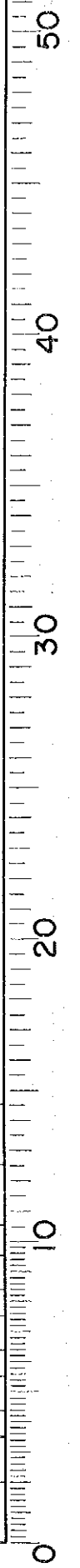
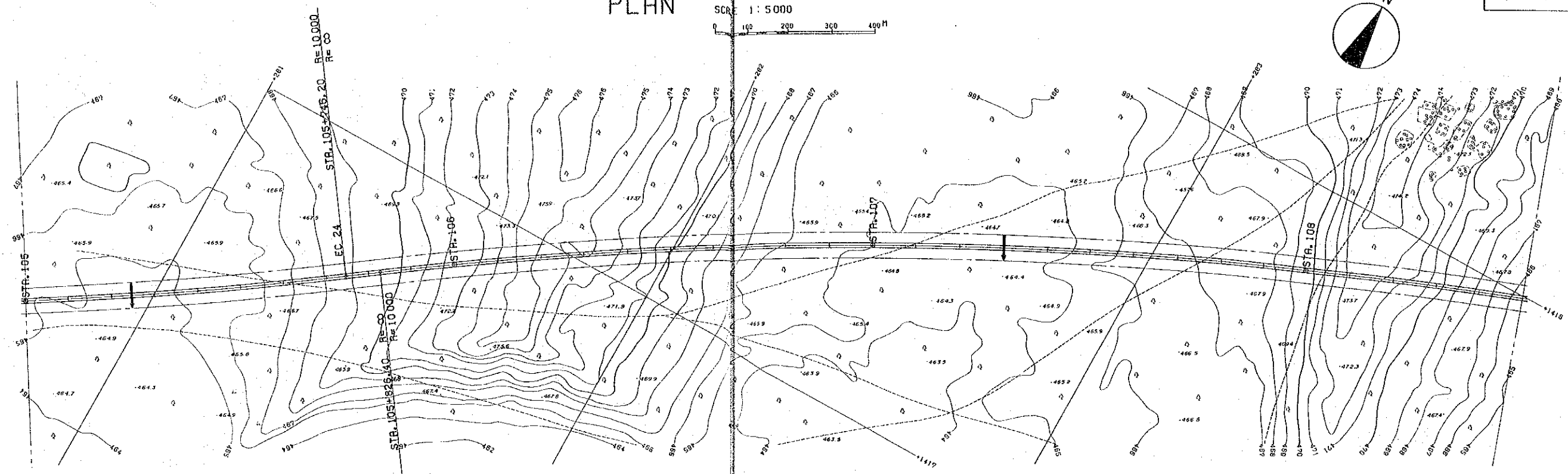
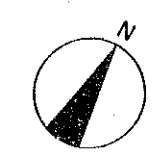


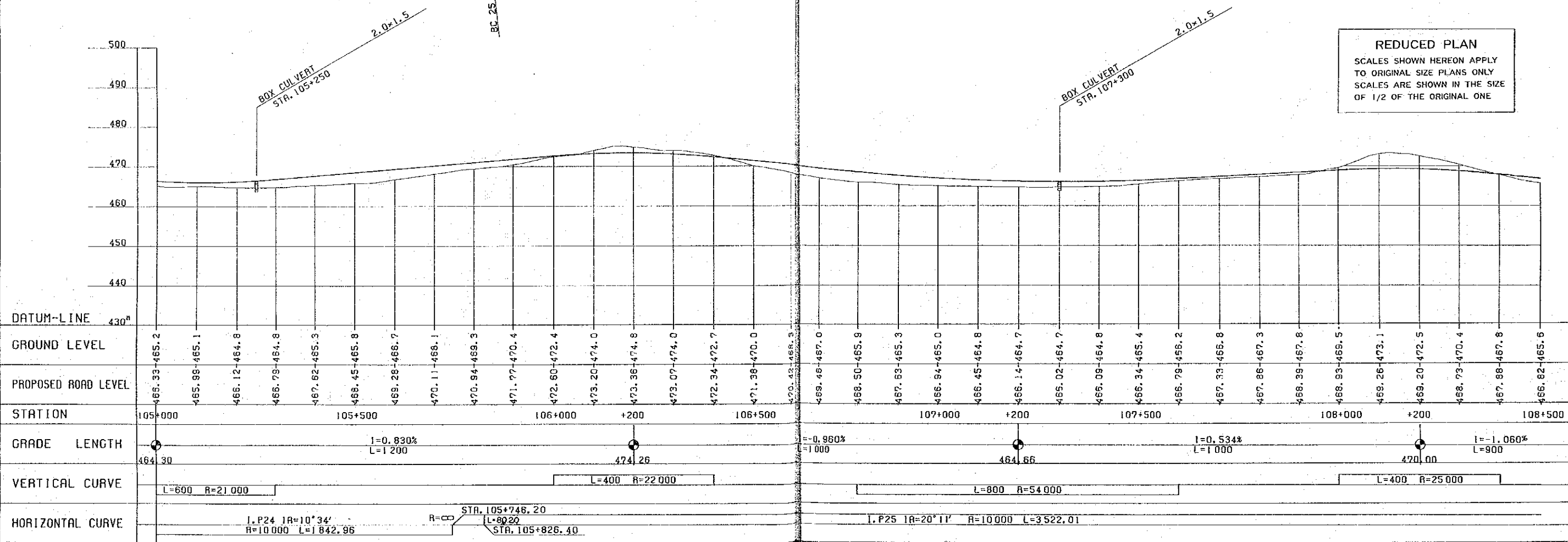
PLAN

SCALE 1:5000
0 100 200 300 400 M

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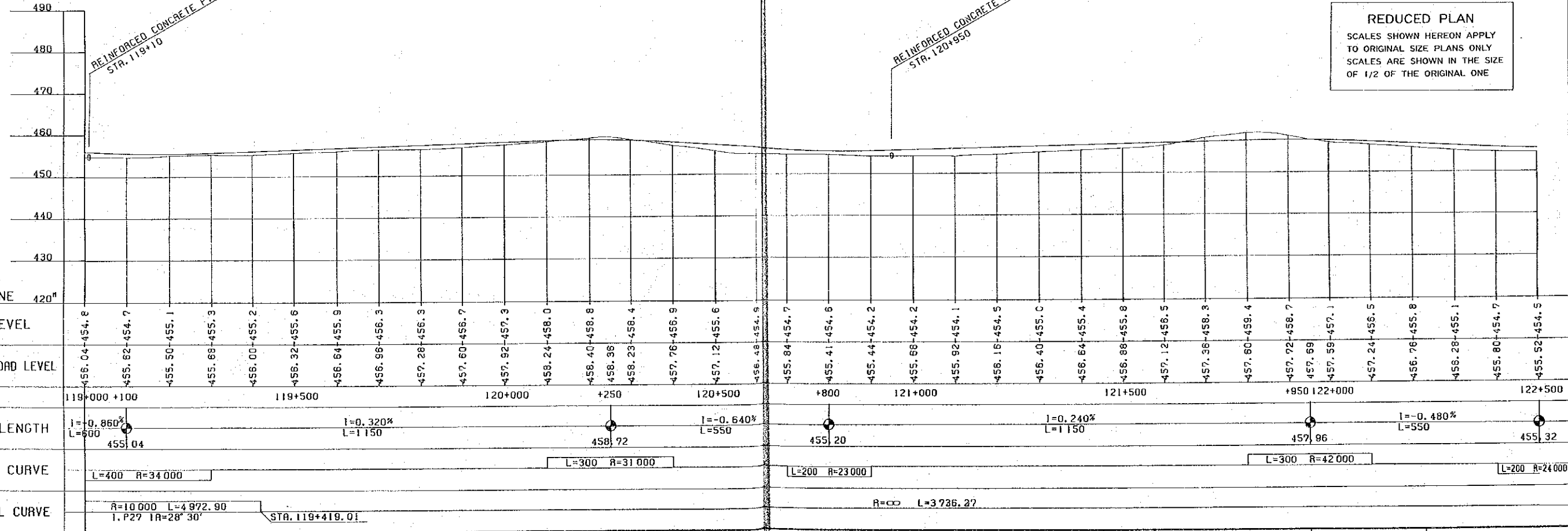
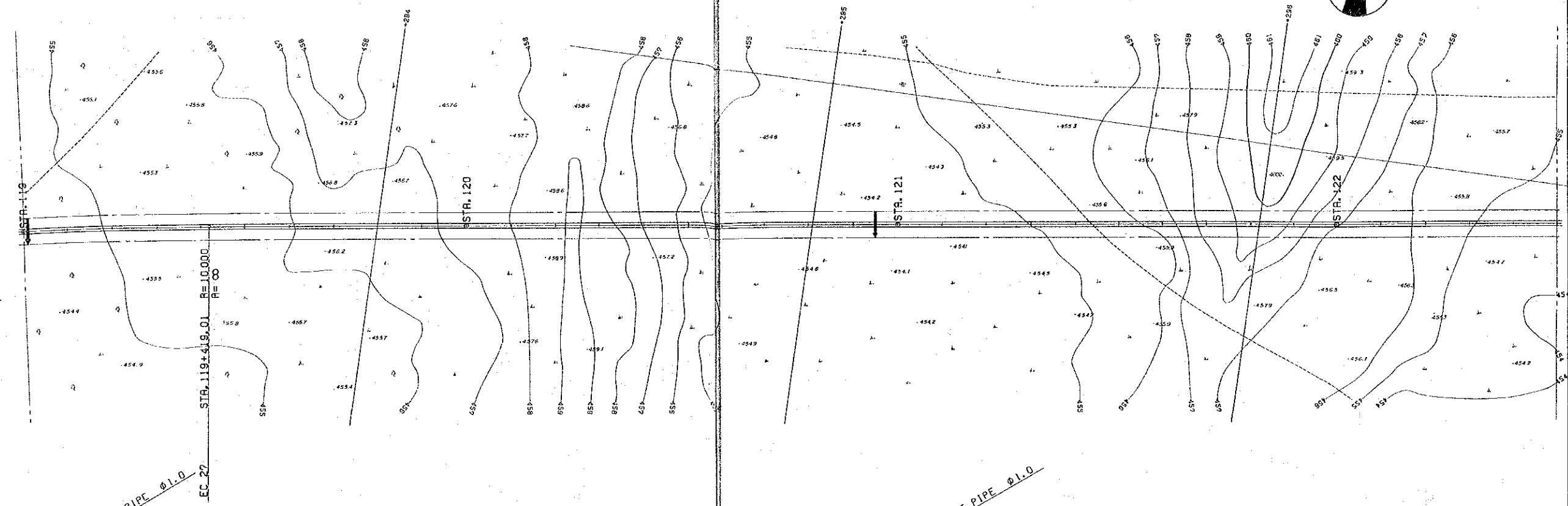
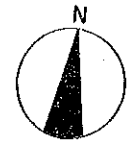
REDUCED PLAN
SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE



THE DEMOCRATIC REPUBLIC OF THE SUDAN ROADS AND BRIDGES PUBLIC CORPORATION	ROAD PROJECT EL OBEID - UM RUABA	PLAN AND PROFILE FROM STA. 105+000 TO STA. 108+500	APPROVED BY	AMENDMENTS	SCALE HORIZONTAL 1:5000 VERTICAL 1:500	DATE 1978 SHEET NO. 35 OF 87
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PLAN

SCALE 1 : 5000

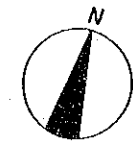


REDUCED PLAN
 SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
 SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE

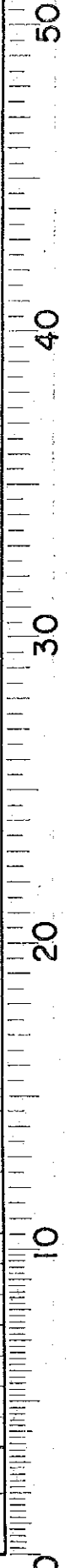
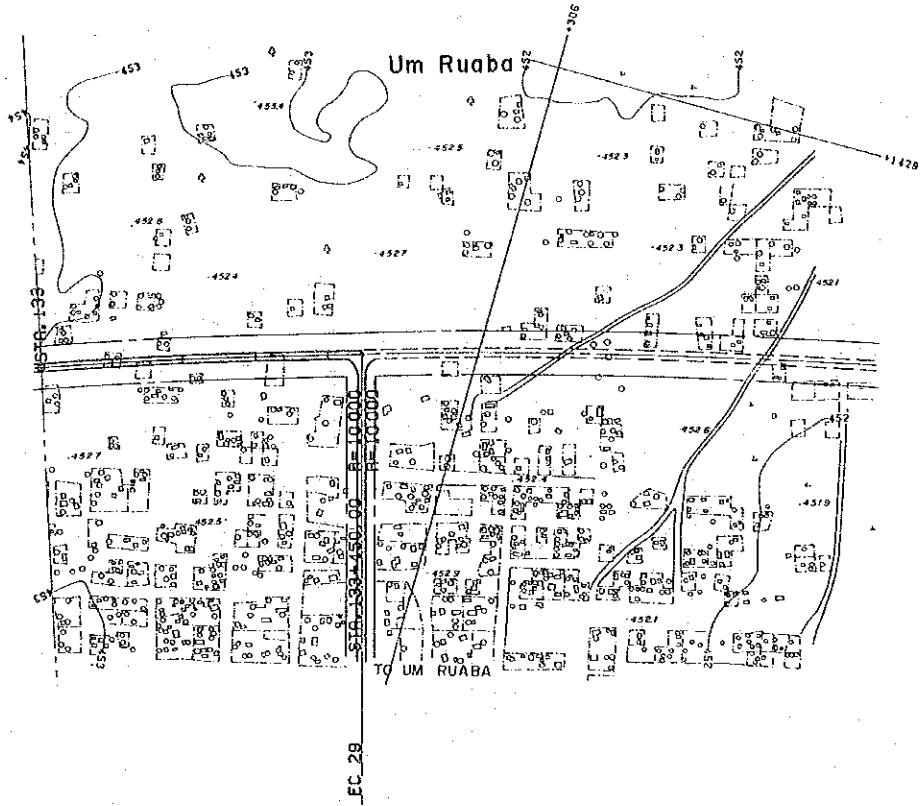
DATUM-LINE	420m																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
GROUND LEVEL	456.04	454.8	455.62	454.7	455.50	455.1	455.69	455.3	456.00	455.2	456.32	455.6	456.64	455.9	456.96	456.3	457.28	456.3	457.60	456.7	457.92	457.3	458.24	458.0	458.40	458.8	458.96	458.23	458.4	457.76	456.9	457.12	455.6	456.48	454.9	455.84	454.7	455.41	454.6	455.44	454.2	455.68	454.2	455.92	454.1	456.16	454.5	456.40	455.0	456.64	455.4	456.88	455.8	457.12	456.5	457.36	458.3	457.60	459.4	457.72	458.7	457.69	457.59	457.1	457.24	456.5	456.76	455.8	456.28	455.1	455.80	454.7	455.52	454.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
PROPOSED ROAD LEVEL	455.04	454.7	455.1	455.3	455.2	455.6	455.9	456.3	456.3	456.7	457.3	458.0	458.8	458.96	458.4	457.9	457.6	457.3	456.7	456.3	455.9	455.6	455.2	454.8	454.4	454.0	453.6	453.2	452.8	452.4	452.0	451.6	451.2	450.8	450.4	450.0	449.6	449.2	448.8	448.4	448.0	447.6	447.2	446.8	446.4	446.0	445.6	445.2	444.8	444.4	444.0	443.6	443.2	442.8	442.4	442.0	441.6	441.2	440.8	440.4	440.0	439.6	439.2	438.8	438.4	438.0	437.6	437.2	436.8	436.4	436.0	435.6	435.2	434.8	434.4	434.0	433.6	433.2	432.8	432.4	432.0	431.6	431.2	430.8	430.4	430.0	429.6	429.2	428.8	428.4	428.0	427.6	427.2	426.8	426.4	426.0	425.6	425.2	424.8	424.4	424.0	423.6	423.2	422.8	422.4	422.0	421.6	421.2	420.8	420.4	420.0	419.6	419.2	418.8	418.4	418.0	417.6	417.2	416.8	416.4	416.0	415.6	415.2	414.8	414.4	414.0	413.6	413.2	412.8	412.4	412.0	411.6	411.2	410.8	410.4	410.0	409.6	409.2	408.8	408.4	408.0	407.6	407.2	406.8	406.4	406.0	405.6	405.2	404.8	404.4	404.0	403.6	403.2	402.8	402.4	402.0	401.6	401.2	400.8	400.4	400.0	399.6	399.2	398.8	398.4	398.0	397.6	397.2	396.8	396.4	396.0	395.6	395.2	394.8	394.4	394.0	393.6	393.2	392.8	392.4	392.0	391.6	391.2	390.8	390.4	390.0	389.6	389.2	388.8	388.4	388.0	387.6	387.2	386.8	386.4	386.0	385.6	385.2	384.8	384.4	384.0	383.6	383.2	382.8	382.4	382.0	381.6	381.2	380.8	380.4	380.0	379.6	379.2	378.8	378.4	378.0	377.6	377.2	376.8	376.4	376.0	375.6	375.2	374.8	374.4	374.0	373.6	373.2	372.8	372.4	372.0	371.6	371.2	370.8	370.4	370.0	369.6	369.2	368.8	368.4	368.0	367.6	367.2	366.8	366.4	366.0	365.6	365.2	364.8	364.4	364.0	363.6	363.2	362.8	362.4	362.0	361.6	361.2	360.8	360.4	360.0	359.6	359.2	358.8	358.4	358.0	357.6	357.2	356.8	356.4	356.0	355.6	355.2	354.8	354.4	354.0	353.6	353.2	352.8	352.4	352.0	351.6	351.2	350.8	350.4	350.0	349.6	349.2	348.8	348.4	348.0	347.6	347.2	346.8	346.4	346.0	345.6	345.2	344.8	344.4	344.0	343.6	343.2	342.8	342.4	342.0	341.6	341.2	340.8	340.4	340.0	339.6	339.2	338.8	338.4	338.0	337.6	337.2	336.8	336.4	336.0	335.6	335.2	334.8	334.4	334.0	333.6	333.2	332.8	332.4	332.0	331.6	331.2	330.8	330.4	330.0	329.6	329.2	328.8	328.4	328.0	327.6	327.2	326.8	326.4	326.0	325.6	325.2	324.8	324.4	324.0	323.6	323.2	322.8	322.4	322.0	321.6	321.2	320.8	320.4	320.0	319.6	319.2	318.8	318.4	318.0	317.6	317.2	316.8	316.4	316.0	315.6	315.2	314.8	314.4	314.0	313.6	313.2	312.8	312.4	312.0	311.6	311.2	310.8	310.4	310.0	309.6	309.2	308.8	308.4	308.0	307.6	307.2	306.8	306.4	306.0	305.6	305.2	304.8	304.4	304.0	303.6	303.2	302.8	302.4	302.0	301.6	301.2	300.8	300.4	300.0	299.6	299.2	298.8	298.4	298.0	297.6	297.2	296.8	296.4	296.0	295.6	295.2	294.8	294.4	294.0	293.6	293.2	292.8	292.4	292.0	291.6	291.2	290.8	290.4	290.0	289.6	289.2	288.8	288.4	288.0	287.6	287.2	286.8	286.4	286.0	285.6	285.2	284.8	284.4	284.0	283.6	283.2	282.8	282.4	282.0	281.6	281.2	280.8	280.4	280.0	279.6	279.2	278.8	278.4	278.0	277.6	277.2	276.8	276.4	276.0	275.6	275.2	274.8	274.4	274.0	273.6	273.2	272.8	272.4	272.0	271.6	271.2	270.8	270.4	270.0	269.6	269.2	268.8	268.4	268.0	267.6	267.2	266.8	266.4	266.0	265.6	265.2	264.8	264.4	264.0	263.6	263.2	262.8	262.4	262.0	261.6	261.2	260.8	260.4	260.0	259.6	259.2	258.8	258.4	258.0	257.6	257.2	256.8	256.4	256.0	255.6	255.2	254.8	254.4	254.0	253.6	253.2	252.8	252.4	252.0	251.6	251.2	250.8	250.4	250.0	249.6	249.2	248.8	248.4	248.0	247.6	247.2	246.8	246.4	246.0	245.6	245.2	244.8	244.4	244.0	243.6	243.2	242.8	242.4	242.0	241.6	241.2	240.8	240.4	240.0	239.6	239.2	238.8	238.4	238.0	237.6	237.2	236.8	236.4	236.0	235.6	235.2	234.8	234.4	234.0	233.6	233.2	232.8	232.4	232.0	231.6	231.2	230.8	230.4	230.0	229.6	229.2	228.8	228.4	228.0	227.6	227.2	226.8	226.4	226.0	225.6	225.2	224.8	224.4	224.0	223.6	223.2	222.8	222.4	222.0	221.6	221.2	220.8	220.4	220.0	219.6	219.2	218.8	218.4	218.0	217.6	217.2	216.8	216.4	216.0	215.6	215.2	214.8	214.4	214.0	213.6	213.2	212.8	212.4	212.0	211.6	211.2	210.8	210.4	210.0	209.6	209.2	208.8	208.4	208.0	207.6	207.2	206.8	206.4	206.0	205.6	205.2	204.8	204.4	204.0	203.6	203.2	202.8	202.4	202.0	201.6	201.2	200.8	200.4	200.0	199.6	199.2	198.8	198.4	198.0	197.6	197.2	196.8	196.4	196.0	195.6	195.2	194.8	194.4	194.0	193.6	193.2	192.8	192.4	192.0	191.6	191.2	190.8	190.4	190.0	189.6	189.2	188.8	188.4	188.0	187.6	187.2	186.8	186.4	186.0	185.6	185.2	184.8	184.4	184.0	183.6	183.2	182.8	182.4	182.0	181.6	181.2	180.8	180.4	180.0	179.6	179.2	178.8	178.4	178.0	177.6	177.2	176.8	176.4	176.0	175.6	175.2	174.8	174.4	174.0	173.6	173.2	172.8	172.4	172.0	171.6	171.2	170.8	170.4	170.0	169.6	169.2	168.8	168.4	168.0	167.6	167.2	166.8	166.4	166.0	165.6	165.2	164.8	164.4	164.0	163.6	163.2	162.8	162.4	162.0	161.6	161.2	160.8	160.4	160.0	159.6	159.2	158.8	158.4	158.0	157.6	157.2	156.8	156.4	156.0	155.6	155.2	154.8	154.4	154.0	153.6	153.2	152.8	152.4	152.0	151.6	151.2	150.8	150.4	150.0	149.6	149.2	148.8	148.4	148.0	147.6	147.2	146.8	146.4	146.0	145.6	145.2	144.8	144.4	144.0	143.6	143.2	142.8	142.4	142.0	141.6	141.2	140.8	140.4	140.0	139.6	139.2	138.8	138.4	138.0	137.6	137.2	136.8	136.4	136.0	135.6	135.2	134.8	134.4	134.0	133.6	133.2	132.8	132.4	132.0	131.6	131.2	130.8	130.4	130.0	129.6	129.2	128.8	128.4	128.0	127.6	127.2	126.8	126.4	126.0	125.6	125.2	124.8	124.4	124.0	123.6	123.2	122.8	122.4	122.0	121.6	121.2	120.8	120.4	120.0	119.6	119.2	118.8	118.4	118.0	117.6	117.2	116.8	116.4	116.0	115.6	115.2	114.8	114.4	114.0	113.6	113.2	112.8	112.4	112.0	111.6	111.2	110.8	110.4	110.0	109.6	109.2	108.8	108.4	108.0	107.6	107.2	106.8	106.4	106.0	105.6	105.2	104.8	104.4	104.0	103.6	103.2	102.8	102.4	102.0	101.6	101.2	100.8	100.4	100.0	99.6	99.2	98.8	98.4	98.0	97.6	97.2	96.8	96.4	96.0	95.6	95.2	94.8	94.4	94.0	93.6	93.2	92.8	92.4	92.0	91.6	91.2	90.8	90.4	90.0	89.6	89.2	88.8	88.4	88.0	87.6	87.2	86.8	86.4	86.0	85.6	85.2	84.8	84.4	84.0	83.6	83.2	82.8	82.4	82.0	81.6	81.2	80.8	80.4	80.0	79.6	79.2	78.8	78.4	78.0	77.6	77.2	76.8	76.4	76.0	75.6	75.2	74.8	74.4	74.0	73.6	73.2	72.8	72.4	72.0	71.6	71.2	70.8	70.4	70.0	69.6	69.2	68.8	68.4	68.0	67.6	67.2	66.8	66.4	66.0	65.6	65.2	64.8	64.4	64.0	63.6	63.2	62.8	62.4	62.0	61.6	61.2	60.8	60.4	60.0	59.6	59.2	58.8	58.4	58.0	57.6	57.2	56.8	56.4	56.0	55.6	55.2	54.8	54.4	54.0	53.6	53.2	52.8	52.4	52.0	51.6	51.2	50.8	50.4	50.0	49.6	49.2	48.8	48.4	48.0	47.6	47.2	46.8	46.4	46.0	45.6	45.2	44.8	44.4	44.0	43.6	43.2	42.8	42.4	42.0	41.6	41.2	40.8	40.4	40.0	39.6	39.2	38.8	38.4	38.0	37.6	37.2	36.8	36.4	36.0	35.6	35.2	34.8	34.4	34.0	33.6	33.2	32.8	32.4	32.0	31.6	31.2	30.8	30.4	30.0	29.6	29.2	28.8	28.4	28.0	27.6	27.2	26.8	26.4	26.0	25.6	25.2	24.8	24.4	24.0	23.6	23.2	22.8	22.4	22.0	21.6	21.2	20.8	20.4	20.0	1

PLAN

SCALE 1 : 5000
0 100 200 300 400 M



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TERMINAL POINT
STA. 133+450

SECTION 6
LENGTH = 22.150 M

480					
470					
460					
450					
440					
430					
420					
DATUM-LINE	410 ^M				
GROUND LEVEL					
PROPOSED ROAD LEVEL	454.83+452.9	454.47+452.8	454.31+452.7	454.15+452.6	453.99+452.4
STATION	133+000				+450
GRADE LENGTH		I = -0.160%			
		L = 650			
VERTICAL CURVE					
HORIZONTAL CURVE		R=10000 L=4209.66 I.P29 TA=24° 7'			STA. 133+450.00

REDUCED PLAN
SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE

THE DEMOCRATIC REPUBLIC OF THE SUDAN ROADS AND BRIDGES PUBLIC CORPORATION	ROAD PROJECT EL OBEID - UM RUABA	PLAN AND PROFILE FROM STA. 133+000 TO STA. 133+450	APPROVED BY	AMENDMENTS	SCALE	DATE 1978
					HORIZONTAL 1:5000 VERTICAL 1:500	SHEET NO. 43 OF 87

PLAN

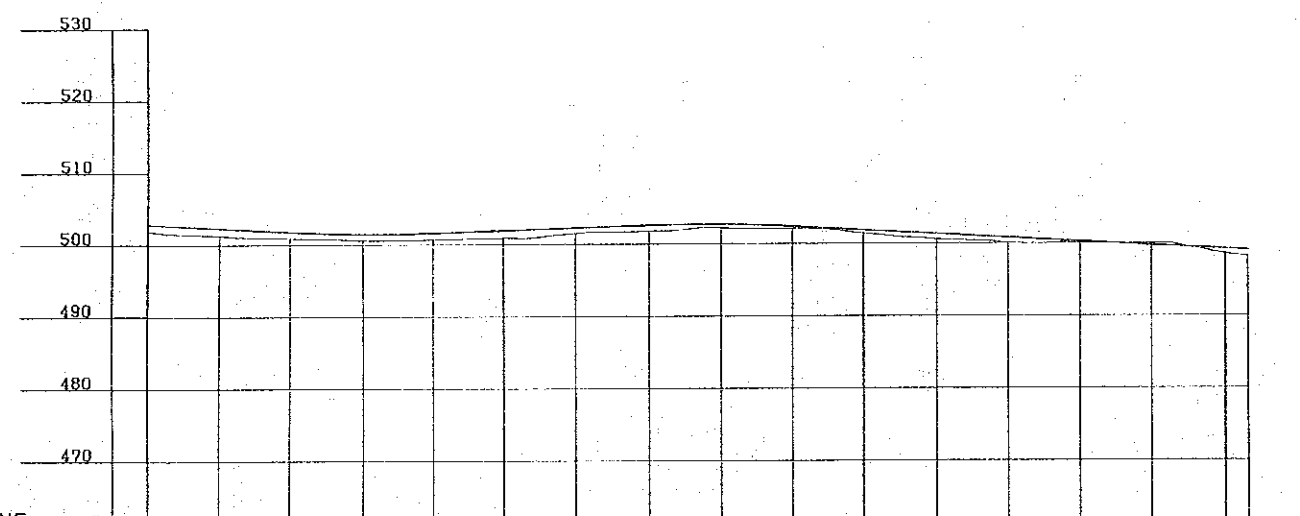
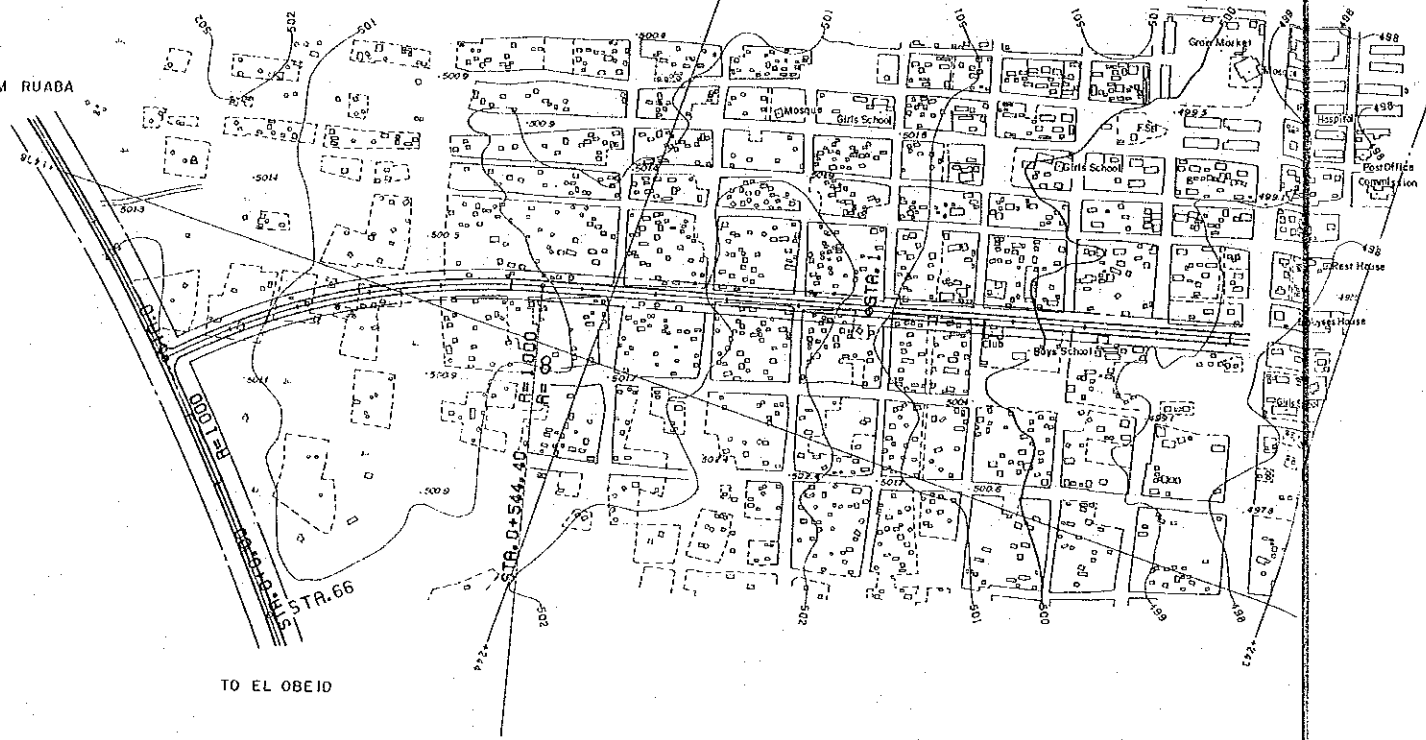
SCALE 1 : 5000
0 100 200 300 400 M



Rahad

TO UM RUABA

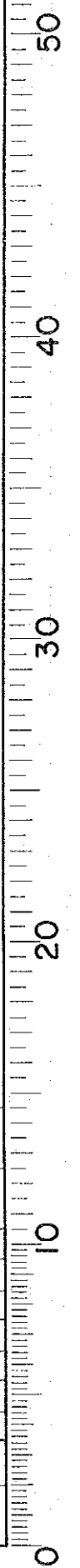
TO EL OBEID



REDUCED PLAN
SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE

DATUM-LINE	460.0																																				
GROUND LEVEL	502.85	501.9	502.31	501.3	501.77	500.9	501.44	500.6	501.57	500.7	501.91	500.9	502.25	501.5	502.59	501.8	502.71	502.2	502.39	502.1	501.85	501.4	501.32	500.6	500.78	500.1	500.25	500.0	499.71	500.0	499.18	498.5	499.02	498.2			
PROPOSED ROAD LEVEL	502.85	501.9	502.31	501.3	501.77	500.9	501.44	500.6	501.57	500.7	501.91	500.9	502.25	501.5	502.59	501.8	502.71	502.2	502.39	502.1	501.85	501.4	501.32	500.6	500.78	500.1	500.25	500.0	499.71	500.0	499.18	498.5	499.02	498.2			
STATION	0+000			+300				0+500						+800																						1+500	1+530
GRADE LENGTH	i = -0.540% L = 300			i = 0.340% L = 500			i = -0.535% L = 730																														
VERTICAL CURVE	L=200 R=23000										L=200 R=23000																										
HORIZONTAL CURVE	R=1000 L=544.40 I.P.I. IA=31° 12'										R=∞ L=985.60																										

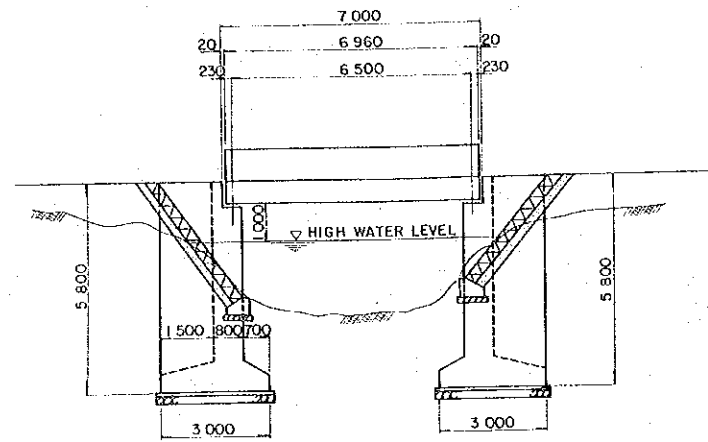
THE DEMOCRATIC REPUBLIC OF THE SUDAN ROADS AND BRIDGES PUBLIC CORPORATION	ROAD PROJECT EL OBEID - UM RUABA	PLAN AND PROFILE ACCESS ROAD O RAHAD FROM STA. 0+000 TO STA. 1+530	APPROVED BY	AMENDMENTS	SCALE	DATE
					HORIZONTAL 1:5000 VERTICAL 1:500	1978 SHEET NO. 44 OF 87



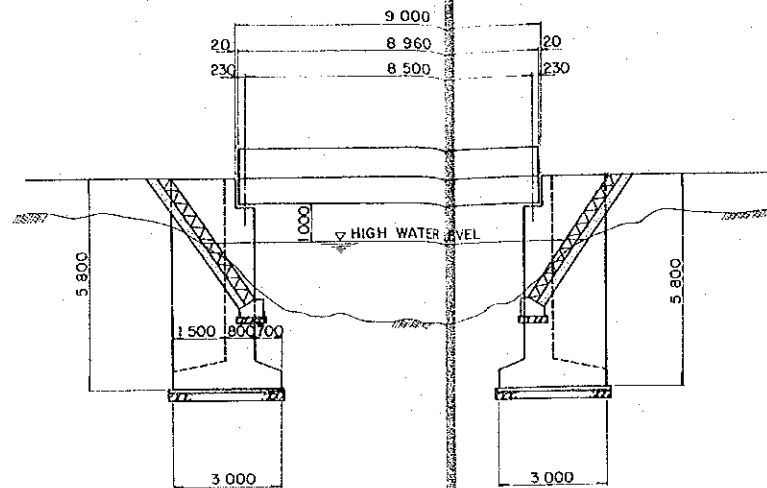
BRIDGES

PROFILE SCALE 1:100

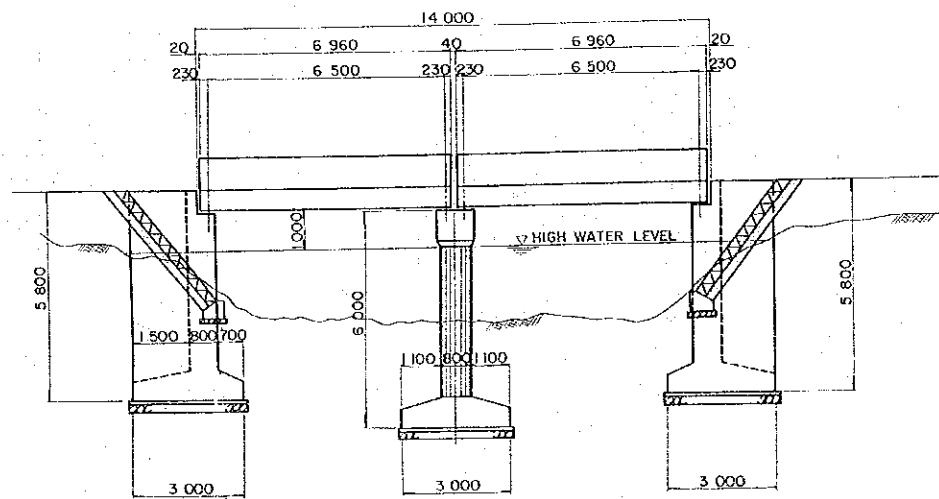
BRIDGE L=7.0



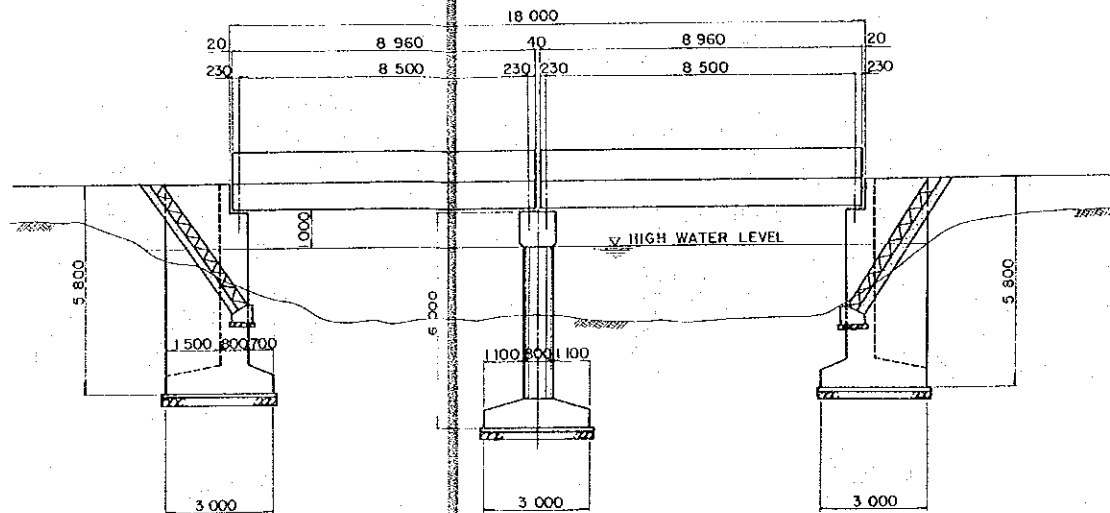
BRIDGE L=9.0



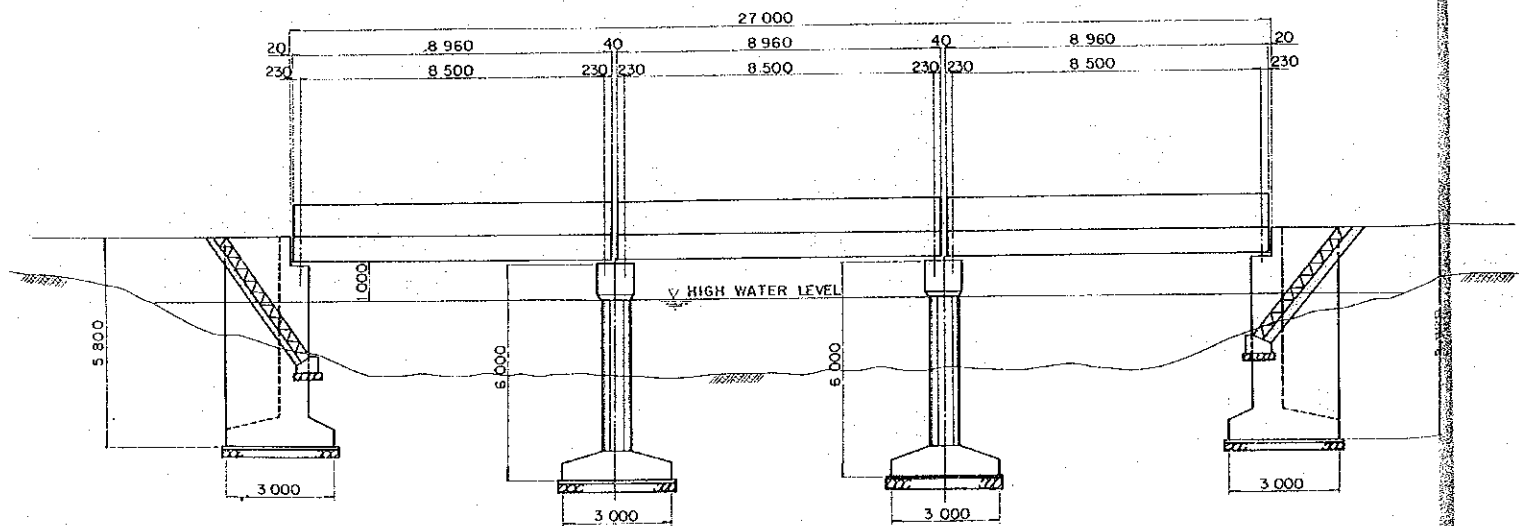
BRIDGE L = 2x7.0 = 14.0



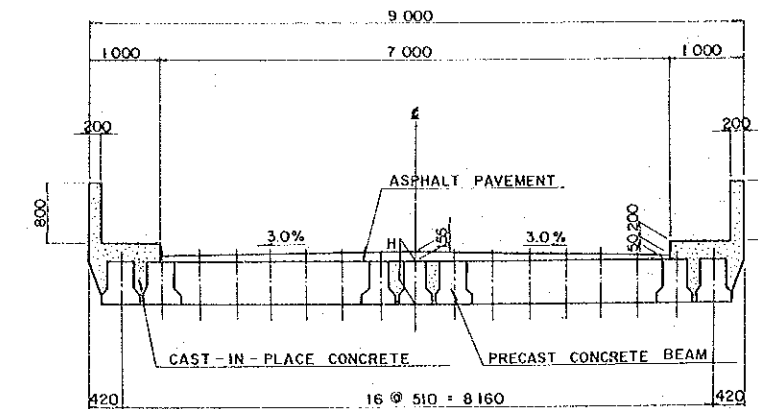
BRIDGE L = 2x9.0 = 18.0



BRIDGE L = 3x9.0 = 27.0



TYPICAL CROSS SECTION SCALE 1:50



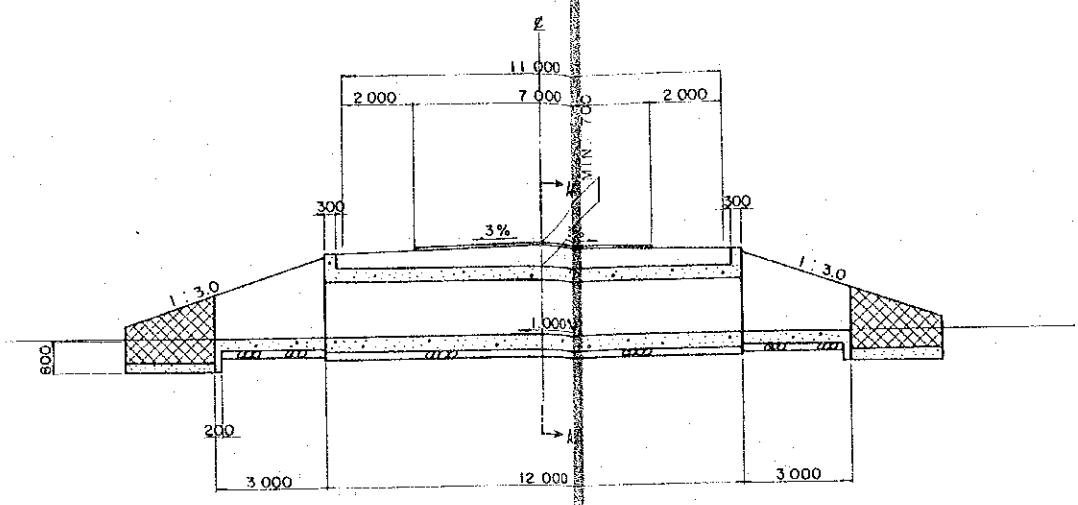
NOTES

BEAM LENGTH	BEAM HEIGHT
L = 7.0 ^M	H = 0.5 ^M
L = 9.0	H = 0.6

DESIGN DATA				
BRIDGE LENGTH	7.0 ^M ~ 27.0 ^M			
BRIDGE WIDTH	9.0 ^M			
LIVE LOAD	AASHTO H - 20			
DEAD LOAD (REINFORCED CONCRETE)	2.5 ^{TON} / _{M³}			
SOIL CONDITIONS	$\beta = 30^\circ$			
	$R = 1.8 \text{ } \frac{\text{TON}}{\text{M}^2}$			
	$Q = 25 \text{ } \frac{\text{TON}}{\text{M}^2}$			
STRUCTURES	SUPER-STRUCTURE	P - C - R.C. - SLAB		
	SUBSTRUCTURE	R - T - TYPE - ABUTMENT		
ALLOWABLE STRESSES	CONCRETE (σ_{ca}) ^{KG} / _{CM²}	SUPER-STRUCTURE	CLASS A	110
		SUBSTRUCTURE	CLASS B	60
	REINFORCING BAR (σ_{sa}) ^{KG} / _{CM²}	STRUCTURES	GRADE	1400
			40.50	
NOTE				
P - C - R.C. - SLAB ----- PRECAST REINFORCED CONCRETE SLAB				
R - T - TYPE - ABUTMENT ----- REVERSED T-TYPE ABUTMENT				
R ----- UNIT WEIGHT				
Q ----- GROUND BEARING CAPACITY				

REDUCED PLAN
 SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
 SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE

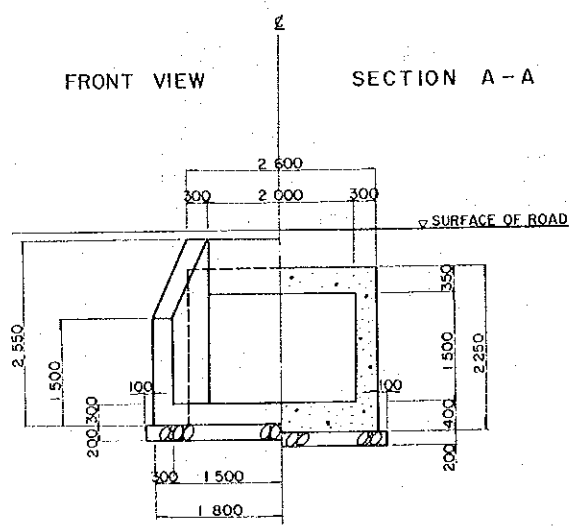
BOX CULVERTS
PROFILE SCALE 1:100



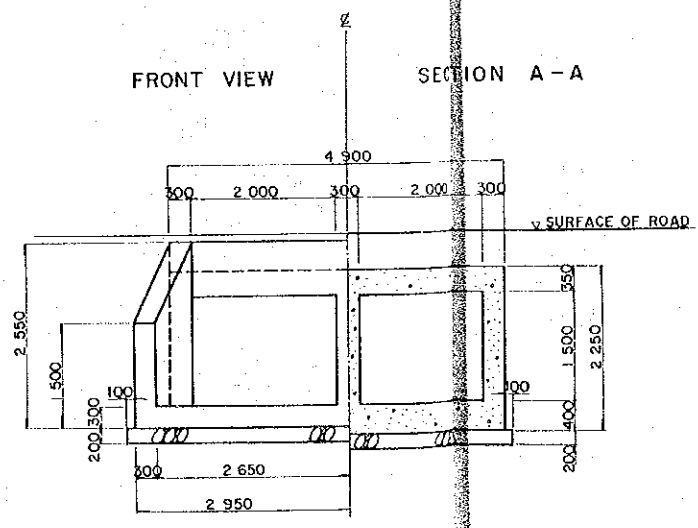
CROSS SECTION SCALE 1:50

REDUCED PLAN
SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE

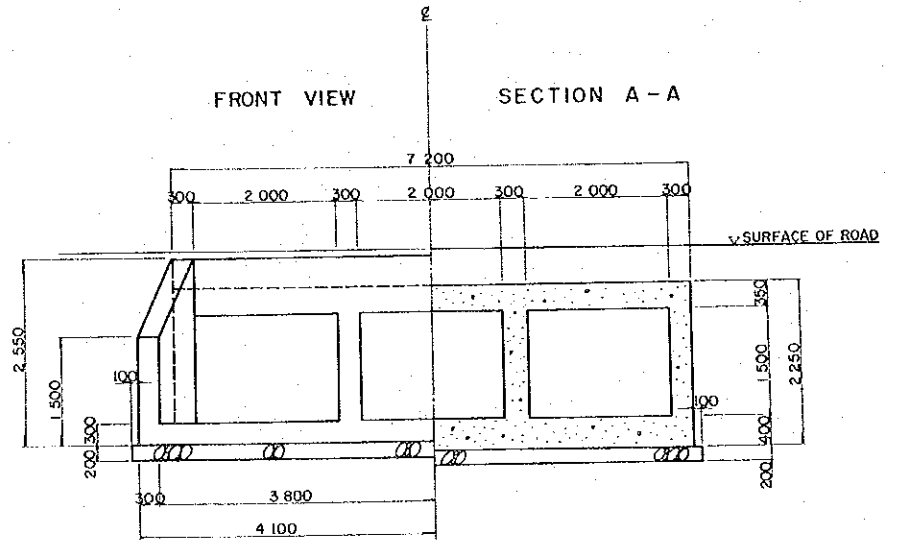
BOX CULVERT 2.0 x 1.5



BOX CULVERT 2 CELLS 2.0 x 1.5



BOX CULVERT 3 CELLS 2.0 x 1.5



THE DEMOCRATIC REPUBLIC OF THE SUDAN
ROADS AND BRIDGES PUBLIC CORPORATION

ROAD PROJECT
EL OBEID - UM RUABA

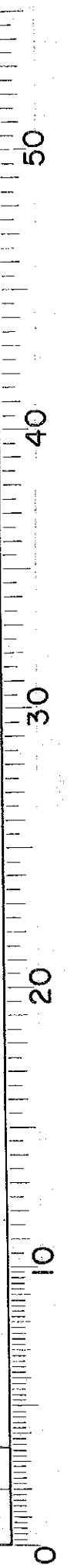
BOX CULVERTS

APPROVED BY

AMENDMENTS

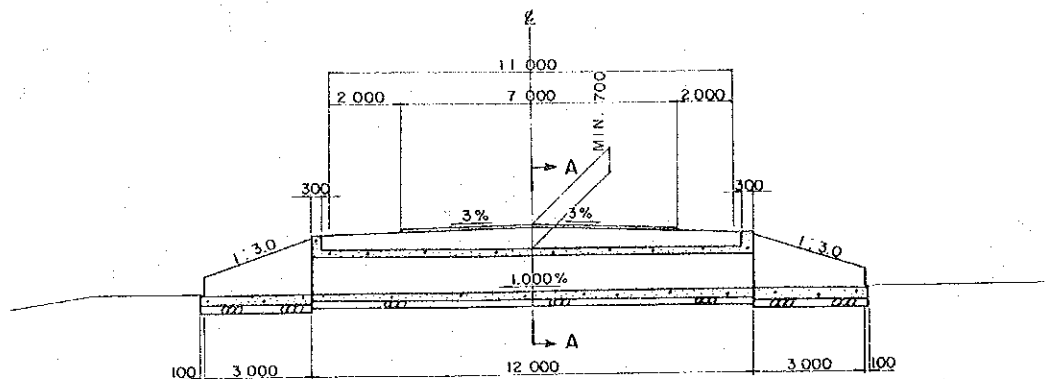
SCALE
1:100
1:50

DATE 1978
SHEET NO.
47 OF 87



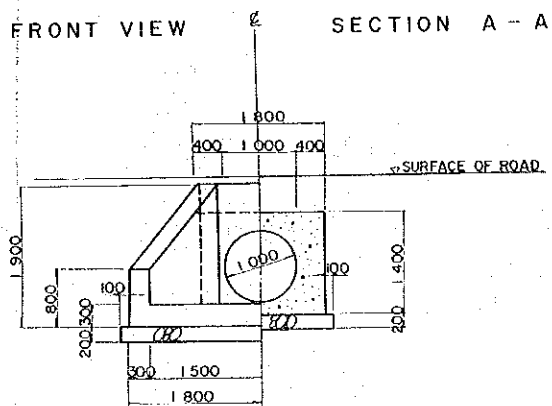
PIPE CULVERTS

PROFILE SCALE 1:100

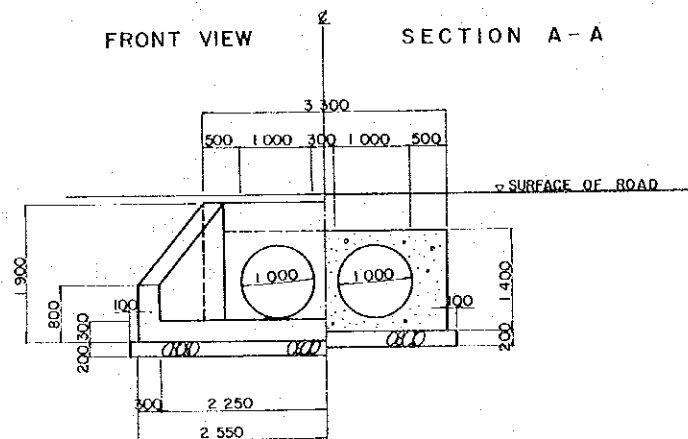


CROSS SECTION SCALE 1:50

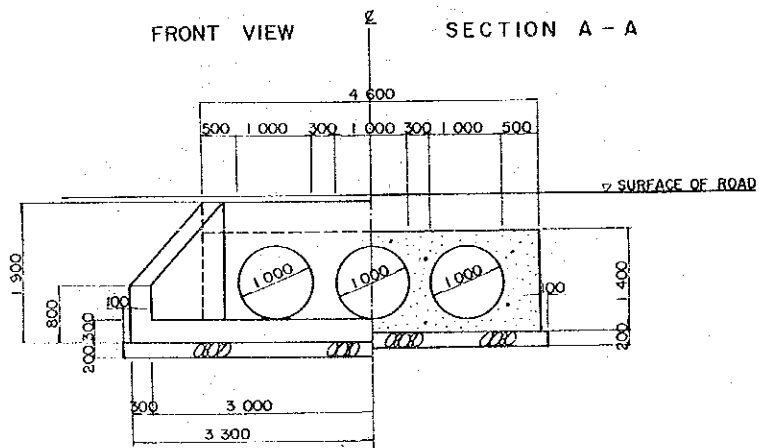
REINFORCED CONCRETE PIPE ϕ 1.0



REINFORCED CONCRETE PIPE ϕ 1.0 x 2

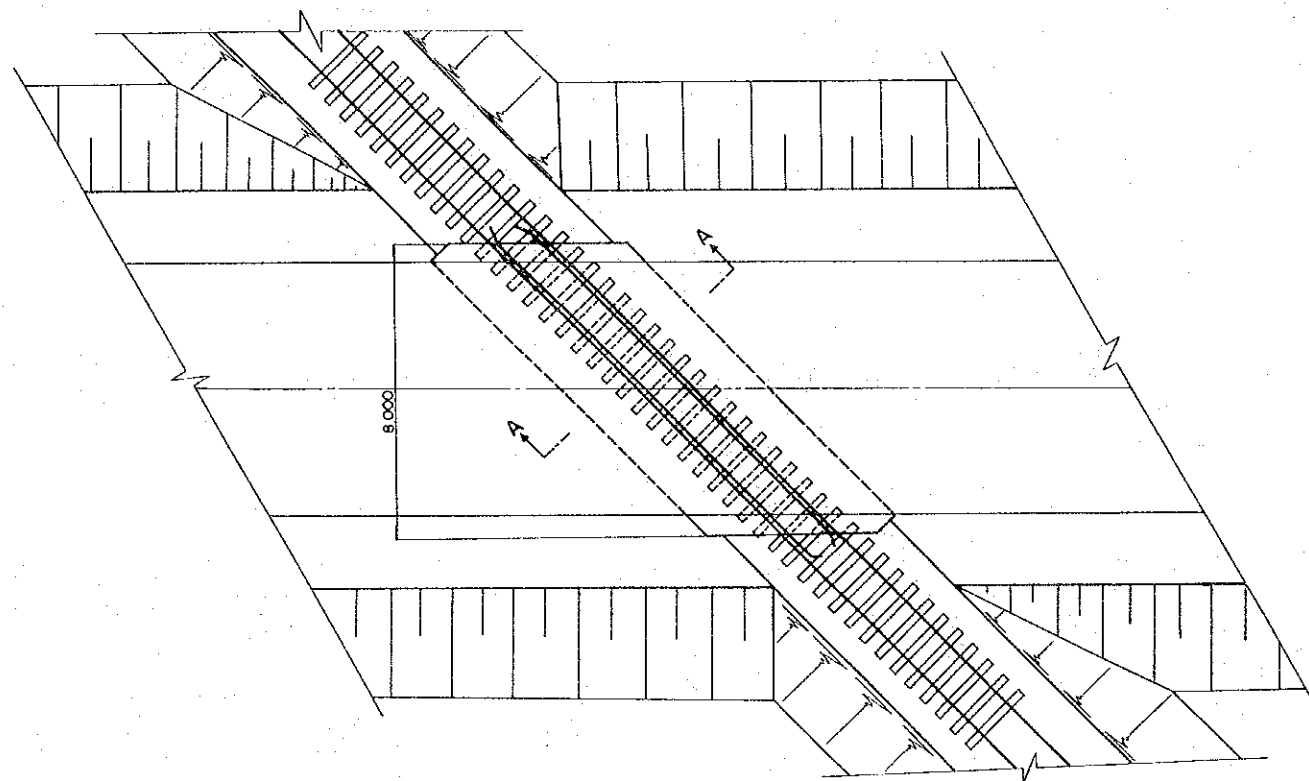


REINFORCED CONCRETE PIPE ϕ 1.0 x 3

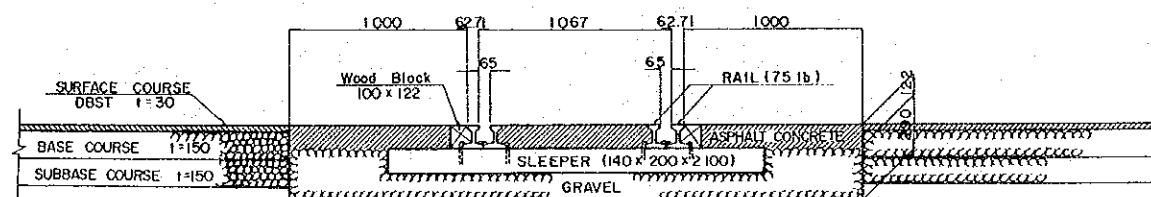


RAILWAYS CROSSING

PLAN SCALE 1:100



SECTION A-A SCALE 1:20



REDUCED PLAN
 SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
 SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE

II MINOR ALTERNATIVE ROUTES SCALE 1:5000

J.KORDOFAN BYPASS "B" 49 ~ 53

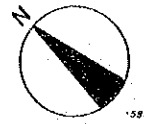
RAHAD BYPASS "C" 54 ~ 58

RAHAD ROUTE "E" 59 ~ 63

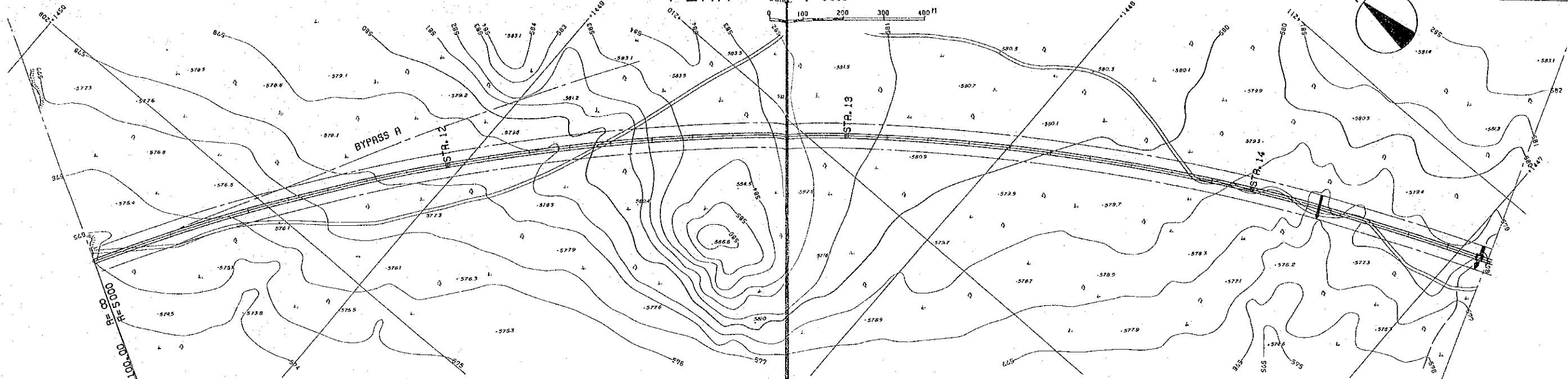
UM RUABA ROUTE "G" 64 ~ 65

PLAN

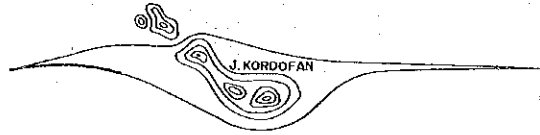
SCALE 1 : 5000



1/5



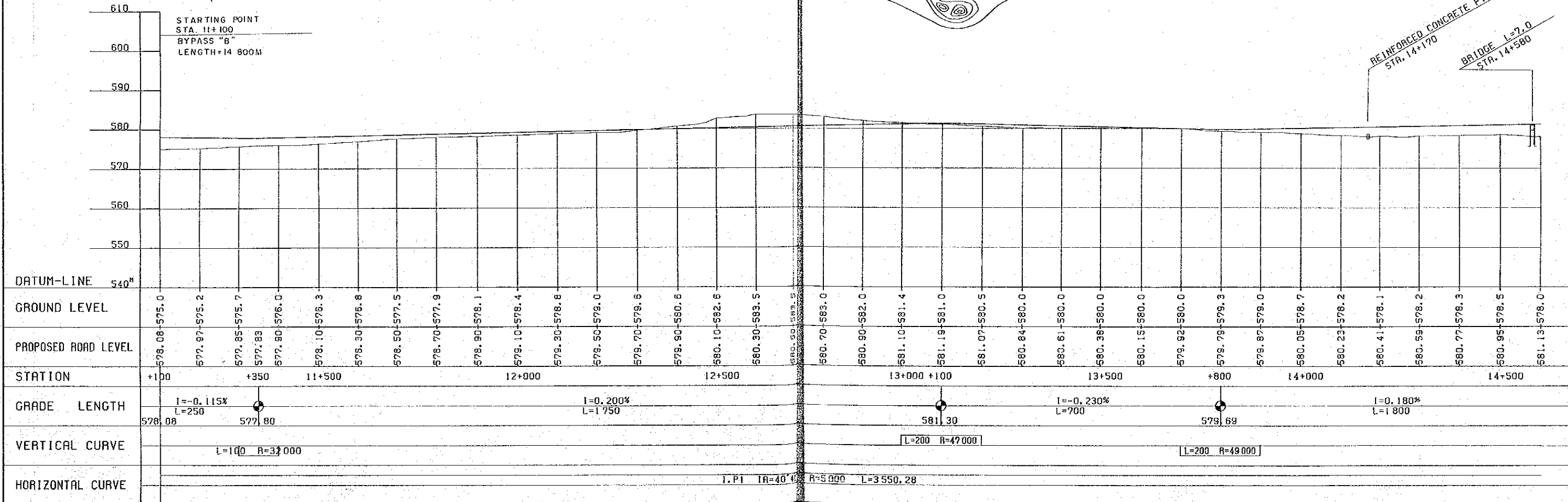
KEY PLAN



REDUCED PLAN
 SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
 SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE

REINFORCED CONCRETE PIPE ϕ 1.0
 STA. 14+170

BRIDGE L=7.0
 STA. 14+580



THE DEMOCRATIC REPUBLIC OF THE SUDAN
 ROADS AND BRIDGES PUBLIC CORPORATION

ROAD PROJECT
 EL OBEID - UM RUABA

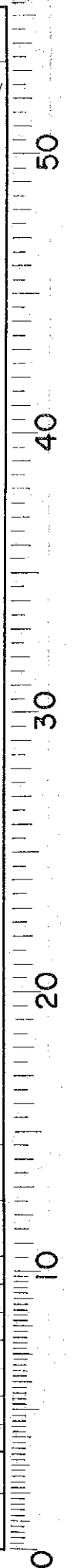
PLAN AND PROFILE
 (J. KORDOFAN BYPASS "B")
 FROM STA. 11+100 TO STA. 14+600

APPROVED BY

AMENDMENTS

SCALE
 HORIZONTAL 1 : 5000
 VERTICAL 1 : 500

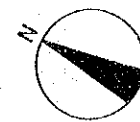
DATE 1978
 SHEET NO. 49 OF 87



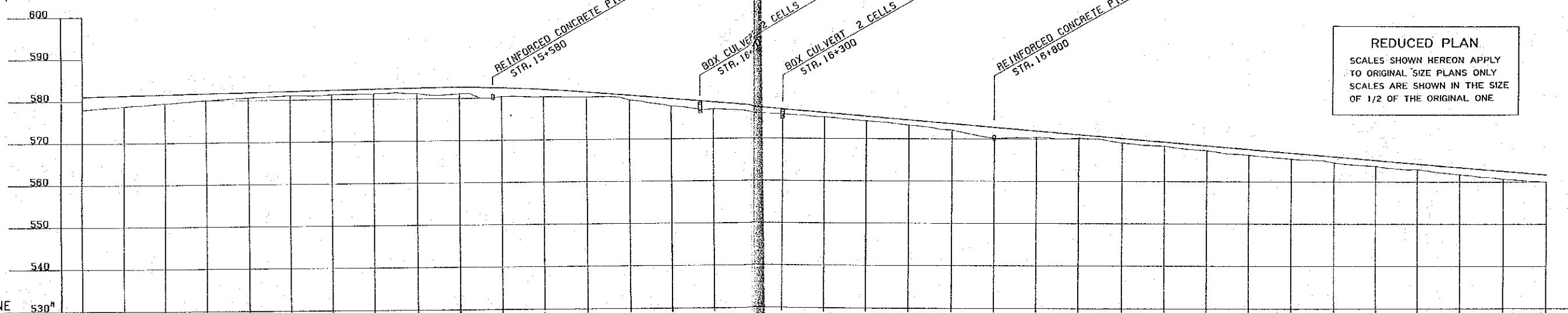
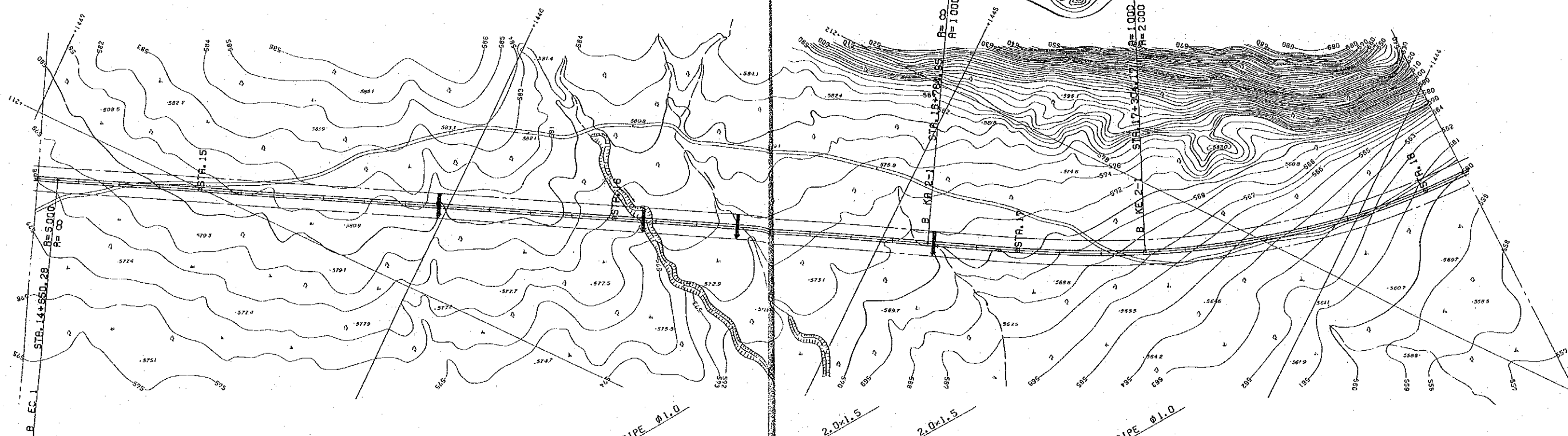
PLAN

SCALE 1 : 5000
0 100 200 300 400 M

KEY PLAN



2 / 5



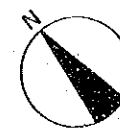
REDUCED PLAN
SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE

DATUM-LINE	530 ^M
GROUND LEVEL	581.13-578.0, 581.31-578.7, 581.48-579.4, 581.67-580.0, 581.85-580.6, 582.03-581.0, 582.21-581.2, 582.39-581.3, 582.57-581.3, 582.62-581.1, 582.41-580.4, 581.94-580.2, 581.23-580.1, 580.38-579.3, 579.53-577.7, 578.68-577.0, 576.98-575.8, 576.13-575.1, 575.28-574.2, 574.43-573.2, 573.58-572.1, 572.73-570.1, 571.88-570.4, 571.03-570.2, 570.18-569.1, 569.33-568.4, 568.48-567.3, 567.63-566.3, 566.78-565.4, 565.93-564.5, 565.08-563.7, 564.23-562.9, 563.38-561.7, 562.53-560.7, 561.68-560.0
PROPOSED ROAD LEVEL	581.13-578.0, 581.31-578.7, 581.48-579.4, 581.67-580.0, 581.85-580.6, 582.03-581.0, 582.21-581.2, 582.39-581.3, 582.57-581.3, 582.62-581.1, 582.41-580.4, 581.94-580.2, 581.23-580.1, 580.38-579.3, 579.53-577.7, 578.68-577.0, 576.98-575.8, 576.13-575.1, 575.28-574.2, 574.43-573.2, 573.58-572.1, 572.73-570.1, 571.88-570.4, 571.03-570.2, 570.18-569.1, 569.33-568.4, 568.48-567.3, 567.63-566.3, 566.78-565.4, 565.93-564.5, 565.08-563.7, 564.23-562.9, 563.38-561.7, 562.53-560.7, 561.68-560.0
STATION	15+000, 15+500 +600, 16+000, 16+500, 17+000, 17+500, 18+000
GRADE LENGTH	I=0.180% L=1800, I=-0.850% L=2800
VERTICAL CURVE	L=400 R=39,000
HORIZONTAL CURVE	STA. 14+650.28, R=∞ L=2134.67, STA. 16+784.95, I.P2 IA=6°18' R=2000 L=1990.15

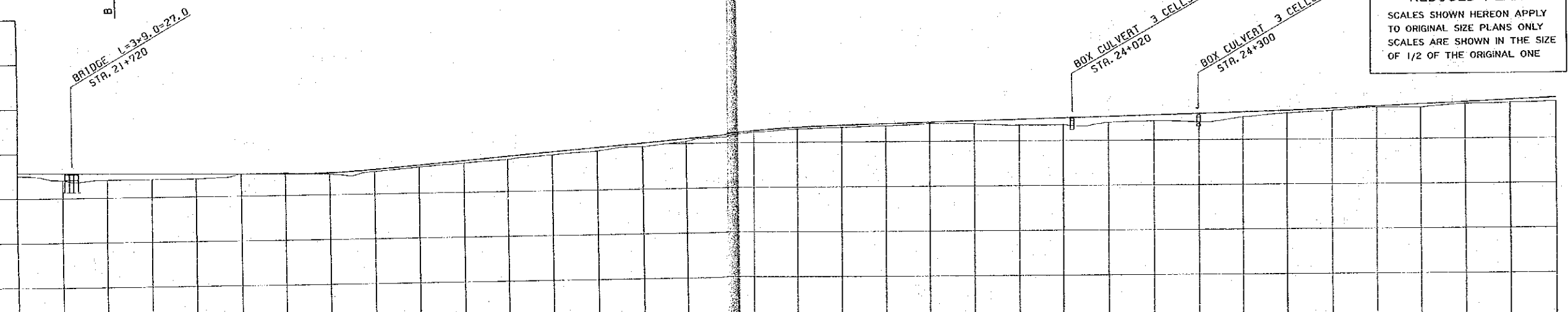
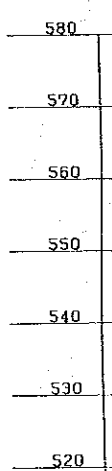
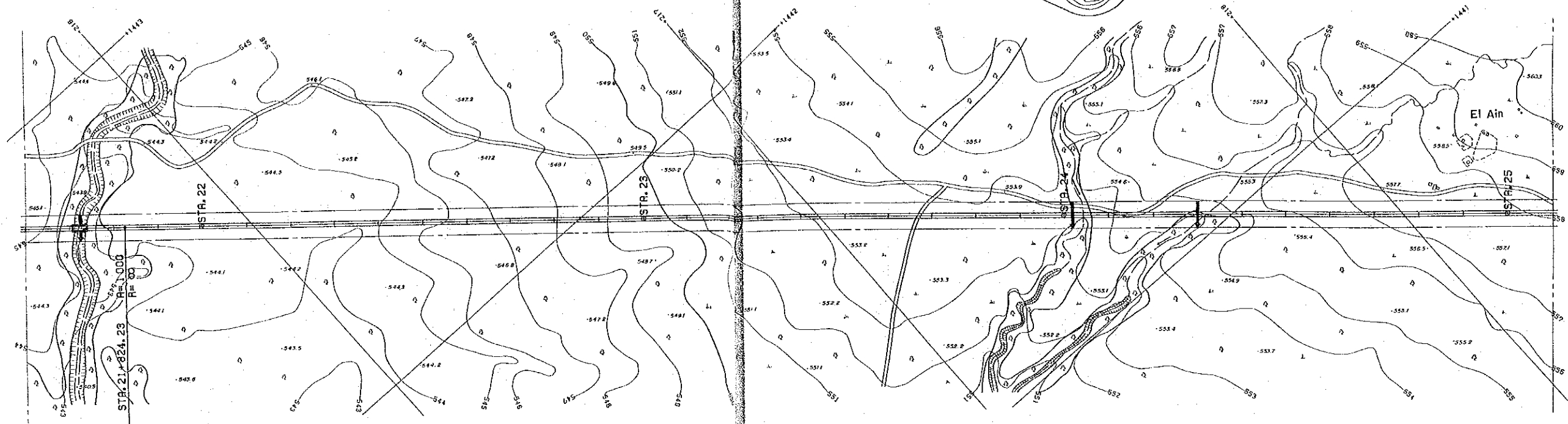
PLAN

KEY PLAN

SCALE 1:5000



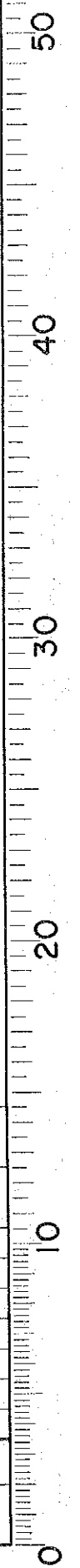
4/5



REDUCED PLAN
 SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
 SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE

DATUM-LINE	510 ^m	
GROUND LEVEL	545.89-545.0	
PROPOSED ROAD LEVEL	545.54-544.0	
STATION	22+000	23+000
GRADE LENGTH	$I = -0.150\%$ $L = 1300$	$I = -0.800\%$ $L = 1100$
VERTICAL CURVE	$[L=200 \quad R=21000]$	$[L=200 \quad R=38000]$
HORIZONTAL CURVE	$R=1000 \quad L=590.63 \quad \text{STA. 21+824.23}$	$R=\infty \quad L=3601.07$

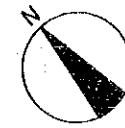
THE DEMOCRATIC REPUBLIC OF THE SUDAN ROADS AND BRIDGES PUBLIC CORPORATION	ROAD PROJECT EL OBEID - UM RUABA	PLAN AND PROFILE [J. KORDOFAN PASS "B"] FROM STA. 21+600 TO STA. 25+100	APPROVED BY	AMENDMENTS	SCALE HORIZONTAL 1:5000 VERTICAL 1:500	DATE 1978
						SHEET NO. 52 OF 87



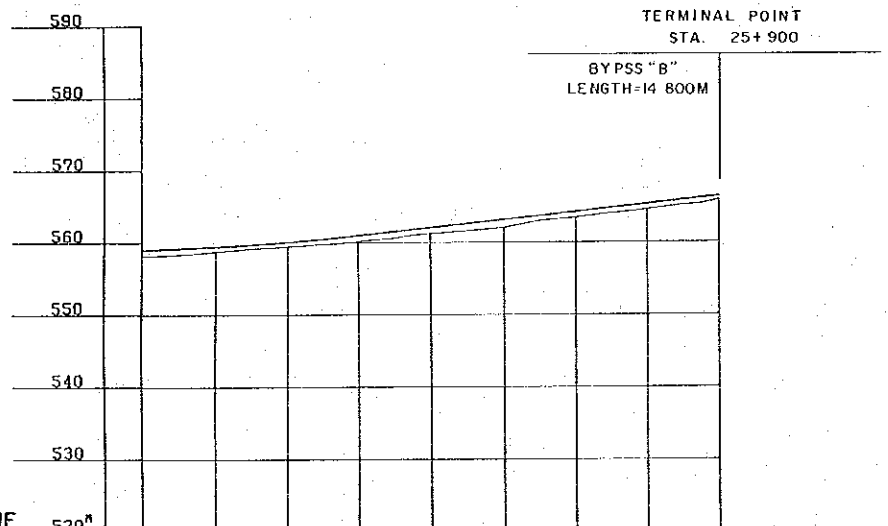
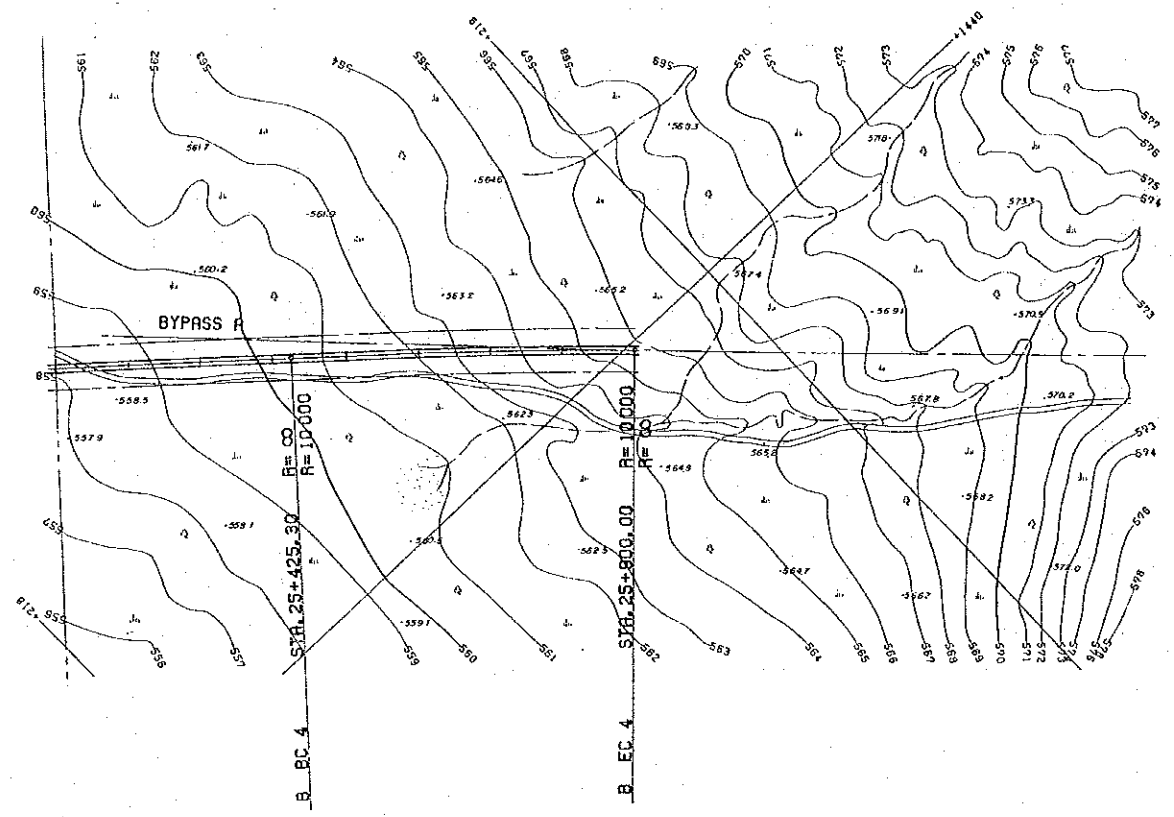
PLAN

Scale 1:5000
0 100 200 300 400m

KEY PLAN



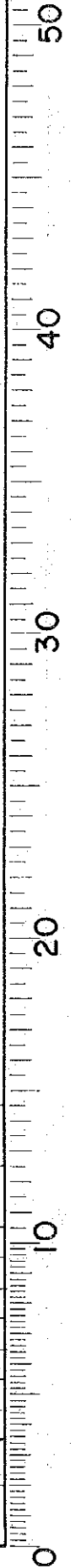
5/5



DATUM-LINE	520 ^m	
GROUND LEVEL	[Graphical representation]	
PROPOSED ROAD LEVEL	[Graphical representation]	
STATION	+300	+900
GRADE LENGTH	$i = 0.432\%$ $L = 800$	$i = 1.070\%$ $L = 600$
VERTICAL CURVE	[L=200 R=31000]	
HORIZONTAL CURVE	[R=∞ L=3601.07 STA. 25+425.30] [R=10000 L=474.70 I.P.4 TA=2'34' STA. 25+900.00]	

REDUCED PLAN
SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE

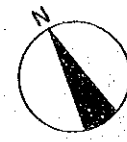
THE DEMOCRATIC REPUBLIC OF THE SUDAN ROADS AND BRIDGES PUBLIC CORPORATION	ROAD PROJECT EL OBEID - UM RUABA	PLAN AND PROFILE (J. KORDOFAN BYPASS "B") FROM STA. 25+100 TO STA. 25+900	APPROVED BY	AMENDMENTS	SCALE HORIZONTAL 1:5000 VERTICAL 1:500	DATE 1978
						SHEET NO. 53 OF 87



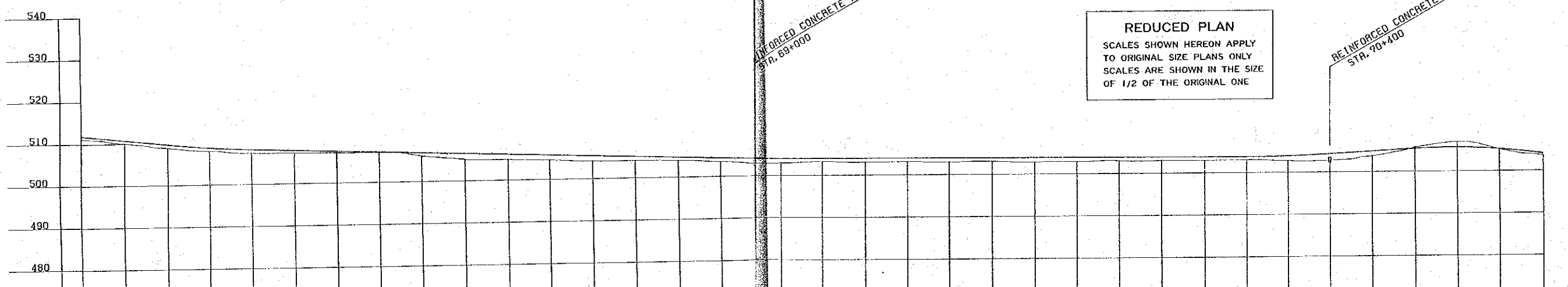
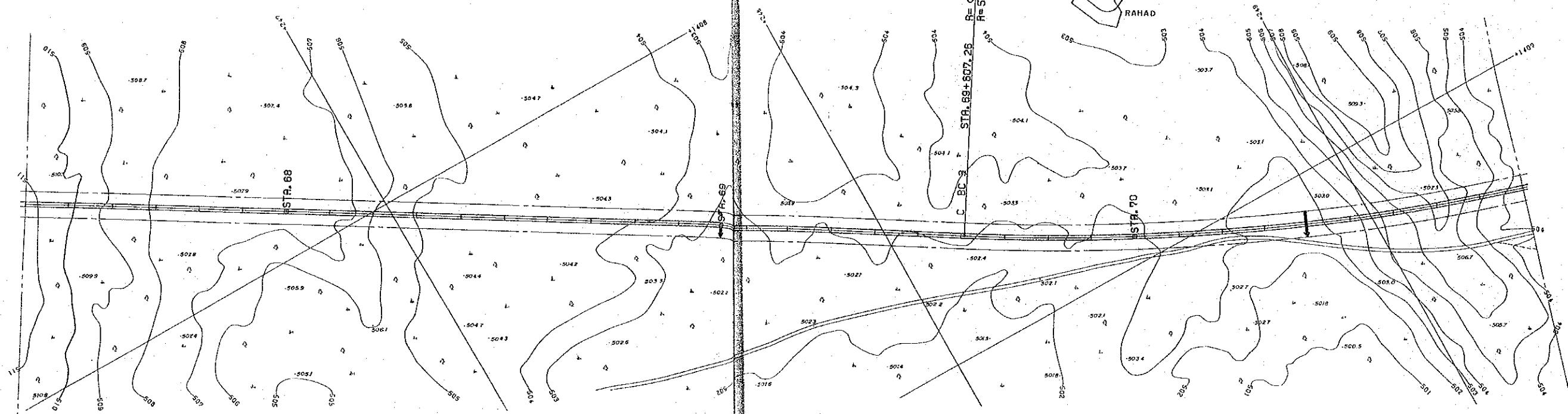
PLAN

KEY PLAN

SCALE 1:5000
0 100 200 300 400 M



3
5



DATUM-LINE	420 ^m																																																																						
GROUND LEVEL	511.84	511.2	510.74	510.1	509.64	508.9	508.72	508.0	508.19	507.4	507.84	507.3	507.49	507.2	507.14	507.1	506.79	506.0	506.44	505.0	506.09	504.9	505.74	504.6	505.39	504.2	505.04	504.1	504.69	504.0	504.34	503.5	503.87	503.0	503.95	503.3	503.93	503.0	503.91	503.2	503.89	503.0	503.87	503.1	503.85	502.8	503.83	502.9	503.81	503.0	503.79	503.0	503.77	503.0	503.75	503.1	503.87	502.8	504.29	502.7	504.85	503.7	505.41	505.8	505.63	507.0	505.49	505.17	505.1	504.06	503.6
PROPOSED ROAD LEVEL	511.84	511.2	510.74	510.1	509.64	508.9	508.72	508.0	508.19	507.4	507.84	507.3	507.49	507.2	507.14	507.1	506.79	506.0	506.44	505.0	506.09	504.9	505.74	504.6	505.39	504.2	505.04	504.1	504.69	504.0	504.34	503.5	503.87	503.0	503.95	503.3	503.93	503.0	503.91	503.2	503.89	503.0	503.87	503.1	503.85	502.8	503.83	502.9	503.81	503.0	503.79	503.0	503.77	503.0	503.75	503.1	503.87	502.8	504.29	502.7	504.85	503.7	505.41	505.8	505.63	507.0	505.49	505.17	505.1	504.06	503.6
STATION	67+500		+700		68+000		68+500		69+000		69+500		70+000		+300		70+500		+750																																																				
GRADE LENGTH	I=-1.100% L=500		508.54		I=-0.350% L=1300		503		I=-0.020% L=1300		503.73		I=0.560% L=450		506.25		I=-1.460% L=600																																																						
VERTICAL CURVE	[L=200 R=27000]		[L=200 R=34000]		[L=300 R=15000]																																																																		
HORIZONTAL CURVE	R=∞ L=2779.46		[L=200 R=34000]		I.P3 IA=42'48" R=5000 L=3735.24																																																																		

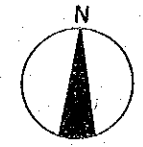
REDUCED PLAN
SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
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REINFORCED CONCRETE PIPE Ø1.0
STA. 69+000

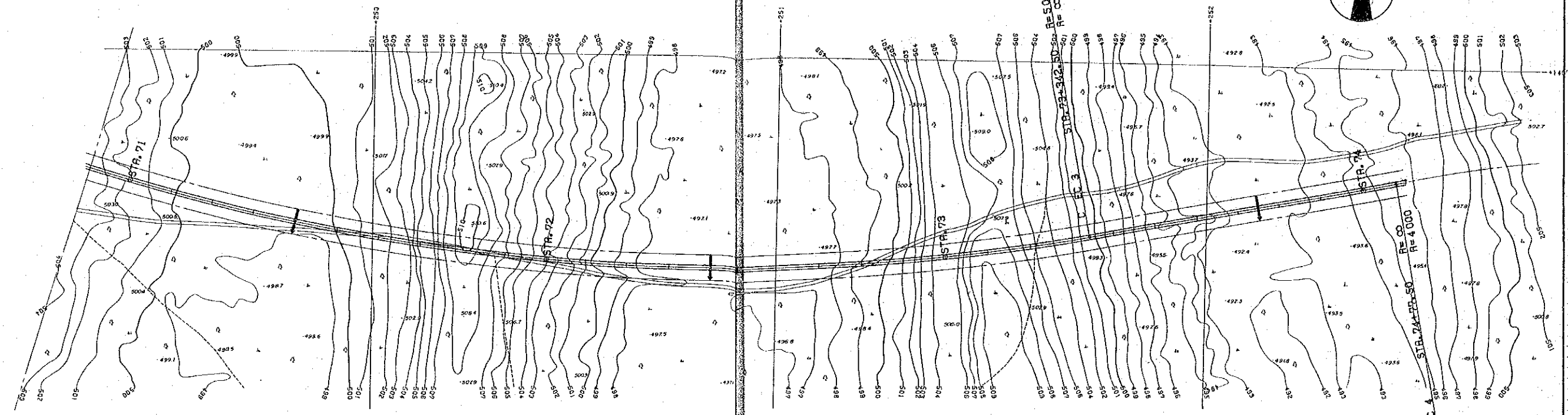
REINFORCED CONCRETE PIPE Ø1.0
STA. 70+400

PLAN

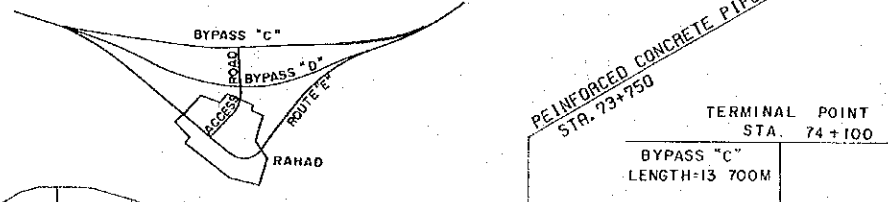
1:5000
0 100 200 300 400 M



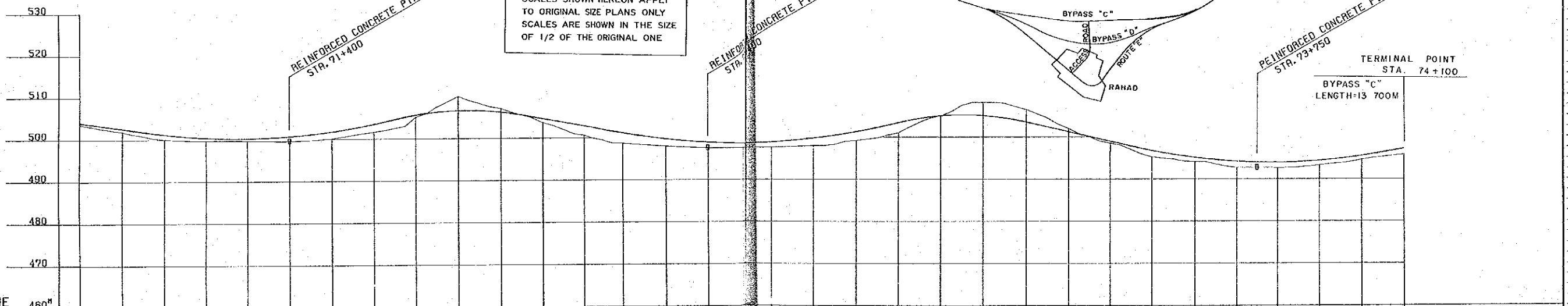
4
5



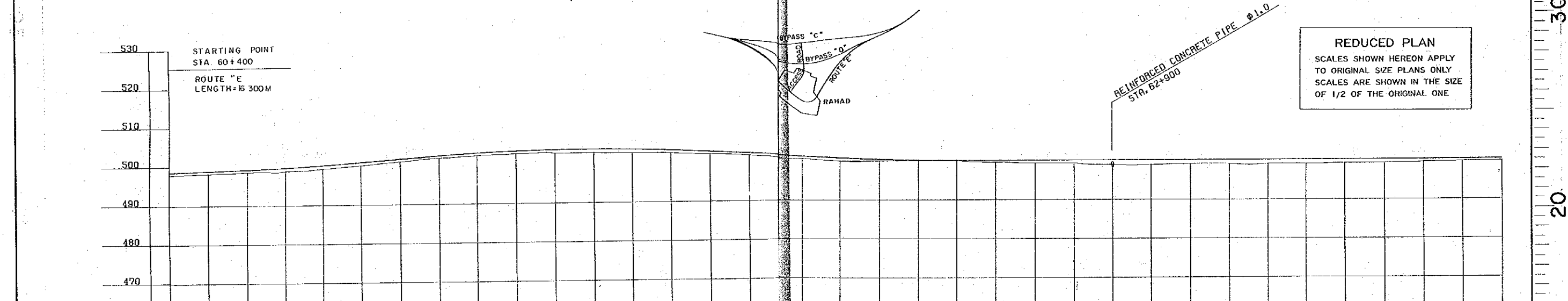
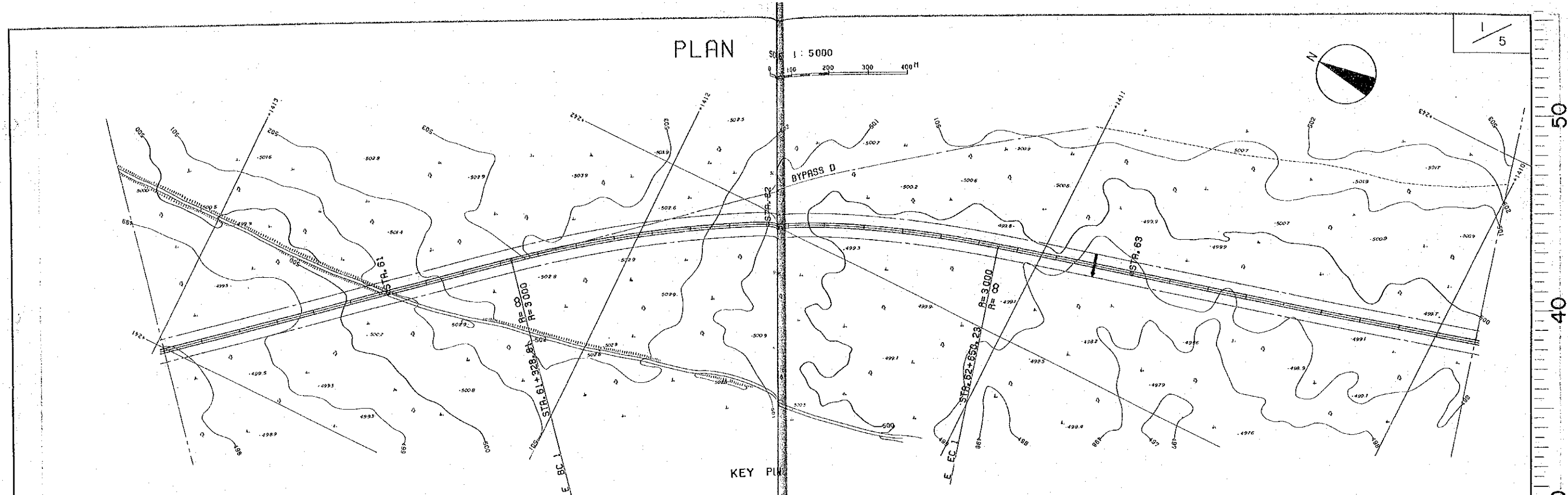
KEY PLAN



REDUCED PLAN
 SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
 SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE



DATUM-LINE	460 ^m																																																																		
GROUND LEVEL	504.06	503.6	502.60	501.9	501.20	500.1	500.37	499.7	500.19	499.6	500.34	500.65	498.5	501.77	500.1	503.59	501.6	505.60	505.2	505.62	510.0	506.24	507.1	504.63	503.7	502.89	500.7	501.15	498.7	499.67	488.0	498.80	497.5	498.87	497.6	499.80	498.0	501.94	499.2	503.99	501.0	505.03	505.0	505.25	505.08	508.2	503.52	506.5	501.23	502.0	498.94	498.5	496.65	495.2	494.73	494.1	493.84	492.7	493.43	493.99	492.6	493.97	493.3	495.43	494.6	497.23	495.8
PROPOSED ROAD LEVEL	504.06	503.6	502.60	501.9	501.20	500.1	500.37	499.7	500.19	499.6	500.34	500.65	498.5	501.77	500.1	503.59	501.6	505.60	505.2	505.62	510.0	506.24	507.1	504.63	503.7	502.89	500.7	501.15	498.7	499.67	488.0	498.80	497.5	498.87	497.6	499.80	498.0	501.94	499.2	503.99	501.0	505.03	505.0	505.25	505.08	508.2	503.52	506.5	501.23	502.0	498.94	498.5	496.65	495.2	494.73	494.1	493.84	492.7	493.43	493.99	492.6	493.97	493.3	495.43	494.6	497.23	495.8
STATION	71+000			+350			71+500			+800			72+000			72+550			73+000			+050			73+500			+750			74+000																																				
GRADE LENGTH	I=-1.460% L=600						I=2.360% L=450						I=-1.740% L=750						I=2.380% L=500						I=-2.290% L=700						I=1.800% L=900																																				
VERTICAL CURVE	L=600 R=16 000						L=300 R=7 300						L=750 R=17 000						L=300 R=6 400						L=500 R=12 000																																										
HORIZONTAL CURVE	I.P3 IA=42' 48" R=5 000 L=3 735.24																								STA. 73+342.50 R=∞ L=735.00						STA. 74+77.50																																				



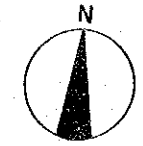
530	STARTING POINT STA. 60+400	
520	ROUTE "E" LENGTH = 300M	
510		
500		
490		
480		
470		
DATUM-LINE	460 ^M	
GROUND LEVEL	498.57-497.9 498.89-498.2 499.21-498.6 499.60-498.8 499.86 500.15-499.3 500.66-500.1 501.64-501.0 502.99-501.9 502.99-502.4 503.41-502.8 503.64-502.8 503.69-502.8 503.55-502.7 503.24-502.5 502.76-502.2 502.26-501.7 501.26-500.7 500.76-500.0 500.34-500.0 500.20 500.10-500.0 500.04-500.0 500.06-499.6 500.08-499.4 500.10-499.4 500.12-499.0 500.14-498.9 500.16-499.2 500.18-499.2 500.20-499.2 500.22-499.1 500.24-499.3 500.26-499.4 500.28-499.6 500.30-499.8 500.32-499.9	
PROPOSED ROAD LEVEL	498.57-497.9 498.89-498.2 499.21-498.6 499.60-498.8 499.86 500.15-499.3 500.66-500.1 501.64-501.0 502.99-501.9 502.99-502.4 503.41-502.8 503.64-502.8 503.69-502.8 503.55-502.7 503.24-502.5 502.76-502.2 502.26-501.7 501.26-500.7 500.76-500.0 500.34-500.0 500.20 500.10-500.0 500.04-500.0 500.06-499.6 500.08-499.4 500.10-499.4 500.12-499.0 500.14-498.9 500.16-499.2 500.18-499.2 500.20-499.2 500.22-499.1 500.24-499.3 500.26-499.4 500.28-499.6 500.30-499.8 500.32-499.9	
STATION	60+500 +750 61+000 +400 61+500 +350 62+500 63+000 63+500	
GRADE LENGTH	I=0.320% L=1150 I=0.280% L=650 I=-0.500% L=950 I=0.020% L=3050	
VERTICAL CURVE	L=300 R=65000 L=700 R=55000 L=300 R=58000	
HORIZONTAL CURVE	R=∞ L=3228.80 I.P1 I.A=25°14' R=3000 L=21.42 STA. 61+328.81 STA. 62+650.23 R=∞ L=4473.73	

REDUCED PLAN
 SCALES SHOWN HEREON APPLY
 TO ORIGINAL SIZE PLANS ONLY
 SCALES ARE SHOWN IN THE SIZE
 OF 1/2 OF THE ORIGINAL ONE

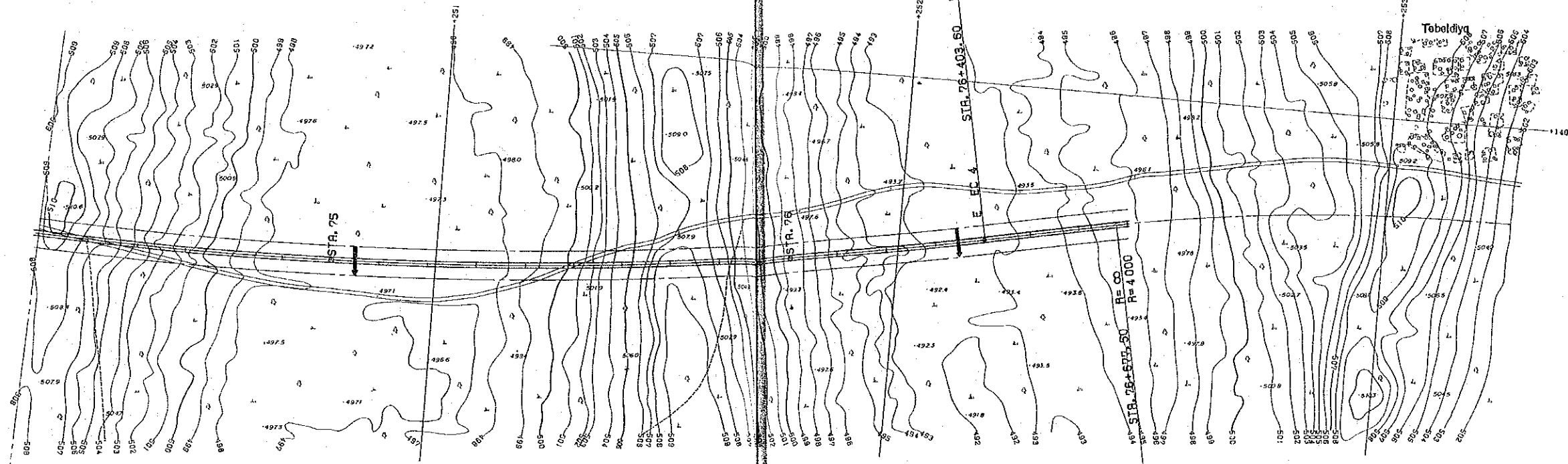
REINFORCED CONCRETE PIPE Ø1.0
 STA. 62+900

PLAN

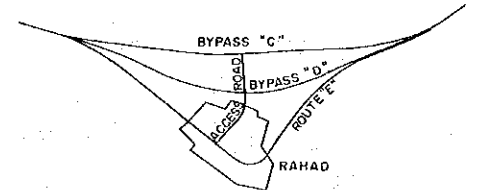
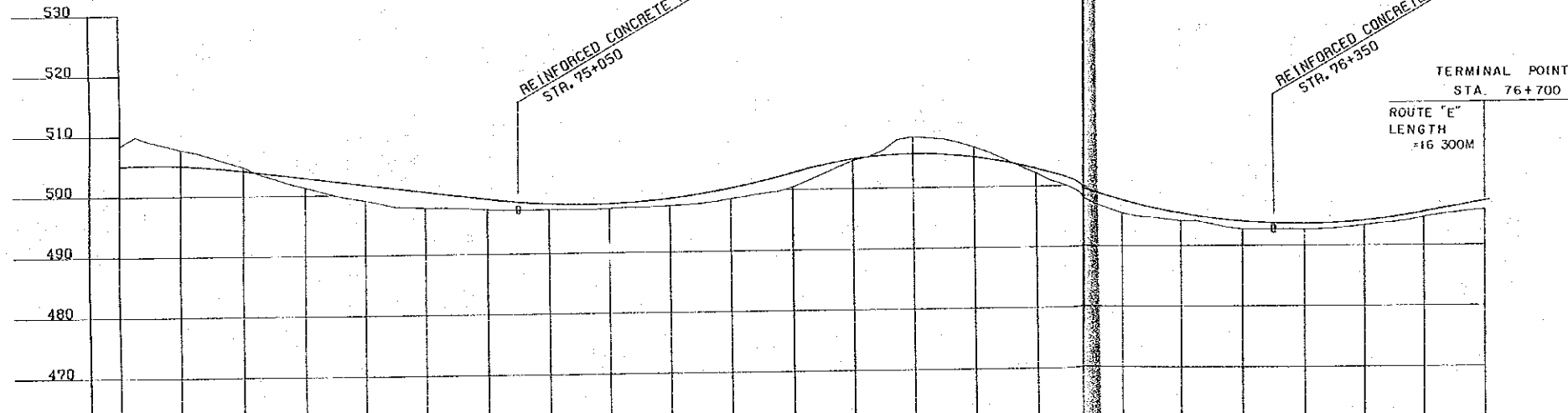
1:5000



5/5



KEY PLAN



REDUCED PLAN
 SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
 SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE

DATUM-LINE	460 ^m																																															
GROUND LEVEL	505.12	508.5	503.07	507.7	504.16	504.8	502.88	501.3	501.60	499.0	500.32	497.7	499.04	497.3	498.14	497.2	498.08	497.3	498.36	498.85	497.6	500.45	498.6	502.74	500.4	504.88	504.6	505.64	508.4	504.99	506.6	502.92	502.2	497.58	495.4	495.31	494.1	493.93	492.7	493.58	493.48	492.6	493.94	493.3	495.43	494.6	497.23	495.8
PROPOSED ROAD LEVEL																																																
STATION	+400	74+500					75+000	+250					75+500	+700					+350	76+500																												
GRADE LENGTH	L=400 R=12000		I=-1.280% L=850				495.84		I=2.260% L=450				508.26		I=0.668% L=450				490.93		I=1.800% L=900																											
VERTICAL CURVE																																																
HORIZONTAL CURVE																																																

THE DEMOCRATIC REPUBLIC OF THE SUDAN
 ROADS AND BRIDGES PUBLIC CORPORATION

ROAD PROJECT
 EL OBEID - UM RUABA

PLAN AND PROFILE
 [RAHAD ROAD]
 FROM STA. 74+000 TO STA. 78+700

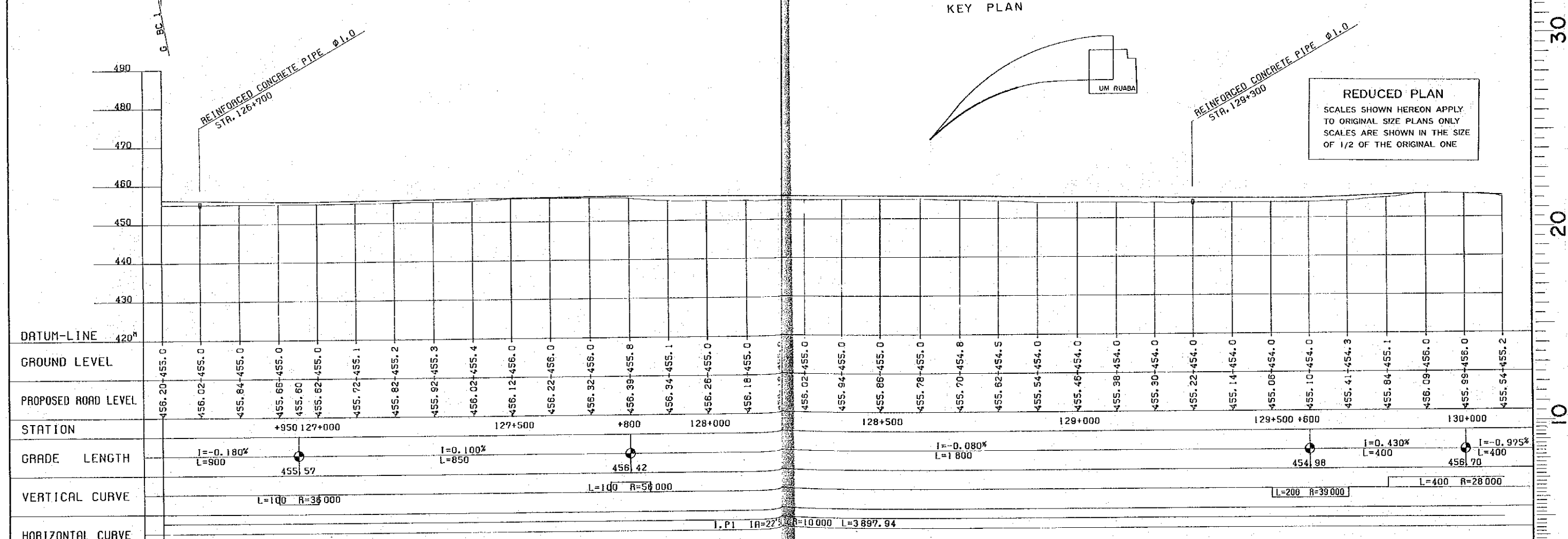
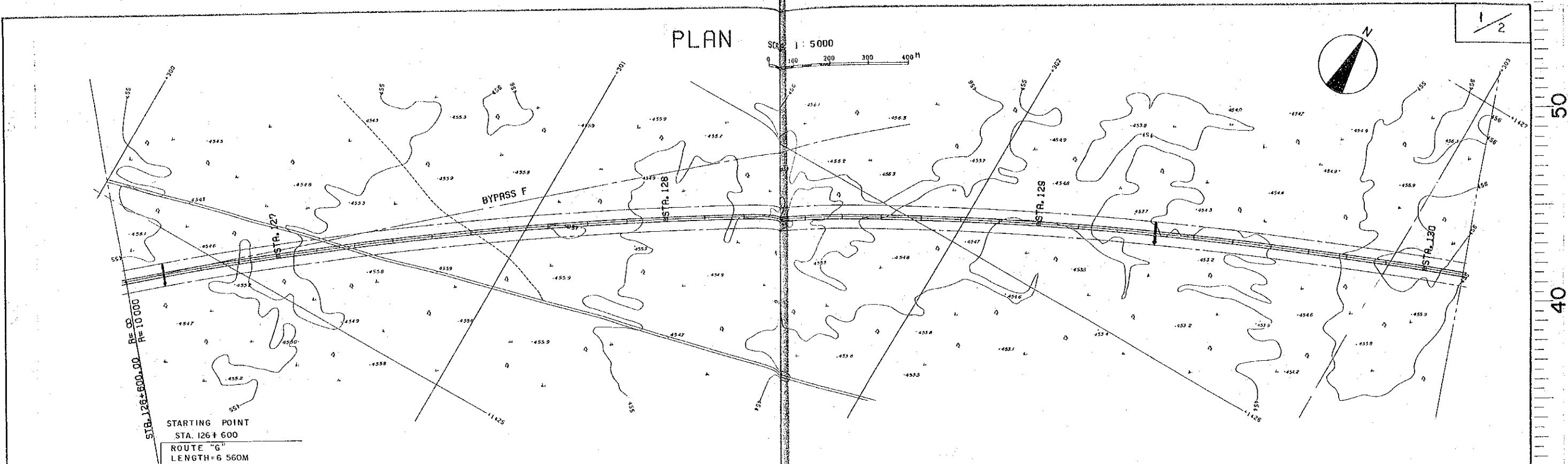
APPROVED BY

AMENDMENTS

SCALE
 HORIZONTAL 1:5000
 VERTICAL 1:500

DATE 1978
 SHEET NO. 63 OF 87

50
40
30
20
10
0



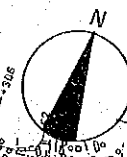
THE DEMOCRATIC REPUBLIC OF THE SUDAN ROADS AND BRIDGES PUBLIC CORPORATION	ROAD PROJECT EL OBEID - UM RUABA	PLAN AND PROFILE [UM RUABA PART "G"] FROM STA. 126+600 TO STA. 130+100	APPROVED BY	AMENDMENTS	SCALE HORIZONTAL 1:5000 VERTICAL 1:500	DATE 1978
						SHEET NO.
						64 OF 87

PLAN

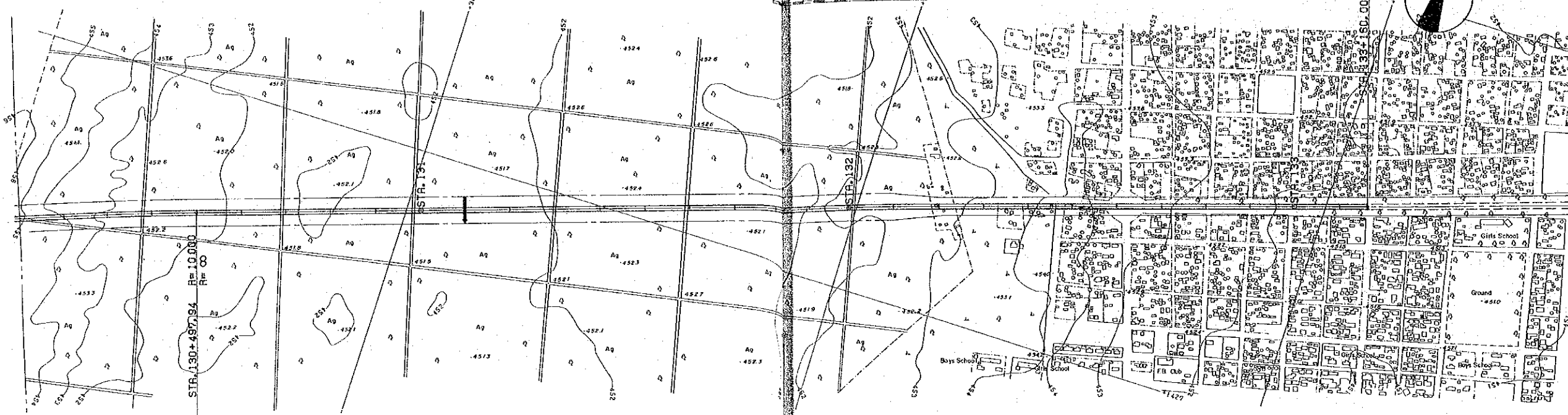
1 : 5000

Um Ruaba

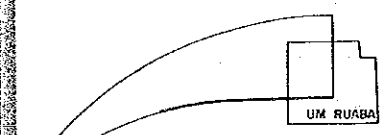
2 / 2



50
40
30
20
10
0



KEY PLAN



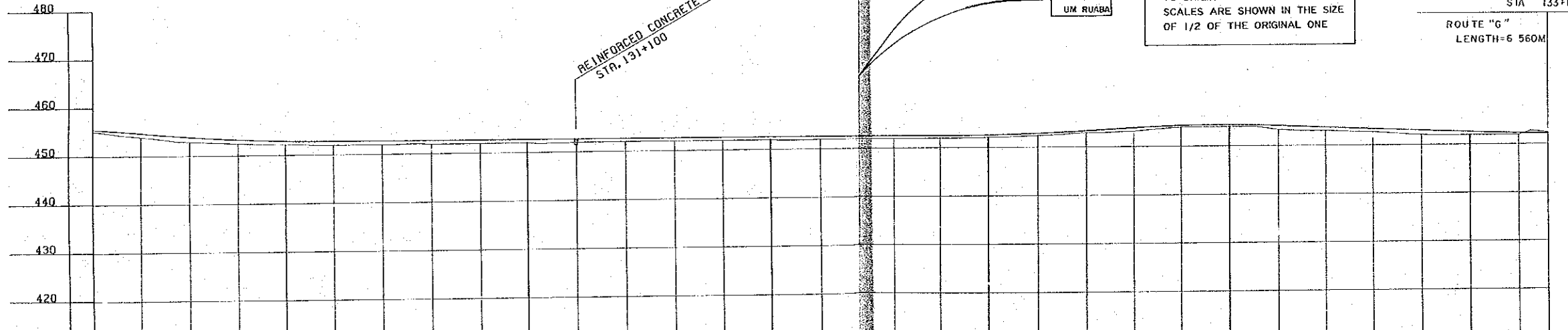
REDUCED PLAN
 SCALES SHOWN HEREON APPLY TO ORIGINAL SIZE PLANS ONLY
 SCALES ARE SHOWN IN THE SIZE OF 1/2 OF THE ORIGINAL ONE

TERMINAL POINT

STA 133+160

ROUTE "G"
 LENGTH=6 560M

REINFORCED CONCRETE PIPE Ø1.0
 STA. 131+100



DATUM-LINE	419.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
GROUND LEVEL	455.54	455.2	454.75	454.0	453.89	452.9	453.27	452.5	452.89	452.2	452.76	452.0	452.74	452.0	452.72	452.0	452.70	452.0	452.68	452.0	452.66	452.0	452.64	452.0	452.62	452.0	452.60	452.0	452.58	452.0	452.56	452.0	452.52	452.0	452.50	452.0	452.57	452.1	452.68	452.4	453.31	452.9	453.87	453.2	454.27	453.9	454.35	454.0	454.36	454.0	454.14	453.3	453.76	453.1	453.38	452.7	453.00	452.1	452.62	452.0	452.32	452.0	452.23	452.2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
PROPOSED ROAD LEVEL	455.54	455.2	454.75	454.0	453.89	452.9	453.27	452.5	452.89	452.2	452.76	452.0	452.74	452.0	452.72	452.0	452.70	452.0	452.68	452.0	452.66	452.0	452.64	452.0	452.62	452.0	452.60	452.0	452.58	452.0	452.56	452.0	452.52	452.0	452.50	452.0	452.57	452.1	452.68	452.4	453.31	452.9	453.87	453.2	454.27	453.9	454.35	454.0	454.36	454.0	454.14	453.3	453.76	453.1	453.38	452.7	453.00	452.1	452.62	452.0	452.32	452.0	452.23	452.2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
STATION	130+00	130+400	130+800	131+200	131+600	132+000	132+400	132+800	133+200	133+600	134+000	134+400	134+800	135+200	135+600	136+000	136+400	136+800	137+200	137+600	138+000	138+400	138+800	139+200	139+600	140+000	140+400	140+800	141+200	141+600	142+000	142+400	142+800	143+200	143+600	144+000	144+400	144+800	145+200	145+600	146+000	146+400	146+800	147+200	147+600	148+000	148+400	148+800	149+200	149+600	150+000	150+400	150+800	151+200	151+600	152+000	152+400	152+800	153+200	153+600	154+000	154+400	154+800	155+200	155+600	156+000	156+400	156+800	157+200	157+600	158+000	158+400	158+800	159+200	159+600	160+000	160+400	160+800	161+200	161+600	162+000	162+400	162+800	163+200	163+600	164+000	164+400	164+800	165+200	165+600	166+000	166+400	166+800	167+200	167+600	168+000	168+400	168+800	169+200	169+600	170+000	170+400	170+800	171+200	171+600	172+000	172+400	172+800	173+200	173+600	174+000	174+400	174+800	175+200	175+600	176+000	176+400	176+800	177+200	177+600	178+000	178+400	178+800	179+200	179+600	180+000	180+400	180+800	181+200	181+600	182+000	182+400	182+800	183+200	183+600	184+000	184+400	184+800	185+200	185+600	186+000	186+400	186+800	187+200	187+600	188+000	188+400	188+800	189+200	189+600	190+000	190+400	190+800	191+200	191+600	192+000	192+400	192+800	193+200	193+600	194+000	194+400	194+800	195+200	195+600	196+000	196+400	196+800	197+200	197+600	198+000	198+400	198+800	199+200	199+600	200+000	200+400	200+800	201+200	201+600	202+000	202+400	202+800	203+200	203+600	204+000	204+400	204+800	205+200	205+600	206+000	206+400	206+800	207+200	207+600	208+000	208+400	208+800	209+200	209+600	210+000	210+400	210+800	211+200	211+600	212+000	212+400	212+800	213+200	213+600	214+000	214+400	214+800	215+200	215+600	216+000	216+400	216+800	217+200	217+600	218+000	218+400	218+800	219+200	219+600	220+000	220+400	220+800	221+200	221+600	222+000	222+400	222+800	223+200	223+600	224+000	224+400	224+800	225+200	225+600	226+000	226+400	226+800	227+200	227+600	228+000	228+400	228+800	229+200	229+600	230+000	230+400	230+800	231+200	231+600	232+000	232+400	232+800	233+200	233+600	234+000	234+400	234+800	235+200	235+600	236+000	236+400	236+800	237+200	237+600	238+000	238+400	238+800	239+200	239+600	240+000	240+400	240+800	241+200	241+600	242+000	242+400	242+800	243+200	243+600	244+000	244+400	244+800	245+200	245+600	246+000	246+400	246+800	247+200	247+600	248+000	248+400	248+800	249+200	249+600	250+000	250+400	250+800	251+200	251+600	252+000	252+400	252+800	253+200	253+600	254+000	254+400	254+800	255+200	255+600	256+000	256+400	256+800	257+200	257+600	258+000	258+400	258+800	259+200	259+600	260+000	260+400	260+800	261+200	261+600	262+000	262+400	262+800	263+200	263+600	264+000	264+400	264+800	265+200	265+600	266+000	266+400	266+800	267+200	267+600	268+000	268+400	268+800	269+200	269+600	270+000	270+400	270+800	271+200	271+600	272+000	272+400	272+800	273+200	273+600	274+000	274+400	274+800	275+200	275+600	276+000	276+400	276+800	277+200	277+600	278+000	278+400	278+800	279+200	279+600	280+000	280+400	280+800	281+200	281+600	282+000	282+400	282+800	283+200	283+600	284+000	284+400	284+800	285+200	285+600	286+000	286+400	286+800	287+200	287+600	288+000	288+400	288+800	289+200	289+600	290+000	290+400	290+800	291+200	291+600	292+000	292+400	292+800	293+200	293+600	294+000	294+400	294+800	295+200	295+600	296+000	296+400	296+800	297+200	297+600	298+000	298+400	298+800	299+200	299+600	300+000	300+400	300+800	301+200	301+600	302+000	302+400	302+800	303+200	303+600	304+000	304+400	304+800	305+200	305+600	306+000	306+400	306+800	307+200	307+600	308+000	308+400	308+800	309+200	309+600	310+000	310+400	310+800	311+200	311+600	312+000	312+400	312+800	313+200	313+600	314+000	314+400	314+800	315+200	315+600	316+000	316+400	316+800	317+200	317+600	318+000	318+400	318+800	319+200	319+600	320+000	320+400	320+800	321+200	321+600	322+000	322+400	322+800	323+200	323+600	324+000	324+400	324+800	325+200	325+600	326+000	326+400	326+800	327+200	327+600	328+000	328+400	328+800	329+200	329+600	330+000	330+400	330+800	331+200	331+600	332+000	332+400	332+800	333+200	333+600	334+000	334+400	334+800	335+200	335+600	336+000	336+400	336+800	337+200	337+600	338+000	338+400	338+800	339+200	339+600	340+000	340+400	340+800	341+200	341+600	342+000	342+400	342+800	343+200	343+600	344+000	344+400	344+800	345+200	345+600	346+000	346+400	346+800	347+200	347+600	348+000	348+400	348+800	349+200	349+600	350+000	350+400	350+800	351+200	351+600	352+000	352+400	352+800	353+200	353+600	354+000	354+400	354+800	355+200	355+600	356+000	356+400	356+800	357+200	357+600	358+000	358+400	358+800	359+200	359+600	360+000	360+400	360+800	361+200	361+600	362+000	362+400	362+800	363+200	363+600	364+000	364+400	364+800	365+200	365+600	366+000	366+400	366+800	367+200	367+600	368+000	368+400	368+800	369+200	369+600	370+000	370+400	370+800	371+200	371+600	372+000	372+400	372+800	373+200	373+600	374+000	374+400	374+800	375+200	375+600	376+000	376+400	376+800	377+200	377+600	378+000	378+400	378+800	379+200	3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III ALTERNATIVE ROUTES SCALE 1 : 50000

MAP OF ALTERNATIVE ROUTES..... 66

PLAN AND PROFILE

ROUTE (A) 67 ~ 69

ROUTE (B) 70 ~ 72

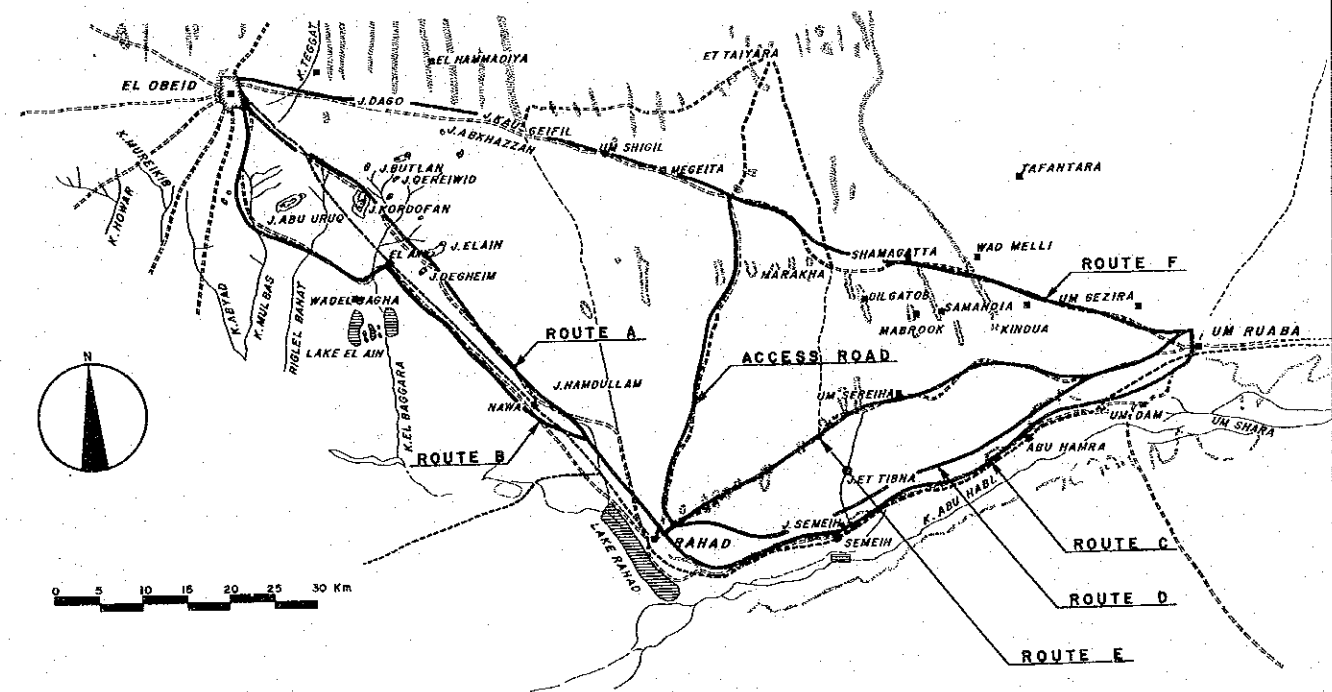
ROUTE (C) 73 ~ 75

ROUTE (D) 76 ~ 78

ROUTE (E) 79 ~ 81

ROUTE (F) + ACCESS ROAD 82 ~ 87

MAP OF ALTERNATIVE ROUTES



LEGEND

-----	EXISTING ROADS		HILLS
- - - - -	RAILWAYS	—	PROPOSED ROUTES
~~~~~	RIVERS (KHORS)		
○	QOZ		

DISTANCE BY ROUTE		
Route A	EL OBEID - RAHAD (VIA J. KORDOFAN)	68.0km
Route B	EL OBEID - RAHAD (VIA LAKE EL AIN)	73.0km
Route C	RAHAD - UM RUABA (VIA SEMEIH)	71.8km
Route D	RAHAD - UM RUABA (A NEW ROUTE)	66.6km
Route E	RAHAD - UM RUABA (VIA UM SEREHA)	67.3km
Route F	EL OBEID - UM RUABA	114.7km
Access Road	RAHAD - ET TAIYARA	40.8km

REDUCED PLAN  
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 TO ORIGINAL SIZE PLANS ONLY  
 SCALES ARE SHOWN IN THE SIZE  
 OF 1/2 OF THE ORIGINAL ONE