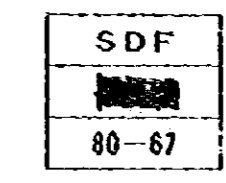
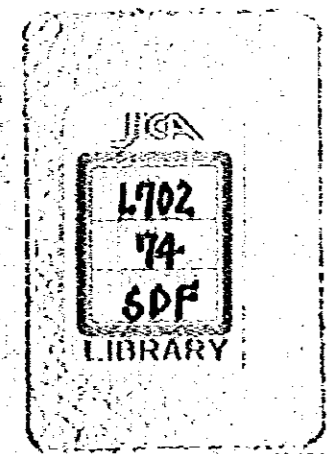


REPUBLIC OF BOLIVIA
BOLIVIAN NATIONAL RAILWAYS'
REHABILITATION PROGRAM
FINAL REPORT

VOLUME II
APPENDIX

MARCH 1980

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)



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JAPAN INTERNATIONAL COOPERATION AGENCY

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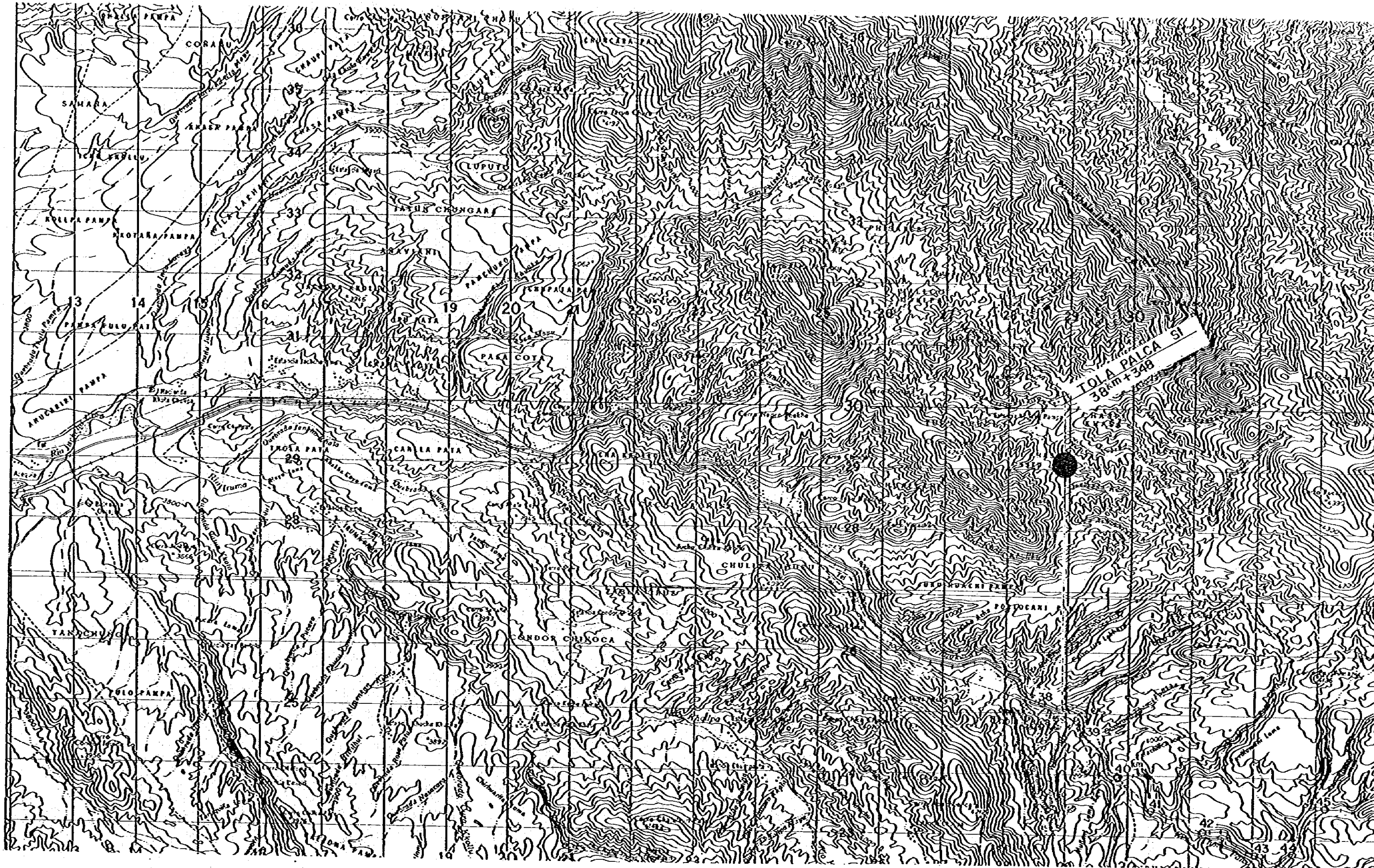


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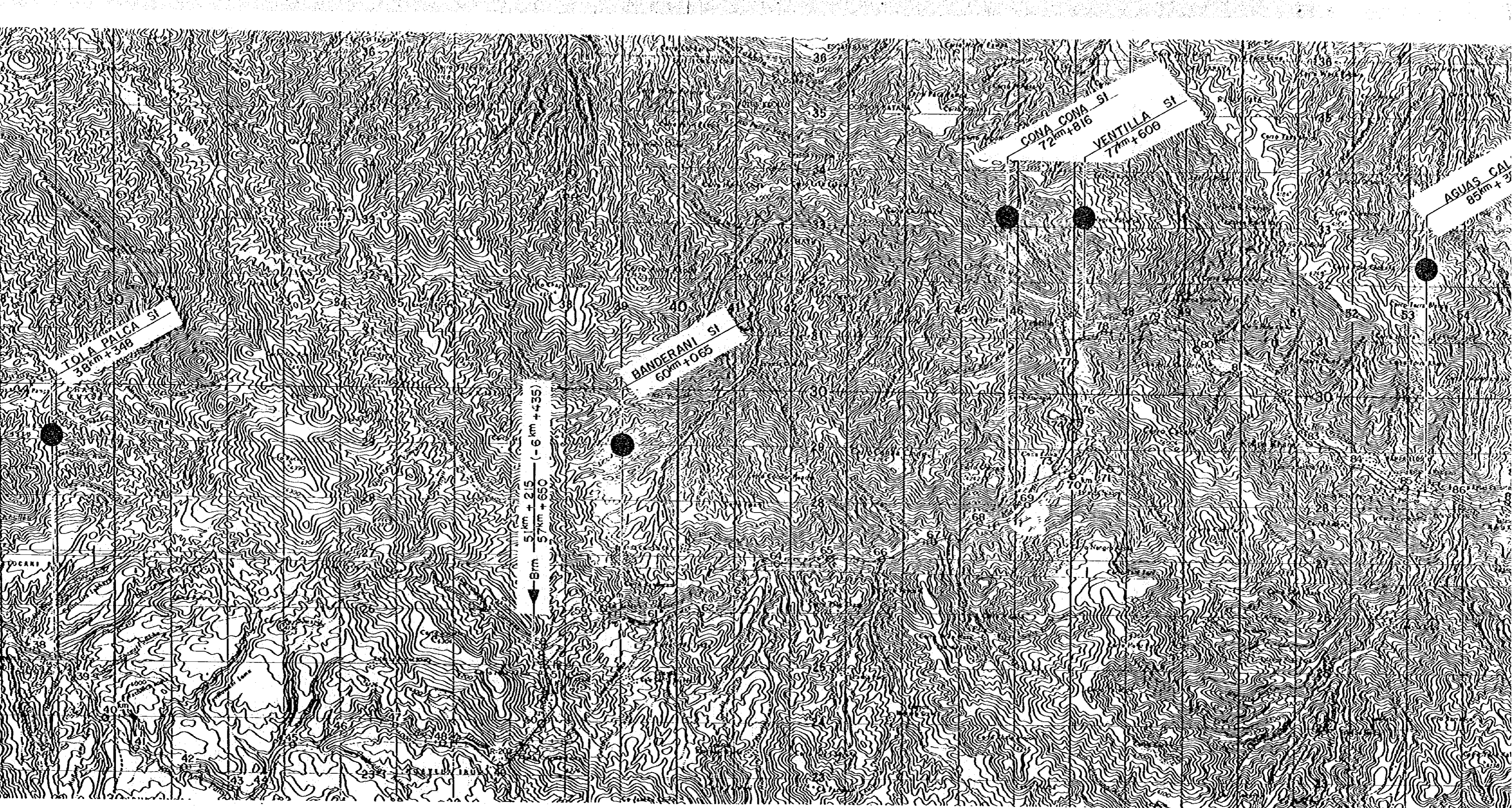
国際協力事業団		
受入 月日	'87.2.4	L702
登録 No.	08257	74 SDF

REHABILITATION PLAN FOR WESTERN LINE

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <p>Drawing - 1 Plan of Tunnel Construction ($48^{km}+000^m \sim 57^{km}+650^m$)
(scale 1/50,000)</p> | <p>Drawing - 15 Typical Design of Through Girder (TG - 40)</p> |
| <p>Drawing - 2 Longitudinal Profile of Tunnel Construction
($48^{km}+000^m \sim 57^{km}+650^m$), (scale 1/50,000, 1/4,000)</p> | <p>Drawing - 16 Design of bridge ($l = 15^m$)</p> |
| <p>Drawing - 3 Plan of Existing Line Improvement (Alternative A,
$103^{km}+000^m \sim 109^{km}+400^m$) and Lifting-up of track
level ($112^{km}+500^m \sim 116^{km}+500^m$), (scale 1/50,000)</p> | <p>Drawing - 17 Design of bridge ($l = 20^m$)</p> |
| <p>Drawing - 4 Longitudinal Profile of Existing Line Improvement
(Alternative A, $103^{km}+000^m \sim 109^{km}+400^m$) and Lifting-up
track level ($112^{km}+500^m \sim 116^{km}+500^m$), (scale 1/50,000, 1/4,000)</p> | <p>Drawing - 18 Design of bridge ($l = 40^m$)</p> |
| <p>Drawing - 5 Plan of New Detour Line (Alternative B, $103^{km}+000^m \sim$
$110^{km}+000^m$), (scale 1/50,000)</p> | <p>Drawing - 19 Design of bridge ($l = 80^m$)</p> |
| <p>Drawing - 6 Longitudinal Profile of New Detour Line (Alternative B,
$103^{km}+000^m \sim 110^{km}+000^m$), (scale 1/50,000, 1/4,000)</p> | <p>Drawing - 20 Design of bridge ($l = 15^m + 80^m + 15^m$)</p> |
| <p>Drawing - 7 Plan of New Detour Line (Alternative C, $101^{km}+000^m \sim$
$110^{km}+000^m$), (scale 1/50,000)</p> | <p>Drawing - 21 Design of arche bridge ($l = 20^m + 110^m + 20^m$)</p> |
| <p>Drawing - 8 Longitudinal Profile of New Detour Line (Alternative C,
$101^{km}+000^m \sim 110^{km}+000^m$), (scale 1/50,000, 1/4,000)</p> | <p>Drawing - 22 Design of arche bridge ($l = 40^m + 170^m + 40^m$)</p> |
| <p>Drawing - 9 Typical Design of Open Culvert</p> | |
| <p>Drawing - 10 Typical Design of Corrugated steel pipe</p> | |
| <p>Drawing - 11 Typical Design of Rock Fall shed</p> | |
| <p>Drawing - 12 Typical Design of Tunnel</p> | |
| <p>Drawing - 13 Typical Design of Through Girder (TG - 15)</p> | |
| <p>Drawing - 14 Typical Design of Through Girder (TG - 20)</p> | |



TOLA PALCA SI
38km + 348



IOLA PALCA SI
38km + 348

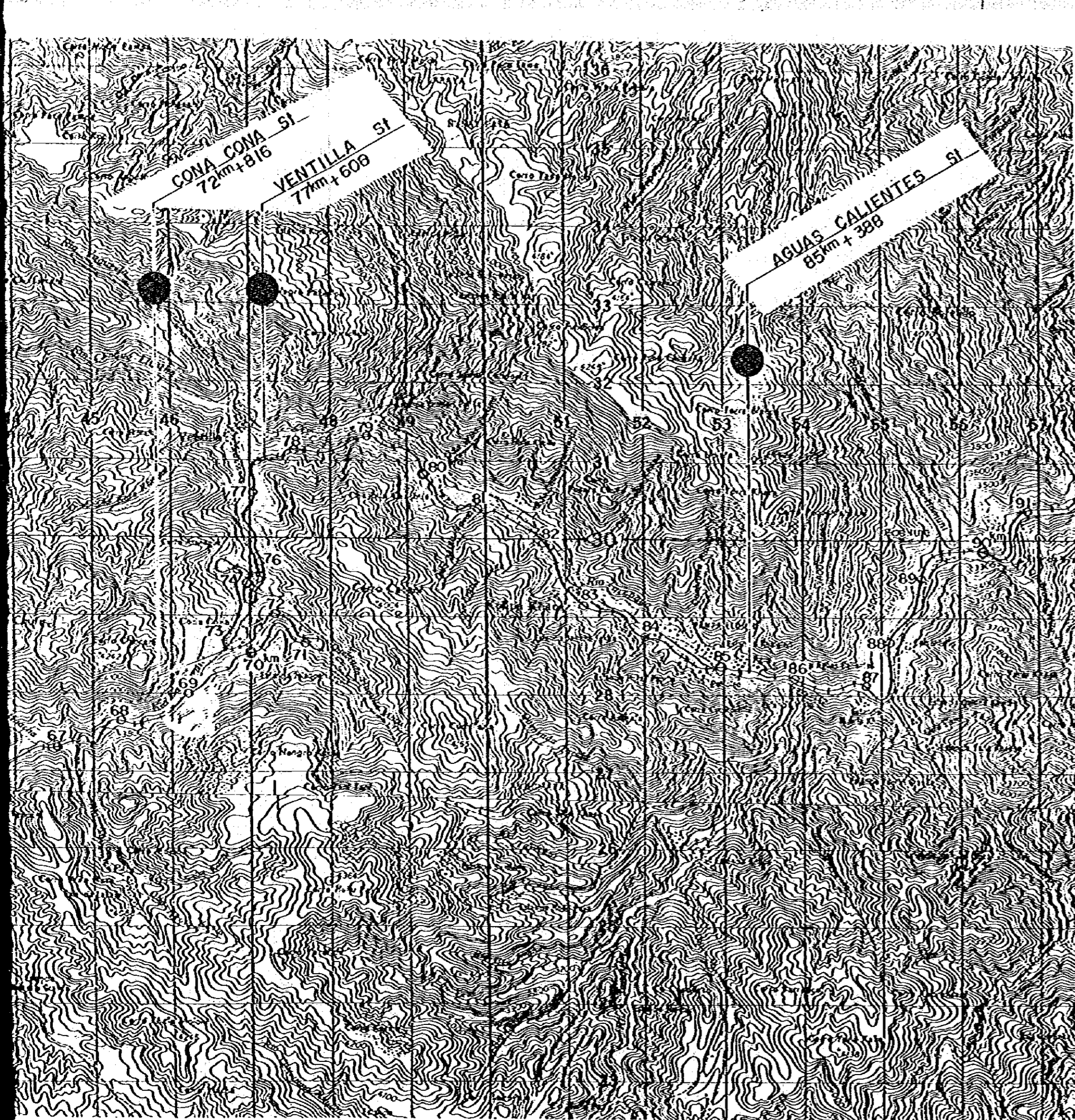
BANDERANI SI
60km + 065

CONA CONA SI
72km + 816

VENTILLA SI
77km + 608

AGUAS CA
85km + 2

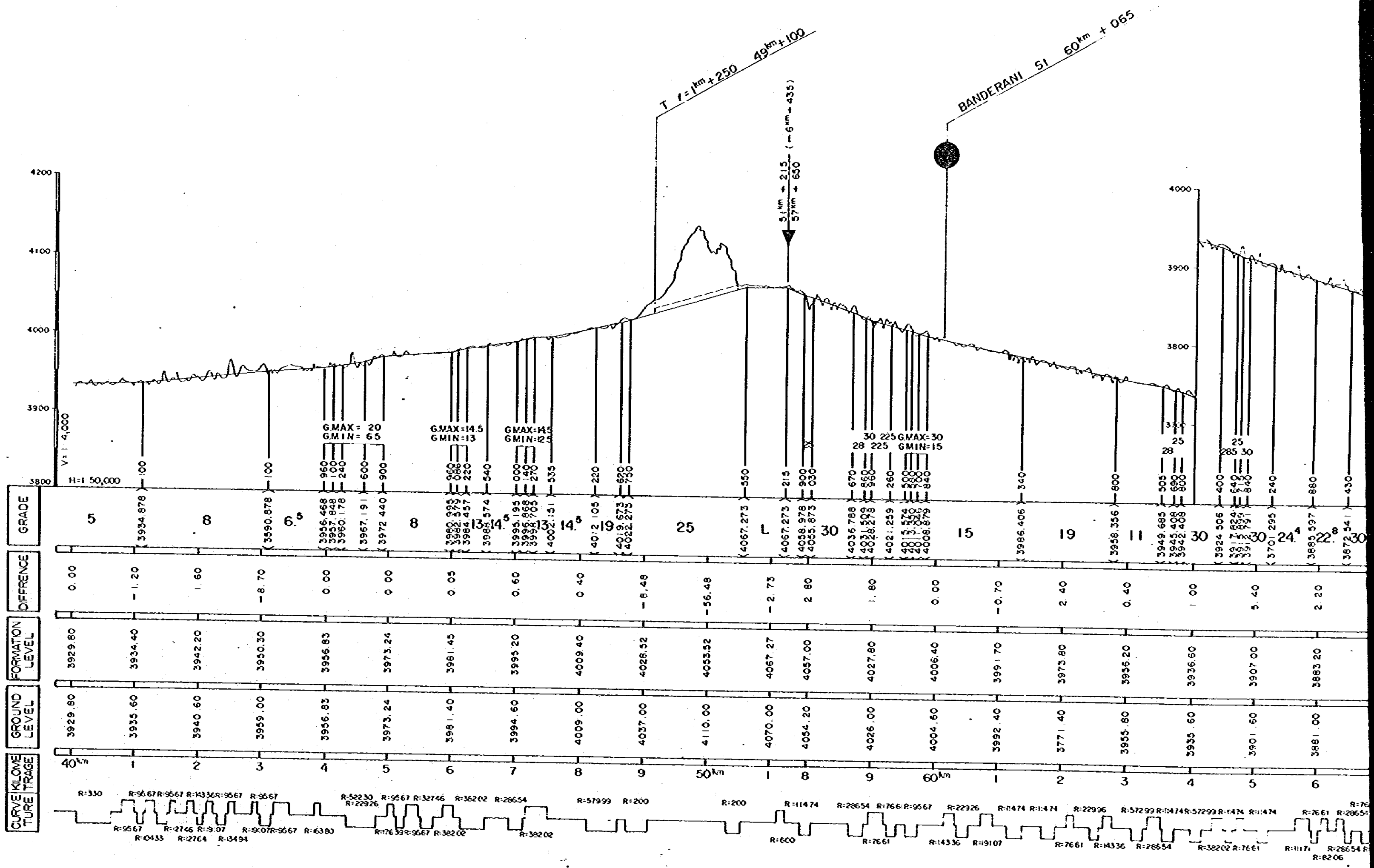
8km
51km + 215
57km + 650
(-6 km + 435)



Drawing - 1

Plan of Tunnel Construction (48^{km}+000^m ~ 57^{km}+650^m)

(scale 1/50,000)



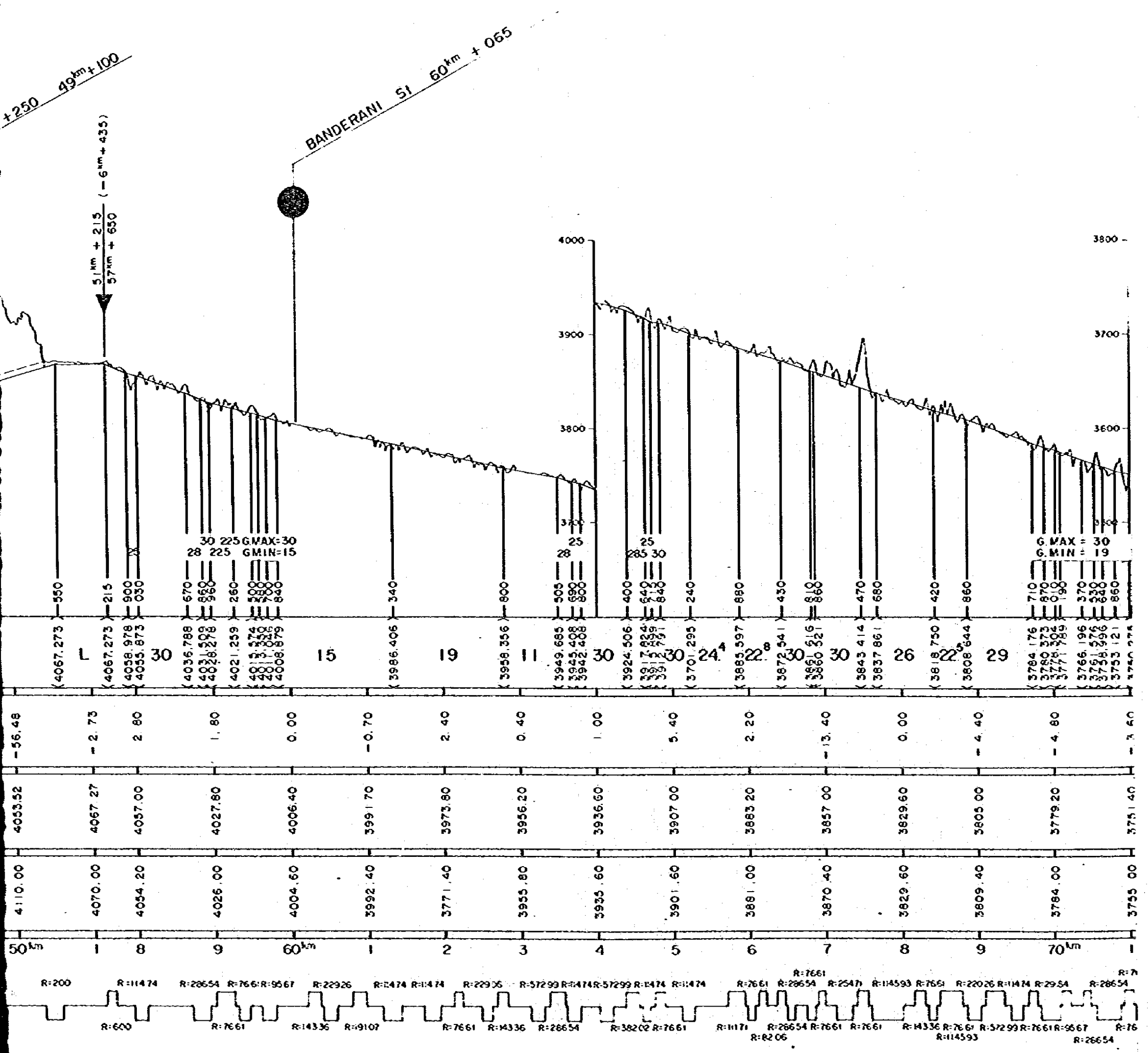
T = 1km + 250 49km + 100

BANDERANI 51 60km + 065

5.1km + 2.15 (-6km + 435)

V = 1:4,000
H = 1:50,000

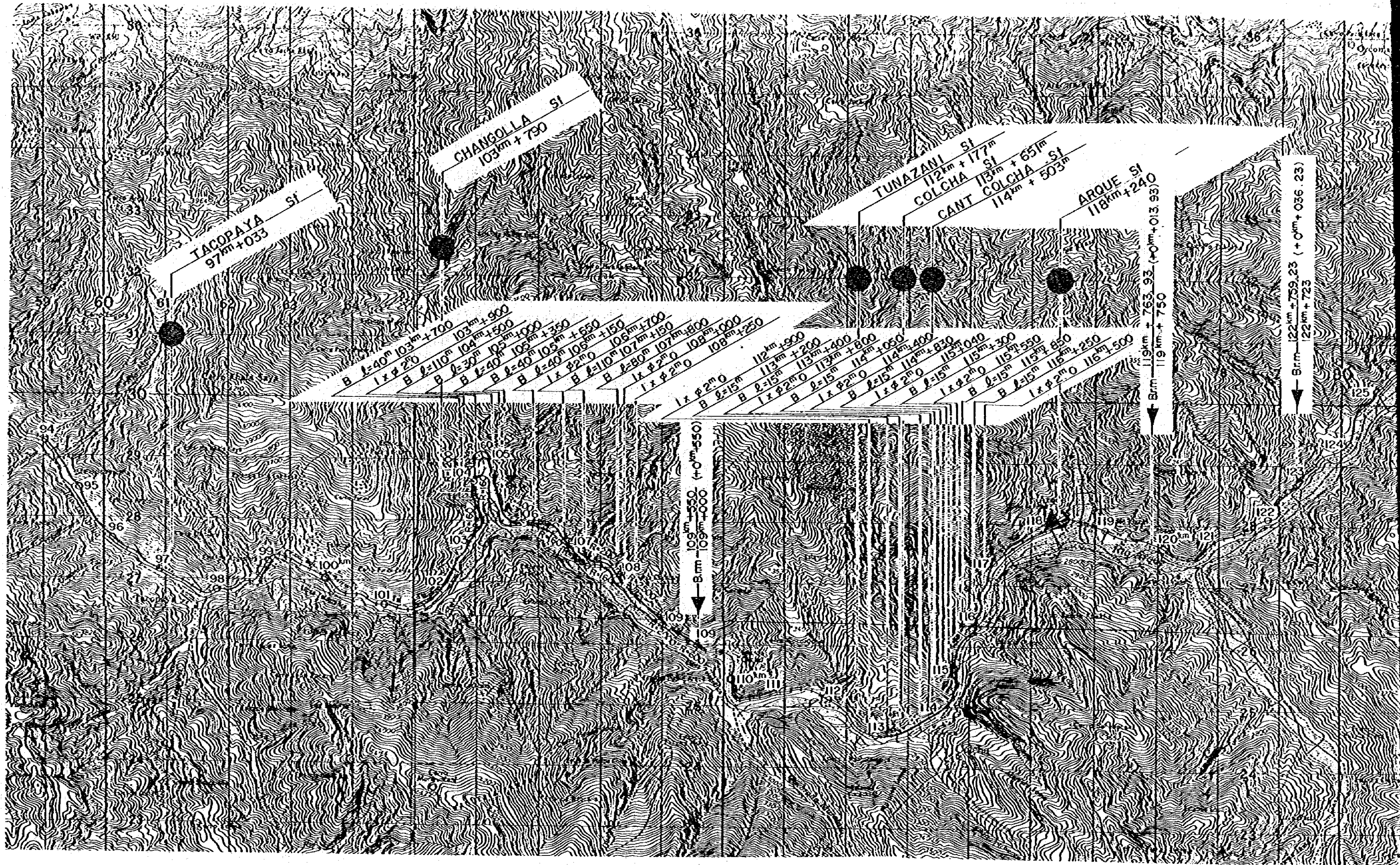
CURVE KILOME	GROUND LEVEL	FORMATION LEVEL	DIFFERENCE	GRADE
1	3929.80	3929.80	0.00	5
2	3935.60	3934.40	-1.20	8
3	3940.60	3942.20	1.60	6
4	3959.00	3950.30	-8.70	5
5	3956.83	3956.83	0.00	6
6	3973.24	3973.24	0.00	8
7	3981.40	3981.45	0.05	13
8	3994.60	3995.20	0.60	14
9	4009.00	4009.40	0.40	19
50km				
1	4037.00	4028.52	-8.48	25
2	4110.00	4053.52	-56.48	1
3	4070.00	4067.27	-2.73	1
4	4054.20	4057.00	2.80	30
5	4026.00	4027.80	1.80	30
6	4004.60	4006.40	0.00	15
7	3992.40	3991.70	-0.70	19
8	3971.40	3973.80	2.40	11
9	3955.80	3956.20	0.40	30
60km				
1	3935.60	3936.60	1.00	30
2	3901.60	3907.00	5.40	25
3	3881.00	3883.20	2.20	24
4				22
5				30
6				30

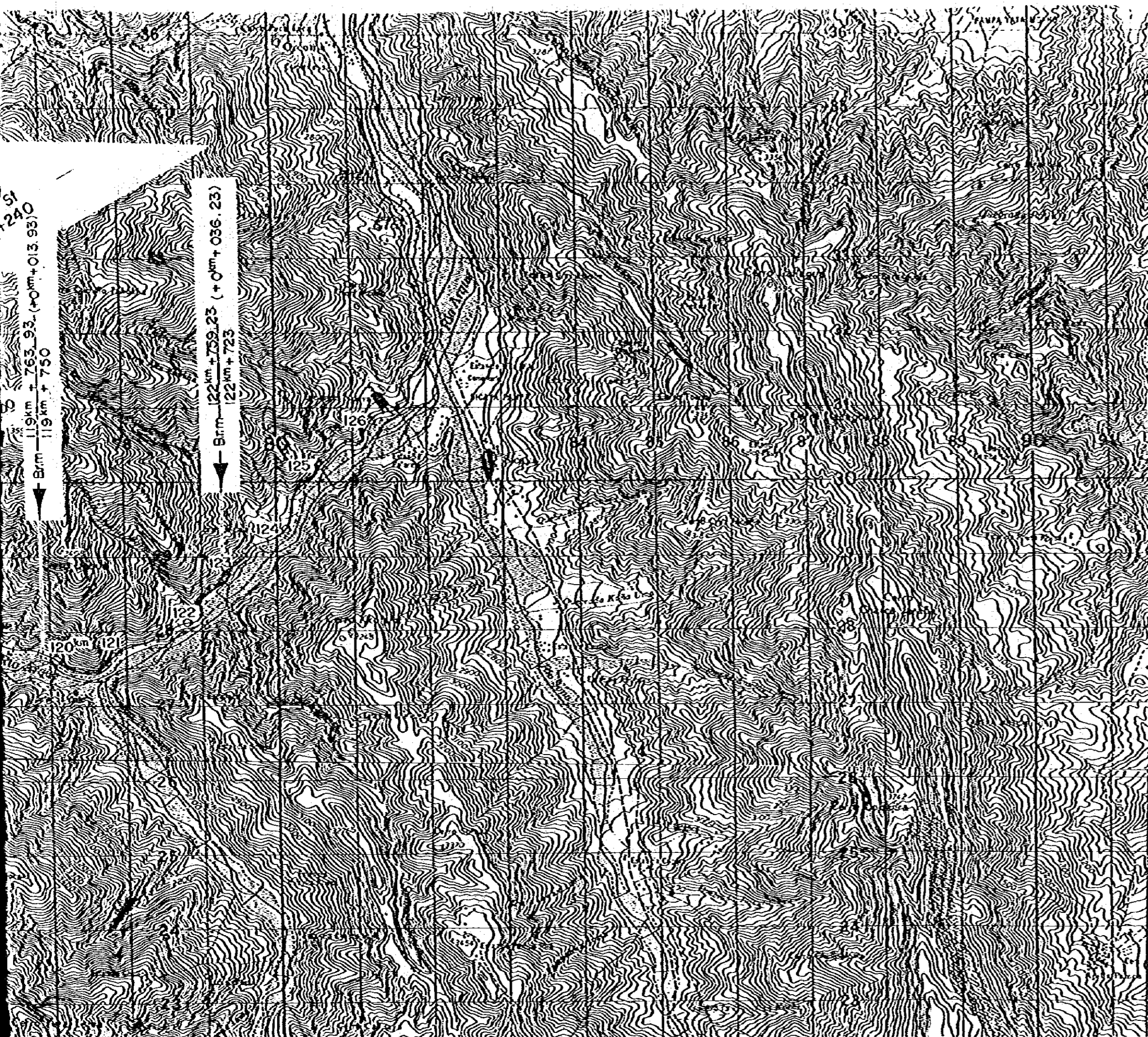


Drawing - 2

Longitudinal Profile of Tunnel Construction
 (48^{km}+000^m ~ 57^{km}+650^m)

(scale 1/50,000, 1/4,000)





Drawing - 3

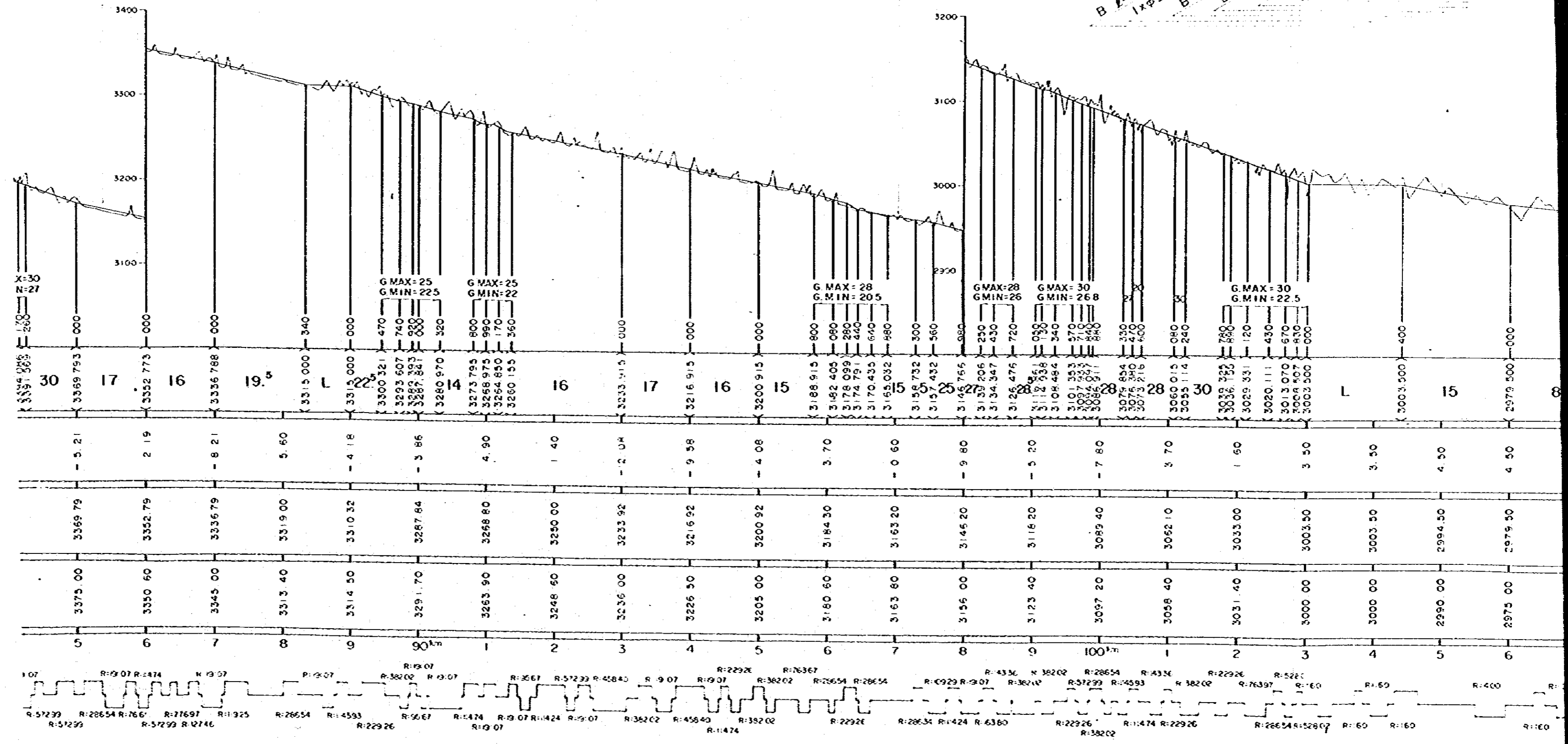
Plan of Existing Line Improvement (Alternative A,
 $103^{\text{km}} + 000^{\text{m}} \sim 109^{\text{km}} + 400^{\text{m}}$) and Lifting-up of track
level ($112^{\text{km}} + 500^{\text{m}} \sim 116^{\text{km}} + 500^{\text{m}}$)

(scale 1/50,000)

AGUAS CALIENTES St 85km + 388

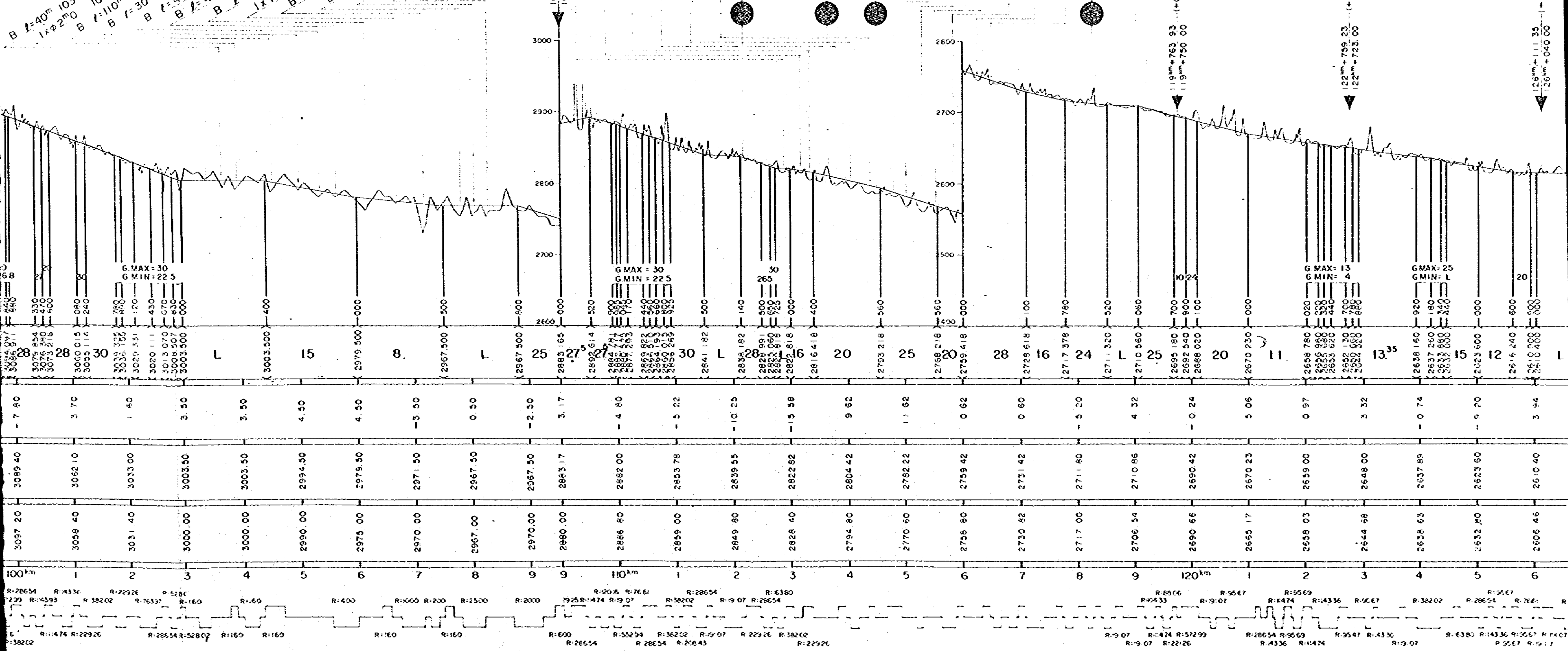
TACOPAYA St 97km + 033

B l=40m 103km + 700
 l x 22° 10'
 B l=110m 103km + 900
 B l=30m 105km + 000
 B l=40m 105km + 500
 B l=40m 105km + 350
 l x 40m 106km + 650
 B l=110m 106km + 150
 B l=110m 106km + 700
 l x 22°

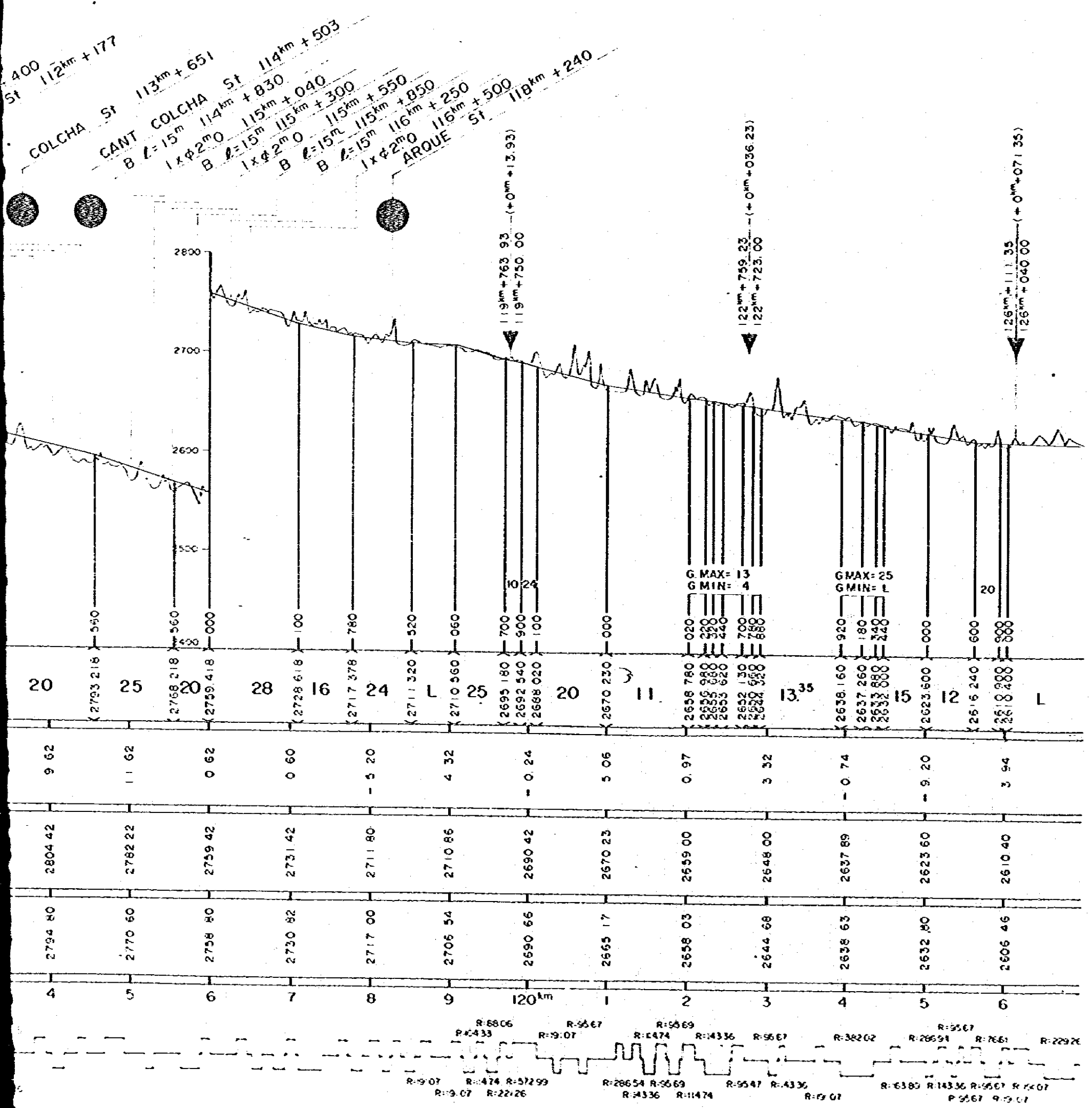


B $\ell=40^m$ 103^{km} + 700
 1x $\phi 2^m$ B
 $\ell=110^m$ 103^{km} + 900
 B
 $\ell=30^m$ 104^{km} + 500
 B
 $\ell=40^m$ 105^{km} + 350
 B
 $\ell=40^m$ 105^{km} + 550
 B
 $\ell=110^m$ 106^{km} + 150
 B
 $\ell=80^m$ 107^{km} + 700
 1x $\phi 2^m$ B
 107^{km} + 150
 1x $\phi 2^m$ B
 108^{km} + 800
 108^{km} + 000
 108^{km} + 250

109^{km} + 550
 109^{km} + 000
 1x $\phi 2^m$ B
 $\ell=15^m$ 112^{km} + 900
 B
 $\ell=15^m$ 113^{km} + 200
 1x $\phi 2^m$ B
 $\ell=15^m$ 113^{km} + 400
 B
 $\ell=15^m$ 114^{km} + 800
 1x $\phi 2^m$ B
 114^{km} + 050
 TUNAZANI St
 112^{km} + 400
 COLCHA St
 112^{km} + 177
 CANT COLCHA St
 113^{km} + 651
 B
 $\ell=15^m$ 114^{km} + 830
 1x $\phi 2^m$ B
 $\ell=15^m$ 115^{km} + 040
 B
 $\ell=15^m$ 115^{km} + 300
 1x $\phi 2^m$ B
 $\ell=15^m$ 115^{km} + 550
 B
 $\ell=15^m$ 116^{km} + 850
 1x $\phi 2^m$ B
 116^{km} + 250
 ARQUE St
 116^{km} + 500
 118^{km} + 240



126^{km} + 111.35
 126^{km} + 040.00



Drawing - 4

Longitudinal Profile of Existing Line Improvement
 (Alternative A, 103^{km} + 000^m 109^{km} + 400^m) and Lifting-up
 track level (112^{km} + 500^m ~ 116^{km} + 500^m)

(scale 1/50,000, 1/4,000)