

**APPENDIX 3. COST ESTIMATION AND UNIT COST OF
CONSTRUCTION WORKS**

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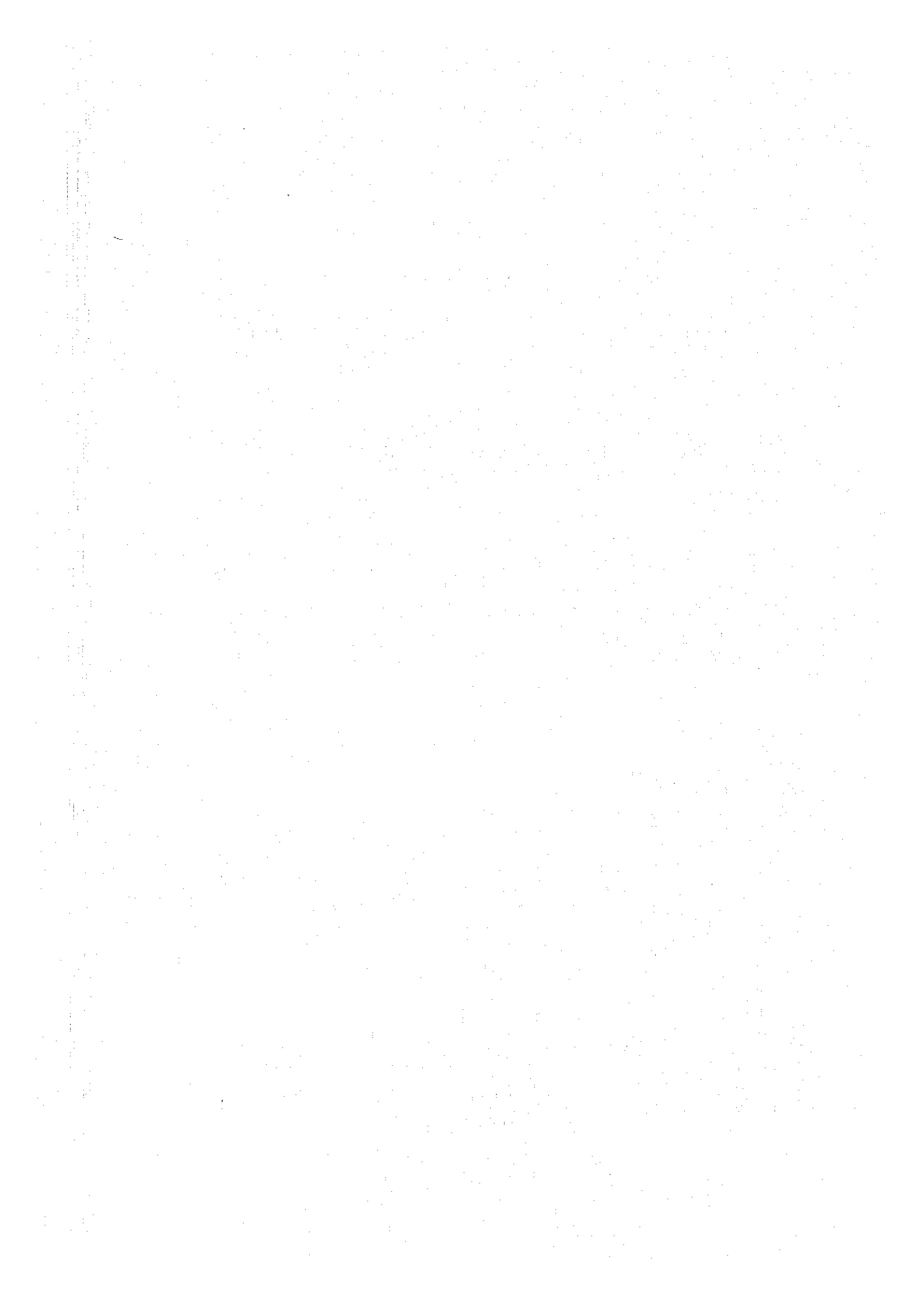


Table 1 Summary of Sabo Facilities of K. Krasak (Plan I)

No.	Facility	Element			Construction Cost (Rp. x 1,000)	Volume of Sediment Production Suppression (1,000m ³)	Volume of Sediment Discharge Reducing (1,000m ³)	Volume of Sediment Discharge Control (1,000m ³)	Remarks
		Type	Height (m)	Length (m)					
1	BE - C.1	Consolidation Dam	4.0	630.0	117,600	10,500			} Sand Pocket
2	C.2	"	"	550.0	103,040	9,200		2,999	
3	C.3	"	"	425.0	79,520	7,100		3,154	
4	C.4	"	"	108.0	57,400	4,100			
5	C.5	"	3.0	111.0	43,400	3,100	1		
6	C.6	"	4.0	"	44,800	3,200	1		
7	C.7	"	3.5	"	51,800	3,700	2		
8	C.8	"	4.5	118.0	57,400	4,100	18		
9	C.9	"	4.0	61.0	33,600	2,400	47		
10	BE - D.1	Check Dam			15,400	1,100	252	(144)	
11	D.2	"	6.5	85.0	84,000	6,000	155	(8)	
12	D.3	"	11.0	134.0	187,600	13,400	298	(98)	
13	D.4	"	11.5	140.0	260,400	18,600	175	(107)	
14	D.5	"	10.0	80.0	147,000	10,500	138	(33)	
15	D.6	"	7.5	88.0	109,200	7,800	138	(23)	
16	D.7	"	10.0	104.0	179,200	12,800	212	(49)	
17	D.8	"	11.0	100.0	175,000	12,500	350	(62)	
18	D.9	"	12.5	140.0	186,200	13,300	171	(38)	
19	BE - K.1	Revetment (D-3)	3.0	220.0	14,080				
20	R.2	(D-5)	"	750.0	27,000				

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No.	Facility	Element				Construction Cost (Rp. x 1,000)	Volume of Sediment Production Suppression (1,000m ³)	Volume of Sediment Discharge Reduction (1,000m ³)	Volume of Sediment Discharge Control (1,000m ³)	Remarks
		Type	Height (m)	Length (m)	Volume (m ³)					
21	BE - R.3	Revetment (D-4)	3.0	420	21,420					
22	R.4	(D-4)	"	570	37,620					
23	R.5	(")		600	39,600					
24	R.6	(B-2)	3.0	950	41,800					
25	R.7	(")	"	1,230	54,120					
26	BE - T.1	Training Levee	6.0	950	142,500					
27	T.2	"	"	1,070	160,500	3,123				
28	T.3	"	"	630	94,500					
29	T.4	"	"	1,000	150,000					
30	KR - D.1	Check Dam	14.0	189	672,600	264	(178)			
31	D.2	"	14.5	178	657,400	210	(31)			
32	D.3	"	8.0	143	166,600	48	(12)			
33	D.4	"	"	155	240,800	159	(61)			
34	D.5	"	10.0	128	175,000	48	(25)			
35	KR - R.1	Revetment (B-5)	3.0	200	7,200					
36	R.2	(B-5)	"	"	7,200					
37	R.3	(")	"	430	15,480					
38	R.4	(")	"	580	20,880					
39	R.5	(")	3.0	210	8,280					
40	R.6	(")	"	350	12,600					
41	R.7	(D-2)	"	1,140	42,180					
42	R.8	(")	"	330	12,210					

No.	Facility	Element			Volume of Sediment Discharge Control (1,000m ³)	Volume of Sediment Discharge Reduction (1,000m ³)	Volume of Sediment Production Suppression (1,000m ³)	Construction Cost (Rp. x 1,000)	Volume of Sediment Discharge Control (1,000m ³)	Remarks
		Type	Height (m)	Length (m)						
43	KR - R.9	Revetment (D-2)	3.0	450			16,650			
44	R.10	(B-1)	"	2,400			136,800			
45	R.11	(")	"	"			136,800			
46	R.12	(")	"	1,600			91,200			
47	R.13	(A.F)	"	2,050			170,150			
48	R.14	(")	"	1,100			91,300			
49	R.15	(D-1)	"	2,050			102,500			
50	R.16	(")	"	1,950			97,500			
51	KR - G	Groin			4,500 ^m		148,500		(including K. Bebang)	
52	KR - T.1	Trimming Levee	6.0	450			67,500			
53	T.2	"	"	1,250			187,500			
54	T.3	"	"	840			126,000			
55	T.4	"	"	550			82,500			
56	T.5	"	"	400			60,000			
57	KR - C.1	Consolidation Dam	4.1	69	2,100		37,560		Protection Work to Syphone	
58		(Chipping of Head Work (Protection to abutment(s)))			13,380		13,380			
	Sub Total						6,319,970	5,810	2,999 * 3,154	
	Supplemental Works and Contingency						980,030			
	Total						7,300,000	5,810	2,999 * 3,154	

Table 2 Summary of Sabo Facilities of K. Krasak (Plan II)

No.	Facility	Element			Construction Cost (Rp. x 1,000)	Volume of Sediment Production Suppression (1,000m ³)	Volume of Sediment Discharge Reduction (1,000m ³)	Volume of Sediment Discharge Control (1,000m ³)	Remarks
		Type	Height (m)	Length (m)					
	Sub total from No. 1 to No. 58 in Plan I; from No. 15 to No. 18 exclusive				5,670,370	4,939	(697)	2,750* 3,154*	* in case of passing through K. Beberang
	BE - D.6.A		12.0	97.0	179,200		(70)		
	D.6.B	"	9.0	107.0	207,200		(245)		
	D.6.C	"	8.5	95.0	176,400	1,120	(222)		
	D.6.D	"	"	135.0	218,400		(203)		
	D.6.E	"	"	183.0	275,800		(225)		
	Sub Total				6,727,370	6,059	(1662)	2,750* 3,154	
	Supplemental Works and Contingency				972,630				
	Total				7,700,000	6,059	(1662)	2,750* 3,154	

Figures in () are excluded out of the Sediment Disposal Plan

Table 3 Summary of Sabo Facilities of K. Krasak (Plan III)

No.	Facility	Element			Construction Cost (Rp. x 1,000)	Volume of Sediment Production Suppression (1,000m ³)	Volume of Sediment Discharge Reducing (1,000m ³)	Volume of Sediment Discharge Control (1,000m ³)	Remarks
		Type	Height (m)	Length (m)					
	Sub total from No. 1 to No. 58 in Plan I; from No. 15 to No. 18 exclusive				5,670,370	4,939	(697)	1,625* 3,154	* in case of passing through K. Beberg
	BE - D.6.A	Check Dam	12.0	103.0	225,400		(110)		
	D.6.B	"	10.0	125.0	235,200		(328)		
	D.6.C	"	"	155.0	365,400		(595)		
	D.6.D	"	8.0	240.0	365,400	1,245	(1174)	1,000*	
	BE - W.1	Guide Wall	-	550.0	82,500				
	W.2	"	-	620.0	93,000				
	W.3	"	-	700.0	105,000				
	Sub total				7,142,270	6,184	(2904)	2,625* 3,154	
	Supplemental Works and Contingency				1,057,730				
	Total				8,200,000	6,184	(2904)	2,625* 3,154	

Figures in () are excluded out of the Sediment Disposal Plan

Table 4 Summary of Sabo Facilities in K. Woro (Plan I)

No.	Facility	Element				Construction Cost (Rp. x 1,000)	Volume of Sediment Production Suppression (1,000m ³)	Volume of Sediment Discharge Reduction (1,000m ³)	Volume of Sediment Discharge Control (1,000m ³)	Remarks
		Type	Height (m)	Length (m)	Volume (m ³)					
1	WO - C.1	Consolidation Dam	5.0	360	6,000	67,200			} 1,986	
2	C.2	"	"	320	5,400	60,480				
3	C.3	"	"	318	5,300	59,360				
4	C.4	"	"	130	5,000	70,000	28			
5	C.5	"	7.0	125	8,100	113,400	19	(70)		
6	WO - D.1	Check Dam	10.0	135	13,200	184,800	88	(21)		
7	D.2	"	"	120	12,300	172,200	61	(294)		
8	D.3	"	13.5	125	17,500	245,000	138	(142)		
9	D.4	"	12.0	"	17,700	247,800	115	(46)		
10	D.5	"	13.0	97	15,300	214,200	153	(35)		
11	D.5'	"	7.0	162	19,700	275,800	188	(111)		
12	D.6	"	13.0	55	11,300	158,200	137	(18)		
13	D.7	"	12.0	158	18,200	254,800	137	(87)		
14	D.8	"	8.0	70	7,500	105,000	335	(173)		
15	D.9.A	"	14.5	141	16,300	228,200	98	(25)		
16	D.9.B	"	10.0	148	19,100	267,400				
17	D.10	"	"	72	9,500	133,000				
18	WO - R.1	Revetment (B-1)	3.0	3,270		186,390				
19	R.2	(B-5)	"	1,900		68,400				

No.	Facility	Element				Volume of Sediment Discharge Reduction (1,000m ³)	Volume of Sediment Discharge Control (1,000m ³)	Remarks
		Type	Height (m)	Length (m)	Volume (m ³)			
20	WO - R.3	Revetment (B-5)	3.0	1,070				
21	R.4	(B-5)	"	650				
22	R.5	(")	"	1,570				
23	R.6	(")	"	1,050				
24	R.7	(B-2)	"	580				
25	R.8	(")	"	600				
26	R.9	(")	"	230				
27	R.10	(")	"	350				
28	R.11	(D-C)	"	250				
29	WO - C	Groin			3,000 ^m			
30	Excavation				1,500,000	1,500	400x200x5	
	Sum above					1,737	1,986	
	Supplemental works and Contingency							
	Total					1,737	1,500	

Table 5 Summary of Sabo Facilities of K. Woro (Plan II)

No.	Facility	Element				Construction Cost (Rp. x 1,000)	Volume of Sediment Production Suppression (1,000m ³)	Volume of Sediment Discharge Reduction (1,000m ³)	Volume of Sediment Discharge Control (1,000m ³)	Remarks
		Type	Height (m)	Length (m)	Volume (m ³)					
	Sum from No. 1 to No. 29 in Case I					3,461,960	1,737	(1,022)	1,986	
	Rising of Bank					706,950		(1,500)		1,200 ^m
	Sub Total					4,168,910		1,500 (2,522)	1,986	
	Supplemental Works and Contingency					631,090				
	Total					4,800,000	1,737	1,500 (2,522)	1,986	

Table 6 Summary of Sabo Facilities of K. Woro (Plan III)

No.	Facility	Element			Construction Cost (Rp. x 1,000)	Volume of Sediment Production Suppression (1,000m ³)	Volume of Sediment Discharge Reduction (1,000m ³)	Volume of Sediment Discharge Control (1,000m ³)	Remarks
		Type	Height (m)	Length (m)					
	Sum from No. 1 to No. 29 in Case I				3,461,960	1,737	(1,022)	1,986	
	Sand Pocket (50 ha)				524,000		(1,500)		
	Sum above				3,985,960		1,500 (2,522)	1,986	
	Supplemental Works and Contingency				614,040				
	Total				4,600,000	1,737	1,500 (2,522)	1,986	

Table 7 Summary of Sabo Facilities of K. Boyong

No.	Facility	Element				Construction Cost (Rp. x 1,000)	Volume of Sediment Production Suppression (1,000m ³)	Volume of Sediment Discharge Reducing (1,000m ³)	Volume of Sediment Discharge Control (1,000m ³)	Remarks
		Type	Height (m)	Length (m)	Volume (m ³)					
1	BO - C.1	Consolidation Dam	5.0	74	6,100	85,400				
2	C.2	"	"	"	"	85,400				
3	BO - D.1	Check Dam	8.0	61	7,900	110,600	68	(43)	67	
4	D.2	"	7.0	130	8,300	116,200	83	(22)	30	
5	D.3	"	11.0	120	14,300	200,200	156	(35)	35	
6	D.4	"	"	75	11,300	158,200	140	(58)	82	
7	D.5	"	"	80	10,300	144,200	68	(39)	54	
8	BO - R.1	Revetment (D-2)	3.0	1,300		48,100				
9	R.2	(D-2)	"	1,150		42,550				
10	R.3	(")	"	1,340		49,580				
11	R.4	(")	"	200		7,400				
12	R.5	(")	"	190		7,030				
13	R.6	(")	"	"		7,030				
14	R.7	(")	"	980		36,260				
15	R.8	(")	"	450		16,650				
16	R.9	(")	"	300		11,100				
17	R.10	(")	"	350		12,950				
18	R.11	(")	"	"		12,950				
19	R.12	(")	"	160		5,920				

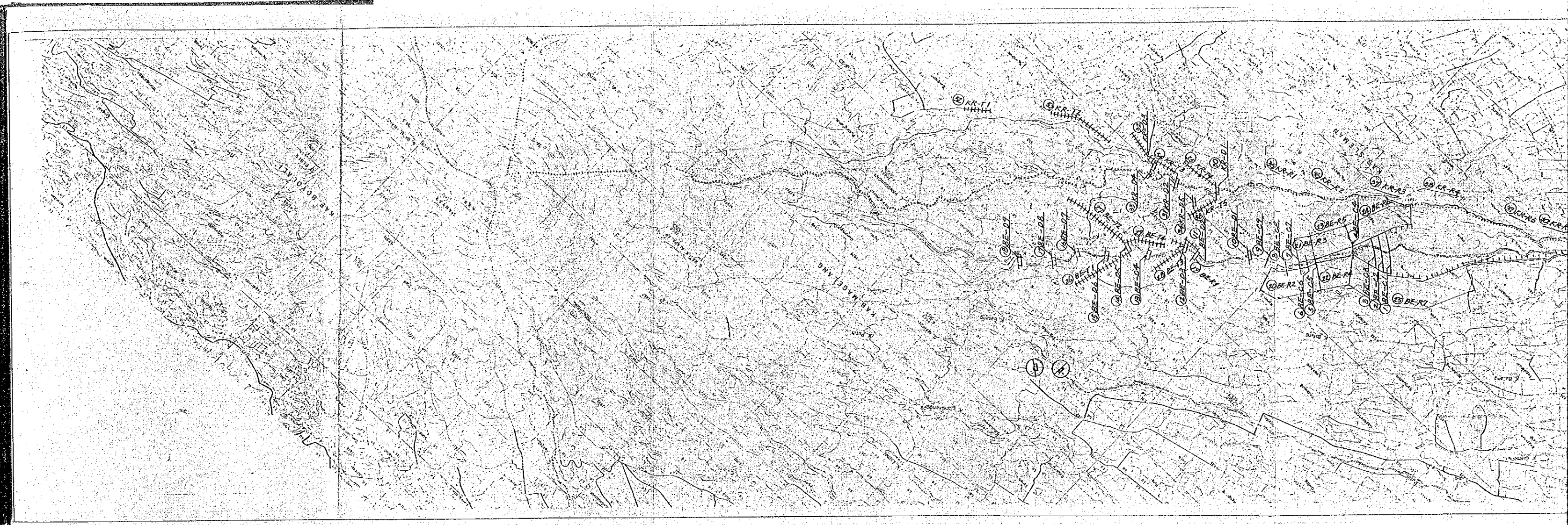
No.	Facility	Element			Construction Cost (Rp. x 1,000)	Volume of Sediment Production Suppression (1,000m ³)	Volume of Sediment Discharge Reduction (1,000m ³)	Volume of Sediment Discharge Control (1,000m ³)	Remarks
		Type	Height (m)	Length (m)					
20	B0 - B.1	Bridge			50,000				
21	B.2	"			50,000				
	Sub Total				1,257,720	515	(197)	269	
	Supplemental Works and Contingency				242,280				
	Total				1,500,000	515	(197)	269	

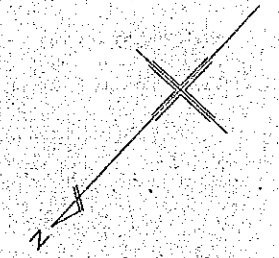
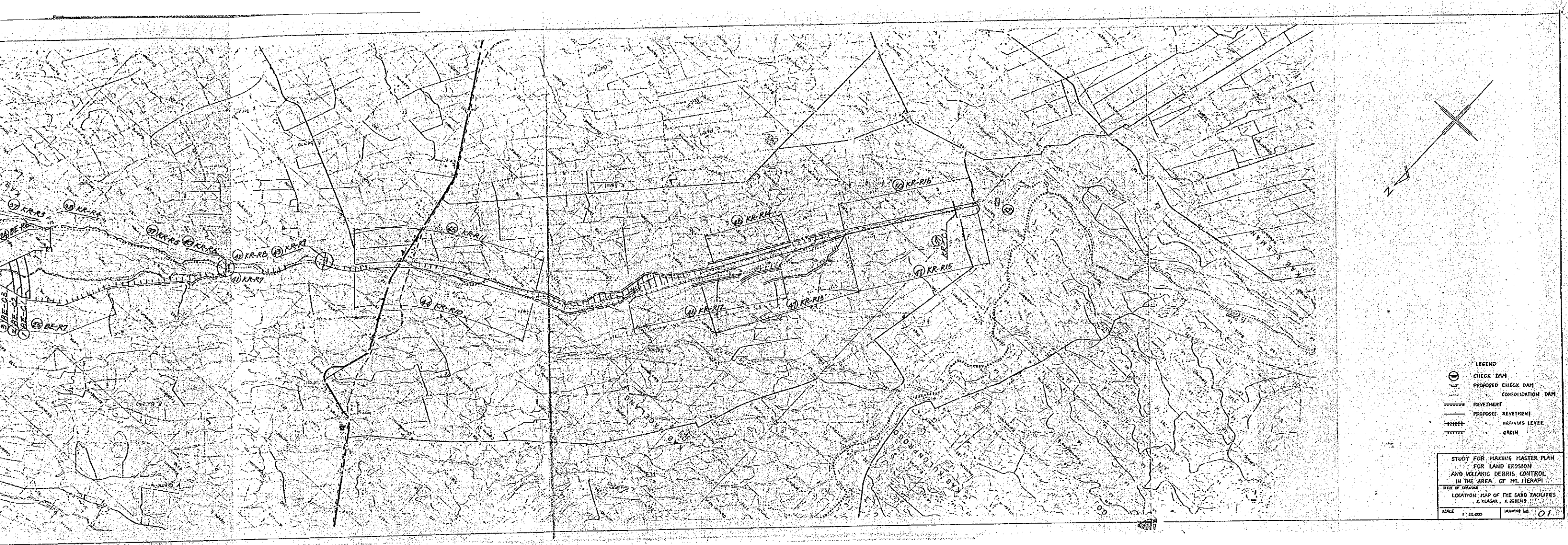
Table 8 工事費単価表

工事	型式	単価 (1000Rp.)	摘要
防波 及 床固工	粗石工州	14 /m ²	粗石:多
	"	19 "	" :少
護岸	砕工	11.2 "	
	A	59 /m	
	B-1	57 "	
	B-2	44 "	
	B-3	79 "	
	B-4	66 "	
	B-5	36 "	
	C	63 "	
	D-1	50 "	
	D-2	37 "	
	D-3	64 "	
	D-4	51 "	
	E	43 "	
F	24 "		
導流堤		150 /m	
水制工		33 /m	

工 事	単 価 (100/Rp)	摘 要
K. Work I 案 (掘削, 排除)		
1. 掘削費	225 000	$750 000 \text{ m}^3 \times 300 \text{ Rp/m}^3$
2. 貯水池底張(粘土)	45 000	$90 000 \text{ m}^2 \times 500 \text{ Rp/m}^2$
3. 貯水池側壁	66 300	$1300 \text{ m} \times 51 000 \text{ Rp/m}$
4. 捨土場所補償費	56 175	$21.4 \text{ ha} \times 875 000 \text{ Rp/ha} \times 5 \text{ Year}$
5. 捨土場所農地造成費	21 400	$21.4 \text{ ha} \times 1 000 000 \text{ Rp/ha} \text{ (水田)}$
工 事 費 計	413 875	
6. 維持管理費(掘削)	225 000	$750 000 \text{ m}^3 \times 300 \text{ Rp/m}^3$
合 計	638 875	
K. Work II 案 (庄下ボケット)		
1. 回堤	37 400	$850 \text{ m} \times 44 000 \text{ Rp/m} \text{ (B-2)}$
2. 河川改修(築堤)	52 800	$300 \text{ m} \times 2 \times 2 \times 44 000 \text{ Rp/m} \text{ (B-2)}$
3. 仮堤	29 250	$375 \text{ m} / \text{Block} \times 52 \text{ m} \times 300 \text{ Rp/m}^2 \times 3 \text{ Block}$
4. 補償	437 500	$50 \text{ ha} \times 875 \text{ Rp/ha} \times 10 \text{ Year}$
5. 農地復旧費	150 000	$50 \text{ ha} \times 3 000 000 \text{ Rp/ha} \text{ (水田)}$
合 計	706 950	
K. Work III 案 (堤防嵩上げ)		
築 堤	528 000	$1 200 \text{ m} \times 44 000 \text{ Rp/m} \text{ (B-2)}$

APPENDIX 4. DRAWINGS OF SABO FACILITIES





LEGEND

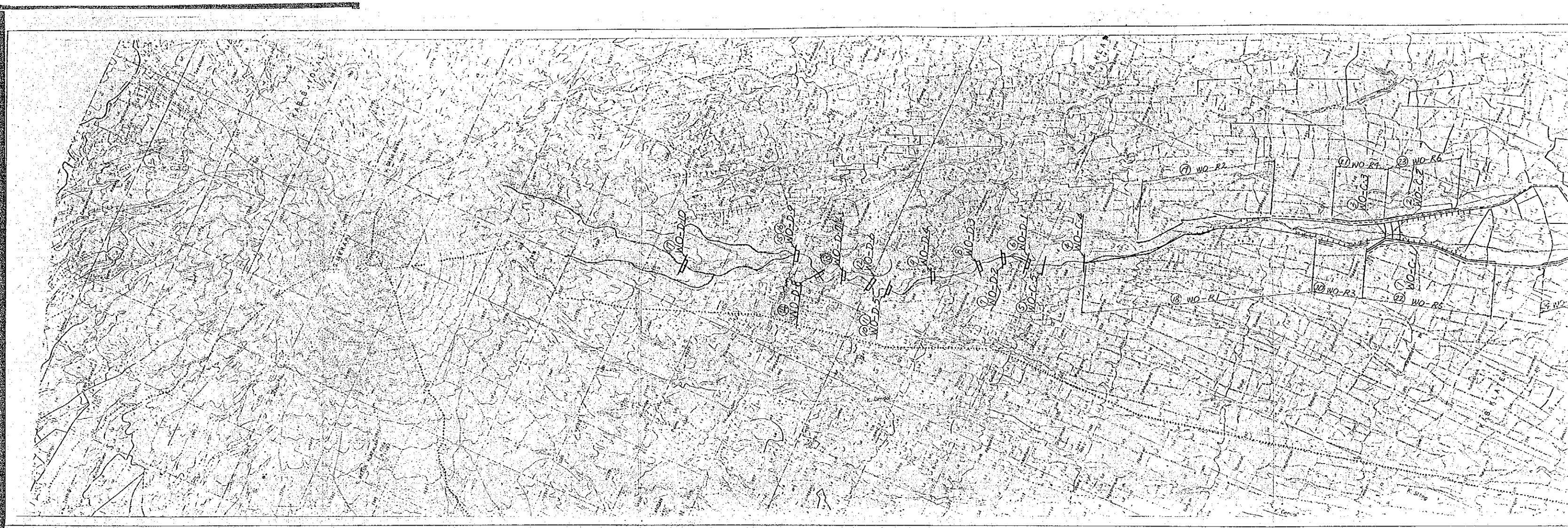
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- PROPOSED CHECK DAM
- CONSOLIDATION DAM
- REVEDMENT
- PROPOSED REVEDMENT
- HAWING LEVEL
- ORGIN

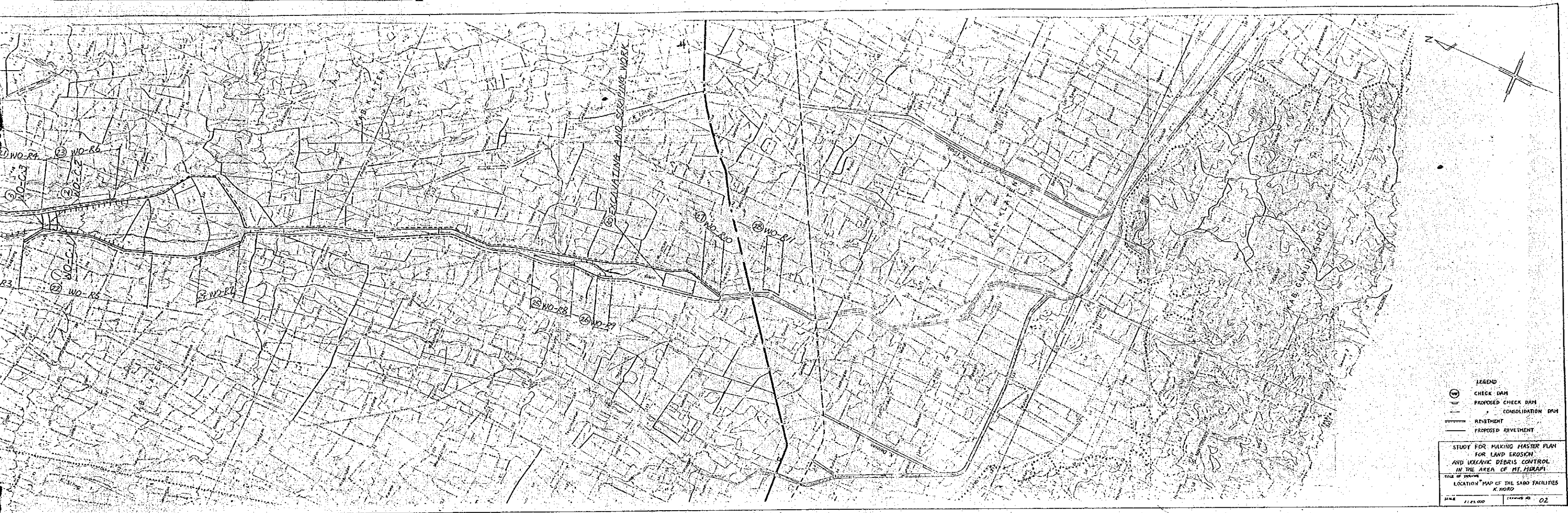
STUDY FOR MAKING MASTER PLAN
FOR LAND EROSION
AND WILFANG DEBRIS CONTROL
IN THE AREA OF MT. MERAPI

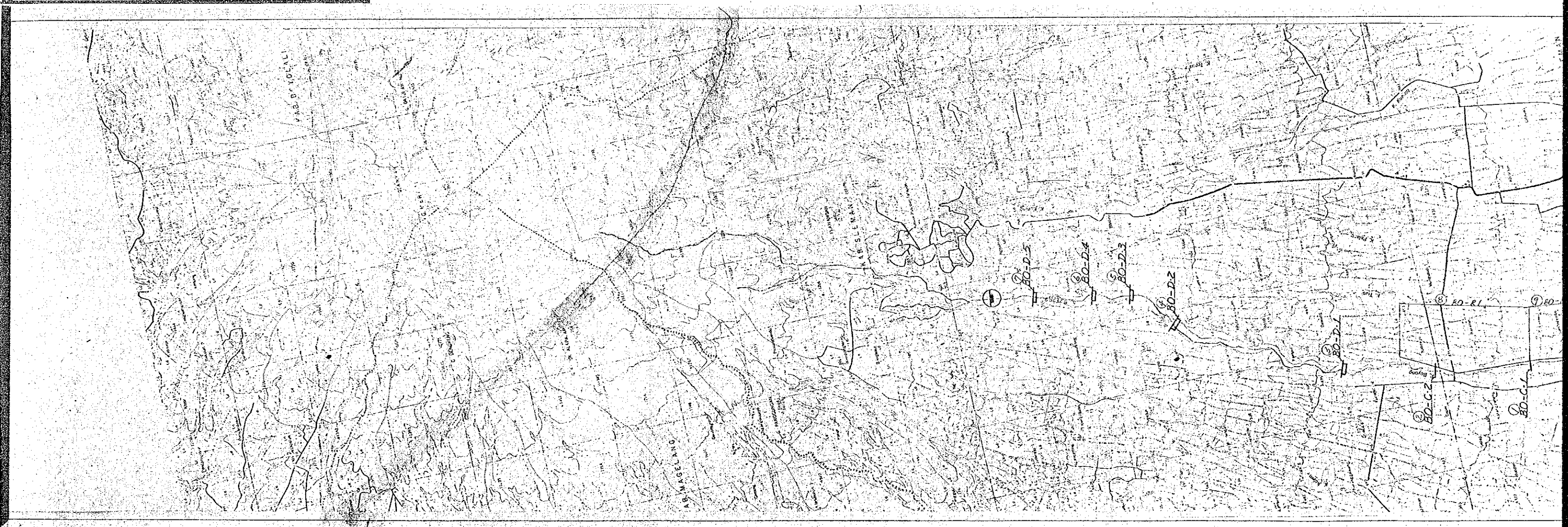
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K. VLADAR, A. BEBEN

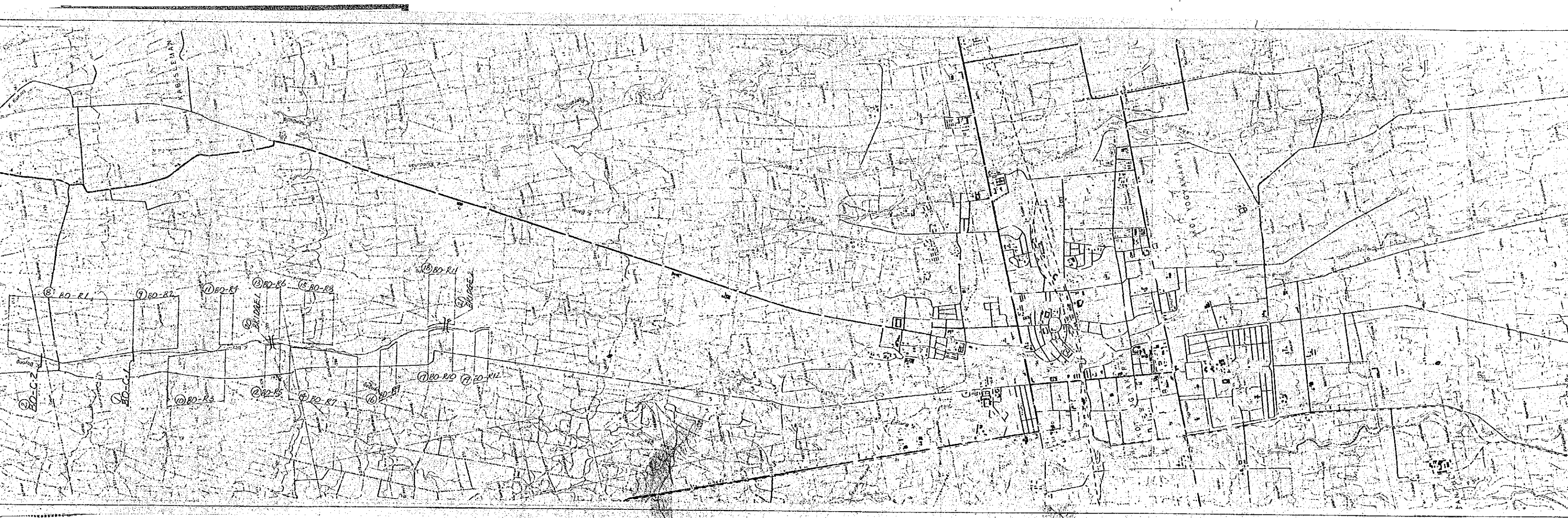
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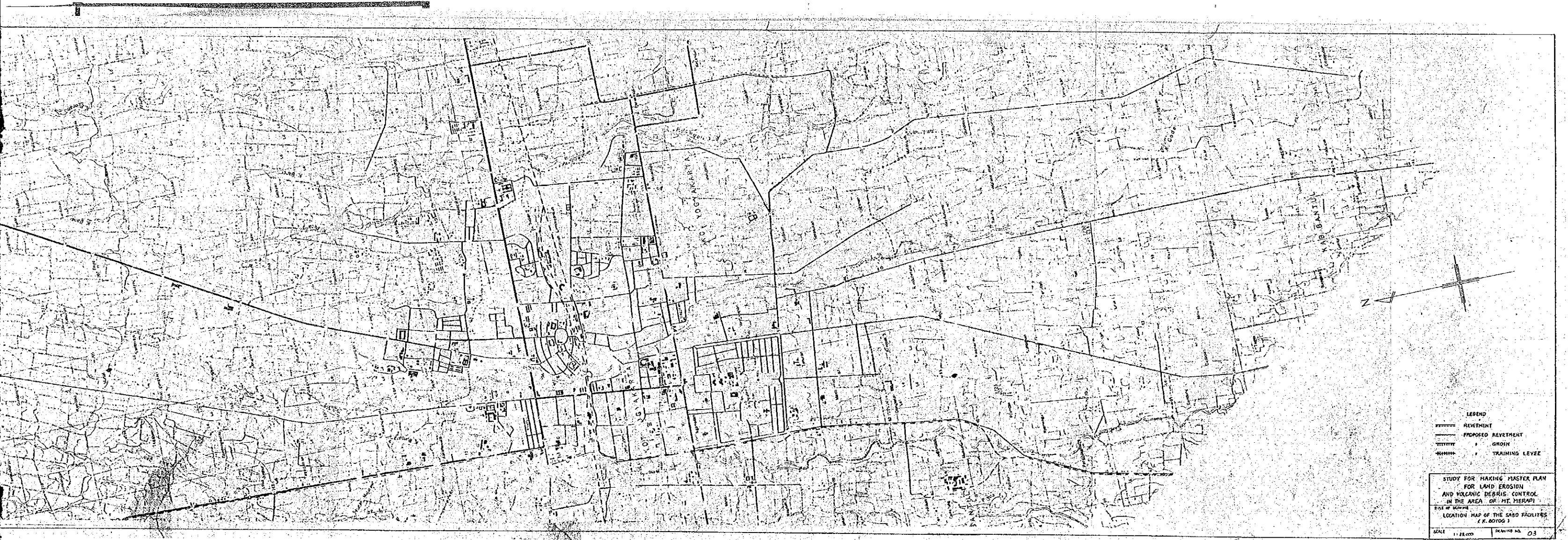






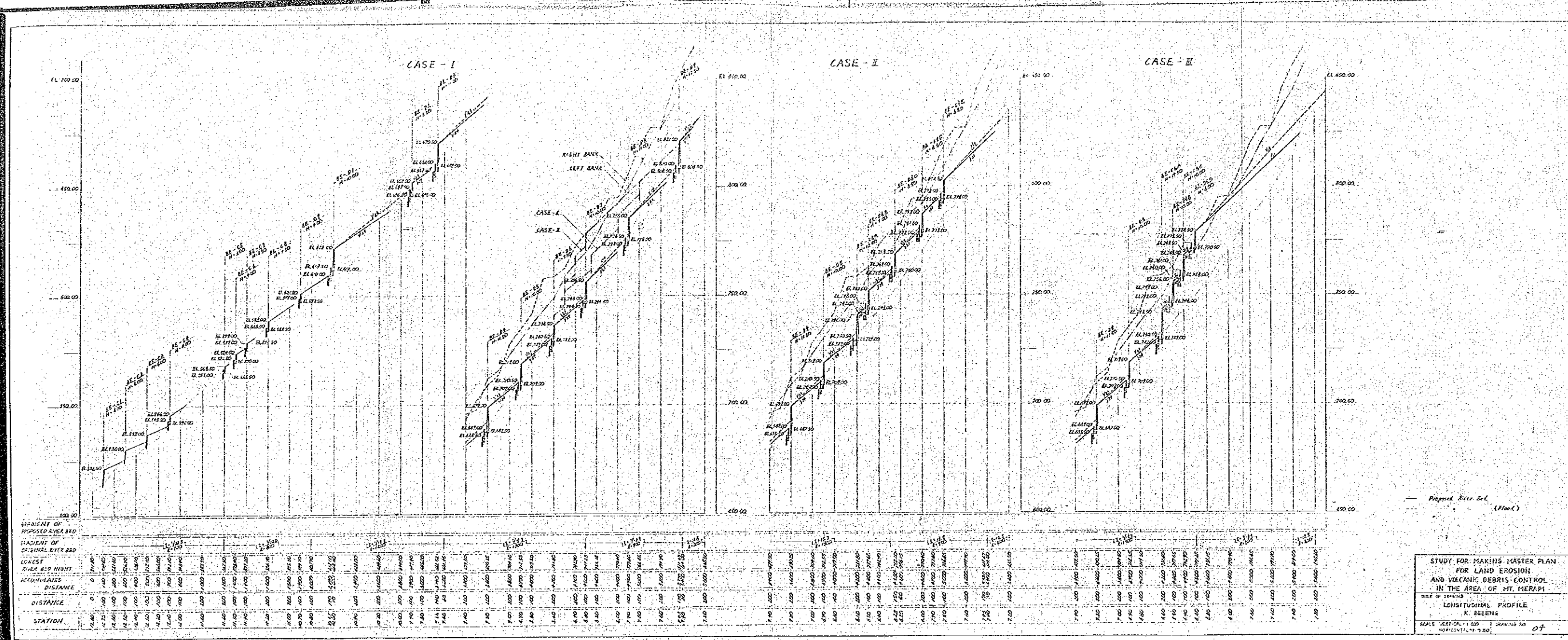






LEGEND
----- REVEGETMENT
———— PROPOSED REVEGETMENT
||||| GROIN
———— TRAINING LEVEE

STUDY FOR MAKING MASTER PLAN
FOR LAND EROSION
AND VOLCANIC DEBRIS CONTROL
IN THE AREA OF MT. MERAPI
SCALE 1:25,000 DRAWING NO. 03



Proposed River Bed
(Flow)

STUDY FOR MAKING MASTER PLAN
FOR LAND EROSION
AND VOLCANIC DEBRIS CONTROL
IN THE AREA OF MT. MERAPI
NAME OF DRAWN
LONGITUDINAL PROFILE
K. BEBENA
SCALE VERTICAL: 1:200 HORIZONTAL: 1:200

