

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
NEPAL ELECTRICITY AUTHORITY (NEA)

No. 57

FEASIBILITY STUDY
ON
ILAM SMALL HYDROPOWER DEVELOPMENT PROJECT
IN
THE KINGDOM OF NEPAL
FINAL REPORT (ANNEX)

February, 1994

CHUO KAIHATSU CORPORATION

MPN

J R

94-002

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
NEPAL ELECTRICITY AUTHORITY (NEA)

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FINAL REPORT (ANNEX)

JICA LIBRARY



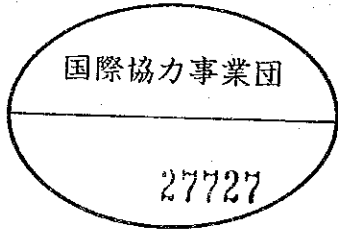
1119832121

27927

February, 1994

CHUO KAIHATSU CORPORATION

2011年10月1日
2011年10月1日



国際協力事業団

27727

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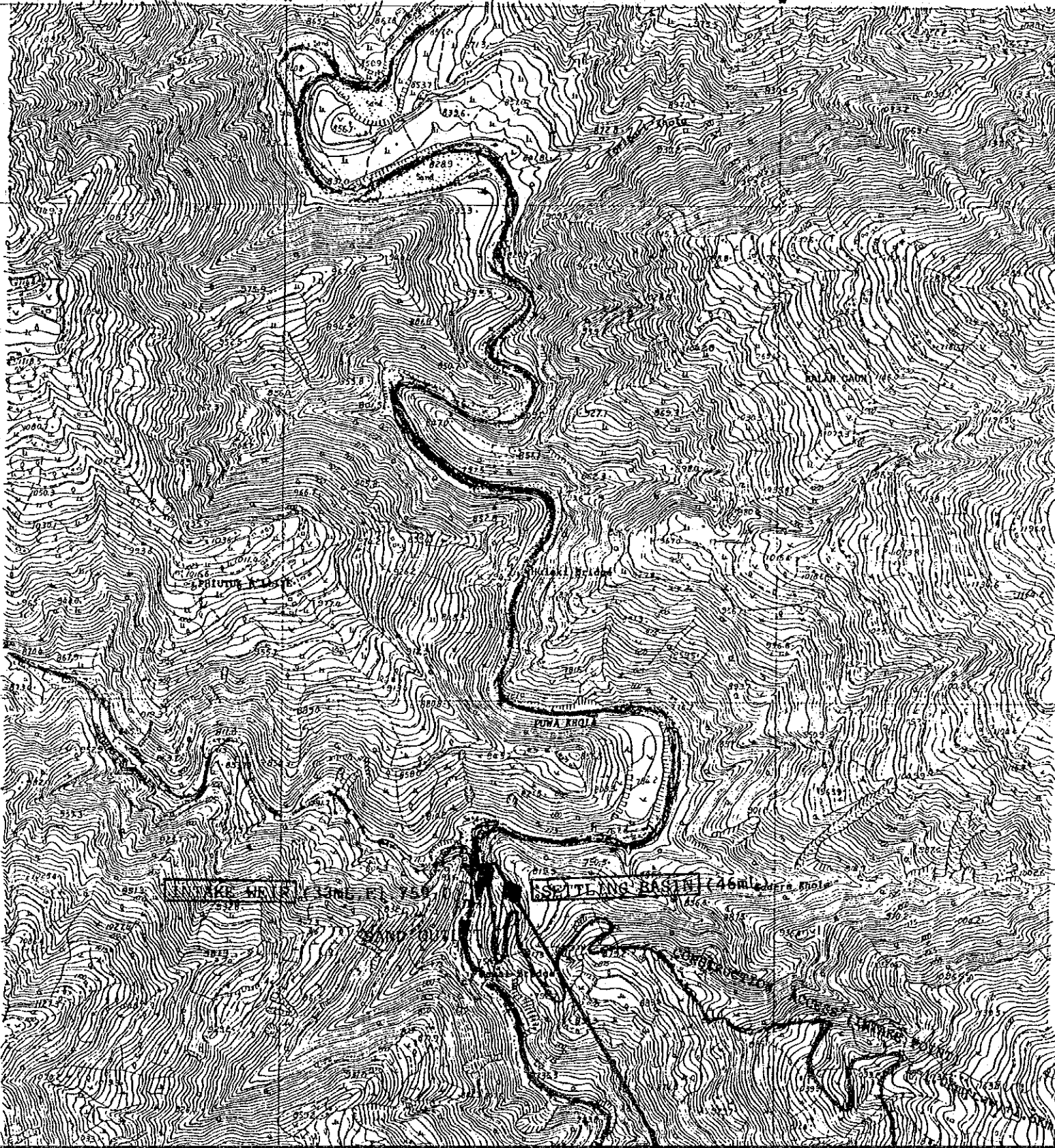
ANNEX - I TOPOGRAPHY AND GEOLOGY

I.1	Topographical Mapping 1/10,000	A - I - 1
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	Analysis Sections SL - 1	A - I - 2
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	Analysis Sections SL - 5	A - I - 6
	Analysis Sections SL - 6	A - I - 7
	Analysis Sections SL - 7	A - I - 8
	Analysis Sections SL - 8	A - I - 9
	Analysis Sections SL - 9	A - I - 10

NEPAL - ILAM.

NO. =1

589 3E
2.979.0N
2.978.0N

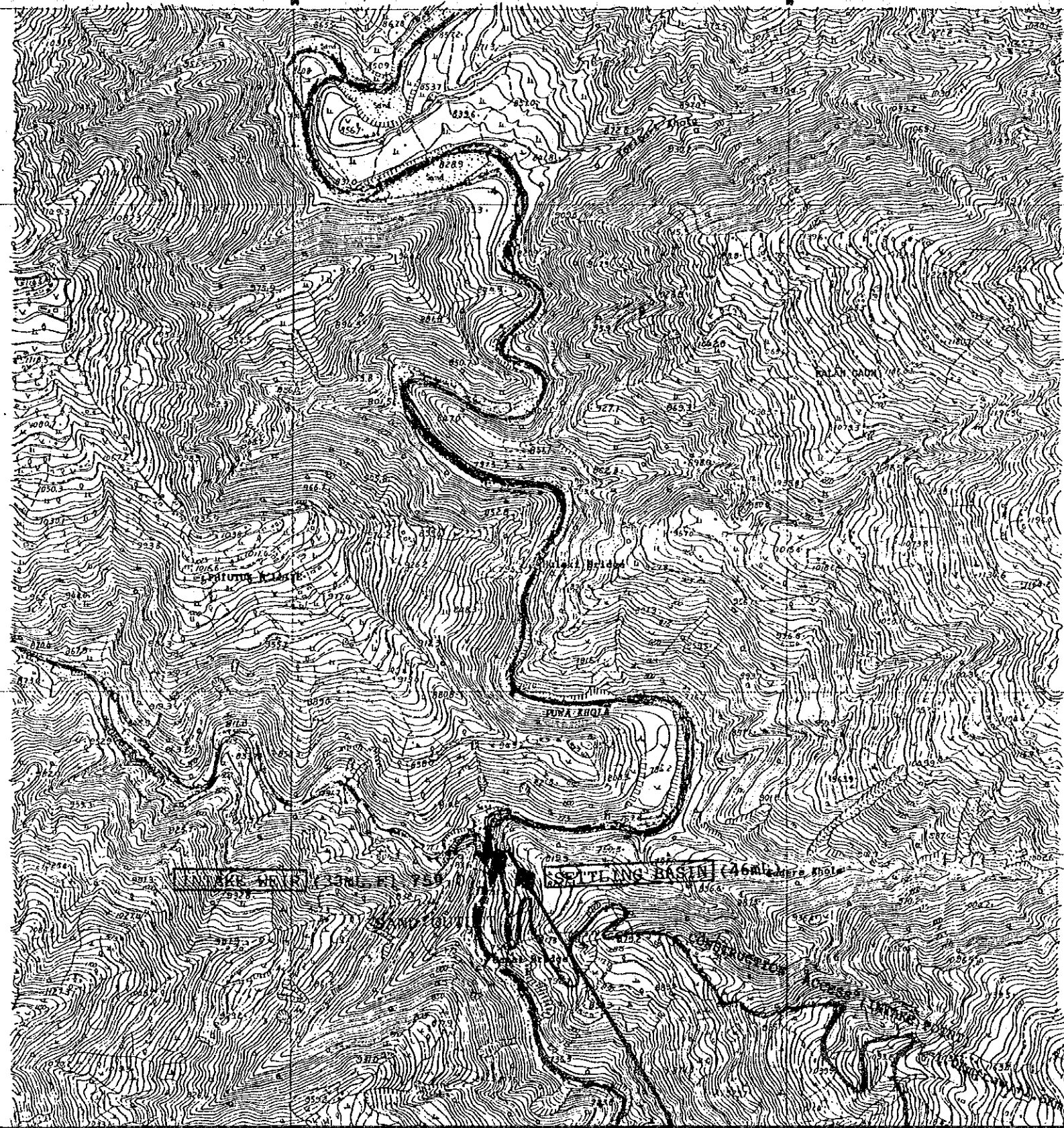


TOPOGRAPHICAL MAP for ILAM HYDROPOWER DEVELOPMENT PROJECT



SCALE : 1 : 10.000m

500121
500800
300010
500801
Mahendya Ratna Bahumuki Campus



TOPOGRAPHICAL MAP for ILAM HYDROPOWER DEVELOPMENT PROJECT



SCALE : 1 : 10.000m

5933E
 2979.4N
 2979.0N
 2978.0N

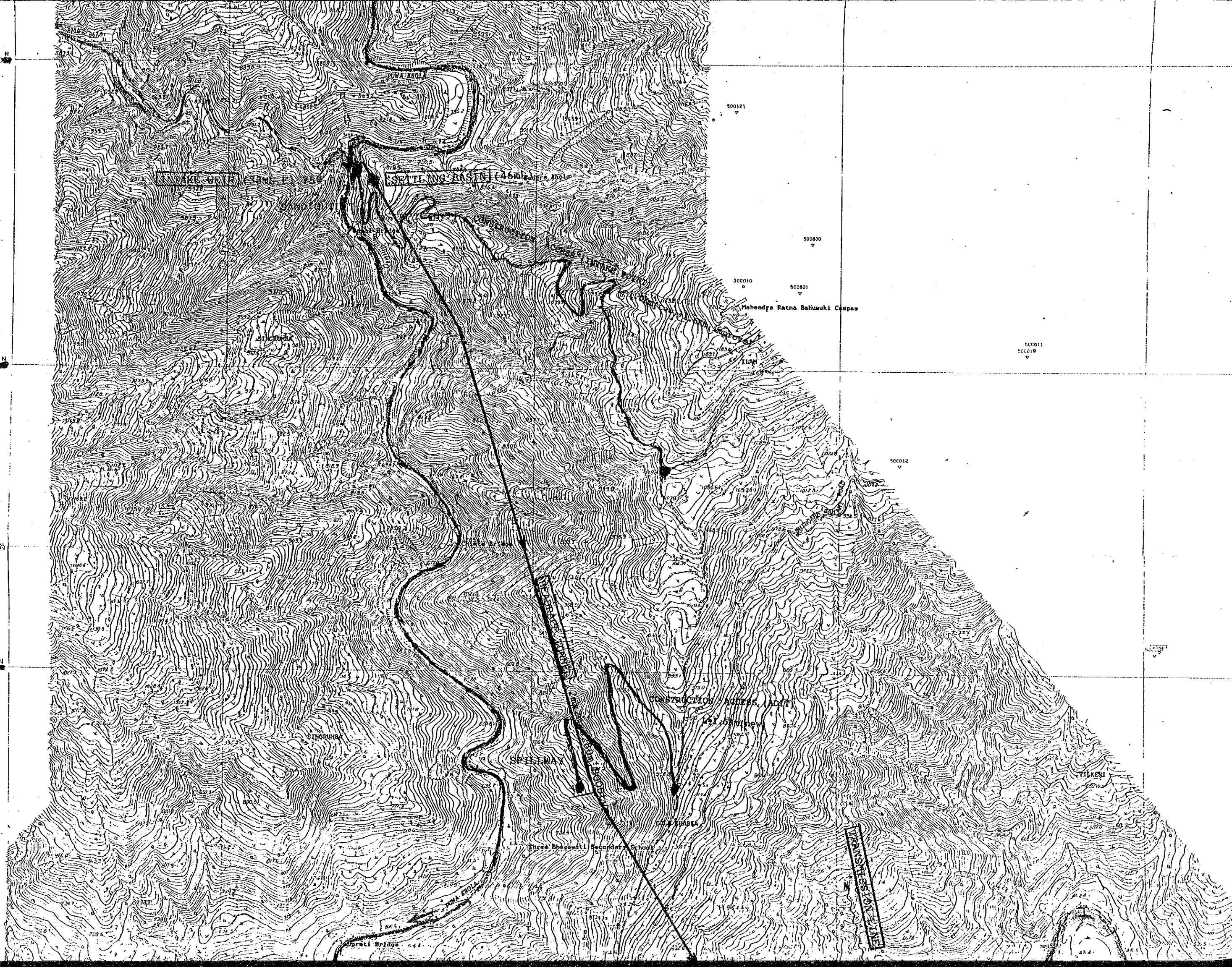
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 Mahendra Ratna Bahumuki Campus

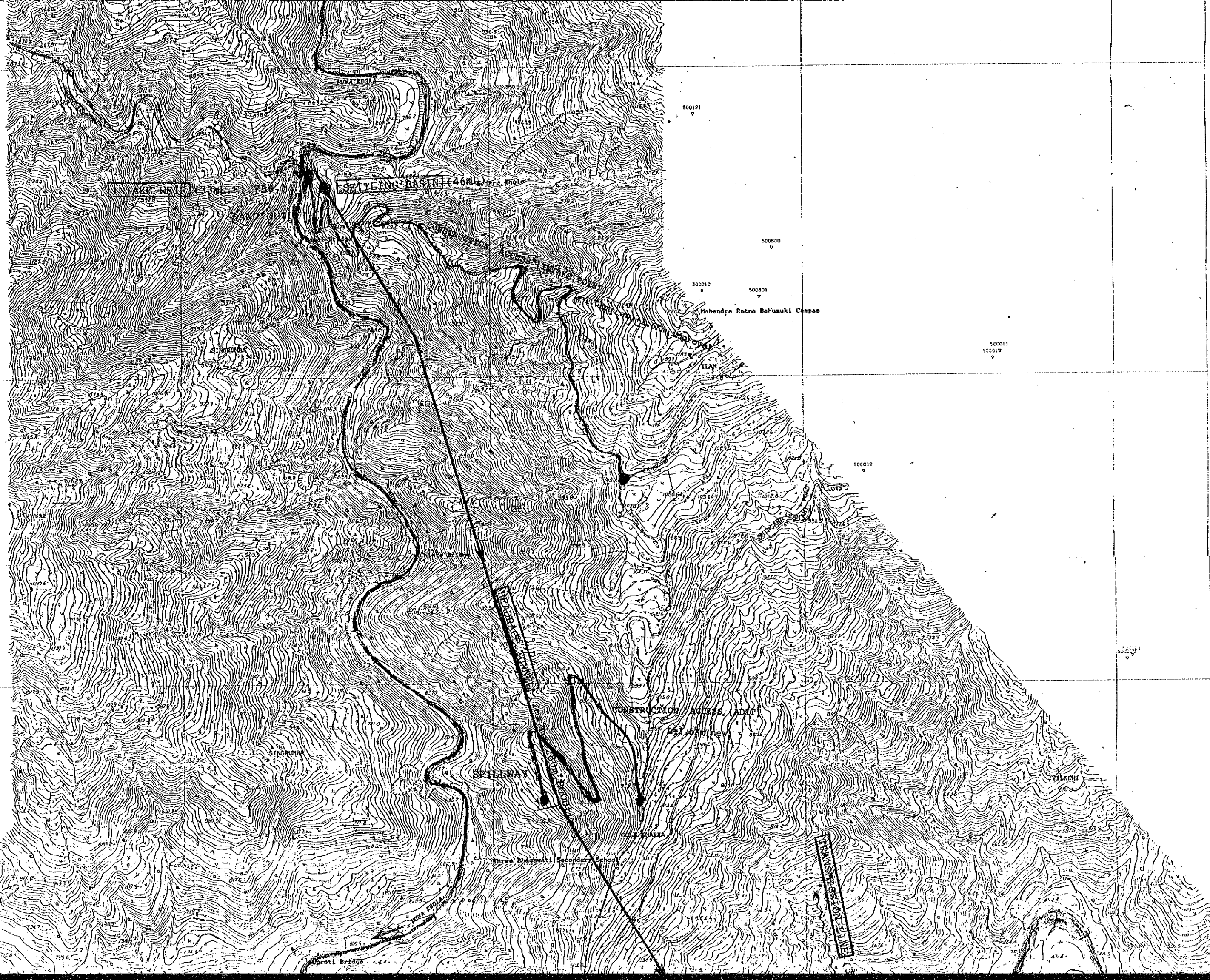
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2364.4

2,976.0





2978.0N

2977.0N

2976.4N

2976.0N

500121

500800

300010

500801

Mahendra Ratna Bahumuki Campus

500011
500012

500012

CONSTRUCTION ADDRESS ADPT

Sri Lanka

SPEEDWAY

TILKUNI

Mahendra Bahumuki Secondary School

Sri Lanka

2.975.0 N

2.974.0 N

2973.4 N

I-I-V

589.3E

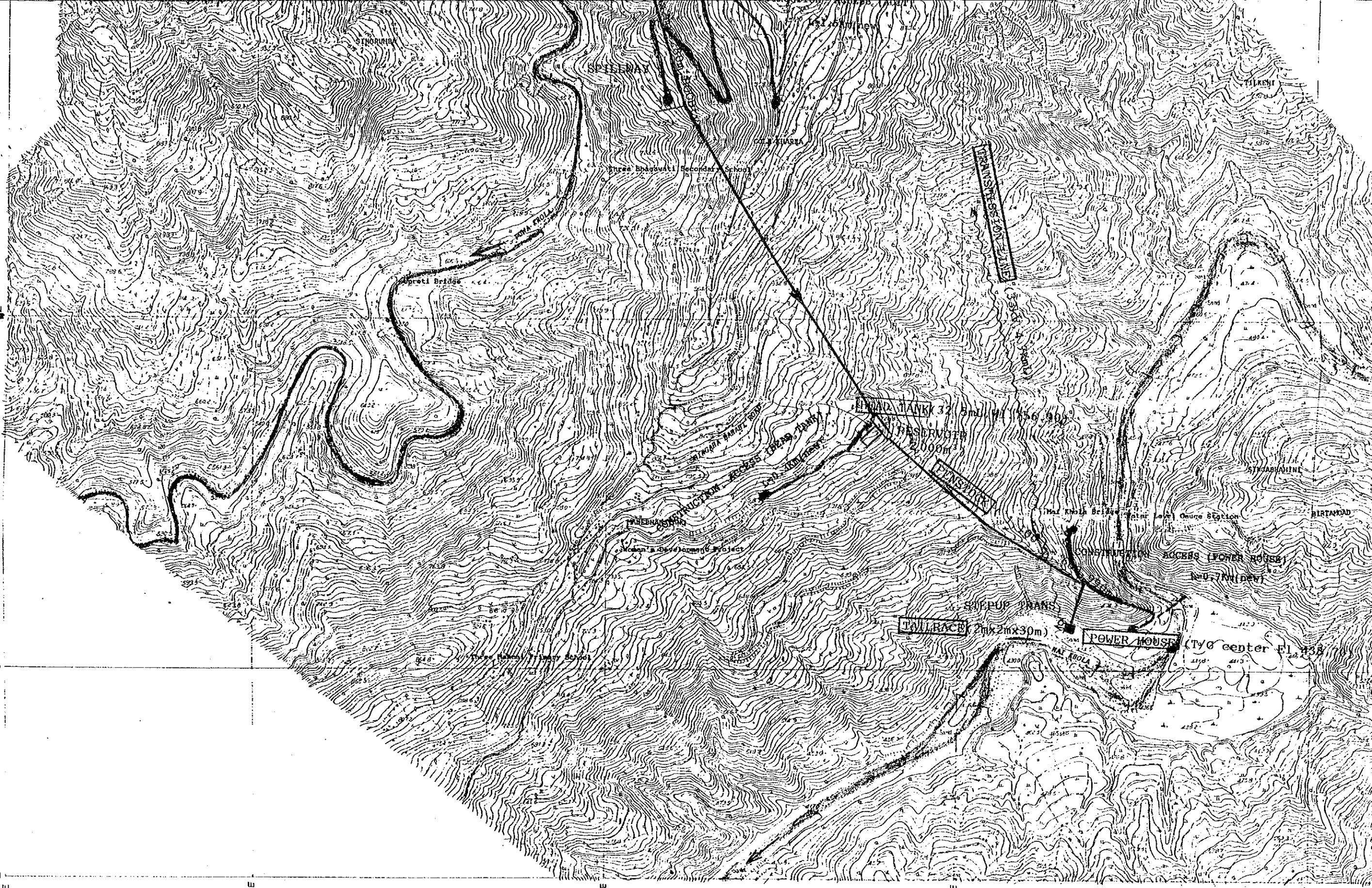
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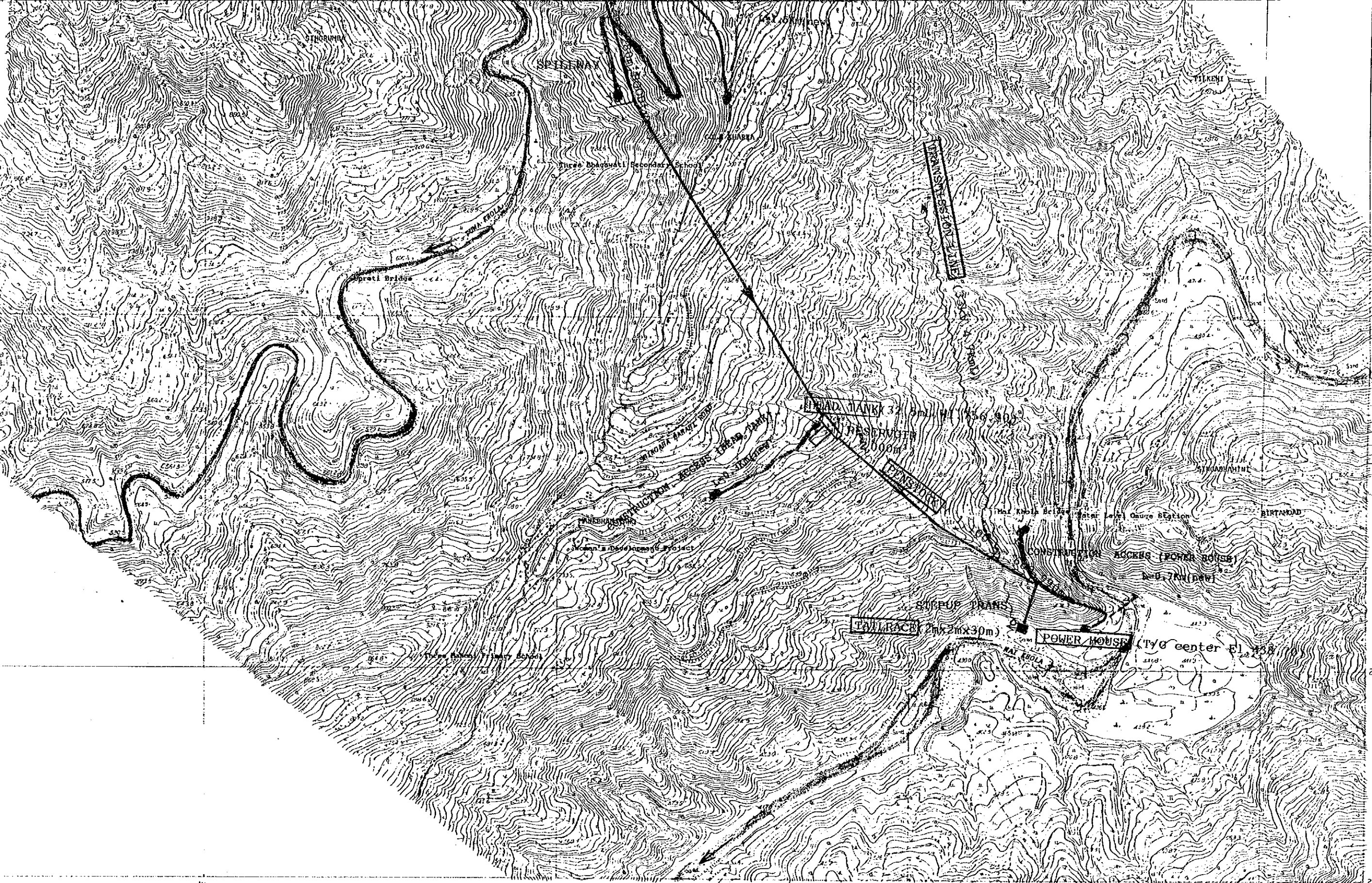
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2975.0N

2974.0N

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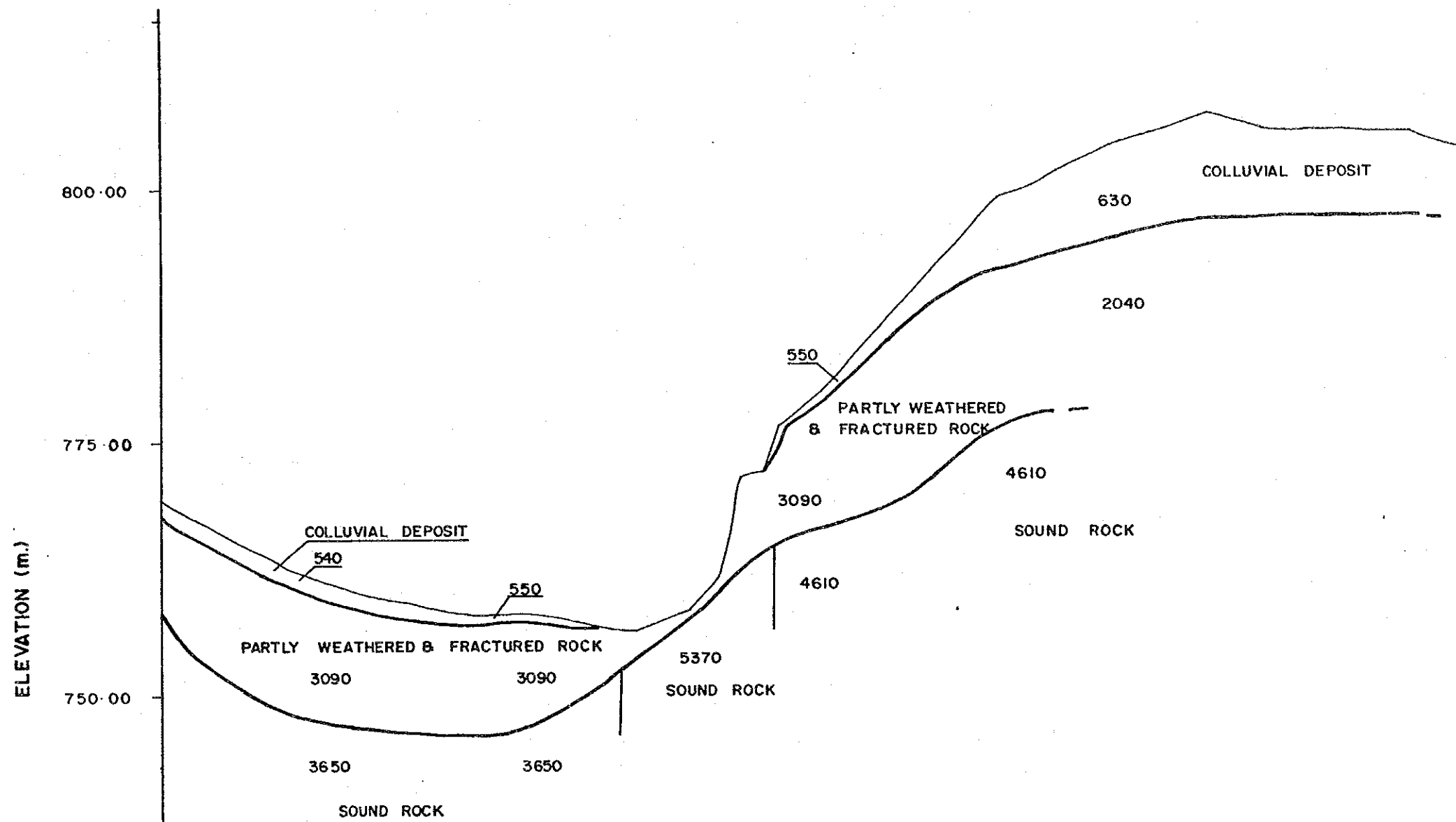
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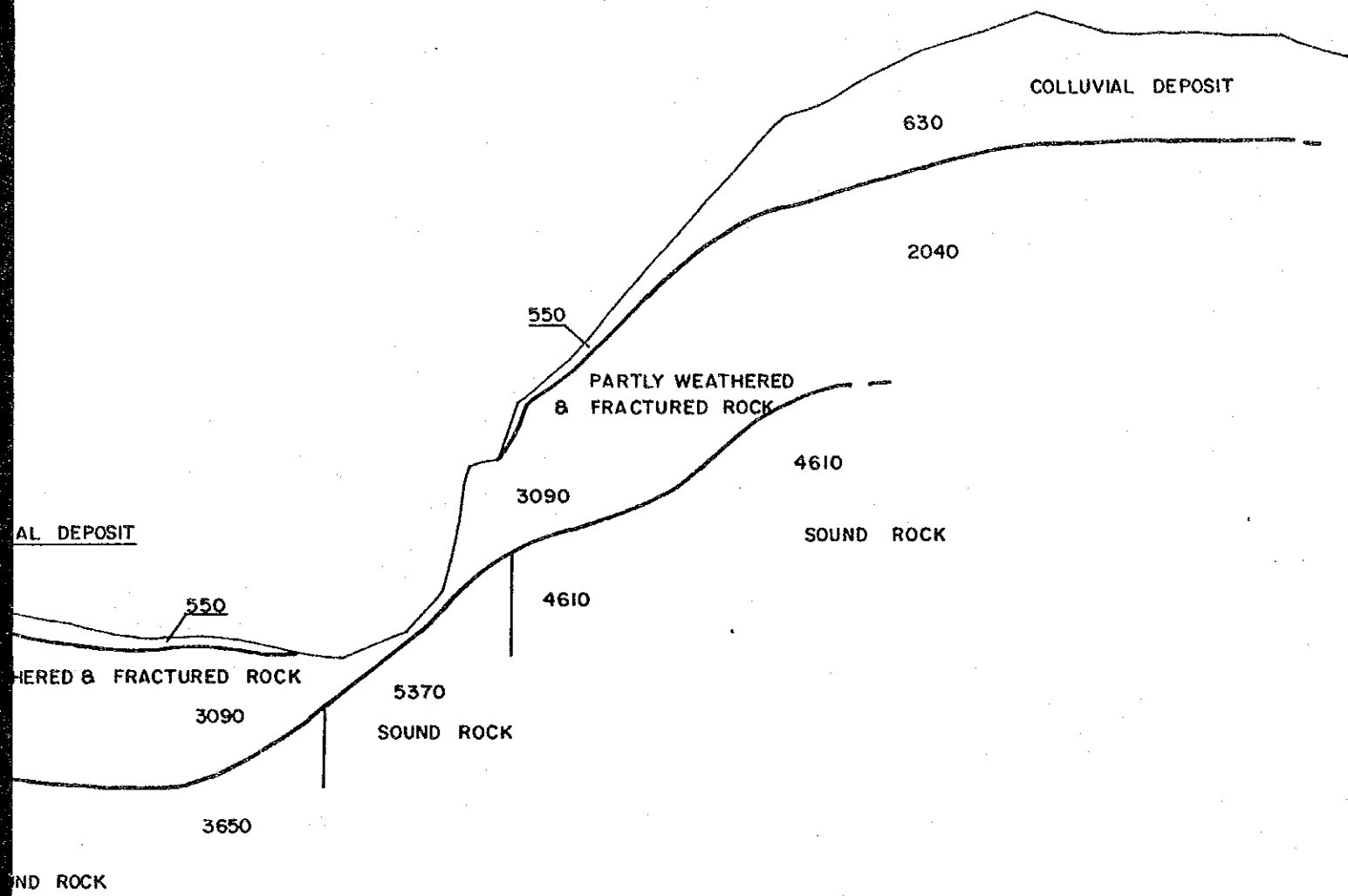
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593.0E

593.5E

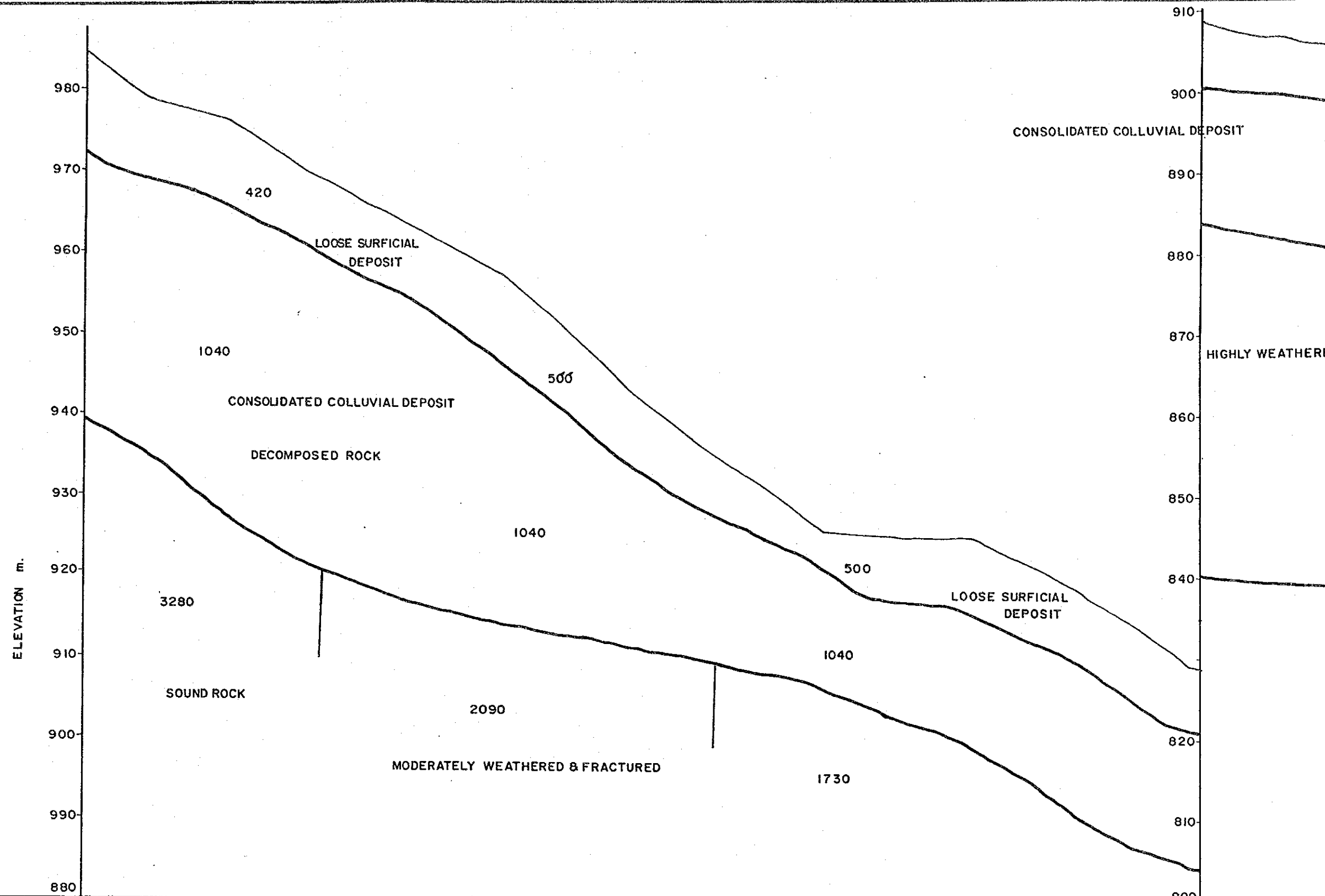


HOR. DISTANCE (M)	CHAINAGE (M)	ELEVATION (M)
0.00	0+000	768.88
3.33	0+005	766.87
7.76	0+010	764.09
12.70	0+015	761.94
17.05	0+020	760.41
21.64	0+025	759.22
26.84	0+030	758.07
31.56	0+035	757.54
36.56	0+040	757.60
41.52	0+045	756.42
46.78	0+050	755.86
51.84	0+055	757.92
54.54	0+060	761.09
56.84	0+070	770.93
59.17	0+075	771.54
60.67	0+080	775.83
63.87	0+085	778.20
66.59	0+090	781.56
70.83	0+095	786.09
73.44	0+100	789.13
76.52	0+105	792.68
80.38	0+110	796.97
82.32	0+115	798.44
84.28	0+118	798.95
87.90	0+123	801.30
92.41	0+128	803.42
97.33	0+138	804.38
102.25	0+138	806.59
107.18	0+143	805.07
112.17	0+148	804.62
117.08	0+153	804.67
122.06	0+158	804.42
127.06	0+163	802.25

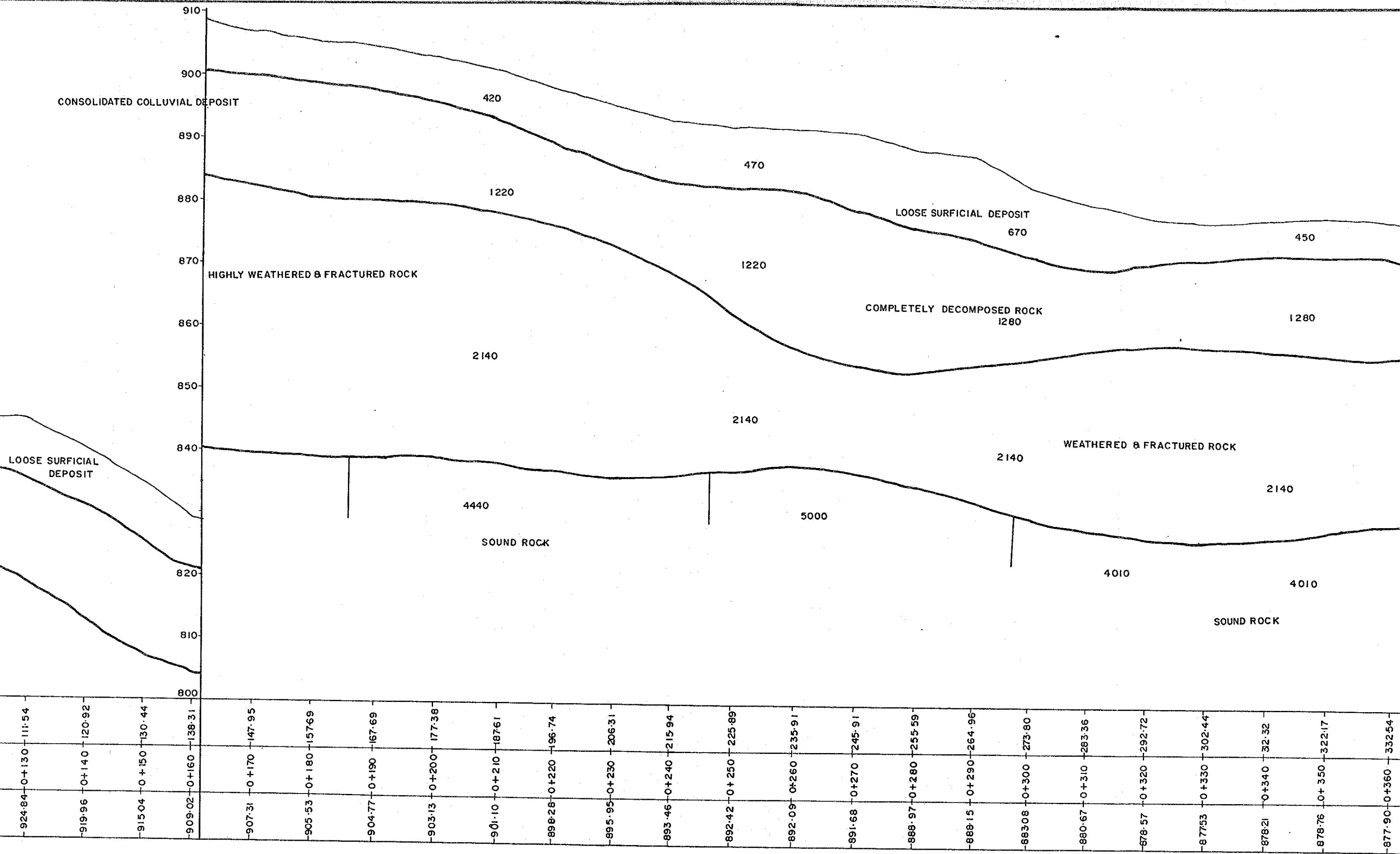


-759.22	0+025	21.64
-758.07	0+030	26.84
-757.54	0+035	31.56
-757.60	0+040	36.56
-756.42	0+045	41.52
-755.86	0+050	46.78
-757.92	0+055	51.84
-761.09	0+060	54.54
-770.93	0+070	56.84
-771.54	0+075	59.17
-775.83	0+080	60.67
-778.20	0+085	63.87
-781.56	0+090	66.59
-786.09	0+095	70.83
-789.13	0+100	73.44
-792.68	0+105	76.52
-796.97	0+110	80.38
-798.44	0+115	82.32
-798.95	0+118	84.28
-801.30	0+123	87.90
-803.42	0+128	92.41
-804.38	0+138	97.33
-806.59	0+138	102.25
-805.07	0+143	107.18
-804.62	0+148	112.17
-804.67	0+153	117.08
-804.42	0+158	122.06
-802.95	0+163	127.06

SEISMIC DEPTH SECTION ALONG SL-1



HORIZONTAL DISTANCE (m)	CHAINAGE (m)	ELEVATION (m)
0.00	0+000	985.48
8.03	0+010	979.31
18.21	0+020	976.64
25.51	0+030	971.89
34.80	0+040	966.63
43.43	0+050	962.05
51.99	0+060	957.43
59.10	0+070	951.29
67.39	0+080	943.57
75.50	0+090	937.02
83.93	0+100	931.82
91.96	0+110	925.85
101.60	0+120	924.85
111.54	0+130	924.84
120.92	0+140	919.96
130.44	0+150	915.04
138.31	0+160	909.02
147.95	0+170	907.31



CONSOLIDATED COLLUVIAL DEPOSIT

900

890

880

870

860

850

840

820

810

800

HIGHLY WEATHERED & FRACTURED ROCK

LOOSE SURFICIAL DEPOSIT

LOOSE SURFICIAL DEPOSIT

WEATHERED & FRACTURED ROCK

SOUND ROCK

SOUND ROCK

420

470

1220

670

450

1220

COMPLETELY DECOMPOSED ROCK
1280

1280

2140

2140

2140

4440

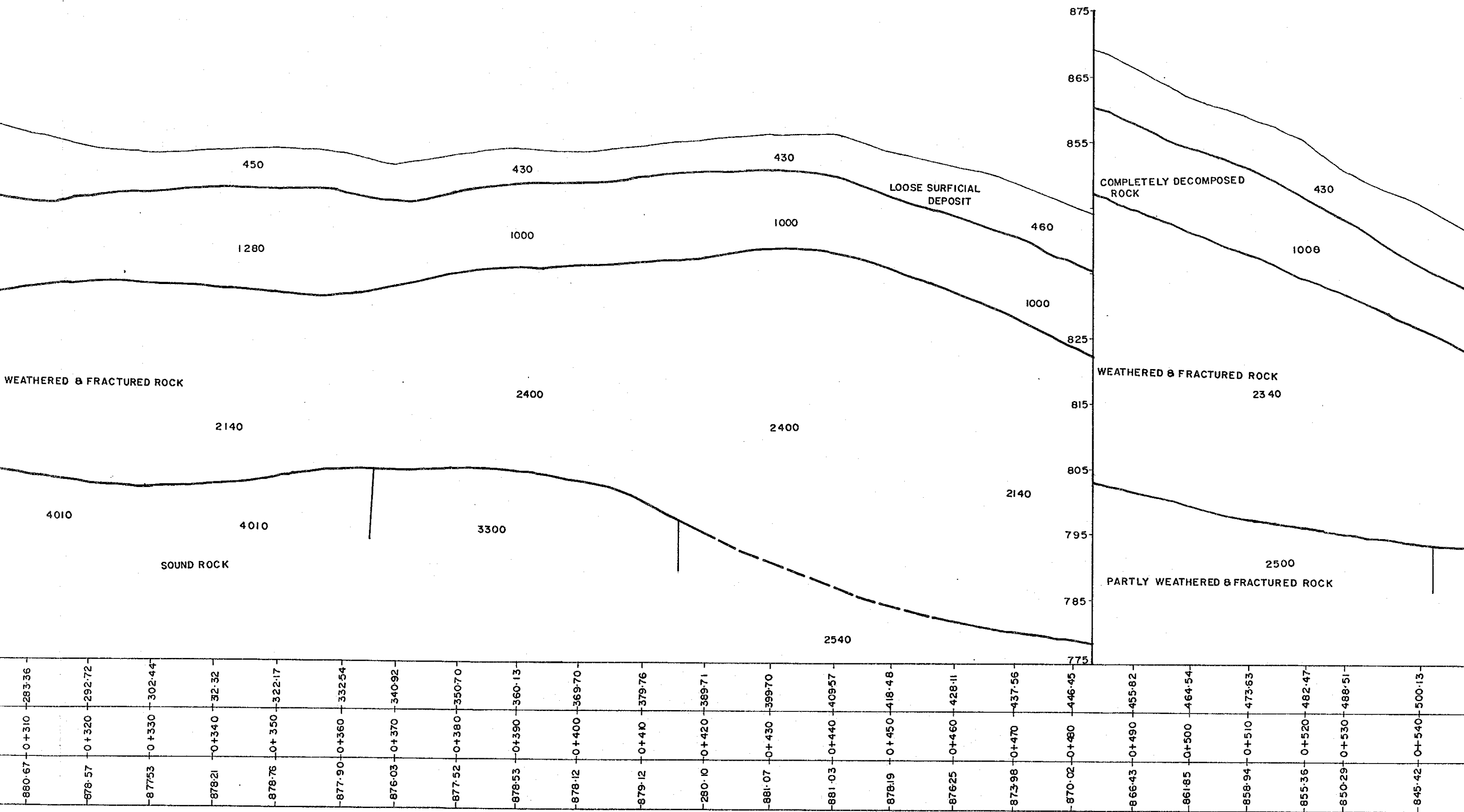
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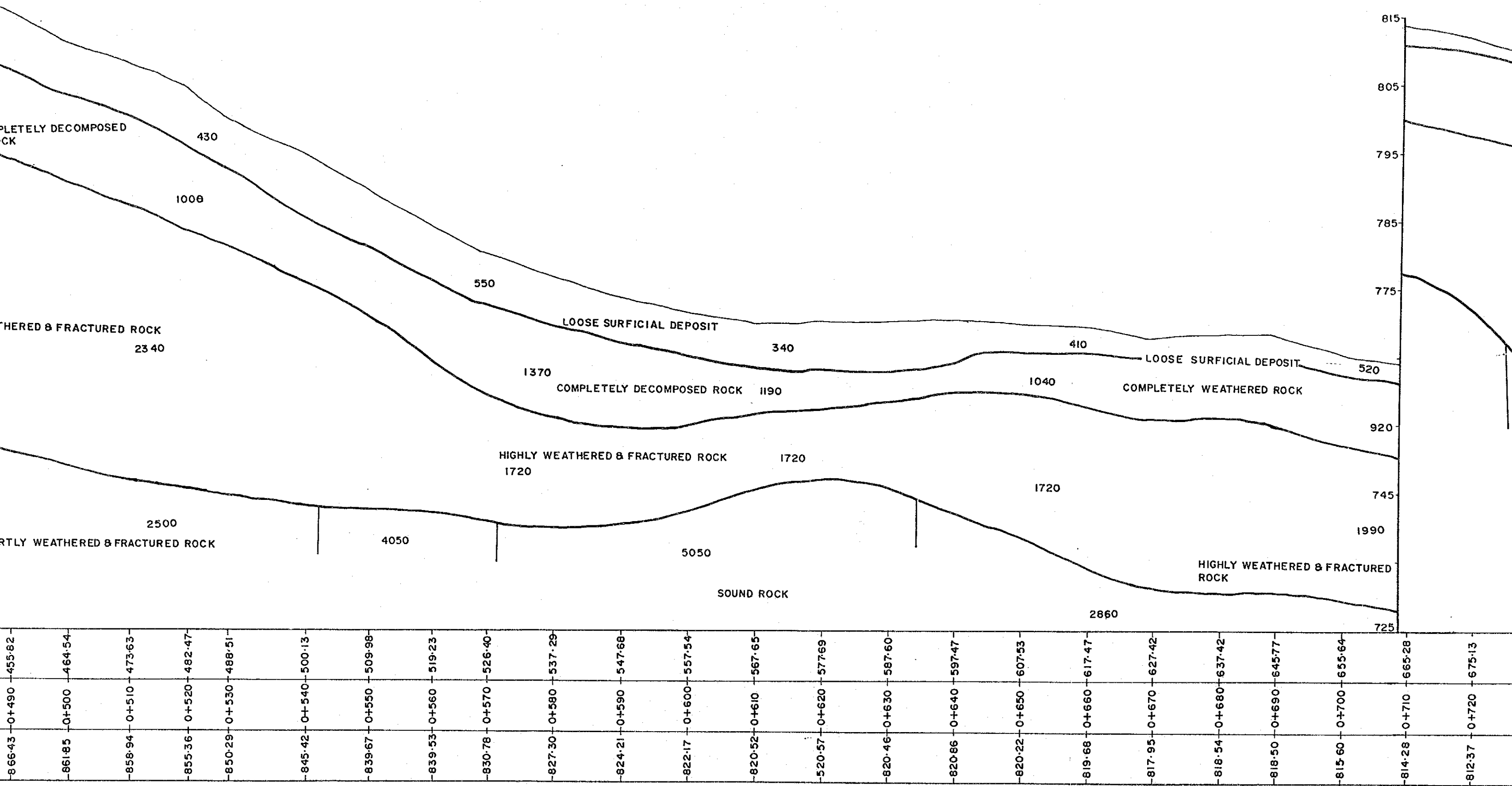
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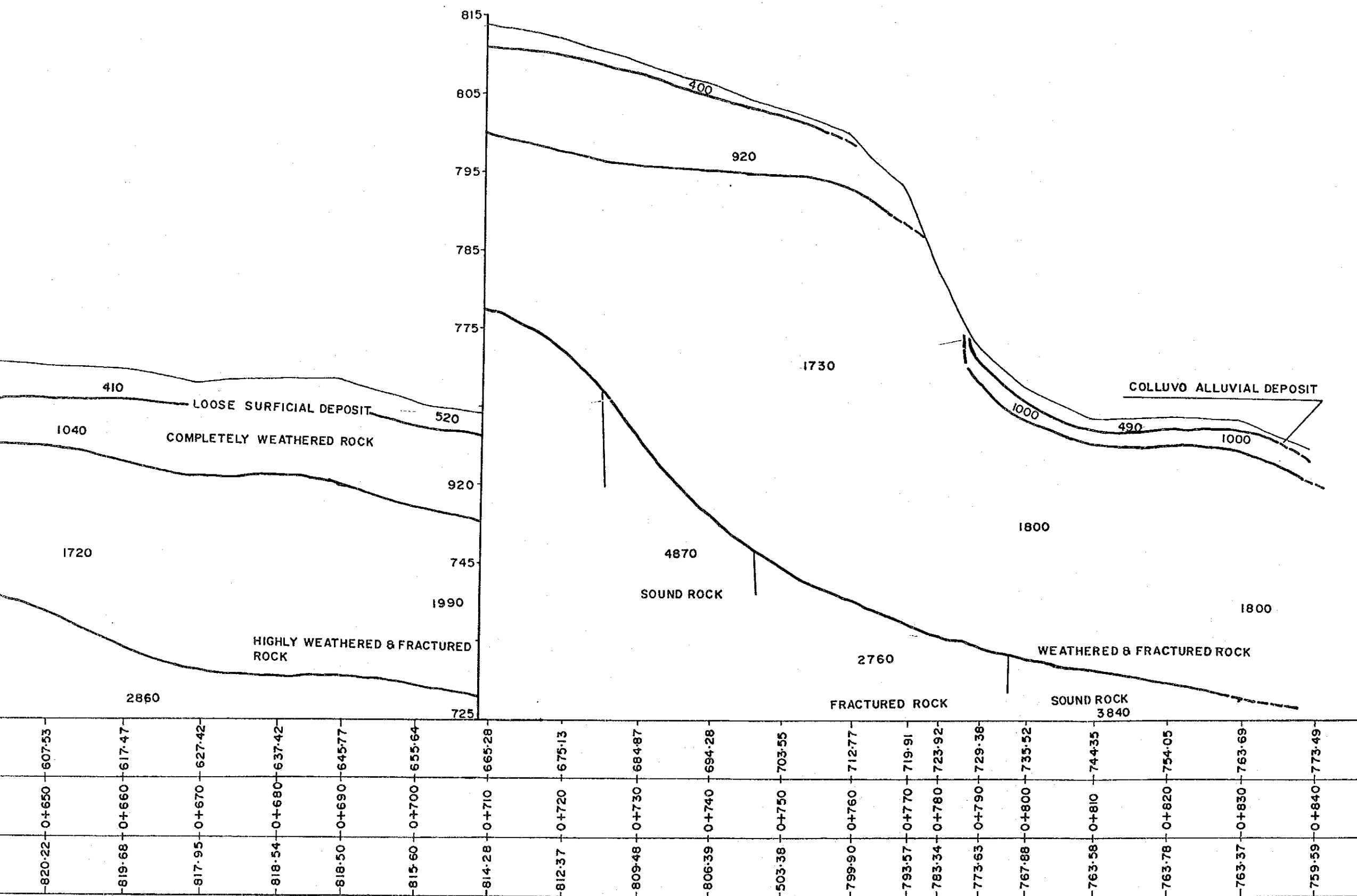
4010

4010

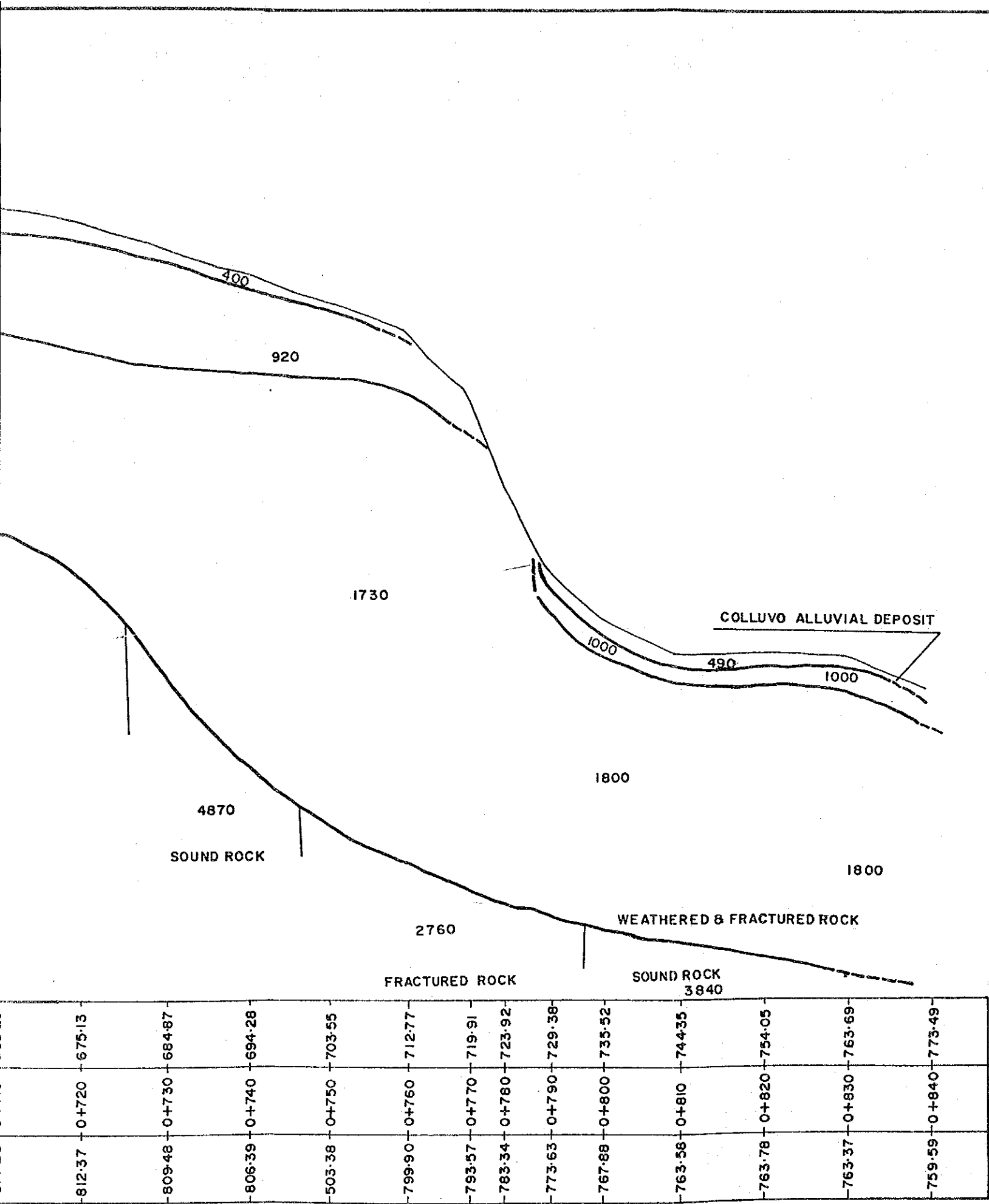
924+84 0+130 111+54
919+96 0+140 120+92
915+04 0+150 130+44
909+02 0+160 138+31
907+31 0+170 147+95
905+53 0+180 157+69
904+77 0+190 167+69
903+13 0+200 177+38
901+10 0+210 187+61
898+28 0+220 196+74
895+95 0+230 206+31
893+46 0+240 215+94
892+42 0+250 225+89
892+09 0+260 235+91
891+68 0+270 245+91
888+97 0+280 255+59
888+15 0+290 264+96
883+08 0+300 273+80
880+67 0+310 283+36
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878+21 0+340 312+32
878+76 0+350 322+17
877+90 0+360 332+54



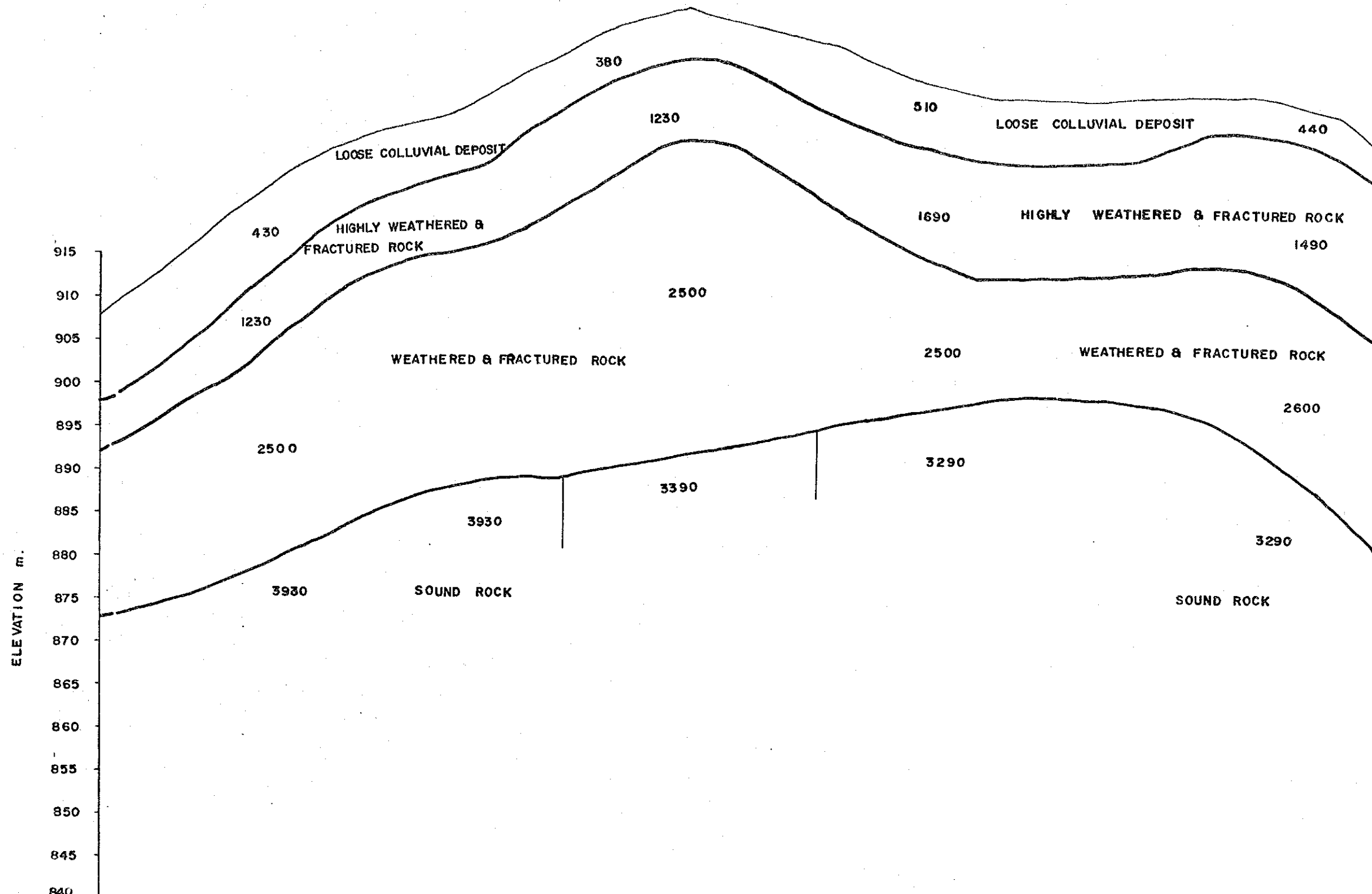




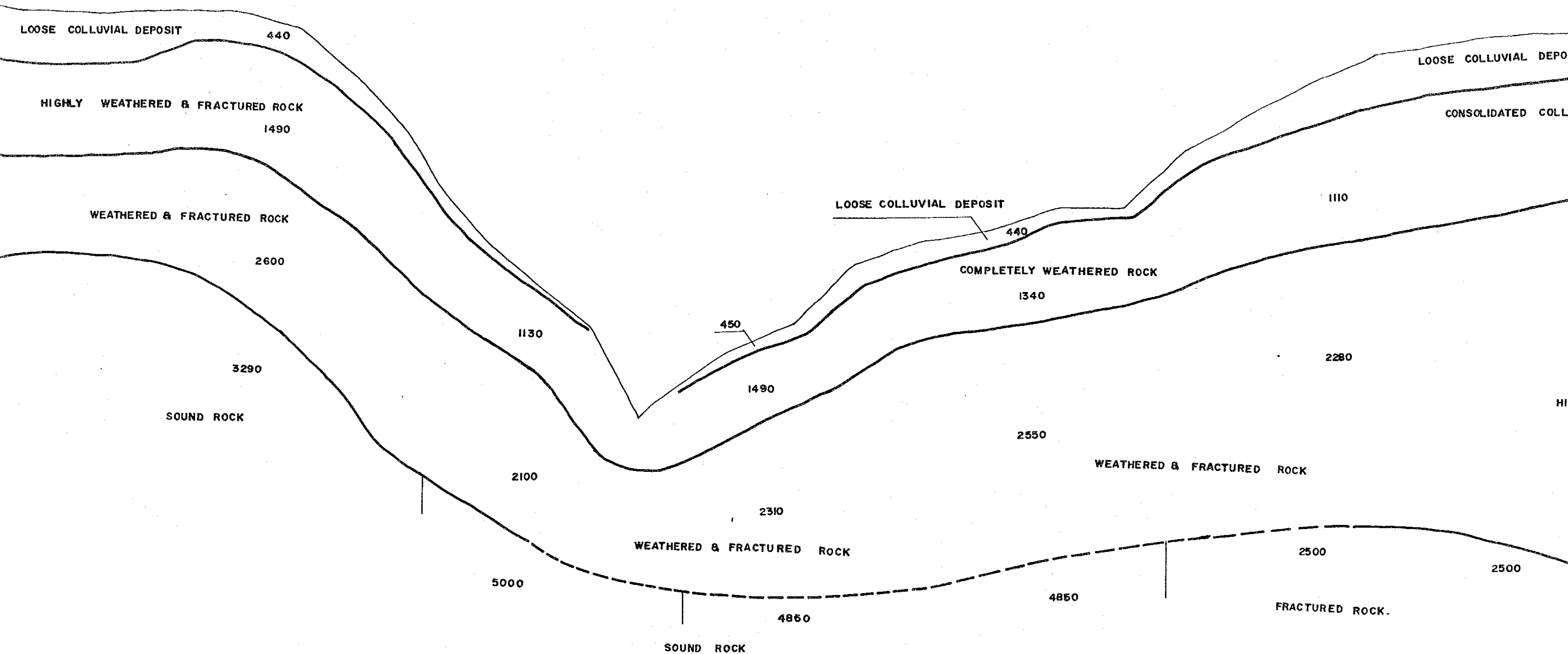
SEISMIC DEPTH SECTION



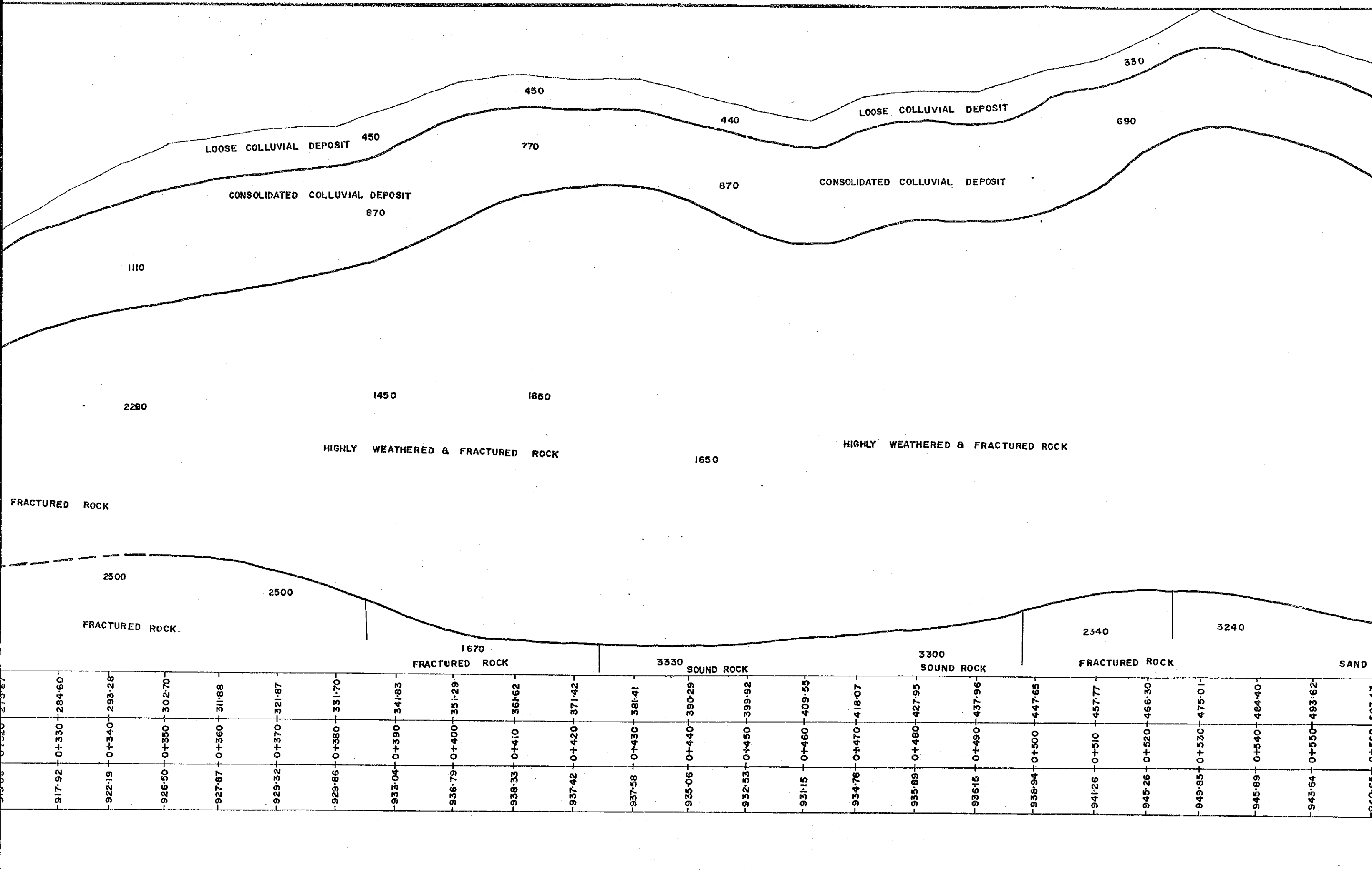
SEISMIC DEPTH SECTION ALONG SL-2



HORIZONTAL DISTANCE (m)	CHAINAGE (m)	ELEVATION (m)
0.00	0+00	907.94
7.83	0+010	913.07
15.74	0+020	919.59
23.82	0+030	925.29
32.87	0+040	928.86
42.35	0+050	931.26
51.74	0+060	935.81
60.93	0+070	940.64
70.28	0+080	943.43
79.54	0+090	940.86
87.15	0+100	938.70
97.51	0+110	934.70
107.35	0+120	932.56
117.36	0+130	932.15
127.22	0+140	932.54
137.58	0+150	932.72
147.42	0+160	930.47



932-56	0+120	107-35
932-15	0+130	117-36
932-54	0+140	127-22
932-72	0+150	137-58
930-47	0+160	147-42
923-25	0+170	155-84
916-15	0+180	162-67
906-94	0+190	168-50
899-16	0+200	175-38
893-22	0+210	183-15
887-50	0+220	190-11
874-37	0+230	197-26
878-92	0+240	202-94
884-53	0+250	211-56
888-17	0+260	219-88
896-63	0+270	228-23
900-15	0+280	238-70
901-43	0+290	248-14
904-88	0+300	257-52
904-67	0+310	266-62
913-06	0+320	275-67
917-92	0+330	284-60
922-19	0+340	293-28
926-50	0+350	302-70
927-87	0+360	311-88
929-32	0+370	321-87



LOOSE COLLUVIAL DEPOSIT 450

CONSOLIDATED COLLUVIAL DEPOSIT 870

LOOSE COLLUVIAL DEPOSIT

CONSOLIDATED COLLUVIAL DEPOSIT

HIGHLY WEATHERED & FRACTURED ROCK

HIGHLY WEATHERED & FRACTURED ROCK

FRACTURED ROCK

FRACTURED ROCK.

FRACTURED ROCK

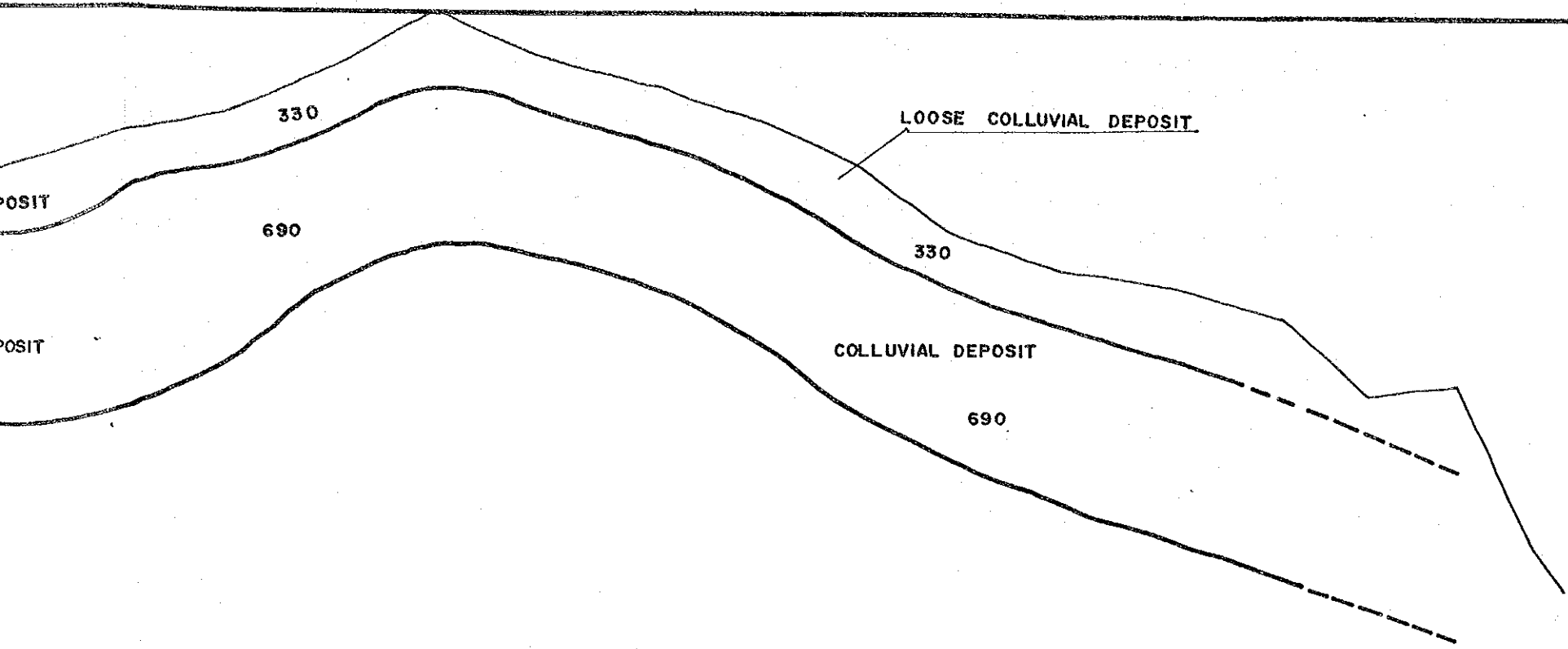
SOUND ROCK

SOUND ROCK

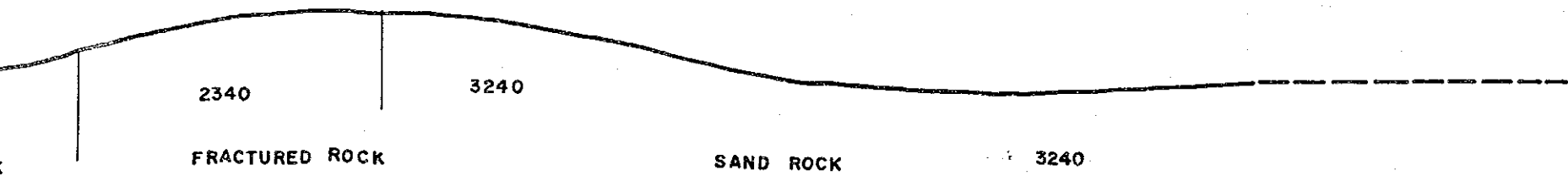
FRACTURED ROCK

SAND

- 917.92 - 0+330 - 284.60
- 922.19 - 0+340 - 293.28
- 926.50 - 0+350 - 302.70
- 927.87 - 0+360 - 311.88
- 929.32 - 0+370 - 321.87
- 929.86 - 0+380 - 331.70
- 933.04 - 0+390 - 341.83
- 936.79 - 0+400 - 351.29
- 938.33 - 0+410 - 361.62
- 937.42 - 0+420 - 371.42
- 937.58 - 0+430 - 381.41
- 935.06 - 0+440 - 390.29
- 932.53 - 0+450 - 399.92
- 931.15 - 0+460 - 409.55
- 934.76 - 0+470 - 418.07
- 935.89 - 0+480 - 427.95
- 936.15 - 0+490 - 437.96
- 938.94 - 0+500 - 447.65
- 941.26 - 0+510 - 457.77
- 945.26 - 0+520 - 466.30
- 949.85 - 0+530 - 475.01
- 945.89 - 0+540 - 484.40
- 945.64 - 0+550 - 493.62

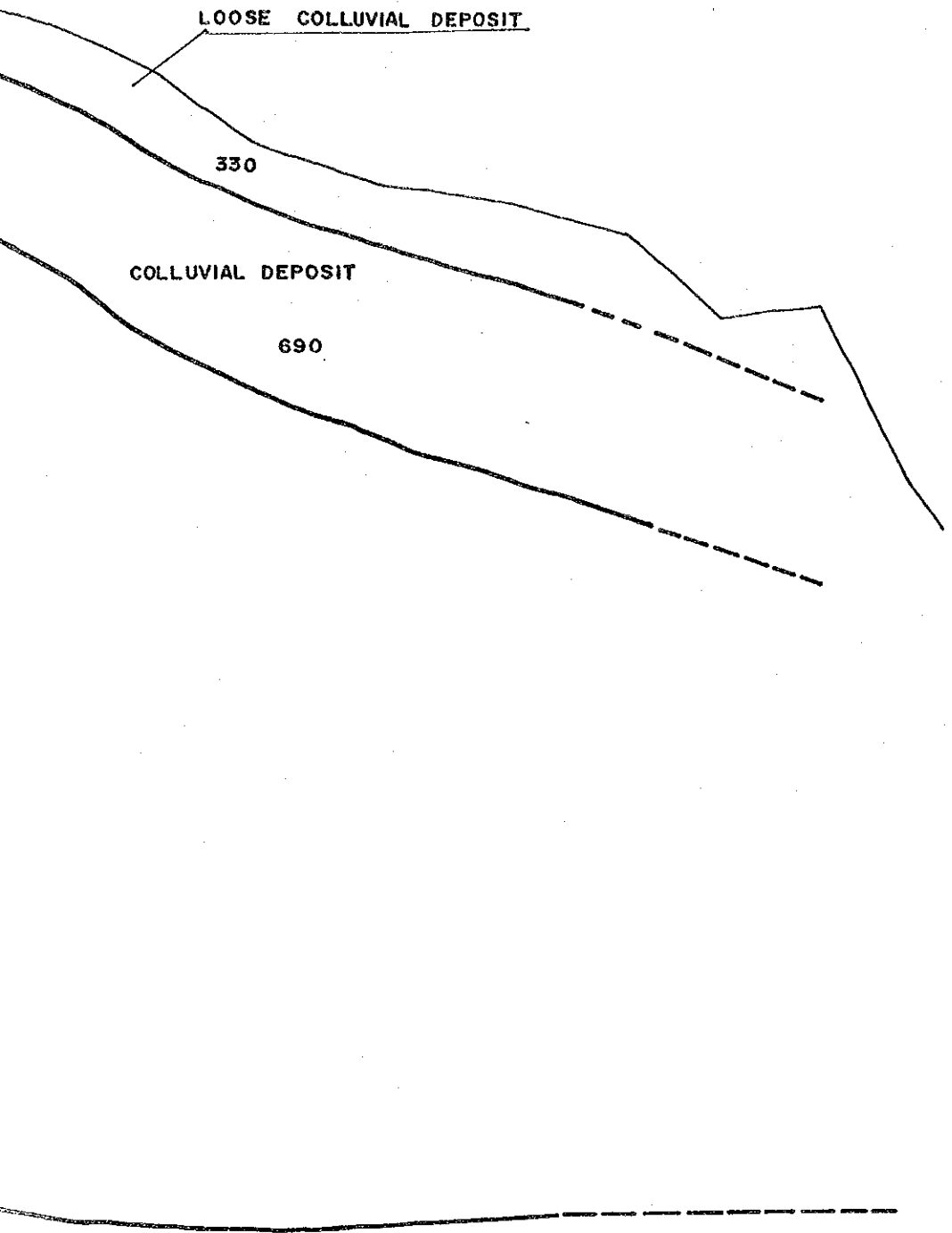


FRACTURED ROCK



-936.94	0+500	447.65	-941.26	0+510	457.77	-945.26	0+520	466.30	-949.85	0+530	475.01	-945.89	0+540	484.40	-943.64	0+550	493.62	-940.65	0+560	503.47	-936.88	0+570	511.19	-931.45	0+580	518.94	-927.95	0+590	528.17	-927.09	0+600	537.26	-924.60	0+610	547.24	-918.31	0+620	554.61	-919.14	0+630	562.37	-905.95	0+640	568.75	-902.04	0+650	571.64
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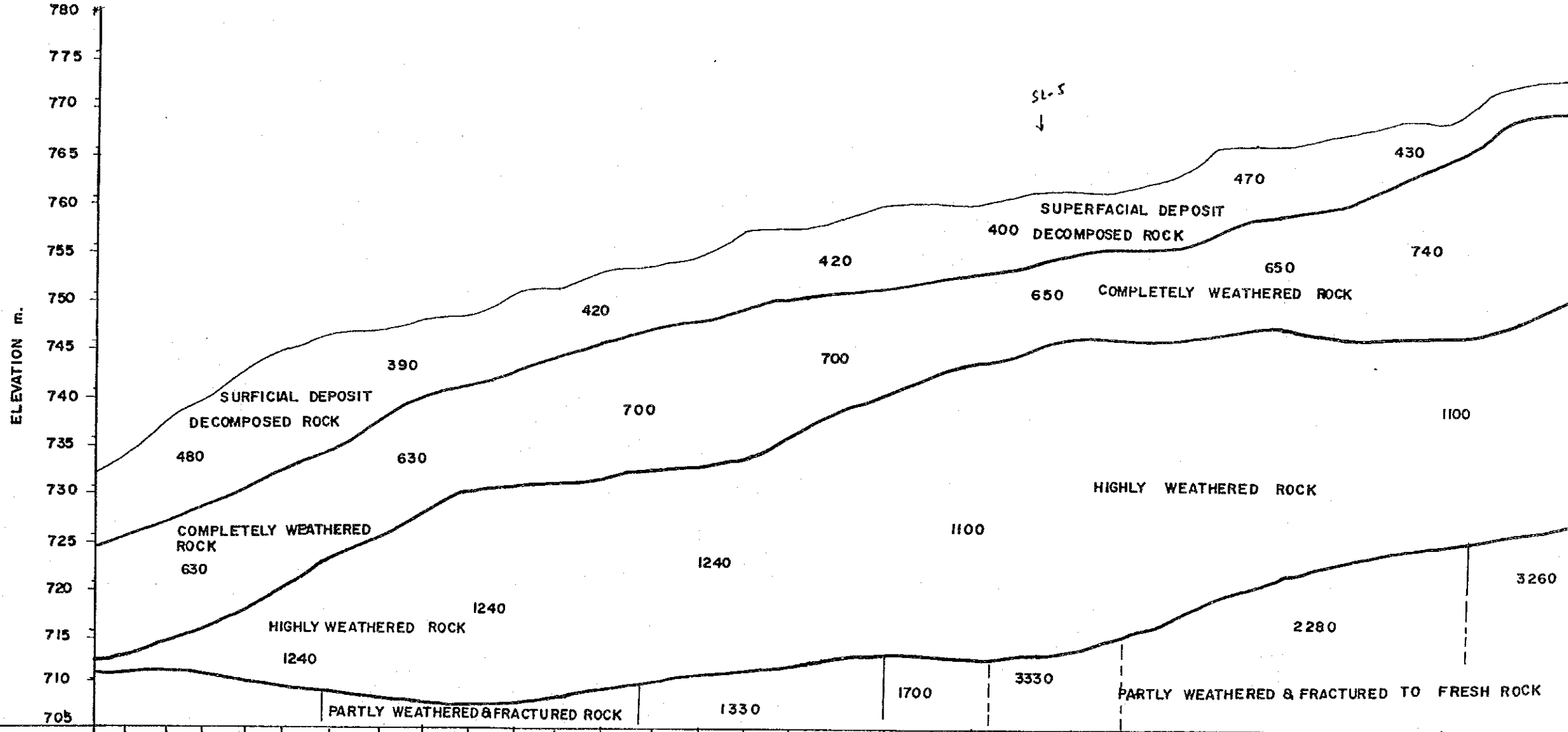
SEISMIC DEPTH



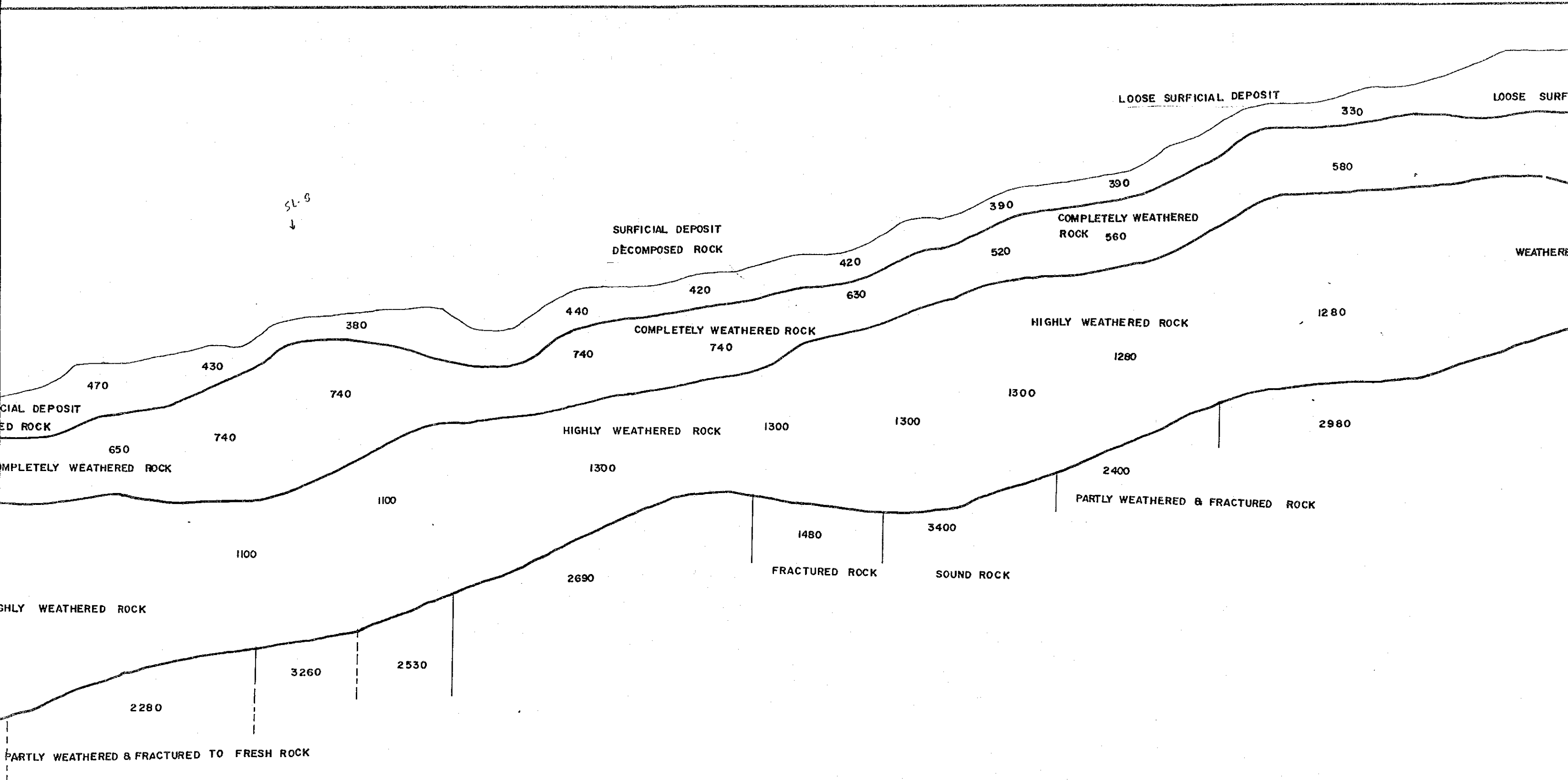
AND ROCK 3240

-940.65	0+560	503.47
-936.68	0+570	511.19
-931.45	0+580	518.94
-927.95	0+590	528.17
-927.09	0+600	537.26
-924.60	0+610	547.24
-918.31	0+620	554.61
-919.14	0+630	562.37
-905.95	0+640	568.75
-902.04	0+650	571.64

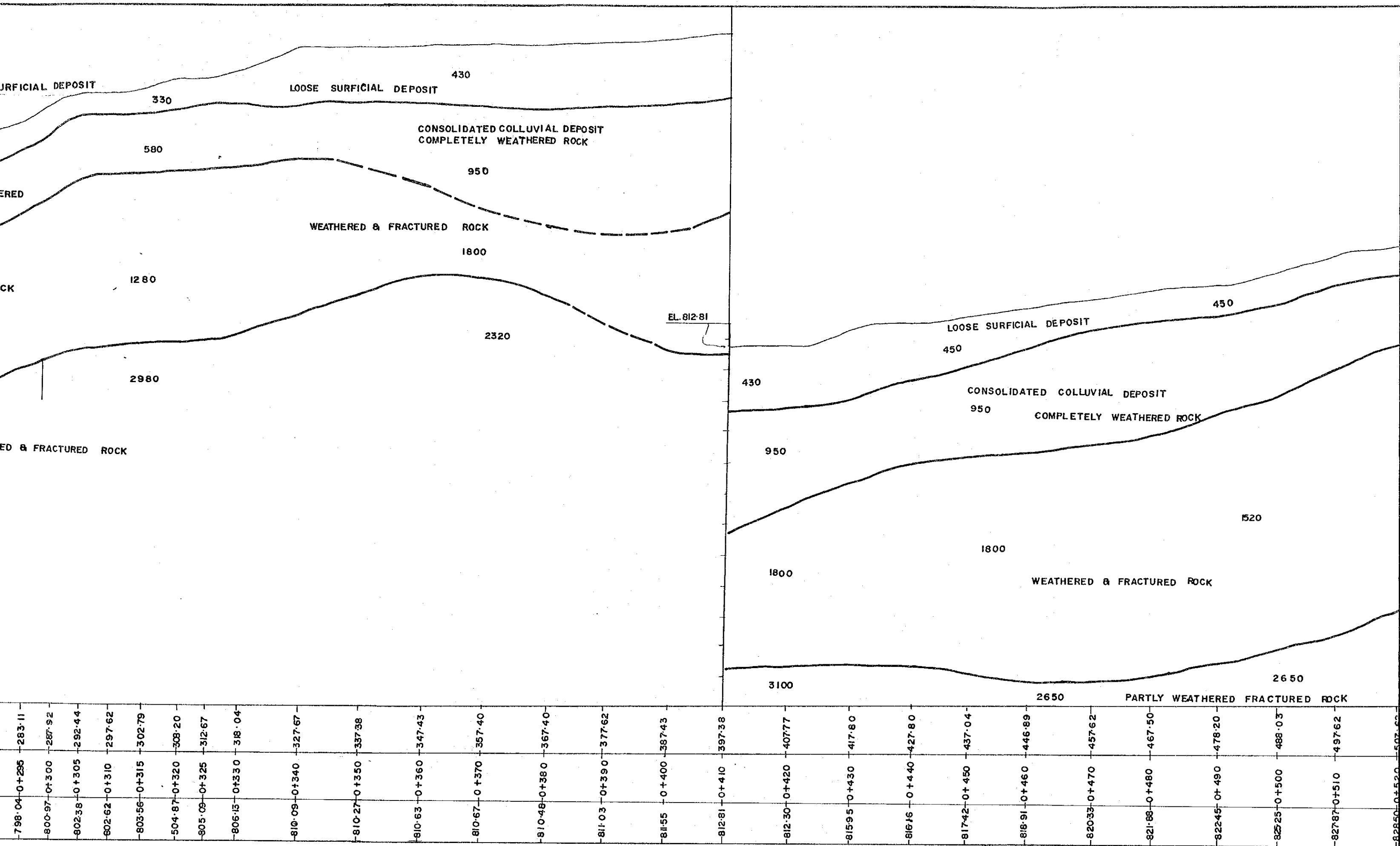
SEISMIC DEPTH SECTION ALONG SL-3



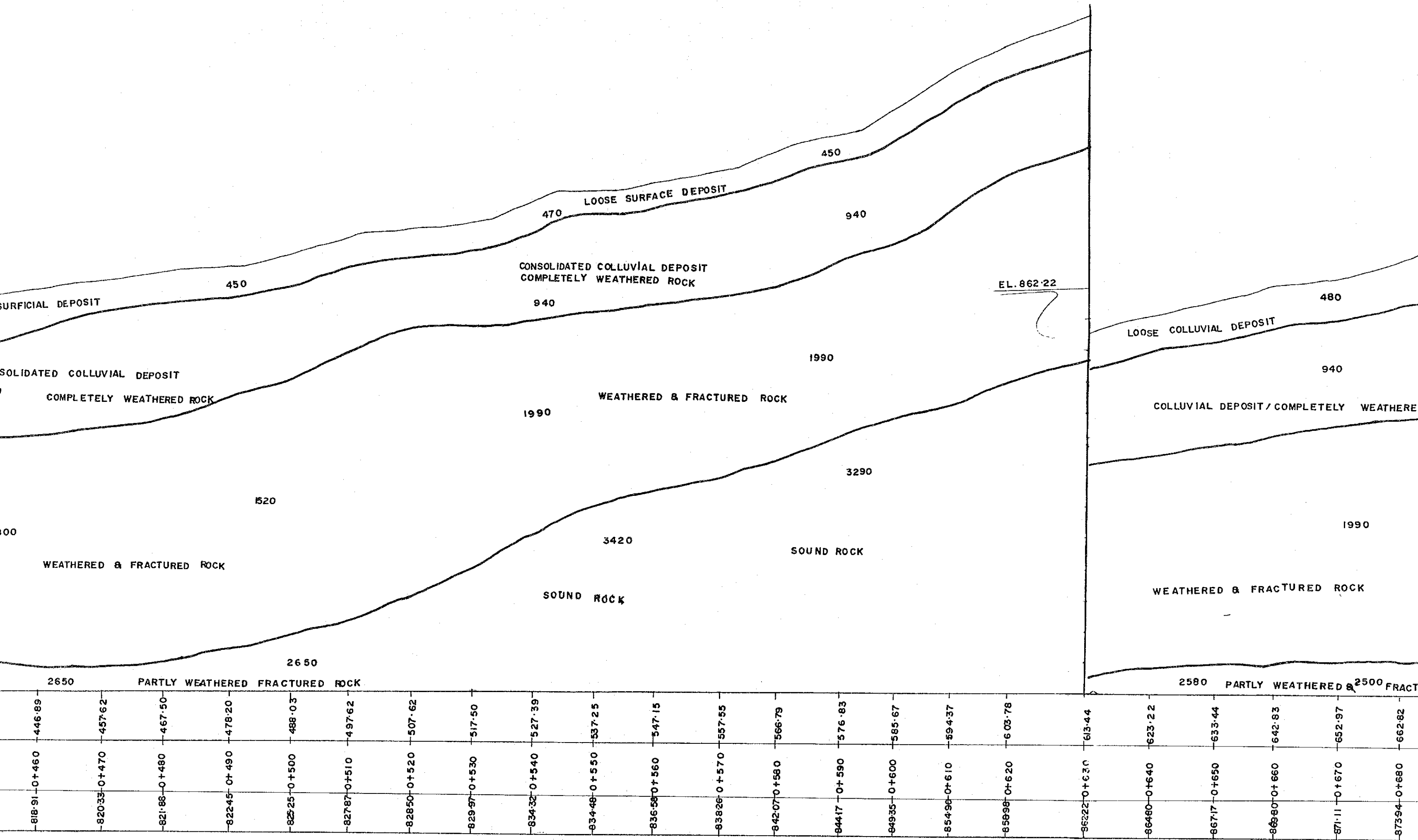
HOR. DISTANCE. (m.)	CHAINAGE (m.)	ELEVATION (m.)
0+00	0+00	731.30
3+67	0+005	733.43
7+57	0+010	736.70
11+59	0+015	739.03
16+29	0+020	742.46
20+47	0+025	743.94
25+34	0+030	745.71
30+21	0+035	746.17
35+04	0+040	747.31
39+92	0+045	747.86
44+80	0+050	750.13
49+86	0+055	750.54
54+64	0+060	752.43
59+49	0+065	752.80
64+37	0+070	753.72
69+05	0+075	756.32
73+81	0+080	756.68
78+77	0+085	757.65
83+74	0+090	759.10
88+49	0+095	759.13
98+21	0+100	759.29
98+48	0+105	760.47
103+37	0+110	760.34
108+21	0+115	760.61
113+25	0+120	761.71
117+95	0+125	765.00
122+89	0+130	765.17
127+83	0+135	765.64
132+73	0+140	766.42
137+42	0+145	767.58
142+28	0+150	767.52
147+22	0+155	770.87
152+12	0+160	771.60
156+51	0+165	772.35



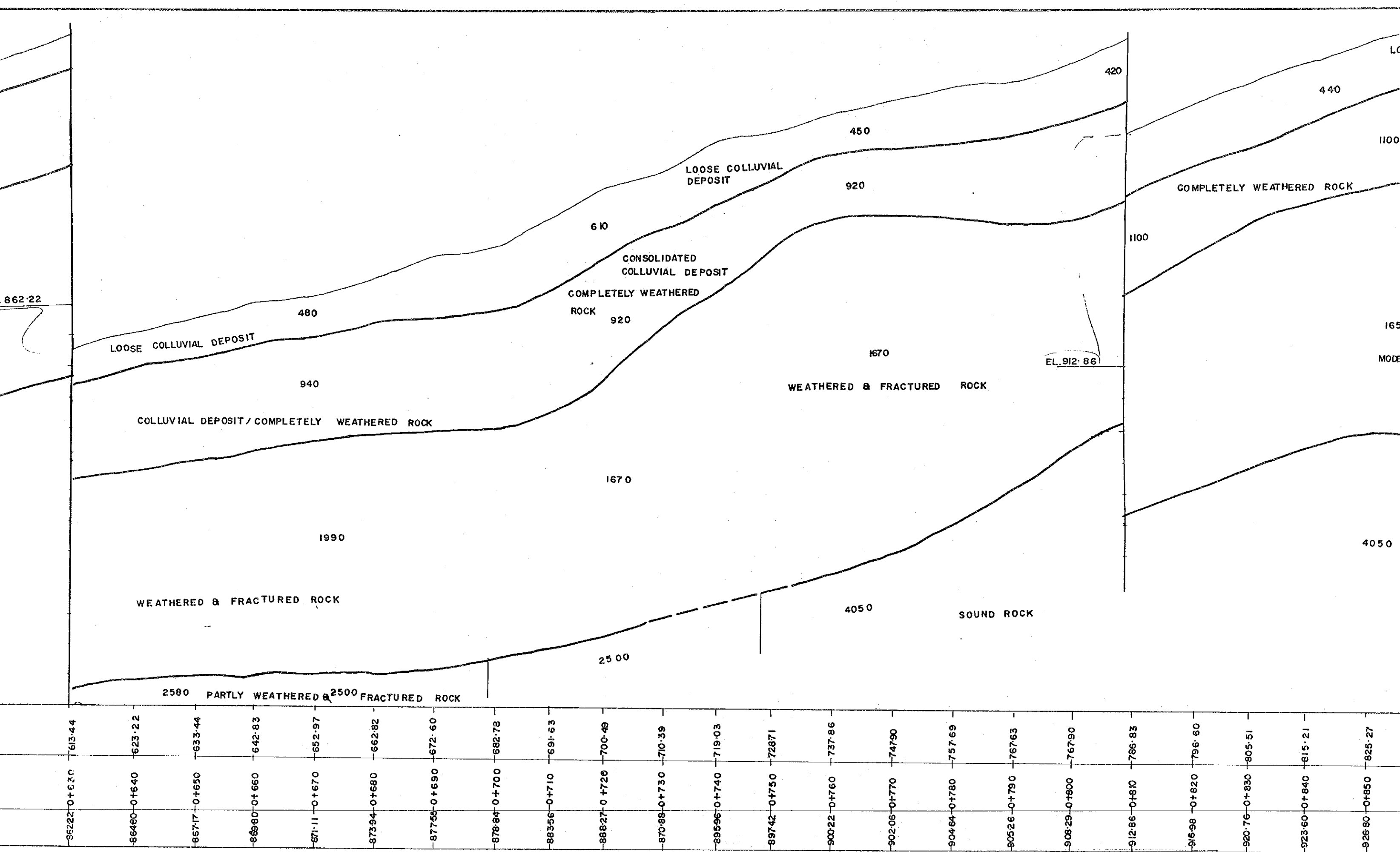
-760.61	-0+115	-108.21	-761.71	-0+120	-113.25	-765.00	-0+125	-117.95	-765.17	-0+130	-122.89	-765.64	-0+135	-127.83	-766.42	-0+140	-132.73	-767.58	-0+145	-137.42	-767.52	-0+150	-142.28	-770.87	-0+155	-147.22	-771.60	-0+160	-152.12	-772.35	-0+165	-156.61	-772.79	-0+170	-161.57	-773.00	-0+175	-166.56	-772.95	-0+180	-171.74	-770.25	-0+185	-175.96	-770.09	-0+190	-181.25	-773.12	-0+195	-186.25	-775.17	-0+200	-190.58	-776.34	-0+205	-195.92	-776.45	-0+210	-201.05	-776.87	-0+215	-205.80	-778.16	-0+220	-210.23	-778.41	-0+225	-214.97	-779.74	-0+230	-220.01	-780.94	-0+235	-225.06	-781.17	-0+240	-229.77	-782.52	-0+245	-234.89	-785.64	-0+250	-229.98	-785.96	-0+255	-244.87	-787.46	-0+260	-249.65	-789.87	-0+265	-254.22	-790.88	-0+270	-259.58	-791.15	-0+275	-264.37	-792.24	-0+280	-269.31	-793.31	-0+285	-274.02	-795.93	-0+290	-278.67	-798.04	-0+295	-283.11	-800.97	-0+300	-287.92	-802.38	-0+305	-292.44	-802.62	-0+310	-297.62	-803.56	-0+315	-302.79	-804.87	-0+320	-308.20	-805.09	-0+325	-312.67	-806.15	-0+330	-318.04	-810.09	-0+340	-327.67
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798.04-0+295	283.11	800.97-0+300	287.92	802.38-0+305	292.44	802.62-0+310	297.62	803.56-0+315	302.79	804.87-0+320	308.20	805.09-0+325	312.67	806.15-0+330	318.04	810.09-0+340	327.67	810.27-0+350	337.38	810.63-0+360	347.43	810.67-0+370	357.40	810.48-0+380	367.40	811.03-0+390	377.62	811.55-0+400	387.43	812.81-0+410	397.38	812.30-0+420	407.77	815.95-0+430	417.80	816.16-0+440	427.80	817.42-0+450	437.04	818.91-0+460	446.89	820.33-0+470	457.62	821.88-0+480	467.50	822.45-0+490	478.20	825.25-0+500	488.03	827.87-0+510	497.62	828.50-0+520	507.62
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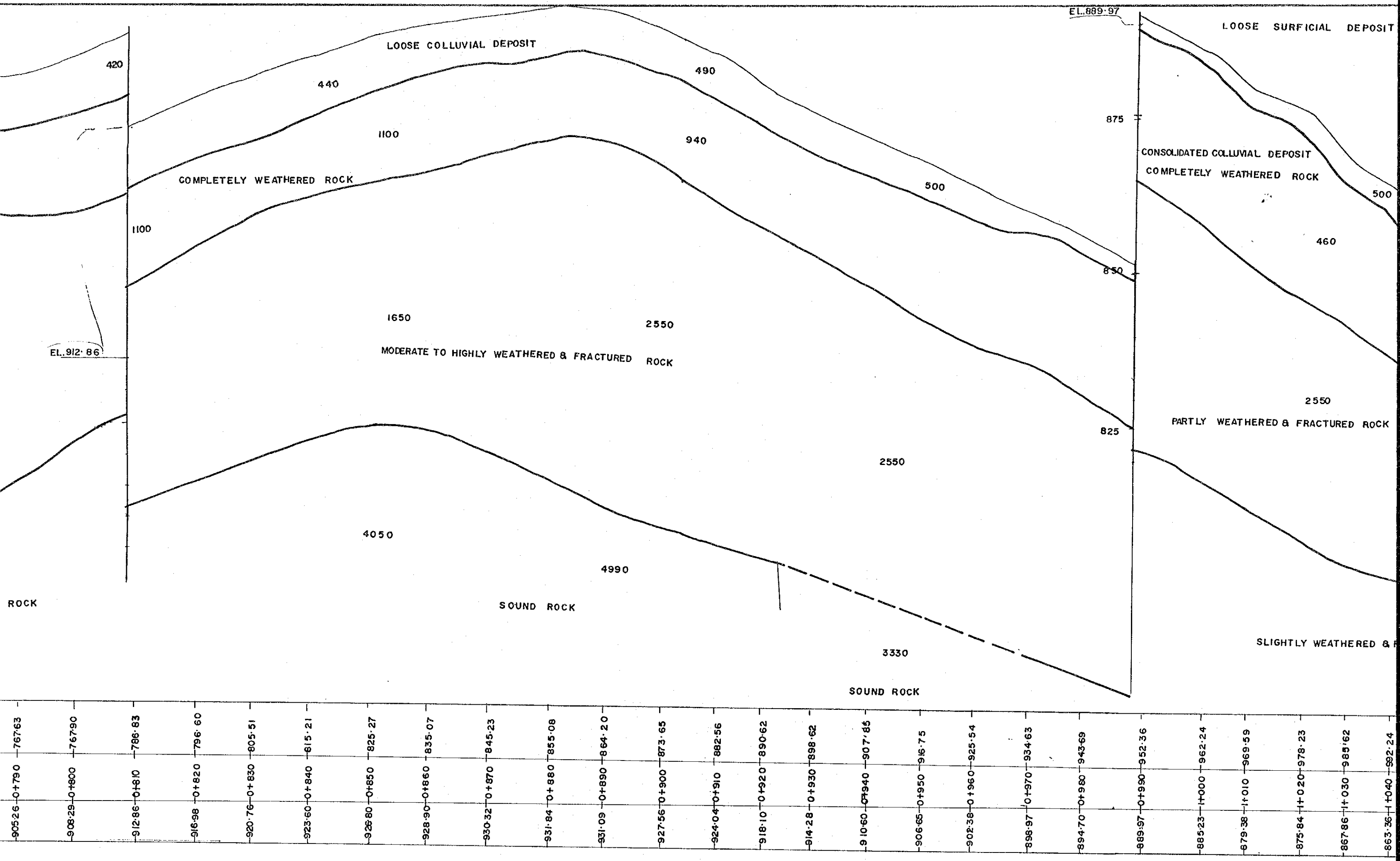


818.91	820.33	821.88	822.45	825.25	827.87	828.50	829.97	834.32	834.48	836.58	838.26	842.07	844.17	849.35	854.96	858.98	862.22	864.80	867.17	869.80	871.11	873.94
0+460	0+470	0+480	0+490	0+500	0+510	0+520	0+530	0+540	0+550	0+560	0+570	0+580	0+590	0+600	0+610	0+620	0+630	0+640	0+650	0+660	0+670	0+680
446.89	457.62	467.50	478.20	488.03	497.62	507.62	517.50	527.39	537.25	547.15	557.55	566.79	576.83	585.67	594.37	603.78	613.44	623.22	633.44	642.83	652.97	662.82



2580 PARTLY WEATHERED & 2500 FRACTURED ROCK

EL. 912.86



EL. 889.97

EL. 912.86

LOOSE COLLUVIAL DEPOSIT

LOOSE SURFICIAL DEPOSIT

COMPLETELY WEATHERED ROCK

CONSOLIDATED COLLUVIAL DEPOSIT

COMPLETELY WEATHERED ROCK

MODERATE TO HIGHLY WEATHERED & FRACTURED ROCK

PARTLY WEATHERED & FRACTURED ROCK

SOUND ROCK

SLIGHTLY WEATHERED & FRACTURED ROCK

SOUND ROCK

420

440

490

1100

940

875

1100

500

500

460

850

1650

2550

2550

825

4050

2550

4990

3330

ROCK

EL. 889.97

LOOSE SURFICIAL DEPOSIT

875

CONSOLIDATED COLLUVIAL DEPOSIT
COMPLETELY WEATHERED ROCK

500

460

850

350

K LOOSE SURFICIAL DEPOSIT

2550

PARTLY WEATHERED & FRACTURED ROCK

860 CONSOLIDATED COLLUVIAL
DEPOSIT
COMPLETELY WEATHERED ROCK

500

825

800

60

LOOSE COLLUVIAL DE

900

CONSOLIDATED

2270

790

PARTLY WEATHERED & FRACTURED ROCK

2270

2270

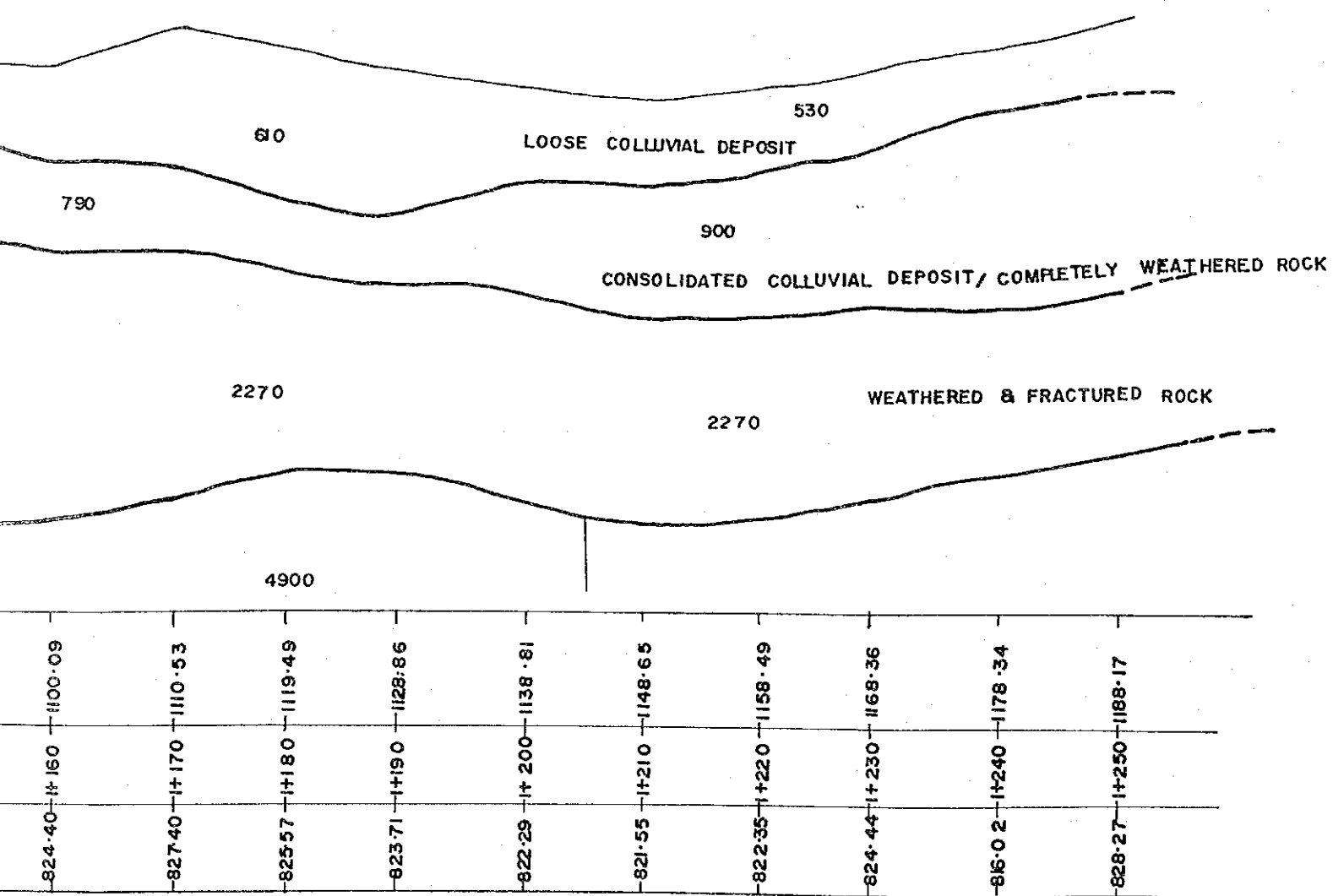
SLIGHTLY WEATHERED & FRACTURED ROCK

4950

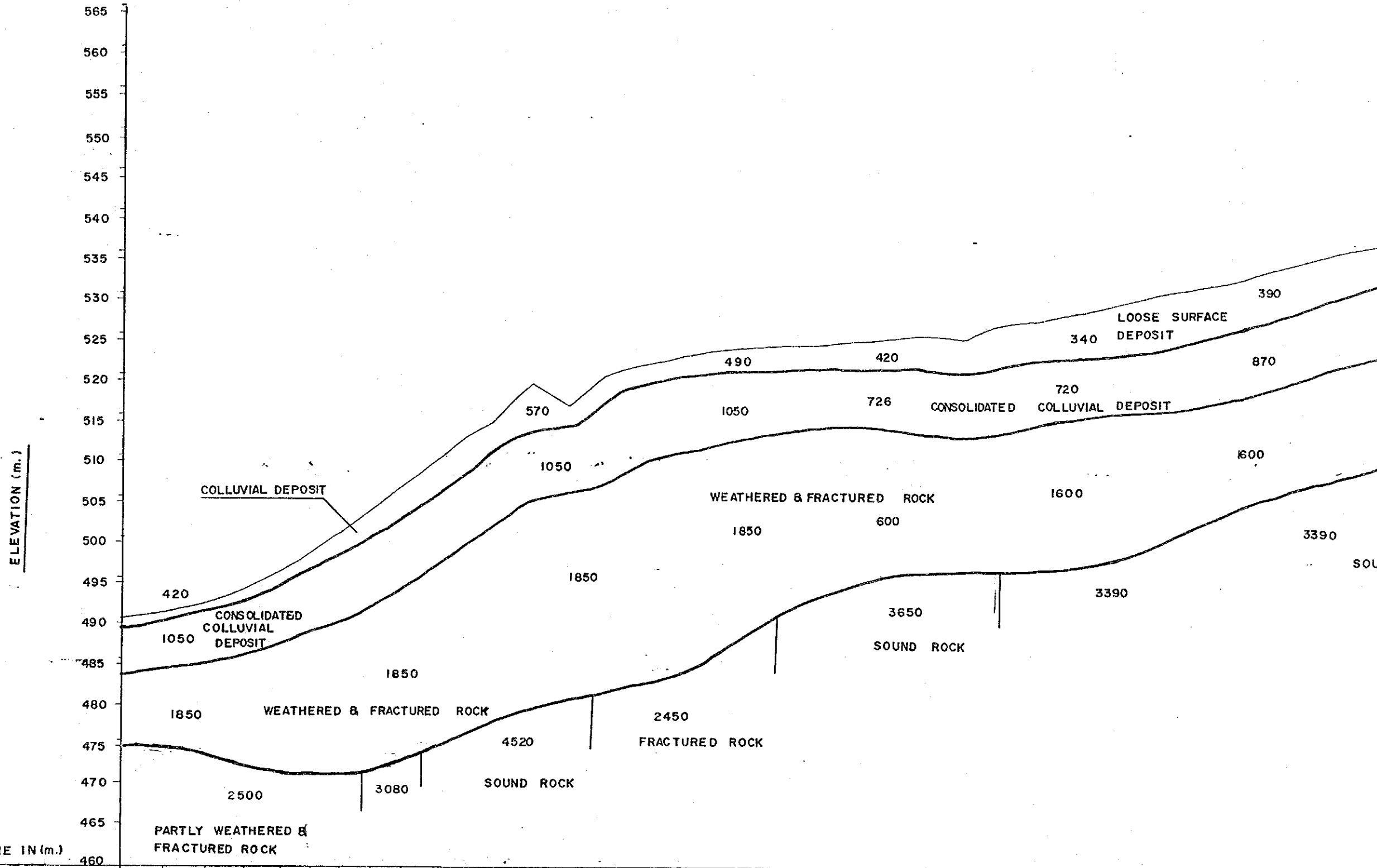
3590

4900

898.97	0+970	934.63	894.70	0+980	943.69	889.97	0+990	952.36	885.23	1+000	962.24	879.38	1+010	969.59	875.84	1+020	978.23	867.86	1+030	985.62	863.36	1+040	992.24	853.07	1+050	1001.16	850.62	1+060	1009.74	844.65	1+070	1018.56	843.07	1+080	1028.52	840.15	1+090	1038.02	837.05	1+100	1047.26	834.42	1+110	1057.13	830.83	1+120	1065.82	824.77	1+130	1074.16	819.51	1+140	1082.81	824.45	1+150	1098.98	824.40	1+160	1100.09	827.40	1+170	1110.53	825.57	1+180	1119.49	823.71	1+190	1128.86	822.29	1+200	1138.81	821.55	1+210	1148.65
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SEISMIC DEPTH SECTION ALONG SL-4



HORIZONTAL DISTANCE (m.)	CHAINAGE (m)	ELEVATION (m.)
0.000	0+000	489.91
5.12	0+005	490.74
10.20	0+010	491.89
14.91	0+015	493.32
19.58	0+020	495.62
23.29	0+025	497.87
27.02	0+030	500.47
30.71	0+035	503.18
34.69	0+040	505.88
38.69	0+045	508.95
42.47	0+050	511.94
46.64	0+055	514.22
51.21	0+060	518.80
55.73	0+065	516.17
60.78	0+070	519.86
65.49	0+075	521.21
70.35	0+080	522.39
75.86	0+085	523.14
80.39	0+090	523.64
85.42	0+095	523.57
90.37	0+100	524.17
95.81	0+105	524.50
100.80	0+110	524.91
105.68	0+115	524.45
110.50	0+120	526.10
115.86	0+125	527.00
120.27	0+130	527.85
125.58	0+135	529.03
129.95	0+140	530.05
135.78	0+145	531.22
140.64	0+150	532.13
145.45	0+155	533.44
150.30	0+160	534.84
155.06	0+165	535.87