

***C2.3 Bore Holes Water Level Record of
Grand Falls Dam Site***

1 Record of water level in boreholes (Grand Falls: 1/7)
(after the completion of drilling works)

Left abutment (Upstream)

Date	G95-1(EL.520.37m)		G95-2(EL.493.42m)		G95-3(EL.478.76m)	
	Depth(m)	EL.(m)	Depth(m)	EL.(m)	Depth(m)	EL.(m)
Jul. 31			16.80	476.62	12.90	465.86
Aug. 2			17.50	475.92	12.90	465.86
4			17.60	475.82	12.90	465.86
7	10.50	509.87	17.70	475.72	13.20	465.56
9	16.10	504.27	18.10	475.32	13.50	465.26
12	16.50	503.87	18.10	475.32	18.50	460.26
16	16.70	503.67	18.25	475.17	18.85	459.91
18	17.05	503.32	18.35	475.07	19.05	459.71
29						

Left abutment (Downstream)

Date	G95-6(EL.522.82m)		G95-7(EL.492.71m)	
	Depth(m)	EL.(m)	Depth(m)	EL.(m)
Jul. 28			11.20	481.51
31			12.15	480.56
Aug. 2			13.00	479.71
4			13.10	479.61
7	9.00	513.82	13.40	479.31
9	12.60	510.22	13.50	479.21
12	12.90	509.92	13.55	479.16
16	13.00	509.82		
18	13.00	509.82		

Right abutment (Upstream)

Date	G95-9(EL.464.46m)		G95-10(EL.473.62m)		G95-4(EL.505.59m)	
	Depth(m)	EL.(m)	Depth(m)	EL.(m)	Depth(m)	EL.(m)
Jul. 8	19.80	444.66	21.00	452.62	14.80	490.79
10	20.10	444.36	21.40	452.22	15.90	489.69
12	20.20	444.26	21.50	452.12	15.90	489.69
14	20.30	444.16	21.60	452.02	16.10	489.49
17	20.40	444.06	21.90	451.72	16.20	489.39
19	20.50	443.96	21.90	451.72	16.20	489.39
21	20.50	443.96	21.90	451.72	19.70	485.89
24	20.60	443.86	21.90	451.72	19.70	485.89
26	20.60	443.86	21.90	451.72	19.70	485.89
28	20.70	443.76	22.00	451.62	20.25	485.34
31	20.70	443.76	22.00	451.62	21.00	484.59
Aug. 2	20.70	443.76	22.00	451.62	21.10	484.49
4	20.70	443.76	22.00	451.62	21.10	484.49
7	20.70	443.76	22.00	451.62	21.10	484.49
9	20.80	443.66	22.10	451.52	21.10	484.49
29	20.80	443.66	22.70	450.92	23.60	481.99

2 Record of water level in boreholes (Grand Falls: 2/7)
(after the completion of drilling works)

Right abutment (Downstream)

Date	G95-11(EL.465.06m)		G95-12(EL.491.83m)		G95-13(EL.484.45m)	
	Depth(m)	EL.(m)	Depth(m)	EL.(m)	Depth(m)	EL.(m)
Jul. 12	15.60	449.46	23.40	468.43		
14	15.80	449.26	25.40	466.43		
17	15.80	449.26	25.60	466.23		
19	16.00	449.06	26.70	465.13		
21	16.00	449.06	27.15	464.68		
24	16.00	449.06	27.40	464.43	23.20	461.25
26	16.00	449.06	27.60	464.23	23.20	461.25
28	16.00	449.06	27.65	464.18	23.60	460.85
31	16.10	448.96	27.70	464.13	23.70	460.75
Aug. 2	16.10	448.96	27.70	464.13	23.70	460.75
4	16.10	448.96	27.70	464.13	23.80	460.65
7	16.10	448.96	27.70	464.13	23.90	460.55
9	16.10	448.96	28.20	463.63	23.90	460.55
29	16.10	448.96	28.60	463.23	23.90	460.55

Right abutment

River bed

Date	G95-5(EL.530.37m)		G95-14(EL.521.78m)		G95-8(EL.442.97m)	
	Depth(m)	EL.(m)	Depth(m)	EL.(m)	Depth(m)	EL.(m)
Jul. 14					0.60	442.37
17					0.60	442.37
19					0.60	442.37
21					0.60	442.37
24	18.50	511.87	37.00	484.78	0.60	442.37
26	22.30	508.07	37.10	484.68	0.60	442.37
28	22.75	507.62	37.20	484.58	0.60	442.37
31	22.80	507.57	37.20	484.58	0.50	442.27
Aug. 2	22.80	507.57	37.30	484.48	0.50	442.27
4	22.80	507.57	37.30	484.48	0.50	442.27
7	22.80	507.57	37.30	484.48	0.50	442.27
9	22.80	507.57	37.30	484.48	0.50	442.27
12	23.80	506.57	36.90	484.88		
16	23.80	506.57	36.95	484.83		
18	23.85	506.52	36.95	484.83		
29	24.30	506.07	36.95	484.83	1.30	441.67

3 Record of water level in boreholes (Grand Falls: 3/7)
(Measured at morning before start drilling works)

G95-1 Hole mouth EL.(m) 520.37			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/8/2	15.80	4.50	515.87
1995/8/3	27.65	5.60	514.77
1995/8/4	44.50	12.40	507.97

G95-2 Hole mouth EL.(m) 493.42			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/7/28	6.00	5.35	488.07
1995/7/29	16.00	15.75	477.67
1995/7/30	27.00	15.35	478.07

G95-3 Hole mouth EL.(m) 478.76			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/7/26	10.85	3.15	475.61
1995/7/27	18.65	3.15	475.61
1995/7/28	24.25	3.15	475.61
1995/7/29	30.20	3.15	475.61
1995/7/30	35.50	3.15	475.61

G95-4 Hole mouth EL.(m) 505.59			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/6/29	12.00	6.25	499.34
1995/6/30	12.00	11.04	494.55
1995/7/1	19.60	14.65	490.94
1995/7/2	22.60	14.75	490.84
1995/7/3	29.60	14.60	490.99
1995/7/4	34.50	15.00	490.59
1995/7/5	44.50	13.80	491.79

G95-5 Hole mouth EL.(m) 530.37			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/7/13	5.00	2.50	527.87
1995/7/14	6.00	3.00	527.37
1995/7/15	9.00	5.00	525.37
1995/7/16	12.60	nil	
1995/7/17	21.00	17.55	512.82
1995/7/18	33.00	17.10	513.27
1995/7/19	40.50	15.85	514.52
1995/7/20	43.90	15.40	514.97
1995/7/21	47.10	15.90	514.47
1995/7/22	49.50	16.50	513.87

4 Record of water level in boreholes (Grand Falls: 4/7)
 (Measured at morning before start drilling works)

G95-6 Hole mouth EL.(m) 522.82			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/7/29	4.00	3.50	519.32
1995/7/30	4.00	3.50	519.32
1995/7/31	13.00	1.50	521.32
1995/8/1	23.00	10.00	512.82
1995/8/2	38.00	10.00	512.82
1995/8/3	46.80	11.50	511.32
1995/8/4	58.00	12.00	510.82
1995/8/5	66.60	10.00	512.82
1995/8/6	73.60	9.40	513.42
1995/8/7	80.15	9.80	513.02

G95-7 Hole mouth EL.(m) 492.71			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/7/20	8.40	7.40	485.31
1995/7/21	10.50	7.60	485.11
1995/7/22	13.90	8.00	484.71
1995/7/23	20.20	8.00	484.71
1995/7/24	30.05	10.35	482.36

G95-8 Hole mouth EL. (m) 442.97			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/7/2	3.00	1.00	441.97
1995/7/3	4.50	1.00	441.97
1995/7/4	6.40	1.00	441.97
1995/7/5	10.00	1.00	441.97
1995/7/6	15.00	1.00	441.97
1995/7/7	18.00	1.00	441.97
1995/7/8	25.40	1.00	441.97
1995/7/9	34.50	1.00	441.97
1995/7/10	40.15	1.00	441.97
1995/7/11	48.40	1.00	441.97
1995/7/12	50.20	1.00	441.97

G95-9 Hole mouth EL.(m) 464.46			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/7/2	6.00	3.35	461.11
1995/7/3	12.00	nil	
1995/7/4	18.00	nil	
1995/7/5	21.40	17.70	446.76
1995/7/6	26.00	19.35	445.11

5 Record of water level in boreholes (Grand Falls: 5/7)
 (Measured at morning before start drilling works)

G95-10 Hole mouth EL. (m) 473.62			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/6/29	9.00	6.45	467.17
1995/6/30	11.00	nil	
1995/7/1	15.00	14.40	459.22
1995/7/2	19.50	16.15	457.47
1995/7/3	26.50	16.80	456.82
1995/7/4	30.20	17.10	456.52

G95-11 Hole mouth EL.(m) 465.06			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/7/5	4.50	1.70	463.36
1995/7/6	8.00	5.65	459.41
1995/7/7	12.50	10.75	454.31
1995/7/8	17.00	nil	
1995/7/9	21.35	15.45	449.61
1995/7/10	24.25	15.25	449.81
1995/7/11	30.25	14.95	450.11

G95-12 Hole mouth EL.(m) 491.83			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/7/11	7.50	7.10	484.73
1995/7/12	19.75	15.20	476.63
1995/7/13	27.30	17.80	474.03

G95-13 Hole mouth EL. (m) 484.45			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/7/17	12.20	10.40	474.05
1995/7/18	17.50	12.60	471.85
1995/7/19	21.30	17.85	466.60
1995/7/20	27.30	21.15	463.30
1995/7/21	30.10	18.30	466.15

G95-14 Hole mouth EL.(m) 521.78			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/7/15	5.00	2.75	519.03
1995/7/16	11.20	6.05	515.73
1995/7/17	21.00	17.00	504.78
1995/7/18	29.30	25.00	496.78
1995/7/19	36.75	33.75	488.03
1995/7/20	42.00	36.00	485.78
1995/7/21	48.75	38.27	483.51
1995/7/22	50.20	38.55	483.23

GQ95-1 Hole mouth EL. (m) 572.15			
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1995/7/8	9.00	5.40	566.75
1995/7/9	16.50	8.55	563.60
1995/7/10	22.50	5.35	566.80

6 Record of water level in boreholes (Grand Falls: 6/7)
 (Measured at morning before start drilling works)

94-1			
Hole mouth EL. (m)			495.66
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1994/8/19	16.05	1.00	494.66
1994/8/20	22.20	10.30	485.36
1994/8/21	32.75	7.00	488.66
1994/8/22	41.35	21.00	474.66
1994/8/23	52.00	28.40	467.26
1994/8/24	57.85	30.00	465.66
1994/8/25	67.25	29.30	466.36
1994/8/26	72.05	28.80	466.86
1994/8/27	79.10	29.35	466.31
1994/8/28	85.90	29.45	466.21
1994/8/29	93.15	29.05	466.61

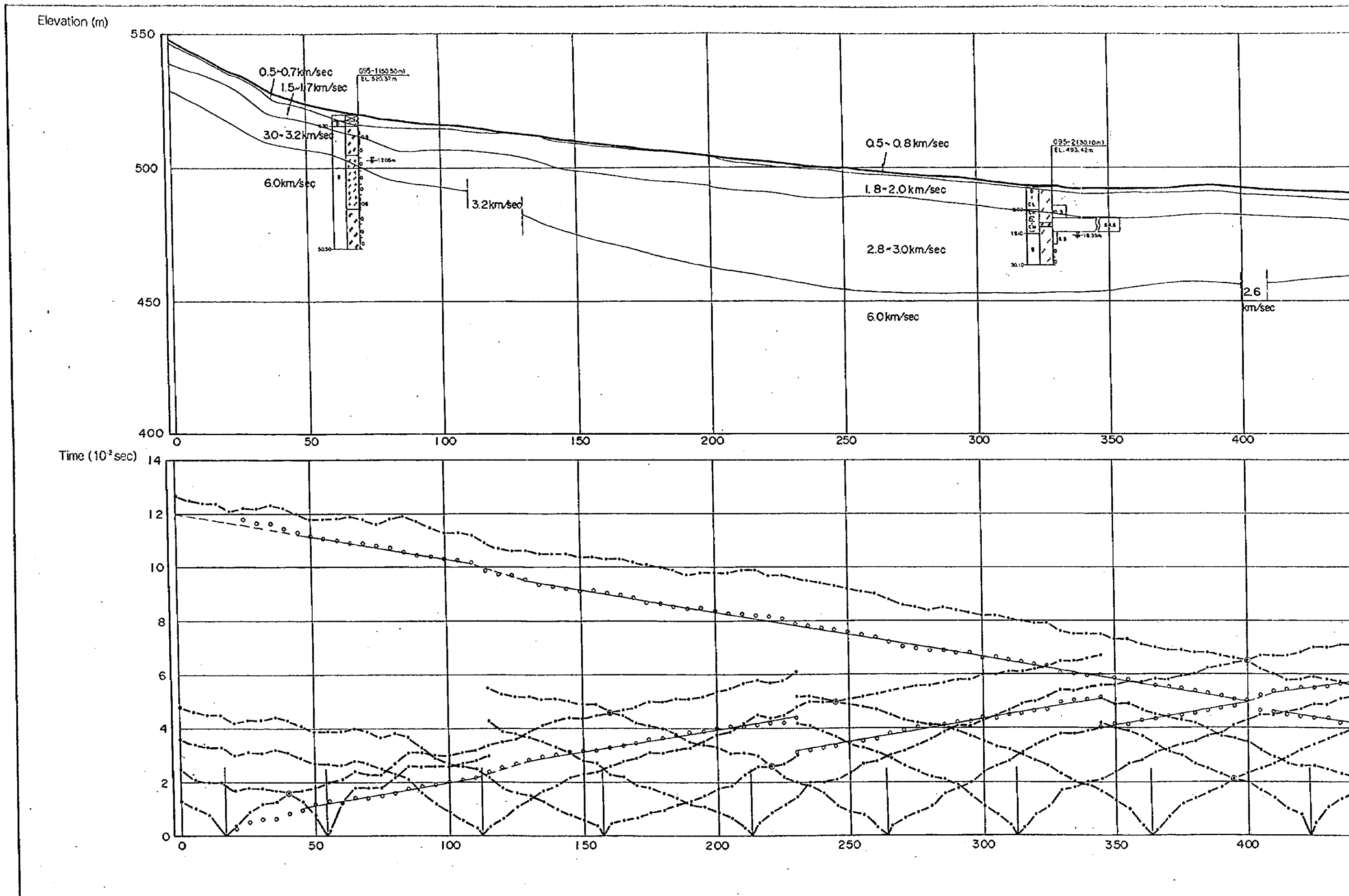
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Hole mouth EL. (m)			474.36
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1994/8/14	5.50	1.10	473.26
1994/8/15	5.50	1.00	473.36
1994/8/16	11.35	4.40	469.96
1994/8/17	18.50	6.65	467.71
1994/8/20	18.50	11.00	463.36
1994/8/21	23.50	15.30	459.06
1994/8/22	33.65	18.60	455.76
1994/8/23	39.75	21.30	453.06
1994/8/24	45.75	7.15	467.21
1994/8/27	47.40	14.20	460.16
1994/8/28	57.05	22.90	451.46
1994/8/29	65.85	19.20	455.16
1994/8/30	66.85	20.15	454.21
1994/8/31	72.00	19.40	454.96
1994/9/1	75.00	21.10	453.26

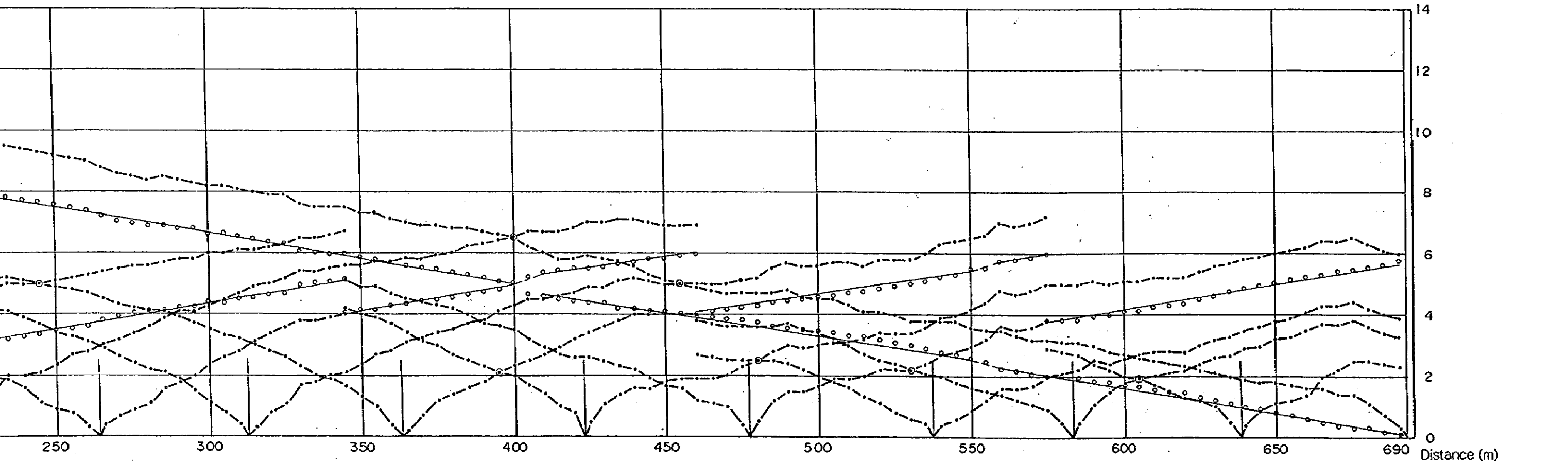
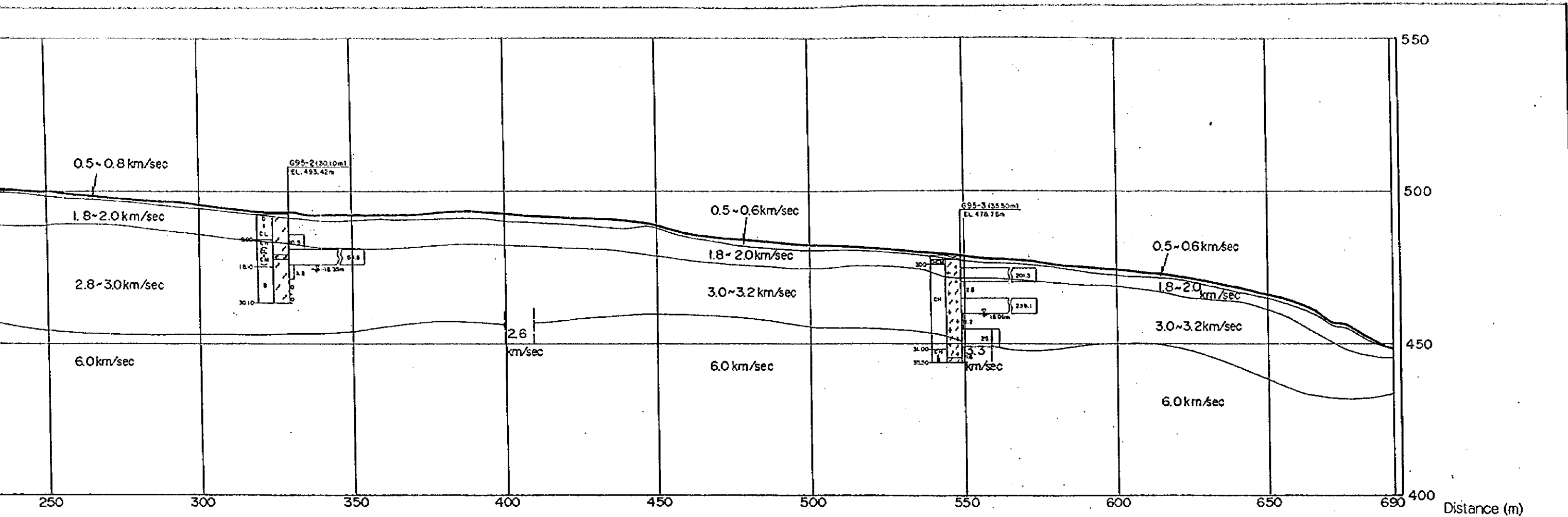
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Hole mouth EL. (m)			444.20
Date	Depth of hole (m)	Depth of water level(m)	EL. of water level(m)
1994/9/13	10.40	5.00	439.87
1994/9/14	12.40	6.00	439.00
1994/9/15	13.00	4.30	440.48
1994/9/16	16.80	3.00	441.60
1994/9/17	22.70	3.00	441.60
1994/9/18	33.00	3.00	441.60
1994/9/19	37.60	3.00	441.60
1994/9/20	45.60	3.00	441.60
1994/9/21	57.50	3.00	441.60
1994/9/22	67.60	3.00	441.60
1994/9/23	80.05	3.00	441.60
1994/9/24	87.80	3.00	441.60
1994/9/25	91.60	3.00	441.60
1994/9/26	96.10	3.00	441.60

7 Record of water level in boreholes (Grand Falls: 7/7)
 (Measured at morning before start drilling works)

94-4 Date	Hole mouth EL.(m) Depth of hole (m)	536.62 Depth of water level(m)	EL. of water level(m)
1994/9/14	14.05	8.20	528.42
1994/9/15	26.15	9.30	527.32
1994/9/16	39.35	10.90	525.72
1994/9/17	47.20	10.50	526.12
1994/9/18	56.00	42.70	493.92
1994/9/19	63.65	44.90	491.72
1994/9/20	77.40	32.00	504.62
1994/9/21	91.40	19.60	517.02
1994/9/22	106.40	32.00	504.62
1994/9/23	113.40	32.00	504.62
1994/9/24	125.35	32.00	504.62
1994/9/25	125.35	36.40	500.22
1994/9/26	125.35	42.80	493.82
1994/9/27	125.35	45.65	490.97

***C2.4 Seismic Prospecting Investigation of
Grand Falls Dam Site***





JAPAN INTERNATIONAL COOPERATION AGENCY REPUBLIC OF KENYA MUTONGA/GRAND FALLS HYDROPOWER PROJECT	Seismic Prospecting Investigation and Geological Profile on G95-A	Fig. No. C 2.1
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Elevation (m)

550

500

450

400

Time (10^2 sec)

16

14

12

10

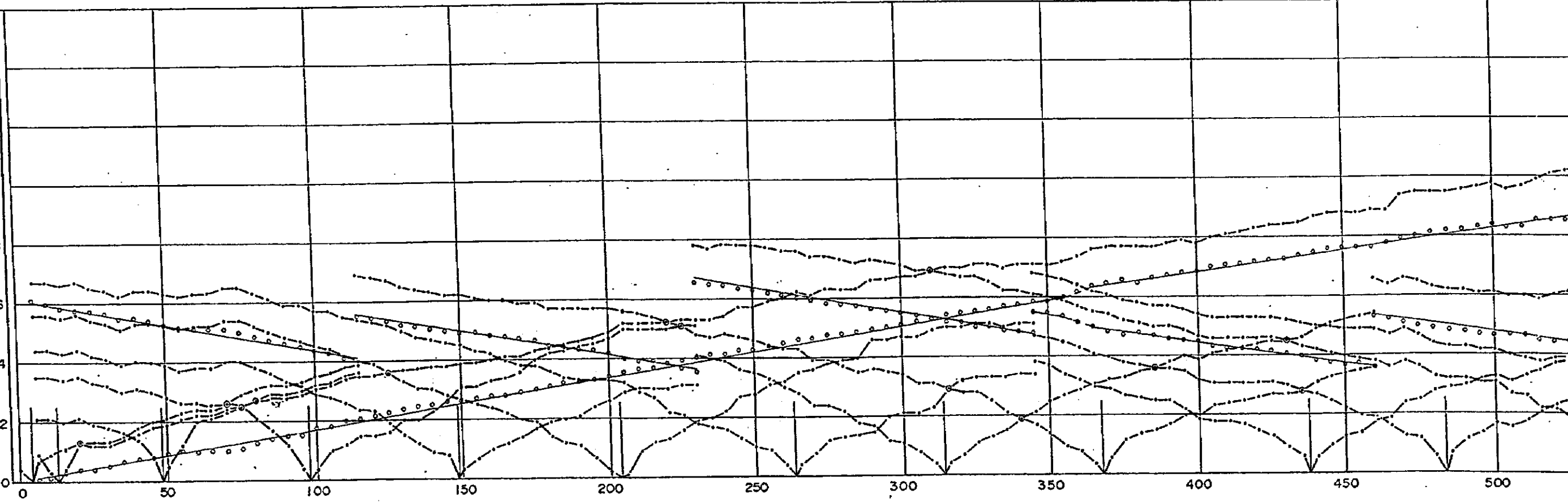
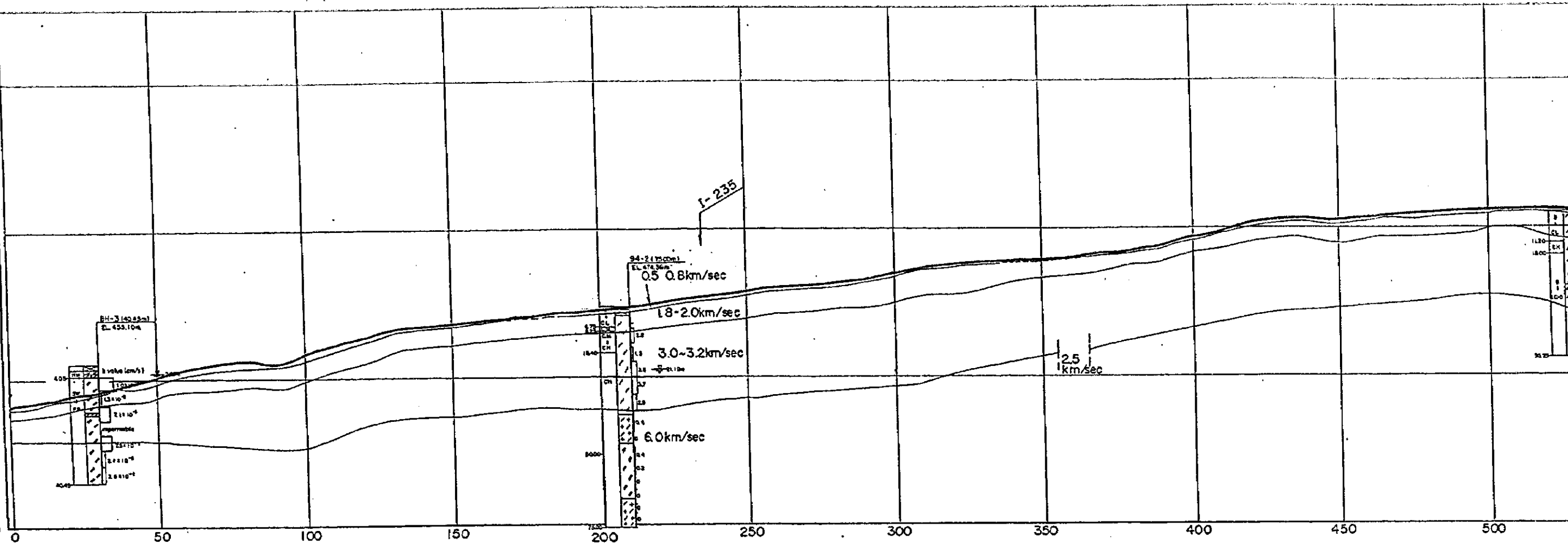
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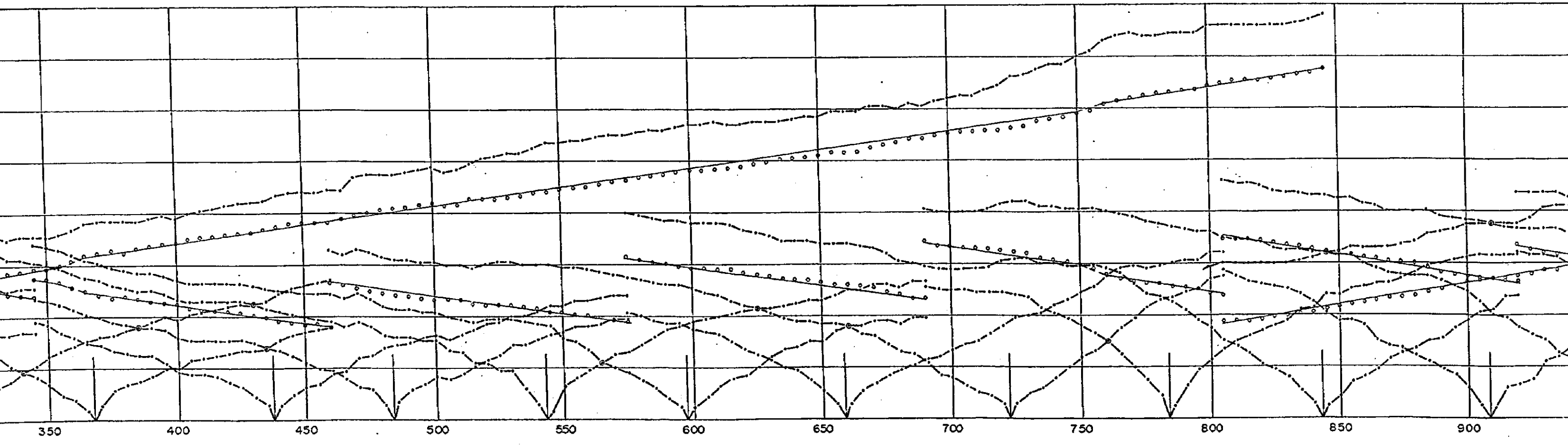
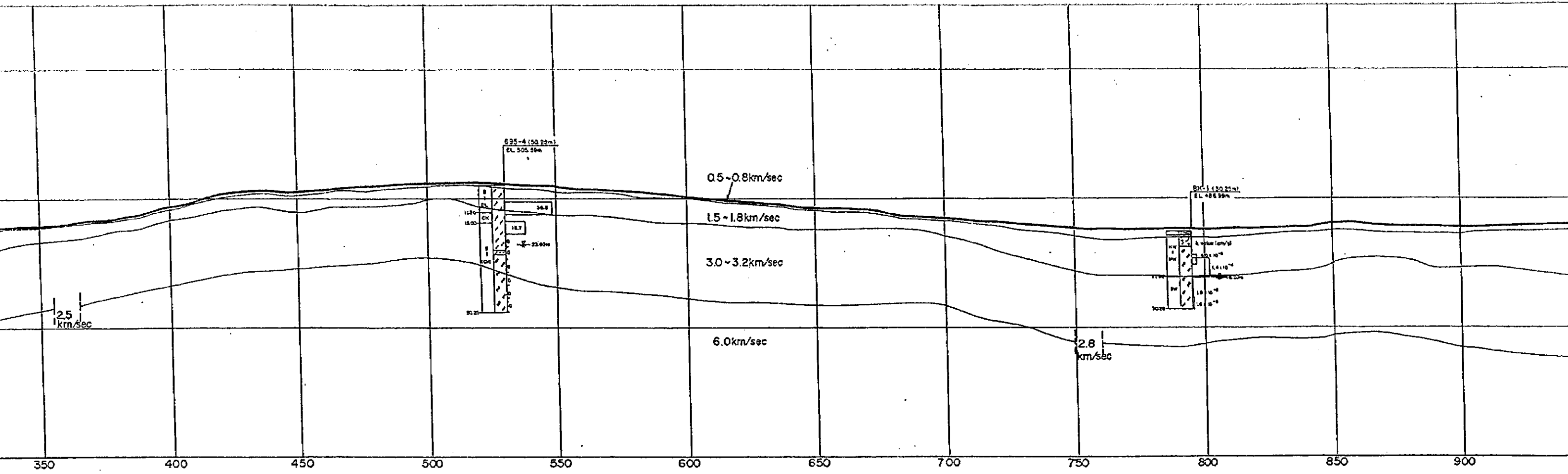
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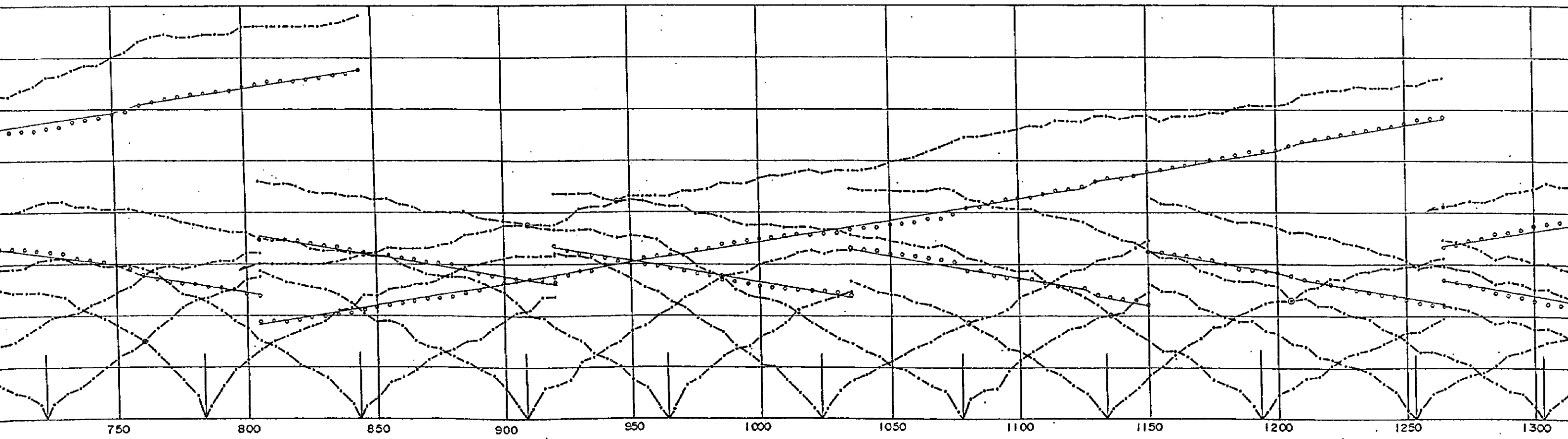
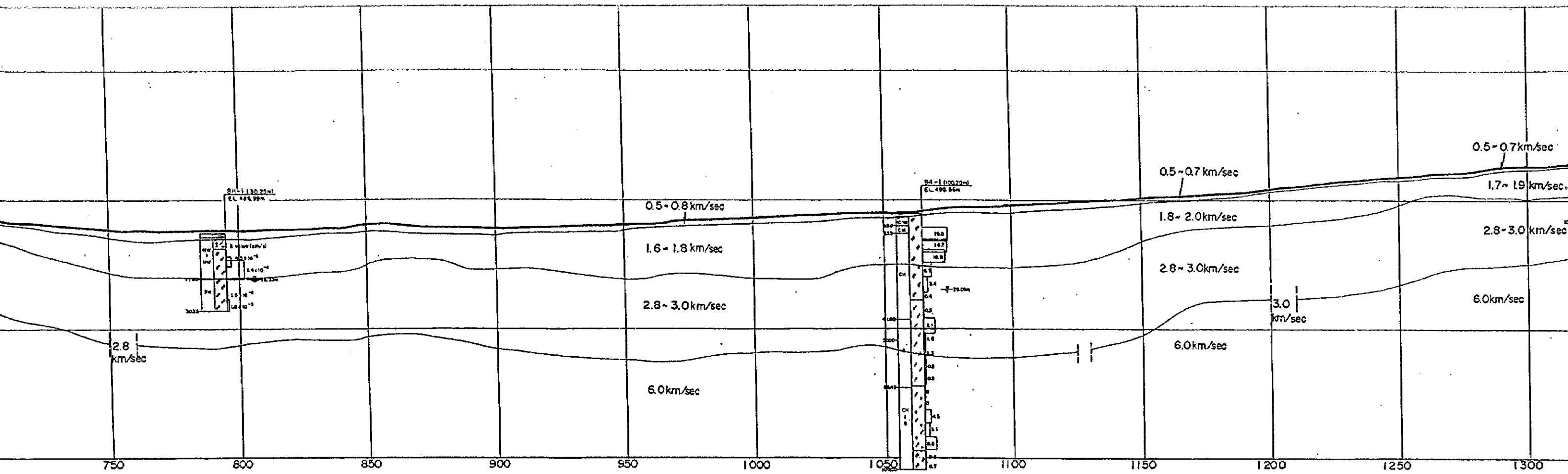
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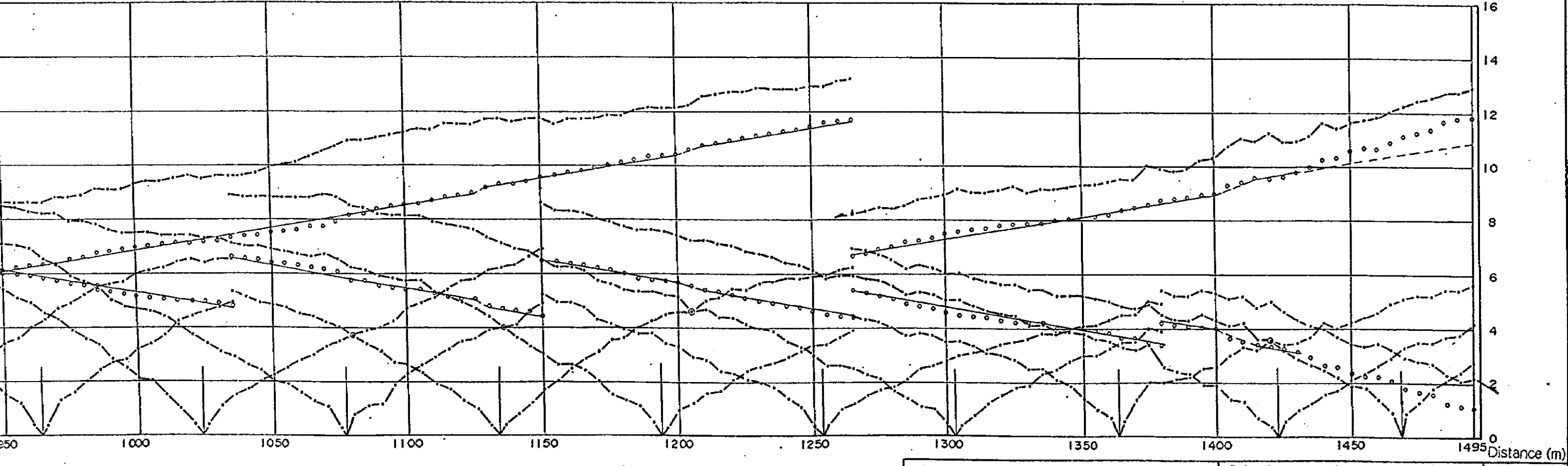
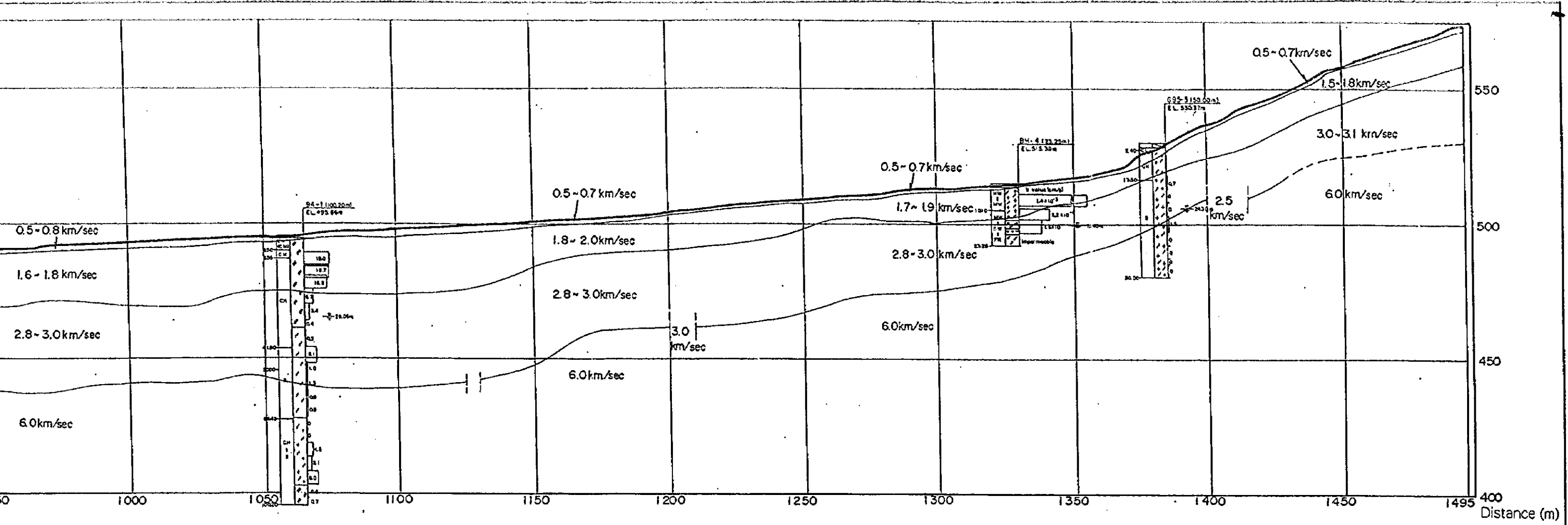
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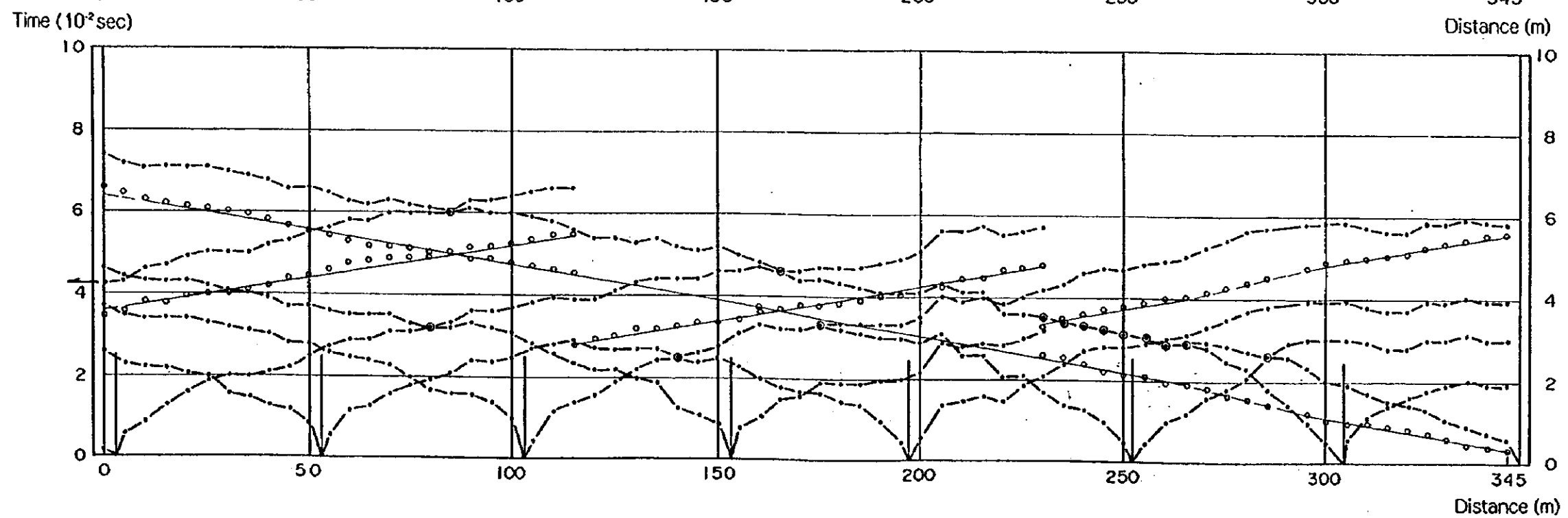
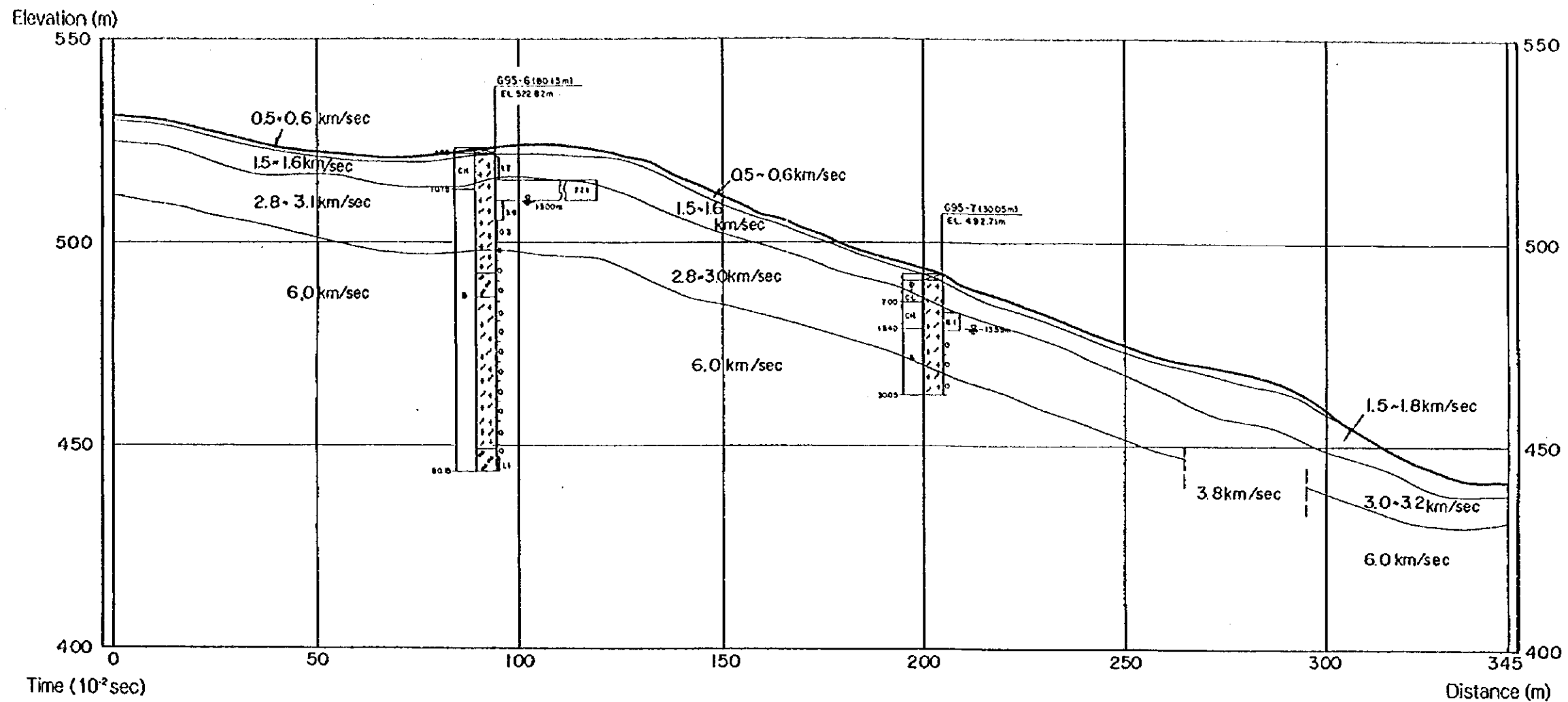






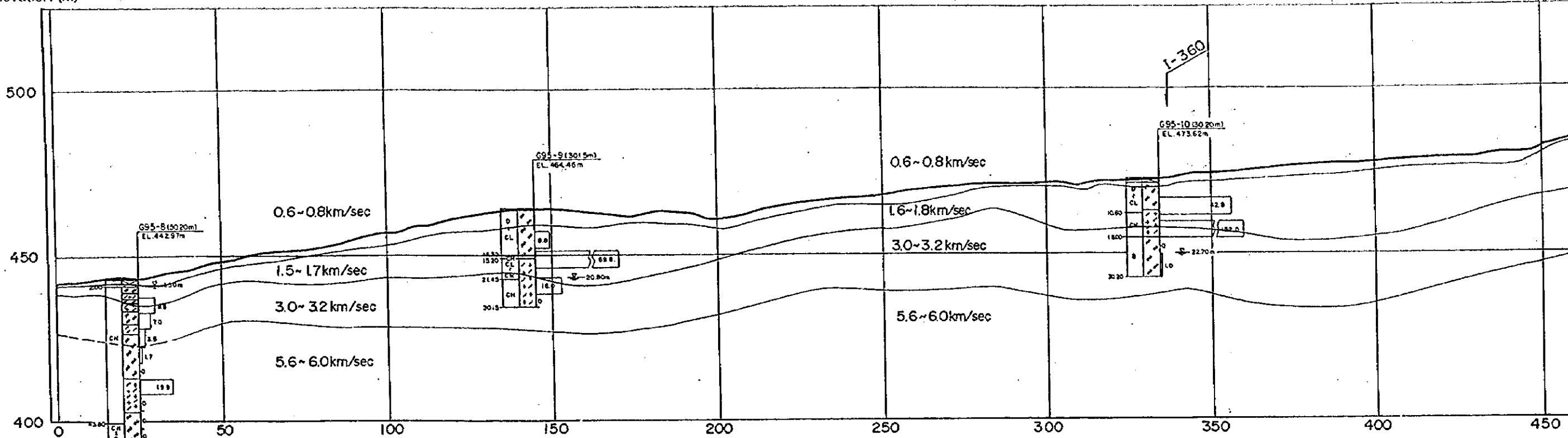


JAPAN INTERNATIONAL COOPERATION AGENCY	Seismic Prospecting Investigation and	Fig. No.
REPUBLIC OF KENYA	Geological Profile on G95-B	C 2.2
MUTONGA/GRAND FALLS HYDROPOWER PROJECT		

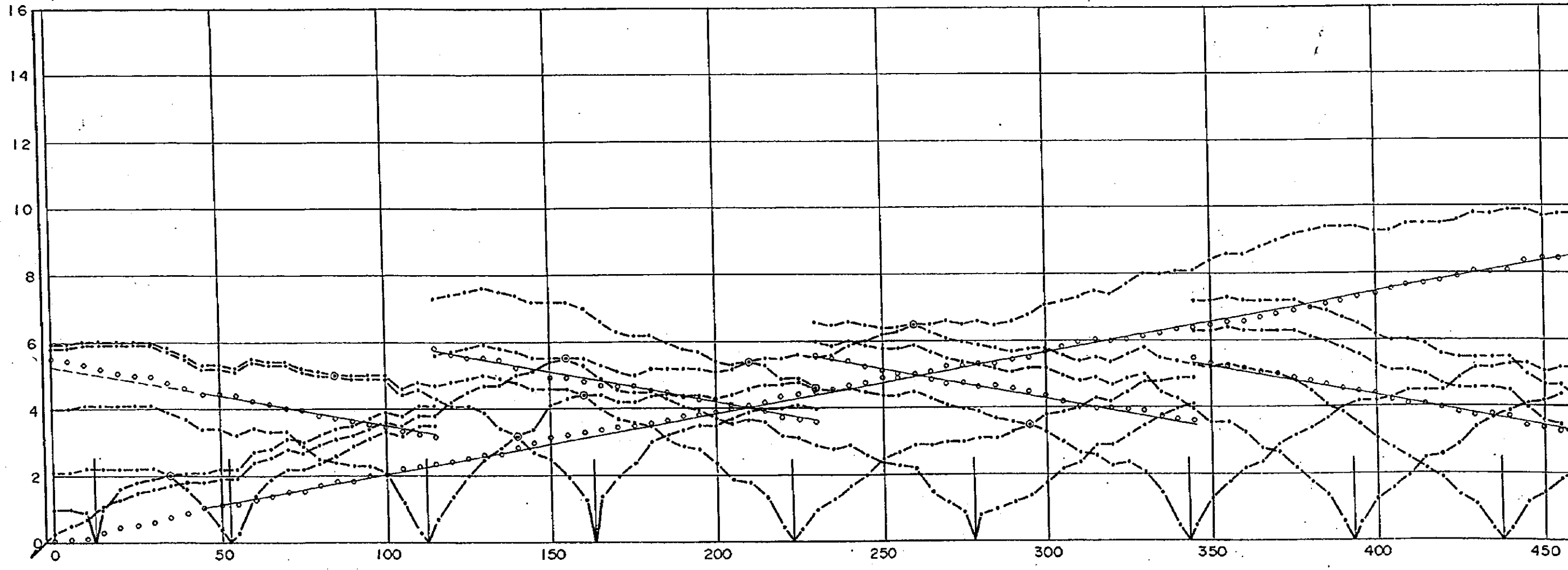


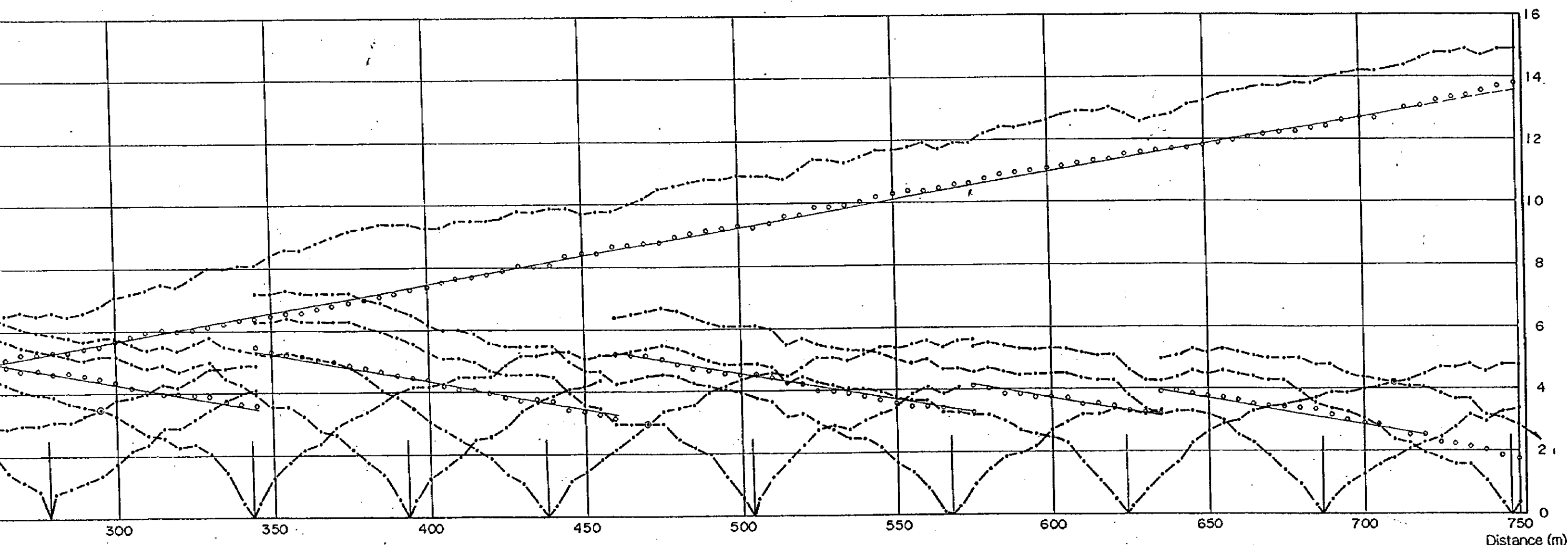
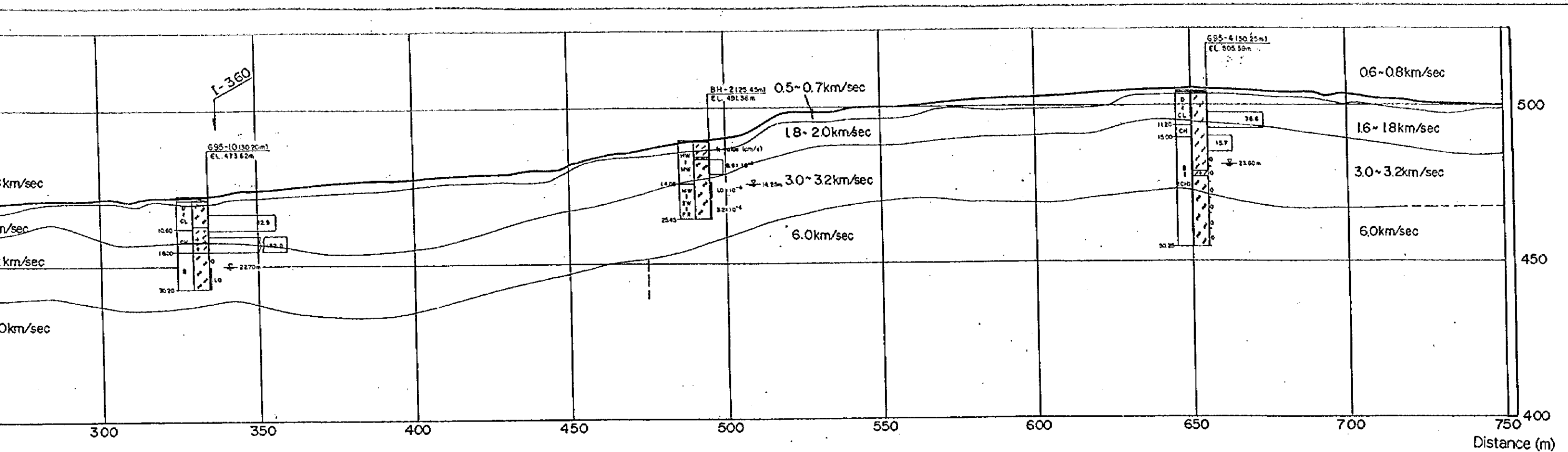
JAPAN INTERNATIONAL COOPERATION AGENCY REPUBLIC OF KENYA MUTONGA/GRAND FALLS HYDROPOWER PROJECT	Seismic Prospecting Investigation and Geological Profile on G95-C	Fig. No.
		C 2.3

Elevation (m)

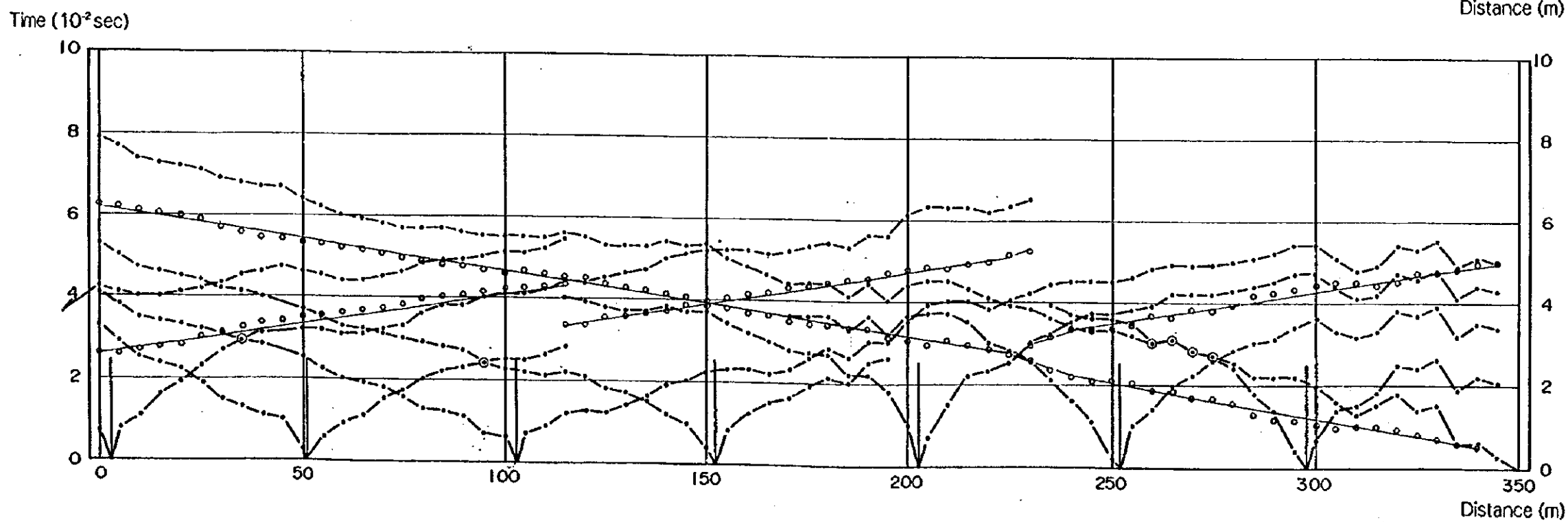
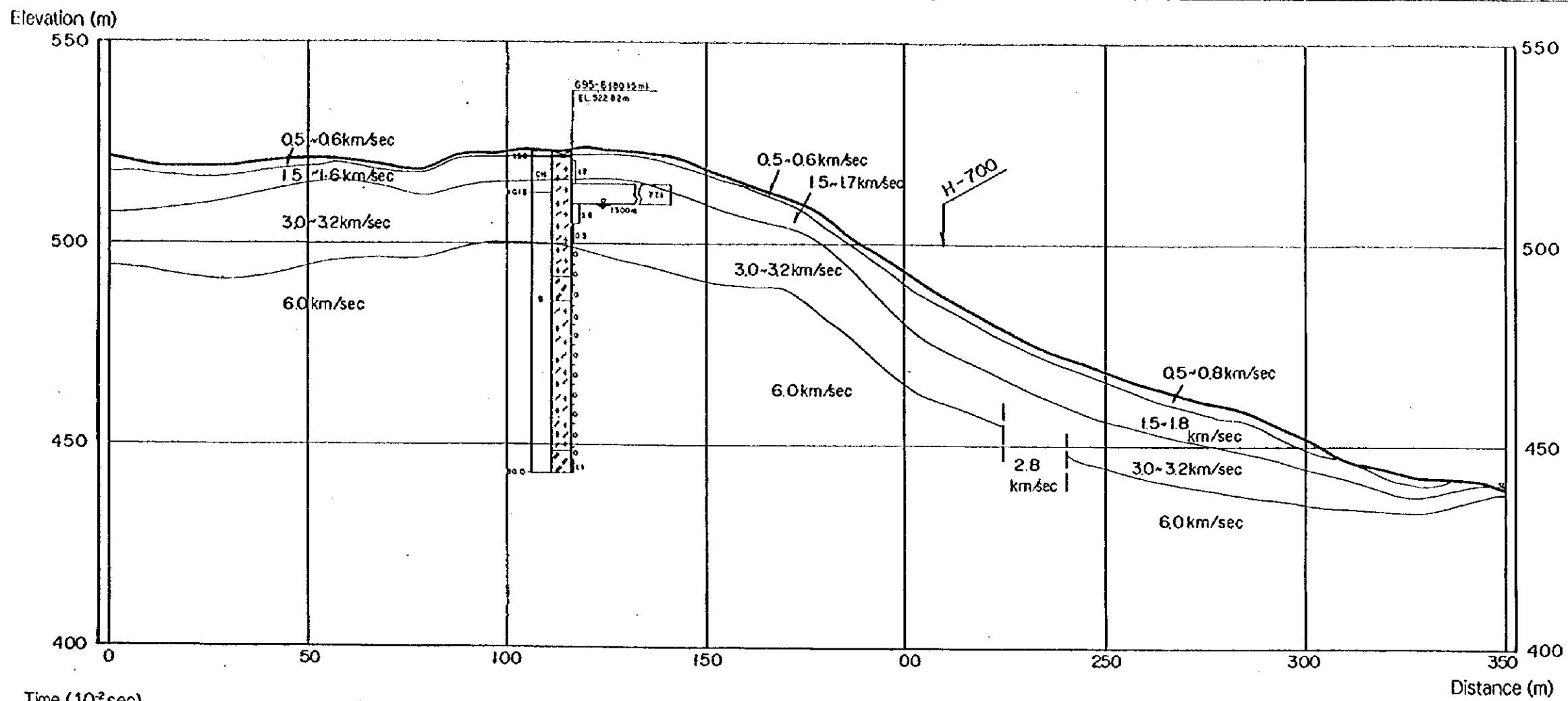


Time (10²sec)



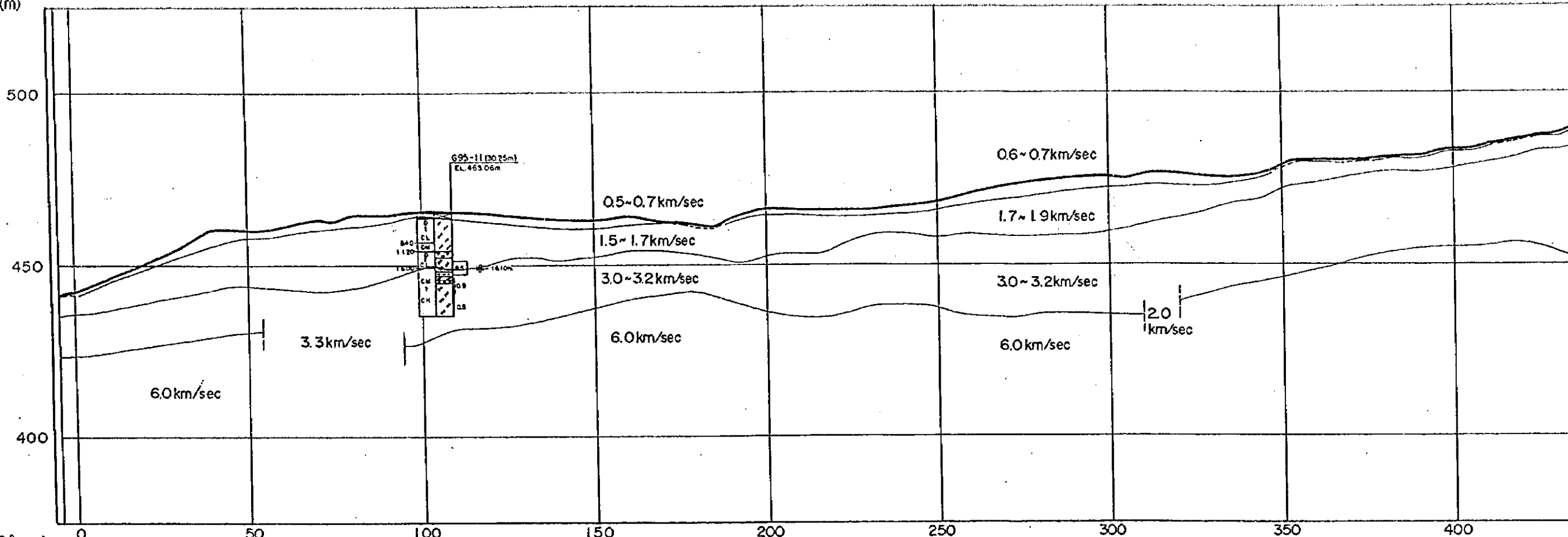


JAPAN INTERNATIONAL COOPERATION AGENCY	Seismic Prospecting Investigation and	Fig. No.
REPUBLIC OF KENYA	Geological Profile on G95-D	C 2.4
MUTONGA/GRAND FALLS HYDROPOWER PROJECT		

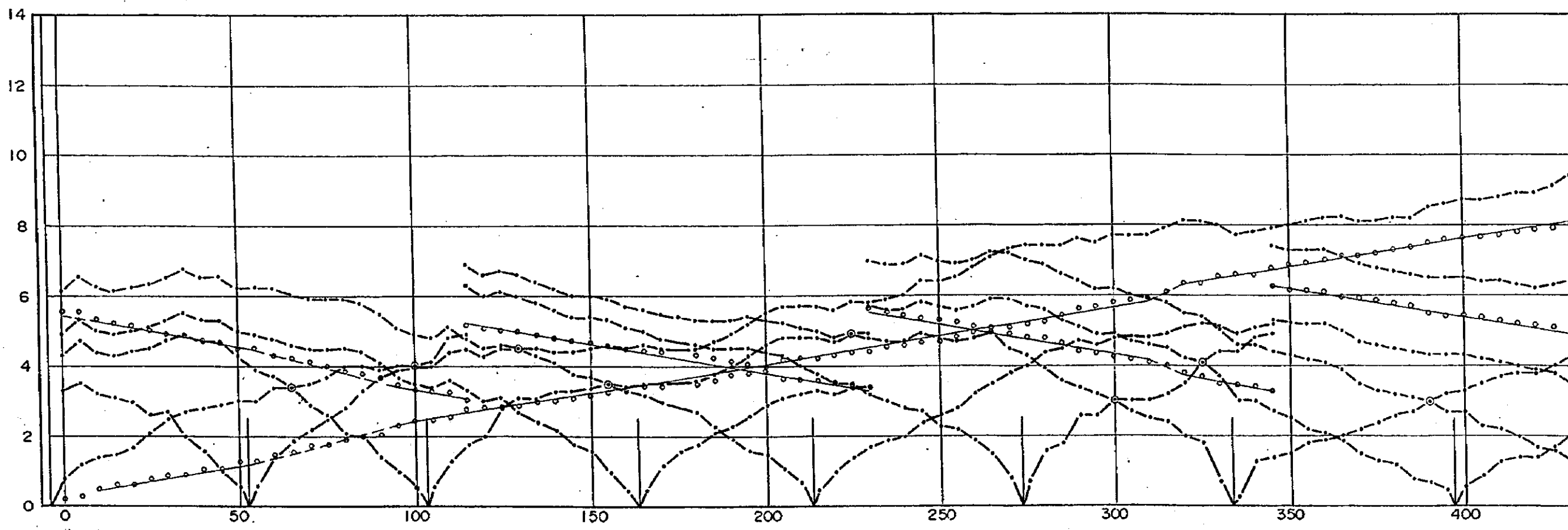


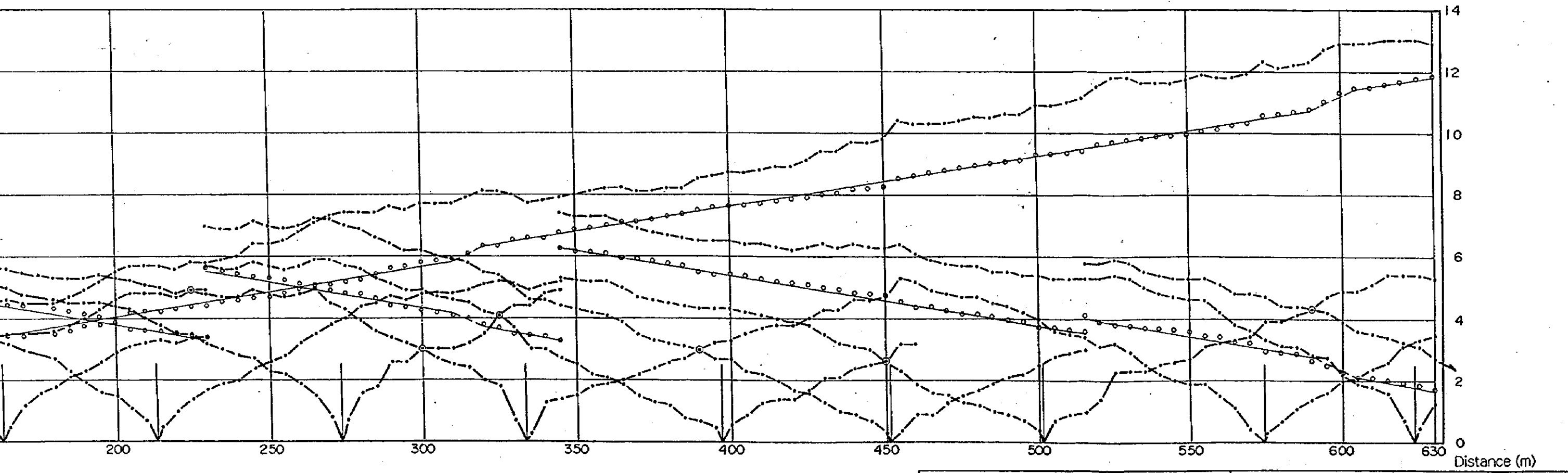
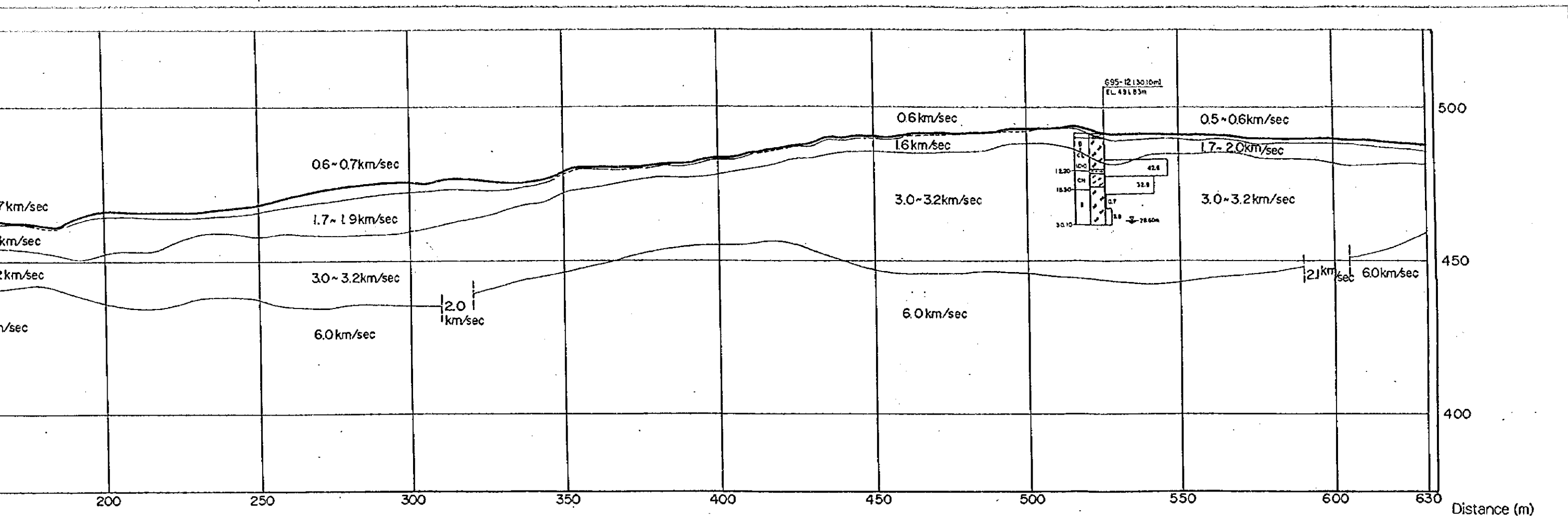
JAPAN INTERNATIONAL COOPERATION AGENCY REPUBLIC OF KENYA MUTONGA/GRAND FALLS HYDROPOWER PROJECT	Seismic Prospecting Investigation and Geological Profile on G95-E	Fig. No. C 2.5
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Elevation (m)



Time (10^2 sec)





Elevation (m)

550

500

450

0

50

100

150

200

250

300

350

400

450

695-12130(10m)
EL. 491.83m

0.5-0.6 km/sec

1.8-1.9 km/sec

3.0-3.2 km/sec

42.8

32.9

2.8

23.80m

695-13130(10m)
EL. 484.45m

1.87

19.1

19.00

2.8

23.80m

6.0 km/sec

2.2 km/sec

6.0 km/sec

2.4 km/sec

5.5 km/sec

3.0 km/sec

6.0 km/sec

Time (10²sec)

10

8

6

4

2

0

0

50

100

150

200

250

300

350

400

450

0.6 km/sec

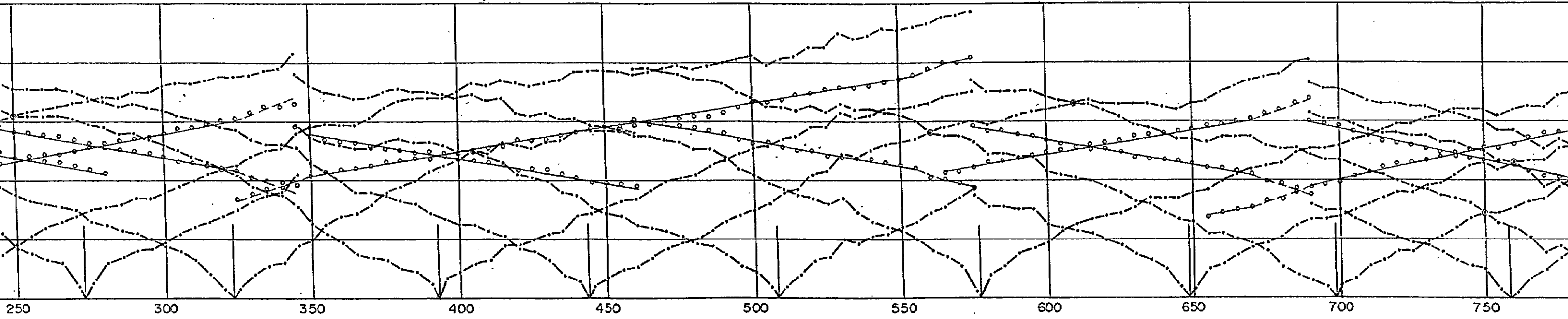
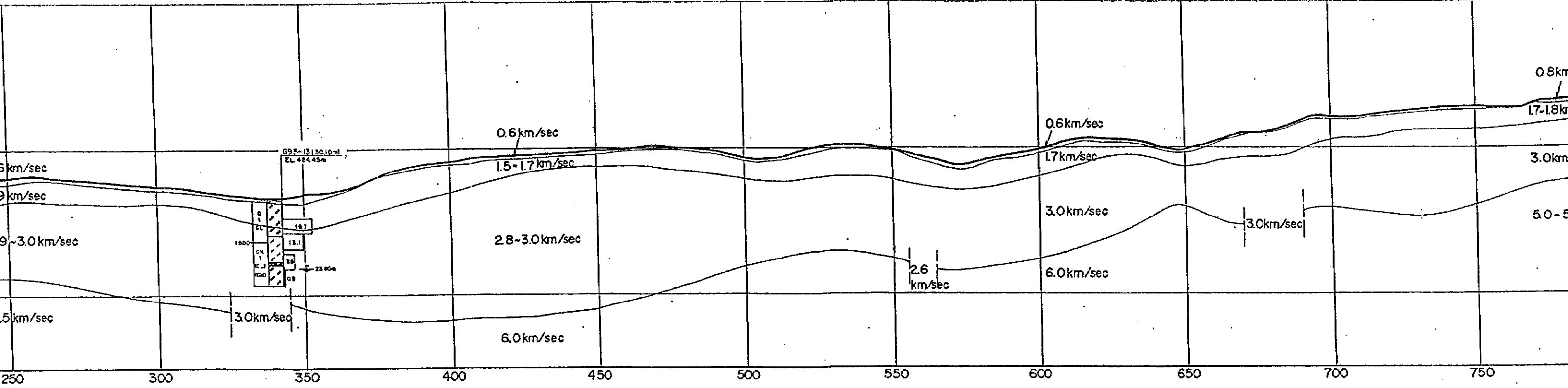
1.9 km/sec

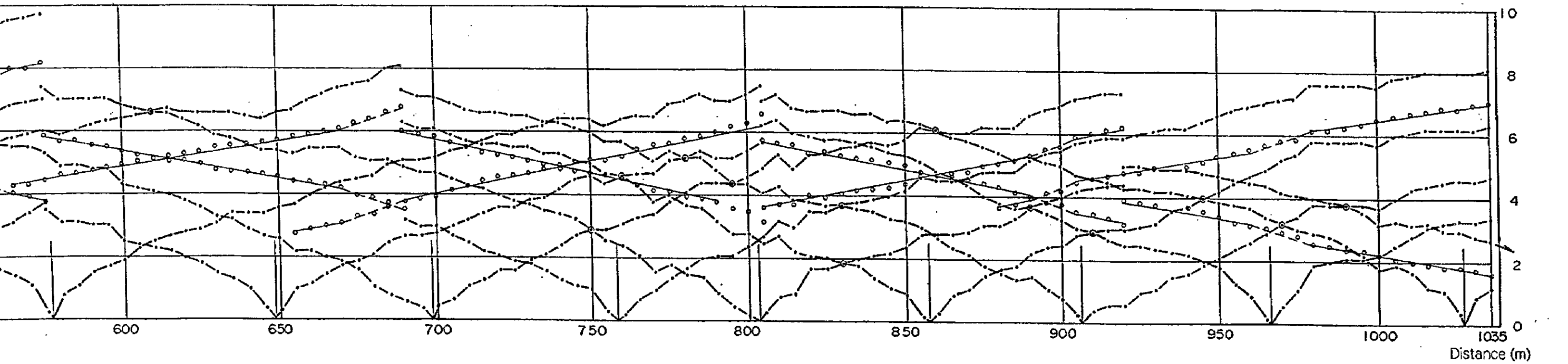
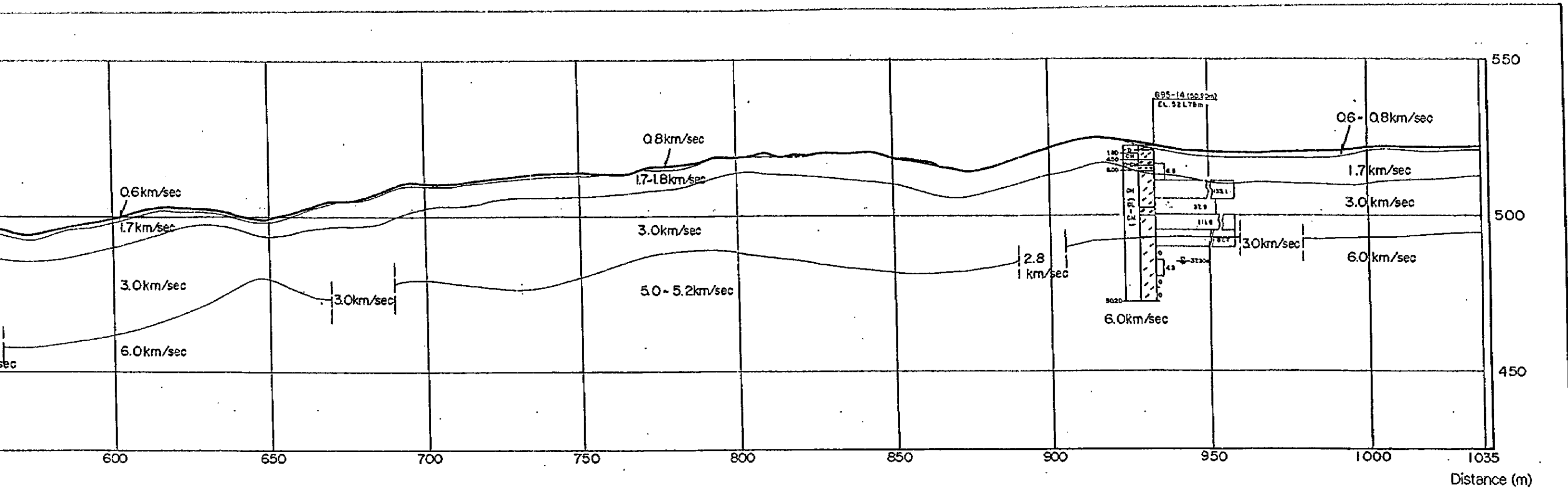
2.9-3.0 km/sec

0.6 km/sec

1.5-1.7 km/sec

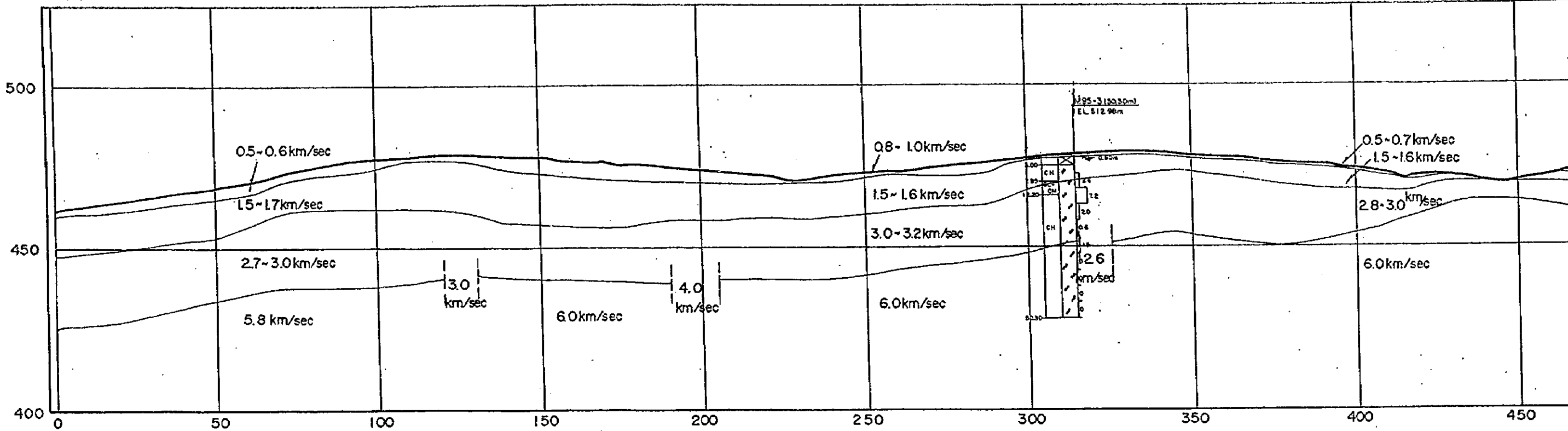
2.8-3.0 km/sec



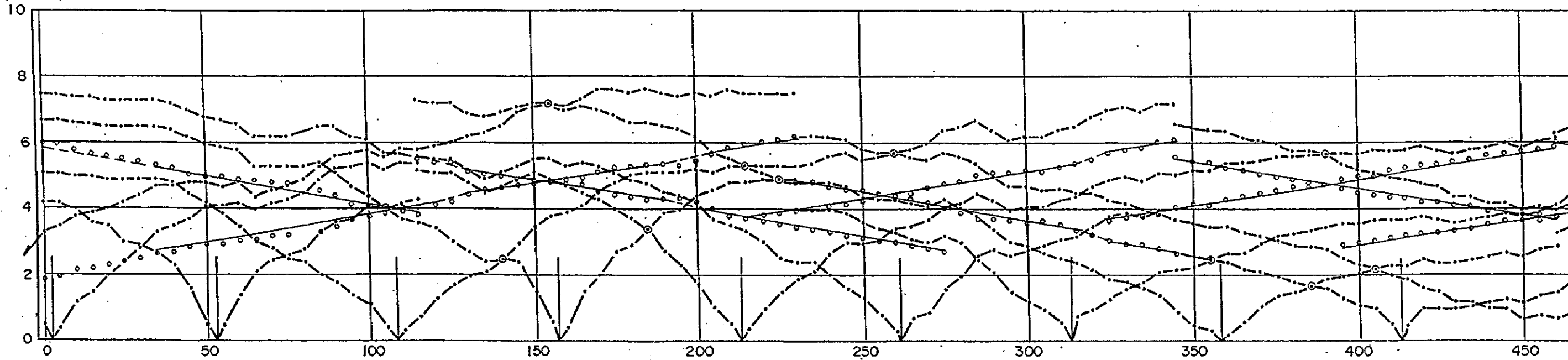


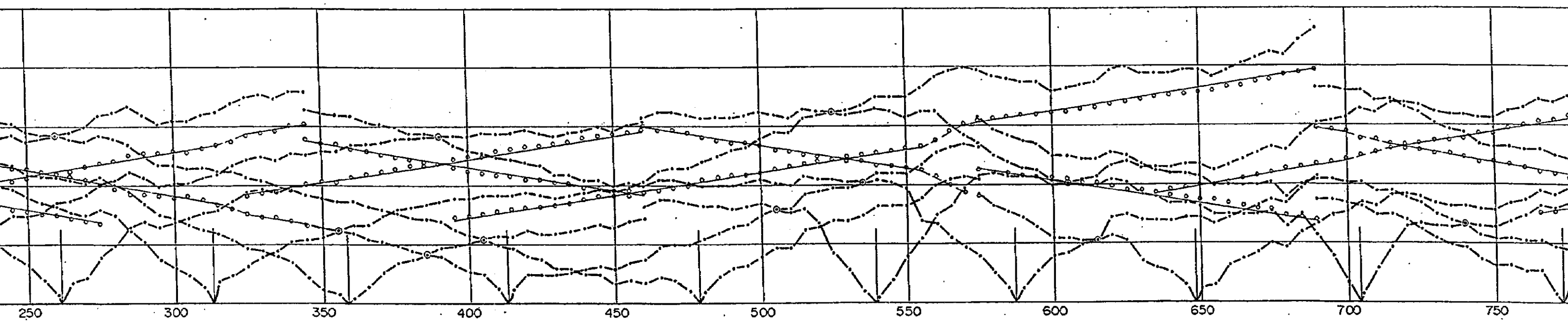
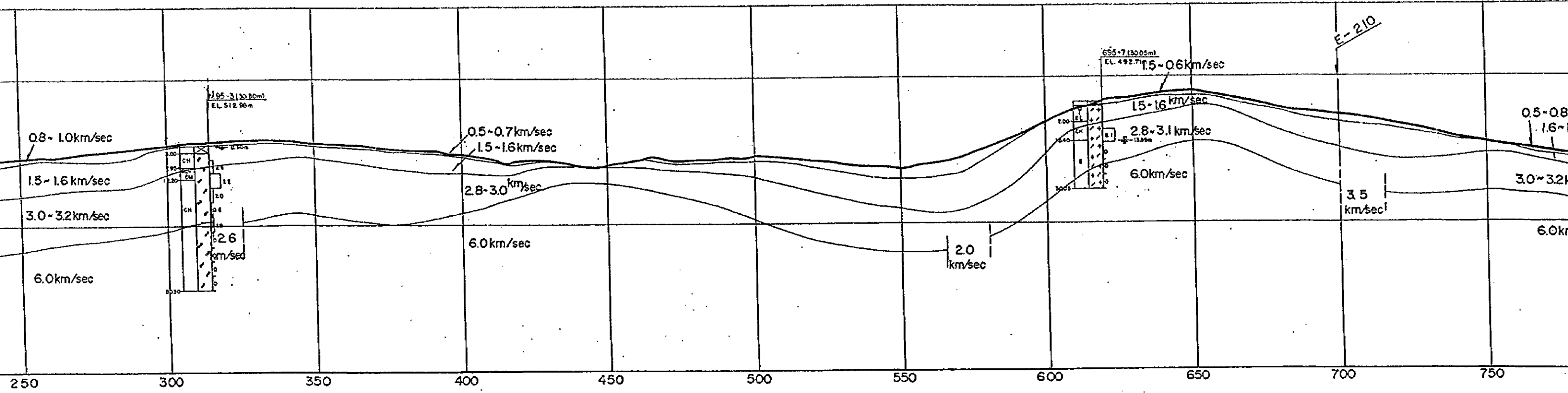
JAPAN INTERNATIONAL COOPERATION AGENCY	Seismic Prospecting Investigation and	Fig. No.
REPUBLIC OF KENYA	Geological Profile on G95-G	C 2.7
MUTONGA/GRAND FALLS HYDROPOWER PROJECT		

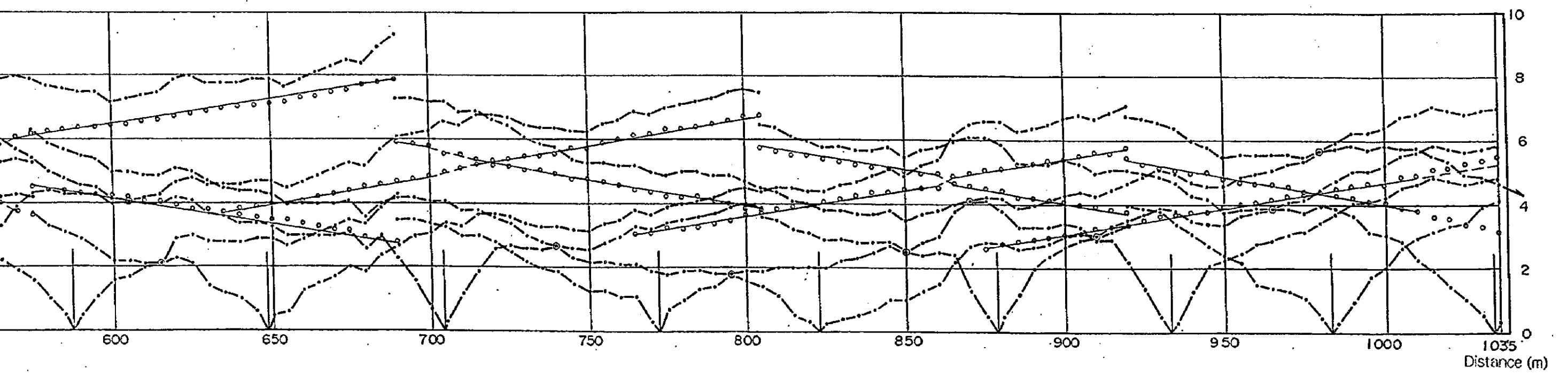
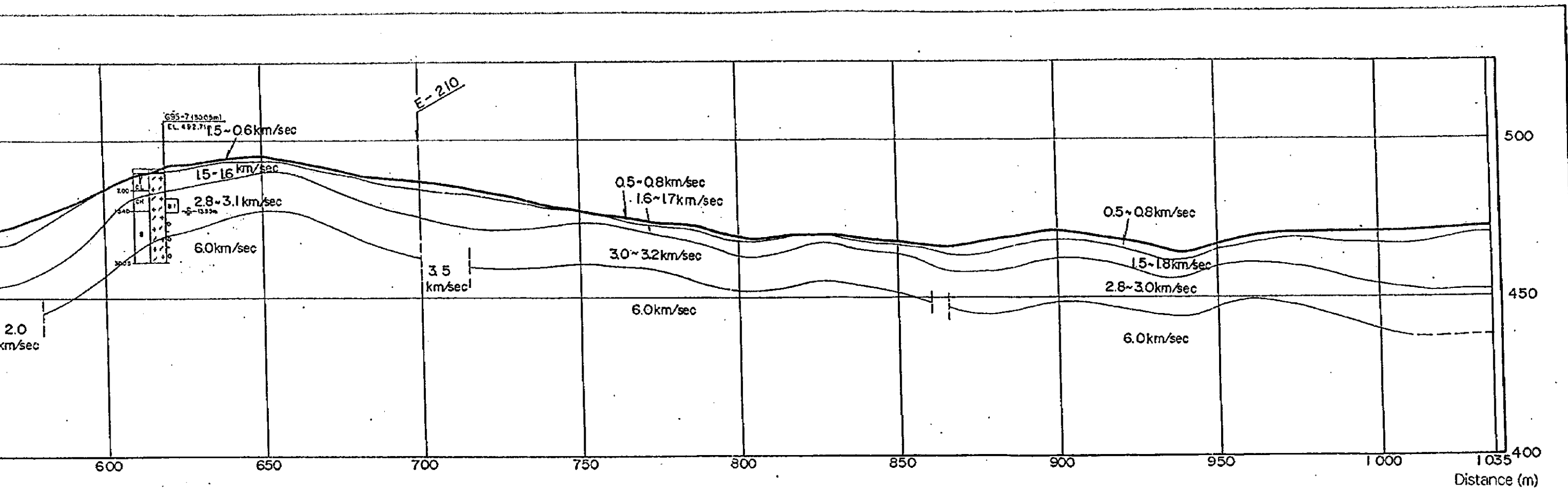
Elevation (m)



Time (10^2 sec)

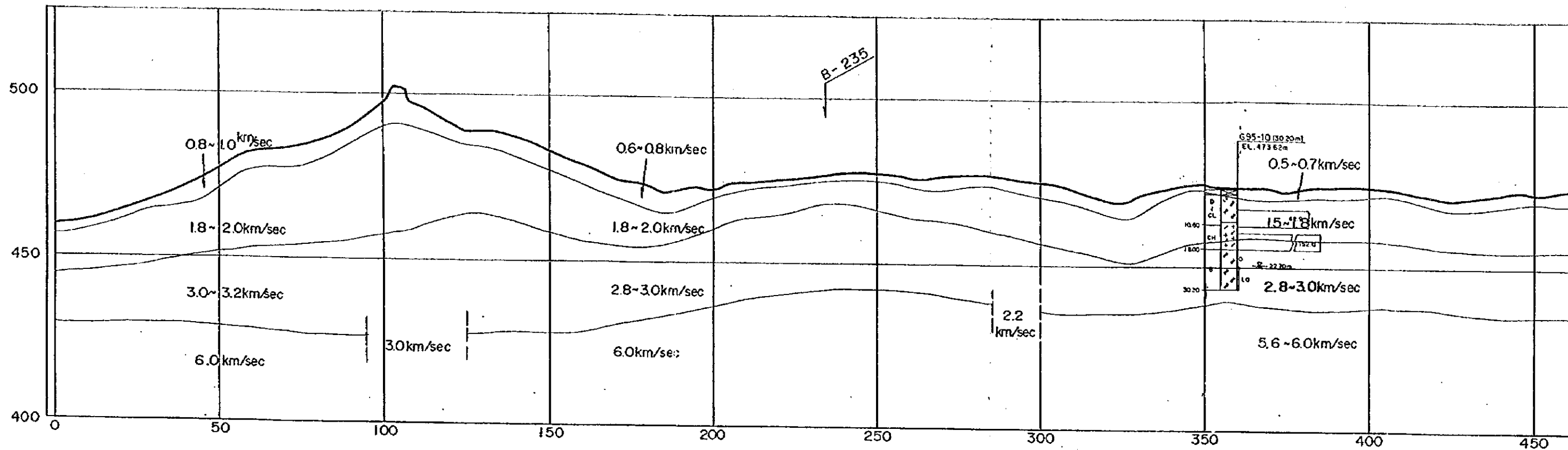




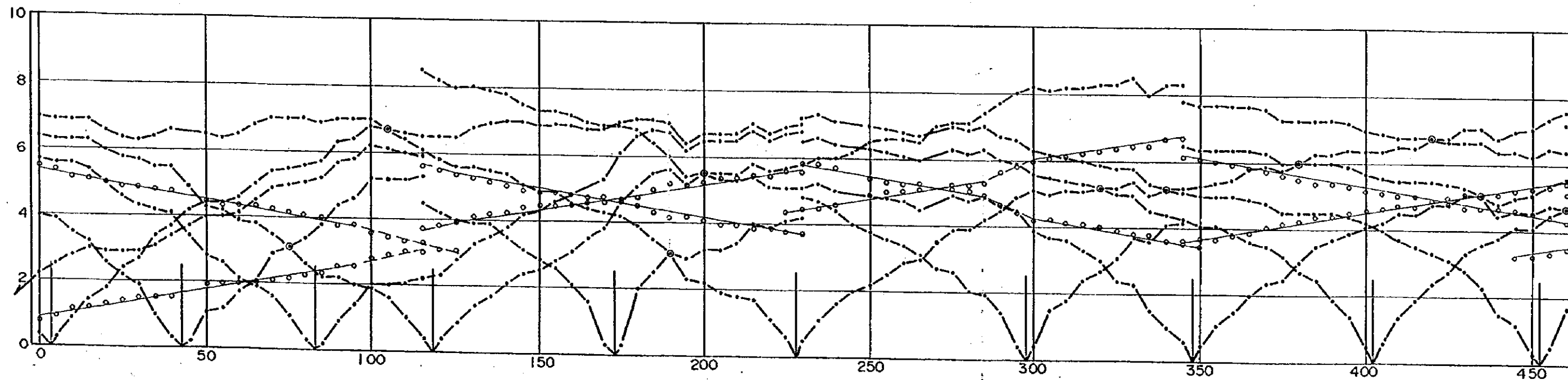


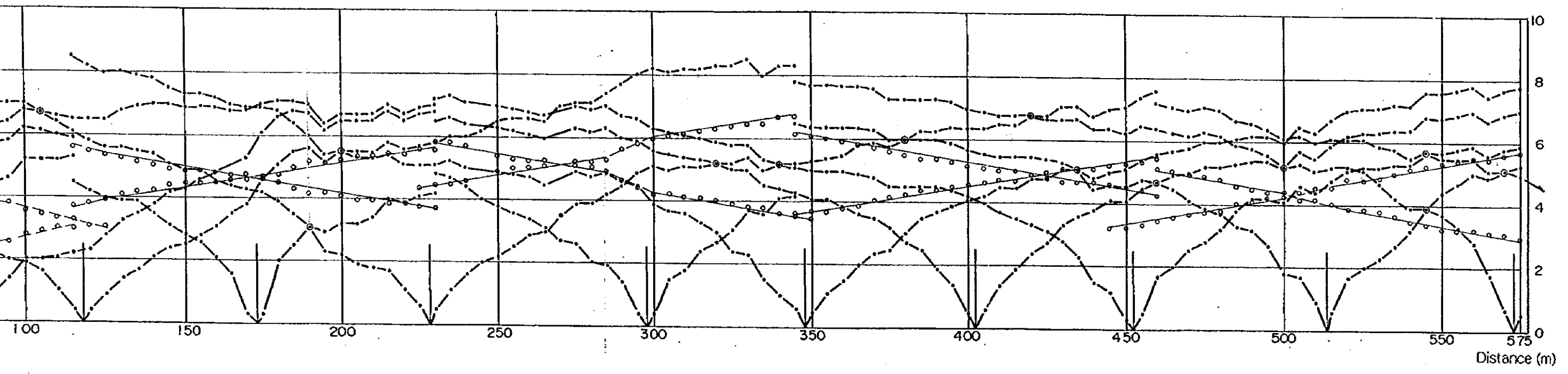
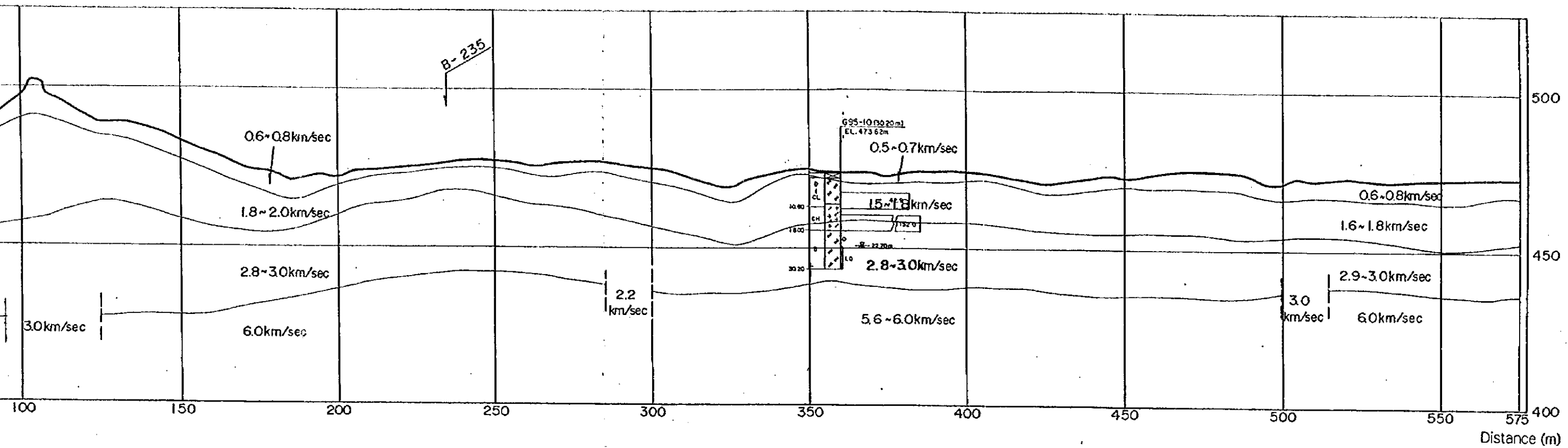
JAPAN INTERNATIONAL COOPERATION AGENCY	Seismic Prospecting Investigation and Geological Profile on G95-H	Fig. No.
REPUBLIC OF KENYA		C 2.8
MUTONGA/GRAND FALLS HYDROPOWER PROJECT		

Elevation (m)



Time (10^2 sec)





JAPAN INTERNATIONAL COOPERATION AGENCY REPUBLIC OF KENYA MUTONGA/GRAND FALLS HYDROPOWER PROJECT	Seismic Prospecting Investigation and Geological Profile on G95-I	Fig. No. C 2.9
	C2-144	

C3.1 Test Pit Logs of Mutonga Dam Site

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
 DRILL LOG HOLE NO. MC1 SHEET NO. 1 OF 1
 TP 95-1

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R Q D	WATER PRESSURE TEST					DEPTH	
								1	2		LUCEON VALUE						
	0.40		CLAYEY SILT		Reddish brown very sandy		B1, 01										
			GNEISS		Moderately weathered light grey with green tinge coarse grained quartz-feldspar-biotite.		B2, 02										

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
 DRILL LOG HOLE NO. MC1 SHEET NO. 1 OF 1
 TP 95-2

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R Q D	WATER PRESSURE TEST					DEPTH	
								1	2		LUCEON VALUE						
	0.80		CLAYEY SILT		Reddish brown very sandy		B1, 01										
	0.90		GRAVEL		Brown angular fine and medium mainly quartz fragment.		B2, 02										
	1.00		GNEISS		Highly weathered altered brown medium and coarse grained quartz-feldspar-biotite.												

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. MC1 SHEET NO. 1 OF 1
 TP 95-3

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH
								%	ft		LUCEON VALUE					
	0.30		CLAYEY SILT		Reddish brown very sandy		B1, D1									
	0.80		GRAVEL		Brown angular fine, medium and coarse mainly quartz in reddish brown clayey sand matrix.		B2, D2									
	0.90		GNEISS		Highly weathered light grey medium grained quartz-feldspar-biotite											

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. MC1 SHEET NO. 1 OF 1
 TP 95-4

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH
								%	ft		LUCEON VALUE					
	1.20		CLAYEY SILT		Reddish brown sandy, trace fine gravel.		B1, D1									
	1.50		GRAVEL		Brown angular fine medium and coarse mainly quartz		B2, D2									
	1.60		GNEISS		Highly weathered light grey with green tinge medium grained quartz-feldspar-biotite.											

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. MC 2 SHEET NO. 1 OF 1
 TP 95-5

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST						DEPTH	
								1	2		1	2	3	4	5	6		
	0.50		SILTY CLAY		Reddish brown slightly sandy		B1, 01											
	1.00		GRAVEL		Orange brown angular fine and medium in sandy clayey silt matrix.		B2, 02											
	1.20		GREISS		Highly weathered light brown coarse grained quartz-feldspathic, occasional black biotite flakes.													

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. MC 2 SHEET NO. 1 OF 1
 TP 95-5

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST						DEPTH	
								1	2		1	2	3	4	5	6		
	2.20		CLAYEY SILT		Reddish brown very sandy		B1, 01											
			GRAVEL		Orange brown angular fine, medium and coarse; sandy silt matrix.		B2, 02											

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
 DRILL LOG HOLE NO. MC 3 SHEET NO. 1 OF 1

P 95-7

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH	
								%	ft		LUCKON VALUE						
	0.50		SILTY CLAY		Reddish brown sandy occasional fragments upto 5mm.		B1, D1										
	2.35		CLAYEY SILT		Brown sandy with trace gravel		B2, D2										

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
 DRILL LOG HOLE NO. MC 3 SHEET NO. 1 OF 1

P 95-8

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH	
								%	ft		LUCKON VALUE						
	0.20		SANDY SILT		Reddish brown, trace clay		B1, D1										
	0.90		GRAVEL		Brown angular fine and medium; silty sand matrix.		B2, D2										
			QUARTZITE		Highly weathered white with pink tinge medium grained with muscovite												

LOG FORM-C

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. MC 3 SHEET NO. 1 OF 1
 JP 95-9

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH	
								%	m		LUCEON VALUE						
	1.20		SILTY CLAY		Reddish brown sandy		81.01 82.02										
			GRAVEL		Brown angular fine medium and coarse; mainly quartz fragments.												

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. MC 3 SHEET NO. 1 OF 1
 JP 95-10

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH	
								%	m		LUCEON VALUE						
	0.50		CLAYEY SILT		Reddish brown sandy		81.01 82.02										
			GRAVEL		Brown angular fine, medium and coarse; sandy silt matrix trace clay.												

LOG FORM-C

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. MC 3 SHEET NO. 1 OF 1
 TP 95-11

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE		R. Q. D.	WATER PRESSURE TEST				DEPTH
								RECOVERED	REMARKS		LOGON VALUE				
	0.20		CLAYEY SILT		Reddish brown sandy, trace fine gravel		81,01								
			GRAVEL		Brown angular fine, medium and coarse mainly quartz fragments; occasional cobbles; sandy matrix.		82,02								

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. MC 3 SHEET NO. 1 OF 1
 TP 95-12

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE		R. Q. D.	WATER PRESSURE TEST				DEPTH
								RECOVERED	REMARKS		LOGON VALUE				
	0.50		SILTY CLAY		Reddish brown sandy		81,01								
	0.60		GRAVEL		Brown angular fine, medium and coarse mainly quartz		82,02								

LOG FORM-C

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

C3.2 Test Pit Logs of Grand Falls Dam Site



MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 1 SHEET NO. 1 OF 1
 TP 95-1

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST				DEPTH
								%	m		LUCEON VALUE				
	0.80		SANDY SILT		Reddish brown clayey		81.01								
	1.30		GRAVEL		Brown angular fine, medium and coarse, in reddish brown sandy silt matrix.		82.02								
	1.60		LIMESTONE		Highly weathered white concretionary; with quartz-feldspar gneiss zones. (as gravel)										

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 1 SHEET NO. 1 OF 1
 TP 95-2




DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST				DEPTH
								%	m		LUCEON VALUE				
	0.40		SILTY CLAY		Reddish brown, sandy		81.01								
	0.70		GRAVEL		Brown angular medium, in reddish brown sandy silt										
	1.10		GNEISS		Highly weathered light grey with green tinge quartz-biotite-feldspar-hornblende; mafic		82.02								

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 1 SHEET NO. 1 OF 1
 TP 95-3




DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE		R. Q. D.	WATER PRESSURE TEST		DEPTH
								RECOVERY			LUCEON VALUE		
	0.40		CLAYEY SILT		Reddish brown very sandy		B1, 01						
	0.90		GRAVEL		Brown angular fine medium and coarse								
	1.50		GNEISS		Highly weathered thinly laminated light grey with green tinge medium grained		B2, 02						

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

LOG FORM - C

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 1 SHEET NO. 1 OF 1
 TP 95-4

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE		R. Q. D.	WATER PRESSURE TEST		DEPTH
								RECOVERY			LUCEON VALUE		
	0.10		SILTY CLAY		Reddish brown, sandy		B1, 01						
	0.70		GRAVEL		Brown angular fine, medium and coarse, mainly quartz and feldspar fragments		B2, 02						
			GNEISS		Highly weathered light brown with dark greenish grey specks; semi-pelitic								

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

LOG FORM - C

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 1 SHEET NO. 1 OF 1
 TP 95-5

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH	
								1	2		1	2	3	4	5		
	0.30		SILTY CLAY		Reddish brown, sandy		81,01										
	0.70		GRAVEL		Brown angular fine, medium and coarse; mainly quartz and feldspar fragments		82,02										
			GNEISS		Moderately weathered greenish grey mafic hornblende biotite; with little quartz, feldspar												

LOG FORM-C

Pick/shovel hand tools excavation NIPPON KOEI CO., LTD.
CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 1 SHEET NO. 1 OF 1
 TP 95-6

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH	
								1	2		1	2	3	4	5		
	0.20		SAND		Reddish brown silty and clayey; trace gravel		81,01										
	0.50		GRAVEL		Brown angular fine to coarse mainly quartz and feldspar fragments in clayey silt matrix		82,02										
			GNEISS		Moderately weathered banded greenish grey/whitish mafic hornblende biotite; with little felsic minerals												

LOG FORM-C

Pick/shovel hand tools excavation NIPPON KOEI CO., LTD.
CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC-2 SHEET NO. 1 OF 1
 TP 95-7

LOG FORM-C

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH
								%	REMARKS		LUCEON VALUE					
	0.80		GRAVEL		Brown angular medium and coarse mainly quartz, in thin reddish brown sandy clayey silt matrix		81.01 82.02									
			GNEISS		Moderately weathered greenish grey mafic hornblende-biotite with little felsic minerals											

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC-2 SHEET NO. 1 OF 1
 TP 95-8

LOG FORM-C

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH
								%	REMARKS		LUCEON VALUE					
	0.50		SILTY CLAY		Reddish brown, sandy		81.01									
	0.95		GRAVEL		Brown angular fine medium and coarse; quartz, feldspar fragments in sandy silt, trace clay		82.02									
	1.20		GNEISS		Highly becoming moderately weathered greenish grey coarse grained, mafic											

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 2 SHEET NO. 1 OF 1
 TP 95 - 9

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH	
								U	C		LUCEON VALUE						
	0.25		SILTY CLAY		Reddish brown very sandy		B1, 01										
	0.65		GRAVEL		Brown angular fine to coarse, in very sandy clayey silt matrix		B2, 02										
			GNEISS mafic		Moderately weathered foliated dark greenish grey with light coloured felsic lamination medium grained.												

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 2 SHEET NO. 1 OF 1
 TP 95 - 10

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH	
								U	C		LUCEON VALUE						
	0.35		SILTY CLAY		Reddish brown, sandy with roots		B1, 01										
	0.45		GRAVEL		Brown angular mainly quartz		B2, 02										
	0.50		GNEISS		Slightly weathered grey mafic hornblende biotite with felsic bands upto 3mm. Foliation trend 020/80°												

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 3 SHEET NO. 1 OF 1
 TP 95-1

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST				DEPTH
								1	2		1	2	3	4	
	0.60		GRAVEL		Brown angular fine, medium and coarse mainly quartz fragments in sandy clay matrix.		81.01								
	1.20		GNEISS		Completely weathered grey medium grained quartz-feldspar-hornblende biotite		82.02								

LOG FORM - C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 3 SHEET NO. 1 OF 1
 TP 95-2

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST				DEPTH
								1	2		1	2	3	4	
	0.25		CLAYEY		Reddish brown sandy										
	0.75		GRAVEL		Brown angular medium and coarse mainly quartz fragments in sandy silt		81.01								
	1.30		GNEISS		Completely weathered grey with green tinge mafic biotite-hornblende-feldspar, little quartz.		82.02								

LOG FORM - C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 3 SHEET NO. 1 OF 1
 TP 95-13

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH		
								%	REMARKS		1	2	3	4	5			
	0.10		CLAYEY SILT		Reddish brown sandy, gravelly													
			GRAVEL		Brown angular fine, medium and coarse, mainly quartz fragments.		B1, D1											
	0.90		GNEISS		Completely weathered finely laminated light grey with green tinge medium grained quartz-feldspar biotite.		B2, D2											
	1.70																	

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 3 SHEET NO. 1 OF 1
 TP 95-14

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH		
								%	REMARKS		1	2	3	4	5			
	0.40		SILTY CLAY		Reddish brown sandy		B1, D1											
	0.65		GRAVEL		Brown angular fine, medium and coarse mainly quartz with cobbles at bottom.		B2, D2											

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 3 SHEET NO. 1 OF 1
 TP 95-15

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH	
								%	FT		LUCEON VALUE						
	0.40		CLAYEY		Brown sandy		B1,01										
	0.50		GRAVEL		Brown angular medium, in thin sandy silt												
	0.85		LIMESTONE		Moderately weathered concretionary white fine and medium grained with reddish silty clay pockets.		B2,02										

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

LOG FORM-C

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 4 SHEET NO. 1 OF 1
 TP 95-16

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST					DEPTH	
								%	FT		LUCEON VALUE						
	0.50		SILTY CLAY		Reddish brown sandy		B1,01										
	1.10		GRAVEL		Brown angular fine, medium and coarse mainly quartz, occasional feldspar and grey gneiss fragments in reddish brown sandy silt.		B2,02										
	1.30		GNEISS		Moderately weathered thinly laminated foliated medium grained dark grey, mic												

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.

LOG FORM-C

MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 4 SHEET NO. 1 OF 1
 TP 95-17

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST LOGGON VALUE						DEPTH	
								%	M		1	2	3	4	5	6		
	0.15		CLAYEY SILT		Reddish brown sandy		B1, D1											
	0.50		TUFF		Moderately weathered light grey with green tinge fine and medium grained outcrops on northern side of pit.		B2, D2											
					A couple of metres away from pit, mafic gneiss exposed.													

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
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MUTONGA / GRAND FALLS HYDROPOWER PROJECT
DRILL LOG HOLE NO. GC 4 SHEET NO. 1 OF 1
 TP 95-18

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST LOGGON VALUE						DEPTH	
								%	M		1	2	3	4	5	6		
	0.90		CLAYEY		Reddish brown sandy		B1, D1											
	1.40		GRAVEL		Brown angular medium and coarse; occasional cobbles; mainly quartz		B2, D2											
	1.90		GNEISS		Highly weathered dark grey medium grained mafic, hornblende-biotite. Nearly outcrop foliation trend 010/70° W													

LOG FORM-C

Pick/shovel hand tools excavation

NIPPON KOEI CO., LTD.
 CONSULTING ENGINEERS, TOKYO.