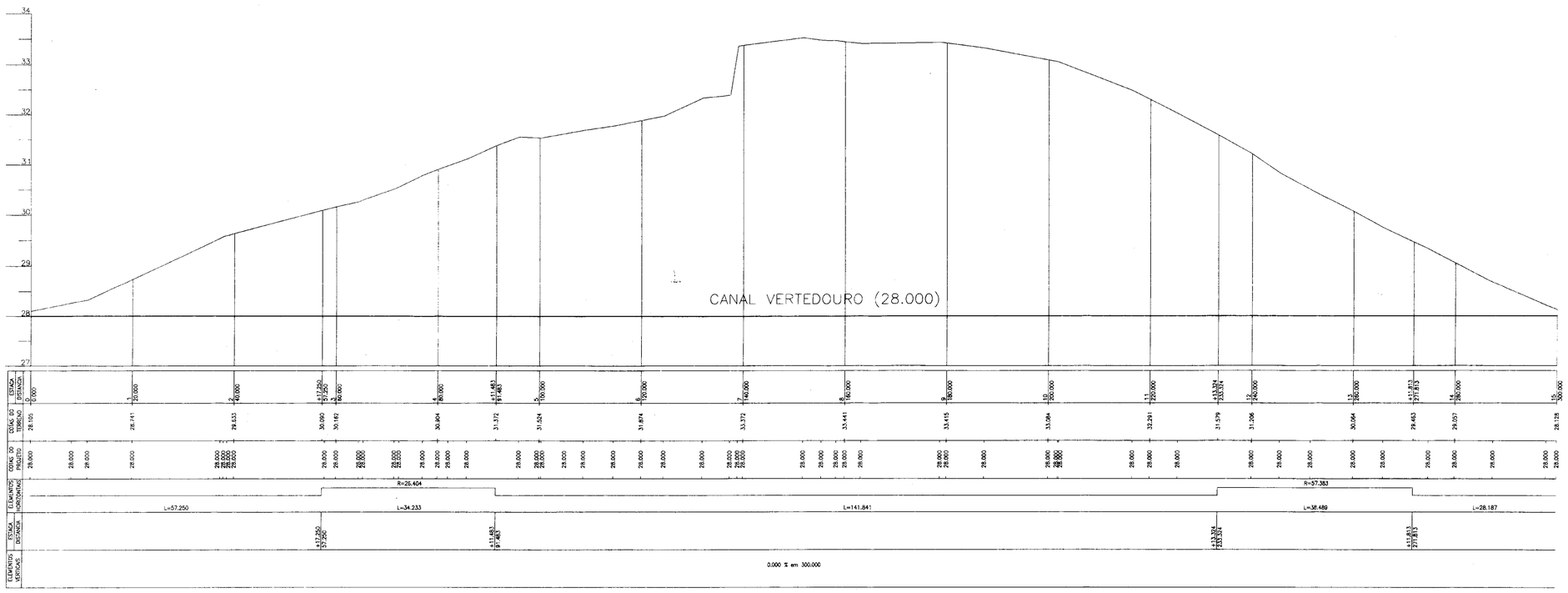
DESENHO: 03

RESPONSAVEIS TECNICOS DA GEONORTE
JOSE DE RIBAMAR PINHEIRO BARBOSA – CREA CE. 2918/D

Geonorte

PERFIL LONGITUDINAL DO VERTEDOURO

ESC. H = 1:500
V = 1:50



000020

S.R.H - SECRETARIA DE RECURSOS HIDRICOS

BACIA HIDROGRAFICA DO RIO CATU
AQUIRAZ / CE

PROJETO BASICO
PERFIL LONGITUDINAL DO VERTEDOURO

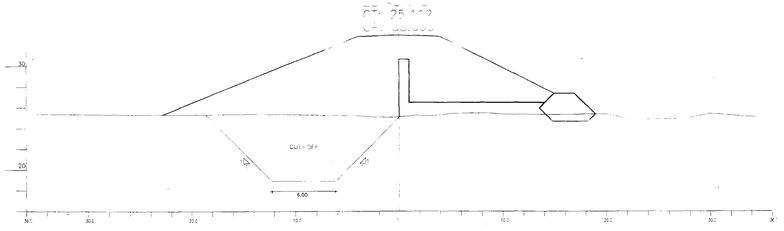
DESENHO 04

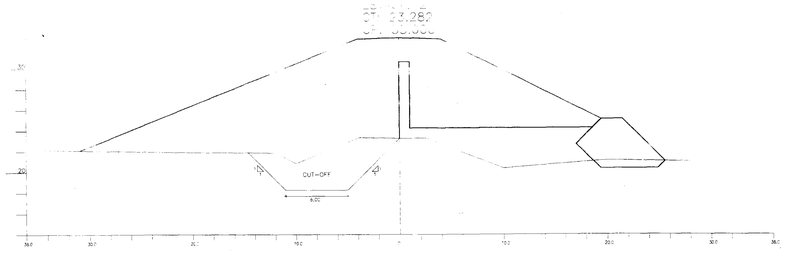
DESENHO: J.W.C.C
DATA: SET/95
ESCALA: H = 1:500, V = 1:50

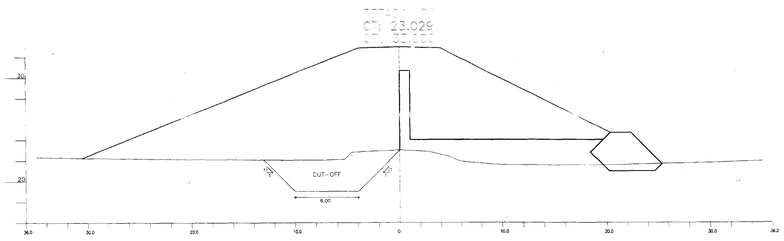
RESPONSAVEIS TECNICOS DA GEONORTE

JOSE DE RIBAMAR PINHEIRO BARBOSA – CREA CE. 2918/D

Geonorte







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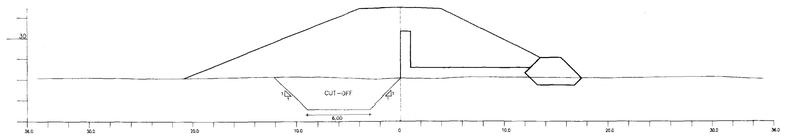
CP: 33.000



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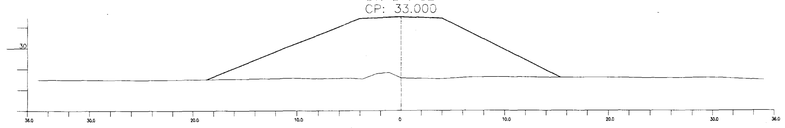
CP: 33.000



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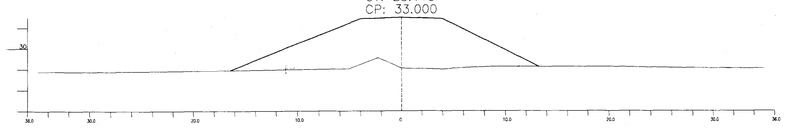
CT: 28.113
CP: 33.000



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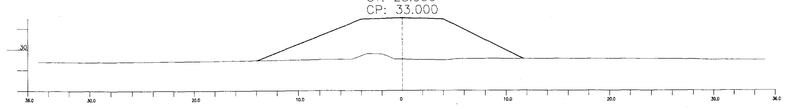

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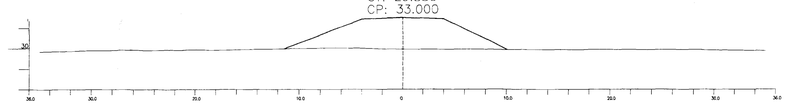
CP: 33.000



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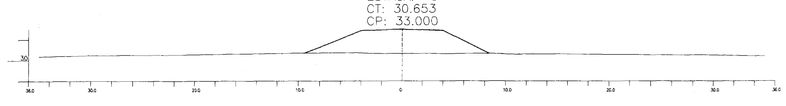
CP: 33.000



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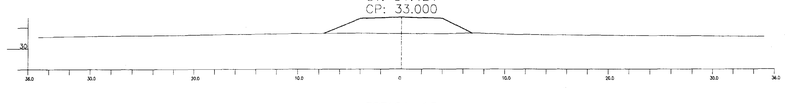
CP: 33.000



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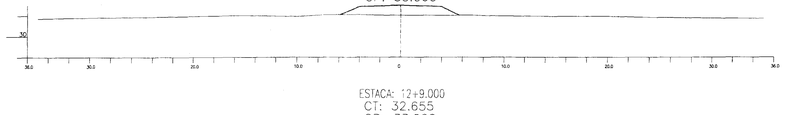
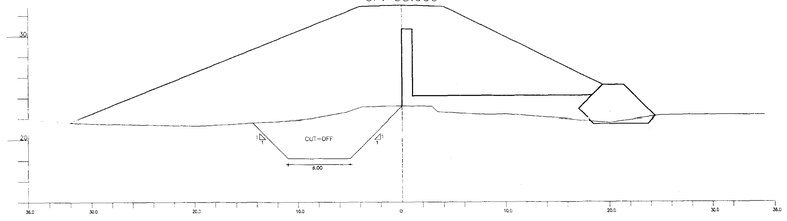
CP: 33.000



ESTACA: 12+9.000
CT: 32.655
CP: 33.000

ESTACA: 27
CT: 23.282
CP: 33.000

ESTACA: 26
CT: 23.799
CP: 33.000



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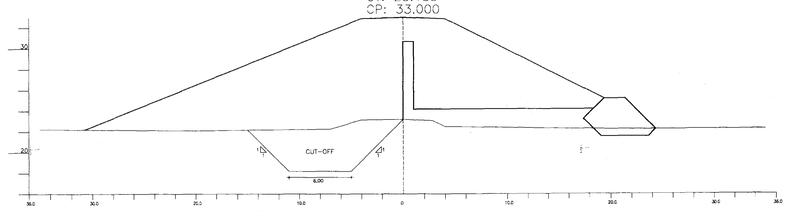
CP: 33.000



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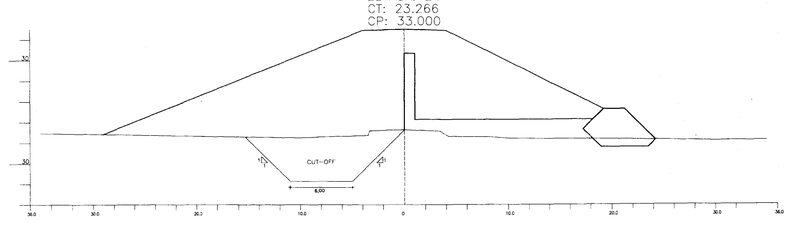
CP: 33.000



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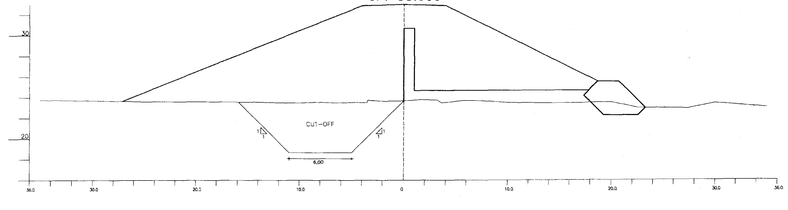

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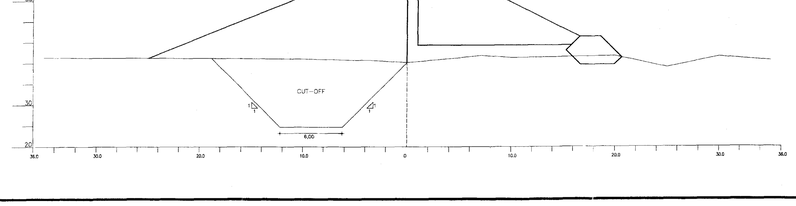

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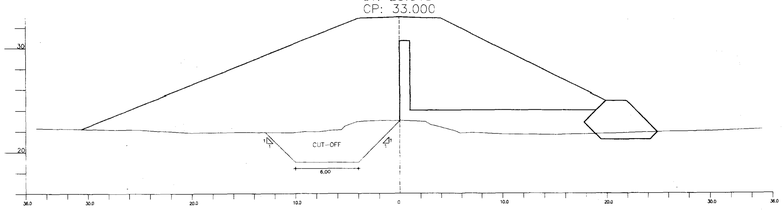
CP: 33.000



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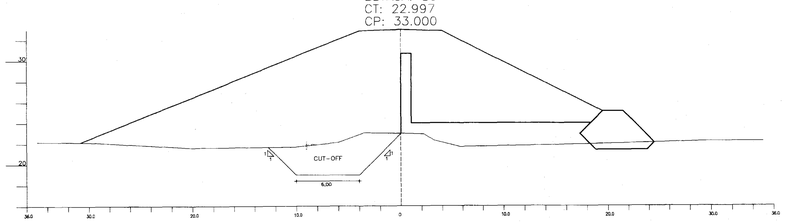
CP: 33.000



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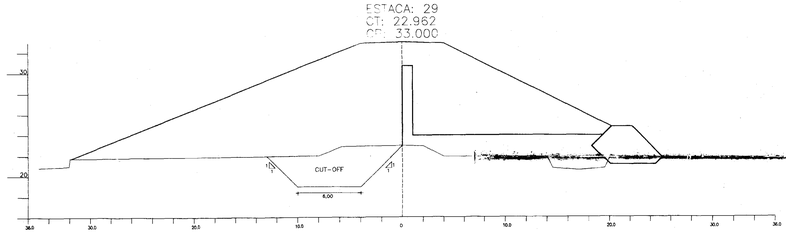
CP: 33.000



ESTACA: 28
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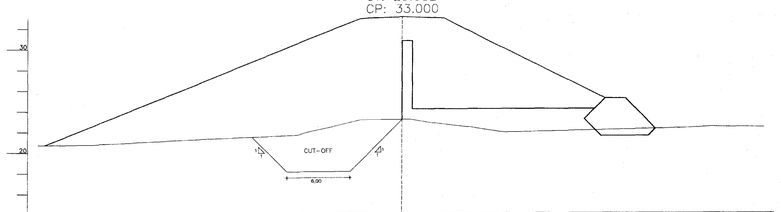
CP: 33.000



000021

S.R.H - SECRETARIA DE RECURSOS HIDRICOS

BACIA HIDROGRAFICA DO RIO CATU
AQUIRAZ / CE

DESENHO: J.W.C.C
DATA: SET/95
ESCALA: 1:200

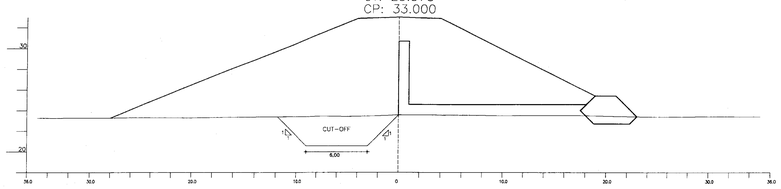
PROJETO BASICO
SEÇOES TRANSVERSAIS DA BARRAGEM (EST.12+09 a 32)

DESENHO: 05

RESPONSAVEIS TECNICOS DA GEONORTE
JOSE OLI RIBAMAR PINHEIRO BARBOSA - CREA CE. 2918/D

Geonorte

ESTACA: 39
CT: 23.578
CP: 33.000



ESTACA: 38
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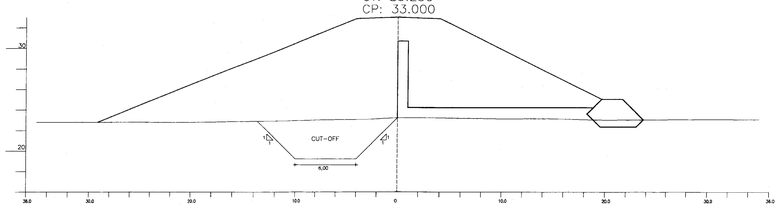
CP: 33.000



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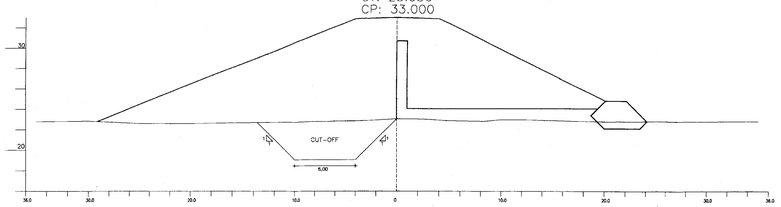
CP: 33.000



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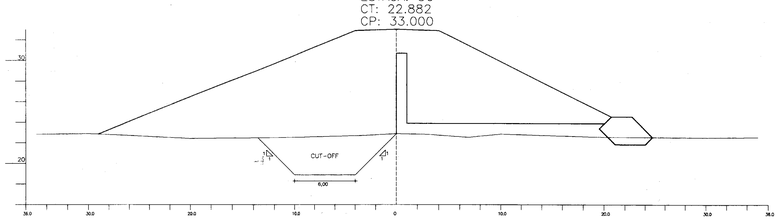

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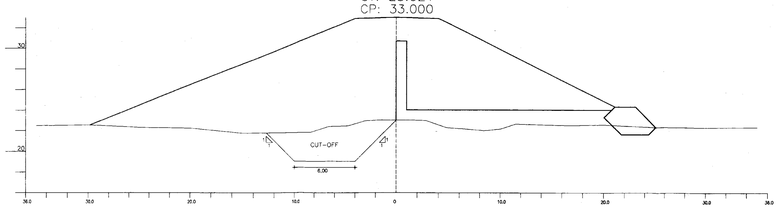

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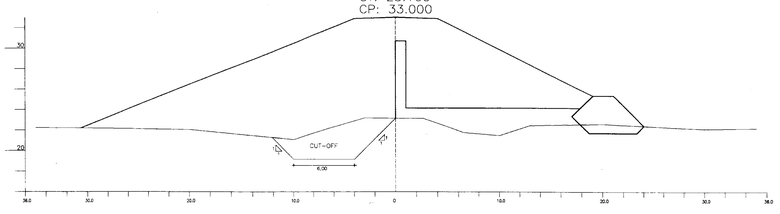

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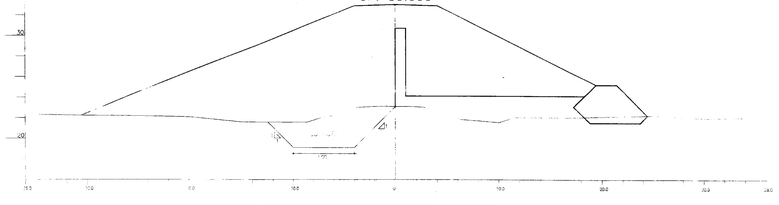
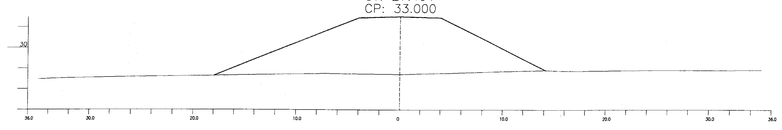
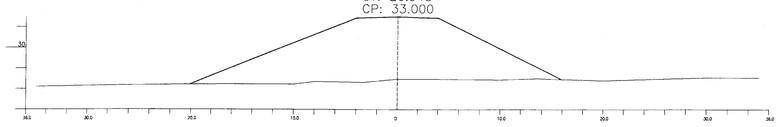


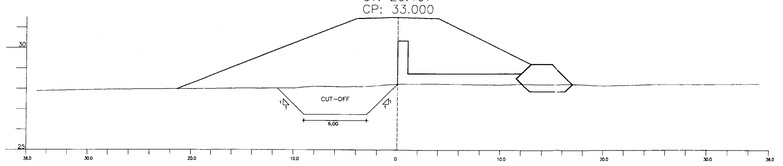
ESTACA: 47
CT: 27.404
CP: 33.000



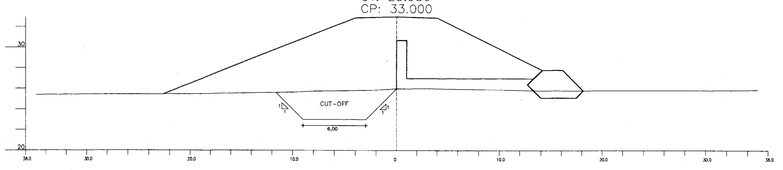
ESTACA: 46
CT: 26.948
CP: 33.000



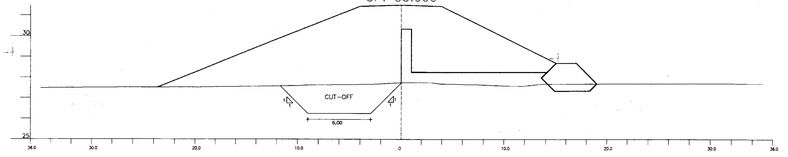
ESTACA: 45
CT: 26.467
CP: 33.000



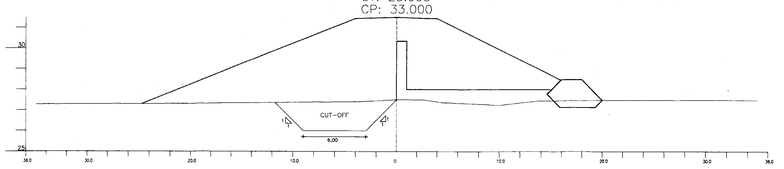
ESTACA: 44
CT: 25.986
CP: 33.000



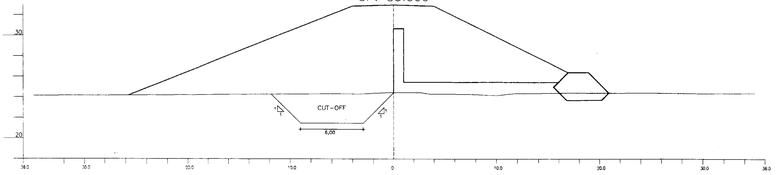
ESTACA: 43
CT: 25.496
CP: 33.000



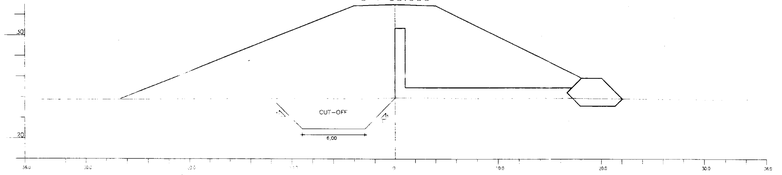
ESTACA: 42
CT: 25.005
CP: 33.000



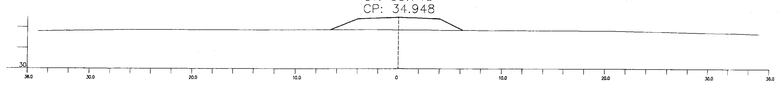
ESTACA: 41
CT: 24.465
CP: 33.000



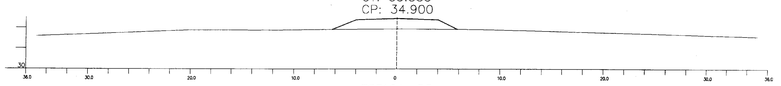
ESTACA: 40
CT: 23.925
CP: 33.000



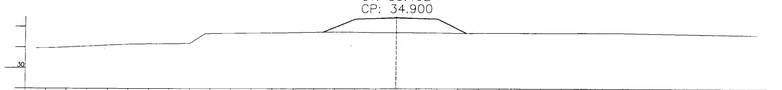
ESTACA: 55
CT: 33.743
CP: 34.948



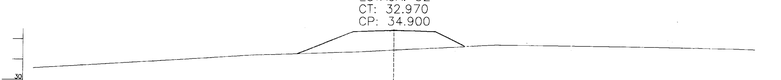
ESTACA: 54
CT: 33.885
CP: 34.900



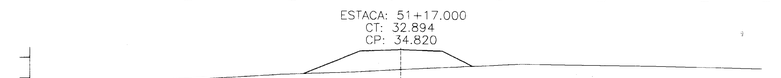
ESTACA: 53
CT: 33.462
CP: 34.900



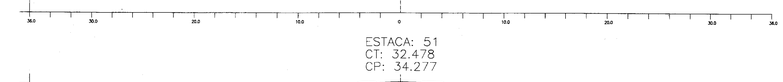
ESTACA: 52
CT: 32.970
CP: 34.900



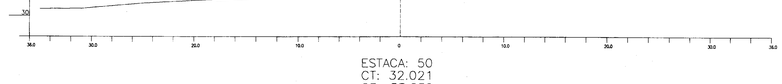
ESTACA: 51+17,000
CT: 32.894
CP: 34.820



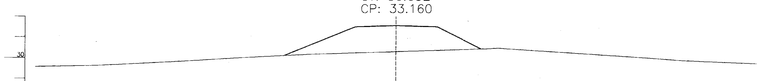
ESTACA: 51
CT: 32.478
CP: 34.277



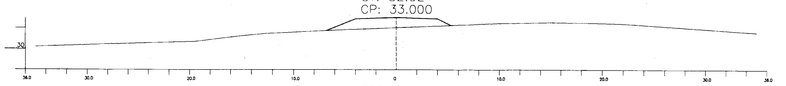
ESTACA: 50
CT: 32.021
CP: 33.639



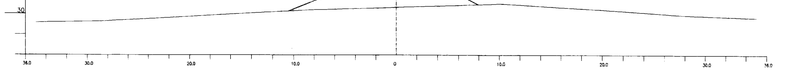
ESTACA: 49
CT: 30.632
CP: 33.160



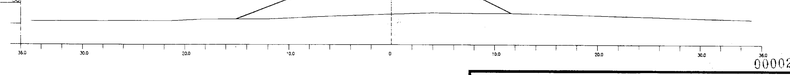
ESTACA: 50
CT: 32.021
CP: 33.000



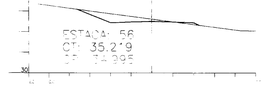
ESTACA: 49
CT: 30.632
CP: 33.000



ESTACA: 48
CT: 28.970
CP: 33.000



ESTACA: 56
CT: 35.279
CP: 34.995



000022

S.R.H - SECRETARIA DE RECURSOS HIDRICOS

BACIA HIDROGRAFICA DO RIO CATU
AQUIRAZ / CE

PROJETO BASICO
SEÇOES TRANSVERSAIS DA BARRAGEM (EST.39 a 56)

DESENHO 06

DESENHO: J.W.C.C
DATA: AGO/95
ESCALA: 1:200

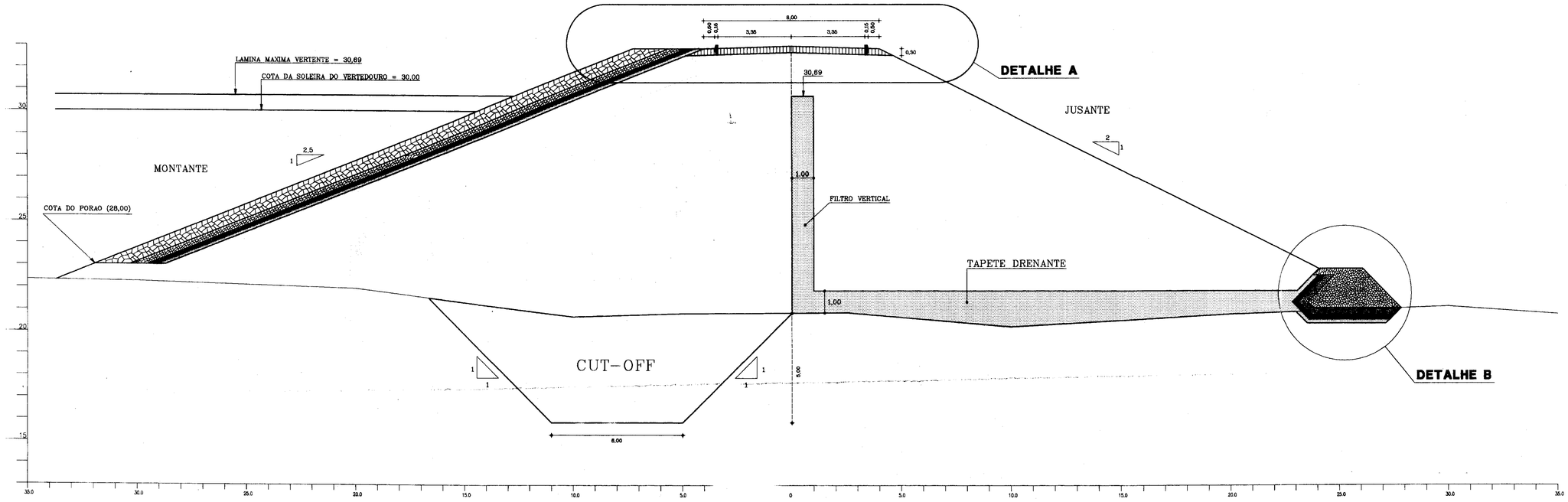
RESPONSAVEIS TECNICOS DA GEONORTE
JOSE DE RIBAMAR PINHEIRO BARBOSA - CREA CE. 2918/D

Geonorte

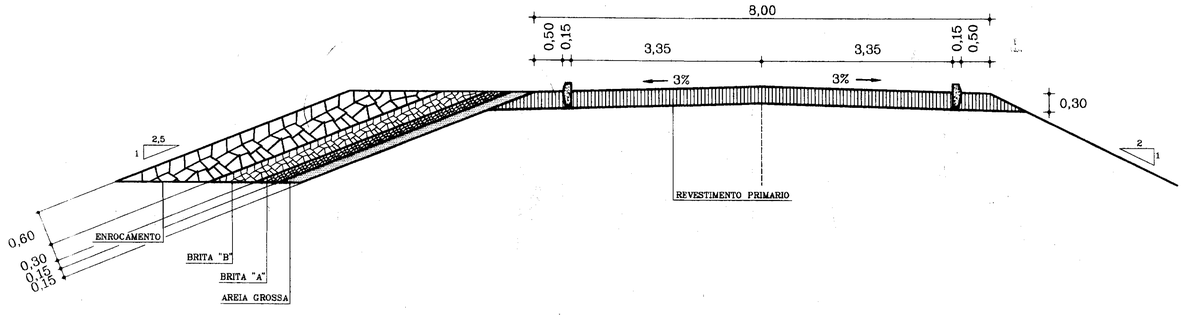
SEÇAO MAXIMA

ESC. 1:100

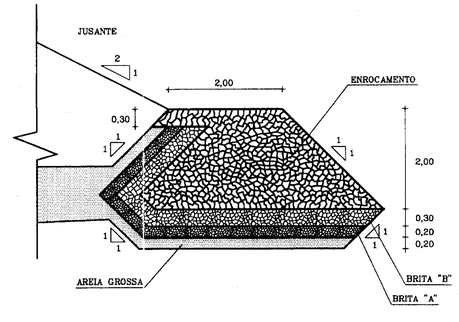
ESTACA: 26+17.570
CT: 23.289
CP: 33.000



DETALHE 'A'
COROAMENTO
ESC. 1:50



DETALHE 'B'
ROCK-FILL
ESC. 1:50



000023

S.R.H - SECRETARIA DE RECURSOS HIDRICOS

BACIA HIDROGRAFICA DO RIO CATU
AQUIRAZ / CE

DESENHO: J.W.C.C
DATA: SET/95
ESCALA: INDICADA

PROJETO BASICO
SEÇAO MAXIMA E DETALHES

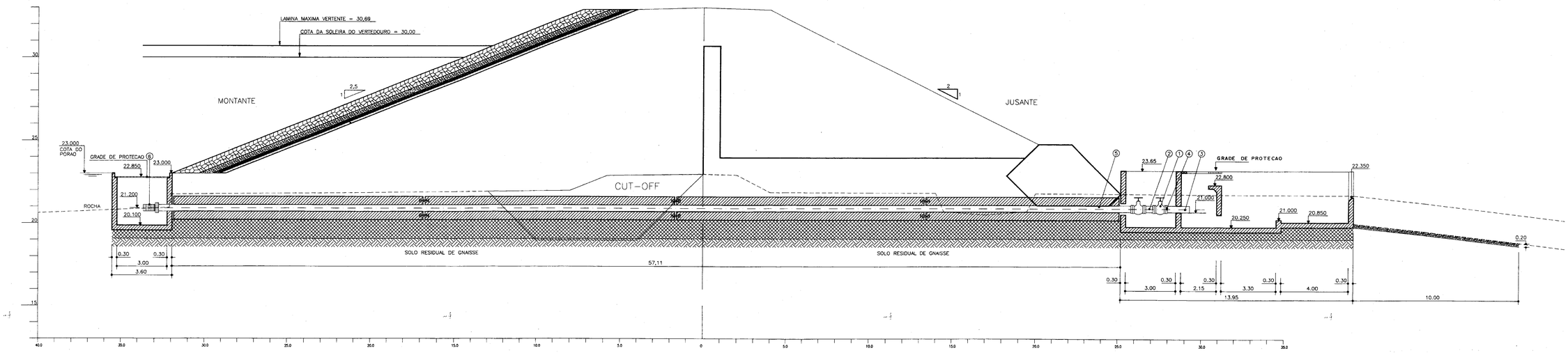
DESENHO: 07

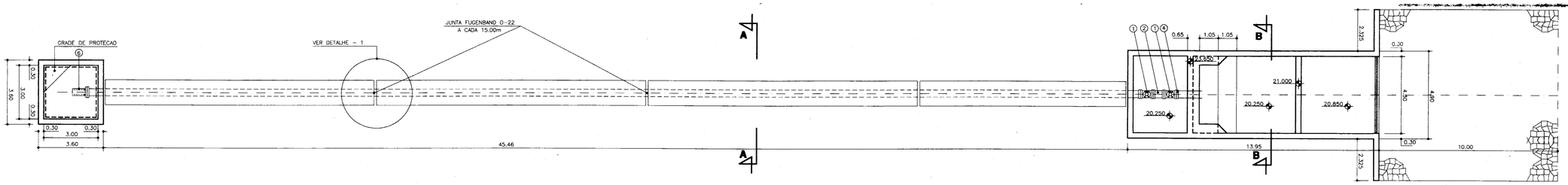
RESPONSAVEIS TECNICOS DA GEONORTE
JOSE DE RIBAMAR PINHEIRO BARBOSA – CREA CE. 2918/D

Geonorte

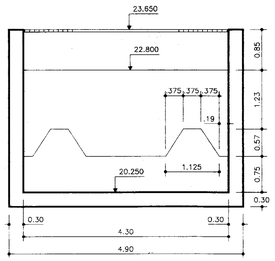
SEÇAO LONGITUDINAL
ESCALA - 1:100

ESTACA: 29
CT: 22.962
CP: 33.000

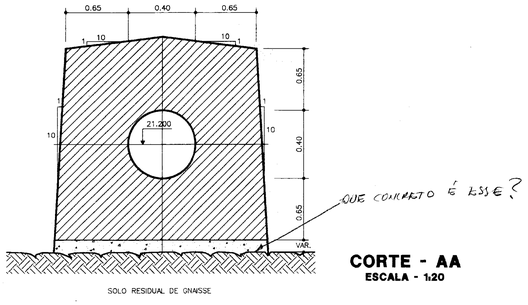




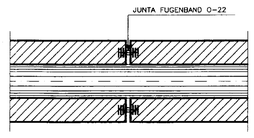
PLANTA BAIXA
ESCALA - 1:100



CORTE - BB
ESCALA - 1:50



CORTE - AA
ESCALA - 1:20



DETALHE - 1 (JUNTA FUGENBAND)
SEM ESCALA

LEGENDA

- CONCRETO ESTRUTURAL - fck = 15MPa
- CONCRETO ESTRUTURAL - fck = 12MPa
- CONCRETO SIMPLES - fck = 10MPa
- ENROCAMENTO
- EQUIPAMENTOS HIDROMECANICOS
  - (1) REGISTRO DE GAVETA C/VOLANTE E REDUTOR DN=400mm
  - (2) TOCO DE FºFº C/FLANGES, DN=400mm - L=0.50m
  - (3) TOCO DE FºFº C/FLANGES, DN=400mm - L=1.00m
  - (4) FLANGE AVULSO, DN=400mm
  - (5) TUBO FºFº JUNTA ELASTICA, DN=400mm
  - (6) CRIVO FºFº C/FLANGES, DN=400mm

000024

S.R.H - SECRETARIA DE RECURSOS HIDRICOS

BACIA HIDROGRAFICA DO RIO CATU
AQUIRAZ / CE

PROJETO BASICO
SECAO DA TOMADA D'AGUA E DETALHES

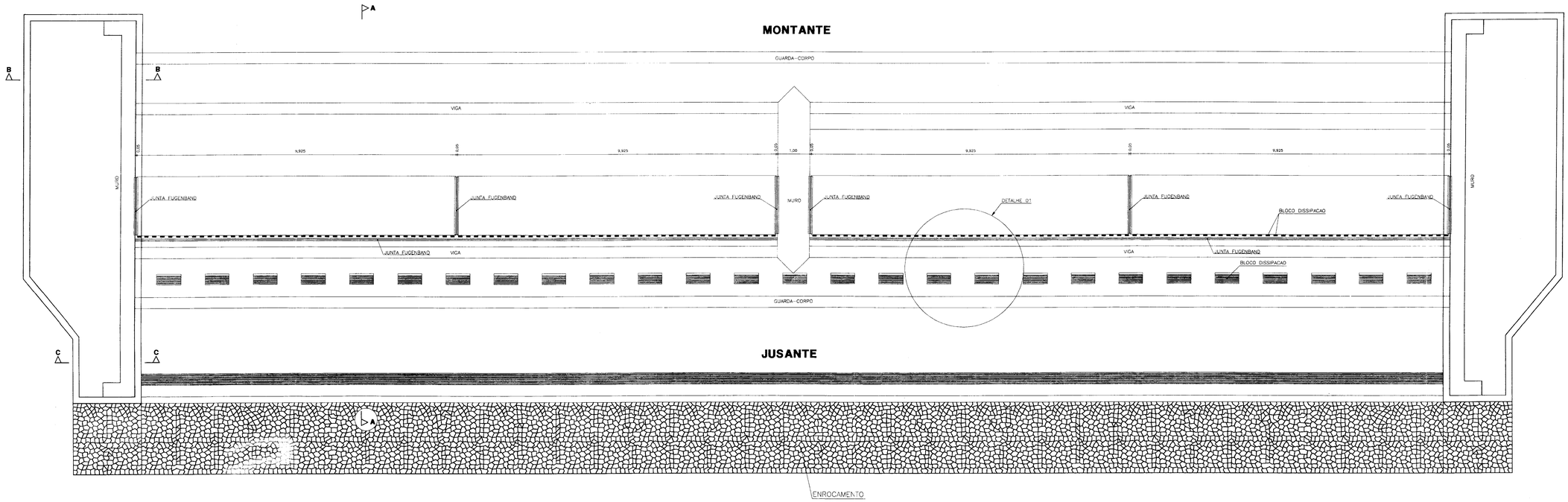
DESENHO 08

DESENHO: J.W.C.C
DATA: SET/95
ESCALA: INDICADA

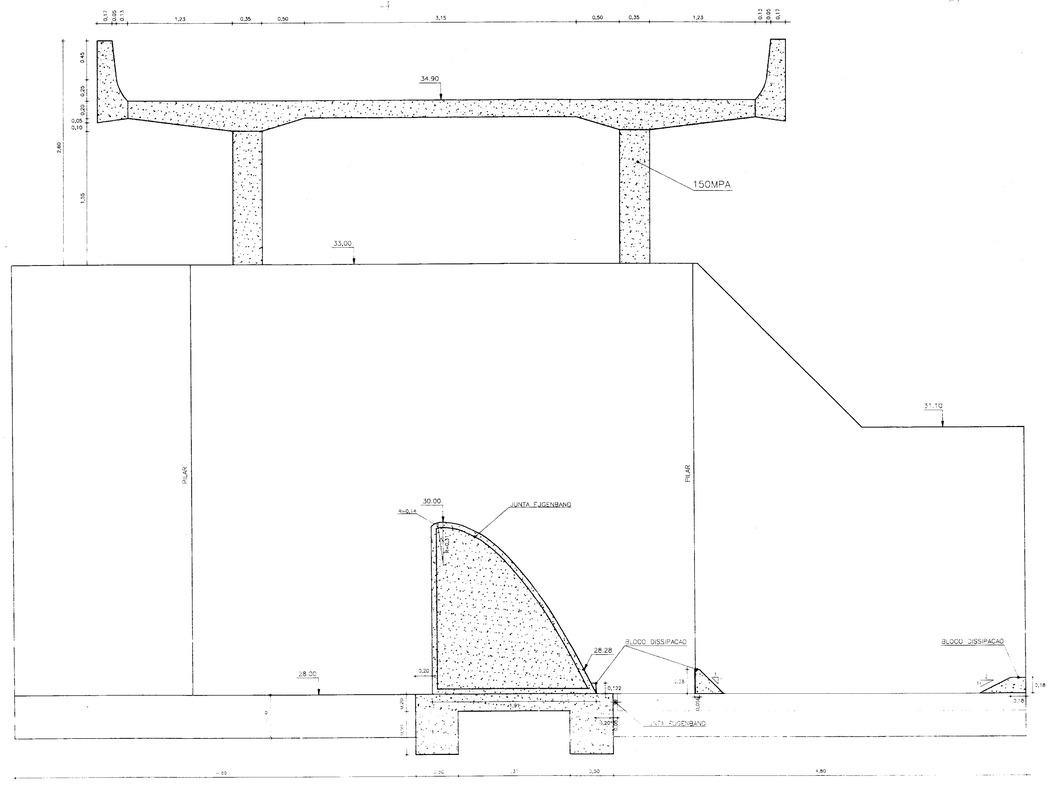
RESPONSAVEIS TECNICOS DA GEONORTE
JOSE DE RIBAMAR PINHEIRO BARBOSA - CREA CE. 2918/D

Geonorte

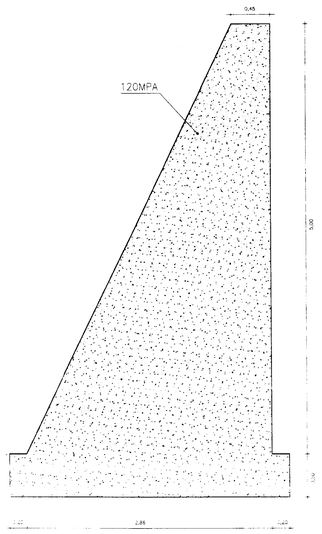
PLANTA BAIXA
ESC. 1:50



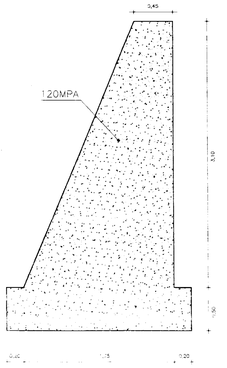
CORTE AA"
ESC. 1:25



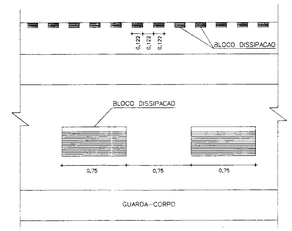
CORTE BB"
ESC. 1:25



CORTE CC"
ESC. 1:25



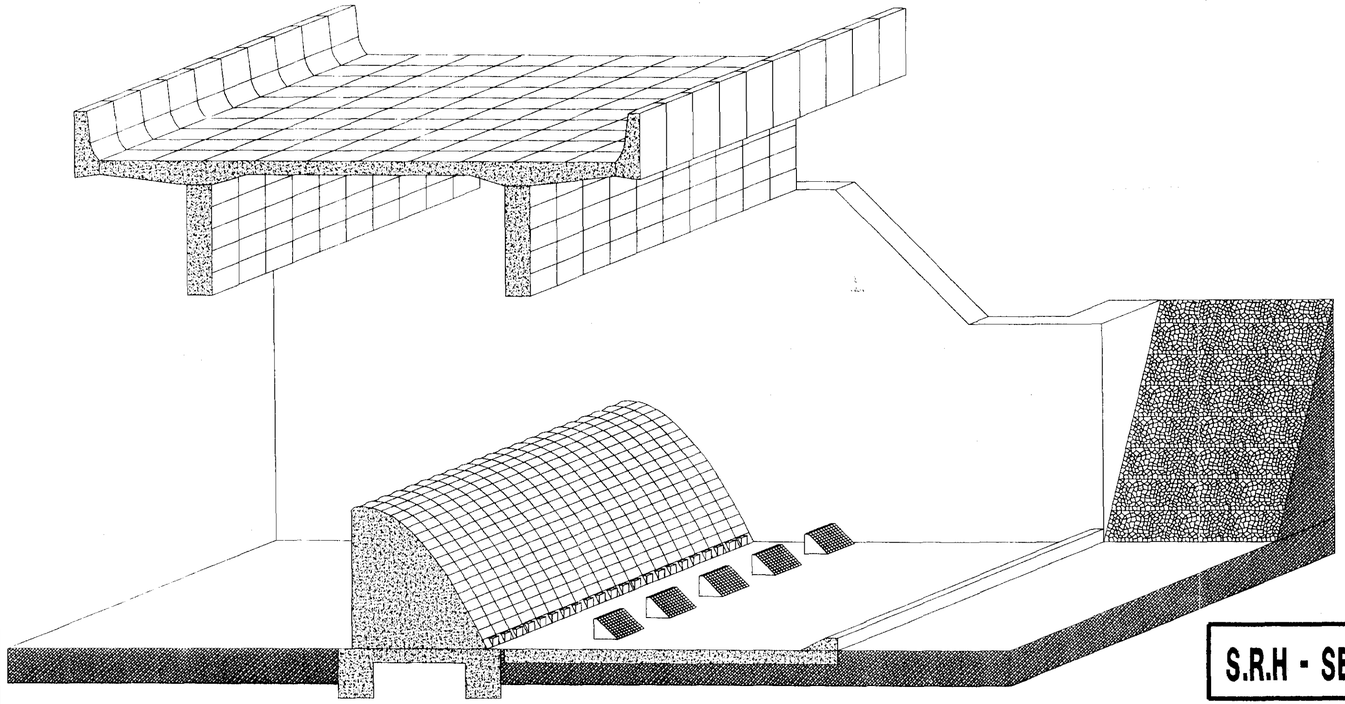
DETALHE 01
ESC. 1:25



000025

S.R.H - SECRETARIA DE RECURSOS HIDRICOS

BACIA HIDROGRAFICA DO RIO CATU AQUIRAZ / CE	DESENHO: J.W.C.C DATA: SET/95 ESCALA: INDICADA
PROJETO BASICO PLANTA BAIXA DO VERTEDOURO E DETALHES	DESENHO: 09
RESPONSAVEIS TECNICOS DA GEONORTE JOSE DE RIBAMAR PINHEIRO BARBOSA - CREA CE. 2913/D	Geonorte



000026

S.R.H - SECRETARIA DE RECURSOS HIDRICOS

BACIA HIDROGRAFICA DO RIO CATU
AQUIRAZ / CE

PROJETO BASICO
PERSPECTIVA DO CANAL VERTEDOURO

DESENHO 10

DESENHO: J.W.C.C

DATA: SET/95

ESCALA:

RESPONSAVEIS TECNICOS DA GEONORTE

JOSE DE RIBAMAR PINHEIRO BARBOSA - CREA CE. 2918/D

Geonorte

ELEMENTOS TOPOGRÁFICOS

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

- Projeto Geométrico Horizontal da Barragem

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

GEONORTE LTDA DIA 21-09-95 HORA 22 59 13 FOLHA No 001

CLIENTE .. 005 SRH - SECRET. DE RECURSOS HIDRICOS TRECHO : 01 T-204/95
OBRA : 001 BARRAGEM CINZENTA LOCAL AQUIRAZ-CE

PROJETO GEOMETRICO HORIZONTAL *SUB-TRECHO .. 11 PROJETO EIXO - 1*

NOME	ESTACA	NORTE	ESTE	LINHA	RAIO	EXTENSAO
AO=0	0	100000 000	50000 000			
				TANGENTE	-	900 000
PC1	45	100900 000	50000 000			
				CIRCULAR	144 235	78.039
PT1	48+18 039	100974 287	50020 602			
				TANGENTE	-	144 000
PAA+4	56-2 039	101097 719	50094 767			

GEONORTE LTDA topoGRAPH

- Projeto Geométrico Vertical da Barragem

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

GEONORTE LTDA DIA.. 21-09-95 HORA 22 59 57 FOLHA No 001

CLIENTE . 005 SRH - SECRET DE RECURSOS HIDRICOS TRECHO 01 T-204/95
OBRA 001 BARRAGEM CINZENTA LOCAL . AQUIRAZ-CE

PROJETO GEOMETRICO VERTICAL

SUB-TRECHO : 11 PROJETO EIXO - 1

NOME	ESTACA	COTA	RAMPA (%)	RAIO VERTICAL	EXTENSAO
PO	51+9 000	33 000			
			0 00000	-	731 000
PCV1	48	33 000			
			PARABOLA	1252 632	40 000
PTV1	50	33 639			
			1 [illegible]328	-	39 500
PCV2	51+19 500	34 000			
			PARABOLA	-0 001	0 000
PTV2	51+19 500	34 000			
			0 00000	-	40 500
PCV3	53+20 000	34 000			
			PARABOLA	0 001	0 000
PTV3	54	34 000			
			0 23787	-	42 039
P4	56+2 039	35 000			

GEONORTE LTDA topoGRAPH

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

- Projeto Geométrico Horizontal do Vertedouro

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

GEONORTE LTDA DIA 21-09-95 HORA 23 00 49 FOLHA No 001

CLIENTE . . 005 SRH - SECRET DE RECURSOS HIDRICOS TRECHO . 01 T-204/95
OBRA . 001 BARRAGEM CINZENTA LOCAL . AQUIRAZ-CE

PROJETO GEOMETRICO HORIZONTAL SUB-TRECHO : 13 VERTEDOURO

NOME	ESTACA	NORTE	ESTE	LINHA	RAIO	EXTENSAO
P1	0	101034 495	49931 860			
				TANGENTE	-	57 250
PC2	2+17 250	101073 668	49973 610			
				CIRCULAR	26 404	34 233
PT2	4+11 483	101027 049	50005 319			
				TANGENTE	-	141 541
PC3	11+13 324	101003 739	50126 761			
				CIRCULAR	57 383	38 489
PT3	13+11 813	100974 654	50150 876			
				TANGENTE	-	33 [illegible]
P4	15+1 872	100946 502	50161 384			

GEONORTE LTDA topoGRAPH

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

- Projeto Geométrico Vertical do Vertedouro

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

GEONORTE LTDA DIA 21-09-95 HORA 23 01 31 FOLHA No 001

CLIENTE 005 SRH - SECRET DE RECURSOS HIDRICOS TRECHO 01 T-204/95
OBRA : 001 BARRAGEM CINZENTA LOCAL AQUIRAZ-CE

PROJETO GEOMETRICO VERTICAL *SUB-TRECHO 13 VERTEDOURO*

NOME	ESTACA	COTA	RAMPA (%)	RAIO VERTICAL	EXTENSAO
P1	0	28 000			
			0 00000	-	301 872
P2	15+1 872	28 000			

GEONORTE LTDA topoGRAPH

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

- Cubação da Barragem

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

GEONORTE LTDA DIA 21-09-95 HORA 22:51:53 FOLHA No 001

CLIENTE..: 005 SRH - SECRET. DE RECURSOS HIDRICOS TRABALHO .. 01 T-204/95
OBRA .. 001 BARRAGEM CINZENTA LOCAL AQUIRAZ-CE

VOLUME: TERRENO X PROJETO REFERENCIA 11 PROJETO EIXO - 1

ESTACA	AREAS CORTE	AREAS ATERRO	AREAS ACUM CORTE	AREAS ACUM ATERRO	SEMI DISTANCIA	VOLUMES CORTE	VOLUMES ATERRO	VOLUMES ACUM CORTE	VOLUMES ACUM ATERRO
11+0.000	0.3	0.1	0.3	0.1					
					5.5	1.7	13.2	1.7	13.2
12	0.0	2.3	0.3	2.4					
					10.0	3.0	110.0	1.7	123.2
13	0.0	8.7	0.3	11.1					
					10.0	0.0	255.0	1.7	378.2
14	0.0	16.8	0.3	27.9					
					10.0	0.0	458.0	1.7	836.2
15	0.0	29.0	0.3	56.9					
					10.0	0.0	730.0	1.7	1566.2
16	0.0	44.0	0.3	100.9					
					8.0	2.0	1080.0	1.7	2646.2
17	0.0	64.0	0.3	164.9					
					10.0	0.0	1521.0	1.7	4167.2
18	0.0	88.1	0.3	253.0					
					10.0	0.0	2080.0	1.7	6247.2
19	0.0	119.9	0.3	372.9					
					10.0	0.0	2752.0	1.7	8999.2
20	0.0	155.3	0.3	528.2					
					10.0	0.0	3449.0	1.7	12448.2
21	0.0	189.6	0.3	717.8					
					10.0	0.0	4165.0	1.7	16613.2
22	0.0	226.9	0.3	944.7					
					10.0	0.0	4984.0	1.7	21597.2
23	0.0	271.6	0.3	1216.2					
					10.0	0.0	5896.0	1.7	27493.2
24	0.0	318.1	0.3	1534.3					
					10.0	0.0	6503.0	1.7	33996.2
25	0.0	332.2	0.3	1866.5					
					10.0	0.0	6831.0	1.7	40827.2
26	0.0	359.9	0.3	2227.4					
					8.0	2.0	6594.0	1.7	47421.2
26+17.570	0.0	393.9	0.3	2611.3					
					1.2	0.0	912.0	1.7	48293.4
27	0.0	366.4	0.3	2977.4					
					10.0	0.0	7279.0	1.7	55572.4
28	0.0	361.8	0.3	3339.2					
					10.0	1.0	7206.0	1.7	62778.4
29	1.0	358.8	0.3	3698.1					
					10.0	0.0	7215.0	1.7	69993.4
30	0.0	352.7	0.3	4050.7					
					10.0	0.0	7826.0	1.7	76819.4
31	0.0	349.3	0.3	4400.0					

GEONORTE LTDA topoGRAPH

GEONORTE LTDA DIA 21-09-95 HORA 22 51 55 FOLHA No 002

CLIENTE 005 SRH - SECRET DE RECURSOS HIDRICOS TRABALHO 01 0-204/95
OBRA 001 BARRAGEM CINZENTA LOCAL AQUIRAZ-CE

VOLUME: TERRENO X PROJETO REFERENCIA 01 PROJETO EIXO - I

ESTACA	AREAS CORTE	AREAS ATERRO	AREAS ACUM CORTE	AREAS ACUM ATERRO	SEMI DISTANCIA	VOLUMES CORTE	VOLUMES ATERRO	VOLUMES ACUM CORTE	VOLUMES ACUM ATERRO
					10 0	0 0	6942 0	1 7	83911 4
32	0 0	349 3	0 3	4749 9					
					10 0	0 0	6952 0	1 7	90863 4
33	0 0	345 9	0 3	5095 8					
					10 0	0 0	6883 0	1 7	97746 4
34	0 0	342 4	0 3	5438 2					
					10 0	0 0	6760 0	1 7	104506 4
35	0 0	333 6	0 3	5771 8					
					10 0	0 0	6522 0	1 7	111028 4
36	0 0	318 6	0 3	6090 4					
					10 0	0 0	6276 0	1 7	117304 4
37	0 0	309 0	0 3	6399 4					
					10 0	0 0	6073 0	1 7	123377 4
38	0 0	298 3	0 3	6697 7					
					10 0	0 0	5747 0	1 7	129124 4
39	0 0	276 4	0 3	6974 1					
					10 0	0 0	5322 0	1 7	134446 4
40	0 0	255 8	0 3	7229 9					
					10 0	0 0	4896 0	1 7	139342 4
41	0 0	233 8	0 3	7463 7					
					10 0	0 0	4477 0	1 7	143819 4
42	0 0	213 9	0 3	7677 5					
					10 0	0 0	4064 0	1 7	147883 4
43	0 0	192 5	0 3	7870 1					
					10 0	0 0	3638 0	1 7	151521 4
44	0 0	171 3	0 3	8041 4					
					10 0	0 0	3232 0	1 7	154753 4
45	0 0	151 9	0 3	8193 3					
					10 0	0 0	2864 0	1 7	157617 4
46	0 0	134 5	0 3	8327 8					
					10 0	0 0	2430 0	1 7	160047 4
47	0 0	103 5	0 3	8431 3					
					10 0	0 0	1774 0	1 7	161821 4
48	0 0	68 9	0 3	8500 2					
					10 0	0 0	1021 0	1 7	162842 4
49	0 0	33 2	0 3	8538 4					
					10 0	0 0	512 0	1 7	163354 4
50	0 0	18 0	0 3	8556 4					
					10 0	0 0	391 0	1 7	163745 4
51	0 0	21 1	0 3	8577 5					
					6 5	0 0	373 2	1 7	164118 6
51+17 000	0 0	22 8	0 3	8600 3					
					3 5	0 0	68 4	1 7	164187 0
52	0 0	22 8	0 3	8623 1					

GEONORTE LTDA topoGRAPH

GEONORTE LTDA DIA 21-09-95 HORA 22 52 36 FOLHA No 003

CLIENTE : 005 SRH - SECRET DE RECURSOS HIDRICOS TRABALHO 01 T-204/95
OBRA 001 BARRAGEM CINZENTA LOCAL AQUIRAZ-CE

VOLUME: TERRENO X PROJETO REFERENCIA . 11 PROJETO EIXO - 1

ESTACA	AREAS CORTE	AREAS ATERRO	AREAS ACUM CORTE	AREAS ACUM ATERRO	SEMI DISTANCIA	VOLUMES CORTE	VOLUMES ATERRO	VOLUMES ACUM CORTE	VOLUMES ACUM ATERRO
					10 0	0 0	377 0	1 7	164564 0
53	0 0	14 9	0 3	8638 0					
					10 0	0 0	246 0	1 7	164810 0
54	0 0	9 7	0 3	8647 7					
					10 0	0 0	215 0	1 7	165025 0
55	0 0	11 8	0 3	8659 5					
					10 0	38 0	20 0	39 7	165145 0
56	3 8	0 2	4 1	8659 7					

AREA TOTAL DE CORTE 4 1 m2
AREA TOTAL DE ATERRO 8659 7 m2

VOLUME TOTAL DE CORTE 39 7 m3
VOLUME TOTAL DE ATERRO 165145 0 m3

GEONORTE LTDA topoGRAPH

GEONORTE - Engenharia de Solos e Fundações Ltda.
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

- Cubação do Vertedouro

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
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GEONORTE LTDA DIA 21-09-95 HORA 22 55 48 FOLHA No 001

CLIENTE : 005 SRH - SECRET DE RECURSOS HIDRICOS TRABALHO . 01 T-204/95
OBRA 001 BARRAGEM CINZENTA LOCAL AQUIRAZ-CE

VOLUME: TERRENO X PROJETO REFERENCIA 13 VERTEDOURO

ESTACA	AREAS CORTE	AREAS ATERRO	AREAS ACUM CORTE	AREAS ACUM ATERRO	SEMI DISTANCIA	VOLUMES CORTE	VOLUMES ATERRO	VOLUMES ACUM CORTE	VOLUMES ACUM ATERRO
0	[illegible] 0	0 0	5 0	0 0					
					10 0	333 0	0 0	333 0	0 0
1	28 3	0 0	33 3	0 0					
					10 0	911 0	0 0	1244 0	0 0
2	62 8	0 0	96 1	0 0					
					9 6	1241 8	0 0	2485 8	0 0
2+[illegible] 250	81 6	0 0	177 7	0 0					
					1 4	233 1	0 0	2718 9	0 0
3	84 9	0 0	262 6	0 0					
					10 0	2010 3	0 0	4728 9	0 0
4	116 1	0 0	378 7	0 0					
					5 7	1430 7	0 0	6159 5	0 0
4+11 493	134 9	0 0	513 6	0 0					
					4 3	1193 3	0 0	7352 9	0 0
5	142 6	0 0	656 2	0 0					
					10 0	3018 0	0 0	10370 9	0 0
6	159 2	0 0	815 4	0 0					
					10 0	3692 0	0 0	14062 9	0 0
7	210 0	0 0	1025 4	0 0					
					10 0	4295 0	0 0	18357 9	0 0
8	219 5	0 0	1244 9	0 0					
					10 0	4357 0	0 0	22714 9	0 0
9	216 2	0 0	1461 1	0 0					
					10 0	4157 0	0 0	26871 3	0 0
10	199 5	0 0	1660 6	0 0					
					10 0	3701 0	0 0	30572 9	0 0
11	170 6	0 0	1831 2	0 0					
					6 7	2101 1	0 0	32674 0	0 0
11+13 324	143 0	0 0	1974 2	0 0					
					3 3	863 0	0 0	33537 0	0 0
12	127 6	0 0	2101 8	0 0					
					[illegible]	[illegible]	0 0	[illegible]	0 0
13	82 1	0 0	2183 9	0 0					
					[illegible]	831 1	0 0	[illegible]	0 0
13+1 813	58 9	0 0	2242 7	0 0					
					4 1	476 2	0 0	36911 5	0 0
14	42 7	0 0	2285 4	0 0					
					10 0	482 0	0 0	37393 5	0 0
15	5 5	0 0	2290 9	0 0					

AREA TOTAL DE CORTE 2290 9 m2
AREA TOTAL DE ATERRO 0 0 m2

VOLUME TOTAL DE CORTE 37393 5 m3
VOLUME TOTAL DE ATERRO 0 0 m3

GEONORTE LTDA topoGRAPH

ANEXO E - ESTUDOS HIDROLÓGICOS

GEONORTE - Engenharia de Solos e Fundações Ltda
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SUMÁRIO

– Análise de Frequência dos Totais anuais

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
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- Análise de Freqüência dos Totais Anuais

ESTAÇÃO: 2873824

SAMPLE SIZE = 47

STATISTICS OF THE OBSERVED VALUES

MEAN = 1532.17 STD. DEV. = 607.27 COEF. OF SKEW = .3819

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 7.24990 STD. DEV. = .43240 COEF. OF SKEW. = -.5642

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 3.14859 STD. DEV. = .18777 COEF. OF SKEW. = -.5582

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2 00	1532 18	1407 97	1494 19	1437 20	1315 89	1493 68	1465 87
3 33	1661 15	1521 57	1603 09	1548 65	1424 57	1603 02	1579 94
5 00	2048 05	2032 91	2032 25	2032 84	2011 01	2033 67	2044 19
10 00	2321 76	2470 35	2342 02	2427 20	2662 96	2343 76	2385 56
20 00	2551 57	2909 53	2616 05	2805 49	3486 13	2617 19	2685 81
50 00	2815 71	3511 61	2947 62	3295 14	4940 38	2946 56	3041 29
100 00	2955 80	3992 04	3184 33	3662 06	6415 44	3180 57	3287 07
200 00	3163 90	4499 65	3413 43	4027 64	8322 95	3406 07	3516 99
500 00	3373 44	5219 93	3708 96	4509 97	11733 52	3695 41	3800 35
1000 00	3522 25	5807 52	3929 31	4874 50	15210 83	3909 95	4001 08

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	14286	883 88	887 39	894 83	894 73	894 28	901 29	891 69
2	28571	1188 49	1102 33	1166 42	1126 16	1054 48	1173 16	1068 39
3	42857	1422 86	1302 53	1387 38	1331 67	1220 64	1395 02	1244 20
4	57143	1641 49	1521 93	1603 44	1549 65	1425 60	1612 19	1449 77
5	71429	1875 86	1790 33	1846 20	1817 00	1724 53	1856 21	1729 17
6	85714	2180 47	2233 92	2179 92	2227 22	2309 53	2191 18	2212 96
7	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		9 447	3 787	8 851	3 787	3 191	7 957	2 000

95% CHI-SQUARE TEST STATISTIC =12 596

RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2.00	1446.05
2.33	1560.44
5.00	2047.92
10.00	2417.66
20.00	2763.38
50.00	3155.24
100.00	3513.00
200.00	3817.97
500.00	4217.83
1000.00	4516.39

WEIGHTED SKEW CHI-SQUARE VALUE 4.979

COMPUTED SKEW (LOG10)= -.5582

REGIONAL SKEW (LOG10)= .000

WEIGHTED SKEW (LOG10)= -.3717

MEAN SQUARE ERROR OF LOG10 SKEW= .1515

MEAN SQUARE ERROR OF REGIONAL SKEW= .3020

MONTH	DAY	WAT YR	PEAK VALUE ( )	RANK	RETURN PERIOD WEIBULL	HAZEN	GRINGORTEN	CHEGODAYEV	CUNNANE
0	0	0	2489.60	5	9.60	10.44	10.33	10.09	10.26
0	0	0	1712.70	18	2.67	2.69	2.68	2.68	2.68
0	0	0	1824.10	16	3.00	3.03	3.03	3.02	3.03
0	0	0	443.20	47	1.02	1.01	1.01	1.01	1.01
0	0	0	1526.40	22	2.18	2.19	2.19	2.18	2.19
0	0	0	2631.70	3	16.00	18.80	18.41	17.56	18.15
0	0	0	1608.30	21	2.29	2.29	2.29	2.29	2.29
0	0	0	510.60	46	1.04	1.03	1.03	1.04	1.04
0	0	0	1735.50	17	2.82	2.85	2.85	2.84	2.84
0	0	0	2491.70	4	12.00	13.43	13.24	12.81	13.11
0	0	0	1685.90	19	2.53	2.54	2.54	2.53	2.54
0	0	0	1402.20	23	2.09	2.09	2.09	2.09	2.09
0	0	0	1962.90	11	4.36	4.48	4.46	4.43	4.45
0	0	0	1354.10	27	1.78	1.77	1.77	1.78	1.77
0	0	0	1066.10	37	1.30	1.29	1.29	1.29	1.29
0	0	0	1363.40	24	2.00	2.00	2.00	2.00	2.00
0	0	0	858.00	43	1.12	1.11	1.11	1.11	1.11
0	0	0	1087.30	33	1.45	1.45	1.45	1.45	1.45
0	0	0	727.90	44	1.09	1.08	1.08	1.08	1.08
0	0	0	1866.10	15	3.20	3.24	3.24	3.22	3.23
0	0	0	1355.60	26	1.85	1.84	1.84	1.84	1.84
0	0	0	928.60	42	1.14	1.13	1.13	1.14	1.13
0	0	0	1085.50	34	1.41	1.40	1.40	1.41	1.40
0	0	0	1151.70	31	1.55	1.54	1.54	1.54	1.54
0	0	0	1901.40	13	3.69	3.76	3.75	3.73	3.75
0	0	0	2319.80	6	8.00	8.55	8.47	8.32	8.43
0	0	0	1299.60	29	1.66	1.65	1.65	1.65	1.65
0	0	0	988.50	40	1.20	1.19	1.19	1.19	1.19
0	0	0	1898.70	14	3.43	3.48	3.47	3.46	3.47
0	0	0	1079.00	35	1.37	1.36	1.36	1.37	1.36
0	0	0	1652.60	20	2.40	2.41	2.41	2.41	2.41
0	0	0	994.90	39	1.23	1.22	1.22	1.22	1.22
0	0	0	2318.40	7	6.86	7.23	7.18	7.07	7.15
0	0	0	2235.30	8	6.00	6.27	6.23	6.16	6.21
0	0	0	2812.80	1	48.00	94.00	84.14	67.71	78.67
0	0	0	1950.60	12	4.00	4.09	4.08	4.05	4.07
0	0	0	1362.70	25	1.92	1.92	1.92	1.92	1.92
0	0	0	1963.60	10	4.80	4.95	4.93	4.89	4.92
0	0	0	1323.90	28	1.71	1.71	1.71	1.71	1.71
0	0	0	1074.50	36	1.33	1.32	1.33	1.33	1.33
0	0	0	978.30	41	1.17	1.16	1.16	1.16	1.16
0	0	0	1045.90	38	1.26	1.25	1.25	1.26	1.26
0	0	0	1130.00	32	1.50	1.49	1.49	1.50	1.49
0	0	0	609.80	45	1.07	1.06	1.06	1.06	1.06
0	0	0	2784.50	2	24.00	31.33	30.21	27.88	29.50
0	0	0	2227.50	9	5.33	5.53	5.50	5.45	5.49
0	0	0	1190.80	30	1.60	1.59	1.59	1.60	1.59

ESTAÇÃO: 2882188

SAMPLE SIZE = 51

STATISTICS OF THE OBSERVED VALUES

MEAN = 1110.86 STD. DEV. = 377.61 COEF. OF SKEW = .4614

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 6.95431 STD. DEV. = .35161 COEF. OF SKEW. = -.2490

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 3.02022 STD. DEV. = .15272 COEF. OF SKEW. = -.2579

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2 00	1110 87	1047 66	1082 54	1051 59	991 40	1082 00	1063 03
3 33	1178 60	1115 86	1150 03	1120 49	1057 09	1149 86	1131 46
5 00	1431 41	1412 02	1418 79	1419 84	1396 89	1420 02	1416 50
10 00	1601 27	1654 00	1615 33	1663 65	1752 90	1616 94	1635 68
20 00	1743 71	1888 57	1790 79	1897 52	2179 38	1791 96	1837 47
50 00	1907 15	2199 00	2004 89	2200 24	2889 00	2004 23	2089 93
100 00	2018 37	2438 95	2158 85	2427 09	3568 47	2155 86	2274 79
200 00	2122 03	2686 10	2308 67	2653 10	4404 34	2302 53	2456 74
500 00	2250 39	3027 10	2503 03	2951 29	5813 86	2491 41	2695 02
1000 00	2342 42	3297 94	2648 69	3176 66	7171 32	2631 90	2874 75

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	14286	707 73	719 78	716 75	716 22	725 49	731 37	721 86
2	28571	897 15	858 61	881 26	859 30	828 87	896 77	850 53
3	42857	1042 89	983 40	1016 64	986 35	932 97	1033 57	969 65
4	57143	1178 94	1116 11	1150 27	1121 12	1057 70	1168 98	1100 02
5	71429	1324 57	1278 32	1301 97	1286 40	1233 68	1322 42	1264 63
6	85714	1513 99	1524 89	1512 66	1540 01	1562 29	1535 35	1526 06
7	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		4 039	2 667	4 314	2 392	4 314	3 765	4 314

95% CHI-SQUARE TEST STATISTIC =12 596

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RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2 00	1059 08
2 33	1127 51
5 00	1415 65
10 00	1640 77
20 00	1850 88
50 00	2117 68
100 00	2315 88
200 00	2513 31
500 00	2775 48
1000 00	2975 96

WEIGHTED SKEW CHI-SQUARE VALUE: 4 314

COMPUTED SKEW (LOG10)= - 2579

REGIONAL SKEW (LOG10)= 000

WEIGHTED SKEW (LOG10)= - 1853

MEAN SQUARE ERROR OF LOG10 SKEW= 1183

MEAN SQUARE ERROR OF REGIONAL SKEW= 3020

MONTH	DAY	WAT	YR	PEAK VALUE ( )	RANK	RETURN PERIOD WEIBULL	HAZEN	GRINGORTEN	CHEGODAYEV	CUNNANE
	0	0		1920 70	2	26 00	34 00	32 77	30 24	32 00
	0	0		1245 50	18	2 89	2 91	2 91	2 90	2 91
	0	0		919 90	35	1 49	1 48	1 48	1 48	1 48
	0	0		1818 10	3	17 33	20 40	19 97	19 04	19 69
	0	0		1093 40	23	2 26	2 27	2 27	2 26	2 27
	0	0		1142 80	20	2 60	2 62	2 61	2 61	2 61
	0	0		1137 20	21	2 48	2 49	2 49	2 48	2 49
	0	0		787 80	39	1 33	1 32	1 33	1 33	1 33
	0	0		1128 30	22	2 36	2 37	2 37	2 37	2 37
	0	0		752 70	42	1 24	1 23	1 23	1 23	1 23
	0	0		916 20	37	1 41	1 40	1 40	1 40	1 40
	0	0		566 60	48	1 08	1 07	1 07	1 08	1 08
	0	0		1071 80	25	2 08	2 08	2 08	2 08	2 08
	0	0		1621 10	7	7 43	7 85	7 79	7 67	7 76
	0	0		1423 70	11	4 73	4 86	4 84	4 80	4 83
	0	0		516 40	50	1 04	1 03	1 03	1 03	1 03
	0	0		1278 90	15	3 47	3 52	3 51	3 50	3 51
	0	0		1545 30	8	6 50	6 80	6 76	6 68	6 74
	0	0		1394 90	12	4 33	4 43	4 42	4 39	4 41
	0	0		1289 90	14	3 71	3 78	3 77	3 75	3 76
	0	0		485 20	51	1 02	1 01	1 01	1 01	1 01
	0	0		757 80	41	1 27	1 26	1 26	1 26	1 26
	0	0		1044 00	27	1 93	1 92	1 92	1 93	1 92
	0	0		647 00	46	1 13	1 12	1 12	1 12	1 12
	0	0		1059 00	26	2 00	2 00	2 00	2 00	2 00
	0	0		635 50	47	1 11	1 10	1 10	1 10	1 10
	0	0		917 90	36	1 44	1 44	1 44	1 44	1 44
	0	0		713 00	44	1 18	1 17	1 17	1 18	1 17
	0	0		1037 90	29	1 79	1 79	1 79	1 79	1 79
	0	0		838 70	38	1 37	1 36	1 36	1 36	1 36
	0	0		1292 70	13	4 00	4 08	4 07	4 05	4 06
	0	0		1084 20	24	2 17	2 17	2 17	2 17	2 17
	0	0		1530 00	9	5 78	6 00	5 97	5 91	5 95
	0	0		1757 30	4	13 00	14 57	14 36	13 89	14 22
	0	0		1272 00	16	3 25	3 29	3 29	3 27	3 28
	0	0		659 30	45	1 16	1 15	1 15	1 15	1 15
	0	0		1262 30	17	3 06	3 09	3 09	3 08	3 08
	0	0		1040 70	28	1 86	1 85	1 85	1 86	1 86
	0	0		1000 50	32	1 63	1 62	1 62	1 62	1 62
	0	0		566 60	49	1 06	1 05	1 05	1 06	1 05
	0	0		1229 90	19	2 74	2 74	2 75	2 75	2 75
	0	0		726 90	43	1 21	1 20	1 20	1 20	1 20
	0	0		1718 00	5	10 40	11 33	11 21	10 94	11 13
	0	0		1980 60	1	52 00	102 00	91 29	73 43	85 33
	0	0		1435 00	10	5 20	5 37	5 35	5 30	5 33
	0	0		1010 50	31	1 68	1 67	1 67	1 67	1 67
	0	0		1660 90	6	8 67	9 27	9 19	9 02	9 14
	0	0		1015 30	30	1 73	1 73	1 73	1 73	1 73
	0	0		958 90	34	1 53	1 52	1 52	1 53	1 52
	0	0		982 60	33	1 58	1 57	1 57	1 57	1 57
	0	0		762 60	40	1 30	1 29	1 29	1 29	1 29

– Anállse de Frequência do mês mais Chuvoso

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- Análise de Frequência do Mês Mais Chuvoso

ESTAÇÃO: 2873824

SAMPLE SIZE = 51

STATISTICS OF THE OBSERVED VALUES

MEAN = 351.36 STD. DEV. = 151.72 COEF. OF SKEW = -.0984

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 5.73126 STD. DEV. = .58351 COEF. OF SKEW. = -1.4452

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2.48905 STD. DEV. = .25342 COEF. OF SKEW. = -1.4459

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2 00	351 36	308 36	353 85	327 55	281 37	353 85	352 06
2 33	376 58	342 38	326 57	355 23	312 98	380 97	384 71
5 00	480 16	506 02	223 35	475 51	497 05	480 79	500 11
10 00	548 41	657 91	152 71	573 47	724 48	546 63	565 46
20 00	605 64	819 88	92 67	667 44	1039 86	601 07	609 59
50 00	671 31	1055 44	22 85	789 07	1660 07	662 69	647 24
100 00	716 00	1253 36	-25 23	880 22	2357 01	704 12	665 20
200 00	757 65	1471 10	-70 46	971 03	3342 26	742 35	676 95
500 00	809 22	1793 82	-127 03	1090 84	5298 51	789 19	685 89
1000 00	846 20	2067 95	-167 98	1181 40	7505 75	822 44	689 29

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	14286	189 39	165 39	512 90	192 80	167 58	189 76	181 81
2	28571	265 49	221 63	438 86	250 28	209 04	263 81	214 87
3	42857	324 05	277 61	381 06	301 33	254 39	321 62	254 48
4	57143	378 68	342 51	326 48	355 48	313 28	376 21	308 79
5	71429	437 23	429 02	267 25	421 89	404 44	435 45	395 92
6	85714	513 34	574 90	189 13	523 79	598 48	513 57	585 54
7	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		3 490	15 294	211 569	5 961	29 020	3 490	29 843

95% CHI-SQUARE TEST STATISTIC =12 596

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RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2 00	329 60
2 33	364 17
5 00	509 60
10 00	619 49
20 00	716 92
50 00	832 03
100 00	910 95
200 00	983 64
500 00	1071 63
1000 00	1132 54

WEIGHTED SKEW CHI-SQUARE VALUE= 19 686

COMPUTED SKEW (LOG10)= -1 4459

REGIONAL SKEW (LOG10)= 000

WEIGHTED SKEW (LOG10)= - 6941

MEAN SQUARE ERROR OF LOG10 SKEW= 3271

MEAN SQUARE ERROR OF REGIONAL SKEW= 3020

MONTH	DAY	MAT	YR	PEAK VALUE ( )	RANK	RETURN PERIOD WEIBULL	HAZEN	GRINGORTEN	CHEGODAYEV	CUNNANE
0	0			388 60	24	2 17	2 17	2 17	2 17	2 17
0	0			298 60	33	1 58	1 57	1 57	1 57	1 57
0	0			447 30	14	3 71	3 78	3 77	3 75	3 76
0	0			132 60	46	1 13	1 12	1 12	1 12	1 12
0	0			502 60	10	5 20	5 37	5 35	5 30	5 33
0	0			320 00	29	1 79	1 79	1 79	1 79	1 79
0	0			131 60	47	1 11	1 10	1 10	1 10	1 10
0	0			93 60	49	1 06	1 05	1 05	1 06	1 05
0	0			498 30	12	4 33	4 43	4 42	4 39	4 41
0	0			539 70	5	10 40	11 33	11 21	10 94	11 13
0	0			518 60	8	6 50	6 80	6 76	6 68	6 74
0	0			412 40	19	2 74	2 76	2 75	2 75	2 75
0	0			305 20	32	1 63	1 62	1 62	1 62	1 62
0	0			404 50	20	2 60	2 62	2 61	2 61	2 61
0	0			365 70	27	1 93	1 92	1 92	1 93	1 92
0	0			508 00	9	5 78	6 00	5 97	5 91	5 95
0	0			295 40	34	1 53	1 52	1 52	1 53	1 52
0	0			152 20	45	1 16	1 15	1 15	1 15	1 15
0	0			342 30	28	1 86	1 85	1 85	1 86	1 86
0	0			209 40	40	1 30	1 29	1 29	1 29	1 29
0	0			372 30	25	2 08	2 08	2 08	2 08	2 08
0	0			429 10	16	3 25	3 29	3 29	3 27	3 28
0	0			450 50	13	4 00	4 08	4 07	4 05	4 06
0	0			393 00	22	2 36	2 37	2 37	2 37	2 37
0	0			289 00	37	1 41	1 40	1 40	1 40	1 40
0	0			525 00	6	8 67	9 27	9 19	9 02	9 14
0	0			582 90	3	17 33	20 40	19 97	19 04	19 69
0	0			434 20	15	3 47	3 52	3 51	3 50	3 51
0	0			261 30	38	1 37	1 36	1 36	1 36	1 36
0	0			500 50	11	4 73	4 86	4 84	4 80	4 83
0	0			199 00	41	1 27	1 26	1 26	1 26	1 26
0	0			521 30	7	7 43	7 85	7 79	7 67	7 76
0	0			372 20	26	2 00	2 00	2 00	2 00	2 00
0	0			309 40	30	1 73	1 73	1 73	1 73	1 73
0	0			291 60	35	1 49	1 48	1 48	1 48	1 48
0	0			544 00	4	13 00	14 57	14 36	13 89	14 22
0	0			694 40	1	52 00	102 00	91 29	73 43	85 33
0	0			289 90	36	1 44	1 44	1 44	1 44	1 44
0	0			394 10	21	2 48	2 49	2 49	2 48	2 49
0	0			427 40	17	3 06	3 09	3 09	3 08	3 08
0	0			306 30	31	1 69	1 67	1 67	1 67	1 67
0	0			103 70	48	1 08	1 07	1 07	1 08	1 08
0	0			37 70	51	1 02	1 01	1 01	1 01	1 01
0	0			161 20	44	1 18	1 17	1 17	1 18	1 17
0	0			256 40	39	1 33	1 32	1 33	1 33	1 33
0	0			85 90	50	1 04	1 03	1 03	1 03	1 03
0	0			390 80	23	2 26	2 27	2 27	2 26	2 27
0	0			423 00	18	2 89	2 91	2 91	2 90	2 91
0	0			616 00	2	26 00	34 00	32 77	30 24	32 00
0	0			194 60	43	1 21	1 20	1 20	1 20	1 20
0	0			196 20	42	1 24	1 23	1 23	1 23	1 23

ESTAÇÃO: 2882138

SAMPLE SIZE = 56

STATISTICS OF THE OBSERVED VALUES

MEAN = 264.21 STD. DEV. = 129.27 COEF. OF SKEW = -.1234

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 5.37328 STD. DEV. = .78643 COEF. OF SKEW. = -1.8771

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 2.33359 STD. DEV. = .34154 COEF. OF SKEW. = -1.8769

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2 00	264 21	215 57	266 86	243 84	190 45	266 86	269 35
2 33	287 38	248 21	243 63	267 28	219 64	289 94	300 00
5 00	373 85	420 03	155 42	369 11	408 10	374 52	401 36
10 00	431 88	597 88	94 85	452 06	675 95	429 97	449 78
20 00	480 48	803 53	43 26	531 62	1096 80	475 59	476 13
50 00	536 13	1127 35	-16 82	634 60	2052 23	526 97	492 28
100 00	573 94	1418 90	-58 24	711 77	3281 89	561 33	496 83
200 00	609 12	1757 51	-97 23	788 66	5239 37	592 91	498 18
500 00	652 59	2289 58	-146 01	890 11	9711 93	631 42	498 33
1000 00	683 70	2766 61	-181 34	966 78	15483 64	658 63	498 91

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	14286	126 20	93 10	401 71	129 75	95 13	126 89	104 49
2	28571	191 05	138 13	339 08	178 42	127 92	189 53	119 54
3	42857	240 94	187 11	290 02	221 64	166 39	238 61	140 93
4	57143	287 48	248 35	243 53	267 49	219 92	285 12	174 29
5	71429	337 36	336 42	192 94	323 72	309 62	335 74	235 13
6	85714	402 21	499 12	125 96	410 00	523 34	402 72	392 03
7	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		8 000	24 750	230 250	16 000	42 000	10 500	43 250

95% CHI-SQUARE TEST STATISTIC =12 596

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RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2 00	238 26
2 33	272 18
5 00	423 66
10 00	545 01
20 00	655 81
50 00	789 07
100 00	881 01
200 00	965 92
500 00	1063 02
1000 00	1137 98

WEIGHTED SKEW CHI-SQUARE VALUE: 38 750

COMPUTED SKEW (LOG10)= -1 8769

REGIONAL SKEW (LOG10)= 000

WEIGHTED SKEW (LOG10)= - 7763

MEAN SQUARE ERROR OF LOG10 SKEW= 4281

MEAN SQUARE ERROR OF REGIONAL SKEW= 3020

MONTH	DAY	WAT	YR	PEAK VALUE ( )	RANK	RETURN PERIOD WEIBULL	HAZEN	GRINGORTEN	CHEGODAYEV	CUNNANE
0	0		0	373 30	13	4 38	4 48	4 47	4 44	4 46
0	0		0	396 40	9	6 33	6 59	6 56	6 48	6 53
0	0		0	231 60	34	1 68	1 67	1 67	1 67	1 67
0	0		0	349 80	17	3 35	3 39	3 39	3 38	3 39
0	0		0	371 10	15	3 80	3 86	3 85	3 84	3 85
0	0		0	346 10	19	3 00	3 03	3 02	3 02	3 02
0	0		0	382 90	11	5 18	5 33	5 31	5 27	5 30
0	0		0	347 10	18	3 17	3 20	3 20	3 19	3 19
0	0		0	248 70	31	1 84	1 84	1 84	1 84	1 84
0	0		0	294 70	26	2 19	2 20	2 20	2 19	2 20
0	0		0	181 40	43	1 33	1 32	1 32	1 32	1 32
0	0		0	15 90	55	1 04	1 03	1 03	1 03	1 03
0	0		0	516 70	2	28 50	37 33	35 97	33 18	35 13
0	0		0	255 30	29	1 97	1 96	1 96	1 97	1 97
0	0		0	413 50	5	11 40	12 44	12 31	12 00	12 22
0	0		0	27 50	54	1 06	1 05	1 05	1 05	1 05
0	0		0	337 10	22	2 59	2 60	2 60	2 60	2 60
0	0		0	538 20	1	57 00	112 00	100 21	80 57	93 67
0	0		0	188 30	39	1 46	1 45	1 46	1 46	1 46
0	0		0	454 70	3	19 00	22 40	21 92	20 89	21 62
0	0		0	154 10	44	1 30	1 29	1 29	1 29	1 29
0	0		0	92 00	51	1 12	1 11	1 11	1 11	1 11
0	0		0	407 00	7	8 14	8 62	8 55	8 42	8 52
0	0		0	434 00	4	14 25	16 00	15 76	15 24	15 61
0	0		0	186 00	40	1 42	1 42	1 42	1 42	1 42
0	0		0	364 80	16	3 56	3 61	3 61	3 59	3 60
0	0		0	222 50	35	1 63	1 62	1 62	1 63	1 62
0	0		0	99 80	49	1 16	1 15	1 16	1 16	1 16
0	0		0	235 00	33	1 73	1 72	1 72	1 72	1 72
0	0		0	239 90	32	1 78	1 78	1 78	1 78	1 78
0	0		0	341 00	21	2 71	2 73	2 73	2 72	2 73
0	0		0	13 50	56	1 02	1 01	1 01	1 01	1 01
0	0		0	128 30	47	1 21	1 20	1 21	1 21	1 21
0	0		0	182 70	42	1 36	1 35	1 35	1 35	1 35
0	0		0	399 30	8	7 13	7 47	7 42	7 32	7 39
0	0		0	308 10	25	2 28	2 29	2 29	2 28	2 28
0	0		0	310 10	24	2 39	2 38	2 38	2 38	2 38
0	0		0	407 10	6	9 50	10 18	10 09	9 89	10 04
0	0		0	376 70	12	4 75	4 87	4 85	4 82	4 84
0	0		0	136 30	46	1 24	1 23	1 23	1 23	1 23
0	0		0	318 30	23	2 48	2 49	2 49	2 48	2 49
0	0		0	276 60	27	2 11	2 11	2 11	2 11	2 11
0	0		0	341 20	20	2 85	2 87	2 87	2 86	2 87
0	0		0	104 40	48	1 19	1 19	1 18	1 18	1 18
0	0		0	249 50	30	1 90	1 90	1 90	1 90	1 90
0	0		0	205 80	37	1 54	1 53	1 54	1 54	1 54
0	0		0	372 00	14	4 07	4 15	4 14	4 12	4 13
0	0		0	396 00	10	5 70	5 89	5 87	5 81	5 85
0	0		0	267 10	28	2 04	2 04	2 04	2 04	2 04
0	0		0	211 50	36	1 58	1 58	1 58	1 58	1 58
0	0		0	154 10	45	1 27	1 26	1 26	1 26	1 26
0	0		0	189 10	38	1 50	1 49	1 49	1 50	1 49
0	0		0	93 80	50	1 14	1 13	1 13	1 13	1 13
0	0		0	61 90	53	1 08	1 07	1 07	1 07	1 07
0	0		0	62 60	52	1 10	1 09	1 09	1 09	1 09
0	0		0	183 10	41	1 39	1 38	1 38	1 39	1 38

– Análise de Frequência de Séries de Máximas Diárias

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- Análise de Freqüência da Série de Maximos Diários

ESTAÇÃO: 2873824

SAMPLE SIZE = 51

STATISTICS OF THE OBSERVED VALUES

MEAN = 11.01 STD. DEV. = 15.22 COEF. OF SKEW = 2.5919

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 1.68453 STD. DEV. = 1.20041 COEF. OF SKEW. = .3201

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = 73158 STD. DEV. = .52133 COEF. OF SKEW. = .3201

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2 00	11 01	5 39	6 99	8 62	4 46	5 59	5 06
2 33	13 74	6 68	9 08	11 40	5 56	7 57	6 28
5 00	23 92	14 93	19 46	23 46	14 39	18 56	14 59
10 00	30 77	25 62	29 49	33 28	31 24	29 75	26 60
20 00	36 51	40 30	40 49	42 70	65 71	41 93	44 96
50 00	43 09	67 75	56 98	54 90	172 02	59 46	84 12
100 00	47 57	96 49	71 20	64 04	353 80	73 79	130 82
200 00	51 75	134 15	87 16	73 15	725 76	89 03	199 66
500 00	56 92	201 74	111 35	85 16	1872 71	110 66	342 20
1000 00	60 63	270 31	132 34	94 24	3833 61	128 11	508 89

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	14286	00	1 50	00	00	1 54	00	1 51
2	28571	2 40	2 73	1 80	87	2 42	59	2 61
3	42857	8 27	4 34	5 13	5 99	3 63	2 43	4 06
4	57143	13 75	6 69	9 09	11 42	5 57	5 45	6 24
5	71429	19 62	10 63	14 52	18 08	9 42	10 50	10 07
6	85714	27 25	19 42	23 97	28 30	21 09	20 44	19 33
7	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		30 110	1 569	18 589	68 275	4 314	25 725	2 667

95% CHI-SQUARE TEST STATISTIC =12 596

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RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2 00	5 15
2 33	6 39
5 00	14 71
10 00	26 35
20 00	43 62
50 00	79 10
100 00	113 85
200 00	177 91
500 00	293 22
1000 00	422 57

WEIGHTED SKEW CHI-SQUARE VALUE= 2 118

COMPUTED SKEW (LOG10)= 3201

REGIONAL SKEW (LOG10)= 000

WEIGHTED SKEW (LOG10)= 2275

MEAN SQUARE ERROR OF LOG10 SKEW= 1229

MEAN SQUARE ERROR OF REGIONAL SKEW= 3020

MONTH	DAY	WAT	YR	PEAK VALUE ( )	RANK	RETURN PERIOD WEIBULL	HAZEN	GRINGOPTEN	CHEGODAYEV	GUNNANE
0	0			3 00	31	1 68	1 67	1 67	1 67	1 67
0	0			11 50	15	3 47	3 52	3 51	3 50	3 51
0	0			1 50	42	1 24	1 23	1 23	1 23	1 23
0	0			80	51	1 02	1 01	1 01	1 01	1 01
0	0			58 00	2	26 00	34 00	32 77	30 24	32 00
0	0			5 00	26	2 00	2 00	2 00	2 00	2 00
0	0			40 00	4	13 00	14 57	14 36	13 89	14 22
0	0			10 00	16	3 25	3 29	3 29	3 27	3 28
0	0			25 20	6	8 67	9 27	9 19	9 02	9 14
0	0			1 10	46	1 13	1 12	1 12	1 12	1 12
0	0			6 00	23	2 26	2 27	2 27	2 26	2 27
0	0			15 00	11	4 73	4 86	4 84	4 80	4 83
0	0			20 00	8	6 50	6 80	6 76	6 68	6 74
0	0			2 00	39	1 33	1 32	1 33	1 33	1 33
0	0			20 00	9	5 78	6 00	5 97	5 91	5 95
0	0			5 00	27	1 93	1 92	1 92	1 93	1 92
0	0			1 00	47	1 11	1 10	1 10	1 10	1 10
0	0			4 00	28	1 66	1 65	1 85	1 86	1 86
0	0			14 00	13	4 00	4 08	4 07	4 05	4 06
0	0			3 00	32	1 63	1 62	1 62	1 62	1 62
0	0			1 80	41	1 27	1 76	1 26	1 26	1 26
0	0			6 30	22	2 36	2 37	2 37	2 37	2 37
0	0			8 70	19	2 74	2 76	2 75	2 75	2 75
0	0			1 00	48	1 08	1 07	1 07	1 08	1 08
0	0			1 00	49	1 06	1 05	1 05	1 06	1 05
0	0			76 50	1	52 00	102 00	91 29	73 43	85 33
0	0			1 20	45	1 16	1 15	1 15	1 15	1 15
0	0			1 50	43	1 21	1 20	1 20	1 20	1 20
0	0			3 60	29	1 79	1 79	1 79	1 79	1 79
0	0			5 50	25	2 08	2 08	2 08	2 08	2 08
0	0			1 40	44	1 18	1 17	1 17	1 18	1 17
0	0			1 00	50	1 04	1 03	1 03	1 03	1 03
0	0			14 60	12	4 33	4 43	4 42	4 39	4 41
0	0			2 20	38	1 37	1 36	1 36	1 36	1 36
0	0			2 00	40	1 30	1 29	1 29	1 29	1 29
0	0			23 80	7	7 43	7 85	7 79	7 67	7 76
0	0			13 20	14	3 71	3 78	3 77	3 75	3 76
0	0			32 80	5	10 40	11 33	11 21	10 94	11 13
0	0			2 80	33	1 58	1 57	1 57	1 57	1 57
0	0			2 80	34	1 53	1 52	1 52	1 53	1 52
0	0			18 50	10	5 20	5 37	5 35	5 30	5 33
0	0			3 50	30	1 73	1 73	1 73	1 73	1 73
0	0			2 80	35	1 49	1 48	1 48	1 48	1 48
0	0			5 60	24	2 17	2 17	2 17	2 17	2 17
0	0			8 40	20	2 60	2 62	2 61	2 61	2 61
0	0			9 00	18	2 89	2 91	2 91	2 90	2 91
0	0			2 60	36	1 44	1 44	1 44	1 44	1 44
0	0			42 40	3	17 33	20 40	19 97	19 04	19 69
0	0			6 40	21	2 48	2 49	2 49	2 48	2 49
0	0			2 40	37	1 41	1 40	1 40	1 40	1 40
0	0			10 00	17	3 06	3 09	3 09	3 08	3 08

ESTAÇÃO: 2882138

SAMPLE SIZE = 57

STATISTICS OF THE OBSERVED VALUES

MEAN = 8.36 STD. DEV. = 10.48 COEF. OF SKEW = 2.8165

STATISTICS OF THE NATURAL LOGARITHMS

MEAN = 1.53348 STD. DEV. = 1.12998 COEF. OF SKEW. = -.0607

STATISTICS OF THE BASE 10 LOGARITHMS

MEAN = .66598 STD. DEV. = .49074 COEF. OF SKEW. = -.0607

FREQUENCY DISTRIBUTION

RETURN PERIOD (YRS)	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
2 00	8 36	4 63	5 52	6 71	3 88	4 45	4 69
2 33	10 24	5 67	6 92	8 61	4 76	5 72	5 74
5 00	17 26	12 08	13 94	16 86	11 58	13 08	12 12
10 00	21 96	20 06	20 84	23 58	23 89	20 85	19 90
20 00	25 90	30 67	28 50	30 03	47 85	29 44	30 04
50 00	30 41	49 87	40 09	38 37	117 59	41 97	47 95
100 00	33 47	69 38	50 17	44 62	230 69	52 29	65 72
200 00	36 32	94 31	61 55	50 85	451 43	63 33	87 95
500 00	39 84	137 81	78 91	59 07	1094 61	79 00	125 78
1000 00	42 36	180 76	94 03	65 28	2137 88	91 70	162 22

FREQUENCY DISTRIBUTION

CLASS INTERVAL	PROBABILITY	TRUNCATED NORMAL ( )	2-PARAMETER LOGNORMAL ( )	3-PARAMETER LOGNORMAL ( )	TYPE I EXTREMAL ( )	TYPE I LOG-EXTREMAL ( )	PEARSON TYPE III ( )	LOG PEARSON TYPE III ( )
0	00000	00	00	00	00	00	00	00
1	14286	00	1 39	00	00	1 43	1 16	1 39
2	28571	2 43	2 44	2 10	1 41	2 19	1 91	2 43
3	42857	6 48	3 78	4 28	4 91	3 19	3 28	3 75
4	57143	10 25	5 68	6 92	8 63	4 77	5 55	5 63
5	71429	14 30	8 78	10 58	13 18	7 79	9 33	8 74
6	85714	19 56	15 48	17 05	20 17	16 55	16 77	15 55
7	1 00000	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY	INFINITY
CHI-SQUARE VALUE		30 561	2 561	15 825	23 930	13 614	3 789	2 561

95% CHI-SQUARE TEST STATISTIC =12 596

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RETURN PERIOD (YRS)	LOG PEARSON TYPE III WITH WEIGHTED REGIONAL SKEW ( )
2 00	4 67
2 33	5 72
5 00	12 11
10 00	19 94
20 00	30 19
50 00	48 41
100 00	66 57
200 00	89 43
500 00	128 55
1000 00	166 44

WEIGHTED SKEW CHI-SQUARE VALUE 2 561

COMPUTED SKEW (LOG10)= - 0607

REGIONAL SKEW (LOG10)= 000

WEIGHTED SKEW (LOG10)= - 0462

MEAN SQUARE ERROR OF LOG10 SKEW= 0947

MEAN SQUARE ERROR OF REGIONAL SKEW= 3020

MONTH	DAY	MAT	YR	PEAK VALUE ( )	RANK	RETURN PERIOD WEIBULL	HAZEN	GRINGORTEN	CHEGODAYEV	CUNNANE
9		0		9 80	16	3 63	3 68	3 67	3 66	3 67
9		0		8 50	17	3 41	3 45	3 45	3 44	3 45
9		0		10 80	13	4 46	4 56	4 55	4 52	4 54
0		0		14 00	10	5 80	6 00	5 97	5 92	5 96
0		0		14 00	11	5 27	5 43	5 41	5 36	5 40
0		0		1 10	52	1 12	1 11	1 11	1 11	1 11
0		0		7 00	23	2 52	2 53	2 53	2 53	2 53
0		0		30	57	1 02	1 01	1 01	1 01	1 01
0		0		7 30	21	2 76	2 78	2 78	2 77	2 78
0		0		2 00	43	1 35	1 34	1 34	1 34	1 34
0		0		3 40	33	1 76	1 75	1 75	1 76	1 75
0		0		6 20	26	2 21	2 24	2 23	2 23	2 23
0		0		1 00	54	1 07	1 07	1 07	1 07	1 07
0		0		10 30	15	3 87	3 93	3 92	3 90	3 92
0		0		30 50	3	19 33	22 80	22 31	21 26	22 00
0		0		5 50	27	2 15	2 15	2 15	2 15	2 15
0		0		1 20	49	1 18	1 18	1 18	1 18	1 18
0		0		8 50	18	3 22	3 26	3 25	3 24	3 25
0		0		50	56	1 04	1 03	1 03	1 03	1 03
0		0		2 70	39	1 49	1 48	1 48	1 48	1 48
0		0		3 20	37	1 57	1 56	1 56	1 56	1 56
0		0		5 50	28	2 07	2 07	2 07	2 07	2 07
0		0		15 00	8	7 25	7 60	7 56	7 45	7 53
0		0		5 20	29	2 00	2 00	2 00	2 00	2 00
0		0		8 00	19	3 05	3 08	3 08	3 07	3 08
0		0		12 00	12	4 83	4 96	4 94	4 91	4 93
0		0		1 10	53	1 09	1 09	1 09	1 09	1 09
0		0		8 00	20	2 90	2 92	2 92	2 91	2 92
0		0		16 00	6	9 67	10 36	10 27	10 07	10 21
0		0		2 10	41	1 41	1 41	1 41	1 41	1 41
0		0		4 40	31	1 87	1 87	1 87	1 87	1 87
0		0		14 20	9	6 44	6 71	6 67	6 60	6 65
0		0		1 60	45	1 29	1 28	1 28	1 28	1 28
0		0		6 80	24	2 42	2 43	2 42	2 42	2 42
0		0		6 40	25	2 32	2 33	2 33	2 32	2 33
0		0		2 20	40	1 45	1 44	1 44	1 45	1 44
0		0		10 60	14	4 14	4 22	4 21	4 19	4 21
0		0		57 60	1	58 00	114 00	102 00	82 00	95 33
0		0		3 40	34	1 71	1 70	1 70	1 70	1 70
0		0		7 30	22	2 64	2 65	2 65	2 65	2 65
0		0		3 30	36	1 61	1 61	1 61	1 61	1 61
0		0		1 30	48	1 21	1 20	1 20	1 20	1 20
0		0		2 00	44	1 32	1 31	1 31	1 31	1 31
0		0		3 20	38	1 53	1 52	1 52	1 52	1 52
0		0		90	55	1 05	1 05	1 05	1 05	1 05
0		0		3 40	35	1 66	1 65	1 65	1 65	1 65
0		0		15 40	7	8 29	8 77	8 71	8 57	8 67
0		0		1 50	46	1 26	1 25	1 25	1 26	1 25
0		0		5 20	30	1 93	1 93	1 93	1 93	1 93
0		0		4 30	32	1 81	1 81	1 81	1 81	1 81
0		0		2 10	42	1 38	1 37	1 37	1 38	1 38
0		0		1 20	50	1 16	1 15	1 15	1 15	1 15
0		0		24 80	5	11 60	12 67	12 53	12 21	12 43
0		0		42 20	2	29 00	38 00	36 62	33 76	35 75
0		0		1 20	51	1 14	1 13	1 13	1 13	1 13
0		0		28 20	4	14 50	16 29	16 04	15 51	15 89
0		0		1 40	47	1 23	1 23	1 23	1 23	1 23

– Resultados da Simulação do Modelo MODHAC

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- Resultados da Simulação do Modelo MODHAC X

********** MODHAC **********

MODELO HIDROLOGICO MODHAC

desenvolvido por
ANTONIO EDUARDO LANNA e MIRIAM SCHARZBACH
INSTITUTO DE PESQUISAS HIDRAULICAS DA UFRGS

IDENTIFICACAO DO PROBLEMA
Curso de agua : Rio CATU
Secao fluvial : Secao
Area de drenagem : 130.0 Km2

Periodo : 1937 a 1986
Intervalo de simulacao : MENSAL
Numero de intervalos de simulacao : 600
Intervalo de computacao DIARIO
Tamanho arquivo de chuvas : 19616

Nome arquivo de chuvas : catu3789.plu
Nome arquivo ET Potencial : catu3789.det

MODHAC : PARAMETROS DESTA SIMULACAO

	VALOR	MIN.	MAX.	PASSO	PREC.
RSPX	**178.8000**	178.8000	178.8000	1.0000	.0010
RSSX	**266.5000**	266.5000	266.5000	10.0000	.0010
RSBX	**.0000**	.0000	.0000	.0000	.0010
RSBF	**.0000**	.0000	.0000	.0000	.0000
IMAX	**40.6600**	40.6600	40.6600	5.0000	.0100
IMIN	**3.8100**	3.8100	3.8100	1.0000	.0100
IDEC	**.550000**	.550000	.550000	.010000	.000100
ASP	**.001000**	.001000	.001000	.000100	.000000
ASS	**.001000**	.001000	.001000	.000100	.000000
ASB	**.000000**	.000000	.000000	.000000	.000100
PRED	**999.0000**	999.0000	999.0000	.0000	.0000
CEVA	**.0801**	.0801	.0801	.0010	.0000

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 CONDICOES SUPLEMENTARES E INICIAIS

 RETARDO DOS ESCOAMENTOS
                         SUPERFICIAL ...  1
                         SUBTERRANEO ...  2

 RESERVAS INICIAIS DE UMIDADE NA BACIA
                    RESERVA SUPERFICIAL ......    5.0
                    RESERVA SUBSUPERFICIAL ...   50.0
                    RESERVA SUBTERRANEA ......     .0

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++
 MODHAC : RESULTADOS OBTIDOS
 PARAMETROS USADOS NESTA SIMULACAO
 RSPX=  178.8000 RSSX=  266.5000 RSBX=     .0000 RSBF=     .0000
 IMAX=   40.6600 IMIN=    3.8100 IDEC=     .5500 ASP =     .0010
 ASS =     .0010 ASB =     .0000 PRED=  999.0000 CEVA=     .0801
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++
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	CHUVA INFILTRACAO	VAZAO OBS	VAZAO CAL	EVAPOTRANSPIRACOES POTENCIAL	EVAPOTRANSPIRACOES SUPERFICIE	EVAPOTRANSPIRACOES SUBSOLO	UNIDADES TOTAL	UNIDADES SUPERFICIE	UNIDADES SUBSOLO	UNIDADES AQUIFERO	UNIDADES PROFUNDA
1	2 500	-20582 470	1 000	154 380	5 000	29 048	36 548	000	19 911	000	000
2	134 500	-18590 620	428	129 920	29 297	8 126	77 762	64 546	11 692	000	000
3	98 500	-20582 470	375	134 540	77 491	895	128 106	34 727	11 531	000	000
4	174 000	-19918 520	365	132 900	77 670	000	132 900	73 739	13 250	000	000
5	134 000	-20582 470	438	131 750	49 500	000	131 750	73 645	15 152	000	000
6	86 000	-19918 520	476	120 900	80 220	000	120 900	36 817	16 602	000	000
7	4 500	-20582 470	422	120 900	36 662	9 598	50 760	000	6 756	000	000
8	6 500	-20582 470	072	129 270	000	6 698	13 198	000	000	000	000
9	8 000	-19918 520	000	134 700	010	000	8 000	000	000	000	000
10	3 000	-20582 470	000	149 730	000	000	3 000	000	000	000	000
11	500	-19918 520	000	150 900	000	000	500	000	000	000	000
12	15 500	-20582 470	000	157 480	4 914	006	15 500	000	000	000	000
13	45 000	-20582 470	001	154 380	26 915	124	44 999	000	000	000	000
14	61 500	-18590 620	001	129 920	47 070	149	61 499	000	000	000	000
15	303 000	-20582 470	551	134 540	38 400	000	125 860	169 597	6 979	000	000
16	268 500	-19918 520	52 037	132 900	41 520	000	137 900	172 415	87 563	000	000
17	41 000	-20582 470	2 739	131 750	105 250	000	131 750	77 773	88 713	000	000
18	45 500	-19918 520	2 654	120 900	86 780	000	120 900	876	87 558	000	000
19	000	-20582 470	2 122	120 900	876	37 376	38 253	000	48 138	000	000
20	3 000	-20582 470	1 094	129 270	000	25 134	28 134	000	21 963	000	000
21	000	-19918 520	406	134 700	000	16 810	16 810	000	4 781	000	000
22	4 500	-20582 470	034	149 730	000	4 757	9 257	000	000	000	000
23	19 500	-19918 520	000	150 900	000	000	19 500	000	000	000	000
24	4 000	-20582 470	000	157 480	000	000	4 000	000	000	000	000
25	33 000	-20582 470	000	154 380	8 526	014	33 000	000	000	000	000
26	252 000	-18590 620	005	129 920	24 546	014	117 300	133 706	987	000	000
27	118 000	-20582 470	086	134 540	56 940	000	134 540	113 334	4 726	000	000
28	95 500	-19918 520	182	132 900	70 240	000	132 900	72 945	7 527	000	000
29	92 500	-20582 470	265	131 750	75 250	000	131 750	31 540	9 413	000	000
30	33 000	-19918 520	250	120 900	44 254	5 828	70 142	000	3 573	000	000
31	18 000	-20582 470	024	120 900	9 685	3 571	21 556	000	000	000	000
32	7 000	-20582 470	000	129 270	000	000	7 000	000	000	000	000
33	29 000	-19918 520	000	134 700	3 526	004	29 000	000	000	000	000
34	35 000	-20582 470	000	149 730	19 111	059	35 000	000	000	000	000
35	1 000	-19918 520	000	150 900	000	000	1 000	000	000	000	000
36	14 500	-20582 470	000	157 480	4 915	005	14 500	000	000	000	000
37	57 500	-20582 470	000	154 380	9 498	002	38 420	19 001	078	000	000
38	63 500	-19254 570	008	134 560	51 918	594	82 572	000	000	000	000
39	118 000	-20582 470	001	134 540	29 105	055	97 580	20 224	195	000	000
40	241 000	-19918 520	039	132 900	47 590	000	132 900	125 394	3 081	000	000
41	143 000	-20582 470	154	131 750	67 000	000	131 750	132 395	7 168	000	000
42	32 000	-19918 520	253	120 900	103 310	000	120 900	40 914	9 490	000	000
43	23 500	-20582 470	236	120 900	48 960	5 862	70 022	000	3 658	000	000
44	4 500	-20582 470	024	129 270	000	3 642	8 142	000	000	000	000
45	2 000	-19918 520	000	134 700	000	000	2 000	000	000	000	000
46	1 500	-20582 470	000	149 730	000	000	1 500	000	000	000	000
47	1 000	-19918 520	000	150 900	000	000	1 000	000	000	000	000
48	9 000	-20582 470	000	157 480	000	000	9 000	000	000	000	000
49	500	-20582 470	000	154 380	000	000	500	000	000	000	000
50	55 500	-18590 620	001	129 920	20 362	078	55 499	000	000	000	000
51	60 500	-20582 470	001	134 540	18 326	133	60 499	000	000	000	000
52	77 000	-19918 520	000	132 900	17 075	055	77 000	000	000	000	000
53	21 000	-20582 470	000	131 750	5 494	006	21 000	000	000	000	000
54	4 500	-19918 520	000	120 900	000	000	4 500	000	000	000	000
55	1 500	-20582 470	000	120 900	000	000	1 500	000	000	000	000
56	2 500	-20582 470	000	129 270	000	000	2 500	000	000	000	000
57	7 000	-19918 520	000	134 700	1 508	002	7 000	000	000	000	000
58	2 000	-20582 470	000	149 730	000	000	2 000	000	000	000	000
59	8 500	-19918 520	000	150 900	000	000	8 500	000	000	000	000
60	10 500	-20582 470	000	157 480	1 918	002	10 500	000	000	000	000
61	000	-20582 470	000	154 380	000	000	000	000	000	000	000
62	000	-18590 620	000	129 920	000	000	000	000	000	000	000
63	000	-20582 470	000	134 540	000	000	000	000	000	000	000
64	000	-19918 520	000	132 900	000	000	000	000	000	000	000
65	000	-20582 470	000	131 750	000	000	000	000	000	000	000
66	000	-19918 520	000	120 900	000	000	000	000	000	000	000
67	000	-20582 470	000	120 900	000	000	000	000	000	000	000
68	000	-20582 470	000	129 270	000	000	000	000	000	000	000
69	000	-19918 520	000	134 700	000	000	000	000	000	000	000
70	000	-20582 470	000	149 730	000	000	000	000	000	000	000
71	000	-19918 520	000	150 900	000	000	000	000	000	000	000
72	000	-20582 470	000	157 480	000	000	000	000	000	000	000
73	000	-20582 470	000	154 380	000	000	000	000	000	000	000
74	000	-18590 620	000	129 920	000	000	000	000	000	000	000
75	000	-20582 470	000	134 540	000	000	000	000	000	000	000
76	000	-19918 520	000	132 900	000	000	000	000	000	000	000
77	000	-20582 470	000	131 750	000	000	000	000	000	000	000
78	000	-19918 520	000	120 900	000	000	000	000	000	000	000
79	000	-20582 470	000	120 900	000	000	000	000	000	000	000
80	000	-20582 470	000	129 270	000	000	000	000	000	000	000
81	000	-19918 520	000	134 700	000	000	000	000	000	000	000
82	000	-20582 470	000	149 730	000	000	000	000	000	000	000
83	000	-19918 520	000	150 900	000	000	000	000	000	000	000
84	000	20582 470	000	157 480	000	000	000	000	000	000	000
85	000	-20582 470	000	154 380	000	000	000	000	000	000	000
86	000	-19254 570	000	134 560	000	000	000	000	000	000	000
87	000	-20582 470	000	134 540	000	000	000	000	000	000	000
88	000	-19918 520	000	132 900	000	000	000	000	000	000	000
89	000	-20582 470	000	131 750	000	000	000	000	000	000	000
90	000	-19918 520	000	120 900	000	000	000	000	000	000	000

	CHUVA INFILTRACAO	VAZAO OBS	VAZAO CAL	EVAPOTRANSPIRACOES POTENCIAL	SUPERFICIE	SUBSOLO	TOTAL	UMIDADES SUPERFICIE	SUBSOLO	AQUIFERO	PROFUNDA
91	000	-20582 470	000	120 900	000	000	000	000	000	000	000
92	000	-20582 470	000	129 270	000	000	000	000	000	000	000
93	000	-19918 520	000	134 700	000	000	000	000	000	000	000
94	000	-20582 470	000	149 730	000	000	000	000	000	000	000
95	000	-19918 520	000	150 900	000	000	000	000	000	000	000
96	000	-20582 470	000	157 480	000	000	000	000	000	000	000
97	000	-20582 470	000	154 380	000	000	000	000	000	000	000
98	000	-18590 620	000	129 920	000	000	000	000	000	000	000
99	000	-20582 470	000	134 540	000	000	000	000	000	000	000
100	000	-19918 520	000	132 900	000	000	000	000	000	000	000
101	000	-20582 470	000	131 750	000	000	000	000	000	000	000
102	000	-19918 520	000	120 900	000	000	000	000	000	000	000
103	000	-20582 470	000	120 900	000	000	000	000	000	000	000
104	000	-20582 470	000	129 270	000	000	000	000	000	000	000
105	000	-19918 520	000	134 700	000	000	000	000	000	000	000
106	000	-20582 470	000	149 730	000	000	000	000	000	000	000
107	000	-19918 520	000	150 900	000	000	000	000	000	000	000
108	000	-20582 470	000	157 480	000	000	000	000	000	000	000
109	000	-20582 470	000	154 380	000	000	000	000	000	000	000
110	000	-18590 620	000	129 920	000	000	000	000	000	000	000
111	000	-20582 470	000	134 540	000	000	000	000	000	000	000
112	000	-19918 520	000	132 900	000	000	000	000	000	000	000
113	000	-20582 470	000	131 750	000	000	000	000	000	000	000
114	000	-19918 520	000	120 900	000	000	000	000	000	000	000
115	000	-20582 470	000	120 900	000	000	000	000	000	000	000
116	000	-20582 470	000	129 270	000	000	000	000	000	000	000
117	000	-19918 520	000	134 700	000	000	000	000	000	000	000
118	000	-20582 470	000	149 730	000	000	000	000	000	000	000
119	000	-19918 520	000	150 900	000	000	000	000	000	000	000
120	000	-20582 470	000	157 480	000	000	000	000	000	000	000
121	000	-20582 470	000	154 380	000	000	000	000	000	000	000
122	000	-18590 620	000	129 920	000	000	000	000	000	000	000
123	000	-20582 470	000	134 540	000	000	000	000	000	000	000
124	000	-19918 520	000	132 900	000	000	000	000	000	000	000
125	000	-20582 470	000	131 750	000	000	000	000	000	000	000
126	000	-19918 520	000	120 900	000	000	000	000	000	000	000
127	000	-20582 470	000	120 900	000	000	000	000	000	000	000
128	000	-20582 470	000	129 270	000	000	000	000	000	000	000
129	000	-19918 520	000	134 700	000	000	000	000	000	000	000
130	000	-20582 470	000	149 730	000	000	000	000	000	000	000
131	000	-19918 520	000	150 900	000	000	000	000	000	000	000
132	000	-20582 470	000	157 480	000	000	000	000	000	000	000
133	44 500	-20582 470	000	154 380	25 996	064	44 500	000	000	000	000
134	24 500	-19254 570	000	134 560	1 079	001	24 500	000	000	000	000
135	319 000	-20582 470	4 502	134 540	26 560	000	125 860	174 607	14 004	000	000
136	150 500	-19918 520	10 613	132 900	80 030	000	132 900	161 747	33 811	000	000
137	195 500	-20582 470	42 393	131 750	81 000	000	131 750	130 780	86 030	000	000
138	134 000	-19918 520	2 610	120 900	69 600	000	120 900	139 480	87 817	000	000
139	22 000	-20582 470	2 730	120 900	101 700	000	120 900	37 923	87 743	000	000
140	7 500	-20582 470	2 428	129 270	39 586	27 716	72 972	000	57 825	000	000
141	7 500	-19918 520	1 282	134 700	010	28 725	36 225	000	27 878	000	000
142	7 500	-20582 470	559	149 730	000	19 816	27 316	000	7 544	000	000
143	5 000	-19918 520	070	150 900	000	7 490	12 490	000	000	000	000
144	9 000	-20582 470	000	157 480	2 418	002	9 000	000	000	000	000
145	13 500	-20582 470	000	154 380	2 017	003	13 500	000	000	000	000
146	207 500	-18590 620	013	129 920	63 746	000	125 280	80 731	1 473	000	000
147	432 500	-20582 470	76 288	134 540	27 720	000	134 540	178 621	112 303	000	000
148	390 000	-19918 520	117 586	132 900	41 230	000	132 900	178 621	252 468	000	000
149	428 000	-20582 470	302 821	131 750	32 750	000	131 750	170 437	265 854	000	000
150	120 000	-19918 520	19 120	120 900	82 750	000	120 900	152 762	263 513	000	000
151	16 500	-20582 470	8 110	120 900	111 600	000	120 900	45 276	258 499	000	000
152	11 500	-20582 470	7 352	129 270	47 210	61 834	118 385	000	189 673	000	000
153	1 500	-19918 520	4 473	134 700	000	78 037	79 537	000	107 329	000	000
154	4 000	-20582 470	2 519	149 730	000	51 361	55 361	000	53 557	000	000
155	5 500	-19918 520	1 138	150 900	000	30 239	35 739	000	22 244	000	000
156	2 000	-20582 470	391	157 480	000	18 902	20 902	000	2 989	000	000
157	70 000	-20582 470	023	154 380	33 060	3 052	72 972	000	000	000	000
158	97 500	-18590 620	000	129 920	22 341	019	68 480	28 875	144	000	000
159	325 000	-20582 470	12 080	134 540	45 920	000	134 540	178 621	28 724	000	000
160	432 000	-19918 520	130 504	132 900	28 730	000	132 900	178 621	196 117	000	000
161	203 500	-20582 470	47 315	131 750	63 500	000	131 750	143 351	256 568	000	000
162	11 000	-19918 520	7 641	120 900	112 840	000	120 900	30 837	251 551	000	000
163	27 000	-20582 470	7 297	120 900	43 325	53 312	110 837	000	191 371	000	000
164	1 500	-20582 470	4 698	129 270	000	76 049	77 549	000	110 786	000	000
165	1 000	-19918 520	2 560	134 700	000	49 312	50 312	000	59 018	000	000
166	4 000	-20582 470	1 313	149 730	000	32 415	36 415	000	25 357	000	000
167	6 000	-19918 520	472	150 900	969	19 133	25 132	000	5 793	000	000
168	22 000	-20582 470	054	157 480	2 338	5 753	27 751	000	000	000	000
169	31 500	-20582 470	000	154 380	9 515	005	29 960	1 532	008	000	000
170	27 000	-18590 620	000	129 920	16 208	052	28 540	000	000	000	000
171	80 500	-20582 470	002	134 540	31 220	000	54 080	26 120	298	000	000
172	319 000	-19918 520	27 581	132 900	71 310	000	132 900	151 066	33 804	000	000
173	50 500	-20582 470	1 086	131 750	102 250	000	131 750	66 524	36 005	000	000
174	181 000	-19918 520	1 109	120 900	54 540	000	120 900	123 285	38 231	000	000
175	000	-20582 470	1 205	120 900	120 900	000	120 900	536	38 874	000	000
176	000	-20582 470	856	129 270	536	22 226	22 761	000	15 838	000	000
177	000	-19918 520	258	134 700	000	14 549	14 549	000	1 062	000	000

GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

	CHUVA INFILTRACAO	VAZAO OBS	VAZAO CAL	EVAPOTRANSPIRACOES				UMIDADES			
				POTENCIAL	SUPERFICIE	SUBSOLO	TOTAL	SUPERFICIE	SUBSOLO	AQUIFERO	PROFUNDA
178	16 500	-20582 470	003	149 730	000	1 061	11 391	6 164	006	000	000
179	31 000	-19918 520	000	150 900	19 556	054	37 170	000	000	000	000
180	52 500	-20582 470	001	157 480	30 728	112	52 499	000	000	000	000
181	71 500	-20582 470	000	154 380	26 997	082	56 980	14 505	014	000	000
182	102 500	-19254 570	008	134 560	72 756	496	117 012	000	000	000	000
183	320 500	-20582 470	048	134 540	64 280	000	134 540	178 621	7 280	000	000
184	378 500	-19918 520	111 967	132 900	40 590	000	132 900	174 017	145 237	000	000
185	137 500	-20582 470	23 917	131 750	77 250	000	131 750	129 580	171 454	000	000
186	18 500	-19918 520	5 115	120 900	102 400	000	120 900	24 903	168 621	000	000
187	10 000	-20582 470	4 613	120 900	24 936	48 830	83 666	000	115 351	000	000
188	13 500	-20582 470	2 908	129 270	4 323	45 350	58 843	000	67 196	000	000
189	3 000	-19918 520	1 506	134 700	000	32 921	35 921	000	32 838	000	000
190	1 000	-20582 470	661	149 730	000	22 493	23 493	000	9 730	000	000
191	2 000	-19918 520	106	150 900	000	9 644	11 644	000	000	000	000
192	15 000	-20582 470	000	157 480	2 418	002	15 000	000	000	000	000
193	1 500	-20582 470	000	154 380	000	000	1 500	000	000	000	000
194	54 000	-18590 620	000	129 920	28 480	000	51 040	2 845	115	000	000
195	87 000	-20582 470	001	134 540	50 168	251	89 959	000	000	000	000
196	111 500	-19918 520	002	132 900	36 160	000	92 670	18 591	236	000	000
197	20 500	-20582 470	007	131 750	18 559	267	39 326	000	000	000	000
198	27 500	-19918 520	000	120 900	10 904	036	27 500	000	000	000	000
199	8 000	-20582 470	000	120 900	200	000	8 000	000	000	000	000
200	000	-20582 470	000	129 270	000	000	000	000	000	000	000
201	500	-19918 520	000	134 700	000	000	500	000	000	000	000
202	000	-20582 470	000	149 730	000	000	000	000	000	000	000
203	000	-19918 520	000	150 900	000	000	000	000	000	000	000
204	7 000	-20582 470	000	157 480	000	000	7 000	000	000	000	000
205	11 000	-20582 470	000	154 380	000	000	11 000	000	000	000	000
206	60 000	-18590 620	001	129 920	26 029	131	59 999	000	000	000	000
207	98 000	-20582 470	001	134 540	39 646	132	97 999	000	000	000	000
208	49 500	-19918 520	000	132 900	18 074	065	49 500	000	000	000	000
209	57 500	-20582 470	001	131 750	21 894	105	57 499	000	000	000	000
210	000	-19918 520	000	120 900	000	000	000	000	000	000	000
211	000	-20582 470	000	120 900	000	000	000	000	000	000	000
212	000	-20582 470	000	129 270	000	000	000	000	000	000	000
213	000	-19918 520	000	134 700	000	000	000	000	000	000	000
214	000	-20582 470	000	149 730	000	000	000	000	000	000	000
215	000	-19918 520	000	150 900	000	000	000	000	000	000	000
216	000	-20582 470	000	157 480	000	000	000	000	000	000	000
217	35 000	-20582 470	000	154 380	11 510	030	35 000	000	000	000	000
218	65 500	-18590 620	002	129 920	43 310	268	65 498	000	000	000	000
219	76 000	-20582 470	000	134 540	31 397	063	68 680	7 310	010	000	000
220	117 500	-19918 520	002	132 900	55 346	182	124 468	334	017	000	000
221	97 500	-20582 470	004	131 750	61 189	407	97 846	000	000	000	000
222	23 000	-19918 520	000	120 900	11 423	017	23 000	000	000	000	000
223	000	-20582 470	000	120 900	000	000	000	000	000	000	000
224	000	-20582 470	000	129 270	000	000	000	000	000	000	000
225	000	-19918 520	000	134 700	000	000	000	000	000	000	000
226	2 500	-20582 470	000	149 730	000	000	2 500	000	000	000	000
227	000	-19918 520	000	150 900	000	000	000	000	000	000	000
228	43 500	-20582 470	000	157 480	10 168	012	43 500	000	000	000	000
229	19 000	-20582 470	000	154 380	020	000	19 000	000	000	000	000
230	92 500	-19254 570	000	134 560	18 711	009	76 340	16 103	057	000	000
231	73 500	-20582 470	001	134 540	45 618	081	82 580	6 936	143	000	000
232	134 500	-19918 520	024	132 900	86 460	000	132 900	7 245	1 408	000	000
233	30 500	-20582 470	013	131 750	14 201	1 442	39 143	000	000	000	000
234	4 500	-19918 520	000	120 900	470	000	4 500	000	000	000	000
235	1 500	-20582 470	000	120 900	000	000	1 500	000	000	000	000
236	4 500	-20582 470	000	129 270	000	000	4 500	000	000	000	000
237	5 000	-19918 520	000	134 700	000	000	5 000	000	000	000	000
238	2 000	-20582 470	000	149 730	000	000	2 000	000	000	000	000
239	2 000	-19918 520	000	150 900	000	000	2 000	000	000	000	000
240	6 500	-20582 470	000	157 480	000	000	6 500	000	000	000	000
241	50 500	-20582 470	000	154 380	6 553	007	48 480	2 018	002	000	000
242	17 500	-18590 620	000	129 920	6 658	002	12 300	7 201	019	000	000
243	286 500	-20582 470	6 831	134 540	65 480	000	134 540	137 718	14 602	000	000
244	171 000	-19918 520	2 851	132 900	52 310	000	132 900	159 186	28 356	000	000
245	38 000	-20582 470	924	131 750	99 500	000	131 750	61 928	30 934	000	000
246	5 500	-19918 520	877	120 900	61 420	9 230	76 150	000	21 353	000	000
247	1 000	-20582 470	429	120 900	000	15 099	16 099	000	5 856	000	000
248	500	-20582 470	053	129 270	000	5 815	6 315	000	000	000	000
249	1 000	-19918 520	000	134 700	000	000	1 000	000	000	000	000
250	000	-20582 470	000	149 730	000	000	000	000	000	000	000
251	000	-19918 520	000	150 900	000	000	000	000	000	000	000
252	11 500	-20582 470	000	157 480	1 918	002	11 500	000	000	000	000
253	000	-20582 470	000	154 380	000	000	000	000	000	000	000
254	11 500	-18590 620	000	129 920	5 852	008	11 500	000	000	000	000
255	43 000	-20582 470	000	134 540	11 520	000	28 360	14 557	083	000	000
256	7 000	-19918 520	000	132 900	14 607	103	21 639	000	000	000	000
257	20 000	-20582 470	000	131 750	2 747	003	20 000	000	000	000	000
258	8 500	-19918 520	000	120 900	000	000	8 500	000	000	000	000
259	14 000	-20582 470	000	120 900	1 099	001	14 000	000	000	000	000
260	000	-20582 470	000	129 270	000	000	000	000	000	000	000
261	000	-19918 520	000	134 700	000	000	000	000	000	000	000
262	000	-20582 470	000	149 730	000	000	000	000	000	000	000
263	000	-19918 520	000	150 900	000	000	000	000	000	000	000
264	1 000	-20582 470	000	157 480	000	000	1 000	000	000	000	000
265	62 500	-20582 470	000	154 380	36 400	040	58 880	3 571	049	000	000
266	44 000	-18590 620	000	129 920	15 621	078	46 260	1 359	001	000	000

	CHUVA INFILTRACAO	VAZAO OBS	VAZAO CAL	EVAPOTRANSPIRACOES POTENCIAL	SUPERFICIE	SUBSOLO	TOTAL	UMIDADES SUPERFICIE	SUBSOLO	AQUIFERO	PROFUNDA
267	143 000	-20582 470	004	134 540	54 734	025	130 680	13 300	375	000	000
268	64 000	-19918 520	007	132 900	30 558	461	77 669	000	000	000	000
269	78 000	-20582 470	002	131 750	47 039	209	77 998	000	000	000	000
270	20 500	-19918 520	000	120 900	6 461	009	20 508	000	000	000	000
271	2 000	-20582 470	000	120 900	000	000	2 000	000	000	000	000
272	3 500	-20582 470	000	129 270	000	000	3 500	000	000	000	000
273	000	-19918 520	000	134 700	000	000	000	000	000	000	000
274	000	-20582 470	000	149 730	000	000	000	000	000	000	000
275	500	-19918 520	000	150 900	000	000	500	000	000	000	000
276	7 500	-20582 470	000	157 480	1 918	002	7 500	000	000	000	000
277	000	-20582 470	000	154 380	000	000	000	000	000	000	000
278	3 000	-19254 570	000	134 560	000	000	3 000	000	000	000	000
279	179 000	-20582 470	007	134 540	53 100	000	108 500	69 593	898	000	000
280	98 000	-19918 520	047	132 900	84 890	000	132 900	33 441	2 101	000	000
281	13 500	-20582 470	032	131 750	33 804	2 210	49 014	000	000	000	000
282	16 000	-19918 520	000	120 900	5 934	006	16 000	000	000	000	000
283	5 500	-20582 470	000	120 900	599	001	5 500	000	000	000	000
284	000	-20582 470	000	129 270	000	000	000	000	000	000	000
285	000	-19918 520	000	134 700	000	000	000	000	000	000	000
286	000	-20582 470	000	149 730	000	000	000	000	000	000	000
287	000	-19918 520	000	150 900	000	000	000	000	000	000	000
288	10 000	-20582 470	000	157 480	1 419	001	10 000	000	000	000	000
289	38 000	-20582 470	000	154 380	16 018	022	38 000	000	000	000	000
290	189 000	-18590 620	005	129 920	52 410	070	123 660	64 479	835	000	000
291	145 500	-20582 470	049	134 540	42 100	000	134 540	73 595	2 646	000	000
292	199 000	-19918 520	114	132 900	55 880	000	132 900	136 517	5 704	000	000
293	61 500	-20582 470	226	131 750	97 750	000	131 750	62 854	8 882	000	000
294	4 000	-19918 520	243	120 900	62 361	5 592	71 953	000	3 551	000	000
295	11 000	-20582 470	024	120 900	2 597	3 536	14 534	000	000	000	000
296	000	-20582 470	000	129 270	000	000	000	000	000	000	000
297	000	-19918 520	000	134 700	000	000	000	000	000	000	000
298	4 000	-20582 470	000	149 730	000	000	4 000	000	000	000	000
299	1 000	-19918 520	000	150 900	000	000	1 000	000	000	000	000
300	12 500	-20582 470	000	157 480	1 918	002	12 500	000	000	000	000
301	85 500	-20582 470	001	154 380	20 400	000	48 820	36 428	251	000	000
302	100 500	-18590 620	005	129 920	42 115	419	86 235	50 795	145	000	000
303	370 000	-20582 470	55 553	134 540	49 760	000	134 540	164 085	66 629	000	000
304	298 000	-19918 520	69 692	132 900	45 450	000	132 900	164 217	161 715	000	000
305	68 500	-20582 470	5 009	131 750	95 500	000	131 750	96 789	160 886	000	000
306	116 500	-19918 520	4 816	120 900	89 190	000	120 900	88 645	159 815	000	000
307	13 500	-20582 470	4 879	120 900	91 338	11 928	113 066	000	144 044	000	000
308	7 000	-20582 470	7 533	129 270	000	57 252	64 252	000	83 382	000	000
309	7 500	-19918 520	1 929	134 700	000	37 723	45 223	000	43 810	000	000
310	1 500	-20582 470	929	149 730	000	26 799	26 299	000	16 138	000	000
311	27 000	-19918 520	257	150 900	2 937	13 733	40 730	000	2 179	000	000
312	25 000	-20582 470	009	157 480	2 837	2 177	27 174	000	000	000	000
313	186 500	-20582 470	007	154 380	28 380	000	99 600	85 626	1 264	000	000
314	258 500	-18590 620	074	129 920	63 740	000	129 920	178 621	21 051	000	000
315	480 500	-20582 470	175 702	134 540	36 080	000	134 540	178 621	204 613	000	000
316	415 000	-19918 520	136 066	132 900	45 520	000	132 900	178 621	266 234	000	000
317	100 500	-20582 470	110 002	131 750	77 000	000	131 750	127 165	262 748	000	000
318	10 000	-19918 520	7 817	120 900	111 870	000	120 900	14 215	256 993	000	000
319	9 500	-20582 470	6 938	120 900	15 892	79 073	102 764	000	171 175	000	000
320	000	-20582 470	4 188	129 270	000	69 540	69 540	000	97 595	000	000
321	000	-19918 520	2 239	134 700	000	44 731	44 731	000	50 719	000	000
322	000	-20582 470	1 098	149 730	000	29 773	29 773	000	19 909	000	000
323	40 500	-19918 520	350	150 900	21 391	13 711	54 162	000	5 926	000	000
324	213 500	-20582 470	106	157 480	58 994	3 943	119 657	96 914	2 756	000	000
325	297 500	-20582 470	26 925	154 380	28 320	000	154 380	172 311	43 472	000	000
326	400 000	-19254 570	106 860	134 560	25 980	000	134 560	176 305	197 750	000	000
327	340 000	-20582 470	138 054	134 540	44 600	000	134 540	175 547	265 778	000	000
328	495 500	-19918 520	361 854	132 900	24 440	000	132 900	176 205	265 865	000	000
329	309 500	-20582 470	179 482	131 750	35 000	000	131 750	174 197	266 142	000	000
330	82 500	-19918 520	7 986	120 900	76 160	000	120 900	131 119	262 880	000	000
331	60 000	-20582 470	8 092	120 900	93 800	000	120 900	66 814	258 202	000	000
332	3 500	-20582 470	7 598	129 270	66 299	51 556	121 354	000	199 678	000	000
333	37 500	-19918 520	5 002	134 700	5 521	63 157	100 648	000	131 667	000	000
334	8 000	-20582 470	3 145	149 730	000	59 605	67 605	000	69 042	000	000
335	4 500	-19918 520	1 514	150 900	000	36 495	40 995	000	31 109	000	000
336	2 500	-20582 470	609	157 480	000	22 503	25 003	000	8 043	000	000
337	74 500	-20582 470	135	154 380	26 490	7 589	81 979	000	445	000	000
338	21 000	-18590 620	001	129 920	719	445	21 444	000	000	000	000
339	181 000	-20582 470	004	134 540	37 169	031	101 780	78 355	859	000	000
340	404 000	-19918 520	59 388	132 900	36 160	000	132 900	178 621	100 309	000	000
341	257 500	-20582 470	56 039	131 750	43 250	000	131 750	178 621	181 658	000	000
342	228 500	-19918 520	48 411	120 900	34 950	000	120 900	166 611	252 712	000	000
343	69 000	-20582 470	12 219	120 900	93 000	000	120 900	95 762	259 429	000	000
344	7 500	-20582 470	7 903	129 270	94 698	24 851	127 048	000	227 799	000	000
345	8 500	-19918 520	5 439	134 700	000	88 134	96 634	000	134 414	000	000
346	16 500	-20582 470	3 280	149 730	2 667	57 772	74 269	000	73 487	000	000
347	500	-19918 520	1 601	150 900	000	39 053	39 553	000	32 915	000	000
348	17 500	-20582 470	666	157 480	919	21 503	39 002	000	10 792	000	000
349	8 500	-20582 470	131	154 380	000	10 683	19 183	000	000	000	000
350	65 500	-18590 620	001	129 920	37 271	166	65 499	000	000	000	000
351	63 500	-20582 470	002	134 540	36 271	207	63 498	000	000	000	000
352	199 500	-19918 520	010	132 900	51 410	030	98 810	99 257	1 421	000	000
353	236 000	-20582 470	20 296	131 750	71 750	000	131 750	158 331	26 251	000	000
354	83 500	-19918 520	838	120 900	77 690	000	120 900	116 608	29 729	000	000
355	108 000	-20582 470	967	120 900	81 600	000	120 900	99 702	32 762	000	000
356	5 500	-20582 470	1 019	129 270	99 837	4 730	108 737	000	28 216	000	000

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	CHUVA INFILTRACAO	VAZAO	VAZAO	EVAPOTRANSPIRACOES				UMIDADES			
		CSS	CAL	POTENCIAL	SUPERFICIE	SUBSOLO	TOTAL	SUPERFICIE	SUBSOLO	AQUIFERO	PROFUNDA
357	20 500	-19918 520	572	134 700	4 515	16 758	37 253	000	10 925	000	000
358	1 500	-20582 470	134	149 730	000	10 814	12 314	000	000	000	000
359	14 000	-19918 520	000	150 900	969	001	14 000	000	000	000	000
360	18 500	-20582 470	000	157 480	9 905	015	18 500	000	000	000	000
361	16 500	-20582 470	000	154 380	519	001	16 500	000	000	000	000
362	337 500	-18590 620	2 902	129 920	26 620	000	127 280	178 621	20 762	000	000
363	384 500	-20582 470	99 502	134 540	11 209	000	134 540	178 103	179 314	000	000
364	410 500	-19918 520	192 185	132 900	30 160	000	132 900	176 515	266 144	000	000
365	239 000	-20582 470	122 290	131 750	59 000	000	131 750	162 919	264 702	000	000
366	99 500	-19918 520	7 899	120 900	70 220	000	120 900	137 009	261 320	000	000
367	53 000	-20582 470	8 041	120 900	86 400	000	120 900	66 013	256 385	000	000
368	4 500	-20582 470	7 547	129 270	65 485	51 079	121 065	000	198 399	000	000
369	14 500	-19918 520	4 895	134 700	7 000	74 756	89 247	000	118 918	000	000
370	7 500	-20582 470	2 839	149 730	669	54 853	62 353	000	61 342	000	000
371	1 500	-19918 520	1 316	150 900	000	33 992	35 492	000	26 105	000	000
372	13 500	-20582 470	486	157 480	2 417	19 335	32 832	000	6 328	000	000
373	74 000	-20582 470	056	154 380	23 900	5 296	74 606	5 510	169	000	000
374	93 000	-19254 570	004	134 560	48 728	171	91 559	6 775	341	000	000
375	290 000	-20582 470	936	134 540	17 880	000	134 540	159 561	2 974	000	000
376	238 500	-19918 520	30 191	132 900	27 270	000	132 900	177 906	59 924	000	000
377	298 000	-20582 470	74 146	131 750	39 000	000	131 750	174 197	155 546	000	000
378	16 500	-19918 520	4 661	120 900	113 870	000	120 900	66 267	154 417	000	000
379	33 500	-20582 470	4 725	120 900	79 495	12 961	111 645	000	137 845	000	000
380	5 500	-20582 470	3 396	129 270	000	55 653	61 153	000	78 915	000	000
381	2 000	-19918 520	1 801	134 700	000	37 384	39 384	000	39 808	000	000
382	6 500	-20582 470	833	149 730	000	24 554	31 054	000	14 472	000	000
383	7 000	-19918 520	208	150 900	000	14 293	17 293	000	000	000	000
384	8 500	-20582 470	000	157 480	000	000	8 500	000	000	000	000
385	87 000	-20582 470	000	154 380	40 013	087	87 000	000	000	000	000
386	65 500	-18590 620	000	129 920	16 916	024	52 640	12 847	013	000	000
387	284 000	-20582 470	017	134 540	51 780	000	134 540	160 417	1 883	000	000
388	432 000	-19918 520	116 700	132 900	15 150	000	132 900	178 621	160 283	000	000
389	230 500	-20582 470	41 413	131 750	38 500	000	131 750	174 697	226 889	000	000
390	102 000	-19918 520	6 778	120 900	76 250	000	120 900	151 524	224 389	000	000
391	70 500	-20582 470	6 926	120 900	86 000	000	120 900	96 904	221 689	000	000
392	25 500	-20582 470	6 809	129 270	103 110	6 840	127 789	000	209 515	000	000
393	11 500	-19918 520	5 075	134 700	010	80 118	91 618	000	124 493	000	000
394	17 000	-20582 470	2 977	149 730	000	54 035	71 035	000	67 596	000	000
395	4 500	-19918 520	1 469	150 900	000	35 933	40 433	000	30 269	000	000
396	3 000	-20582 470	589	157 480	000	22 103	25 103	000	7 623	000	000
397	43 500	-20582 470	076	154 380	19 498	7 624	51 062	000	000	000	000
398	69 000	-18590 620	001	129 920	31 149	150	68 999	000	000	000	000
399	202 500	-20582 470	007	134 540	60 018	042	125 140	76 211	1 140	000	000
400	228 500	-19918 520	2 926	132 900	53 310	000	132 900	169 312	10 694	000	000
401	97 000	-20582 470	1 864	131 750	88 750	000	131 750	120 368	22 999	000	000
402	64 500	-19918 520	725	120 900	88 780	000	120 900	61 089	25 149	000	000
403	23 000	-20582 470	757	120 900	70 696	5 688	89 384	000	19 108	000	000
404	7 000	-20582 470	362	129 270	000	14 578	21 578	000	4 198	000	000
405	1 500	-19918 520	028	134 700	000	4 178	5 678	000	000	000	000
406	5 000	-20582 470	000	149 730	000	000	5 000	000	000	000	000
407	16 500	-19918 520	000	150 900	6 461	000	16 500	000	000	000	000
408	15 000	-20582 470	000	157 480	2 418	002	15 000	000	000	000	000
409	144 000	-20582 470	002	154 380	47 400	020	100 280	43 324	393	000	000
410	137 000	-18590 620	032	129 920	80 160	000	129 920	48 748	2 014	000	000
411	286 500	-20582 470	5 648	134 540	59 120	000	134 540	174 107	22 926	000	000
412	278 500	-19918 520	62 622	132 900	54 020	000	132 900	167 320	112 511	000	000
413	407 500	-20582 470	120 910	131 750	16 750	000	131 750	177 694	256 690	000	000
414	195 000	-19918 520	88 636	120 900	50 980	000	120 900	155 298	264 534	000	000
415	228 000	-20582 470	96 737	120 900	75 200	000	120 900	164 655	265 539	000	000
416	13 000	-20582 470	8 176	129 270	116 600	000	129 270	45 107	260 650	000	000
417	4 500	-19918 520	7 066	134 700	44 904	71 673	121 877	000	182 267	000	000
418	39 500	-20582 470	4 657	149 730	8 002	64 605	104 097	000	113 152	000	000
419	13 500	-19918 520	2 621	150 900	470	51 276	64 775	000	59 364	000	000
420	30 500	-20582 470	1 363	157 480	8 252	29 239	59 731	000	28 832	000	000
421	34 500	-20582 470	583	154 380	13 038	17 655	52 133	000	10 652	000	000
422	115 500	-19254 570	206	134 560	54 960	4 739	95 899	23 658	6 398	000	000
423	134 500	-20582 470	197	134 540	70 715	315	131 770	26 100	6 489	000	000
424	249 000	-19918 520	173	132 900	28 490	1 749	117 190	158 103	6 124	000	000
425	205 000	-20582 470	36 946	131 750	77 500	000	131 750	145 446	54 987	000	000
426	147 000	-19918 520	7 393	120 900	67 100	000	120 900	149 049	70 061	000	000
427	70 000	-20582 470	2 201	120 900	83 700	000	120 900	94 228	71 778	000	000
428	71 500	-20582 470	2 223	129 270	90 420	000	129 270	34 676	71 338	000	000
429	2 500	-19918 520	1 845	134 700	34 560	26 900	63 959	000	42 765	000	000
430	2 000	-20582 470	905	149 730	000	26 315	28 315	000	15 600	000	000
431	2 500	-19918 520	236	150 900	000	15 396	17 896	000	000	000	000
432	21 000	-20582 470	000	157 480	8 408	012	21 000	000	000	000	000
433	125 000	-20582 470	000	154 380	27 041	019	91 880	32 979	140	000	000
434	274 500	-18590 620	129	129 920	71 020	000	129 920	171 493	6 065	000	000
435	390 000	-20582 470	98 024	134 540	25 880	000	134 540	178 603	156 091	000	000
436	458 000	-19918 520	216 611	132 900	11 080	000	132 900	176 909	266 053	000	000
437	258 000	-20582 470	135 406	131 750	52 750	000	131 750	167 856	265 951	000	000
438	219 500	-19918 520	96 920	120 900	49 540	000	120 900	170 008	265 479	000	000
439	160 000	-20582 470	42 230	120 900	57 600	000	120 900	166 410	265 947	000	000
440	43 500	-20582 470	13 908	129 270	104 760	000	129 270	70 336	262 350	000	000
441	18 000	-19918 520	7 615	134 700	78 789	42 141	129 919	000	213 247	000	000
442	1 000	-20582 470	5 084	149 730	000	94 410	95 410	000	113 953	000	000
443	7 500	-19918 520	2 611	150 900	000	53 322	60 822	000	58 133	000	000
444	20 000	-20582 470	1 294	157 480	7 909	30 675	50 664	000	26 239	000	000
445	391 500	-20582 470	39 147	154 380	11 940	8 633	107 753	178 621	77 540	000	000

	CHUVA INFILTRACAO	VAZAO OBS	VAZAO CAL	EVAPOTRANSPIRACOES POTENCIAL	SUPERFICIE	SUBSOLO	TOTAL	UMIDADES SUPERFICIE	SUBSOLO	AQUIFERO	PROFUNDA
446	176 000	-18590 620	38 000	129 920	67 020	000	129 920	156 496	122 242	000	000
447	536 000	-20582 470	240 183	134 540	36 400	000	134 540	174 043	265 676	000	000
448	545 500	-19918 520	410 356	132 900	37 230	000	132 900	175 909	266 055	000	000
449	368 000	-20582 470	237 874	131 750	35 000	000	131 750	174 197	266 142	000	000
450	160 000	-19918 520	62 844	120 900	71 690	000	120 900	153 334	263 266	000	000
451	38 000	-20582 470	8 105	120 900	97 400	000	120 900	67 003	258 601	000	000
452	38 500	-20582 470	7 855	129 270	90 655	22 780	127 276	000	229 029	000	000
453	40 000	-19918 520	5 759	134 700	12 992	69 940	109 912	000	153 510	000	000
454	23 500	-20582 470	3 823	149 730	5 834	62 037	85 531	000	87 788	000	000
455	13 000	-19918 520	1 969	150 900	000	41 910	54 910	000	43 997	000	000
456	69 000	-20582 470	1 093	157 480	24 979	17 661	86 620	000	25 322	000	000
457	86 000	-20582 470	561	154 380	27 034	12 174	83 067	15 030	12 689	000	000
458	150 500	-18590 620	326	129 920	58 917	1 852	116 528	50 242	11 126	000	000
459	363 500	-20582 470	42 283	134 540	39 080	000	134 540	169 383	78 328	000	000
460	276 500	-19918 520	52 105	132 900	40 090	000	132 900	177 514	161 725	000	000
461	343 000	-20582 470	106 441	131 750	34 500	000	131 750	177 694	266 145	000	000
462	171 000	-19918 520	47 380	120 900	71 070	000	120 900	178 621	266 234	000	000
463	185 500	-20582 470	119 625	120 900	83 100	000	120 900	126 880	264 657	000	000
464	13 500	-20582 470	8 132	129 270	116 600	000	129 270	9 096	258 551	000	000
465	9 500	-19918 520	6 495	134 700	9 101	92 324	110 915	000	159 932	000	000
466	3 000	-20582 470	3 785	149 730	000	72 401	75 401	000	83 900	000	000
467	7 500	-19918 520	1 859	150 900	000	41 697	49 197	000	40 431	000	000
468	91 000	-20582 470	1 038	157 480	32 326	15 813	90 379	6 327	23 727	000	000
469	33 000	-20582 470	491	154 380	6 320	15 714	52 014	3 017	7 560	000	000
470	298 500	-19254 570	224	134 560	50 690	256	132 406	167 297	9 148	000	000
471	293 000	-20582 470	63 475	134 540	52 940	000	134 540	173 952	97 300	000	000
472	302 000	-19918 520	78 175	132 900	63 310	000	132 900	163 723	198 252	000	000
473	114 000	-20582 470	6 121	131 750	86 250	000	131 750	142 036	196 073	000	000
474	36 000	-19918 520	5 852	120 900	87 810	000	120 900	54 169	193 193	000	000
475	13 500	-20582 470	5 685	120 900	57 337	36 152	103 389	000	151 868	000	000
476	15 000	-20582 470	3 755	129 270	6 322	56 758	71 749	000	91 485	000	000
477	2 000	-19918 520	2 092	134 700	000	41 982	43 982	000	47 500	000	000
478	55 500	-20582 470	1 171	149 730	24 413	19 612	75 015	000	26 855	000	000
479	17 500	-19918 520	517	150 900	2 466	18 492	35 988	000	7 888	000	000
480	3 000	-20582 470	075	157 480	000	7 829	10 829	000	000	000	000
481	122 500	-20582 470	000	154 380	22 983	017	68 900	53 330	269	000	000
482	243 500	-18590 620	040	129 920	63 180	000	129 970	163 754	3 380	000	000
483	357 500	-20582 470	80 168	134 540	49 080	000	134 540	174 107	135 554	000	000
484	290 000	-19918 520	71 147	132 900	60 450	000	132 900	174 017	221 425	000	000
485	230 500	-20582 470	87 908	131 750	65 250	000	131 750	141 033	265 164	000	000
486	290 500	-19918 520	146 105	120 900	50 950	000	120 900	164 308	265 384	000	000
487	212 500	-20582 470	89 757	120 900	67 100	000	120 900	166 410	265 126	000	000
488	27 000	-20582 470	8 164	129 270	110 430	000	129 270	60 803	260 308	000	000
489	6 000	-19918 520	7 303	134 700	60 424	58 853	125 277	000	194 659	000	000
490	15 500	-20582 470	4 784	149 730	1 838	80 296	95 794	000	109 752	000	000
491	7 000	-19918 520	2 492	150 900	000	51 844	58 844	000	55 526	000	000
492	5 500	-20582 470	1 209	157 480	000	32 067	37 567	000	22 317	000	000
493	60 000	-20582 470	481	154 380	23 033	12 684	72 638	000	9 224	000	000
494	147 500	-18590 620	181	129 920	58 600	4 001	96 021	53 913	6 615	000	000
495	183 000	-20582 470	237	134 540	69 140	000	134 540	99 554	9 192	000	000
496	247 500	-19918 520	11 267	132 900	77 170	000	132 900	172 213	39 805	000	000
497	184 000	-20582 470	24 538	131 750	57 500	000	131 750	156 387	83 256	000	000
498	79 500	-19918 520	2 525	120 900	84 190	000	120 900	110 829	84 885	000	000
499	147 500	-20582 470	2 649	120 900	60 500	000	120 900	133 509	86 155	000	000
500	11 500	-20582 470	2 675	129 270	117 770	000	129 270	13 593	85 626	000	000
501	13 500	-19918 520	2 110	134 700	14 088	33 591	60 669	000	50 010	000	000
502	23 500	-20582 470	1 112	149 730	4 835	25 822	49 317	000	23 136	000	000
503	19 000	-19918 520	423	150 900	000	17 622	30 152	6 464	5 134	000	000
504	51 500	-20582 470	080	157 480	36 029	5 180	63 028	000	000	000	000
505	33 500	-20582 470	000	154 380	20 963	057	33 500	000	000	000	000
506	144 000	-18590 620	001	129 920	000	000	40 620	102 907	472	000	000
507	243 500	-20582 470	5 669	134 540	69 620	000	134 540	178 588	28 026	000	000
508	98 500	-19918 520	890	132 900	97 820	000	132 900	139 826	31 492	000	000
509	317 000	-20582 470	83 446	131 750	53 000	000	131 750	147 320	130 603	000	000
510	72 500	-19918 520	3 921	120 900	89 280	000	120 900	90 118	130 484	000	000
511	4 500	-20582 470	3 983	120 900	89 096	13 690	107 286	000	113 865	000	000
512	32 500	-20582 470	2 811	129 270	12 141	38 793	71 274	000	72 364	000	000
513	56 000	-19918 520	1 914	134 700	44 257	22 708	78 444	000	48 055	000	000
514	3 000	-20582 470	1 040	149 730	000	28 267	31 267	000	18 811	000	000
515	5 500	-19918 520	315	150 900	000	16 614	22 114	000	1 917	000	000
516	2 000	-20582 470	008	157 480	000	1 913	3 913	000	000	000	000
517	91 000	-20582 470	004	154 380	64 175	401	90 996	000	000	000	000
518	483 000	-19254 570	87 652	134 560	20 836	024	105 100	178 621	104 897	000	000
519	170 000	-20582 470	53 436	134 540	97 320	000	134 540	118 816	153 150	000	000
520	50 000	-19918 520	4 571	132 900	107 680	000	132 900	33 675	150 824	000	000
521	59 500	-20582 470	4 328	131 750	69 737	22 826	113 563	2 147	124 015	000	000
522	39 500	-19918 520	3 252	120 900	17 036	34 974	76 600	000	85 885	000	000
523	22 000	-20582 470	2 215	120 900	8 085	31 350	53 335	000	52 403	000	000
524	2 000	-20582 470	1 198	129 270	000	26 796	28 796	000	24 464	000	000
525	25 000	-19918 520	533	134 700	3 034	15 018	40 013	000	8 950	000	000
526	10 000	-20582 470	102	149 730	000	8 867	18 867	000	000	000	000
527	15 500	-19918 520	000	150 900	1 469	001	15 500	000	000	000	000
528	10 500	-20582 470	000	157 480	1 918	002	10 500	000	000	000	000
529	101 000	-20582 470	000	154 380	21 511	009	78 880	21 952	167	000	000
530	44 500	-18590 620	002	129 920	43 290	268	66 617	000	000	000	000
531	420 000	-20582 470	71 392	134 540	6 360	000	85 460	176 070	86 904	000	000
532	112 000	-19918 320	25 487	132 900	101 890	000	132 900	96 793	119 720	000	000
533	103 500	-20582 470	3 710	131 750	96 500	000	131 750	65 307	119 254	000	000
534	27 500	-19918 320	3 516	120 900	76 986	13 375	105 421	000	103 155	000	000

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	CHUVA INFILTRACAO	VAZAO OBS	VAZAO CAL	EVAPOTRANSPIRACOES POTENCIAL	EVAPOTRANSPIRACOES SUPERFICIE	EVAPOTRANSPIRACOES SUBSOLO	EVAPOTRANSPIRACOES TOTAL	UNIDADES SUPERFICIE	UNIDADES SUBSOLO	UNIDADES AQUIFERO	UNIDADES PROFUNDA
535	1 500	-20582 470	2 522	120 900	000	42 445	43 945	000	58 279	000	000
536	2 500	-20582 470	1 352	129 270	000	28 776	31 276	000	28 212	000	000
537	1 500	-19918 520	561	134 700	000	18 949	20 448	000	8 743	000	000
538	500	-20582 470	092	149 730	000	8 668	9 168	000	000	000	000
539	2 000	-19918 520	000	150 900	000	000	2 000	000	000	000	000
540	87 000	-20582 470	092	157 480	32 560	000	57 380	29 105	512	000	000
542	139 000	-18590 620	006	129 920	58 187	447	114 674	41 655	382	000	000
543	180 000	-20582 470	054	134 540	63 320	000	134 540	84 014	3 423	000	000
544	219 500	-19918 520	147	132 900	50 950	000	132 900	166 837	7 046	000	000
545	162 500	-20582 470	19 416	131 750	65 500	000	131 750	149 652	35 508	000	000
546	73 500	-19918 520	1 115	120 900	91 720	000	120 900	98 000	38 638	000	000
547	59 500	-20582 470	1 214	120 900	91 500	000	120 900	34 549	39 473	000	000
548	1 500	-20582 470	1 029	129 270	34 424	17 212	53 136	000	21 394	000	000
549	18 500	-19918 520	424	134 700	509	14 747	33 246	000	6 253	000	000
550	10 500	-20582 470	052	149 730	000	6 214	16 714	000	000	000	000
551	7 000	-19918 520	000	150 900	000	000	7 000	000	000	000	000
552	17 000	-20582 470	000	157 480	000	000	17 000	000	000	000	000
553	13 500	-20582 470	000	154 380	7 509	011	13 500	000	000	000	000
554	79 500	-18590 620	003	129 920	58 717	360	79 497	000	000	000	000
555	79 000	-20582 470	001	134 540	39 566	113	72 219	6 717	062	000	000
556	43 000	-19918 520	000	132 900	20 407	093	49 780	000	000	000	000
557	40 500	-20582 470	000	131 750	14 481	019	40 500	000	000	000	000
558	21 500	-19918 520	000	120 900	15 930	039	21 500	000	000	000	000
559	7 500	-20582 470	000	120 900	1 099	001	7 500	000	000	000	000
560	5 000	-20582 470	000	129 270	829	001	5 000	000	000	000	000
561	500	-19918 520	000	134 700	000	000	500	000	000	000	000
562	4 000	-20582 470	000	149 730	000	000	4 000	000	000	000	000
563	000	-19918 520	000	150 900	000	000	000	000	000	000	000
564	10 500	-20582 470	000	157 480	000	000	10 500	000	000	000	000
565	28 500	-20582 470	000	154 380	5 011	009	28 500	000	000	000	000
566	87 500	-19254 570	003	134 560	46 499	298	84 137	3 357	003	000	000
567	209 000	-20582 470	010	134 540	54 780	000	134 540	76 850	958	000	000
568	197 000	-19918 520	066	132 900	44 950	000	132 900	137 729	4 107	000	000
569	180 500	-20582 470	16 218	131 750	50 750	000	131 750	146 956	27 365	000	000
570	215 000	-19918 520	24 049	120 900	61 100	000	120 900	175 915	68 375	000	000
571	68 500	-20582 470	2 156	120 900	83 700	000	120 900	119 124	70 605	000	000
572	30 500	-20582 470	2 193	129 270	110 760	000	129 270	18 569	70 198	000	000
573	9 500	-19918 520	1 752	134 700	19 049	28 614	56 653	000	39 921	000	000
574	9 000	-20582 470	872	149 730	1 169	24 245	33 244	000	14 855	000	000
575	1 500	-19918 520	216	150 900	000	14 670	16 170	000	000	000	000
576	000	-20582 470	000	157 480	000	000	000	000	000	000	000
577	96 000	-20582 470	001	154 380	15 880	000	72 240	23 453	305	000	000
578	326 000	-18590 620	19 102	129 920	29 540	000	129 920	166 192	34 476	000	000
579	289 500	-20582 470	65 314	134 540	41 780	000	134 540	172 549	117 598	000	000
580	216 000	-19918 520	44 476	132 900	54 380	000	132 900	159 486	169 182	000	000
581	188 500	-20582 470	27 029	131 750	66 250	000	131 750	155 205	203 116	000	000
582	129 000	-19918 520	6 077	120 900	62 070	000	120 900	158 641	201 706	000	000
583	116 000	-20582 470	8 386	120 900	68 800	000	120 900	135 794	211 248	000	000
584	13 000	-20582 470	6 502	129 270	117 100	900	129 270	17 286	206 992	000	000
585	10 500	-19918 520	5 285	134 700	17 262	70 492	98 254	000	131 388	000	000
586	000	-20582 470	3 073	149 730	000	62 097	62 097	000	66 350	000	000
587	4 000	-19918 520	1 449	150 900	000	35 527	39 527	000	29 449	000	000
588	74 500	-20582 470	644	157 480	22 111	15 263	73 774	15 904	13 659	000	000
589	53 000	-20582 470	308	154 380	39 314	9 473	78 247	000	4 027	000	000
590	189 500	-18590 620	126	129 920	58 020	000	129 920	58 455	5 023	000	000
591	295 500	-20582 470	2 538	134 540	44 580	000	134 540	178 621	31 616	000	000
592	318 500	-19918 520	75 582	132 900	42 230	000	132 900	178 621	140 075	000	000
593	64 000	-20582 470	17 298	131 750	90 250	000	131 750	106 842	139 759	000	000
594	143 000	-19918 520	4 188	120 900	68 600	000	120 900	125 222	139 292	000	000
595	23 000	-20582 470	4 301	120 900	105 600	000	120 900	24 901	137 415	000	000
596	20 500	-20582 470	3 760	129 270	32 484	40 055	85 380	000	93 762	000	000
597	6 000	-19918 520	2 146	134 700	1 508	41 803	47 801	000	49 903	000	000
598	8 500	-20582 470	1 108	149 730	000	28 140	36 640	000	20 714	000	000
599	14 000	-19918 520	370	150 900	1 938	16 570	30 568	000	3 811	000	000
600	25 000	-20582 470	027	157 480	2 338	3 794	28 792	000	000	000	000
TOT	44928 500	500	7479 480	82424 020	16417 120	4803 745	37504 030				000

– Rescultados do HEC-1 para a Bacia do Rio Catu

C \WINWORD\RELATORI\A204295 DOC

GEONORTE - *Engenharia de Solos e Fundações Ltda*
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

- RESULTADOS DO HEC-1 PARA A BACIA DO RIACHO CATU

```
1*****************************************
*****************************************
 *                                       *
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *   U S  ARMY CORPS OF ENGINEERS        *
 *             SEPTEMBER 1990            *
 *   HYDROLOGIC ENGINEERING CENTER       *
 *             VERSION 4 0               *
 *          609 SECOND STREET            *
 *                                       *
 *       DAVIS, CALIFORNIA 95616         *
 *  RUN DATE  07/12/1995  TIME  21 40 29 *
 *          (916) 756-1104               *
 *                                       *
 *                                       *
 *****************************************
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS HEC1DB AND HEC1KW

THE DEFINITIONS OF VARIABLES -PTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 91 THIS IS THE FORTRAN77 VERSION

NEW OPTIONS DAMBREAK OUTFLOW SUBMERGENCE SINGLE EVENT DAMAGE CALCULATION, DSS WRITE STAGE FREQUENCY

DSS READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE GREEN AND AMPT INFILTRATION

KINEMATIC WAVE NEW FINITE DIFFERENCE ALGORITHM

LAGOA DO CATU - CHEIA ASSOCIADA AO HIETOGRAMA TR = 1000 ANOS

```
1                                        HEC-1 INPUT                                        PAGE  1

          LINE          ID      1       2       3       4       5       6       7       8       9      10

             1          ID          BACIA HIDROGRAFICA DO RESERVATORIO CATU
             2          ID          MODELO SCS DA BACIA
             3          IT      30 01JUL95      00     150
             4          IO
             5          IM
                        *DIAGRAM

             6          KK  SBCATU
             7          KM        ESC  SUPERFICIAL SUBBACIA RESERVATORIO CATU (SCS)
             8          KO        1       2
             9          BA   166 9
            10          PH    1000       0   16 02   32 19   63 31   84 80   92 67  114 54  134 52  153 31
            11          LS                65
            12          UD    7 40
                        *

            13          KK  RES
            14          KM      ROUTE SBCATU THROUGH RES  CATU
            15          KO        1       2
            16          RS        1    ELEV   5 844
            17          SV        0  78 625 494 875 1394 63 2705 13 4459 13 6710 63 9511 13   19000   45000
            18          SE        1       2       3       4       5       6       7       8      10      15
            19          SS    5 844      40     2 10     1 5
            20          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING           (--->) DIVERSION OR PUMP FLOW

   NO       ( ) CONNECTOR         (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6      SBCATU
                 V
                 V
    13      RES

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1**************************************
*                                    *                    **************************************
*                                    *                    *                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*                    *                                    *
*           SEPTEMBER 1990           *                    *   U S  ARMY CORPS OF ENGINEERS     *
*            VERSION 4 0             *                    *   HYDROLOGIC ENGINEERING CENTER    *
*                                    *                    *        609 SECOND STREET           *
*                                    *                    *      DAVIS, CALIFORNIA 95616       *
*  RUN DATE  09/08/1995  TIME  21 49 14*                   *          (916) 756-1104            *
*                                    *                    *                                    *
**************************************                    **************************************
                                  BACIA HIDROGRAFICA DO RESERVATORIO CATU
                                  MODELO SCS DA BACIA

    4 IO          OUTPUT CONTROL VARIABLES
                        IPRNT          0  PRINT CONTROL
                        IPLOT          0  PLOT CONTROL
                        QSCAL          0  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                        NMIN          30  MINUTES IN COMPUTATION INTERVAL
                        IDATE      1JUL95  STARTING DATE
                        ITIME        0000  STARTING TIME
                          NQ         150  NUMBER OF HYDROGRAPH ORDINATES
                       NDDATE      4JUL95  ENDING DATE
                       NDTIME        0230  ENDING TIME
                       ICENT          19  CENTURY MARK

                    COMPUTATION INTERVAL      0.50 HOURS
                        TOTAL TIME BASE   74.50 HOURS

            METRIC UNITS
                 DRAINAGE AREA          SQUARE KILOMETERS
                 PRECIPITATION DEPTH    MILLIMETERS
                 LENGTH, ELEVATION      METERS
                 FLOW                   CUBIC METERS PER SECOND
                 STORAGE VOLUME         CUBIC METERS
                 SURFACE AREA           SQUARE METERS
                 TEMPERATURE            DEGREES CELSIUS
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
               ***************
               *             *
               *             *
    6 KK       *   SBCATU    *
               *             *
               ***************
                                  SBC  SUPERFICIAL SUBBACIA RESERVATORIO CATU (SCS)

    8 KO          OUTPUT CONTROL VARIABLES
                        IPRNT          1  PRINT CONTROL
                        IPLOT          2  PLOT CONTROL
                        QSCAL          0  HYDROGRAPH PLOT SCALE

                SUBBASIN RUNOFF DATA
```

```
 9 BA          SUBBASIN CHARACTERISTICS
                    TAREA       166 90  SUBBASIN AREA

               PRECIPITATION DATA

10 PH                                DEPTHS FOR1000-PERCENT HYPOTHETICAL STORM
                    HYDRO-35                          TP-40                                TP-49
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
               16 02   32 19   63 31   84 80   92 67  114 54  134 52  153 31      00      00      00      00

                                                  STORM AREA =  166 90

11 LS          SCS LOSS RATE
                    STRTL       27 35  INITIAL ABSTRACTION
                   CRVNBR       65 00  CURVE NUMBER
                    RTIMP          00  PERCENT IMPERVIOUS AREA

12 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG        7 40  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                            76 END-OF-PERIOD ORDINATES
                    0       0       0       1       1       1       2       2       3       3
                    4       4       4       4       5       5       4       4       4       4
                    4       3       3       3       2       2       2       2       2       1
                    1       1       1       1       1       1       1       1       1       0
                    0       0       0       0       0       0       0       0       0       0
                    0       0       0       0       0       0       0       0       0       0
                    0       0       0       0       0       0       0       0       0       0
                    0       0       0       0       0       0
```

****

HYDROGRAPH AT STATION SBCATU

****

DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
						*						
1 JUL 0000	1	00	00	00	0	*	2 JUL 1330	76	00	00	00	16
1 JUL 0030	2	70	70	00	0	*	2 JUL 1400	77	00	00	00	14
1 JUL 0100	3	73	73	00	0	*	2 JUL 1430	78	00	00	00	13
1 JUL 0130	4	75	75	00	0	*	2 JUL 1500	79	00	00	00	12
1 JUL 0200	5	78	78	00	0	*	2 JUL 1530	80	00	00	00	10
1 JUL 0230	6	81	81	00	0	*	2 JUL 1600	81	00	00	00	9
1 JUL 0300	7	84	84	00	0	*	2 JUL 1630	82	00	00	00	8
1 JUL 0330	8	88	88	00	0	*	2 JUL 1700	83	00	00	00	8
1 JUL 0400	9	92	92	00	0	*	2 JUL 1730	84	00	00	00	7
1 JUL 0430	10	96	96	00	0	*	2 JUL 1800	85	00	00	00	6
1 JUL 0500	11	1 01	1 01	00	0	*	2 JUL 1830	86	00	00	00	6
1 JUL 0530	12	1 07	1 07	00	0	*	2 JUL 1900	87	00	00	00	5
1 JUL 0600	13	1 13	1 13	00	0	*	2 JUL 1930	88	00	00	00	4
1 JUL 0630	14	1 53	1 53	00	0	*	2 JUL 2000	89	00	00	00	4
1 JUL 0700	15	1 62	1 62	00	0	*	2 JUL 2030	90	00	00	00	4
1 JUL 0730	16	1 74	1 74	00	0	*	2 JUL 2100	91	00	00	00	3
1 JUL 0800	17	1 88	1 88	00	0	*	2 JUL 2130	92	00	00	00	3
1 JUL 0830	18	2 04	2 04	00	0	*	2 JUL 2200	93	00	00	00	3
1 JUL 0900	19	2 25	2 25	00	0	*	2 JUL 2230	94	00	00	00	2
1 JUL 0930	20	3 20	3 20	00	0	*	2 JUL 2300	95	00	00	00	2
1 JUL 1000	21	3 59	3 59	01	0	*	2 JUL 2330	96	00	00	00	2
1 JUL 1030	22	4 16	3 97	18	0	*	3 JUL 0000	97	00	00	00	2
1 JUL 1100	23	4 43	3 98	44	0	*	3 JUL 0030	98	00	00	00	1
1 JUL 1130	24	9 99	8 16	1 83	0	*	3 JUL 0100	99	00	00	00	1
1 JUL 1200	25	16 43	11 37	5 06	1	*	3 JUL 0130	100	00	00	00	1
1 JUL 1230	26	26 53	14 40	12 13	4	*	3 JUL 0200	101	00	00	00	1
1 JUL 1300	27	11 51	5 12	6 39	8	*	3 JUL 0230	102	00	00	00	1
1 JUL 1330	28	5 06	2 08	2 98	13	*	3 JUL 0300	103	00	00	00	1
1 JUL 1400	29	4 54	1 78	2 76	21	*	3 JUL 0330	104	00	00	00	1
1 JUL 1430	30	3 85	1 46	2 39	31	*	3 JUL 0400	105	00	00	00	0
1 JUL 1500	31	3 38	1 24	2 14	42	*	3 JUL 0430	106	00	00	00	0
1 JUL 1530	32	2 37	85	1 53	57	*	3 JUL 0500	107	00	00	00	0
1 JUL 1600	33	2 14	75	1 39	73	*	3 JUL 0530	108	00	00	00	0
1 JUL 1630	34	1 95	67	1 28	91	*	3 JUL 0600	109	00	00	00	0
1 JUL 1700	35	1 80	61	1 19	109	*	3 JUL 0630	110	00	00	00	0
1 JUL 1730	36	1 68	56	1 12	125	*	3 JUL 0700	111	00	00	00	0
1 JUL 1800	37	1 57	52	1 06	141	*	3 JUL 0730	112	00	00	00	0
1 JUL 1830	38	1 16	38	79	153	*	3 JUL 0800	113	00	00	00	0
1 JUL 1900	39	1 10	35	74	164	*	3 JUL 0830	114	00	00	00	0
1 JUL 1930	40	1 04	33	71	172	*	3 JUL 0900	115	00	00	00	0
1 JUL 2000	41	99	31	67	178	*	3 JUL 0930	116	00	00	00	0
1 JUL 2030	42	94	30	64	182	*	3 JUL 1000	117	00	00	00	0
1 JUL 2100	43	90	28	62	183	*	3 JUL 1030	118	00	00	00	0
1 JUL 2130	44	86	27	59	183	*	3 JUL 1100	119	00	00	00	0
1 JUL 2200	45	83	25	57	181	*	3 JUL 1130	120	00	00	00	0
1 JUL 2230	46	79	24	55	177	*	3 JUL 1200	121	00	00	00	0
1 JUL 2300	47	77	23	53	171	*	3 JUL 1230	122	00	00	00	0
1 JUL 2330	48	74	22	52	165	*	3 JUL 1300	123	00	00	00	0
2 JUL 0000	49	71	21	50	156	*	3 JUL 1330	124	00	00	00	0
2 JUL 0030	50	00	00	00	148	*	3 JUL 1400	125	00	00	00	0
2 JUL 0100	51	00	00	00	139	*	3 JUL 1430	126	00	00	00	0
2 JUL 0130	52	00	00	00	131	*	3 JUL 1500	127	00	00	00	0
2 JUL 0200	53	00	00	00	124	*	3 JUL 1530	128	00	00	00	0
2 JUL 0230	54	00	00	00	117	*	3 JUL 1600	129	00	00	00	0
2 JUL 0300	55	00	00	00	110	*	3 JUL 1630	130	00	00	00	0
2 JUL 0330	56	00	00	00	103	*	3 JUL 1700	131	00	00	00	0
2 JUL 0400	57	00	00	00	97	*	3 JUL 1730	132	00	00	00	0
2 JUL 0430	58	00	00	00	90	*	3 JUL 1800	133	00	00	00	0
2 JUL 0500	59	00	00	00	84	*	3 JUL 1830	134	00	00	00	0
2 JUL 0530	60	00	00	00	78	*	3 JUL 1900	135	00	00	00	0
2 JUL 0600	61	00	00	00	72	*	3 JUL 1930	136	00	00	00	0

2 JUL 0630	62	00	00	00	66	*	3 JUL 2000	137	00	00	00	0
2 JUL 0700	63	00	00	00	61	*	3 JUL 2030	138	00	00	00	0
2 JUL 0730	64	00	00	00	55	*	3 JUL 2100	139	00	00	00	0
2 JUL 0800	65	00	00	00	50	*	3 JUL 2130	140	00	00	00	0
2 JUL 0830	66	00	00	00	46	*	3 JUL 2200	141	00	00	00	0
2 JUL 0900	67	00	00	00	41	*	3 JUL 2230	142	00	00	00	0
2 JUL 0930	68	00	00	00	37	*	3 JUL 2300	143	00	00	00	0
2 JUL 1000	69	00	00	00	34	*	3 JUL 2330	144	00	00	00	0
2 JUL 1030	70	00	00	00	30	*	4 JUL 0000	145	00	00	00	0
2 JUL 1100	71	00	00	00	27	*	4 JUL 0030	146	00	00	00	0
2 JUL 1130	72	00	00	00	24	*	4 JUL 0100	147	00	00	00	0
2 JUL 1200	73	00	00	00	22	*	4 JUL 0130	148	00	00	00	0
2 JUL 1230	74	00	00	00	20	*	4 JUL 0200	149	00	00	00	0
2 JUL 1300	75	00	00	00	18	*	4 JUL 0230	150	00	00	00	0

TOTAL RAINFALL = 140 64, TOTAL LOSS = 89 32, TOTAL EXCESS = 51 32

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	74 50-HR
+ (CU M/S)	(HR)				
		(CU M/S)			
+ 183	21 00	172	96	33	32
	(MM)	22 249	49 556	51 324	51 324
	(1000 CU M)	3713	8271	8566	8566

CUMULATIVE AREA = 166 90 SQ KM

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
              **************
              *            *
   13 KK      *    RES     *
              *            *
              **************
```

ROUTE SBCATU THROUGH RES CATU

```
   15 KO          OUTPUT CONTROL VARIABLES
                        IPRNT          1  PRINT CONTROL
                        IPLOT          2  PLOT CONTROL
                        QSCAL          0  HYDROGRAPH PLOT SCALE

                  HYDROGRAPH ROUTING DATA

   16 RS          STORAGE ROUTING
                        NSTPS          1  NUMBER OF SUBREACHES
                         ITYP       ELEV  TYPE OF INITIAL CONDITION
                       RSVRIC       5 84  INITIAL CONDITION
                            X         00 WORKING R AND D COEFFICIENT

   17 SV            STORAGE          0     78 6    494 9    1394 6   2705 1   4459 1   6710 6   9511 1   19000 0
45000 0

   18 SE            ELEVATION      1 00    2 00    3 00     4 00     5 00     6 00     7 00     8 00     10 00
15 00

   19 SS            SPILLWAY
                        CREL       5 84  SPILLWAY CREST ELEVATION
                        SPWID     40 00  SPILLWAY WIDTH
                        COQW       2 10  WEIR COEFFICIENT
                        EXPW       1 50  EXPONENT OF HEAD
```

***

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	00	00	40	3 19	10 77	25 54	49 88	86 19	136 87	204 31
ELEVATION	1 00	5 84	5 87	5 96	6 10	6 30	6 55	6 86	7 23	7 65
OUTFLOW	290 90	399 04	531 13	689 55	876 70	1094 98	1346 77	1634 48	1960 50	2327 22
ELEVATION	8 13	8 67	9 26	9 91	10 62	11 38	12 20	13 08	14 01	15 00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	00	78 63	494 88	1394 63	2705 13	4105 51	4235 07	4383 77	4459 13	4680 53
OUTFLOW	00	00	00	00	00	00	40	3 19	5 18	10 77
ELEVATION	1 00	2 00	3 00	4 00	5 00	5 84	5 87	5 96	6 00	6 10
STORAGE	5125 91	5698 54	6398 42	6710 63	7351 12	8538 22	9511 13	10142 14	12689 55	15505 11
OUTFLOW	25 54	49 88	86 19	104 40	136 87	204 31	265 92	290 90	399 04	531 13
ELEVATION	6 30	6 55	6 86	7 00	7 23	7 65	8 00	8 13	8 67	9 26
STORAGE	16588 61	19000 00	22221 01	26190 62	30452 13	35007 52	39856 81	45000 00		
OUTFLOW	689 55	711 69	876 70	1094 98	1346 77	1634 48	1960 50	2327 22		
ELEVATION	9 91	10 00	10 62	11 38	12 20	13 08	14 01	15 00		

HYDROGRAPH AT STATION RES

DA MON HRMN ORD	OUTFLOW	STORAGE	STAGE	DA MON HRMN ORD	OUTFLOW	STORAGE	STAGE	DA MON HRMN ORD	OUTFLOW	STORAGE	STAGE
1 JUL 0000 1	0	4185 5	5 8	* 2 JUL 0100 51	128	7185 7	7 2	* 3 JUL 0200 101	13	4741 3	6 1
1 JUL 0030 2	0	4185 5	5 8	* 2 JUL 0130 52	129	7197 6	7 2	* 3 JUL 0230 102	12	4720 4	6 1
1 JUL 0100 3	0	4185 5	5 8	* 2 JUL 0200 53	129	7195 3	7 2	* 3 JUL 0300 103	11	4700 4	6 1
1 JUL 0130 4	0	4185 5	5 8	* 2 JUL 0230 54	128	7180 3	7 2	* 3 JUL 0330 104	11	4681 4	6 1
1 JUL 0200 5	0	4185 5	5 8	* 2 JUL 0300 55	127	7154 5	7 2	* 3 JUL 0400 105	10	4663 3	6 1
1 JUL 0230 6	0	4185 5	5 8	* 2 JUL 0330 56	125	7119 2	7 1	* 3 JUL 0430 106	10	4645 9	6 1
1 JUL 0300 7	0	4185 5	5 8	* 2 JUL 0400 57	123	7075 8	7 1	* 3 JUL 0500 107	9	4629 1	6 1

1	JUL	0330	8		0	4185	5	5	8	*	2	JUL	0430	58	120	7025	2	7	1	*	3	JUL	0530	108	9	4613	0	6	1
1	JUL	0400	9		0	4185	5	5	8	*	2	JUL	0500	59	117	6968	1	7	1	*	3	JUL	0600	109	9	4597	5	6	1
1	JUL	0430	10		0	4185	5	5	8	*	2	JUL	0530	60	114	6905	3	7	1	*	3	JUL	0630	110	8	4582	6	6	1
1	JUL	0500	11		0	4185	5	5	8	*	2	JUL	0600	61	111	6837	4	7	0	*	3	JUL	0700	111	8	4568	4	6	0
1	JUL	0530	12		0	4185	5	5	8	*	2	JUL	0630	62	107	6765	2	7	0	*	3	JUL	0730	112	8	4554	7	6	0
1	JUL	0600	13		0	4185	5	5	8	*	2	JUL	0700	63	103	6689	8	7	0	*	3	JUL	0800	113	7	4541	6	6	0
1	JUL	0630	14		0	4185	5	5	8	*	2	JUL	0730	64	99	6612	4	7	0	*	3	JUL	0830	114	7	4529	0	6	0
1	JUL	0700	15		0	4185	5	5	8	*	2	JUL	0800	65	94	6534	1	6	9	*	3	JUL	0900	115	7	4516	9	6	0
1	JUL	0730	16		0	4185	5	5	8	*	2	JUL	0830	66	90	6455	4	6	9	*	3	JUL	0930	116	6	4505	4	6	0
1	JUL	0800	17		0	4185	5	5	8	*	2	JUL	0900	67	85	6376	8	6	9	*	3	JUL	1000	117	6	4494	3	6	0
1	JUL	0830	18		0	4185	5	5	8	*	2	JUL	0930	68	81	6298	4	6	8	*	3	JUL	1030	118	6	4483	7	6	0
1	JUL	0900	19		0	4185	5	5	8	*	2	JUL	1000	69	77	6220	2	6	8	*	3	JUL	1100	119	6	4473	6	6	0
1	JUL	0930	20		0	4185	5	5	8	*	2	JUL	1030	70	73	6142	0	6	7	*	3	JUL	1130	120	5	4463	9	6	0
1	JUL	1000	21		0	4185	5	5	8	*	2	JUL	1100	71	69	6066	9	6	7	*	3	JUL	1200	121	5	4454	6	6	0
1	JUL	1030	22		0	4185	5	5	8	*	2	JUL	1130	72	65	5992	5	6	7	*	3	JUL	1230	122	5	4445	7	6	0
1	JUL	1100	23		0	4185	6	5	8	*	2	JUL	1200	73	61	5920	2	6	6	*	3	JUL	1300	123	5	4437	2	6	0
1	JUL	1130	24		0	4186	0	5	8	*	2	JUL	1230	74	58	5850	3	6	6	*	3	JUL	1330	124	4	4429	2	6	0
1	JUL	1200	25		0	4187	4	5	8	*	2	JUL	1300	75	54	5783	0	6	6	*	3	JUL	1400	125	4	4421	4	6	0
1	JUL	1230	26		0	4191	7	5	8	*	2	JUL	1330	76	51	5718	5	6	6	*	3	JUL	1430	126	4	4414	1	6	0
1	JUL	1300	27		0	4201	6	5	9	*	2	JUL	1400	77	48	5656	5	6	5	*	3	JUL	1500	127	4	4407	1	6	0
1	JUL	1330	28		0	4220	2	5	9	*	2	JUL	1430	78	46	5596	7	6	5	*	3	JUL	1530	128	4	4400	4	6	0
1	JUL	1400	29		1	4250	5	5	9	*	2	JUL	1500	79	43	5530	9	6	5	*	3	JUL	1600	129	3	4394	0	6	0
1	JUL	1430	30		2	4295	3	5	9	*	2	JUL	1530	80	41	5483	2	6	5	*	3	JUL	1630	130	3	4387	9	6	0
1	JUL	1500	31		3	4357	4	5	9	*	2	JUL	1600	81	39	5429	7	6	4	*	3	JUL	1700	131	3	4382	1	6	0
1	JUL	1530	32		5	4440	1	6	0	*	2	JUL	1630	82	36	5378	5	6	4	*	3	JUL	1730	132	3	4376	5	6	0
1	JUL	1600	33		7	4546	2	6	0	*	2	JUL	1700	83	34	5329	4	6	4	*	3	JUL	1800	133	3	4371	1	5	9
1	JUL	1630	34		11	4677	7	6	1	*	2	JUL	1730	84	32	5282	6	6	4	*	3	JUL	1830	134	3	4365	9	5	9
1	JUL	1700	35		16	4833	6	6	2	*	2	JUL	1800	85	30	5237	9	6	3	*	3	JUL	1900	135	3	4360	8	5	9
1	JUL	1730	36		22	5010	5	6	2	*	2	JUL	1830	86	28	5195	5	6	3	*	3	JUL	1930	136	3	4355	9	5	9
1	JUL	1800	37		29	5204	4	6	3	*	2	JUL	1900	87	27	5155	1	6	3	*	3	JUL	2000	137	3	4351	2	5	9
1	JUL	1830	38		38	5409	2	6	4	*	2	JUL	1930	88	25	5116	8	6	3	*	3	JUL	2030	138	2	4346	6	5	9
1	JUL	1900	39		47	5619	3	6	5	*	2	JUL	2000	89	24	5080	2	6	3	*	3	JUL	2100	139	2	4342	2	5	9
1	JUL	1930	40		57	5829	1	6	6	*	2	JUL	2030	90	23	5048	0	6	3	*	3	JUL	2130	140	2	4337	9	5	9
1	JUL	2000	41		67	6033	0	6	7	*	2	JUL	2100	91	22	5011	1	6	2	*	3	JUL	2200	141	2	4333	8	5	9
1	JUL	2030	42		77	6227	2	6	8	*	2	JUL	2130	92	21	4978	6	6	2	*	3	JUL	2230	142	2	4329	8	5	9
1	JUL	2100	43		87	6408	3	6	9	*	2	JUL	2200	93	20	4947	5	6	2	*	3	JUL	2300	143	2	4326	0	5	9
1	JUL	2130	44		96	6572	8	6	9	*	2	JUL	2230	94	19	4917	6	6	2	*	3	JUL	2330	144	2	4322	2	5	9
1	JUL	2200	45		105	6718	6	7	0	*	2	JUL	2300	95	18	4888	9	6	2	*	4	JUL	0000	145	2	4318	6	5	9
1	JUL	2230	46		111	6845	8	7	0	*	2	JUL	2330	96	17	4861	5	6	2	*	4	JUL	0030	146	2	4315	1	5	9
1	JUL	2300	47		117	6954	0	7	1	*	3	JUL	0000	97	16	4835	3	6	2	*	4	JUL	0100	147	2	4311	8	5	9
1	JUL	2330	48		121	7042	4	7	1	*	3	JUL	0030	98	15	4810	2	6	2	*	4	JUL	0110	148	2	4308	5	5	9
2	JUL	0000	49		125	7110	1	7	1	*	3	JUL	0100	99	14	4786	2	6	1	*	4	JUL	0200	149	2	4305	4	5	9
2	JUL	0030	50		127	7157	3	7	2	*	3	JUL	0130	100	14	4763	3	6	1	*	4	JUL	0230	150	2	4302	3	5	9

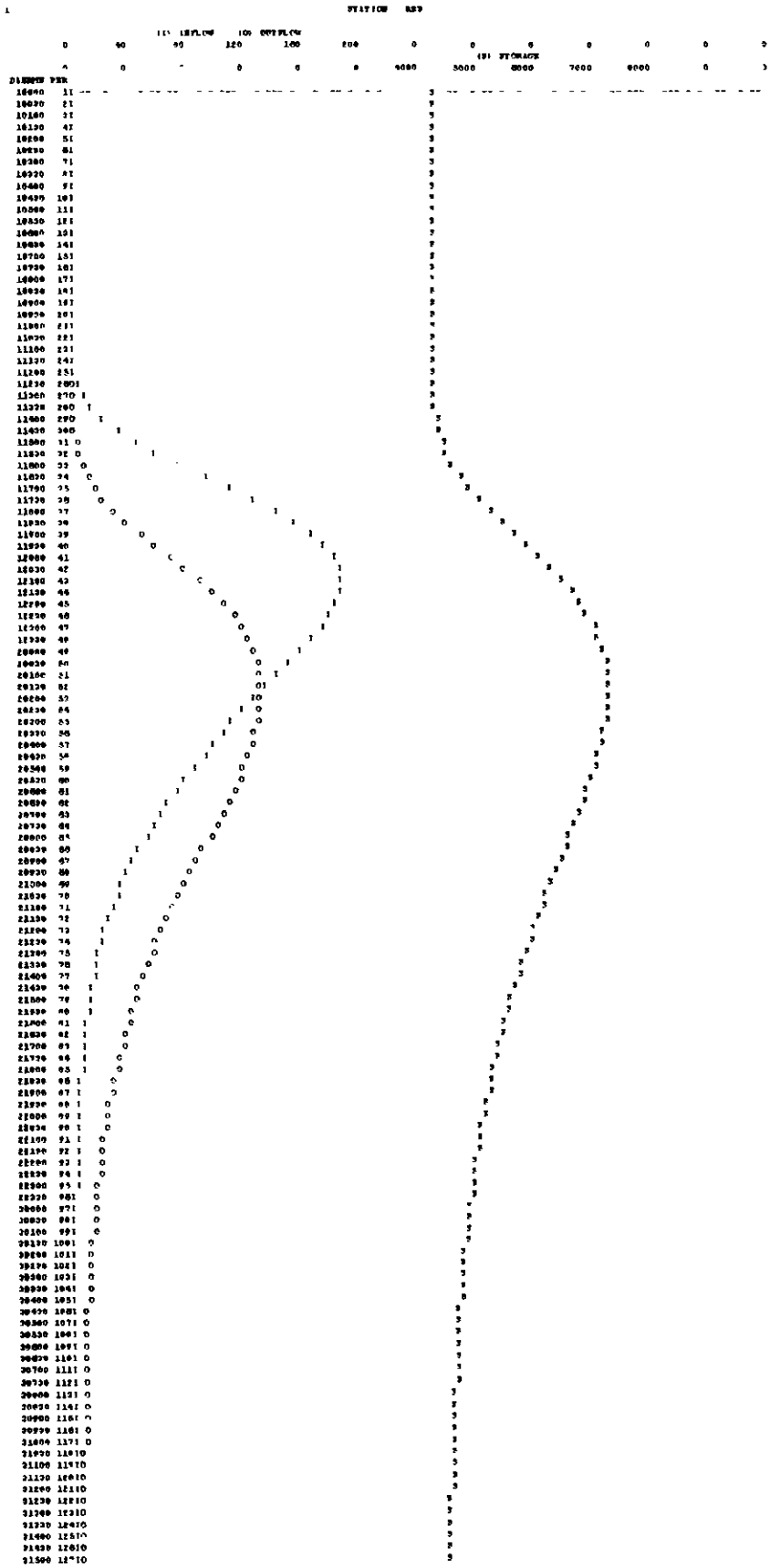
PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW				
		6-HR	24-HR	72-HR	74 50-HR	
+ (CU M/S)	(HR)					
		(CU M/S)				
+ 129	25 50	125	84	33	32	
		(MM)	16 178	43 593	50 624	50 624
		(1000 CU M)	2700	7276	8449	8449

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	74 50-HR
+ (1000 CU M)	(HR)				
7198	25 50	7117	6336	5103	5073

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	74 50-HR
+ (METERS)	(HR)				
7 17	25 50	7 15	6 82	6 27	6 26

CUMULATIVE AREA = 166 90 SQ KM

Cu0074



GEONORTE - Engenharia de Solos e Fundações Ltda
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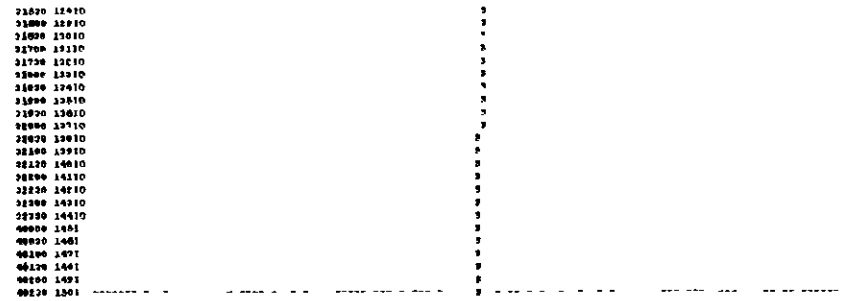
C G C 07 542 392/0001-60 - C G F 06 013 384-8



1

RUNOFF SUMMARY AVERAGE FLOW IN CUBIC METERS PER SECOND
AREA IN SQUARE KILOMETERS

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	SBCATU	183 30	21 00	171 92	95 73	33 05	166 90		
+	ROUTED TO	RES	129 09	25 50	125 01	84 21	32 60	166 90	7 17	
+										
25 50										

*** NORMAL END OF SEC-1 ***

– Lago Catu - Cheia Associada ao Histograma TR-1000 anos

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C G C 07 542 392/0001-60 - C G F 06 013 384-8

LAGOA DO CATU-BARRAGEM CINZENTA - CHEIA ASSOCIADA AO HIETOGRAMA TR = 1000 ANOS

```
1                                        HEC-1 INPUT                                        PAGE  1

          LINE          ID       1       2       3       4       5       6       7       8       9      10

             1          ID          BACIA HIDROGRAFICA DO SISTEMA CINZENTA-CATU
             2          ID          MODELO SCS DA BACIA
             3          IT      30 01JUL95      00     150
             4          IO
             5          IM
                        *DIAGRAM

             6          KK  SBCINZ
             7          KM        ESC  SUPERFICIAL SUBBACIA RESERVATORIO CINZENTA (SCS)
             8          KO        1       2
             9          BA     66 4
            10          PH     1000       0   16 02   32 19   63 31   84 80   92 67  114 54  134 52  153 31
            11          LS                65
            12          UD     3 26
                        *

            13          KK  RES
            14          KM      ROUTE SBCATU THROUGH RES  CINZENTA
            15          KO        1       2
            16          RS        1    ELEV  30 000
            17          SV        0    3600   10300   27000   55400
            18          SE       20      25      30      35      40
            19          SS  30 000      40    2 00     1 5
                        *

            20          KK  SBCATU
            21          KM        ESC  SUPERFICIAL SUBBACIA RESERVATORIO CATU (SCS)
            22          KO        1       2
            23          BA    100 5
            24          LS                65
            25          UD     7 40
                        *

            26          KK  CONFL
            27          KM       CONFLUENCIA
            28          HC       2
                        *

            29          KK  RES
            30          KM      ROUTE SBCATU THROUGH RES  CATU
            31          KO        1       2
            32          RS        1    ELEV   5 844
            33          SV        0  78 625 494 875 1394 63 2705 13 4459 13 6710 63 9511 13   19000   45000
            34          SE        1       2       3       4       5       6       7       8      10      15
            35          SS   5 844      40    2 10     1 5
                        *

            36          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO       ( ) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6      SBCINZ
                 \
                  V
    13      RES


    20                  SBCATU


    26      CONFL
                 V
                 V
    29      RES

  (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                 *****************************************
*                                       *                 *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                 *    U S  ARMY CORPS OF ENGINEERS       *
*            SEPTEMBER 1990             *                 *    HYDROLOGIC ENGINEERING CENTER      *
*             VERSION 4 0               *                 *          609 SECOND STREET            *
*                                       *                 *        DAVIS, CALIFORNIA 95616        *
*  RUN DATE  09/08/1995  TIME  21:49:27 *                 *           (916) 756-1104              *
*                                       *                 *                                       *
*****************************************                 *****************************************
                                    BACIA HIDROGRAFICA DO SISTEMA CINZENTA-CATU
                                    MODELO SCS DA BACIA

    4 IO            OUTPUT CONTROL VARIABLES
                          IPRNT          0  PRINT CONTROL
                          IPLOT          0  PLOT CONTROL
```

```
                    QSCAL          0   HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                    NMIN          30   MINUTES IN COMPUTATION INTERVAL
                   IDATE       1JUL95   STARTING DATE
                   ITIME        0000   STARTING TIME
                      NQ         150   NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE       4JUL95   ENDING DATE
                  NDTIME        0230   ENDING TIME
                   ICENT          19   CENTURY MARK

                COMPUTATION INTERVAL       50 HOURS
                   TOTAL TIME BASE     74 50 HOURS

        METRIC UNITS
             DRAINAGE AREA          SQUARE KILOMETERS
             PRECIPITATION DEPTH    MILLIMETERS
             LENGTH, ELEVATION      METERS
             FLOW                   CUBIC METERS PER SECOND
             STORAGE VOLUME         CUBIC METERS
             SURFACE AREA           SQUARE METERS
             TEMPERATURE            DEGREES CELSIUS
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
             **************
             *            *
   6 KK      *   SECINZ   *
             *            *
             **************

                              ESC  SUPERFICIAL SUBBACIA RESERVATORIO CINZENTA (SCS)

   8 KO      OUTPUT CONTROL VARIABLES
                   IPRNT          1   PRINT CONTROL
                   IPLOT          2   PLOT CONTROL
                   QSCAL          0   HYDROGRAPH PLOT SCALE

             SUBBASIN RUNOFF DATA

   9 BA      SUBBASIN CHARACTERISTICS
                   TAREA       66 40   SUBBASIN AREA

             PRECIPITATION DATA

  10 PH                                  DEPTHS FOR1000-PERCENT HYPOTHETICAL STORM
                  HYDPO-35                        TP-40                              TP-49
             5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
             16 02   32 19   63 31   84 80   92 67  114 54  134 52  153 31      00      00      00      00

                                                STORM AREA =   66 40

  11 LS      SCS LOSS RATE
                   STRTL       27 35   INITIAL ABSTRACTION
                  CRVNBR       65 00   CURVE NUMBER
                   RTIMP          00   PERCENT IMPERVIOUS AREA

  12 UD      SCS DIMENSIONLESS UNITGRAPH
                   TLAG        3 26   LAG

                                                ***

                                              UNIT HYDROGRAPH
                                          35 END-OF-PERIOD ORDINATES
             0       1       1       2       3       4       4       4       3       3
             2       2       1       1       1       1       1       0       0       0
             0       0       0       0       0       0       0       0       0       0
             0       0       0       0       0
```

HYDROGRAPH AT STATION SECINZ

DA	HON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	HON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JUL	0000	1	00	00	00	0	2	JUL	1330	76	00	00	00	0
1	JUL	0030	2	67	67	00	0	2	JUL	1400	77	00	00	00	0
1	JUL	0100	3	70	70	00	0	2	JUL	1430	78	00	00	00	0
1	JUL	0130	4	72	72	00	0	2	JUL	1500	79	00	00	00	0
1	JUL	0200	5	75	75	00	0	2	JUL	1530	80	00	00	00	0
1	JUL	0230	6	78	78	00	0	2	JUL	1600	81	00	00	00	0
1	JUL	0300	7	81	81	00	0	2	JUL	1630	82	00	00	00	0
1	JUL	0330	8	84	84	00	0	2	JUL	1700	83	00	00	00	0
1	JUL	0400	9	88	88	00	0	2	JUL	1730	84	00	00	00	0
1	JUL	0430	10	93	93	00	0	2	JUL	1800	85	00	00	00	0
1	JUL	0500	11	97	97	00	0	2	JUL	1830	86	00	00	00	0
1	JUL	0530	12	1 03	1 03	00	0	2	JUL	1900	87	00	00	00	0
1	JUL	0600	13	1 09	1 09	00	0	2	JUL	1930	88	00	00	00	0
1	JUL	0630	14	1 46	1 46	00	0	2	JUL	2000	89	00	00	00	0
1	JUL	0700	15	1 56	1 56	00	0	2	JUL	2030	90	00	00	00	0
1	JUL	0730	16	1 67	1 67	00	0	2	JUL	2100	91	00	00	00	0
1	JUL	0800	17	1 81	1 81	00	0	2	JUL	2130	92	00	00	00	0
1	JUL	0830	18	1 97	1 97	00	0	2	JUL	2200	93	00	00	00	0
1	JUL	0900	19	2 18	2 18	00	0	2	JUL	2230	94	00	00	00	0
1	JUL	0930	20	3 13	3 13	00	0	2	JUL	2300	95	00	00	00	0
1	JUL	1000	21	3 54	3 54	00	0	2	JUL	2330	96	00	00	00	0
1	JUL	1030	22	4 12	4 00	13	0	3	JUL	0000	97	00	00	00	0
1	JUL	1100	23	4 17	3 81	36	0	3	JUL	0030	98	00	00	00	0
1	JUL	1130	24	9 87	8 20	1 67	1	3	JUL	0100	99	00	00	00	0
1	JUL	1200	25	16 26	11 45	4 81	3	3	JUL	0130	100	00	00	00	0
1	JUL	1230	26	33 08	17 67	15 41	11	3	JUL	0200	101	00	00	00	0

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 1 JUL 1300  27  11 63   4 92   6 70      25      *   3 JUL 0230  102   00   00   00    0
 1 JUL 1330  28   4 81   1 88   2 92      46      *   3 JUL 0300  103   00   00   00    0
 1 JUL 1400  29   4 52   1 70   2 82      73      *   3 JUL 0330  104   00   00   00    0
 1 JUL 1430  30   3 80   1 38   2 43     100      *   3 JUL 0400  105   00   00   00    0
 1 JUL 1500  31   3 32   1 17   2 16     120      *   3 JUL 0430  106   00   00   00    0
 1 JUL 1530  32   2 90     79   1 51     133      *   3 JUL 0500  107   00   00   00    0
 1 JUL 1600  33   2 07     70   1 37     138      *   3 JUL 0530  108   00   00   00    0
 1 JUL 1630  34   1 89     62   1 26     136      *   3 JUL 0600  109   00   00   00    0
 1 JUL 1700  35   1 74     57   1 17     129      *   3 JUL 0630  110   00   00   00    0
 1 JUL 1730  36   1 61     52   1 09     117      *   3 JUL 0700  111   00   00   00    0
 1 JUL 1800  37   1 51     48   1 03     104      *   3 JUL 0730  112   00   00   00    0
 1 JUL 1830  38   1 13     35     77      99      *   3 JUL 0800  113   00   00   00    0
 1 JUL 1900  39   1 06     33     73      83      *   3 JUL 0830  114   00   00   00    0
 1 JUL 1930  40   1 00     31     69      75      *   3 JUL 0900  115   00   00   00    0
 1 JUL 2000  41     95     29     66      67      *   3 JUL 0930  116   00   00   00    0
 1 JUL 2030  42     90     27     63      60      *   3 JUL 1000  117   00   00   00    0
 1 JUL 2100  43     86     26     60      54      *   3 JUL 1030  118   00   00   00    0
 1 JUL 2130  44     83     25     58      48      *   3 JUL 1100  119   00   00   00    0
 1 JUL 2200  45     79     24     56      44      *   3 JUL 1130  120   00   00   00    0
 1 JUL 2230  46     76     23     54      40      *   3 JUL 1200  121   00   00   00    0
 1 JUL 2300  47     73     22     52      36      *   3 JUL 1230  122   00   00   00    0
 1 JUL 2330  48     71     21     50      33      *   3 JUL 1300  123   00   00   00    0
 2 JUL 0000  49     68     20     49      31      *   3 JUL 1330  124   00   00   00    0
 2 JUL 0030  50     00     00     00      28      *   3 JUL 1400  125   00   00   00    0
 2 JUL 0100  51     00     00     00      26      *   3 JUL 1430  126   00   00   00    0
 2 JUL 0130  52     00     00     00      24      *   3 JUL 1500  127   00   00   00    0
 2 JUL 0200  53     00     00     00      21      *   3 JUL 1530  128   00   00   00    0
 2 JUL 0230  54     00     00     00      19      *   3 JUL 1600  129   00   00   00    0
 2 JUL 0300  55     00     00     00      16      *   3 JUL 1630  130   00   00   00    0
 2 JUL 0330  56     00     00     00      13      *   3 JUL 1700  131   00   00   00    0
 2 JUL 0400  57     00     00     00      11      *   3 JUL 1730  132   00   00   00    0
 2 JUL 0430  58     00     00     00       9      *   3 JUL 1800  133   00   00   00    0
 2 JUL 0500  59     00     00     00       7      *   3 JUL 1830  134   00   00   00    0
 2 JUL 0530  60     00     00     00       5      *   3 JUL 1900  135   00   00   00    0
 2 JUL 0600  61     00     00     00       4      *   3 JUL 1930  136   00   00   00    0
 2 JUL 0630  62     00     00     00       3      *   3 JUL 2000  137   00   00   00    0
 2 JUL 0700  63     00     00     00       3      *   3 JUL 2030  138   00   00   00    0
 2 JUL 0730  64     00     00     00       2      *   3 JUL 2100  139   00   00   00    0
 2 JUL 0800  65     00     00     00       2      *   3 JUL 2130  140   00   00   00    0
 2 JUL 0830  66     00     00     00       1      *   3 JUL 2200  141   00   00   00    0
 2 JUL 0900  67     00     00     00       1      *   3 JUL 2230  142   00   00   00    0
 2 JUL 0930  68     00     00     00       1      *   3 JUL 2300  143   00   00   00    0
 2 JUL 1000  69     00     00     00       1      *   3 JUL 2330  144   00   00   00    0
 2 JUL 1030  70     00     00     00       0      *   4 JUL 0000  145   00   00   00    0
 2 JUL 1100  71     00     00     00       0      *   4 JUL 0030  146   00   00   00    0
 2 JUL 1130  72     00     00     00       0      *   4 JUL 0100  147   00   00   00    0
 2 JUL 1200  73     00     00     00       0      *   4 JUL 0130  148   00   00   00    0
 2 JUL 1230  74     00     00     00       0      *   4 JUL 0200  149   00   00   00    0
 2 JUL 1300  75     00     00     00       0      *   4 JUL 0230  150   00   00   00    0
*****************************************************************************************************************************

     TOTAL RAINFALL =  144 61  TOTAL LOSS =   90 48  TOTAL EXCESS =   54 12

  PEAK FLOW      TIME                              MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      74 50-HR
+  (CU M/S)      (HR)
                        (CU M/S)
+      138       16 00                     108          42           14           13
                          (MM)          35 220       54 088       54 123       54 123
                   (1000 CU M)          2339         3591         3594         3594

                        CUMULATIVE AREA =   66 40 SQ KM
*** *** *** *** * * *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
              ***** ********
              *             *
   13 KK      *     RES     *
              *             *
              ***************
                          ROUTE SBCATU THROUGH RES  CINZENTA

   15 PO          OUTPUT CONTROL VARIABLES
                        IPRNT          1  PRINT CONTROL
                        IPLOT          2  PLOT CONTROL
                        QSCAL          0  HYDROGRAPH PLOT SCALE

                  HYDROGRAPH ROUTING DATA

   16 RS          STORAGE ROUTING
                        NSTPS          1  NUMBER OF SUBREACHES
                         ITYP       ELEV  TYPE OF INITIAL CONDITION
                       RSVRIC      30 00  INITIAL CONDITION
                            X          00 WORKING R AND D COEFFICIENT

   17 SV           STORAGE          0    3600 0   10300 0   27000 0   55400 0

   18 SE          ELEVATION      20 00     25 00     30 00     35 00     40 00

   19 SS          SPILLWAY
                        CREL       30 00  SPILLWAY CREST ELEVATION
                       SPWID       40 00  SPILLWAY WIDTH
                        COQW        2 00  WEIR COEFFICIENT
                        EXPW        1 50  EXPONENT OF HEAD

                                                ***
                                    COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW        00       00       43      3 47     11 71     27 76     54 22     93 70    148 79    222 10
        ELEVATION     20 00    30 00    30 03    30 12    30 28    30 49    30 77    31 11    31 51    31 98
```

OUTFLOW	316 23	433 78	577 36	749 58	953 02	1190 30	1464 02	1776 77	2131 18	2529 82	
ELEVATION	32 50	33 09	33 73	34 44	35 22	36 05	36 94	37 90	38 92	40 00	

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	00	3600 00	10300 00	10403 09	10712 35	11227 78	11949 38	12877 16	14011 11	15351 24	
OUTFLOW	00	00	00	43	3 47	11 71	27 76	54 22	93 70	148 79	
ELEVATION	20 00	25 00	30 00	30 03	30 12	30 28	30 49	30 77	31 11	31 51	
STORAGE	16897 53	18650 00	20608 64	22773 45	25144 44	27000 00	28227 16	32960 49	38044 43	43479 01	
OUTFLOW	222 10	316 23	433 78	577 36	749 58	894 43	953 02	1190 30	1464 02	1776 77	
ELEVATION	31 98	32 50	33 09	33 73	34 44	35 00	35 22	36 05	36 94	37 90	
STORAGE	49264 20	55400 00									
OUTFLOW	2131 18	2529 82									
ELEVATION	38 92	40 00									

HYDROGRAPH AT STATION RES

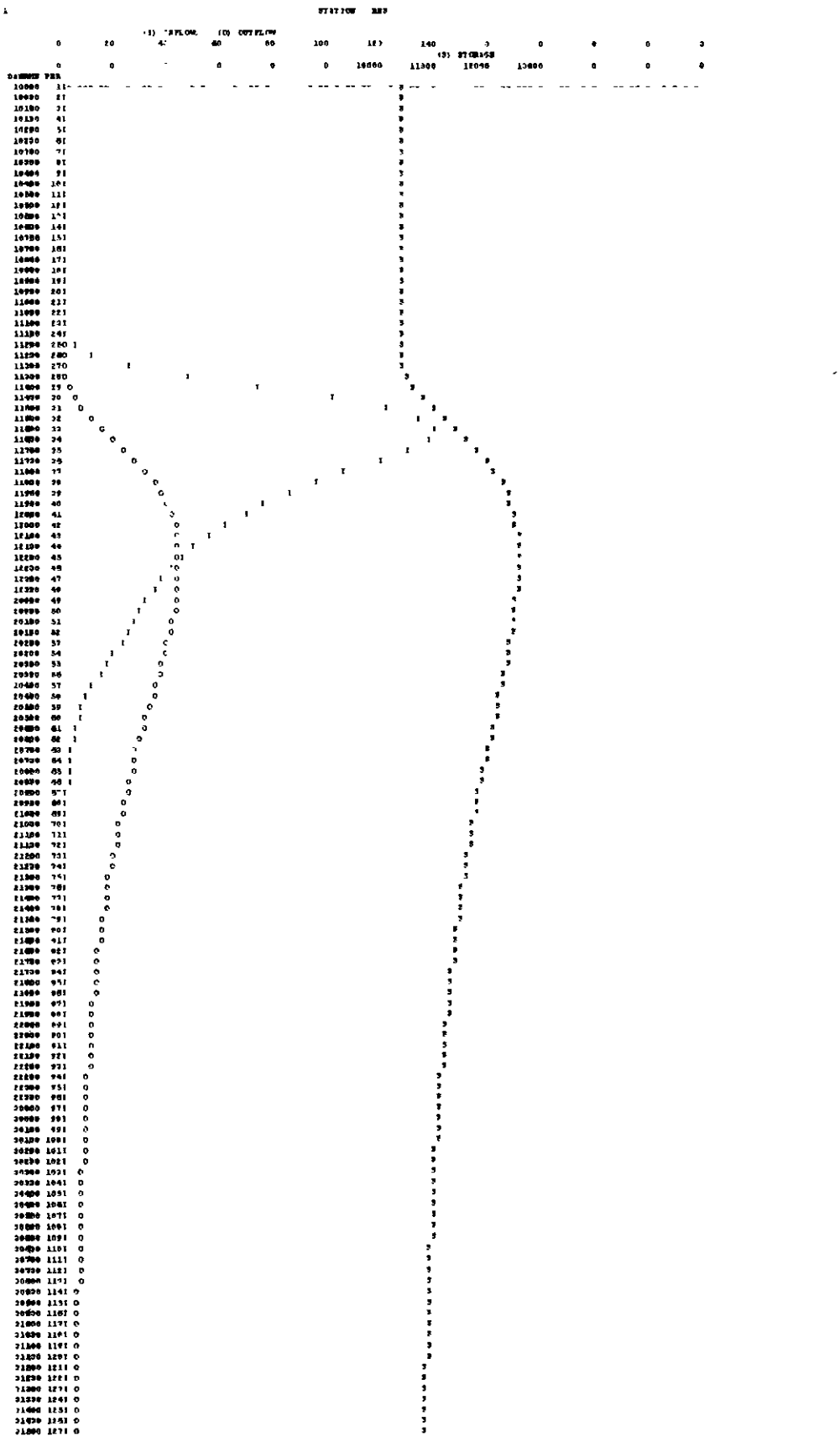
DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	JUL	0000	1	0	10300 0	30 0	*	2	JUL	0100	51	40	12389 4	30 6	*	3	JUL	0200	101	7	10948 1	30 2
1	JUL	0030	2	0	10300 0	30 0	*	2	JUL	0130	52	40	12362 5	30 6	*	3	JUL	0230	102	7	10935 2	30 2
1	JUL	0100	3	0	10300 0	30 0	*	2	JUL	0200	53	39	12332 9	30 6	*	3	JUL	0300	103	7	10922 7	30 2
1	JUL	0130	4	0	10300 0	30 0	*	2	JUL	0230	54	38	12300 2	30 6	*	3	JUL	0330	104	7	10910 6	30 2
1	JUL	0200	5	0	10300 0	30 0	*	2	JUL	0300	55	37	12264 3	30 6	*	3	JUL	0400	105	6	10898 8	30 2
1	JUL	0230	6	0	10300 0	30 0	*	2	JUL	0330	56	36	12225 5	30 6	*	3	JUL	0430	106	6	10887 4	30 2
1	JUL	0300	7	0	10300 0	30 0	*	2	JUL	0400	57	34	12184 1	30 6	*	3	JUL	0500	107	6	10876 3	30 2
1	JUL	0330	8	0	10300 0	30 0	*	2	JUL	0430	58	33	12140 6	30 6	*	3	JUL	0530	108	6	10865 4	30 2
1	JUL	0400	9	0	10300 0	30 0	*	2	JUL	0500	59	32	12095 8	30 5	*	3	JUL	0600	109	6	10854 9	30 2
1	JUL	0430	10	0	10300 0	30 0	*	2	JUL	0530	60	31	12050 1	30 5	*	3	JUL	0630	110	6	10844 7	30 2
1	JUL	0500	11	0	10300 0	30 0	*	2	JUL	0600	61	29	12004 5	30 5	*	3	JUL	0700	111	5	10834 8	30 2
1	JUL	0530	12	0	10300 0	30 0	*	2	JUL	0630	62	28	11959 3	30 5	*	3	JUL	0730	112	5	10825 2	30 2
1	JUL	0600	13	0	10300 0	30 0	*	2	JUL	0700	63	27	11914 9	30 5	*	3	JUL	0800	113	5	10815 8	30 2
1	JUL	0630	14	0	10300 0	30 0	*	2	JUL	0730	64	26	11871 3	30 5	*	3	JUL	0830	114	5	10806 7	30 2
1	JUL	0700	15	0	10300 0	30 0	*	2	JUL	0800	65	25	11828 4	30 5	*	3	JUL	0900	115	5	10797 9	30 1
1	JUL	0730	16	0	10300 0	30 0	*	2	JUL	0830	66	24	11786 6	30 4	*	3	JUL	0930	116	5	10789 3	30 1
1	JUL	0800	17	0	10300 0	30 0	*	2	JUL	0900	67	23	11745 9	30 4	*	3	JUL	1000	117	5	10781 0	30 1
1	JUL	0830	18	0	10300 0	30 0	*	2	JUL	0930	68	22	11706 4	30 4	*	3	JUL	1030	118	4	10772 9	30 1
1	JUL	0900	19	0	10300 0	30 0	*	2	JUL	1000	69	22	11668 1	30 4	*	3	JUL	1100	119	4	10765 0	30 1
1	JUL	0930	20	0	10300 0	30 0	*	2	JUL	1030	70	21	11631 1	30 4	*	3	JUL	1130	120	4	10757 3	30 1
1	JUL	1000	21	0	10300 0	30 0	*	2	JUL	1100	71	20	11595 0	30 4	*	3	JUL	1200	121	4	10749 9	30 1
1	JUL	1030	22	0	10300 0	30 0	*	2	JUL	1130	72	19	11560 7	30 4	*	3	JUL	1230	122	4	10742 7	30 1
1	JUL	1100	23	0	10300 2	30 0	*	2	JUL	1200	73	18	11527 4	30 4	*	3	JUL	1300	123	4	10735 7	30 1
1	JUL	1130	24	0	10301 1	30 0	*	2	JUL	1230	74	18	11495 3	30 4	*	3	JUL	1330	124	4	10728 8	30 1
1	JUL	1200	25	0	10304 6	30 0	*	2	JUL	1300	75	17	11464 4	30 3	*	3	JUL	1400	125	4	10722 2	30 1
1	JUL	1230	26	0	10316 6	30 0	*	2	JUL	1330	76	16	11434 6	30 3	*	3	JUL	1430	126	4	10715 8	30 1
1	JUL	1300	27	0	10340 3	30 0	*	2	JUL	1400	77	16	11406 0	30 3	*	3	JUL	1500	127	3	10709 5	30 1
1	JUL	1330	28	1	10410 8	30 0	*	2	JUL	1430	78	15	11378 4	30 3	*	3	JUL	1530	128	3	10703 4	30 1
1	JUL	1400	29	2	10515 3	30 1	*	2	JUL	1500	79	14	11351 9	30 3	*	3	JUL	1600	129	3	10697 3	30 1
1	JUL	1430	30	3	10666 2	30 1	*	2	JUL	1530	80	14	11326 4	30 3	*	3	JUL	1630	130	3	10691 4	30 1
1	JUL	1500	31	6	10856 3	30 2	*	2	JUL	1600	81	13	11301 9	30 3	*	3	JUL	1700	131	3	10685 6	30 1
1	JUL	1530	32	9	11070 8	30 2	*	2	JUL	1630	82	13	11279 3	30 3	*	3	JUL	1730	132	3	10679 9	30 1
1	JUL	1600	33	13	11294 6	30 3	*	2	JUL	1700	83	12	11255 7	30 3	*	3	JUL	1800	133	3	10674 2	30 1
1	JUL	1630	34	18	11513 1	30 4	*	2	JUL	1730	84	12	11233 9	30 3	*	3	JUL	1830	134	3	10668 7	30 1
1	JUL	1700	35	23	11715 2	30 4	*	2	JUL	1800	85	11	11212 9	30 3	*	3	JUL	1900	135	3	10663 3	30 1
1	JUL	1730	36	27	11892 7	30 5	*	2	JUL	1830	86	11	11192 5	30 3	*	3	JUL	1930	136	3	10658 0	30 1
1	JUL	1800	37	30	12041 0	30 5	*	2	JUL	1900	87	11	11172 8	30 3	*	3	JUL	2000	137	3	10652 7	30 1
1	JUL	1830	38	34	12161 1	30 6	*	2	JUL	1930	88	11	11153 5	30 3	*	3	JUL	2030	138	3	10647 6	30 1
1	JUL	1900	39	37	12256 8	30 6	*	2	JUL	2000	89	10	11134 9	30 2	*	3	JUL	2100	139	3	10642 5	30 1
1	JUL	1930	40	39	12331 7	30 6	*	2	JUL	2030	90	10	11116 7	30 2	*	3	JUL	2130	140	3	10637 5	30 1
1	JUL	2000	41	40	12388 5	30 6	*	2	JUL	2100	91	10	11099 1	30 2	*	3	JUL	2200	141	3	10632 7	30 1
1	JUL	2030	42	41	12429 2	30 6	*	2	JUL	2130	92	9	11081 9	30 2	*	3	JUL	2230	142	3	10627 9	30 1
1	JUL	2100	43	42	12456 3	30 6	*	2	JUL	2200	93	9	11065 3	30 2	*	3	JUL	2300	143	3	10623 2	30 1
1	JUL	2130	44	43	12471 8	30 7	*	2	JUL	2230	94	9	11049 1	30 2	*	3	JUL	2330	144	3	10618 5	30 1
1	JUL	2200	45	43	12477 8	30 7	*	2	JUL	2300	95	9	11033 4	30 2	*	4	JUL	0000	145	3	10614 0	30 1
1	JUL	2230	46	43	12475 6	30 7	*	2	JUL	2330	96	8	11018 1	30 2	*	4	JUL	0030	146	2	10609 5	30 1
1	JUL	2300	47	43	12466 9	30 6	*	3	JUL	0000	97	8	11003 3	30 2	*	4	JUL	0100	147	2	10605 1	30 1
1	JUL	2330	48	42	12452 9	30 6	*	3	JUL	0030	98	8	10988 9	30 2	*	4	JUL	0130	148	2	10600 8	30 1
2	JUL	0000	49	42	12434 9	30 6	*	3	JUL	0130	99	8	10974 9	30 2	*	4	JUL	0200	149	2	10596 6	30 1
2	JUL	0030	50	41	12413 5	30 6	*	3	JUL	0130	100	7	10961 3	30 2	*	4	JUL	0230	150	2	10592 4	30 1

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	74 50-HR
+ (CU M/S)	(HR)					
		(CU M/S)				
+ 43	22 00		42	29	13	12
		(MM)	13 524	38 305	49 720	49 720
		(1000 CU M)	898	2543	3301	3301

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	74 50-HR
+ (1000 CU M)	(HR)				
12478	22 00	12434	11972	11136	11108

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	74 50-HR
+ (METERS)	(HR)				
30 65	22 00	30 64	30 50	30 25	30 24

CUMULATIVE AREA = 66 40 SQ KM



GEONORTE - Engenharia de Solos e Fundações Ltda
Rua Jorge Severiano, 900 - Vila União - Fone 272 4777 - Fax 272 7799 - CEP 60 420-180 - Fortaleza - Ceará
C G C 07 542 392/0001-60 - C G F 06 013 384-8

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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
            ***************
            *             *
  20 KK     *    SBCATU   *
            *             *
            ***************

                          ESC  SUPERFICIAL SUBBACIA RESERVATORIO CATU (SCS)

  22 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          1  PRINT CONTROL
                      IPLOT          2  PLOT CONTROL
                      QSCAL          0  HYDROGRAPH PLOT SCALE

                 SUBBASIN RUNOFF DATA

  23 BA          SUBBASIN CHARACTERISTICS
                      TAREA      100 50  SUBBASIN AREA

                 PRECIPITATION DATA

  10 PH                                  DEPTHS FOR1000-PERCENT HYPOTHETICAL STORM
                      HYDRO-35                                TP-40                                  TP-49
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                16 02   32 19   63 31   84 80   92 67  114 54  134 52  153 31      00      00      00      00

                                                  STORM AREA =  100 50

  24 LS          SCS LOSS RATE
                    STRTL       27 35  INITIAL ABSTRACTION
                   CRVNBR       65 00  CURVE NUMBER
                    RTIMP          00  PERCENT IMPERVIOUS AREA

  25 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG        7 40  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                            76 END-OF-PERIOD ORDINATES
                3         0         0         0         1         1         1         1         2         2
                2         2         3         3         3         3         3         3         2         2
                2         2         2         2         1         1         1         1         1         1
                1         1         1         1         0         0         0         0         0         0
                0         0         0         0         0         0         0         0         0         0
                0         0         0         0         0         0         0         0         0         0
                0         0         0         0         0         0         0         0         0         0
                0         0         0         0         0         0

 ********************************************************************************************************************************
                                                HYDROGRAPH AT STATION    SBCATU
 ********************************************************************************************************************************
DA HON HREN  ORD     RAIN    LOSS  EXCESS     COMP Q       *    DA HON HREN  ORD     RAIN    LOSS  EXCESS     COMP Q
                                                              *
      1 JUL 0000    1       00      00      00         0     *      2 JUL 1330   76      00      00      00        10
      1 JUL 0030    2       69      69      00         0     *      2 JUL 1400   77      00      00      00         9
      1 JUL 0100    3       71      71      00         0     *      2 JUL 1430   78      00      00      00         8
      1 JUL 0130    4       74      74      00         0     *      2 JUL 1500   79      00      00      00         7
      1 JUL 0200    5       76      76      00         0     *      2 JUL 1530   80      00      00      00         6
      1 JUL 0230    6       79      79      00         0     *      2 JUL 1600   81      00      00      00         6
      1 JUL 0300    7       83      83      00         0     *      2 JUL 1630   82      00      00      00         5
      1 JUL 0330    8       86      86      00         0     *      2 JUL 1700   83      00      00      00         5
      1 JUL 0400    9       90      90      00         0     *      2 JUL 1730   84      00      00      00         4
      1 JUL 0430   10       94      94      00         0     *      2 JUL 1800   85      00      00      00         4
      1 JUL 0500   11       99      99      00         0     *      2 JUL 1830   86      00      00      00         3
      1 JUL 0530   12    1 05    1 05      00         0     *      2 JUL 1900   87      00      00      00         3
      1 JUL 0600   13    1 11    1 11      00         0     *      2 JUL 1930   88      00      00      00         3
      1 JUL 0630   14    1 49    1 49      00         0     *      2 JUL 2000   89      00      00      00         2
      1 JUL 0700   15    1 59    1 59      00         0     *      2 JUL 2030   90      00      00      00         2
      1 JUL 0730   16    1 71    1 71      00         0     *      2 JUL 2100   91      00      00      00         2
      1 JUL 0800   17    1 84    1 84      00         0     *      2 JUL 2130   92      00      00      00         2
      1 JUL 0830   18    2 01    2 01      00         0     *      2 JUL 2200   93      00      00      00         2
      1 JUL 0900   19    2 22    2 22      00         0     *      2 JUL 2230   94      00      00      00         1
      1 JUL 0930   20    3 16    3 16      00         0     *      2 JUL 2300   95      00      00      00         1
      1 JUL 1000   21    3 57    3 57      00         0     *      2 JUL 2330   96      00      00      00         1
      1 JUL 1030   22    4 14    3 98      16         0     *      3 JUL 0000   97      00      00      00         1
      1 JUL 1100   23    4 30    3 90      40         0     *      3 JUL 0030   98      00      00      00         1
      1 JUL 1130   24    4 93    6 18   1 75          0     *      3 JUL 0100   99      00      00      00         1
      1 JUL 1200   25   16 35   11 41   4 94          1     *      3 JUL 0130  100      00      00      00         1
      1 JUL 1230   26   29 71   16 00  13 71          2     *      3 JUL 0200  101      00      00      00         1
      1 JUL 1300   27   11 57    5 03   6 54          5     *      3 JUL 0230  102      00      00      00         0
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1 JUL 1330	28	4 94	1 98	2 95	8	*	3 JUL 0300	103	00	00	00	0
1 JUL 1400	29	4 53	1 74	2 79	13	*	3 JUL 0330	104	00	00	00	0
1 JUL 1430	30	3 83	1 42	2 41	19	*	3 JUL 0400	105	00	00	00	0
1 JUL 1500	31	3 35	1 20	2 15	27	*	3 JUL 0430	106	00	00	00	0
1 JUL 1530	32	2 34	82	1 52	36	*	3 JUL 0500	107	00	00	00	0
1 JUL 1600	33	2 11	72	1 38	46	*	3 JUL 0530	108	00	00	00	0
1 JUL 1630	34	1 92	65	1 27	57	*	3 JUL 0600	109	00	00	00	0
1 JUL 1700	35	1 77	59	1 18	68	*	3 JUL 0630	110	00	00	00	0
1 JUL 1730	36	1 65	54	1 11	79	*	3 JUL 0700	111	00	00	00	0
1 JUL 1800	37	1 54	50	1 04	88	*	3 JUL 0730	112	00	00	00	0
1 JUL 1830	38	1 15	37	78	96	*	3 JUL 0800	113	00	00	00	0
1 JUL 1900	39	1 08	34	74	103	*	3 JUL 0830	114	00	00	00	0
1 JUL 1930	40	1 02	32	70	108	*	3 JUL 0900	115	00	00	00	0
1 JUL 2000	41	97	30	67	111	*	3 JUL 0930	116	00	00	00	0
1 JUL 2030	42	92	28	64	114	*	3 JUL 1000	117	00	00	00	0
1 JUL 2100	43	88	27	61	114	*	3 JUL 1030	118	00	00	00	0
1 JUL 2130	44	84	26	59	114	*	3 JUL 1100	119	00	00	00	0
1 JUL 2200	45	81	24	56	112	*	3 JUL 1130	120	00	00	00	0
1 JUL 2230	46	78	23	54	110	*	3 JUL 1200	121	00	00	00	0
1 JUL 2300	47	75	22	53	106	*	3 JUL 1230	122	00	00	00	0
1 JUL 2330	48	72	22	51	102	*	3 JUL 1300	123	00	00	00	0
2 JUL 0000	49	70	21	49	97	*	3 JUL 1330	124	00	00	00	0
2 JUL 0030	50	00	00	00	91	*	3 JUL 1400	125	00	00	00	0
2 JUL 0100	51	00	00	00	86	*	3 JUL 1430	126	00	00	00	0
2 JUL 0130	52	00	00	00	81	*	3 JUL 1500	127	00	00	00	0
2 JUL 0200	53	00	00	00	76	*	3 JUL 1530	128	00	00	00	0
2 JUL 0230	54	00	00	00	71	*	3 JUL 1600	129	00	00	00	0
2 JUL 0300	55	00	00	00	67	*	3 JUL 1630	130	00	00	00	0
2 JUL 0330	56	00	00	00	63	*	3 JUL 1700	131	00	00	00	0
2 JUL 0400	57	00	00	00	59	*	3 JUL 1730	132	00	00	00	0
2 JUL 0430	58	00	00	00	55	*	3 JUL 1800	133	00	00	00	0
2 JUL 0500	59	00	00	00	51	*	3 JUL 1830	134	00	00	00	0
2 JUL 0530	60	00	00	00	47	*	3 JUL 1900	135	00	00	00	0
2 JUL 0600	61	00	00	00	44	*	3 JUL 1930	136	00	00	00	0
2 JUL 0630	62	00	00	00	40	*	3 JUL 2000	137	00	00	00	0
2 JUL 0700	63	00	00	00	37	*	3 JUL 2030	138	00	00	00	0
2 JUL 0730	64	00	00	00	34	*	3 JUL 2100	139	00	00	00	0
2 JUL 0800	65	00	00	00	31	*	3 JUL 2130	140	00	00	00	0
2 JUL 0830	66	00	00	00	28	*	3 JUL 2200	141	00	00	00	0
2 JUL 0900	67	00	00	00	25	*	3 JUL 2230	142	00	00	00	0
2 JUL 0930	68	00	00	00	23	*	3 JUL 2300	143	00	00	00	0
2 JUL 1000	69	00	00	00	20	*	3 JUL 2330	144	00	00	00	0
2 JUL 1030	70	00	00	00	18	*	4 JUL 0000	145	00	00	00	0
2 JUL 1100	71	00	00	00	16	*	4 JUL 0030	146	00	00	00	0
2 JUL 1130	72	00	00	00	15	*	4 JUL 0100	147	00	00	00	0
2 JUL 1200	73	00	00	00	13	*	4 JUL 0130	148	00	00	00	0
2 JUL 1230	74	00	00	00	12	*	4 JUL 0200	149	00	00	00	0
2 JUL 1300	75	00	00	00	11	*	4 JUL 0230	150	00	00	00	0

TOTAL RAINFALL = 142 57 TOTAL LOSS = 89 89, TOTAL EXCESS = 52 68

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	74 50-HR
+ (CU M/S)	(HR)					
		(CU M/S)				
+ 114	21 00		107	59	20	20
		(MM)	22 986	50 897	52 679	52 679
		(1000 CU M)	2310	5115	5294	5294

CUMULATIVE AREA = 100 50 SQ KM

1

26 KK   * CONFL *

CONFLUENCIA

28 HC   HYDROGRAPH COMBINATION
ICOMP   2   NUMBER OF HYDROGRAPHS TO COMBINE

HYDROGRAPH AT STATION CONFL
SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW
1 JUL 0000	1	0	*	1 JUL 1900	39	139	*	2 JUL 1400	77	24	*	3 JUL 0900	115	5
1 JUL 0030	2	0	*	1 JUL 1930	40	146	*	2 JUL 1430	78	23	*	3 JUL 0930	116	5
1 JUL 0100	3	0	*	1 JUL 2000	41	152	*	2 JUL 1500	79	21	*	3 JUL 1000	117	5
1 JUL 0130	4	0	*	1 JUL 2030	42	155	*	2 JUL 1530	80	20	*	3 JUL 1030	118	4
1 JUL 0200	5	0	*	1 JUL 2100	43	156	*	2 JUL 1600	81	19	*	3 JUL 1100	119	4
1 JUL 0230	6	0	*	1 JUL 2130	44	156	*	2 JUL 1630	82	18	*	3 JUL 1130	120	4
1 JUL 0300	7	0	*	1 JUL 2200	45	155	*	2 JUL 1700	83	17	*	3 JUL 1200	121	4
1 JUL 0330	8	0	*	1 JUL 2230	46	152	*	2 JUL 1730	84	16	*	3 JUL 1230	122	4
1 JUL 0400	9	0	*	1 JUL 2300	47	149	*	2 JUL 1800	85	15	*	3 JUL 1300	123	4
1 JUL 0430	10	0	*	1 JUL 2330	48	144	*	2 JUL 1830	86	14	*	3 JUL 1330	124	4
1 JUL 0500	11	0	*	2 JUL 0000	49	138	*	2 JUL 1900	87	14	*	3 JUL 1400	125	4
1 JUL 0530	12	0	*	2 JUL 0030	50	132	*	2 JUL 1930	88	13	*	3 JUL 1430	126	4
1 JUL 0600	13	0	*	2 JUL 0100	51	126	*	2 JUL 2000	89	13	*	3 JUL 1500	127	3
1 JUL 0630	14	0	*	2 JUL 0130	52	120	*	2 JUL 2030	90	12	*	3 JUL 1530	128	3
1 JUL 0700	15	0	*	2 JUL 0200	53	115	*	2 JUL 2100	91	12	*	3 JUL 1600	129	3
1 JUL 0730	16	0	*	2 JUL 0230	54	109	*	2 JUL 2130	92	11	*	3 JUL 1630	130	3
1 JUL 0800	17	0	*	2 JUL 0300	55	104	*	2 JUL 2200	93	11	*	3 JUL 1700	131	3
1 JUL 0830	18	0	*	2 JUL 0330	56	99	*	2 JUL 2230	94	10	*	3 JUL 1730	132	3
1 JUL 0900	19	0	*	2 JUL 0400	57	93	*	2 JUL 2300	95	10	*	3 JUL 1800	133	3

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1	JUL	0930	20	0	*	2	JUL	0430	58	88	*	2	JUL	2330	96	10	*	3	JUL	1830	134	3
1	JUL	1000	21	0	*	2	JUL	0500	59	83	*	3	JUL	0000	97	9	*	3	JUL	1900	135	3
1	JUL	1030	22	0	*	2	JUL	0530	60	78	*	3	JUL	0030	98	9	*	3	JUL	1930	136	3
1	JUL	1100	23	0	*	2	JUL	0600	61	73	*	3	JUL	0100	99	8	*	3	JUL	2000	137	3
1	JUL	1130	24	0	*	2	JUL	0630	62	68	*	3	JUL	0130	100	8	*	3	JUL	2030	138	3
1	JUL	1200	25	1	*	2	JUL	0700	63	64	*	3	JUL	0200	101	8	*	3	JUL	2100	139	3
1	JUL	1230	26	2	*	2	JUL	0730	64	60	*	3	JUL	0230	102	7	*	3	JUL	2130	140	3
1	JUL	1300	27	5	*	2	JUL	0800	65	56	*	3	JUL	0300	103	7	*	3	JUL	2200	141	3
1	JUL	1330	28	9	*	2	JUL	0830	66	52	*	3	JUL	0330	104	7	*	3	JUL	2230	142	3
1	JUL	1400	29	15	*	2	JUL	0900	67	48	*	3	JUL	0400	105	7	*	3	JUL	2300	143	3
1	JUL	1430	30	22	*	2	JUL	0930	68	45	*	3	JUL	0430	106	7	*	3	JUL	2330	144	3
1	JUL	1500	31	32	*	2	JUL	1000	69	42	*	3	JUL	0500	107	6	*	4	JUL	0000	145	3
1	JUL	1530	32	45	*	2	JUL	1030	70	39	*	3	JUL	0530	108	6	*	4	JUL	0030	146	2
1	JUL	1600	33	59	*	2	JUL	1100	71	36	*	3	JUL	0600	109	6	*	4	JUL	0100	147	2
1	JUL	1630	34	75	*	2	JUL	1130	72	34	*	3	JUL	0630	110	6	*	4	JUL	0130	148	2
1	JUL	1700	35	91	*	2	JUL	1200	73	32	*	3	JUL	0700	111	6	*	4	JUL	0200	149	2
1	JUL	1730	36	105	*	2	JUL	1230	74	30	*	3	JUL	0730	112	5	*	4	JUL	0230	150	2
1	JUL	1800	37	119	*	2	JUL	1300	75	28	*	3	JUL	0800	113	5	*					
1	JUL	1830	38	130	*	2	JUL	1330	76	26	*	3	JUL	0830	114	5	*					

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	74 50-HR
+ (CU M/S)	(HR)				
		(CU M/S)			
* 156	21 00	148	88	33	32
	(MM)	19 137	45 573	51 502	51 502
	(1000 CU M)	3194	7606	8596	8596

CUMULATIVE AREA = 166 90 SQ KM

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*** ** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
            ***************
            *               *
   29 KK    *     RES       *
            *               *
            ***************
```

ROUTE SBCATU THROUGH RES CATU

31 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	2	PLOT CONTROL
QSCAL	0	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

32 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	ELEV	TYPE OF INITIAL CONDITION
RSVRIC	5 84	INITIAL CONDITION
X	00	WORYING R AND D COEFFICIENT

33 SV STORAGE 0 78 6 494 9 1394 6 2705 1 4459 1 6710 6 9511 1 19000 0
45000 0

34 SE ELEVATION 1 00 2 00 3 00 4 00 5 00 6 00 7 00 8 00 10 00
15 00

35 SS SPILLWAY

CREL	5 84	SPILLWAY CREST ELEVATION
SPWID	40 00	SPILLWAY WIDTH
COQW	2 10	WEIR COEFFICIENT
EXPW	1 50	EXPONENT OF HEAD

***

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	00	00	40	3 19	10 77	25 54	49 88	86 19	136 87	204 31
ELEVATION	1 00	5 84	5 87	5 96	6 10	6 30	6 55	6 86	7 23	7 65
OUTFLOW	290 90	399 04	531 13	689 55	876 70	1094 98	1346 77	1634 48	1960 50	2327 22
ELEVATION	8 13	8 67	9 26	9 91	10 62	11 38	12 20	13 08	14 01	15 00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	00	78 63	494 88	1394 63	2705 13	4185 51	4235 07	4303 77	4459 13	4680 53
OUTFLOW	00	00	00	00	00	00	40	3 19	5 10	10 77
ELEVATION	1 00	2 00	3 00	4 00	5 00	5 84	5 87	5 96	6 00	6 10
STORAGE	5125 91	5698 54	6398 42	6710 63	7351 12	8530 22	9511 13	10142 14	12689 55	15505 11
OUTFLOW	25 54	49 88	86 19	104 40	136 87	204 31	265 92	290 90	399 04	531 13
ELEVATION	6 30	6 55	6 86	7 00	7 23	7 65	8 00	8 13	8 67	9 26
STORAGE	19568 81	19000 00	22223 03	26190 63	30452 13	35007 52	39856 81	45000 00		
OUTFLOW	589 55	711 69	876 70	1094 98	1346 77	1634 48	1960 50	2327 22		
ELEVATION	9 91	10 00	10 62	11 38	12 20	13 08	14 01	15 00		

HYDROGRAPH AT STATION RES

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	JUL	0000	1	0	4185 5	5 8	*	2	JUL	0100	51	110	6923 1	7 0	*	3	JUL	0200	101	19	4937 9	6 2
1	JUL	0030	2	0	4185 5	5 8	*	2	JUL	0130	52	111	6845 4	7 0	*	3	JUL	0230	102	18	4917 5	6 2
1	JUL	0100	3	0	4185 5	5 8	*	2	JUL	0200	53	112	6856 1	7 1	*	3	JUL	0300	103	18	4897 8	6 2
1	JUL	0130	4	0	4185 5	5 8	*	2	JUL	0230	54	112	6856 3	7 1	*	3	JUL	0330	104	17	4878 7	6 2

1	JUL	0200	5	0	4185	5	5	8	*	2	JUL	0300	55	111	6847	2	7	0	*	3	JUL	0400	105	17	4860	4	6	2
1	JUL	0230	6	0	4185	5	5	8	*	2	JUL	0330	56	110	6829	7	7	0	*	3	JUL	0430	106	16	4842	7	6	2
1	JUL	0300	7	0	4185	5	5	8	*	2	JUL	0400	57	109	6804	9	7	0	*	3	JUL	0500	107	16	4825	6	6	2
1	JUL	0330	8	0	4185	5	5	8	*	2	JUL	0430	58	108	6773	4	7	0	*	3	JUL	0530	108	15	4809	2	6	2
1	JUL	0400	9	0	4185	5	5	8	*	2	JUL	0500	59	106	6735	7	7	0	*	3	JUL	0600	109	15	4793	4	6	1
1	JUL	0430	10	0	4185	5	5	8	*	2	JUL	0530	60	103	6692	6	7	0	*	3	JUL	0630	110	14	4778	2	6	1
1	JUL	0500	11	0	4185	5	5	8	*	2	JUL	0600	61	101	6645	0	7	0	*	3	JUL	0700	111	14	4763	5	6	1
1	JUL	0530	12	0	4185	5	5	8	*	2	JUL	0630	62	98	6593	7	6	9	*	3	JUL	0730	112	13	4749	4	6	1
1	JUL	0600	13	0	4185	5	5	8	*	2	JUL	0700	63	94	6539	6	6	9	*	3	JUL	0800	113	13	4735	8	6	1
1	JUL	0630	14	0	4185	5	5	8	*	2	JUL	0730	64	91	6483	7	6	9	*	3	JUL	0830	114	12	4722	7	6	1
1	JUL	0700	15	0	4185	5	5	8	*	2	JUL	0800	65	88	6426	4	6	9	*	3	JUL	0900	115	12	4710	1	6	1
1	JUL	0730	16	0	4185	5	5	8	*	2	JUL	0830	66	85	6368	1	6	8	*	3	JUL	0930	116	11	4698	0	6	1
1	JUL	0800	17	0	4185	5	5	8	*	2	JUL	0900	67	82	6308	8	6	8	*	3	JUL	1000	117	11	4686	3	6	1
1	JUL	0830	18	0	4185	5	5	8	*	2	JUL	0930	68	78	6249	0	6	8	*	3	JUL	1030	118	11	4675	0	6	1
1	JUL	0900	19	0	4185	5	5	8	*	2	JUL	1000	69	75	6188	9	6	8	*	3	JUL	1100	119	10	4664	0	6	1
1	JUL	0930	20	0	4185	5	5	8	*	2	JUL	1030	70	72	6129	0	6	7	*	3	JUL	1130	120	10	4653	3	6	1
1	JUL	1000	21	0	4185	5	5	8	*	2	JUL	1100	71	69	6069	7	6	7	*	3	JUL	1200	121	10	4642	9	6	1
1	JUL	1030	22	0	4185	5	5	8	*	2	JUL	1130	72	66	6011	2	6	7	*	3	JUL	1230	122	10	4632	6	6	1
1	JUL	1100	23	0	4185	6	5	8	*	2	JUL	1200	73	63	5953	9	6	7	*	3	JUL	1300	123	9	4622	7	6	1
1	JUL	1130	24	0	4185	8	5	8	*	2	JUL	1230	74	60	5897	9	6	6	*	3	JUL	1330	124	9	4613	0	6	1
1	JUL	1200	25	0	4186	6	5	8	*	2	JUL	1300	75	57	5843	6	6	6	*	3	JUL	1400	125	9	4603	5	6	1
1	JUL	1230	26	0	4189	2	5	8	*	2	JUL	1330	76	55	5791	0	6	6	*	3	JUL	1430	126	9	4594	2	6	1
1	JUL	1300	27	0	4195	5	5	8	*	2	JUL	1400	77	52	5740	2	6	6	*	3	JUL	1500	127	8	4585	3	6	1
1	JUL	1330	28	0	4207	7	5	9	*	2	JUL	1430	78	50	5691	2	6	5	*	3	JUL	1530	128	8	4576	5	6	1
1	JUL	1400	29	0	4228	6	5	9	*	2	JUL	1500	79	48	5643	7	6	5	*	3	JUL	1600	129	8	4568	1	6	0
1	JUL	1430	30	1	4260	8	5	9	*	2	JUL	1530	80	46	5597	5	6	5	*	3	JUL	1630	130	8	4559	9	6	0
1	JUL	1500	31	2	4307	5	5	9	*	2	JUL	1600	81	44	5552	5	6	5	*	3	JUL	1700	131	8	4552	0	6	0
1	JUL	1530	32	3	4372	7	6	0	*	2	JUL	1630	82	42	5508	8	6	5	*	3	JUL	1730	132	7	4544	4	6	0
1	JUL	1600	33	5	4458	9	6	0	*	2	JUL	1700	83	40	5466	5	6	4	*	3	JUL	1800	133	7	4537	0	6	0
1	JUL	1630	34	8	4568	0	6	0	*	2	JUL	1730	84	38	5425	6	6	4	*	3	JUL	1830	134	7	4529	8	6	0
1	JUL	1700	35	11	4700	1	6	1	*	2	JUL	1800	85	37	5386	2	6	4	*	3	JUL	1900	135	7	4522	9	6	0
1	JUL	1730	36	16	4851	5	6	2	*	2	JUL	1830	86	35	5348	5	6	4	*	3	JUL	1930	136	7	4516	1	6	0
1	JUL	1800	37	22	5018	5	6	2	*	2	JUL	1900	87	33	5312	4	6	4	*	3	JUL	2000	137	6	4509	6	6	0
1	JUL	1830	38	29	5196	7	6	3	*	2	JUL	1930	88	32	5277	9	6	4	*	3	JUL	2030	138	6	4503	3	6	0
1	JUL	1900	39	36	5380	7	6	4	*	2	JUL	2000	89	31	5244	9	6	3	*	3	JUL	2100	139	6	4497	2	6	0
1	JUL	1930	40	44	5565	3	6	5	*	2	JUL	2030	90	29	5213	4	6	3	*	3	JUL	2130	140	6	4491	2	6	0
1	JUL	2000	41	52	5746	5	6	6	*	2	JUL	2100	91	28	5183	3	6	3	*	3	JUL	2200	141	6	4485	4	6	0
1	JUL	2030	42	61	5920	2	6	6	*	2	JUL	2130	92	27	5154	6	6	3	*	3	JUL	2230	142	6	4479	9	6	0
1	JUL	2100	43	70	6082	5	6	7	*	2	JUL	2200	93	26	5127	9	6	3	*	3	JUL	2300	143	6	4474	4	6	0
1	JUL	2130	44	78	6231	3	6	8	*	2	JUL	2230	94	25	5100	9	6	3	*	3	JUL	2330	144	5	4469	2	6	0
1	JUL	2200	45	84	6365	7	6	8	*	2	JUL	2300	95	24	5075	4	6	3	*	4	JUL	0000	145	5	4464	1	6	0
1	JUL	2230	46	91	6484	2	6	9	*	2	JUL	2330	96	23	5050	6	6	3	*	4	JUL	0030	146	5	4459	1	6	0
1	JUL	2300	47	97	6585	9	6	9	*	3	JUL	0000	97	22	5026	6	6	3	*	4	JUL	0100	147	5	4454	3	6	0
1	JUL	2330	48	102	6670	1	7	0	*	3	JUL	0030	98	21	5003	4	6	2	*	4	JUL	0130	148	5	4449	6	6	0
2	JUL	0000	49	106	6737	0	7	0	*	3	JUL	0100	99	21	4980	9	6	2	*	4	JUL	0200	149	5	4445	1	6	0
2	JUL	0030	50	108	6787	5	7	0	*	3	JUL	0130	100	20	4959	0	6	2	*	4	JUL	0230	150	5	4440	7	6	0

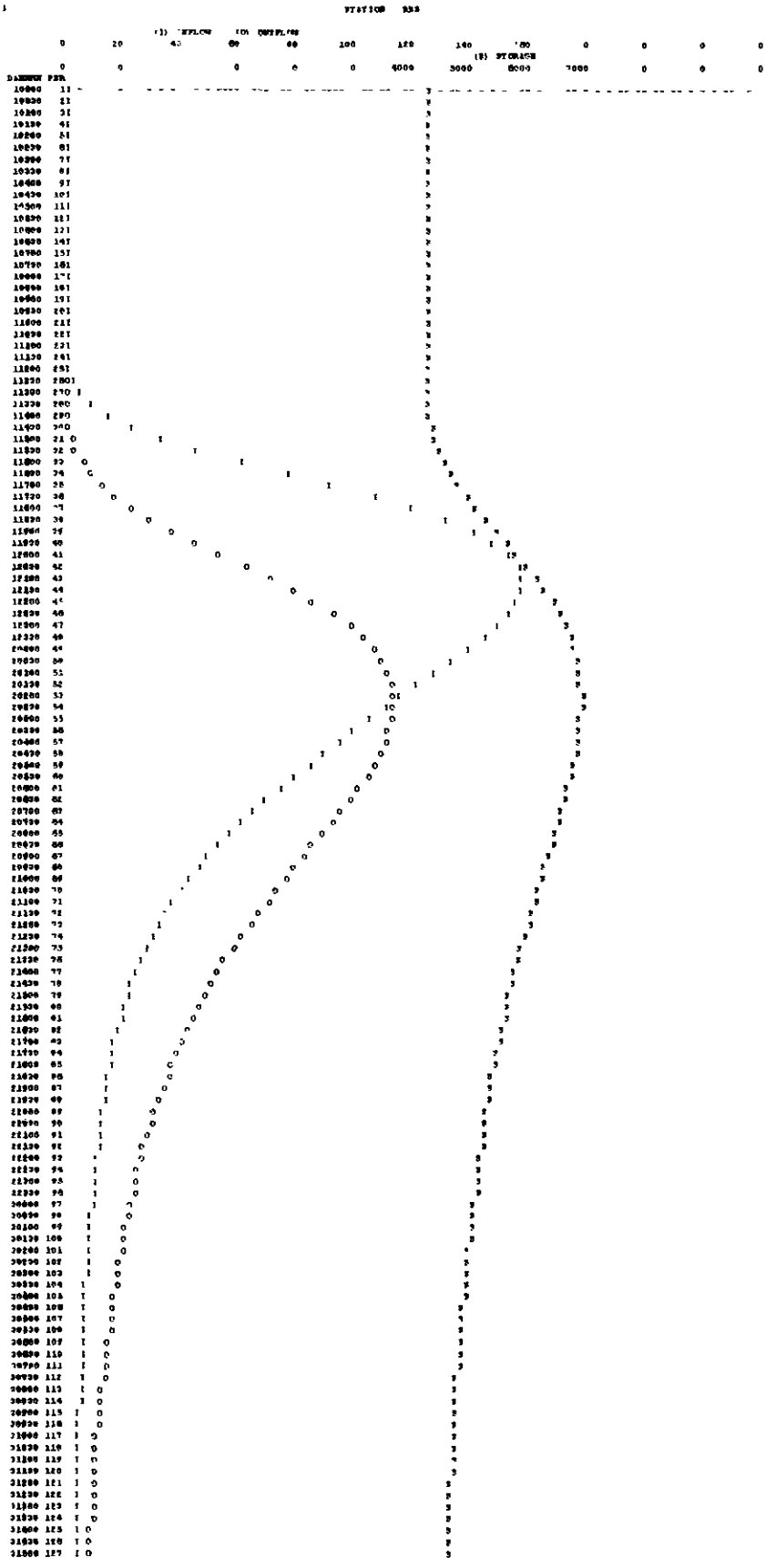
PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	74 50-HR
+ (CU M/S)	(HR)				
		(CU M/S)			
+ 112	26 50	109	77	32	31
	(MM)	14 083	39 754	49 973	49 973
	(1000 CU M)	2351	6635	8340	8340

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	74 50-HR
+ (1000 CU M)	(HR				
6856	26 50	6798	6197	5129	5097

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	74 50-HR
+ (METERS)	(HR				
7 05	26 50	7 03	6 77	6 29	6 28

CUMULATIVE AREA = 166 90 SQ KM

000086



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 21520 120  I O                                                  3
 21560 121  I O                                                  3
 21570 122  I O                                                  3
 21700 123  I O                                                  3
 21730 124  I O                                                  3
 21800 125  I O                                                  3
 21850 126  IO                                                   3
 21900 127  I O                                                  3
 21920 128  I O                                                  3
 22000 129  I O                                                  3
 22080 130  I O                                                  3
 22130 131  I O                                                  3
 22200 132  I O                                                  3
 22230 133  I O                                                  3
 22300 134  I O                                                  3
 22320 135  I O                                                  3
 40000 136  I O                                                  3
 40020 137  I O                                                  3
 40100 138  I O                                                  3
 40130 139  IO                                                   3
 40200 140  IO                                                   3
 40230 150  IO                                                   3
;
1
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RUNOFF SUMMARY, AVERAGE FLOW IN CUBIC METERS PER SECOND
AREA IN SQUARE KILOMETERS

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	SBCINZ	138 01	16 00	108 27	41 57	13 86	66 40		
+	ROUTED TO	RES	42 83	22 00	41 57	29 44	12 74	66 40		
+									30 65	
22 00										
+	HYDROGRAPH AT	SBCATU	114 20	21 00	106 95	59 20	20 43	100 50		
+	2 COMBINED AT	CONFL	156 42	21 00	147 87	89 03	33 16	166 90		
+	ROUTED TO	RES	111 79	26 50	108 82	76 79	32 18	166 90		
+									7 05	
26 50										

*** NORMAL END OF HEC-1 ***

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- CÁLCULO DO FATOR DE FORMA PARA O RESERVATÓRIO DO CATU E CINZENTA

CATU - Regression Output : $Z \times h^3$

Constant	0,0
Std Err of Y Est	556567,3
R Squared	1,0
No. of Observations	8,0
Degrees of Freedom	7,0
X Coefficient(s)	***29672,2***
Std Err of Coef	1294,6

α = 29672,2

CINZENTA - Regression Output. : $Z \times h^3$

Constant	0,0
Std Err of Y Est	2851460,4
R Squared	1,0
No. of Observations	6,0
Degrees of Freedom	5,0
X Coefficient(s)	***7143,7***
Std Err of Coef.	326,1

α = 7143,7

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