

THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
THE CEYLON ELECTRICITY BOARD

SAMANALAWEWA HYDROELECTRIC PROJECT
RESERVOIR REMEDIAL WORKS - WET BLANKETING

COMPLETION REPORT

RESERVOIR REMEDIAL WORKS
- WET BLANKETING

PART II

SUPPORTING DOCUMENTS

JUNE 1999

Nippon Koei Co., Ltd.
Consulting Engineers, Tokyo

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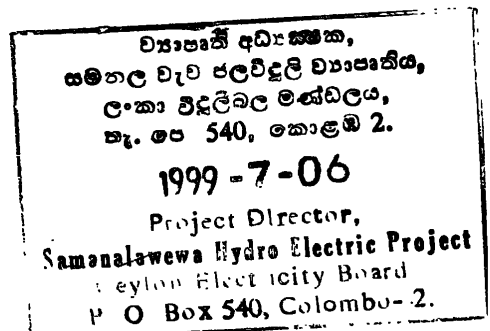
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The Completion Report consists of

Part I : MAIN REPORT

Part II : SUPPORTING DOCUMENTS

-SAMANALAWEWA HYDROELECTRIC PROJECT
RESERVOIR REMEDIAL WORKS- WET BLANKETING

COMPLETION REPORT

PART II

SUPPORTING DOCUMENTS

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ANNEX-A

PROGRESS REPORT OF DUMPING

ANNEX-A

PROGRESS REPORT OF DUMPING

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1 General

Dumping under KHK JV's Contract (OECF Financing)

The remedial works with dumping operation under KHK JV's Contract commenced on 27.03.98 has been terminated on 02.01.99 with a total number of 3,873 dumped loads (426,030 m³= 110m³ x 3,873 nos) which consists of 2,783 loads of Scheme -1 and 1,090 loads of Scheme -2.

Scheme	Allocated BOQ	Actual Loads Completed	(as of 31.03.99)
			Balance
Scheme-1	2,270	2,783	+513
Scheme-2	2,275	1,090	-1,185
Total	4,545	3,873	-672

Dumping under Local Contract (CEB's Financing)

Investigatory dumping was commenced by CEB on 10 May 1999 over the credible areas proposed by the Consultants, under Local contract with Lanka Transformers Ltd. engaging personnel trained on the Project supervised by CECB after termination of KHK Contract on 31 March 1999.

Scheme	Proposed Dumping Locations	Actual Loads Completed as of 19.06.99	(as of 19.06.99)
			Balance
Scheme-3	386	180	-206
Total	386	180	-206

The overall dumping areas and completed dumping locations since 27.03.98 upto 19.06.99 are shown in Figure 1. The dumping progress and design modifications carried out during dumping operation are summarised below.

2 Dumping Works under Scheme-1(27.03-22.09.98)

Dumping works under Scheme-1 are divided into two categories as Trial Blanketing and Main Blanketing-1.

2.1 Trial Blanketing (27.03.98 - 28.04.98)

During trial blanketing, three (3) major tests which consist of preliminary trials, initial dumping trials and main trials have been carried out although preliminary trials has not been defined in the Technical Specifications.

Item	Purposes	Results	Period
1 Preliminary Trials	To check the performance of the barges and accuracy of barge positioning	Barge empty time of 10 minutes w/o canvas and 1.5 minutes w/ canvas	3.27 - 16.04.98
2 Initial Dumping Trials	To assess and decide OMC for dumping	Adopted 25% among three (3) different moisture contents of 25, 30 and 35%	17-22.04.98
3 Main Trials	To assess optimum spacing of dumping locations to build up a minimum formed blanket of 0.5 m thickness	Adopted 20 m intervals with 5 loads at each dumping location	24-28.04.98

2.2 Main Blanketing -1 (29.04-22.09.98)

1) Original Target Area(29.04-11.08.98)

Dumping operation for Main Blanketing -1 under Scheme -1 has commenced on 29.04.98 and carried out over Original Target Area (Figure 2).

Sections	No. of Blocks	No. of Locations	No. of Loads	Period
River Course	10	110	607	29.04-14.06.98
Abutment	10	324	1,080	14.06-11.08.98

*Note : No. of dumping locations and loads include the trial blanketing.

While dumping over Block K left abutment of Block K the first effectiveness was observed in Block -K on 01-08.07.98 in a form of a reduction of the ground water level (some 50 cm) (Figure 3). However, the reductions of GWL confirmed at Block K have been recovered to the original level even after additional dumping due to main ingress point being still uncovered.

2) Additional Blocks just downstream of Original Target Area(22.07-22.08.98)

Having no positive results by dumping over the original Target Area, in an attempt to find out ingress locations salt-tracing tests by dumping two -50 kg of salt bags with slit-cut in suspected locations, commenced on 02.07.98 at downstream adjacent to the Original target area. On 13.07.98, it was observed from the tracing test in Block-U the EC value measured in WB-2 slightly increased. Although the following dumping over Block-U proved to be effective in reducing ground water level by about 0.5 m (Figure 4), the reduced level recovered to the original GWL within a short time period.

Additional Blocks just downstream of Original Target Area

Sections	No. of Blocks	No. of Locations	No. of Loads	Period
Abutment	2 (U&V)	51	344	22.07-22.08.98

3) Design Modifications of Dumping Area towards Downstream of Original (16.08.98)

Through the letter No. N/C-815 dated 16.08.98, the Engineer proposed to carry out the investigatory dumping over the downstream stretch of the original target area, along downstream Walawe ganga, to identify possible ingress locations.

The investigatory dumping for downstream commenced on 22.08.98, from Block W, with three (3) loads at each dumping location.

Soon after dumping over Block-X early morning on 26 September 1998, the groundwater level in Area-B started falling down, and the leakage volume did start reducing. Specially, while dumping at the location of DL20 in the midnight of 28 September 1998, groundwater levels monitored in Area-B boreholes fell down drastically (Figure 5).

Within five days from 27th to 31st August 1998, the groundwater level (WB-2) dropped from 431.40 masl to 427.57 masl (3.83 m down) and the leakage volume reduced from 2.19 m³/sec. to 2.06 m³/sec. (0.13 m³/sec. reduction).

Meantime, through the letter No. N/K-601 dated 25.08.98 the Engineer has instructed the Contractor to carry out dumping beyond 2,270 loads allocated in Scheme -1.

4) Adit G Portal (18.09.98)

Before identification and closure of open joint at Block X along karstic limestone band across Walawe Ganga, salt tracing test was instigated at around Adit G portal located at El. 415.50 m on 02.07.98. We could not confirm any identification of ingress locations to change EC values in Borehole WB-2.

After blocking of open joints at Block X, we carried out investigatory dumping over Adit G portal at El. 415.50 m on 18.09.98 and we confirm that the portal was completely covered with a blanket of about 4 m thickness after dumping of 10 loads (Figures 6 to 8).

On 16.09.98 just before dumping and on 22.10.98 after dumping over the Adit G Portal, additional salt tracing tests were carried out at around Adit G.

However, we could not confirm any reduction of GWL and any changing of EC values to indicate the existence of any ingress points at Adit G.

5) Dumping Locations in Scheme -2 agreed at 4th International Panel Meeting (21-23.09.98)

3) 1st Review Meeting (22-23.10.98)

At 1st Review Meeting held on 22-23.10.98, the Local Panel Members agreed with the Engineer's above proposal and a revised order of priority for the balance work was agreed by the Local Panel Members.

Revised Dumping Programme agreed at 1st Review Meeting on 22-23.10.98

Original Priority	Revised Priority	Description	Original Allocation	Done to Date	Balance Allocated
1	1	Both Abutments of Block X up to 400 masl	171	312	To be done as required
	2	Belihuloya Upstream Area (GG & HH)	0	0	124
6	3	Right Abutment of Block-BB up to 400 masl (Cavity 1)	63	0	68
7	4	Block CC, DD & EE (River Bed) Belihuloya	90		60
2	5	Block W Abutment up to 400 masl	180	24	104
8	6	Both Abutments of Limestone in Block - Y up to 430 masl (Block FF)	180	0	120
3	7	Extension of Block AA to 400 masl	180	0	120
4		Extension of Block-J (Riverbed) by 200 m	90	0	Will be considered in latter stage if necessary
5		Extension of Block-P to 400 masl	180	0	-do-
9		Right Bank of the Main Target Area No. 1 to a Higher Level (420 masl)	390	0	-do-
Total			1,524	336	596

Mr. J. Barry Cooke has queried regarding the above revised programme in his letter 10.11.98. Through the letter No. N/C-894 dated 12.11.98 the Engineer has replied to Mr. J. Barry Cooke that only Blocks, EE due to another major limestone band crosses Walawe ganga and Belihuloya, GG & HH due to extended cavitated limestone band from Block X are added without any cancellation of locations Block 1-9.

After 1st Review Meeting held on 22-23.10.98, the investigatory dumping has been carried out according to the revised priority order.

After collection of two (2) trays on 20.11.98 the Engineer confirmed a minimum thickness more than 0.35 m even with only 1 load at each location with a grid pattern on a 20 m intervals (Figure 10). The number of loads for investigatory dumping was changed from 2 loads to 1 load on 17.11.98.

During investigatory dumping over the right abutment of Block Y close to Block X, the Engineer confirmed a significant response of GWL while dumping over YR1 (El. 393 m) even with dumping of 1 load on 23.11.98 (Figures 11 and 12).

Due to this, the GWL and leakage amount since 22.11.98 until 28.11.98 were reduced by about 1 m from El. 418.87 m to El. 417.96 m and about 0.04 m³/s from 1.79 m³/s to 1.75 m³/s, respectively.

4) 2nd Review Meeting (30.11-01.12.98)

On 30.11-01.12.98, 2nd Review Meeting was held. Mr. K. W. Perera, Local Panel Expert has recommended to carry out additional investigatory dumping for the middle stretch of Belihuloya (Block RR), about 1 km upstream of dam site, where there is a possibility of outcropped karstic limestone layer extrapolated from the strike at Block X towards the river stretch of Belihuloya.

Summary of Dumped Loads and Remaining Dumping Locations
confirmed at 2nd Review Meeting

(as of 30.11.98)

Priority	Locations	Remaining Locations	No. of Loads Completed under Scheme -2	Concerned Blocks
1	Both abutments of Block X upto 400 masl	8	353	X
2	Both abutments of Block W upto 400 masl	68	24	W
3	Extension of Block-AA to 400 masl	138	0	AA, JJ, KK, LL & MM
4	Extension of Block -J (river bed) by 200 m	45	0	II
5	Extension of Block-P to 400 masl	28	0	NN
6	Right Bank Abutment of Block-BB upto 400 masl	0	68	FF
7	Block-CC, DD and EE(river bed) in Belihul Oya	0	105	CC, DD, & EE
8	Both abutments of the limestone in Block-Y upto 400 masl	0	65	Y
9	Right Bank Abutment of the Main Target Area No. 1 to a higher level (420 masl)	92	0	OO, PP & QQ
10	Upstream Belihul Oya	0	124	GG & HH
11	The remaining locations along river course at Block Z	0	21	Z
12	Additional Locations suspected based on seepage detector test at Block BB	0	2	BB
13	The remaining locations for abutments within original main target area	45	0	N, O, Q, R, S & T
14	Middle river stretch of Belihuloya	57	0	RR
	Total	481	762	

5) Termination of Dumping(02.01.99)

Due to rising of the reservoir above El.450 m reaching non operable level for No. 1 Conveyor provided at the loading bay of El. 452 m, the Engineer instructed the Contractor to shift the loading facility to EL.462 m on 02.01.99. The loading facility was shifted during 3-04.01.99.

After confirmation with CEB through the letter No. N/K-667 dated 05.01.99, the Engineer has instructed the Contractor to terminate the dumping under Scheme -2

to avoid any extra claim due to unpredictable stand-by period until rising of the reservoir upto the lowest operating level of El.455 for loading bay shifted to El.462 m.

3.2 Summary of Dumping Progress under Scheme-2

Dumping under Scheme-2 has reached 1,090 loads with the dumping locations of 706 nos. The investigatory dumping agreed at the 4th International Panel Meeting has been satisfactorily completed except for Location No. 5 (Block NN), extension of Block P to 400 masl (Table 2).

Summary of Dumping Progress under Scheme-2 (as of 02.01.99)

Priority	Locations	Remaining Locations	No. of Loads Completed under Scheme -2	Concerned Blocks
1	Both abutments of Block X upto 400 masl	0	363	X
2	Both abutments of Block W upto 400 masl	0	92	W
3	Extension of Block-AA to 400 masl	25	113	AA, JJ, KK, LL & MM
4	Extension of Block -J (river bed) by 200 m	5	45	II
5	Extension of Block-P to 400 masl	28	0	NN
6	Right Bank Abutment of Block-BB upto 400 masl	0	68	FF
7	Block-CC, DD and EE(river bed) in Belihul Oya	0	105	CC, DD, & EE
8	Both abutments of the limestone in Block-Y upto 400 masl	0	65	Y
9	Right Bank Abutment of the Main Target Area No. 1 to a higher level (420 masl)	0	92	OO, PP & QQ
10	Upstream Belihul Oya	0	124	GG & HH
11	The remaining locations along river course at Block Z	0	21	Z
12	Additional Locations suspected based on seepage detector test at Block BB	0	2	BB
13	The remaining locations for abutments within original main target area	45	0	N, O, Q, R, S & T
14	Middle river stretch of Belihuloya	57	0	RR
	Total	160	1,090	

4 Summary of Dumping Works including Scheme-1 and Scheme-2

Dumping works including Scheme-1 and-2 are summarised below (Table 3).

(as of 02.01.99)

Locations	No. of Locations	No. of Loads	Period
<u>Main Target Area</u>			
Original Target Area	324	1,687	27.03-11.08.98
Block U & V	51	344	22.07-22.08.98
<u>Sub Total</u>	<u>375</u>	<u>2,031</u>	

Locations	No. of Locations	No. of Loads	Period
<u>Downstream Area</u>			
<u>Sub total</u>	<u>852</u>	<u>1,842</u>	22.08.98-02.01.99
<u>Total</u>	<u>1,227</u>	<u>3,873</u>	

Dumping progress for each block at the main target area and downstream of the main target area are shown in Figure 13 and 14. The completed dumping locations under Scheme-1 and -2 is shown in Figure 15.

5 Investigatory Dumping under Local Contract

On 10 May 1999 CEB commenced investigatory dumping over the credible areas proposed by the Consultants, under Local contract with Lanka Transformers Ltd. engaging personnel trained on the Project supervised by CECB after termination of KHK Contract on 31 March 1999.

As of 19.06.99 dumping reached 180 loads in total with 55 locations in Blocks -1, -2 and -3 and 124 locations in Blocks RR, X, Y, Z and W (Figure 16).

(as of 19.06.99)			
Locations	No. of Locations	No. of Loads	Period
<u>Upstream of Walawe Ganga</u>			
Block No.1	12	12	10.05-13.05.99
Block No.2	15	15	14.05-19.05.99
Block No.3	28	28	19.05-24.05.99
<u>Sub total</u>	<u>55</u>	<u>55</u>	
<u>Downstream Area</u>			
Block RR	19	19	24.05-26.05.99
Block X	53	53	27.05-14.06.99
Block W	5	5	28.05-31.05.99
Block Y	28	29	28.05-17.06.99
Block Z	19	19	17.06.99-continued
<u>Sub total</u>	<u>124</u>	<u>125</u>	
<u>Total</u>	<u>179</u>	<u>180</u>	

During this period, there was a slight response in GWL while dumping over the point 3Y3 (around El. 440) as observed on 28.05.99 (Figures 17 and 18). Although a second load was dumped over the same location on 31.05.99, there was no any further response in GWL.

6 Conclusions

Due to prevailing southwest monsoon rain since 25.05.99, for the second time FSL was achieved and the first automatic gate operation was successfully performed on 14.06.99. When the reservoir water level reached El. 460.03 m, 3 cm above FSL of 460 m, the automatic gate operation sequence properly functioned and the center gate automatically opened at 2:56 hrs on 14.06.99. This was automatically closed at 5:22 hrs after RWL dropping to 459.96 m.

The GWL and leakage amount have stabilised within one week after reaching FSL. As of 19.06.99, the GWL and leakage amount has reached El. 429.93 m and 2.07 m³/s at RWL of 459.88 which is a reduction of 14.07 m and 0.73 m³/s (about 25 %) comparing to the recorded data during the 1st filling in December 1997, which were 444 of GWL and 2.8 m³/s of leakage before dumping (Figures 19 and 20).

Based on significant reduction of leakage amount due to effectiveness of Wet Blanketing, the amount of water exceeding the downstream irrigation requirement due to excess leakage amount could be reduced by about 0.57 m³/s through the reservoir operation based on the inflow data from 1949 to 1989 and therefore about 18 MCM/year could be stored and utilised for the power production. Due to this, the incremental annual energy benefit of about 16 GWh could be achieved.

TABLES

**Table 1 SUMMARY OF DUMPING LOCATIONS AND LOADS COMPLETED
UNDER SCHEME-1 SINCE 27.03.98-22.09.98 (1/2)**

Target Area	Block No.	No. of Loads Dumped Completed	No. of Dumping Locations	No. of Dumping Locations Completed	No. of Remaining Dumping Locations
1	MAIN TARGET AREA				
1.1	River Course				
No.3	A	65	13	13	0
No.3	B	45	9	9	0
No.1	C	70	12	12	0
No.1	D	71	12	12	0
No.1	E	71	12	12	0
No.1	F	80	12	12	0
No.2	G	70	13	13	0
No.2	H	45	9	9	0
No.2	I	45	9	9	0
No.2	J	45	9	9	0
Subtotal		607	110	110	0
1.2	Abutments				
No.1	K	280	55	55	0
No.1	L	240	48	48	0
No.1	M	85	17	17	0
No.1	N	125	26	25	1
No.2	O	20	11	4	7
No.2	P	95	19	19	0
No.2	Q	100	26	20	6
No.2	R	0	14	0	14
No.3	S	35	16	6	10
No.3	T	100	27	20	7
	U	219	35	35	0
	V	125	16	16	0
Subtotal		1424	310	265	45
Total		2031	420	375	45

**Table 1 SUMMARY OF DUMPING LOCATIONS AND LOADS COMPLETED
UNDER SCHEME-1 SINCE 27.03.98-22.09.98 (2/2)**

Target Area	Block No.	No. of Loads Dumped Completed	No. of Dumping Locations	No. of Dumping Locations Completed	No. of Remaining Dumping Locations
2 Downstream of Main Target Area					
	W	90	104	30	74
	X	412	173	73	100
	Y	90	79	30	49
	Z	18	27	6	21
	AA	45	26	15	11
	ADIT G	10	1	1	0
	BB	87	31	29	2
Total		752	441	184	257
Grand Total		2783	861	559	302

Table 2 Summary of Dumping Locations and Loads Completed in Scheme -2

(as of 02.01.99)

Priority	Locations	No. of Dumping Locations	No. of Dumping Locations Completed	Remaining Locations	No. of Loads Completed	Remaining Loads	Concerned Blocks
1	Both abutments of Block X upto 400 masl	135	135	0	363	0	X
2	Both abutments of Block W upto 400 masl	74	74	0	92	0	W
3	Extension of Block -AA to 400 masl	138	113	25	113	25	AA, JJ, KK, LL & MM
4	Extension of Block - J (river bed) by 200 m	50	45	5	45	5	II
5	Extension of Block- P to 400 masl	28	0	28	0	28	NN
6	Right Bank Abutment of Block-BB upto 400 masl	34	34	0	68	0	FF
7	Block-CC, DD and EE (river bed) in Belihuloya	76	76	0	105	0	CC, DD & EE
8	Both abutments of the limestones in Block-Y upto 400 masl	52	52	0	65	0	Y
9	Right Bank Abutment of the Main Target Area No.1 to a higher level (420 masl)	92	92	0	92	0	OO, PP & QQ
10	Upstream Belihuloya	62	62	0	124	0	GG & HH
11	The remaining locations along river course at Block Z	21	21	0	21	0	Z
12	Additional locations suspected based on seepage detector test at Block BB	2	2	0	2	0	BB
13	The remaining locations for abutments within original main target area	45	0	45	0	45	N, O, Q, R, S & T
14	Middle River Stretch of Belihuloya	57	0	57	0	57	RR
	Total	866	706	160	1090	160	

Allocated BOQ Quantity in Scheme-2

2,275

Used Amount since 27.09.98 until 02.01.99

1,090

47.91%

Balance

672

Table 3 SUMMARY OF DUMPING LOCATIONS AND LOADS COMPLETED (1/2)

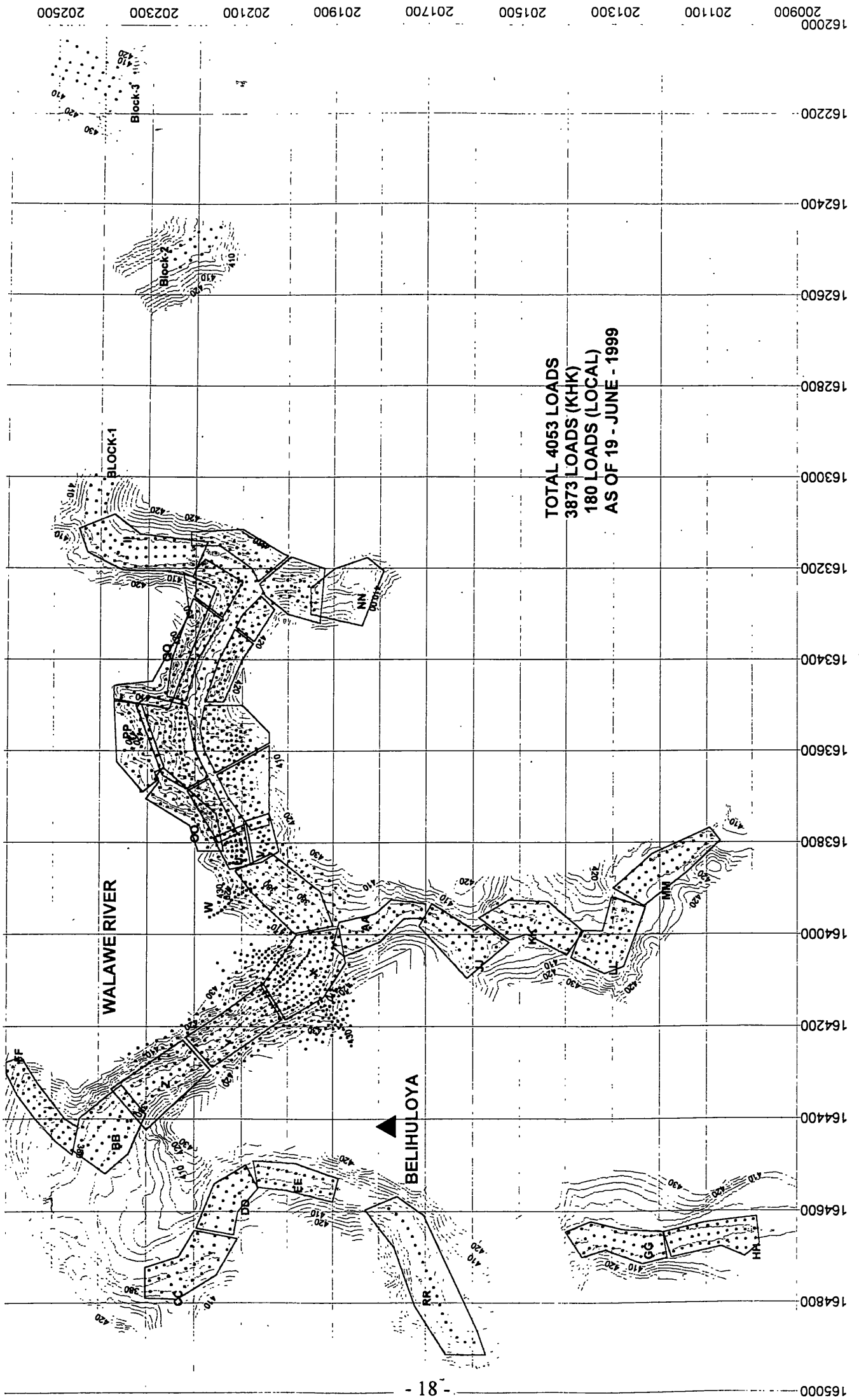
Target Area	Block No.	No. of Loads Dumped Completed	No. of Dumping Locations	No. of Dumping Locations Completed	No. of Remaining Dumping Locations	
1	MAIN TARGET AREA					
1.1	River Course					
	No.3	A	65	13	13	0
	No.3	B	45	9	9	0
	No.1	C	70	12	12	0
	No.1	D	71	12	12	0
	No.1	E	71	12	12	0
	No.1	F	80	12	12	0
	No.2	G	70	13	13	0
	No.2	H	45	9	9	0
	No.2	I	45	9	9	0
	No.2	J	45	9	9	0
	Subtotal		607	110	110	0
1.2	Abutments					
	No.1	K	280	55	55	0
	No.1	L	240	48	48	0
	No.1	M	85	17	17	0
	No.1	N	125	26	25	1
	No.2	O	20	11	4	7
	No.2	P	95	19	19	0
	No.2	Q	100	26	20	6
	No.2	R	0	14	0	14
	No.3	S	35	16	6	10
	No.3	T	100	27	20	7
		U	219	35	35	0
		V	125	16	16	0
	Subtotal		1424	310	265	45
	Total		2031	420	375	45

Table 3 SUMMARY OF DUMPING LOCATIONS AND LOADS COMPLETED (2/2)

Target Area	Block No.	No. of Loads Dumped Completed	No. of Dumping Locations	No. of Dumping Locations Completed	No. of Remaining Dumping Locations
2 Downstream of Main Target Area					
	W	182	104	104	0
	X	775	173	173	0
	Y	155	79	79	0
	Z	39	27	27	0
	AA	56	26	26	0
	ADIT G	10	1	1	0
	BB	89	31	31	0
	CC	32	32	32	0
	DD	33	24	24	0
	EE	40	20	20	0
	FF	68	34	34	0
	GG	60	30	30	0
	HH	64	32	32	0
	II	45	50	45	5
	JJ	30	30	30	0
	KK	35	35	35	0
	LL	30	30	30	0
	MM	7	32	7	25
	NN	0	28	0	28
	OO	30	30	30	0
	PP	30	30	30	0
	QQ	32	32	32	0
	RR	0	57	0	57
Total		1842	967	852	115
Grand Total		3873	1387	1227	160

FIGURES

FIG. 1 COMPLETE DUMPED LOCATIONS UNTIL 19 - JUNE - 99



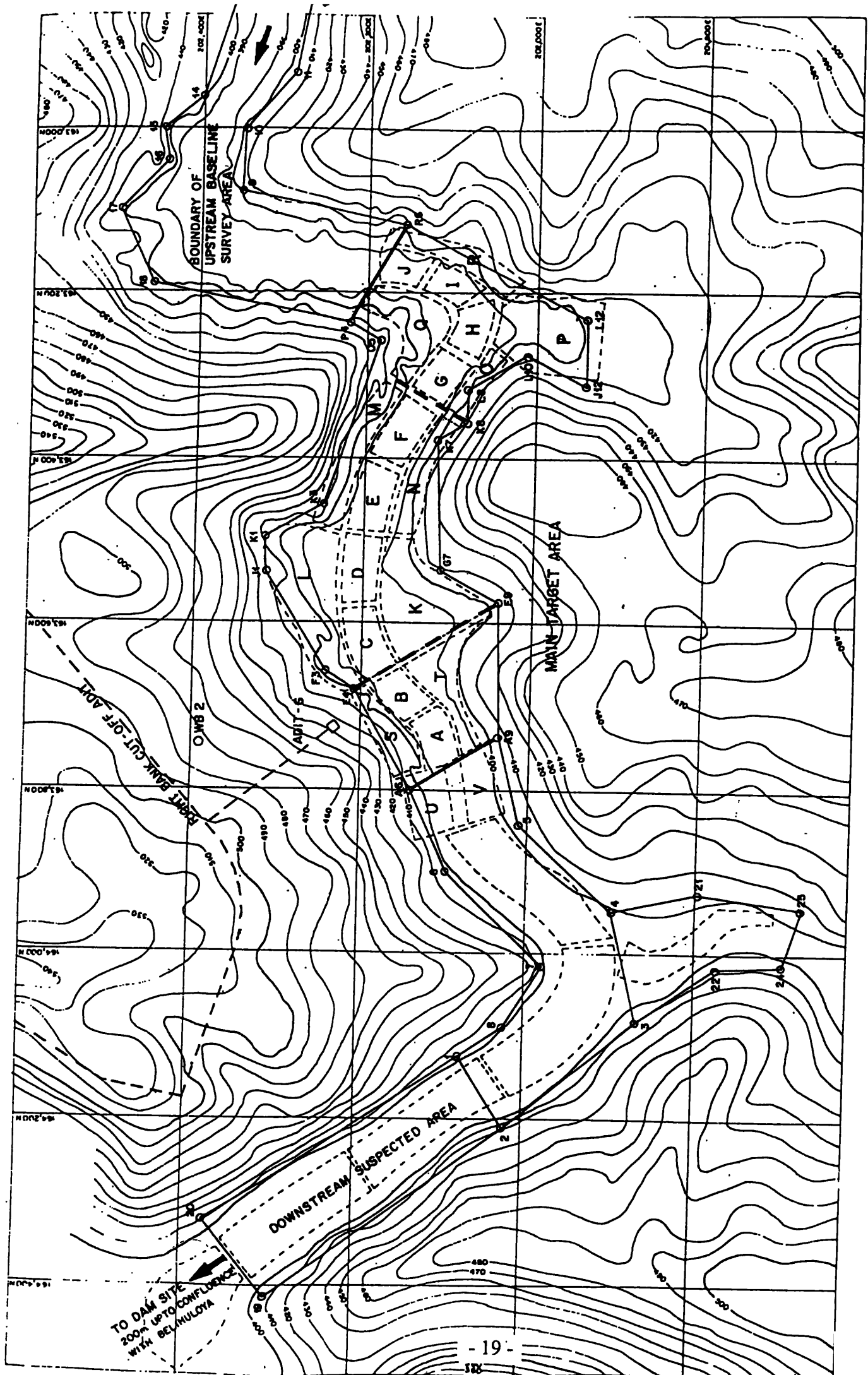


Figure 2 BLOCK ARRANGEMENT FOR DUMPING (1/2)

GWL VARIATION OF WB SERIES

From 01-Jul-98 10:25 to 11-Jul-98 09:00

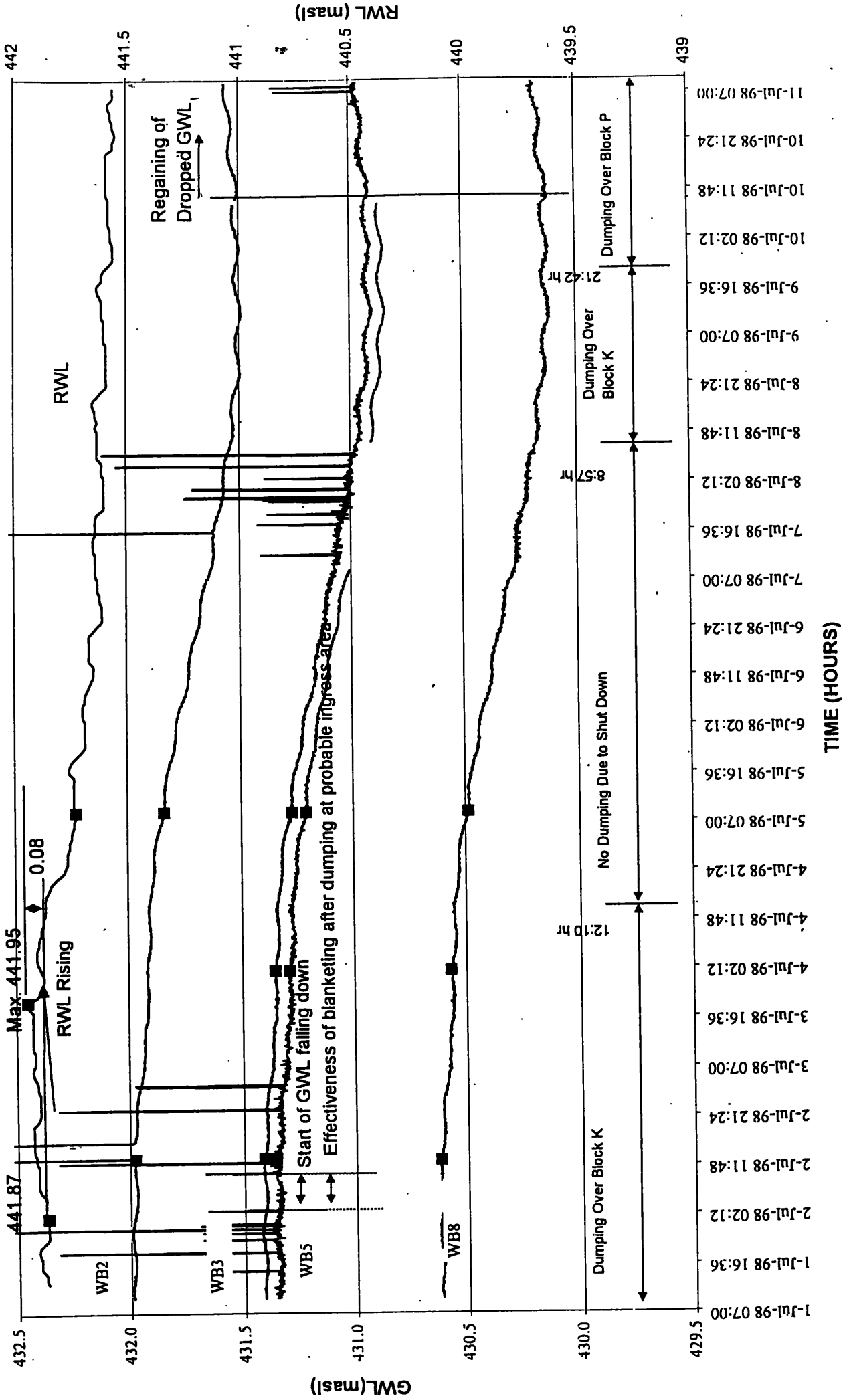
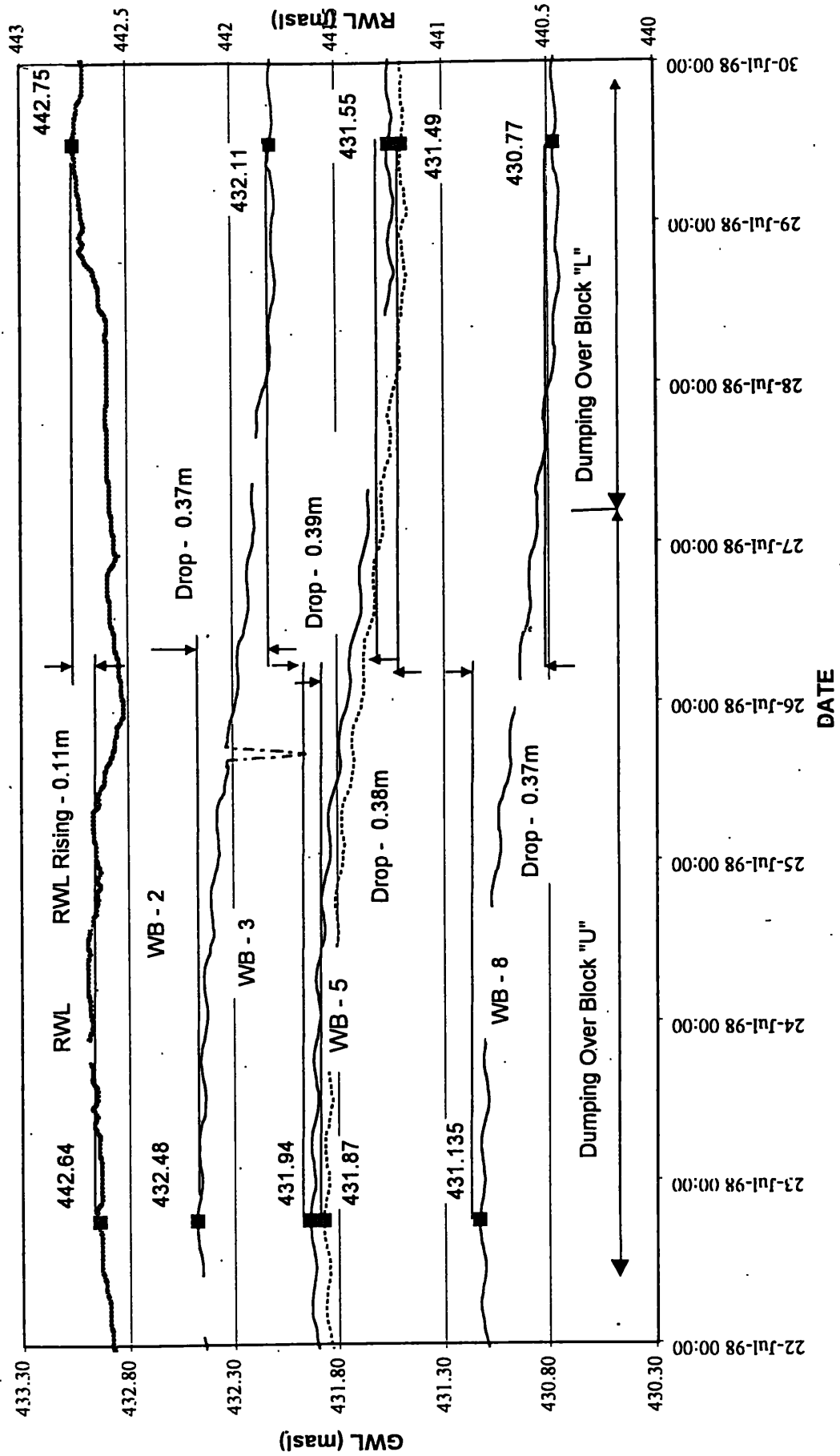


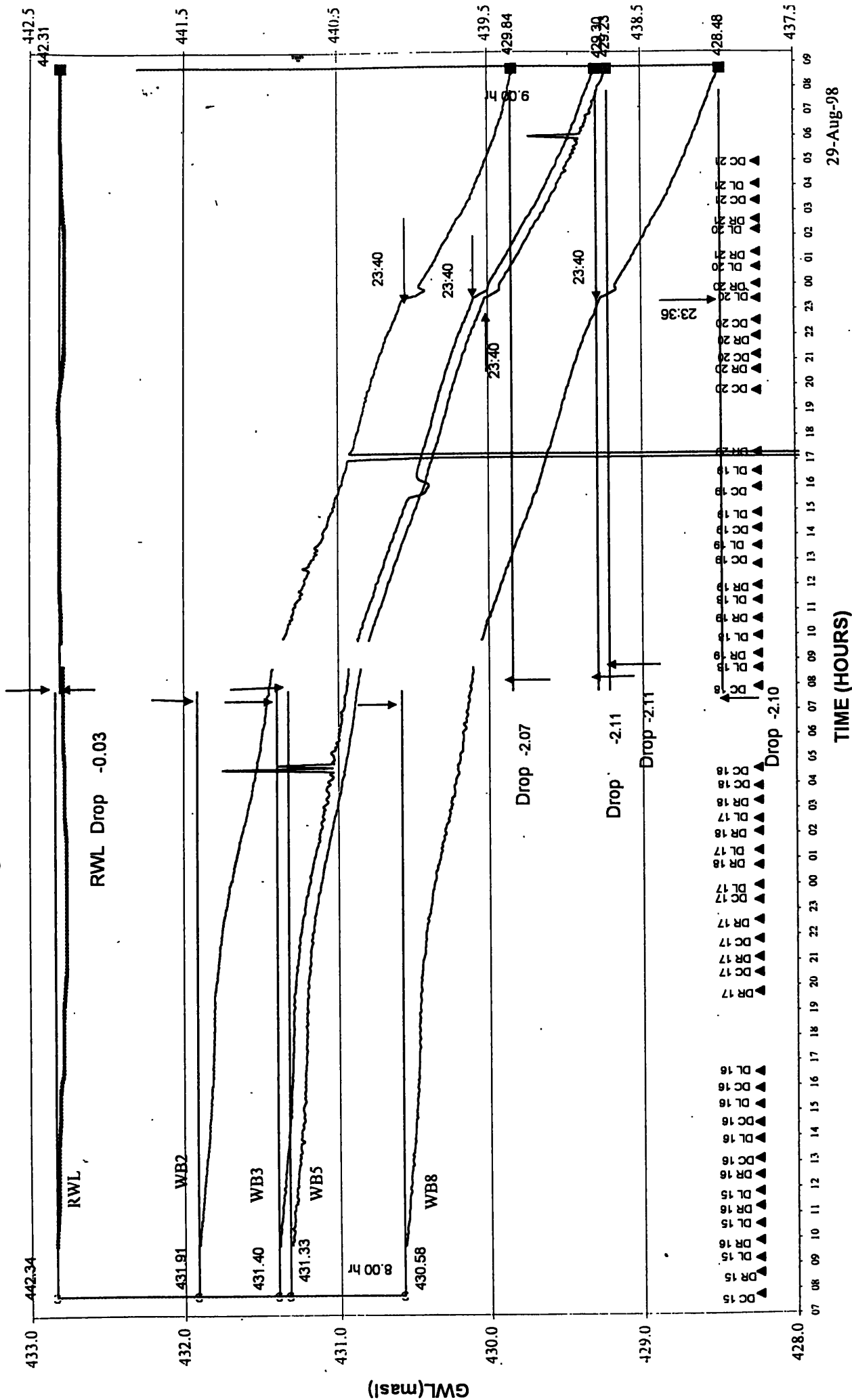
Figure 3 · GWL Variation during Dumping over Block "K"

Figure 4 GWL Variation during Dumping over Block "U"
GWL VARIATION OF WB SERIES DURING DUMPING OVER BLOCK "U"



From 27-Aug-98 to 29-Aug-98

GWL VARIATION OF WB SERIES



From . 27-Aug-98

Figure 5 Effect of Dumping on DL20 at Block X

Figure 6

MAIN BLANKETING-1 MAIN TARGET AREA
BASELINE SURVEY AT ADIT "G" PORTAL

SURVEY DATE : 14/10/98

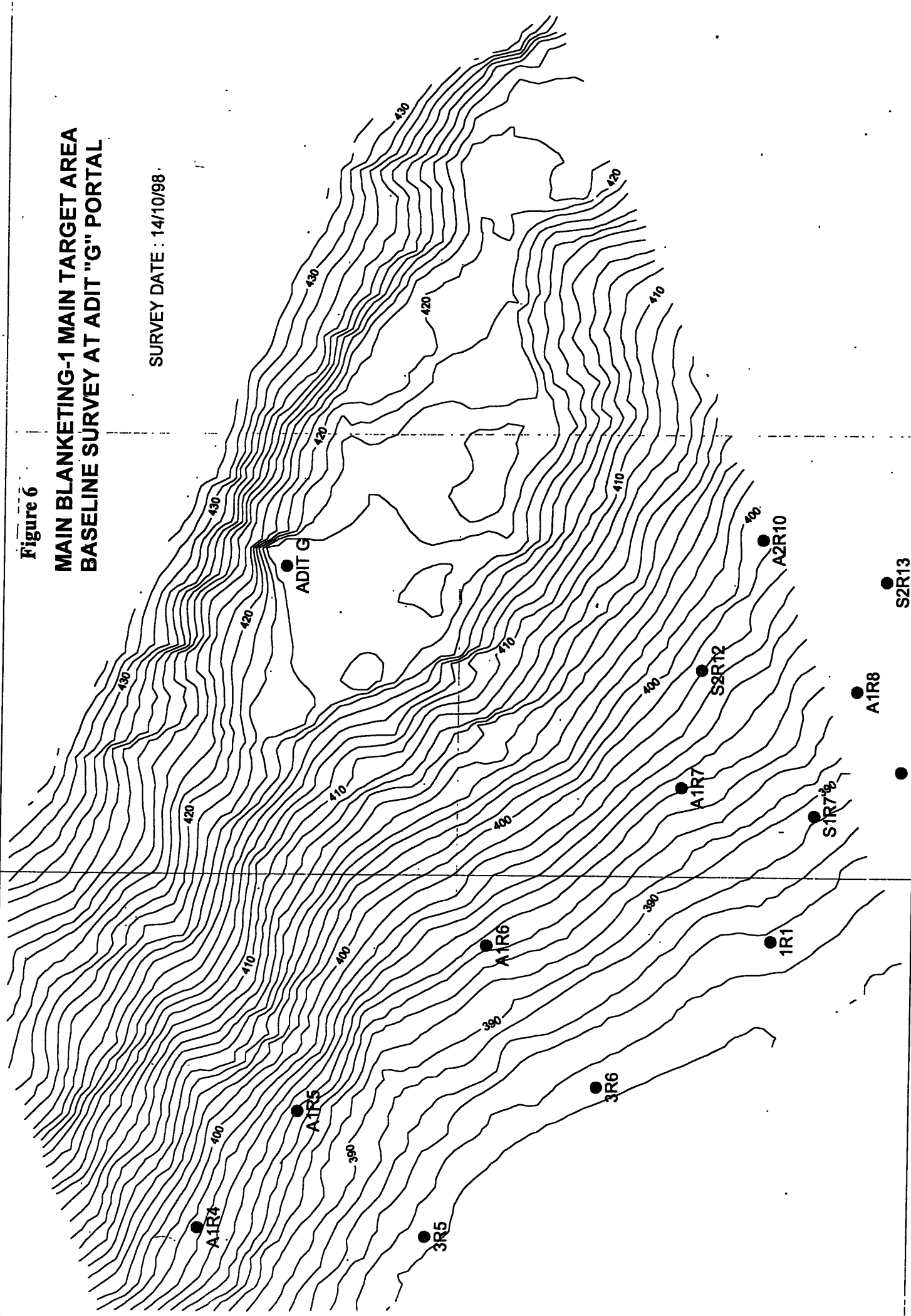
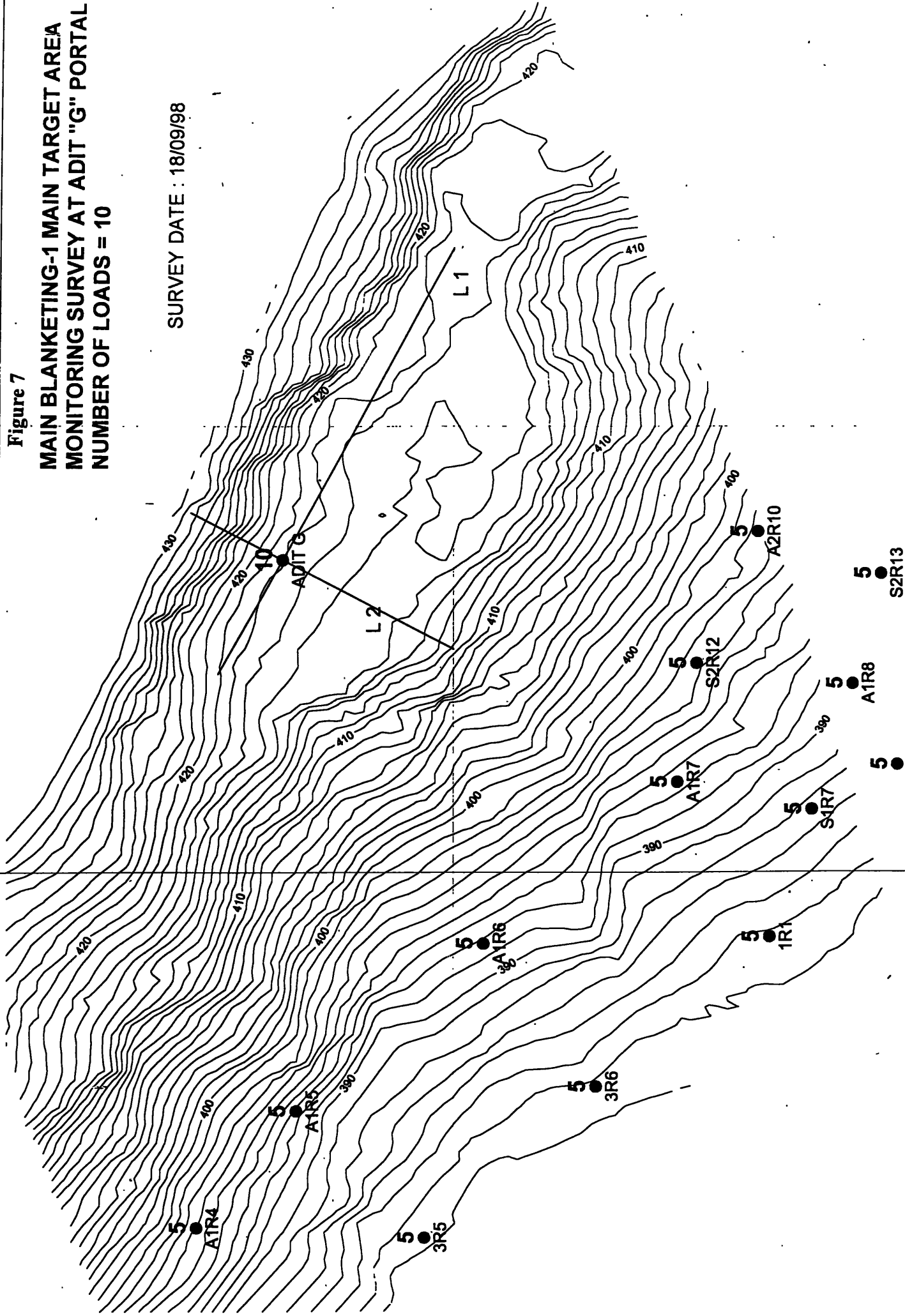


Figure 7

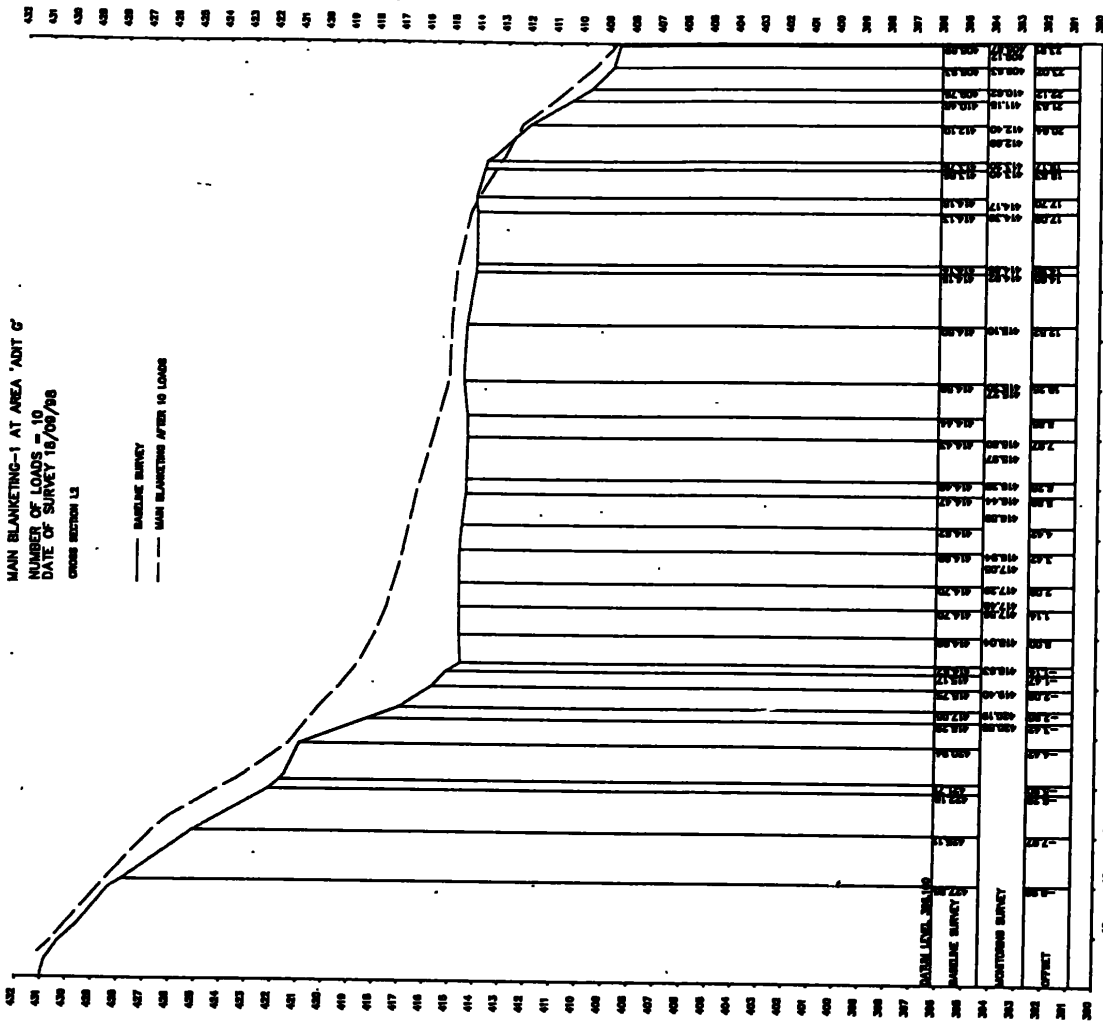
MAIN BLANKETING-1 MAIN TARGET AREA
MONITORING SURVEY AT ADIT "G" PORTAL
NUMBER OF LOADS = 10

SURVEY DATE : 18/09/98



MAIN BLANKETING-1 AT AREA 'ADIT G'
 NUMBER OF LOADS = 10
 DATE OF SURVEY 16/09/98
 CROSS SECTION L3

— BASELINE SURVEY
 - - - MAIN BLANKETING AFTER 10 LOADS



MAIN BLANKETING-1 AT AREA 'ADIT G'
 NUMBER OF LOADS = 10
 DATE OF SURVEY 16/09/98
 CROSS SECTION L1

— BASELINE SURVEY
 - - - MAIN BLANKETING AFTER 10 LOADS

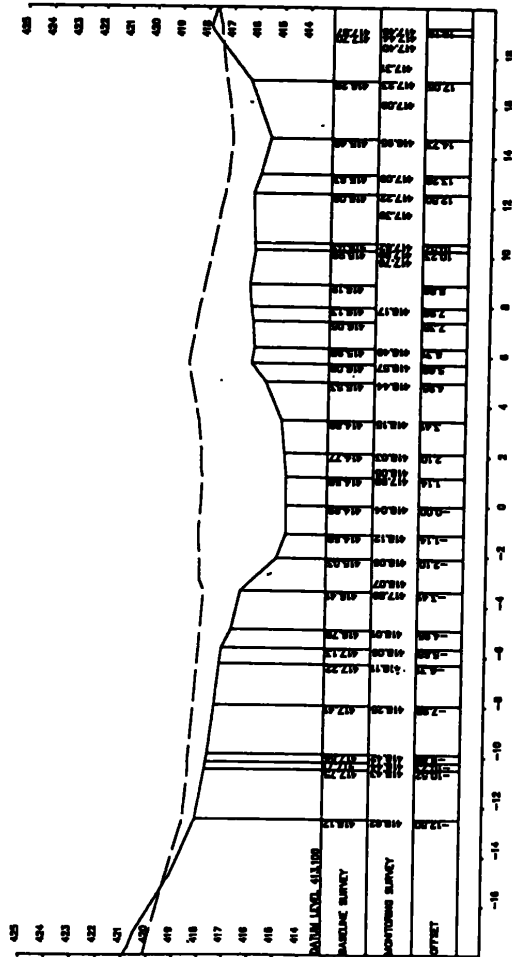


Figure 8 Cross Sections at L1 and L2

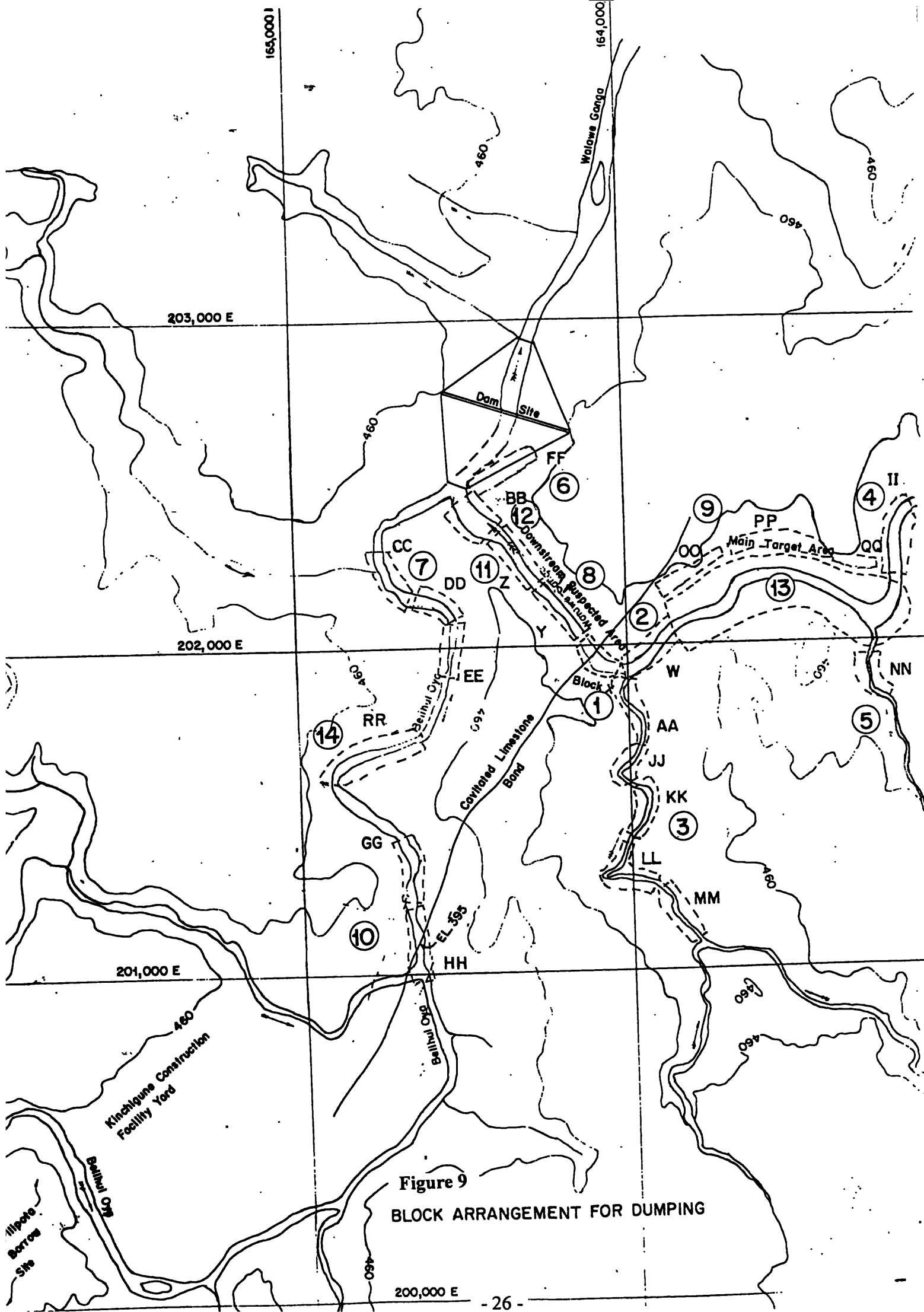


Figure 9
BLOCK ARRANGEMENT FOR DUMPING

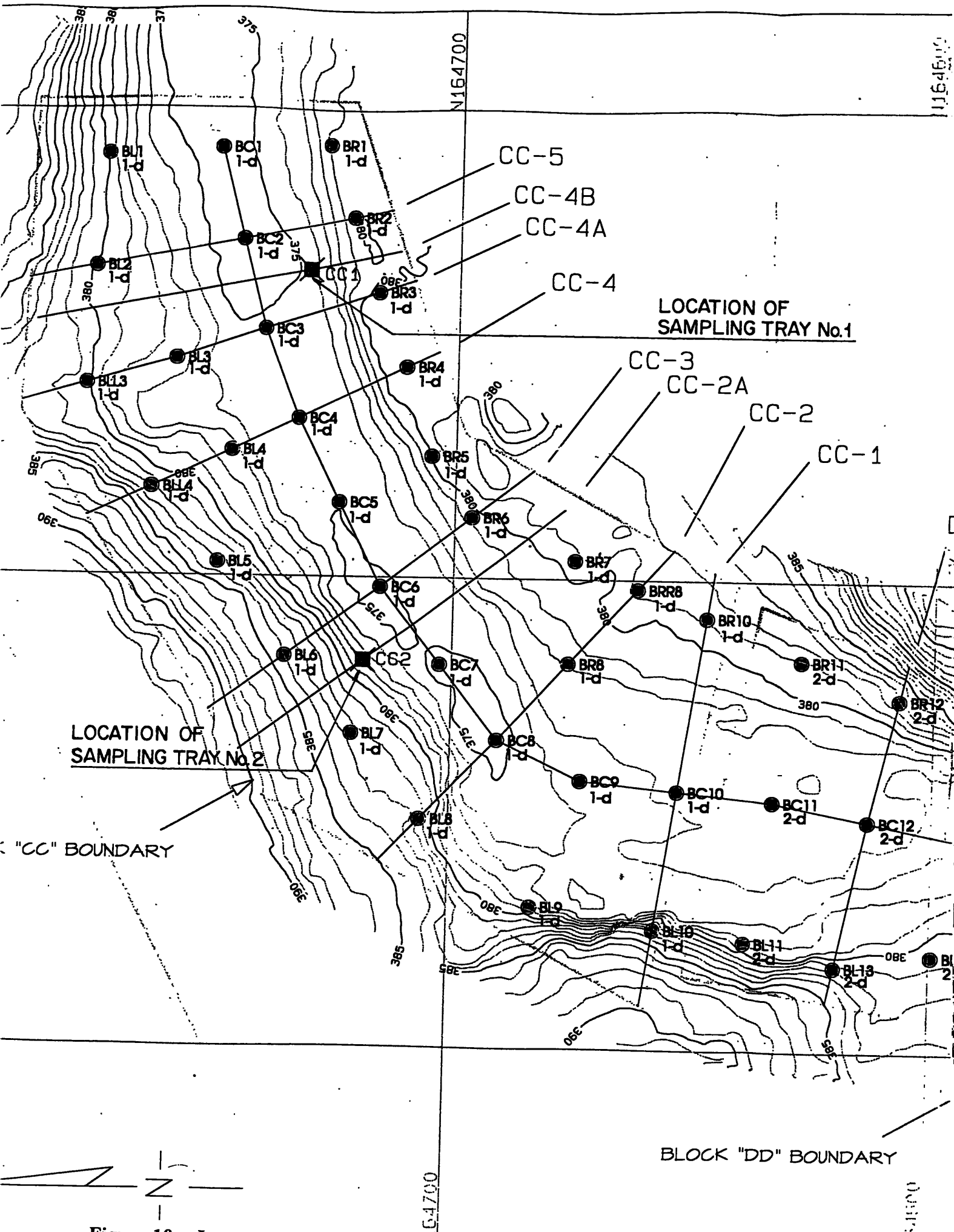


Figure 10 Location of Disturbed Sampling Tray to Clarify Minimum Spacing of Dumping Locations

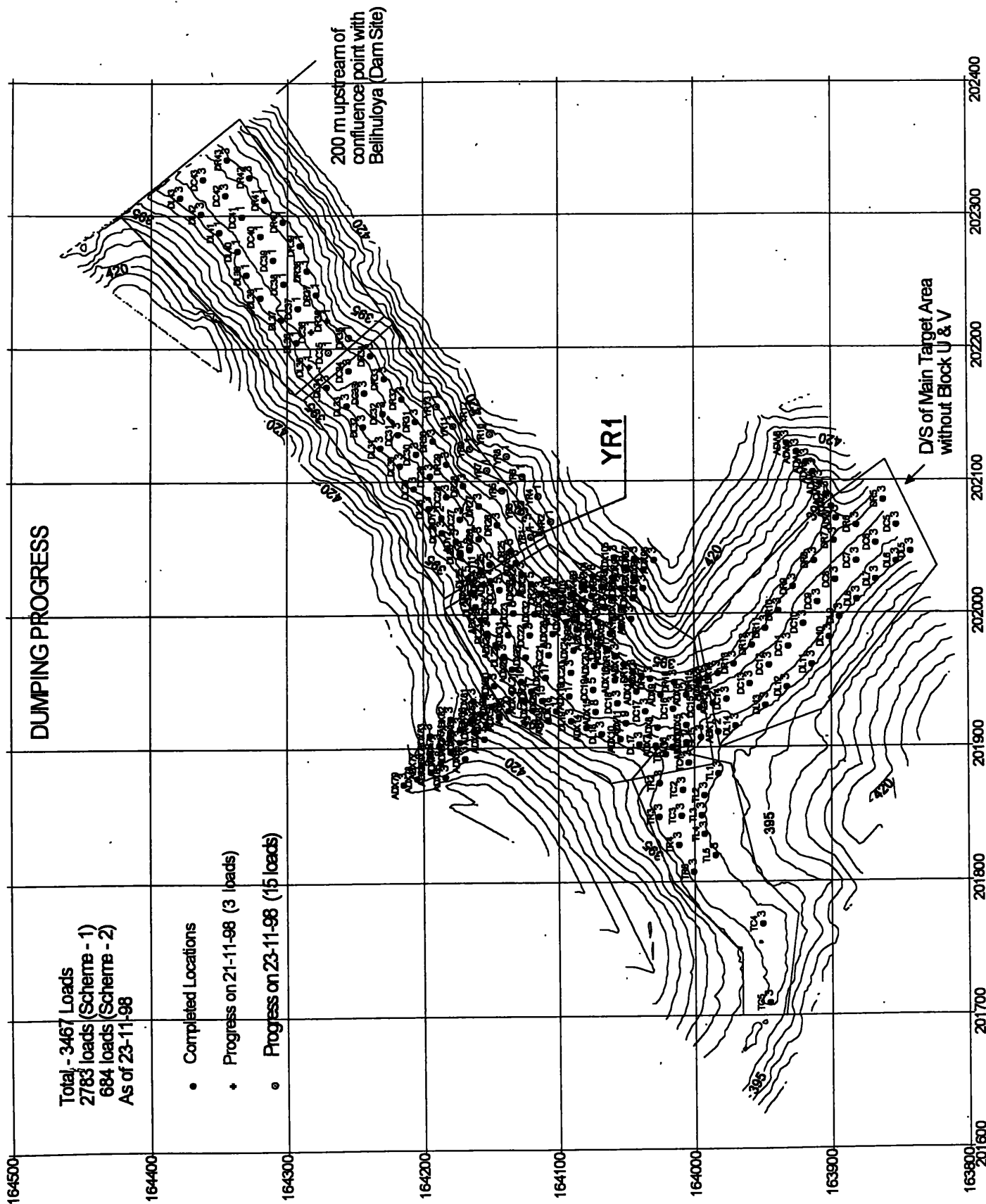
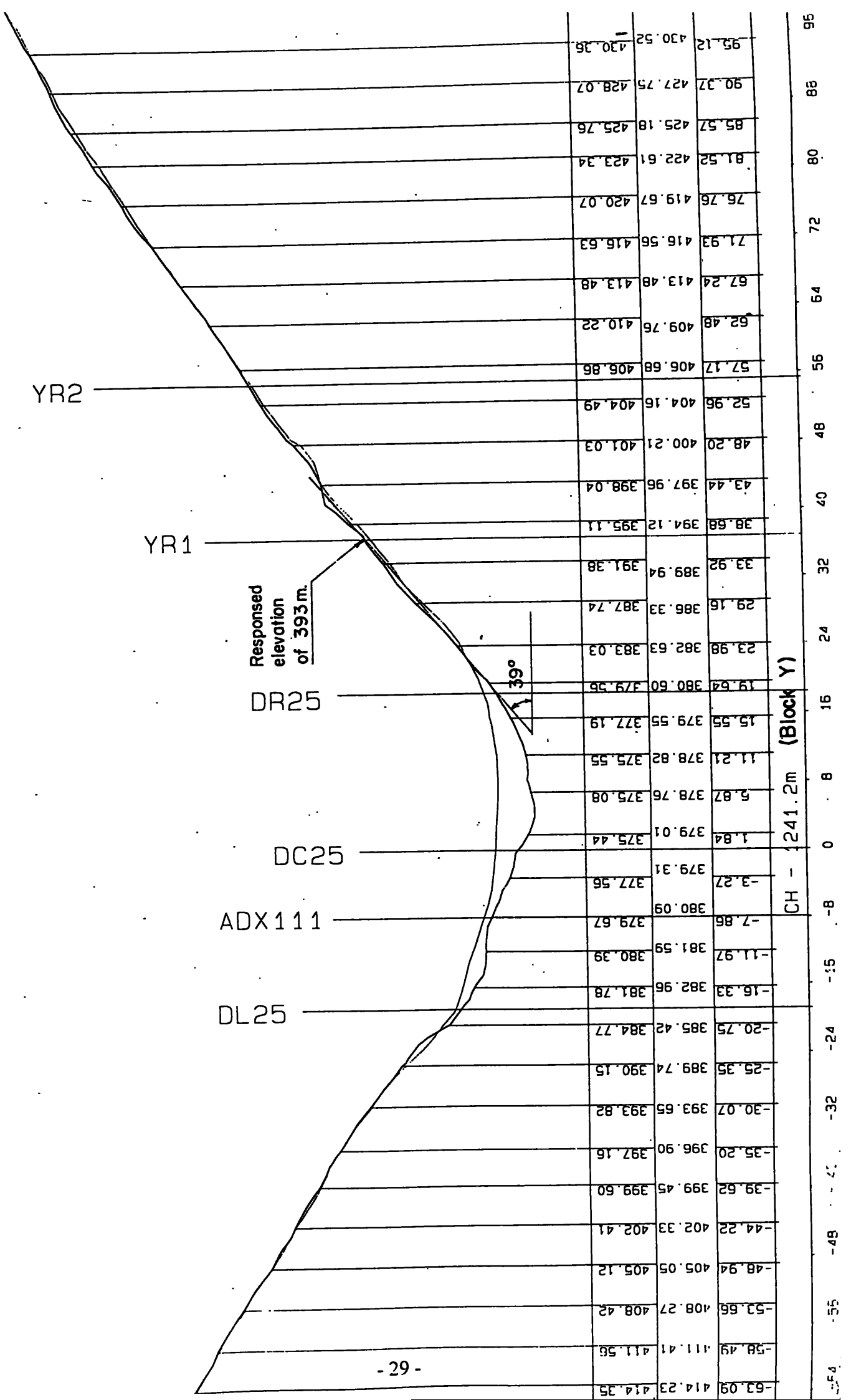


Figure 11 Dumping Location of YR1 at Block Y(1/2)

Figure 11 Dumping Location of YR1 at Block Y(2/2)



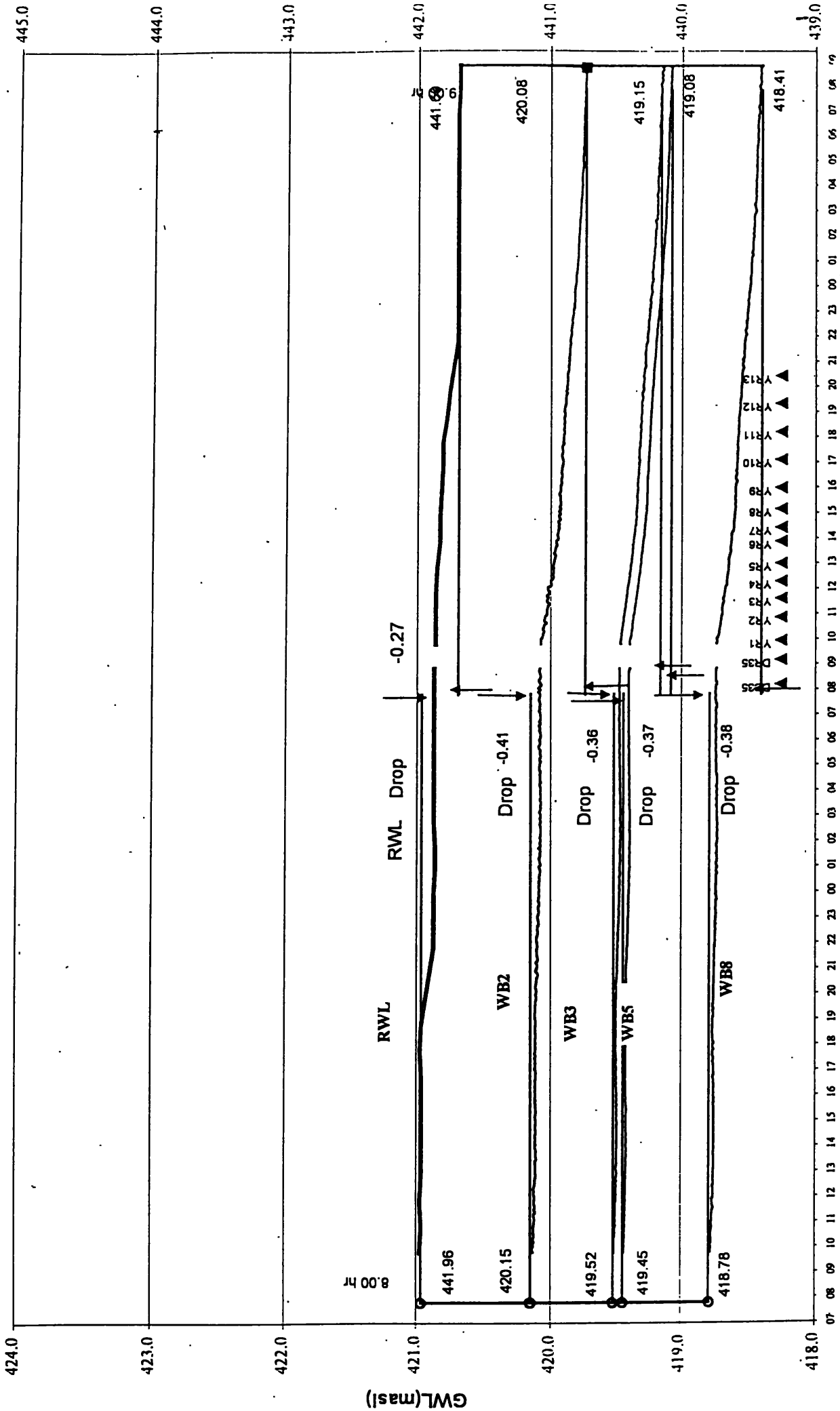


Figure 12 Effect of Dumping on YR1 at Block Y

Figure 13 Dumping Progress for Each Block at Main Target Area

Location	Target Area	Block	1998												No. of Dumping Locations	No. of Dumping Locations Completed	No. of Loads Completed
			Mar	Apr	May	Jun	Jul	Aug									
River Course	3	A			6/2	6/13								13	13	65	
	3	B			6/4	6/10								9	9	45	
	1	C		4/19		5/27								12	12	70	
	1	D			3/27	5/27								12	12	71	
	1	E		4/20		5/29								12	12	71	
	1	F		4/17		5/30								12	12	80	
	2	G		5/4		6/13								13	13	70	
	2	H		5/6		5/26								9	9	45	
	2	I		5/8		5/30								9	9	45	
	2	J		5/31		6/1								9	9	45	
			Sub-total											110	110	607	
Abutments	1	K				6/30	7/8	7/13						55	55	280	
	1	L			6/10	6/12	7/4	7/10	7/17	8/4	8/11			48	48	240	
	1	M			6/14	6/19	7/27	7/31						17	17	85	
	1	N			6/22	6/24	7/17	7/27	8/2	8/4				26	25	125	
	2	O					8/3	8/4						11	4	20	
	2	P				7/10	7/13							19	19	95	
	2	Q			6/24	6/28								26	20	100	
	2	R												14	0	0	
	3	S			6/14	6/22								16	6	35	
	3	T			6/28-30	7/13	7/15	11/08/16						27	20	100	
	3	U				7/22-27								35	35	219	
	3	V					8/16							16	16	125	
			Sub-total											310	265	1424	
			Total											420	375	2031	

Figure 14 Dumping Progress for Each Block at Downstream of Main Target Area

Location	Block	1998												1999	Dumping Locations	Locations Completed	Loads Completed
		Aug	Sep	Oct	Nov	Dec	Jan										
River Course & abutments	W	8/22-26		10/13-15	12/01-08									104	104	182	
	X	8/26-30	9/20-21	9/27-10/15	10/15-22	11/25-30								173	173	775	
	Y	8/30-9/2	9/14	10/26-28		11/23-26								79	79	155	
	Z		9/14-15			11/19-23					12/20-21			27	27	39	
River Course	AA	9/18-20	9/15-18											26	26	56	
	BB		9/18			11/19								31	31	89	
Right Abutment	Adit G													1	1	10	
	CC					11/17-19								32	32	32	
	DD					11/14-17								24	24	33	
	EE									11/11-14				20	20	40	
	FF									11/04-11				34	34	68	
	GG					10/23	10/23-27	10/27-11/04						30	30	60	
Main target area around 425 RB	HH													32	32	64	
	OO													30	30	30	
	PP													30	30	30	
Main tributary of Walawe River	QQ													32	32	32	
	JJ													30	30	30	
	KK													35	35	35	
	LL													30	30	30	
Upstream of Main Target Area	MM													32	7	7	
	II													50	45	45	
	NN													28	0	0	
Middle river stretch of Beiluloya	RR													57	0	0	
	Total													967	852	1842	

FIGURE 15 COMPLETE DUMPED LOCATIONS UNTIL 02 - JAN - 99

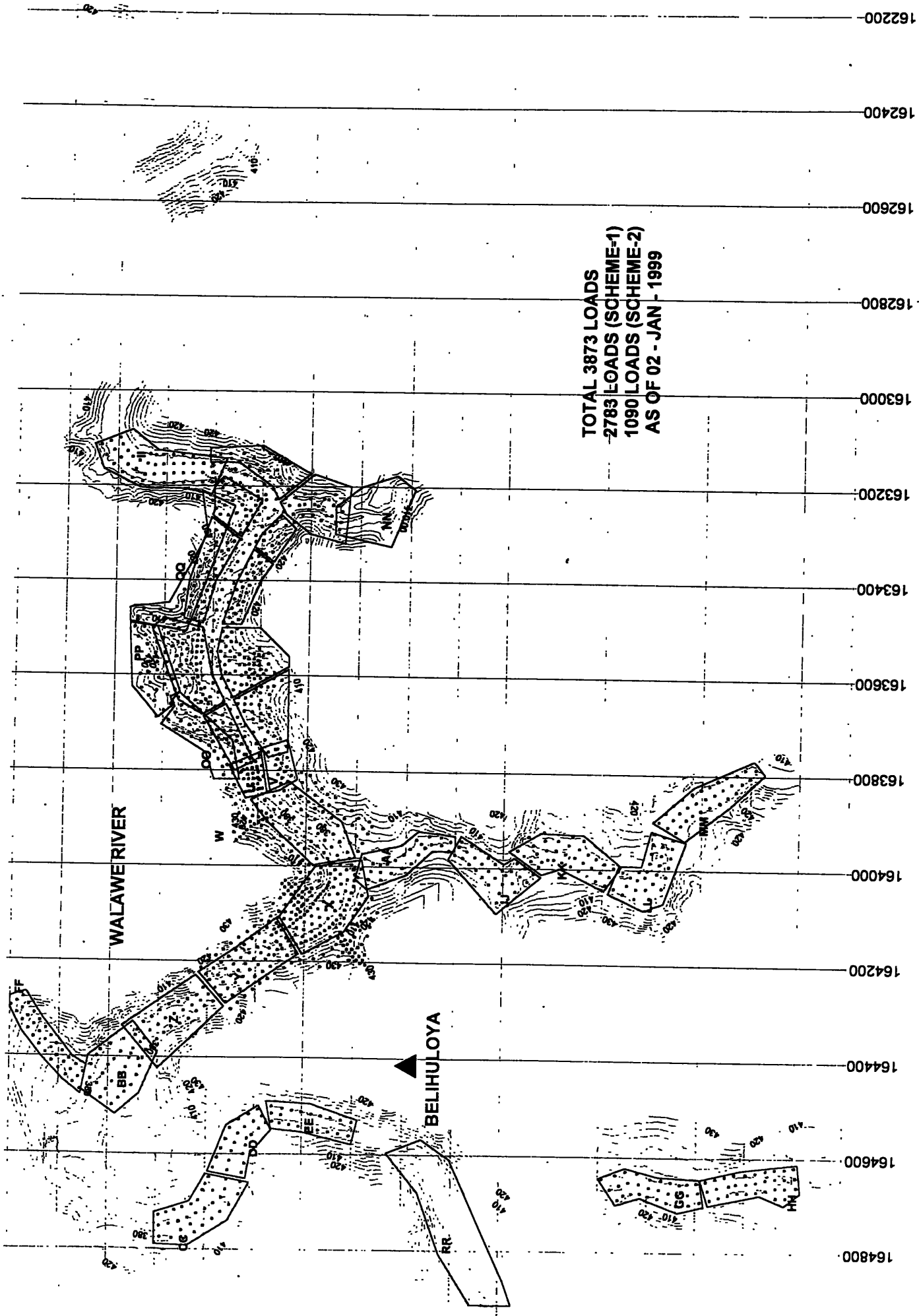


FIG. 16 INVESTIGATORY DUMPING UNDER LOCAL CONTRACT SINCE 10 MAY 99 UPTO 19 JUNE 99

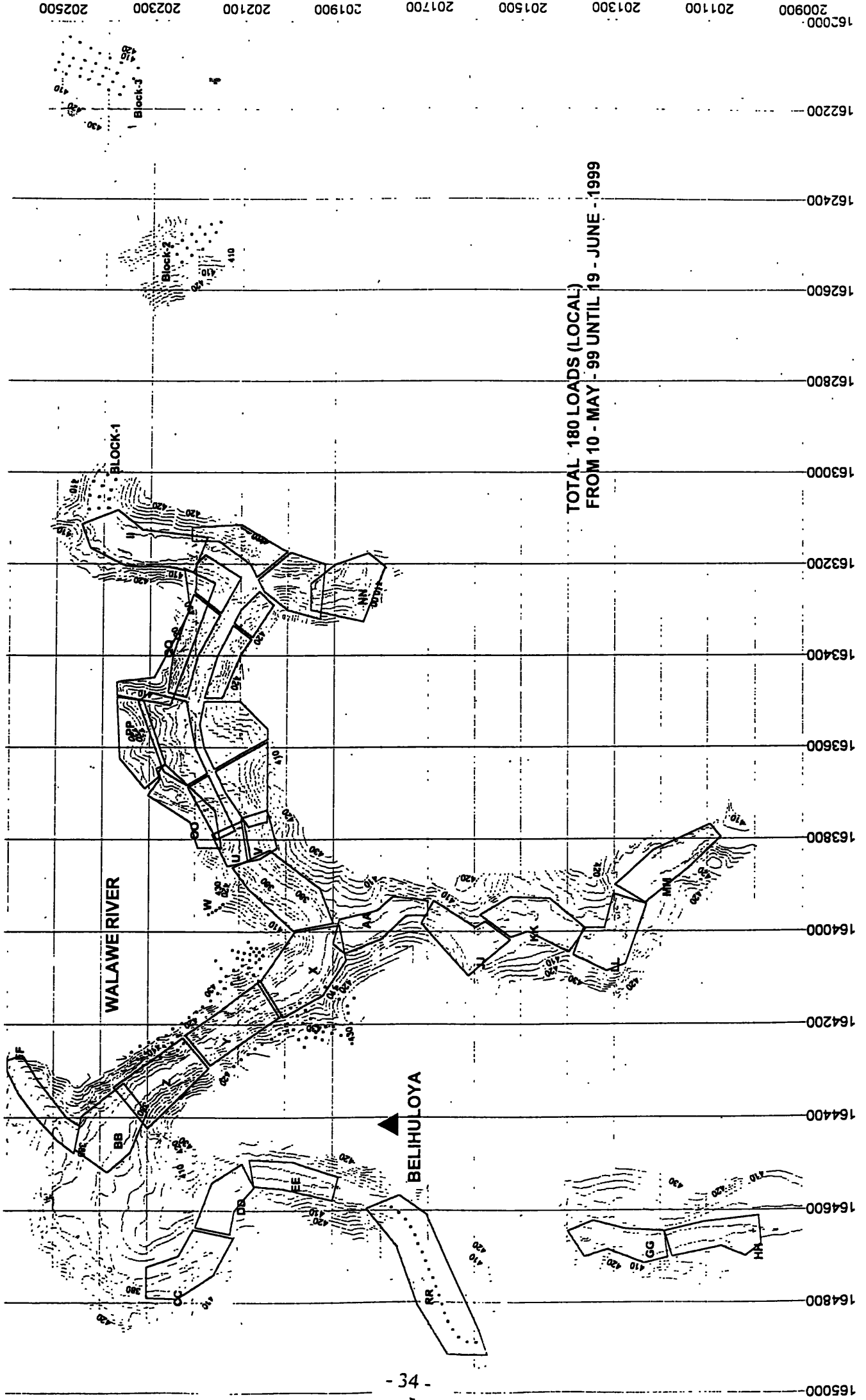


Figure 17 Dumping Location of 3Y3 at Block Y

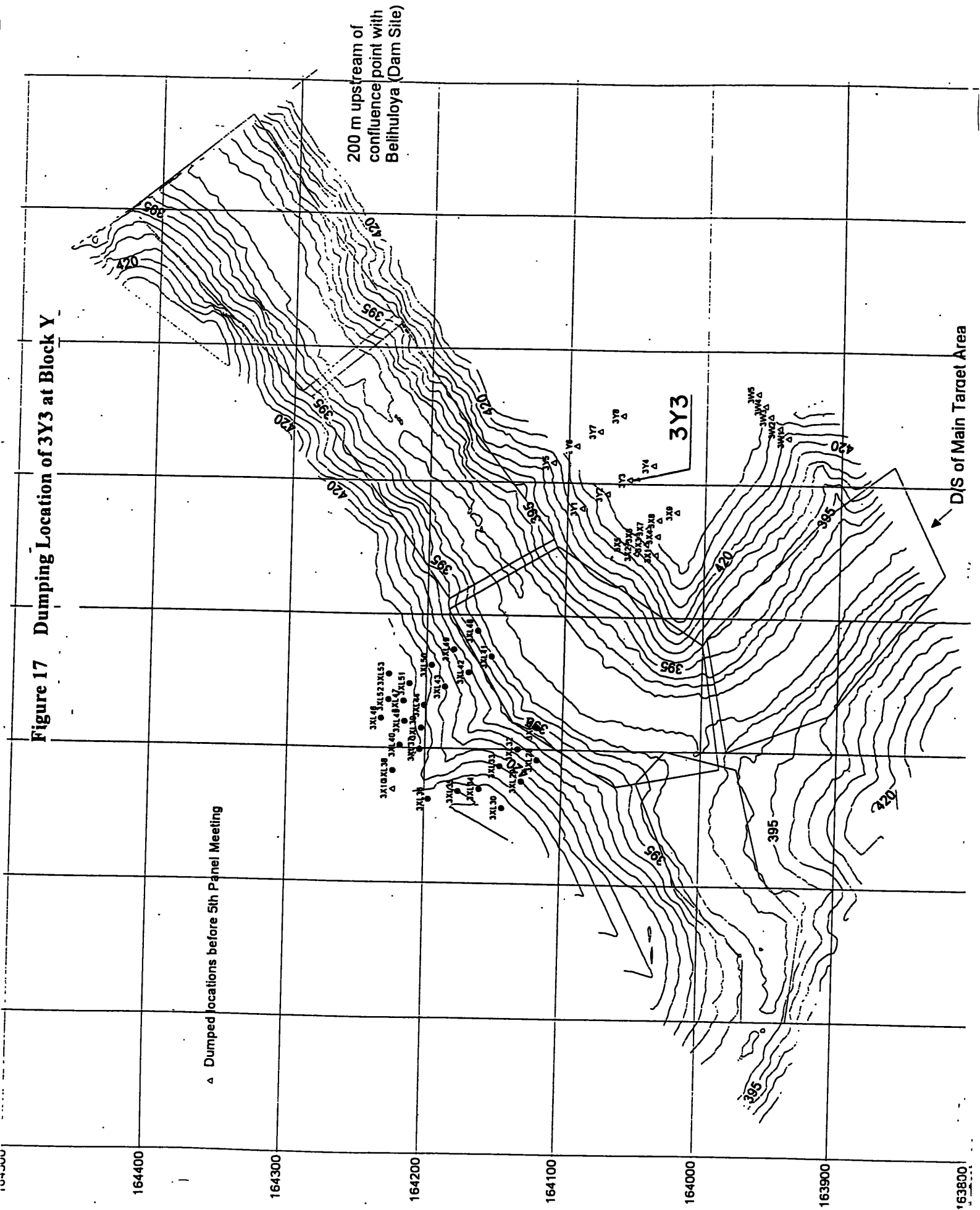
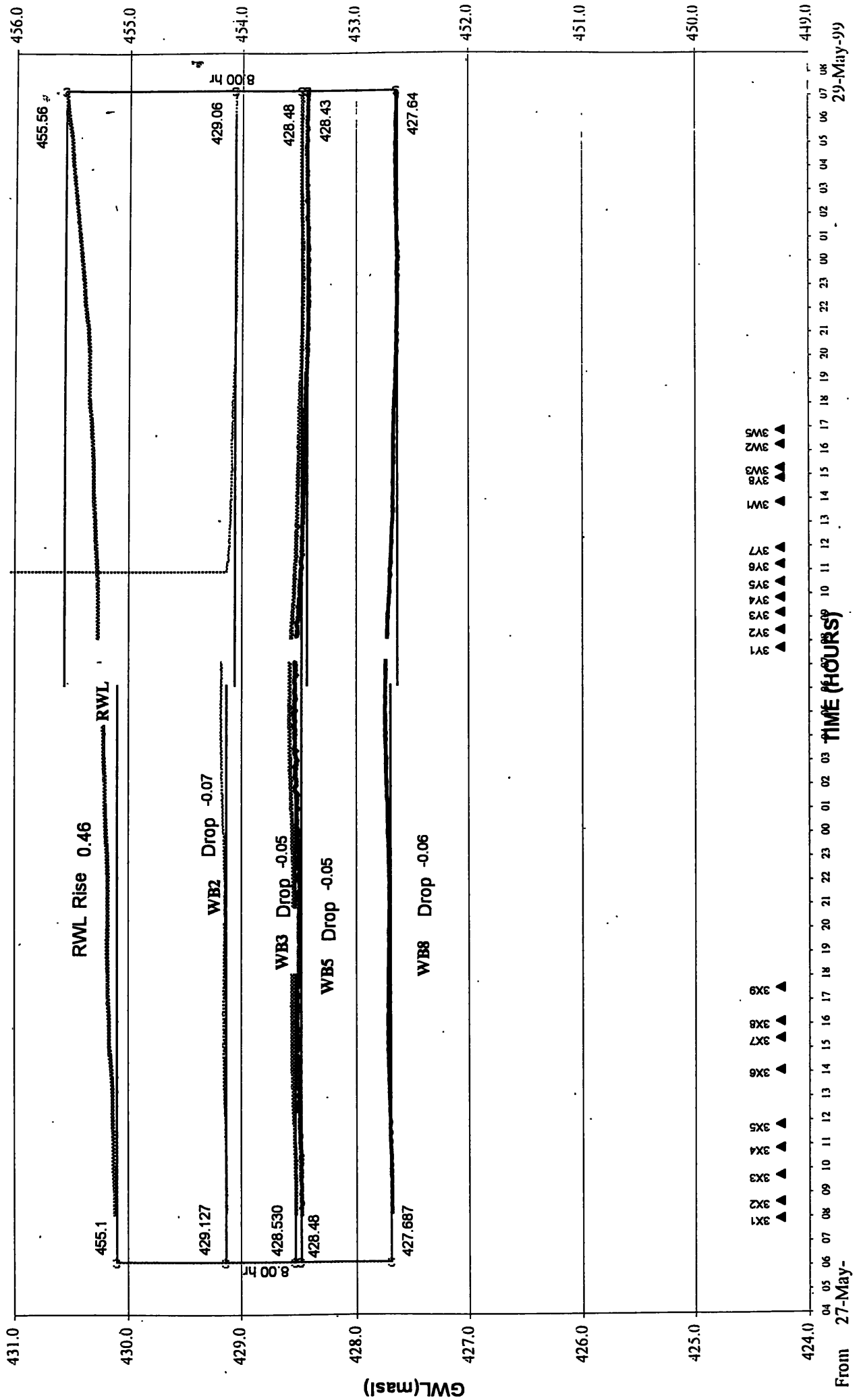


Figure 18 Effect of Dumping on 3Y3 at Block Y



GWL VARIATION (WB SERIES)

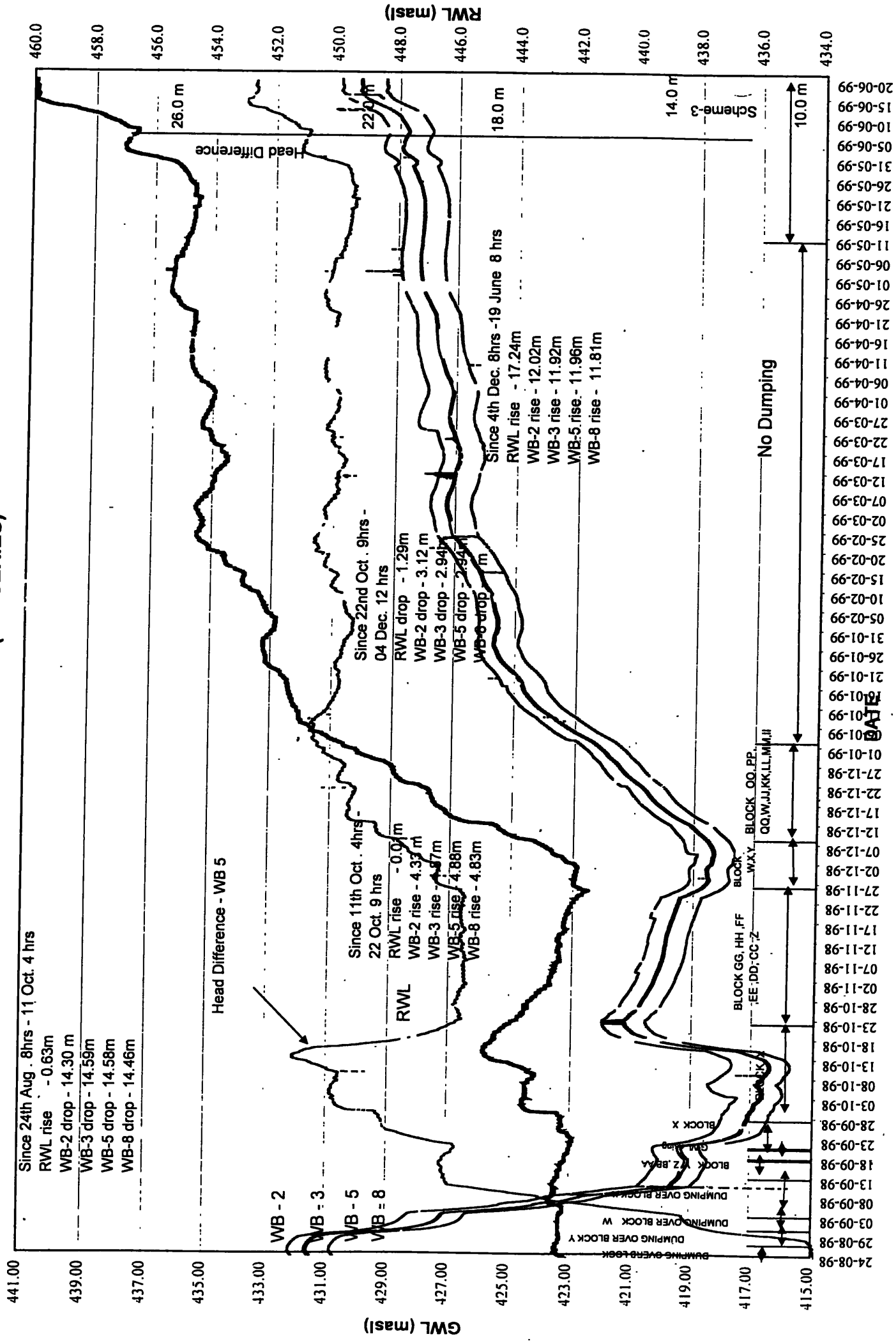


Figure 19 GWL Variation (WB Series) since 24 Aug '98 until 19 June '00

LEAKAGE VARIATION

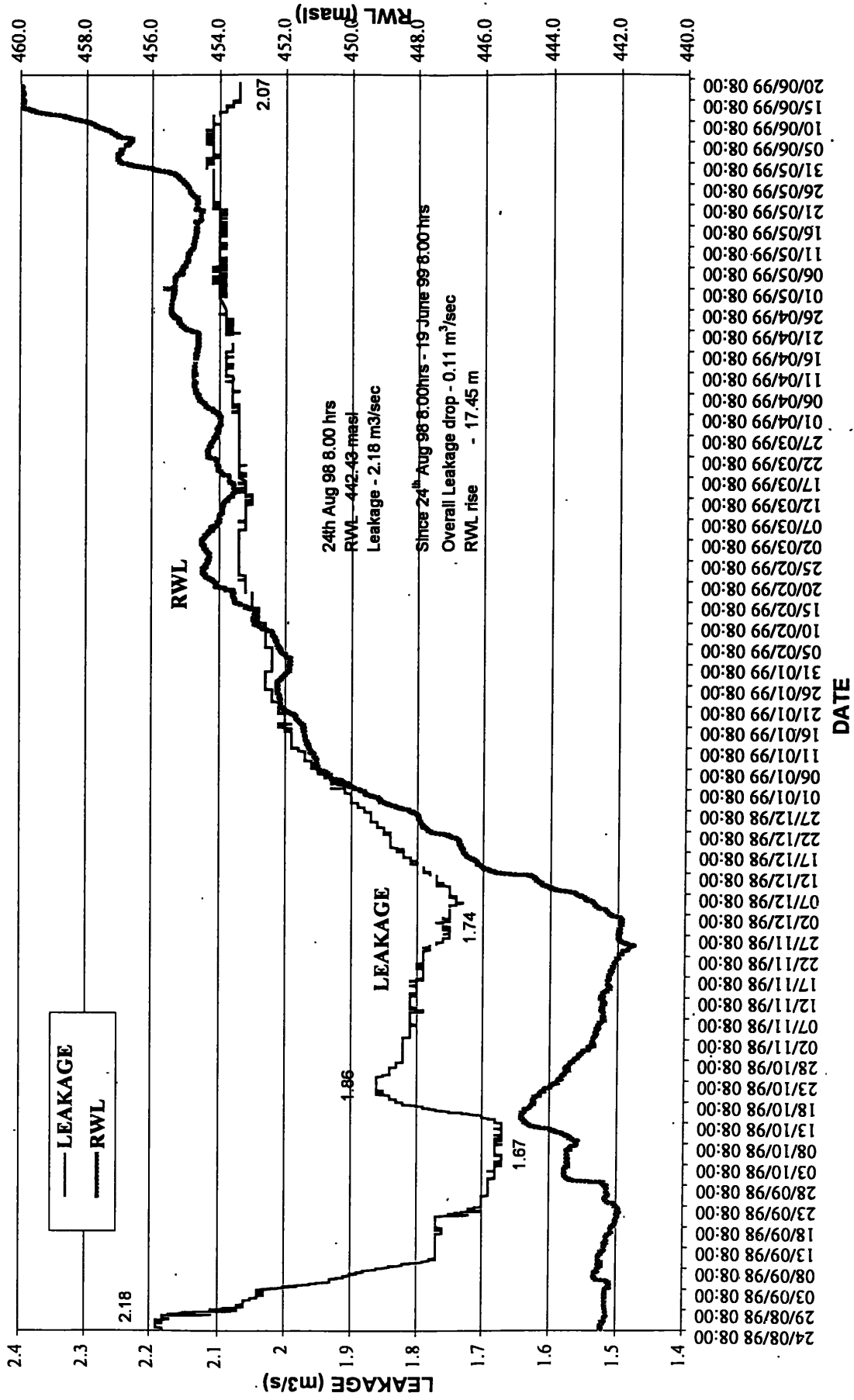
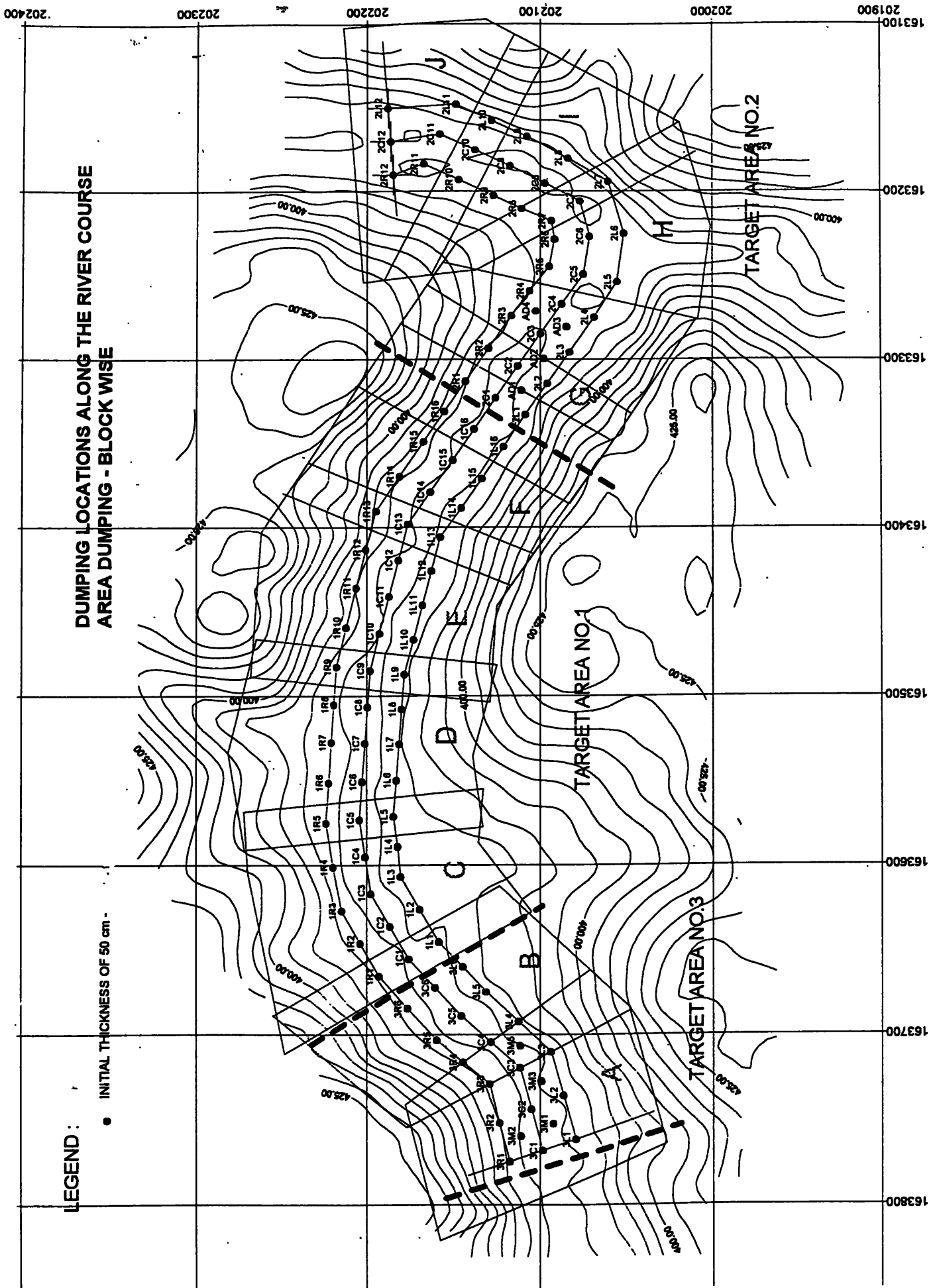


Figure 20 Leakage Variation since 24 Aug.'98 until 19 June'99

APPENDIX-A
DUMPING LOCATION MAPS

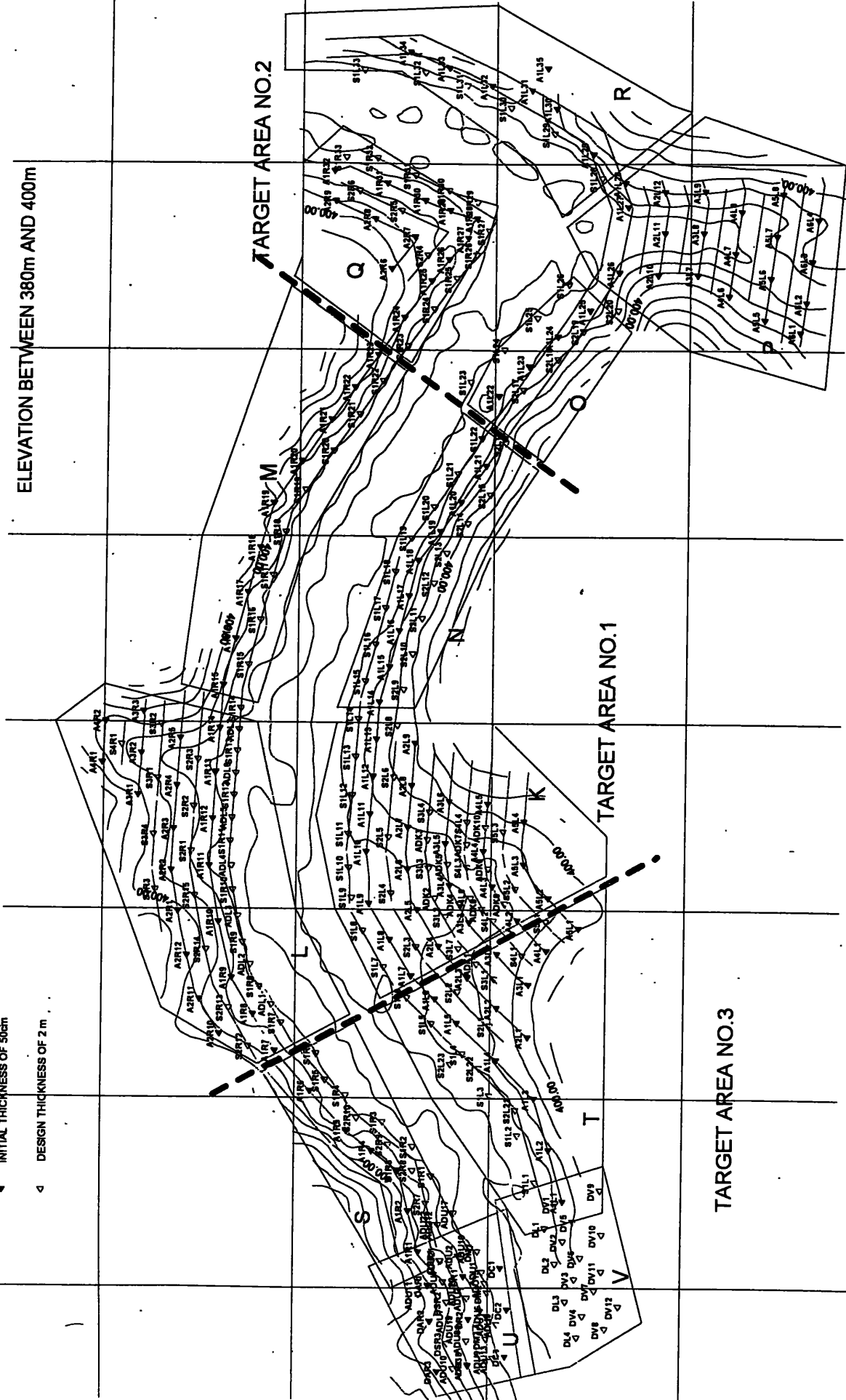


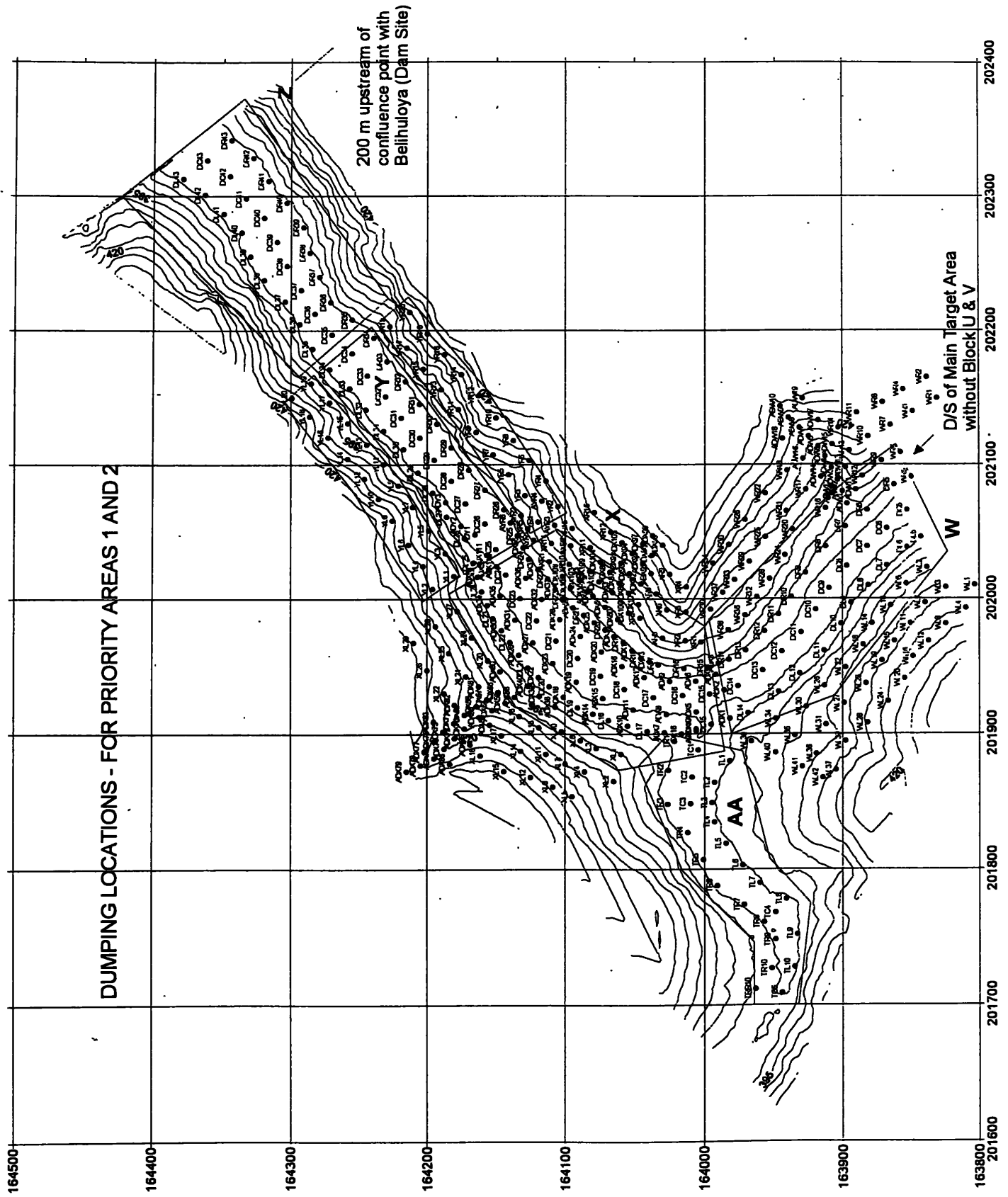
DUMPING LOCATIONS FOR ABUTMENTS

ELEVATION BETWEEN 380m AND 400m

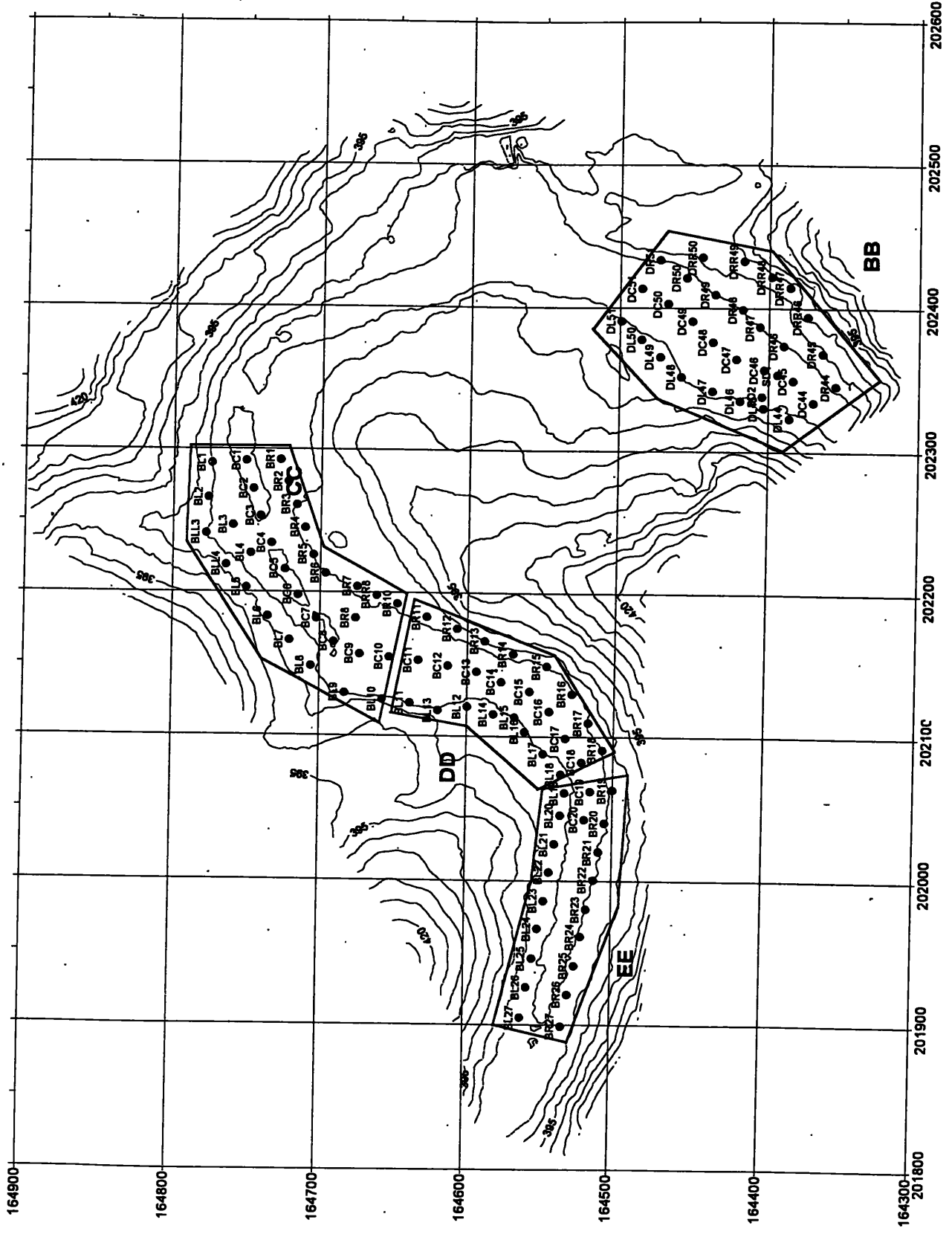
LEGEND :

- ◄ INITIAL THICKNESS OF 50cm
- ◄ DESIGN THICKNESS OF 2 m

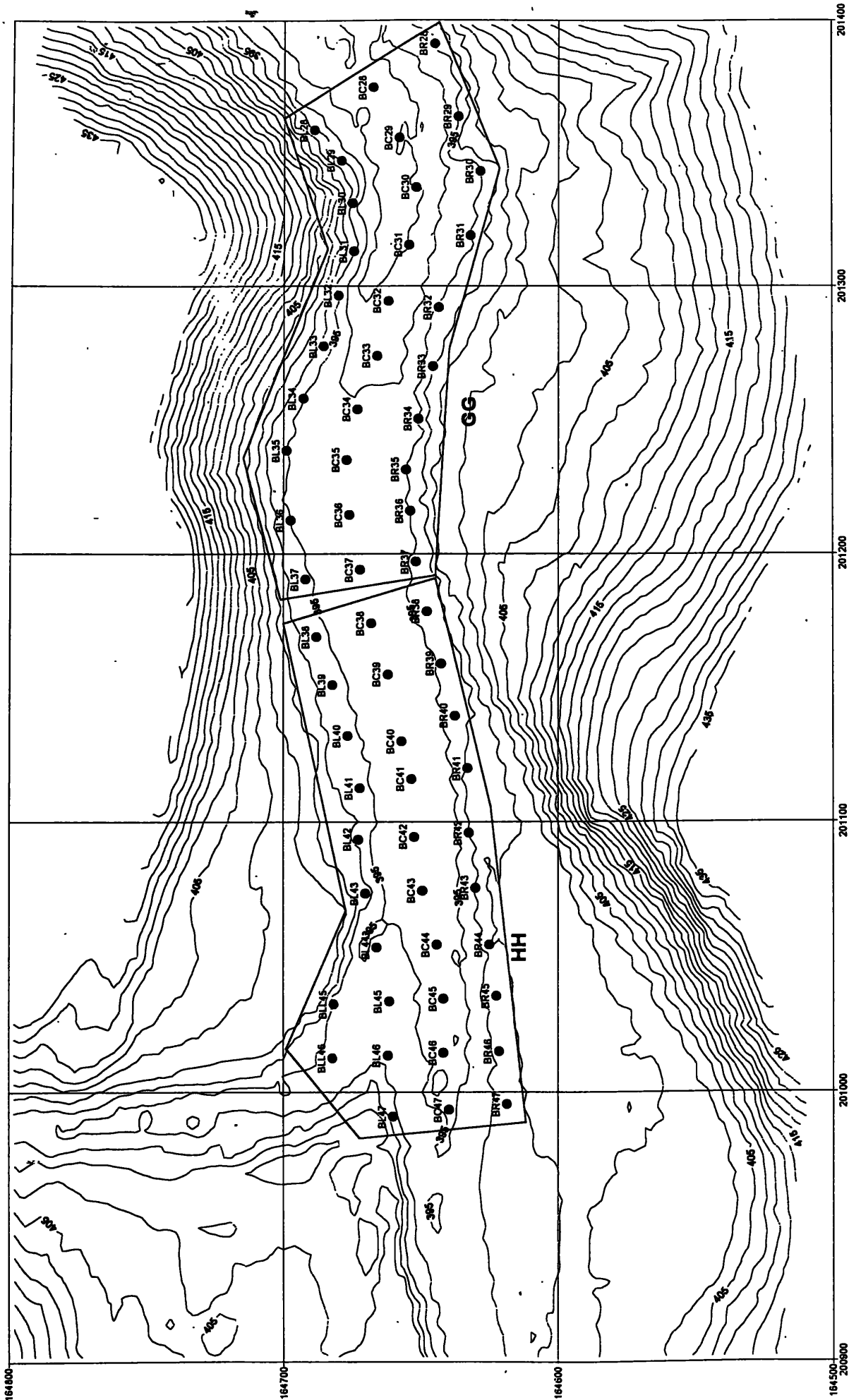




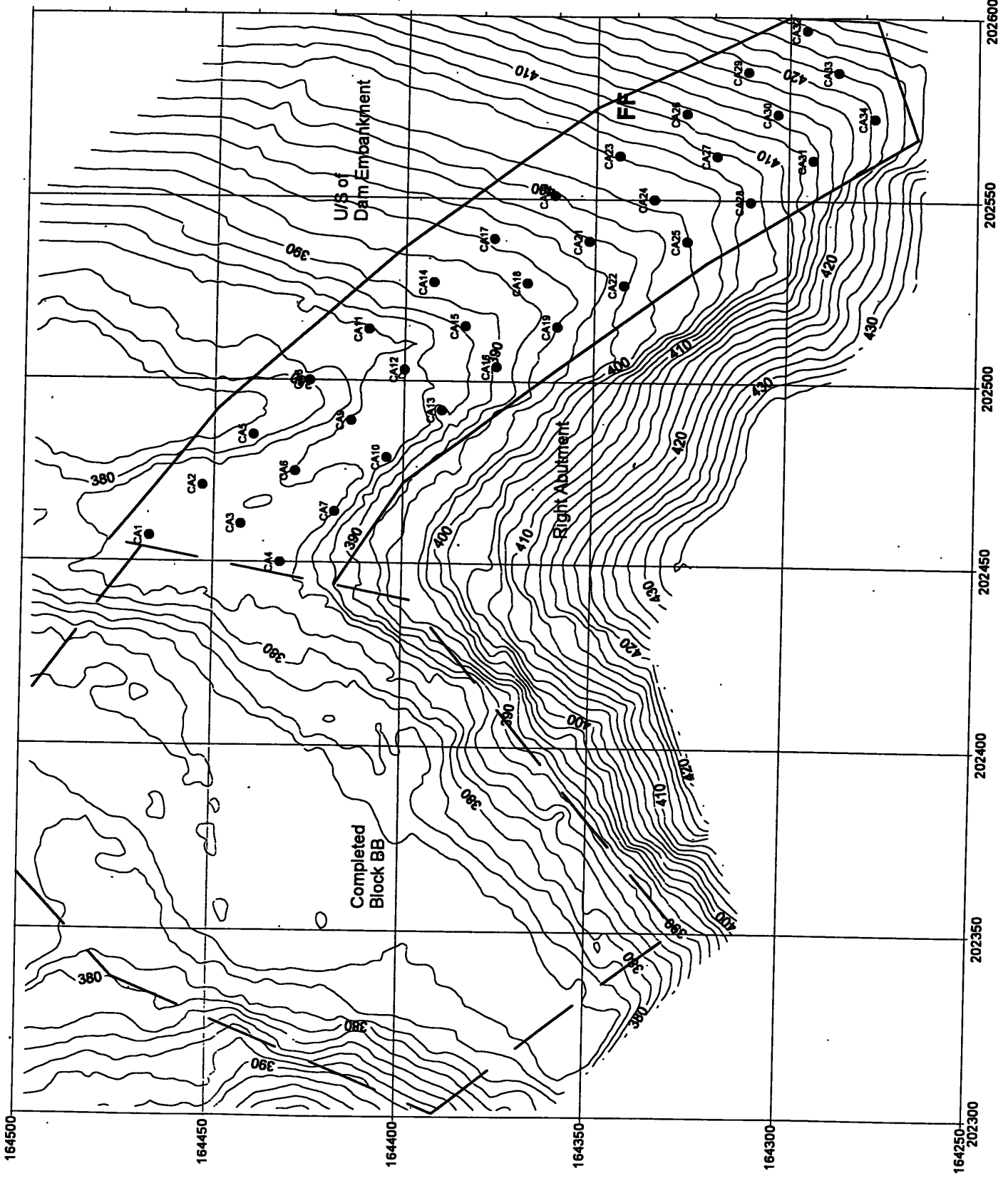
DUMPING PROGRESS ALONG RIVER COURSE OF
WALAWE GANGA AND BELIHULOYA



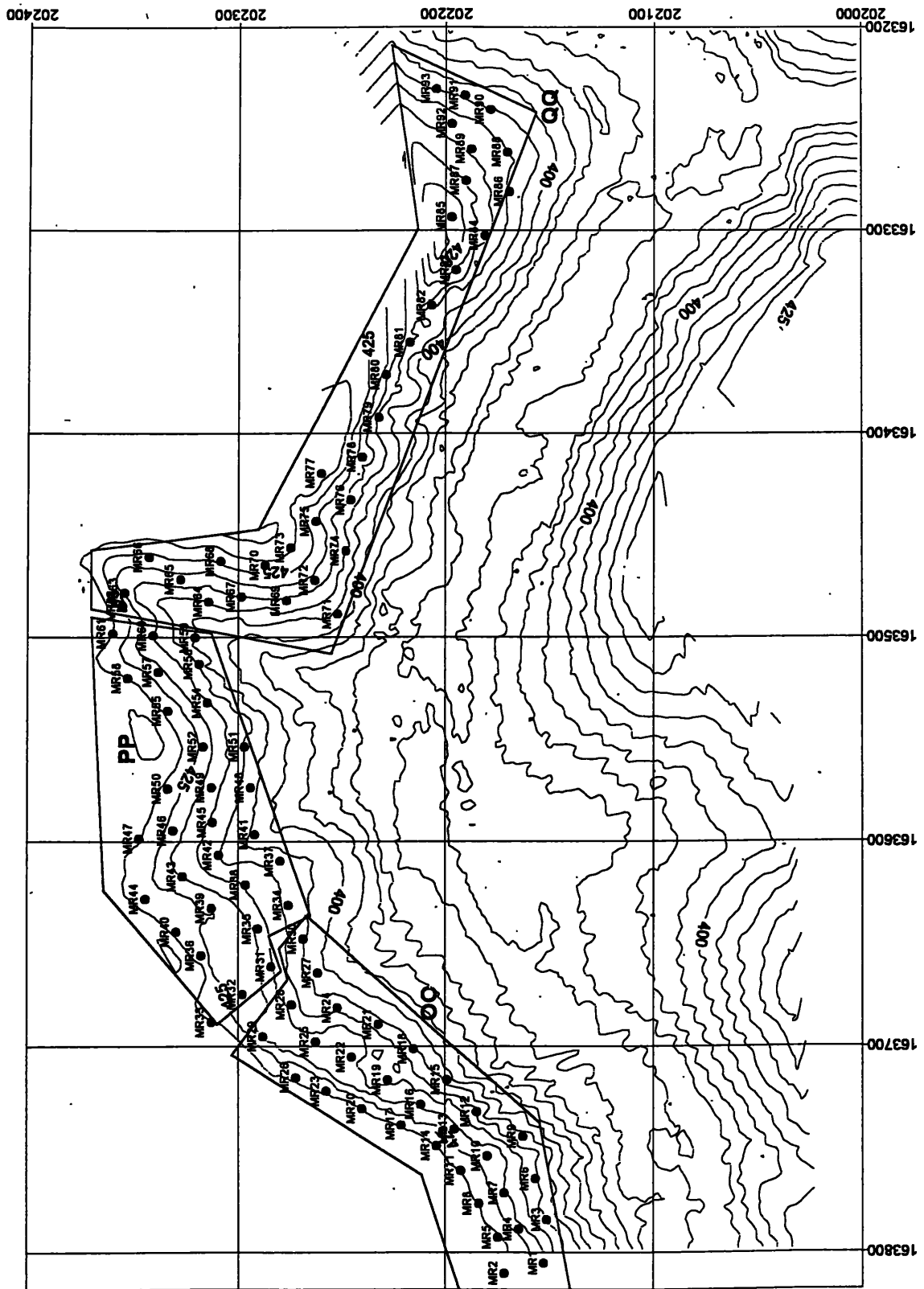
DUMPING LOCATIONS ALONG RIVER COURSE FOR UPSTREAM BELIHULOYA



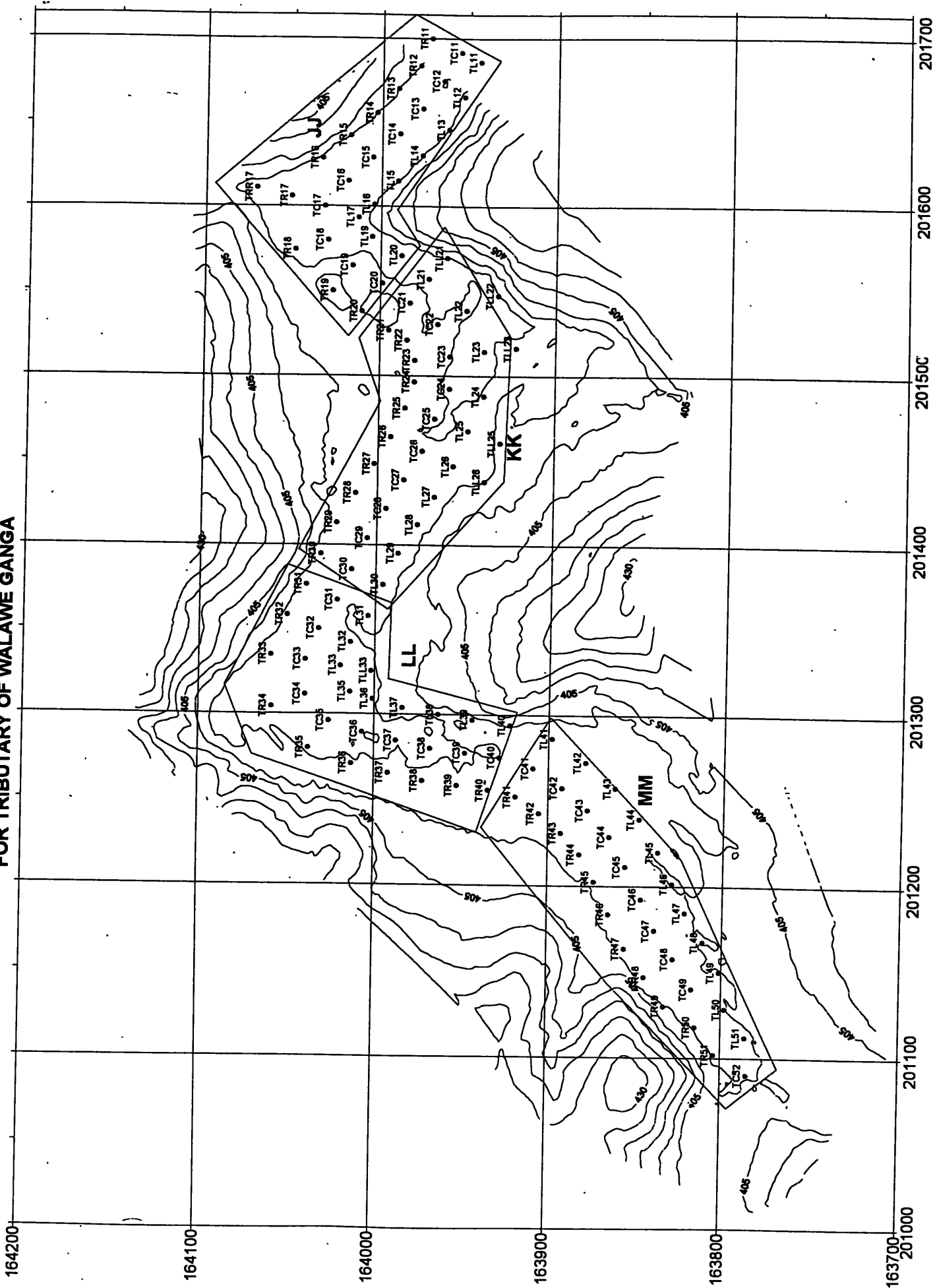
**DUMPING LOCATIONS ALONG CAVITIES
AT RIGHT ABUTMENT CLOSE TO DAM SITE**



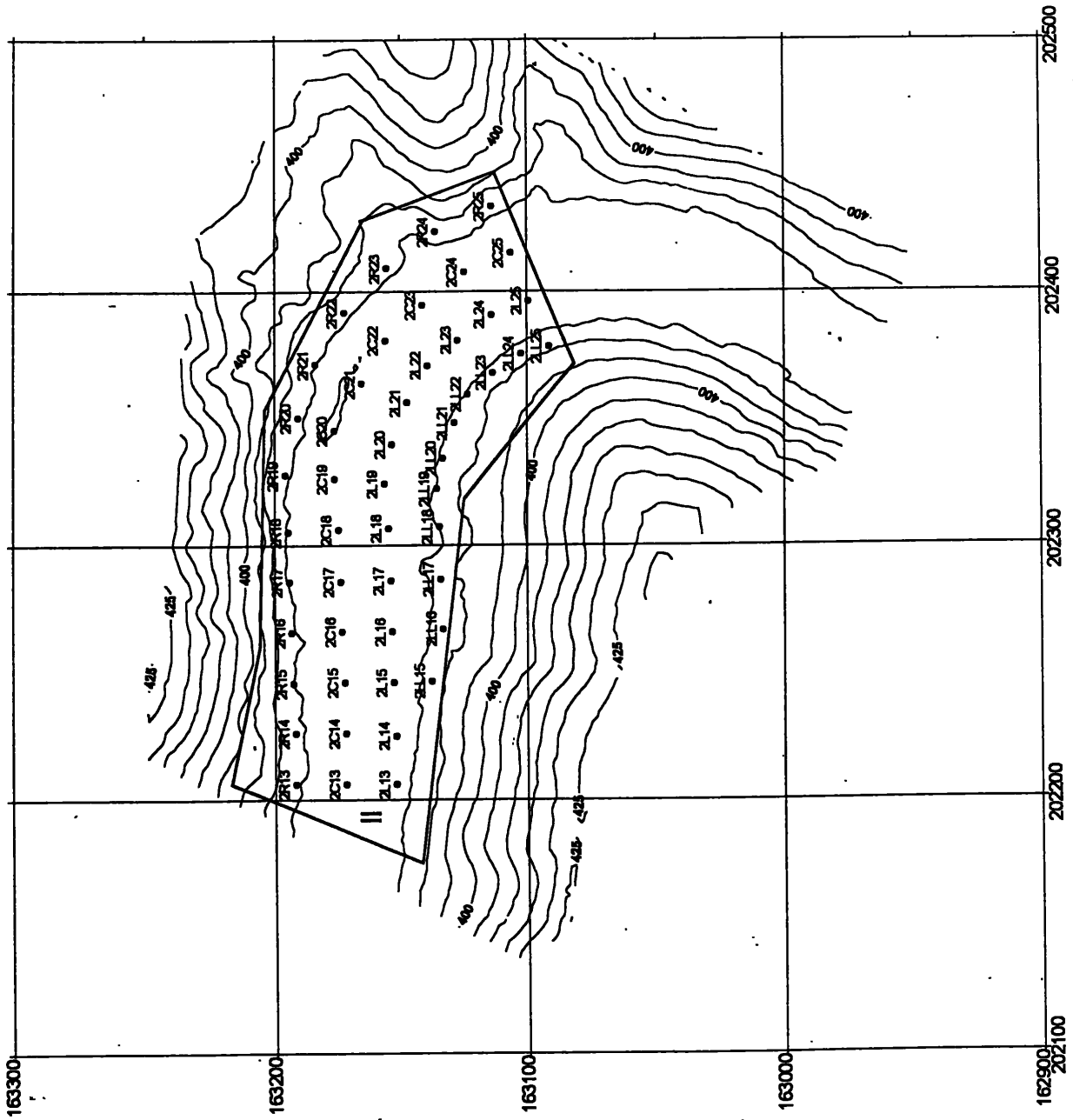
**INVESTIGATORY DUMPING LOCATIONS FOR RIGHT BANK ABUTMENT
AT MAIN TARGET AREA AT LEVEL ABOVE EL. 400 UPTO 430 m.**

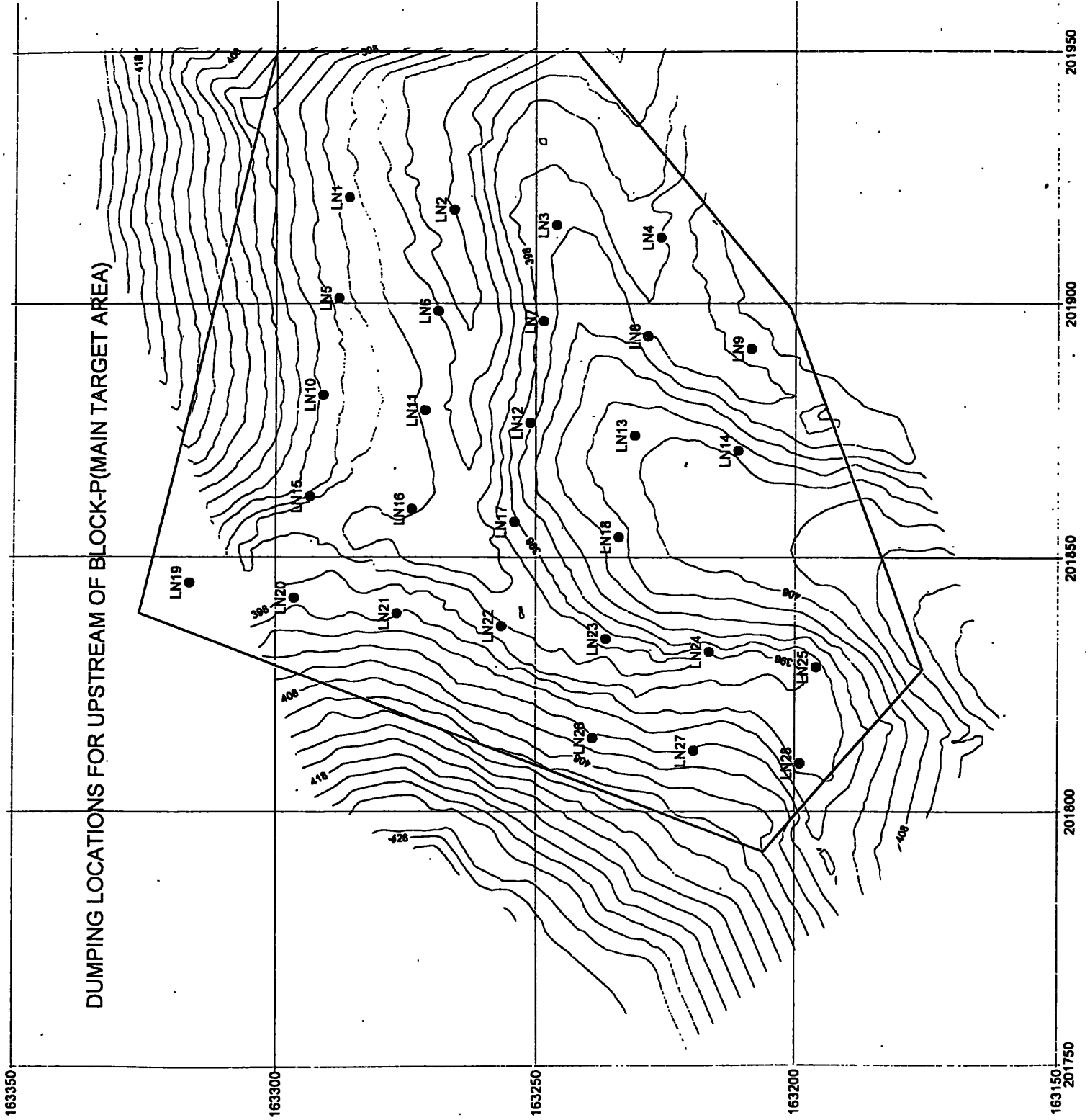


ADDITIONAL DUMPING LOCATIONS
FOR TRIBUTARY OF WALAWE GANGA

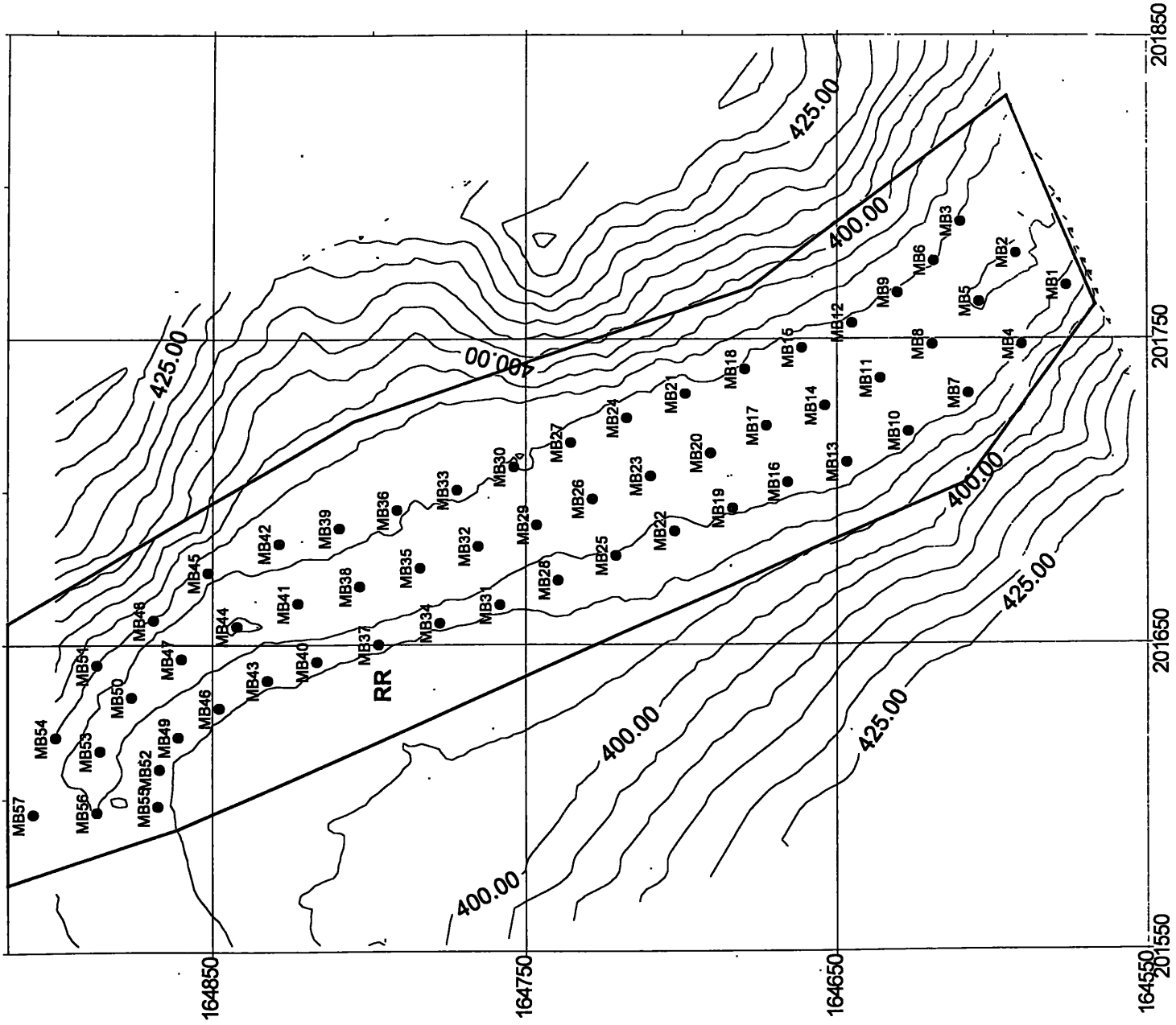


DUMPING LOCATIONS
UPSTREAM OF MAIN TARGET AREA

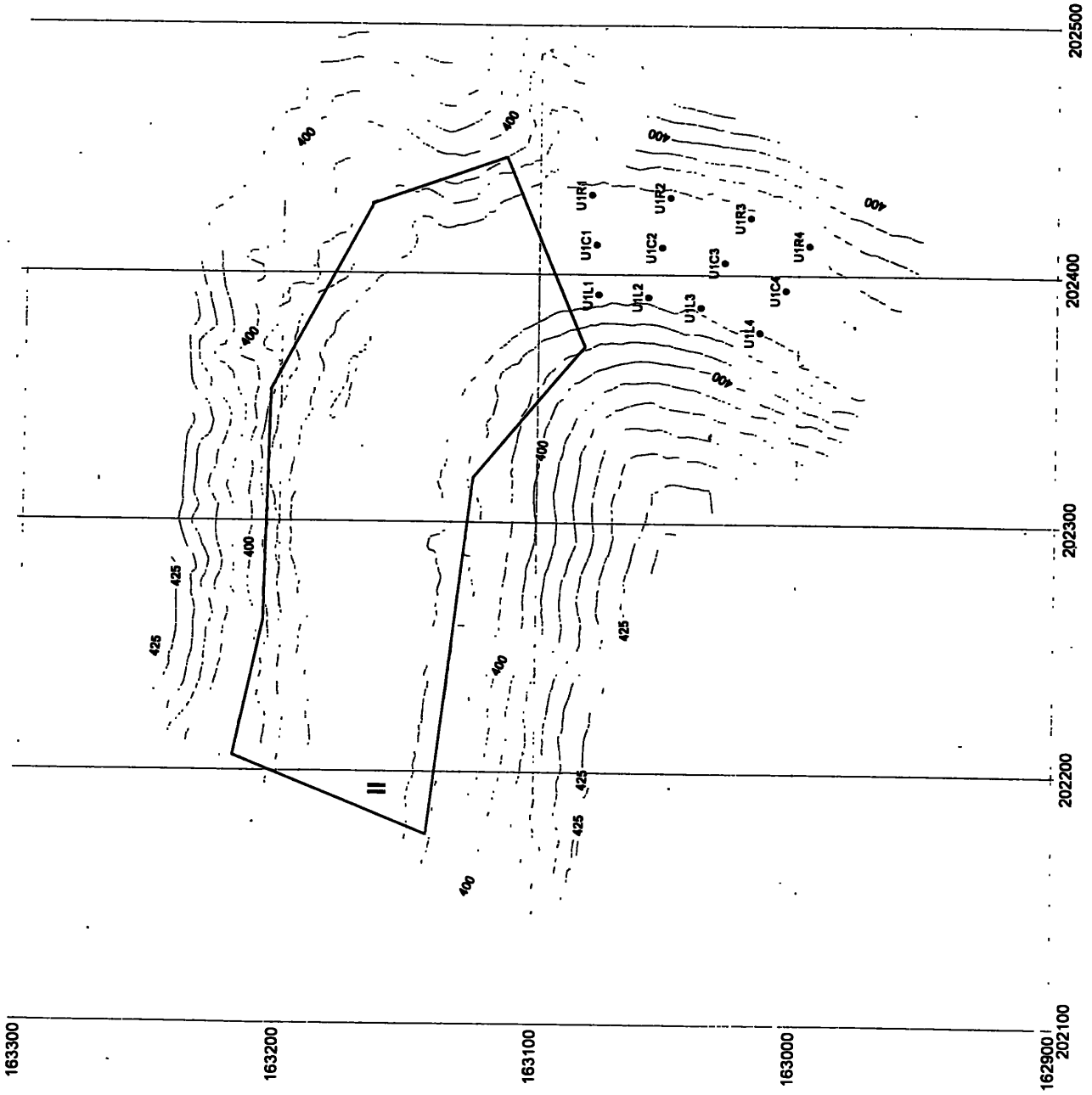




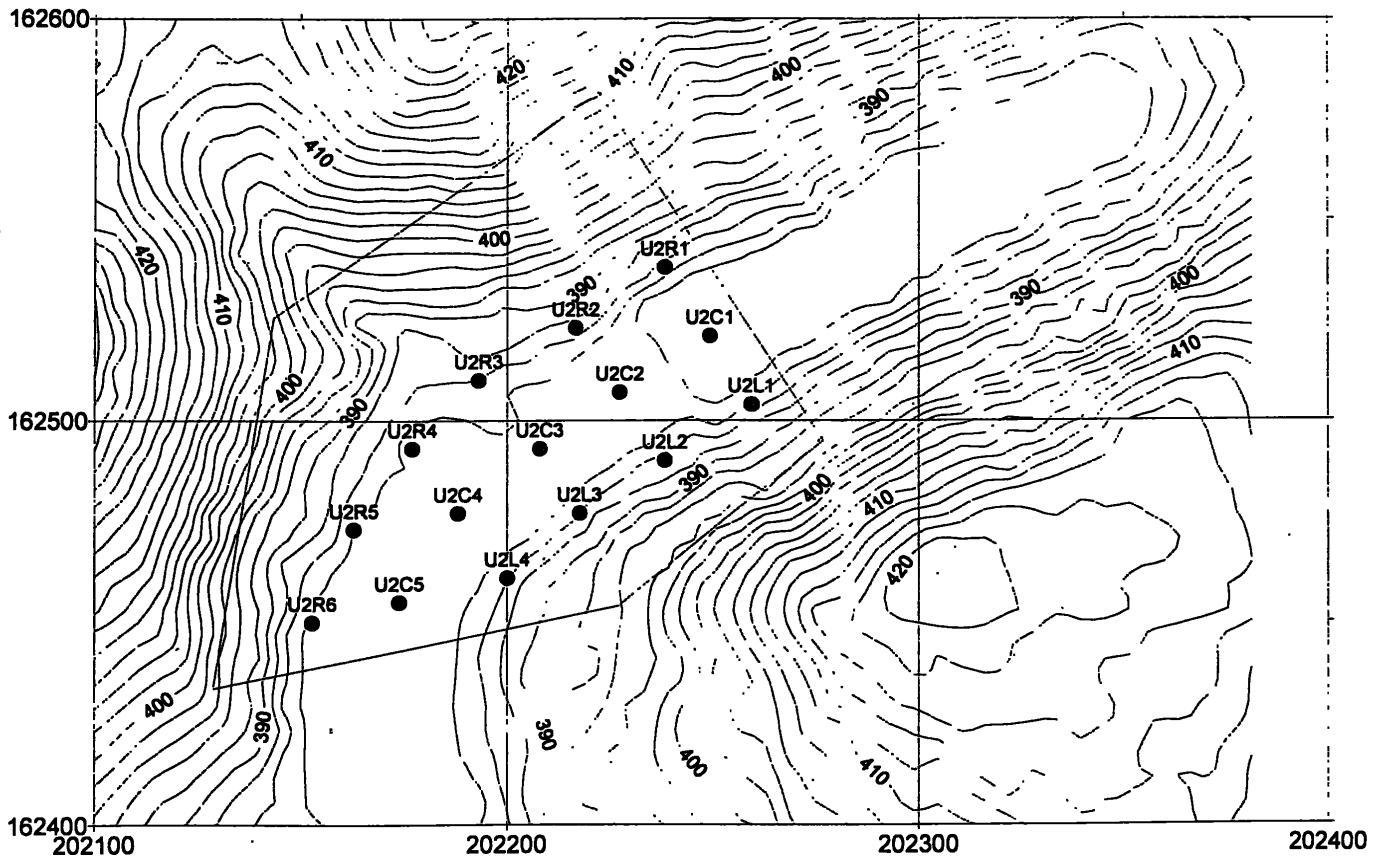
BELIHULOYA UPSTREAM



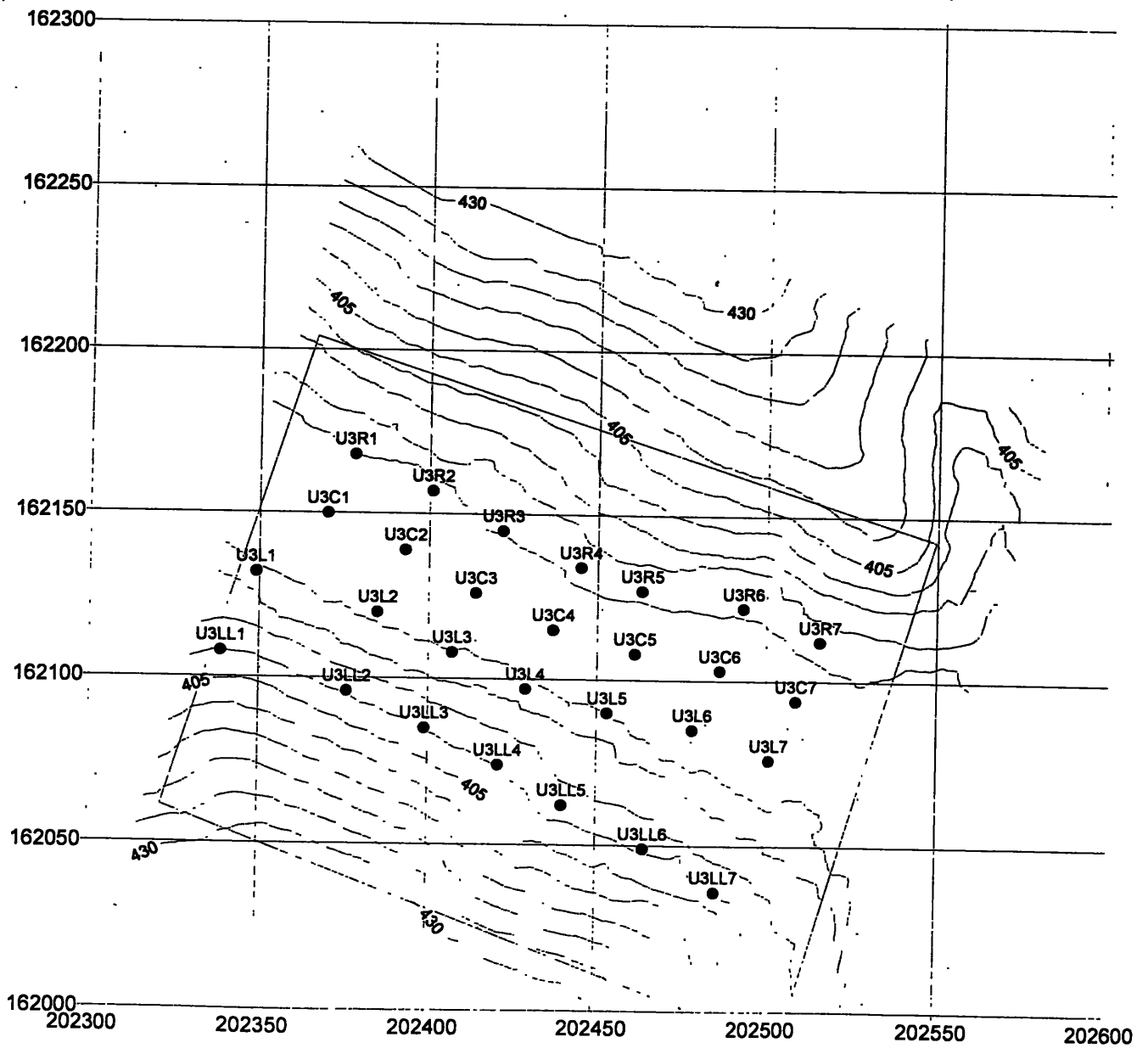
INVESTIGATORY DUMPING LOCATIONS
UPSTREAM OF MAIN TARGET AREA BLOCK-1

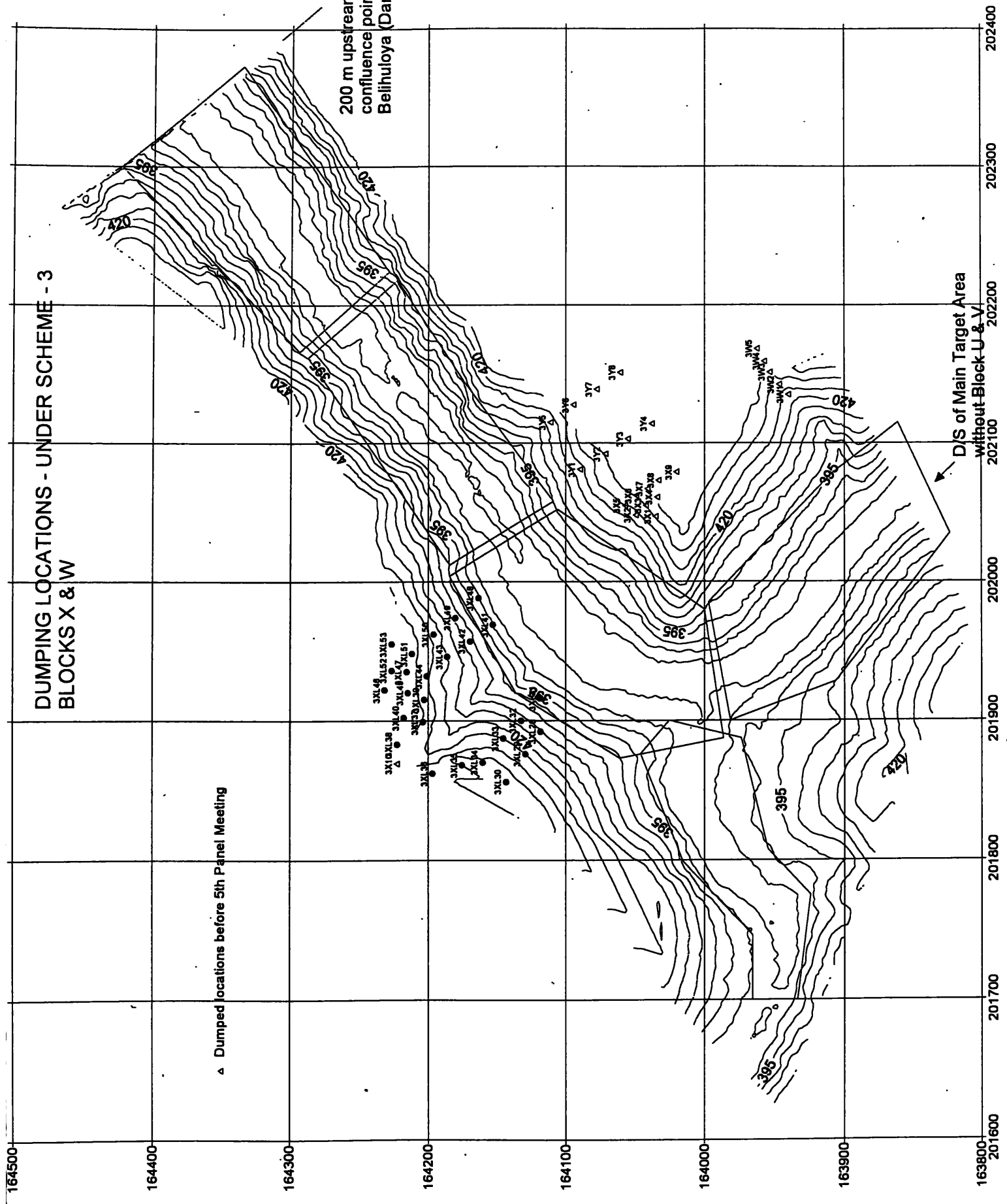


INVESTIGATORY DUMPING LOCATIONS FOR
UPSTREAM OF MAIN TARGET AREA BLOCK-2

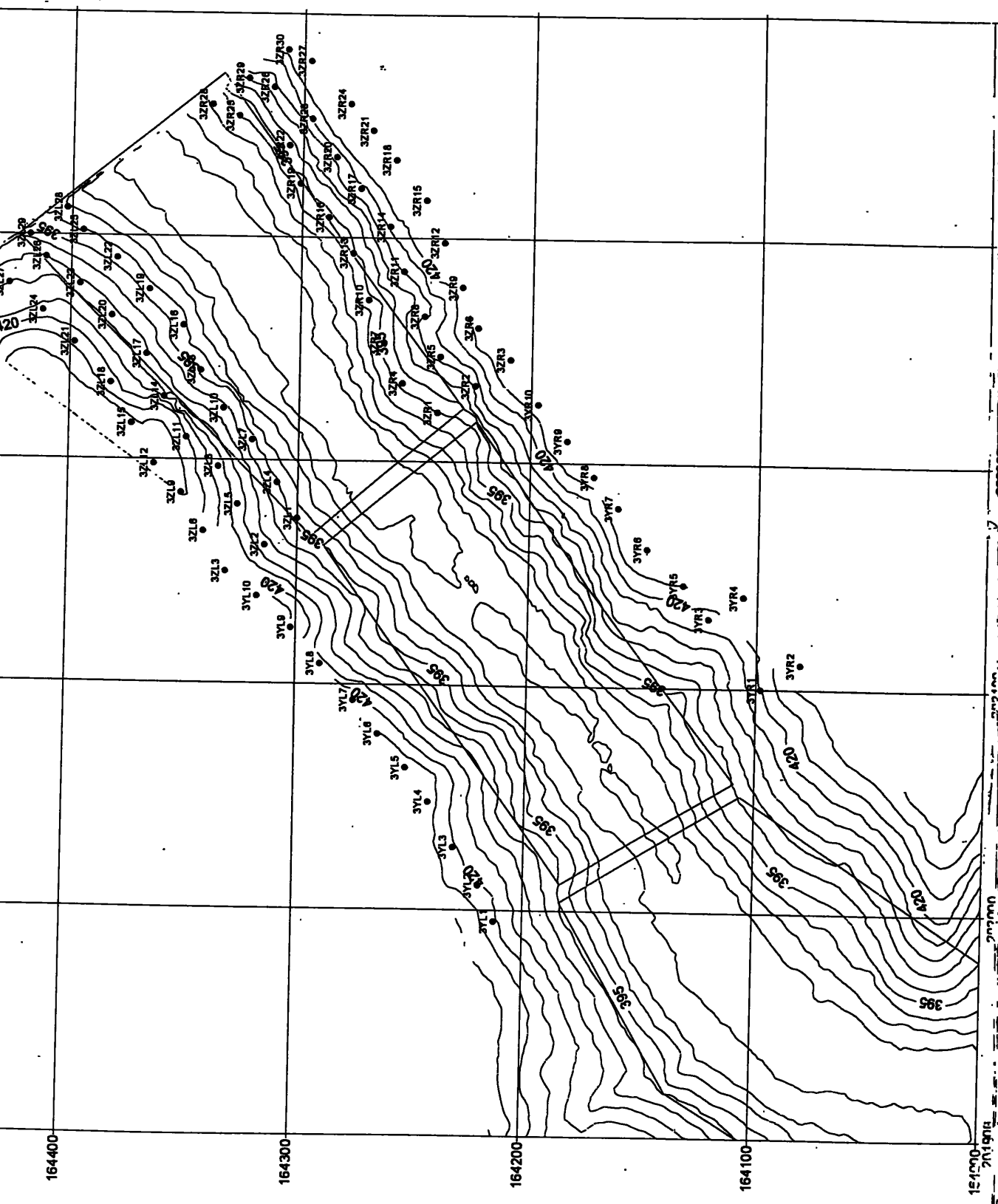


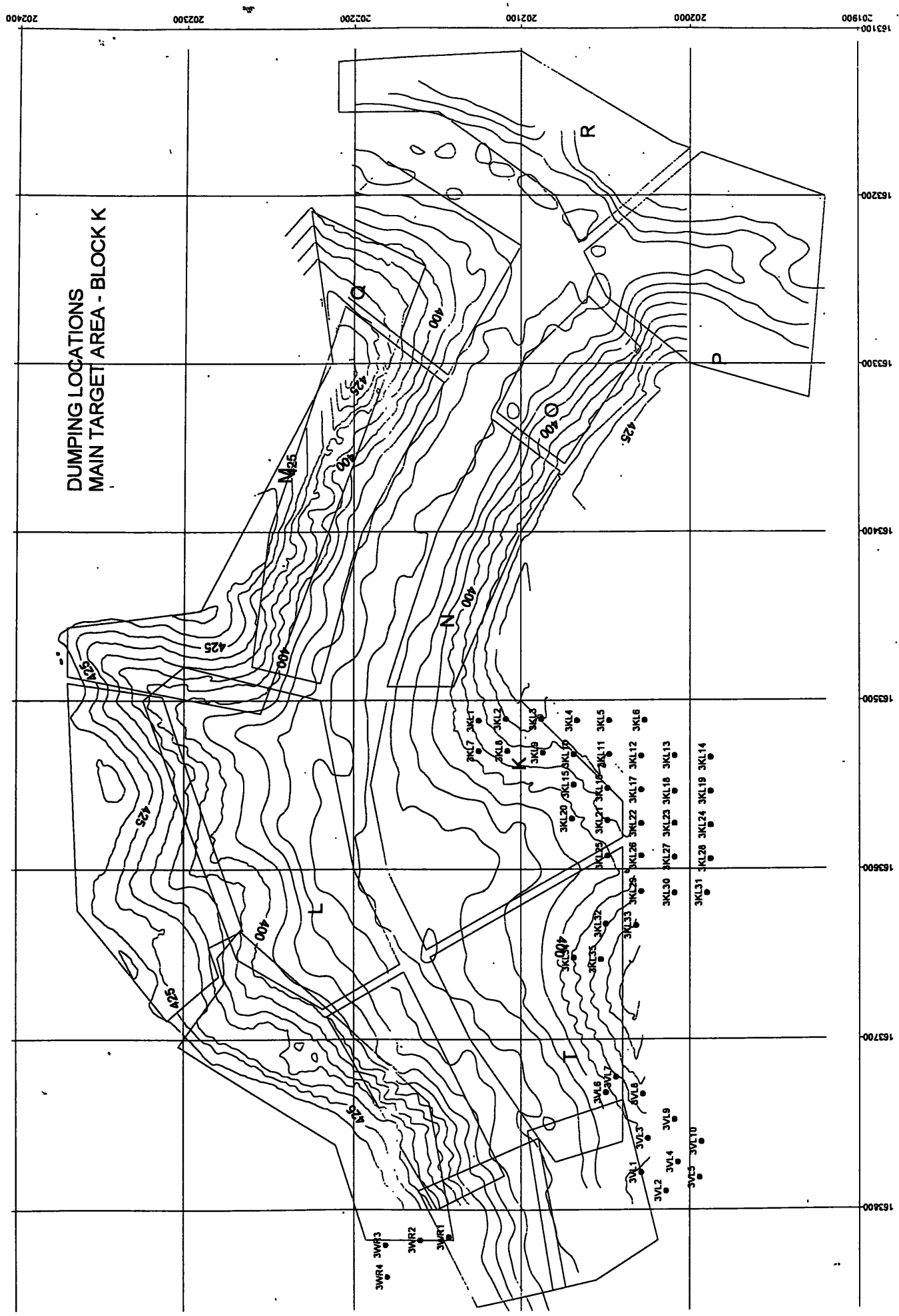
INVESTIGATORY DUMPING LOCATIONS FOR UPSTREAM OF MAIN TARGET AREA BLOCK-3





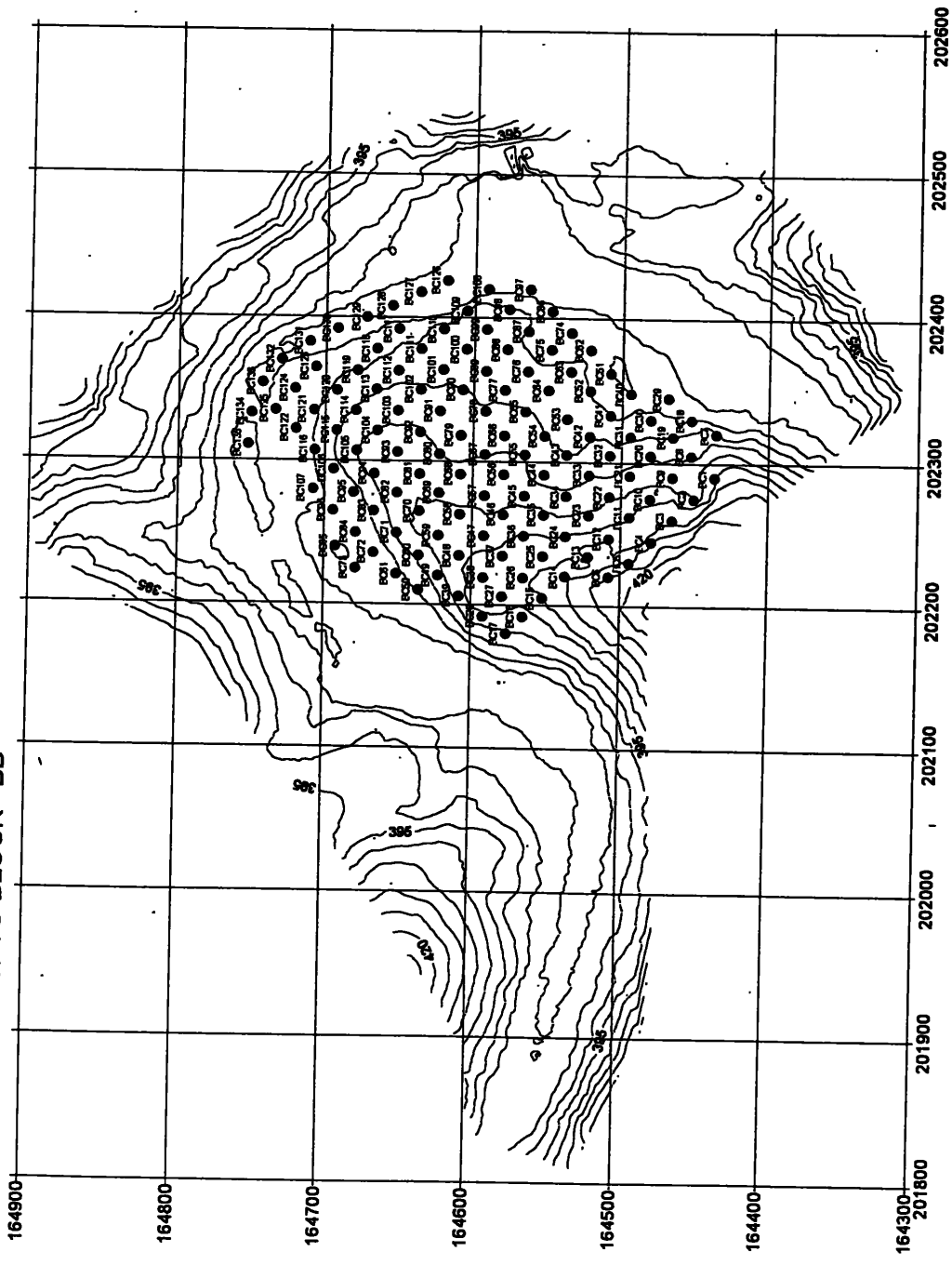
DUMPING LOCATIONS FOR ABUTMENTS OF BLOCKS Y & Z





DUMPING LOCATIONS
MAIN TARGET AREA - BLOCK K

DUMPING LOCATIONS - UNDER SCHEME - 3
INFRONT OF DAM - ADJACENT TO BLOCK - BB



APPENDIX-B

**CO-ORDINATES AND NO. OF LOADS DUMPED OF EACH DUMPING
LOCATION**

CO-ORDINATES OF DUMPING LOCATIONS FOR MAIN TARGET AREA
ALONG RIVER COURSE (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)

Target area	No. of Location	Block No.	Point No.	Easting	Northing	No. of Loads	Remarks
No.3	1	A	3L1	202,079.60	163,761.40	5	
No.3	2	A	3C1	202,098.50	163,768.00	5	
No.3	3	A	3R1	202,117.40	163,774.60	5	
No.3	4	A	3L2	202,086.70	163,735.70	5	
No.3	5	A	3C2	202,105.00	163,743.80	5	
No.3	6	A	3R2	202,123.30	163,751.80	5	
No.3	7	A	3L3	202,093.90	163,710.10	5	
No.3	8	A	3C3	202,111.50	163,719.50	5	
No.3	9	A	3R3	202,129.10	163,728.90	5	
No.3	10	A	3M1	202,092.45	163,752.23	5	
No.3	11	A	3M2	202,111.05	163,759.55	5	
No.3	12	A	3M3	202,099.28	163,727.28	5	
No.3	13	A	3M4	202,117.23	163,736.00	0	
No.3	14	A	3M5	202,111.55	163,706.55	5	
No.3	15	A	3M6	202,128.35	163,717.23	0	
No.3	1	B	3L4	202,112.40	163,692.30	5	
No.3	2	B	3C4	202,128.40	163,704.30	5	
No.3	3	B	3R4	202,144.40	163,716.20	5	
No.3	4	B	3L5	202,131.20	163,674.80	5	
No.3	5	B	3C5	202,145.30	163,689.00	5	
No.3	6	B	3R5	202,159.40	163,703.20	5	
No.3	7	B	3L6	202,144.60	163,660.00	5	
No.3	8	B	3C6	202,160.40	163,672.30	5	
No.3	9	B	3R6	202,176.20	163,684.50	5	
No.3	10	B	3M7	202,129.33	163,690.10	0	
No.3	11	B	3M8	202,144.38	163,703.18	0	
No.3	12	B	3M9	202,145.38	163,674.03	0	
No.3	13	B	3M10	202,160.33	163,687.25	0	
No.3	14	B	3M11	202,159.68	163,658.33	0	
No.3	15	B	3M12	202,176.23	163,669.45	0	
No.1	1	C	1L1	202,158.20	163,645.50	5	
No.1	2	C	1C1	202,175.50	163,655.50	15	
No.1	3	C	1R1	202,192.80	163,665.50	5	
No.1	4	C	1L2	202,169.20	163,626.30	5	
No.1	5	C	1C2	202,186.50	163,636.30	5	
No.1	6	C	1R2	202,203.80	163,646.30	5	
No.1	7	C	1L3	202,180.20	163,607.00	5	
No.1	8	C	1C3	202,197.50	163,617.00	5	
No.1	9	C	1R3	202,214.80	163,627.00	5	
No.1	10	C	1L4	202,181.90	163,589.10	5	
No.1	11	C	1C4	202,200.90	163,595.20	5	
No.1	12	C	1R4	202,220.00	163,601.30	5	
No.1	13	C	1M1	202,172.35	163,640.90	0	
No.1	14	C	1M2	202,189.65	163,650.90	0	
No.1	15	C	1M3	202,183.35	163,621.65	0	
No.1	16	C	1M4	202,200.65	163,631.65	0	
No.1	17	C	1M5	202,190.13	163,602.08	0	
No.1	18	C	1M6	202,208.30	163,610.13	0	
No.1	19	C	1M7	202,192.88	163,582.25	0	
No.1	20	C	1M8	202,212.35	163,586.28	0	
No.1	1	D	1L5	202,184.40	163,571.40	5	
No.1	2	D	1C5	202,204.30	163,573.30	16	
No.1	3	D	1R5	202,224.20	163,575.30	5	

CO-ORDINATES OF DUMPING LOCATIONS FOR MAIN TARGET AREA
ALONG RIVER COURSE (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)

Target area	No. of Location	Block No.	Point No.	Easting	Northing	No. of Loads	Remarks
No.1	4	D	1L6	202,182.70	163,550.00	5	
No.1	5	D	1C6	202,202.70	163,550.70	5	
No.1	6	D	1R6	202,222.70	163,551.40	5	
No.1	7	D	1L7	202,181.00	163,528.50	5	
No.1	8	D	1C7	202,201.00	163,528.00	5	
No.1	9	D	1R7	202,221.00	163,527.50	5	
No.1	10	D	1L8	202,179.50	163,507.90	5	
No.1	11	D	1C8	202,199.50	163,506.50	5	
No.1	12	D	1R8	202,219.50	163,505.10	5	
No.1	13	D	1M9	202,193.53	163,561.35	0	
No.1	14	D	1M10	202,213.48	163,562.68	0	
No.1	15	D	1M11	202,191.85	163,539.30	0	
No.1	16	D	1M12	202,211.85	163,539.40	0	
No.1	17	D	1M13	202,190.25	163,517.73	0	
No.1	18	D	1M14	202,210.25	163,516.78	0	
No.1	19	D	1M15	202,188.78	163,496.65	0	
No.1	20	D	1M16	202,208.73	163,494.85	0	
No.1	1	E	1L9	202,178.10	163,487.20	5	
No.1	2	E	1C9	202,198.00	163,485.00	15	
No.1	3	E	1R9	202,217.90	163,482.80	5	
No.1	4	E	1L10	202,172.80	163,466.60	5	
No.1	5	E	1C10	202,192.50	163,463.00	5	
No.1	6	E	1R10	202,212.20	163,459.40	5	
No.1	7	E	1L11	202,167.70	163,446.10	6	
No.1	8	E	1C11	202,187.00	163,441.00	5	
No.1	9	E	1R11	202,206.30	163,435.90	5	
No.1	10	E	1L12	202,162.50	163,425.90	5	
No.1	11	E	1C12	202,181.50	163,419.50	5	
No.1	12	E	1R12	202,200.50	163,413.10	5	
No.1	13	E	1M17	202,185.35	163,475.45	0	
No.1	14	E	1M18	202,205.15	163,472.55	0	
No.1	15	E	1M19	202,180.00	163,454.18	0	
No.1	16	E	1M20	202,199.50	163,449.83	0	
No.1	17	E	1M21	202,174.68	163,433.13	0	
No.1	18	E	1M22	202,193.83	163,427.38	0	
No.1	19	E	1M23	202,169.38	163,412.28	0	
No.1	20	E	1M24	202,188.13	163,405.23	0	
No.1	1	F	1L13	202,157.50	163,405.70	5	
No.1	2	F	1C13	202,176.00	163,398.00	15	
No.1	3	F	1R13	202,194.50	163,390.30	5	
No.1	4	F	1L14	202,145.60	163,388.40	5	
No.1	5	F	1C14	202,163.30	163,379.00	5	
No.1	6	F	1R14	202,180.90	163,369.60	5	
No.1	7	F	1L15	202,133.80	163,371.00	5	
No.1	8	F	1C15	202,150.50	163,360.00	5	
No.1	9	F	1R15	202,167.20	163,349.90	15	
No.1	10	F	1L16	202,121.30	163,352.00	5	
No.1	11	F	1C16	202,138.30	163,341.50	5	
No.1	12	F	1R16	202,155.30	163,331.00	5	
No.1	13	F	1M25	202,160.60	163,392.78	0	
No.1	14	F	1M26	202,178.68	163,384.23	0	
No.1	15	F	1M27	202,148.30	163,374.60	0	
No.1	16	F	1M28	202,165.48	163,364.63	0	

CO-ORDINATES OF DUMPING LOCATIONS FOR MAIN TARGET AREA
ALONG RIVER COURSE (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)

Target area	No. of Location	Block No.	Point No.	Easting	Northing	No. of Loads	Remarks
No.1	17	F	1M29	202,135.98	163,356.13	0	
No.1	18	F	1M30	202,152.83	163,345.60	0	
No.1	19	F	1M31	202,123.58	163,337.38	0	
No.1	20	F	1M32	202,140.73	163,327.13	0	
No.2	1	G	2L1	202,108.70	163,333.00	5	
No.2	2	G	2C1	202,126.00	163,323.00	5	
No.2	3	G	2R1	202,143.30	163,313.00	5	
No.2	4	G	2L2	202,096.00	163,314.50	5	
No.2	5	G	2C2	202,113.00	163,304.00	5	
No.2	6	G	2R2	202,130.00	163,293.50	5	
No.2	7	G	2L3	202,083.30	163,295.90	10	
No.2	8	G	2C3	202,100.00	163,285.00	5	
No.2	9	G	2R3	202,116.80	163,274.10	5	
No.2	10	G	2M1	202,110.93	163,318.63	5	
No.2	11	G	2M2	202,128.08	163,308.38	0	
No.2	12	G	2M3	202,098.08	163,299.85	5	
No.2	13	G	2M4	202,114.95	163,289.15	0	
No.2	14	G	2M5	202,085.10	163,280.83	5	
No.2	15	G	2M6	202,102.70	163,271.45	5	
No.2	1	H	2L4	202,069.30	163,275.10	5	
No.2	2	H	2C4	202,087.80	163,267.30	5	
No.2	3	H	2R4	202,106.20	163,259.40	5	
No.2	4	H	2L5	202,056.00	163,254.00	5	
No.2	5	H	2C5	202,075.50	163,249.50	5	
No.2	6	H	2R5	202,095.00	163,245.00	5	
No.2	7	H	2L6	202,052.10	163,225.20	5	
No.2	8	H	2C6	202,072.00	163,227.00	5	
No.2	9	H	2R6	202,091.90	163,228.80	5	
No.2	10	H	2M7	202,072.15	163,261.48	0	
No.2	11	H	2M8	202,091.13	163,255.30	0	
No.2	12	H	2M9	202,063.90	163,238.93	0	
No.2	13	H	2M10	202,083.60	163,237.58	0	
No.2	14	H	2M11	202,065.73	163,213.13	0	
No.2	15	H	2M12	202,083.78	163,219.90	0	
No.2	1	I	2L7	202,061.30	163,194.30	5	
No.2	2	I	2C7	202,077.50	163,206.00	5	
No.2	3	I	2R7	202,093.70	163,217.80	5	
No.2	4	I	2L8	202,084.20	163,180.50	5	
No.2	5	I	2C8	202,097.50	163,195.50	5	
No.2	6	I	2R8	202,110.80	163,210.50	5	
No.2	7	I	2L9	202,107.80	163,167.50	5	
No.2	8	I	2C9	202,117.50	163,185.00	5	
No.2	9	I	2R9	202,127.20	163,202.50	5	
No.2	10	I	2M13	202,080.13	163,194.08	0	
No.2	11	I	2M14	202,094.88	163,207.45	0	
No.2	12	I	2M15	202,101.75	163,182.13	0	
No.2	13	I	2M16	202,113.25	163,198.38	0	
No.2	14	I	2M17	202,122.85	163,171.45	0	
No.2	15	I	2M18	202,132.43	163,189.05	0	
No.2	1	J	2L10	202,128.30	163,157.80	5	
No.2	2	J	2C10	202,137.80	163,175.50	5	
No.2	3	J	2R10	202,147.20	163,193.20	5	
No.2	4	J	2L11	202,148.90	163,148.20	5	

CO-ORDINATES OF DUMPING LOCATIONS FOR MAIN TARGET AREA
ALONG RIVER COURSE (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)

Target area	No. of Location	Block No.	Point No.	Easting	Northing	No. of Loads	Remarks
No.2	5	J	2C11	202,158.00	163,166.00	5	
No.2	6	J	2R11	202,167.10	163,183.80	5	
No.2	7	J	2L12	202,187.80	163,150.80	5	
No.2	8	J	2C12	202,186.20	163,170.40	5	
No.2	9	J	2R12	202,184.70	163,190.30	5	
No.2	10	J	2M19	202,143.25	163,161.88	0	
No.2	11	J	2M20	202,152.53	163,179.63	0	
No.2	12	J	2M21	202,170.23	163,158.85	0	
No.2	13	J	2M22	202,174.00	163,177.63	0	

CO-ORDINATES OF DUMPING LOCATIONS FOR MAIN TARGET AREA
FOR ABUTMENTS (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)

Target Area	No. of Order	Block No.	Point No.	Easting	Northing	No. of Loads	Remarks
No.1	1	K	S1L7	202,155.03	163,630.89	5	
No.1	2	K	S1L8	202,166.03	163,611.64	5	
No.1	3	K	S1L9	202,171.84	163,593.98	5	
No.1	4	K	S1L10	202,173.29	163,578.20	5	
No.1	5	K	S1L11	202,173.57	163,560.02	5	
No.1	6	K	S1L12	202,171.85	163,539.20	5	
No.1	7	K	S1L13	202,170.27	163,518.67	5	
No.1	8	K	A1L7	202,140.90	163,635.50	5	
No.1	9	K	A1L8	202,151.90	163,616.30	5	
No.1	10	K	A1L9	202,162.90	163,597.00	5	
No.1	11	K	A1L10	202,164.50	163,569.50	5	
No.1	12	K	A1L11	202,162.70	163,549.30	5	
No.1	13	K	A1L12	202,161.00	163,529.00	5	
No.1	14	K	A1L13	202,159.60	163,509.20	5	
No.1	15	K	S2L3	202,138.50	163,620.00	5	
No.1	16	K	S2L4	202,151.50	163,591.50	5	
No.1	17	K	S2L5	202,153.00	163,561.50	5	
No.1	18	K	S2L6	202,150.50	163,529.50	5	
No.1	19	K	A2L4	202,126.90	163,619.70	5	
No.1	20	K	A2L5	202,138.00	163,600.10	5	
No.1	21	K	A2L6	202,143.00	163,578.60	5	
No.1	22	K	A2L7	202,143.10	163,556.20	5	
No.1	23	K	A2L8	202,141.30	163,533.80	5	
No.1	24	K	A2L9	202,139.70	163,511.30	5	
No.1	25	K	S3L2	202,123.50	163,604.00	5	
No.1	26	K	S3L3	202,132.50	163,578.00	5	
No.1	27	K	S3L4	202,132.00	163,548.00	10	
No.1	28	K	S3L7	202,116.63	163,621.03	5	
No.1	29	K	A3L3	202,111.10	163,607.00	5	
No.1	30	K	A3L4	202,121.50	163,587.30	5	
No.1	31	K	A3L5	202,123.70	163,564.90	5	
No.1	32	K	A3L6	202,121.90	163,542.50	5	
No.1	33	K	S4L2	202,098.50	163,606.00	5	
No.1	34	K	S4L3	202,112.50	163,577.50	5	
No.1	35	K	S4L4	202,112.50	163,553.50	5	
No.1	36	K	S4L6	202,110.57	163,594.00	5	
No.1	37	K	A4L2	202,085.70	163,605.90	5	
No.1	38	K	A4L3	202,099.10	163,587.70	5	
No.1	39	K	A4L4	202,104.00	163,569.00	5	
No.1	40	K	A4L5	202,101.90	163,543.50	5	
No.1	41	K	S5L2	202,087.00	163,589.00	5	
No.1	42	K	S5L3	202,093.50	163,558.50	5	
No.1	43	K	A5L2	202,069.60	163,593.80	5	
No.1	44	K	A5L3	202,082.70	163,576.00	5	
No.1	45	K	A5L4	202,082.60	163,552.80	5	
No.1	46	K	ADK1	202,107.30	163,629.00	5	
No.1	47	K	ADK2	202,129.70	163,594.00	5	
No.1	48	K	ADK3	202,133.00	163,563.00	5	
No.1	49	K	ADK4	202,116.30	163,597.20	5	
No.1	50	K	ADK5	202,122.60	163,576.10	5	

CO-ORDINATES OF DUMPING LOCATIONS FOR MAIN TARGET AREA
FOR ABUTMENTS (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)

Target Area	No. of Order	Block No.	Point No.	Easting	Northing	No. of Loads	Remarks
No.1	51	K	ADK6	202,104.50	163,600.00	5	
No.1	52	K	ADK7	202,112.50	163,565.50	5	
No.1	53	K	ADK8	202,092.40	163,596.80	5	
No.1	54	K	ADK9	202,101.50	163,578.30	5	
No.1	55	K	ADK10	202,103.00	163,556.30	5	
No.1	1	L	S1R7	202,206.97	163,660.91	5	
No.1	2	L	S1R8	202,217.97	163,641.66	5	
No.1	3	L	S1R9	202,226.59	163,618.22	5	
No.1	4	L	S1R10	202,231.94	163,590.32	5	
No.1	5	L	S1R11	202,233.43	163,564.00	5	
No.1	6	L	S1R12	202,231.85	163,539.50	5	
No.1	7	L	S1R13	202,230.23	163,515.83	5	
No.1	8	L	S1R14	202,228.64	163,493.05	5	
No.1	9	L	A1R7	202,210.10	163,675.50	5	
No.1	10	L	A1R8	202,221.10	163,656.30	5	
No.1	11	L	A1R9	202,232.10	163,637.00	5	
No.1	12	L	A1R10	202,239.00	163,607.40	5	
No.1	13	L	A1R11	202,244.20	163,577.20	5	
No.1	14	L	A1R12	202,242.60	163,552.10	5	
No.1	15	L	A1R13	202,241.00	163,527.00	5	
No.1	16	L	A1R14	202,239.40	163,503.80	5	
No.1	17	L	S2R1	202,253.50	163,569.50	5	
No.1	18	L	S2R2	202,252.50	163,545.50	5	
No.1	19	L	S2R3	202,250.50	163,520.50	5	
No.1	20	L	S2R12	202,223.36	163,673.40	5	
No.1	21	L	S2R13	202,233.52	163,653.11	5	
No.1	22	L	S2R14	202,245.36	163,622.10	5	
No.1	23	L	S2R15	202,251.57	163,593.35	5	
No.1	24	L	A2R1	202,260.30	163,601.70	5	
No.1	25	L	A2R2	202,264.00	163,579.60	5	
No.1	26	L	A2R3	202,263.00	163,557.50	5	
No.1	27	L	A2R4	202,261.50	163,534.50	5	
No.1	28	L	A2R5	202,259.80	163,509.10	5	
No.1	29	L	A2R10	202,238.17	163,666.77	5	
No.1	30	L	A2R11	202,248.61	163,648.48	5	
No.1	31	L	A2R12	202,255.44	163,625.07	5	
No.1	32	L	S3R1	202,271.50	163,530.50	5	
No.1	33	L	S3R2	202,270.00	163,501.50	5	
No.1	34	L	S3R3	202,272.44	163,589.97	5	
No.1	35	L	S3R4	202,273.57	163,560.66	5	
No.1	36	L	A3R1	202,281.90	163,539.60	5	
No.1	37	L	A3R2	202,280.40	163,517.20	5	
No.1	38	L	A3R3	202,279.50	163,494.70	5	
No.1	39	L	S4R1	202,291.00	163,512.50	5	
No.1	40	L	A4R1	202,300.90	163,522.30	5	
No.1	41	L	A4R2	202,299.30	163,500.00	5	
No.1	42	L	ADL1	202,212.00	163,651.30	5	
No.1	43	L	ADL2	202,222.50	163,630.00	5	
No.1	44	L	ADL3	202,229.30	163,604.30	5	
No.1	45	L	ADL4	202,232.70	163,577.20	5	

CO-ORDINATES OF DUMPING LOCATIONS FOR MAIN TARGET AREA
FOR ABUTMENTS (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)

Target Area	No. of Order	Block No.	Point No.	Easting	Northing	No. of Loads	Remarks
No.1	46	L	ADL5	202,232.60	163,551.80	5	
No.1	47	L	ADL6	202,231.00	163,527.70	5	
No.1	48	L	ADL7	202,229.40	163,504.40	5	
No.1	1	M	S1R15	202,224.94	163,469.65	5	
No.1	2	M	S1R16	202,219.02	163,445.47	5	
No.1	3	M	S1R17	202,212.98	163,421.62	5	
No.1	4	M	S1R18	202,206.85	163,398.19	5	
No.1	5	M	S1R19	202,196.75	163,375.67	5	
No.1	6	M	S1R20	202,182.77	163,354.58	5	
No.1	7	M	S1R21	202,169.79	163,335.00	5	
No.1	8	M	S1R22	202,157.89	163,316.86	5	
No.1	9	M	A1R15	202,237.80	163,480.60	5	
No.1	10	M	A1R16	202,231.80	163,455.70	5	
No.1	11	M	A1R17	202,225.70	163,430.80	5	
No.1	12	M	A1R18	202,219.40	163,406.70	5	
No.1	13	M	A1R19	202,213.00	163,382.70	5	
No.1	14	M	A1R20	202,198.60	163,360.20	5	
No.1	15	M	A1R21	202,183.90	163,337.90	5	
No.1	16	M	A1R22	202,172.30	163,320.50	5	
No.1	17	M	A1R23	202,160.60	163,303.00	5	
No.1	1	N	S1L14	202,168.86	163,498.45	5	
No.1	2	N	S1L15	202,165.56	163,478.35	5	
No.1	3	N	S1L16	202,160.48	163,458.53	5	
No.1	4	N	S1L17	202,155.52	163,438.88	5	
No.1	5	N	S1L18	202,150.65	163,419.31	5	
No.1	6	N	S1L19	202,142.52	163,401.33	5	
No.1	7	N	S1L20	202,131.01	163,384.64	5	
No.1	8	N	S1L21	202,119.01	163,366.72	5	
No.1	9	N	S1L22	202,106.41	163,347.64	5	
No.1	10	N	A1L14	202,158.20	163,489.40	5	
No.1	11	N	A1L15	202,153.20	163,470.30	5	
No.1	12	N	A1L16	202,148.30	163,451.20	5	
No.1	13	N	A1L17	202,143.60	163,432.30	5	
No.1	14	N	A1L18	202,139.00	163,413.30	5	
No.1	15	N	A1L19	202,127.90	163,397.80	5	
No.1	16	N	A1L20	202,117.10	163,382.10	5	
No.1	17	N	A1L21	202,104.20	163,362.50	5	
No.1	18	N	S2L8	202,149.00	163,502.00	5	
No.1	19	N	S2L9	202,146.00	163,482.50	5	
No.1	20	N	S2L10	202,141.50	163,463.50	5	
No.1	21	N	S2L11	202,137.00	163,444.50	5	
No.1	22	N	S2L12	202,131.00	163,425.50	5	
No.1	23	N	S2L13	202,124.50	163,409.50	5	
No.1	24	N	S2L14	202,113.50	163,393.50	5	
No.1	25	N	S2L15	202,102.00	163,378.00	5	
No.1	26	N	S2L16	202,094.00	163,350.00	0	
No.2	1	O	S1L23	202,093.76	163,328.89	5	
No.2	2	O	S1L24	202,081.18	163,310.56	5	
No.2	3	O	S1L25	202,067.45	163,290.23	5	
No.2	4	O	S1L26	202,062.00	163,265.00	5	

CO-ORDINATES OF DUMPING LOCATIONS FOR MAIN TARGET AREA
FOR ABUTMENTS (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)

Target Area	No. of Order	Block No.	Point No.	Easting	Northing	No. of Loads	Remarks
No.2	5	O	A1L22	202,098.00	163,325.00	0	
No.2	6	O	A1L23	202,082.00	163,309.00	0	
No.2	7	O	A1L24	202,067.50	163,293.00	0	
No.2	8	O	A1L25	202,051.00	163,279.00	0	
No.2	9	O	S2L17	202,085.00	163,321.50	0	
No.2	10	O	S2L18	202,067.50	163,305.00	0	
No.2	11	O	S2L19	202,054.50	163,290.00	0	
No.2	1	P	A1L26	202,036.50	163,258.60	5	
No.2	2	P	A1L27	202,032.20	163,223.40	5	
No.2	3	P	A2L10	202,016.50	163,260.00	5	
No.2	4	P	A2L11	202,013.40	163,237.50	5	
No.2	5	P	A2L12	202,013.30	163,215.40	5	
No.2	6	P	A3L7	201,996.30	163,260.00	5	
No.2	7	P	A3L8	201,993.20	163,237.50	5	
No.2	8	P	A3L9	201,992.40	163,215.20	5	
No.2	9	P	A4L6	201,979.70	163,271.20	5	
No.2	10	P	A4L7	201,976.60	163,248.50	5	
No.2	11	P	A4L8	201,973.50	163,226.00	5	
No.2	12	P	A5L5	201,961.30	163,284.00	5	
No.2	13	P	A5L6	201,958.20	163,261.50	5	
No.2	14	P	A5L7	201,955.10	163,239.00	5	
No.2	15	P	A5L8	201,952.00	163,216.50	5	
No.2	16	P	A6L1	201,942.80	163,290.50	5	
No.2	17	P	A6L2	201,939.80	163,274.70	5	
No.2	18	P	A6L3	201,936.80	163,252.40	5	
No.2	19	P	A6L4	201,933.70	163,230.20	5	
No.2	1	Q	S1R23	202,145.24	163,298.12	5	
No.2	2	Q	S1R24	202,131.84	163,278.44	5	
No.2	3	Q	S1R25	202,120.35	163,262.05	5	
No.2	4	Q	S1R26	202,110.14	163,249.11	5	
No.2	5	Q	S1R27	202,103.55	163,236.21	5	
No.2	6	Q	S1R29	202,109.69	163,220.88	5	
No.2	7	Q	S1R30	202,124.80	163,214.70	5	
No.2	8	Q	S1R31	202,141.98	163,206.62	0	
No.2	9	Q	S1R32	202,161.79	163,197.35	0	
No.2	10	Q	S1R33	202,177.94	163,197.23	0	
No.2	11	Q	A1R24	202,147.10	163,283.10	5	
No.2	12	Q	A1R25	202,133.50	163,263.20	5	
No.2	13	Q	A1R26	202,124.50	163,251.60	5	
No.2	14	Q	A1R27	202,114.50	163,240.40	5	
No.2	15	Q	A1R28	202,109.90	163,229.50	5	
No.2	16	Q	A1R29	202,124.00	163,225.40	5	
No.2	17	Q	A1R30	202,136.90	163,220.00	5	
No.2	18	Q	A1R31	202,156.50	163,210.80	5	
No.2	19	Q	A1R32	202,183.60	163,204.40	5	
No.2	20	Q	S2R4	202,135.50	163,249.50	0	
No.2	21	Q	S2R5	202,149.00	163,225.50	0	
No.2	22	Q	S2R6	202,171.00	163,215.00	0	
No.2	23	Q	A2R6	202,153.90	163,256.80	5	
No.2	24	Q	A2R7	202,142.10	163,239.50	5	

CO-ORDINATES OF DUMPING LOCATIONS FOR MAIN TARGET AREA
FOR ABUTMENTS (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)

Target Area	No. of Order	Block No.	Point No.	Easting	Northing	No. of Loads	Remarks
No.2	25	Q	A2R8	202,162.60	163,230.10	5	
No.2	26	Q	A2R9	202,183.00	163,220.50	5	
No.2	1	R	S1L28	202,045.50	163,208.00	0	
No.2	2	R	S1L29	202,070.00	163,184.00	0	
No.2	3	R	S1L30	202,092.50	163,170.00	0	
No.2	4	R	S1L31	202,115.50	163,158.00	0	
No.2	5	R	S1L32	202,137.50	163,151.00	0	
No.2	6	R	S1L33	202,169.00	163,150.00	0	
No.2	7	R	A1L28	202,033.50	163,210.50	0	
No.2	8	R	A1L29	202,050.00	163,195.00	0	
No.2	9	R	A1L30	202,069.00	163,170.50	0	
No.2	10	R	A1L31	202,081.50	163,160.50	0	
No.2	11	R	A1L32	202,102.50	163,158.00	0	
No.2	12	R	A1L33	202,125.00	163,148.50	0	
No.2	13	R	A1L34	202,145.00	163,140.00	0	
No.2	14	R	A1L35	202,073.50	163,148.50	0	
No.3	1	S	S1R1	202,130.00	163,741.50	0	
No.3	2	S	S1R2	202,139.50	163,726.00	0	
No.3	3	S	S1R3	202,155.00	163,713.00	0	
No.3	4	S	S1R4	202,174.00	163,699.00	0	
No.3	5	S	S1R5	202,184.50	163,691.00	0	
No.3	6	S	S1R6	202,189.00	163,677.00	0	
No.3	7	S	A1R1	202,136.30	163,781.20	10	
No.3	8	S	A1R2	202,141.60	163,759.80	5	
No.3	9	S	A1R3	202,146.80	163,738.40	5	
No.3	10	S	A1R4	202,160.50	163,728.20	5	
No.3	11	S	A1R5	202,173.50	163,717.40	5	
No.3	12	S	A1R6	202,192.10	163,696.70	5	
No.3	13	S	S2R7	202,132.50	163,756.00	0	
No.3	14	S	S2R8	202,139.50	163,738.50	0	
No.3	15	S	S2R9	202,152.00	163,725.00	0	
No.3	16	S	S2R10	202,168.50	163,756.00	0	
No.3	1	T	S1L1	202,075.50	163,745.00	0	
No.3	2	T	S1L2	202,085.00	163,720.00	0	
No.3	3	T	S1L3	202,100.00	163,699.00	0	
No.3	4	T	S1L4	202,114.23	163,676.98	5	
No.3	5	T	S1L5	202,130.40	163,660.77	5	
No.3	6	T	S1L6	202,143.08	163,647.17	5	
No.3	7	T	A1L1	202,060.70	163,754.80	5	
No.3	8	T	A1L2	202,068.40	163,727.70	5	
No.3	9	T	A1L3	202,076.20	163,700.60	5	
No.3	10	T	A1L4	202,096.30	163,680.30	5	
No.3	11	T	A1L5	202,117.10	163,660.60	5	
No.3	12	T	A1L6	202,128.70	163,647.80	5	
No.3	13	T	S2L1	202,076.00	163,731.50	0	
No.3	14	T	S2L2	202,117.00	163,644.00	5	
No.3	15	T	S2L21	202,086.00	163,706.50	0	
No.3	16	T	S2L22	202,105.50	163,684.50	0	
No.3	17	T	S2L23	202,120.50	163,682.50	0	
No.3	18	T	A2L1	202,079.90	163,668.00	5	

CO-ORDINATES OF DUMPING LOCATIONS FOR MAIN TARGET AREA
FOR ABUTMENTS (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)

Target Area	No. of Order	Block No.	Point No.	Easting	Northing	No. of Loads	Remarks
No.3	19	T	A2L2	202,096.30	163,652.60	5	
No.3	20	T	A2L3	202,111.90	163,636.40	5	
No.3	21	T	S3L1	202,098.00	163,637.00	5	
No.3	22	T	A3L1	202,079.50	163,640.00	5	
No.3	23	T	A3L2	202,096.30	163,623.90	5	
No.3	24	T	S4L1	202,083.00	163,624.50	5	
No.3	25	T	A4L1	202,070.50	163,622.10	5	
No.3	26	T	S5L1	202,071.00	163,606.50	5	
No.3	27	T	A5L1	202,054.00	163,610.00	5	
No.3	1	U	DC1	202,093.20	163,789.90	5	
No.3	2	U	DC2	202,089.40	163,812.10	5	
No.3	3	U	DC3	202,090.60	163,837.10	5	
No.3	4	U	DM1	202,105.60	163,781.30	5	
No.3	5	U	DM2	202,100.20	163,803.20	5	
No.3	6	U	DM3	202,100.80	163,827.70	5	
No.3	7	U	DR1	202,112.60	163,794.60	5	
No.3	8	U	DR2	202,109.90	163,817.10	5	
No.3	9	U	DR3	202,110.00	163,841.90	5	
No.3	10	U	DSR1	202,125.00	163,786.00	5	
No.3	11	U	DSR2	202,121.30	163,808.30	5	
No.3	12	U	DSR3	202,121.00	163,830.00	5	
No.3	13	U	DAR1	202,131.00	163,799.00	10	
No.3	14	U	DAR2	202,130.00	163,818.00	10	
No.3	15	U	DAR3	202,126.00	163,845.00	10	
No.3	16	U	ADU1	202,102.90	163,792.30	5	
No.3	17	U	ADU2	202,115.30	163,783.70	5	
No.3	18	U	ADU3	202,110.80	163,805.80	5	
No.3	19	U	ADU4	202,123.20	163,797.20	5	
No.3	20	U	ADU5	202,095.10	163,819.90	5	
No.3	21	U	ADU6	202,100.50	163,815.50	5	
No.3	22	U	ADU7	202,120.00	163,817.50	5	
No.3	23	U	ADU8	202,110.90	163,828.80	5	
No.3	24	U	ADU9	202,100.30	163,839.50	5	
No.3	25	U	ADU10	202,118.00	163,843.50	5	
No.3	26	U	ADU11	202,136.00	163,804.00	2	
No.3	27	U	ADU12	202,126.00	163,767.00	2	
No.3	28	U	ADU13	202,084.00	163,835.50	5	
No.3	29	U	ADU14	202,086.50	163,813.00	5	
No.3	30	U	ADU15	202,089.00	163,790.00	5	
No.3	31	U	ADU16	202,100.00	163,769.50	5	
No.3	32	U	ADU17	202,104.00	163,746.00	5	
No.3	33	U	ADU18	202,110.00	163,841.50	10	
No.3	34	U	ADU19	202,115.00	163,822.00	10	
No.3	35	U	ADU20	202,114.00	163,802.00	10	
No.3	36	U	ADU21	202,124.50	163,786.00	10	
No.3	37	U	ADU22	202,129.00	163,767.00	10	
No.3	1	V	DL1	202,070.00	163,769.00	10	
No.3	2	V	DL2	202,064.50	163,788.00	10	
No.3	3	V	DL3	202,059.00	163,808.00	10	
No.3	4	V	DL4	202,053.00	163,827.00	10	

**CO-ORDINATES OF DUMPING LOCATIONS FOR MAIN TARGET AREA
FOR ABUTMENTS (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Target Area	No. of Order	Block No.	Point No.	Easting	Northing	No. of Loads	Remarks
No.3	5	V	DV1	202,064.50	163,756.00	10	
No.3	6	V	DV2	202,060.50	163,776.50	10	
No.3	7	V	DV3	202,054.50	163,796.00	10	
No.3	8	V	DV4	202,050.00	163,815.50	10	
No.3	9	V	DV5	202,055.50	163,765.50	10	
No.3	10	V	DV6	202,051.50	163,784.50	5	
No.3	11	V	DV7	202,044.00	163,802.00	5	
No.3	12	V	DV8	202,038.50	163,822.50	5	
No.3	13	V	DV9	202,041.50	163,749.00	5	
No.3	14	V	DV10	202,040.50	163,772.50	5	
No.3	15	V	DV11	202,040.50	163,792.00	5	
No.3	16	V	DV12	202,031.50	163,810.50	5	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
W	1	DL5	202,046.00	163,842.50	3	
W	2	DC5	202,066.00	163,853.00	3	
W	3	DR5	202,085.00	163,862.50	3	
W	4	DL6	202,038.50	163,853.00	3	
W	5	DC6	202,052.50	163,868.00	3	
W	6	DR6	202,066.00	163,882.00	3	
W	7	DL7	202,025.00	163,868.00	3	
W	8	DC7	202,039.00	163,882.00	3	
W	9	DR7	202,054.00	163,898.00	3	
W	10	DL8	202,010.00	163,881.50	3	
W	11	DC8	202,024.50	163,897.00	3	
W	12	DR8	202,039.00	163,912.50	3	
W	13	DL9	201,997.00	163,894.00	3	
W	14	DC9	202,008.00	163,910.00	3	
W	15	DR9	202,019.50	163,927.50	3	
W	16	DL10	201,981.50	163,901.50	3	
W	17	DC10	201,992.00	163,920.00	3	
W	18	DR10	202,001.50	163,938.00	3	
W	19	DL11	201,961.50	163,914.00	3	
W	20	DC11	201,975.00	163,931.00	3	
W	21	DR11	201,988.50	163,947.50	3	
W	22	DL12	201,944.50	163,932.00	3	
W	23	DC12	201,961.00	163,945.00	3	
W	24	DR12	201,976.00	163,957.50	3	
W	25	DL13	201,931.00	163,947.50	3	
W	26	DC13	201,947.00	163,959.00	3	
W	27	DR13	201,962.00	163,971.00	3	
W	28	DL14	201,915.50	163,969.50	3	
W	29	DC14	201,935.50	163,976.50	3	
W	30	DR14	201,955.00	163,983.00	3	
W	31	ADW1	202,071.00	163,896.50	3	
W	32	ADW2	202,080.00	163,900.00	3	
W	33	ADW3	202,089.00	163,903.50	3	
W	34	ADW4	202,097.50	163,908.00	3	
W	35	ADW5	202,106.00	163,913.00	3	
W	36	ADW6	202,113.50	163,918.00	3	
W	37	ADW7	202,121.00	163,925.00	3	
W	38	ADW8	202,127.50	163,932.00	3	
W	39	ADW9	202,135.00	163,940.00	0	
W	40	ADW10	202,143.50	163,946.00	0	
W	41	ADW11	202,081.50	163,890.00	0	
W	42	ADW12	202,079.50	163,906.50	0	
W	43	ADW13	202,098.00	163,897.50	0	
W	44	ADW14	202,091.00	163,916.00	0	

CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
W	45	ADW15	202,115.00	163,907.50	0	
W	46	ADW16	202,104.50	163,929.00	0	
W	47	ADW17	202,133.00	163,918.00	0	
W	48	ADW18	202,109.00	163,944.50	0	
W	49	ADW19	202,149.00	163,929.50	0	
W	50	WL1	202,010.50	163,803.50	1	
W	51	WL2	202,023.50	163,838.00	1	
W	52	WL3	202,008.50	163,824.50	1	
W	53	WL4	201,993.00	163,810.00	1	
W	54	WL6	202,011.50	163,853.50	1	
W	55	WL7	201,997.00	163,839.50	1	
W	56	WL8	201,981.50	163,824.50	1	
W	57	WL10	201,995.00	163,865.00	1	
W	58	WL11	201,982.00	163,850.50	1	
W	59	WL12	201,968.50	163,837.00	1	
W	60	WL14	201,982.00	163,878.50	1	
W	61	WL15	201,968.50	163,862.50	1	
W	62	WL16	201,957.00	163,848.50	1	
W	63	WL18	201,966.00	163,885.00	1	
W	64	WL19	201,954.00	163,871.50	1	
W	65	WL20	201,941.00	163,855.00	1	
W	66	WL22	201,949.00	163,898.00	1	
W	67	WL23	201,937.00	163,883.00	1	
W	68	WL24	201,924.00	163,867.00	1	
W	69	WL26	201,935.50	163,913.50	1	
W	70	WL27	201,922.50	163,899.00	1	
W	71	WL28	201,908.00	163,882.00	1	
W	72	WL30	201,920.00	163,927.00	1	
W	73	WL31	201,906.50	163,912.50	1	
W	74	WL32	201,894.50	163,898.00	1	
W	75	WL34	201,911.00	163,949.50	1	
W	76	WL35	201,898.50	163,935.50	1	
W	77	WL36	201,885.00	163,919.50	1	
W	78	WL37	201,873.00	163,905.00	1	
W	79	WL39	201,894.50	163,967.00	1	
W	80	WL40	201,886.00	163,950.00	1	
W	81	WL41	201,875.50	163,930.00	1	
W	82	WL42	201,867.50	163,915.00	1	
W	83	WR1	202,149.50	163,830.50	1	
W	84	WR2	202,165.00	163,838.00	1	
W	85	WR3	202,139.50	163,848.50	1	
W	86	WR4	202,156.00	163,855.50	1	
W	87	WR5	202,091.00	163,849.50	1	
W	88	WR6	202,109.00	163,857.50	2	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
W	89	WR7	202,129.50	163,865.00	2	
W	90	WR8	202,146.50	163,871.00	1	
W	91	WR9	202,103.00	163,871.50	1	
W	92	WR10	202,121.00	163,881.50	1	
W	93	WR11	202,138.50	163,889.50	1	
W	94	WR12	202,091.50	163,885.50	1	
W	95	WR13	202,110.50	163,895.00	1	
W	96	WR14	202,127.50	163,903.00	1	
W	97	WR16	202,067.50	163,912.50	1	
W	98	WR17	202,081.50	163,927.00	1	
W	99	WR18	202,095.50	163,941.00	1	
W	100	WR20	202,051.50	163,937.00	1	
W	101	WR21	202,065.50	163,941.50	1	
W	102	WR22	202,078.50	163,957.00	1	
W	103	WR24	202,032.50	163,942.50	1	
W	104	WR25	202,046.00	163,957.00	1	
W	105	WR26	202,059.00	163,971.50	1	
W	106	WR28	202,015.00	163,954.00	1	
W	107	WR29	202,028.00	163,968.50	1	
W	108	WR30	202,040.50	163,983.00	1	
W	109	WR32	202,001.50	163,963.00	1	
W	110	WR33	202,014.50	163,979.00	1	
W	111	WR34	202,026.50	163,994.00	1	
W	112	WR36	201,988.00	163,971.50	1	
W	113	WR37	202,005.00	163,987.50	1	
W	114	WR38	201,977.00	163,983.50	1	
W	115	WR39	201,992.50	163,996.00	1	
X	1	DL15	201,907.00	163,995.50	3	
X	2	DC15	201,929.50	163,996.50	3	
X	3	DR15	201,949.00	163,997.50	3	
X	4	DL16	201,900.00	164,016.50	3	
X	5	DC16	201,928.50	164,016.00	3	
X	6	DR16	201,948.50	164,015.00	3	
X	7	DL17	201,902.00	164,041.00	3	
X	8	DC17	201,927.00	164,036.50	3	
X	9	DR17	201,951.00	164,033.00	3	
X	10	DL18	201,910.00	164,068.50	3	
X	11	DC18	201,933.00	164,057.00	3	
X	12	DR18	201,956.00	164,045.50	3	
X	13	DL19	201,919.50	164,091.00	3	
X	14	DC19	201,943.00	164,074.50	5	
X	15	DR19	201,968.00	164,058.00	3	
X	16	DL20	201,935.00	164,112.00	15	
X	17	DC20	201,956.00	164,091.00	3	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
X	18	DR20	201,977.00	164,071.00	15	
X	19	DL21	201,949.00	164,127.50	10	
X	20	DC21	201,969.00	164,107.00	5	
X	21	DR21	201,988.00	164,086.50	10	
X	22	DL22	201,968.00	164,140.50	3	
X	23	DC22	201,984.00	164,121.00	3	
X	24	DR22	201,999.50	164,102.00	3	
X	25	DL23	201,985.50	164,152.50	3	
X	26	DC23	202,000.50	164,133.00	3	
X	27	DR23	202,015.00	164,113.00	3	
X	28	DL24	202,005.50	164,161.00	3	
X	29	DC24	202,018.00	164,143.50	5	
X	30	DR24	202,029.50	164,127.00	3	
X	31	ADX1	201,911.25	163,982.50	2	
X	32	ADX2	201,932.50	163,986.50	2	
X	33	ADX3	201,952.00	163,990.25	2	
X	34	ADX4	201,903.50	164,006.00	2	
X	35	ADX5	201,916.25	164,006.13	2	
X	36	ADX6	201,938.88	164,006.25	2	
X	37	ADX7	201,901.00	164,028.75	7	
X	38	ADX8	201,914.38	164,027.50	7	
X	39	ADX9	201,938.75	164,025.13	7	
X	40	ADX10	201,906.00	164,054.75	7	
X	41	ADX11	201,918.00	164,050.75	9	
X	42	ADX12	201,941.75	164,043.00	7	
X	43	ADX13	201,953.50	164,039.25	7	
X	44	ADX14	201,914.75	164,079.75	7	
X	45	ADX15	201,926.38	164,072.75	8	
X	46	ADX16	201,950.00	164,058.75	7	
X	47	ADX17	201,962.00	164,051.75	7	
X	48	ADX18	201,927.25	164,101.50	17	
X	49	ADX19	201,938.38	164,092.13	17	
X	50	ADX20	201,961.00	164,073.63	17	
X	51	ADX21	201,972.50	164,064.50	17	
X	52	ADX22	201,942.00	164,119.75	17	
X	53	ADX23	201,952.25	164,109.38	17	
X	54	ADX24	201,972.50	164,088.88	12	
X	55	ADX25	201,982.50	164,078.75	17	
X	56	ADX26	201,958.50	164,134.00	7	
X	57	ADX27	201,967.50	164,124.00	7	
X	58	ADX28	201,985.13	164,104.13	7	
X	59	ADX29	201,993.75	164,094.25	7	
X	60	ADX30	201,976.75	164,146.50	7	
X	61	ADX31	201,984.50	164,136.75	7	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
X	150	XL8	201,861.00	164,109.50	1	
X	151	XL10	201,902.00	164,103.00	1	
X	152	XL11	201,885.00	164,114.50	1	
X	153	XL12	201,868.00	164,125.50	1	
X	154	XL13	201,904.50	164,119.50	1	
X	155	XL14	201,887.50	164,132.50	1	
X	156	XL15	201,872.50	164,145.00	1	
X	157	XL16	201,913.00	164,133.50	1	
X	158	XL17	201,899.00	164,146.50	1	
X	159	XL18	201,884.00	164,162.00	1	
X	160	XL20	201,954.50	164,156.50	1	
X	161	XL21	201,942.50	164,172.00	1	
X	162	XL22	201,930.00	164,187.50	1	
X	163	XL24	201,971.50	164,168.00	1	
X	164	XL25	201,960.00	164,184.00	1	
X	165	XL26	201,947.50	164,200.00	1	
X	166	XL27	201,991.00	164,178.00	2	
X	167	XL28	201,980.00	164,194.00	2	
X	168	XL29	201,967.50	164,210.00	1	
X	169	XR1	201,968.00	164,002.50	1	
X	170	XR2	201,969.00	164,014.00	1	
X	171	XR3	201,990.50	164,013.50	1	
X	172	XR4	202,009.00	164,013.00	1	
X	173	XR5	201,971.00	164,030.00	1	
X	174	XR6	201,992.00	164,027.00	1	
X	175	XR7	201,986.00	164,046.00	1	
X	176	XR8	202,004.00	164,034.50	1	
X	177	XR9	202,018.50	164,025.00	1	
X	178	XR10	202,026.00	164,097.00	3	
X	179	XR11	202,038.50	164,082.00	3	
X	180	XR12	202,050.00	164,067.00	1	
X	181	XR14	202,041.50	164,110.50	1	
X	182	XR15	202,052.50	164,095.00	1	
X	183	XR16	202,064.50	164,079.00	1	
X	184	AXR1	201,999.50	164,094.50	1	
X	185	AXR2	202,013.63	164,064.88	1	
X	186	AXR3	202,033.82	164,104.01	1	
X	187	AXR4	202,032.25	164,089.50	1	
Y	1	DL25	202,027.00	164,166.50	5	
Y	2	DC25	202,037.00	164,150.50	5	
Y	3	DR25	202,047.00	164,135.00	5	
Y	4	DL26	202,045.00	164,173.00	3	
Y	5	DC26	202,056.00	164,158.50	3	
Y	6	DR26	202,066.50	164,145.00	3	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
Y	7	DL27	202,061.00	164,186.00	3	
Y	8	DC27	202,071.00	164,172.50	3	
Y	9	DR27	202,081.00	164,158.50	3	
Y	10	DL28	202,079.00	164,196.00	3	
Y	11	DC28	202,088.00	164,182.50	3	
Y	12	DR28	202,096.00	164,170.00	3	
Y	13	DL29	202,094.00	164,207.00	3	
Y	14	DC29	202,103.50	164,195.00	3	
Y	15	DR29	202,112.50	164,182.50	3	
Y	16	DL30	202,111.50	164,217.50	3	
Y	17	DC30	202,120.00	164,205.50	3	
Y	18	DR30	202,130.00	164,193.00	3	
Y	19	DL31	202,125.00	164,232.00	3	
Y	20	DC31	202,135.00	164,219.00	3	
Y	21	DR31	202,145.00	164,206.00	3	
Y	22	DL32	202,141.00	164,245.00	3	
Y	23	DC32	202,151.00	164,230.50	3	
Y	24	DR32	202,162.00	164,216.00	3	
Y	25	DL33	202,157.00	164,257.00	3	
Y	26	DC33	202,166.50	164,244.00	3	
Y	27	DR33	202,177.00	164,229.50	3	
Y	28	DL34	202,171.00	164,271.50	3	
Y	29	DC34	202,183.00	164,255.50	3	
Y	30	DR34	202,194.50	164,239.50	3	
Y	31	ADY1	202,048.00	164,165.50	2	
Y	32	ADY2	202,054.50	164,175.50	5	
Y	33	ADY3	202,072.00	164,186.50	2	
Y	34	YL1	202,017.00	164,180.50	1	
Y	35	YL2	202,007.50	164,196.00	1	
Y	36	YL3	202,034.00	164,187.00	1	
Y	37	YL4	202,024.50	164,203.00	1	
Y	38	YL5	202,051.00	164,199.00	1	
Y	39	YL6	202,040.50	164,213.50	1	
Y	40	YL7	202,068.50	164,210.50	1	
Y	41	YL8	202,058.50	164,225.50	1	
Y	42	YL9	202,084.50	164,221.00	1	
Y	43	YL10	202,074.50	164,235.50	1	
Y	44	YL11	202,100.50	164,232.00	1	
Y	45	YL12	202,089.50	164,246.00	1	
Y	46	YL13	202,115.00	164,244.50	1	
Y	47	YL14	202,104.50	164,258.50	1	
Y	48	YL15	202,131.00	164,258.50	1	
Y	49	YL16	202,120.50	164,272.50	1	
Y	50	YL17	202,146.50	164,271.50	1	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
Y	51	YL18	202,136.00	164,286.00	1	
Y	52	YL19	202,160.50	164,285.00	1	
Y	53	YL20	202,150.00	162,299.50	1	
Y	54	YR1	202,057.50	164,120.00	3	
Y	55	YR2	202,069.00	164,105.50	1	
Y	56	YR3	202,077.00	164,129.50	1	
Y	57	YR4	202,088.00	164,114.50	1	
Y	58	YR5	202,092.50	164,141.50	1	
Y	59	YR6	202,103.00	164,126.50	1	
Y	60	YR7	202,107.50	164,152.50	1	
Y	61	YR8	202,118.00	164,138.00	1	
Y	62	YR9	202,124.00	164,165.00	1	
Y	63	YR10	202,135.00	164,150.50	1	
Y	64	YR11	202,141.00	164,177.50	1	
Y	65	YR12	202,151.50	164,163.00	1	
Y	66	YR13	202,156.00	164,190.00	1	
Y	67	YR14	202,167.00	164,175.50	1	
Y	68	YR15	202,171.00	164,203.00	1	
Y	69	YR16	202,182.00	164,187.50	1	
Y	70	YR17	202,187.00	164,215.00	1	
Y	71	YR18	202,197.50	164,200.00	1	
Y	72	YR19	202,203.00	164,227.50	1	
Y	73	YR20	202,213.50	164,213.00	1	
Y	74	AYR1	202,100.75	164,130.25	1	
Y	75	AYR2	202,100.38	164,130.13	1	
Y	76	AYR3	202,121.63	164,151.75	1	
Y	77	AYR4	202,113.13	164,145.50	1	
Y	78	AYR5	202,052.25	164,127.50	2	
Y	79	AYR6	202,056.75	164,140.00	2	
Z	1	DL35	202,186.50	164,284.00	1	
Z	2	DC35	202,197.00	164,270.00	1	
Z	3	DR35	202,208.00	164,255.50	1	
Z	4	DL36	202,204.50	164,293.50	1	
Z	5	DC36	202,212.50	164,282.50	1	
Z	6	DR36	202,221.00	164,271.00	1	
Z	7	DL37	202,221.50	164,304.50	1	
Z	8	DC37	202,230.00	164,292.50	1	
Z	9	DR37	202,240.00	164,279.00	1	
Z	10	DL38	202,237.50	164,320.00	1	
Z	11	DC38	202,248.00	164,303.00	1	
Z	12	DR38	202,258.00	164,286.00	1	
Z	13	DL39	202,255.00	164,330.00	1	
Z	14	DC39	202,266.00	164,310.50	1	
Z	15	DR39	202,277.00	164,291.00	1	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
Z	16	DL40	202,273.00	164,336.50	1	
Z	17	DC40	202,284.00	164,320.00	1	
Z	18	DR40	202,295.00	164,303.50	1	
Z	19	DL41	202,287.00	164,350.00	1	
Z	20	DC41	202,298.50	164,333.50	1	
Z	21	DR41	202,311.50	164,317.00	1	
Z	22	DL42	202,301.00	164,363.50	3	
Z	23	DC42	202,315.00	164,345.50	3	
Z	24	DR42	202,328.50	164,328.00	3	
Z	25	DL43	202,313.00	164,379.00	3	
Z	26	DC43	202,327.00	164,362.00	3	
Z	27	DR43	202,342.00	164,344.50	3	
AA	1	TL1	201,880.00	163,982.50	3	
AA	2	TC1	201,888.00	164,004.50	3	
AA	3	TR1	201,894.50	164,021.50	3	
AA	4	TL2	201,864.00	163,993.00	3	
AA	5	TC2	201,868.00	164,009.00	3	
AA	6	TR2	201,873.00	164,026.00	3	
AA	7	TL3	201,849.00	163,995.00	3	
AA	8	TC3	201,848.50	164,010.00	3	
AA	9	TR3	201,848.00	164,026.50	3	
AA	10	TL4	201,835.00	163,993.00	3	
AA	11	TC4	201,768.00	163,950.00	3	
AA	12	TR4	201,827.00	164,012.00	3	
AA	13	TL5	201,819.00	163,985.00	3	
AA	14	TC5	201,709.00	163,945.00	3	
AA	15	TR5	201,807.00	164,001.00	3	
AA	16	TL6	201,803.00	163,973.00	1	
AA	17	TR6	201,788.00	163,991.00	1	
AA	18	TL7	201,790.00	163,961.00	1	
AA	19	TR7	201,774.00	163,972.00	1	
AA	20	TL8	201,778.00	163,942.00	1	
AA	21	TR8	201,761.00	163,958.00	1	
AA	22	TL9	201,752.00	163,934.00	1	
AA	23	TR9	201,748.00	163,950.00	1	
AA	24	TL10	201,728.00	163,936.00	1	
AA	25	TR10	201,727.00	163,952.50	1	
AA	26	TRR10	201,712.00	163,964.00	1	
ADIT G	1	ADG1	202,235.00	163,719.00	10	
BB	1	DL44	202,323.00	164,386.00	3	
BB	2	DC44	202,334.50	164,370.00	3	
BB	3	DR44	202,346.00	164,355.00	3	
BB	4	DL45	202,330.50	164,403.50	3	
BB	5	DC45	202,349.50	164,383.50	3	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
BB	6	DR45	202,368.50	164,364.00	3	
BB	7	DL46	202,335.50	164,419.50	3	
BB	8	DC46	202,357.00	164,403.00	3	
BB	9	DR46	202,374.00	164,390.00	3	
BB	10	DRR46	202,394.50	164,374.00	3	
BB	11	DL47	202,342.00	164,438.50	3	
BB	12	DC47	202,364.50	164,422.00	3	
BB	13	DR47	202,387.00	164,406.00	3	
BB	14	DRR47	202,414.50	164,386.00	3	
BB	15	DL48	202,352.00	164,459.00	3	
BB	16	DC48	202,376.50	164,438.00	3	
BB	17	DR48	202,399.00	164,418.00	3	
BB	18	DRR48	202,422.00	164,398.50	3	
BB	19	DL49	202,366.00	164,473.00	3	
BB	20	DC49	202,391.00	164,452.00	3	
BB	21	DR49	202,409.50	164,436.50	3	
BB	22	DRR49	202,433.00	164,417.50	3	
BB	23	DL50	202,378.00	164,485.50	3	
BB	24	DC50	202,403.00	164,468.00	3	
BB	25	DR50	202,421.00	164,456.00	3	
BB	26	DRR50	202,435.50	164,445.50	3	
BB	27	DL51	202,391.00	164,499.00	3	
BB	28	DC51	202,413.50	164,485.50	3	
BB	29	DR51	202,433.50	164,473.50	3	
BB	30	SD1	202,353.50	164,394.20	1	
BB	31	SD2	202,338.50	164,404.50	1	
CC	1	BL1	202,290.00	164,774.00	1	
CC	2	BC1	202,291.50	164,750.50	1	
CC	3	BR1	202,292.50	164,727.50	1	
CC	4	BL2	202,266.00	164,776.00	1	
CC	5	BC2	202,272.00	164,745.50	1	
CC	6	BR2	202,277.00	164,722.00	1	
CC	7	BLL3	202,241.00	164,777.50	1	
CC	8	BL3	202,246.50	164,759.00	1	
CC	9	BC3	202,253.00	164,740.50	1	
CC	10	BR3	202,261.00	164,716.50	1	
CC	11	BLL4	202,219.00	164,763.50	1	
CC	12	BL4	202,227.00	164,747.50	1	
CC	13	BC4	202,234.00	164,733.00	1	
CC	14	BR4	202,245.00	164,710.50	1	
CC	15	BL5	202,203.00	164,749.50	1	
CC	16	BC5	202,216.00	164,724.00	1	
CC	17	BR5	202,226.00	164,705.00	1	
CC	18	BL6	202,183.00	164,735.00	1	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
CC	19	BC6	202,198.00	164,715.00	1	
CC	20	BR6	202,213.00	164,696.50	1	
CC	21	BL7	202,166.50	164,720.50	1	
CC	22	BC7	202,181.50	164,702.50	1	
CC	23	BR7	202,204.00	164,675.00	1	
CC	24	BL8	202,148.50	164,706.00	1	
CC	25	BC8	202,165.50	164,690.50	1	
CC	26	BR8	202,182.00	164,676.00	1	
CC	27	BRR8	202,198.00	164,662.00	1	
CC	28	BL9	202,130.00	164,683.00	1	
CC	29	BC9	202,157.00	164,673.00	1	
CC	30	BL10	202,125.50	164,657.50	1	
CC	31	BC10	202,155.00	164,653.00	1	
CC	32	BR10	202,192.00	164,647.50	1	
DD	1	BL11	202,123.00	164,638.50	1	
DD	2	BC11	202,153.00	164,633.00	1	
DD	3	BR11	202,183.00	164,627.50	1	
DD	4	BL12	202,120.50	164,599.50	1	
DD	5	BC12	202,149.00	164,613.00	1	
DD	6	BR12	202,175.00	164,607.00	1	
DD	7	BL13	202,118.00	164,619.50	1	
DD	8	BC13	202,145.00	164,593.50	1	
DD	9	BR13	202,166.50	164,588.00	1	
DD	10	BL14	202,115.50	164,581.50	1	
DD	11	BC14	202,138.00	164,574.50	1	
DD	12	BR14	202,157.50	164,568.50	1	
DD	13	BL15	202,113.50	164,567.00	1	
DD	14	BC15	202,131.50	164,557.00	1	
DD	15	BR15	202,149.00	164,547.50	1	
DD	16	BL16	202,103.50	164,560.00	2	
DD	17	BC16	202,117.50	164,543.50	2	
DD	18	BR16	202,130.00	164,528.00	2	
DD	19	BL17	202,088.00	164,547.00	2	
DD	20	BC17	202,099.00	164,532.00	2	
DD	21	BR17	202,110.00	164,517.00	2	
DD	22	BL18	202,074.00	164,535.00	2	
DD	23	BC18	202,082.50	164,521.00	2	
DD	24	BR18	202,091.00	164,507.00	2	
EE	1	BL19	202,061.00	164,532.00	2	
EE	2	BC19	202,062.00	164,515.00	2	
EE	3	BR19	202,063.00	164,500.00	2	
EE	4	BL20	202,045.50	164,535.00	2	
EE	5	BC20	202,042.50	164,518.50	2	
EE	6	BR20	202,040.00	164,505.00	2	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
EE	7	BL21	202,025.50	164,538.50	2	
EE	8	BR21	202,020.00	164,509.00	2	
EE	9	BL22	202,006.00	164,542.00	2	
EE	10	BR22	202,000.50	164,512.00	2	
EE	11	BL23	201,986.00	164,545.50	2	
EE	12	BR23	201,980.00	164,516.50	2	
EE	13	BL24	201,966.50	164,549.50	2	
EE	14	BR24	201,961.00	164,520.00	2	
EE	15	BL25	201,946.00	164,553.00	2	
EE	16	BR25	201,941.00	164,524.00	2	
EE	17	BL26	201,926.00	164,556.50	2	
EE	18	BR26	201,921.00	164,528.50	2	
EE	19	BL27	201,905.00	164,560.50	2	
EE	20	BR27	201,899.00	164,532.50	2	
FF	1	CA1	202,457.00	164,467.00	2	
FF	2	CA2	202,471.00	164,453.00	2	
FF	3	CA3	202,460.50	164,442.50	2	
FF	4	CA4	202,450.00	164,432.00	2	
FF	5	CA5	202,485.00	164,439.50	2	
FF	6	CA6	202,475.00	164,428.50	2	
FF	7	CA7	202,464.00	164,418.00	2	
FF	8	CA8	202,500.00	164,425.00	2	
FF	9	CA9	202,489.00	164,414.00	2	
FF	10	CA10	202,479.00	164,404.50	2	
FF	11	CA11	202,514.00	164,409.50	2	
FF	12	CA12	202,503.00	164,400.00	2	
FF	13	CA13	202,492.00	164,390.00	2	
FF	14	CA14	202,527.00	164,392.50	2	
FF	15	CA15	202,515.00	164,384.00	2	
FF	16	CA16	202,504.00	164,375.50	2	
FF	17	CA17	202,539.00	164,376.50	2	
FF	18	CA18	202,527.00	164,367.50	2	
FF	19	CA19	202,515.00	164,359.50	2	
FF	20	CA20	202,551.00	164,360.50	2	
FF	21	CA21	202,538.50	164,351.50	2	
FF	22	CA22	202,526.50	164,342.50	2	
FF	23	CA23	202,562.00	164,344.00	2	
FF	24	CA24	202,550.00	164,335.00	2	
FF	25	CA25	202,538.50	164,326.50	2	
FF	26	CA26	202,573.50	164,327.00	2	
FF	27	CA27	202,562.00	164,319.00	2	
FF	28	CA28	202,549.50	164,310.00	2	
FF	29	CA29	202,585.00	164,311.00	2	
FF	30	CA30	202,573.50	164,303.00	2	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
FF	31	CA31	202,561.00	164,293.50	2	
FF	32	CA32	202,596.50	164,295.50	2	
FF	33	CA33	202,585.00	164,287.00	2	
FF	34	CA34	202,572.50	164,277.50	2	
GG	1	BL28	201,358.50	164,689.00	2	
GG	2	BC28	201,374.50	164,667.50	2	
GG	3	BR28	201,391.00	164,645.50	2	
GG	4	BL29	201,347.00	164,679.00	2	
GG	5	BC29	201,355.50	16,458.00	2	
GG	6	BR29	201,363.50	164,637.00	2	
GG	7	BL30	201,331.00	164,675.00	2	
GG	8	BC30	201,337.00	164,652.00	2	
GG	9	BR30	201,343.00	164,629.00	2	
GG	10	BL31	201,313.00	164,674.50	2	
GG	11	BC31	201,315.50	164,654.50	2	
GG	12	BR31	201,319.00	164,632.50	2	
GG	13	BL32	201,296.50	164,680.00	2	
GG	14	BC32	201,294.50	164,662.00	2	
GG	15	BR32	201,292.00	164,644.00	2	
GG	16	BL33	201,277.50	164,685.50	2	
GG	17	BC33	201,274.00	164,666.00	2	
GG	18	BR33	201,270.00	164,646.00	2	
GG	19	BL34	201,258.00	164,693.00	2	
GG	20	BC34	201,254.50	164,673.00	2	
GG	21	BR34	201,250.50	164,651.00	2	
GG	22	BL35	201,238.50	164,699.00	2	
GG	23	BC35	201,235.00	164,677.00	2	
GG	24	BR35	201,231.50	164,655.50	2	
GG	25	BL36	201,212.50	164,697.50	2	
GG	26	BC36	201,214.50	164,676.00	2	
GG	27	BR36	201,216.00	164,654.00	2	
GG	28	BL37	201,190.50	164,692.00	2	
GG	29	BC37	201,194.00	164,672.00	2	
GG	30	BR37	201,197.00	164,652.00	2	
HH	1	BL38	201,169.00	164,688.00	2	
HH	2	BC38	201,174.00	164,668.00	2	
HH	3	BR38	201,178.50	164,648.00	2	
HH	4	BL39	201,151.00	164,682.00	2	
HH	5	BC39	201,155.00	164,662.00	2	
HH	6	BR39	201,159.00	164,643.00	2	
HH	7	BL40	201,132.00	164,676.50	2	
HH	8	BC40	201,130.00	164,657.00	2	
HH	9	BR40	201,139.50	164,638.00	2	
HH	10	BL41	201,112.50	164,672.00	2	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
HH	11	BC41	201,116.00	164,653.50	2	
HH	12	BR41	201,120.00	164,633.50	2	
HH	13	BL42	201,093.50	164,672.50	2	
HH	14	BC42	201,094.50	164,652.50	2	
HH	15	BR42	201,096.00	164,633.00	2	
HH	16	BL43	201,073.50	164,670.00	2	
HH	17	BC43	201,074.50	164,649.50	2	
HH	18	BR43	201,075.50	164,630.50	2	
HH	19	BL44	201,053.50	164,666.00	2	
HH	20	BC44	201,054.50	164,644.50	2	
HH	21	BR44	201,054.50	164,625.50	2	
HH	22	BLL45	201,032.50	164,681.50	2	
HH	23	BL45	201,033.50	164,661.50	2	
HH	24	BC45	201,034.50	164,642.00	2	
HH	25	BR45	201,035.50	164,623.00	2	
HH	26	BLL46	201,012.50	164,682.00	2	
HH	27	BL46	201,013.50	164,662.00	2	
HH	28	BC46	201,014.50	164,642.00	2	
HH	29	BR46	201,015.00	164,622.00	2	
HH	30	BL47	200,991.00	164,660.00	2	
HH	31	BC47	200,993.50	164,640.00	2	
HH	32	BR47	200,995.50	164,619.00	2	
II	1	2L13	202,206.00	163,152.00	1	
II	2	2C13	202,206.00	163,172.00	1	
II	3	2R13	202,206.00	163,192.00	1	
II	4	2L14	202,225.00	163,152.00	1	
II	5	2C14	202,226.00	163,172.00	1	
II	6	2R14	202,226.00	163,192.00	1	
II	7	2LL15	202,246.50	163,138.00	1	
II	8	2L15	202,246.00	163,153.00	1	
II	9	2C15	202,246.00	163,172.50	1	
II	10	2R15	202,245.50	163,193.00	1	
II	11	2LL16	202,267.00	163,133.50	1	
II	12	2L16	202,266.00	163,153.50	1	
II	13	2C16	202,266.00	163,173.50	1	
II	14	2R16	202,265.50	163,193.50	1	
II	15	2LL17	202,286.50	163,134.50	1	
II	16	2L17	202,286.00	163,154.00	1	
II	17	2C17	202,285.50	163,174.00	1	
II	18	2R17	202,285.50	163,194.50	1	
II	19	2LL18	202,307.00	163,135.00	1	
II	20	2L18	202,306.50	163,155.00	1	
II	21	2C18	202,306.00	163,175.00	1	
II	22	2R18	202,305.00	163,195.00	1	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
II	23	2LL19	202,322.00	163,136.00	1	
II	24	2L19	202,324.00	163,156.50	1	
II	25	2C19	202,326.00	163,176.50	1	
II	26	2R19	202,327.50	163,196.00	1	
II	27	2LL20	202,334.00	163,133.50	1	
II	28	2L20	202,339.50	163,153.50	1	
II	29	2C20	202,345.00	163,176.50	1	
II	30	2R20	202,350.00	163,191.00	1	
II	31	2LL21	202,348.00	163,129.00	0	
II	32	2L21	202,356.00	163,147.50	1	
II	33	2C21	202,363.50	163,165.50	1	
II	34	2R21	202,371.00	163,184.00	1	
II	35	2LL22	202,359.00	163,123.50	0	
II	36	2L22	202,370.50	163,139.50	1	
II	37	2C22	202,380.50	163,156.00	1	
II	38	2R22	202,391.50	163,172.50	1	
II	39	2LL23	202,367.50	163,113.50	0	
II	40	2L23	202,380.50	163,127.50	1	
II	41	2C23	202,394.50	163,141.50	1	
II	42	2R23	202,409.00	163,155.50	1	
II	43	2LL24	202,375.00	163,102.50	0	
II	44	2L24	202,390.50	163,114.00	1	
II	45	2C24	202,407.50	163,125.00	1	
II	46	2R24	202,423.50	163,136.50	1	
II	47	2LL25	202,378.00	163,091.50	0	
II	48	2L25	202,396.00	163,099.50	1	
II	49	2C25	202,415.00	163,106.50	1	
II	50	2R25	202,433.50	163,114.00	1	
JJ	1	TL11	201,686.00	163,944.00	1	
JJ	2	TC11	201,691.50	163,955.00	1	
JJ	3	TR11	201,700.00	163,972.00	1	
JJ	4	TL12	201,665.00	163,953.00	1	
JJ	5	TC12	201,674.50	163,965.00	1	
JJ	6	TR12	201,683.50	163,978.50	1	
JJ	7	TL13	201,645.50	163,962.00	1	
JJ	8	TC13	201,658.00	163,977.00	1	
JJ	9	TR13	201,670.00	163,991.00	1	
JJ	10	TL14	201,630.00	163,977.00	1	
JJ	11	TC14	201,643.00	163,990.00	1	
JJ	12	TR14	201,655.50	164,003.00	1	
JJ	13	TL15	201,615.00	163,990.50	1	
JJ	14	TC15	201,629.00	164,005.00	1	
JJ	15	TR15	201,642.00	164,018.00	1	
JJ	16	TL16	201,601.00	164,004.00	1	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
JJ	17	TC16	201,615.00	164,019.00	1	
JJ	18	TR16	201,628.50	164,033.50	1	
JJ	19	TL17	201,593.50	164,013.00	1	
JJ	20	TC17	201,600.00	164,032.00	1	
JJ	21	TR17	201,606.00	164,051.00	1	
JJ	22	TRR17	201,611.00	164,071.00	1	
JJ	23	TC18	201,580.00	164,030.00	1	
JJ	24	TR18	201,574.50	164,048.50	1	
JJ	25	TL19	201,582.00	164,005.00	1	
JJ	26	TC19	201,565.00	164,016.00	1	
JJ	27	TR19	201,550.00	164,027.00	1	
JJ	28	TL20	201,571.00	163,988.00	1	
JJ	29	TC20	201,554.50	163,999.00	1	
JJ	30	TR20	201,538.00	164,010.50	1	
KK	1	TLL21	201,569.50	163,962.00	1	
KK	2	TL21	201,557.00	163,972.50	1	
KK	3	TC21	201,543.00	163,983.00	1	
KK	4	TR21	201,527.00	163,995.00	1	
KK	5	TLL22	201,547.50	163,932.50	1	
KK	6	TL22	201,538.50	163,950.50	1	
KK	7	TC22	201,530.50	163,967.00	1	
KK	8	TR22	201,521.00	163,984.50	1	
KK	9	TLL23	201,516.50	163,922.00	1	
KK	10	TL23	201,514.50	163,940.00	1	
KK	11	TC23	201,511.50	163,960.00	1	
KK	12	TR23	201,509.00	163,980.00	1	
KK	13	TL24	201,488.00	163,940.00	1	
KK	14	TC24	201,492.50	163,960.00	1	
KK	15	TR24	201,496.50	163,980.00	1	
KK	16	TLL25	201,460.50	163,930.50	1	
KK	17	TL25	201,467.50	163,949.00	1	
KK	18	TC25	201,474.50	163,968.00	1	
KK	19	TR25	201,481.00	163,985.00	1	
KK	20	TLL26	201,437.50	163,939.00	1	
KK	21	TL26	201,446.50	163,957.00	1	
KK	22	TC26	201,455.50	163,975.00	1	
KK	23	TR26	201,464.00	163,993.00	1	
KK	24	TL27	201,428.50	163,967.50	1	
KK	25	TC27	201,438.50	163,985.00	1	
KK	26	TR27	201,448.00	164,002.00	1	
KK	27	TL28	201,412.00	163,977.00	1	
KK	28	TC28	201,421.50	163,995.00	1	
KK	29	TR28	201,430.50	164,012.50	1	
KK	30	TL29	201,395.00	163,987.50	1	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
KK	31	TC29	201,404.00	164,005.50	1	
KK	32	TR29	201,413.00	164,023.00	1	
KK	33	TL30	201,376.50	163,996.00	1	
KK	34	TC30	201,385.50	164,014.00	1	
KK	35	TR30	201,394.50	164,031.50	1	
LL	1	TL31	201,358.00	164,004.00	1	
LL	2	TC31	201,367.50	164,022.00	1	
LL	3	TR31	201,376.50	164,039.50	1	
LL	4	TL32	201,342.50	164,014.00	1	
LL	5	TC32	201,350.50	164,032.00	1	
LL	6	TR32	201,358.50	164,050.00	1	
LL	7	TLL33	201,325.50	164,002.00	1	
LL	8	TL33	201,328.50	164,019.50	1	
LL	9	TC33	201,332.00	164,039.50	1	
LL	10	TR33	201,335.00	164,059.00	1	
LL	11	TC34	201,311.50	164,039.50	1	
LL	12	TR34	201,304.50	164,058.50	1	
LL	13	TL35	201,313.00	164,014.00	1	
LL	14	TC35	201,296.00	164,026.00	1	
LL	15	TR35	201,280.00	164,037.50	1	
LL	16	TL36	201,309.00	164,001.00	1	
LL	17	TC36	201,289.50	164,007.00	1	
LL	18	TR36	201,271.00	164,013.00	1	
LL	19	TL37	201,304.00	163,984.00	1	
LL	20	TC37	201,284.50	163,987.50	1	
LL	21	TR37	201,265.50	163,992.00	1	
LL	22	TL38	201,300.00	163,963.50	1	
LL	23	TC38	201,280.00	163,968.00	1	
LL	24	TR38	201,261.00	163,972.50	1	
LL	25	TL39	201,297.00	163,944.00	1	
LL	26	TC39	201,277.50	163,948.00	1	
LL	27	TR39	201,258.50	163,952.50	1	
LL	28	TL40	201,294.00	163,922.00	1	
LL	29	TC40	201,275.00	163,928.00	1	
LL	30	TR40	201,256.00	163,934.50	1	
MM	1	TL41	201,286.50	163,898.00	1	
MM	2	TC41	201,269.00	163,908.50	1	
MM	3	TR41	201,252.00	163,918.50	1	
MM	4	TL42	201,272.50	163,879.00	1	
MM	5	TC42	201,257.50	163,892.00	1	
MM	6	TR42	201,242.50	163,905.00	1	
MM	7	TL43	201,257.50	163,862.00	1	
MM	8	TC43	201,244.50	163,877.50	0	
MM	9	TR43	201,231.00	163,892.50	0	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
MM	10	TL44	201,239.50	163,848.50	0	
MM	11	TC44	201,229.00	163,865.00	0	
MM	12	TR44	201,218.50	163,882.00	0	
MM	13	TL45	201,220.00	163,837.50	0	
MM	14	TC45	201,211.50	163,856.00	0	
MM	15	TR45	201,202.50	163,873.50	0	
MM	16	TL46	201,201.50	163,829.00	0	
MM	17	TC46	201,192.50	163,847.00	0	
MM	18	TR46	201,183.50	163,865.00	0	
MM	19	TL47	201,184.50	163,821.50	0	
MM	20	TC47	201,174.00	163,839.00	0	
MM	21	TR47	201,163.50	163,856.00	0	
MM	22	TL48	201,167.50	163,811.00	0	
MM	23	TC48	201,157.50	163,828.00	0	
MM	24	TR48	201,147.00	163,844.50	0	
MM	25	TL49	201,150.00	163,801.50	0	
MM	26	TC49	201,140.00	163,817.00	0	
MM	27	TR49	201,130.00	163,833.00	0	
MM	28	TL50	201,128.50	163,798.00	0	
MM	29	TR50	201,118.00	163,815.00	0	
MM	30	TL51	201,112.00	163,786.50	0	
MM	31	TR51	201,102.00	163,804.00	0	
MM	32	TC52	201,090.00	163,785.50	0	
OO	1	MR1	202,153.00	163,805.00	1	
OO	2	MR2	202,172.00	163,810.00	1	
OO	3	MR3	202,151.50	163,784.00	1	
OO	4	MR4	202,165.00	163,788.50	1	
OO	5	MR5	202,175.00	163,792.50	1	
OO	6	MR6	202,157.00	163,764.00	1	
OO	7	MR7	202,172.00	163,771.00	1	
OO	8	MR8	202,184.00	163,776.00	1	
OO	9	MR9	202,163.00	163,743.50	1	
OO	10	MR10	202,180.00	163,753.00	1	
OO	11	MR11	202,192.50	163,760.00	1	
OO	12	MR12	202,185.00	163,731.50	1	
OO	13	MR13	202,195.50	163,740.00	1	
OO	14	MR14	202,204.00	163,748.00	1	
OO	15	MR15	202,199.00	163,716.00	1	
OO	16	MR16	202,211.50	163,728.00	1	
OO	17	MR17	202,221.00	163,738.00	1	
OO	18	MR18	202,215.00	163,701.00	1	
OO	19	MR19	202,227.50	163,716.00	1	
OO	20	MR20	202,240.00	163,730.00	1	
OO	21	MR21	202,232.00	163,689.00	1	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
OO	22	MR22	202,245.00	163,705.00	1	
OO	23	MR23	202,257.50	163,721.50	1	
OO	24	MR24	202,252.00	163,681.00	1	
OO	25	MR25	202,262.50	163,697.50	1	
OO	26	MR26	202,212.00	163,715.00	1	
OO	27	MR27	202,261.50	163,664.00	1	
OO	28	MR28	202,274.00	163,679.50	1	
OO	29	MR29	202,288.00	163,695.00	1	
OO	30	MR30	202,268.50	163,647.50	1	
PP	1	MR31	202,284.00	163,661.00	1	
PP	2	MR32	202,298.00	163,674.50	1	
PP	3	MR33	202,313.00	163,688.00	1	
PP	4	MR34	202,275.50	163,631.00	1	
PP	5	MR35	202,290.50	163,642.50	1	
PP	6	MR36	202,318.00	163,655.50	1	
PP	7	MR37	202,279.50	163,609.50	1	
PP	8	MR38	202,296.50	163,621.00	1	
PP	9	MR39	202,313.00	163,632.50	1	
PP	10	MR40	202,330.00	163,644.00	1	
PP	11	MR41	202,292.00	163,596.50	1	
PP	12	MR42	202,309.50	163,606.50	1	
PP	13	MR43	202,327.00	163,617.00	1	
PP	14	MR44	202,344.50	163,628.00	1	
PP	15	MR45	202,312.50	163,590.50	1	
PP	16	MR46	202,331.50	163,594.50	1	
PP	17	MR47	202,347.50	163,598.50	1	
PP	18	MR48	202,294.00	163,573.50	1	
PP	19	MR49	202,313.00	163,573.50	1	
PP	20	MR50	202,334.00	163,574.00	1	
PP	21	MR51	202,297.00	163,553.50	1	
PP	22	MR52	202,317.00	163,553.50	1	
PP	23	MR54	202,315.00	163,532.00	1	
PP	24	MR55	202,334.00	163,536.00	1	
PP	25	MR56	202,319.00	163,513.00	1	
PP	26	MR57	202,338.50	163,517.00	1	
PP	27	MR58	202,353.00	163,520.00	1	
PP	28	MR59	202,321.00	163,500.00	1	
PP	29	MR60	202,341.00	163,499.00	1	
PP	30	MR61	202,360.00	163,498.00	1	
QQ	1	MR62	202,355.50	163,484.50	1	
QQ	2	MR63	202,354.50	163,478.00	1	
QQ	3	MR64	202,314.50	163,482.50	1	
QQ	4	MR65	202,328.00	163,471.50	1	
QQ	5	MR66	202,343.00	163,460.50	1	

**CO-ORDINATES OF DUMPING LOCATIONS FOR DOWNSTREAM
OF MAIN TARGET AREA (since 27.03.98 until 02.01.99 under KHK JV's CONTRACT)**

Block	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
QQ	6	MR67	202,298.50	163,480.00	1	
QQ	7	MR68	202,308.50	163,462.50	1	
QQ	8	MR69	202,276.50	163,482.00	1	
QQ	9	MR70	202,287.00	163,464.50	1	
QQ	10	MR71	202,252.00	163,488.50	1	
QQ	11	MR72	202,263.00	163,472.00	1	
QQ	12	MR73	202,274.50	163,456.00	1	
QQ	13	MR74	202,248.00	163,457.50	1	
QQ	14	MR75	202,262.50	163,443.00	1	
QQ	15	MR76	202,245.50	163,432.50	1	
QQ	16	MR77	202,260.00	163,419.50	1	
QQ	17	MR78	202,240.00	163,411.50	1	
QQ	18	MR79	202,232.00	163,392.00	1	
QQ	19	MR80	202,228.50	163,371.00	1	
QQ	20	MR81	202,217.00	163,355.00	1	
QQ	21	MR82	202,206.50	163,337.00	1	
QQ	22	MR83	202,195.00	163,319.50	1	
QQ	23	MR84	202,181.50	163,302.50	1	
QQ	24	MR85	202,197.00	163,293.50	1	
QQ	25	MR86	202,170.00	163,281.00	1	
QQ	26	MR87	202,190.50	163,275.50	1	
QQ	27	MR88	202,171.00	163,261.50	1	
QQ	28	MR89	202,188.00	163,260.00	1	
QQ	29	MR90	202,179.00	163,240.50	1	
QQ	30	MR91	202,191.00	163,233.50	1	
QQ	31	MR92	202,197.00	163,247.50	1	
QQ	32	MR93	202,204.50	163,230.50	1	

**CO-ORDINATES OF DUMPING LOCATIONS FOR SUSPECTED AREAS
UNDER LOCAL CONTRACT (since 10 May 1999 upto 19.06.99)**

Block No.	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
Block-1	1	U1C1	202,412.00	163,078.00	1	
Block-1	2	U1C2	202,411.00	163,053.00	1	
Block-1	3	U1C3	202,405.00	163,029.00	1	
Block-1	4	U1C4	202,394.00	163,005.00	1	
Block-1	5	U1L1	202,392.00	163,077.00	1	
Block-1	6	U1L2	202,391.00	163,058.00	1	
Block-1	7	U1L3	202,387.00	163,038.00	1	
Block-1	8	U1L4	202,377.00	163,015.00	1	
Block-1	9	U1R1	202,432.00	163,080.00	1	
Block-1	10	U1R2	202,431.00	163,050.00	1	
Block-1	11	U1R3	202,423.00	163,019.00	1	
Block-1	12	U1R4	202,412.00	162,996.00	1	
Block-2	1	U2C1	202,250.00	162,521.00	1	
Block-2	2	U2C2	202,228.00	162,507.00	1	
Block-2	3	U2C3	202,208.00	162,493.00	1	
Block-2	4	U2C4	202,188.00	162,477.00	1	
Block-2	5	U2C5	202,174.00	162,455.00	1	
Block-2	6	U2R1	202,239.00	162,538.00	1	
Block-2	7	U2R2	202,217.00	162,523.00	1	
Block-2	8	U2R3	202,193.00	162,510.00	1	
Block-2	9	U2R4	202,177.00	162,493.00	1	
Block-2	10	U2R5	202,163.00	162,473.00	1	
Block-2	11	U2R6	202,153.00	162,450.00	1	
Block-2	12	U2L1	202,260.00	162,504.00	1	
Block-2	13	U2L2	202,239.00	162,490.00	1	
Block-2	14	U2L3	202,218.00	162,477.00	1	
Block-2	15	U2L4	202,200.00	162,461.00	1	
Block-3	1	U3C1	202,370.00	162,150.00	1	
Block-3	2	U3C2	202,393.00	162,139.00	1	
Block-3	3	U3C3	202,414.00	162,126.00	1	
Block-3	4	U3C4	202,437.00	162,115.00	1	
Block-3	5	U3C5	202,461.00	162,108.00	1	
Block-3	6	U3C6	202,486.00	162,103.00	1	
Block-3	7	U3C7	202,509.00	162,094.00	1	
Block-3	8	U3R1	202,378.00	162,168.00	1	
Block-3	9	U3R2	202,401.00	162,157.00	1	
Block-3	10	U3R3	202,422.00	162,145.00	1	
Block-3	11	U3R4	202,445.00	162,134.00	1	
Block-3	12	U3R5	202,463.00	162,127.00	1	
Block-3	13	U3R6	202,493.00	162,122.00	1	
Block-3	14	U3R7	202,516.00	162,112.00	1	
Block-3	15	U3L1	202,349.00	162,132.00	1	
Block-3	16	U3L2	202,385.00	162,120.00	1	
Block-3	17	U3L3	202,407.00	162,108.00	1	

**CO-ORDINATES OF DUMPING LOCATIONS FOR SUSPECTED AREAS
UNDER LOCAL CONTRACT (since 10 May 1999 upto 19.06.99)**

Block No.	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
Block-3	18	U3L4	202,429.00	162,097.00	1	
Block-3	19	U3L5	202,453.00	162,090.00	1	
Block-3	20	U3L6	202,478.00	162,085.00	1	
Block-3	21	U3L7	202,501.00	162,076.00	1	
Block-3	22	U3LL1	202,339.00	162,108.00	1	
Block-3	23	U3LL2	202,376.00	162,096.00	1	
Block-3	24	U3LL3	202,399.00	162,085.00	1	
Block-3	25	U3LL4	202,421.00	162,074.00	1	
Block-3	26	U3LL5	202,440.00	162,062.00	1	
Block-3	27	U3LL6	202,464.00	162,049.00	1	
Block-3	28	U3LL7	202,485.00	162,036.00	1	
K	1	3KL1	202,125.00	163,512.00	0	
K	2	3KL2	202,109.00	163,511.00	0	
K	3	3KL3	202,088.00	163,511.00	0	
K	4	3KL4	202,067.00	163,512.00	0	
K	5	3KL5	202,048.00	163,512.00	0	
K	6	3KL6	202,027.00	163,512.00	0	
K	7	3KL7	202,125.00	163,530.00	0	
K	8	3KL8	202,108.00	163,530.00	0	
K	9	3KL9	202,087.00	163,531.00	0	
K	10	3KL10	202,069.00	163,532.00	0	
K	11	3KL11	202,048.00	163,532.00	0	
K	12	3KL12	202,029.00	163,533.00	0	
K	13	3KL13	202,009.00	163,533.00	0	
K	14	3KL14	201,988.00	163,534.00	0	
K	15	3KL15	202,069.00	163,550.00	0	
K	16	3KL16	202,049.00	163,552.00	0	
K	17	3KL17	202,029.00	163,553.00	0	
K	18	3KL18	202,009.00	163,554.00	0	
K	19	3KL19	201,988.00	163,554.00	0	
K	20	3KL20	202,070.00	163,570.00	0	
K	21	3KL21	202,049.00	163,571.00	0	
K	22	3KL22	202,029.00	163,573.00	0	
K	23	3KL23	202,009.00	163,573.00	0	
K	24	3KL24	201,988.00	163,574.00	0	
K	25	3KL25	202,049.00	163,592.00	0	
K	26	3KL26	202,029.00	163,592.00	0	
K	27	3KL27	202,009.00	163,593.00	0	
K	28	3KL28	201,988.00	163,594.00	0	
K	29	3KL29	202,029.00	163,613.00	0	
K	30	3KL30	202,009.00	163,614.00	0	
K	31	3KL31	201,990.00	163,614.00	0	
K	32	3KL32	202,050.00	163,632.00	0	
K	33	3KL33	202,032.00	163,633.00	0	

**CO-ORDINATES OF DUMPING LOCATIONS FOR SUSPECTED AREAS
UNDER LOCAL CONTRACT (since 10 May 1999 upto 19.06.99)**

Block No.	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
K	34	3KL34	202,069.00	163,652.00	0	
K	35	3KL35	202,053.00	163,653.00	0	
V	1	3VL1	202,029.00	163,778.00	0	
V	2	3VL2	202,014.00	163,789.00	0	
V	3	3VL3	202,025.00	163,758.00	0	
V	4	3VL4	202,007.00	163,772.00	0	
V	5	3VL5	201,994.00	163,781.00	0	
V	6	3VL6	202,050.00	163,731.00	0	
V	7	3VL7	202,044.00	163,722.00	0	
V	8	3VL8	202,028.00	163,732.00	0	
V	9	3VL9	202,009.00	163,747.00	0	
V	10	3VL10	201,993.00	163,760.00	0	
W	1	3W1	202,135.00	163,940.00	1	
W	2	3W2	202,142.00	163,946.50	1	
W	3	3W3	202,151.00	163,953.00	1	
W	4	3W4	202,159.00	163,957.00	1	
W	5	3W5	202,168.00	163,962.00	1	
W	6	3WR1	202,143.00	163,816.00	0	
W	7	3WR2	202,160.00	163,818.00	0	
W	8	3WR3	202,181.00	163,821.00	0	
W	9	3WR4	202,180.00	163,840.00	0	
X	1	3X1	202,047.00	164,036.00	1	
X	2	3X2	202,048.00	164,050.50	1	
X	3	3X3	202,055.00	164,043.00	1	
X	4	3X4	202,061.00	164,035.00	1	
X	5	3X5	202,055.00	164,058.00	1	
X	6	3X6	202,062.00	164,050.00	1	
X	7	3X7	202,067.00	164,042.00	1	
X	8	3X8	202,073.00	164,034.00	1	
X	9	3X9	202,079.00	164,021.00	1	
X	10	3X10	201,869.00	164,223.00	1	
X	11	3X11	201,864.00	164,232.00	1	
X	12	3X12	201,860.00	164,241.00	1	
X	13	3X13	202,007.00	164,179.00	1	
X	14	3X14	201,994.00	164,197.50	1	
X	15	3X15	201,982.00	164,210.00	1	
X	16	3X16	201,971.00	164,231.00	1	
X	17	3X17	201,959.00	164,247.50	1	
X	18	3XR18	202,052.50	164,077.50	1	
X	19	3XR19	202,062.50	164,065.00	1	
X	20	3XR20	202,075.00	164,047.50	1	
X	21	3XR21	202,076.00	164,060.00	1	
X	22	3XR22	202,087.50	164,045.00	1	
X	23	3XR23	202,056.00	164,105.00	1	

**CO-ORDINATES OF DUMPING LOCATIONS FOR SUSPECTED AREAS
UNDER LOCAL CONTRACT (since 10 May 1999 upto 19.06.99)**

Block No.	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
X	24	3XR24	202,067.00	164,092.00	1	
X	25	3XR25	202,078.00	164,076.00	1	
X	26	3XR26	202,091.00	164,059.00	1	
X	27	3XR27	202,101.00	164,042.50	1	
X	28	3XL28	201,892.00	164,118.00	1	
X	29	3XL29	201,876.00	164,129.00	1	
X	30	3XL30	201,856.00	164,143.00	1	
X	31	3XL31	201,916.00	164,118.00	1	
X	32	3XL32	201,900.00	164,132.00	1	
X	33	3XL33	201,887.00	164,145.00	1	
X	34	3XL34	201,870.00	164,160.00	1	
X	35	3XL35	201,868.00	164,175.00	1	
X	36	3XL36	201,862.00	164,197.00	1	
X	37	3XL37	201,899.00	164,204.00	1	
X	38	3XL38	201,883.00	164,223.00	1	
X	39	3XL39	201,915.00	164,203.00	1	
X	40	3XL40	201,902.00	164,218.00	1	
X	41	3XL41	201,969.00	164,152.50	1	
X	42	3XL42	201,957.00	164,169.00	1	
X	43	3XL43	201,946.00	164,186.00	1	
X	44	3XL44	201,932.00	164,201.00	1	
X	45	3XL45	201,920.00	164,215.00	1	
X	46	3XL46	201,922.00	164,232.00	1	
X	47	3XL47	201,935.00	164,216.00	1	
X	48	3XL48	201,988.00	164,163.00	1	
X	49	3XL49	201,974.00	164,180.00	1	
X	50	3XL50	201,962.00	164,196.00	1	
X	51	3XL51	201,948.00	164,212.00	1	
X	52	3XL52	201,936.00	164,227.00	1	
X	53	3XL53	201,955.00	164,227.00	1	
Y	1	3Y1	202,081.00	164,090.00	1	
Y	2	3Y2	202,092.00	164,072.00	1	
Y	3	3Y3	202,103.00	164,056.00	2	
Y	4	3Y4	202,114.00	164,039.00	1	
Y	5	3Y5	202,115.00	164,111.00	1	
Y	6	3Y6	202,127.50	164,094.50	1	
Y	7	3Y7	202,139.00	164,078.00	1	
Y	8	3Y8	202,151.00	164,061.50	1	
Y	9	3YR1	202,100.00	164,098.00	1	
Y	10	3YR2	202,111.00	164,081.00	1	
Y	11	3YR3	202,131.00	164,121.00	1	
Y	12	3YR4	202,141.00	164,106.00	1	
Y	13	3YR5	202,146.00	164,132.00	1	
Y	14	3YR6	202,162.00	164,148.00	1	

**CO-ORDINATES OF DUMPING LOCATIONS FOR SUSPECTED AREAS
UNDER LOCAL CONTRACT (since 10 May 1999 upto 19.06.99)**

Block No.	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
Y	15	3YR7	202,180.00	164,161.00	1	
Y	16	3YR8	202,194.00	164,172.00	1	
Y	17	3YR9	202,210.00	164,184.00	1	
Y	18	3YR10	202,226.00	164,197.00	1	
Y	19	3YL1	201,995.00	164,212.00	1	
Y	20	3YL2	202,011.00	164,219.00	1	
Y	21	3YL3	202,028.00	164,230.00	1	
Y	22	3YL4	202,048.00	164,241.00	1	
Y	23	3YL5	202,063.00	164,251.00	1	
Y	24	3YL6	202,078.00	164,263.00	1	
Y	25	3YL7	202,093.00	164,274.00	1	
Y	26	3YL8	202,109.00	164,289.00	1	
Y	27	3YL9	202,125.00	164,302.00	1	
Y	28	3YL10	202,139.00	164,317.00	1	
Z	1	3ZR1	202,222.00	164,240.00	1	
Z	2	3ZR2	202,234.00	164,224.00	1	
Z	3	3ZR3	202,246.00	164,209.00	1	
Z	4	3ZR4	202,235.00	164,255.00	1	
Z	5	3ZR5	202,247.00	164,239.00	1	
Z	6	3ZR6	202,260.00	164,223.00	1	
Z	7	3ZR7	202,253.00	164,263.00	1	
Z	8	3ZR8	202,265.00	164,246.00	1	
Z	9	3ZR9	202,278.00	164,230.00	1	
Z	10	3ZR10	202,272.00	164,270.00	1	
Z	11	3ZR11	202,285.00	164,255.00	1	
Z	12	3ZR12	202,298.00	164,238.00	1	
Z	13	3ZR13	202,293.00	164,277.00	1	
Z	14	3ZR14	202,305.00	164,261.00	1	
Z	15	3ZR15	202,317.00	164,246.00	1	
Z	16	3ZR16	202,309.00	164,288.00	1	
Z	17	3ZR17	202,322.00	164,274.00	1	
Z	18	3ZR18	202,335.00	164,259.00	1	
Z	19	3ZR19	202,324.00	164,301.00	1	
Z	20	3ZR20	202,336.00	164,285.00	0	
Z	21	3ZR21	202,348.00	164,269.00	0	
Z	22	3ZR22	202,341.00	164,306.00	0	
Z	23	3ZR23	202,353.00	164,296.00	0	
Z	24	3ZR24	202,360.00	164,279.00	0	
Z	25	3ZR25	202,354.00	164,328.00	0	
Z	26	3ZR26	202,367.00	164,313.00	0	
Z	27	3ZR27	202,379.00	164,297.00	0	
Z	28	3ZR28	202,359.00	164,340.00	0	
Z	29	3ZR29	202,371.00	164,324.00	0	
Z	30	3ZR30	202,384.00	164,307.00	0	

**CO-ORDINATES OF DUMPING LOCATIONS FOR SUSPECTED AREAS
UNDER LOCAL CONTRACT (since 10 May 1999 upto 19.06.99)**

Block No.	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
Z	31	3ZL1	202,174.00	164,300.00	0	
Z	32	3ZL2	202,162.00	164,314.00	0	
Z	33	3ZL3	202,150.00	164,331.00	0	
Z	34	3ZL4	202,190.00	164,309.00	0	
Z	35	3ZL5	202,180.00	164,326.00	0	
Z	36	3ZL6	202,168.00	164,341.00	0	
Z	37	3ZL7	202,209.00	164,320.00	0	
Z	38	3ZL8	202,197.00	164,335.00	0	
Z	39	3ZL9	202,185.00	164,351.00	0	
Z	40	3ZL10	202,223.00	164,333.00	0	
Z	41	3ZL11	202,210.00	164,349.00	0	
Z	42	3ZL12	202,198.00	164,363.00	0	
Z	43	3ZL13	202,240.00	164,343.00	0	
Z	44	3ZL14	202,228.00	164,359.00	0	
Z	45	3ZL15	202,216.00	164,373.00	0	
Z	46	3ZL16	202,260.00	164,351.00	0	
Z	47	3ZL17	202,247.00	164,367.00	0	
Z	48	3ZL18	202,234.00	164,382.00	0	
Z	49	3ZL19	202,276.00	164,366.00	0	
Z	50	3ZL20	202,264.00	164,382.00	0	
Z	51	3ZL21	202,252.00	164,398.00	0	
Z	52	3ZL22	202,290.00	164,380.00	0	
Z	53	3ZL23	202,278.00	164,396.00	0	
Z	54	3ZL24	202,266.00	164,412.00	0	
Z	55	3ZL25	202,302.00	164,395.00	0	
Z	56	3ZL26	202,290.00	164,411.00	0	
Z	57	3ZL27	202,278.00	164,427.00	0	
Z	58	3ZL28	202,312.00	164,402.00	0	
Z	59	3ZL29	202,300.00	164,418.00	0	
BC	1	BC1	202,290.00	164,436.00	0	
BC	2	BC2	202,275.00	164,450.00	0	
BC	3	BC3	202,260.00	164,465.00	0	
BC	4	BC4	202,245.00	164,479.00	0	
BC	5	BC5	202,230.00	164,494.00	0	
BC	6	BC6	202,220.00	164,508.00	0	
BC	7	BC7	202,320.00	164,435.00	0	
BC	8	BC8	202,305.00	164,452.00	0	
BC	9	BC9	202,290.00	164,465.00	0	
BC	10	BC10	202,275.00	164,480.00	0	
BC	11	BC11	202,262.00	164,494.00	0	
BC	12	BC12	202,247.00	164,508.00	0	
BC	13	BC13	202,234.00	164,522.00	0	
BC	14	BC14	202,220.00	164,537.00	0	
BC	15	BC15	202,205.00	164,552.00	0	

**CO-ORDINATES OF DUMPING LOCATIONS FOR SUSPECTED AREAS
UNDER LOCAL CONTRACT (since 10 May 1999 upto 19.06.99)**

Block No.	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
BC	16	BC16	202,192.00	164,565.00	0	
BC	17	BC17	202,180.00	164,576.00	0	
BC	18	BC18	202,330.00	164,452.00	0	
BC	19	BC19	202,318.00	164,465.00	0	
BC	20	BC20	202,305.00	164,480.00	0	
BC	21	BC21	202,291.00	164,494.00	0	
BC	22	BC22	202,276.00	164,508.00	0	
BC	23	BC23	202,263.00	164,522.00	0	
BC	24	BC24	202,248.00	164,537.00	0	
BC	25	BC25	202,234.00	164,552.00	0	
BC	26	BC26	202,219.00	164,565.00	0	
BC	27	BC27	202,206.00	164,579.00	0	
BC	28	BC28	202,192.00	164,592.00	0	
BC	29	BC29	202,345.00	164,468.00	0	
BC	30	BC30	202,330.00	164,480.00	0	
BC	31	BC31	202,318.00	164,494.00	0	
BC	32	BC32	202,305.00	164,508.00	0	
BC	33	BC33	202,291.00	164,522.00	0	
BC	34	BC34	202,276.00	164,537.00	0	
BC	35	BC35	202,263.00	164,552.00	0	
BC	36	BC36	202,248.00	164,565.00	0	
BC	37	BC37	202,234.00	164,579.00	0	
BC	38	BC38	202,219.00	164,592.00	0	
BC	39	BC39	202,206.00	164,608.00	0	
BC	40	BC40	202,348.00	164,494.00	0	
BC	41	BC41	202,333.00	164,508.00	0	
BC	42	BC42	202,318.00	164,522.00	0	
BC	43	BC43	202,305.00	164,537.00	0	
BC	44	BC44	202,291.00	164,552.00	0	
BC	45	BC45	202,276.00	164,565.00	0	
BC	46	BC46	202,263.00	164,579.00	0	
BC	47	BC47	202,248.00	164,592.00	0	
BC	48	BC48	202,234.00	164,608.00	0	
BC	49	BC49	202,220.00	164,622.00	0	
BC	50	BC50	202,210.00	164,635.00	0	
BC	51	BC51	202,362.00	164,508.00	0	
BC	52	BC52	202,350.00	164,522.00	0	
BC	53	BC53	202,330.00	164,537.00	0	
BC	54	BC54	202,318.00	164,552.00	0	
BC	55	BC55	202,305.00	164,565.00	0	
BC	56	BC56	202,291.00	164,579.00	0	
BC	57	BC57	202,276.00	164,592.00	0	
BC	58	BC58	202,263.00	164,608.00	0	
BC	59	BC59	202,248.00	164,622.00	0	

**CO-ORDINATES OF DUMPING LOCATIONS FOR SUSPECTED AREAS
UNDER LOCAL CONTRACT (since 10 May 1999 upto 19.06.99)**

Block No.	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
BC	60	BC60	202,234.00	164,635.00	0	
BC	61	BC61	202,221.00	164,650.00	0	
BC	62	BC62	202,378.00	164,522.00	0	
BC	63	BC63	202,363.00	164,535.00	0	
BC	64	BC64	202,350.00	164,550.00	0	
BC	65	BC65	202,335.00	164,565.00	0	
BC	66	BC66	202,318.00	164,579.00	0	
BC	67	BC67	202,305.00	164,592.00	0	
BC	68	BC68	202,291.00	164,608.00	0	
BC	69	BC69	202,278.00	164,622.00	0	
BC	70	BC70	202,265.00	164,635.00	0	
BC	71	BC71	202,250.00	164,650.00	0	
BC	72	BC72	202,236.00	164,666.00	0	
BC	73	BC73	202,225.00	164,678.00	0	
BC	74	BC74	202,390.00	164,535.00	0	
BC	75	BC75	202,378.00	164,548.00	0	
BC	76	BC76	202,363.00	164,564.00	0	
BC	77	BC77	202,350.00	164,579.00	0	
BC	78	BC78	202,335.00	164,592.00	0	
BC	79	BC79	202,318.00	164,608.00	0	
BC	80	BC80	202,305.00	164,622.00	0	
BC	81	BC81	202,291.00	164,635.00	0	
BC	82	BC82	202,278.00	164,650.00	0	
BC	83	BC83	202,265.00	164,666.00	0	
BC	84	BC84	202,250.00	164,678.00	0	
BC	85	BC85	202,240.00	164,692.00	0	
BC	86	BC86	202,405.00	164,548.00	0	
BC	87	BC87	202,391.00	164,564.00	0	
BC	88	BC88	202,378.00	164,578.00	0	
BC	89	BC89	202,363.00	164,592.00	0	
BC	90	BC90	202,350.00	164,607.00	0	
BC	91	BC91	202,335.00	164,622.00	0	
BC	92	BC92	202,320.00	164,635.00	0	
BC	93	BC93	202,306.00	164,650.00	0	
BC	94	BC94	202,291.00	164,666.00	0	
BC	95	BC95	202,278.00	164,680.00	0	
BC	96	BC96	202,265.00	164,694.00	0	
BC	97	BC97	202,420.00	164,563.00	0	
BC	98	BC98	202,406.00	164,577.00	0	
BC	99	BC99	202,392.00	164,592.00	0	
BC	100	BC100	202,378.00	164,605.00	0	
BC	101	BC101	202,364.00	164,620.00	0	
BC	102	BC102	202,350.00	164,635.00	0	
BC	103	BC103	202,335.00	164,650.00	0	

**CO-ORDINATES OF DUMPING LOCATIONS FOR SUSPECTED AREAS
UNDER LOCAL CONTRACT (since 10 May 1999 upto 19.06.99)**

Block No.	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
BC	104	BC104	202,321.00	164,664.00	0	
BC	105	BC105	202,307.00	164,678.00	0	
BC	106	BC106	202,294.00	164,694.00	0	
BC	107	BC107	202,280.00	164,708.00	0	
BC	108	BC108	202,420.00	164,591.00	0	
BC	109	BC109	202,405.00	164,605.00	0	
BC	110	BC110	202,392.00	164,620.00	0	
BC	111	BC111	202,378.00	164,635.00	0	
BC	112	BC112	202,363.00	164,650.00	0	
BC	113	BC113	202,350.00	164,665.00	0	
BC	114	BC114	202,335.00	164,679.00	0	
BC	115	BC115	202,321.00	164,692.00	0	
BC	116	BC116	202,307.00	164,707.00	0	
BC	117	BC117	202,392.00	164,650.00	0	
BC	118	BC118	202,378.00	164,665.00	0	
BC	119	BC119	202,363.00	164,678.00	0	
BC	120	BC120	202,349.00	164,692.00	0	
BC	121	BC121	202,335.00	164,708.00	0	
BC	122	BC122	202,322.00	164,720.00	0	
BC	123	BC123	202,365.00	164,707.00	0	
BC	124	BC124	202,350.00	164,721.00	0	
BC	125	BC125	202,335.00	164,734.00	0	
BC	126	BC126	202,426.00	164,618.00	0	
BC	127	BC127	202,418.00	164,636.00	0	
BC	128	BC128	202,408.00	164,655.00	0	
BC	129	BC129	202,400.00	164,672.00	0	
BC	130	BC130	202,392.00	164,692.00	0	
BC	131	BC131	202,383.00	164,711.00	0	
BC	132	BC132	202,370.00	164,730.00	0	
BC	133	BC133	202,354.00	164,743.00	0	
BC	134	BC134	202,333.00	164,750.00	0	
BC	135	BC135	202,311.00	164,752.00	0	
RR	1	MB1	201,767.50	164,576.50	0	
RR	2	MB2	201,778.00	164,593.00	1	
RR	3	MB3	201,788.50	164,611.00	0	
RR	4	MB4	201,748.00	164,591.00	0	
RR	5	MB5	201,762.00	164,605.00	1	
RR	6	MB6	201,775.50	164,619.50	0	
RR	7	MB7	201,732.00	164,608.50	0	
RR	8	MB8	201,748.00	164,620.00	1	
RR	9	MB9	201,765.00	164,631.00	0	
RR	10	MB10	201,719.50	164,627.50	0	
RR	11	MB11	201,737.00	164,636.50	1	
RR	12	MB12	201,755.00	164,645.50	0	

**CO-ORDINATES OF DUMPING LOCATIONS FOR SUSPECTED AREAS
UNDER LOCAL CONTRACT (since 10 May 1999 upto 19.06.99)**

Block No.	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
RR	13	MB13	201,709.50	164,647.00	0	
RR	14	MB14	201,728.00	164,654.00	1	
RR	15	MB15	201,747.00	164,661.50	0	
RR	16	MB16	201,703.00	164,666.00	0	
RR	17	MB17	201,721.50	164,673.00	1	
RR	18	MB18	201,740.00	164,680.00	0	
RR	19	MB19	201,694.50	164,684.00	0	
RR	20	MB20	201,712.50	164,691.00	1	
RR	21	MB21	201,732.00	164,699.00	0	
RR	22	MB22	201,687.00	164,702.50	0	
RR	23	MB23	201,705.00	164,710.00	1	
RR	24	MB24	201,724.00	164,717.50	0	
RR	25	MB25	201,679.00	164,721.00	0	
RR	26	MB26	201,697.50	164,728.50	1	
RR	27	MB27	201,716.00	164,735.50	0	
RR	28	MB28	201,671.00	164,739.50	0	
RR	29	MB29	201,689.00	164,746.50	1	
RR	30	MB30	201,708.00	164,754.00	0	
RR	31	MB31	201,663.00	164,758.50	0	
RR	32	MB32	201,682.00	164,765.50	1	
RR	33	MB33	201,700.50	164,772.50	0	
RR	34	MB34	201,657.00	164,778.00	0	
RR	35	MB35	201,675.00	164,784.50	1	
RR	36	MB36	201,694.00	164,792.00	0	
RR	37	MB37	201,650.00	164,798.00	0	
RR	38	MB38	201,669.00	164,804.00	1	
RR	39	MB39	201,688.00	164,810.50	0	
RR	40	MB40	201,644.50	164,817.50	0	
RR	41	MB41	201,663.50	164,823.50	1	
RR	42	MB42	201,683.00	164,829.50	0	
RR	43	MB43	201,638.50	164,833.00	0	
RR	44	MB44	201,656.00	164,842.50	1	
RR	45	MB45	201,673.50	164,851.50	0	
RR	46	MB46	201,629.50	164,848.00	0	
RR	47	MB47	201,645.50	164,860.00	1	
RR	48	MB48	201,658.00	164,869.00	0	
RR	49	MB49	201,620.00	164,861.00	0	
RR	50	MB50	201,633.00	164,876.00	1	
RR	51	MB51	201,643.50	164,887.00	0	
RR	52	MB52	201,609.50	164,867.00	0	
RR	53	MB53	201,615.50	164,886.00	1	
RR	54	MB54	201,620.00	164,900.00	0	
RR	55	MB55	201,597.50	164,867.50	0	
RR	56	MB56	201,595.50	164,887.00	1	

**COORDINATES OF DUMPING LOCATIONS FOR SUSPECTED AREAS
UNDER LOCAL CONTRACT (since 10 May 1999 upto 19.06.99)**

Block No.	No. of Order	Point No.	Easting	Northing	No. of Loads	Remarks
RR	57	MB57	201,595.00	164,907.00	0	

APPENDIX-C
WEEKLY DUMPING RECORD

DUMPING RECORD (LOCATION, LOADS

(unit: No. of Loads)

Date	Pre-trials		Initial Trials													Daily Accum. Total No. of Loads	No. of Barges Shift	Work Remarks
	IC5 25%	IC13 25%	IC1 30%	IC9 35%	IC2 C	IC3 C	IC4 C	IC7 D	IC8 D	IC11 E	IC12 E	IC13 E	IC14 E	IC15 E				
27.03.98	2															2	1	One
28.03.98																0		
29.03.98																0		
30.03.98	3															3	1	One
31.03.98																0		
01.04.98																0		
02.04.98	1															1	1	One
03.04.98																0		
04.04.98																0		
05.04.98																0		
06.04.98																0		
07.04.98																0		
08.04.98																0		
09.04.98																0		
10.04.98	1															1	1	One
11.04.98																0		
12.03.98																0		
13.04.98																0		
14.04.98																0		
15.04.98	3															3	10	One
16.04.98	5															5	15	One
17.04.98																5	20	One
18.04.98																5	25	One
19.04.98	1															8	33	One
20.04.98																10	43	One
21.04.98																12	55	One
22.04.98																6	61	One
23.04.98																0	61	
24.04.98																8	69	One
25.04.98																9	78	One
26.04.98																0	78	
27.04.98																12	90	Two
28.04.98																12	102	Two
29.04.98																10	112	Two
30.04.98																10	122	Two
Total	16	15	15	5	5	5	5	5	5	5	5	5	5	5	5	122	1	Two

DUMPING RECORD (LOCATION, NO. OF LOADS)

(unit : No. of Loads)

Date	Main										Blanket ing-1			(unit : No. of Loads)				Daily Accum. Total No. of Loads	No. of Barges	No. of Shift					
	IC11	IR10	IL10	IR14	IL14	IC15	IL16	IR16	IL16	IC16	IR14	2L1	2L2	2R2	2C1	2C3	2L4				2R4	2L6	2R6	2C5	2C7
As of 30.04.98																									122
01.05.98	4	3																							7
02.05.98		2	5	1	5																				13
03.05.98				4																					4
03.05.98					5	5																			10
04.05.98							5	5	5																15
06.05.98									5	5	3	2													15
07.05.98										2	3								4	1	5				15
08.05.98																			1	4		5	3		13
09.05.98																							2		4
Total	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	96	

DUMPING RECORD (LOCATION, NO. OF LOA

(unit : No. of Loads)

Date	Main										Blanket ing-1			(unit : No. of Loads)				Daily Accum. Total No. of Loads	No. of Barges	Work Remarks					
	2R8	IC14	IC16	IR15	IL13	IC12	IC8	IC4	IR5	IC2	IL1	IR1	IL3	IR3	IC3	IC	IC				IC	IL15	2R1	2L1	2C2
As of 13.05.98																									
14.05.98	1	1	5	5	1																				13
15.05.98					4	2	1																		7
16.05.98					4	3	3																		10
17.05.98					6	1	5	1																	13
18.05.98	2	4				3	3																		12
19.05.98								1	2	5	4														12
20.05.98										1	2	5	1	5											14
21.05.98											3								5	1	4				13
22.05.98																				4	1	5	4	1	15
23.05.98																						1	3	2	6
24.05.98																									12
Total	3	5	5	5	15	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	115	

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Date	Main Blanket ing-1											Daily Total No. of Loads	Accum. No. of Loads					
	2L3	2C4	2L5	2R5	2C6	2R6	2C7	2R7	2C8	2R8	2C9			2R9	2C10	2R10	2C11	2R11
as of 24.05	4	2		1													16	333
25.05.98	1	3	5	5	2												13	349
26.05.98			3	5	3	5	5										18	362
27.05.98		1		3	5	4											13	380
28.05.98				6	3	3											17	393
29.05.98				2	2	5	5	1	2								21	410
30.05.98				4	3	5	5	4									21	431
31.05.98				1	5	5	5	4									21	452
Total	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	119	

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Date	Main Blanket ing-1											Daily Total No. of Loads	Accum. No. of Loads	Remarks												
	2R11	2L12	2C12	2R12	3L1	3R1	3L2	3C2	3C1	3R2	3L3				3C3	3R3	3L4	3C4	3R4	3L5	3C5	3R5	AD1			
as of 31.05.98																									452	
01.06.98	5	5	5	5																					20	472
02.06.98					5	5	3	3																	21	493
03.06.98						2	2		5																14	507
04.06.98										5	5	5	2	1											18	525
05.06.98												3	4	5	2	5									19	544
06.06.98																5									5	549
07.06.98																									0	549
Total	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	97	

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Date	Main Blanket										Ing-1										Daily Total No. of Loads	Accum. No. of Loads								
	AD2 G	AD3 G	AD4 G	JCS C	JCS B	JCS B	JR6 B	A1L7 K	A1L8 K	A1L9 K	A1L10 K	A1L11 K	A1L12 K	A1L13 K	A2L4 K	A2L5 K	A2L6 K	A2L7 K	JM1 A	JM2 A			JM3 A	JM5 A	3L3 G	A1R8 L	A1R9 L	A1R10 L	A1R11 L	A1R7 L
as of 07.06.98																														
08.06.98																														549
09.06.98	5	5	5	3	3	1																						0		
10.06.98							4	5	5	1																		549		
11.06.98											4																	22		
12.06.98												4																593		
13.06.98													4															23		
14.06.98														1														19		
															1													635		
																4												23		
																												658		
																												681		
Total	5	5	5	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	23			

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Date	Main Blanket										Ing-1										Daily Total No. of Loads	Accum. No. of Loads	Remarks					
	A1R10 L	A1R11 L	A1R12 L	A1R13 L	A1R14 L	A2R1 L	A2R2 L	A2R3 L	A2R4 L	A2R5 L	A3R1 L	A3R2 L	A3R3 L	A2L3 K	A4R1 L	A4R2 L	A2R10 L	A2R11 L	A2R12 L	A1R1 S				A1R2 S	A1R3 S	A1R4 S	A1R5 S	A1R6 S
as of 14.06.98																												681
15.06.98	2	2																									18	
16.06.98	3	3																									699	
17.06.98																											21	
18.06.98																											720	
19.06.98																											24	
20.06.98																											744	
21.06.98																											23	
																											767	
																											18	
																											785	
																											9	
																											794	
																											0	
Total	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	794		

Breakdown No 1
Day-off

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges)

Date	Main Blanket ing-1												Daily			Remarks
	A1R1	A1R2	A1R3	A1R4	A1R5	A1R6	A1R7	A1R8	A1R9	A1R10	A1R11	A1R12	Total	No. of Loads	Accum. No. of Loads	
21.06.98	3	4											16	794	794	Install New seal for No.2
22.06.98	2	1	5	3									23	810	810	Repairing No.1
23.06.98													17	833	833	Finish repair No.1(drop New seal(2 m)
24.06.98													18	850	850	Only No.1 Install New seal for No.2
25.06.98													6	868	868	Only No.2 Install New seal for No.1
26.06.98													17	874	874	Breakdown No.2
27.06.98													23	891	891	Repairing No.2
28.06.98													1	914	914	
Total	5	5	5	5	5	5	5	5	5	5	5	5	1	1	120	

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges)

Date	Main Blanket ing-1																								Daily		Accum. No. of Loads	
	A1L1	A1L2	A1L3	A1L4	A1L5	A1L6	A2L1	A2L2	A2L3	A3L1	A3L2	A3L3	A3L4	A3L5	A3L6	A4L1	A4L2	A4L3	A4L4	A4L5	A5L1	A5L2	A5L3	A5L4	A5L5	A5L6		Total
28.06.98	1	1																									30	914
29.06.98	4	4	5	5	5	2																				29	944	
30.06.98							3	5	5	5	5	1														18	973	
01.07.98													4	5	5	3	1									25	991	
02.07.98													2	4	5	3	1									26	1016	
03.07.98																		2	4	5	5	5	5	3	2	26	1042	
04.07.98																										6	1048	
05.07.98																										0	1048	
Total	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1	134	

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Date	Main Bin												Daily Total No. of Loads	Accum. No. of Loads	Remarks																	
	S5L2	S5L3	S4L6	S3L7	S3L2	S3L3	S3L4	A2L9	A1L26	A1L27	A2L11	A2L12				A2L10	A3L7	A3L8	A3L9	A4L6	A4L7	A4L8	A5L8	A5L7	A5L6	A5L5	A5L4	A6L2	A6L1	A6L3	A6L4	
as of 05.07.98	1													1048																		
06.07.98													0	1048																		
07.07.98													0	1048																		
08.07.98	4	5	5	5	3	1																									23	1071
09.07.98					2	4	5	4	5	1																				26	1097	
10.07.98										4	5	5	5	4	4														28	1125		
11.07.98										1	1	1	1	1	1														26	1151		
12.07.98																													28	1179		
Total	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	2	131	

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Date	Main Bin												Daily Total No. of Loads	Accum. No. of Loads	Remarks																
	A6L4	S1L6	S1L7	S1L8	S1L9	S1L10	S1L11	S2L3	S2L4	S2L5	S1L4	S1L5				S1L2	S1L1	S2L1	S3L4	S3L3	S3L2	S3L1	S4L4	S4L3	S4L2	S4L1	S5L18	S5L19	S5L20		
as of 12.07.98	2													1179																	
13.07.98	3												27	1206																	
14.07.98	2												28	1234																	
15.07.98	3												28	1262																	
16.07.98	1												17	1279																	
17.07.98	4												23	1302																	
18.07.98	1												10	1312																	
19.07.98	2												0	1312																	
Total	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	133

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Date	Main Barge - Top-1							Main Barge - Bot-1							Daily Total No. of Loads	Accum. No. of Loads							
	AIL14	AIL15	AIL16	AIL17	AIL18	AIL19	AIL20	AIL21	AIL22	AIL23	AIL24	AIL25	AIL26	AIL27									
24.07.98	5	5	5	2	2										5	5	5	2	2	24	1352		
25.07.98	3	3	5	5	4	3									3	3	5	4	3	23	1356		
26.07.98	1	2	5	5	5	5									1	2	5	5	5	25	1382		
27.07.98	1	2	5	5	5	4	3								1	2	5	5	4	3	27	1409	
28.07.98	5	5	5	5	5	5	1	1	1	1	1	1	1	1	5	5	5	5	4	5	25	1434	
29.07.98	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1	5	27	1461	
30.07.98	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	3	28	1489
Total															177								

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Date	Main Barge - Top-1											Main Barge - Bot-1											Daily Total No. of Loads	Accum. No. of Loads	
	ADU7	ADU8	SUR8	SUR9	SUR10	SUR11	SUR12	SUR13	SUR14	SUR15	SUR16	ADU17	ADU18	ADU19	ADU20	ADU21	ADU22	ADU23	ADU24	ADU25	ADU26	ADU27			
24.07.98	4	3										4	3										1	1	489
25.07.98	1	2	5	5	5	2	3	5	5	4	1	1	3	2	5	5	5	2	1	1			1	1	517
26.07.98																									542
27.07.98																									571
28.07.98																									598
29.07.98																									625
30.07.98																									654
Total															192										

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Date	Main Blanket ing-1														Daily Total No. of Loads	Accum. No. of Loads						
	S2L11	S2L12	S2L13	ADU11	S2L14	S2L15	S1L23	S1L24	S1L25	ADU12	S1L26	ADK1	ADK2	ADK3			ADK4	ADK5	ADK6	ADK7	ADK8	ADK9
as of 02.08.98	3	1																				1681
03.08.98	2	4	5	2	5	5	5	5	2	5	3											1709
04.08.98											2	5	5	1								1729
05.08.98																						1742
06.08.98																						1758
07.08.98																						1770
08.08.98																						1773
09.08.98																						1773
Total	5	5	5	2	5	5	5	5	2	5	5	5	5	5	5	5	5	5	5	2	2	96

Breakdown barge No.1 due to engine defects
 Replaced with computer of barge No 1
 after breakdown computer of barge No 2
 Replaced with computer of survey boat
 after breakdown computer of barge No 1
 (shutdown from 12.00 on 8.8.98)

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Date	Main Blanket ing-1														Daily Total No. of Loads	Accum. No. of Loads						
	ADK10	ADU13	ADU14	ADU15	ADU16	ADU17	S1R23	S1R24	S1R25	S1R26	S1R27	S1R29	S1R30	ADU18			ADU19	ADU20	ADU21	ADU22	DL1	DL2
as of 09.08.98	2																					1773
10.08.98																						1773
11.08.98	3	5	3																			1789
12.08.98																						1804
13.08.98																						1818
14.08.98																						1843
15.08.98																						1863
16.08.98																						1891
Total	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	1	1	120

Completed repairing No.1

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges)

Date Main Blanketing-1

Date	DL1	DL2	DL3	DL4	DV1	DV2	DV3	DV4	DV5	DV6	DV7	DV8	DV9	DV10	DV11	DV12	DAR1	DAR2	DAR3	AIR1	DR5	DC5	DL5	DR6	Total	No. of Loads
16.08.98	4	1																	5	5					1891	
17.08.98	6	9	8	5																					28	1919
18.08.98			2	5																					7	1926
19.08.98					5	5	4	2																	21	1947
20.08.98					5	5	6	7																	28	1975
21.08.98								1	5	5	5	5	5	2	2										25	2000
22.08.98										3	3	5	5	3	5	5	5	5	3	3					27	2027
23.08.98																			2	2	3	3	2	2	14	2041
Total	10	10	10	10	10	10	10	10	10	5	5	5	5	5	5	5	5	5	10	10	3	3	2	2	125	

TABLE) WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges)

Date	DL5	DR6	DC6	DL6	DL7	DL7	DR8	DC8	DL8	DR9	DC9	DL9	DR10	DC10	DL10	DR11	DC11	DL11	DR12	DC12	DL12	DR13	DC13	DL13	DR14	DC14	DL14	DR15	DC15	DL15	DR16	DC16	DL16
23.08.98	2	2																															
24.08.98	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
25.08.98									1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
26.08.98																																	
27.08.98																																	
28.08.98																																	
29.08.98																																	
30.08.98																																	
Total	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	

Date	DL17	DR17	DC17	DL18	DR18	DC18	DL19	DR19	DC19	DL20	DR20	DC20	DL21	DR21	DC21	DL22	DR22	DC22	DL23	DR23	DC23	DL24	DR24	DC24	DL25	DR25	DC25	DL26	DR26	DC26	DL27	DR27	DC27	DL27	Total No. of Loads	
2041																																				2041
28																																				28
2069																																				2069
28																																				28
2097																																				2097
28																																				28
2125																																				2125
28																																				28
2153																																				2153
28																																				28
2181																																				2181
28																																				28
2209																																				2209
28																																				28
2237																																				2237

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Date	DL17	DL08	DL28	DL15	DL23	DL25	DL25	DL25	DL15	DL25	DL25	DL25	DL25	DL15	DL25	DL25	DL25	DL25	DL15	DL25	DL25	DL25	DL25	DL15	DL25	DL25	DL25	DL15	DL25	DL25	DL25	DL15	DL25	DL25	DL25	DL15	DL25	DL25	DL25	No. of Loads	No. of Loads
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
07.09.98	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2172
08.09.98	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2172	
09.09.98	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2172	
10.09.98	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2172	
11.09.98	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2172	
12.09.98	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2172	
13.09.98	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2172	
Total																																									172

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Date	Main Blanketing-1																										Total No. of Loads														
	AD18	AD18	AD22	AD22	AD19	AD23	AD20	DR20	AD21	AD24	AD25	DL21	DR21	AD38	AD39	AD40	AD40	AD15	DC21	AD11	DC19																				
06.09.98	2	3	5	5	5	5	5	3	3	5	5	5	3	3	3	5	5	5	3	3	5	5	3	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	2409		
07.09.98	3	5	5	5	5	5	5	4	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2437		
08.09.98	3	5	5	5	5	5	5	4	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2465		
09.09.98	3	5	5	5	5	5	5	4	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2493		
10.09.98	3	5	5	5	5	5	5	4	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2520		
11.09.98	3	5	5	5	5	5	5	4	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2548		
12.09.98	3	5	5	5	5	5	5	4	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2562		
13.09.98	3	5	5	5	5	5	5	4	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	0	2562	
Total																																									153

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges

Main Blanket ing-1

Date	DL34	DC34	DR34	DL42	DC42	DR42	DL43	DC43	DR43	DL44	DC44	DR44	DL45	DC45	DR45	DL46	DC46	DR46	DL48	DC48	DR48	DL49	DC49	DR49	DL50	
14.09.98	3	3	3	3	3	3	3	3	3	1																
15.09.98																										
16.09.98																										
17.09.98																										
18.09.98																										
19.09.98																										
20.09.98																										
Total	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

AS of 13.09.98

DC50	DR50	DL51	DC51	DR51	ADG1	TL1	TC1	TR1	TL2	TC2	TR2	TL3	TC3	TR3	TL4	TC4	TR4	TL5	TC5	TR5	ADX34	ADX35	ADX37	ADX54	ADX55	ADX56	ADX57	ADX58	APXS9	Total No. of Loads		
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2562	
																															28	2590
																															28	2618
																															25	2643
																															30	2673
																															28	2701
																															28	2729
																															28	2757

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads)

Date	Main Blanket ing-1			Main Blanket ing-2			Total No. of Loads	Total No. of Loads	Notes
	ADX59	ADX61	ADX62	ADX63	ADX58	ADX60			
as of 20.09.98	2				3		10	0	
21.09.98	8	3	3	2	7		26	0	4th Panel Meeting
22.09.98					0		2783	0	4th Panel Meeting
23.09.98					0		2783	0	4th Panel Meeting
24.09.98					0		2783	0	CEB decided to proceed Dumping
25.09.98					0		2783	0	4
26.09.98					0		2783	0	
27.09.98					3	3	3	13	Commenced Main Blanketing -2
Total	10	3	3	2	10	2	26	13	

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads)

Date	Main Blanket ing-2																Daily Accum Total No. of Loads							
	ADX66	ADX67	ADX68	ADX100	ADX102	ADX103	ADX69	ADX70	ADX71	ADX72	ADX63	ADX87	ADX73	ADX74	ADX88	ADX81		ADX84	ADX89	ADX82	ADX80	ADX86	ADX85	
as of 27.09.98	2	2																						13
28.09.98	1	1	3	3	3	1	2																	14
29.09.98				5	1	1	3	1																10
30.09.98							2	3	3	2														10
01.10.98				5									3	3	1									12
02.10.98										1				5	4	3	3	3	1					20
03.10.98																		2	3	3	2			10
04.10.98																								0
Total	3	3	3	13	1	3	3	3	3	5	3	3	3	8	5	3	3	3	3	3	3	2	2	76

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges)

Date	Main Blanket ing-2													Daily Total No. of Loads	Accum. No of Loads										
	ADX75	ADX37	ADX106	ADX103	ADX102	ADX104	ADX88	ADX87	ADX91	ADX90	ADX85	ADX76	ADX78			ADX79	ADX77	ADX107	ADX108	ADX83	ADX109	ADX92	ADX93	ADX85	ADX105
as of 04.10.98																									
05.10.98	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
06.10.98	3	3	5	4	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
07.10.98			2																						
08.10.98																									
09.10.98																									
10.10.98																									
11.10.98																									
Total	3	6	7	10	21	3	8	6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	910

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges)

Date	Main Blanket ing-2													Daily Total No. of Loads	Accum. No of Loads										
	ADX94	ADX66	ADX97	ADX98	ADX94	ADX98	ADX94	ADX98	ADX94	ADX98	ADX94	ADX98	ADX94			ADX98	ADX94	ADX98	ADX94	ADX98	ADX94	ADX98	ADX94	ADX98	ADX94
as of 11.10.98																									
12.10.98	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
13.10.98	1	3	3	3	5	2	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
14.10.98																									
15.10.98																									
16.10.98																									
17.10.98																									
18.10.98																									
Total	3	3	3	3	8	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	179

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges)

Main Blanketing-2

Date

Date	ADX58	ADX107	ADX103	ADX102	ADX13	ADX7	ADX8	ADX9	ADX4	ADX5	ADX6	ADX1	ADX2	ADX3	ADX22	ADX23	ADX24	ADX25	ADX26	ADX27	ADX28	ADX29	ADX30	ADX31
as of 18.10.98	15	5	10	21	5	5	5	5							15	15	10	15	5	5	5	5	5	5
19.10.98																								
20.10.98	5	5	5	5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
21.10.98																								
22.10.98																								
23.10.98																								
24.10.98																								
25.10.98																								
Total	20	10	15	26	7	7	7	7	2	2	2	2	2	2	17	17	12	17	7	7	7	7	7	7

Date	Main Blanketing-2													Daily				Accum. No. of Loads						
	ADX32	ADX33	ADX34	ADX35	ADX36	ADX37	DC24	DL25	DC25	DR25	BL28	BC28	BL41	BC41	BR41	BL42	BC42		BR42	BL43	BC43	AD111	AD112	Daily Total No. of Loads
18.10.98	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0	256
19.10.98																							20	276
20.10.98																							20	296
21.10.98																							20	316
22.10.98																							20	336
23.10.98																							20	356
24.10.98																							4	360
25.10.98																								
Total	7	7	5	5	2	5	5	5	5	2	2	2	2	2	2	2	2	2	2	2	2	2	61	

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges)

Date	ADY1	ADY2	ADY3	BR43	BL44	BC44	BR44	BL45	BC45	BL46	BC46	BR46	BL47	BC47	BR47	BL40	BC40	BR40	BL39	BC39	BR39
as of 25.10.98	X	X	X	III	HH	III	HH	III	III	III	III	III	III	III	III	III	III	III	III	III	III
26.10.98	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
27.10.98																					
28.10.98																					
29.10.98		3																			
30.10.98																					
31.10.98																					
01.11.98																					
Total	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

		BL38	BC38	BL46	BR38	BL37	BC37	BR37	BL36	BC36	BR36	BL35	BC35	BR35	BL34	BC34	BR34	BL33	BC33	BR33	BL32	BC32	BR32	BL31	BC31	Daily Accum. Total No. of Loads
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	360
																										20
																										20
																										18
																										18
																										18
																										4
																										0
																										98

TABLE WEEKLY DUMPING RECORD (unit: No. of Loads) Two Shift of 10 Hours with Two Barges)

Date	Main Barge ing-2										Daily Accum																														
	BR31	BR30	BR29	BR28	BR27	BR26	BR25	BR24	BR23	BR22	CA23	CA22	CA21	CA20	CA19	CA18	CA17	CA16	CA15	CA14	CA23	CA22	CA21	CA20	CA19	CA18	CA17	CA16	CA15	CA14	CA23	CA22	CA21	CA20	CA19	CA18	CA17	CA16	CA15	CA14	Total
as of 01.11.98	1																																								458
02.11.98	1	2	2	2	2	2	2	2	2	2																															15
03.11.98																																									473
04.11.98																																									0
05.11.98																																									468
06.11.98																																									15
07.11.98																																									503
08.11.98																																									13
Total	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	64	

TABLE WEEKLY DUMPING RECORD (unit: No. of Loads) Two Shift of 10 Hours with Two Barges)

Date	Main Barge ing-2										Daily Accum																														
	CA24	CA25	CA26	CA27	CA28	CA29	CA30	CA31	CA32	CA33	BR19	BR18	BR17	BR16	BR15	BR14	BR13	BR12	BR11	BR10	BR19	BR18	BR17	BR16	BR15	BR14	BR13	BR12	BR11	BR10	BR19	BR18	BR17	BR16	BR15	BR14	BR13	BR12	BR11	BR10	Total
as of 08.11.98	1																																								522
09.11.98																																									0
10.11.98	1	2	2	2	2	2	2	2	2	2																															15
11.11.98																																									537
12.11.98																																									12
13.11.98																																									549
14.11.98																																									18
15.11.98																																									567
Total	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	64	

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges)

Date
Main Blanket ing-2

BC19	BR18	BL17	BC17	BR17	BL16	BC16	BR16	BL15	BC15	BR15	BL14	BC14	BR14	BL13	BC13	BR13	BL12	BC12	BR12	BL11	BC11	BR11	BL10	BC10	BR10	BL9	BC9	BR9	BL8	BC8	BR8	BL7	BC7	BR7	BL6	BC6	BR6	
DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD
1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total																																						

as of 15.11.98
16.11.98
17.11.98
18.11.98
19.11.98
20.11.98
21.11.98
22.11.98

Main Blanket ing-2

BL5	BC5	BR5	BL4	BC4	BR4	BL3	BC3	BR3	BL2	BC2	BR2	BL1	BC1	BR1	SD1	SD2	DL41	DC41	DR41	DL40	DC40	DR40	DL39	DC39	DR39	DL38	DC38	DR38	DL37	DC37	DR37	DL36	DC36	DR36	DL35			
CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	BB	BB	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Total																																						

Daily No of Loads
15 601
20 621
15 636
15 651
15 666
3 669
0 669
83

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges)

Date	Main Blanket ing-2																													
	TC15	TR15	TL16	TC16	TR16	TL17	TC17	TR17	TL18	TC18	TR18	TL19	TC19	TR19	TL20	TC20	TR20	TL21	TC21	TR21	TL22	TC22	TR22	TL23	TC23	TR23	TL23	TC23		
as of 20.12.98																														
21/12/98	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
22/12/98																														
23/12/98																														
24/12/98																														
25/12/98																														
26/12/98																														
27/12/98																														
Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	

4

TR23	TL24	TC24	TR24	TL25	TC25	TR25	TL26	TC26	TR26	TL27	TC27	TR27	TL28	TC28	TR28	TL29	TC29	TR29	TL30	TC30	TR30	TL31	TC31	Daily Accum.	
																								Total	No. of Loads
KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	KK	LL	LL	956	974
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18	974
																								18	992
																								18	1010
																								0	1010
																								0	1010
																								0	1010
																								0	1010
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	54	

TABLE WEEKLY DUMPING RECORD (unit : No. of Loads) Two Shift of 10 Hours with Two Barges)

Date

Main Blanket		Main Blanket																															Main Blanket																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
		ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2	ing-2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
TR31	TL32	TC32	TR32	TL33	TC33	TR33	TL34	TC34	TR34	TL35	TC35	TR35	TL36	TC36	TR36	TL37	TC37	TR37	TL38	TC38	TR38	TL39	TC39	TR39	TL40	TC40	TR40	TL41	TC41	TR41	TL42	TC42	TR42	TL43	TC43	TR43	TL44	TC44	TR44	TL45	TC45	TR45	TL46	TC46	TR46	TL47	TC47	TR47	TL48	TC48	TR48	TL49	TC49	TR49	TL50	TC50	TR50	TL51	TC51	TR51	TL52	TC52	TR52	TL53	TC53	TR53	TL54	TC54	TR54	TL55	TC55	TR55	TL56	TC56	TR56	TL57	TC57	TR57	TL58	TC58	TR58	TL59	TC59	TR59	TL60	TC60	TR60	TL61	TC61	TR61	TL62	TC62	TR62	TL63	TC63	TR63	TL64	TC64	TR64	TL65	TC65	TR65	TL66	TC66	TR66	TL67	TC67	TR67	TL68	TC68	TR68	TL69	TC69	TR69	TL70	TC70	TR70	TL71	TC71	TR71	TL72	TC72	TR72	TL73	TC73	TR73	TL74	TC74	TR74	TL75	TC75	TR75	TL76	TC76	TR76	TL77	TC77	TR77	TL78	TC78	TR78	TL79	TC79	TR79	TL80	TC80	TR80	TL81	TC81	TR81	TL82	TC82	TR82	TL83	TC83	TR83	TL84	TC84	TR84	TL85	TC85	TR85	TL86	TC86	TR86	TL87	TC87	TR87	TL88	TC88	TR88	TL89	TC89	TR89	TL90	TC90	TR90	TL91	TC91	TR91	TL92	TC92	TR92	TL93	TC93	TR93	TL94	TC94	TR94	TL95	TC95	TR95	TL96	TC96	TR96	TL97	TC97	TR97	TL98	TC98	TR98	TL99	TC99	TR99	TL100	TC100	TR100	TL101	TC101	TR101	TL102	TC102	TR102	TL103	TC103	TR103	TL104	TC104	TR104	TL105	TC105	TR105	TL106	TC106	TR106	TL107	TC107	TR107	TL108	TC108	TR108	TL109	TC109	TR109	TL110	TC110	TR110	TL111	TC111	TR111	TL112	TC112	TR112	TL113	TC113	TR113	TL114	TC114	TR114	TL115	TC115	TR115	TL116	TC116	TR116	TL117	TC117	TR117	TL118	TC118	TR118	TL119	TC119	TR119	TL120	TC120	TR120	TL121	TC121	TR121	TL122	TC122	TR122	TL123	TC123	TR123	TL124	TC124	TR124	TL125	TC125	TR125	TL126	TC126	TR126	TL127	TC127	TR127	TL128	TC128	TR128	TL129	TC129	TR129	TL130	TC130	TR130	TL131	TC131	TR131	TL132	TC132	TR132	TL133	TC133	TR133	TL134	TC134	TR134	TL135	TC135	TR135	TL136	TC136	TR136	TL137	TC137	TR137	TL138	TC138	TR138	TL139	TC139	TR139	TL140	TC140	TR140	TL141	TC141	TR141	TL142	TC142	TR142	TL143	TC143	TR143	TL144	TC144	TR144	TL145	TC145	TR145	TL146	TC146	TR146	TL147	TC147	TR147	TL148	TC148	TR148	TL149	TC149	TR149	TL150	TC150	TR150	TL151	TC151	TR151	TL152	TC152	TR152	TL153	TC153	TR153	TL154	TC154	TR154	TL155	TC155	TR155	TL156	TC156	TR156	TL157	TC157	TR157	TL158	TC158	TR158	TL159	TC159	TR159	TL160	TC160	TR160	TL161	TC161	TR161	TL162	TC162	TR162	TL163	TC163	TR163	TL164	TC164	TR164	TL165	TC165	TR165	TL166	TC166	TR166	TL167	TC167	TR167	TL168	TC168	TR168	TL169	TC169	TR169	TL170	TC170	TR170	TL171	TC171	TR171	TL172	TC172	TR172	TL173	TC173	TR173	TL174	TC174	TR174	TL175	TC175	TR175	TL176	TC176	TR176	TL177	TC177	TR177	TL178	TC178	TR178	TL179	TC179	TR179	TL180	TC180	TR180	TL181	TC181	TR181	TL182	TC182	TR182	TL183	TC183	TR183	TL184	TC184	TR184	TL185	TC185	TR185	TL186	TC186	TR186	TL187	TC187	TR187	TL188	TC188	TR188	TL189	TC189	TR189	TL190	TC190	TR190	TL191	TC191	TR191	TL192	TC192	TR192	TL193	TC193	TR193	TL194	TC194	TR194	TL195	TC195	TR195	TL196	TC196	TR196	TL197	TC197	TR197	TL198	TC198	TR198	TL199	TC199	TR199	TL200	TC200	TR200	TL201	TC201	TR201	TL202	TC202	TR202	TL203	TC203	TR203	TL204	TC204	TR204	TL205	TC205	TR205	TL206	TC206	TR206	TL207	TC207	TR207	TL208	TC208	TR208	TL209	TC209	TR209	TL210	TC210	TR210	TL211	TC211	TR211	TL212	TC212	TR212	TL213	TC213	TR213	TL214	TC214	TR214	TL215	TC215	TR215	TL216	TC216	TR216	TL217	TC217	TR217	TL218	TC218	TR218	TL219	TC219	TR219	TL220	TC220	TR220	TL221	TC221	TR221	TL222	TC222	TR222	TL223	TC223	TR223	TL224	TC224	TR224	TL225	TC225	TR225	TL226	TC226	TR226	TL227	TC227	TR227	TL228	TC228	TR228	TL229	TC229	TR229	TL230	TC230	TR230	TL231	TC231	TR231	TL232	TC232	TR232	TL233	TC233	TR233	TL234	TC234	TR234	TL235	TC235	TR235	TL236	TC236	TR236	TL237	TC237	TR237	TL238	TC238	TR238	TL239	TC239	TR239	TL240	TC240	TR240	TL241	TC241	TR241	TL242	TC242	TR242	TL243	TC243	TR243	TL244	TC244	TR244	TL245	TC245	TR245	TL246	TC246	TR246	TL247	TC247	TR247	TL248	TC248	TR248	TL249	TC249	TR249	TL250	TC250	TR250	TL251	TC251	TR251	TL252	TC252	TR252	TL253	TC253	TR253	TL254	TC254	TR254	TL255	TC255	TR255	TL256	TC256	TR256	TL257	TC257	TR257	TL258	TC258	TR258	TL259	TC259	TR259	TL260	TC260	TR260	TL261	TC261	TR261	TL262	TC262	TR262	TL263	TC263	TR263	TL264	TC264	TR264	TL265	TC265	TR265	TL266	TC266	TR266	TL267	TC267	TR267	TL268	TC268	TR268	TL269	TC269	TR269	TL270	TC270	TR270	TL271	TC271	TR271	TL272	TC272	TR272	TL273	TC273	TR273	TL274	TC274	TR274	TL275	TC275	TR275	TL276	TC276	TR276	TL277	TC277	TR277	TL278	TC278	TR278	TL279	TC279	TR279	TL280	TC280	TR280	TL281	TC281	TR281	TL282	TC282	TR282	TL283	TC283	TR283	TL284	TC284	TR284	TL285	TC285	TR285	TL286	TC286	TR286	TL287	TC287	TR287	TL288	TC288	TR288	TL289	TC289	TR289	TL290	TC290	TR290	TL291	TC291	TR291	TL292	TC292	TR292	TL293	TC293	TR293	TL294	TC294	TR294	TL295	TC295	TR295	TL296	TC296	TR296	TL297	TC297	TR297	TL298	TC298	TR298	TL299	TC299	TR299	TL300	TC300	TR300	TL301	TC301	TR301	TL302	TC302	TR302	TL303	TC303	TR303	TL304	TC304	TR304	TL305	TC305	TR305	TL306	TC306	TR306	TL307	TC307	TR307	TL308	TC308	TR308	TL309	TC309	TR309	TL310	TC310	TR310	TL311	TC311	TR311	TL312	TC312	TR312	TL313	TC313	TR313	TL314	TC314	TR314	TL315	TC315	TR315	TL316	TC316	TR316	TL317	TC317	TR317	TL318	TC318	TR318	TL319	TC319	TR319	TL320	TC320	TR320	TL321	TC321	TR321	TL322	TC322	TR322	TL323	TC323	TR323	TL324	TC324	TR324	TL325	TC325	TR325	TL326	TC326	TR326	TL327	TC327	TR327	TL328	TC328	TR328	TL329	TC329	TR329	TL330	TC330	TR330	TL331	TC331	TR331	TL332	TC332	TR332	TL333	TC333	TR333	TL334	TC334	TR334	TL335	TC335	TR335	TL336	TC336	TR336	TL337	TC337	TR337	TL338	TC338	TR338	TL339	TC339	TR339	TL340	TC340	TR340	TL341	TC341	TR341	TL342	TC342	TR342	TL343	TC343	TR343	TL344	TC344	TR344	TL345	TC345	TR345	TL346	TC346	TR346	TL347	TC347	TR347	TL348	TC348	TR348	TL349	TC349	TR349	TL350	TC350	TR350	TL351	TC351	TR351	TL352	TC352	TR352	TL353	TC353	TR353	TL354	TC354	TR354	TL355	TC355	TR355	TL356	TC356	TR356	TL357	TC357	TR357	TL358	TC358	TR358	TL359	TC359	TR359	TL360	TC360	TR360	TL361	TC361	TR361	TL362	TC362	TR362	TL363	TC363	TR363	TL364	TC364	TR364	TL365	TC365	TR365	TL366	TC366	TR366	TL367	TC367	TR367	TL368	TC368	TR368	TL369	TC369	TR369	TL370	TC370	TR370	TL371	TC371	TR371	TL372	TC372	TR372	TL373	TC373	TR373	TL374	TC374	TR374	TL375	TC375	TR375	TL376	TC376	TR376	TL377	TC377	TR377	TL378	TC378	TR378	TL379	TC379	TR379	TL380	TC380	TR380	TL381	TC381	TR381	TL382	TC382	TR382	TL383	TC383	TR383	TL384	TC384	TR384	TL385	TC385	TR385	TL386	TC386	TR386	TL387	TC387	TR387	TL388	TC388	TR388	TL389	TC389	TR389	TL390	TC390	TR390	TL391	TC391	TR391	TL392	TC392	TR392	TL393	TC393	TR393	TL394	TC394	TR394	TL395	TC395	TR395	TL396	TC396	TR396	TL397	TC397	TR397	TL398	TC398	TR398	TL399	TC399	TR399	TL400	TC400	TR400	TL401	TC401	TR401	TL402	TC402	TR402	TL403	TC403	TR403	TL404	TC404	TR404	TL405	TC405	TR405	TL406	TC406	TR406	TL407	TC407	TR407	TL408	TC408	TR408	TL409	TC409	TR409	TL410	TC410	TR410	TL411	TC411	TR411	TL412	TC412	TR412	TL413	TC413	TR413	TL414	TC414	TR414	TL415	TC415	TR415	TL416	TC416	TR416	TL417	TC417	TR417	TL418	TC418	TR418	TL419	TC419	TR419	TL420	TC420	TR420	TL421	TC421	TR421	TL422	TC422	TR422	TL423	TC423	TR423	TL424	TC424	TR424	TL425	TC425	TR425	TL426	TC426	TR426	TL427	TC427	TR427	TL428	TC428	TR428	TL429	TC429	TR429	TL430	TC430	TR430	TL431	TC431	TR431	TL432	TC432	TR432	TL433	TC433

DUMPING RECORDS UNDER LOCAL CONTRACT (LOCATIONS & NO. OF LOADS DUMPED)
(unit : No. of Loads)

Date	Daily Accum.												Total No. of Loads				
	U1C1	U1C2	U1C3	U1C4	U1L1	U1L2	U1L3	U1L4	U1R1	U1R2	U1R3	U1R4		U2C1	U2C2	U2C3	U2C4
As of 09.05.99																	0
10.05.99																	1
11.05.99	1	1	1	1													4
12.05.99					1	1	1	1									4
13.05.99								1	1	1	1						3
14.05.99												1	1				2
15.05.99														1	1		2
16.05.99																0	16
Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16

DUMPING RECORDS UNDER LOCAL CONTRACT (LOCATIONS & NO. OF LOADS DUMPED)
(unit : No. of Loads)

Date																																		Daily Total No. of Loads	Accum. No. of Loads	
	U2C5 Blk-2	U2R1 Blk-2	U2R2 Blk-2	U2R3 Blk-2	U2R4 Blk-2	U2R5 Blk-2	U2R6 Blk-2	U2L1 Blk-2	U2L2 Blk-2	U2L3 Blk-2	U2L4 Blk-2	U3C1 Blk-3	U3C2 Blk-3	U3C3 Blk-3	U3C4 Blk-3	U3C5 Blk-3	U3C6 Blk-3	U3C7 Blk-3	U3R1 Blk-3	U3R2 Blk-3	U3R3 Blk-3	U3R4 Blk-3	U3R5 Blk-3	U3R6 Blk-3	U3R7 Blk-3	U3L1 Blk-3	U3L2 Blk-3	U3L3 Blk-3	U3L4 Blk-3	U3L5 Blk-3	U3L6 Blk-3	U3L7 Blk-3				
As of 16.05.99																																				
17/5/99	1	1	1																																16	
18/5/99																																				20
19/5/99																																				24
20/5/99																																				28
21/5/99																																				32
22/5/99																																				40
23/5/99																																				49
Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33	

DUMPING RECORDS UNDER LOCAL CONTRACT (LOCATIONS & NO. OF LOADS DUMPED)
(unit : No. of Loads)

Date	Locations																										Daily		Accum. No. of Loads
	MB53	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	Total	No. of Loads	
As of 23.05.99																													
24/5/99			1																								1	1	49
25/5/99				1																								4	53
26/5/99					1																							7	60
27/5/99						1																						8	68
28/5/99							1																					6	74
29/5/99								1																				9	83
30/5/99									1																			12	95
Total																												0	95

Date	Locations																										Daily		Accum. No. of Loads
	MB53	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	RR	Total	No. of Loads	
1																													46

DUMPING RECORDS UNDER LOCAL CONTRACT (LOCATIONS & NO. OF LOADS DUMPED)

(unit : No. of Loads)

Date	3W4	3Y3	3X10	3X11	3X12	3X13	3X14	3X15	3X16	3X17	3XR18	3XR19	3XR20	3XR21	3XR22	3XR23	3XR24	3XR25	3XR26	3XR27	Daily Total	Accum. No. of Loads	
As of 30.05.99																						95	
31.05.99	1	1	1																			3	98
01.06.99				1	1	1	1															4	102
02.06.99							1	1	1	1												3	105
03.06.99											1	1	1	1								5	110
04.06.99														1	1	1	1	1	1	1		5	115
05.06.99																						0	115
06.06.99																						0	115
Total	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	

DUMPING RECORDS UNDER LOCAL CONTRACT (LOCATIONS & NO. OF LOADS DUMPED)
(unit : No. of Loads)

Date	(unit : No. of Loads)																				Daily Total No. of Loads	Accum. No. of Loads				
	3XL28	3XL29	3XL30	3XL31	3XL32	3XL33	3XL34	3XL35	3XL36	3XL37	3XL38	3XL39	3XL40	3XL41	3XL42	3XL43	3XL44	3XL45	3XL46	3XL47			3XL48	3XL49	3XL50	3XL51
As of 06.06.99																										115
07.06.99	1	1	1	1																					4	119
08.06.99				1	1	1	1																		4	123
09.06.99								1	1	1	1														4	127
10.06.99												1	1	1	1										4	131
11.06.99														1	1	1	1								4	135
12.06.99																				1	1	1	1	1	4	139
13.06.99																									0	139
Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24		

DUMPING RECORDS UNDER LOCAL CONTRACT (LOCATIONS & NO. OF LOADS DUMPED)

(unit : No. of Loads)

Date	3XL52	3XL53	3YR1	3YR2	3YR3	3YR4	3YR5	3YR6	3YR7	3YR8	3YR9	3YR10	3YL1	3YL2	3YL3	3YL4	3YL5	3YL6	3YL7	3YL8	3YL9	3YL10
	X	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
As of 13.06.99																						
14/6/99	1	1	1																			
15/6/99			1	1	1	1	1	1	1	1	1	1										
16/6/99											1	1	1	1	1	1	1	1	1	1	1	1
17/6/99																						
18/6/99																						
19/6/99																						
20/6/99																						

Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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3ZR1	3ZR2	3ZR3	3ZR4	3ZR5	3ZR6	3ZR7	3ZR8	3ZR9	3ZR10	3ZR11	3ZR12	3ZR13	3ZR14	3ZR15	3ZR16	3ZR17	3ZR18	3ZR19	Daily		Accum.	
																			Total	No. of Loads		
Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	3	139	
																				8	142	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	150	
																				8	156	
																				8	164	
																				8	172	
																				8	180	
																				0	180	
																				41		

ANNEX-B

*QUALITY CONTROL OF
BARGE DUMPING MATERIAL*

ANNEX – B

QUALITY CONTROL OF BARGE DUMPING MATERIAL

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1 General

This chapter presents a brief discussion on quality control work of the barge dumping material for the construction stages under Scheme -1 and -2 of the wet blanketing contract. All investigation reports of used and unused borrow pits namely

1. Kinchigune, Pilipota and Warakawela Area
2. University Playground and the valley adjacent to it
3. Berawaula new borrow pits, are separately annexed in the Data Book.

Initial investigation work of Kinchigune & Pilipota borrow pits and material testing were carried out by a local sub contractor, Messrs. Engineering Laboratory services Ltd. All the subsequent investigation and soil testing as well as the other quality control works were handled by the main contractor Messrs. KHK Joint Venture at their site laboratories.

Testing of material and reporting results were done according to ASTM.

2 Sources of Blanketing Material

In the preliminary stage of the design, Kalawelpe, Kinchigune and Pilipota had been identified as potential borrow pits for wet blanketing work. Soil investigation were done in April 1996. It was found that Kalawelpe was not suitable and available quantity in Kinchigune was far less than the envisaged amount. Consequently other areas namely Belihul Oya Right Bank, Warakawela and Pilipota above the reservoir full supply level were selected and investigated.

The panel recommended two borrow pits, Kinchigune and Pilipota above & below 460 m MSL to be included in the tender documents at the first International meeting held on May 1996.

In the mean time the reservoir was allowed to fill to its full capacity following the recommendations of the second international panel meeting held on September 1996. The reservoir reached to its full supply level on 20th November 1997. Since then the reservoir operation was done at higher levels inundating selected borrow pits in most of the times.

The revised wet blanketing programme necessitated the dumping operation to be commenced from middle of March 1998. The temporary access road to Pilipota could not be completed and the causeway at the Belihul Oya crossing was not constructed for various reasons at that time. Pilipota had been completely inundated and the upper levels were also inaccessible. It was anticipated that the reservoir could not be lowered enough in time to extract soil. Therefore alternative sites were investigated to avoid possible delay in commencing of trial blanketing.

Additional soil investigation were carried out first in the university Playground and small valley below it. Test results showed that average fines content of this soils were not sufficient to be used in the initial barge dumping. However the soil material was found to be within the specified gradation limits.

Subsequently the new borrow pit in Berawaula was located. This proved to be the best borrow area containing fines more than 50% with sufficient quantities until Pilipota borrow pit could be used.

Location plan of borrow pits are shown in Fig. 1.

Table 1 gives the comparison of estimated quantities and extracted quantities from each borrow pits.

2-1 Berawaula New Borrow Pit

This area was forming the lower half of a mountain flank. The ridge was very wide and gently sloping and standing above the two adjacent valleys on either side. Elevation of the area was 530m El to 550m EL.

From the investigation tests, soil characteristics of the Berawaula pits could be given as follows.

- (a) The top part of the ridge was covered with hard quartz gravel and quartz boulders underlain by red lateritic residual soils. The lower part consisted of 1.0 to 1.5m thick clayey sand layer of probably slopewash origin and lateritic insitu soil beneath it.
- (b) Soils were classified into CH, CL and SC groups according to the unified soil classification charts.
- (c) Fines content of the soil was 45% to 70%.
- (d) Natural moisture content varied in the range of 18% to 36%.
- (e) Maximum dry density of the soil as determined by the standard proctor compaction test was 2.10 T/ cum and the optimum moisture content was 26.5%.
- (f) Liquid limit and the plasticity index of the soil was 40 - 60% and 20 - 22% respectively.

2-2 Pilipota - Above 440 m MSL

The Elevation of the bottom of the Pilipota valley was 430m MSL. The soil found on the higher elevations such as 440m EL was slightly coarser and the thickness was 2.0 to 2.5m only. However a 40-50m wide extremely weathered, sub vertical band was found behind the two hillocks on the slopes in the west direction. The

depth of this band was more than 30m and the excavated saprolite was found suitable for barge dumping material.

- (a) Soils on slopes are residual soil and lateritic.
- (b) Soils were classified into SC,SC-SM, SM and GC groups according to the unified soil classification charts.
- (c) Fines content of the soil was 20% to 45%.
- (d) Natural moisture content varied in the range of 18% to 28%.
- (e) Maximum dry density of the soil as determined by the standard proctor compaction test was 2.10 T/ cum and the optimum moisture content was 26.5%.
- (f) Liquid limit and the plasticity index of the soil was 40 - 60% and 20 - 22% respectively.

In addition to above sources, excavated material from hostel site in Pambahinna was incorporated to the stockpiles.

3 Stockpiling

Stockpiles were located at Kinchigune adjacent to the building yard at and above 462m MSL. Soil material from borrow pits were hauled by using 11 ton drum trucks to the stock piles . Fully loaded drum trucks were unable to discharge soil directly to the hopper of the loading facilities without spilling and wasting. Therefore for economical reasons separate fleet of trucks were allocated for stockpiling and four nos half loaded trucks were engaged for hauling material from stockpiles to the hopper. Soil material from both borrow pits was used “ as dug” without any blending as it met the specified grading limits.

3-1 Quality Control of Stockpiling

After careful visual inspection by experienced supervisors excavated material was loaded into drum trucks and hauled to stockpiles. Unsuitable material and oversize boulders were removed at the borrow pit using loading equipments itself. Samples were taken from every 20 trucks and wash gradation test was carried out immediately on wet samples to determine the fines content. A correction for the moisture content of the fine soil was applied. The fines content of the samples taken in the morning session were informed to the borrow area foreman during the same day to increase the confidence level of their judgment. This procedure was proved to be very effective to ensure only suitable material were sent to the stockpiles while minimizing the wasting of suitable material.

A screen had been fixed on the hopper to separate oversize fraction during unloading to the hopper. In addition to that large rock fragments and boulders were removed during stockpiling.

4 Moisture control of blanketing material

Moisture control of blanketing material was necessary to form a uniform blanket from barge dumping of soil from the surface of the reservoir.

Contractor had arranged two grouting pumps with gears to provide different flow rate to the sprinklers which are fixed at the end of secondary conveyor belt of the loading facilities. The filling of the barge took about 35-40 minutes and the capacity of the barge was 110 cum. The average mass flow rate of soil was observed and based on that figure the required flow rates for sprinklers were determined for different initial moisture conditions. Two pumps were connected in parallel for easy operation. Tables have been provided for operators to obtain different flow rate with different gear combinations.

Determination of moisture content was carried out by using large 'speedy' moisture tester-type G2 which has working range 0 to 50% (Ashworth Instrumentation)

4-1 Moisture control for trial dumping

It was required to use soils having different moisture content in order to select optimum moisture content with regard to the properties of soils, performance of the barges and pattern of dumping. Therefore trials were carried at 25%, 30% and 35% moisture content of soils. The heavy rain experienced during that period made it difficult to prepare soils at 20% moisture content and no trials were done for that.

After checking the initial moisture content at the stockpiles by using speedy moisture tester the required flow rate was adjusted to achieve the target moisture content. Soil samples were taken from the hopper of the barge after mixing and moisture content was rechecked.

4-2 Moisture control for main blanketing

Optimum moisture content of the soil for barge dumping was identified as 25% and specification required to control moisture with the tolerance of +/-5%.

At the beginning moisture content of every barge load was checked using speedy moisture tester and later the frequency of testing was reduced to two test per shift.

Fig 2 and Fig. 3 show the moisture control test results of barge loads in Scheme -1 and -2 respectively. For barge dumping over slopes it was required to use soils having moisture content close to upper limits to reduce the spreading of material after hitting on the bottom. In addition to that high moisture content facilitates quick dumping as well. Therefore upper limits were chosen towards the latter stages.

5 Gradation and Fines Content of Barge Dumping Material

The gradation requirement of barge dumping material was as follows.

<u>Sieve Size</u>	<u>Passing percentage</u>
100mm	100
50mm	85 - 100
20mm	70 - 100
10mm	61 - 100
5mm	50 - 100
2.36mm	45 - 95
1.18mm	39 - 90
0.600mm	34 - 85
0.300mm	28 - 80
0.150mm	23 - 72
0.075mm	20 - 65

Fig. 4 shows the specified envelope for barge dumping material.

5-1 Sampling for Gradation Test

Representative samples for gradation test were obtained from the secondary conveyor belt while loading the material to barges. The moving conveyor belt with the soil was stopped and one meter length of the belt was randomly selected. The total amount of material in that meter length was carefully collected to polythene bags and delivered to the site laboratory. The average weight of the sample exceeded 6 kg.

5-2 Gradation Test results

Gradation test was conducted on oven dried samples. Wash gradation test was done for the minus 4.75mm fraction. One soil sample was collected for every 5 barge loads. Total 755 tests were performed for barge loads during Scheme -1 and -2. Only 8 samples have recorded fine contents marginally below the minimum specified value. The average particle size distribution curves of the soil samples on monthly basis are plotted in Fig. 5. This shows that material used for blanketing has been satisfactory.

The average fines content of the material used for the Scheme -1 was 50%.
The average fines content of the material used for the Scheme -2 was 35%

Fig 6 and Fig 7 show the distribution of the fine content of the material used for two stages.

6 Index Tests of Barge Dumping Material

Atterberg Limits

A few no of tests have been done to determine the plasticity of barge dumping materials from both borrow pits. The results are shown in the plasticity chart given in Fig 8.

Bulk Density of barge dumping material

As per the specifications, 110 cubic metres of barge dumping material is regarded as one barge load. It was required to determine the total weight of one barge load to monitor the draft of the fully loaded barge. Therefore bulk density test was carried out under the normal loading conditions at specified moisture content periodically or whenever the changes of material properties was observed. The results are given in Table 2.

7 Disturbed Sampling

Disturbed samples of underwater placed blanket was obtained to assess the quality of the wet blanket. This was achieved by using sampling trays shown in Fig 9. This equipment and method had been successfully tested and used for the wet blanketing of the Tarbela dam project.

Total 9 nos. tray samplers were fabricated for the wet blanketing project of the Samanalawewa Dam. Using these trays 80 nos. test were done and 70 nos. samples were recovered.

7-1 Disturbed Sampling for trial blanketing and main blanketing

Various parameters required for successful wet blanketing operation such as optimum moisture content, spacing of barge dumping locations, no of barge loads in each location to achieve required thickness of the blanket, pattern of barge locations etc. were decided during trial blanketing. Quality of the formed blanket after trial blanketing were compared with the help of collected samples of the blanket. Visual observation gradation, natural moisture content, bulk density and permeability tests were carried out. All Test results are summarized in Table 3 and Table 4 for trial and main blanketing respectively.

7-2 Loss of Fines

Coarser particles contained in barge loads tends to settle more rapidly and deposits near the dumping locations. However quick dumping at correct moisture content can minimize segregation. Good samples collected 15m away from the target points showed that loss of fines was in the range of 8 - 15%.

Gradation of the top, middle and the bottom of the samples were compared with the original gradation before dumping. Fig 9 to Fig 12 shows the comparison of particle size distribution curves of the disturbed samples.

7-3 Permeability Test on undisturbed samples

Permeability measurement on undisturbed samples of the blanket has provided very valuable information. Total 59 tests were conducted at the site laboratory during the Scheme -1 and -2 of wet blanketing.

7-4 Preparation of undisturbed sample and test results

A 150mm dia., 200mm high steel cylindrical mould with covered bottom was fixed to the disturbed sampling tray as shown in Fig. 9. Inside the mould 90mm diameter 110 mm high PVC pipe was kept in place with the inter space filled by clay to receive the soil during formation of blanket. As the clay filling could be removed easily undisturbed sample contained in the pipe could be transferred to permeability cell with minimum disturbance. PVC pipe has to be used as the consistency of the sample was soft to medium.

Once the sample was put in the permeability cell of 100mm intenal dia., the inter space was filled with bentonite powder and allowed it to saturate for 72 hrs. Thereafter falling head permeability test was carried out to determine the coefficient of permeability of the sample when it reached to the steady state condition.

About 90% of the samples showed the coefficient of permeability lower than 1×10^{-5} cm/s. Maximum value fell in the range of 1×10^{-4} and the minimum value was on the order of 10^{-6} cm/s. Hence all barge dumping material produced a low enough coefficient of permeability so that significant head loss can be established across the blanket.

7-5 Bulk Density and Natural Moisture Content of the Blanket

Bulk density of the underwater placed blanket was estimated from the undisturbed sample used for the permeability test. The test results could be summarized as follows.

- (a) Natural moisture content of the blanket varied from 41% to 97%
- (b) Average dry density of the blanket was 1.2 T/m^3
- (c) Average maximum dry density of the used material was 2.1 t/m^3 as determined by standard proctor compaction test. Accordingly about 70% relative compaction has been achieved by barge dumping of soil.

TABLES

Table 1 Usage of Borrow Pits

Name of Borrow Pit	Estimated Quantity	Extracted Quantity	Hauling Distance
Kinchigune	95,000 cum	Nil	< 0.5 km
Berawaula	35,000 cum	78,000 cum	3.0 km
Pilipota - Below 440 m EL.	373,200 cum	Nil	1.5 km
- Above 440 m EL.	330,600 cum	383,100 cum	1.5 km

Table 2 Bulk Density of Barge Dumping Material

Date	Bulk Density	Moisture content	Source of soil	Description of soil
03/05/98	1355 kg/cum	25%	Berawaula	Reddish Brown Sandy Clay
22/06/98	1352 kg/cum	25%	Pilipota A	Yellowish to Light Brown Clayey Sand
01/07/98	1301 kg/cum	25%	Pilipota A	Yellowish to Light Brown Clayey Sand
25/07/98	1333 kg/cum	26%	Pilipota B	Reddish Brown Clayey Sand with Gravel
01/10/98	1341 kg/cum	28%	Pilipota B	Light Yellowish to Light Brown Clayey Sand

Table 3 Summary of Gradation Test Results

Month	No of Barge Loads	No of Test Samples	No of Failures	Fines Content		
				Average	Maximum	Minimum
April	122*	15	0	58	66	51
May	331	61	1	50	70	18
June	521	99	3	37	52	13
July	652	130	4	36	52	15
August	640	131	0	39	57	24
September	565	112	0	39	52	22
October	411	90	0	32	48	20
November	304	61	0	29	47	23
December	328**	56	0	33	55	22
Total	3873	755	8	37		

- * Included 5 Barge loads in March 1998
- ** Included 17 barge Loads in January 1999

Table 4 Summary of Moisture Control of Barge Dumping Material

Month	No of Barge Loads	No of Test Samples	Moisture Content		
			Average	Maximum	Minimum
April*	122	45	24.9	28.2	22.7
May	331	89	25.9	30.8	20.4
June	521	119	24.7	29.0	20.4
July	652	145	26.2	33.3	23.4
August	640	142	27.7	29.8	24.2
September	564	128	28.2	29.8	26.3
October	412	97	27.6	30.7	21.9
November	304	70	27.6	30.7	24.8
December	328	77	27.7	31.1	24.1
Total	3813	912	26.9		

- * Figure excludes 61 loads of trial blanketing

TABLE 5 SUMMARY OF TEST RESULTS OF TRAY SAMPLES-TRIAL BLANKETING

Tray test No:	Location	Before Dumping		Thickness of Sample (cm)	Sample Retrieved from the Blanket					Permeability cm/Sec	
		% fines content	Moisture Content		% fines content			Bulk Density (g/cm ³)	Natural Moisture content		Dry Density (g/cm ³)
					Top	Middle	Bottom				
1	1C5 -15m	57	27.0	> 30	44.0	41.4	50.3	2.04	59.9	1.27	2.57X10 ⁻⁵
2	1C5 -30m	57	27.0	> 30	45.4	49.3	51.0	1.89	64.6	1.15	2.41X10 ⁻⁵
3	1C5 -45m	57	27.0	**							
4	1C13 -15m	57	26.4		54.3	50.7	49.2	2.20	80.0	1.22	9.67X10 ⁻⁵
5	1C13 -30m	57	26.4						92.0		
6	1C13 -45m	57	26.4								
7	1C1 -15m	52	30.5		49.8	46.8	40.4	2.01	57.8	1.27	6.52X10 ⁻⁵
8	1C1 -30m	52	30.5			47.3			73.4		
9	1C1 -45m	52	30.5			83.7			80.5		
10	1C9 -15m	52	35.3	7		62.8			87.6		
11	1C9 -30m	52	35.3	26	47.5	45.8	42.1	1.82	51.6	1.20	1.18X10 ⁻⁴
12	1C9 -45m	52	35.3	6.5		66.9			84.7		

** Samples could not be collected

TABLE 6 SUMMARY OF TEST RESULTS OF TRAY SAMPLES-MAIN BLANKETING

Tray Test No:	Location	Dates of Barge Dumping	Before Dumping		Date of Retrieval	Thickness of Sample (cm)	Sample Retrieved from the Blanket				Bulk Density (g/cm ³)	Natural Moisture content %	Dry Density (g/cm ³)	Permeability cm/sec
			% fines content	Moisture Content			% fines content							
							Top	Middle	Bottom					
13	1L2-10m	24-Apr	58.3	25.0	29-Apr	12	35.1	37.9	37.9	1.79	44.4	1.24	2.48X10 ⁻⁵	
14	1R2-10m	24-25/Apr	61.9	25.0	29-Apr	18	33.1	30.7	37.9	1.83	41.0	1.29	5.98X10 ⁻⁵	
15	1C3-10m	25-Apr	54.0	24.7	29-Apr	30	53.1	49.2	41.4	1.82	41.0	1.29	2.80X10 ⁻⁵	
16	1L4-10m	25-27/Apr	51.0	25.1	29-Apr	>47	39.6	37.6	36.0	1.80	44.4	1.25	9.48X10 ⁻⁶	
17	1R4-10m	27-Apr	51.0	25.2	29-Apr	30	55.0	42.7	33.1	1.79	40.7	1.28	3.28X10 ⁻⁵	
18	1L6-10m	28-29/Apr	52.5	25.8	01-May	11		57.0		1.67	58.0	1.06	2.26X10 ⁻⁵	
19	1L8-10m	27-28/Apr	61.0	25.0	01-May	>44	57.9	55.8	53.2	1.76	51.5	1.16	3.44X10 ⁻⁵	
20	1R8-10m	27-28/Apr	60.0	24.4	01-May	30	47.9	53.6	60.5	1.71	59.5	1.07	9.03X10 ⁻⁵	
21	1L10-10m	02-May	52.8	25.5	04-May	23	47.6	46.6	44.3	1.78	46.3	1.22	2.76X10 ⁻⁵	
22	1R10-10m	01-02/May	54.3	25.8	04-May	16		42.7		1.67	51.2	1.11	1.40X10 ⁻⁵	
23	1L12-10m	30-Apr	60.0	22.7	04-May	>44	50.5	48.3	38.8	1.80	54.9	1.16	1.95X10 ⁻⁵	
24	1R12-10m	29-30/Apr	56.5	24.6	04-May	>50	53.5	52.0	50.6	1.63	51.7	1.07	7.51X10 ⁻⁵	
25	1L14-10m	04-May	57.9	27.4	07-May	>72	47.0	49.1	40.1	1.94	71.8	1.13	1.19X10 ⁻⁴	
26	1R14-10m	05-May	63.8	27.4	07-May	**								
27	1L16-10m	02-May	70.0	26.5	07-May	20	77.0		70.6	1.86	81.2	1.02	4.50X10 ⁻⁵	
28	1R16-10m	2-3/May	55.9	24.2	07-May	11		56.5		1.95	60.0	1.22	1.68X10 ⁻⁵	
29	2C3-10m	06-May	70.3	26.3	14-May	29	38.6	37.3	43.8	1.78	56.0	1.14	1.79X10 ⁻⁵	
30	2L4-10m	6-7/May	67.0	24.2	14-May	17		37.2		1.73	40.9	1.23	1.09X10 ⁻⁵	
31	2L6-10m	7-8/May	63.7	24.2	14-May	**								
32	2R6-10m	7-8/May	67.4	25.5	14-May	29	49.5	42.6	43.4	1.80	55.3	1.16	5.05X10 ⁻⁵	
33	2L8-10m	8-9/May	47.6	26.0	20-May	32	39.5	40.8	47.2	1.80	49.3	1.21	1.20X10 ⁻⁵	
34	2C9-10m	14-18/May	54.2	25.8	19-May	33	47.1	41.8	41.9	1.67	42.1	1.18	1.81X10 ⁻⁵	
35	2C11-10m	20-May	27.4	25.8	21-May	26	22.8	43.6	37.5	1.74	37.3	1.26	1.31X10 ⁻⁵	

Tray Test No:	Location	Dates of Barge Dumping	Before Dumping		Date of Retrieval	Thickness of Sample (cm)	Sample Retrieved from the Blanket			Bulk Density (g/cm ³)	Natural Moisture content %	Dry Density (g/cm ³)	Permeability cm/sec
			% fines content	Moisture Content			% fines content						
							Top	Middle	Bottom				
39	3L6-10m	19-20/May	29.1	25.0	26-May	20	44.5		1.89	37.5	1.38	3.51X10 ⁻⁶	
40	3R6-10m	20-21/May	40.4	24.9	26-May	27	45.7		1.79	47.2	1.22	1.27X10 ⁻⁵	
41	2C2-10m	22-May	40.9	26.6	28-May	43	46.2	45.9	1.78	47.8	1.21	1.81X10 ⁻⁵	
42	2C4-10m	23-May	43.3	25.0	28-May	>55	41.2	41.3	1.70	48.5	1.14	1.62X10 ⁻⁵	
43	1C6-10m	27-May	54.4	23.4	30-May	36	30.5		1.75	36.6	1.28	1.69X10 ⁻⁵	
44	1L7-10m	26-27/May	41.4	25.8	30-May	19	30.5		1.83	57.4	1.16	6.56X10 ⁻⁶	
45	1L9-10m	27-May	44.5	24.2	30-May	**			1.74	48	1.18	6.75X10 ⁻⁶	
46	2C8-10m	30-May	39.6	27.6	02-Jun	64	41.8		2.41	95.5	1.23	1.90X10 ⁻⁵	
47	2R7-10m	28-29/May	47.4	26.4	02-Jun	0.4	33.9		2.23	96.7	1.13	1.49X10 ⁻⁵	
48	2C10-10m	31-May	41.7	28.2	04-Jun	>75	34.2	45.8	1.76	38.7	1.272	4.39X10 ⁻⁵	
49	2R11-10m	01-Jun	16.2	25.5	04-Jun	48	31.3	39.6	1.54	32.1	1.17	1.74X10 ⁻⁵	
36	2L12-10m	01-Jun	37.1	25.4	04-Jun	25	43.9		1.55	39.9	1.11	8.83X10 ⁻⁶	
50	3C1-10m	2-3/Jun	34.1	24.7	09-Jun	21	56.2	48	2.00	55.2	1.29	7.93X10 ⁻⁶	
51	3L2-10m	02-Jun	22.0	25.0	09-Jun	47			1.76	52.1	1.16	1.13X10 ⁻⁵	
52	3C3-10m	04-Jun	30.7	26.5	09-Jun	7	55.5	49	1.67	65.2	1.01	1.39X10 ⁻⁵	
53	3L4-10m	04-Jun	36.0	25.4	12-Jun	45			1.75	43.7	1.22	1.55X10 ⁻⁵	
54	3C5-10m	5-9/Jun	52.0	25.1	***								
55	3L6-10m	9-10/Jun	46.8	21.5	16-Jun	46	49.7	48.6	1.79	64.8	1.09	2.36X10 ⁻⁶	
56	A1L10-10m	11-Jun	39.1	20.4	18-Jun	32	56.9		2.12	67.2	1.27	9.15X10 ⁻⁶	
57	A1L12-10m	11-Jun	38.5	21.3	18-Jun	16	59.9		2.17	77.1	1.23	1.03X10 ⁻⁵	
58	A1R8-10m	14-Jun	47.3	26.5	20-Jun	59	51.4		1.70	27.5	1.332	9.86X10 ⁻⁶	
60	A1R10-10m	14-15/Jun	44.0	24.6	20-Jun	5	42.9						
61	A2R2-10m	16-Jun	46.6	25.1	23-Jun	16	36.2		1.96	83.6	1.07	1.55X10 ⁻⁴	
62	A2R4-10m	16-17/Jun	42.7	25.0	***								
59	A1R16-10m	22-23/Jun	35.0	25.0	28-Jun	28	39.9		1.69	28.9	1.31	5.63X10 ⁻⁴	

Tray Test No:	Location	Dates of Barge Dumping	Before Dumping		Date of Retrieval	Thickness of Sample (cm)	Sample Retrieved from the Blanket			Bulk Density (g/cm ³)	Natural Moisture content %	Dry Density (g/cm ³)	Permeability cm/sec
			% fines content	Moisture Content			% fines content						
							Top	Middle	Bottom				
63	A1R19-10m	23-Jun	25.8	25.4	28-Jun	38	28.9	31.2	16.4	2.13	32.9	1.6	3.02X10 ⁻⁴
64	A1R22-10m	24-Jun	30.2	24.6	28-Jun	22		26.8					
65	A1R25-10m	25-Jun	41.2	25.8	***								
66	A1R28-10m	25-26/Jul	37.9	22.3	***								
67	A1R31-10m	27-Jun	37.9	27.0	30-Jun	40	31.4	43.6	26	2.18	40.7	1.55	1.91x10 ⁻⁵
68	A1L2-10m	29-Jun	36.1	24.6	03-Jul	6		10.4					
69	A1L5-10m	29-Jun	43.5	25.4	03-Jul	28		31.7		2.35	68.3	1.4	7.48X10 ⁻⁵
70	A2L1-10m	29-30/Jul	30.2	25.7	03-Jul	**		35.4		2.21	62	1.36	1.77X10 ⁻⁵
71	A2L11-10m	9-10/Jul	29	25.8	09-Sep	18		30		1.94	61	1.21	4.22X10 ⁻⁵
72	A4L7-10m	11-Jul	24	25.4	14-Jul	81	28	27	38	2.44	92	1.27	0.99X10 ⁻⁵
73	A5L7-10m	11-12/Jul	30	25.9	***								
74	S1L10-10m	13-14/Jul	20	24.9	21-Jul	38	22		31	1.99	47	1.36	1.46X10 ⁻⁵
75	S2L4-10m	14-Jul	29	25.8	21-Jul	28	26		23	1.75	32	1.32	2.09X10 ⁻⁵
76	S2R1-10m	28-Jul	42	25.8	07-Aug	40	39		31	1.92	61	1.19	1.14X10 ⁻⁵
78	ADU17-10m	12-Jul	46	27.4	30-Aug	49		59		1.99	59	1.25	5.47X10 ⁻⁶
77	S3R1-10m	30-31/Jul	41	25.0	02-Sep	68	51	53	48	1.78	34	1.33	7.17X10 ⁻⁵
79	CC2-10m				20-Nov	35	34	38	40	1.69	47.7	1.145	9.49X10 ⁻⁶
80	CC1-10m				20-Nov	39	39	36	38	1.93	48	1.308	1.16X10 ⁻⁵

** Samples could not be collected

*** Sampling trays could not be retrieved

FIGURES

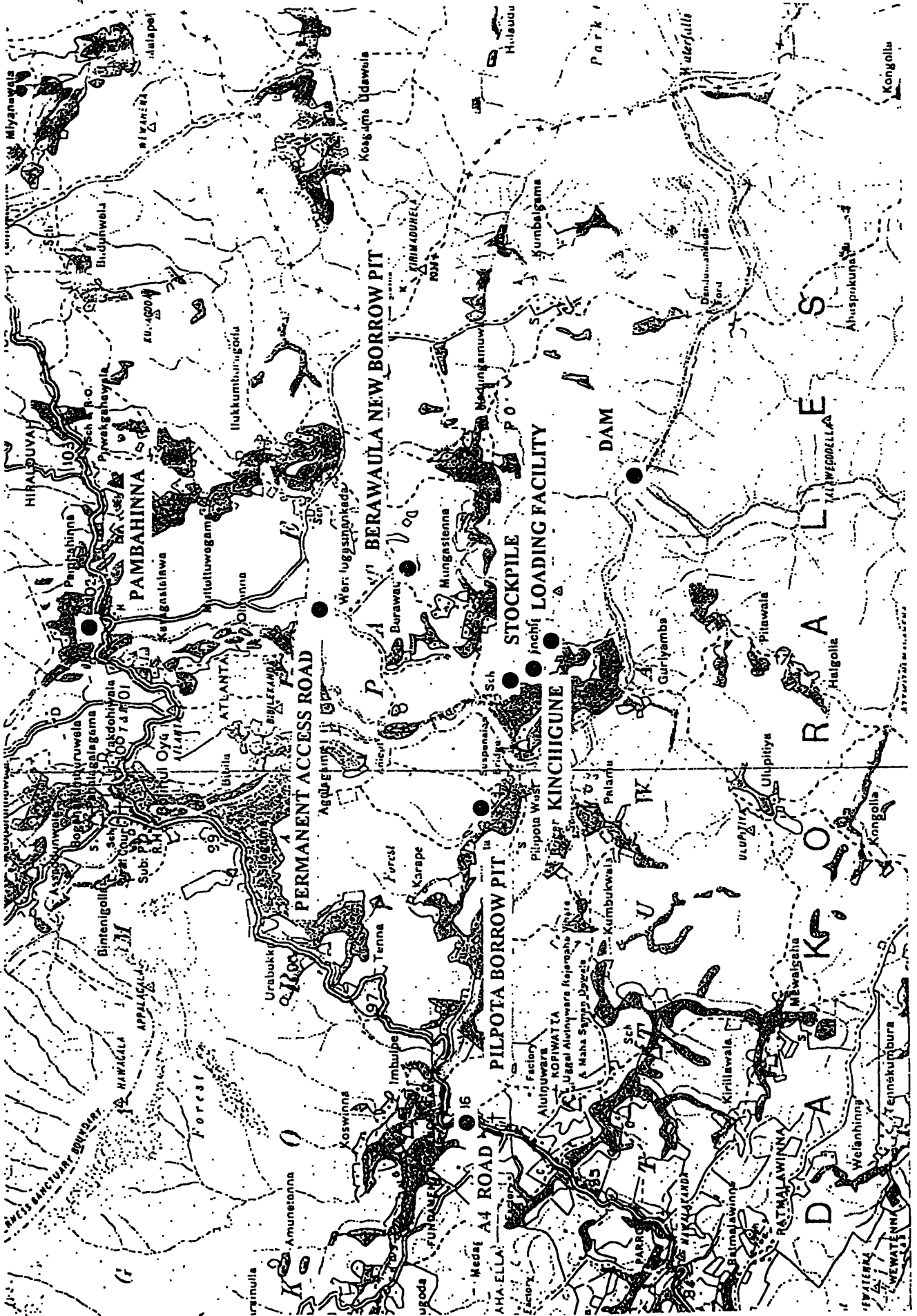


FIG 1 LOCATION MAP OF BORROW PITS

FIG. 2 MOISTURE CONTROL OF BARGE DUMPING MATERIAL
STAGE 1- MAIN BLANKETING

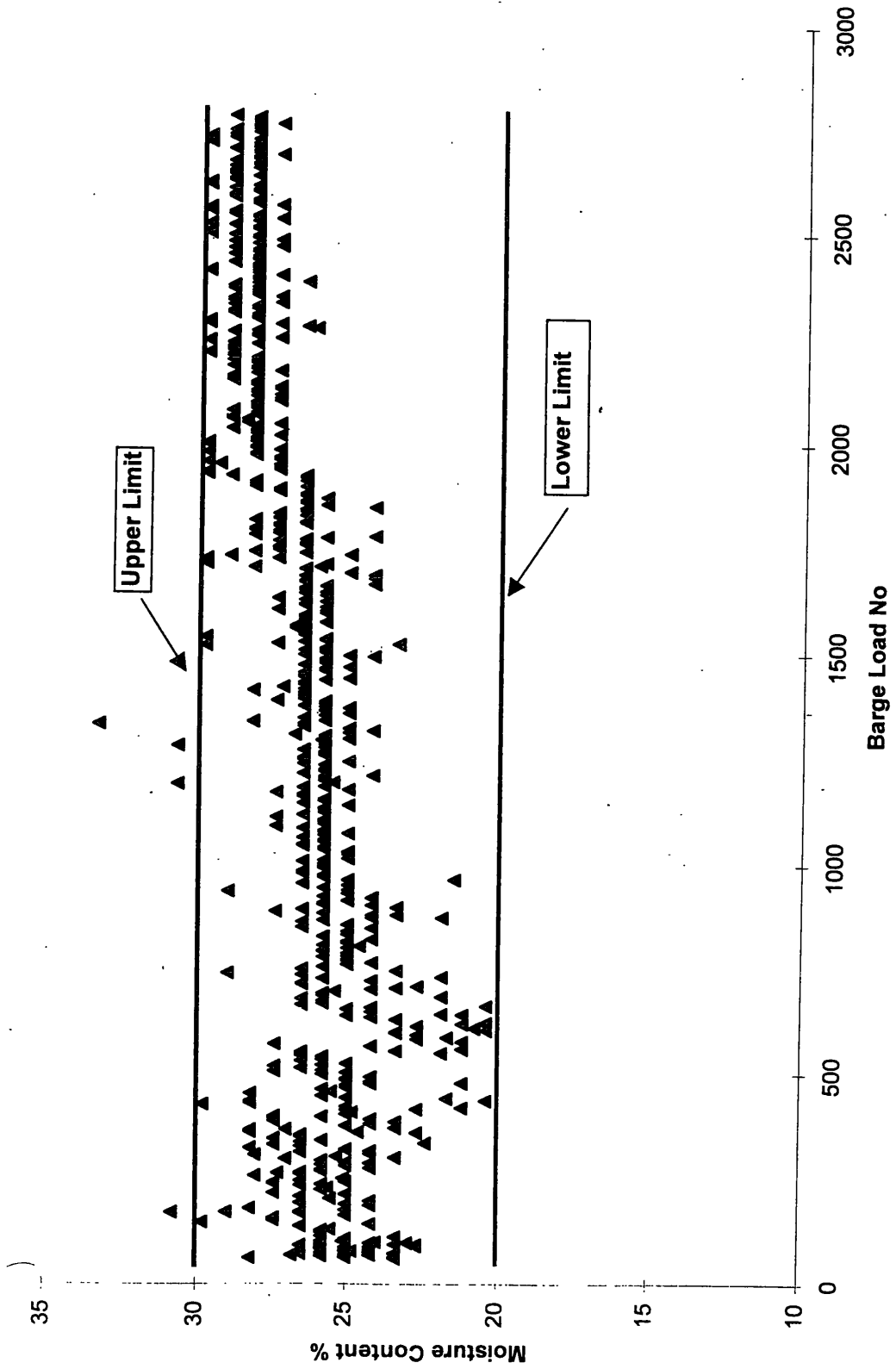


FIG 3 MOISTURE CONTROL OF BARGE DUMPING MATERIAL

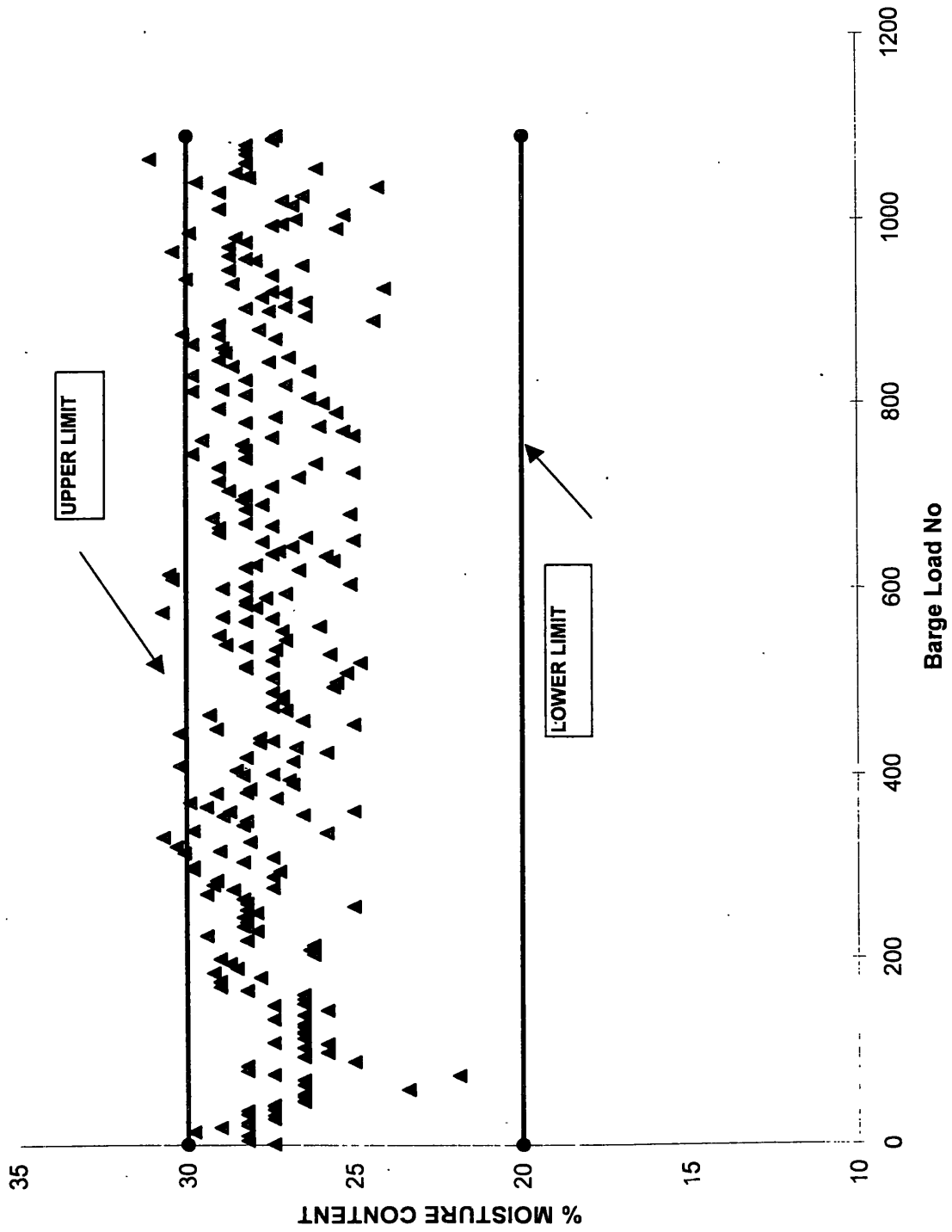


Fig. 4 Particle Size Distribution Curves - Specified

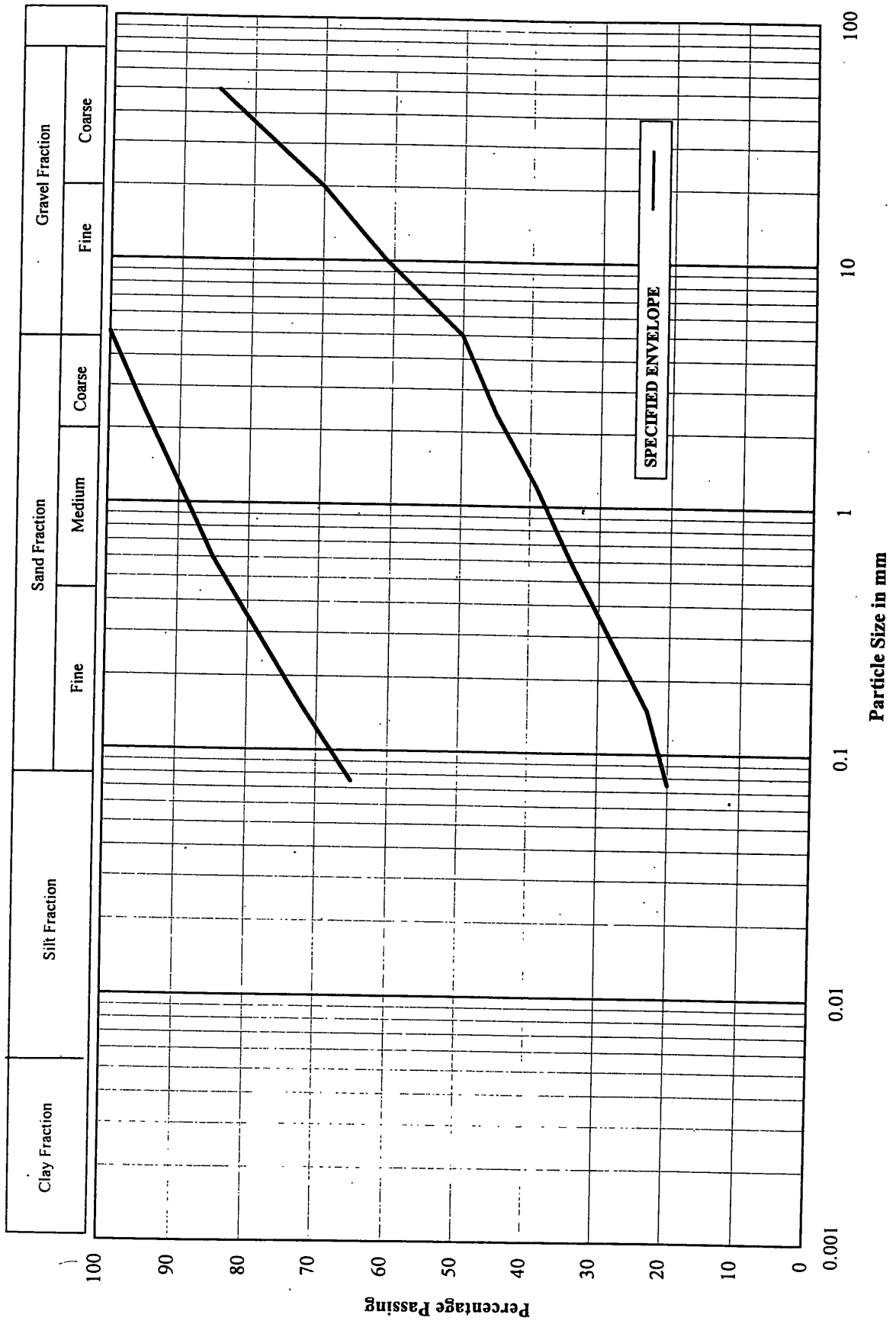


Fig. 5 Particle Size Distribution Curves - Monthly Average Gradation Of Barge Dumping Material

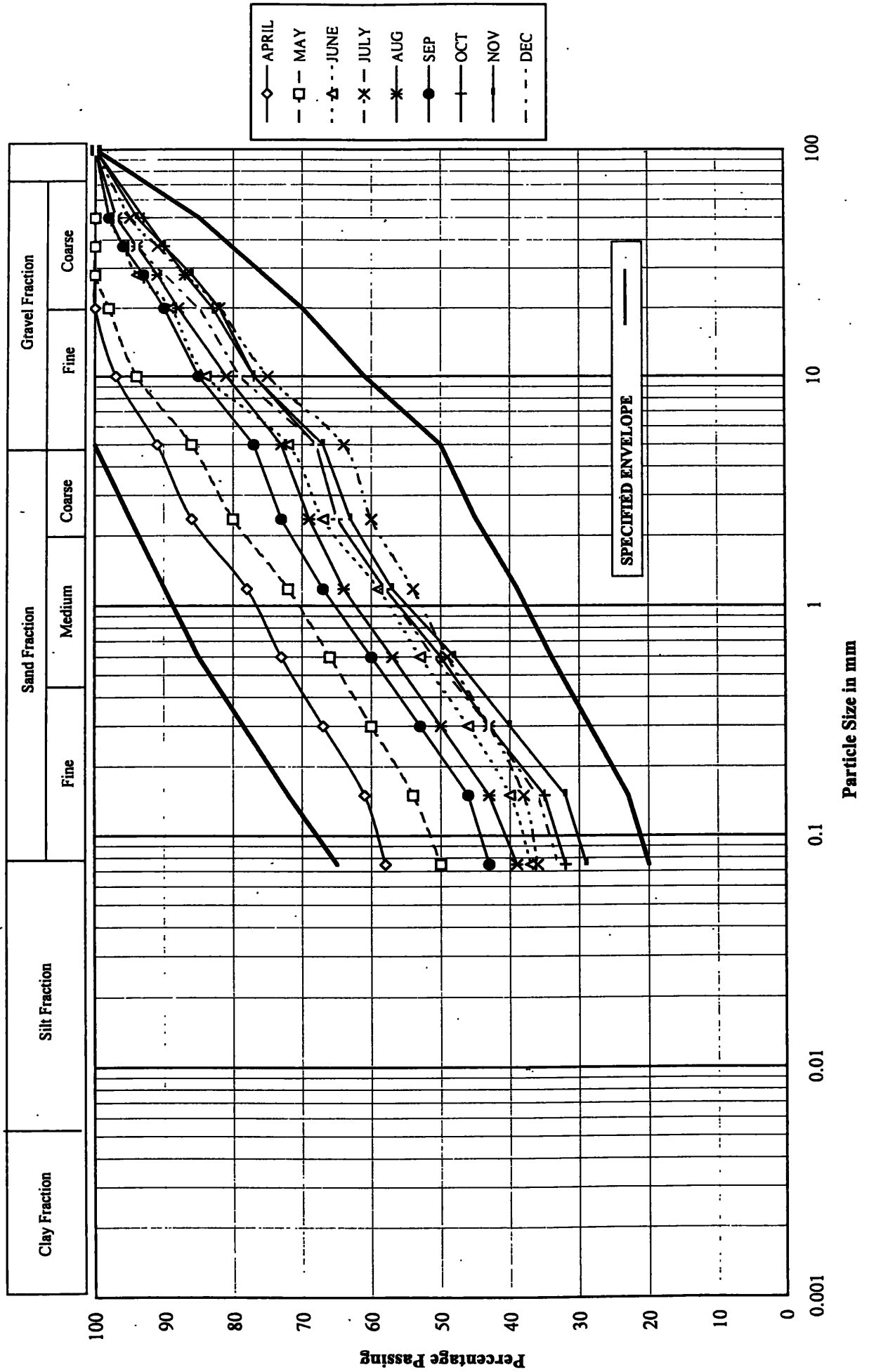


FIG. 6 FINES CONTENT OF BARGE DUMPING MATERIAL

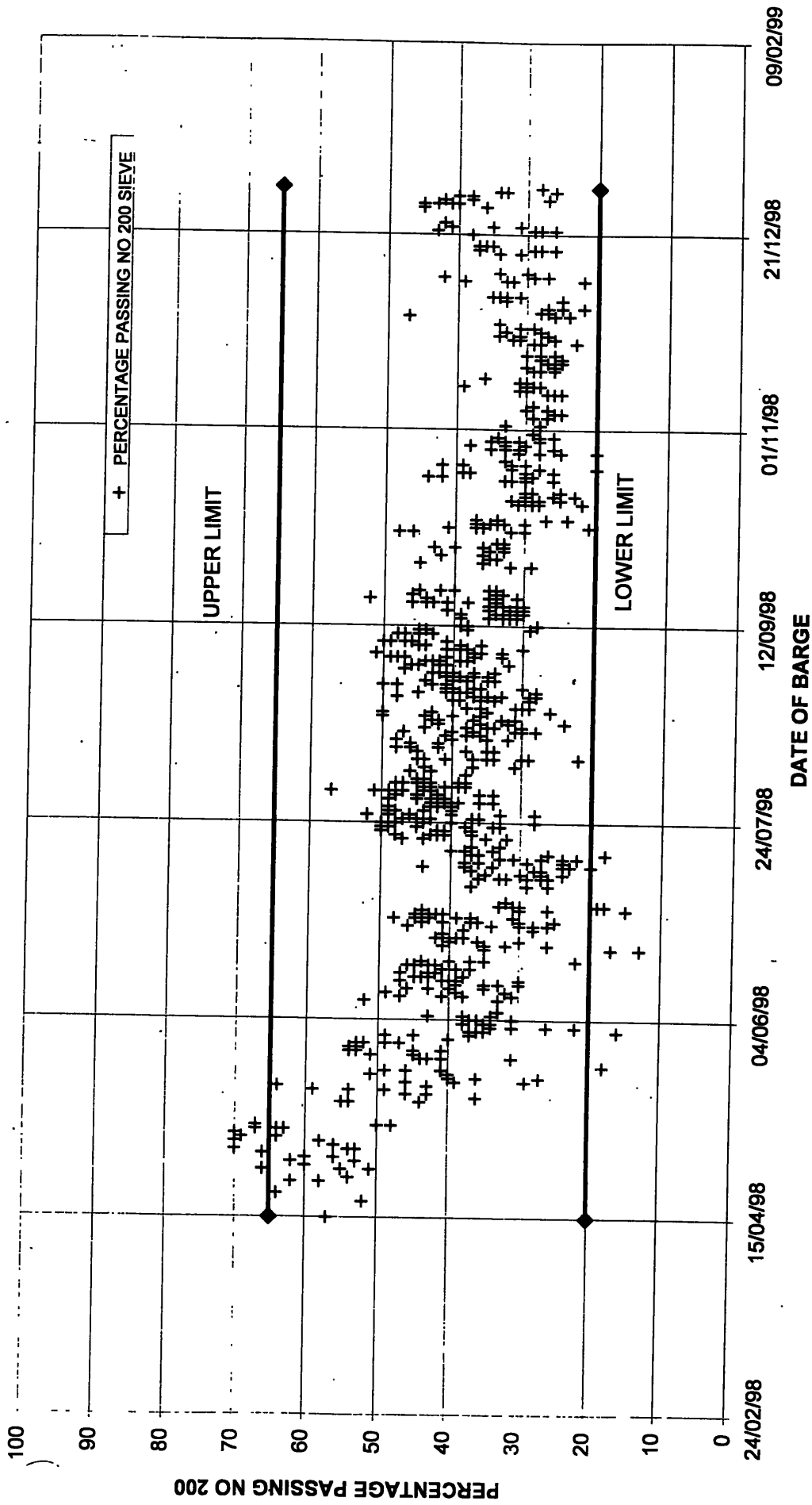
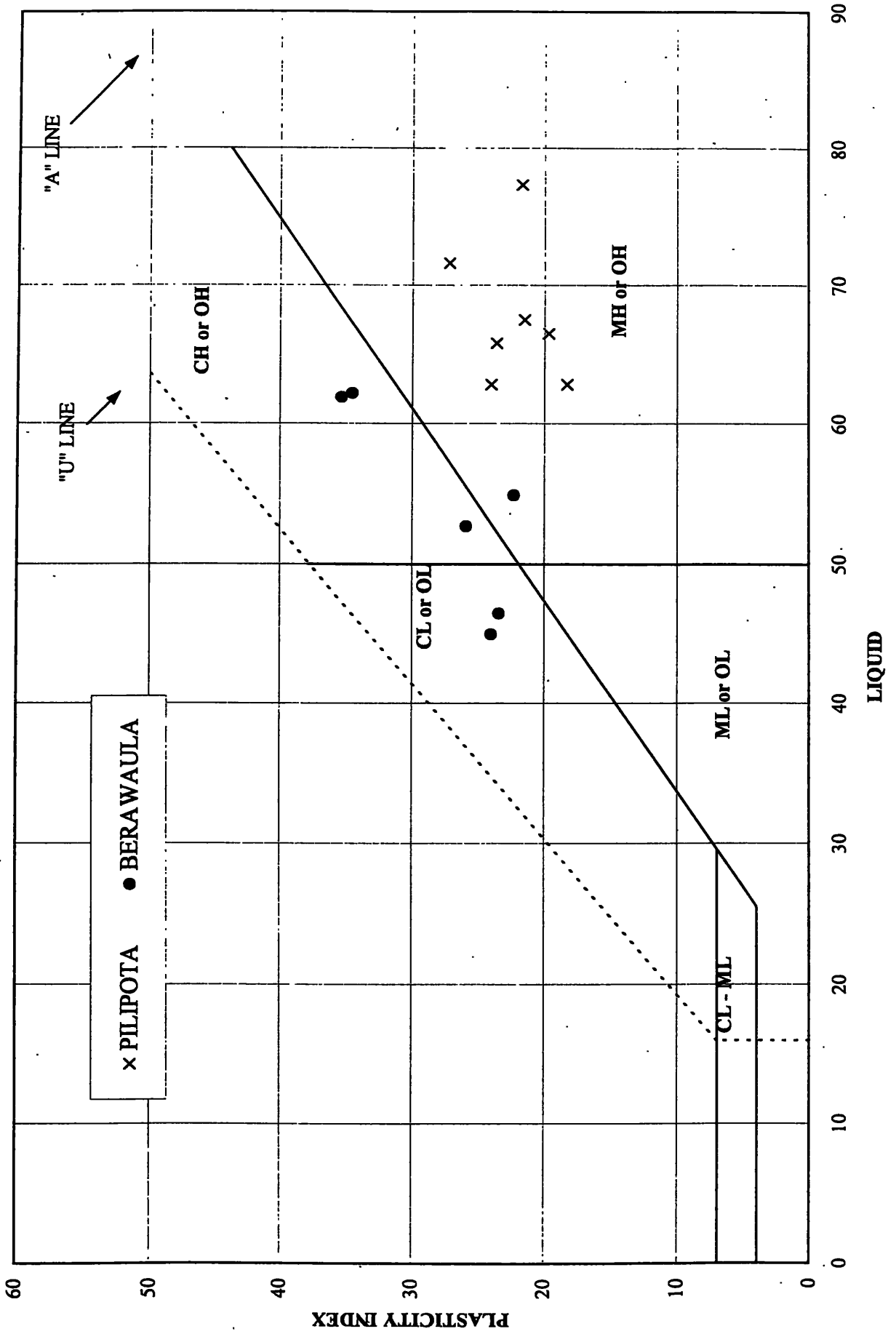
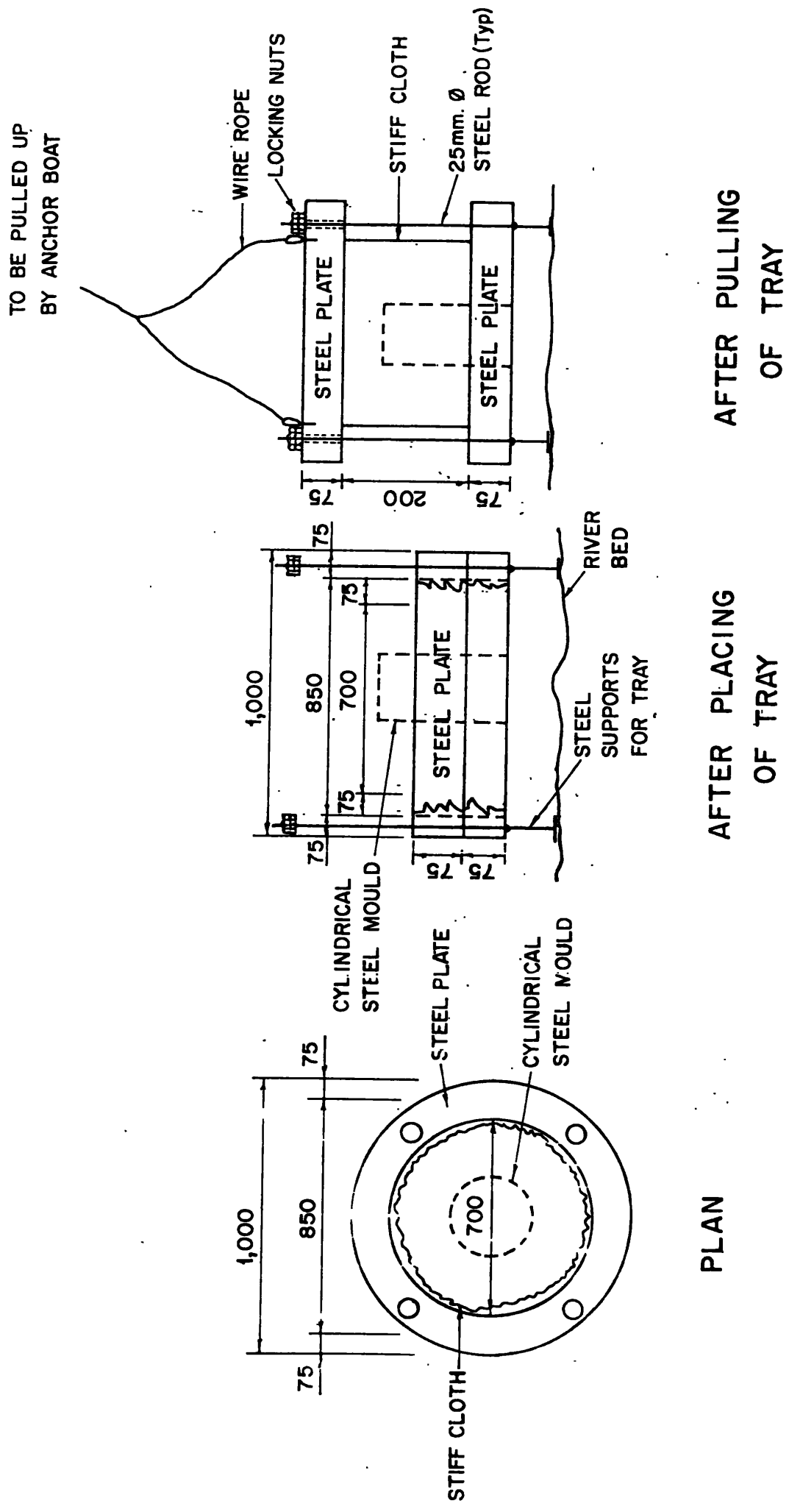


Fig. 7 Plasticity Chart - Barge Dumping Material





PLAN

AFTER PLACING
OF TRAY

AFTER PULLING
OF TRAY

Fig. 8 DISTURBED SAMPLING TRAY AND CYLINDRICAL MOULD

Fig. 9 • Particle Size Distribution Curves - Disturbed Sampling IC1/15m

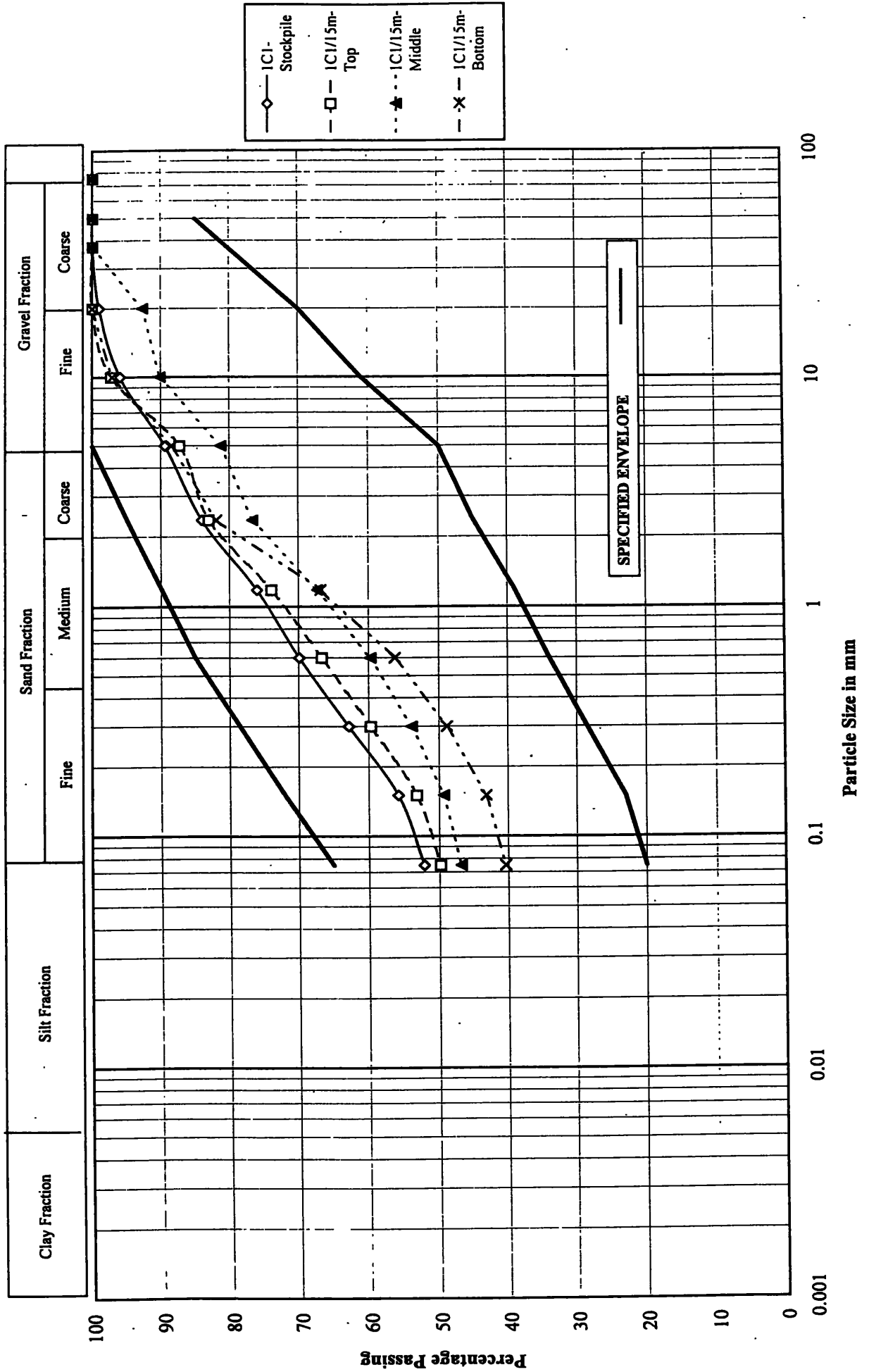


Fig. 10 : Particle Size Distribution Curves - Disturbed Sampling 1C9/30

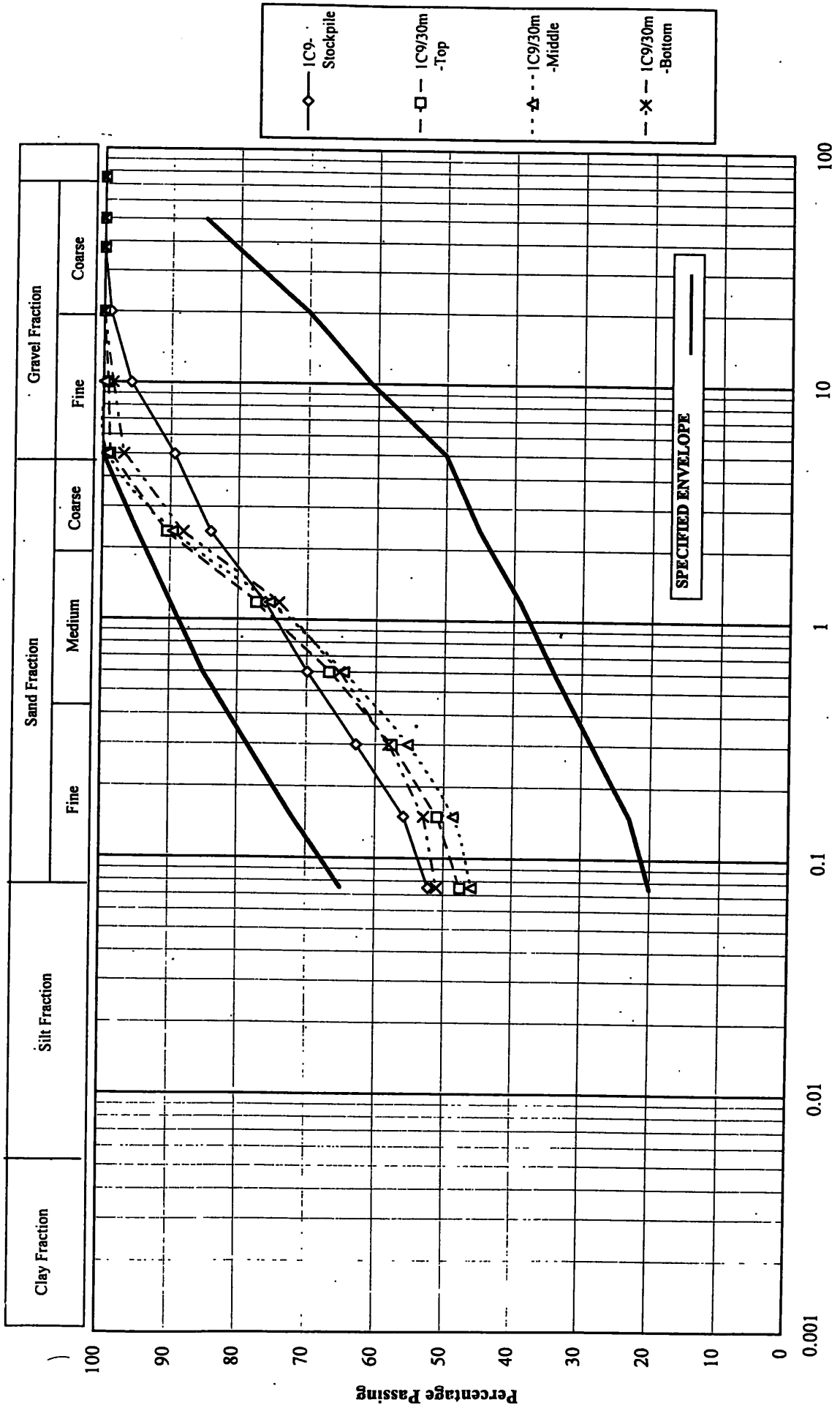


Fig. 11 Particle Size Distribution Curves - Disturbed sampling 1L12

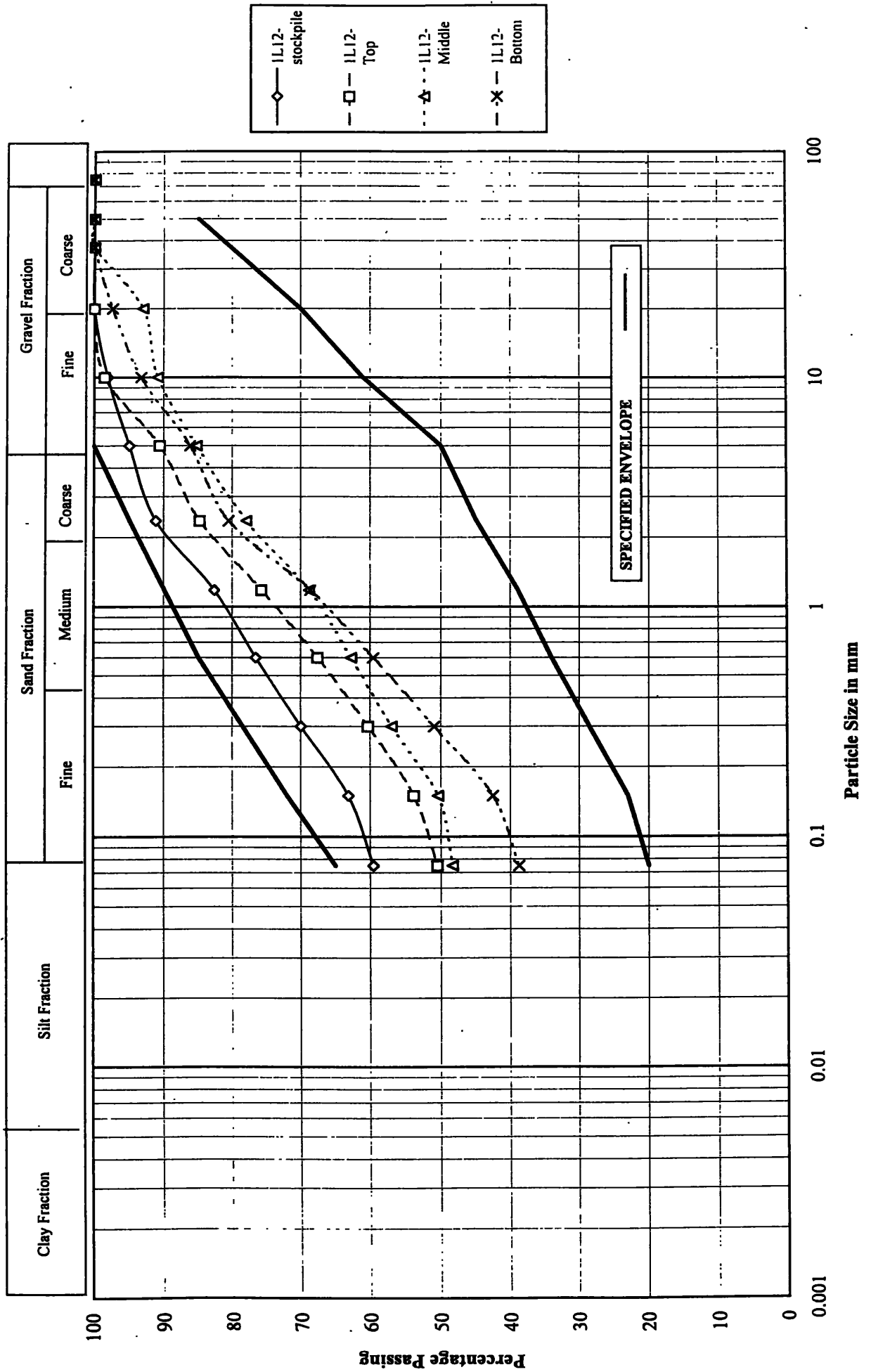
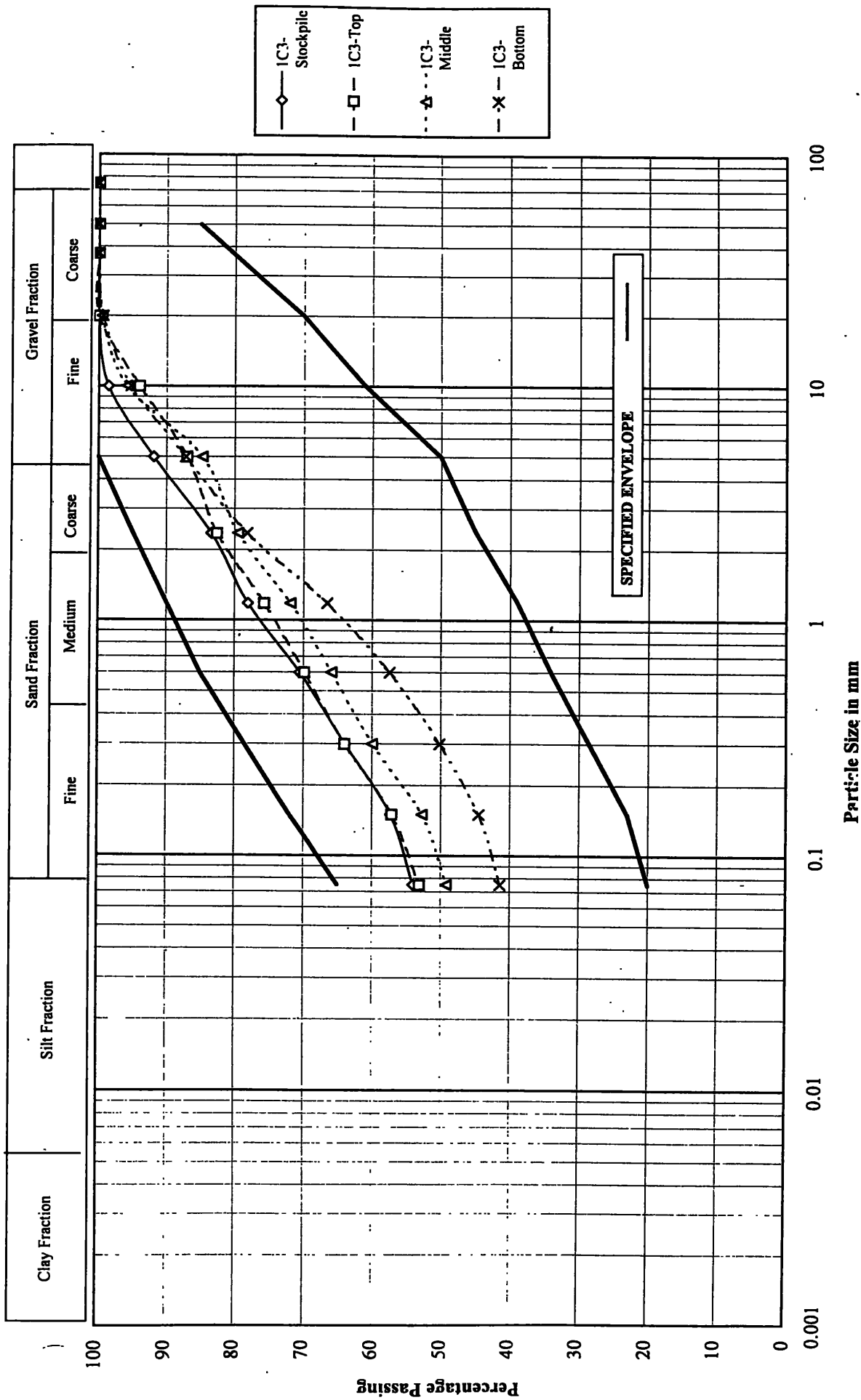


Fig. 12 Particle Size Distribution Curves - Disturbed sampling IC3



APPENDIX-A

GRADATION TEST RESULTS OF BARGE LOADS ON MONTHLY BASIS

GRADATION OF BARGE DUMPING MATERIAL

APRIL 1998

No of samples tested = 15
 No of samples below the specified fines content = 0

MAX	100	100	100	100	100	100	97	93	84	78	73	69	66
MIN	100	100	100	100	96	91	80	77	69	65	61	54	51
AVG	100	100	100	100	100	97	91	86	78	73	67	61	58
SPEC. LIMITS	MAX	100	100	100	100	100	100	95	90	85	80	72	65
	MIN		85			70	61	50	45	39	34	28	20

DATE	BL NO:	LOCATION	% PASSING												
			100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
15/04/98	1-30	1C5,1C13	100	100	100	100	100	98	93	85	76	73	67	62	57
19/04/98	30-60	1C1,1C9	100	100	100	100	100	94	86	81	73	68	61	55	52
21/04/98			100	100	100	100	99	97	92	88	79	75	70	67	64
24/04/98	63	1L2	100	100	100	100	100	98	90	87	78	73	67	61	58
	69	1R2	100	100	100	100	100	100	97	93	84	78	71	65	62
25/04/98	75	1C3	100	100	100	100	100	99	92	83	78	71	64	57	54
27/04/98	80	1R4	100	100	100	100	100	96	91	88	79	71	62	54	51
	85	1L8	100	100	100	100	96	91	80	77	69	65	61	57	55
	89	1L8	100	100	100	100	100	99	95	91	82	77	73	69	66
28/04/98	95	1R8	100	100	100	100	100	93	89	85	80	71	67	64	60
	99	1C7	100	100	100	100	100	98	92	87	80	76	69	63	60
29/04/98	105	1L6	100	100	100	100	100	99	94	91	81	74	65	56	53
	110	1R6	100	100	100	100	100	99	90	86	79	74	69	65	62
30/04/98	115	1R12	100	100	100	100	100	96	87	82	76	72	66	60	56
	120	1L12	100	100	100	100	100	98	95	91	83	77	70	63	60

GRADATION OF BARGE DUMPING MATERIAL

MAY 1998

No of samples tested	=												61
No of samples below the specified fines content =													1
MAX	100	100	100	100	100	100	99	96	90	84	78	73	70
MIN	100	100	100	99	74	70	63	52	43	36	28	22	18
AVG	100	100	100	100	98	94	86	80	72	66	60	54	50

SPEC. LIMITS	MAX	100	100	100	100	100	100	100	95	90	85	80	72	65
	MIN		85			70	61	50	45	39	34	28	23	20

DATE	BL NO: LOCATION	% PASSING												
		100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
01/05/98	125 1C11	100	100	100	100	100	98	91	88	83	79	74	69	66
02/05/98	130 1R10	100	100	100	100	92	87	78	76	69	65	61	57	54
	135 1L16	100	100	100	100	93	87	82	79	71	66	60	56	53
	140 1L16	100	100	100	100	100	96	90	87	81	78	74	71	70
03/05/98	145 1R16	100	100	100	100	99	97	90	83	75	71	64	59	56
04/05/98	150 1C15	100	100	100	100	100	100	91	82	84	79	76	72	70
	155 1L14	100	100	100	99	91	77	74	70	66	64	63	60	58
05/05/98	160 1R14	100	100	100	100	100	95	84	81	77	72	69	66	64
	165 2R2	100	100	100	100	99	95	84	80	77	73	69	66	64
	170 2L2	100	100	100	100	100	98	92	88	83	79	75	72	69
06/05/98	175 2C1	100	100	100	100	100	97	91	87	83	79	76	73	70
	180 2C3	100	100	100	100	100	97	91	87	83	79	76	73	70
07/05/98	191 2L4	100	100	100	100	100	99	99	96	90	84	78	71	67
	192 2C5	100	100	100	100	100	99	96	92	88	83	77	68	63
	199 2L6	100	100	100	100	100	99	93	89	81	76	72	67	64
08/05/98	204 2R6	100	100	100	100	100	98	93	90	85	80	76	70	67
	208 2C7	100	100	100	100	99	96	90	85	77	69	63	55	50
	215 2L8	100	100	100	100	100	98	91	83	74	66	58	52	48
14/05/98	221 2C9	100	100	100	100	99	96	91	88	81	72	64	58	54
	223 1C16	100	100	100	100	100	98	91	85	72	63	56	48	44
	230 1C14	100	100	100	100	100	96	90	85	79	71	66	60	55
15/05/98	235 1R15	100	100	100	100	99	95	88	82	69	59	50	42	36
16/05/98	240 1C13	100	100	100	100	99	94	86	80	70	63	55	47	43
	246 1C12	100	100	100	100	100	95	87	82	73	66	58	50	46
17/05/98	250 1R15	100	100	100	100	99	91	73	69	62	58	55	51	49
	255 1C8	100	100	100	100	100	94	81	77	73	68	64	61	59
	260 1R15	100	100	100	100	100	95	83	77	70	64	59	56	54
18/05/98	268 2R8	100	100	100	100	100	97	96	86	80	75	70	67	64
	271 1R5	100	100	100	100	100	95	88	81	70	63	55	47	43
19/05/98	275 1C4	100	100	100	100	99	92	85	77	64	58	51	43	39
	280 1C2	100	100	100	100	97	93	87	84	76	69	60	51	46
	285 1L1	100	100	100	100	100	97	92	79	66	55	42	34	29
20/05/98	290 2C11	100	100	100	100	97	96	87	79	66	57	44	33	27
	295 1L3	100	100	100	100	93	85	77	74	66	60	52	44	40
	300 1R3	100	100	100	100	74	70	64	62	57	52	47	40	36
21/05/98	305 1R1	100	100	100	100	94	88	80	74	65	58	51	44	40
	310 1L15	100	100	100	100	100	93	84	80	75	70	63	56	51
22/05/98	315	100	100	100	100	100	92	83	79	72	67	59	52	46
	320 2C2	100	100	100	100	100	98	90	77	61	52	47	43	41
	325 2R3	100	100	100	100	99	97	89	85	77	70	62	54	49
23/05/98	330 2L3	100	100	100	100	100	96	88	52	43	36	28	22	18
25/05/98	335 2C4	100	100	100	100	99	96	85	81	71	63	55	48	43
	340 2R5	100	100	100	100	100	99	63	58	49	44	40	34	31
	345 2L5	100	100	100	100	94	91	80	76	68	61	55	49	44
	350 2C6	100	100	100	100	100	93	77	74	66	60	54	46	41

DATE	BL NO: LOCATION	% PASSING												
		100 mm	60 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
26/05/98	355 1L5	100	100	100	100	99	97	92	82	66	58	52	48	45
	360 1L5	100	100	100	100	99	96	84	82	76	71	63	56	51
27/05/98	365 1C6	100	100	100	100	100	93	88	86	80	74	67	60	54
	370 1L7	100	100	100	100	99	95	83	76	64	57	51	45	41
	375 1R7	100	100	100	100	100	95	83	80	74	68	62	57	53
28/05/98	380 1L9	100	100	100	100	99	98	89	84	74	66	57	49	45
	385 1R11	100	100	100	100	99	95	86	83	77	71	65	59	54
	390 1L	100	100	100	100	99	96	90	86	78	70	63	56	53
29/05/98	395 2R7	100	100	100	100	99	93	88	85	77	67	60	52	47
	400 1C10	100	100	100	100	100	94	81	79	71	64	58	52	49
	405 1C10	100	100	100	100	100	96	89	85	77	70	62	55	52
	410 2L7	100	100	100	100	100	99	94	91	82	74	65	57	53
30/05/98	415 1R13	100	100	100	100	88	81	72	69	63	58	51	44	40
31/05/98	439 2L10	100	100	100	100	99	93	82	75	65	58	54	51	49
	442 2R10	100	100	100	100	96	92	80	73	62	54	50	47	45
	444 2R11	100	100	100	100	93	87	71	66	57	50	45	40	37

GRADATION OF BARGE DUMPING MATERIAL

JUNE 1998

No of samples tested	=												99
No of samples below the specified fines content =													3
MAX	100	100	100	100	99	94	86	79	70	66	61	56	52
MIN	100	82	71	67	63	49	29	27	24	22	19	17	13
AVG	100	98	96	94	89	84	72	67	59	53	46	40	37

SPEC. LIMITS:	MAX	100	100	100	100	100	100	100	95	90	85	80	72	65
	MIN		85			70	61	50	45	39	34	28	23	20

DATE	BL NO: LOCATION	% passing												
		100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
01/06/98	454 2R11	100	100	100	100	63	49	29	27	24	22	19	17	16
	460 2L12	100	100	100	100	95	88	74	70	64	59	49	41	37
	461 2C12	100	100	100	100	91	83	69	65	58	52	47	40	36
	470 2R12	100	100	100	100	98	91	81	71	59	52	45	39	35
02/06/98	475 3L1	100	100	100	100	93	87	70	65	58	51	43	35	31
	476 3L1	100	100	100	100	83	74	57	49	40	34	29	25	22
	489 3C2	100	100	100	100	91	82	66	59	53	47	41	37	34
	490 3C1	100	100	100	100	83	71	53	48	42	36	33	29	26
03/06/98	499 3R2	100	100	100	100	86	82	77	70	59	51	44	37	34
	500 3R2	100	100	100	100	93	84	71	65	58	51	44	38	35
	504 3L3	100	100	100	100	91	86	78	70	59	51	46	41	38
04/06/98	511 3C3	100	100	100	100	88	84	71	64	57	51	45	40	37
	518 3L4	100	100	100	100	90	87	72	67	59	53	47	41	36
	523 3C4	100	100	100	100	87	84	68	63	50	42	37	33	31
05/06/98	529 3C4	100	100	100	100	93	89	73	69	62	56	48	38	34
	533 3R4	100	100	100	100	85	80	66	61	54	47	40	37	34
	538 3L5	100	100	100	100	90	88	76	70	60	54	49	43	38
	544 3C5	100	100	100	100	93	89	76	72	65	61	54	47	43
06/06/98	548 AD1	100	100	100	100	86	84	68	63	55	50	44	38	33
09/06/98	551 AD3	100	100	100	100	93	86	68	62	54	49	43	38	33
	567 3C6	100	100	100	100	97	91	79	75	70	66	61	56	52
10/06/98	576 3L6	100	99	99	99	97	94	74	69	62	58	54	49	47
	579 3R6	100	99	99	99	95	90	68	61	56	52	47	43	41
	583 3R6	100	100	98	98	95	89	77	72	64	54	47	41	38
	586 A1L7	100	99	99	99	95	93	86	78	68	57	47	36	31
11/06/98	596 A1L9	100	98	98	98	95	91	77	70	59	52	47	42	39
	599 A1L10	100	99	97	97	94	90	79	73	66	58	49	43	39
	600 A1L11	100	99	99	99	96	94	83	79	70	64	58	52	49
	610 A1L13	100	100	100	100	99	91	75	70	58	50	43	36	32
	615 A1L12	100	98	97	97	95	90	78	71	62	55	48	42	39
12/06/98	619 A2L4	100	100	99	99	95	91	78	74	66	60	54	48	43
	624 A2L5	100	99	99	99	95	94	80	72	61	54	48	43	40
	629 A2L6	100	99	98	98	97	94	83	77	67	60	54	49	46
	632 A2L7	100	100	99	99	98	94	74	66	57	50	45	39	35
13/06/98	640 3M2	100	99	98	98	93	90	79	73	64	57	47	40	35
	641 3M1	100	100	97	97	95	91	78	73	62	55	48	43	39
	650 3M3	100	100	98	96	92	86	75	70	61	53	44	35	30
	657 3M5	100	98	96	95	92	86	72	69	61	53	45	38	33
14/06/98	661 A1R9	100	100	100	97	95	90	79	75	67	59	51	43	39
	664 2L3	100	100	99	95	93	82	68	64	58	53	48	43	40
	670 A1R7	100	100	95	90	88	84	77	71	61	52	42	34	30
	675 A1R8	100	99	93	89	88	84	79	73	65	59	54	50	47
	681 A1R11	100	100	98	95	90	85	74	69	59	54	49	44	41
15/06/98	683 A1R11	100	100	100	95	90	85	73	69	61	55	50	46	44
	688 A1R12	100	100	100	98	95	93	85	79	69	62	55	49	45

DATE	BL NO: LOCATION	% passing												
		100 mm	60 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
	693 A1R12	100	100	100	99	96	94	84	77	68	61	54	47	43
	698 A1R13	100	99	98	98	93	89	76	71	62	55	48	41	38
16/06/98	704 A2R1	100	98	98	97	96	93	80	73	64	59	52	45	42
	707 A2R2	100	100	100	98	96	92	81	76	68	62	55	50	47
	715 A2R3	100	100	98	95	94	90	78	72	64	58	52	46	43
17/06/98	726 A2R5	100	100	97	95	94	89	74	68	61	55	48	41	39
	735 A2L8	100	100	100	99	96	94	81	74	64	56	48	40	37
	745 A3R3	100	98	97	95	93	90	77	71	63	58	50	44	41
18/06/98	750 A4R1	100	100	98	96	93	90	77	71	64	58	51	46	43
	762 A2R11	100	100	99	94	93	91	77	75	67	61	55	49	46
	763 A2R10	100	100	93	87	81	77	68	61	57	53	48	45	42
	765 A4R2	100	100	98	95	91	88	74	71	65	59	53	49	45
19/06/98	769 A2R12	100	100	98	98	92	88	77	73	66	59	52	48	44
	772 A2R12	100	99	97	94	89	85	71	67	60	54	48	43	40
	774 A1R1	100	99	95	91	90	84	71	68	61	54	47	40	37
	784 A1R2	100	94	91	89	81	79	68	62	55	48	44	38	35
	785 A1R3	100	100	95	92	90	85	75	68	59	50	35	26	22
22/06/98	796 A1R4	100	100	97	96	93	86	72	58	49	34	29	23	17
	801 A1R6	100	97	94	89	86	82	73	67	54	42	28	17	13
	805 A1R15	100	100	97	97	93	90	75	71	61	53	47	40	35
23/06/98	812 A1R16	100	95	92	86	82	74	66	62	55	49	43	38	35
	817 A1R17	100	100	100	97	95	88	78	73	66	58	50	43	41
	823 A1R19	100	92	89	87	78	71	63	56	51	45	41	35	32
	827 A1R19	100	89	89	82	78	68	56	51	46	40	34	29	26
	828 A1R20	100	97	89	83	83	80	72	65	54	45	40	35	32
	833 A1R21	100	94	90	83	82	73	63	56	50	45	39	35	32
24/06/98	836 A1R22	100	100	90	88	78	71	57	52	48	41	36	32	30
	844 A1R23	100	95	89	87	84	77	70	65	59	52	45	39	36
	850 A1R24	100	99	93	89	88	84	78	72	63	56	49	44	40
25/06/98	859 A1R25	100	97	97	95	92	89	82	75	66	57	50	45	41
	863 A1R26	100	97	94	92	89	84	78	75	69	63	53	43	39
	868 A1R27	100	95	93	89	87	83	77	74	68	61	53	46	42
	869 A1R28	100	98	93	88	83	81	70	67	61	54	47	41	38
26/06/98	875 A1R29	100	100	95	93	89	84	73	70	64	58	52	46	41
27/06/98	880 A1R30	100	85	80	78	76	70	63	59	52	44	37	31	28
	885 A1R31	100	100	94	89	86	83	72	69	62	55	48	42	38
	889 A1R32	100	90	87	84	80	79	71	68	62	55	48	42	38
28/06/98	894 A2R6	100	94	91	89	84	82	75	66	59	51	44	37	34
	900 A2R7	100	99	94	91	89	86	80	77	69	61	55	50	46
	906 A2R8	100	87	78	74	69	66	53	50	44	37	34	30	26
	907 A2R9	100	93	89	88	79	73	65	59	49	43	37	31	28
	913 A2R8	100	86	76	71	67	65	56	52	48	43	39	34	30
29/06/98	924 A1L3	100	98	95	91	81	76	73	68	61	53	48	39	36
	926 A1L3	100	82	71	67	66	60	52	50	45	40	34	28	25
	927 A1L3	100	99	92	88	84	79	71	66	60	54	49	44	41
	935 A1L5	100	100	96	93	89	87	78	74	68	62	54	47	44
	940 A1L6	100	99	96	94	89	86	76	72	66	59	51	42	37
	943 A2L1	100	88	80	77	76	71	61	58	51	43	38	33	30
30/06/98	954 A2L2	100	97	94	91	87	82	73	70	64	59	51	43	39
	959 A2L3	100	100	94	90	87	81	71	65	57	50	43	35	31
	962 A3L1	100	98	90	84	79	69	56	53	49	46	42	38	37
	966 A3L3	100	99	94	91	90	83	74	70	64	59	55	51	48
	972 A3L3	100	100	97	93	86	84	71	67	61	57	52	48	45
	973 A3L4	100	93	91	86	84	78	66	62	56	53	49	45	43

GRADATION OF BARGE DUMPING MATERIAL

JULY 1998

No of samples tested = 130
 No of samples below the specified fines content = 4

MAX	100	100	100	100	98	92	86	82	76	68	61	54	52
MIN	100	70	60	52	46	37	31	0.67	25	23	20	17	15
AVG	100	95	91	88	83	76	65	61	56	50	44	39	36
SPEC. LIMITS	MAX	100	100	100	100	100	100	95	90	85	80	72	65
	MIN		85			70	61	50	45	39	34	28	20

DATE	BL NO: LOCATION	% passing												
		100 mm	60 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
01/07/98	980 A3L5	100	90	84	81	78	77	62	59	54	51	48	44	42
	981 A3L6	100	92	90	86	82	76	65	61	55	52	49	45	43
	991 A4L2	100	100	95	89	87	83	72	0.67	61	57	53	48	45
	992 A4L1	100	88	82	78	75	73	65	60	55	52	48	44	41
02/07/98	1003 A4L3	100	91	91	86	82	77	73	69	64	59	53	47	44
	1009 A4L5	100	77	60	52	46	37	31	29	25	23	20	17	15
	1010 A4L4	100	100	95	92	80	69	60	56	50	44	37	33	30
	1016 A5L1	100	100	96	90	83	68	57	52	46	41	35	30	26
03/07/98	1019 A5L2	100	95	93	90	79	66	54	50	46	41	37	33	31
	1024 A5L3	100	100	97	92	84	71	57	54	49	45	40	36	33
	1027 A5L4	100	99	95	93	88	75	62	55	49	45	41	32	30
	1037 S4L2	100	76	70	66	62	58	51	44	37	32	26	20	18
04/07/98	1040 S4L3	100	91	79	77	72	64	53	49	40	30	25	21	19
	1046 S5L3	100	88	83	78	76	68	57	55	50	44	39	35	32
08/07/98	1053 S5L2	100	90	87	84	77	67	58	55	49	43	36	32	29
	1060 S4L6	100	79	72	62	60	52	48	46	42	37	33	28	26
	1063 S3L7	100	100	88	80	73	67	56	53	48	42	36	31	29
	1072 S3L2	100	100	93	93	82	73	62	57	57	50	44	40	37
09/08/98	1076 S3L3	100	89	81	78	74	69	58	55	50	43	37	32	29
	1078 S3L4	100	87	82	72	66	64	56	54	48	43	37	32	29
	1082 A2L9	100	91	82	78	75	68	55	53	48	41	36	31	30
	1089 A1L27	100	100	100	97	88	83	67	65	59	54	50	46	44
10/07/98	1090 A2L9	100	100	93	85	82	71	61	59	52	46	41	37	34
	1101 A2L10	100	100	95	91	83	71	60	56	50	44	39	35	33
	1104 A2L11	100	93	89	84	80	69	56	51	44	39	35	31	29
	1108 A2L12	100	88	83	76	73	62	53	49	42	36	32	28	26
11/07/98	1117 A2L12	100	100	93	90	86	84	80	73	66	56	45	35	32
	1120 A3L9	100	89	83	75	71	61	52	49	44	39	33	29	27
	1123 A3L8	100	100	97	89	86	77	64	60	54	46	41	37	36
	1128 A4L6	100	89	77	68	59	53	48	44	40	36	32	28	27
	1131 A4L7	100	99	96	92	84	74	63	60	53	44	34	27	24
	1140 A4L8	100	96	96	93	82	76	68	64	59	50	43	37	35
	1142 A5L5	100	100	95	87	81	74	59	56	51	46	39	33	30
	1149 A5L7	100	100	95	80	70	64	56	53	48	43	37	32	30
12/07/98	1152 A5L6	100	77	72	72	68	61	51	49	45	40	34	30	27
	1161 A5L8	100	88	82	79	74	64	53	50	46	41	36	31	28
	1162 A6L1	100	94	94	83	73	68	55	52	47	42	36	31	28
	1169 A6L2	100	99	97	94	84	77	67	62	55	50	45	39	37
	1176 A6L3	100	88	74	73	68	64	50	47	41	37	33	30	27
13/07/98	1180 A6L4	100	90	88	85	80	72	63	57	48	42	35	30	27
	1184 S1L6	100	100	96	93	90	84	74	65	55	50	44	37	34
	1189 S1L7	100	100	98	95	90	83	70	66	60	56	51	47	44
	1192 S1L8	100	97	94	92	88	85	72	67	60	54	47	41	38

DATE	BL NO:	LOCATION	% passing												
			100 mm	60 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
13/07/98	1197	S1L9	100	94	83	83	74	61	47	42	38	34	29	25	23
	1202	S1L10	100	71	62	57	49	46	37	33	30	27	24	21	20
	1205	S1L9	100	78	68	64	61	52	42	39	35	31	27	25	24
14/07/98	1215	S1L11	100	100	94	85	81	74	62	57	50	43	34	26	24
	1217	S2L4	100	100	91	88	79	75	65	58	53	47	40	32	29
15/07/98	1222	S2L5	100	96	96	94	89	81	67	63	57	52	47	41	38
	1227	S1L4	100	100	96	94	91	83	70	67	60	53	46	39	36
	1236	S1L5	100	82	81	79	77	70	60	57	51	46	40	34	31
	1241	S2L2	100	89	85	82	79	69	58	55	50	45	40	35	33
	1246	S3L1	100	100	98	96	93	83	72	60	52	46	39	34	31
	1251	S4L1	100	100	96	93	88	77	59	54	46	37	30	24	22
	1256	S5L1	100	91	90	88	85	76	64	59	51	41	33	27	24
	1261	S4L5	100	95	92	90	86	77	66	61	52	45	37	30	27
	1265	S1L13	100	90	89	86	83	76	67	60	50	41	33	28	26
16/07/98	1270	S1L12	100	100	98	95	91	83	69	59	50	40	29	20	18
	1275	S1L15	100	97	95	92	88	81	78	68	60	53	45	39	36
	1280	S1L14	100	97	95	92	88	80	77	70	62	53	44	39	37
	1285	S2L6	100	100	95	91	87	85	68	65	59	53	47	42	38
	1290	S1L16	100	91	91	84	82	79	69	66	59	53	43	38	34
	1294	S1L17	100	89	76	71	68	63	57	52	47	43	39	36	34
	1299	S1L18	100	100	99	96	92	84	68	63	58	53	47	42	40
	1304	S1L19	100	94	88	86	82	73	61	54	48	44	39	35	33
	1311	S1L20	100	92	89	85	78	70	57	55	52	49	44	40	37
20/07/98	1315	S1L22	100	98	97	94	87	78	66	62	55	47	41	35	32
	1320	S1L21	100	100	100	96	90	80	65	62	55	47	42	38	35
	1325	A1L15	100	97	89	85	80	71	55	54	50	45	41	37	35
21/07/98	1330	A1L14	100	100	97	95	91	83	74	70	63	57	50	46	44
	1335	A1L17	100	100	100	99	97	90	81	75	68	60	55	49	47
	1340	A1L16	100	100	97	95	90	80	69	65	59	53	48	44	42
	1345	A1L19	100	92	89	88	84	78	63	59	53	47	42	38	37
	1350	A1L18	100	100	100	98	97	92	81	77	69	61	54	50	48
	1355	A1L21	100	97	97	94	89	82	71	68	62	55	50	45	43
	1360	A1L20	100	100	92	90	86	77	68	63	58	52	47	43	41
	1365	DC2	100	100	98	93	88	80	66	62	55	48	43	39	37
22/07/98	1369	DC1	100	94	91	88	85	76	66	64	58	52	47	44	41
	1374	DC3	100	100	98	93	93	86	75	73	69	63	58	53	50
	1379	DM1	100	95	95	95	91	83	73	65	60	55	50	45	42
	1384	DM2	100	94	88	85	79	72	63	60	55	50	45	40	38
	1389	DM3	100	90	83	79	75	66	57	53	48	43	39	36	34
	1394	DR1	100	93	91	87	84	73	63	56	48	44	41	36	33
	1399	DR2	100	100	100	100	98	91	81	77	70	63	58	54	50
	1404	DR3	100	96	95	92	87	81	73	70	63	57	52	48	45
24/07/98	1409	DSR1	100	100	100	97	96	91	81	77	69	62	57	52	49
	1414	DSR2	100	100	99	95	91	82	71	69	64	58	52	46	44
	1419	DSR3	100	70	65	61	59	52	45	43	40	37	33	29	28
	1424	DAR1	100	97	92	92	86	76	63	60	55	49	44	41	40
	1429	DAR2	100	97	97	94	91	83	73	70	65	59	54	50	48
	1434	DAR3	100	100	99	96	92	87	76	73	68	61	56	52	50
25/07/98	1439	S1R7	100	95	89	83	78	69	61	59	55	50	47	45	43 ** Pilipta Are
	1444	ADU1	100	99	98	94	89	83	77	75	68	61	54	49	45 Bulk Density
	1449	ADU2	100	100	100	97	95	88	82	79	72	65	57	51	47
	1454	ADU5	100	100	92	89	84	74	61	59	55	50	44	39	36

DATE	BL NO: LOCATION	% passing												
		100 mm	50 mm	37.5 mm	25 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
26/07/98	1459 ADU6	100	95	92	87	83	75	66	62	58	53	47	40	37
	1464 ADU9	100	100	93	88	86	77	65	62	57	53	48	43	40
	1469 ADU3	100	81	78	76	70	65	56	53	48	44	40	36	33
	1474 ADU8	100	90	85	81	75	68	58	55	49	44	38	31	28
	1479 ADU4	100	100	97	95	92	84	75	72	67	61	55	51	49
	1484 ADU7	100	100	100	96	92	85	78	75	71	65	60	54	52
	1489 ADU10	100	90	87	86	84	78	69	67	63	58	53	48	46
27/07/98	1494 S1R8	100	97	91	91	87	79	69	67	62	57	52	47	44
	1499 S1R9	100	98	98	98	94	86	76	73	68	62	57	52	49
	1504 S1R10	100	98	97	97	93	86	72	70	65	59	53	47	44
	1509 S1R11	100	100	95	94	91	86	78	74	68	62	57	51	48
	1514 S1R12	100	89	89	86	84	78	69	66	61	56	50	44	40
28/07/98	1519 S1R12	100	100	99	99	93	87	80	77	72	66	60	53	49
	1524 S1R13	100	100	97	93	88	83	69	66	61	55	50	45	42
	1529 S1R14	100	99	96	93	88	82	68	65	60	55	50	45	42
	1534 S2R1	100	93	89	85	82	74	67	65	58	53	47	44	42
	1538 S2R3	100	96	93	87	78	75	70	67	61	54	49	46	43
	1541 S2R2	100	100	95	91	87	78	70	67	56	51	46	42	40
	1546 S2R13	100	87	87	85	79	70	61	56	50	45	40	36	34
29/07/98	1551 ADL2	100	100	100	97	91	83	76	73	66	57	48	42	39
	1556 ADL1	100	100	100	98	95	88	71	67	60	54	48	44	41
	1561 ADL4	100	100	94	85	80	73	66	63	58	52	46	39	36
	1566 ADL3	100	100	98	96	92	84	76	73	66	60	53	47	43
	1570 ADL5	100	100	97	95	91	81	73	69	64	58	52	45	42
	1576 ADL6	100	100	99	97	94	88	80	76	70	63	57	49	45
	1581 ADL7	100	99	98	94	90	85	71	69	64	58	50	44	42
30/07/98	1586 S2R12	100	100	100	98	95	90	84	78	72	67	61	54	49
	1589 S2R14	100	97	95	95	93	89	86	82	76	68	56	48	45
	1594 S2R15	100	94	94	93	93	90	85	80	71	63	54	46	43
	1599 S3R1	100	100	98	96	90	82	76	73	68	61	50	44	41
	1604 S3R2	100	100	99	99	92	84	73	71	66	61	55	49	45
	1609 S3R3	100	97	97	96	94	88	80	77	71	64	58	53	48
	1614 S3R4	100	81	80	78	76	72	67	62	55	49	43	37	34
31/07/98	1619 S4R1	100	86	84	81	76	70	63	58	55	50	43	39	36
	1624 S1R22	100	90	90	87	85	79	70	67	62	56	50	45	42

GRADATION OF BARGE DUMPING MATERIAL

AUGUST 1998

No of samples tested = 131
 No of samples below the specified fines content = 0

MAX	100	100	100	100	99	96	92	88	81	73	66	61	57
MIN	100	76	76	73	70	64	50	48	45	39	33	29	24
AVG	100	97	94	92	88	81	73	69	64	57	49	43	39
SPEC. LIMITS	MAX	100	100	100	100	100	100	95	90	85	80	72	65
	MIN		85			70	61	50	45	39	34	28	23

DATE	BL NO: LOCATION	% passing												
		100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
01/08/98	1630 S1R21	100	100	99	98	91	84	79	77	72	65	59	54	51
	1635 S1R20	100	97	97	95	90	85	76	72	67	60	54	51	47
	1640 S1R19	100	98	96	93	87	84	77	73	67	60	51	46	43
	1645 S1R18	100	100	99	98	96	92	87	78	71	64	60	52	49
	1650 S1R17	100	100	100	99	98	94	88	82	75	66	56	48	44
	1655 S1R16	100	100	98	96	95	95	89	83	77	72	66	61	57
02/08/98	1660 S1R15	100	90	88	85	84	80	71	68	64	58	52	47	44
	1665 S2L8	100	86	84	84	78	75	66	64	59	54	48	42	39
	1670 S2L9	100	95	95	93	90	82	73	71	67	59	51	43	38
	1675 S2L10	100	100	100	98	95	89	83	76	70	64	56	48	43
	1681 S2L12	100	95	92	90	88	82	76	74	68	62	55	46	41
03/08/98	1685 S2L11	100	100	100	100	96	91	83	77	70	62	53	47	43
	1691 ADU11	100	100	94	91	87	77	69	63	60	53	46	42	38
	1696 S2L14	100	100	98	94	89	80	70	69	64	56	49	42	39
	1699 S2L13	100	100	98	93	85	80	75	73	68	63	57	50	45
	1704 S1L23	100	100	100	98	97	94	90	85	78	69	61	53	48
	1709 S2L15	100	100	100	100	99	96	90	86	79	71	63	52	47
04/08/98	1714 S1L25	100	99	95	94	89	82	72	70	65	59	53	47	44
	1719 S1L24	100	100	97	93	90	84	71	70	65	59	53	45	44
	1724 S1L26	100	100	100	98	95	91	86	80	73	67	57	48	44
	1729 ADK1	100	100	97	96	96	93	88	85	79	71	58	49	45
05/08/98	1734 ADK2	100	98	95	93	88	83	71	66	60	53	46	40	38
	1740 ADK3	100	100	94	94	89	83	77	72	66	58	52	42	38
06/08/98	1745 ADK4	100	100	100	98	94	89	82	77	69	62	55	50	46
	1750 ADK5	100	98	95	91	88	84	78	74	67	60	52	47	43
	1755 ADK6	100	100	97	94	89	82	74	71	65	59	53	47	43
07/08/98	1760 ADK7	100	91	88	84	79	74	60	58	52	44	38	33	31
	1765 ADK8	100	100	97	94	90	83	71	68	62	55	46	40	37
	1770 ADK9	100	97	91	87	85	80	73	71	66	61	54	48	44
11/08/98	1775 ADK10	100	94	90	90	83	77	67	63	57	49	42	37	34
	1780 ADU13	100	97	92	90	87	78	67	64	56	49	43	38	35
	1785 ADU14	100	98	93	91	88	83	77	74	68	61	52	43	38
	1790 ADU15	100	100	94	94	93	87	82	76	71	64	57	50	45
12/08/98	1795 ADU16	100	99	93	90	84	80	73	71	67	63	58	52	48
	1800 ADU17	100	97	97	95	93	87	78	76	71	65	59	51	46
	1805 S1R23	100	100	100	100	93	84	74	73	68	62	55	47	42
13/08/98	1810 S1R25	100	100	98	96	94	86	79	75	69	64	56	47	42
	1815 S1R24	100	100	100	99	97	92	87	84	78	71	61	51	46
14/08/98	1820 S1R26	100	98	92	86	83	76	67	65	60	55	48	40	35
	1825 S1R27	100	100	92	87	83	76	65	62	58	52	43	35	32
	1830 S1R29	100	100	100	100	97	91	84	82	78	72	63	54	48
	1835 S1R30	100	100	99	98	95	90	84	81	71	69	59	51	48
	1840 ADU18	100	97	97	97	95	87	78	74	67	61	52	44	40

DATE	BL NO: LOCATION	% passing												
		100 mm	60 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.800 mm	0.300 mm	0.150 mm	0.075 mm
15/08/98	1845 ADU19	100	100	98	97	92	82	71	67	61	53	47	42	38
	1850 ADU20	100	99	96	89	83	75	66	62	56	50	44	39	36
	1855 ADU21	100	97	97	96	93	88	81	71	65	59	52	46	41
	1860 ADU22	100	93	90	86	84	77	69	66	62	56	50	43	38
16/08/98	1867 ADU18	100	86	84	79	73	66	58	54	47	42	36	31	28
	1872 ADU19	100	97	94	94	90	83	69	65	58	51	45	40	37
	1877 ADU21	100	93	88	85	79	71	59	56	51	45	40	34	31
	1883 ADU20	100	84	78	76	71	66	61	52	47	42	37	33	30
	1889 ADU20	100	100	100	99	97	93	87	85	79	72	63	53	47
	1890 DL1	100	100	99	97	92	84	75	64	59	54	47	42	40
	1895 DL2	100	97	97	96	92	88	82	77	70	60	50	41	38
17/08/98	1900 DL3	100	100	100	96	91	87	77	74	66	56	47	35	34
	1905 DL4	100	99	96	93	89	84	79	74	65	54	44	34	30
	1910 DL1	100	93	83	82	78	71	62	60	55	51	43	39	35
	1915 DL2	100	100	97	94	90	83	73	71	65	59	45	38	35
	1920 DL3	100	100	99	99	95	83	72	70	65	60	52	46	44
	1925 DV1	100	97	95	92	89	85	76	71	64	56	46	38	32
	1930 DL4	100	99	96	93	90	86	79	73	64	53	42	32	24
18/08/98	1935 DV3	100	87	85	84	82	76	68	66	61	54	45	35	32
	1940 DV2	100	97	93	87	83	74	62	60	55	50	44	38	36
	1945 DV5	100	95	91	88	85	79	72	68	63	58	51	44	42
	1949 DV5	100	92	89	84	80	74	65	60	54	48	41	36	31
	1954 DV1	100	88	86	83	79	76	71	67	60	53	45	38	33
	1959 DV2	100	100	98	95	93	89	85	78	70	60	49	41	37
	1964 DV3	100	93	93	91	90	83	73	71	67	61	54	47	42
19/08/98	1968 DV4	100	100	97	93	90	81	70	68	63	58	51	46	43
	1973 DV5	100	94	89	86	82	74	64	61	56	51	43	39	37
	1978 DV6	100	98	94	87	84	79	69	66	61	55	49	42	40
	1982 DV7	100	100	96	93	88	84	77	72	65	59	53	45	44
	1987 DV8	100	96	96	94	91	87	82	78	72	64	58	53	50
	1991 DV9	100	87	85	83	79	74	65	61	55	50	43	38	36
	2001 DV11	100	94	94	90	87	79	68	65	59	52	44	39	36
20/08/98	2006 DV10	100	100	100	95	93	87	79	76	70	64	54	46	43
	2011 DV12	100	100	100	95	91	88	83	81	74	66	58	53	50
	2014 DAR2	100	97	93	91	89	85	81	79	73	63	58	53	50
	2020 DAR1	100	99	99	90	88	78	64	62	58	52	45	39	35
21/08/98	2025 A1R1	100	100	97	94	90	79	69	66	60	53	44	33	26
	2030 A1R1	100	93	93	91	87	77	64	61	54	46	39	33	31
	2033 DR5	100	93	84	80	77	67	56	54	49	42	36	31	29
	2036 DC5	100	82	80	76	72	66	59	58	53	47	42	39	36
	2039 DR6	100	89	89	86	82	73	64	62	55	48	39	33	30
	2042 DL5	100	91	89	85	81	73	64	61	56	50	44	40	38
22/08/98	2045 DR6	100	96	93	92	87	82	72	70	64	56	49	42	39
	2048 DL6	100	100	97	94	90	84	70	66	58	51	42	32	29
	2051 DC6	100	88	87	83	81	76	65	62	56	49	43	37	34
	2056 DL7	100	91	88	86	81	79	69	65	57	51	45	40	36
	2061 DR8	100	92	92	87	80	72	63	60	56	52	46	41	39
	2066 DC8	100	98	95	88	86	76	65	62	58	54	49	42	40
23/08/98	2071 DR9	100	96	94	87	77	64	53	50	46	40	35	31	29
	2076 DC9	100	100	98	96	87	77	64	61	56	49	44	38	35
	2081 DC10	100	97	93	89	77	65	53	50	45	39	33	29	28
	2086 DL10	100	100	87	85	81	71	64	58	54	50	44	36	33

DATE	BL NO: LOCATION	% passing												
		100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
	2091 DL11	100	100	100	100	99	96	92	88	81	73	63	53	48
	2096 DR12	100	100	100	97	91	82	71	63	58	53	47	40	37
26/08/98	2100 DL12	100	100	98	90	79	65	50	48	46	39	35	30	28
	2105 DR13	100	97	91	88	80	77	70	67	62	56	47	42	40
	2110 DC13	100	100	100	97	91	87	79	77	71	61	53	49	45
	2115 DL13	100	100	100	96	92	84	78	75	69	62	54	44	39
	2120 DL14	100	93	92	88	85	79	71	67	61	55	48	41	38
	2125 DL15	100	98	98	95	89	84	77	71	67	61	53	44	41
27/08/98	2130 DR16	100	98	97	93	89	82	73	70	64	55	48	43	40
	2135 DC16	100	100	99	96	93	89	80	76	69	61	52	45	41
	2140 DL16	100	96	95	90	85	78	69	66	60	52	46	38	36
	2145 DR17	100	76	76	73	70	66	62	58	54	49	42	33	30
	2150 DR18	100	94	93	89	86	82	74	71	66	59	50	40	37
28/08/98	2155 DC18	100	93	91	87	83	78	72	69	63	57	53	45	43
	2160 DL18	100	100	98	95	90	84	77	75	70	63	59	53	50
	2165 DL19	100	98	95	92	88	83	77	74	70	60	55	51	48
	2170 DR20	100	100	100	97	95	90	84	77	71	65	56	48	43
	2175 DR21	100	100	98	97	93	87	81	78	73	66	56	44	41
	2180 DC21	100	100	98	97	94	85	77	72	67	60	52	45	41
29/08/98	2185 DR22	100	88	85	80	75	68	61	58	53	47	42	37	34
	2190 DC22	100	100	93	91	89	77	64	61	56	50	43	38	35
	2195 DL22	100	94	93	88	84	78	70	68	62	57	49	43	40
	2200 DL23	100	96	93	89	85	79	70	66	61	56	51	46	44
	2205 DR24	100	89	86	84	80	74	66	61	56	50	45	40	38
	2210 DC24	100	96	93	89	85	79	70	66	61	56	51	46	44
30/08/98	2215 DC25	100	97	96	93	89	84	77	74	67	58	51	46	41
	2220 DL25	100	100	99	95	90	86	78	75	67	58	49	42	39
	2225 DL26	100	98	96	92	88	81	71	68	63	58	52	44	39
	2230 DC26	100	100	94	92	87	81	72	69	63	56	49	41	37
	2235 DC27	100	95	94	90	85	80	69	66	59	52	44	38	35
31/08/98	2240 DR28	100	100	98	95	91	86	79	75	67	59	52	45	42
	2245 DC28	100	94	90	87	83	77	69	66	59	51	45	40	37
	2250 DL28	100	99	99	95	91	86	80	76	69	61	52	44	40
	2255 DL29	100	100	100	97	91	85	77	73	66	58	47	38	34
	2260 DR30	100	100	98	96	94	90	85	80	72	61	54	46	43
	2265 DL30	100	100	100	99	98	91	83	79	69	61	52	44	40

GRADATION OF BARGE DUMPING MATERIAL

September

1989

No of samples tested = 112
 No of samples below the specified fines content = 0

MAX	100	100	100	100	98	93	88	81	77	70	62	54	52
MIN	100	78	75	73	70	57	44	40	36	32	29	25	22
AVG	100	96	94	91	87	81	73	68	62	55	48	42	39

SPEC. LIMITS	MAX	100	100	100	100	100	100	100	95	90	85	80	72	65
	MIN		85		70	61	50	45	39	34	28	23	20	

DATE	BL NO:	LOCATION	% passing												
			100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
01/09/98	2270	DC31	100	98	97	93	89	84	77	74	70	64	54	49	47
	2275	DR32	100	99	96	93	89	85	77	74	70	63	56	50	47
02/09/98	2280	DC32	100	99	97	95	92	88	80	74	68	62	55	46	42
	2285	DL32	100	100	98	95	91	86	77	71	67	62	55	47	45
	2290	DL33	100	98	97	94	91	86	77	73	68	63	58	50	46
	2295	ADX19	100	97	96	95	91	85	79	71	66	61	54	45	41
	2300	ADX18	100	96	92	85	83	77	64	61	56	51	44	35	32
03/09/98	2305	ADX20	100	98	97	95	92	88	80	76	69	59	52	45	42
	2310	ADX21	100	100	99	96	94	89	82	79	71	62	53	46	43
	2315	ADX14	100	98	98	95	92	86	77	73	66	57	49	43	39
	2320	ADX15	100	97	93	92	89	85	78	70	63	55	47	42	38
	2325	ADX16	100	100	97	96	93	88	82	76	68	61	54	48	44
04/09/98	2330	ADX17	100	99	96	91	88	83	73	70	63	54	47	42	39
	2335	ADX11	100	99	95	91	86	80	71	71	67	64	58	51	48
	2340	ADX10	100	98	97	94	91	86	80	76	71	65	58	54	49
	2345	ADX13	100	98	98	89	83	76	68	64	61	57	50	44	41
	2350	ADX12	100	100	96	95	93	86	78	74	66	57	48	41	37
05/09/98	2355	ADX8	100	98	92	88	83	74	65	62	56	50	42	36	33
	2360	ADX7	100	100	100	100	98	93	83	79	75	69	62	51	47
	2365	ADX8	100	99	97	95	92	88	82	79	75	68	59	53	51
	2370	ADX9	100	94	94	91	87	77	68	64	57	50	43	37	33
	2375	ADX22	100	99	93	91	87	82	73	68	62	54	47	40	37
06/09/98	2380	ADX23	100	98	97	95	88	78	70	65	60	51	45	39	36
	2385	ADX24	100	97	97	93	90	84	78	74	67	58	51	44	41
	2390	ADX25	100	98	96	93	88	85	77	73	66	57	49	42	39
	2395	ADX26	100	100	100	96	92	86	79	75	67	61	52	45	41
	2400	ADX27	100	100	98	96	95	89	80	76	69	61	52	42	38
07/09/98	2405	ADX28	100	100	99	97	91	86	78	74	68	60	49	43	39
	2410	ADX29	100	100	93	91	87	80	73	69	63	54	44	33	30
	2415	ADX30	100	88	84	81	78	73	69	65	58	51	45	39	36
	2420	ADX31	100	97	91	89	85	81	74	71	64	56	49	42	39
	2425	ADX32	100	93	93	91	90	84	78	75	70	64	56	47	44
08/09/98	2430	ADX33	100	100	100	98	97	91	86	80	73	67	59	48	45
	2435	ADX18	100	100	98	96	94	88	82	76	71	65	59	48	45
	2440	DL20	100	94	93	90	86	82	75	71	68	61	56	52	49
	2445	ADX19	100	98	97	94	90	85	76	71	66	61	57	54	50
	2450	ADX23	100	100	98	95	92	88	78	71	65	62	57	50	47
09/08/98	2455	DL20	100	100	100	98	96	89	82	77	70	64	56	46	41
	2460	DR20	100	100	100	99	98	91	87	75	68	62	56	49	46
	2465	ADX20	100	100	100	99	98	91	84	79	74	67	60	52	49
	2470	ADX21	100	91	88	85	80	77	69	65	58	52	45	40	37
	2475	ADX21	100	89	87	84	80	75	64	60	54	48	43	38	35
10/09/98	2480	DL21	100	89	85	78	70	57	44	40	36	32	29	25	22
	2485	ADX25	100	99	98	95	92	87	80	77	70	60	53	48	45
	2490	DR21	100	100	100	96	92	86	78	74	67	59	50	44	41
2495	DL21	100	97	95	94	90	85	79	75	68	63	56	47	45	

DATE	BL NO:	LOCATION	% passing												
			100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
		2500 ADX38	100	99	97	95	92	86	79	76	68	59	52	46	43
		2505 ADX39	100	100	99	96	92	86	78	75	68	60	52	46	43
		2510 ADX21	100	99	98	95	93	88	84	80	75	65	59	49	45
		2515 ADX40	100	100	98	95	91	87	83	79	73	67	59	51	48
		2520 DR20	100	100	100	99	95	92	88	81	77	70	60	51	47
11/09/98		2525 ADX25	100	100	98	95	92	87	78	74	68	62	55	48	45
		2530 DL20	100	99	96	93	91	87	80	75	68	62	55	47	44
		2535 ADX22	100	95	93	91	88	83	76	73	68	61	55	47	44
		2540 ADX18	100	95	95	94	93	85	71	68	62	54	44	32	29
		2545 ADX19	100	100	98	96	93	86	77	72	64	54	47	41	38
12/09/98		2550 ADX23	100	90	90	87	82	73	61	57	49	44	38	30	28
		2555 ADX20	100	98	95	92	89	84	80	76	69	61	53	43	39
		2560 ADX11	100	100	97	94	90	85	81	77	69	60	50	42	38
14/09/98		2565 DC34	100	88	85	83	80	73	66	61	55	49	41	36	33
		2570 DR34	100	98	98	96	90	79	75	71	63	54	48	43	39
		2575 DL42	100	98	93	91	83	77	66	63	57	49	41	35	32
		2580 DR42	100	97	94	90	87	77	67	57	51	47	41	34	31
		2585 DL43	100	100	94	91	88	78	67	61	53	48	42	36	31
		2590 DL44	100	100	95	92	88	80	69	65	58	52	45	38	35
15/09/98		2595 DC44	100	92	92	88	81	76	66	63	55	49	42	36	33
		2600 DR44	100	97	95	90	89	82	72	67	60	54	47	42	39
		2605 DC45	100	92	88	85	79	77	66	60	52	44	38	33	30
		2610 DR45	100	90	89	84	79	73	66	62	56	49	42	34	31
		2615 DR46	100	97	91	90	85	75	64	60	55	49	43	36	34
16/09/98		2620 DRR46	100	89	86	84	82	75	59	55	49	43	38	33	30
		2625 DL47	100	100	92	88	83	78	67	62	54	48	42	38	35
		2630 DRR47	100	89	84	84	80	73	62	59	53	46	41	35	32
		2635 DL48	100	100	98	97	96	88	80	71	65	59	52	44	41
		2640 DR48	100	100	100	98	94	85	75	63	55	49	41	32	30
		2645 DRR48	100	78	75	73	70	63	55	52	48	43	38	33	31
17/09/98		2650 DC49	100	83	83	83	80	75	63	59	53	46	40	36	33
		2655 DR49	100	89	87	81	75	73	64	60	55	49	43	37	35
		2660 DL50	100	100	93	84	82	76	69	64	56	49	44	37	34
		2665 DR5	100	97	96	91	83	70	59	55	51	45	39	33	30
		2670 DRR50	100	92	91	89	85	70	60	57	52	46	39	33	31
18/09/98		2675 ADG1	100	98	95	91	86	82	77	73	68	59	53	46	44
		2680 ADG1	100	97	92	84	82	76	72	69	64	58	51	45	43
		2685 DR51	100	100	90	86	81	74	64	61	58	52	46	41	38
		2690 TL1	100	100	100	98	94	84	72	62	55	50	46	42	41
		2695 TC1	100	100	100	100	97	89	80	72	64	57	52	48	46
		2700 TC2	100	100	100	94	90	81	70	56	50	46	41	36	34
19/09/98		2705 TR2	100	93	93	84	80	73	65	61	56	48	42	37	34
		2710 TR3	100	87	81	80	78	72	64	59	53	49	43	35	31
		2715 TL4	100	98	95	88	85	81	68	65	59	51	44	38	35
		2720 TC4	100	100	100	99	98	93	84	76	71	67	61	54	52
		2725 TC5	100	94	91	84	83	75	66	60	55	50	43	36	34
		2730 TR5	100	88	88	85	82	80	71	65	60	56	50	45	44
20/09/98		2735 ADX34	100	90	86	84	81	76	65	62	56	49	43	37	34
		2740 ADX54	100	94	87	83	81	75	66	63	57	49	41	36	33
		2745 ADX55	100	95	86	82	80	73	65	62	56	49	41	36	33
		2750 ADX56	100	100	94	90	86	75	66	63	57	50	42	36	33
		2755 ADX57	100	100	100	100	98	89	78	74	70	66	58	50	46
21/09/98		2760 ADX60	100	87	81	79	78	75	65	61	54	48	43	38	35
		2765 ADX61	100	96	89	87	81	79	71	64	57	51	43	37	34
		2770 ADX62	100	95	94	92	89	83	78	74	69	62	54	45	42

DATE	BL NO:	LOCATION.	% passing												
			100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
	2775	ADX58	100	96	95	93	92	86	80	76	71	64	56	48	45
	2780	ADX59	100	100	96	94	92	88	82	77	70	62	53	43	40
27/09/98	6	ADX64	100	80	75	73	70	66	61	55	48	41	36	31	29
	11	ADX67	100	82	78	77	75	68	61	56	50	43	38	33	32
28/09/98	15	ADX67	100	89	85	82	80	75	71	64	56	51	44	39	36
	20	ADX69	100	96	92	90	86	84	82	75	68	61	54	48	45
	25	ADX102	100	100	100	98	93	85	77	72	64	55	47	40	36
29/09/98	30	ADX70	100	98	96	89	81	78	66	62	55	49	43	37	35
	35	ADX102	100	90	87	85	81	76	68	66	60	51	44	37	34
30/09/98	40	ADX72	100	95	93	91	86	82	74	71	65	56	50	46	42
	45	ADX63	100	100	100	99	95	86	74	68	60	52	45	38	36

GRADATION OF BARGE DUMPING MATERIAL - SCHEME 2 October

98

		No of samples tested = 90												
		No of samples below the specified fines content = 0												
	MAX	100	100	100	100	100	95	87	93	93	68	58	50	48
	MIN	100	74	73	68	65	61	50	47	41	34	28	22	20
	AVG	100	93	90	87	83	77	68	65	58	50	43	35	32
SPEC. LIMITS	MAX	100	100	100	100	100	100	100	95	90	85	80	72	65
	MIN		85			70	61	50	45	39	34	28	23	20

DATE	BL NO: LOCATION	% passing												
		100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
27.09.98	6 ADX64	100	80	75	73	70	66	61	55	48	41	36	31	29
	11 ADX67	100	82	78	77	75	68	61	56	50	43	38	33	32
28.09.98	15 ADX67	100	89	85	82	80	75	71	64	56	51	44	39	36
	20 ADX69	100	96	92	90	86	84	82	75	68	61	54	48	45
29.09.98	25 ADX102	100	100	100	98	93	85	77	72	64	55	47	40	36
	30 ADX70	100	98	96	89	81	78	66	62	55	49	43	37	35
30.09.98	35 ADX102	100	90	87	85	81	76	68	66	60	51	44	37	34
	40 ADX72	100	95	93	91	86	82	74	71	65	56	50	46	42
01/10/98	45 ADX63	100	100	100	99	95	86	74	68	60	52	45	38	36
	50 ADX73	100	95	88	86	83	76	65	59	53	47	41	36	33
02/10/98	55 ADX103	100	100	98	92	88	80	73	69	61	52	45	38	35
	60 ADX81	100	100	96	93	91	86	78	74	65	58	51	46	43
03/10/98	65 ADX74	100	98	96	93	89	84	75	69	62	53	48	42	40
	70 ADX81	100	91	90	87	83	74	62	59	54	48	43	37	36
06/10/98	75 ADX88	100	100	94	89	84	74	60	57	52	46	40	35	33
	80 ADX82	100	98	94	88	86	82	67	63	56	49	43	37	34
08/10/98	85 ADX80	100	93	91	86	83	81	66	61	53	49	42	36	33
	90 ADX85	100	100	98	96	93	90	84	80	72	63	56	50	46
07/10/98	95 ADX57	100	98	97	94	91	87	80	77	69	61	55	50	48
	100 ADX106	100	85	83	80	77	68	61	57	50	44	39	34	32
09/10/98	105 ADX102	100	81	79	77	73	64	53	51	47	41	37	32	30
	110 ADX104	100	89	87	86	82	79	72	66	58	51	46	39	36
08/10/98	115 ADX88	100	87	85	83	81	78	72	66	57	50	44	40	37
	120 ADX91	100	96	94	91	88	84	72	68	62	56	50	44	41
13/10/98	125 ADX102	100	87	84	80	76	69	57	52	46	39	32	25	21
	130 ADX85	100	86	82	76	73	69	60	55	49	42	37	32	30
14/10/98	135 ADX78	100	86	83	81	77	72	65	61	55	49	42	37	34
	140 ADX77	100	86	85	82	80	76	68	62	56	48	43	36	33
15/10/98	145 ADX107	100	93	89	86	83	77	68	65	59	52	45	38	35
	150 ADX108	100	100	96	93	90	84	72	67	60	53	46	39	37
13/10/98	155 ADX83	100	93	91	87	83	81	72	69	62	53	46	40	37
	160 ADX103	100	88	84	82	78	75	68	64	58	50	44	39	37
14/10/98	165 ADX109	100	95	94	91	88	84	72	67	61	52	45	37	34
	170 ADX93	100	96	86	86	80	73	65	61	55	47	38	30	27
15/10/98	175 ADX105	100	86	81	77	74	66	58	55	49	41	33	26	24
	180 ADX94	100	93	88	85	81	79	71	64	56	48	38	32	29
14/10/98	185 ADX97	100	90	86	84	79	76	69	64	55	48	41	34	31
	190 ADX101	100	94	91	87	82	76	65	61	55	47	37	31	28
15/10/98	195 ADX104	100	95	88	86	83	74	65	62	57	49	37	25	22
	200 ADW1	100	88	84	82	79	72	64	61	55	49	40	30	28
14/10/98	205 ADW3	100	92	90	85	80	75	64	61	55	50	42	33	30
	210 ADW5	100	85	82	78	74	72	66	62	57	48	42	35	32
15/10/98	215 ADW6	100	89	84	81	78	69	60	56	49	43	37	28	25
	220 ADW8	100	88	83	80	77	73	63	60	53	47	41	33	30
15/10/98	225 ADX59	100	86	85	79	75	71	61	58	52	45	41	33	30
	230 ADX58	100	94	89	84	81	73	63	57	50	41	35	29	26

DATE	BL NO: LOCATION	% passing												
		100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
16/10/98	235 ADX19	100	93	88	84	78	65	54	51	43	37	32	25	23
	240 ADX14	100	88	85	80	75	71	60	57	51	43	37	32	29
	245 ADX16	100	95	94	90	87	74	65	61	53	43	35	28	25
19/10/98	250 ADX11	100	97	93	90	86	77	68	66	59	51	42	33	30
	260 ADX58	100	93	84	83	81	74	64	60	51	42	35	29	26
	265 ADX107	100	98	92	90	86	80	72	68	58	50	42	36	32
	270 ADX103	100	87	78	76	73	68	63	57	53	48	41	33	30
20/10/98	275 ADX102	100	93	86	84	81	73	66	64	59	53	45	36	33
	280 ADX7	100	95	93	86	71	67	63	58	51	45	40	33	30
	285 ADX4	100	95	92	90	81	72	63	60	51	45	38	32	29
	290 ADX6	100	100	100	100	100	95	87	85	78	68	58	48	44
	295 ADX3	100	100	96	96	92	87	80	78	73	65	56	45	42
21/10/98	300 ADX23	100	100	98	95	91	86	74	71	65	56	48	41	39
	305 ADX26	100	98	98	97	94	89	76	73	65	58	48	41	38
	310 ADX28	100	100	98	96	93	85	75	72	65	55	45	34	30
	315 ADX31	100	87	85	83	77	68	58	54	49	43	36	28	26
22/10/98	320 ADX33	100	74	73	68	65	61	50	47	41	34	28	22	20
	325 ADX36	100	93	90	84	81	75	65	62	53	44	37	31	28
	330 DC24	100	100	95	92	89	80	71	69	63	55	46	35	32
	335 DR26	100	100	95	93	87	79	70	68	63	56	46	35	32
23/10/98	340 BC28	100	98	96	90	88	82	74	71	64	54	44	35	32
	345 BR41	100	98	98	91	87	84	74	72	62	55	45	34	30
	350 BC42	100	91	88	87	85	82	77	70	64	57	52	43	39
	355 BC43	100	100	100	96	94	90	83	77	71	64	56	46	42
	360 ADX112	100	90	87	81	78	71	65	61	53	49	42	35	33
26/10/98	365 ADY2	100	91	83	79	72	61	53	50	44	36	29	22	20
	370 BR43	100	96	89	85	83	81	71	68	57	47	39	31	28
	375 BR44	100	96	87	84	80	74	67	64	56	48	40	29	25
	380 BC45	100	85	85	80	76	69	61	58	53	47	42	34	31
27/10/98	385 BLL46	100	97	90	85	81	79	71	68	61	52	44	38	35
	390 BR46	100	97	91	86	84	80	69	65	57	50	42	36	33
	395 BR47	100	100	98	95	93	87	79	75	67	57	46	35	31
	400 BC40	100	85	83	83	80	74	67	64	56	48	39	29	26
	405 BR40	100	100	95	90	84	81	72	93	93	53	43	37	33
28/10/98	410 BR39	100	97	94	89	83	77	63	60	54	47	39	32	30
	415 BC38	100	96	95	94	93	86	80	76	69	60	50	42	38
	420 BL37	100	93	90	85	82	77	68	64	58	49	42	36	33
	425 BR37	100	84	81	79	74	70	61	57	51	43	36	31	28
29/10/98	430 BR36	100	96	94	88	83	80	68	65	58	50	41	33	31
	435 BC35	100	100	99	97	95	91	84	75	68	60	52	41	35
	440 BC34	100	95	92	87	79	77	66	62	55	47	40	31	28
	445 BL33	100	100	95	92	86	79	67	63	56	48	38	30	26
	450 BL32	100	95	93	91	90	85	77	71	64	56	48	38	34
31/10/98	455 BR32	100	95	91	88	84	80	74	69	63	54	44	33	29

GRADATION OF BARGE DUMPING MATERIAL - SCHEME 2

November

No of samples tested													=	61
No of samples below the specified fines content													=	0
MAX	100	100	100	98	97	91	86	83	75	66	59	51	47	
MIN	100	82	76	74	69	64	55	52	47	38	32	25	23	
AVG	100	94	90	86	82	77	67	63	57	48	40	32	29	
SPEC. LIMITS	MAX	100	100	100	100	100	100	95	90	85	80	72	65	
	MIN		85			70	61	50	45	39	34	28	20	

DATE	BL NO:	LOCATION	% passing												
			100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
02/11/98	460	BR31	100	100	92	88	85	79	68	65	57	47	39	31	28
	465	BC30	100	94	92	90	83	80	72	68	61	51	44	37	33
	470	BR29	100	98	91	87	82	76	68	66	59	49	41	34	33
04/11/98	475	BR28	100	84	82	78	77	73	67	64	55	46	39	29	27
	480	CA3	100	100	97	90	82	82	72	68	61	51	41	31	29
	485	CA5	100	99	90	86	81	75	65	64	54	45	36	30	27
05/11/98	490	CA8	100	83	76	76	72	69	59	56	50	42	34	27	25
	495	CA10	100	98	92	88	83	78	68	64	54	44	36	28	26
	500	CA13	100	100	89	84	80	74	66	60	53	43	36	28	26
06/11/98	505	CA15	100	100	88	86	85	82	75	68	58	50	37	33	30
	510	CA18	100	96	93	89	87	82	71	68	55	46	39	32	30
	515	CA20	100	94	91	86	81	75	66	63	56	47	38	29	27
07/11/98	520	CA23	100	82	78	77	75	68	61	59	56	50	41	32	29
10/11/98	525	CA25	100	85	81	79	73	68	57	55	49	41	33	28	25
	530	CA28	100	84	79	76	73	69	58	57	51	43	34	29	26
	535	CA30	100	96	93	88	79	73	63	60	53	43	36	29	27
11/11/98	540	CA33	100	92	87	83	80	74	63	60	53	45	38	32	30
	545	BL27	100	89	84	80	78	76	64	61	55	46	38	33	31
12/11/98	550	BR26	100	93	90	85	82	78	68	65	58	49	41	32	30
	555	BR25	100	87	83	80	77	74	67	63	57	48	41	31	28
	560	BL23	100	85	83	79	76	74	68	65	59	50	42	33	29
	565	BL22	100	100	100	97	94	90	86	83	75	66	57	43	39
13/11/98	570	BR21	100	96	94	89	85	80	70	67	61	53	44	34	31
	575	BC20	100	93	91	87	81	79	70	67	60	52	44	34	31
	580	BC19	100	90	87	84	78	75	67	64	57	50	43	33	30
14/11/98	585	BL18	100	97	94	89	84	78	72	70	65	57	48	40	36
16/11/98	590	BL17	100	100	96	90	85	79	60	56	51	43	36	30	26
	595	BR17	100	96	95	93	86	80	63	60	54	46	36	30	28
	600	BR16	100	93	91	91	82	78	65	63	57	51	41	33	29
	605	BL14	100	94	91	86	79	72	63	61	53	47	41	32	29
17/11/98	610	BR13	100	100	98	88	83	77	60	57	51	42	35	29	26
	615	BC11	100	96	94	90	85	80	67	64	57	51	41	32	30
	620	BL9	100	99	96	92	84	78	64	61	55	44	38	32	30
18/11/98	625	BRR8	100	87	80	74	73	64	55	53	47	40	33	27	26
	630	BC6	100	98	93	88	83	76	59	54	51	45	36	29	27
	635	BL4	100	88	85	84	82	74	61	58	49	39	33	27	25
19/11/98	640	BL3	100	95	84	74	71	68	59	58	50	43	34	27	25
	645	BR2	100	95	91	91	84	75	63	60	54	46	35	28	25
	650	SD2	100	98	96	94	92	83	69	66	59	50	38	31	28
20/11/98	655	DC14	100	97	90	88	83	76	64	61	54	48	39	30	28
	660	DL38	100	97	93	90	86	67	60	58	51	45	36	29	26
	665	BR37	100	90	90	88	84	78	70	61	55	48	42	33	30
23/11/98	670	DC35	100	91	87	84	79	75	65	60	54	45	36	30	28
	675	YR4	100	88	84	81	78	73	63	58	52	44	35	26	23
	680	YR9	100	100	93	89	85	81	72	69	60	51	43	32	29
24/11/98	685	YR14	100	91	86	83	80	80	70	66	59	50	40	34	31
	690	YR1	100	94	90	87	87	83	73	68	61	53	43	36	32
	695	YL2	100	85	83	79	79	76	67	64	56	48	38	28	26
25/11/98	700	AYR2	100	94	91	89	86	82	72	69	61	52	44	33	27

DATE	BL NO:LOCATION	% passing												
		100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
	705 AYR2	100	92	89	86	83	79	70	66	59	49	43	34	31
	710 XR12	100	95	94	91	87	85	71	66	59	52	44	38	34
26/11/98	715 AYR5	100	95	92	90	87	81	74	70	63	53	42	35	33
	720 YL11	100	100	94	89	87	83	74	70	62	52	42	31	28
	725 YL16	100	89	87	84	81	76	68	64	58	49	40	31	28
27/11/98	730 XR10	100	90	86	84	82	78	69	64	58	50	42	32	29
	735 AXR4	100	100	95	91	87	85	72	68	61	52	43	33	31
	740 XR5	100	95	94	89	86	84	76	73	66	56	43	35	31
28/11/98	745 XL1	100	98	94	91	87	81	75	70	64	57	47	38	34
30/11/98	750 XL6	100	99	97	90	81	77	59	56	50	43	35	29	26
	755 XL12	100	88	86	79	69	66	55	52	48	38	32	25	24
	760 XL20	100	100	100	98	97	91	82	78	73	66	59	51	47

GRADATION OF BARGE DUMPING MATERIAL - SCHEME 2

December

		No of samples tested = 56												
		No of samples below the specified fines content = 0												
	MAX	100	100	100	98	96	91	86	82	76	67	57	49	45
	MIN	100	84	79	76	73	65	50	47	43	35	29	24	22
	AVG	100	97	94	90	85	79	68	65	58	51	43	36	33
SPEC. LIMITS	MAX	100	100	100	100	100	100	100	95	90	85	80	72	65
	MIN		85		70	61	50	45	39	34	28	23	20	

DATE	BL N LOCATION	% passing												
		100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
01/12/98	765 XL24	100	100	100	89	80	72	59	55	47	41	35	29	27
	770 XL29	100	97	95	88	83	76	62	60	54	47	38	31	28
	775 WR5	100	100	93	90	80	75	64	60	55	45	38	32	28
02/12/98	780 WR10	100	91	91	86	79	74	59	56	50	42	34	29	27
	785 WR16	100	95	91	89	85	81	52	47	43	35	29	24	22
	790 WR22	100	100	98	96	85	79	59	56	50	41	34	28	25
04/12/98	795 XL28	100	99	96	89	84	81	71	67	60	53	43	36	33
	800 WR30	100	100	95	92	85	81	72	69	62	53	45	37	33
	805 WR37	100	100	97	89	80	72	63	57	51	42	35	29	25
05/12/98	810 WL3	100	100	97	94	89	87	77	73	66	58	48	38	34
	815 WL10	100	96	95	93	88	84	76	73	65	57	46	37	33
	820 WL16	100	100	100	94	92	87	76	73	65	58	48	38	35
	825 WL23	100	95	88	86	83	81	73	70	63	55	45	34	31
09/12/98	830 WL30	100	99	97	92	84	75	68	61	56	50	41	34	32
	835 WL37	100	97	91	88	80	77	70	68	60	52	44	36	33
	840 MR1	100	100	98	90	79	65	50	47	43	36	31	26	22
	845 MR6	100	98	93	89	85	81	77	73	67	59	49	42	39
10/12/98	850 MR10	100	85	81	79	73	68	57	54	49	42	35	29	27
	855 MR15	100	96	93	88	79	73	63	60	54	47	38	32	29
	860 MR20	100	100	99	97	95	91	86	82	74	66	55	46	42
11/12/98	865 MR25	100	99	96	93	88	83	73	70	63	54	46	36	34
	870 MR30	100	94	94	92	87	82	71	68	61	52	43	33	30
16/12/98	875 MR36	100	99	96	91	87	80	64	60	54	48	39	33	31
	880 MR40	100	98	96	92	92	83	68	65	59	52	43	37	34
17/12/98	885 MR45	100	85	81	79	73	68	57	54	49	43	37	30	28
	890 MR50	100	84	79	76	73	69	58	53	48	40	35	29	26
	895 MR56	100	96	93	88	79	73	63	61	53	48	38	33	29
	900 MR61	100	97	95	92	90	85	78	73	66	58	49	41	37
18/12/98	905 MR66	100	100	92	88	85	79	68	66	60	52	45	39	35
	910 MR71	100	98	96	94	86	84	75	71	62	53	46	39	36
	915 MR76	100	93	91	87	82	76	68	65	55	50	44	39	37
21/12/98	970 DR19	100	100	94	91	86	79	73	67	62	57	51	43	38
22/12/98	975 TL21	100	91	91	85	83	73	55	52	48	42	37	31	29
	980 TC22	100	99	95	92	80	76	52	49	44	40	34	28	26
	985 TR23	100	94	93	92	79	66	53	50	46	41	36	31	28
	990 TL25	100	100	97	95	92	87	79	75	69	62	54	46	43
23/12/98	995 TC26	100	100	100	95	87	75	61	58	52	48	42	37	35
	1000 TL28	100	88	88	85	81	74	56	54	50	45	39	34	31
	1005 TR29	100	95	91	86	82	79	70	68	62	56	49	44	41
24/12/98	1010 TC31	100	100	98	98	96	91	85	82	76	67	57	46	42
28/12/98	1015 TLL33	100	100	98	94	91	86	74	71	64	57	48	39	36
	1020 TR34	100	98	95	93	89	84	76	74	66	59	49	40	36
	1025 TL36	100	99	97	95	91	87	83	79	72	64	56	49	45
29/12/98	1030 TL38	100	95	94	91	89	86	76	73	65	57	50	43	40

DATE	BL N LOCATION	% passing												
		100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
	1035 TR39	100	100	98	95	92	88	80	77	68	61	55	47	45
	1040 TC41	100	97	92	90	87	84	73	70	63	54	48	44	41
	1045 TL43	100	97	96	92	89	84	79	76	69	61	54	47	43
30/12/98	1050 2C24	100	99	95	92	88	83	76	74	66	59	49	43	38
	1055 2R23	100	98	95	94	89	87	77	73	66	60	51	44	42
	1060 2L22	100	88	87	84	80	72	55	52	47	42	35	30	27
31/12/98	1065 2C14	100	95	93	91	87	84	75	71	64	57	48	42	38
	1070 2C19	100	100	96	93	89	85	78	75	67	59	49	42	40
01/01/99	1075 2R17	100	99	96	91	87	83	69	66	58	52	44	37	34
	1080 2L16	100	100	85	84	80	74	63	60	55	47	41	35	33
	1085 2LL16	100	94	92	90	78	68	52	50	44	40	34	28	26
02/01/99	1090 2LL20	100	88	87	84	80	72	56	53	48	42	37	31	28

APPENDIX-B

GRADATION OF FORMED BLANKET FROM TRAY SAMPLES

GRADATION OF FORMED BLANKET FROM TRAY SAMPLES

No of samples tested = 130

MAX	100	100	100	100	100	100	100	100	100	99.5	98.5	93.9	87.3	83.7
MIN	100	45.8	40.5	34.9	31.4	25.6	21	19.2	17.7	15.7	13.3	11.4	10.4	
AVG	100	99	99	98	96	91	83	77	69	61	54	47	44	

DATE OF SAMPLING	Location	Sample	% passing												
			100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
17/04/98	1C5-15m	TT1T	100	100	100	100	99	95	87	80	69	60	53	46	44
		TT1M	100	100	100	100	95	91	80	72	61	53	47	43	41
		TT1B	100	100	100	100	100	98	90	84	75	68	59	53	50
17/04/98	1C5-30m	TT2M	100	100	100	100	100	97	96	88	78	70	61	52	49
		TT2B	100	100	100	100	100	99	97	88	74	65	58	53	51
17/04/98	1C5-45M	TT3	100	100	100	100	100	100	99	97	94	89	81	72	67
19/04/98	1C13-15m	TT4T	100	100	100	100	99	95	85	78	71	65	61	56	54
		TT4M	100	100	100	100	100	95	79	71	64	60	56	53	51
		TT4B	100	100	100	100	100	96	86	77	68	61	56	52	49
19/04/98	1C13-45m	TT6	100	100	100	100	100	100	100	100	99	97	92	85	81
22/04/98	1C1-15m	TT7T	100	100	100	100	100	97	87	83	74	67	60	53	50
		TT7M	100	100	100	100	93	90	81	77	67	60	54	49	47
		TT7B	100	100	100	100	100	97	89	82	67	56	49	43	40
22/04/98	1C1-30m	TT8	100	100	100	100	100	100	95	91	81	71	58	50	47
22/04/98	1C1-45m	TT9	100	100	100	100	100	100	100	100	100	99	94	87	84
23/04/98	1C9-15m	TT10	100	100	100	100	100	100	100	98	94	87	77	67	63
23/04/98	1C9-30m	TT11T	100	100	100	100	100	99	99	91	77	67	58	51	48
		TT11M	100	100	100	100	100	100	99	90	75	65	55	49	46
		TT11B	100	100	100	100	100	100	100	90	72	60	51	45	42
23/04/98	1C9-45m	TT12	100	100	100	100	100	100	100	99	95	89	81	72	67
29/04/98	1L2-10m	TT13	100	100	100	100	99	95	82	71	58	48	41	37	35
29/04/98	1R2-10m	TT14T	100	100	100	100	97	92	85	74	59	48	40	36	33
		TT14M	100	100	100	100	98	90	75	66	53	44	38	33	31
		TT14B	100	100	100	100	100	91	79	74	66	55	47	41	38
29/04/98	1C3-10M	TT15T	100	100	100	100	100	94	87	83	76	70	64	57	53
		TT15M	100	100	100	100	100	96	85	80	72	66	60	53	49
		TT15B	100	100	100	100	99	95	87	78	67	57	50	45	41
29/04/98	1L4-10m	TT16T	100	100	100	100	99	92	80	71	61	54	47	40	40
		TT16M	100	100	100	100	99	96	81	75	63	53	47	41	38
		TT16B	100	100	100	100	97	91	74	65	54	47	42	38	36
29/04/98	1R4-10m	TT17T	100	100	100	100	100	98	91	86	78	71	66	59	55
		TT17M	100	100	100	100	100	95	86	78	66	58	52	46	43
		TT17B	100	100	100	100	100	93	80	71	58	49	41	36	33
01/05/98	1L6-10M	TT18	100	100	100	100	100	96	84	80	76	71	67	61	57
01/05/98	1L8-10m	TT19T	100	100	100	100	100	99	95	90	82	76	70	62	58
		TT19M	100	100	100	100	100	98	93	87	80	74	67	60	56
		TT19B	100	100	100	100	100	97	91	84	76	70	63	57	53
01/05/98	1R8-10m	TT20T	100	100	100	100	99	93	88	81	72	66	58	52	48
		TT20M	100	100	100	100	99	97	91	86	80	75	67	59	54
		TT20B	100	100	100	100	100	97	91	86	79	74	68	63	61
04/05/98	1L10-10m	TT21T	100	100	100	100	99	98	95	89	80	71	61	52	48
		TT21M	100	100	100	100	99	97	91	85	74	65	58	51	47

DATE OF SAMPLING	Location	Sample	% passing												
			100 mm	60 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
		TT21B	100	100	100	100	99	91	82	76	70	65	56	50	44
04/05/98	1R10-10m	TT22	100	100	100	100	99	93	82	78	73	65	57	49	43
04/05/98	1L12-10m	TT23T	100	100	100	100	100	99	91	85	76	68	60	54	50
		TT23M	100	100	100	100	93	91	85	78	69	63	57	50	48
		TT23B	100	100	100	100	97	93	86	81	69	60	51	43	39
04/05/98	1R12-10M	TT24T	100	100	100	100	100	98	92	88	81	73	65	57	53
		TT24M	100	100	100	100	99	97	92	87	80	71	63	56	52
		TT24B	100	100	100	100	100	98	88	84	78	71	63	55	51
07/05/98	1L14-10m	TT25T	100	100	100	100	94	89	79	73	66	60	55	50	47
		TT25M	100	100	100	100	98	93	84	76	67	61	56	52	49
		TT25B	100	100	100	100	100	96	72	67	60	54	48	43	40
07/05/98	1L16-10m	TT27T	100	100	100	100	100	100	100	96	90	85	81	79	77
		TT27B	100	100	100	100	100	97	89	87	81	76	74	72	71
07/05/98	1R16-10m	TT28	100	100	100	100	100	98	95	90	82	74	66	60	56
14/05/98	2C3-10m	TT29T	100	100	100	100	98	96	89	78	68	58	49	42	39
		TT29M	100	100	100	100	98	96	88	79	68	58	47	40	37
		TT29B	100	100	100	100	99	97	92	87	77	66	55	47	44
14/05/98	2L6-10m	TT31	100	100	100	100	97	82	74	71	64	56	48	40	37
14/05/98	2R6-10m	TT32T	100	100	100	100	100	97	91	84	76	67	59	53	49
		TT32M	100	100	100	100	100	97	92	84	72	62	53	45	43
		TT32B	100	100	100	100	98	95	87	81	71	61	53	46	43
20/05/98	2L8-10m	TT33T	100	100	100	100	100	97	91	85	71	62	52	44	39
		TT33M	100	100	100	100	100	98	90	81	70	61	53	44	41
		TT33B	100	100	100	100	100	98	82	78	71	65	59	52	47
19/05/98	2C9-10m	TT34T	100	100	100	100	98	96	89	82	71	63	54	46	42
		TT34M	100	100	100	100	98	96	89	84	72	64	55	46	42
		TT34B	100	100	100	100	100	99	94	89	78	70	60	51	47
21/05/98	2C11-10m	TT35T	100	100	100	100	76	71	63	53	44	37	31	25	23
		TT35M	100	100	100	100	96	95	90	83	73	66	57	48	44
		TT35B	100	100	100	100	88	83	71	67	60	55	48	41	37
04/06/98	2L12-10m	TT36	100	100	100	100	99	97	90	81	72	65	56	48	44
26/05/98	3L6-10m	TT39	100	100	100	100	100	99	92	86	75	67	58	49	45
26/05/98	3R6-10m	TT40	100	100	100	100	96	92	87	83	77	71	61	50	46
28/05/98	2C2-10m	TT41T	100	100	100	100	95	92	87	82	72	65	57	50	46
		TT41M	100	100	100	100	99	96	91	86	77	69	61	54	50
		TT41B	100	100	100	100	97	96	91	85	74	67	58	50	46
28/05/98	2C4-10m	TT42T	100	100	100	100	97	92	84	74	63	57	51	44	41
		TT42M	100	100	100	100	97	91	84	78	68	61	54	48	44
		TT42B	100	100	100	100	98	90	83	78	69	61	54	46	41
30/05/98	D/1C6-10m	TT43	100	100	100	100	94	89	80	72	60	47	40	34	31
30/05/98	D/1L7-10m	TT44	100	100	100	100	83	79	72	65	56	49	42	34	30
02/06/98	I/2C8-10m	TT46	100	100	100	100	98	97	93	86	75	65	55	46	42
02/06/98	I/2R7-10m	TT47	100	100	100	100	92	87	78	67	55	47	42	37	34
04/06/98	J/2C10-10m	TT48T	100	100	100	100	93	84	69	63	56	50	44	39	34
		TT48B	100	100	100	100	99	96	88	83	74	66	56	50	46
04/06/98	J/2R11-10m	TT49T	100	100	100	100	79	74	65	59	51	45	39	34	31
		TT49M	100	100	100	100	89	80	66	62	52	44	38	33	29
		TT49B	100	100	100	100	97	87	74	67	59	53	48	43	40
09/06/98	A/3C1-10m	TT50T	100	100	100	100	100	99	94	85	77	70	65	60	56

DATE OF SAMPLING	Location	Sample	% passing												
			100 mm	50 mm	37.5 mm	28 mm	20 mm	10 mm	5 mm	2.36 mm	1.18 mm	0.600 mm	0.300 mm	0.150 mm	0.075 mm
		TT50B	100	100	100	100	98	90	74	68	62	58	54	51	48
09/06/98	A/3L2-10m	TT53T	100	100	100	100	100	97	87	81	76	70	64	59	56
		TT53M	100	100	100	100	100	95	81	74	67	62	58	53	49
		TT53B	100	100	100	100	96	87	74	70	64	60	56	52	49
16/06/98	A/3L6-10m	TT55	100	100	98	98	96	92	81	76	69	64	58	54	50
18/06/98	A1L10-10m	TT56T	100	100	98	97	94	92	84	79	74	68	64	60	57
		TT56B	100	90	90	90	89	85	77	71	65	61	56	52	49
18/06/98	A1L12-10m	TT57	100	100	100	99	99	97	89	84	77	72	67	64	60
20/06/98	A1R8-10m	TT58	100	100	97	97	96	94	85	80	74	69	63	56	51
28/06/98	A1R16-10m	TT59	100	98	96	94	92	88	82	74	63	55	48	42	40
20/06/98	A1R10-10m	TT60	100	100	96	90	87	83	73	69	63	57	50	46	43
23/06/98	A2R2-10m	TT61	100	100	100	95	90	80	65	61	55	49	44	39	36
28/06/98	A1R19-10m	TT63T	100	100	96	93	90	85	72	65	55	46	38	32	29
		TT63M	100	100	100	96	91	86	72	66	56	47	39	33	31
		TT63B	100	98	94	91	89	86	76	63	49	36	28	23	16
28/06/98	A1R22-10m	TT64	100	100	99	99	96	94	90	76	59	44	34	29	27
03/07/98	A1L2-10m	TT68	100	46	41	35	31	26	21	19	18	16	13	11	10
03/07/98	A1L5-10m	TT69	100	100	92	91	88	78	60	54	50	45	39	35	32
03/07/98	A2L1-10m	TT70	100	94	94	93	89	81	71	67	60	53	47	40	36
09/09/98	A2L11-10m	TT71	100	100	100	98	96	77	58	56	51	45	39	33	30
14/07/98	A4L7-10m	TT72T	100	100	92	86	81	71	64	60	52	43	36	30	28
		TT72M	100	93	87	84	78	69	62	58	51	43	35	29	27
		TT72B	100	100	100	99	98	89	69	67	63	58	50	42	38
21/07/98	S1L10-10m	TT74T	100	90	89	84	81	74	65	60	51	43	36	32	31
		TT74B	100	89	78	71	63	54	43	40	36	32	27	23	22
21/07/98	S2L4-10m	TT75T	100	92	88	85	79	71	58	53	45	37	32	28	26
		TT75B	100	100	98	92	82	64	43	41	37	33	28	24	23
21/07/98	S2R1-10m	TT76T	100	100	100	99	97	91	79	77	68	59	51	43	39
		TT76B	100	100	98	94	90	85	78	71	58	47	40	34	31
02/09/98	S3R1-10m	TT77T	100	100	97	93	91	88	83	80	77	73	65	55	51
		TT77M	100	100	100	99	98	96	92	88	85	80	70	57	53
		TT77B	100	100	100	100	100	99	93	90	82	73	61	51	48
31/08/98	ADU17-10m	TT78	100	100	100	100	100	100	100	100	98	93	82	65	59
20/11/98	CC2-10m	TT79T	100	100	100	94	90	87	71	67	60	53	45	37	34
		TT79M	100	100	100	100	98	92	82	77	70	62	52	42	38
		TT79B	100	100	100	100	100	95	81	78	70	62	53	43	40
20/11/98	CC1-10m	TT80T	100	100	97	97	97	94	83	78	69	61	51	43	39
		TT80M	100	100	100	100	100	95	78	74	67	58	48	40	36
		TT80B	100	100	100	100	100	93	79	76	68	59	51	42	38

Sample Notation

- TT20T Tray test no20 - top sample
- TT20M Tray test no20 - middle sample
- TT20B Tray test no20 - bottom sample

ANNEX-C

*PANEL'S SUMMARY REPORT DURING
INTERNATIONAL PANEL MEETINGS*

ANNEX-C

**PANEL'S SUMMARY REPORTS
DURING INTERNATIONAL PANEL MEETING**

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APPEBDIX – A 1ST INTERNATIONAL PANEL MEETING IN MAY 1996

Dr. Leslie Herath
Chairman, Ceylon Electricity Board
Sir Chittampalam A Gardiner Mawatha
P.O. Box 540, Colombo 02
Sri Lanka

Dear Sir,

**Samanalawewa Hydro Electric Project
Reservoir Remedial Works - Wet Blanketing
1st International Panel Meeting, May 1996**

REPORT


ON

**REMEDIAL BLANKETING WORKS
SAMANALAWEWA HYDRO ELECTRIC PROJECT.
FIRST INTERNATIONAL PANEL MEETING**

We are pleased to submit four (4) copies of our report for your review and perusal on the captioned subject. The Two Members International Panel attended 1st Panel Meeting at the Samanalawewa Project Site from 13th to 18th May 1996. In accordance with our terms of reference, all the preliminary issues relating to early stage of Wet Blanketing have been fully addressed and covered in this report. In case the Ceylon Electricity Board needs any further clarification on any of the topic covered in this report, the Panel members shall be pleased to do so from their respective addresses.

May 1996

Sincerely Yours


(Barry Cooke), (S.M. Tariq)

Barry Cooke

S M Tariq

(Under assignment from Overseas Development Administration)

Introduction

1.1 Terms of Reference

By letter dated February 19, 1996 and March 25, 1996; the Overseas Development Administration engaged S.M. Tariq and Barry Cooke respectively of WAPDA-Pakistan and J. Barry Cooke, Engineering Inc. of USA under British Aid Arrangements to advise the Government of Sri Lanka (Ceylon Electricity Board) on the Remedial Blanketing Works on Samanalawewa Hydro Electric Project.

The scope of assignment during First Joint Meeting of interested parties (CEB, OECF, ODA, GIBB & Nippon Koei) in Sri Lanka included review of the Proposed Design and Specifications of Wet Blanketing Material and Equipment and agree to the general approach and methodology adopted in the execution of Wet Blanketing. In addition the Panel was also required to advise CEB in the consideration of any other complicated issues associated with the safety of the Dam.

The Panel participated in this meeting from May 13, 1996 to May 18, 1996 at Samanalawewa Hydroelectric Project Site.

1.2 Responsibility

Although this report has been commissioned by the British Government under British Aid Arrangements, the British Government bears no responsibility for, and is not in any way committed to the views and recommendations expressed herein.

2. Programme for the Panel Meeting

A detailed Programme was chalked out by the Designer (GIBB) and Construction Supervisor (Nippon Koei) prior to the arrival of the Participants. The Programme included briefing and deliberations on :

2.1 Current Status of the Project

- Dam/ Reservoir Monitoring
- Preparation of Tender Documents for Wet Blanketing Works
- Reservoir operations under limited conditions.

EXECUTIVE SUMMARY

At this First International Panel Meeting, the Panel Members read Review Panel Report No. 2 of February, 1993 and reconfirm its Executive Summary, copy attached. Since that time investigations and the 1995 flood event have indicated even more favourable geo-technical and geo-hydrological conditions than and envisioned in 1993.

The following responses to the questions are brief and to be considered the Executive Summary of the Report.

5.1 Optimum Barge Capacity

2.2 Construction Programme upto Commencement of Trial Blanketing

2.3 Most urgent matters at present to observe the Construction Programme.

- Finalisation of Tender Documents
 - Concurrence to the Final Tender Documents
 - Contract Negotiation by CEB
 - Procurement of Barges
3. Major Technical Topics Presented by the Consultants for Panel Concurrence included:
- Optimum Barge Capacity
 - Potential Borrow Areas and Investigation Works
 - Blanket Materials
 - Necessity or otherwise of Silt Protection Curtain
 - Reservoir Impounding Rules during Wet Blanketing Period
 - Technical Specifications for Wet Blanketing including Trial Blanketing
 - Technical Specifications for Machinery and Equipment
 - Further investigations
 - Reconstruction of leakage measuring weir and its facility
 - Dam Safety and treatment of Unlined Adit portions due to rapid weathering rocks
 - Any topics to be raised by the participants

4. Mode of Topic Presentation and Discussion

The Sequence followed was :

- Presentation by the Consultant incharge of the topic
- Comments by the Panel
- Questions from the participants and answers by the Panel
- Summing up to confirm the conclusion of the presentation

5. Panels Recommendation

Based on the topic and issues discussed in the meeting, a questionnaire was handed over to the Panel Members for their views. Based on this, the Panel expresses its views on each question as under :-

Question : Please confirm the recommended:

- Barge size, Type of Barges, Barge door opening time and loading facilities based on Tarbela experience.
- Construction, survey and monitoring equipment to be procured by CEB described in Appendix-A.

Answer:

- The panel reviewed the comparative studies carried out by using combination of different size barges and feels that for a relatively smaller reservoir as is the case here at Samanalawewa, the smaller size barges would provide best manoeuvrability and would need minimum number of loading and handling equipment. Tarbela experience in hauling 125 m capacity barges in most odd and difficult dumping locations and operating the barges in shallow waters was a useful experience in arriving at a decision of selecting 125m capacity barges. The Panel recommends that barge specifications provided to the Engineers in respect of Tarbela barges should be adhered to as much as possible.
- The Panel reviewed the list of equipment provided by the Engineer. The Panel feels that a low bed trailer should be added in the list and power of Anchor Boat should be enhanced to be used as a proper Tug Boat. The Panel does not feel for the necessity of obtaining undisturbed sampling and therefore suggests that undisturbed sampling equipment should be removed from the list. The Panel is of further opinion that monitoring equipment should be cut down to the minimum and equipment such as automatic recorder water gauge for seepage measurements and automatic recorder for water level gauge are not needed.

5.2 Silt Protection Curtain

Question : Please confirm the recommendations made on the Silt Protection Curtain based on experiences gained on Turbidity/Suspended sediments measured at Tarbela.

Answer : Panel considers that dumping location is sufficient distance away from Power Tunnel Intake and Irrigation Inlet that minor dispersion of sediments in the dumping location will not travel to these offtake points in the reservoir. Tarbela experience of even dumping very close to the large size Power Intake did not have any adverse effects. Dumping carried out with controlled moisture content will minimize the dispersion in the reservoir. The Panel, therefore, does not recommend installation of Silt Protection Curtain or any other measures.

5.3 Candidate Borrow Areas and Proposed Blanket Materials:

Question: Please confirm the design criteria adopted for the gradation of the blanket materials and comment on the need for mixing the materials obtained from borrow areas at the stockpiles to produce optimum grading.

Answer: In all over one million cubic meters of material has been investigated in four borrow areas. The panel considers only two borrow areas namely Kinchigune and Pilipota would be adequate and provide the needed material. These two areas contain close to 800,000 m³ which is considered to be more than the Project requirements.

- The gradations presented to the Panel of Investigation Pits in the Borrow Areas do not represent the true picture. Samples for gradation have been collected from each stratified layer. Panel suggests that composite sample be taken out of properly mixed stratified material which would represent the actual excavation process, be tested for gradation.
- Panel feels that blanketing operation should include building up of a reasonable ^{Stockpile} at elevation $\pm 460\text{m}$ so that barge dumping operation could be carried out without interruption during the rainy season. This item of stockpiling should be reflected as one of the major activities in the Implementation Schedule.
- In actual, carrying out the Wet Blanketing the Panel suggests that first a thin layer of finer Blanket Material say upto 0.5 meter be spread over the whole area to allow the finer particles to travel into the cracks and openings in the rock. This thin layer then could be built up to 2 meters thickness to provide full seal.
- The Panel suggests that prior to undertaking massive follow-up blanketing, the Engineer should look into the possibility of other methods to reduce seepage. These methods could be dental concreting of local ingress points along the valley flanks or Blanketing the flanks below minimum reservoir operating level.
- The Panel generally agrees with the design criteria adopted for the gradation of the Blanket Materials and feels that material available naturally in Kinchigune and Pilipota Borrow Areas fulfill the gradation requirement. Panel does not recommend blending of material from different Borrow Areas as little additional benefits thus achieved do not justify the extra efforts and cost.

5.5 Additional Investigation Works

5.4 Guidelines for Controlling Impounding

Question: Please confirm the suitability of the Guidelines for controlling impounding during Wet Blanketing

Answer: The proposed guidelines are presented in REFERENCE NO. 3 are based on restricting the raising of the reservoir level based on ground water levels. During discussion at this meeting we were advised that there would be no restrictions on reservoir raising until the level reaches the spillway ogee elevation 447. At that time conditions would be evaluated before gate closing.

- The Panel accepts the revised guideline. However, the Panel sees no significance in the pause of spillway crest level. Filling should continue to full reservoir subject to normal first reservoir filling monitoring.

- The Panel concurs with the conclusions and comments in the Executive Summary of Review Panel Report No. 2 of February 1993. The investigations and experience since then have confirmed those views.

- In Report No.2 the Panel expressed its confidence in safety while envisioning a possible leakage of 10 m³/s. In extrapolating the data of the leakage event of April 1995, the leakage at full reservoir would be about 3.3 m³/s. The 1995 experience, as well as the 1992 experience, demonstrated the ability of the right abutment to sustain safe leakage

- With no restriction on reservoir filling there will be some conflict between optimum power operation and the most economical blanketing operation. This should be resolved on the basis of economics.

It is noted that the most effective blanketing is from the highest reservoir level.

5.5.1 Question: Please consider the necessity of additional boreholes for monitoring, further geotechnical investigations and identify specific investigations if required.

Answer: Further investigations are discussed and it is concluded that no further geo-technical investigation is required. The Panel concurs.

Hydraulic Model Tests

5.5.2 Question: Please consider the proposed Hydraulic Model Testing and advise of any additional/alternate testing if considered necessary.

Answer: A model test has been proposed. It will illustrate that range of percent moisture will result in minimum segregation and dispersion. It will also show that without a filter, fines will migrate into cracks. These are well known facts. The model is not necessary to provide data for the Wet Blanketing construction.

5.6 Technical Specifications for Wet Blanketing

Question: Please confirm that the principles of the specification described are fit for the purpose.

Answer: The Panel agrees generally with the Technical Specifications but suggests no strict rules should be observed. The experience gained during actual operation would provide better education.

5.7 Technical Specifications for Split-type Barge 125 m3

Question: Please recommend on the principles as specified for a split type dump barge.

Answer: The specifications provided are based on barges used at Tarbela. The Panel has seen the successful use of these barges over the last 21 years and feels that barges obtained close to the specifications of Tarbela barges would meet the requirements at Samanalawewa Project.

5.9 Design of Permanent Structures

Question: Please comment on the proposed monitoring structure and tunnel linings as summarised in the reference no 3 and described in the specifications.

Answer:

5.9.1 Leakage Weir

Drawings for a proposed monitoring weir are in the Draft Tender Document volume. The design is to satisfy a criterion of accurately measuring leakage at the main leakage point. The Panel does not see the need for accuracy for measuring flow: over 2 m³/s and considers that cost to improve or replace the present facility are not justified.

The present weir is subject to damage or loss from high flood discharge. The possibility of such flood discharge before the reservoir has operated at full operating level for some time is remote.

5.9.2 Right Bank Adit Lining

The Panel endorses the proposed Right Bank Adit Lining.

5.8 Trial Blanketing

Question: Please comment on the proposed strategy for the trial blanketing as summarised and specified in Section 7.7 and confirm the suitability of the equipment specified.

Answer: The Panel considers the trial blanketing efforts as outlined to gain more into actual behaviour of the material as it is dumped are quite comprehensive and need not to be further expanded. Since initial thickness of 0.5m of finer material is suggested to seal the cracks and openings in the rock, dumping pattern for half meter thick blanket should also be carried out during trial dumping. The Panel further suggests that undisturbed sampling is not required and no effort and money should be spent on this item.

5.10 Rapid Weathering of Rockfill and Riprap on the Dam

Question: Please comment on the preliminary assessment of the implications of weathering on the rockfill embankment and on the proposed continued studies.

Answer: The quarry face and the rocks on the upper slopes of the dam were inspected. The weathering of some of this small granulate rocks on the dam surface was observed. The change in the colour of some of the quarry face rock, from white to rust, is a self arresting characteristic on the surface. The thin zone of weathered blast damaged rock at the drill - blast holes is due to the blast damage micro-fractures permitting a little deeper than surface weathering.

On some dams of rock types such as shale silt stone, argillite, phyllite and basalt, some surface rocks develop cracks and disintegrate. This has been found to be a surface condition, and not to occur below 0.3 -0.6 meters. This weathering characteristic is considered to be of no consequence to Samanalawewa Dam. No further studies of this phenomena are necessary.

6 General Comments

6.1 Implementation Schedule

Though there was no specific questions addressed to the Panel on the Implementation Schedule, the Panel suggests the following Points need due consideration :-

- Stockpiling to be included as a major activity in the Implementation Schedule.
- Trial Blanketing Period should be reduced to one month.
- Activity 20 appearing in the Schedule should be replaced as " Main Blanketing and Follow up Works."

6.2 Wet Blanketing should be carried out on two 10-hours shift to avoid substantial idle time

6.3 Careful clauses need to be included in the Tender Documents to avoid Contractor's major claims when effective sealing of the leak has been achieved at much less quantity of Wet Blanket material than what has been specified.

6.4 Flushing of Existing Standpipe Piezometers

The Panel was informed during discussions that large number of Standpipe Piezometers have been vandalized. The Panel recommends serious efforts should be put in to pressure wash all of these piezometers and maximum number of piezometers should be reactivated. These are deep piezometers and a lot of cost has gone in their drilling. Proper locking arrangement also needs to be provided to protect the piezometers from future acts of vandalism.

6.5 Inflow Information

The Panel considers that accurate inflow information is needed for future operation of the reservoir at higher levels. The present method of water balance study taking into account seepages and reservoir fluctuations is not accurate and could lead into serious problems downstream during flood seasons.

6.6 Cut Slope near the Main Leak

Though the Ground water level is high in the right bank hill, all the drain holes except a few were not flowing. Panel Recommends roding and flushing of these drain holes in the cut slope near the leak be carried out at regular intervals.

7. Imjibim Irrigation Scheme

A scheme to pump 1 cumeec from the tailrace under rather than release 1 cumeec from the dam was briefly presented. It would not be related to the blanketing prospect. However, such a scheme could be studied as a means of increasing energy. The ratio of 300 m power head to 30 m pumping head is favourable.

8. Environmental Considerations

A summary presentation was made. The Panel concurs with the emphasis that should be placed on providing full information to the public and to the usual factors associated with heavy construction works. For this Project the special factor of siltation which is to be monitored.

SAMANALAWEWA HYDRO-ELECTRIC DEVELOPMENT

RIGHT BANK LEAKAGE - REVIEW PANEL

CONCLUSIONS

1) Dam: The dam is safe for full reservoir and is independent of right ridge leakage conditions.

2) Right Abutment: The right abutment provides a reliable perimeter for the reservoir at full storage level and any credible amount of leakage. Work is required to reduce leakage for economic, not safety, reasons.

3) Geology: Rock foundations are excellent for the dam. However, tectonic activity has resulted in a sheared, and fractured rock where the fissures are open to a great depth in the Right Bank Ridge. The rock, therefore, is excessively pervious.

4) Right Abutment Grout Gallery: In contrast to the adequate rock conditions on the Left Bank, the rock on the Right Bank was found to present adverse conditions as more exposures became visible during construction. For these unusual conditions it was logical to increase the grouting program. The very deep open cracks made the curtain ineffective in adequately reducing leakage.

5) Trial Filling: Combining the knowledge of the very low groundwater levels in the Right Bank with the high grout takes gave rise to concern for high leakage, and logically prompted the trial filling. The test to water el. 402 confirmed this concern.

6) October 1992 Event: During the first filling the sudden release created only a local stability problem in the overburden material. The stabilised 2m/s leakage for water surface 426 is high and suggests that above 10m/s for full reservoir is possible. This event verified the need for measures to reduce leakage.

7) Measures for Reducing Leakage: Evaluation of geology data, experience, and investigations indicate that wet blanketing is the most promising means of reducing leakage.

8) General Abutment Drainage: The reservoir abutment rock drains itself freely and safely. With reservoir level higher than el. 440 some overburden slides can be expected. They would be of no consequence and no ridge drainage is necessary.

EXECUTIVE SUMMARY

TERMS OF REFERENCE AND RESPONSE

1) "To assess the stability of Samanalawewa Dam, as built and under the present hydrogeological condition".

Response: The dam is a conventional central core rockfill on a hard rock foundation designed and constructed to current standards and constructed of satisfactory materials. Its stability could not be affected by many times the maximum credible leakage that might pass through the right abutment ridge, with full reservoir level of el. 450.

2) "To assess the stability of the Right Bank of Samanalawewa Reservoir under present and short term future conditions before remedial measures are complete".

Response: The Right Bank ridge is of non-erodible and non-pipeable rock. There are shear zones, and open joints that exist to great depth. The right abutment perimeter of the reservoir will safely pass any amount of leakage for full reservoir before any measures are taken to reduce leakage.

3) "To review available proposals for conceptual design of remedial measures for the Samanalawewa Dam and Reservoir and to suggest the most appropriate proposal".

Response: The extensive grout curtain carried out according to current standard practice has not adequately sealed the abutment even for the low partial filling. The unusual geological conditions of open cracks at great depth make improvements of the curtain impractical. The most appropriate measure, with the probability of significant reduction in leakage, is blanketing.

9) Dam Right Abutment Drainage The dam and the right abutment rock just downstream of the dam, is safe against high-abutment piezometric levels and drainage is not necessary. However, there is an unlined access gallery in exactly the correct location. Additional controlled drains in the gallery are advisable in this transition zone between dam and abutment.

10) Outlet Works Since it is firmly judged that the right abutment and dam are safe for full reservoir, no modification to the outlet works is necessary.

11) Flood Season 1993 There is no risk to the dam or right bank stability should the reservoir fill before remedial works are carried out. Frequent measurements and surface observations should be made during the rising reservoir.

12) Monitoring During Blanket Placement The principal observations will be measurement of the leakage and observance of sediment and coloration of the leakage, and recording of piezometric levels. At the bench end where placement takes place, the volume discharged for a meter progress in extension of bench should be recorded. Soundings would be made.

13) First Filling There should be no established short or long term objectives of permissible piezometric levels or of limits of permissible leakages.

**APPEBDIX – B 2ND INTERNATIONAL PANEL MEETING IN SEPTEMBER
1996**

THE GOVERNMENT OF DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF IRRIGATION, POWER AND ENERGY
CEYLON ELECTRICITY BOARD

REPORT

ON

REMEDIAL BLANKETING WORKS

SAMANALAWEWA HYDRO ELECTRIC PROJECT

SECOND INTERNATIONAL PANEL MEETING

SEPTEMBER 1996

Barry Cooke
Barry Cooke

S. M. Tariq
S M Tariq

(Under assignment from Overseas Development Administration)

27th September 1996

Mr Arjun Deraniyagala
Chairman
Ceylon Electricity Board
Sir Chittampalam A Gardiner Mawatha
P O Box 540
Colombo 2.
Sri Lanka

Dear Sir,

Samanalawewa Hydro Electric Project
Reservoir Remedial Works - Wet Blanketing
2nd International Panel Meeting, September 1996

We are pleased to submit - four (4) copies of our report for your review and perusal on the captioned subject. The Panel members attended the meeting both at the Project Site and at Colombo from 25th September to 27th September 1996. As you would recall this meeting has been convened at the request of Ceylon Electricity Board at a very short notice and both of us had to cut short our heavy overseas commitments to attend the meeting and clear up some serious misunderstandings created by certain quarters in wrong interpretation of our concerns about the remedial works. We are pleased to mention that this meeting has been fruitful and our views about ill conceived Dam Safety issues have been fully understood by all the participants.

We are further pleased to mention that both GIBBS and NIPPON KOEI have fully endorsed our views that the dam and the right abutment are safe under all reservoir operating levels and the constraints on the operation of the reservoir above elevation 430m need to be removed immediately.

Sincerely yours,

Barry Cooke
BARRY COOKE

S. M. Tariq
S. M. TARIQ

1. INTRODUCTION

1.1 Terms of Reference

This meeting was arranged at a very short notice by the Chairman CEB to obtain Panel's views on current thinking and arrive at a consensus on the Remedial Works and it's Implementation Schedule.

The Panel participated in this meeting from September 25, 1996 to September 27, 1996.

1.2 RESPONSIBILITY

Although this report has been commissioned by the British Government under British Aid Arrangement, the British Government bears no responsibility for, and is not in any way committed to the Views and Recommendations expressed herein.

2. CONCLUSIONS

- 1) The dam, it's foundations and the right bank area are safe for full reservoir.
- 2) There is no credible event that would result in breaching of the dam or the reservoir perimeter.
- 3) Additional safe leakage locations are inevitable in the right bank area for reservoir level exceeding that reached in 1992 (El.439m).
- 4) The 430m El restriction on maximum reservoir level should be removed, and the reservoir operated for maximum benefits.
- 5) Blanketing is the appropriate method to reduce leakage to a value that will permit full economic use of the reservoir.
- 6) Blanketing Documents are well developed and implementation of the programme should proceed.
- 7) Stock-piling of material should proceed while blanketing equipment is being mobilized.
- 8) Barge placement operations should proceed on a two ten hour shift basis.
- 9) The proposed concrete and shotcrete lining of the unlined sections of the adits is not required.

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3. COMMENTS ON CONCLUSIONS

ON CONCLUSION 1

This conclusion was reached by the four member Review Panel in Report No 2, February 93 and by this panel in Report No 1, May 96.

ON CONCLUSION 3

The alarming event of October 92 was the result of a combination of conditions that cannot be repeated.

ON CONCLUSION 4

We came to learn for the first time at this meeting that there has been a ministerial decree to operate the reservoir to a maximum of 430m. The decree was an appropriate action in response to the sudden and unexpected event. The thorough investigations after the 1992 incident verified that there is no basic reservoir safety issue. The Government should therefore be advised that there is no safety issue and the cap should be removed to accrue the maximum benefits.

ON CONCLUSION 5

Blanketing was selected by GIBB as the appropriate method to reduce leakage. All parties and all subsequent reports reached this conclusion.

ON CONCLUSION 8

Initial planning was on a one shift basis. Night operations is practical. Two shift operations is essential for earliest completion and minimum cost.

ON CONCLUSION 9

At the previous meeting we were advised of unsafe and deteriorating conditions in the unlined sections. We endorsed the lining without inspecting the tunnel. At this meeting the tunnel was inspected and is in excellent sound rock with surface problems only in blast damaged areas. No lining is required. However CEB may exercise its option to have it lined purely from a routine maintenance point of view.

4. FUTURE RESERVOIR OPERATION

The Panel in its first meeting in May 1996 has recommended that reservoir should be filled upto its full conservation level of El460m. In view of the facts that in the past alarms were sounded which were later found not connected with the safety of the Dam, the Panel strongly recommends to the Ceylon Electricity Board for its consideration to station at site a Dam Engineer having appropriate experience and knowledge on Dam Safety and Operation of reservoirs. This recommendation is in line with normal requirements of the first filling of the reservoirs.

(H)

K.W. for

J.W.

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Attendance at the Meeting at 10.00 am on 27-07-96.
at the Bangkok Conference Room at TransAsia Hotel

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|------------------------|---------------------------------------|-----------|
| 1. S. Javrillegat | DDHEP / CEB | Signature |
| 2. D. I. K... .. | ADC / CEB | Signature |
| 3. R. Hevaka | Director / CEB | Signature |
| 4. H. Ida | Representative / OSEF
Cebu | Signature |
| 5. H. TANZIMOTO | OSIA Tokyo | (M) |
| 6. Y. SHINDO HARA | " | Signature |
| 7. N. ABE | " | Signature |
| 8. O. KANNO | " | Signature |
| 9. R. KOGA | Representative / OSEF
Osaka | Signature |
| 10. A. MATSUMOTO | GM / KUMAGAI GUMI
SRI LANKA OFFICE | Signature |
| 11. K. TSUBUKI | Nippon Koei | Signature |
| 12. C. G. Deshanayake | President | Signature |
| 13. S. TAKAHASHI | NIPPON KOEI | Signature |
| 14. P. O. S... .. | Representative / OSEF | Signature |
| 15. S. J. L... .. | BRITISH HIGH COMMISSION | Signature |
| 16. P. A. A. BACK | OSIA | Signature |
| 17. K. WADA | Nippon Koei | Signature |
| 18. S. M. TARIQ | WAPDA - PAKISTAN | Signature |
| 19. J. Barry Cooke | Consulting Engineering | Signature |
| 20. C. N. D. Perera | Vice Chairman CEB | Signature |
| 21. Arjun Deserinjeyda | Chairman CEB | Signature |

APPEBDIX – C 3RD INTERNATIONAL PANEL MEETING IN MAY 1998

THE GOVERNMENT OF DEMOCRATIC
SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF IRRIGATION POWER, AND
ENERGY
CEYLON ELECTRICITY BOARD

20th May 1998

Mr. Arjun Deraniyagala
Chairman
Ceylon Electricity Board
Sir Chittampalam A Gardiner Mawatha
P.O.Box 540, Colombo 02.
Sri Lanka.

REPORT

ON

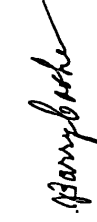
Samanalawewa Hydroelectric Project
Reservoir Remedial Works - Wet Blanketing
Third International Panel Meeting - May 1998

Dear Sir,

SAMANALAWEWA
HYDROELECTRIC PROJECT
RESERVOIR REMEDIAL WORKS
WET BLANKETING
THIRD INTERNATIONAL PANEL
MEETING

We are pleased to submit four (4) copies of our report for your review and record on the captioned subject. The two member International Panel attended the Third Panel Meeting from 18th to 20th May, 1998 at the Samanalawewa Project Site. The meeting was called to review the results of initial trial dumping, additional geological investigations, dumping pattern for main blanketing Scheme -- I involving 250,000 cubic meters of blanket material and advise on the borrow areas and materials suitability. This report, therefore briefly outlines our comments on these issues and provides some modified guidelines to expedite the whole dumping operation.

MAY 1998



Barry Cooke



S.M Tariq

BARRY COOKE

S.M. TARIQ

(Under assignment from Department For International Development)

EXECUTIVE SUMMARY

We are pleased to note that the reservoir was filled up to its full conservation level of 460 m in Nov. 1997 under safe conditions since our last meeting in September 1996.)

The Trial Dumping has been successfully completed enabling the site staff to develop future dumping pattern in the identified target areas. The dumping moisture content, the spread of materials at various moisture contents, the percentage loss of fines and thickness achieved at various number of dumps have been determined during Trial Dumping.

The loading facilities provided at site is excellent along with the navigation system installed in the barges. However, there is a serious problem of material falling slowly out of the barges and also the flooding of the barges during unloaded condition. The problems have been discussed in detail and certain remedies suggested.

We were also able to visit borrow areas and noted that site staff has been too selective in picking up only very fine material and rejecting some good material which fully met the grading specifications. In view of shortage of material above 460 m level, the site staff was advised to pick up material which falls within the grading envelope so that the reservoir is not unnecessarily depleted to achieve access to the low lying borrow areas i.e. Pilipota etc.

1. INTRODUCTION

1.1 Terms of Reference

The Third International Panel Meeting was called in to review the ongoing wet blanketing operation and to advise on the results of trial blanketing which was completed earlier. In addition, the Panel was also requested to confirm the suitability of materials available in different borrow areas and the sequence being followed in treating the priority areas.

During the meeting certain other issues were also raised by the Engineer and the CEB which were addressed by the Panel. This report outlines Panel's comments on the overall blanketing operation and answers other questions.

1.2 Responsibilities

Although the British Government has commissioned this report under British Aid Arrangement, the British Government bears no responsibility for, and is not in any way committed to the views and recommendations expressed herein.

2. BARGE DUMPING ARRANGEMENT

The Panel was pleased to see the excellent facilities acquired for the whole wet blanketing operation. The system works beautifully in loading the barges. However the two barges acquired under the Contract are offering operating difficulties both in terms of their hopper opening time and large volume of water getting into the barge due to non water tightness of the Labyrinth Seals. These issues have been discussed in more details under separate heading.

3. TRIAL DUMPING

Prior to start of Main Blanketing Scheme 1 where 250,000 cubic meters of material is required, the site staff completed 100 dump loads on trial basis to

establish the following dumping parameters:

- Optimum Dumping Moisture Content which offers minimum loss of fines and segregation
- Built up of Blanket Thicknesses at different number of loads.
- Spread of Blanket Material
- Determination of dumping pattern to give a continuous blanket of uniform thickness
- Collection of Sampling Trays to determine gradation of placed blanket, loss of fines and insitu permeabilities of dumped material.

The Panel considers that an excellent exercise has been carried out in establishing base lines for future wet blanketing operation.

4. THE PANEL'S COMMENTS ON SPECIFIC ASPECTS

4.1 Borrow Materials

The material picked up so far has been very selective and on the finer side. The Panel visited the present borrow area and suggested that in view of the large gradation margins permitted in the specified grading envelope, a lot more material can be picked up from the present borrow area. The Panel is of the view that materials available within the specified limits are acceptable and should be borrowed to continue dumping as much as possible from the existing Loading Bay.

4.2 Barge Opening/Dumping Time

4.2.1 Precedents

Two precedent projects are Arrow Lake and Tarbela. At both projects an opening time of 5 seconds resulted in sudden release of the load and jump of the barge. The load hits the target and spreads in a thin flat shape with minimum segregation.

4.2.2 Experience at Samanalawewa

The experience has been that the 5 second opening drops perhaps one-third of the load suddenly and the balance drops slowly in several minutes. This results in segregation and dispersion of fines (minus ± 200) as much as 12%. A number of attempts have been made to achieve sudden dumping with limited success. Among the measures have been (a) adding water on the conveyor (b) plastic sheets (c) staggering the loads and (d) modifying the hydraulic system. The cause of the hang up is the high percentage of the light weight clay and cohesion and to some extent the design and opening time of the barge.

4.2.3 Design of Samanalawewa Barges

The specifications require an opening of Approx. 1.3m to open in not more than 5 seconds and hopper was in closed position not less than 38° and open condition not less than 55°. The Samanalawewa barge is 2 m – 10 seconds – 32° and 52° respectively. The two angles as furnished and the time are less favorable to rapid dumping and the 2m more favorable. The hydraulic system has already been modified to give a quick opening of 2m in less than 10 seconds. It would be desirable to further modify the system to open 2m in 5 seconds.

Flooding of barges results in loss of fines. This aspect was discussed with the Contractor's staff on site. Presently nothing can be done on site except using rubber pipe to seal the bottom and pump out water prior to loading the barges. A meeting has been arranged with the manufacturer in Singapore and one of the Panel Members on his way out would discuss this issue in Singapore to remedy the design fault.

4.5 Criteria for Completion

The Panel is of the view that completion criteria for wet blanketing should be established after a substantial amount out of 250,000m³ of material over whole area has been placed.

4.2.4 Further Measures to attain Rapid Dumping

The reduction in opening time is one measure. The further measures discussed included (a) fewer and higher piles (b) staggered piles (c) maximum use of coarser grading within the current specifications. In combination with these, higher moisture content and other measures may be considered. However, some success was achieved by using fewer and higher piles in shortening opening time. The Panel suggests that other options should be tried to further improve on the dumping operation.

4.2.5 Importance of Rapid Release of Load

The rapid release minimizes segregation and gives a desirable pancake deposit. This is essential for a granular material with minimum specified fines. Efforts to achieve rapid release are important for all gradings. However, the fine cohesive material at Samanalaaveva results in effective blanketing even when the dumping time is several minutes.

4.3 Barge Dumping Location Tolerance

The Panel considers the present specified tolerance for target dumping is too tight and not really required in Area Blanketing. With over 40 meters spread of the material \pm 1 meter specified tolerance is too tight resulting in unnecessary long time in positioning of the barge on dumping location. Dumping within \pm 5 meters of the target area is acceptable, as final blanket thickness would be surveyed and checked to built up areas where blanket thickness is less than specified.

4.4 Placement of First Stage 250,000 m³

It was concluded at the Second Panel Meeting that the optimum placement of the first 250,000 m³ be at 0.5m thickness over the total target area. We reaffirm our agreement with this procedure.

**APPEBDIX – D 4TH INTERNATIONAL PANEL MEETING IN SEPTEMBER
1998**

EXECUTIVE SUMMARY

We are pleased to note after substantial dumping, the main ingress area has been identified and dumping in this area has resulted in a marked drop both in the leakage amount and the water levels in the right abutment rock mass. We observed that previous Hydrogeological Models developed by the Engineer and Designer did not truly represent the leakage paths. This is because of extremely complex geological formations encompassing multiple leakage paths.

This report therefore reviews the dumping operations carried out to date and puts forward firm recommendations for a future line of action.

1. INTRODUCTION

1.1 Terms of Reference

The Fourth International Panel Meeting was called to review the results of blanketing operation envisaged in Scheme -1 and to suggest future line of action. For this purpose the Panel was assigned the following tasks.

- (i) Field visit to observe barge dumping operations. The daily production of number of loads has steadily increased and the procedure well developed.
- (ii) To review the achievements of the blanket construction and surveying and monitoring data to review the possible path of flow from geology as well as monitoring data.
- (iii) To review reading of leakage measurement the only indicator of effectiveness.
- (iv) Review the readings of piezometers and thickness of blanket to determine whether dumping may be in a promising location. Review and discussion of latest piezometric and thickness data and to see if they indicate possible success of additional blanketing.
- (v) Review of the area covered by minimum 0.5 m blanket which is intended to seal cracks within the rock and to sample all the area in an attempt to determine where more dumping would be useful.
- (vi) Review the effectiveness of 0.5 m thick blanket in sealing any leakage area of cracks or to identify area which is not a contributor to leakage.
- (vii) Review the financial, environmental and other significance of leakage.
- (viii) To review the effect of increased head on leakage.

In addition the Panel was also required to review safety of the dam and advise CEB.

2. RESPONSIBILITIES

Although the British Government has commissioned this report under British Aid Arrangement, the British Government bears no responsibilities for, and is not in any way committed to the views and recommendations expressed herein.

3. COMMENTS ON TERMS OF REFERENCE

Para-wise comments on Terms of Reference are as under:-

- (i) The Panel undertook a field visit and was fully satisfied with the barge dumping operation. The Panel is pleased to note that the initial operational problems were successfully overcome and good Dumping Progress has been achieved.
 - (ii) Blanketing operation outside the originally suspected area has been successful in reducing both leakage amount and ground water levels. An excellent colour coded blanket thickness record is being maintained. The flow path actually discovered during dumping operation are different from the Hydrogeological Model developed earlier by the Engineer and Designer. A more accurate Model could only be developed once all suspect areas have been sampled.
 - (iii) We agree that drops in leakage amount and ground water are the positive indicators of effectiveness of blanketing.
 - (iv) Dumping in Block X has been quite promising. Optimum thickness of blanket can only be determined once it withstands the differential head under full reservoir level of 460 m.
 - (v) The original suspected area has been covered with 2 to 3 meters of blanket and not with 0.5 m. This area has not responded to dumping. Sampling of additional area has given positive results and we recommend all possible suspect areas be sampled. Scheme -2 of blanketing should commence immediately to treat Block X and other probable areas which have been identified.
 - (vi) The 0.5 m thick blanket has positively indicated ingress points in Block - X. We recommend this approach should be strictly followed in sampling other areas.
 - (vii) A) It is desirable to further reduce the leakage amount. The monitoring data does not indicate any water quality degradation due to dumping.
B) As regards usage of water for irrigation, C&B can consider pumping from tail race to compensate for reduction /elimination of leakage water presently used for this purpose and thus minimise release of water from the dam.
C) On completion of dumping operation under Scheme -2 C&B will consider taking over the operations by engaging the local sub contractors and retaining the present trained local staff.
 - (viii) There is a possibility that increased head could damage the blanket. This aspect needs to be properly monitored at full reservoir level and in case the leakage and the ground water level increase, the blanket should be strengthened by placing additional loads on targets identified by the monitoring operation.
- In addition the Panel also looked into the monthly monitoring data which they have been receiving regularly. The Panel reiterates its earlier findings that the dam, its foundation and both the abutments are safe under all reservoir operating levels.

The Panel also availed itself of the opportunity and had the Rip Rap stones removed at two places upto rockfill on the downstream slope to assess the degree of disintegration of stones. The Panel confirms the earlier reporting that disintegration of stone is limited to the surface only and no weathering effect is visible below the top Rip Rap surface.

4. CONCLUSIONS

- (i) The blanketing operation has been well planned, performed and monitored.
- (ii) It has been successful to the extent of a leakage reduction of 0.5 m³/s out of 2.2 m³/s and a reduction of 12 m in the ground water level at reservoir elevation of 442 m.
- (iii) The reduction in leakage amount and ground water level achieved to date is primarily attributed to the sealing of ingress points in Block - X, with the maximum visible effects coming from Block X.
- (iv) A specified amount of further blanketing in search of additional leakage points and to reinforce Block - X is justified under Scheme -2.
- (v) There is a probability of a breach in the Block - X seal at full supply level
- (vi) The lower pressure in the ridge due to decrease in leakage by blanketing makes it possible to restrict the leak and further reduce leakage.

5. RECOMMENDATIONS

- (i) Reinforce Block - X by further barge dumping.
- (ii) Proceed with Investigation Dumping on Blocks 1-9 in that order of priority with the understanding that if new leakage points are identified additional dumping will be focussed on such points.
- (iii) Suspend barge dumping on completion of the above.
- (iv) Retain the specialised facilities for barge dumping in good order until reservoir full supply level is experienced.
- (v) If leakage increases at full reservoir level, the barge dumping should resume in Block - X to restore effectiveness of Block X sealing and retain the barge dumping equipment until next filling. Thereafter decide whether these facilities should be retained for further usage.
- (vi) Studies should be initiated to determine the feasibility of constructing a structure at the leakage exit point to further reduce the leakage

APPEBDIX – E 5TH INTERNATIONAL PANEL MEETING IN MAY 1999

THE GOVERNMENT OF DEMOCRATIC SOCIALIST
 REPUBLIC OF SRI LANKA
 MINISTRY OF IRRIGATION & POWER
 CEYLON ELECTRICITY BOARD

Mr. Ajun Deraniyagala
 Chairman
 Ceylon Electricity Board
 Sir Chittampalam A Gardiner Mawatha
 Colombo 02
 Sri Lanka

Dear Sir,

Samanalawewa Hydroelectric Project
 Reservoir Remedial Works - Wet Blanketing
 Fifth International Panel Meeting - 31 May to 3 June 1999

The Panel is pleased to submit (4) copies of report Number 5. The stage of the wet blanketing work is such that this should be considered the final report.

Just before the commencement of the meeting Dr. S M Tariq fell ill and could not attend. The remaining members of the Panel including Mr Barry Cooke and Dr. A H Merritt along with the four local experts attended the site meeting from 31 May to 2 June 1999.

Apart from the Engineer and the Designer, representatives of the British High Commission and OECF also participated in the meeting as per the annexed attendance sheet.

The meeting was called after completion of Scheme 2; barge dumping of 425,000 m³ of blanket material in all of the originally designed suspect areas in the adjoining area downstream, and in the further recommended areas for investigation dumping. The Panel was asked to review the success of the wet blanketing operation that has achieved a reduction of about 500 l/sec in the leakage (23%) and a drop of 13 meters in the groundwater pressure at full supply level. The Panel also was requested to suggest future work to be carried out if any.

In addition the Panel was also requested to comment on the need for lining of the unlined sections of Adit 1 (Grouting Adit) and comment on the deterioration of some rocks on the surface of the dam.

Comments on the above subjects by the International Panel Members are followed by their Conclusions and Recommendations under section 7 and 8.

The comments and recommendations of the Local Panel Members are also included herein separately under section 9.

BARRY COOKE

Barry Cooke
 A H MERRITT

S M TARIQ
 (Absent)

N T K MUNASINGHE

N.T.K. Munasinghe
 N T K MUNASINGHE

K W PERERA

S M A PERERA
 (Absent)

S.M.A. PERERA

S H C De SILVA

(UNDER ASSIGNMENT FROM DEPARTMENT FOR INTERNATIONAL DEVELOPMENT)

REPORT

ON

SAMANALAWEWA HYDROELECTRIC PROJECT
 RESERVOIR REMEDIAL WORKS - WET BLANKETING
 FIFTH INTERNATIONAL PANEL MEETING

31 MAY - 3 JUNE 1999

BARRY COOKE	A.H.MERRITT	S M TARIQ (absent)
N T K MUNASINGHE	S H C De SILVA	K W PERERA

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1. STATUS IN BLANKETING

The blanketing in Block X and on the investigatory areas as recommended in Panel Report No.4 has been completed. Blanketing is now proceeding on a new contract.

2. LONG TERM MONITORING

The project team has a comprehensive monitoring program currently in place and will continue to make the required measurements and observations. Some judgement should be applied as to which instruments are of particular benefit to long term application and to the frequency of readings.

For the coming year, the piezometers and weirs related to the blanketing efforts should be read regularly, as is currently being done. For those instruments in the dam, or elsewhere, that are showing stable conditions with no change in readings for months, the time between readings can be increased to perhaps once per month rather than each 2-3 days, as is the current practice.

The Consultant could be asked to provide a format and procedure for continuing monitoring and an effective means for reporting and analyzing the data such that action may be taken, as required.

Records related to drill holes, grouting results, instruments, etc should be received from the Consultant and organized for future reference.

3. LEAKAGE CONTROL STRUCTURE

In Panel Report No.4 a study to determine the feasibility of a leakage control structure was recommended. The results of this study were presented.

The scheme, as presented is well conceived and is feasible. The rise in water level in the ridge is less than has already been experienced, which reduces or eliminates risks of developing leakage at another location. The rise in water level can be controlled.

The proposed scheme reduces the leakage by about 0.3 m³/s. The cost would be amortized in less than one year, which indicates an extremely favorable investment. This opportunity is made possible by the reduction in leakage and ground water pressures by blanketing.

The rise in water table in the ridge favorably reduces the gradient from reservoir to the ridge water table. The increase in gradient from the water table in the ridge to downstream face is less than has been experienced and therefore acceptable and entails little risk. The benefits in reduced leakage and reduced gradients from reservoir to the pool in the ridge far exceed the slight risk of changing the leakage patterns in the downstream face of the ridge.

The implementation of the scheme should be delayed until the operation of the reservoir at full reservoir has been experienced.

4. **CONDITION OF ROCK FILL**

Weathering of some rock blocks is occurring on the dam and the general appearance of the dam slopes is similar to the quarry regarding weathering patterns. This was observed and commented on in a previous Panel Report. The rock appears to be experiencing oxidation and softening along the foliation. This phenomenon has been observed on other dams and is generally related to surface exposure and alternating wetting and drying.

This condition is not detrimental to the dam and no remediation is necessary.

5. **ROCK TREATMENT IN GROUTING GALLERY**

Some sections of the gallery originally were concrete lined where faulted rock and/or weathered limestone was exposed. The remaining good quality rock was left unlined. The question has arisen regarding the need to line the unlined rock sections.

Considering that all potentially troublesome rock sections are already protected with concrete, the Panel believes that no additional lining is required. The rock surface is dry or moist from slight seepage. Some oxidation of iron minerals is occurring.

The condition of the large diameter relief drains, with valves, was discussed. The Panel was informed that these drains are no longer required. The effects of metal deterioration and loss of integrity is not desirable. They should be grouted off and effectively removed from service.

6. **GROUNDWATER CONDUCTIVITY**

The Consultant initiated a program of groundwater conductivity monitoring prior to impoundment in some locations and has added new monitoring locations more recently. Several long term trends are well established and may be summarized generally as follows. The conductivity units are $\mu\text{s/cm}$

- Reservoir water 50
- Deep groundwater 350
- Water in dam foundation 2500 - 3000
- Water in near right abutment 400-500
- Zone of suspected high flow 150-180
- Water at south end of grout curtain 250-375
- Weir at main leak 150

From these data, it can be concluded that the water in the dam foundation and in the well-grouted near right abutment is quite stationary, i.e. low flow with little effect of reservoir water inflow.

The ground water at the south end of the grout curtain also appears to be only modestly influenced by the reservoir. The water from approximate CH 0+61.0 to 0+800, however, is obviously influenced by reservoir leakage and likewise shows the greatest change (increase) in conductivity when Area X was blanketed.

These data further confirm that the dam is not influenced by reservoir leakage while the karstic zone (Area X) and faulted Zone B is most pervious. This pervious zone also received considerable grouting during construction and indicates that leakage is occurring at least below the grout curtain.

This is an excellent monitoring program and should be continued.

7. **CONCLUSIONS**

- The success of the blanketing work is represented by the reduction in leakage related to dumping on Block X. To preserve that reduction and to possibly increase it, further dumping on Block X is justified.
- The investigatory dumping has covered all credible areas of possible reservoir water ingress.
- The monitoring has been thorough and adequate.
- The scheme for a leakage control structure is well developed and is an economical means to further reduce leakage.
- The deterioration of some rocks on the dam, is continuing. It is experienced on many dams, occurs only on surface rocks, and is of no consequence.
- The rock in the unlined sections of the grouting gallery is sound and fresh. The moderate spalling due to surface oxidation does not affect the stability of the tunnel. No additional lining is justified.

8. **RECOMMENDATIONS**

- Blanketing should continue on Block X until the end of the present contract. The equipment should then be retained for one year before the demobilization. No further investigatory dumping should be done.
- The monitoring should continue.
- After experience with the performance of a full reservoir and a further year of operation, consideration should be given to constructing the leakage control structure.

9. CONCLUSIONS AND RECOMMENDATIONS OF THE LOCAL PANEL

1. The projection by the review panel in 1993 was a leakage of about 10m³/sec. at full supply level (FSL). However when the reservoir was filled immediately prior to the commencement of blanketing the recorded leakage was 2.8 m³/sec and the groundwater level reached EI.444.0 m. The remedial measures taken are effective to the extent that the leakage has been restricted to 2.12 m³/sec at EI.457.05 to date, three meters below FSL and general reduction of around 13 m in groundwater level in comparison with recorded groundwater levels at FSL prior to wet blanketing.
2. Considering the irrigation requirements downstream and the Riparian Rights of those living downstream, this is an acceptable level of leakage.
3. Investigatory dumping could continue in selected areas to the extent already provided for in the Contract entered into with the Local Contractor.
4. Any further remedial measures in the higher elevations of Block X can only be decided on the outcome of investigatory dumping carried out on those slopes. From past experience material is not retained on steep slopes and blanketing such slopes will require large quantities of material and may not justify the consequent further reduction in leakage.
5. Prepare a comprehensive document recording all bore hole logs in the right bank and in the vicinity of the dam from the inception to date, to be compiled for future reference. The Consultant to hand over all available information to CEB and CEB to appoint an acceptable party to carry out this assignment.
6. It is very necessary to carry out effective monitoring, reporting and continued evaluation of the project. To ensure this all instruments and installations have to be properly maintained and regularly calibrated. The Consultant could provide the format and procedures for future continued monitoring.
7. Valves installed in Adit D to be secured against long term deterioration.
8. As recommended by Consultants replace right bank access road, drainage and guard house.
9. The proposed structure to throttle the leakage is not an option to be considered at present. It could be considered subsequently after more intensive investigations and observations.
10. Any weathered sections of Adit Db, grouting gallery is to be protected with shotcrete lining.


Dr. S M A PERERA


Mr. N T K MUNASINGHE

Mr. S H C de SILVA

Mr. K W PERERA

10. RESPONSIBILITIES

Although the British Government has commissioned this report under British Aid Arrangement, the British Government bears no responsibility for, and is not in any way committed to the views and recommendations expressed herein.

**SAMANALAWEWA HYDROELECTRIC PROJECT
RESERVOIR REMEDIAL WORKS - WET BLANKETING
FIFTH INTERNATIONAL PANEL MEETING
31 MAY - 3 JUNE, 1999**

**Annexure
Attendance at the Fifth International Panel Meeting - 31 May to 02nd June 1999**

No.	Participants/Organization
1.	Mr. Arjun Deraniyagala - CEB
2.	Mr. C N D Perera
3.	Mr. S Ganesharajah
4.	Dr. G P Rajapaksa
5.	Mr. J Barry Cooke - PNL-EXPS.
6.	Mr. Andrew Merritt
7.	Mr. S M A Perera - Lel-EXPS.
8.	Mr. N T K Munasinghe
9.	Mr. S H C de Silva
10.	Mr. K W Perera
11.	Dr. Masao Hayashi - OECF-JPN
12.	Dr. Kentaro Takahi
13.	Dr. Yoshio Shinohara
14.	Mr. Hiroyuki Kashimura
15.	Mr. Ryutaro Koga
16.	Mr. H Ida
17.	Ms. Naoko Anzai
18.	Mr. K Yamamoto-JICA
19.	Mr. Martin Dawson-BHC
20.	Mr. P O Squire-GTBB
21.	Mr. Andrew Dodd
22.	Mr. Katsuyoshi Wada-NK
23.	Mr. Kazuo Suzuki
24.	Mr. Shinya Takahashi
25.	Mr. I M Ranjith
26.	Mr. D D Wijesinghe
27.	Ms. Sudeepa Samaraweera
28.	Mr. U S Goonasekara-CECB
29.	Mr. B M A P Mapa
30.	Mr. G H U A Wanigadewa
31.	Mr. C Thiதாகasiri
32.	Mr. N Sivaraja-CEB
33.	Mr. J A Gunadasa
34.	Mr. S Perasiryan
35.	Mr. N D Jayawardena-LTL
36.	Mr. M J M N Marikkar
37.	Mr. T D R Perera
38.	Mr. G Amuthen
39.	Mr. S A R K Sebastian-SHEP

AGENDA

DATE	TIME	ITEMS
31.05.1999 (Monday)	08.30-09.00	Opening for Meeting (Opening speech by CEB chairman, explanation of proposed schedule by the Consultants)
	09.00-12.00	Site Visit (main leak, monitoring weir, and Kinchigayne if required)
	12.00-12.30	Move to Belhuloya Rest House
	12.30-13.30	Lunch
	13.30-14.00	Move to Pambahinna Camp
	14.00-17.00	Explanation by the Consultants on Wet Blanketing and Q & A among POE and Participants
01.06.1999 (Tuesday)	08.30-10.00	Continuation of the Explanation and Q & A
	10.00-10.20	Tea Time
	10.20-12.00	Provisional Time for Q & A
	12.00-12.30	Move to Belhul Oya Rest House
	12.30-13.30	Lunch
	13.30 onward	Preparation of Report by Panel Members
02.06.1999 (Wednesday)	08.30-11.00	Preparation of Report by Panel Members
	11.00-11.50	Explanation of Outline of Report by Panel Members
	11.50-12.00	Closing speech by CEB Chairman
	12.00-12.30	Move to Belhul Oya Resthouse
	12.30-13.30	Lunch
	13.30-	Move to Colombo
03.06.1999 (Thursday)	09.00-10.00	Submission of Recommendations to Minister
	12.00-13.00	Lunch

ANNEX-D

*MONITORING ACTIVITY FOR
SAMANALAWEWA DAM AND RIGHT
BANK ABUTMENT*

ANNEX-D

MONITORING ACTIVITY FOR SAMANALAWEWA DAM AND RIGHT BANK ABUTMENT

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1. Background

The dam reservoir monitoring for the Samanalawewa Hydroelectric Project has been carried out by Central Engineering Consultancy Bureau (CECB) since the 1st trial impounding of the reservoir in March 1992.

Since the commencement of Consultancy Services for the Wet Blanketing, the CECB monitoring team has continued the monitoring work under the supervision of Nippon Koei Co., Ltd. (NK) until the end of June, 1999.

In accordance with the Cabinet decision of 02.10.96 on Cabinet Memorandum dated 01.10.96 to remove the restriction of the maximum reservoir operating level of 430 M EL to obtain maximum benefits from the project, on 01.10.1996 the impounding of the Samanalawewa reservoir above 430 M EL was commenced.

In the Summary Report after the 2nd International Panel Meeting held on 25-27 September 1996 the Panel strongly recommended to the Ceylon Electricity Board for its consideration to station at site a Dam Engineer having appropriate experience and knowledge on Dam Safety and Operation of reservoirs even it is stated in the Panel Report that the dam, its foundations and the right bank are safe for filling upto full reservoir level.

Gibb has recommended the monitoring plan for the areas of potential land instability including the saddles, Kalunaide Ara and Killekandura Ara through the letter No. POS/A110/J96005/1C/139 dated 09.10.96.

In late November 1997, the initial impounding of Samanalawewa dam upto FSL of 460 m after completion of dam construction in March 1991 has been successfully achieved without any additional water burst even with higher GWL, (GW-02) of El. 444 which is higher than the maximum GWL of El. 438.5 experienced at the water burst event on 22.10.92 with the leakage amount of 2.8 m³/s.

As re-affirmed by Panel of Experts, Mr. J Barry Cooke and Dr. S M Tariq at 1st International Panel Meeting held on 13-18 May 1996, the following comments in the Executive Summary of Review Panel Report No.2 of February 1993 has been proved through successful impounding of reservoir upto FSL in Nov.'97 even before commencement of Blanketing Works.

- *The dam is safe for full reservoir and is independent of right bank leakage conditions.*
- *The right abutment provided a reliable perimeter for the reservoir at full storage level and any credible amount of leakage.*

The remedial works with dumping operation commenced on 27.03.98, has been terminated on 02.01.99 with total number of 3,873 (i.e., 426,030 m³) dumped loads which consists of 2,783 loads of Scheme-1 and 1,090 loads of Scheme-2.

To confirm any indetification of effectiveness of blanketing, automatic GWL measurement gauges (Type :SINCO VW Piezometer supplied by SLOPE INDICATOR) were installed in 4 new bore holes WB-2, WB-3, WB-5 and WB-8 for the measurement of GWL in right bank.

Through review of the variations of GWL within 24 hours in WB series after collecting of data logger recorded with 5 minutes intervals, the Monitoring Engineer carefully study the graphs to identify any indication of effectiveness of blanketing whether there are any responsible locations to reduce GWL after dumping.

Due to prevailing southwest monsoon rain since 25.05.99, for the second time FSL was achieved and the first automatic gate operation was successfully performed on 14.06.99. When the reservoir water level reached El. 460.03 m, 3 cm above FSL of 460 m, the automatic gate operation sequence properly functioned and the center gate automatically opened at 2:56 hrs on 14.06.99. This was automatically closed at 5:22 hrs after RWL dropping to 459.96 m.

The GWL and leakage amount have stabilised within one week after reaching FSL. As of 19.06.99, the GWL and leakage amount has reached El. 429.93 m and 2.07 m³/s at RWL of 459.88 which were reduced by 14.07 m and 0.73 m³/s (about 25 %) comparing to the recorded data during the 1st filling in December 1997, which were 444 of GWL and 2.8 m³/s of leakage before dumping.

As requested by the Panel Members at the 5th International Panel Meeting held on 31 May to 2 June, 1999 at the site, CECB Monitoring Team should continue to make the required measurements and observations.

Before closing of NK's dam site office on residential basis on 30.06.99, CEB finalised the proposal and awarded the consultancy contract for supervision of LTL's works and dam monitoring works to CECB within an estimate of Rs. 11.96 million for a period of one (1) year.

2. Organisation for Monitoring Works

2.1 Organisation for Monitoring Works

The organisation for the monitoring works is as shown in Figure 1. The CECB monitoring team which headed by Mr. G.H.U.A. Wanigadewa, Chief of CECB monitoring team consists of 22 members, i.e., two (2) Civil Engineers, seven (7) Work Supervisors, two (2) clerks, one (1) Draughtman, one (1) laboratory technician and eight (8) skilled/non skilled labourers.

The Work Section is divided into seven (7) groups as shown in Figure 1.

- Dam Monitoring
- GWL Monitoring
- Leakage Monitoring
- Water Sampling and Chemical Analysis

- Slope Stability Monitoring
- Data Processing
- Drawing

2.2 Data Processing

All the data monitored and recorded are input to the database maintained in the computers provided at the dam site office.

Computer System provided at dam site office consists of following units.

1. 01 No. Pentium Computer 200 Mhz, 3.2 GB Hard Disk
2. 01 No. Pentium Computer 90 Mhz, 48 Mb RAM, 1GB SCSI Hard Disk
3. 01 No. 486 Computer 100 Mhz, 8 Mb RAM, 630 MB Hard Disk
4. 01 No. 486 Computer 4Mb RAM, 200 Mb Hard Disk
5. Laser Printer HP LASERJET 4MPLUS
6. Dot Matrix Printer, STAR XB2425
7. Laser Printer HP LASERJET 6L

All these units are net worked under Windows Work Groups except one 486 m/c.

2.3 Log Book

According to the suggestions of Mr. S. Ganesharajah, PD of SHEP, two (2) Log-Books have been provided, one at the conference room at the dam site office and one at CEB Dam Control Room/Guard House to maintain the necessary records in the form of Log Book entries.

The intention is to communicate the observations made by the officers already working in the dam area to the parties concerned to take necessary actions if required. Observation on any new leakage points, new crack development, any changes in existing locations blocking of drain ditch along the right bank access road or any other relevant matters regarding the safety of the dam could be reported in the log book.

3. Scope of Works for Monitoring

3.1 Scope of Works

The Scope of Works are broadly divided into the following three (3) categories as shown in Figure 2.

- i) Monitoring and surveillance of dam and appurtenant structures
- ii) Monitoring of right bank and saddles for the reservoir water tightness
- iii) Monitoring of reservoir and downstream water quality for environmental assessment

3.2 Principal Features for Monitoring Items

The monitoring items are mainly divided into six (6) categories as detailed below.

- i) Leakage monitoring
- ii) GWL monitoring
- iii) Dam monitoring
- iv) Water quality monitoring
- v) Slope stability monitoring
- vi) Chemical analysis

Leakage monitoring

The leakage measurements except the seepage measuring chamber provided at the toe of the dam are summarised below and shown in Figures 4 to 9.

<u>No.</u>	<u>Measurement method</u>	<u>Nos. (location)</u>	<u>Purpose</u>
i)	Main leakage measurement weir	1	Leakage amount from main leak outlet through the reservoir & RB
ii)	V-notch weir	10	Seepage water through the reservoir
iii)	Drain holes	33 in adit Da 125 at outlet of main leak	Seepage water in downstream of dam at R/B Seepage water from the slope behind outlet of main leak
iv)	Embedded pipes	7 in NS series at R/B 18 in OP series at R/B 10 in OP series at L/B	Spring at left and right banks of Walawe downstream of dam
v)	Water level gauges	2 at Kalunaide and Kaltota	River flow in dry season

The detailed features of leakage monitoring are described in the item No. 1 of Table 1.

Out of ten weirs, KNS 1 was newly constructed at the left bank of Kalunaide Ara, toe of the spoil bank on 23 October 1996.

Two water level gauging stations have been re established which have been used during Dam construction stage to check the total leakage amounts from both left and right banks through the Samanalawewa reservoir during dry season or non rainy period.

Kalunaide water level gauging station is located just downstream of confluence point with main Walawe ganga and Kalunaide Ara.

Kaltota water level gauging station is located 11 km downstream of dam and 7 km downstream of confluence point with main Walawe Ganga and Killekandra Ara. However, Kaltota gauging station has been vandalised due to illicit gemming since December 1995. The discharge capacity curves for both gauging stations are shown

in Figure 8 and 9. Therefore, this matter was notified to CEB in March 1996 also recommend that the Kaltota gauging station should be urgently repaired.

GWL monitoring

The monitoring of the ground water pressure at both left and right banks of the dam including the right bank adits are summarised below and shown in Figures 4 to 9.

<u>No.</u>	<u>Name of groups</u>	<u>Nos.</u>	<u>Purpose</u>	<u>Remarks</u>
i)	GW	21	measure GWL at left and right bank	GW 01, 10, 13 & 14 are blocked
ii)	MS	4	measure GWL at D/S right bank of dam	
iii)	Y	4	measure GWL at U/S of right bank adit	Y 01 is blocked and Y 02 & 03 were submerged due to impounding
iv)	Z	4	measure GWL near portal of main leak	
v)	LM	2	measure GWL near spillway	
vi)	RI	9	measure GWL near main leak	RI 04,05,06,07,08 & 09 were blocked due to water burst in 92.
vii)	B	7	measure GWL around adit Da	
viii)	WB	8	Measure GWL effectively during wet blanketing	WB-06 is not functioning.
ix)	RBS	31	measure GWL in adits I, H, F & E	
x)	Rajawaka bore hole	1	measure GWL along power waterway	

The detailed features GWL monitoring are described in the item No.2 of Table 1.

Dam monitoring

The dam instrumentations are summarised below and shown in Figures 13 to 17.

<u>No.</u>	<u>Instrumentation</u>	<u>Name of groups</u>	<u>Nos.</u>	<u>Purpose</u>
i)	Pneumatic piezometer	PP	15	measure pressure in dam foundation at 3 sections
ii)	Standpipe piezometer	SP	28	measure pressure across the grout curtain in dam foundation along dam axis
iii)	Standpipe piezometer	SP	41	measure pressure in the foundation along adits, C,B,A,Ab,D,Db & Da
iv)	Leakage measurement	LAD /RAD	2	measure seepage flow in both left and right grouting galleries
v)	Seepage measuring chamber	SMC	1	measure seepage through dam foundation

<u>No.</u>	<u>Instrumentation</u>	<u>Name of groups</u>	<u>Nos.</u>	<u>Purpose</u>
vi)	Earth pressure cell	PC	15	measure earth pressure in core zone at 3 sections
vii)	Hydraulic piezometer	HP	33	measure pore pressure in core zone at 3 sections
viii)	Hydraulic settlement cell	HSC	1	measure settlement in core zone at 5 sections
ix)	Double fluid settlement gauge	DFSG	1	measure differential settlement in midheight of core zone
x)	Survey monument	SM	36	measure settlement/movement on dam crest, U/S and D/S surface slopes

The detailed features of dam monitoring are described in the item No.3 of Table 1.

Water quality monitoring

The details of water quality monitoring is summarised below and shown in Figure 18.

<u>No.</u>	<u>Item</u>	<u>Nos. of sampling locations</u>	<u>Purpose</u>
i)	Water quality monitoring	10	assess water quality of U/S and D/S of the reservoir <ul style="list-style-type: none"> • Temperature • Colour of Water • Visibility • PH • DO • COD • BOD • Turbidity etc.

The detailed features of water quality monitoring are described in the item No. 4 of Table 1.

Slope stability monitoring

The slope stability monitoring is summarised below.

<u>No.</u>	<u>Item</u>	<u>Nos. of survey locations</u>	<u>Purpose</u>
i)	Slope stability monitoring	4 at right bank access road, saddle -3, L/B at mid Kalunaide	monitor the movement of slope /pavement crack width

The detailed features of slope stability monitoring are described in the item No. 5 of Table 1.

As shown in Figure 16, survey points for slope instability monitoring at the existing slip in area of saddle 3 have been installed at 5m intervals, which were driven 1.3 m

into the ground, along the monitoring lines. However, these survey points were completely dislocated during the slip occurred in November 1997.

Two pillars BLP1 and BLP2 have been constructed on the adjacent hillocks as the base line for measurements and the third pillar, BLP3 was provided close to spoil bank area considering the easy access for routine monitoring, as shown in Figure 7.

Survey points on monitoring lines will be observed by using Wild T2 Theodolite and Wild D1 5S distomat.

Water chemical analysis

The water chemical analysis is summarised below.

<u>No.</u>	<u>Item</u>	<u>Nos. of water samples</u>	<u>Purpose</u>
i)	Water chemical analysis	18 at reservoir, main leak, 14 holes in RBS, Kalunaide and Killekandura	trace leakage path and ingress area at right bank by chemical analysis <ul style="list-style-type: none">• pH• Elec. conductivity• Hardness• Sodium• Potassium• Alkalinity• Chloroide• Sulfate• Silica

The detailed features of water chemical analysis are described in the item No. 6 of Table 1.

4. Formatting of Monitoring Reports

4.1 Weekly Monitoring Report

Weekly Monitoring Report has been prepared by Nippon Koei dam site office and thereafter sent to the concerned parties as in the format attached in Appendix-A, which was agreed between Gibb and NK in the Joint Meeting in January 1996. After end of June, 1999, the preparation and delivery of weekly monitoring report may not be required due to stabilisation of GWL and leakage after reaching FSL on 14.06.99.

4.2 Monthly Monitoring Report

In order for better communication with the concerned parties regarding the hydro-structural behavior of Samanalawewa dam and right bank during each month, the monthly monitoring data has been prepared by Nippon Koei dam site office and forwarded to the concerned parties.

Instead of cancellation of weekly monitoring report, the weekly monitoring data of MS3, RBS10, Z10, WB2 and WB8 should be added to the monthly monitoring report to ensure the continuation of related data of the weekly monitoring report delivered so far, as attached format in Appendix-B, if necessary.

The delivery of both Weekly Monitoring Report and Monthly Monitoring Report after closing of NK Dam site office on 30.06.99 will be decided by the CEB.

5 Record Book of Monitoring Data

The monitoring data since January 1992 to date has been printed and binded as “RECORD BOOK OF MONITORING DATA”¹ which consists of the monitoring items described in the summary table below.

SUMMARY TABLE OF RECORD BOOK

Vol No.	Measurement Items	Duration of Data Recorded	
		From	To
GWL MONITORING			
Vol III	GWL (GW,MS,Z,Y & LM) Series	Jan. 1992	Jun. 1999
Vol IV	GWL (RI & B) Series	Sept. 1992	Jun. 1999
Vol III	GWL (WB) Series	Sept. 1997	Jun. 1999
Vol IV	GWL (RBS) Series	Apr. 1992	Jun. 1999
LEAKAGE MONITORING			
Vol I	Rainfall, RWL, Inflow, PH & Dam discharges, Weir Flows & Cavity No.4	Apr. 1992	Jun. 1999
Vol I	Adit Da	Oct. 1996	Jun. 1999
Vol I	Main Leak Portal	Sept. 1996	Jun. 1999
Vol I	Kalunaide Ara & MS Bore hole	Sept. 1996	Jun. 1999
MONITORING OF DAM INSTRUMENTS			
Vol II	Pnumatic Piezometers (PP)	Jan. 1992	Jun. 1999
Vol II	Standpipe Piezometers (SP)	Jan. 1992	Jun. 1999
Vol II	Hydraulic Piezometers (HP)	Jan. 1992	May 1999
Vol II	Earth Pressure Cells (PC)	Jan. 1992	May 1999
Vol II	Hydraulic Settlement Cells (HSC)	Jan. 1992	May 1999
Vol II	Double Fluid Settlement Gauge (DFSG)	Jan. 1992	Oct. 1996
Vol II	Vertical Settlements of Dam Surface Monuments	Jan. 1992	Mar. 1999
Vol II	Lateral Movements of Dam Surface Movements	Jan. 1992	Mar. 1999
WATER QUALITY MONITORING			
Vol I	Water Quality Monitoring to assess Leakage Path	Jun. 1992	Apr. 1999
Vol I	Water Quality Monitoring for Eutrophication	Jan. 1992	Apr. 1999
Vol I	Water Quality Monitoring of Reservoir at Location No.4	Sept. 1992	Apr. 1999
Vol I	Water Quality Monitoring of Reservoir in front of Adit G	Aug. 1996	Apr. 1999
Vol I	Water Temperature Monitoring of RBS and Weirs	Apr. 1994	Apr. 1999
Vol I	EC of RBS Deep Holes & Main Leak Outlet	Sept. 1998	Jun. 1999
Vol I	Temperature of RBS Deep Holes & Main Leak Outlet	Sept. 1998	Jun. 1999

¹ “RECORD BOOK OF MONITORING DATA”, Vol I, II, III & IV, CECB Monitoring Team & Nippon Koei Co., Ltd. (June 1999)

TABLES

Table 1 Principal Features for Monitoring Items (1/12)

Item No.	Name	Purpose	Frequency of Measurement	Location	Remarks
1	Leakage Monitoring				
/001	Main Leakage Measuring Weir (M3)	To observe the behaviour of the Main Leakage flow with the RWL fluctuations.	Daily	R/B of Walawe about 350 m d/s of the toe of the Dam.	
/002	Drain Holes provided at the crown of the Adit D (a) (DR 1 to 31)	Holes were provided to prevent the water migrating from Area B to Area A. Measurements are taken to make a separate assessment of the flow variations of those holes with the RWL fluctuations.	Weekly	R/B access adit D(a) from Ch. 71 ~ 224m.	
/003	Drainage Holes provided at the portal of the Main Leakage	Holes were provided to reduce the pressure developing at the portal by draining water. Measurements are taken to make a separate assessment of the flow variations of those holes with the RWL fluctuations.	Weekly	R/B slope at the portal of the Main Leakage	
/004	Weir DW2	To observe the behaviour of the flow collected through cut off adits (Adit D(a), D end, D(b), I, F,H,E) with the RWL fluctuations.	Every Two Days	Adit D(a) portal close to the Toe (R/B) of the Dam.	
/005	Weir M1	To observe the fluctuations of the flow collected through drain pipes provided close to the bore hole MS 1 and other minor seepages.	Every Two Days	R/B of Walawe about 100 m d/s of the toe of the Dam.	
/006	Weir M4	To observe the seepage flow fluctuations of the flow collected at R/B of Walawe just downstream Main Leakage measuring weir.	Every Two Days	R/B of Walawe about 400 m d/s of the toe of the Dam.	

Table 1 Principal Features for Monitoring Items (2/12)

Item No.	Name	Purpose	Frequency of Measurement	Location	Remarks
/007	NS Series (07 Nos)	To observe the variations of seepage flow collected at R/B of Walawe between toe of the dam and d/s causeway. (Identified after the 01st trial impounding in 1991.)	Every Two Days	R/B of Walawe from 100 to 400 m d/s of the toe of the Dam.	
/008	OP Series (OP 01~OP18) 18 Nos.	To observe the variations of seepage flow collected at R/B of Walawe between toe of the dam and the confluence of Walawe with Kalunaide Ara.	Weekly	R/B of Walawe from 100 to 950 m d/s of the toe of the Dam.	
/009	OP Series (OP 19~OP28) 10 Nos.	To observe the variations of seepage flow collected at L/B of Kalunaide between confluence of Walawe with Kalunaide Ara and the spoil bank.	Weekly	L/B of Kalunaide Ara from 100 to 300 m from confluence to u/s of Kalunaide Ara.	
/010	Weir KNS 1	To observe the variations of flow collected through one of the weak zones, with the RWL fluctuations	Every Two Days	L/B of Kalunaide Ara at the toe of the spoil bank.	
/011	Weir S1	To observe the variations of flow collected through R/B saddles 1,2,3 and 4. with the RWL fluctuations.	Every Two Days	Across Kalunaide Ara about 300m	
/012	Weir S2	To observe the variations of flow collected through R/B saddles 1,2,3 and 4. with the RWL fluctuations.	Every Two Days	Across branch of Kalunaide Ara about 1100 m u/s of the confluence with Walawe.	
/013	Weir S3	To observe the variations of flow collected through R/B saddles 1,2,3 and 4. with the RWL fluctuations.	Every Two Days	Across Kalunaide Ara about 1200 m u/s of the confluence with Walawe.	

Table 1 Pricipal Features for Monitoring Items (3/12)

Item No.	Name	Purpose	Frequency of Measurement	Location	Remarks
/014	Weir S4	To observe the variations of flow collected through R/B saddles 1,2,3 and 4. with the RWL fluctuations.	Every Two Days	Across Kalunaide Ara about 1200 m u/s of the confluence with Walawe.	
/015	Seepage flow at L/B of Kalunaide Ara	To make separate assessment of the flow variations from those seepage paths with RWL fluctuations.	Weekly	L/B of Kalunaide Ara from 900 to 1100 m u/s from the confluence with Walawe.	
/016	Weir KNA	To observe the variations of flow pattern of the springs at L/B with RWL variations.	Weekly	Weir is located across the stream called Killekandira Ara about 3 km away from the Dam.	
/017	Kalunaide gauging station	To check inflow discharge at Kalunaide gauging station	Once a week during dry season and none during rainy season	About 1.5 km d/s of the Dam	
/018	Kaltota gauging station	To check inflow discharge at Kaltota gauging station (Since the station was vandalised, flow measurements are not possible)	Once a week during dry season and none during rainy season	About 11 km d/s of the Dam	

Table 1 Principal Features for Monitoring Items (4/12)

Item No.	Name	Purpose	Frequency of Measurement	Location	Remarks
/001	GWL Monitoring GW2,3,4,5,8,15, 15A,16,18 GW Series 21 Nos (GW 01,10,13&14 are blocked).	GW 01 to GW 18 were installed to assess the ground water level conditions in the R/B while GW 19 was installed at the left bank. (Deep investigation bore holes)	Daily	As shown in the drawing	
/002	MS Series MS 03 o4 Nos MS Series Others	To assess the ground water level conditions in the d/s of the dam at Right Abutment.	Weekly	As shown in the drawing	
/003	Y Series (Y 01 to Y 04) 04 Nos. Y 01 is blocked. Y 02 is covered by slip as well as reservoir water. Y 03 is covered with reservoir water.	To assess the ground water level conditions in the u/s of cut off adits close to the ingress area.	Weekly	As shown in the drawing	
/004	Z Series Z 10 04 Nos. Z Series Others	To assess the ground water level condition around the Main Leakage Portal.	Weekly	As shown in the drawing	
/005	LM Series (LM 01, LM 02) 02 Nos	To assess the ground water level at the L/B close to the spillway.	Weekly	As shown in the drawing	

Table 1 Pricpal Features for Monitoring Items (S/12)

Item No.	Name	Purpose	Frequency of Measurement	Location	Remarks
/006	RI Series (RI 01,02.....09) No access to RI 02. RI 04,,05,06,07,08,09 was caught by the burst.	To assess the ground water level condition around leakage point.	Weekly	As shown in the drawing	
/007	B Series (B 01, 02.....07) No water in N 04 Water in B 06, 07 are diverted to adit D(a).	To assess the ground water level condition around adit (D)(a).	Weekly	As shown in the drawing	
/008	RBS Series (RBS 01) (01 No)	To assess the ground water level condition at d/s of cut off adit I.	Weekly	Adit I Ch. 1110 m	
/009	RBS Series (RBS 10) (RBS 02,03.....18) (17 Nos.) Others	To assess the ground water level condition at d/s of cut off adit H.	Weekly	Adit H Ch. 305 to 923 m	
/010	RBS Series (RBS 19,20,.....26) (08 Nos)	To assess the ground water level condition at d/s of cut off adit F	Weekly	Adit F Ch. 0 to 265 m	
/011	RBS Series (RBS 27, 28.....31) (05 Nos)	To assess the ground water level condition of the overburden d/s of access adit E	Weekly	Adit G Ch.48 to 240 m	
/012	Rajawaka bore hole	To monitor the GWL pattern variation of the Rajawaka area where GWL has been dropped during power tunnel excavation	Twice a Month	About 100 m away from the Rajawaka junction towards Kallota	

Table 1 Pricipal Features for Monitoring Items (6/12)

Item No.	Name	Purpose	Frequency of Measurement	Location	Remarks
3 /001	Dam Monitoring Pneumatic Piezometers (15 Nos) PP 01,02,04 and 12 are not operational. Others	To monitor the pressure variation across the grout curtain at the dam foundation	Three Times a Week Weekly	Dam foundation at Ch.220, 320 and 420 m.	
/002	Pneumatic Piezometers (28 Nos) Grouting Gallery and Adit D 19-22 SP 01.....18 23.....28)	To monitor the pressure variation across the grout curtain at the dam foundation	Every Two Days Twice a Month	Dam foundation at Ch.64 to 571	
/003	Standpipe Piezometers (06 Nos) Adit C SP 33,34.....38)	To monitor the pressure variation across the grout curtain between adit C and D	Twice a Month	Adit C at Ch.469 to 571	
/004	Standpipe Piezometers (04 Nos) Adit B (SP 43,44.....46)	To monitor the pressure variation across the grout curtain between adit B and C	Twice a Month	Adit B at Ch.525 to 571 m	
/005	Standpipe Piezometers (02 Nos) Adit A (SP 49,50)	To monitor the pressure variation across the grout curtain formed between adit A and B	Twice a Month	Adit A at Ch.570 m	
/006	Standpipe Piezometers (04 Nos) Adit A (b) (SP 51,52.....54)	To monitor the pressure variation across the grout curtain formed between adit A (b) and D (b)	Twice a Month	Adit A(b) at Ch. 12 to 55 m	

Table 1 Pricpal Features for Monitoring Items (7/12)

Item No.	Name	Purpose	Frequency of Measurement	Location	Remarks
/007	Standpipe Piezometers (03 Nos) Adit D end (SP 55,56,58)	To monitor the pressure variation across the Adit D end	Twice a Month	Adit D end at Ch. 721 to 724 m	
/008	Standpipe Piezometers (10 Nos) Adit D(b) (SP 59,60.....68)	To monitor the pressure variation across the Adit D(b)	Twice a Month	Adit D(b) at Ch. 30 to 224 m	
/009	Standpipe Piezometers (01 No) Adit D(a) (SP 69)		Twice a Month	Adit D(a) at Ch. 211 m)	
/010	LAD/RAD (Left Abutment Drain/ Right Abutment Drain)	To check the fluctuations of seepage flow collecting through left abutment and right abutment at the grouting gallery.	Weekly	Bottom level of the grouting gallery at Ch.345 m)	
/011	SMC (Seepage Measuring Chamber)	To observe the flow pattern variation due to the seepage through dam foundation	Daily	Toe of the Dam	
/012	Earth Pressure Cells 15 Nos (PC 01...15)	To monitor the total stress along verticle, lateral longitudinal derrections of the clay core	Monthly	Central clay core of the dam at Ch.210,310 and 410 m	
/013	Hydraulic Piezometers 33 Nos	To monitor the pore pressure variations of the clay core with RWL fluctuations.	Monthly	Central clay core of the dam at Ch.220, 320 and 420 m	
/014	Hydraulic Settlement Cells (01 No)	To monitor the settlement of the clay core	Monthly	Central clay core of the dam at Ch.225,270,325, 370 and 425 m	

Table 1 Pricpal Features for Monitoring Items (8/12)

Item No.	Name	Purpose	Frequency of Measurement	Location	Remarks
/015	Double Fluid Settlement Cells (01 No)	To monitor the differential settlements of the midheight of the clay core	Monthly	Mid height of central clay core from Ch.200 to 426 m	
/016	Survey monuments SMC 7,9.....23 09 Nos	To monitor the surface settlements/movements of the dam at the crest	Monthly	At the dam crest from Ch.1.40 to 460 m	
/017	Survey monuments SMC 7/1, 9/1.....23/1 09 Nos	To monitor the surface settlements/movements of the dam at u/s slope	Monthly	At the u/s slope (El.460.5) of the dam from Ch.140 to 460 m	
/018	Survey monuments SMC 7/2,9/2.....23/2 09 Nos	To monitor the surface settlements/movements of the dam at d/s slope	Monthly	At the d/s slope (El.453) of the dam from Ch.140 to 460 m	
/019	Survey monuments SMC 7/3, 9/3.....23/3 09 Nos	To monitor the surface settlements/movements of the dam at d/s slope	Monthly	At the d/s slope (El.443) of the dam from Ch.140 to 460 m	

Table 1 Pricpal Features for Monitoring Items (9/12)

Item No.	Name	Purpose	Frequency of Measurement	Location	Remarks
4	Water Quality Monitoring				
/001	Location 01	To assess the Water Quality of the Reservoir and surrounding Rivers	Monthly	Upstream of Walawe, just above the Reservoir formed at HWL 460m	
/002	Location 02	To assess the Water Quality of the Reservoir and surrounding Rivers	Monthly	In front of the power intake	
/003	Location 03	To assess the Water Quality of the Reservoir and surrounding Rivers	Monthly	Upstream of Denagan Oya, just above the Reservoir formed at HWL 460 m	
/004	Location 04	To assess the Water Quality of the Reservoir and surrounding Rivers	Monthly	In front of the raised intake for Low Level Outlet	
/005	Location 05	To assess the Water Quality of the Reservoir and surrounding Rivers	Monthly	Downstream of Walawe at Kaltota cuaseway	
/006	Location 06	To assess the Water Quality of the Reservoir and surrounding Rivers	Monthly	Downstream of Katupath Oya at the irrigation Anicut located at the confluence with Diyawini Oya	
/007	Location 07	To assess the Water Quality of the Reservoir and surrounding Rivers	Monthly	Upstream of Belihul Oya just above the Reservoir formed at HWL 460 m	
/008	Location 08	To assess the Water Quality of the Reservoir and surrounding Rivers	Monthly	Tributory of Belihuloya at Seelagama just above the Reservoir formed at HWL 460m	

Table 1 Principal Features for Monitoring Items (10/12)

Item No.	Name	Purpose	Frequency of Measurement	Location	Remarks
/009	Location 09	To assess the Water Quality of the Reservoir and surrounding Rivers	Monthly	Tributary of Denagan Oya at Daligurarawa just above the Reservoir formed at HWL 460m	
/010	Location 10	To assess the Water Quality of the Reservoir and surrounding Rivers	Monthly	Tailrace of the Power Station just above the confluence with Katupath Oya	

Table 1 Pricipal Features for Monitoring Items (11/12)

Item No.	Name	Purpose	Frequency of Measurement	Location	Remarks
5 /001	Instability Slope Monitoring Right Bank Access Road	To monitor pavement cracks and movement of slope in the potential slip area	Daily visual observation and weekly survey checking slope movement or road pavement crack width	Downstream of R/B of dam near security guard house	Dislocated during the slip occurred in Nov. '97
/002	Existing Slip in Area of Saddle 3	To monitor the movement of slope in the existing slip area	Every two days visual observation and monthly survey checking slope movement	Upstream of Kalunaide Ara	
/003	New Springs South of Spoil Bank of Kalunaide Ara	To inspect the instability of slope behind new springs and when the instability is found then survey lines will be implemented.	Every two days visual observation and subject to implementation of survey lines	Kalunaide Left Bank slope at toe of spoil bank	
/004	Instability in Paddy Land at Kellekandura Ara	To inspect the instability of paddy land	Weekly visual observation unless otherwise instructed by Independent Dam Engineer or communicate with local people	3 km left bank of dam	

Table 1 Pricipal Features for Monitoring Items (12/12)

Item No.	Name	Purpose	Frequency of Measurement	Location	Remarks
6)	Chemical Analysis				
/001	Ground Water flow beneath right bank adit	To check the chemical compositions and trace the water paths	Monthly	R/B adits F,H,I D end and D(a)	
/002	Main Leak	To check the chemical compositions and trace water paths	Monthly	R/B of Walawe about 350 m d/s of the toe of the Dam.	
/003	Seepage flow at Kalunaide	To check the chemical compositions and trace water paths	Monthly	Kalunaide Ara about 1200 m u/s of the confluence with Walawe	
/004	Seepage flow at Killekandura	To check the chemical compositions and trace water paths	Monthly	Killekandura Ara about 3 km away from the Dam.	
/005	Reservoir	To check the chemical compositions for main water source	Monthly	In front of adit G at the bottom of the reservoir	

Table 2 Principal Features of Drilling/Piezometer Data at Right Bank Abutment (1/2)

Drilling Period		Drilling Data				Description of Piezometer Installed			
Commenced Date	Completed Date	Borehole No.	Co-ordinate		Ground Height (masl)	Depth	Angle	Perforated Section	
			Easting	Northing				Datum Level	Elevations in upper/lower levels
31/07/88	19/8/88	D2	163953.900	202699.300	338.897	200.00	30 09'06" & 82 19"	-	-
13/08/88	17/8/88	D3	153947.200	202699.200	383.924	50.00	01 15'20" & 172 19'	-	-
18/08/88	29/8/88	D4	163948.600	202699.000	388.474	50.00	61 30'00" & 172 19'	-	-
20/08/88	29/8/88	D1	163953.100	202596.500	388.753	50.00	36 30'00" & 262 19'	-	-
15/09/88	27/12/88	GW1	163854.630	202704.510	480.070	201.65	Vertical	481.190	307.07-278.42
15/09/88	15/11/88	GW2	163789.600	207714.220	479.782	200.00	Vertical	498.750	359.38-314.38
26/11/88	13/12/88	MS1	164089.610	202879.791	414.820	75.00	Vertical	415.320	378.82-339.82
27/11/88	17/12/88	MS2	154125.161	202774.801	442.830	90.00	Vertical	443.289	397.83-352.83
14/12/88	30/12/88	MS3	163994.240	202842.920	433.390	80.00	Vertical	434.190	377.99-353.99
24/12/88	18/1/88	MS4	164030.524	202800.070	448.340	110.00	Vertical	449.010	385.34-338.34
3/1/89	24/2/89	GW4	163820.008	202850.105	477.000	200.00	Vertical	477.470	380.12-277.47
14/1/89	8/3/89	GW5	163670.210	202804.997	472.500	225.00	Vertical	472.598	367.5-247.5
27/1/89	31/3/89	GW3	163635.140	202588.300	478.780	230.00	Vertical	479.517	303.78-248.78
28/2/89	4/3/89	D5	163950.874	202698.299	388.438	180.00	Vertical	389.623	255.438-208.4
5/3/89	14/3/89	GW6	163499.753	202799.997	471.500	220.00	Vertical	472.031	411.5-406.5
7/3/89	8/89	GW7	163299.939	202799.834	504.700	205.00	Vertical	505.155	326.5-321.5
14/89	3/7/89	GW8	163831.040	207332.360	497.980	220.00	Vertical	498.290	394.7-369.7
26/5/89	20/7/89	GW9	164219.478	202446.071	497.663	200.00	Vertical	498.174	337.96-297.96
26/5/89	2/7/89	GW10	164128.216	202501.382	534.271	180.00	Vertical	534.738	372.633-347.6
26/5/89	7/9/89	GW11	164176.767	202454.966	524.988	200.00	Vertical	525.473	374.271-359.2
15/7/89	25/11/89	GW12	154155.664	202337.014	481.526	200.00	Vertical	482.169	374.988-359.9
23/9/89	4/11/89	GW14	163101.269	202918.371	507.900	200.00	Vertical	508.493	371.526-331.5
28/9/89	1/11/89	GW13	163444.287	202421.487	462.255	200.00	Vertical	462.518	397.9-347.9
29/9/89	31/1/90	GW15	163218.128	202636.820	467.460	200.00	Vertical	467.893	289.76-286.2
17/11/89	27/1/90	GW16	162795.796	202776.020	479.831	200.00	Vertical	480.883	347.9-307.9
18/11/89	23/4/90	GW17	163879.119	202564.672	504.696	200.00	Vertical	505.239	369.83-319.83
6/3/90	6/6/90	GW18	161924.172	202983.511	495.258	200.00	Vertical	496.199	379.7-359.7
7/3/90	7/3/90	GW19	165121.508	203028.382	503.698	200.00	Vertical	504.110	373.0-318.26

Table 2 Principal Features of Drilling/Piezometer Data at Right Bank Abutment (2/2)

Borehole No.	Drilling Data				Description of Piezometer Installed			
	Co-ordinate		Ground Height (masl)	Depth	Angle	Perforated Section		
	Easting	Northing				Datum Level	Depths in upper/lower levels	Elevations in upper/lower levels
WB-1	202800.000	163820.050	480.83	60.00	Vertical	481.13	50.00-54.00	430.83-426.83
WB-2	202389.600	163739.540	459.01	117.50	Vertical	459.31	100.30-114.30	358.71-344.71
WB-3	202648.580	163449.570	496.22	180.00	Vertical	496.52	152.00-179.00	344.22-317.22
WB-4	202759.060	163251.790	510.51	80.00	Vertical	510.81	62.50-73.40	448.01-437.11
WB-5	202905.870	163128.860	513.360	200.00	Vertical	513.66	189.00-199.00	324.36-314.36
WB-6	202958.060	162772.680	518.59	200.00	Vertical	518.89	186.00-196.00	332.59-322.59
WB-7	203284.170	160570.230	523.580	205.00	Vertical	523.88	106.00-126.00	417.58-397.58
WB-8	202830.300	163729.130	476.240	180.00	Vertical	476.54	128.00-179.00	347.24-297.24

TABLE 3 - STAGE- DISCHARGE TABLE OF MONITORING WEIR (1/10)

Depth to Water (mm)	Overflow Head (mm)	NIT		JSCE		AVERAGE Q (m3/sec)
		C	Q (m3/sec)	C	Q (m3/sec)	
700	100	0.6160	0.20	1.8459	0.20	0.20
699	101	0.6161	0.20	1.8454	0.21	0.21
698	102	0.6163	0.21	1.8450	0.21	0.21
697	103	0.6164	0.21	1.8445	0.21	0.21
696	104	0.6165	0.21	1.8441	0.22	0.22
695	105	0.6166	0.22	1.8436	0.22	0.22
694	106	0.6168	0.22	1.8432	0.22	0.22
693	107	0.6169	0.22	1.8428	0.23	0.23
692	108	0.6170	0.23	1.8424	0.23	0.23
691	109	0.6171	0.23	1.8420	0.23	0.23
690	110	0.6173	0.23	1.8416	0.24	0.24
689	111	0.6174	0.24	1.8412	0.24	0.24
688	112	0.6175	0.24	1.8408	0.24	0.24
687	113	0.6176	0.24	1.8404	0.24	0.24
686	114	0.6178	0.25	1.8400	0.25	0.25
685	115	0.6179	0.25	1.8397	0.25	0.25
684	116	0.6180	0.25	1.8393	0.25	0.25
683	117	0.6181	0.26	1.8390	0.26	0.26
682	118	0.6183	0.26	1.8386	0.26	0.26
681	119	0.6184	0.26	1.8383	0.26	0.26
680	120	0.6185	0.27	1.8379	0.27	0.27
679	121	0.6186	0.27	1.8376	0.27	0.27
678	122	0.6188	0.27	1.8373	0.27	0.27
677	123	0.6189	0.28	1.8370	0.28	0.28
676	124	0.6190	0.28	1.8366	0.28	0.28
675	125	0.6191	0.28	1.8363	0.28	0.28
674	126	0.6193	0.29	1.8360	0.29	0.29
673	127	0.6194	0.29	1.8357	0.29	0.29
672	128	0.6195	0.29	1.8354	0.29	0.29
671	129	0.6196	0.30	1.8351	0.30	0.30
670	130	0.6198	0.30	1.8348	0.30	0.30
669	131	0.6199	0.30	1.8346	0.30	0.30
668	132	0.6200	0.31	1.8343	0.31	0.31
667	133	0.6201	0.31	1.8340	0.31	0.31
666	134	0.6203	0.31	1.8337	0.31	0.31
665	135	0.6204	0.32	1.8335	0.32	0.32
664	136	0.6205	0.32	1.8332	0.32	0.32
663	137	0.6206	0.33	1.8329	0.33	0.33
662	138	0.6208	0.33	1.8327	0.33	0.33
661	139	0.6209	0.33	1.8324	0.33	0.33
660	140	0.6210	0.34	1.8322	0.34	0.34
659	141	0.6211	0.34	1.8320	0.34	0.34
658	142	0.6213	0.34	1.8317	0.34	0.34
657	143	0.6214	0.35	1.8315	0.35	0.35
656	144	0.6215	0.35	1.8313	0.35	0.35
655	145	0.6216	0.35	1.8310	0.35	0.35
654	146	0.6218	0.36	1.8308	0.36	0.36
653	147	0.6219	0.36	1.8306	0.36	0.36
652	148	0.6220	0.37	1.8304	0.36	0.37
651	149	0.6221	0.37	1.8302	0.37	0.37
650	150	0.6223	0.37	1.8299	0.37	0.37

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TABLE 3 - STAGE - DISCHARGE TABLE OF MONITORING WEIR (2/10)

Depth to Water (mm)	Overflow Head (mm)	NIT		JSCE		AVERAGE Q (m3/sec)
		C	Q (m3/sec)	C	Q (m3/sec)	
649	151	0.6224	0.38	1.8297	0.38	0.38
648	152	0.6225	0.38	1.8295	0.38	0.38
647	153	0.6226	0.38	1.8293	0.38	0.38
646	154	0.6228	0.39	1.8291	0.39	0.39
645	155	0.6229	0.39	1.8289	0.39	0.39
644	156	0.6230	0.40	1.8287	0.39	0.40
643	157	0.6231	0.40	1.8286	0.40	0.40
642	158	0.6233	0.40	1.8284	0.40	0.40
641	159	0.6234	0.41	1.8282	0.41	0.41
640	160	0.6235	0.41	1.8280	0.41	0.41
639	161	0.6236	0.42	1.8278	0.41	0.42
638	162	0.6238	0.42	1.8277	0.42	0.42
637	163	0.6239	0.42	1.8275	0.42	0.42
636	164	0.6240	0.43	1.8273	0.42	0.43
635	165	0.6241	0.43	1.8271	0.43	0.43
634	166	0.6243	0.44	1.8270	0.43	0.44
633	167	0.6244	0.44	1.8268	0.44	0.44
632	168	0.6245	0.44	1.8267	0.44	0.44
631	169	0.6246	0.45	1.8265	0.44	0.45
630	170	0.6248	0.45	1.8263	0.45	0.45
629	171	0.6249	0.46	1.8262	0.45	0.46
628	172	0.6250	0.46	1.8260	0.46	0.46
627	173	0.6251	0.46	1.8259	0.46	0.46
626	174	0.6253	0.47	1.8258	0.46	0.47
625	175	0.6254	0.47	1.8256	0.47	0.47
624	176	0.6255	0.48	1.8255	0.47	0.48
623	177	0.6256	0.48	1.8253	0.48	0.48
622	178	0.6258	0.49	1.8252	0.48	0.49
621	179	0.6259	0.49	1.8251	0.48	0.49
620	180	0.6260	0.49	1.8249	0.49	0.49
619	181	0.6261	0.50	1.8248	0.49	0.50
618	182	0.6263	0.50	1.8247	0.50	0.50
617	183	0.6264	0.51	1.8246	0.50	0.51
616	184	0.6265	0.51	1.8244	0.50	0.51
615	185	0.6266	0.52	1.8243	0.51	0.52
614	186	0.6268	0.52	1.8242	0.51	0.52
613	187	0.6269	0.52	1.8241	0.52	0.52
612	188	0.6270	0.53	1.8240	0.52	0.53
611	189	0.6271	0.53	1.8238	0.52	0.53
610	190	0.6273	0.54	1.8237	0.53	0.54
609	191	0.6274	0.54	1.8236	0.53	0.54
608	192	0.6275	0.55	1.8235	0.54	0.55
607	193	0.6276	0.55	1.8234	0.54	0.55
606	194	0.6278	0.55	1.8233	0.55	0.55
605	195	0.6279	0.56	1.8232	0.55	0.56
604	196	0.6280	0.56	1.8231	0.55	0.56
603	197	0.6281	0.57	1.8230	0.56	0.57
602	198	0.6283	0.57	1.8229	0.56	0.57
601	199	0.6284	0.58	1.8228	0.57	0.58
600	200	0.6285	0.58	1.8227	0.57	0.58
599	201	0.6286	0.59	1.8226	0.57	0.58

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TABLE 3 - STAGE - DISCHARGE TABLE OF MONITORING WEIR (3/10)

Depth to Water (mm)	Overflow Head (mm)	NIT		JSCE		AVERAGE Q (m3/sec)
		C	Q (m3/sec)	C	Q (m3/sec)	
598	202	0.6288	0.59	1.8225	0.58	0.59
597	203	0.6289	0.59	1.8225	0.58	0.59
596	204	0.6290	0.60	1.8224	0.59	0.60
595	205	0.6291	0.60	1.8223	0.59	0.60
594	206	0.6293	0.61	1.8222	0.60	0.61
593	207	0.6294	0.61	1.8221	0.60	0.61
592	208	0.6295	0.62	1.8220	0.60	0.61
591	209	0.6296	0.62	1.8220	0.61	0.62
590	210	0.6298	0.63	1.8219	0.61	0.62
589	211	0.6299	0.63	1.8218	0.62	0.63
588	212	0.6300	0.64	1.8217	0.62	0.63
587	213	0.6301	0.64	1.8217	0.63	0.64
586	214	0.6303	0.64	1.8216	0.63	0.64
585	215	0.6304	0.65	1.8215	0.64	0.65
584	216	0.6305	0.65	1.8215	0.64	0.65
583	217	0.6306	0.66	1.8214	0.64	0.65
582	218	0.6308	0.66	1.8213	0.65	0.66
581	219	0.6309	0.67	1.8213	0.65	0.66
580	220	0.6310	0.67	1.8212	0.66	0.67
579	221	0.6311	0.68	1.8211	0.66	0.67
578	222	0.6313	0.68	1.8211	0.67	0.68
577	223	0.6314	0.69	1.8210	0.67	0.68
576	224	0.6315	0.69	1.8210	0.68	0.69
575	225	0.6316	0.70	1.8209	0.68	0.69
574	226	0.6318	0.70	1.8209	0.68	0.69
573	227	0.6319	0.71	1.8208	0.69	0.70
572	228	0.6320	0.71	1.8207	0.69	0.70
571	229	0.6321	0.72	1.8207	0.70	0.71
570	230	0.6323	0.72	1.8206	0.70	0.71
569	231	0.6324	0.73	1.8206	0.71	0.72
568	232	0.6325	0.73	1.8206	0.71	0.72
567	233	0.6326	0.73	1.8205	0.72	0.73
566	234	0.6328	0.74	1.8205	0.72	0.73
565	235	0.6329	0.74	1.8204	0.73	0.74
564	236	0.6330	0.75	1.8204	0.73	0.74
563	237	0.6331	0.75	1.8203	0.74	0.75
562	238	0.6333	0.76	1.8203	0.74	0.75
561	239	0.6334	0.76	1.8203	0.74	0.75
560	240	0.6335	0.77	1.8202	0.75	0.76
559	241	0.6336	0.77	1.8202	0.75	0.76
558	242	0.6338	0.78	1.8202	0.76	0.77
557	243	0.6339	0.78	1.8201	0.76	0.77
556	244	0.6340	0.79	1.8201	0.77	0.78
555	245	0.6341	0.79	1.8201	0.77	0.78
554	246	0.6343	0.80	1.8200	0.78	0.79
553	247	0.6344	0.80	1.8200	0.78	0.79
552	248	0.6345	0.81	1.8200	0.79	0.80
551	249	0.6346	0.81	1.8199	0.79	0.80
550	250	0.6348	0.82	1.8199	0.80	0.81
549	251	0.6349	0.82	1.8199	0.80	0.81
548	252	0.6350	0.83	1.8199	0.81	0.82

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TABLE 3 - STAGE - DISCHARGE TABLE OF MONITORING WEIR (4/10)

Depth to Water (mm)	Overflow Head (mm)	NIT		JSCE		AVERAGE Q (m3/sec)
		C	Q (m3/sec)	C	Q (m3/sec)	
547	253	0.6351	0.83	1.8198	0.81	0.82
546	254	0.6353	0.84	1.8198	0.82	0.83
545	255	0.6354	0.85	1.8198	0.82	0.84
544	256	0.6355	0.85	1.8198	0.82	0.84
543	257	0.6356	0.86	1.8198	0.83	0.85
542	258	0.6358	0.86	1.8197	0.83	0.85
541	259	0.6359	0.87	1.8197	0.84	0.86
540	260	0.6360	0.87	1.8197	0.84	0.86
539	261	0.6361	0.88	1.8197	0.85	0.87
538	262	0.6363	0.88	1.8197	0.85	0.87
537	263	0.6364	0.89	1.8197	0.86	0.88
536	264	0.6365	0.89	1.8197	0.86	0.88
535	265	0.6366	0.90	1.8197	0.87	0.89
534	266	0.6368	0.90	1.8196	0.87	0.89
533	267	0.6369	0.91	1.8196	0.88	0.90
532	268	0.6370	0.91	1.8196	0.88	0.90
531	269	0.6371	0.92	1.8196	0.89	0.91
530	270	0.6373	0.92	1.8196	0.89	0.91
529	271	0.6374	0.93	1.8196	0.90	0.92
528	272	0.6375	0.93	1.8196	0.90	0.92
527	273	0.6376	0.94	1.8196	0.91	0.93
526	274	0.6378	0.94	1.8196	0.91	0.93
525	275	0.6379	0.95	1.8196	0.92	0.94
524	276	0.6380	0.96	1.8196	0.92	0.94
523	277	0.6381	0.96	1.8196	0.93	0.95
522	278	0.6383	0.97	1.8196	0.93	0.95
521	279	0.6384	0.97	1.8196	0.94	0.96
520	280	0.6385	0.98	1.8196	0.94	0.96
519	281	0.6386	0.98	1.8196	0.95	0.97
518	282	0.6388	0.99	1.8196	0.95	0.97
517	283	0.6389	0.99	1.8196	0.96	0.98
516	284	0.6390	1.00	1.8196	0.96	0.98
515	285	0.6391	1.00	1.8196	0.97	0.99
514	286	0.6393	1.01	1.8196	0.97	0.99
513	287	0.6394	1.02	1.8196	0.98	1.00
512	288	0.6395	1.02	1.8197	0.98	1.00
511	289	0.6396	1.03	1.8197	0.99	1.01
510	290	0.6398	1.03	1.8197	0.99	1.01
509	291	0.6399	1.04	1.8197	1.00	1.02
508	292	0.6400	1.04	1.8197	1.00	1.02
507	293	0.6401	1.05	1.8197	1.01	1.03
506	294	0.6403	1.05	1.8197	1.02	1.04
505	295	0.6404	1.06	1.8197	1.02	1.04
504	296	0.6405	1.07	1.8198	1.03	1.05
503	297	0.6406	1.07	1.8198	1.03	1.05
502	298	0.6408	1.08	1.8198	1.04	1.06
501	299	0.6409	1.08	1.8198	1.04	1.06
500	300	0.6410	1.09	1.8198	1.05	1.07
499	301	0.6411	1.09	1.8198	1.05	1.07
498	302	0.6413	1.10	1.8199	1.06	1.08
497	303	0.6414	1.11	1.8199	1.06	1.09

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TABLE 3 - STAGE - DISCHARGE TABLE OF MONITORING WEIR (5/10)

Depth to Water (mm)	Overflow Head (mm)	NIT		JSCE		AVERAGE Q (m3/sec)
		C	Q (m3/sec)	C	Q (m3/sec)	
496	304	0.6415	1.11	1.8199	1.07	1.09
495	305	0.6416	1.12	1.8199	1.07	1.10
494	306	0.6418	1.12	1.8200	1.08	1.10
493	307	0.6419	1.13	1.8200	1.08	1.11
492	308	0.6420	1.13	1.8200	1.09	1.11
491	309	0.6421	1.14	1.8200	1.09	1.12
490	310	0.6423	1.15	1.8201	1.10	1.13
489	311	0.6424	1.15	1.8201	1.10	1.13
488	312	0.6425	1.16	1.8201	1.11	1.14
487	313	0.6426	1.16	1.8201	1.12	1.14
486	314	0.6428	1.17	1.8202	1.12	1.15
485	315	0.6429	1.17	1.8202	1.13	1.15
484	316	0.6430	1.18	1.8202	1.13	1.16
483	317	0.6431	1.19	1.8203	1.14	1.17
482	318	0.6433	1.19	1.8203	1.14	1.17
481	319	0.6434	1.20	1.8203	1.15	1.18
480	320	0.6435	1.20	1.8203	1.15	1.18
479	321	0.6436	1.21	1.8204	1.16	1.19
478	322	0.6438	1.22	1.8204	1.16	1.19
477	323	0.6439	1.22	1.8205	1.17	1.20
476	324	0.6440	1.23	1.8205	1.18	1.21
475	325	0.6442	1.23	1.8205	1.18	1.21
474	326	0.6443	1.24	1.8206	1.19	1.22
473	327	0.6444	1.24	1.8206	1.19	1.22
472	328	0.6445	1.25	1.8206	1.20	1.23
471	329	0.6447	1.26	1.8207	1.20	1.23
470	330	0.6448	1.26	1.8207	1.21	1.24
469	331	0.6449	1.27	1.8208	1.21	1.24
468	332	0.6450	1.27	1.8208	1.22	1.25
467	333	0.6452	1.28	1.8208	1.22	1.25
466	334	0.6453	1.29	1.8209	1.23	1.26
465	335	0.6454	1.29	1.8209	1.24	1.27
464	336	0.6455	1.30	1.8210	1.24	1.27
463	337	0.6457	1.30	1.8210	1.25	1.28
462	338	0.6458	1.31	1.8210	1.25	1.28
461	339	0.6459	1.32	1.8211	1.26	1.29
460	340	0.6460	1.32	1.8211	1.26	1.29
459	341	0.6462	1.33	1.8212	1.27	1.30
458	342	0.6463	1.34	1.8212	1.27	1.31
457	343	0.6464	1.34	1.8213	1.28	1.31
456	344	0.6465	1.35	1.8213	1.29	1.32
455	345	0.6467	1.35	1.8214	1.29	1.32
454	346	0.6468	1.36	1.8214	1.30	1.33
453	347	0.6469	1.37	1.8215	1.30	1.34
452	348	0.6470	1.37	1.8215	1.31	1.34
451	349	0.6472	1.38	1.8216	1.31	1.35
450	350	0.6473	1.38	1.8216	1.32	1.35
449	351	0.6474	1.39	1.8217	1.33	1.36
448	352	0.6475	1.40	1.8217	1.33	1.37
447	353	0.6477	1.40	1.8218	1.34	1.37
446	354	0.6478	1.41	1.8218	1.34	1.38

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TABLE 3 - STAGE - DISCHARGE TABLE OF MONITORING WEIR (6/10)

Depth to Water (mm)	Overflow Head (mm)	NIT		JSCE		AVERAGE
		C	Q (m3/sec)	C	Q (m3/sec)	Q (m3/sec)
445	355	0.6479	1.42	1.8219	1.35	1.39
444	356	0.6480	1.42	1.8219	1.35	1.39
443	357	0.6482	1.43	1.8220	1.36	1.40
442	358	0.6483	1.43	1.8220	1.37	1.40
441	359	0.6484	1.44	1.8221	1.37	1.41
440	360	0.6485	1.45	1.8222	1.38	1.42
439	361	0.6487	1.45	1.8222	1.38	1.42
438	362	0.6488	1.46	1.8223	1.39	1.43
437	363	0.6489	1.47	1.8223	1.39	1.43
436	364	0.6490	1.47	1.8224	1.40	1.44
435	365	0.6492	1.48	1.8224	1.41	1.45
434	366	0.6493	1.49	1.8225	1.41	1.45
433	367	0.6494	1.49	1.8226	1.42	1.46
432	368	0.6495	1.50	1.8226	1.42	1.46
431	369	0.6497	1.50	1.8227	1.43	1.47
430	370	0.6498	1.51	1.8227	1.44	1.48
429	371	0.6499	1.52	1.8228	1.44	1.48
428	372	0.6500	1.52	1.8229	1.45	1.49
427	373	0.6502	1.53	1.8229	1.45	1.49
426	374	0.6503	1.54	1.8230	1.46	1.50
425	375	0.6504	1.54	1.8231	1.47	1.51
424	376	0.6505	1.55	1.8231	1.47	1.51
423	377	0.6507	1.56	1.8232	1.48	1.52
422	378	0.6508	1.56	1.8232	1.48	1.52
421	379	0.6509	1.57	1.8233	1.49	1.53
420	380	0.6510	1.58	1.8234	1.49	1.54
419	381	0.6512	1.58	1.8234	1.50	1.54
418	382	0.6513	1.59	1.8235	1.51	1.55
417	383	0.6514	1.59	1.8236	1.51	1.55
416	384	0.6515	1.60	1.8236	1.52	1.56
415	385	0.6517	1.61	1.8237	1.52	1.57
414	386	0.6518	1.61	1.8238	1.53	1.57
413	387	0.6519	1.62	1.8239	1.54	1.58
412	388	0.6520	1.63	1.8239	1.54	1.59
411	389	0.6522	1.63	1.8240	1.55	1.59
410	390	0.6523	1.64	1.8241	1.55	1.60
409	391	0.6524	1.65	1.8241	1.56	1.61
408	392	0.6525	1.65	1.8242	1.57	1.61
407	393	0.6527	1.66	1.8243	1.57	1.62
406	394	0.6528	1.67	1.8244	1.58	1.63
405	395	0.6529	1.67	1.8244	1.59	1.63
404	396	0.6530	1.68	1.8245	1.59	1.64
403	397	0.6532	1.69	1.8246	1.60	1.65
402	398	0.6533	1.69	1.8246	1.60	1.65
401	399	0.6534	1.70	1.8247	1.61	1.66
400	400	0.6535	1.71	1.8248	1.62	1.67
399	401	0.6537	1.71	1.8249	1.62	1.67
398	402	0.6538	1.72	1.8249	1.63	1.68
397	403	0.6539	1.73	1.8250	1.63	1.68
396	404	0.6540	1.73	1.8251	1.64	1.69
395	405	0.6542	1.74	1.8252	1.65	1.70

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TABLE 3 - STAGE - DISCHARGE TABLE OF MONITORING WEIR (7/10)

Depth to Water (mm)	Overflow Head (mm)	NIT		JSCE		AVERAGE Q (m3/sec)
		C	Q (m3/sec)	C	Q (m3/sec)	
394	406	0.6543	1.75	1.8253	1.65	1.70
393	407	0.6544	1.76	1.8253	1.66	1.71
392	408	0.6545	1.76	1.8254	1.67	1.72
391	409	0.6547	1.77	1.8255	1.67	1.72
390	410	0.6548	1.78	1.8256	1.68	1.73
389	411	0.6549	1.78	1.8256	1.68	1.73
388	412	0.6550	1.79	1.8257	1.69	1.74
387	413	0.6552	1.80	1.8258	1.70	1.75
386	414	0.6553	1.80	1.8259	1.70	1.75
385	415	0.6554	1.81	1.8260	1.71	1.76
384	416	0.6555	1.82	1.8261	1.71	1.77
383	417	0.6557	1.82	1.8261	1.72	1.77
382	418	0.6558	1.83	1.8262	1.73	1.78
381	419	0.6559	1.84	1.8263	1.73	1.79
380	420	0.6560	1.84	1.8264	1.74	1.79
379	421	0.6562	1.85	1.8265	1.75	1.80
378	422	0.6563	1.86	1.8266	1.75	1.81
377	423	0.6564	1.87	1.8266	1.76	1.82
376	424	0.6565	1.87	1.8267	1.77	1.82
375	425	0.6567	1.88	1.8268	1.77	1.83
374	426	0.6568	1.89	1.8269	1.78	1.84
373	427	0.6569	1.89	1.8270	1.78	1.84
372	428	0.6570	1.90	1.8271	1.79	1.85
371	429	0.6572	1.91	1.8272	1.80	1.86
370	430	0.6573	1.91	1.8272	1.80	1.86
369	431	0.6574	1.92	1.8273	1.81	1.87
368	432	0.6575	1.93	1.8274	1.82	1.88
367	433	0.6577	1.94	1.8275	1.82	1.88
366	434	0.6578	1.94	1.8276	1.83	1.89
365	435	0.6579	1.95	1.8277	1.84	1.90
364	436	0.6580	1.96	1.8278	1.84	1.90
363	437	0.6582	1.96	1.8279	1.85	1.91
362	438	0.6583	1.97	1.8279	1.85	1.91
361	439	0.6584	1.98	1.8280	1.86	1.92
360	440	0.6585	1.99	1.8281	1.87	1.93
359	441	0.6587	1.99	1.8282	1.87	1.93
358	442	0.6588	2.00	1.8283	1.88	1.94
357	443	0.6589	2.01	1.8284	1.89	1.95
356	444	0.6590	2.01	1.8285	1.89	1.95
355	445	0.6592	2.02	1.8286	1.90	1.96
354	446	0.6593	2.03	1.8287	1.91	1.97
353	447	0.6594	2.04	1.8288	1.91	1.98
352	448	0.6595	2.04	1.8289	1.92	1.98
351	449	0.6597	2.05	1.8290	1.93	1.99
350	450	0.6598	2.06	1.8291	1.93	2.00
349	451	0.6599	2.06	1.8292	1.94	2.00
348	452	0.6600	2.07	1.8292	1.95	2.01
347	453	0.6602	2.08	1.8293	1.95	2.02
346	454	0.6603	2.09	1.8294	1.96	2.03
345	455	0.6604	2.09	1.8295	1.97	2.03
344	456	0.6605	2.10	1.8296	1.97	2.04

DATE : 26/02/99

War-new.xls

TABLE 3 - STAGE - DISCHARGE TABLE OF MONITORING WEIR (8/10)

Depth to Water (mm)	Overflow Head (mm)	NIT		JSCE		AVERAGE
		C	Q (m3/sec)	C	Q (m3/sec)	Q (m3/sec)
343	457	0.6607	2.11	1.8297	1.98	2.05
342	458	0.6608	2.12	1.8298	1.99	2.06
341	459	0.6609	2.12	1.8299	1.99	2.06
340	460	0.6610	2.13	1.8300	2.00	2.07
339	461	0.6612	2.14	1.8301	2.00	2.07
338	462	0.6613	2.15	1.8302	2.01	2.08
337	463	0.6614	2.15	1.8303	2.02	2.09
336	464	0.6615	2.16	1.8304	2.02	2.09
335	465	0.6617	2.17	1.8305	2.03	2.10
334	466	0.6618	2.17	1.8306	2.04	2.11
333	467	0.6619	2.18	1.8307	2.04	2.11
332	468	0.6620	2.19	1.8308	2.05	2.12
331	469	0.6622	2.20	1.8309	2.06	2.13
330	470	0.6623	2.20	1.8310	2.06	2.13
329	471	0.6624	2.21	1.8311	2.07	2.14
328	472	0.6625	2.22	1.8312	2.08	2.15
327	473	0.6627	2.23	1.8313	2.09	2.16
326	474	0.6628	2.23	1.8314	2.09	2.16
325	475	0.6629	2.24	1.8315	2.10	2.17
324	476	0.6630	2.25	1.8316	2.11	2.18
323	477	0.6632	2.26	1.8317	2.11	2.19
322	478	0.6633	2.26	1.8318	2.12	2.19
321	479	0.6634	2.27	1.8319	2.13	2.20
320	480	0.6635	2.28	1.8320	2.13	2.21
319	481	0.6637	2.29	1.8322	2.14	2.22
318	482	0.6638	2.29	1.8323	2.15	2.22
317	483	0.6639	2.30	1.8324	2.15	2.23
316	484	0.6640	2.31	1.8325	2.16	2.24
315	485	0.6642	2.32	1.8326	2.17	2.25
314	486	0.6643	2.33	1.8327	2.17	2.25
313	487	0.6644	2.33	1.8328	2.18	2.26
312	488	0.6645	2.34	1.8329	2.19	2.27
311	489	0.6647	2.35	1.8330	2.19	2.27
310	490	0.6648	2.36	1.8331	2.20	2.28
309	491	0.6649	2.36	1.8332	2.21	2.29
308	492	0.6650	2.37	1.8333	2.21	2.29
307	493	0.6652	2.38	1.8334	2.22	2.30
306	494	0.6653	2.39	1.8335	2.23	2.31
305	495	0.6654	2.39	1.8337	2.24	2.32
304	496	0.6655	2.40	1.8338	2.24	2.32
303	497	0.6657	2.41	1.8339	2.25	2.33
302	498	0.6658	2.42	1.8340	2.26	2.34
301	499	0.6659	2.42	1.8341	2.26	2.34
300	500	0.6660	2.43	1.8342	2.27	2.35
299	501	0.6662	2.44	1.8343	2.28	2.36
298	502	0.6663	2.45	1.8344	2.28	2.37
297	503	0.6664	2.46	1.8345	2.29	2.38
296	504	0.6665	2.46	1.8346	2.30	2.38
295	505	0.6667	2.47	1.8348	2.30	2.39
294	506	0.6668	2.48	1.8349	2.31	2.40
293	507	0.6669	2.49	1.8350	2.32	2.41

DATE : 26/02/99

Wer-new.xls

TABLE 3 - STAGE - DISCHARGE TABLE OF MONITORING WEIR (9/10)

Depth to Water (mm)	Overflow Head (mm)	NIT		JSCE		AVERAGE
		C	Q (m3/sec)	C	Q (m3/sec)	Q (m3/sec)
292	508	0.6670	2.49	1.8351	2.33	2.41
291	509	0.6672	2.50	1.8352	2.33	2.42
290	510	0.6673	2.51	1.8353	2.34	2.43
289	511	0.6674	2.52	1.8354	2.35	2.44
288	512	0.6675	2.53	1.8355	2.35	2.44
287	513	0.6677	2.53	1.8357	2.36	2.45
286	514	0.6678	2.54	1.8358	2.37	2.46
285	515	0.6679	2.55	1.8359	2.37	2.46
284	516	0.6680	2.56	1.8360	2.38	2.47
283	517	0.6682	2.57	1.8361	2.39	2.48
282	518	0.6683	2.57	1.8362	2.40	2.49
281	519	0.6684	2.58	1.8364	2.40	2.49
280	520	0.6685	2.59	1.8365	2.41	2.50
279	521	0.6687	2.60	1.8366	2.42	2.51
278	522	0.6688	2.61	1.8367	2.42	2.52
277	523	0.6689	2.61	1.8368	2.43	2.52
276	524	0.6690	2.62	1.8369	2.44	2.53
275	525	0.6692	2.63	1.8371	2.45	2.54
274	526	0.6693	2.64	1.8372	2.45	2.55
273	527	0.6694	2.65	1.8373	2.46	2.56
272	528	0.6695	2.65	1.8374	2.47	2.56
271	529	0.6697	2.66	1.8375	2.47	2.57
270	530	0.6698	2.67	1.8376	2.48	2.58
269	531	0.6699	2.68	1.8378	2.49	2.59
268	532	0.6700	2.69	1.8379	2.50	2.60
267	533	0.6702	2.69	1.8380	2.50	2.60
266	534	0.6703	2.70	1.8381	2.51	2.61
265	535	0.6704	2.71	1.8382	2.52	2.62
264	536	0.6705	2.72	1.8384	2.52	2.62
263	537	0.6707	2.73	1.8385	2.53	2.63
262	538	0.6708	2.73	1.8386	2.54	2.64
261	539	0.6709	2.74	1.8387	2.55	2.65
260	540	0.6710	2.75	1.8388	2.55	2.65
259	541	0.6712	2.76	1.8390	2.56	2.66
258	542	0.6713	2.77	1.8391	2.57	2.67
257	543	0.6714	2.78	1.8392	2.58	2.68
256	544	0.6715	2.78	1.8393	2.58	2.68
255	545	0.6717	2.79	1.8395	2.59	2.69
254	546	0.6718	2.80	1.8396	2.60	2.70
253	547	0.6719	2.81	1.8397	2.60	2.71
252	548	0.6720	2.82	1.8398	2.61	2.72
251	549	0.6722	2.82	1.8399	2.62	2.72
250	550	0.6723	2.83	1.8401	2.63	2.73
249	551	0.6724	2.84	1.8402	2.63	2.74
248	552	0.6725	2.85	1.8403	2.64	2.75
247	553	0.6727	2.86	1.8404	2.65	2.76
246	554	0.6728	2.87	1.8406	2.66	2.77
245	555	0.6729	2.87	1.8407	2.66	2.77
244	556	0.6730	2.88	1.8408	2.67	2.78
243	557	0.6732	2.89	1.8409	2.68	2.79
242	558	0.6733	2.90	1.8411	2.69	2.80

DATE : 26/02/99

TABLE 3 - STAGE - DISCHARGE TABLE OF MONITORING WEIR (10/10)

Depth to Water (mm)	Overflow Head (mm)	NIT		JSCE		AVERAGE Q (m3/sec)
		C	Q (m3/sec)	C	Q (m3/sec)	
241	559	0.6734	2.91	1.8412	2.69	2.80
240	560	0.6735	2.92	1.8413	2.70	2.81
239	561	0.6737	2.92	1.8414	2.71	2.82
238	562	0.6738	2.93	1.8416	2.72	2.83
237	563	0.6739	2.94	1.8417	2.72	2.83
236	564	0.6740	2.95	1.8418	2.73	2.84
235	565	0.6742	2.96	1.8420	2.74	2.85
234	566	0.6743	2.97	1.8421	2.75	2.86
233	567	0.6744	2.97	1.8422	2.75	2.86
232	568	0.6745	2.98	1.8423	2.76	2.87
231	569	0.6747	2.99	1.8425	2.77	2.88
230	570	0.6748	3.00	1.8426	2.78	2.89
229	571	0.6749	3.01	1.8427	2.78	2.90
228	572	0.6750	3.02	1.8428	2.79	2.91
227	573	0.6752	3.03	1.8430	2.80	2.92
226	574	0.6753	3.03	1.8431	2.81	2.92
225	575	0.6754	3.04	1.8432	2.81	2.93
224	576	0.6755	3.05	1.8434	2.82	2.94
223	577	0.6757	3.06	1.8435	2.83	2.95
222	578	0.6758	3.07	1.8436	2.84	2.96
221	579	0.6759	3.08	1.8438	2.84	2.96
220	580	0.6760	3.08	1.8439	2.85	2.97
219	581	0.6762	3.09	1.8440	2.86	2.98
218	582	0.6763	3.10	1.8442	2.87	2.99
217	583	0.6764	3.11	1.8443	2.87	2.99
216	584	0.6765	3.12	1.8444	2.88	3.00

FIGURES

Figure 1 Organisation of Monitoring Works for Samanalawewa Dam and Right Bank(1/2)
 Since January 1996 upto End of June, 1999 under NIPPON KOEI's CONTRACT

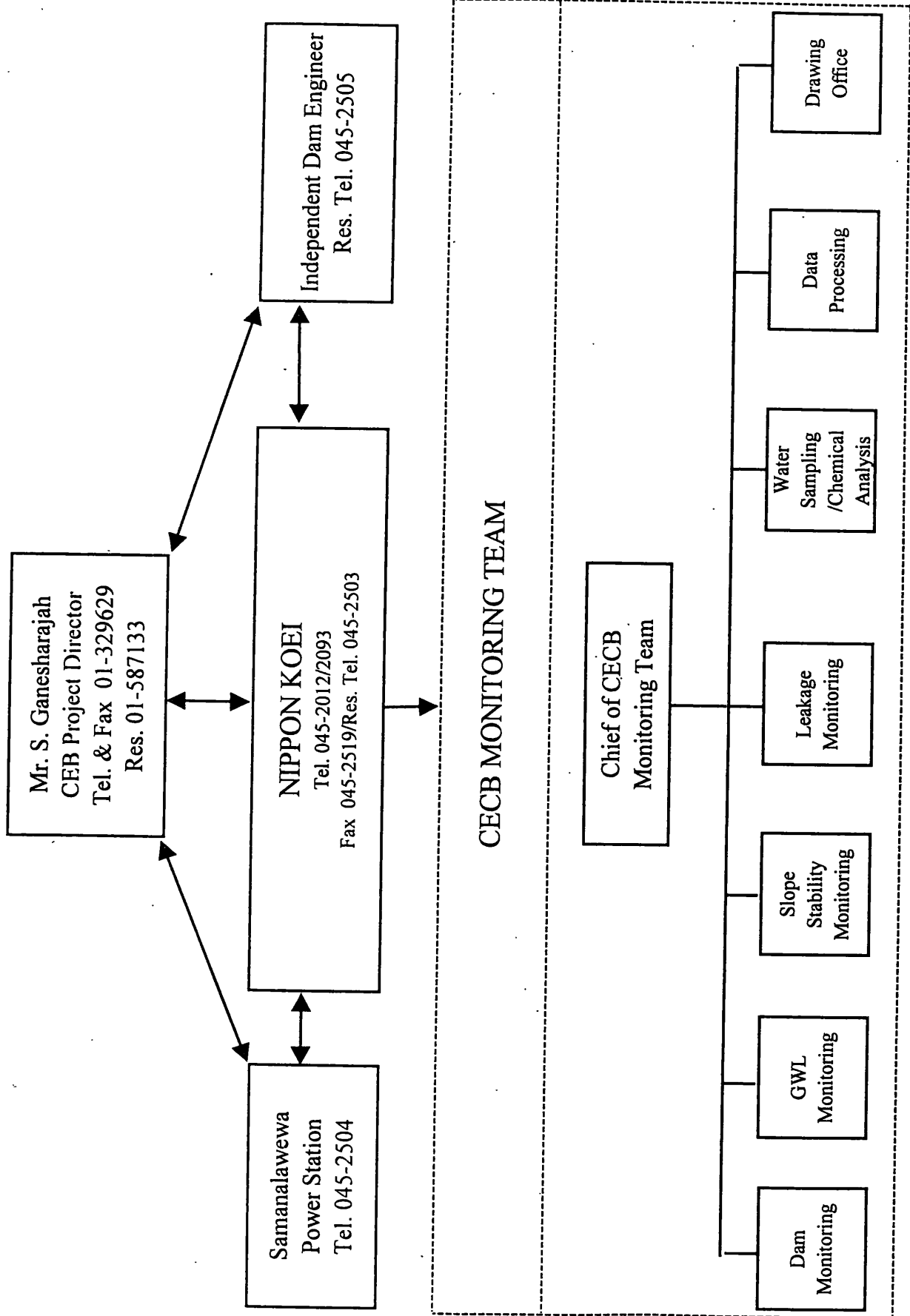


Figure 1 Organisation of Monitoring Works for Samanalawewa Dam and Right Bank (2/2)
After End of June, 1999 under LOCAL CONTRACT

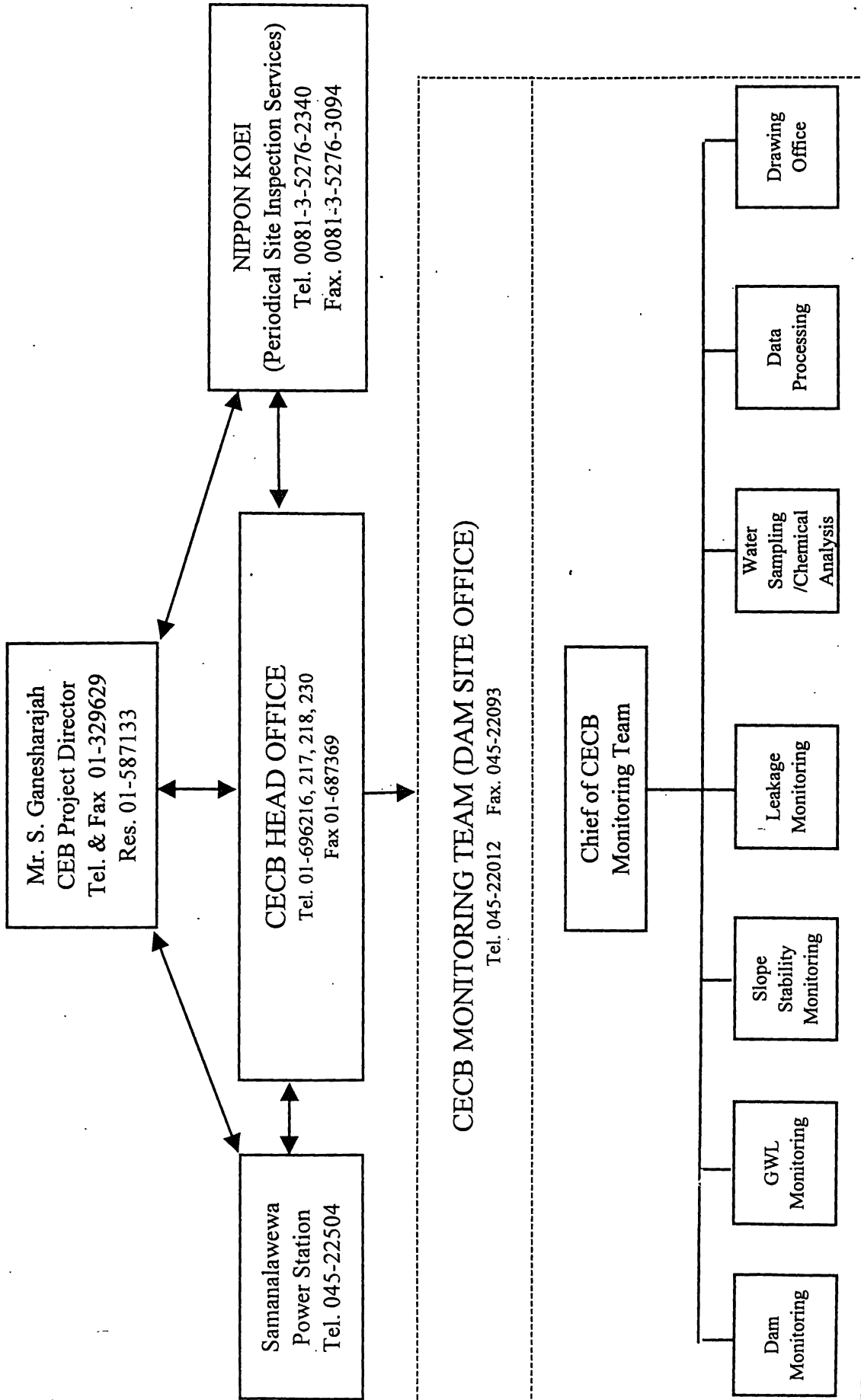
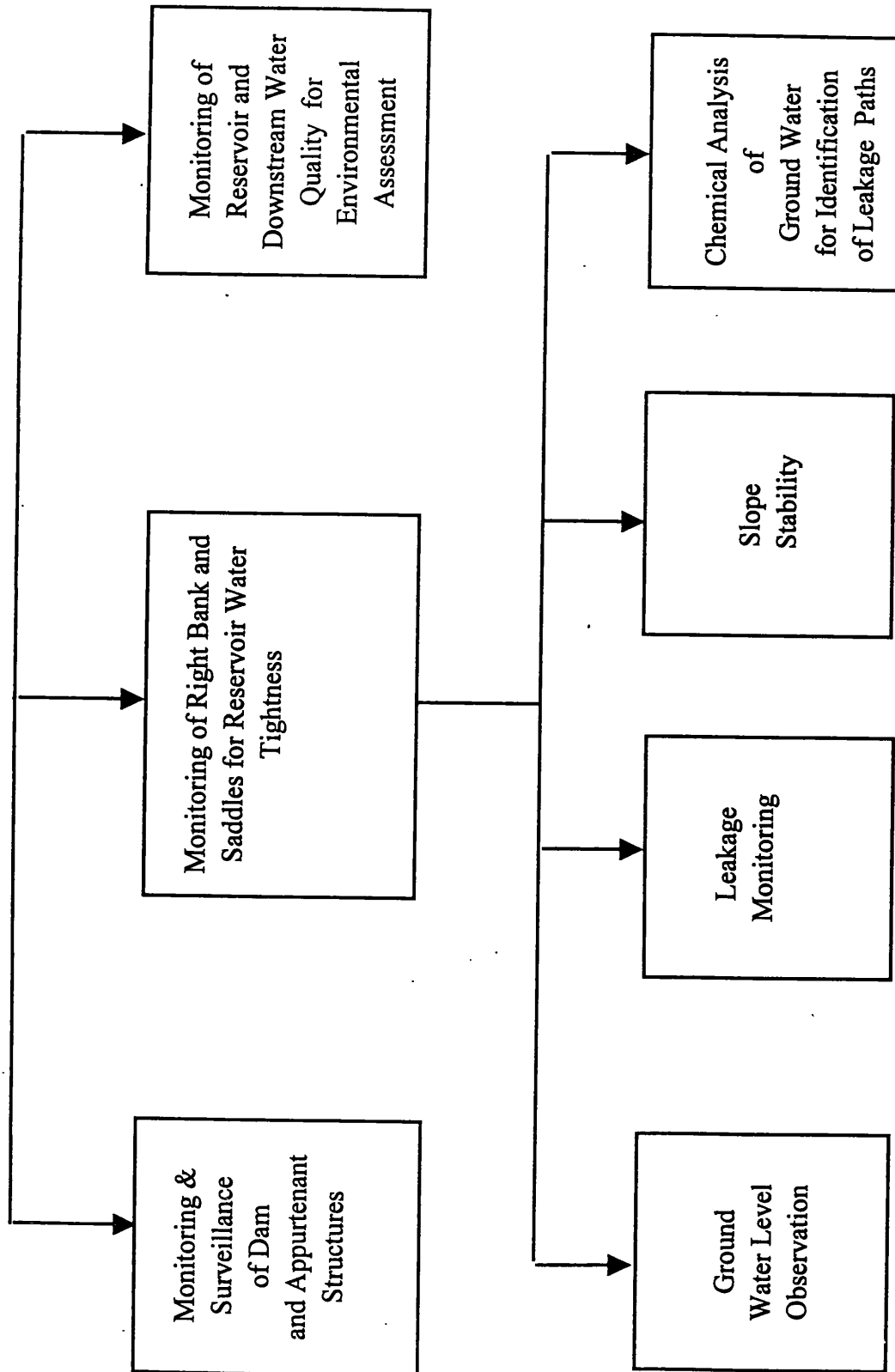


Figure 2 Scope of Works for Samanalawewa Dam & Right Bank Monitoring



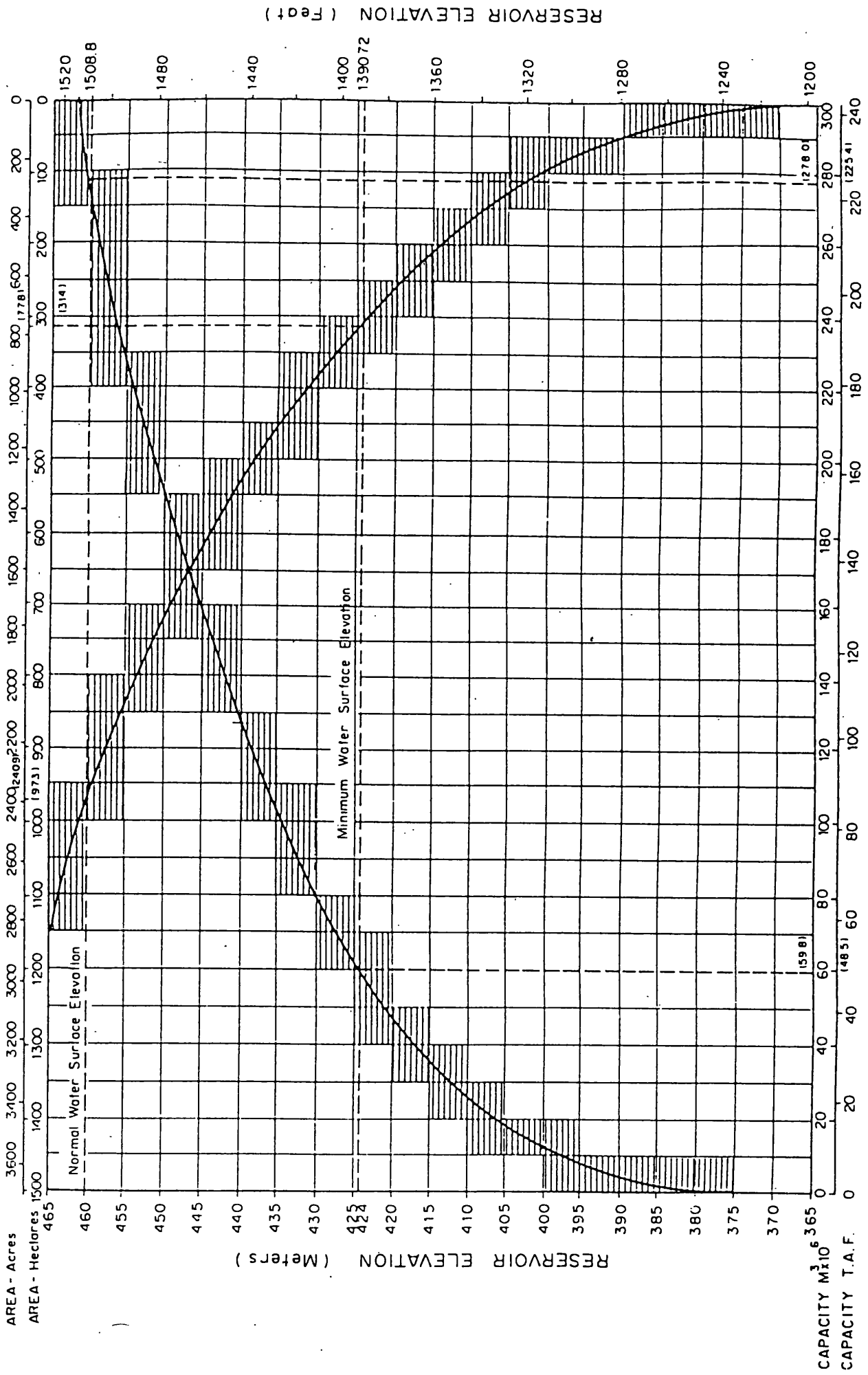


Figure 3 SAMANALA RESERVOIR
AREA - CAPACITY CURVE

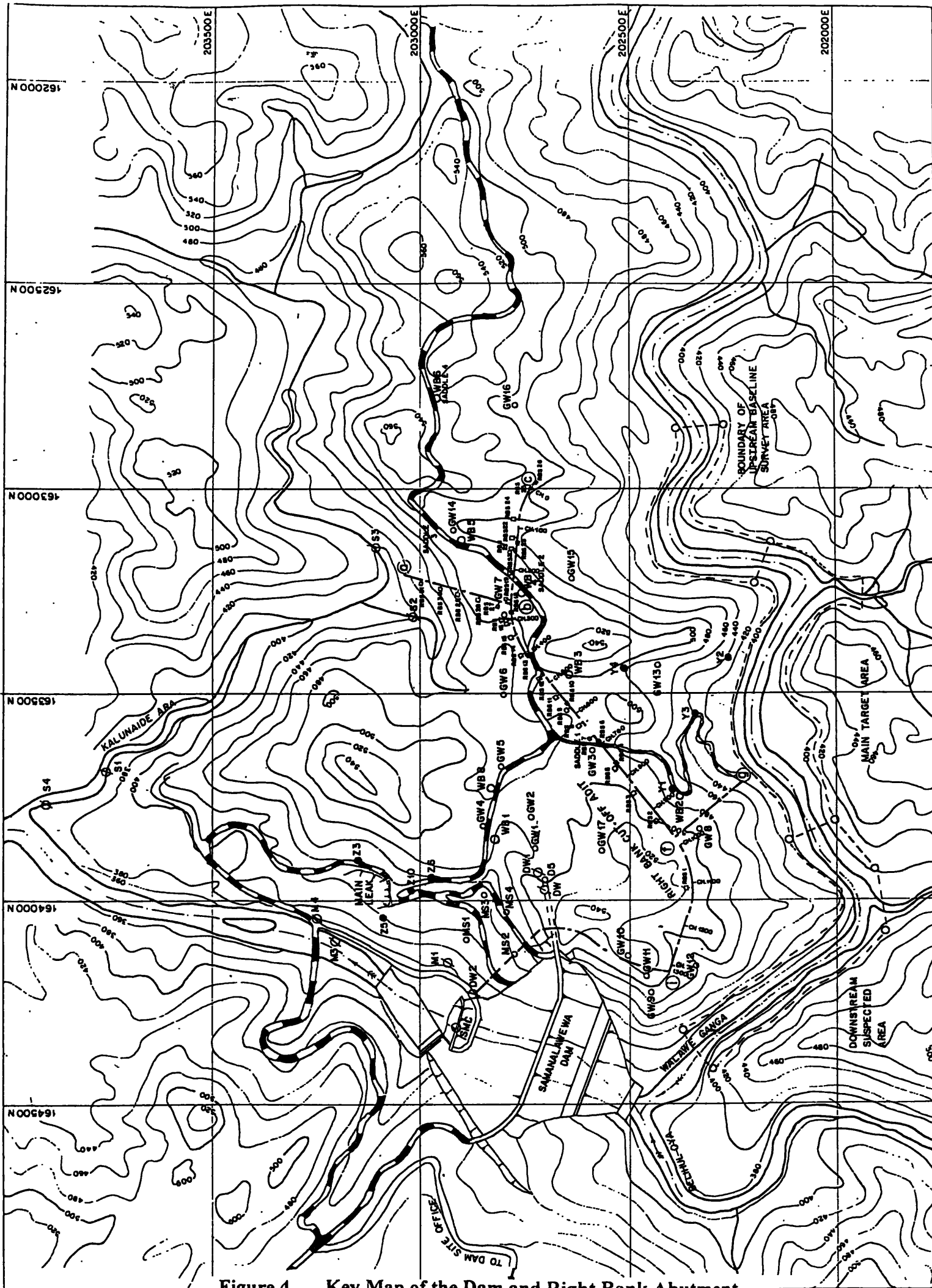


Figure 4 Key Map of the Dam and Right Bank Abutment

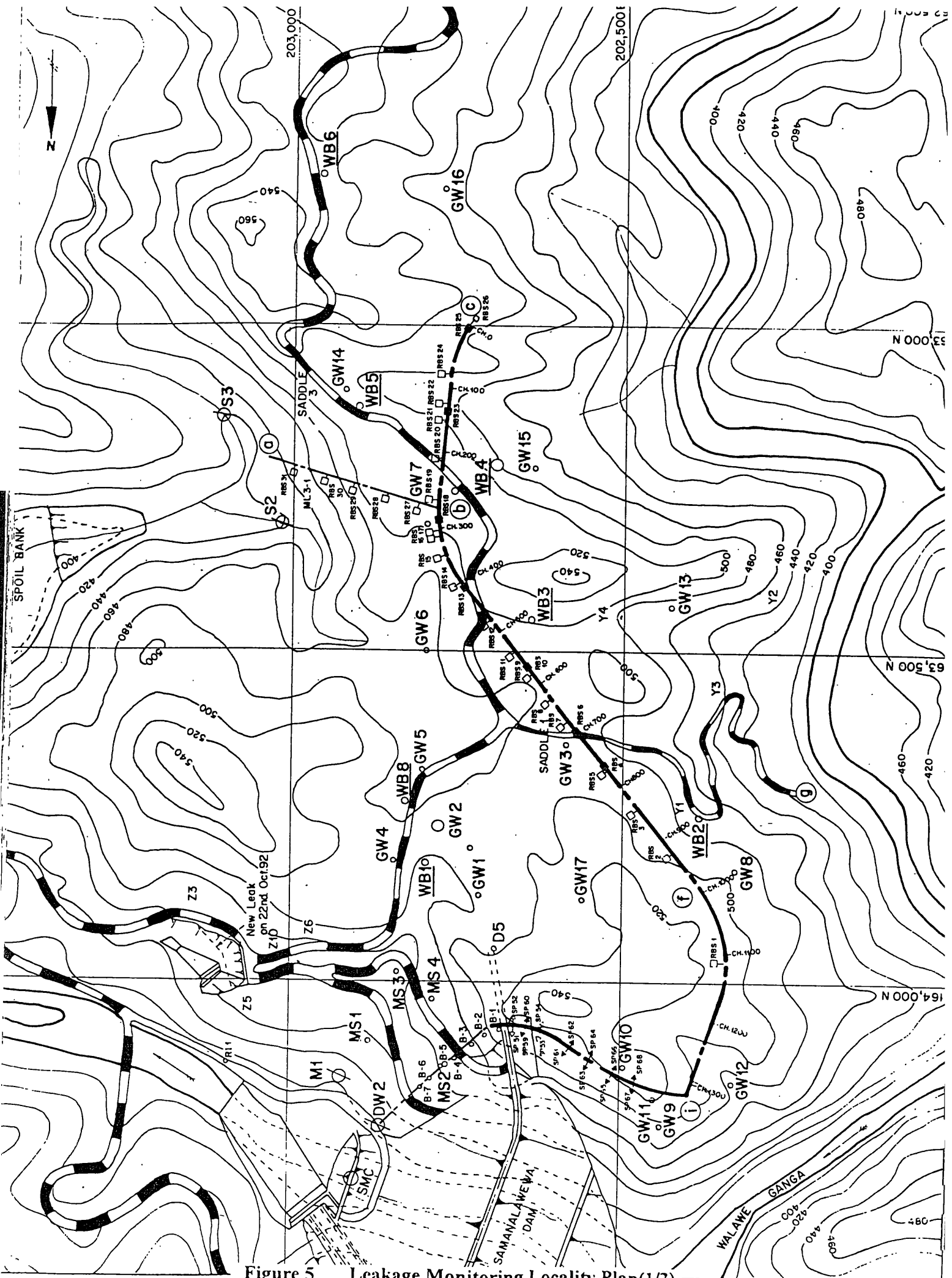
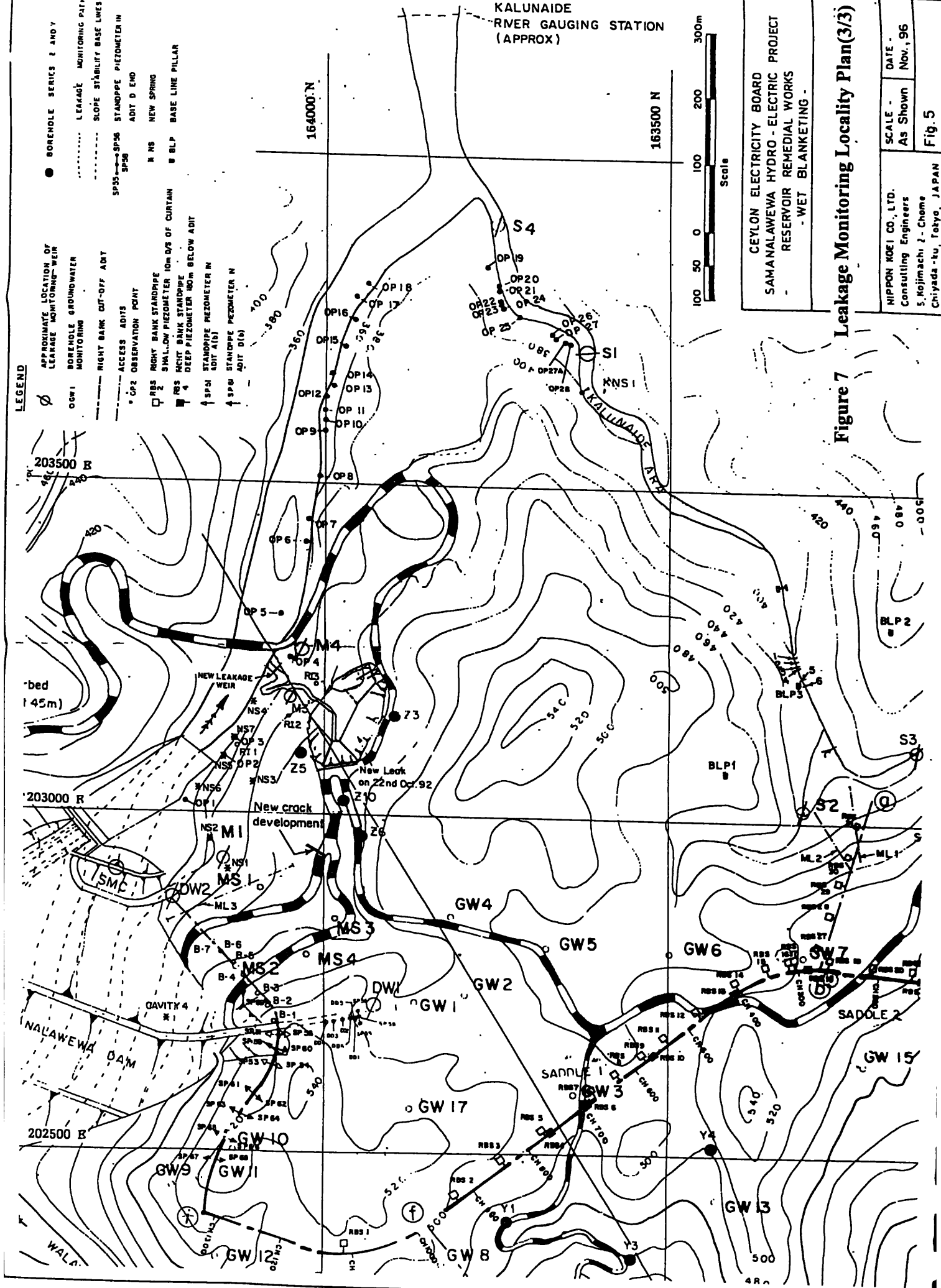


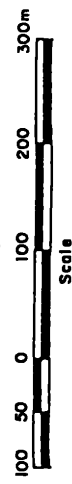
Figure 5 Leakage Monitoring Locality Plan(1/3)



LEGEND

- APPROXIMATE LOCATION OF LEAKAGE MONITORING WEIR
- BOREHOLE MONITORING
- RIGHT BANK CUT-OFF ADIT
- ACCESS ADITS
- OBSERVATION POINT
- RIGHT BANK STANDPIPE
- SHALLOW PIEZOMETER (0m DVS OF CURTAIN)
- RIGHT BANK STANDPIPE
- DEEP PIEZOMETER (80m BELOW ADIT)
- STANDPIPE PIEZOMETER IN ADIT (A1)
- STANDPIPE PIEZOMETER IN ADIT (D1)
- BOREHOLE MONITORING PAIR
- SLOPE STABILITY BASE LINES
- SP36 STANDPIPE PIEZOMETER IN ADIT D END
- NS NEW SPRING
- BLP BASE LINE PILLAR

KALUNAIDE RIVER GAUGING STATION (APPROX)



CEYLON ELECTRICITY BOARD
SAMANALAWewa HYDRO - ELECTRIC PROJECT
RESERVOIR REMEDIAL WORKS
- WET BLANKETING -

Figure 7 Leakage Monitoring Locality Plan(3/3)

SCALE - As Shown	DATE - Nov, 96
NIPPON KOEI CO., LTD. Consulting Engineers 5, Kojimachi 2-Chome Chiyoda-ku, Tokyo, JAPAN	

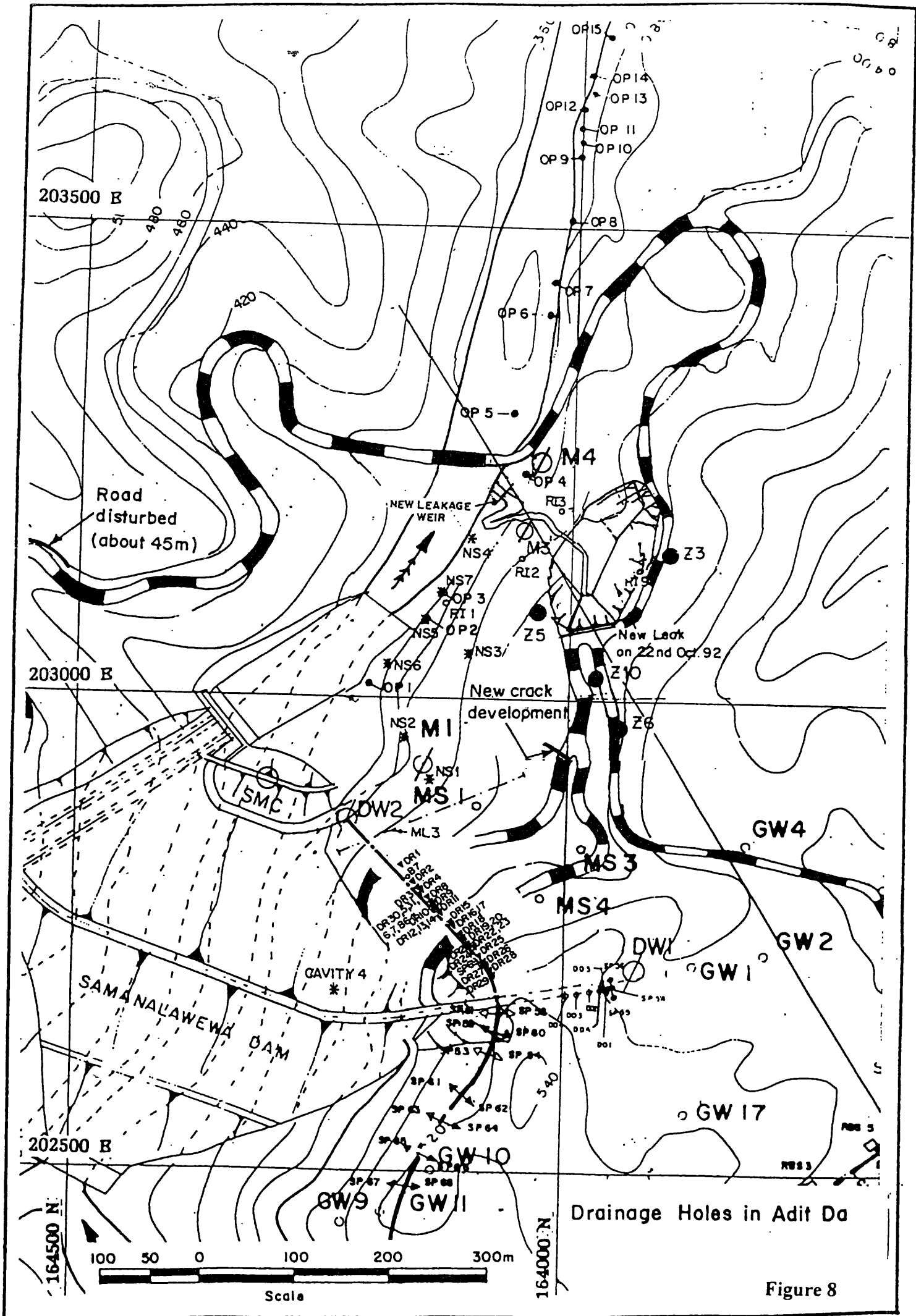


Figure 8

Figure 10 SAMANALA WEWA HEP
STAGE-DISCHARGE (LEAKAGE MONITORING WEIR)

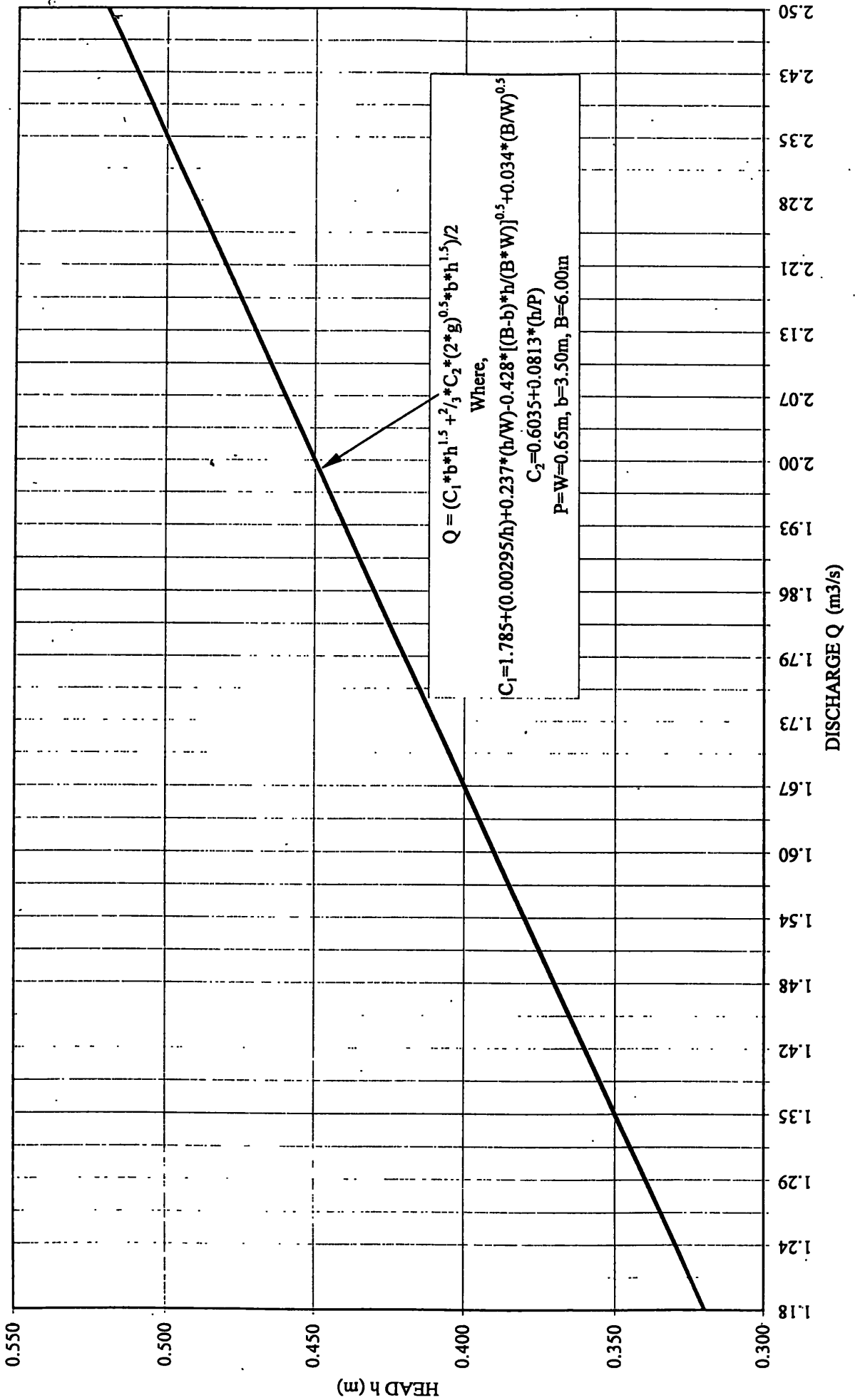


Figure 11 KALUNAIDE GAUGING STATION: STAGE - DISCHARGE CURVE

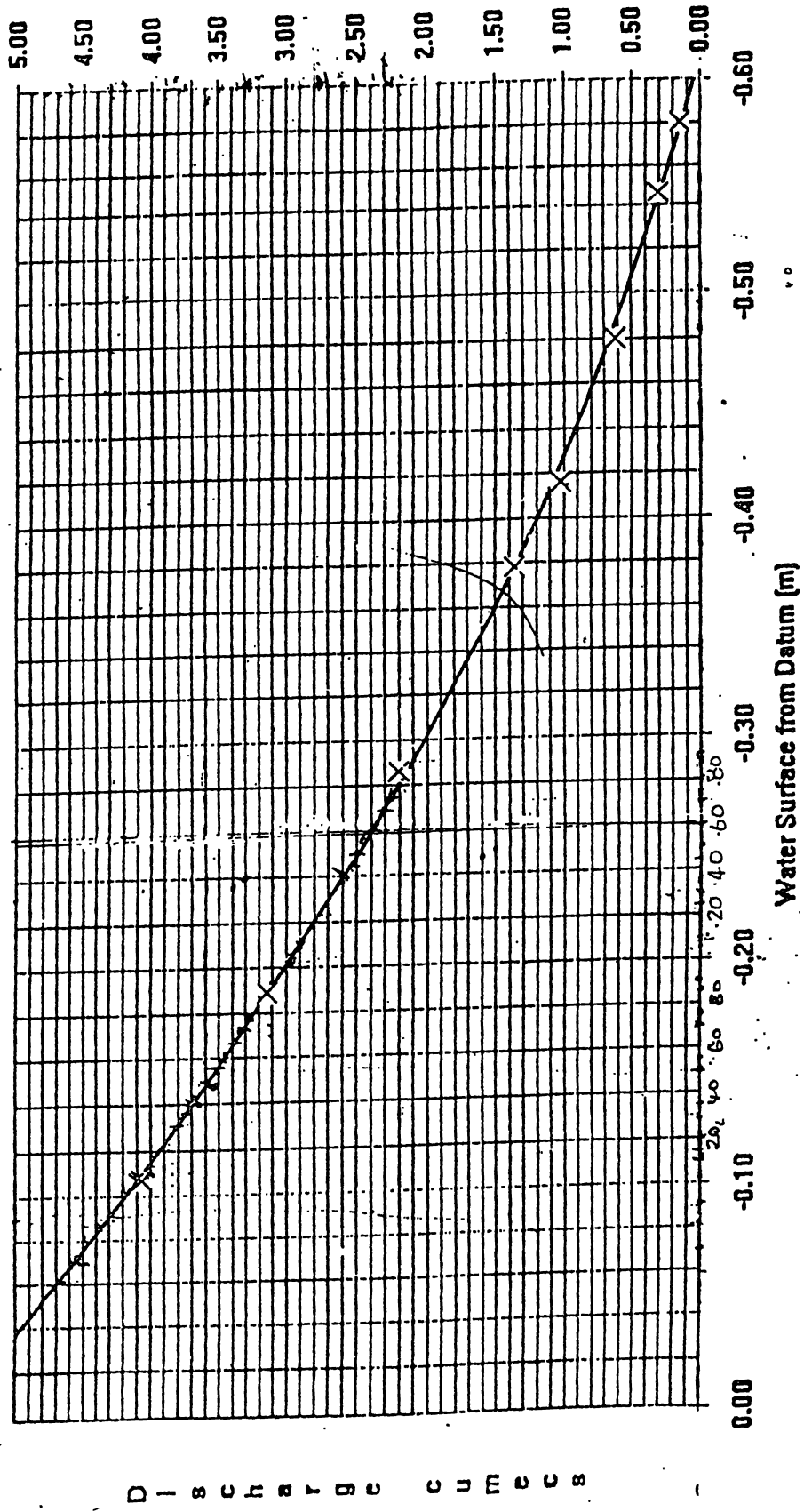
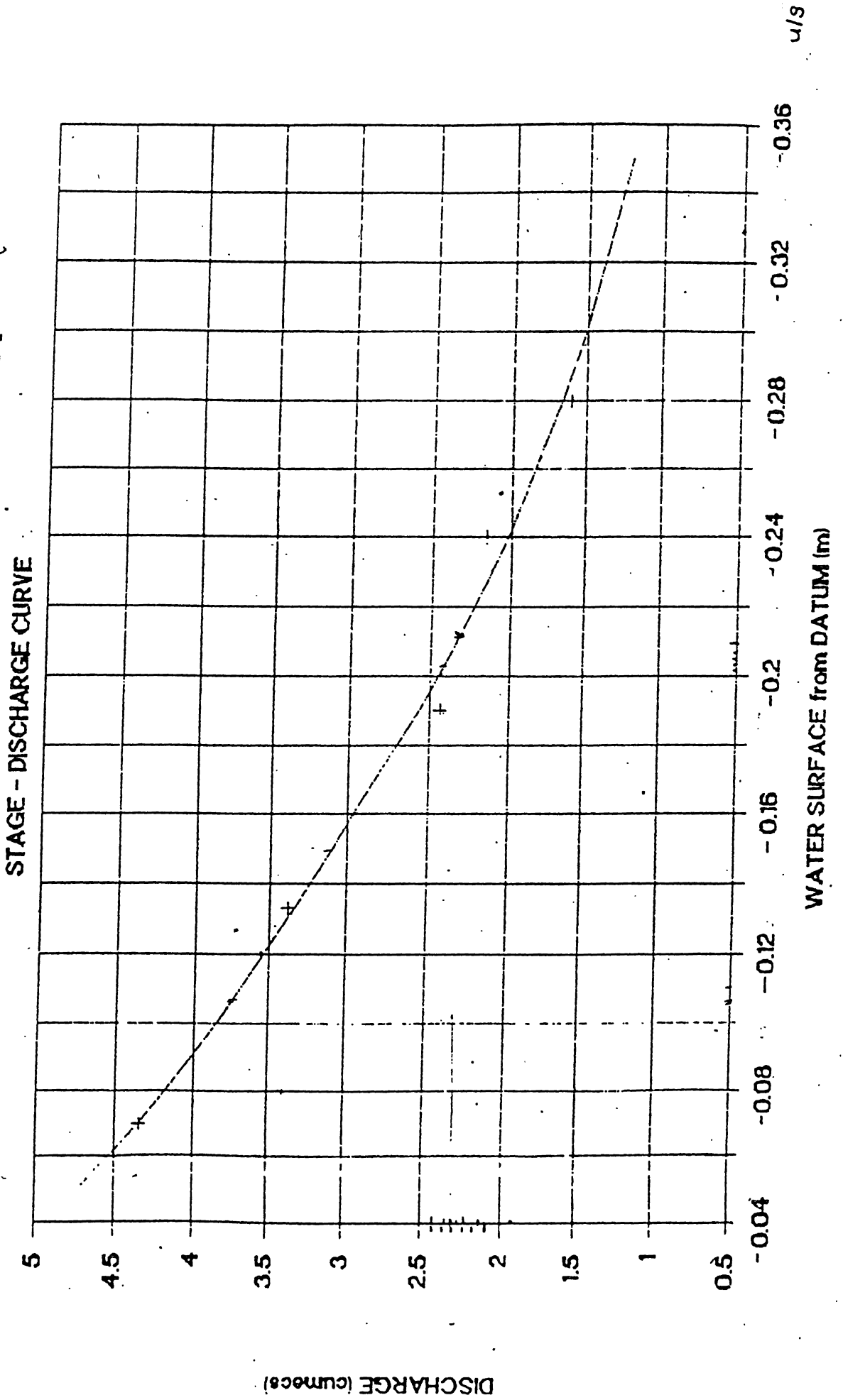


Figure 12 **KALTOTA GAUGING STATION No.01** (u/s)



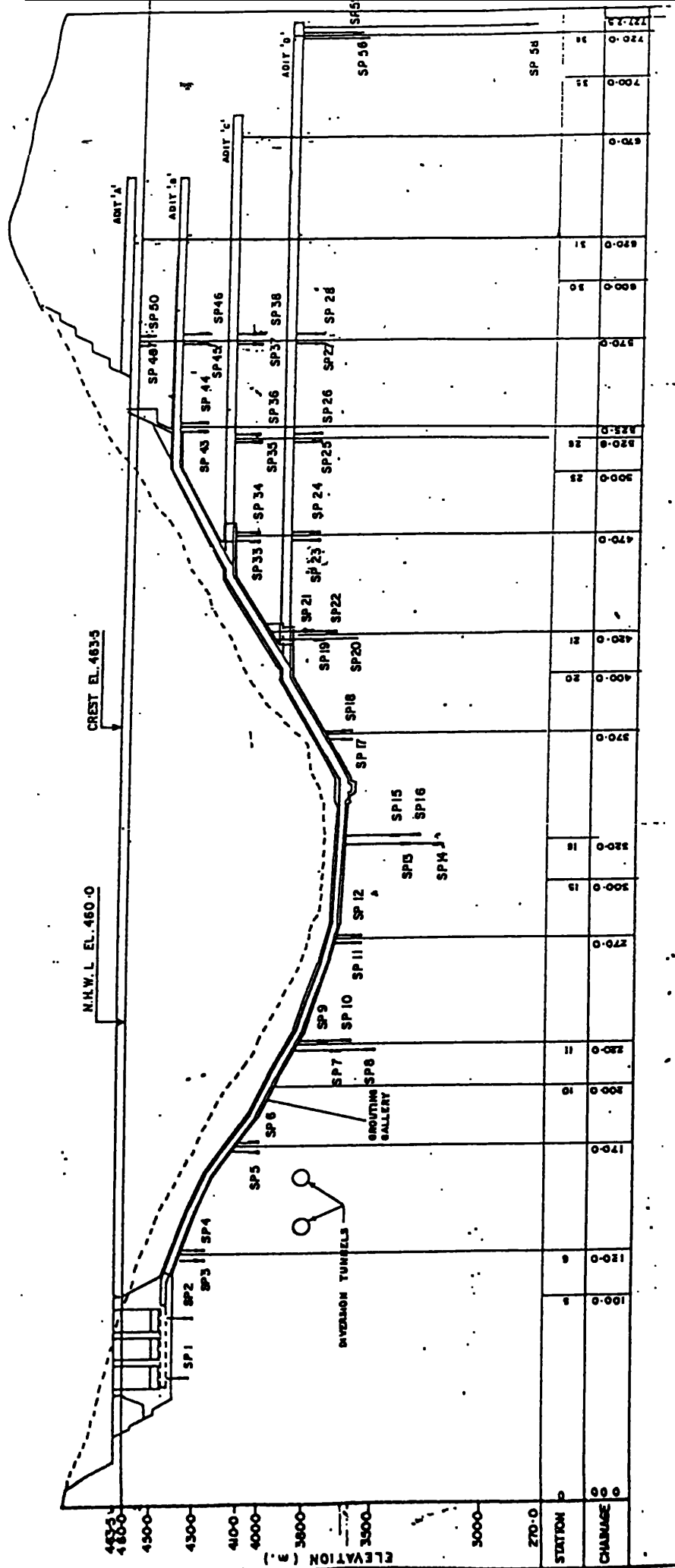


Figure 14 LOCATION OF STANDPIPE PIEZOMETERS

SCALE: NOT TO SCALE

FOR GENERAL ARRANGEMENT OF
PIEZOMETERS IN ADIT A, B AND
ADIT D SEE FIG A-1 AND
A-2 IN PART C

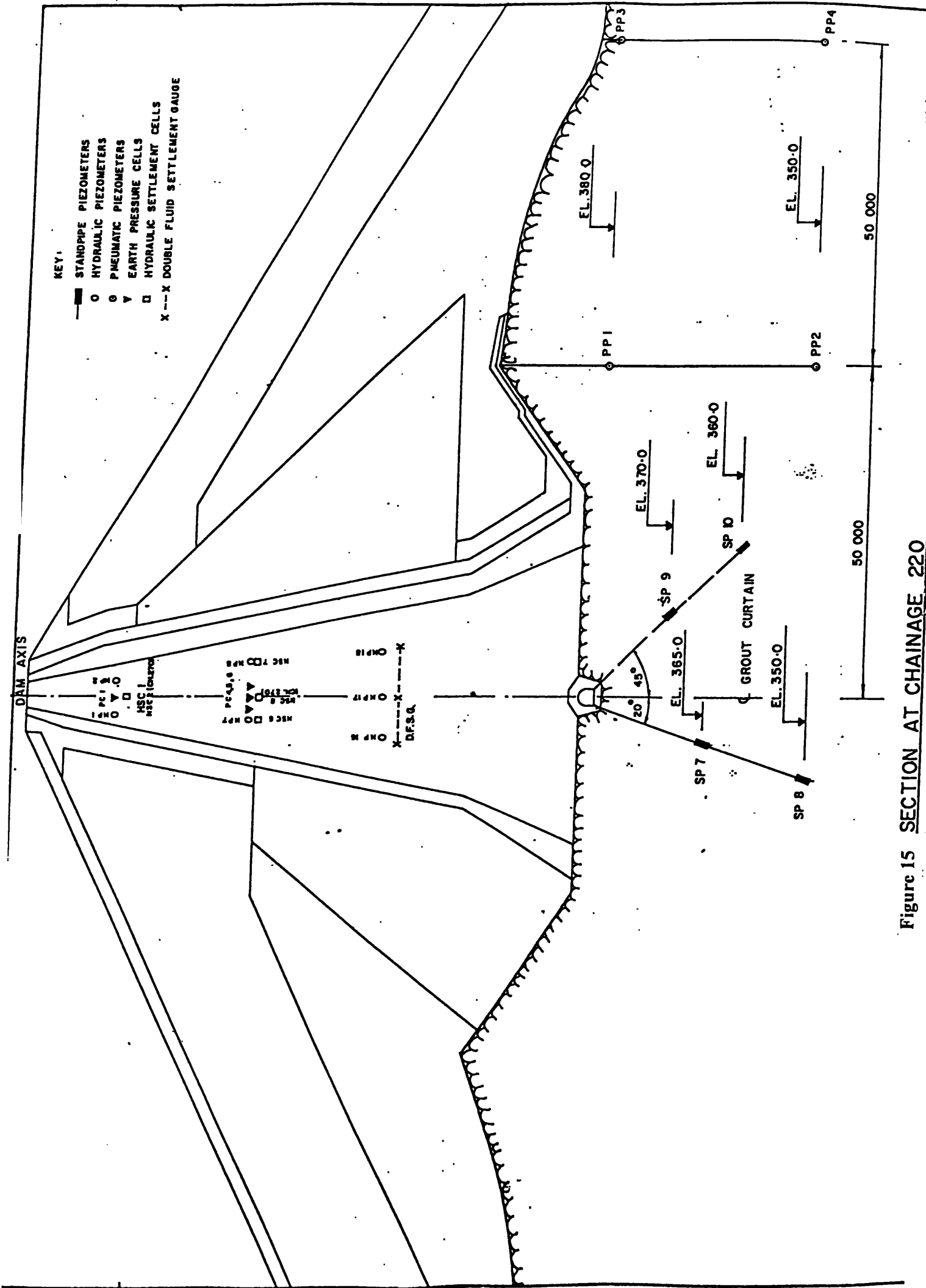
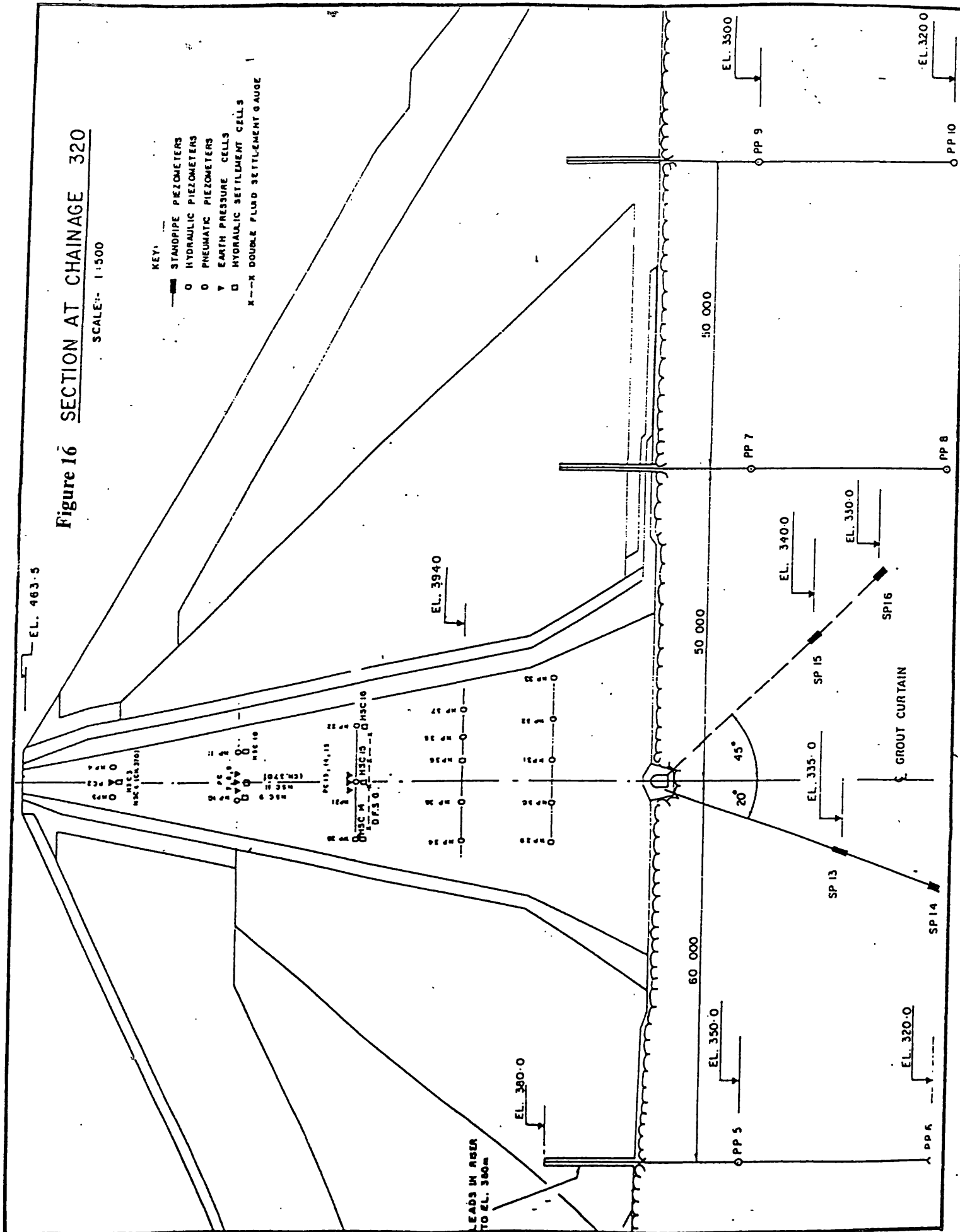


Figure 15 SECTION AT CHAINAGE 220

Figure 16 SECTION AT CHAINAGE 320

SCALE: 1:500

- KEY:
- STANDPIPE PIEZOMETERS
 - HYDRAULIC PIEZOMETERS
 - PNEUMATIC PIEZOMETERS
 - ▽ EARTH PRESSURE CELLS
 - HYDRAULIC SETTLEMENT CELLS
 - X--X DOUBLE FLUID SETTLEMENT GAUGE



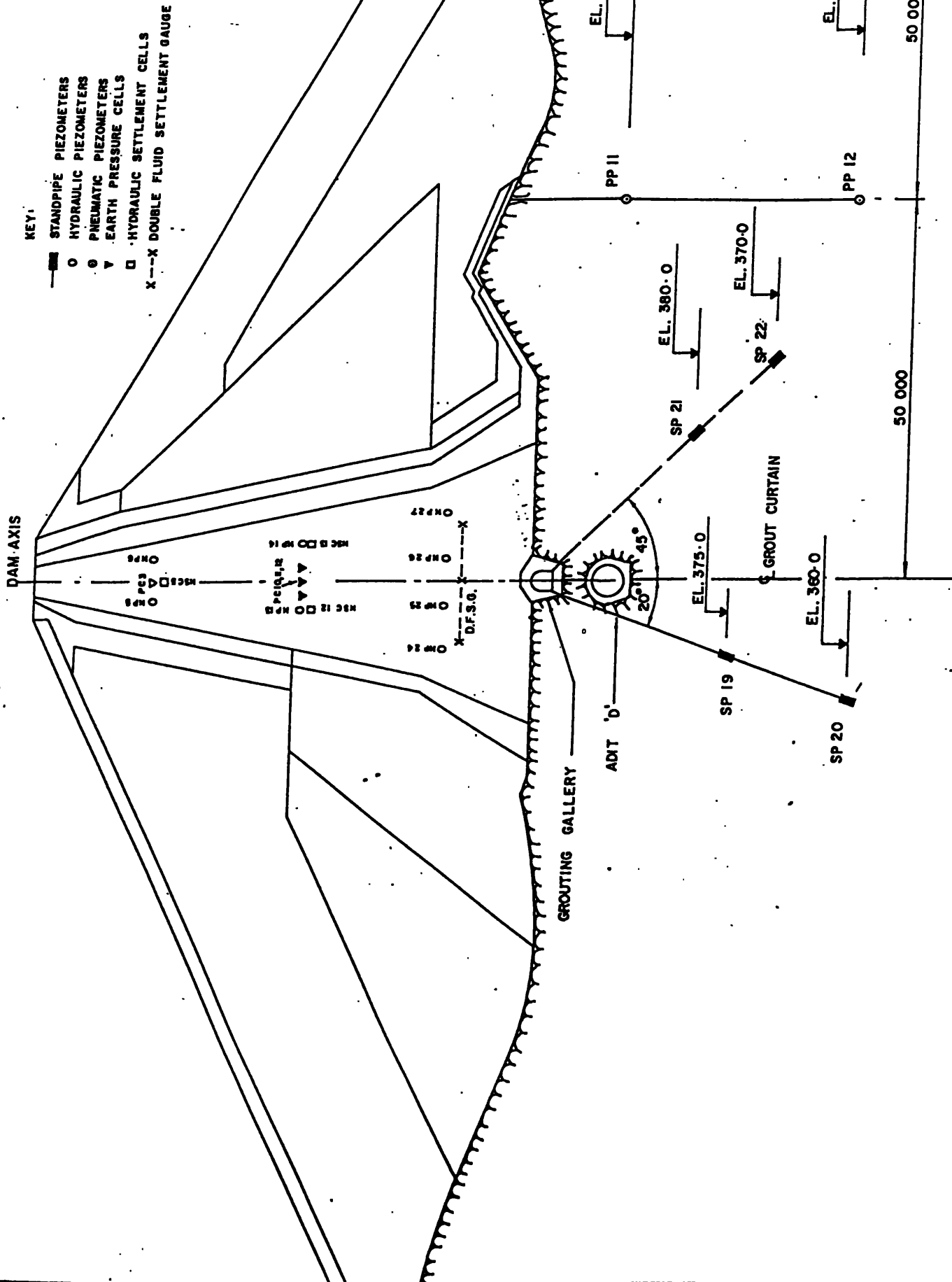


Figure 17 SECTION AT CHAINAGE 420

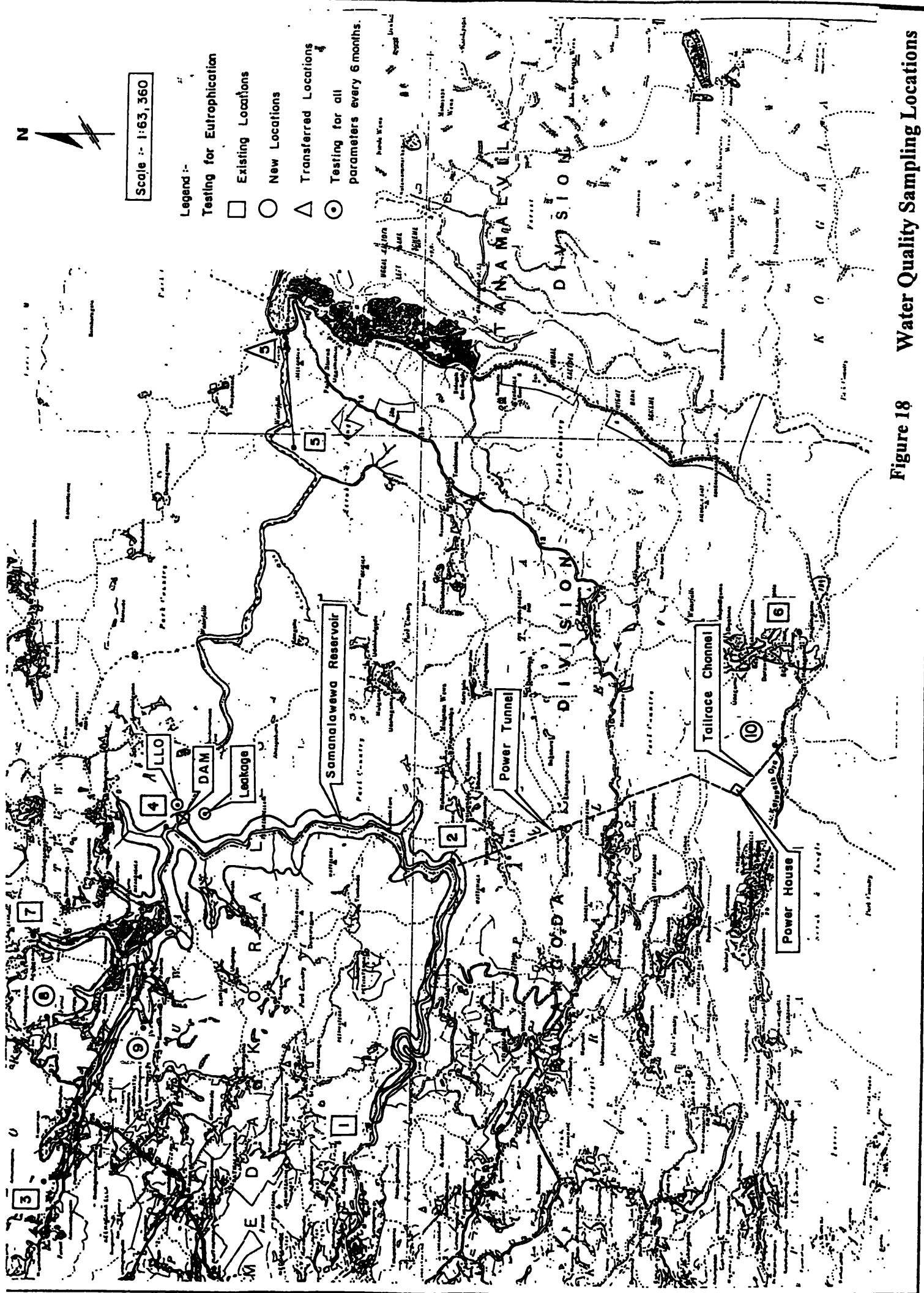
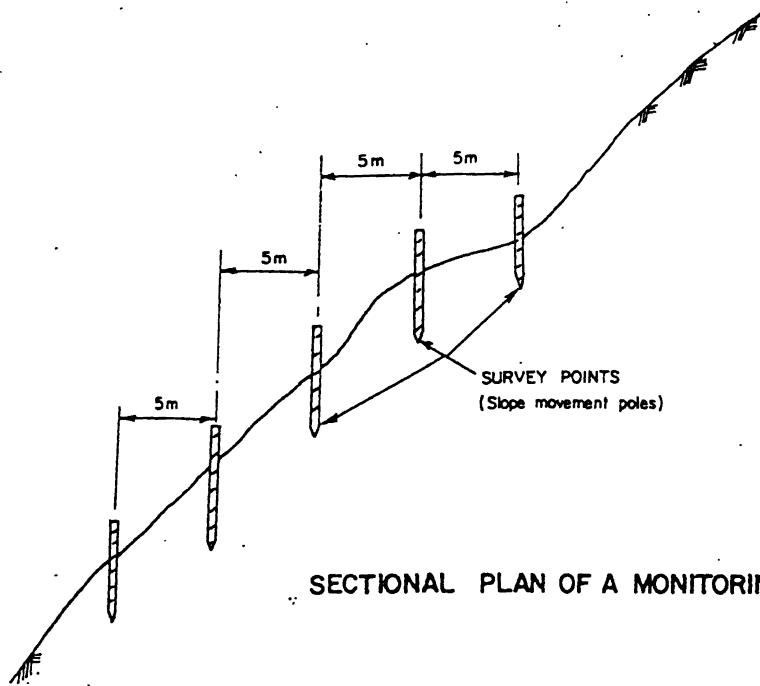
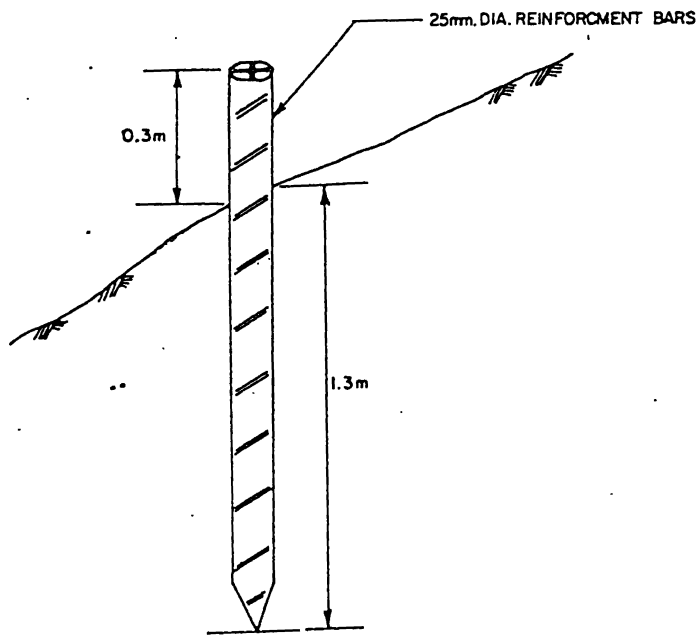


Figure 18 Water Quality Sampling Locations



SECTIONAL PLAN OF A MONITORING LINE



DETAIL OF A SURVEY POINT

(NOT TO SCALE)

Survey Points for Slope Stability Monitoring

Figure 19

APPENDIX-A

WEEKLY MONITORING REPORT

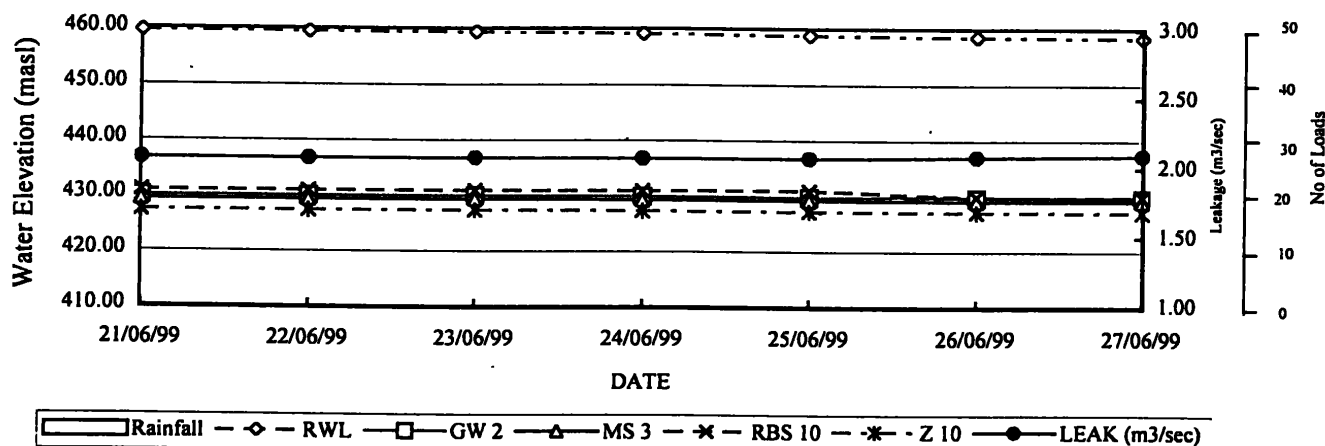
FAX MESSAGE

Attention: **Mr. S. Ganesharajah**
 Company: **Project Director,**
 From: **Samanalawewa Dam Site Office**

Date : 29/06/98

SAMANALAWEWA HYDRO ELECTRIC PROJECT WEEKLY MONITORING REPORT

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Date	21/06/99	22/06/99	23/06/99	24/06/99	25/06/99	26/06/99	27/06/99
RWL (08:00)	459.68	459.60	459.48	459.24	458.97	458.73	458.54
GW 2	429.94	429.94	429.93	429.89	429.80	429.73	429.65
MS 3	429.33	429.32	429.33	429.28	429.18	429.10	429.06
RBS 10	430.86	430.86	430.86	430.86	430.86	429.86	429.86
Z 10	427.33	427.32	427.31	427.26	427.17	427.10	427.03
LEAKAGE (m3/sec)	2.07	2.07	2.07	2.07	2.07	2.08	2.09
WB 2 (08:00)	430.94	430.94	430.93	430.90	430.80	430.72	430.65
WB 8 (08:00)	429.43	429.49	429.48	429.44	429.35	429.27	429.19
PS DISCHARGE (cms)	17.45	18.98	34.84	32.61	32.46	26.62	12.47
IRR/LLO (m3/sec)	1.47	1.47	1.47	1.47	1.46	1.46	1.46
RAINFALL (mm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00




As observed in the first filling of the reservoir upto FSL in Nov./Dec. '97 both GWL and Leakage indicate same tendencies. That is, the GWL during rising the of the reservoir upto FSL is lower than GWL during drawn down from FSL. On the other hand the leakage during the rising of the reservoir upto FSL is higher than that during drawn down from FSL, at same RWLs.

Due to complete saturated conditions within the area of extent of the aquifer after reaching FSL, the response of GWL might be delayed compared to the dropping rate of RWL.

Anyway at FSL the experienced maximum GWL & Leakage were 429.94 and 2.08 m3/s which are lesser than the GWL and Leakage of 430.90 and 2.20 m3/s at FSL forecasted by the consultants before 5th International Panel Meeting.

This is the last weekly monitoring fax which will be sent by NK. Good Bye !


Kazuo TSUZUKI
 Resident Engineer
 Nippon Koei Co. Ltd.

CC:

- | | |
|---|------------------------|
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APPENDIX-B
MONTHLY MONITORING DATA

**SAMANALAWEWA HEP - RESERVOIR REMEDIAL WORKS
MONTHLY MONITORING DATA**

May-99

Date	Basin Rainfall	Inflow (m ³ /s)	RWL (m)	Outflow (m ³ /s)			GWL(GW2) (m)	RWL-GWL (m)	Operation hrs (two units)	MWh (two units)
				Leak	Spillway	P. House				
01-May-99	0.00	4.92	455.35	2.10	0.00	5.76	427.82	27.53	7.58	409
02-May-99	0.00	7.02	455.32	2.10	0.00	4.92	427.85	27.47	6.48	321
03-May-99	0.00	5.71	455.32	2.10	0.00	5.57	427.88	27.44	7.77	414
04-May-99	0.00	5.39	455.30	2.10	0.75	14.06	427.89	27.41	22.03	971
05-May-99	0.00	6.76	455.19	2.10	1.07	13.58	427.84	27.35	19.92	891
06-May-99	0.00	8.25	455.09	2.10	1.07	12.86	427.86	27.23	18.63	960
07-May-99	0.00	8.03	455.01	2.10	1.07	10.69	427.85	27.16	16.63	734
08-May-99	0.00	6.84	454.95	2.10	1.07	4.63	427.84	27.11	6.27	326
09-May-99	0.00	2.74	454.94	2.10	1.06	6.35	427.81	27.13	10.93	451
10-May-99	0.00	6.17	454.87	2.10	1.06	11.71	427.80	27.07	17.40	821
11-May-99	0.00	6.03	454.78	2.10	1.06	4.79	427.77	27.01	6.55	333
12-May-99	0.00	4.71	454.76	2.10	1.06	4.44	427.78	26.98	6.23	312
13-May-99	0.00	3.85	454.73	2.10	1.06	4.55	427.77	26.96	6.30	319
14-May-99	3.00	7.12	454.69	2.10	1.39	4.92	427.78	26.91	6.90	346
15-May-99	0.00	7.39	454.68	2.10	1.43	4.84	427.77	26.91	7.48	338
16-May-99	0.00	6.48	454.67	2.10	1.43	5.83	427.75	26.92	8.55	401
17-May-99	0.00	4.20	454.73	2.10	1.43	9.32	427.78	26.95	15.67	638
18-May-99	0.00	5.45	454.55	2.10	1.43	0.00	427.77	26.78	0.00	0
19-May-99	7.00	25.45	454.57	2.09	1.43	10.40	427.78	26.79	14.27	738
20-May-99	0.00	11.62	454.69	2.11	1.43	10.00	427.80	26.89	14.38	697
21-May-99	3.50	9.47	454.67	2.11	1.43	5.93	427.84	26.83	8.93	420
22-May-99	0.50	14.12	454.67	2.11	1.43	6.73	427.85	26.82	9.25	473
23-May-99	0.00	21.52	454.71	2.11	1.43	4.46	427.89	26.82	6.35	312
24-May-99	1.50	15.74	454.85	2.11	1.43	6.39	427.93	26.92	8.18	455
25-May-99	6.00	17.97	454.91	2.11	1.43	5.70	427.98	26.93	7.65	402
26-May-99	0.00	18.72	455.00	2.11	1.43	5.45	428.03	26.97	8.05	379
27-May-99	3.00	25.03	455.10	2.11	1.43	5.86	428.09	27.01	8.32	411
28-May-99	20.00	37.58	455.26	2.11	1.44	4.53	428.11	27.15	6.72	315
29-May-99	18.00	72.60	455.56	2.11	1.44	6.19	428.04	27.52	8.20	440
30-May-99	3.00	72.57	456.19	2.12	1.45	4.95	428.18	28.01	6.78	350
31-May-99	0.00	34.22	456.82	2.11	1.45	9.04	428.40	28.42	11.60	648
Average	2.11	15.60	455.03	2.10	1.09	6.92	427.89	27.14	10.00	485
Maximum	20.00	72.60	456.82	2.12	1.45	14.06	428.40	28.42	22.03	971
Minimum	0.00	2.74	454.55	2.09	0.00	0.00	427.75	26.78	0.00	0
Total	65.50	mm							310.00	15025

Annual Energy (Planned)

403.000 GWh

Runoff Coefficient 1.87

This Month Production

15.025 GWh

Accumulated in this year

99.857 GWh

24.8 % of Design

**SAMANALAWEWA HEP - RESERVOIR REMEDIAL WORKS
MONTHLY MONITORING DATA**

May-99

Date	RWL (m)	GW 2 (m)	MS 3 (m)	RBS 10 (m)	Z 10 (m)	WB 2 (m)	WB 8 (m)
01-May-99	455.35	427.82	427.27	428.86	425.42	428.90	427.44
02-May-99	455.32	427.85	427.29	428.86	425.44	428.91	427.45
03-May-99	455.32	427.88	427.27	428.86	425.46	428.90	427.46
04-May-99	455.30	427.89	427.32	428.86	425.46	428.91	427.47
05-May-99	455.19	427.84	427.31	428.86	425.43	428.91	427.45
06-May-99	455.09	427.86	427.30	428.86	425.46	428.90	427.46
07-May-99	455.01	427.85	427.30	428.86	425.44	428.90	427.45
08-May-99	454.95	427.84	427.32	428.86	425.41	428.85	427.41
09-May-99	454.94	427.81	427.24	428.86	425.40	428.85	427.40
10-May-99	454.87	427.80	427.28	428.86	425.40	428.83	427.39
11-May-99	454.78	427.77	427.22	428.86	425.36	428.81	427.36
12-May-99	454.76	427.78	427.20	428.86	425.35	428.80	427.36
13-May-99	454.73	427.77	427.17	428.86	425.35	428.79	427.35
14-May-99	454.69	427.78	427.25	428.86	425.36	428.79	427.35
15-May-99	454.68	427.77	427.21	428.86	425.35	428.78	
16-May-99	454.67	427.75	427.21	428.86	425.35	428.80	427.35
17-May-99	454.73	427.78	427.25	428.86	425.37	428.80	427.37
18-May-99	454.55	427.77	427.21	428.86	425.35	428.80	427.36
19-May-99	454.57	427.78	427.20	428.86	425.37	428.81	427.36
20-May-99	454.69	427.80	427.22	428.86	425.37	428.81	427.37
21-May-99	454.67	427.84	427.28	428.86	425.43	428.84	427.40
22-May-99	454.67	427.85	427.27	428.86	425.43	428.84	427.43
23-May-99	454.71	427.89	427.32	428.86	425.44	428.90	427.45
24-May-99	454.85	427.93	427.37	428.86	425.51	428.95	427.51
25-May-99	454.91	427.98	427.39	428.86	425.56	429.00	427.56
26-May-99	455.00	428.03	427.46	428.86	425.59	429.05	427.61
27-May-99	455.10	428.09	427.53	428.86	425.65	429.13	427.69
28-May-99	455.26	428.11	427.56	428.86	425.66	429.17	427.74
29-May-99	455.56	428.04	427.48	428.86	425.59	429.06	427.64
30-May-99	456.19	428.18	427.65	428.86	425.72	429.19	427.77
31-May-99	456.82	428.40	427.86	429.86	425.92	429.40	427.98
Average	455.03	427.89	427.33	428.89	425.46	428.92	427.48
Maximum	456.82	428.40	427.86	429.86	425.92	429.40	427.98
Minimum	454.55	427.75	427.17	428.86	425.35	428.78	427.35

SAMANALAWEWA HEP
Leakage Measurements monitored at Major Points including Drain Holes May '99

Date	Rainfall at dam mm	RWL _r masl	GW2 masl	Main Leak m ³ /s	Drain holes at portal of Main Leak l/s	DW2 at portal of D(a) l/s	Drain holes in adit D(a) l/s	SMC at toe of dam l/s	M1 d/s of D(a) portal l/s	S1 w/s of Kalunaide l/s	KNS 1 mid of Kalunaide l/s	S4 d/s of Kalunaide l/s	Total leak* m ³ /s	GS at Walawe (kalunaide) m ³ /s	KKA Kille-kandura #l/s
01-May-99	0.0	455.35	427.82	2.10				3.0							
02-May-99	0.0	455.32	427.85	2.10				2.7							
03-May-99	0.0	455.32	427.88	2.10		15.2		2.7	6.8	53.3	7.2	53.3	2.18	2.4	
04-May-99	0.0	455.30	427.89	2.10				2.6							
05-May-99	0.0	455.19	427.84	2.10		15.2		2.5	6.7	53.3	6.9	55.0	2.18		
06-May-99	0.0	455.09	427.86	2.10		15.2		2.5	6.7	53.3	6.9	56.7	2.18		
07-May-99	0.0	455.01	427.85	2.10	15.3		15.0	2.5	6.7	46.9	6.9	60.1	2.18		79.28
08-May-99	0.0	454.95	427.84	2.10				2.4							
09-May-99	0.0	454.94	427.81	2.10				2.5							
10-May-99	0.0	454.87	427.80	2.10		15.3		2.4	6.7	46.9	6.7	55.0	2.18	3.2	
11-May-99	0.0	454.78	427.77	2.10				2.2							
12-May-99	0.0	454.76	427.78	2.10		14.9		2.1	6.7	46.9	6.9	53.3	2.18		
13-May-99	0.0	454.73	427.77	2.10		15.0		2.1	6.7	46.9	6.9	53.3	2.18		
14-May-99	3.0	454.69	427.78	2.10				2.0							
15-May-99	0.0	454.68	427.77	2.10		15.0		2.0	6.7	46.9	6.9	53.3	2.18		75.4
16-May-99	0.0	454.67	427.75	2.10				1.9							
17-May-99	0.0	454.73	427.78	2.10		15.3		1.9	6.5	46.3	6.9	55.0	2.18	3.2	
18-May-99	0.0	454.55	427.77	2.10				1.9							
19-May-99	7.0	454.57	427.78	2.09		15.2		1.9	6.5	41.2	6.9	51.6	2.17		
20-May-99	0.0	454.69	427.80	2.11		15.2		1.9	6.5	43.5	6.9	56.7	2.19		
21-May-99	3.5	454.67	427.84	2.11				1.9							
22-May-99	0.5	454.67	427.85	2.11		15.2		1.9	6.5	39.3	6.9	53.3	2.19		73.5
23-May-99	0.0	454.71	427.89	2.11				1.9							
24-May-99	1.5	454.85	427.93	2.11		15.7	15.7	1.8	6.8	39.3	6.9	48.1	2.18	3.4	
25-May-99	6.0	454.91	427.98	2.11	16.3			1.8							
26-May-99	0.0	455.00	428.03	2.11				1.8							
27-May-99	3.0	455.10	428.09	2.11		15.7		1.7	6.5	39.3	6.9	49.8	2.18		69.7
28-May-99	20.0	455.26	428.11	2.11				1.6							
29-May-99	18.0	455.56	428.04	2.11		16.3		1.9							
30-May-99	3.0	456.19	428.18	2.12				2.0							
31-May-99	0.0	456.82	428.40	2.11		16.5		1.7	6.8	46.9	7.7	60.1	2.20	3.5	

Note : * Total leak is the sum total of Main Leak, DW2, M1, S4 including SMC through the dam foundation.

**Annual Summary of Reservoir
Operation Data for Samanalawewa HEP (in 1998)**

Month Year	Monthly Basin Rainfall (mm)	Inflow			Reservoir Water Level			Out Flow			Monthly Power Generation			Monthly Running Hours				
		Ave. (m ³ /s)	Max. (m ³ /s)	Min. (m ³ /s)	Ave. (El. - m)	Max. (El. - m)	Min. (El. - m)	LLO & Irrigation Valve		Main Leak Ave. (m ³ /s)	Ave. (m ³ /s)	Unit 1 GWh	Unit 2 GWh	Total GWh	Unit 1 hrs.	Unit 2 hrs.	Total hrs.	
								Ave. (m ³ /s)	Max. (m ³ /s)									Min. (m ³ /s)
Jan '99	132.3	17.69	46.20	6.10	451.45	452.25	449.71	1.09	1.05	0.00	1.94	9.34	12.273	7.897	20.170	245.27	159.35	404.62
Feb '99	306.0	20.57	45.73	11.86	453.32	454.5	451.85	1.09	1.05	0.00	2.05	9.79	10.529	8.571	19.100	210.08	179.90	389.98
Mar '99	288.0	13.75	34.88	5.65	454.04	454.51	453.49	0.00	0.00	0.00	2.06	13.09	17.339	11.082	28.421	344.3	225.6	569.9
Apr '99	*222.5	14.49	42.56	4.23	454.83	455.45	454.03	1.09	0.00	0.00	2.09	8.17	9.024	8.117	17.141	181.5	166.0	347.4
May '99	**65.5	15.60	72.60	2.74	455.03	456.82	454.55	1.09	1.45	0.00	2.10	6.92	6.529	8.496	15.025	130.7	179.3	310.0
	726.3	16.42	72.60	2.74	453.734	456.82	449.71	0.87	1.45	0.00	2.05	9.46	55.694	44.163	99.857	1111.8	910.2	2021.9

* Only Damsite Rainfall

** Only Damsite Rainfall

ANNEX-E

*LIBRARY LIST OF NIPPON
KOEI DAM SITE OFFICE*

ANNEX-E

LIBRARY LIST OF NIPPON KOEI DAM SITE OFFICE

TABLE OF APPENDICES

Appendix A	List of Reports under Dam & Hydroplant Construction.....	02
Appendix B	List of Reports under Wet Blanketing Works.....	13

**APPEBDIX – A LIST OF REPORTS UNDER DAM& HYDROPLANT
CONSTRUCTION**

SAMANALAWEWA HEP
LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (1/19)

A. F/S and Design Reports before the Commencement of Construction

No.	Title	Nos.	Location
A-1	Samanalawewa Power Project, Technical Report Vol I of II Main Report, CECB, April 1985	1	
A-2	Samanalawewa Project, Detail Technical Report Vol I of Climate, Hydrology & Water Management, CECB, January 1978	1	
A-3	Samanalawewa Project, Review Report, CECB, August 1975	1	
A-4	Samanalawewa Hydro-Electric Scheme, Review Report Vol I, Electrowatt Zurich, November 1984	1	
A-5	Samanalawewa Hydro-Electric Project, Engineering Review and Recommendations Technical Report, Balfour Beatty UK April 1984	1	
A-6	Samanalawewa Hydro-Electric Project, Engineering Review and Recommendations Technical Report, April 1984, Balfour Beatty	1	
A-7	Samanalawewa Hydro-Electric Project, Additional Studies Annex. I: Geological Report September 1985 Electrowatt Zurich	1	
A-8	Samanalawewa Hydro-Electric Scheme, Review Report Vol. 2 Annex: Supplementary Data Submitted by Balfour Beatty November 1984 Electrowatt Zurich	1	
A-9	Samanalawewa Hydro-Electric Scheme, Review Report Vol 1 (Chapter 9: Determination of the Optimal Concept of the Samanalawewa Scheme) January 1985 Electrowatt Zurich	1	
A-10	Samanalawewa Hydro-Electric Scheme, Additional Studies Main Report: Optimisation Studies August 1985 Electrowatt Zurich	1	
A-11	Samanalawewa Hydro-Electric Scheme, Additional Studies, August 1985 Electrowatt Zurich	1	
A-12	Samanalawewa Project Detailed Project Report, Brief Report TPE, USSR 1978	1	
A-13	Samanalawewa Project Detailed Project Report, Drawings Geology, 1978 TPE, USSR	1	

SAMANALAWEWA HEP
LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (2/19)

B. Contract Documents for Construction

No.	Title	Nos.	Location
B-1-1	Samanalawewa Hydro-Electric Project, Information to Tenderers for Lot-I: Civil Works (Diversion Tunnels and Relevant Works) and Lot II: Civil Works (Dam and Appurtenant Structures) August 1986 by Nippon Koei, Tokyo	2	
B-1-2	Samanalawewa Hydro-Electric Project, Tender Evaluation Procedures & Criteria for Lot-I: Civil Works (Diversion Tunnels and Relevant Works) October 1986, by CEB	2	
B-1-3	Samanalawewa Hydro-Electric Project, Tender Documents for Lot I: Civil Works (Diversion Tunnels and Relevant Works) Vol. I, August 1986 by Nippon Koei, Tokyo	2	
B-1-4	Samanalawewa Hydro-Electric Project, Tender Documents for Lot I: Civil Works (Diversion Tunnels and Relevant Works) Vol. II General Specifications Technical Specifications, August 1986 by Nippon Koei, Tokyo	2	
B-1-5	Samanalawewa Hydro-Electric Project, Tender Documents for Lot I: Civil Works (Diversion Tunnels and Relevant Works) Vol. III Drawings, August 1986 by Nippon Koei, Tokyo	1	
B-1-6	Samanalawewa Hydro-Electric Project, Tender Documents for Lot I: Civil Works (Diversion Tunnels and Relevant Works) December 1986 by Nippon Koei, Tokyo	1	
B-1-7	Samanalawewa Hydro-Electric Project, Lot I: Civil Works (Diversion Tunnels and Relevant Works) Construction Cost Estimate November 1986 by Nippon Koei, Tokyo	1	
B-1-8	Samanalawewa Hydro-Electric Project, Tender Documents for Lot I: Civil Works (Diversion Tunnels and Relevant Works), November 1986 by Hazama-Kumagai-Joint Venture	1	
B-1-9	Samanalawewa Hydro-Electric Project, Contract for Lot-I: Civil Works (Diversion Tunnels and Relevant Works), between CEB & Hazama-Kumagai-Joint Venture	1	

SAMANALAWEWA HEP
LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (4/19)

B. Contract Documents for Construction(Continued)			
No.	Title	Nos.	Location
B-2-12	Samanalawewa Hydro-Electric Project, Tender Documents for Lot II Civil Works (Dam and Appurtenant Structures), Attachment I to Vol.I. June 1987 by KHK-JV	1	
B-2-13	Samanalawewa Hydro-Electric Project, Tender Documents for Lot II Civil Works (Dam and Appurtenant Structures), Vol. I Document 2/8, June 1987 by KHK-JVS	1	
B-2-14	Samanalawewa Hydro-Electric Project, Tender Documents for Lot II Civil Works (Dam and Appurtenant Structures), Attachment II to Vol.I. June 1987 by KHK-JV	1	
B-2-15	Samanalawewa Hydro-Electric Project, Tender Documents for Lot II Civil Works (Dam and Appurtenant Structures), Covering Letter. Separate Information. June 1987 at KHK-JVS	1	
B-3-1	Samanalawewa Hydro-Electric Project, UK Civil Works Vol.1 November 1986 by Balfour Beatty	1	
B-3-2	Samanalawewa Hydro-Electric Project, UK Civil Works Vol.2 November 1986 by Balfour Beatty	1	
B-3-3	Samanalawewa Hydro-Electric Project, UK Civil Works Vol.3 - Project Drawings November 1986 by Balfour Beatty	1	
B-4-1	Samanalawewa Hydro-Electric Project, Tender Documents for Lot IV: Power Generating Mechanical Plant (Turbines, Supervisory Control System and Relevant Works) Vol. I, May 1987 by Nippon Koei & Electrowatt	1	
B-4-2	Samanalawewa Hydro-Electric Project, Tender Documents for Lot IV: Power Generating Mechanical Plant (Turbines, Supervisory Control System and Relevant Works) Vol. II, May 1987 by Nippon Koei & Electrowatt	1	
B-5-1	Samanalawewa Hydro-Electric Project, Tender Documents for Lot VI: Hydromechanical Equipment (Gates, Valves, Penstock and Relevant Works). May 1987 by Nippon Koei & Electrowatt	1	
B-5-2	Samanalawewa Hydro-Electric Project, Contract for Lot VI: Hydromechanical Equipment (Gates, Valves, Penstock and Relevant Works). Vol.(II) between CEB & SMK-M-JV	1	

SAMANALAWEWA HEP
LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (3/19)

B. Contract Documents for Construction(Continued)			
No.	Title	Nos.	Location
B-2-1	Samanalawewa Hydro-Electric Project, Information to Tenderers for Lot-I: Civil Works (Diversion Tunnels and Relevant Works) and Lot II: Civil Works (Dam and Appurtenant Structures) March 1987 by Nippon Koei & Electrowatt Ltd.	2	
B-2-2	Samanalawewa Hydro-Electric Project, Evaluation Criteria for Prequalification. Lot II Civil Works Works (Dam and Appurtenant Structures) October 1986 by CEB	1	
B-2-3	Samanalawewa Hydro-Electric Project, Prequalification Documents for Lot II Civil Works Works (Dam and Appurtenant Structures) October 1986 by CEB	1	
B-2-4	Samanalawewa Hydro-Electric Project, Report on Tender Evaluation for Lot II Civil Works (Dam and Appurtenant Structures), July 1987 by Nippon Koei, Tokyo	1	
B-2-5	Samanalawewa Hydro-Electric Project, Lot II Civil Works (Dam and Appurtenant Structures), Construction Cost Estimate. June, 1987 by JVS	1	
B-2-6	Samanalawewa Hydro-Electric Project, Lot II Civil Works (Dam and Appurtenant Structures), Construction Cost Estimate. Annex I&II May, 1987 by Nippon Koei	1	
B-2-7	Samanalawewa Hydro-Electric Project, Tender Documents for Lot II Civil Works (Dam and Appurtenant Structures), Vol. I, Vol II Addendum, Q/A, 1987 by Nippon Koei & Electrowatt	1	
B-2-8	Samanalawewa Hydro-Electric Project, Tender Documents for Lot II Civil Works (Dam and Appurtenant Structures), Vol. I, Vol III, Drawings March 1987 by Nippon Koei & Electrowatt	2	
B-2-9	Samanalawewa Hydro-Electric Project, Contract for Lot II Civil Works (Dam and Appurtenant Structures), Part 1/3 between CEB and KHK-JV	1	
B-2-10	Samanalawewa Hydro-Electric Project, Contract for Lot II Civil Works (Dam and Appurtenant Structures), Part 2/3 between CEB and KHK-JV	1	
B-2-11	Samanalawewa Hydro-Electric Project, Contract for Lot II Civil Works (Dam and Appurtenant Structures), Part 3/3 between CEB and KHK-JV	1	

SAMANALAWEWA HEP
LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (6/19)

D. Study Report Prepared by UK before Dam Construction

No.	Title	Nos.	Location
D-1	Samanalawewa Hydro Electric Project, Implementation Program, February 1986 by CEB	1	2
D-2	Consultancy Services, Samanalawewa Hydro Electric Project, Technical Proposal, Nippon Koei, Tokyo August 1986	1	
D-3	Consultancy Services, Samanalawewa Hydro Electric Project, Technical Proposal (Summary) Nippon Koei Tokyo August 1986	1	
D-4	Consultancy Services, Samanalawewa Hydro Electric Project, Financial Proposal, Nippon Koei Tokyo August 1986	1	
D-5	Samanalawewa Hydro Electric Project Design Data for Workd included in Lot II (Dam and Appurtenant Structures), November 1986, Nippon Koei Tokyo	1	
D-6	Samanalawewa Hydro Electric Project Design Data for Workd included in Lot II (Dam and Appurtenant Structures), November 1986, Nippon Koei Tokyo	2	
D-7	Samanalawewa Hydro Electric Project Design Review Report, October 1987 by Nippon Koei Tokyo	2	
D-8	Samanalawewa Hydro Electric Project, Report on Additional Geotechnical Investigation for Samanalawewa Dam, Part III Data Book July 1987 by Nippon Koei Tokyo	1	
D-9	Samanalawewa Hydro Electric Project, Report on Additional Geotechnical Investigation for Samanalawewa Dam, Part II Embankment Material & Concrete Aggregate, July 1987 by Nippon Koei Tokyo	2	

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LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (5/19)

C. Contract Document for Engineering Services

No.	Title	Nos.	Location
C-1	Samanalawewa Project, Agreement for Engineering Consultancy Services for Preparation of Detailed Project Report & Investigations, Design & Construction of Preliminary Work between CEB and CECB, August 1978	1	
C-2	Agreement for Engineering Consultancy Services for Dam & Reservoir Monitoring of the Samanalawewa Hydro Electric Project, between the CEB & CECB, July 1992	1	
C-3	Samanalawewa Hydropower Scheme, Electrical Mechanical Equipment Part I by CEB & GEC Turbine Ltd.	1	
C-4	Samanalawewa Hydropower Scheme, Electrical Mechanical Equipment Part II by CEB and GEC Turbine Ltd.	1	
C-5	Samanalawewa Hydro Electric Project, Agreement for Consultancy Services & Power Development Consultants Ltd, November 1986	1	
C-6	Samanalawewa Hydro Electric Project, JV Agreement for Consultancy Services by JVS & Electrowatt Engineering Services Ltd.	1	
C-7	Agreement for Consultancy Services for Samanalawewa Hydro-Electric Project, between JVS & CECB	1	
C-8	Contract for Consultancy Services for the Samanalawewa Hydro-Electric Project, between CEB & JVS, December	3	

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LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (7/19)

E. Manuals and Completion Reports made by Contractors

No.	Title	Nos.	Location
E-1	Samanalawewa Hydro Electric Project. Lot I: Diversion Tunnel October 1988 by Hazama-Kumagai JV (Contractor's Completion Report)	3	
E-2	Samanalawewa Hydro Electric Project, Lot II: Civil Works Operation & Maintenance Manual for Dam Instrumentation September 1991 by Hazama-Kumagai JV	1	
E-3	Samanalawewa Hydro Electric Project, Lot II: Civil Works Final Completion Report Instrumentation September 1991 by Hazama-Kumagai JV	1	
E-4	Samanalawewa Hydro Electric Project, Dam & Reservoir Monitoring Manual by Gibb & Partners	2	
E-5	Samanalawewa Hydro Electric Project, Dam and Associated Works Civil Engineering and Architectural Works Operating & Maintenance Manual Vol. 1 by Sir Alexander Gibb & partners	1	
E-6	Samanalawewa Hydro Electric Project, Lot II: Civil Works (Dam and Appurtenant Structures) As built drawings (Micro Film) Vol. 1 Chapter - X Permanent Electrical and Mechanical Equipment by KHK JV	1	
E-7	Samanalawewa Hydro Electric Project, Lot II: Civil Works (Dam and Appurtenant Structures) Operation & Maintenance Vol. 3 by KHK JV	1	
E-8	Samanalawewa Hydro Electric Project, Operation and Maintenance Manual Hydromechanical Equipment, Vol 5	2	
E-9	Samanalawewa Hydro Electric Project, Hydromechanical Equipment as Built Drawings (Calculation (1/3) SMK-M JV	1	
E-10	do - Calculation (2/3)	1	
E-11	do - Calculation (3/3)	1	
E-12	Samanalawewa Hydro Electric Project, Lot II Civil Works (Dam and Appurtenant Structures) As built drawings (Micro Film) Vol. 1 Chapter - X Permanent Electrical and Mechanical Equipment Right Bank Cut-off Adits by KHK JV	1	

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LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (8/19)

F. Environmental Report

No.	Title	Nos.	Location
F-1	Samanalawewa Hydro Electric Project, Environmental and Social Studies, A Report on a Technical Cooperation Assignment for the UK ODA, September 1990	1	
F-2	Samanalawewa Hydro Electric Project, Removal of Biomass in the Samanalawewa Reservoir, February 1991	1	
F-3	Frame Work of the Environmental Monitoring & Management Plan for Samanalawewa Hydro Electric Project, March 1991, JVS	1	
F-4	Samanalawewa Hydro Electric Project Post Environment Study May 1992	1	
F-5	Samanalawewa Hydro Electric Project, Post-Project Environment Study on Fauna & Flora (Final Report), May 1992, CEB	1	
F-6	Samanalawewa Hydro Electric Project, Environment Post Evaluation Study (Final Report), Submitted to CEB 1992	1	
F-7	Overseas Development Administration Management of Environmental and Socio-economics Aspect of the Samanalawewa Hydro Electric Project (Final Report), 1993	1	
F-8	Environmental Impact Assessment of Clay Extraction and Blanketing of Samanalawewa Reservoir for Leakage Mitigation (Final Report) submitted to CEB July 1994	1	

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LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (9/19)

G. Reports prepared by GIBB

No.	Title	Nos.	Location
G-1	Samanalawewa Hydro Electric Project, Reservoir Remedial Measures Design Engineer Services, Geotechnical Monthly Report for December 1992 by Sir Alexander Gibb & Partners Ltd. UK	1	
G-2	-DO - January 1993	1	
G-3	-DO - February 1993	1	
G-4	-DO - March 1993	1	
G-5	-DO - April 1993	1	
G-6	-DO - May 1993	1	
G-7	-DO - June 1993	1	
G-8	-DO - July 1993	1	
G-9	-DO - August 1993	1	
G-10	-DO - September 1993	1	
G-11	-DO - October 1993	1	
G-12	-DO - November 1993	1	
G-13	-DO - December 1993	1	
G-14	-DO - January 1994	1	
G-15	-DO - February 1994	1	
G-16	-DO - March 1994	1	
G-17	Samanalawewa Hydro Electric Project, Reservoir Remedial Measures Design Engineer's June 1994 site visit	1	
G-18	do - September 1994	1	
G-19	Samanalawewa Hydro Electric Project, Reservoir Remedial Measures Summary of the Seismic Reflection Survey, Sir Alexander Gibb & Partners Ltd. UK	1	
G-20	Report Samanalawewa Hydro Electric Project Sri Lanka Reservoir Remedial Measures the Seismic Reflection Survey, carried out for CEB, July 1993, Soil Mechanics UK	1	
G-21	Report Seismic Survey, on the Right Bank of Samanalawewa Dam, Sri Lanka carried out CEB, March 1990	1	
G-22	Report Seismic Survey, on the Right Bank of Samanalawewa Dam, Sri Lanka carried out for CEB March 1990	1	
G-23	Report Samanalawewa Hydro Electric Project Sri Lanka Reservoir Remedial Measures the Seismic Reflection Survey, carried out for CEB May 1993	1	
G-24	Samanalawewa Hydro Electric Project, Lot VI- Low Level Outlet and Guard Valve, Summary Report on Commissioning Tests November 1993 by Sir Alexander & Partners, UK	1	
G-25	Samanalawewa Hydro Electric Project, Spillway Model Tests, 13th July, 1987 by Sir Alexander & Partners, UK	1	
G-26	Samanalawewa Hydro Electric Project, Design Criteria for Civil Works, June 1987 by Sir Alexander & Partners, UK	1	

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LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (10/19)

H. Quarterly Progress and Claim Settlement

No.	Title	Nos.	Location
H-1	Samanalawewa Hydro Electric Project, Quarterly Progress Report, No. 21 (January to March 1992) Nippon Koei & Electrowatt Ltd.	1	
H-2	Samanalawewa Hydro Electric Project, Quarterly Progress Report, No. 22 (April to June 1992) Nippon Koei & Electrowatt Ltd.	3	
H-3	Samanalawewa Hydro Electric Project, Quarterly Progress Report, No. 18 (April to June 1992) Nippon Koei & Electrowatt Ltd.	1	
H-4	Samanalawewa Hydro Electric Project, Quarterly Progress Report, No. 23 (July to September 1992) Nippon Koei & Electrowatt Ltd.	1	
H-5	Samanalawewa Hydro Electric Project, Quarterly Progress Report, No. 25 (January to March 1993) Nippon Koei & Electrowatt Ltd.	1	
H-6	Samanalawewa Hydro Electric Project, Report on New Rate Analysis of Right Bank Cut-Off Works on Lot II, August 1990 JVS	1	

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LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (11/19)

I. Reports by International Panel and Proposed Measures by JVS/GIBB and CECB

No.	Title	Nos.	Location
I-1	Samanalawewa Hydro Electric Project, Recommendations for Remedial Measures to be taken for Samanalawewa Reservoir March 1993, JVS & GIBB	1	
I-2	Samanalawewa Hydro Electric Project Remedial Measures for Leakage along Right Abutment Hill Presented to the Review Panel of February 18, 1993	1	
I-3	Samanalawewa Hydro Electric Project Third Party Review Panel 29 November - 3 December 1992, Report SM-1 G.Post & P.Londe Paris Feb 1992	1	
I-4	Samanalawewa Hydro Electric Project Review Panel Report No.2 (SMW-2) J.B. Cooke, P. Londe A.H. Merritt, G.R. Post Colombo Feb-93	1	
I-5	Samanalawewa Hydro Electric Project Third Party Review Panel 29 November - 3 December 1992, Report SM-1 G.Post & P.Londe Paris Feb 1992	1	

SAMANALAWEWA HEP
LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (12/19)

J. OECF

No.	Title	Nos.	Location
J-1	Samanalawewa Hydro Electric Project, Answer to Additional Questionnaire Reservoir Remedial Works (Wet Blanketing) 1994, 28th Loan Package	1	
J-2	Samanalawewa Hydro Electric Project, Answer to Questionnaire Reservoir Remedial Works (Wet Blanketing) 1994, 27th Loan Package	1	
J-3	Samanalawewa Hydro Electric Project, (Wet Blanketing) Explanatory Notes for 28th Loan Package Japanese Mission January 1995, JVS (Used for the Government Mission of 28th Loan Package)	1	
J-4	Questionnaire by OECF on the Samanalawewa Hydro Electric Project, 1990 (For the Additional Loan to the Main Loan)	2	
J-5	Questionnaire by OECF on the Samanalawewa Hydro Electric Project and Answers, 1993 (27th Loan Package)	1	
J-6	International Documents of Reservoir Remedial Works for Samanalawewa prepared by OECF July 1994 (Written in Japanese)	1	
J-7	- do - (Draft)	1	

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LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (13/19)

K. Executive Meeting during Construction

No.	Title	Nos.	Location
K-1	Samanalawewa Hydro Electric Project, Right Bank Cutoff Works - Proposed Agenda for the 4th Executive Review Meeting by JVS & Gibb, 1998	2	
K-2	Samanalawewa Hydro Electric Project, Reference Materials for 5th Project Director's Meeting 4th November 1998 by JVS	2	
K-3	Samanalawewa Hydro Electric Project, Reference Materials for 6th Project Director's Meeting 20th April 1998 by JVS	2	
K-4	Samanalawewa Hydro Electric Project, Reference Materials for 7th Project Director's Meeting 22st October 1998 by JVS	2	
K-5	Samanalawewa Hydro Electric Project, Reference Materials for 7th Project Director's Meeting 22nd April 1990 by JVS	2	
K-6	Samanalawewa Hydro Electric Project, Reference Materials for 9th Project Director's Meeting November 1990 by JVS	2	
K-7	Samanalawewa Hydro Electric Project, Reference Materials for 10th Project Director's Meeting April 1991 by JVS	1	
K-8	Samanalawewa Hydro Electric Project, Discussion Materials Prepared by JVS for the Executive Review Meeting for the Right Bank Cut-Off Works, April 1991	1	

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LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (14/19)

L. Reports Relating to the Right Bank Leakage Problem

No.	Title	Nos.	Location
L-1	Samanalawewa Hydro Electric Project, Report on Implementation of the Cut-Off Works for Reservoir Watertightness on Right Bank, December 1989 by JVS	2	
L-2	Samanalawewa Hydro Electric Project, Second Executive Meeting on 28th November 1990, Right Bank Cutoff Works Summary of Conclusions, 5.12.1990, JVS	1	
L-3	Samanalawewa Hydro Electric Project, Explanation Sheets for Updated Grouting Plan for the Right Bank Cut-Off Works, 1991, JVS	1	
L-4	Samanalawewa Hydro Electric Project, Right Bank Cut-Off Works - Grouting 8 February 1991, JVS	2	
L-5	Samanalawewa Hydro Electric Project, Minutes of the Meeting held by the Hon. Minister of Power & Energy on 22nd August 1991 with the Consultants and the CEB	1	
L-6	Samanalawewa Hydro Electric Project, Lot II Right Bank Cut-Off Works, 15th October 1991 by Sir Aleander Gibb & Partners	1	
L-7	Samanalawewa Hydro Electric Project, Reservoir Water Tightness & the Right Bank Cut-Off Works, A Summary November 1991 by JVS, Gibb & CECB	1	
L-8	Samanalawewa Hydro Electric Project, Lot II Right Bank Cut-Off Works - Review of Grouting Results, 10th February, 1992, JVS & Gibb	1	
L-9	Samanalawewa Hydro Electric Project, Reservoir Remedial Measures, Results of Investigation, Monitoring & Stabilization works carried out since 22nd October 1992 JVS & GiBB	1	
L-10	Report by UK on the Job Trainee Mr. Hayashi, September 1991 Trial Impounded Behaviour of GWL	1	
L-11	Data Book of Drill Logs for Boreholes at Right Bank Abutment, October 1990	1	

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LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (15/19)

M. Monitoring Reports,

No.	Title	Nos.	Location
M-1	Samanalawewa Hydro Electric Project, Monitoring Report on Pore Pressure in Dam Foundation 10 October 1994 by JVS	1	
M-2	Samanalawewa Hydro Electric Project, Annual Monitoring Report-1993 13th September, 1993 by JVS	1	
M-3	Samanalawewa Hydro Electric Project, Draft Report on Annual Monitoring - 1994 06/07 1995, by Monitoring Section	1	

N. Monthly Monitoring Reports

No.	Title	Nos.	Location
N-1	Monthly Report on Dam/Reservoir Monitoring Reservoir Water Level and Leakage water quality June 1991 by JVS	1	
N-2	do - July 1991		
N-3	do - August 1991	1	
N-4	do - September 1991	1	
N-5	do - October 1991	1	
N-6	do - November 1991	1	
N-7	do - December 1991	1	
N-8	do - January 1992	2	
N-9	do - February 1992	1	
N-10	do - March 1992	1	
N-11	do - April 1992	1	
N-12	do - May 1992	1	
N-13	do - June 1992	1	
N-14	do - July 1992	1	
N-15	do - August 1992	1	
N-16	do - September 1992	1	
N-17	do - October 1992	1	
N-18	do - November 1992	1	
N-19	do - December 1992	1	
N-20	do - January 1993	1	
N-21	do - February 1993	1	
N-22	do - March 1993	1	
N-23	do - April 1993	1	
N-24	do - May 1993	1	
N-25	do - June 1993	1	
N-26	do - July 1993	1	
N-27	do - August 1993	1	
N-28	do - September 1993	1	
N-29	do - October 1993	1	
N-30	do - November 1993	1	
N-31	do - December 1993	1	
N-32	do - January 1994	1	
N-33	do - February 1994	1	
N-34	do - March 1994	2	
N-35	do - April 1994	1	
N-36	do - May 1994	1	
N-37	do - June 1994	1	
N-38	do - July 1994	1	
N-39	do - August 1994	1	

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LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (18/19)

O. Reports on Right Bank Leakage Problem prepared by Third Party

No.	Title	Nos.	Location
O-1	Sri Lanka National Committee on Large Dams of International Commission of Large Dams, Sincolod Bulletin Vol.III, Number 1 September 1992, Irrigation Department	1	#
O-2	Special Report on Underwater Investigations for Samanalawewa HEP, Lot-2 Kumagai-Hazama-Kajima Joint Venture	2	1
O-3	Samanalawewa Hydro Electric Project, Lot I Civil Works Diversion Tunnels & Relevant Works, Geological & Geotechnical Review of the Diversion Tunnels & the Out Fall Structure Foundation	2	
O-4	Samanalawewa Hydro Electric Project, Seminar on Samanalawewa Leak - Remedial Measures organized by the Institute of Engineers, Sri Lanka	1	
O-5	Samanalawewa Leak - Remedial Measures Proceedings of the Seminar, organized by the Institute of Engineers, Sri Lanka on 13th January 1995 Completed by JVS	1	
O-6	Samanalawewa Leak - Remedial Measures Proceedings of the Seminar held on 13.01.95 and Summing up Report, The Institute of Engineers, Sri Lanka	1	
O-7	Samanalawewa Hydro Electric Project, Documented Papers of Topics Explained by JVS at SLNCOLD Seminar at Sawsiripaya on 13th March, 1992	1	

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LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (17/19)

N. Monthly Monitoring Reports(Continued)

No.	Title	Nos.	Location
N-40	do - September 1994	1	
N-41	do - October 1994	1	
N-42	do - November 1994	1	
N-43	do - December 1994	1	
N-44	do - January 1995	1	
N-45	do - February 1995	1	
N-46	do - March 1995	1	
N-47	do - April 1995	1	

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LIST OF REPORTS UNDER DAM & HYDROPLANT CONSTRUCTION (19/19)

P. List of Photo Books

No.	Title	Nos.	Location
P-1	Samanalawewa HEP, Record of Construction Activities of Lot I & II (1)	1	
P-2	do - (II)	1	
P-3	do - (III)	1	
P-4	Samanalawewa HEP, Record of Construction Lot I	1	
P-5	Samanalawewa HEP, Record of Construction Lot I Negative	1	
P-6	Samanalawewa HEP, Photo of Cores in Diversion Tunnels (1)	1	
P-7	do - (2)	1	
P-8	do - (3)	1	
P-9	Samanalawewa HEP, Record of Excavation Activities for Dam & Spillway in Lot II, by KHK	1	
P-10	Samanalawewa Project, Borehole Core Photographs RD - 3.7, RD-44, RDW-10, RDW - 18 by GIBB	1	
P-11	Samanalawewa Project, Borehole Core Photographs RD - 3.7, RD-48, 49, RDW-10, RDW - 18 by GIBB	1	
P-12	Samanalawewa Project, Borehole Core Photographs RD - 1.7, RD-10, RDW-14, RDW 33 A, RD-68A, RD-69, by GIBB	1	
P-13	Samanalawewa Project, Borehole Core Photographs SD-4, August 1983, by GIBB	1	
P-14	Samanalawewa Hydro Electric Project, Additional Geotechnical Investigation Boring Core Photographs, July 1987, Nippon Koei & CECB	1	

APPEBDIX – B LIST OF REPORTS UNDER WET BLANKETING WORKS

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LIST OF REPORTS UNDER WET BLANKETING WORKS (1/8)

A. Monthly Progress Report and Quarterly Report

No.	Title	Nos.	Location
	Weekly Monitoring Report	1	
	Monthly Monitoring Report	1	
	Dumping Details	1	
	Photographs of Core Boxes	1	
MPR 96-01	Monthly Progress Report - No 1 - January 96	1	
MPR 96-02	Monthly Progress Report - No 2 - February 96	1	
MPR 96-03	Monthly Progress Report - No 3 - March 96	1	
MPR 96-04	Monthly Progress Report - No 4 - April 96	1	
MPR 96-05	Monthly Progress Report - No 5 - May 96	1	
MPR 96-06	Monthly Progress Report - No 6 - June 96	1	
MPR 96-07	Monthly Progress Report - No 7 - July 96	1	
MPR 96-08	Monthly Progress Report - No 8 - August 96	1	
MPR 96-09	Monthly Progress Report - No 9 - Sept 96	1	
MPR 96-10	Monthly Progress Report - No 10 - October 96	1	
MPR 96-11	Monthly Progress Report - No 11 - November 96	1	
MPR 96-12	Monthly Progress Report - No 12 - Dec 96	1	
MPR 97-13	Monthly Progress Report - No 13 - January 97	1	
MPR 97-14	Monthly Progress Report - No 14 - February 97	1	
MPR 97-15	Monthly Progress Report - No 15 - March 97	1	
MPR 97-16	Monthly Progress Report - No 16 - April 97	1	
MPR 97-17	Monthly Progress Report - No 17 - May 97	1	
MPR 97-18	Monthly Progress Report - No 18 - June 97	1	
MPR 97-19	Monthly Progress Report - No 19 - July 97	1	
MPR 97-20	Monthly Progress Report - No 20 - August 97	1	
MPR 97-21	Monthly Progress Report - No 21 - Sept 97	1	
MPR 97-22	Monthly Progress Report - No 22 - October 97	1	
MPR 97-23	Monthly Progress Report - No 23 - November 97	1	
MPR 97-24	Monthly Progress Report - No 24 - December 97	1	
MPR 98-25	Monthly Progress Report - No 25 - January 98	1	
MPR 98-26	Monthly Progress Report - No 26 - Feb 98	1	
MPR 98-27	Monthly Progress Report - No 27 - March 98	1	
MPR 98-28	Monthly Progress Report - No 28 - April 98	1	
MPR 98-29	Monthly Progress Report - No 29 - May 98	1	
MPR 98-30	Monthly Progress Report - No 30 - June 98	1	
MPR 98-31	Monthly Progress Report - No 31 - July 98	1	
MPR 98-32	Monthly Progress Report - No 32 - August 98	1	
MPR 98-33	Monthly Progress Report - No 33 - Spt 98	1	

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LIST OF REPORTS UNDER WET BLANKETING WORKS (2/8)

A. Monthly Progress Report and Quarterly Progress Report (Continued)

No.	Title	Nos.	Location
MPR 98-34	Monthly Progress Report - No 34 - October 98	1	
MPR 98-35	Monthly Progress Report - No 35 - November 98	1	
MPR 98-36	Monthly Progress Report - No 36 - Dec 98	1	
MPR 99-37	Monthly Progress Report - No 37 - January 99	1	
MPR 99-38	Monthly Progress Report - No 38 - February 99	1	
MPR 99-39	Monthly Progress Report - No 39 - March 99	1	
MPR 99-40	Monthly Progress Report - No 40 - April 99	1	
MPR 99-41	Monthly Progress Report - No 41 - May 99	1	
MPR 99-42	Monthly Progress Report - No 42 - June 99	1	
	Quarterly Progress Report		
QPR Vol 2	Quarterly Progress Report- Quarter ending Sept '96	1	
QPR Vol 3	Quarterly Progress Report- Quarter ending Dec '96	1	
QPR Vol 4	Quarterly Progress Report- Quarter ending March '97	1	
QPR Vol 5	Quarterly Progress Report- Quarter ending June '97	1	
QPR Vol 6	Quarterly Progress Report- Quarter ending Sept '97	1	
QPR Vol 7	Quarterly Progress Report- Quarter ending Dec '97	1	
QPR Vol 9	Quarterly Progress Report- Quarter ending June '98	1	
QPR Vol 10	Quarterly Progress Report- Quarter ending Sept '98	1	
QPR Vol 11	Quarterly Progress Report- Quarter ending Dec '98	1	
QPR Vol 12	Quarterly Progress Report- Quarter ending Mar '99	1	
QPR Vol 13	Quarterly Progress Report- Quarter ending Jun '99	1	
	Monthly Monitoring Report on Dam/Reservoir Monitoring		
MIMR 96-01	Monthly Monitoring Report on Dam/Reservoir - January 96	1	
MIMR 96-03	Monthly Monitoring Report on Dam/Reservoir - March 96	1	
MIMR 96-04	Monthly Monitoring Report on Dam/Reservoir - April 96	1	
MIMR 96-05	Monthly Monitoring Report on Dam/Reservoir - May 96	1	
MIMR 96-06	Monthly Monitoring Report on Dam/Reservoir - June 96	1	
MIMR 96-07	Monthly Monitoring Report on Dam/Reservoir - July 96	1	
MIMR 96-08	Monthly Monitoring Report on Dam/Reservoir - August 96	1	
MIMR 96-09	Monthly Monitoring Report on Dam/Reservoir - Sept 96	1	
MIMR 96-10	Monthly Monitoring Report on Dam/Reservoir - October 96	1	
MIMR 96-11	Monthly Monitoring Report on Dam/Reservoir - Nov 96	1	

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LIST OF REPORTS UNDER WET BLANKETING WORKS (3/8)

No.	Title	Nos.	Location
	<u>First International Panel Meeting</u>		
FPM Ref:0	Draft Programme on First International Panel Meeting	1	
FPM Ref:1/2	General Information on FIP Meeting	1	
FPM Ref:3	Questionnaire to Panel of Experts on Draft tender Documents	1	
FPM Ref:4	Report on Remedial Blanketing Works- SHEP	1	
FPM Ref:5	Project Consultants Report on FIP Meeting	1	
FPM Ref:6	Additional Study	1	
FPM Ref:7	Reference Materials - SHEP	1	
	<u>Second International Panel Meeting</u>		
SPM Ref:01	Programme on Second International Panel Meeting	1	
SPM Ref:02	Explanation note on Remedial Measures For Samanalawewa Reservoir	1	
SPM Ref:03	Reference Material for SIP Meeting	1	
SPM Ref:04	Minutes of discussions During SIP Meeting	1	
SPM Ref:05	Design Engineers' Summary Report	1	
SPM Ref:06	The OECF Concerns and Questions on SHEP	1	
SPM Ref:07	Report on Remedial Blanketing Works	1	
	<u>Third International Panel Meeting</u>		
TPM 5/98	Reference Materials on Remedial Measures for Samanalawewa Reservoir	1	
TPM May/98	Report on SHEP RRRW - Wet Blanketing by Barry Cooke & SM Tariq	1	
TPM GIBB/98	Design Engineers' Summary Report	1	

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LIST OF REPORTS UNDER WET BLANKETING WORKS (4/8)

No.	Title	Nos.	Location
	<u>International Panel Meeting (Continued)</u>		
TPM NK	Supervising Engineers' Summary Report	1	
TPM	Design Engineers' Visit Report	1	
GIBB/VR			
TPM 98/May	Programme on TIP Meeting - May 1998	1	
TPM 98/2	Detailed Guideline of WB Works to be carried out by Mid of May '98	1	
	<u>Fourth International Panel Meeting</u>		
F ^o PM No.1	Fourth International Panel Meeting - Summary Report	1	
F ^o PM No.2	Report on SHEP RRRW - September 21 st - 24 th 1998	1	
F ^o PM 98/9	Design Engineers' Visit Report 15 - 26 September	1	
	<u>Fifth International Panel Meeting</u>		
L 99/5	Reference Materials For the Fifth International Panel Meeting	1	
L 99/Sum	Fifth International Panel Meeting - Summary Report	1	
L 99/5-6	Report on SHEP RRRW - WB, Fifth IP Meeting	1	

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LIST OF REPORTS UNDER WET BLANKETING WORKS (5/8)

C. Study Reports and Others		No.	Nos.	Location
GEN 96-3/1	Review on the Environmental Impacts and the Water Quality Monitoring Programme for the Samanalawewa Remedial Works	1	1	
GEN 96-3/2	SHEP, RRW, Submission of Site Inspection Report	1	1	
GEN 96-4/1	Construction Plan and Schedule	1	1	
GEN 96-06	Construction Cost Estimate	1	1	
GEN 96-09	Public Perception of Safety and Stability of Samanalawewa Dam & Right Bank Abutment	1	1	
GEN 96-10	Recommendations on reservoir Operation During Impounding	1	1	
GEN 96-11/1	Proposed Monitoring Programme for Samanalawewa Dam & Right Bank During Impounding	1	1	
GEN 96-11/2	Samanalawewa Hydro Electric Project and Wet Blanketing	1	1	
GEN 96-4/2	Contract for consultancy Services for the SHEP	1	1	
GEN 96-5/1	Construction Plan & Schedule	1	1	
GEN 96-5/2	Soil Material Investigations	1	1	
GEN 96-5/3	Soil Material Investigations	1	1	
GEN 96-2/1	SHEP RRW Vol-1 (GIBB)	1	1	
GEN 96-2/2	SHEP RRW Vol -2	1	1	
GEN 97-31	Design Criteria and Road Note 31	1	1	
GEN 97-5	Study on Most Economical Mode of Operation for Samanalawewa Reservoir to Satisfy the RW	1	1	
GEN 87-7	Design Criteria Manual for Civil Works	1	1	
GEN 97-KAL	Kaltota Diversion Scheme	1	1	
GEN 97-10	RRW - WB Site Inspection Report- S Takahashi	1	1	
GEN 97-11-S	Design Engineers' Site Visit - PO Squire 10-15 Nov. 1997	1	1	
GEN 97-11-T	SHEP First Filling of Reservoir November 1997	1	1	
GEN 97-12-M	Review Report of First Reservoir Filling upto FSL and WB works	1	1	
GEN 98-3/main	Report on Additional Geological Investigations- Main Report- S Takahashi	1	1	
GEN 98-3/attach	Report on Additional Geological Investigations - Attachments-by S.T	1	1	
KAL 99-1	Terms of reference for Consultancy Services for preparation of Tender Documents/For Lift irrigation Scheme for Kaltota Area	1	1	
KAL 99-2	Preliminary Study Report on lift irrigation Scheme for Kaltota Area	1	1	
DIW 99-1	Preliminary Study Report on Stage 2 Development of SHEP	1	1	
DIW 99-2	Terms of Reference for Consultancy Services for Preparation for the Tender Documents	1	1	

SAMANALAWEWA HEP

LIST OF REPORTS UNDER WET BLANKETING WORKS (6/8)

D. Environmental Reports		No.	Title	Nos.	Location
ENV 96-05	The Environmental and Social Issues SHEP - Jane Lovel	1	1		
ENV 96-10	Land Stability & Land use Survey - October 1996	1	1		
ENV 96-11	Environmental Terms of Reference - Final Report	1	1		
ENV GT-93	AIT The Reservoir Leakage Problem of the SHEP- SL	1	1		
ENV C & H	Environmental Impact of the Mahaweli Deve. on Climate and Hydrology	1	1		
ENV 97-12	Soil Material Investigations	1	1		
ENV 97-5	Study on Most Economical Mode of Operation for Samanalawewa Reservoir to Satisfy the RW	1	1	4	

SAMANALAWEWA HEP

LIST OF REPORTS UNDER WET BLANKETING WORKS (7/8)

No.	Title	Nos.	Location
WB/ CDO 2/98	Monitoring Programme to Control Dumping Operation Feb-98	1	
WB 2/98	Detailed Guideline of Wet Blanketing Works	1	
WB Ecom/98	Economic Study Report on Alternative Remedial Works- Nov/98	1	
WB DATA	Data Book of Coordinates of Dumping Locations & Dumping Records	1	
WB 98-09	Report on Review of Ingress and Leakage Path - S Takahashi	1	
WB O & M	O & M Works of the Employers' Equipment/Facilities under CECB	1	
WB 98/6	Check/Review Manual of Monitoring Data & Bathometric Survey	1	
WB 99/4/1	History and Current Progress of Reservoir Remedial Works- WB	1	
WB 99/11	Samanalawewa HEP and Wet Blanketing	1	
WB 98/12	Leakage Control Measures Feasibility Study	1	
WB 99/4	Summary Report on Financial Status of Scheme- 2	1	
WB 99/4/11	Engineers Review Report on WB Works due to Termination of Dumping	1	
WB 99/6/25	Details of Items Handed Over to CEB	1	
WB 99/6/29	Negative Films of Wet Blanketing Works	1	
	Completion Report Part I: Main Report	1	
	Completion Report Part II: Supporting Documents	1	
	Record Book of Monitoring Data Vol I: Monitoring Data of Main Features of Samanalawewa Project and Water Quality	1	
	Record Book of Monitoring Data Vol II: Measurements of Dam Instruments	1	
	Record Book of Monitoring Data Vol III: Groundwater Levels at Right Bank (1/2)	1	
	Record Book of Monitoring Data Vol IV: Groundwater Levels at Right Bank (2/2)	1	

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LIST OF REPORTS UNDER WET BLANKETING WORKS (8/8)

No.	Title	Nos.	Location
F. Contract Documents and Employer's Equipment Manuals			
	Contract Documents		
CON 97-3-1	Contract for Reservoir Remedial Works - WB SHEP (1/3)	1	
CON 97-3-2	Contract for Reservoir Remedial Works - WB SHEP (2/3)	1	
CON 97-3-3	Contract for Reservoir Remedial Works - WB SHEP (2/3)	1	
	Tender Documents		
TND Vol:0	SHEP - Instructions to Tender	1	
TND Vol:1	SHEP Tender Documents for RRRW _WB	1	
TND Vol:2	Specifications for part A Civil Works	1	
TND Vol:3	Specification for part B Supply of Machinery & Equipment	1	
TND Vol:4	Drawings	1	
TND Vol:5	Tender Forms	1	
TND 1996/1	Guidelines on Government Tender Procedure	1	
	Survey Equipment Manuals		
MAN B-3-1	B-3-1 Survey Equipment - Submission for Approval	1	
	Earth Moving Equipment Manuals		
MAN B/2	B-2 Construction Equipment - Submission for Approval	1	
_MAN P/II	Dump Truck	1	
	Monitoring Equipment Manuals		
MAN 99/3	Automatic Water level Gauge	1	
MAN 1999	Tipping Bucket Automatic Remote recording Rain gauge Manuals (General)	1	
INT No-03	Eudora Electric Mail User's Manual	1	
PRT No-05	HP Jet Direct Print Server	1	
PRT No-01	XB- 2420 Multi Font	1	
NK	Hydro Technical Overview	1	
MAN TGM - 4000	TGM-4000 SERIES	1	
NK 1/2	DR/2000 Spectrophotometer Handbook	1	
NK 2/2	DR/2000 Spectrophotometer Handbook	1	
199/1234	Manual of Income Tax Law	1	

ANNEX-F

*PHOTOGRAPHS OF WET
BLANKETING WORKS*

*Assembling and Launching of
Barges*



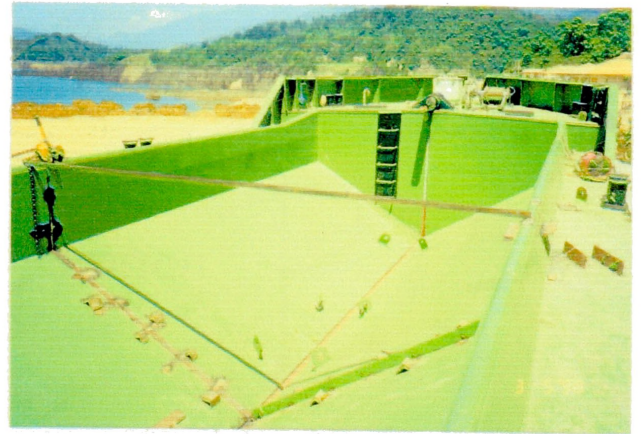
Completed Concrete Foundations of Assembling Yard on 31.01.98



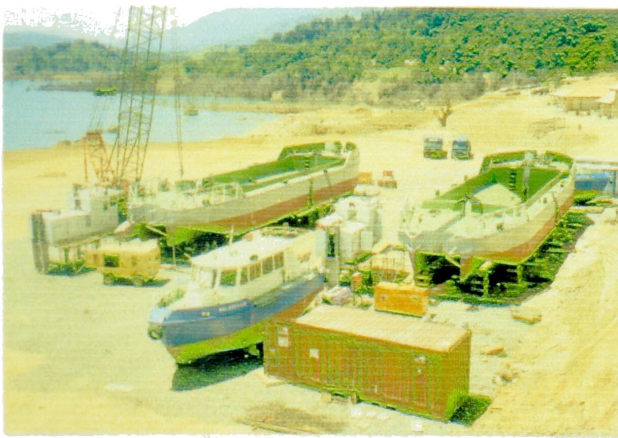
Delivered 1st Piece of Barge to Site on 23.02.98



Assembling Works of No. 1 and No.2 Barges (28.02-13.03.98)



Assembling of Barges



View of Assembling Yard



Transportation of an Half Hull of Barge Using 2 nos-80 ton Truck Cranes from El.462 m to El.447 m through Access Road



Launching of an Half Hull of Barge Using 2 nos-80 ton Truck Cranes (14-17.03.98)



Coupling of Two Half Hulls of No.1 Barge (15.03.98)

*Barge Dumping Operation
during Initial Stage*



View of Main Target Area



Dewatering of Barge Hopper after Arrangement of Canvas Sheets



Loading Operation into Barge through Belt Conveyor provided on Pontoon



Traveling of Barge



Falling of Blanket Material, after about 15-20 seconds from Opening



Just before Completion of dropping of Blanket Materials, after about 2 minutes from Opening



End of Complete Operation after Taking-Out of Canvas Sheets

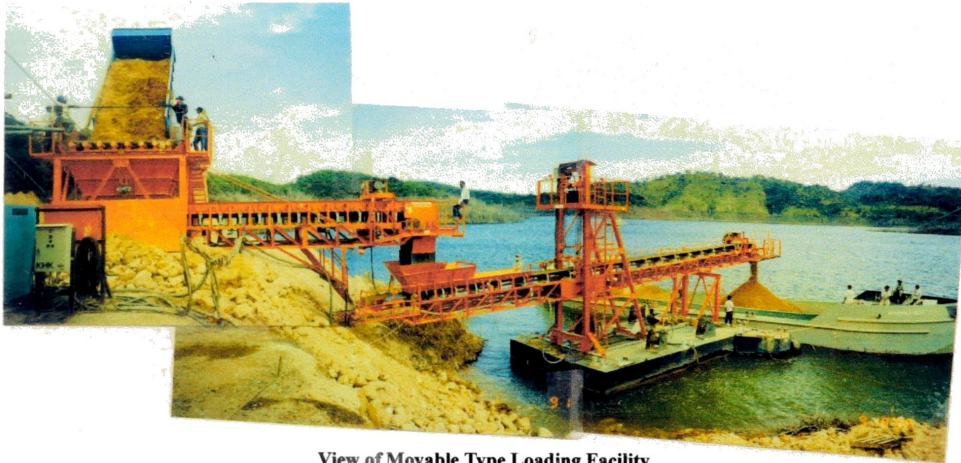
*Improved Barge Dumping
Operation*



Developing of Pilipota Borrow Site



Stockpile Yard at Kinchigune



View of Movable Type Loading Facility



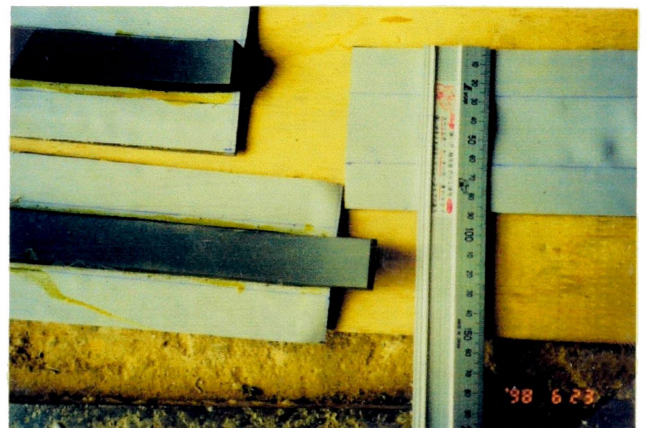
Access Ramp to A Hopper for Dump Truck



Loading of Material by Belt Conveyor



Moisture Control by Sprinkler with 81 Holes of 3 mm dia



Rubber Seal with Magnetic Plate provided along Steel Labyrinth Seal of Barge Hopper



View of Downstream of Main Target Area



Traveling of Barge to Dumping Area



Quick Dumping Operation within 15 Seconds even without Canvas Sheet (1/2)



Quick Dumping Operation within 15 Seconds even without Canvas Sheet (2/2)



Major Ingress Area Identified at Block X (Left Abutment)



Major Ingress Area Identified at Block X (Right Abutment)



Placing of Disturbed Sampling Tray



Collection of Disturbed Sampling Tray

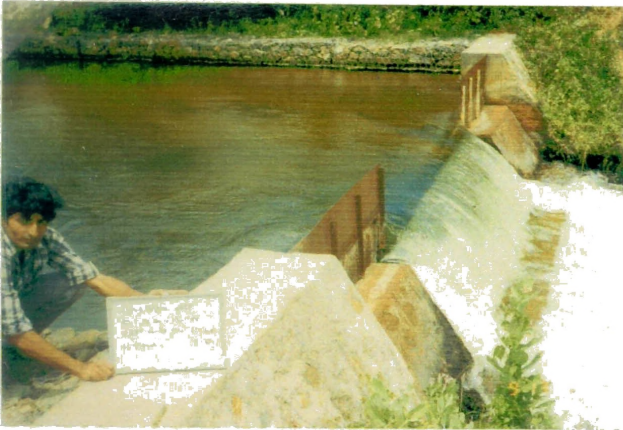
Monitoring Works



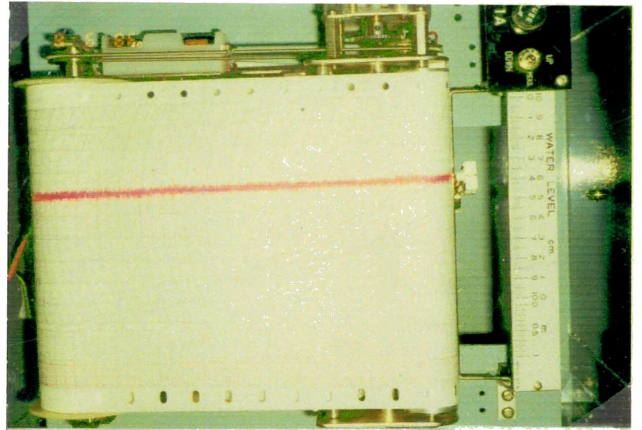
Water Sampling of the Reservoir



Salt Tracing Tests - Dumping of Two - 50 kg of Salt Bags Close to Cavity No. 1



Monitoring Weir - Overflow Discharge Depth Reduced by 61 mm (0.41m³/s) from 478 mm (2.19m³/s) to 417 mm (1.77m³/s) since 24.08.98 until 13. 09. 98



Automatic Water Level Recorder - drop of 4 mm/day (0.02 m³/s) from 441 mm (1.93 m³/s) to 437 mm (1.91 m³/s)



Main Leak Outlet after Significant Reduction of GWL (Leakage Amount 1.77m³/s on 13. 09. 98)



View of Main Leak Outlet

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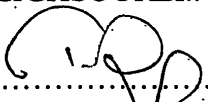
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