

調查團概要報告書

1990年7月26日

July 26, 1990

MR. GODOFREDO N. ALCASID, JR.
Director
Bureau of Soils and Water Management
Department of Agriculture
Republic of the Philippines

The Model Infrastructure Improvement Works
for the Soil Research and Development Center Project

Dear Sir,

In line with the Basic Plan on Model Infrastructure Improvement Works of Soil Research and Development Center Project submitted on July 6, 1990, the Detailed Design Survey Team has conducted with your staff, the field survey and the data collection during the period of June 28 to July 27.

In this regard, the Team submits herewith a wrap-up paper of the results of the major activities and some of the findings as per attached. These results and findings, however, are presented as a tentative base and are finalized in the home office after the further detail analysis.

The plan will be also finalised on the basis of such analysis, detailed design and cost estimation in accordance with the schedule attached in the Basic Plan.

Lastly, we would like to express our heartfelt appreciation to you and your staff for the kind cooperation extended to the team during our field activities in the Philippines.

Sincerely yours,

T. SUZUKI
Detailed Design Survey Team
for the
Soil Research & Development Center Project

cc: Director
Agricultural Development Cooperation Department, JICA
Resident Representative of JICA in the Philippines

1. Major Activities and Findings

(1) Topo-Survey

- 1/200 scale topo-survey was completed at the location for the soil tanks which was proposed by the BSWM staffs on the basis of the present and future land use in the Central Soils and Water Resources Research Station, San Idelfonso, Bulacan (as per attached Fig. 1)
- since the temporary bench mark (EL. 100m) at the base of the old flag pole had been demolished, a new temporary bench mark (approximately EL. 18.36±0.10) above mean sea level) has been established. The old bench mark is thus estimated at about EL. 20.29 above mean sea level.

(2) Test Pitting

- As indicated in Fig. 1, six (6) pits have been excavated at the proposed soil tank site, while, one of each pit at some of the proposed site for the representative sample soil has also been excavated. These pits have been observed by SRDC experts and the chemical test of such sampled soil are being conducted by SRDC.
- The July 16 earthquake affected the accessibility to some of such sites for the sample soil, therefore, the said sites in the province of Pangasinan are recommended to make further review. In such cases, where are affected largely the selection of closer site to the Central Station are appreciated considering the limited amount of the budget for the works.
- The observation results of the test pitting at the Central Station show the top soil with the depth of 40 to 60 cm is generally pervious, while the impervious clay strata underlain beneath the top soil.

(3) Geophysical exploration

- Four points of the vertical electrical resistivity sounding (ves) have been conducted at and around the proposed well site for the depth of about 200 which are shown in Fig. 2.
- The results of the preliminary analysis of the sounding (Fig. 1 3 and 4) represent the existence of some aquifers from the ground surface to the depth of 120 m, and below 180 m, while the same also show the nonexistence of the aquifer between 120 and 180 m.

- The team will conduct further analysis in the home office focussing on the upper aquifer (20 to 120 m below the ground surface) as the main source of the irrigation water to the soil tank.

(4) Irrigation System Survey

- The existing well, which is the only water source of the Station during the dry season, is approximately 300 to 400 feet deep and produces 25 l /sec which is only sufficient to irrigate the limited upland crop field (drip system) and a half of the entire paddy field (12 ha). All of the said irrigated area are covered by the well maintained concrete and earth canal net works.

In accordance with the series of discussion with the SRDC experts and the collected data, the concept of the irrigation planning for the soil tank are tentatively proposed as follows:

- the evapotranspiration of both upland and paddy field does not exceed 20 mm/day;
- water for preparation is estimated at 200 mm in the soil tank for clay while 400 mm for volcanic ash.
- the percolation rate does not exceed 10 mm/day (this high percolation is deemed mainly due to well developed cracks in the clay strata);
- the normal irrigation hour is 8 hours a day and 5 days a week;
- the open gravity irrigation is adopted to the paddy cultivation while sprinkler to upland cultivation;

(5) Drainage System Survey

- 1/1000 scale topographic map prepared by the BSWM is useful to understand the present drainage condition of the entire station.
- The proposed drainage system for the soil tank can be planned on the basis of the newly conducted 1/200 scale topo-map as well as the field survey. Such drainage water is collected by the proposed catch drain and is emptied into the existing farm pond. The existing creek which flows from the east to the west during only rainy season and along the outside of the border fence of the station seems to have sufficient drainage capacity except maximum flood.

n
v

The inundation of the water in the creek has been seldom observed and never reached to the area for the proposed soil tank site.

2. Schedule of the Home Office Work

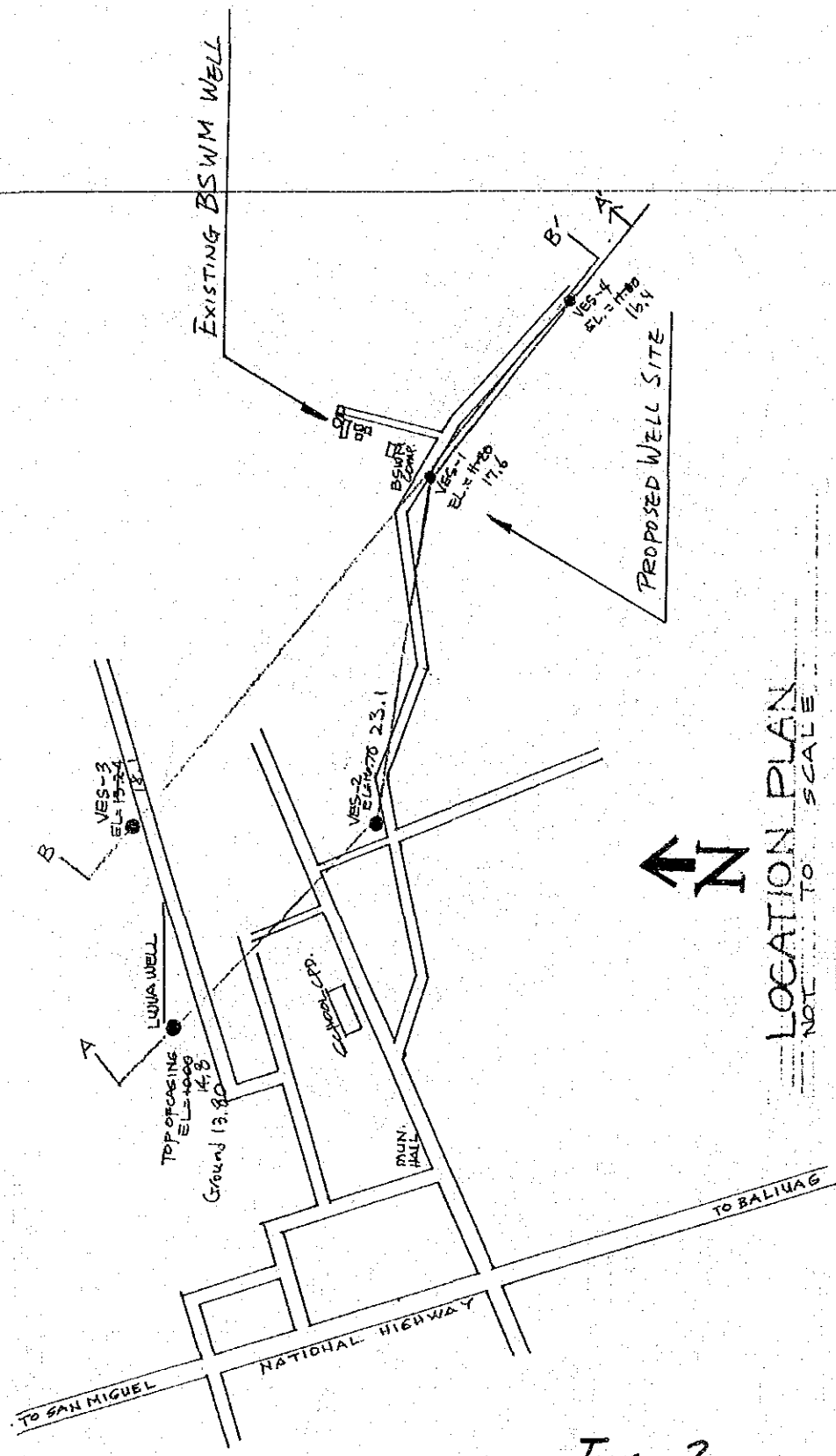
The team will conduct the analysis of the collected data and prepare of the detailed design and the draft report by August 23. The final report will be submitted to the JICA Head Office, Tokyo by the beginning of September.

3. Request to BSWM

Expedition of the following arrangement is expected to the BSWM and the prompt perusal is highly appreciated:

- Determination of the exact plot of the collected sample soil, where dump trucks are easily accessible, and pointing the location on the attached 1/50,000 map;
- Acquisition of the soil in the said plot with the size of 200 sq m. (with some allowance to disturbance) and about 70 cm deep (except top soil) by December;
- Necessary tests for the said sampled soil;
- Completion of the research activities conducted at the proposed tank site by December;
- Provision of the additional pole mounted electric transformer with the capacity not less than 25 KVA at the nearest location to the proposed pump house by February, 1991.
- Maintenance of the schedule in the Basic Plan, and
- Collection of not less than 50 cu. m husk for backfilling material for underground drainage.

GEORESTIVITY SURVEY POINTS
 BUREAU OF SOIL AND WATER MANAGEMENT
 SAN ILDEFONSO, BULACAN



LOCATION PLAN
 NOT TO SCALE

FIG. 2

$t_0 = 580 \mu s/cm$

7423
993.5

LOCATION: BSMW - PROPOSED DEEP WELLS LOCATION
 SAMPLING PT.: YES #1 Date Conducted: July 14, 1990

a	a/2	3a/2	2Ta	$\frac{mV}{V}$	I _{ma}	R(Ω)	P(h-m)
1	0.5	1.5	6.28	97.3	SD	1.945	12.2
2	1	3	12.60	19.3	SD	0.387	4.9
3	1.5	4.5	18.80	18.8	100	0.188	3.5
4	2	6	25.10	20.8	100	0.208	5.2
5	2.5	7.5	31.40	12.3	100	0.123	3.9
6	3	9	37.7	10.8	100	0.108	4.1
8	4	12	50.2	15.0	199	0.078	3.9
10	5	15	62.8	12.9	199	0.064	4.0
12	6	18	75.4	11.3	199	0.056	4.2
14	7	21	87.9	10.7	199	0.053	4.7
16	8	24	100	10.7	350	0.0477	4.8
18	9	27	113	15.0	350	0.0442	5.0
20	10	30	126	13.8	350	0.0396	4.9896
24	12	36	151	12.1	350	0.0357	5.24
28	14	42	176	10.5	288 350	0.0301	5.3
32	16	48	201	8.97	350	0.0256	5.15
36	18	54	226	7.91	350	0.0225	5.09
40	20	60	251	6.95	350	0.0198	5.0
44	22	66	276	6.57	350	0.0187	5.2
48	24	72	301	6.20	349	0.0177	5.33
52	26	78	327	5.71	350	0.0163	5.33
56	28	84	352	5.04	350	0.0144	5.07
60	30	90	377	4.93	349	0.0140	5.28
64	32	96	402	4.50	349	0.0129	5.19
68	34	102	427	4.39	349	0.0125	5.34
72	36	108	452	4.16	350	0.0199	9.00 ✓
76	38	114	477	3.84	349	0.0109	5.2
80	40	120	502	5.044.20	349 476	0.0105	5.3
84	42	126	528	5.10	500	0.0102	5.30
88	44	132	553	4.70	500	0.0095	5.3
92	46	138	578	4.59	500	0.0091	5.3
96	48	144	603	4.42	500	0.0088	5.31
100	50	150	628	4.30	500	0.0086	5.30
110	55	165	691	3.79	500	0.0075	5.18
120	60	180	754	3.67	500	0.0069	5.20
130	65	195	816	3.20	500	0.0063	5.14
140	70	210	879	3.01	500	0.0060	5.27
150	75	225	942	2.77	500	0.0055	5.2
160	80	240	1005	2.58	500	0.0051	5.13
170	85	255	1068	2.52	500	0.0050	4.16
180	90	270	1130	2.19	500	0.0043	4.90
190	95	285	1193	2.08	500	0.0041	4.90
200	100	300	1256	1.80	500	0.0035	4.40

6047

LOCATION : Poblacion, San Ildefonso

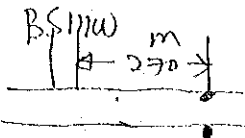
SAMPLING FT. : RES 2

Date Conducted: July 14 190

a	a/2	3a/2	2πa	v	I	R	ρ
1	0.5	1.5	6.28	187	350	.5362	3.34
2	1	3	12.60	121	349	.2477	4.4
3	1.5	4.5	18.80	87	349	.2487	4.7
4	2	6	25.10	67.7	349	.1934	4.9
5	2.5	7.5	31.40	55.1	349	.1575	4.95
6	3	9	37.7	46.1	349	.1318	4.97
8	4	12	50.2	35.4	349	.1013	5.1
10	5	15	62.8	28.2	349	.0807	5.07
12	6	18	75.4	24.0	349	-.0682	5.17
14	7	21	87.9	21.2	349	-.0606	5.33
16	8	24	100	18.6	349	-.0531	5.31
18	9	27	113	16.4	349	-.0469	5.30
20	10	30	126	15.1	349	-.0432	5.44
24	12	36	151	13.3	349	-.032	5.74
28	14	42	176	12.1	349	-.0348	6.13
32	16	48	201	10.5	349	-.0302	6.07
36	18	54	226	7.39	349	.0211	4.8
40	20	60	251	8.11	349	-.0232	5.8
44	22	66	276	7.15	349	.0264	5.63
48	24	72	301	7.23	349	-.0206	6.20
52	26	78	327	6.96	350	-.0198	6.47
56	28	84	352	6.04	349	.0192	6.05
60	30	90	377	5.70	349	-.0162	6.11
64	32	96	402	5.33	349	-.0152	6.11
68	34	102	427	3.96	252	-.0157	6.70
72	36	108	452	6.66	500	-.0133	6.01
76	38	114	477	3.64	293	.0124	5.91
80	40	120	502	5.75	500	-.0114	5.92
84	42	126	528	5.73	500	.0114	7.60
88	44	132	553	5.35	500	-.0106	5.82
92	46	138	578	5.33	500	.011	6.36
96	48	144	603	5.26	500	.0105	6.33
100	50	150	628	4.96	500	-.0099	6.22
110	55	165	691	4.43	500		6.12
120	60	180	754	4.12	500	.0082	6.18
130	65	195	816	3.73	500	.0074	6.06
140	70	210	879	3.37	500	.0067	5.89
150	75	225	942	2.94	482	.0061	6.75
160	80	240	1005	2.76	500	-.0055	5.53
170	85	255	1068	2.56	500	-.0050	5.34
180	90	270	1130	2.33	500	.0046	5.2
190	95	285	1193	2.12	500	.0042	5.0
200	100	300	1256	1.72	500	.0034	4.3

LOCATION : Jablacion - LWUA Water District
 SAMPLING PT. : 3 Date Conducted: July 16/90

a	a/2	3a/2	2Ta	v	I	R	P
1	0.5	1.5	6.28	199	262	0.760	4.8
2	1	3	12.60	126	350	.355	4.5
3	1.5	4.5	18.80	75.2	250	.249	4.04
4	2	6	25.10	50.6	350	.1521	3.9
5	2.5	7.5	31.40	43.3	350	.1237	3.88
6	3	9	37.7	36.0	350	.1061	3.9
8	4	12	50.2	30.4	350	.0829	4.4
10	5	15	62.8	23.7	318	.0745	4.7
12	6	18	75.4	22.0	350	.0642	4.84
14	7	21	87.9	20.6	350	.0589	5.2
16	8	24	100	19.1	350	.0546	5.5
18	9	27	113	17.8	349	.0509	5.8
20	10	30	126	16.6	349	.0470	5.9
24	12	36	151	14.4	349	.0413	6.24
28	14	42	176	12.6	349	.0361	6.4
32	16	48	201	11.5	349	.0328	6.6
36	18	54	226	9.98	338	.0295	6.7
40	20	60	251	9.42	349	.0270	6.8
44	22	66	276	8.70	349	.0248	6.88
48	24	72	301	7.90	349	.0225	6.8
52	26	78	327	7.29	349	.0208	6.8
56	28	84	352	6.63	349	.0189	6.7
60	30	90	377	6.18	349	.0176	6.64
64	32	96	402	5.60	349	.0160	6.43
68	34	102	427	4.97	301	.0148	6.32
72	36	108	452	4.33	313	.0138	6.24
76	38	114	477	4.49	349	.0128	6.10
80	40	120	502	4.29	349	.0122	6.12
84	42	126	528	3.70	325	.0113	6.0
88	44	132	553	4.11	349	.0117	6.5
92	46	138	578	3.62	349	.0103	6.0
96	48	144	603	3.41	349	.0097	5.85
100	50	150	628	3.24	349	.0092	5.80
110	55	165	691	1.34	161	.0080	5.5
120	60	180	754	1.58	219	.007	5.3
130	65	195	816	1.5	229	.006	4.9
140	70	210	879	1.35	226	.005	4.4
150	75	225	942	1.22	226	.005	4.7
160	80	240	1005	0.58	500	.005	5.1
170	85	255	1068	2.80	500	.0050	5.34
180	90	270	1130	2.41	50	.0048	5.4
190	95	285	1193				
200	100	300	1256				



LOCATION :

SAMPLING FT. : VES 4

Date Conducted: July 10 '90

a	a/2	3a/2	2πa	v	I	R	ρ
1	0.5	1.5	6.28	479	350	1.3689	8.0
2	1	3	12.60	139	350	.3981	5.0
3	1.5	4.5	18.80	101	350	.2895	5.00
4	2	6	25.10	82.1	349	.2347	5.9
5	2.5	7.5	31.40	71	349	.2028	6.4
6	3	9	37.7	62.9	349	.1799	6.8
8	4	12	50.2	49.9	349	.1428	7.2
10	5	15	62.8	41.2	349	.1179	7.4
12	6	18	75.4	34.4	350	.0983	7.4
14	7	21	87.9	28.9	349	.0827	7.3
16	8	24	100	24.7	349	.0706	7.1
18	9	27	113	21.9	349	.0626	7.1
20	10	30	126	19.3	349	.0553	6.92
24	12	36	151	15.5	349	.0465	6.7
28	14	42	176	12.9	349	.0370	6.5
32	16	48	201	11.0	349	.0317	6.4
36	18	54	226	9.83	349	.0280	6.33
40	20	60	251	8.67	349	.0248	6.2
44	22	66	276	8.50	349	.0242	6.7
48	24	72	301	7.16	349	.0204	6.1
52	26	78	327	6.52	349	.0186	6.08
56	28	84	352	6.04	349	.0172	6.05
60	30	90	377	5.45	349	.0155	5.81
64	32	96	402	4.99	349	.0142	5.7
68	34	102	427	4.67	349	.0133	5.7
72	36	108	452	4.33	349	.0124	5.6
76	38	114	477	4.09	349	.0128	6.1
80	40	120	502	3.87	349	.0110	5.5
84	42	126	528	3.63	349	.0103	5.4
88	44	132	553	3.41	349	.0097	5.4
92	46	138	578	3.16	349	.0090	5.2
96	48	144	603	3.04	349	.0086	5.2
100	50	150	628	2.88	349	.0082	5.15
110	55	165	691	2.84	349	.0081	5.60
120	60	180	754	1.72	255	.0067	5.1
130	65	195	816	1.62	349	.0052	4.24
140	70	210	879	1.197	329	.0059	5.2
150	75	225	942	1.58	349	.0045	4.2
160	80	240	1005	1.67	349	.0047	4.72
170	85	255	1068	1.59	349		1.97
180	90	270	1130	1.29	349		4.27
190	95	285	1193				
200	100	300	1256				

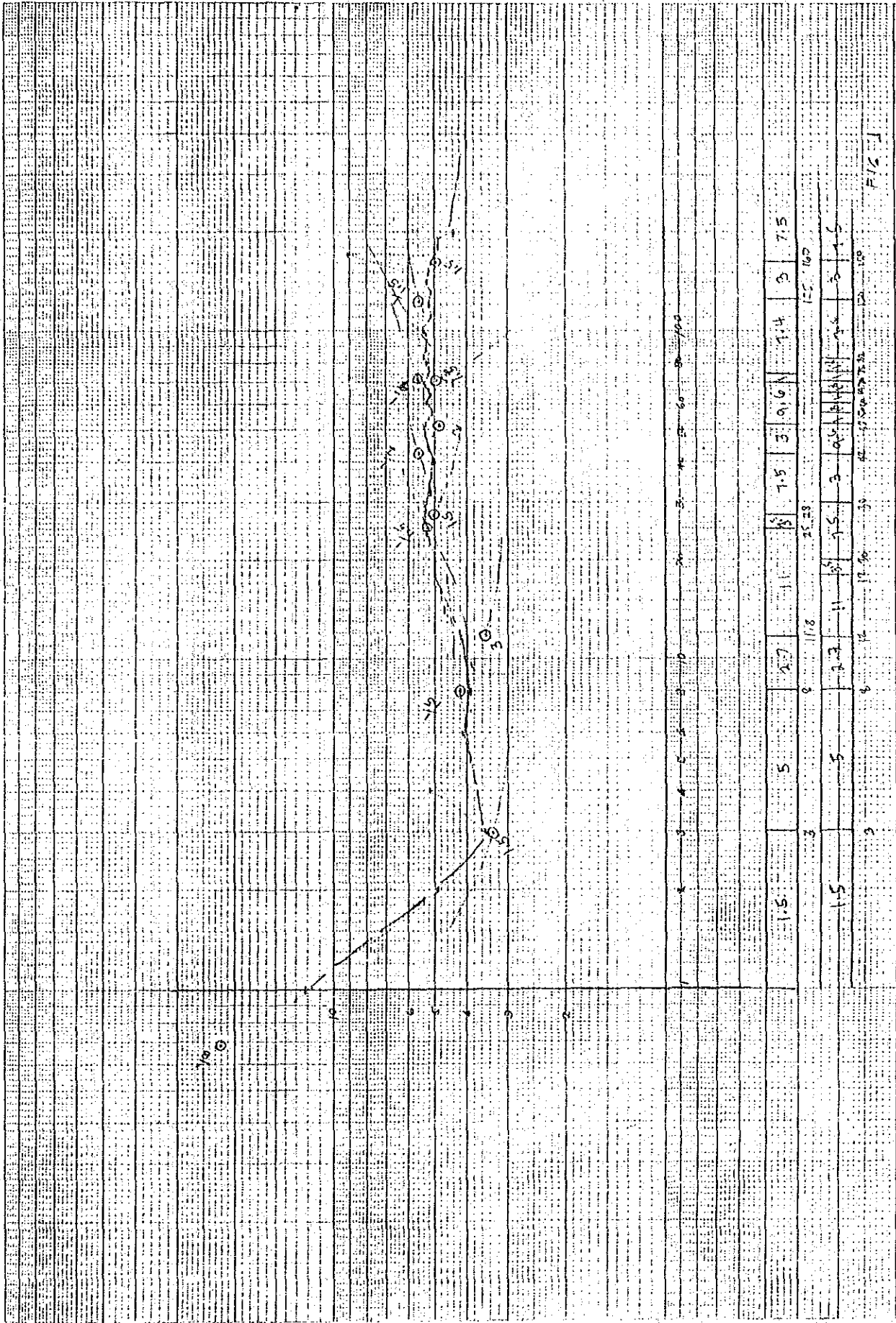
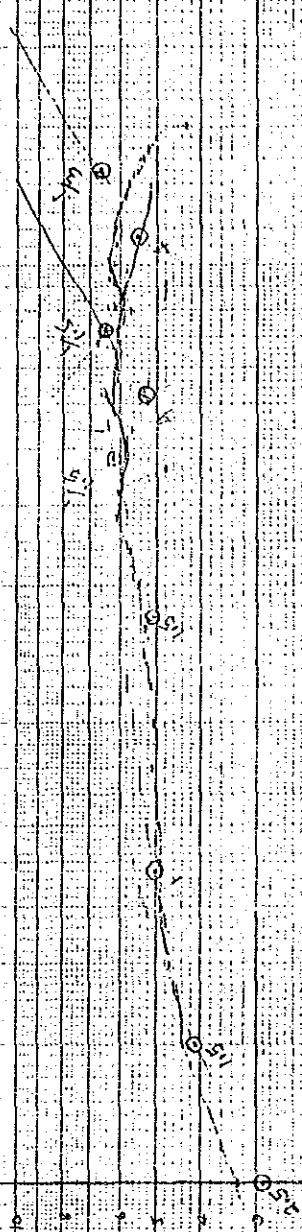
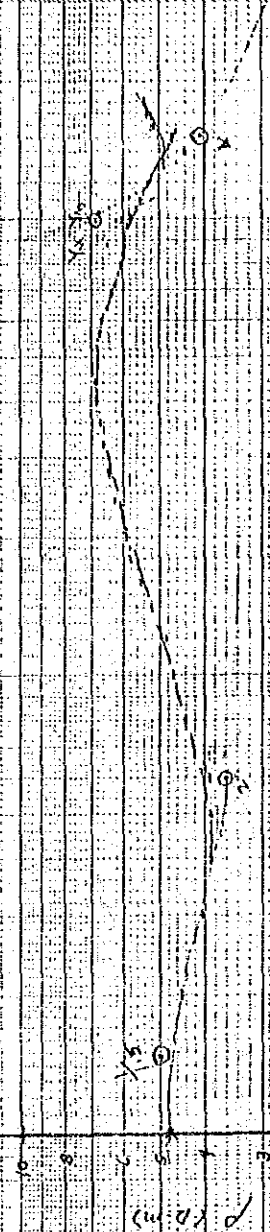


FIG. 1
 VES. # 1
 BSITAN PAJUBEN WELLE AT
 SAN ILDEFONSO BULACAN



Station	1	2	3	4	5	6	7	8	9	10	Curve Marking	Dist. Data
7.3	6	6	5	5	7.5	4	4	4.5	2.2	2.2	←	←
7.3	4.8	17	2.9	40	56	7.50	100	2.2			←	←

FIG 2
 VES # 2
 POB. SAN IDEFONSO

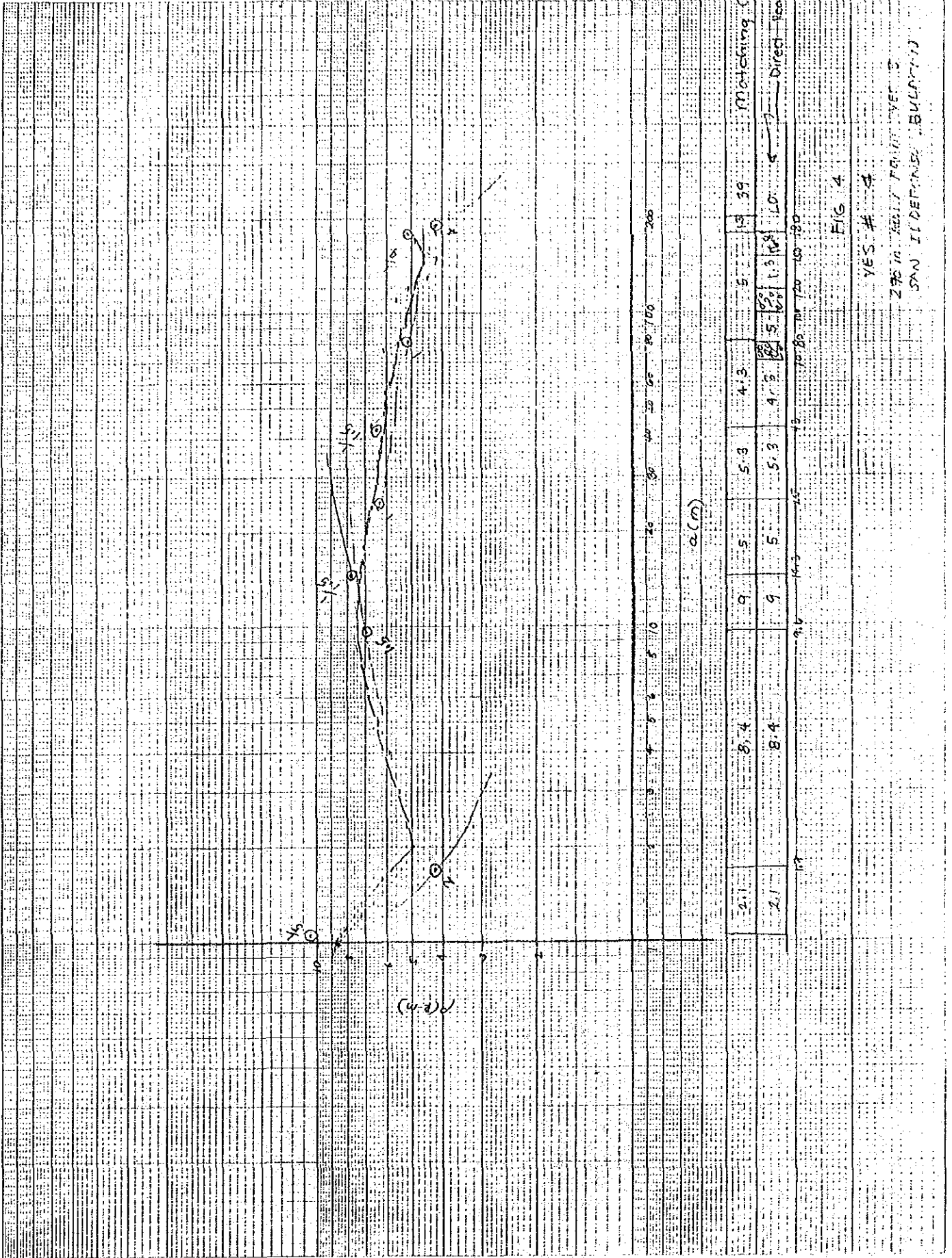


1	2	3	4	5	6	7	10	120
5	3.3	7.2	2	2.16	16.4	190.30	150	
1.5								

FIG. 3

VES - 4.3

77 M AWAY FROM LAHAR DEEPT
SAN JIDEFONSO, BULACAN



2.1	8.4	9	5	5.3	4.3	5	1.3	39	Matching Curve
2.1	8.4	9	5	5.3	4.3	5	1.3	40	Direct Reading

FIG. 4
 YES # 4
 ZRE in ASST. PART YES 3
 SAN I DEFINIBI BULGARI

RESISTIVITY PROFILE ALONG SECTION A-A

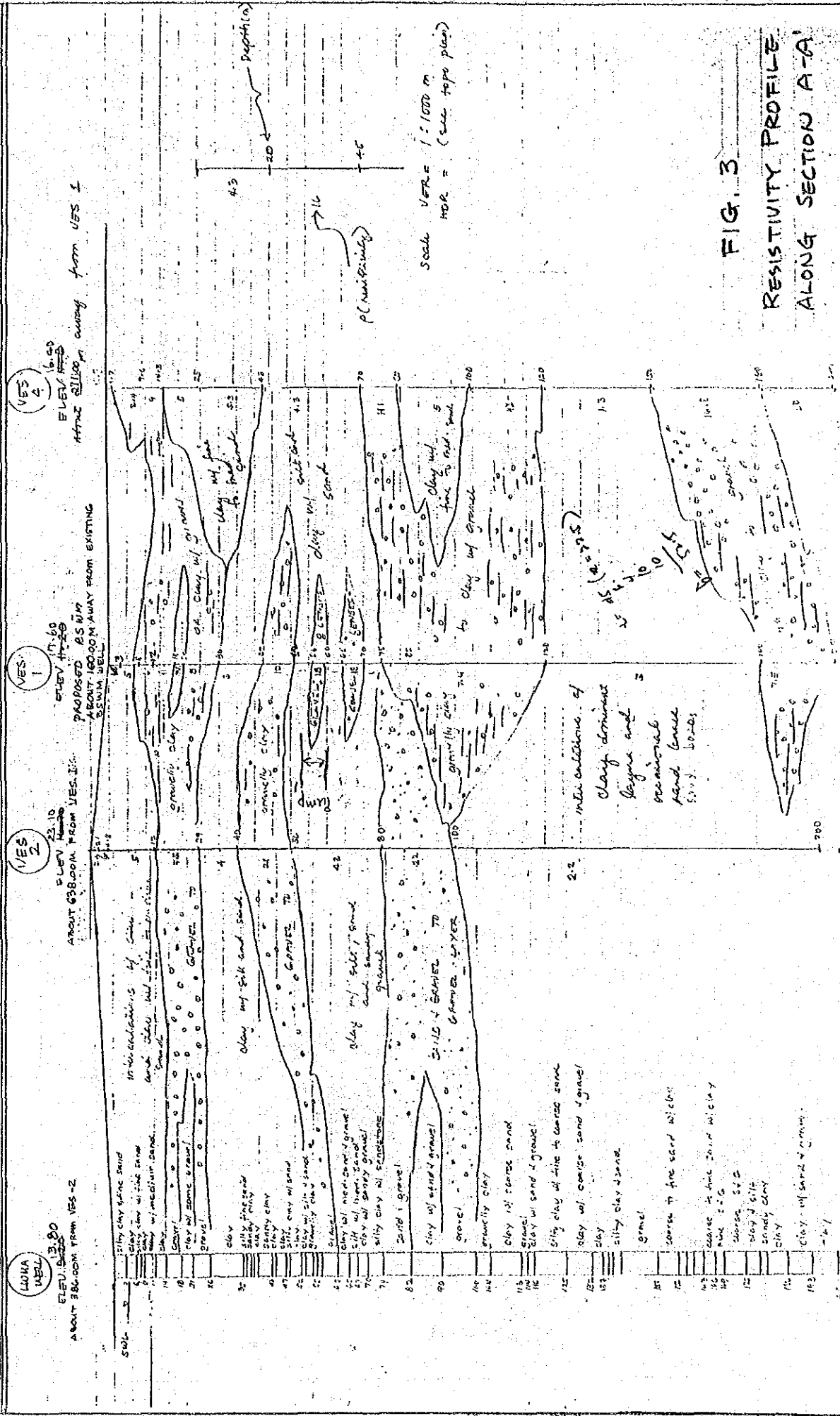


FIG. 3
RESISTIVITY PROFILE
ALONG SECTION A-A

RESISTIVITY PROFILE ALONG SECTION B-B'

(VES 5) EL. 2418.1
 19000 ft away from existing
 normal well
 (VES 1) EL. 17.6
 PROPOSED 186 W/M WELL
 ABOUT 482.00 M FROM VES-3
 (VES 4) EL. 16.4
 about 21100 m away from VES 1

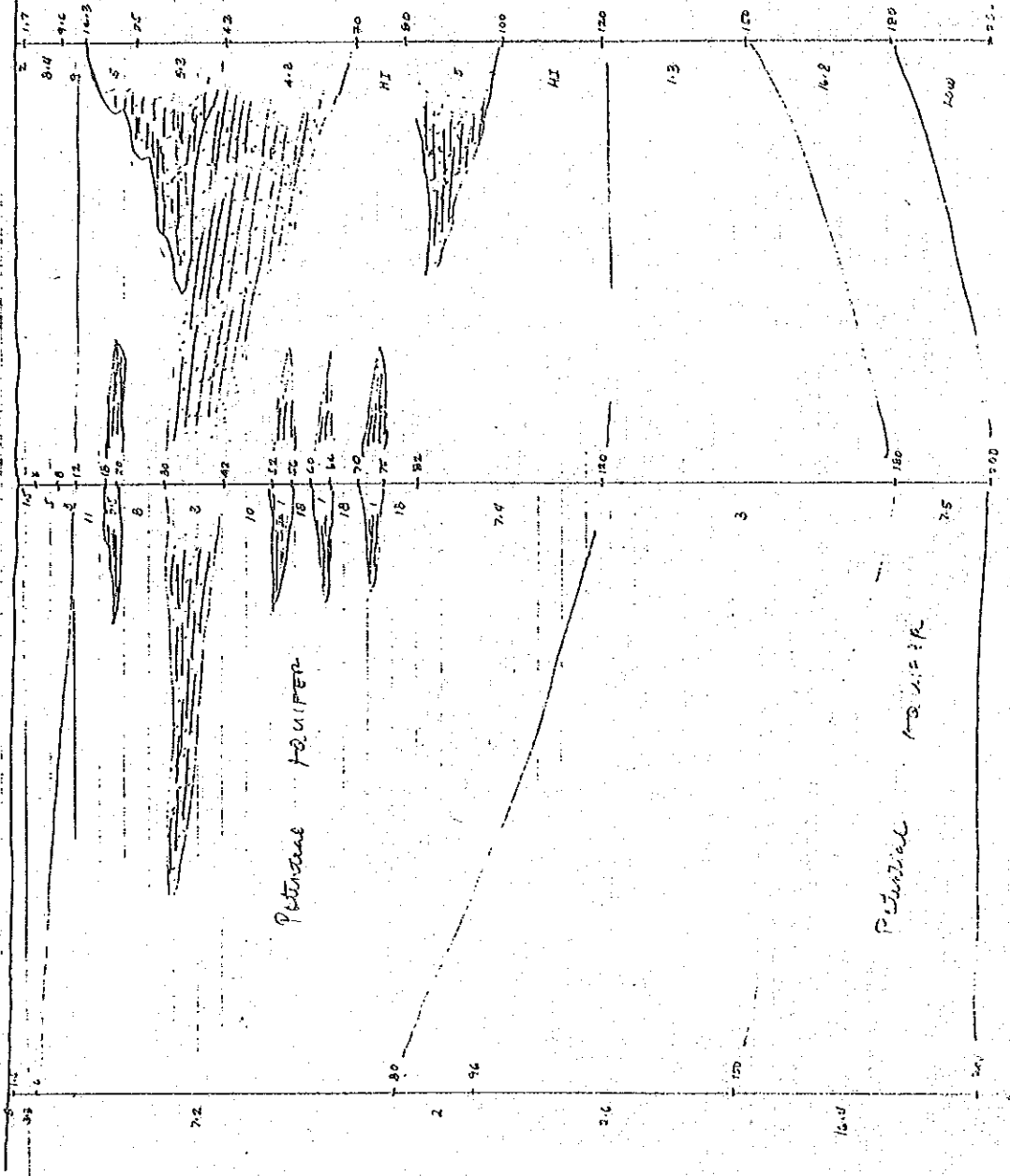
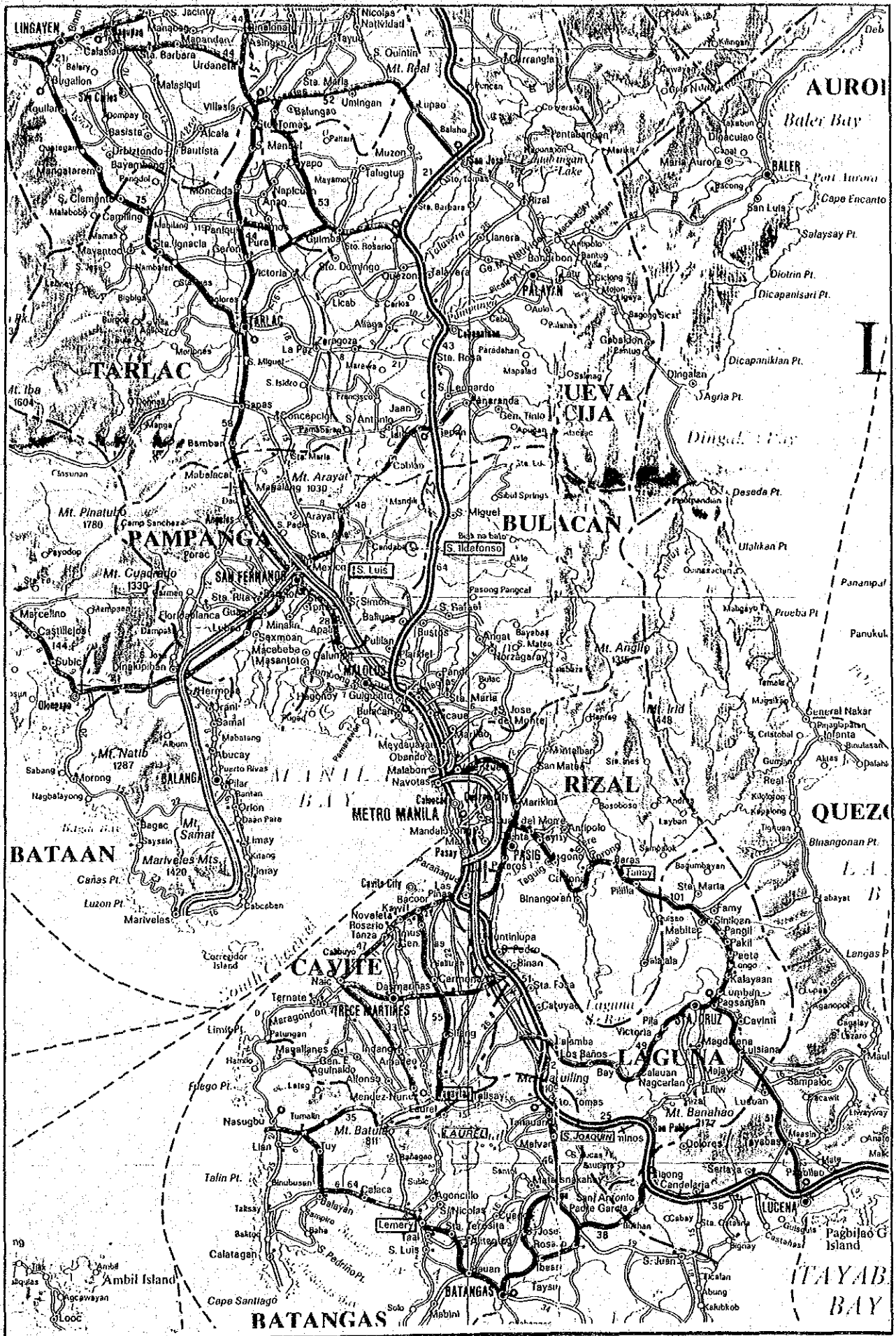
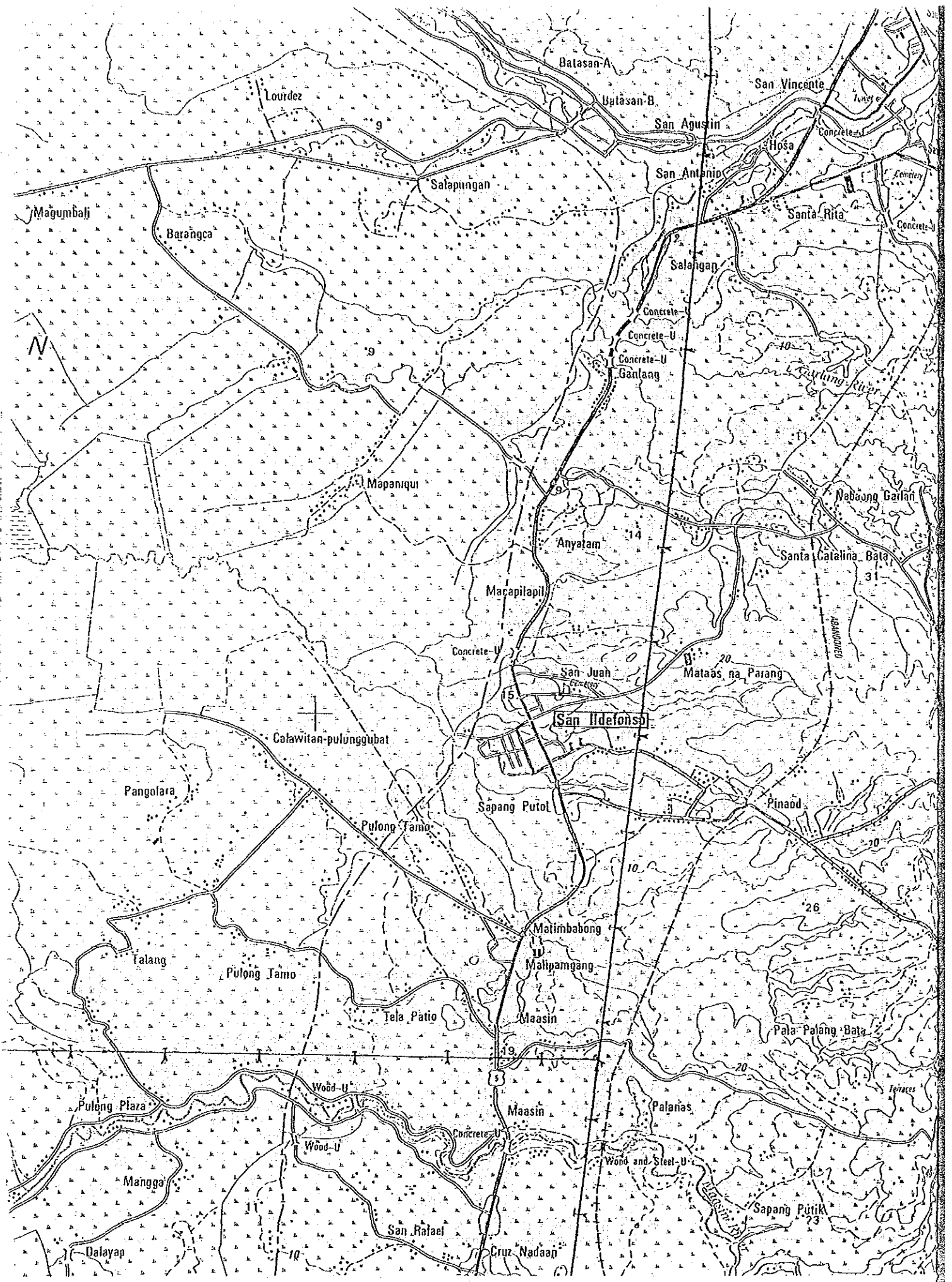
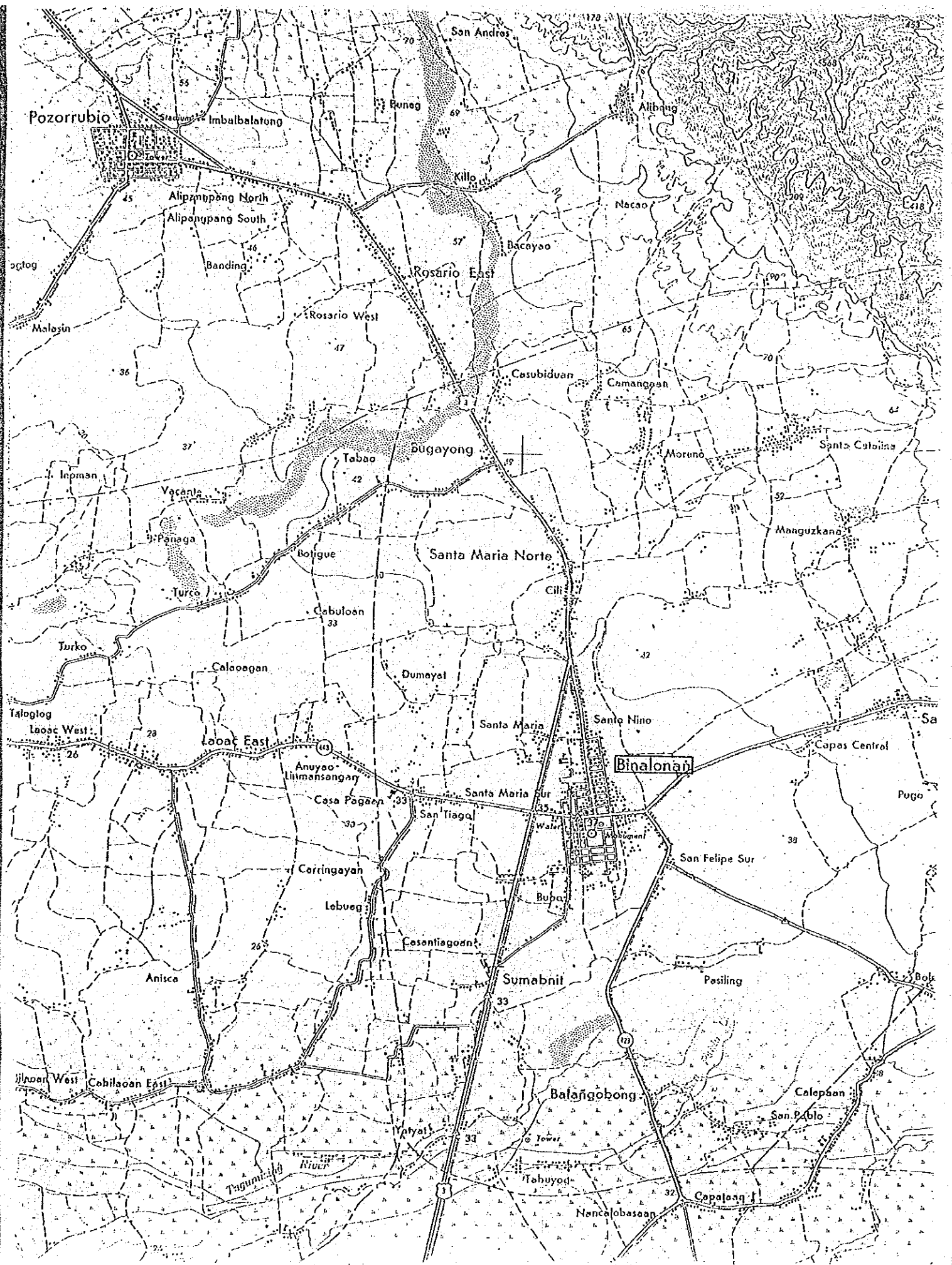


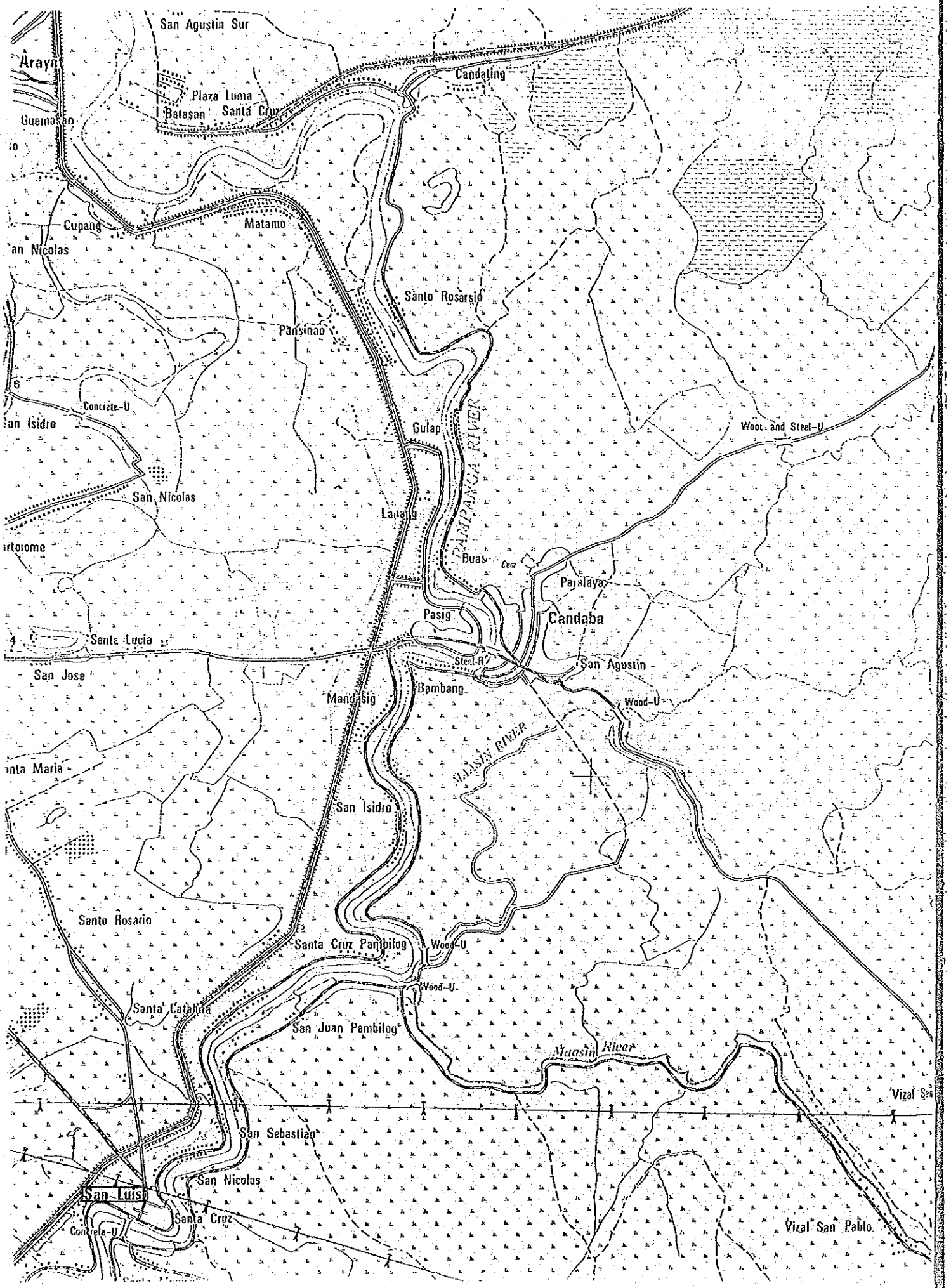
FIG. 4

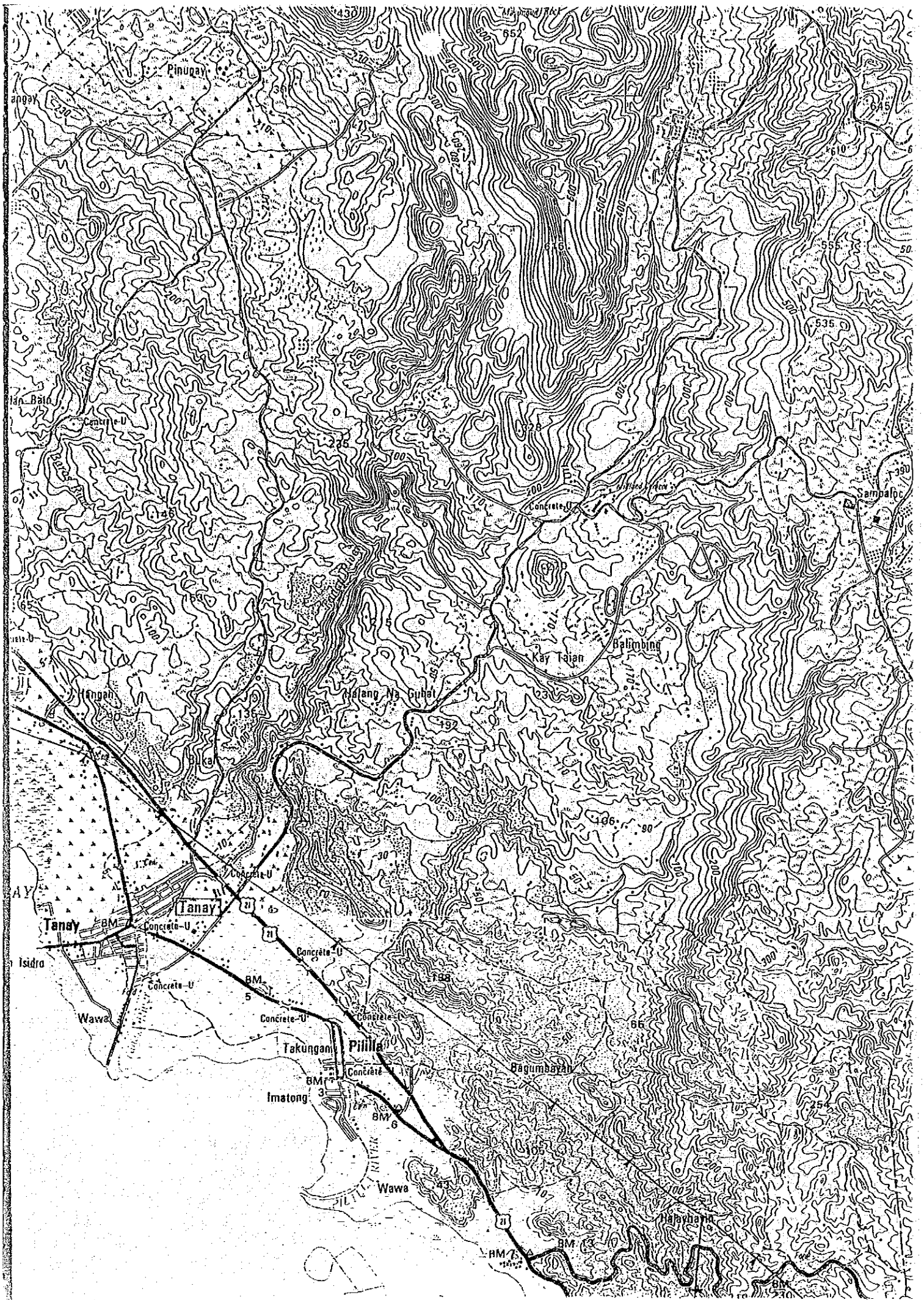
RESISTIVITY PROFILE
ALONG SECTION B-B'

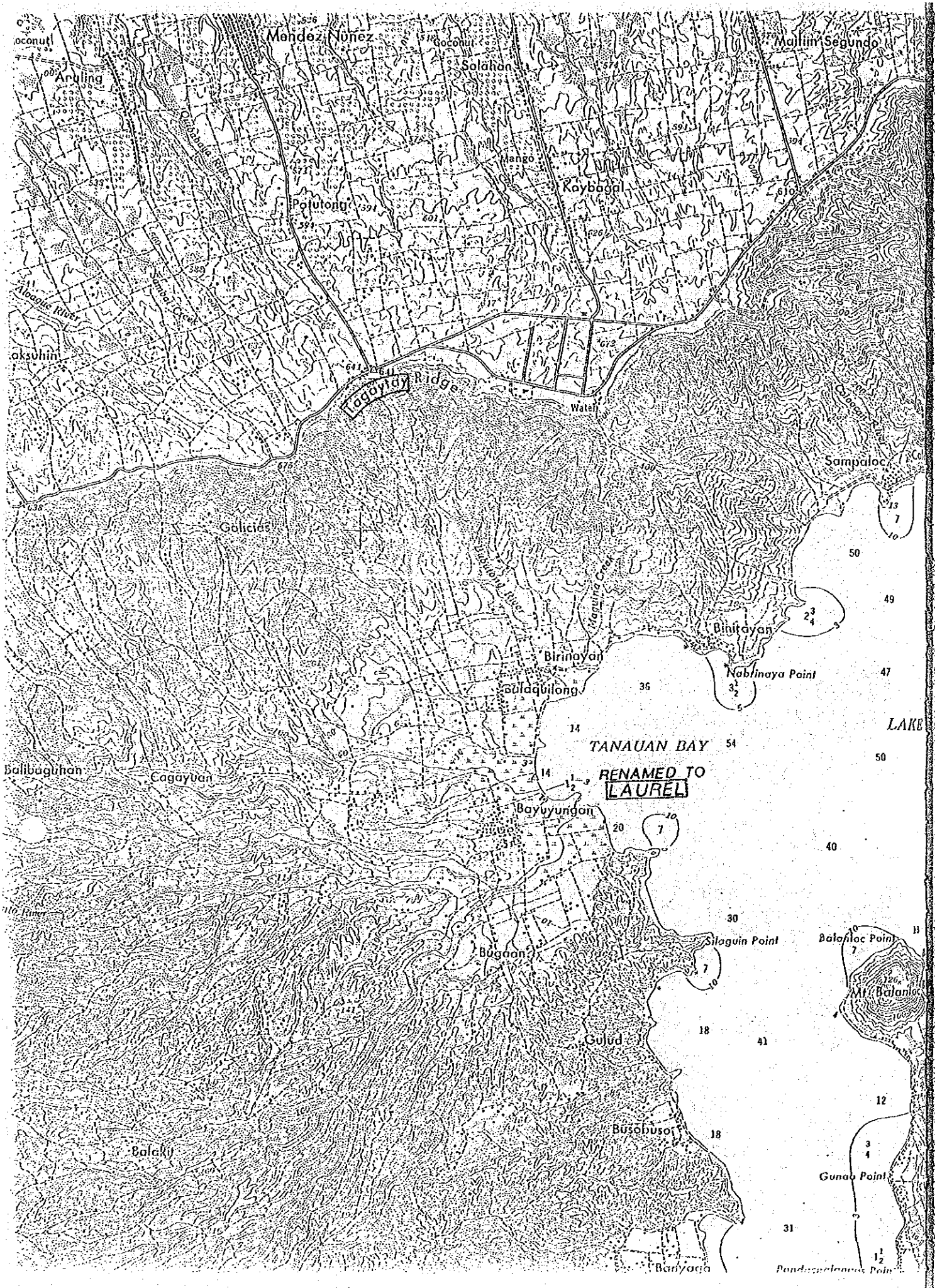












Field Profile Description

by: Dr. Tokodume

Location: Tagaytay City City, Cavite Province, Phil. near Tagaytay City Hospital, Approximately 642 meters above sea level.

Depth:

- 0 - 26 cm: 7.5 YR 2/1 Black loam with common coarse sand and gravel, weakly sub-angular blocky and friable, many fine roots, Presence of weathered and unweathered scoria and tuff.
- 26 - 50 cm: 7.5 YR 2/1 Black clay loam, very clear boundary with medium coarse sand and gravel, with weathered and unweathered scoria, very weakly sub-angular blocky structure and friable, with many fine roots.
- 50 - 60 cm: 7.5 YR 2/2 Brownish black, silty clay loam with few sand and gravel, very weakly sub-angular blocky structure and friable with many fine roots.
- 60 - 81 cm: 7.5 1.7/1 Black clay loam, with very few coarse sand and gravel with few weathered basalt, basically consisting the original soil which was buried, very weakly sub-angular blocky structure, friable with few very fine roots.

81 - 98 cms: 7.5 YR 2/1 Black clay loam, very few weathered coarse sand and gravel, medium sub-angular structure, not so friable, with few fine roots.

>298cms: 7.5 YR 3/2 Brownish black clay loam to clay, very few weathered coarse sand and gravel, weakly developed sub-angular structure, sticky very few fine roots.

Agoncillo, Batangas

7-13-90

- 0 - 25 cms: 10 YR 3/1 Brownish black, very hard, but brittle, very compact
- 25 - 34 cms: 10 YR 2/2 Brownish black, weathered soil, loam weakly develop sub-angular structure few coarse gravelly weathered scorsia, boundary clear smooth, very few fine roots.
- 34 - 57 cms: 10 YR 3/1 Brownish black, very hard, brittle very compact, with coarse and gravelly weathered scorsia, very few fine roots along the cracks.
- 57 - 67 cms: 10 YR 2/2 Brownish black scosia, with gravelly coarse sand, very few fine roots. Smooth and clear boundary.
- 67 - 90 cms: 7.5 YR 3/3 Dark brown silty clay loam to loam, weakly develop sub-angular blocky structure & friable. Very few fine roots. Few strongly weathered basalt with coarse sand.
- 90 - 120 cms: 7.5 YR 3/4 Dark brown silty clay loam to loam, weakly develop sub-angular structure, friable, very few fine roots.

Profile Description

Pit # 1 Re: For Soil Tanks at the CSWRRS, Bulacan

7-14-90

- 0 - 10 cms: 7.5 YR 4/3 Brown silty clay loam, weakly developed sub-angular blockly structure, few rounded gravel and coarse sand, few diffused mottles-smooth gradual boundary. Occurence of brown mottles.
- 10 - 28 cms: 7.5 YR 5/3 Dull brown sandy clay loam, weakly developed sub-angular blocky structure. Many Mn concretion and brown mottles-smooth gradual boundary.
- 28 - 51 cms: 7.5 YR 6/2 Grayish brown clay, with coarse sand with approx. 10-15 cms curvex lens, weakly developed sub-angular blocky smooth gradual boundary. Also with mottles and conretions.
- 51 - 85 cms: 5 YR 5/3 Dull brown clay with coarse sandy loam layer (neglible). Developed angular blocky structure, ^{presence} ~~pressure~~ of clay skins (cutan), smooth gradual boundary.
- 85 - 112cms: 7.5 YR 5/3 Dull brown clay with few to medium round, smooth gradual boundary. Pressure of mottles.

112 - 167 cms: 7.5 YR 6/3 Grayish brown clay, developed sub-angular blocky structure, with medium round gravel, with few mottles, with cutan and with clear boundary.

Pit No. 2 CSWRRS, Buenavista, Bulacan 7-13-90

Soil Depth Soil Profile Description

- 0 - 10 cms: Silty clay, with gravel, weakly developed sub-angular blocky structure with few round gravel and cobble.
- 10 - 21 cms: Clay, with few round gravel, weakly developed sub-angular blocky structure
- 21 - 60 cms: Clay texture, developed angular structure, few to medium round gravel.
- 110 cms: The same as 60 cms.

Pit No. 3 CSWRRS, Buenavista, Bulacan

Depth	Profile Description
0 - 11 cms:	Silty clay loa, with few round gravel and coarse sand, weakly developed sub-angular blocky structure.
11 - 22 cms:	Silty clay loam, many Mn concretions, few round gravel, weakly developed sub-angular blocky structure
22 - 37 cms:	Silty clay, weakly developed angular structure, few medium round gravel and coarse sand.
37 - 65 cms:	Clay, weakly developed angular structure, few to medium round gravel and coarse sand.
65 - 90 cms:	Clay, medium developed angular structure, with few round gravel
90 - 165 cms:	Clay, weakly developed angular structure, few to medium round gravel and coarse sand.

Pit No. 4 CSWRRS, Buenavista, Bulacan

Depth Soil Profile Description

- 0 - 18 cms: Clay loam, Mn concretion and mottles, weakly developed sub-angular blocky structure
- 18 - 35 cms: Sandy clay loam, weakly developed sub-angular blocky structure, with few round gravel and coarse sand.
- 35 - 50 cms: Clay weakly developed sub-angular blocky structure, few sand.
- 50 - 73 cms: Clay, developed sub-angular blocky structure, few round sand.
- 73 -111 cms: Clay, developed angular structure, with few to medium round gravel and coarse sand
- 111-151 cms: Clay, developed angular blocky structure, few cobbles, gravel and coarse sand.

No. 5 pit = only pictured by Dr. Suguki

Pit No. 6 CSWRRS, Buenavista, Bulacan
(Young Vertisol?)

Depth	Profile Description
0 - 11 cms:	7.5 3/2 YR. Brownish black, clay with grayed spots, very weakly developed sub-angular blocky angular structure, many roots, few round gravel and sand, clear smooth boundary with mottles.
11 - 25 cms:	7.5 YR 5/2 Grayish brown clay, many connections, brown mottles, very weakly developed sub-angular blocky structure, very sticky, medium fine roots, smooth and gradual boundary.
25 - 46 cms:	7.5 YR 5/1 Brownish gray clay, weakly developed blocky structure, few mottles, few round gravel and coarse sand, few fine roots, clear gradual boundary
46 - 75 cms:	7.5 YR 6/1 Brownish gray clay, developed angular blocky structure, existence of clay cutan, few fine roots, few round gravel and coarse sand, very few mottles.
75 -110 cms:	7.5 7/1 Light brownish gray clay, with developed sub-angular blocky structure with diffused brownish mottles, few round gravel and coarse sand, sticky.

PRICE ESCALATION

WHOLESALE PRICE INDEX OF SELECTED MATERIALS USED IN
CONSTRUCTION ACTIVITIES IN METRO MANILA (1978=100)

REPUBLIC OF THE PHILIPPINES
NATIONAL STATISTICS OFFICE
ESTABLISHMENT SURVEYS DEPARTMENT
PRICE DIVISION, MANILA

Period	Automotive Diesel Fuel	Portland Cement	Reinforc- ing Steel	Asphaltic Material	Metal Products	Lumber Products	Electrical Machinery & Fixtures	Structural Steel
1985	607.7	328.6	315.2	534.1	331.8	291.0	224.0	301.6
1986	492.7	347.8	327.9	409.4	340.0	294.7	215.7	301.4
1987	427.5	382.6	327.9	419.9	365.4	342.3	226.9	322.2
1988	459.0	384.8	337.1	488.3	403.8	383.4	281.5	393.1
1989	400.7	506.5	404.2	487.0	462.5	471.4	306.3	455.7
JAN	382.6	399.0	364.1	445.5	419.1	411.5	289.5	401.6
FEB	382.6	435.8	364.1	445.5	429.3	411.5	291.7	401.6
MAR	382.6	459.0	375.0	445.5	438.1	426.3	299.2	435.8
APR	382.6	465.7	385.9	445.5	441.5	445.0	305.3	435.8
MAY	382.6	480.4	385.9	445.5	445.7	463.1	305.7	444.3
JUN	382.6	480.4	406.5	445.5	451.6	481.2	306.5	470.0
JUL	382.6	509.2	423.4	445.5	461.3	485.5	308.9	470.0
AUG	382.6	513.8	429.0	496.8	467.7	485.5	315.3	478.5
SEP	382.6	513.8	429.0	496.8	489.5	496.8	313.7	478.5
OCT	415.4	595.6	429.0	496.8	491.2	493.4	314.7	478.5
NOV	415.4	595.6	429.0	617.8	507.4	508.9	311.5	487.1
DEC	534.6	629.1	429.0	617.8	507.8	547.7	313.6	487.1
1990.0								
JAN	534.6	594.2	425.8	617.8	520.1	547.7	316.9	482.8
FEB	534.6	594.2	425.8	617.8	530.0	547.7	318.6	482.8
FEB1990/ MAR1989 %	39.7	29.5	13.5	38.7	21.0	28.5	6.5	10.8
AVERAGE PRICE ESCALATION FACTOR (MAR, 1989 - FEB, 1990)							=	23.5 Percent

*1 : Including other petroleum products

Source of basic data : National Statistics Office and other reporting establishments

Processed by National Statistics Office



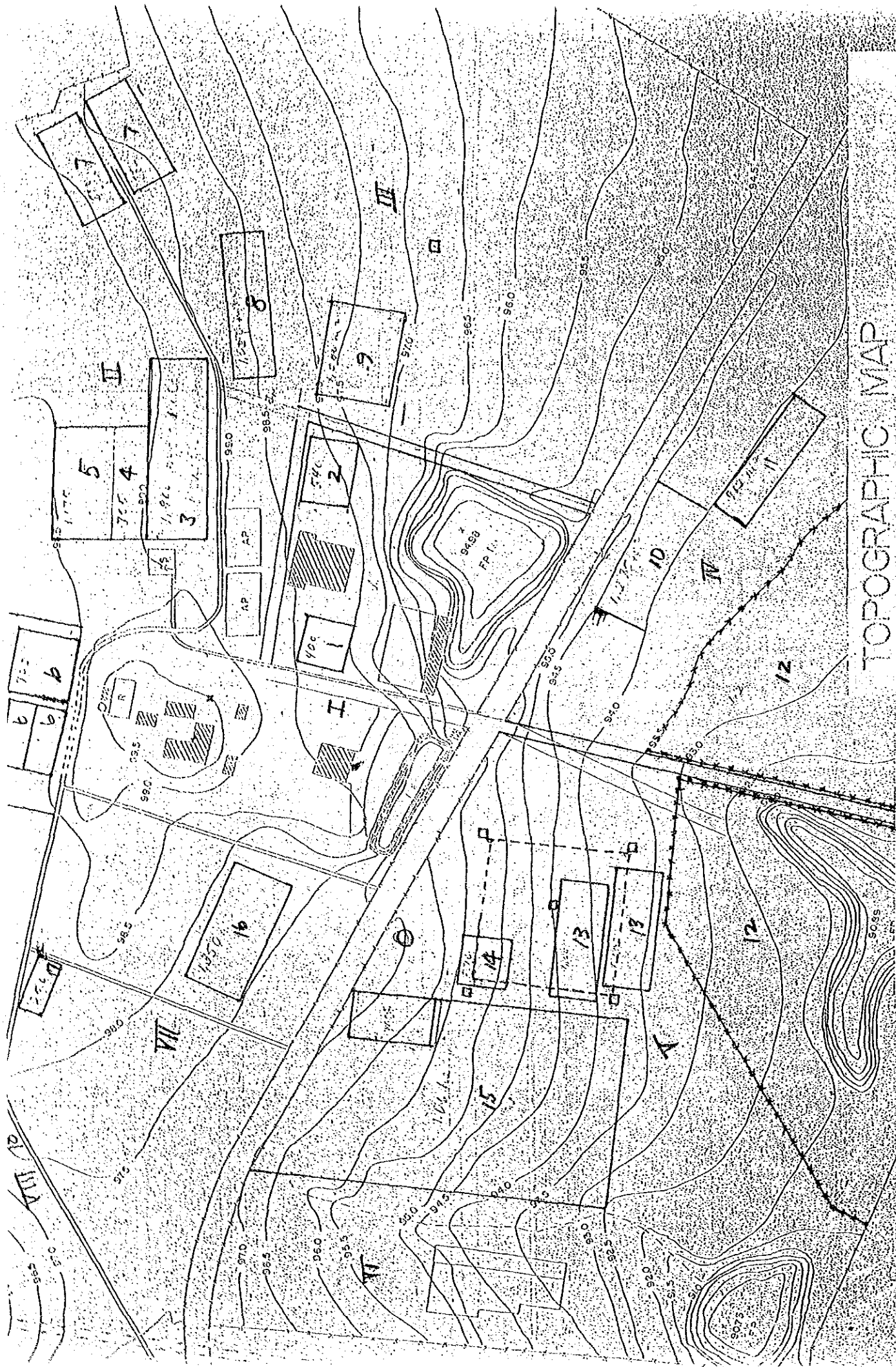
EXCHANGE RATE (TTS BASE)

YEAR	DATE	PESO/USD	DATE	YEN/USD	YEN/PESO
1989	12.04	22.234	12.01	144.15	6.483
	12.15	22.320	12.15	145.35	6.512
	12.29	22.440	12.29	144.55	6.442
1990	1.02	22.428	1.04	146.50	6.532
	1.15	22.450	1.16	146.95	6.546
	1.31	22.543	1.31	145.25	6.443
	2.01	22.568	2.01	145.45	6.445
	2.15	22.600	2.15	145.60	6.442
	2.28	22.761	2.28	149.80	6.581
	3.01	22.762	3.01	150.80	6.625
	3.15	22.795	3.15	153.45	6.732
	3.30	22.750	3.30	159.00	6.989
	4.02	22.747	4.02	161.15	7.084
	4.16	22.760	4.16	160.15	7.036
	4.30	22.805	4.27	160.30	7.029
	5.02	22.830	5.01	160.10	7.013
	5.15	22.873	5.15	152.80	6.680
	5.31	22.977	5.31	152.60	6.641
	6.04	23.024	6.01	153.30	6.658
	6.15	23.088	6.15	155.55	6.737
	6.29	23.270	6.29	153.90	6.614
	7.02	23.350	7.02	153.15	6.559
	7.16	23.670	7.16	149.35	6.310
7.27	23.700	7.27	151.55	6.395	

← 帰国

円 - ペソの換算レートは帰国時莫の換算レートより

6.4 円/ペソ とする。



TOPOGRAPHIC MAP

Central Soil Research Station

Buena Vista, San Ildefonso, Bulacan

Area Land-use

		11	Bio-algal Fertilizers & Alga- lyzation of Lowland Rice.	0.091	Dec/90
		12	Soil & Water Based Integrated Farming System (Lowland Rice Area)	1.200	Long-term
V	3.26 Upland crops	12	(area for - do - (Farm-house, poultry/livestock, fishponds, upland crops and other components)		Long-term
		13	Multiple Cropping (Soil Conserv. Div.)	0.200	Dec/90
		14	Evaluation on the Utilization of Azotobacter in Upland Rice	0.037	Dec/90
		15	Deep-Irrigation System for Various Field Crops.	1.060	Long-term
VI	1.54 (for Orchard)		NONE		
VII		16	Trial on the Utilization of C.M.H. in Lowland Rice	0.135	1990
		17	Study on Various BGA as Source of N-fix for Lowland Rice (Post-doctoral thesis of Mr. A. S. Cakudon, Instructor, BNAS, as per request approved by the Chief, SKIRRO.	0.040	1990
VIII	1.88	18	Soil, Plant & Water Mgt. on the establishment of Perennial & Annual Crop-based Multi-story Cropping System.		



land use

Blk. No.	Area (ha)	Expt. No.	Title	Area (ha)	Per
Manila Organic Fertilizer					
I	2.56	1	Evaluation of MOF on Okra	0.040	Dec/90
		2	Evaluation of Recommended Management Practices and Cropping Systems for Rice	0.054	Dec/91
II	2.00	3	Integration Trial on the Integrated Use of Urea, N and Azolla or Rice Straw in		
		4	Lowland Rice & Its Residual Effect on Soil Chemical Properties	0.190	Long Term
			Evaluation of Inorganic Fertilizer & Green Manure in Lowland Rice	0.070	Dec/91
		5	Evaluation of MOF on Lowland Rice	0.118	Dec/91
		6	Long-Term Rice-Fish-Azolla Vegetable Polyculture	0.139	Dec/91
		7	Study on the Infestation of Weeds & Water Stresses on the Growth & Yield of Transplanted Rice	0.088	} Indefinite
			- do -	0.088	
III	4.24	8	Evaluation of Foliar Fertilizer on Lowland Rice	0.102	June/91
		9	Evaluation of Recommended Management Practices and Cropping System for Veg.	0.170	Dec/91
		10	Correlation of Crop Growth and Dev. with Soil & Weather	0.128	Dec/90