ボリビア共和国
ボリビア国有鉄道

東部路線イピアス～ロボレ間鉄道災害復旧工事

第 1 巻　入札心得
第 2 巻　契約条件書
第 3 巻　一般仕様書
第 4 巻　技術仕様書
第 5 巻　数量明細書
第 6 巻　基本設計図

第 6 巻
基本設計図　(2)

昭和57年 1月

国際協力事業団

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RAILWAY REHABILITATION PROJECT, EASTERN LINE

(IPIAS – ROBORE)

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42	$378^{K}+436^{M}$ BRIDGE GENERAL VIEW
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SUM TOTAL QUANTITIES OF WORKS (ALL PROJECT)

Pay item No	Description of work item	Unit	Sum Total quantity	Surveying	Geological survey	Detailed design	Earth work	Road bed facilities	Box culvert	Bridge	Pipe culvert	Track materials	Track motor trolley	Administration building	Communication facilities	Remarks
1	Surveying	Lump sum	1	1												
2	Geological survey	Lump sum	1		1											
3	Detailed design	Lump sum	1			1										
4	Main line cuttings (soil mixed sand)	m³	11,000				11,000									
5	Main line cuttings (loose rock)	m³	1,000				1,000									
6	Temporary line cuttings (soil mixed sand)	m³	18,000				18,000									
7	Temporary line cuttings (loose rock)	m³	2,320				2,000									
8	Main line Embankments	m³	[illegible]				419,000									
9	Temporary line Embankments	m³	45,000				45,000									
10	Clearing and grubbing of river-bed	m³	118,000				118,000									
11	Excavation (soil mixed sand)	m³	[illegible]						10,150	8,370	20					
12	Excavation (loose rock)	m³	4,100						630	3,470						
13	Boulder	m³	153					103		50						
14	Leveling concrete	m³	738					3	500	230	5					
15	Retaining wall concrete	m³	310					310								
16	Open drainage concrete	m³	140					140								
17	Miscellaneous concrete	m³	40						40							
18	U-shaped retaining wall concrete	m³	1,810						1,790		20					
19	Structure-demolishing	m³	1,030					1,030								
20	Bridge abutment concrete	m³	7,590							7,590						
21	Bridge abutment foundation concrete	m³	2,600							2,600						
22	Bridge piere concrete	m³	460							460						
23	Bridge piere foundation concrete	m³	300							300						
24	Box culvert concrete	m³	3,600						3,600							
24-1	Corrugated pipe	m	8								8					
25	Reinforcing bar	kg	1,079,000					1,700	633,600	442,000	2,500					
26	Fabrication and placement of reinforcing bar	"	1,079,000					1,700	633,600	442,000	2,500					
26-1	Steel deck girder bridge for tangent track (Span 10m) Fabrication and delivery	Each	1							1						
26-2	-Do- Erection	Each	1							1						
26-3	-Do- Painting	Each	1							1						
27	Steel deck girder bridge for tangent track (Span 15m) Fabrication and delivery	Each	1							1						
28	-Do- Erection	Each	1							1						
29	-Do- Painting	Each	1							1						
30	Steel deck girder bridge for curved track (Span 15m) Fabrication and delivery	Each	2							2						
31	-Do- Erection	Each	2							2						
32	-Do- Painting	Each	2							2						
33	Steel through girder bridge for tangent track (Span 15m) Fabrication and delivery	Each	4							4						
34	-Do- Erection	Each	4							4						
35	-Do- Painting	Each	4							4						
36	Steel through girder bridge for tangent track (Span 20m) Fabrication and delivery	Each	8							8						
37	-Do- Erection	Each	8							8						
38	-Do- Painting	Each	8							8						
39	Steel deck girder bridge for curved track (Span 40m) Fabrication and delivery	Each	1							1						
40	-Do- Erection	Each	1							1						
41	-Do- Painting	Each	1							1						
42	Steel deck truss bridge for curved track (Span 40m) Fabrication and delivery	Each	3							3						
43	-Do- Erection	Each	3							3						
44	-Do- Painting	Each	3							3						
45	Steel through truss bridge for tangent track (Span 47m) Fabrication and delivery	Each	1							1						
46	-Do- Erection	Each	1							1						
47	-Do- Painting	Each	1							1						
48	Furnishing and delivering rail (37.2kg/m, 18m/one rail)	Each	2,270									2,270				
49	Furnishing and delivering joint bar (for 37.2kg/m rail)	Each	2,400									2,400				×1.04
50	Furnishing and delivering Bolt, Nut, Washer	Each	4,800									4,800				×1.04
51	Furnishing and delivering Screw Spike	Each	40,200									40,200				×1.04
52	Furnishing and delivering 110ps track motor trolleys	Unit	2										2			
53	Furnishing and delivering 30ps track motor trolleys	Unit	5										5			
54	Furnishing and delivering 40t track flat trolleys	Unit	2										2			
55	Furnishing and delivering 20t track flat trolleys	Unit	5										5			
56	Furnishing and delivering 10t track flat trolleys	Unit	2										2			
57	Furnishing and delivering 5t track flat trolleys	Unit	2										2			
58	New construction of engineer's office	m²	140											[illegible]		
59	New construction of engineer's lodgings	m²	470											470		
60	Communication facilities	Lump sum	1												1	[illegible]

ALL PROJECT

Eearth work (Porte 1)

Section From	Section To	Extension of diversion New line	Extension of diversion Temporary line	Main line Embankments New line	Main line Embankments Existing line	Main line cuttings (soil mixed sand) New line	Main line cuttings (soil mixed sand) Existing line	Main line cuttings (loose rock) New line	Temporary line Embankments	Temporary line cuttings (soil mixed sand)	Temporary line cuttings (loose rock)	Remarks
K M	K M	M	M	M³	M³	M³	M³	M³	M³	M³	M³	
339236.84	339423.6		877						1 600			2
339.50	339423.6				1 130							2
343228.4	343591.6		3674						8 160	0		2
343228.4	343591.6				1 490		200					2
347 317	347590		2292						7 300			
347 325	347500				1 730							
351 419 near					1 420							
352 183	352 375.5		1837						2 100	100		
352 284 near					955							
352645	353300	4550		32 740		1 560						
3545.6	356 571		7650						1 900	4 100		
3548.6	355571				100		5 770					
355900	356531.6	63-6		12 700		2 600						
357975	358300		3339						4 100	200		
358005	358250				120		110					
359056	359300		2455						1 300	100		
359.60	359300				370		120					
Total		2 sector M 9086.15	7 sector M 23264	61 440	2 410	4 100	6 200		26760	5 300		
				65 850		10 330						

Section From	Section To	Extension of diversion New line	Extension of diversion Temporary line	Main line Embankments New line	Main line Embankments Existing line	Main line cuttings (soil mixed sand) New line	Main line cuttings (soil mixed sand) Existing line	Main line cuttings (loose rock) New line	Temporary line Embankments	Temporary line cuttings (soil mixed sand)	Temporary line cuttings (loose rock)	Remarks
K M	K M	M	M	M³	M³	M³	M³	M³	M³	M³	M³	
359531	361407.27	1576.27		41 950		2 210						
361577	361920		3592						100	300		
361577	361920				570		650					
363307.5	363794.65	487.15		5 500		2 200						
364540	365000		4862						5 300	900		
364778 near					1 500		100					
367090	367454		3538						4 400	11 500	2 000	
367273 near					1 240							
376536	385272.09	9576.59		124 730		20 250						2
385550	387602	1752		23 440		15 740		1 000				
387 165	392883.93	5728.93		61 160		24 500						2
396 471	396696.5		2264						2 050			2
396500	396 674				50							2
397364	397563.3		2045						1 690			2
397370	397560				330		50					2
Total		5 sector 9220.15	5 sector 1680.1	316 940	3 210	57 900	550	1 000	19 240	12 700	2 000	
				350 150		60 700						
Sum Total		7 sector K M 26306.6	2 sector K M 3986.5	455 357	10 620	64 000	7 000	1 000	45 000	13 000	2 000	
				417 000		71 000						

Earth work (Porte 2)

Kilometrage	Clearing and grubbing of river-bed (soil mixed sand)	Remarks
K M	M³	
339 330 near	600	
343 4.0	1 300	
347 425	2 100	
353 020	18 000	
353 160		
354 940	3 300	
355 208	2 600	
355 443	2 800	
356 307	17 600	
358 165	15 600	
359 86	5 100	
360 345.5	5 100	
361 725	14 800	
363 575	7 700	
364 778	2 900	
367 273	100	
378 435	3 600	2
386 760	0 300	
396 583.5	2 400	2
397 462.5	1 500	2
Total	5 600	

Rooded facilities

Kilometrage	Structure Name	Structure Type	Boulder	Leveling concrete	Retaining wall	Open drainage	Reinforcing bar	Fabrication and placement of reinforcing bar	Structure demolishing	Remarks
K M		M	M³	M³	M³	M³	kg	kg	M³	
356 24	Oc	3×03	4	2		39	940	940		
353 325	Oc	1×04	4			25				
355 793	Oc	1×04	4			25				
355 950 near	■								110	
356 005 near	■		70		340					
357 400 near	■		10		50					
359 300	Oc	1×04	4			14				
362 427.5	Oc	1×04	4			16				
364 778 near	Oc								920	
374 363	Oc	1×04	3	1		30	760	760		
Total			103	3	390	140	1700	1700	1030	

QUANTITY TABLE
(Sheet 2 OF 5)

ALL PROJECT

BOX CULVERT

Kilometerage	Inside dimention clear span x hight	Skew	Execution method	Excavation: Soil mixed sand	Excavation: Loose rock	Miscellaneous concrete	U-shaped retaining wall concrete	Leveling concrete	Box culvert concrete	Reinforcing bar	Fabrication and placement of reinforcing bar (kg)	Remarks
K M	M M			M³	M³	M³	M³	M³	M³	kg	kg	
348 330	2.0 x 1.5	Right angle	Live line				9	9	19	2700	2720	
351 100	2.5 x 2.0	-Do-	-Do-				77	8	26	8370	8370	
351 419	2.5 x 2.0	-Do-	-Do-	110			22	13	55	21600	21600	
352 284	5.0 x 4.0	-Do-	Temporary line		550	12	117	33	123	16250	16250	
353 020	7.0 x 6.0	45° right hand	New line	220			375	26	1033	154000	153000	
353 160	7.0 x 5.0	75° left hand	-Do-	430	350		163	41	312	65500	65500	
353 930	2.0 x 2.0	Right angle	Live line				13	8	33	6550	6550	
354 430	1.5 x 1.5	-Do-	-Do-			6	3	7	21	5000	5000	
355 365	2.0 x 1.5	-Do-	Temporary line	[illegible]			10	5	21	4330	4330	
356 907	1.5 x 1.0	-Do-	Live line			7	17	10	31	6110	6110	
357 032	1.0 x 1.0	-Do-	-Do-				5	4	17	3010	3010	
357 536	1.5 x 1.0	-Do-	-Do-			5	7	6	23	7230	7230	
358 700	1.5 x 1.0	-Do-	-Do-				5	3	10	1550	1550	
358 869	1.5 x 1.5	-Do-	-Do-			5	10	4	20	3860	3860	
358 980	1.5 x 1.5	-Do-	-Do-			5	11	6	25	9550	9550	
360 925	2.5 x 2.0	-Do-	New line	20			21	11	37	11330	11330	
360 986	2.5 x 2.0	-Do-	-Do-	20			13	13	71	17110	17110	
361 130	2.5 x 2.0	-Do-	-Do-	30			13	8	36	7120	7120	
364 778	2x5.0x4.0	60° right hand	Temporary line	7720			255	43	701	95550	95550	
367 273	5.0 x 5.0	Right angle	-Do-	1500			173	43	221	48700	48700	
377 827.5	2.0 x 1.5	-Do-	New line	50			11	4	17	3650	3650	
Total	21 place			8830	590	40	1384	361	3242	412590	412590	

Kilometerage	Inside dimention clear span x hight	Skew	Execution method	Excavation: Soil mixed sand	Excavation: Loose rock	Miscellaneous concrete	U-shaped retaining wall concrete	Leveling concrete	Box culvert concrete	Reinforcing bar	Fabrication and placement of reinforcing bar (kg)	Remarks
K M	M M			M³	M³	M³	M³	M³	M³	kg	kg	
378 650	0.8 x 1.1	Right angle	New line	10			6	2	7	1550	1550	2
379 360	1.0 x 1.55	-Do-	-Do-	37			9	4	16	5130	5130	2
380 537	1.0 x 1.5	-Do-	-Do-	40			9	5	19	3570	3570	2
381 245	1.0 x 1.5	-Do-	-Do-	30			9	4	13	3030	3030	2
383 821	1.6 x 1.6	-Do-	-Do-	30			11	5	13	3330	3330	2
384 787	0.8 x 1.5	-Do-	-Do-	20			8	3	13	2680	2680	2
385 215.3	0.8 x 1.0	-Do-	-Do-	50			6	4	15	2770	2770	2
387 050	3.5 x 3.0	-Do-	-Do-	80	40		35	11	55	17100	17100	
387 525.5	0.8 x 1.55	-Do-	-Do-	20			7	3	11	2180	2180	2
387 946	0.65 x 2.0	-Do-	-Do-	30			12	3	9	2620	2620	2
388 908.5	0.8 x 1.1	-Do-	-Do-	30			6	3	15	2160	2160	2
389 654.5	0.8 x 1.5	-Do-	-Do-	30			7	3	10	2310	2310	2
389 886.5	2x3.0x2.5	-Do-	-Do-	80			42	14	45	12360	12360	2
390 936.5	1.65 x 1.5	-Do-	-Do-	30			9	4	11	2750	2750	2
391 062.5	2x2.5x2.0	-Do-	-Do-	110			24	10	32	7380	7380	2
391 290.5	2x2.5x2.0	-Do-	-Do-	30			37	12	45	7440	7440	2
391 603.2	2x2.6x2.0	-Do-	-Do-	20			23	10	33	7630	7630	2
391 935.5	4.0 x 3.5	-Do-	-Do-	120			55	13	57	13330	13330	2
395 507	2x3.5x3.0	-Do-	Live line	320			75	26	118	21310	21410	2
Total	19 place			1320	40	0	386	139	358	121010	121010	
Sum Total	40 place			10150	630	40	1770	500	3600	533600	533600	412590 + 121010 = 533600

Pipe culvert

Kilometerage	Inside diameter	Skew	Execution method	Excavation: Soil mixed sand	Excavation: Loose rock	Miscellaneous concrete	U-shaped retaining wall concrete	Leveling concrete	Corrugated pipe	Reinforcing bar	Fabrication and placement of reinforcing bar (kg)	Remarks
K M	M			M³	M³	M³	M³	M³	M	kg	kg	
383 935	φ=1.8	Right angle	New line	20			20	5	8	2500	2500	[illegible]
Sum Total	1 place			20			20	5		2500	2500	

QUANTITY TABLE

(Sheet 3 of 5)

ALL PROJECT

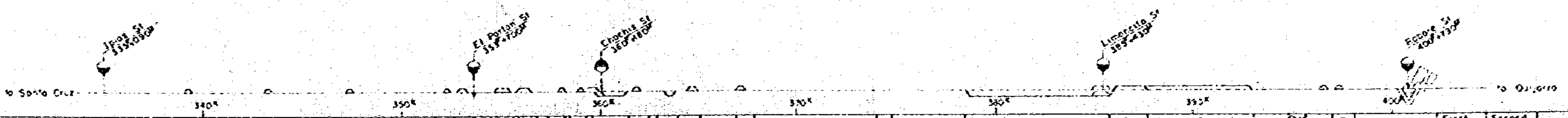
BRIDGE

Chainage	Structure: Type	Structure: Span	Bridge length	Construction method	Excavation: Common soil	Excavation: Loose rock	Boulder	Leveling concrete	Bridge abutment concrete	Bridge abutment foundation concrete	Bridge pier concrete	Bridge pier foundation concrete	Reinforcing bar	Fabrication and placement of reinforcing bar
k m		m	m		m³	m³	m³	m³	m³	m³	m³	m³	kg	kg
339 330	St	1×4.5	4	Ordinary line	310	–		5	151	103			3 900	3 900
343 410	St	1×4.5	4	-Do-	280	–		9	334	117			14 700	14 700
347 428	St	1×4.5	4	-Do-	443	–		11	397	117			17 000	17 000
354 543	St	1×4.5	14	-Do-	295	130		12	372	117			18 000	18 000
355 208	St	1×4.5	14	-Do-	240	25		12	392	117			16 700	16 700
356 448	St	1×4.5	14	-Do-	260	28		13	392	117			12 700	12 700
356 307	Tr	1×40	38	New line	1065	38		21	1390	362			21 700	21 700
358 55	Tr	1×40	38	Ordinary line	772	243		14	222	190			37 400	37 400
359 66	St	1×4.5	14	-Do-	185	103		13	320	117			21 400	21 400
360 364.5	Tr	1×65	65	New line	120	220		14	690	330			16 700	16 700
361 725	Tr	1×40	38	Ordinary line	550	340		12	278	210			44 100	44 100
363 375	St	1×40	38.4	New line	200	277		5	128	280			35 100	35 100
378 436	St	3×20	60.2	-Do-	183	–		5	356	134	190	225	23 200	23 200
386 730	St	4×20	8	-Do-	720	–	52	43	328	135	250	160	27 600	27 600
388 358	St	1×10	9	-Do-	260	–		7	140	72			10 400	10 400
396 563.5	St	2×4.5	28.5	Ordinary line	310	–		7	300	90			10 200	10 100
397 462.5	St	1×20	18.5	-Do-	320	–		10	205	72	30	35	12 300	12 300
Total	17	23	542	New line 4 places, Ordinary line 13 places	4570	3470	52	230	7 590	2 650	440	300	412 000	412 000

Chainage	Steel deck girder bridge for tangent track (span 6m): Fabricating and delivery	Erection	Painting	Steel deck girder bridge for tangent track (span 5m): Fabricating and delivery	Erection	Painting	Steel deck girder bridge for curved track (span 6m): Fabricating and delivery	Erection	Painting	Steel through girder bridge for tangent track (span 5m): Fabricating and delivery	Erection	Painting	Steel through girder bridge for tangent track (span 20m): Fabricating and delivery	Erection	Painting	Steel deck girder bridge for curved track (span 40m): Fabricating and delivery	Erection	Painting	Steel deck truss bridge for curved track (span 40m): Fabricating and delivery	Erection	Painting	Steel through truss bridge for tangent track (span 65m): Fabricating and delivery	Erection	Painting
	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each
339 330										1	1	1												
343 410							1	1	1															
347 428							1	1	1															
354 543										1	1	1												
355 208										1	1	1												
356 448										1	1	1												
356 307																			1	1	1			
358 55																			1	1	1			
359 66				1	1	1																		
360 364.5																						1	1	1
361 725																			1	1	1			
363 375																1	1	1						
378 436													3	3	3									
386 730													1	1	1									
388 358	1	1	1																					
396 563.5										2	2	2												
397 462.5													1	1	1									
Total	1	1	1	1	1	1	2	2	2	6	6	6	5	5	5	1	1	1	3	3	3	1	1	1

QUANTITY TABLE
(Sheet 4 Of 5)

WORK DESCRIPTION AND MATERIAL SUPPLY CONSTRUCTED BY ENFE

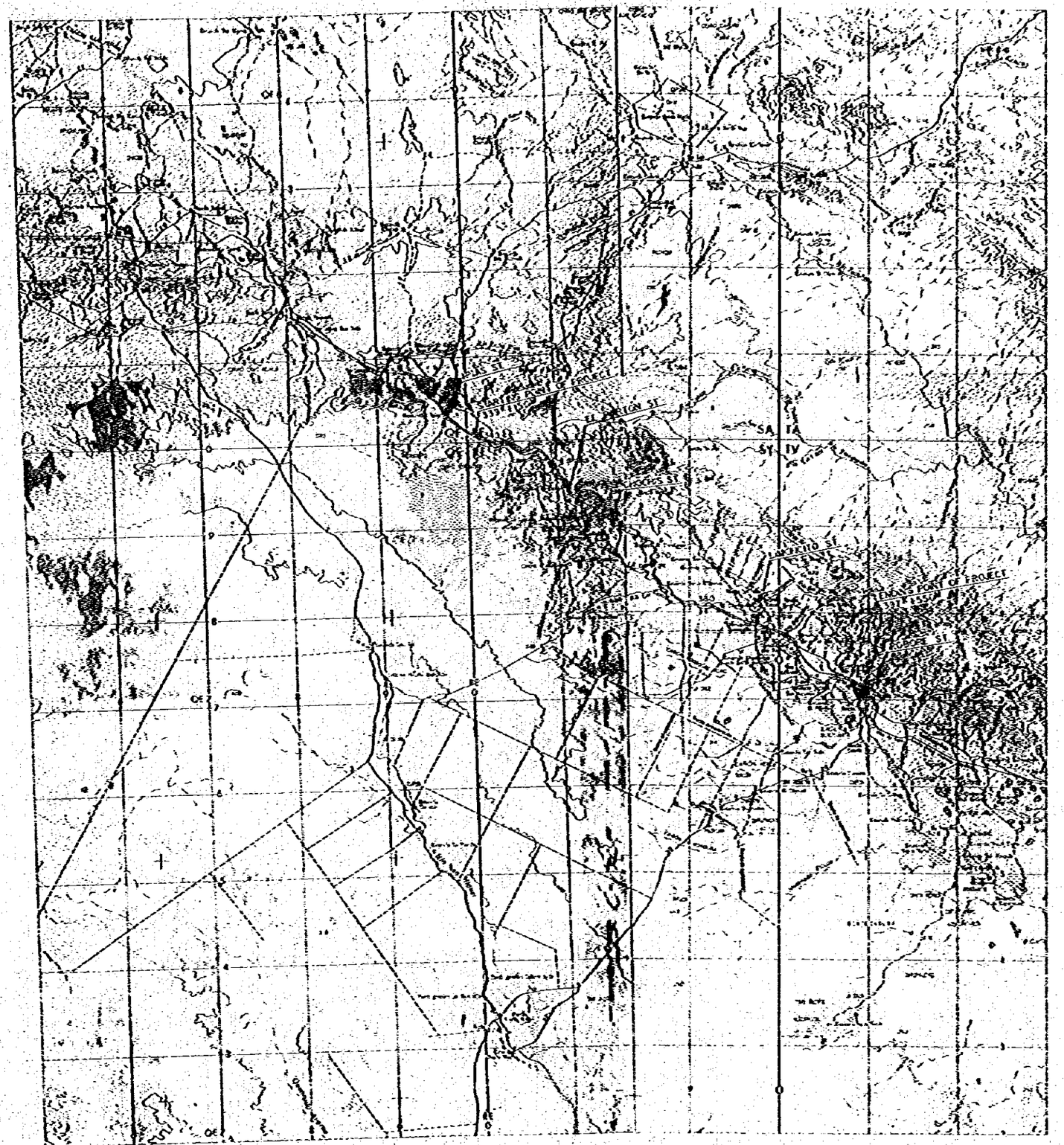


Description of work / Station		Unit	340K		Ca1	(T)	Ca2	(T)	(N)	Cx	(T)	(N)	(T)	(T)	(N)	(T)	(N)	(T)	(T)	Cx	(N)	(N)	(N)	Ca	(T)	(T)	First stage	Second stage	Total
Temporary Line	Laying	m	277	329		292		321			253		329	293		392		462	2[illegible]						2664	2245	3000.5	786	3786.5
	Removal	m	277	477		292		287			353		329	292		392		462	2[illegible]						2264	2245	3000.5	786	3786.5
	Rail (Bineas length per each)	pcs	22	42		25		22			85		32	18		42		29	42						26	29	337	114	451
	Joint bar	pcs	28	48		32		28			92		44	32		44		60	45						32	28	380	136	516
	Bolt, Nut, Washer for joint bar	pcs	55	76		64		56			184		88	64		88		120	56						64	56	760	272	1032
	Drive spike	pcs	[illegible]	[illegible]		[illegible]		[illegible]			4132		[illegible]	[illegible]		[illegible]		[illegible]	[illegible]						459	1316	17310	6392	25740
	Regular tie	pcs	277	[illegible]		333		304			1233		[illegible]	[illegible]		577		733	[illegible]						314	225	1837	1454	2291
	Diversion (existing line, temporary line)	pcs	2	2		2		2			2		2	2		2		2	2						2	2	16	2	18
Existing Line	Removal and restoration (for Temporary line)	m	52	52		59					158		84	59		80									50	50	440	110	550
	Rail beam construction and dismantling	pcs			1		2			3		3												1			15	2	17
New Line	Laying (for New line)	m							555			375			15762		227				7676	11320	5727				4791.58	15495	20306.8
	Rail (Bineas length per each)	pcs							52			71			176		55				1076	155	636				550	1720	2270
	Welding of rail	pcs							65			36			28		23				538	78	318				276	856	1132
	Joint bar	pcs							54			76			178		60				1020	200	650				600	1800	2400
	Bolt, Nut, Washer for joint bar	pcs							112			152			355		120				2110	400	1280				1200	3600	4800
	Drive spike	pcs							[illegible]			[illegible]			2132		354				4320	11292	2520				33000	7200	40200
	Regular tie	pcs							790			[illegible]			2927		718				15434	2287	9210				7522	24694	32216
	Bridge tie	pcs	2[illegible]	28		27					87	78	76	27	112	72	78				76	136	19		52	36	725	239	964
	Ballast	m³							553			853			2110		553				12900	2340	7690				L-765 6560	20540	27100
	Diversion (temporary line, new line)	pcs		2		2		2	2		2	2	2	2	2	2	2	2	2		2	2	2		2	2	26	12	38
Materials Line	Turnout 10# Laying and removal	pcs													2												2	–	2
	Turnout 8# Laying and removal	pcs													4												4	–	4
	Laying and removal	m													210												310	–	210
	Rail (Bineas length per each)	pcs													90												90	–	90
	Joint bar	pcs													172												172	–	172
	Bolt, Nut, Washer for joint bar	pcs													344												344	–	344
	Drive spike	pcs													6032												6032	–	6032
	Regular tie	pcs													1508												1508	–	1508
Box culvert Open drainage	Excavation	m³			110		500			600		30	60	30	30		30			23							3400	80	3480
	Refilling	m³			10		300			550		30	60	40	30		30			20							2090	50	2690
	Embankment	m³			–		150			100			30	110													2200	–	2200
Communication	Relocation	m	300	300		200		200	500		300	200	300	300		500		500	400			1300	5400		200	300	6800	6300	13100
Stage			2	2																2	2		2		2	2			

LEGEND

- (T) Temporary line portion
- (N) New line portion
- Cb Box culvert
- Co Open drainage
- Temporary line laying and removal
- Existing line removal and restoration
- Temporary line removal (not included)
- New line laying
- Figures in [ ] are net values of materials which the contractor will furnish and hand over to ENFE
- ------- Second stage construction

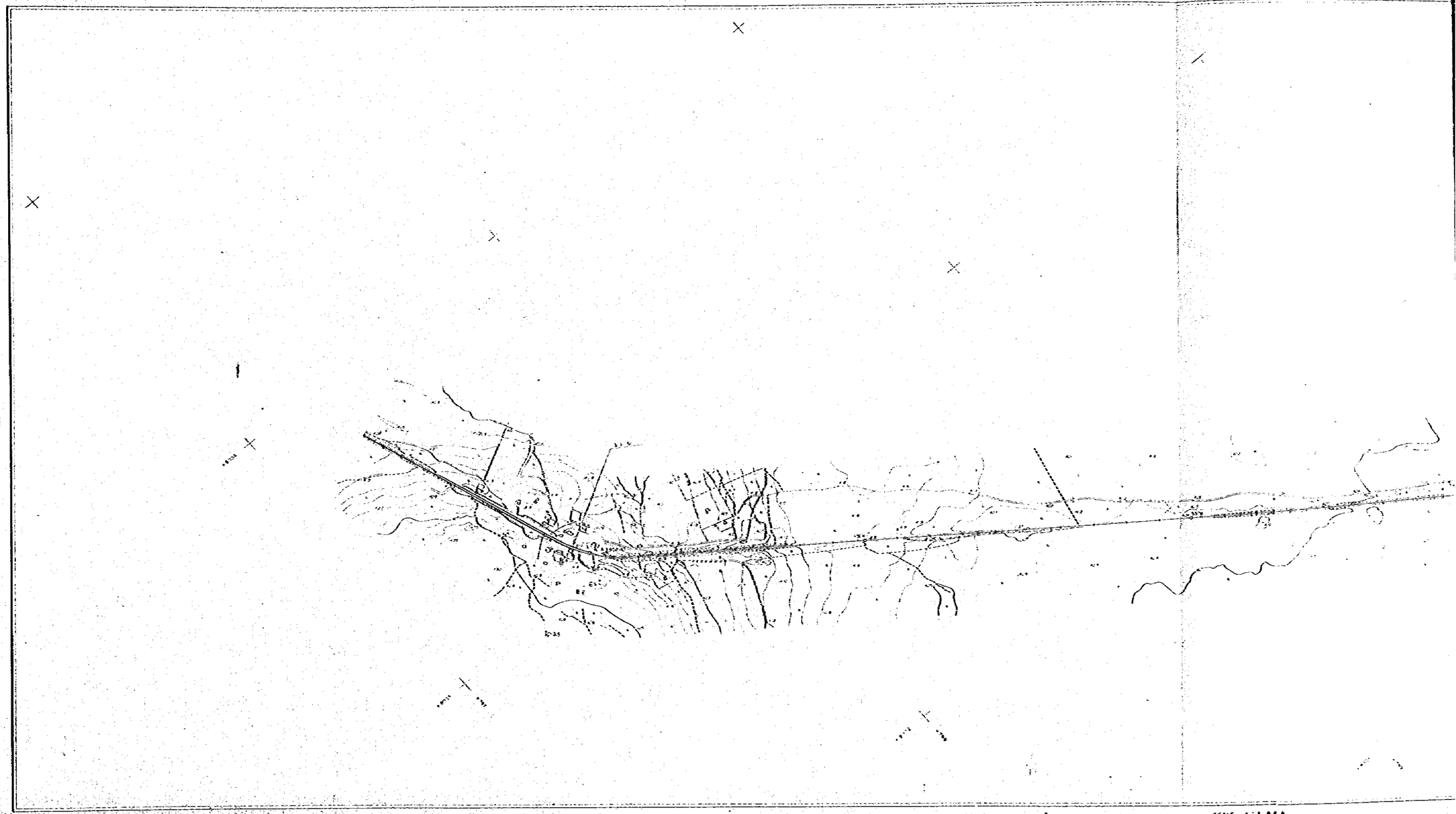
QUANTITY TABLE
(Sheet 5 OF 5)



LOCATION MAP
S=1.250,000

1 : 5000
BOLIVIA

RAILWAY REHABILITATION PROJECT(IPIAS

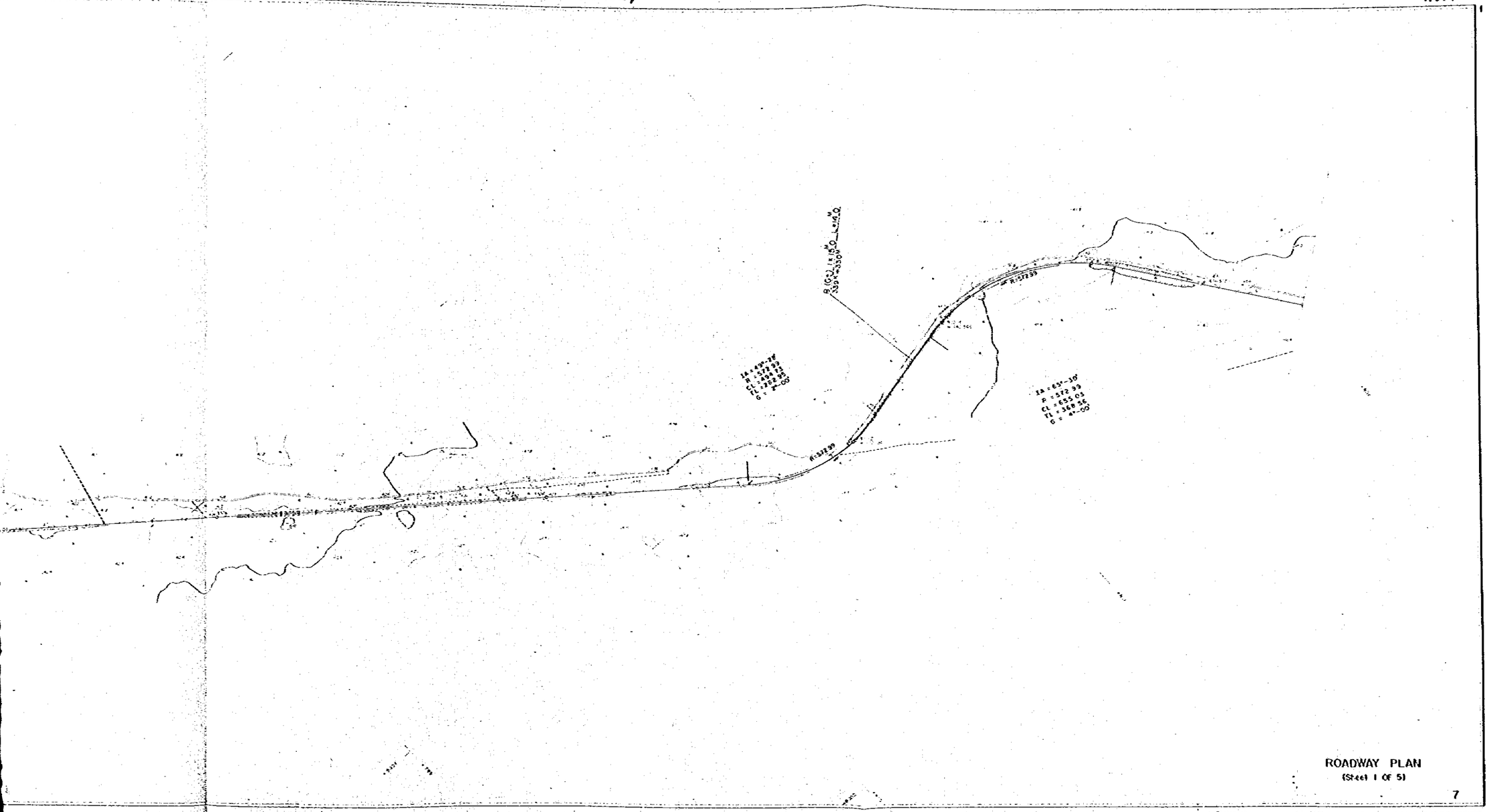


NO.1 JAPAN INTERNATIONAL COOPERATION AGENCY

SCALE 1:5,000
METERS

Y REHABILITATION PROJECT(IPIAS-ROBORE)

NO. 1



ROADWAY PLAN
(Sheet 1 OF 5)

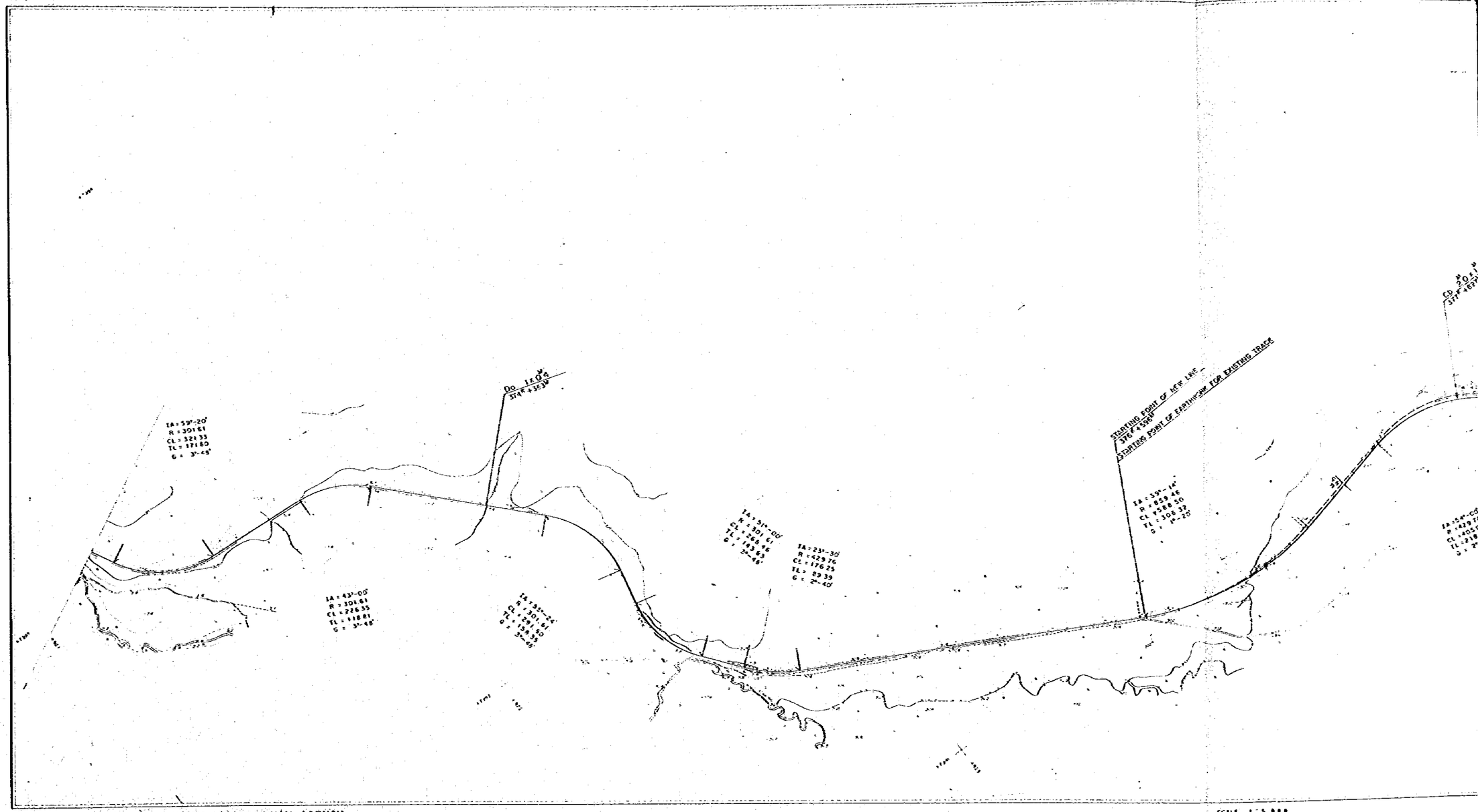
7

SCALE 1:5,000
METERS

1 Photography ..... July 1979
2 Revision ..... September 1981
3 Ground control survey ..... June 1981
4 Field Surveys ..... June 1981

1 : 5000
BOLIVIA

RAILWAY REHABILITATION PROJECT(IPIAS-

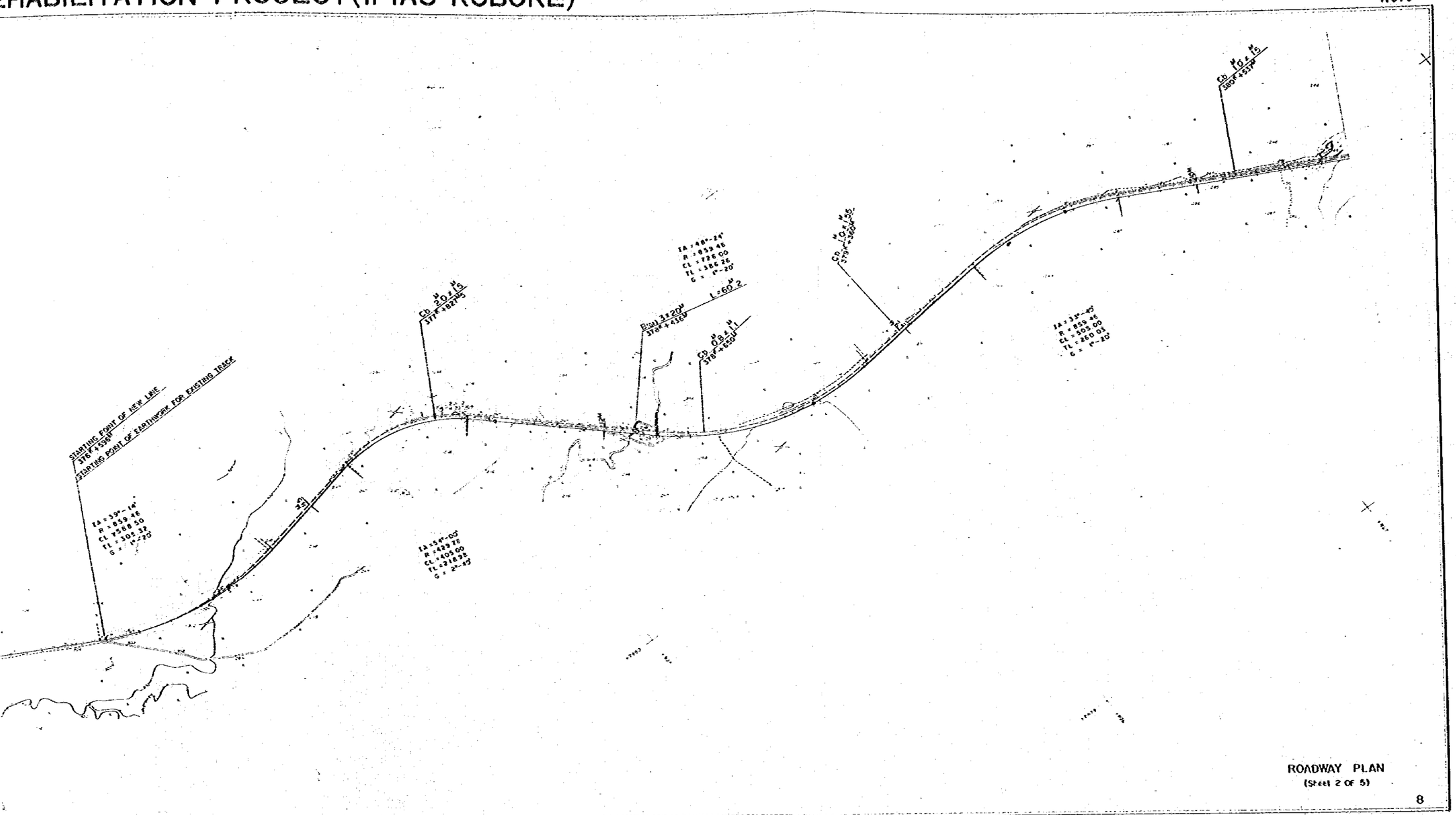


NO.6 JAPAN INTERNATIONAL COOPERATION AGENCY

SCALE 1:5,000
METERS

EHABILITATION PROJECT(IPIAS-ROBORE)

NO.6



ROADWAY PLAN
(Sheet 2 OF 5)

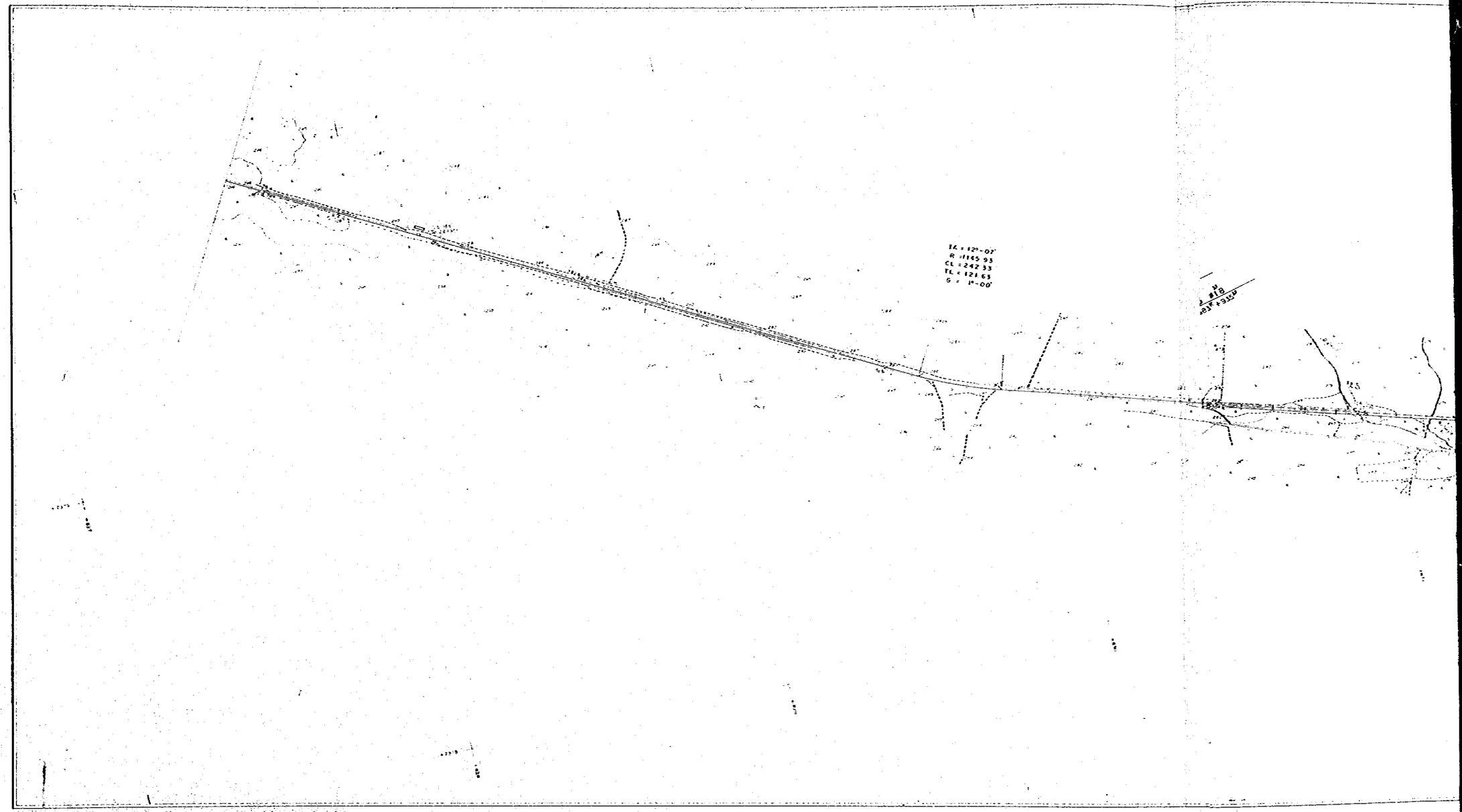
8

SCALE 1:5,000
METERS

1. Photography ---------- July 1978
2. Restitution ---------- September 1981
3. Ground control survey -- June 1981
4. Field identification ---- June 1981

1 : 5000
BOLIVIA

RAILWAY REHABILITATION PROJECT(IPIAS

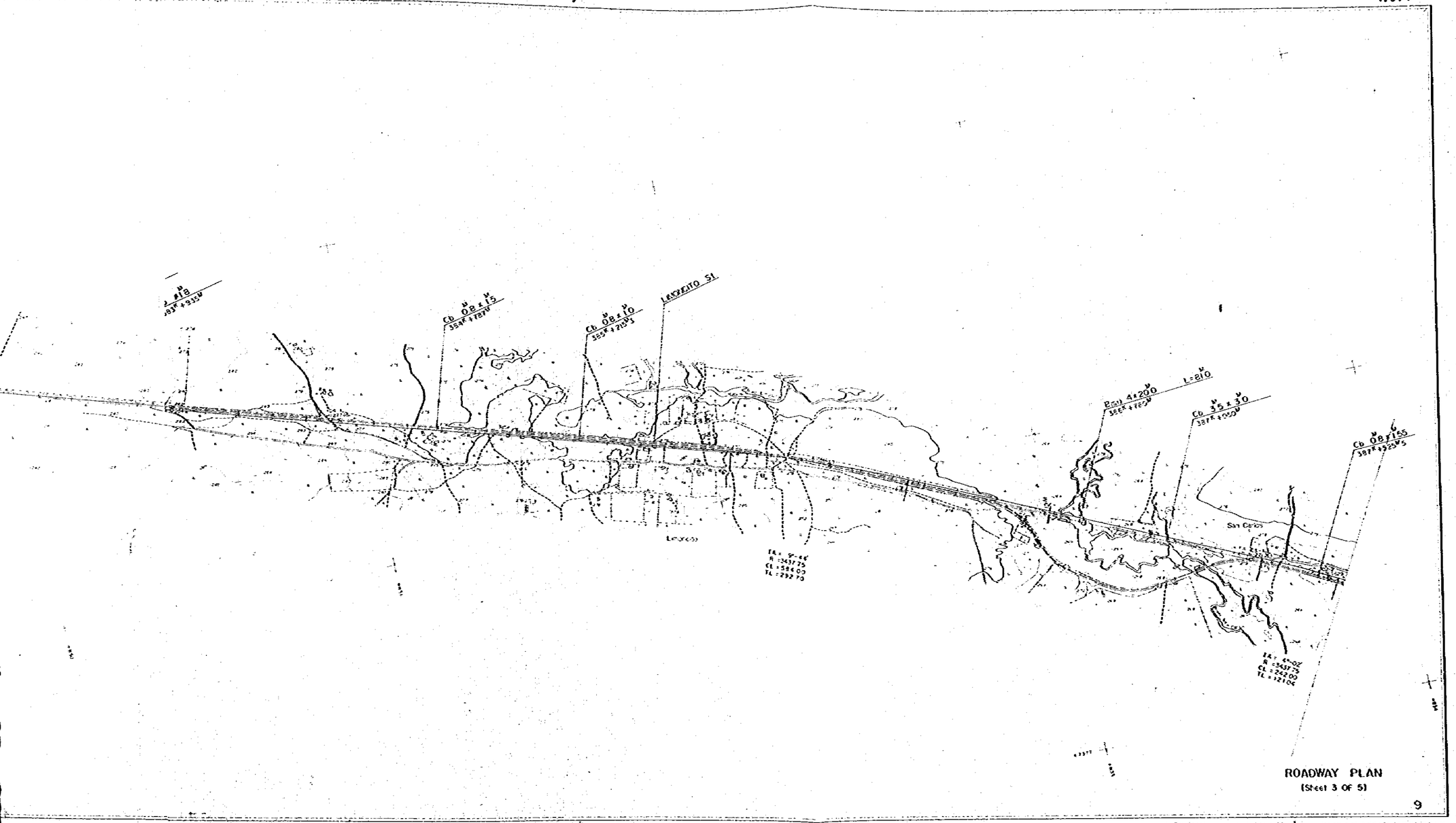


NO.7 JAPAN INTERNATIONAL COOPERATION AGENCY

SCALE 1:5,000
METERS

EHABILITATION PROJECT(IPIAS-ROBORE)

NO. 7



ROADWAY PLAN
(Sheet 3 OF 5)

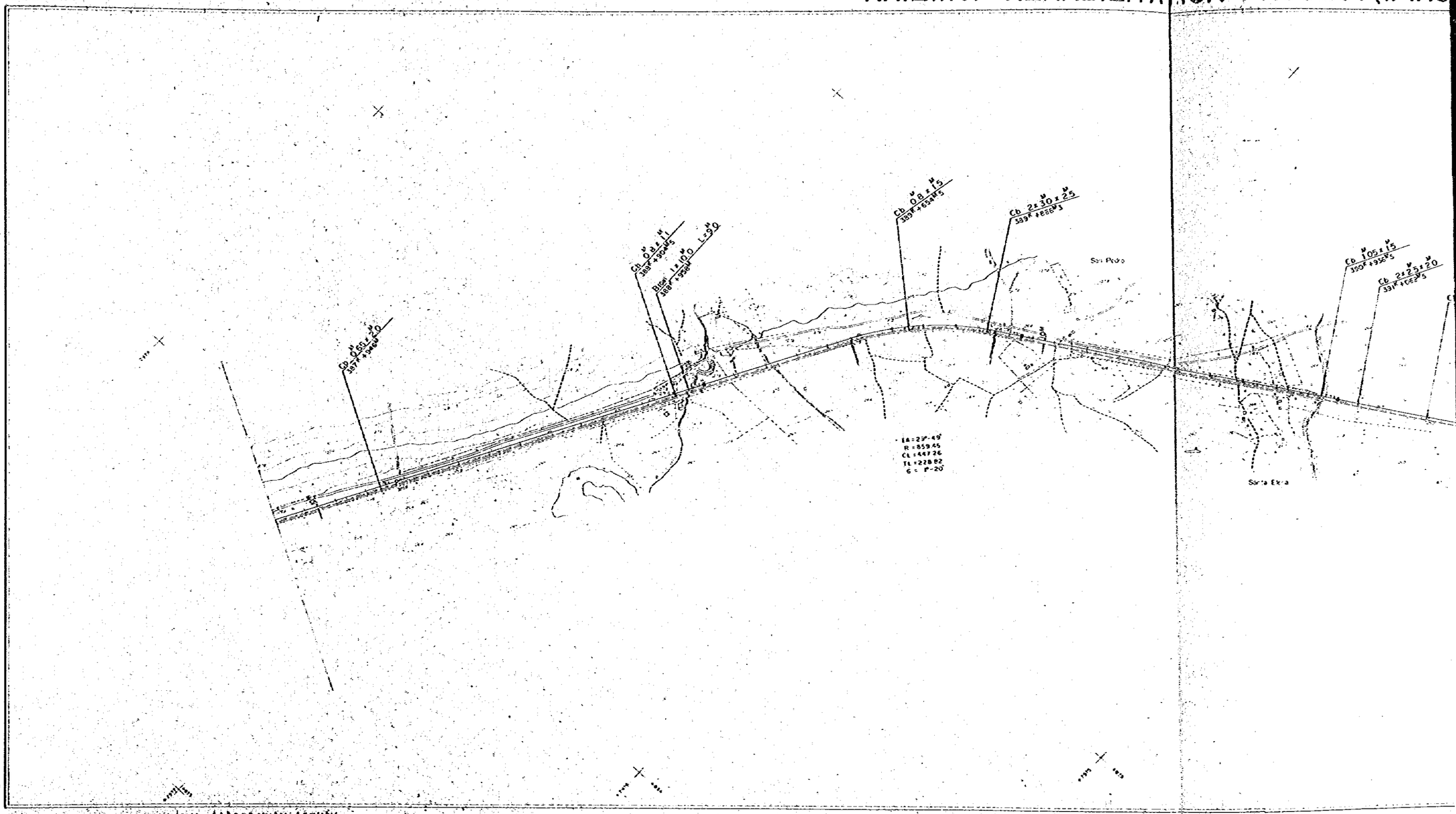
9

SCALE 1:5,000
METERS

1. Photography ..... July 1979
2. Restitution ..... September 1981
3. Ground control survey ..... June 1981
4. Field identification ..... June 1981

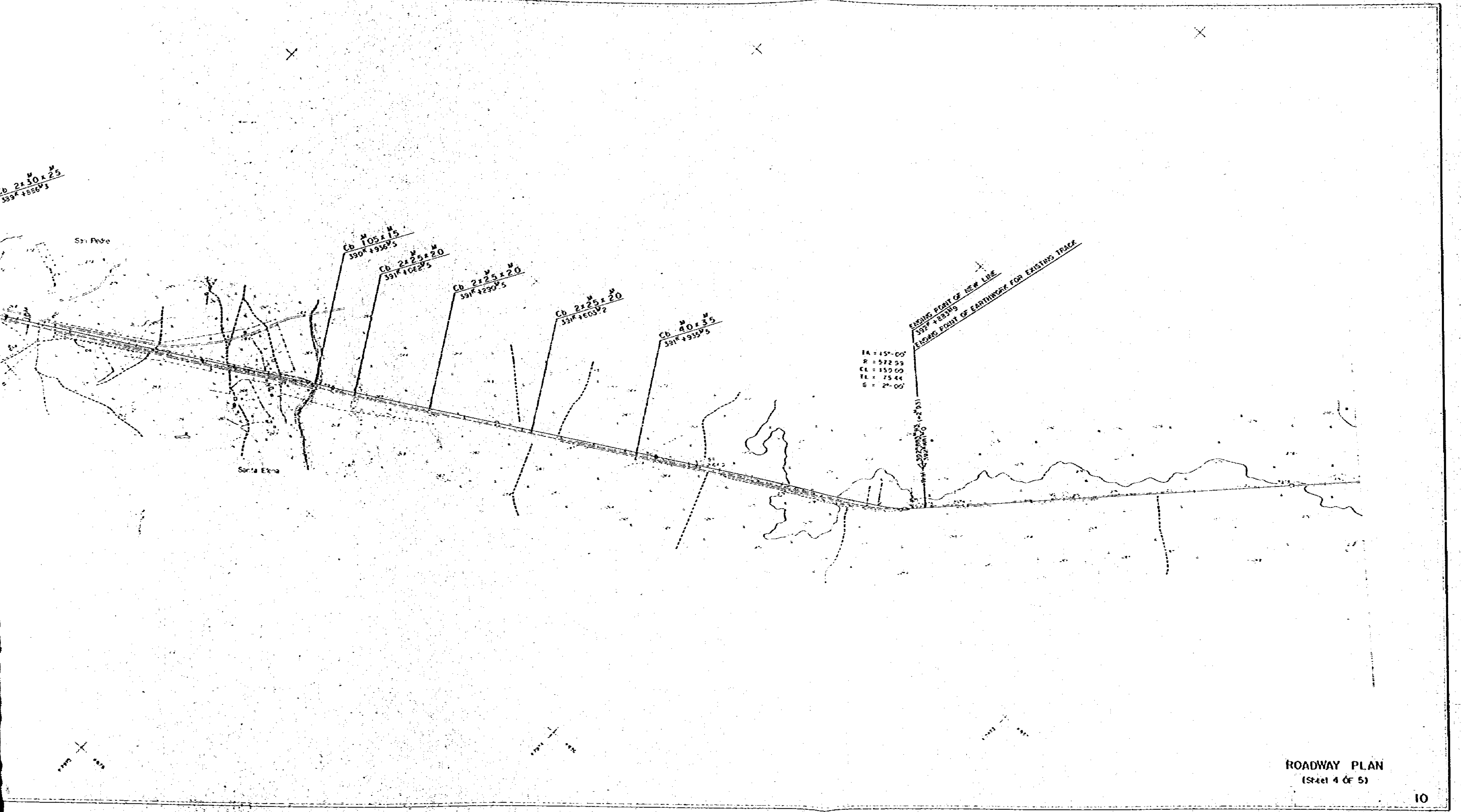
1 : 5000
BOLIVIA

RAILWAY REHABILITATION PROJECT(IPIAS



NO.8 JAPAN INTERNATIONAL COOPERATION AGENCY

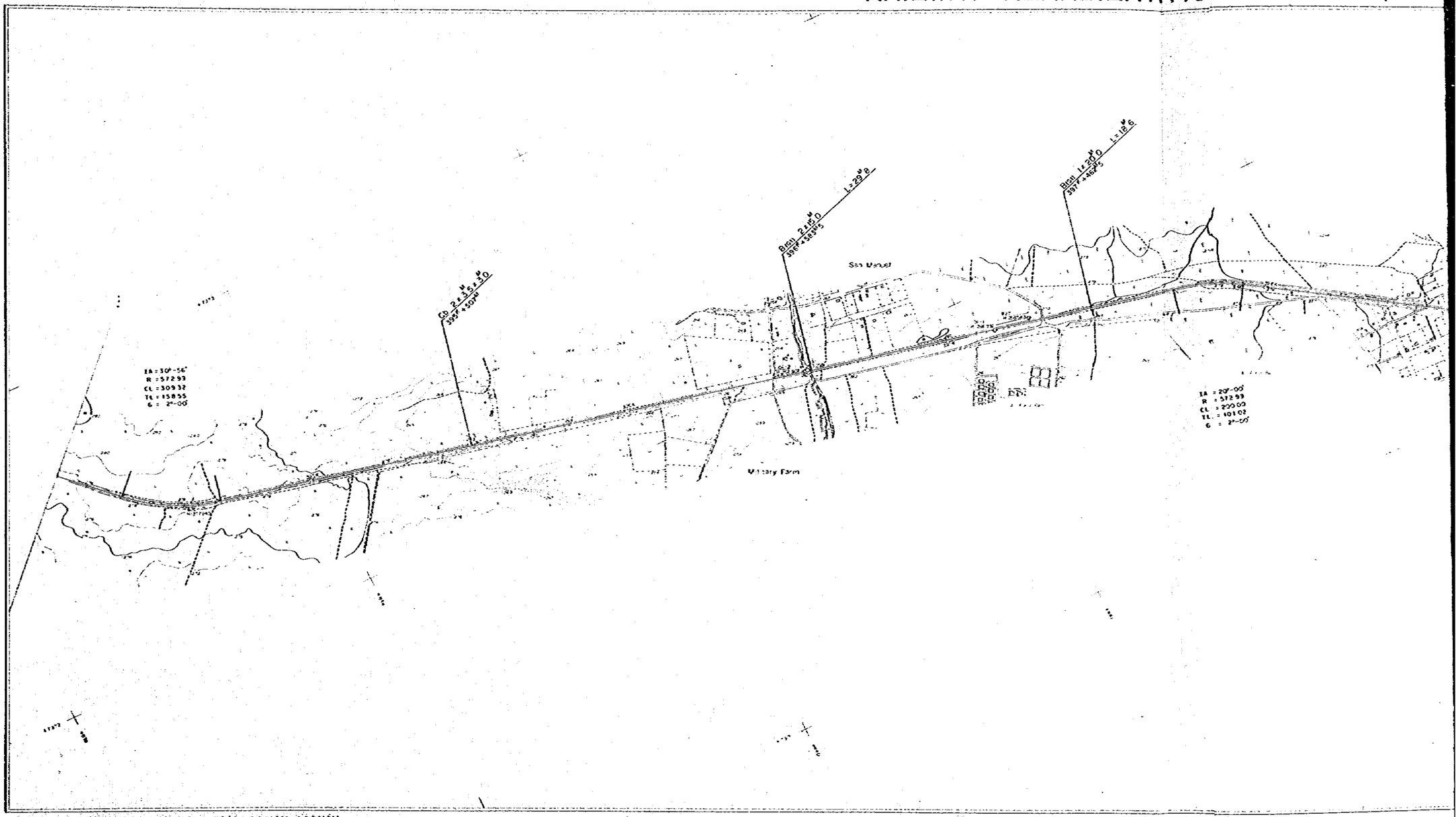
SCALE 1:5,000
METERS



ROADWAY PLAN
(Sheet 4 OF 5)

1 : 5000
BOLIVIA

RAILWAY REHABILITATION PROJECT(IPIA

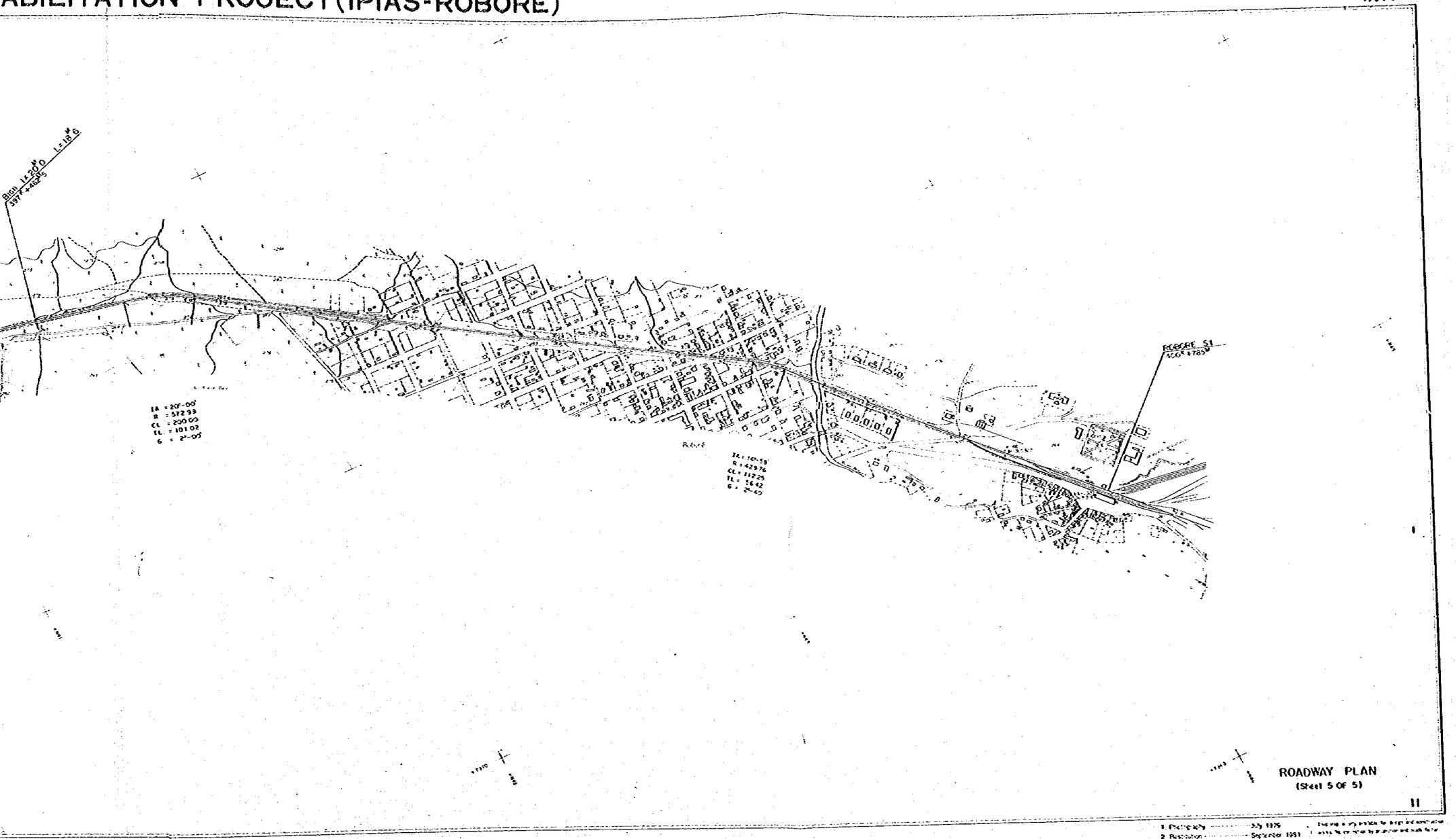


NO.9 JAPAN INTERNATIONAL COOPERATION AGENCY

SCALE 1 : 5,000
METERS

ABILITATION PROJECT(IPIAS-ROBORE)

NO. 9



SCALE 1:5,000
METERS