

THE KINGDOM OF THAILAND
BANGKOK METROPOLITAN ADMINISTRATION

**FEASIBILITY STUDY
ON FLOOD PROTECTION / DRAINAGE PROJECT
IN EASTERN SUBURBAN-BANGKOK**

SURVEY DRAWINGS

FEBRUARY, 1986

JAPAN INTERNATIONAL COOPERATION AGENCY

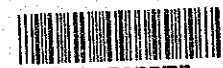
L122
618
SDS

SDS
86-18

FEBRUARY 1986

JICA

JICA LIBRARY



1031568[7]

**THE KINGDOM OF THAILAND
BANGKOK METROPOLITAN ADMINISTRATION**

**FEASIBILITY STUDY
ON FLOOD PROTECTION / DRAINAGE PROJECT
IN EASTERN SUBURBAN-BANGKOK**

SURVEY DRAWINGS

FEBRUARY, 1986

JAPAN INTERNATIONAL COOPERATION AGENCY

国際協力事業団	
受入 月日 '86.10.21	L122
登録No. 15506	61.8
	SDS

CONTENTS

I.A Topographical Survey in Preliminary Study, in 1984

I.A.1	Introduction	A-1
I.A.2	Bench Mark Survey	A-1
I.A.3	Survey of Water Gauge Station	A-2
I.A.4	Survey of Main Klongs	A-2
I.A.5	Survey of Spot Levelling	A-2
I.A.6	Survey Drawings	A-3

I.B Topographical Survey in Master Plan, in 1985

I.B.1	Introduction	B-1
I.B.2	Bench Mark Survey	B-1
I.B.3	Survey of Water Gauge Stations	B-2
I.B.4	Survey of Sub Klongs	B-2
I.B.5	Survey of Spot Levelling	B-2
I.B.6	Survey of Flood Marks	B-2
I.B.7	Survey Drawing	B-3

I.C Topographical Survey in Feasibility Study in 1986

I.C.1	Introduction	C-1
I.C.2	Bench Mark Survey	C-
I.C.3	Land Subsidence	C-2
I.C.4	Survey Drawing	C-3

I.A TOPOGRAPHICAL SURVEY IN PRELIMINARY STUDY

1984

I.A Topographical Survey in Preliminary Study in 1984

I.A.1. Introduction

1) General

The topographical survey was carried out in order to obtain the necessary data for planning the flood protection/drainage system, especially for the implementation of the hydraulic analysis.

The location of the surveys are shown in Fig. A.1.

Datum line for the levelling was delivered from the BM 31 of Royal Thai Survey Department (RTSD), established in July 1982.

15 millimeters are usually allowed for accuracy of closure on the control levelling of 5 kilometers. But in the Study Area, the accuracy of closure was allowed at 20 millimeters considering the soft and weak ground condition.

2) Objective of the topographical survey. The objective of the survey is as follows:

- 1) To survey the level of 11 water gauges which were newly installed for the Study.
- 2) To survey the longitudinal and lateral cross sections of main klongs.
- 3) To survey spot ground elevations in the Study Area.

3) Scope of work of the topographical survey

The following main items were surveyed;

- | | | |
|--|---|---------------|
| 1) Levelling of Water Gauges | : | 11 stations |
| 2) Longitudinal levelling of main klongs | : | 74 kilometers |
| 3) Cross levelling of main klongs | : | 62 sections |
| 4) Spot levelling | : | 780 points |
| 5) Elevation of existing roads | : | 60 kilometers |

I.A.2. Bench Mark survey

The investigation of 11 existing bench marks was executed in order to use these bench marks as temporary bench marks for our survey. According to the survey, all these bench marks have been affected by land subsidence. Following table shows the results.

Table A.1 Elevation of BMA Bench Marks
Surveyed in July 1983

Number	Surveyed Elevation (m) in July 1983	Past Surveyed Elevation *1	
		Date	Elevation (m)
BM. 018	4.003	Aug., 1978	4.445
BM. 024	1.829	Aug., 1978	2.210
		May., 1981	2.028
BM. 026	2.042	Aug., 1978	2.432
BM. 084	1.407	Aug., 1978	1.968
BM. 085	1.393	Aug., 1978	1.923
BM. 086	1.359	Aug., 1978	1.881
		April., 1981	1.607
BM. 087	2.025	Aug., 1978	2.361
BM. 088	5.237	Aug., 1978	5.817
BM. 100	1.023	Aug., 1978	1.587
BM. 101	0.908	Aug., 1978	1.394
		May., 1981	1.173
(BM.16)*2	2.001	Aug., 1978	2.347

Note; *1 These figures were surveyed by the Royal Thai Survey Department (RTSD)

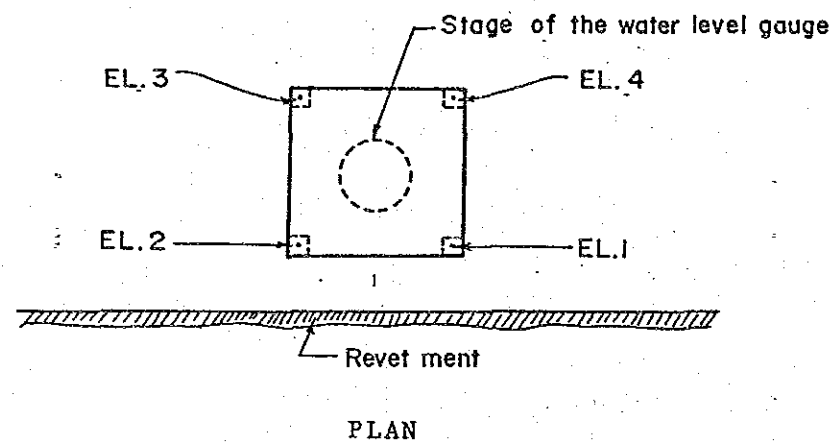
*2 AIT Bench Mark

* Elevation of based BM. 31 is 2.425 m. above MSL.

I.A.3 Survey of water gauge stations

After the installation of 12 water gauges, their elevations were delivered/obtained from BM 31 of RTSD.

Top Elevation of The Foundation for Water Level Gauge



Station	EL.1	EL.2	EL.3	EL.4	Average
A	37.163	37.155	37.159	37.160	37.16
B	36.868	36.863	36.859	36.860	36.86
C	36.988	36.966	36.995	36.986	36.99
D	36.740	36.756	36.752	36.743	36.75
E	36.858	36.858	36.856	36.849	36.86
F	36.399	36.398	36.397	36.402	36.40
G	36.539	36.537	36.536	36.532	36.54
H	-	-	-	-	36.80
I	35.832	35.830	35.830	35.823	35.83
J	36.237	36.234	36.238	36.226	36.23
K	36.302	36.302	36.305	36.301	36.30
L	36.335	36.339	36.337	36.331	36.34

Note : mean sea level is EL. 35.030 m

I.A.4. Survey of main klongs

Longitudinal and cross-sectional survey for the existing main klongs, namely, Klong Phra Khanong, Klong Tan, Klong Saen Saep, Klong Lat Phrao were executed at 1 kilometer intervals. The results are shown in Figs. A.2 to A.20.

I.A.5. Survey of spot levelling

Longitudinal profiles of the existing roads were drawn when surveys of water gauge stations and main klongs were made.

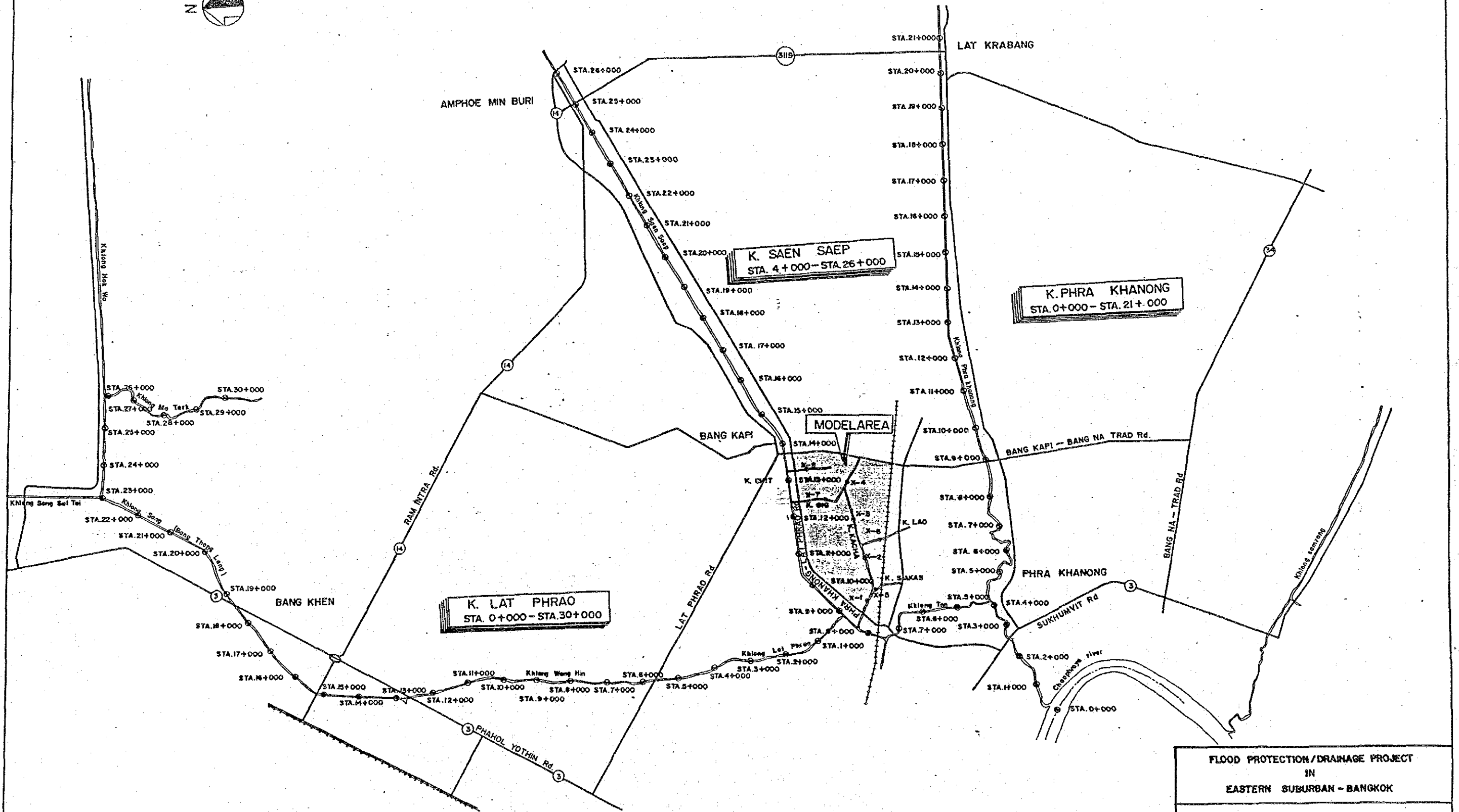
Survey of spot levels was conducted to obtain the general features of ground elevations in the Study Area necessary for the preliminary study, and also for the model area necessary for the rainfall-discharge analysis.

SURVEY DRAWINGS IN PRELIMINARY STUDY

CONTENTS

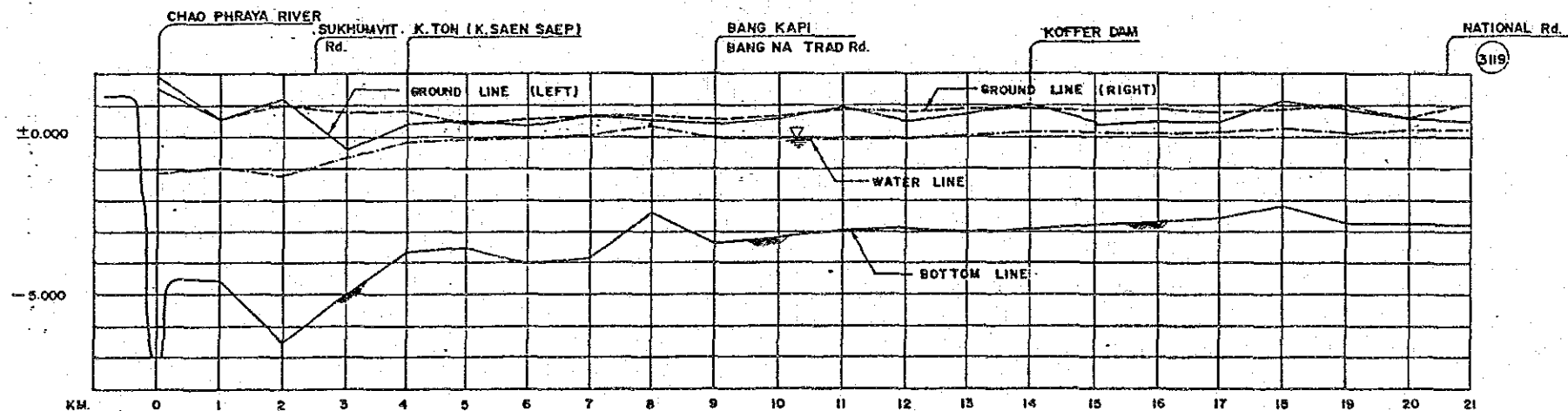
<u>DWG. NO.</u>	<u>TITLE</u>	<u>PAGE</u>
SA-1	Plant of Klong	A-5
SA-2	Profile of Klong Phra Khanong	A-6
SA-3	Cross Section of Phra Khanong (1)	A-7
SA-4	- do. - (2)	A-8
SA-5	- do. - (3)	A-9
SA-6	- do. - (4)	A-10
SA-7	Profile of Klong Saen Saep	A-11
SA-8	Cross Section of Klong Saen Saep (1)	A-12
SA-9	- do. - (2)	A-13
SA-10	- do. - (3)	A-14
SA-11	- do. - (4)	A-15
SA-12	- do. - (5)	A-16
SA-13	Profile of Klong Lat Phrao	A-17
SA-14	Cross Section of Klong Lat Phrao (1)	A-18
SA-15	- do. - (2)	A-19
SA-16	- do. - (3)	A-20
SA-17	Profile of Klongs in Model Area	A-21
SA-18	Cross Section of Klongs in Model Area (1)	A-22
SA-19	- do. - (2)	A-23

PLAN OF KHLONG



FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
PLAN OF KLONG	
DRAWING NO	SA-1
SCALE	1 : 30,000
DATE	AUGUST 1983

KLONG PHRA KHANONG



GROUND ELEV. RIGHT	GROUND ELEV. LEFT	BOTTOM ELEV.	WATER LEVEL DATA ELEV., TIME, DATE
1.32			1.168, 11:17, 8/8
0.80	0.80	-4.80	-1.018, 14:10, 8/26
0.87	1.18	-8.60	-1.824, 18:02, 8/28
0.78	-0.42	-8.02	-0.700, 18:40, 8/28
0.77	0.38	-2.71	-0.228, 18:00, 8/20
0.39	0.48	-3.82	-0.117, 14:20, 8/20
0.83	0.36	-4.04	-0.088, 18:00, 8/20
0.85	0.88	-3.87	0.034, 18:20, 8/20
0.71	0.83	-2.38	0.886, 17:38, 8/20
0.82	0.49	-2.28	-0.016, 19:10, 8/21
0.88	0.81	-3.18	-0.038, 12:08, 8/21
0.81	0.92	-2.38	-0.070, 13:30, 8/21
0.82	0.80	-2.82	-0.070, 14:20, 8/21
0.80	0.78	-2.97	0.017, 19:30, 8/21
0.84	1.07	-2.90	0.170, 18:38, 8/21
0.84	0.38	-2.78	0.126, 10:40, 8/22
0.82	0.30	-2.88	0.181, 11:30, 8/22
0.83	0.48	-2.87	0.124, 13:00, 8/22
0.88	1.16	-2.14	0.288, 14:30, 8/22
1.05	0.87	-2.70	0.088, 18:40, 8/22
0.84	0.82	-2.92	0.178, 10:10, 8/22
1.08	0.48	-2.72	0.178, 11:00, 8/22

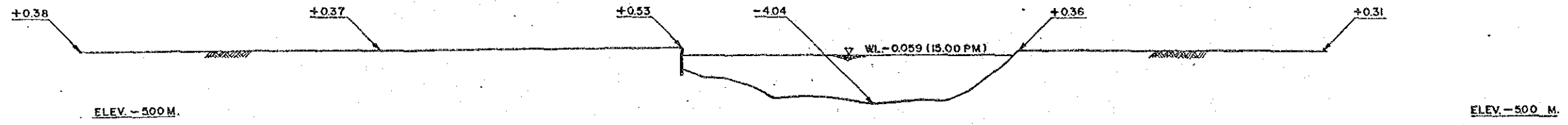
FLOOD PROTECTION / DRAINAGE PROJECT
IN
EASTERN SUBURBAN - BANGKOK

PROFILE
OF
KLONG PHRA KHANONG

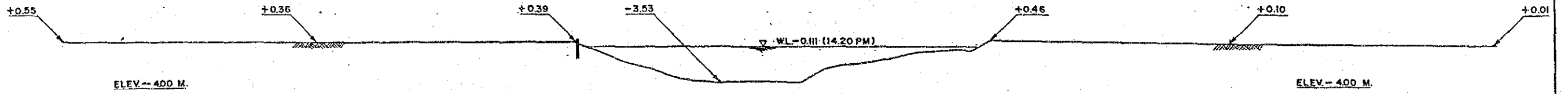
SCALE	H = 1:50,000	V = 1:100
DATE	AUGUST 1983	

DRAWING NO
SA-2

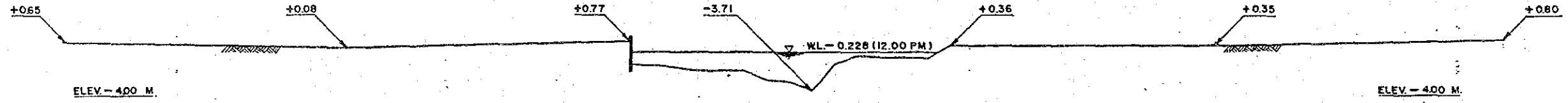
X-6 STA 6+000 (DATE 20/6)



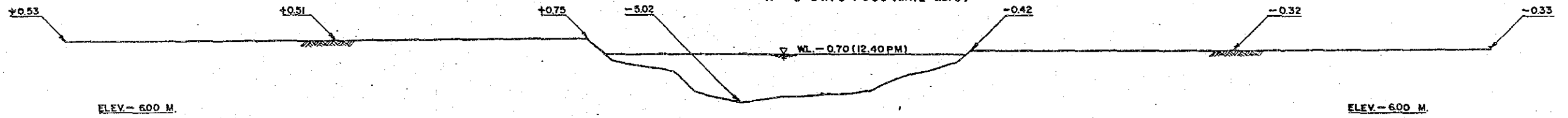
X-5 STA 5+000 (DATE 20/6)



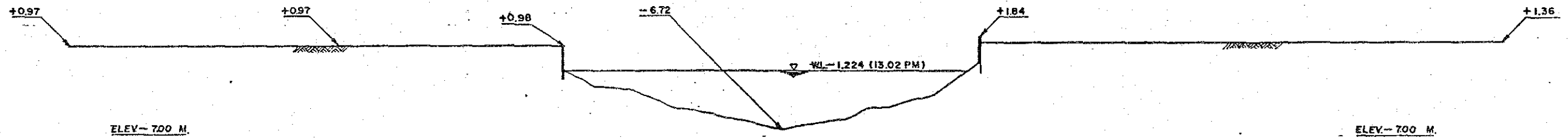
X-4 STA 4+000 (DATE 20/6)



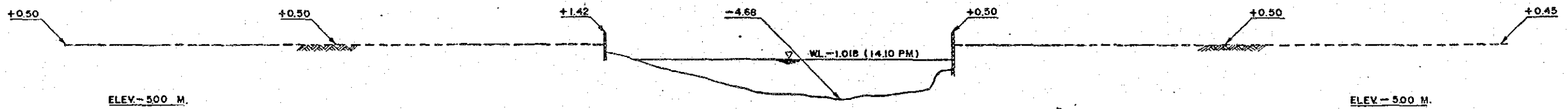
X-3 STA 3+000 (DATE 23/6)



X-2 STA 2+000 (DATE 26/6)



X-1 STA 1+000 (DATE 26/6)

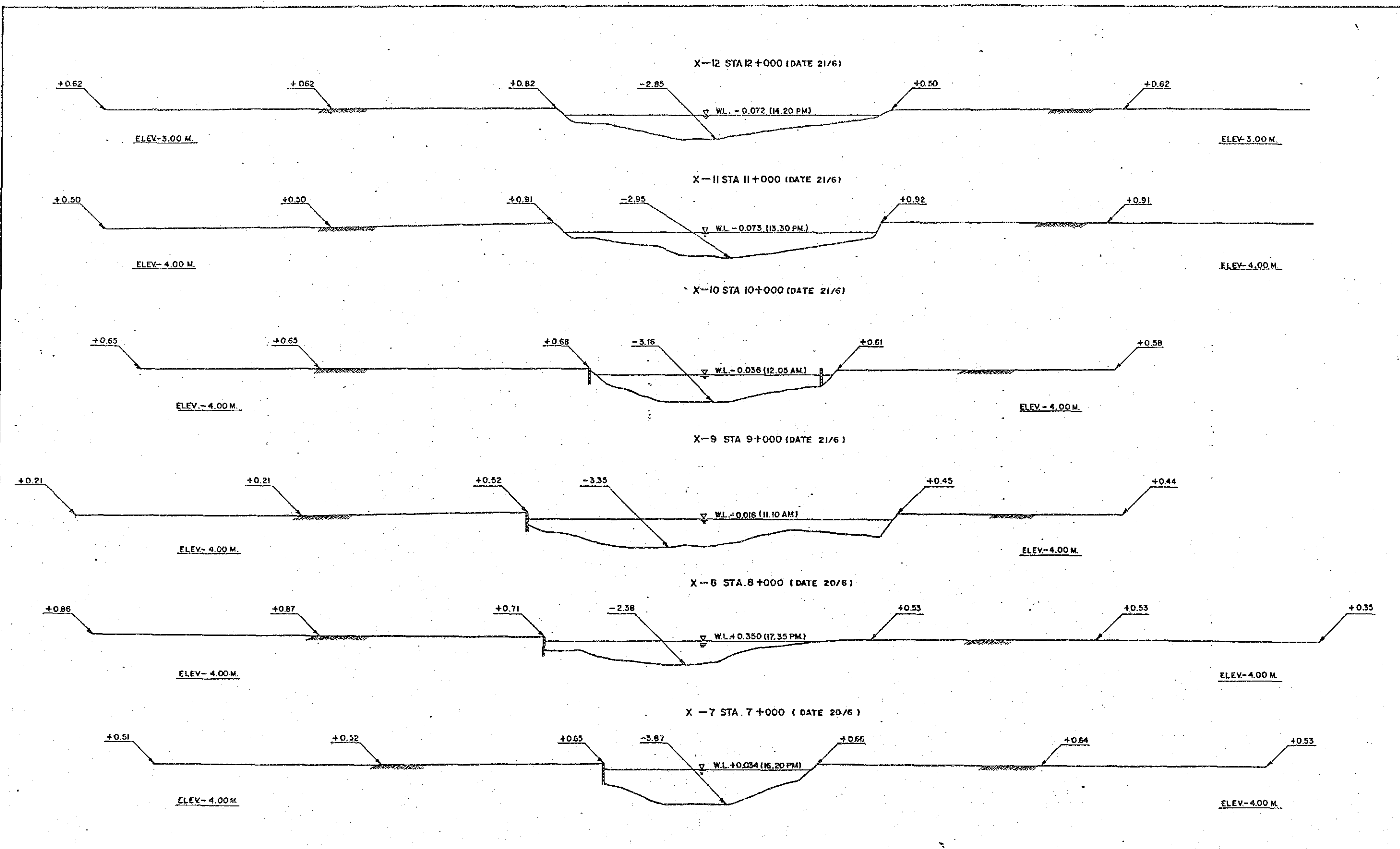


FLOOD PROTECTION/DRAINAGE PROJECT
IN
EASTERN SUBURBAN - BANGKOK

CROSS SECTION
OF
KLONG PHAKANONG

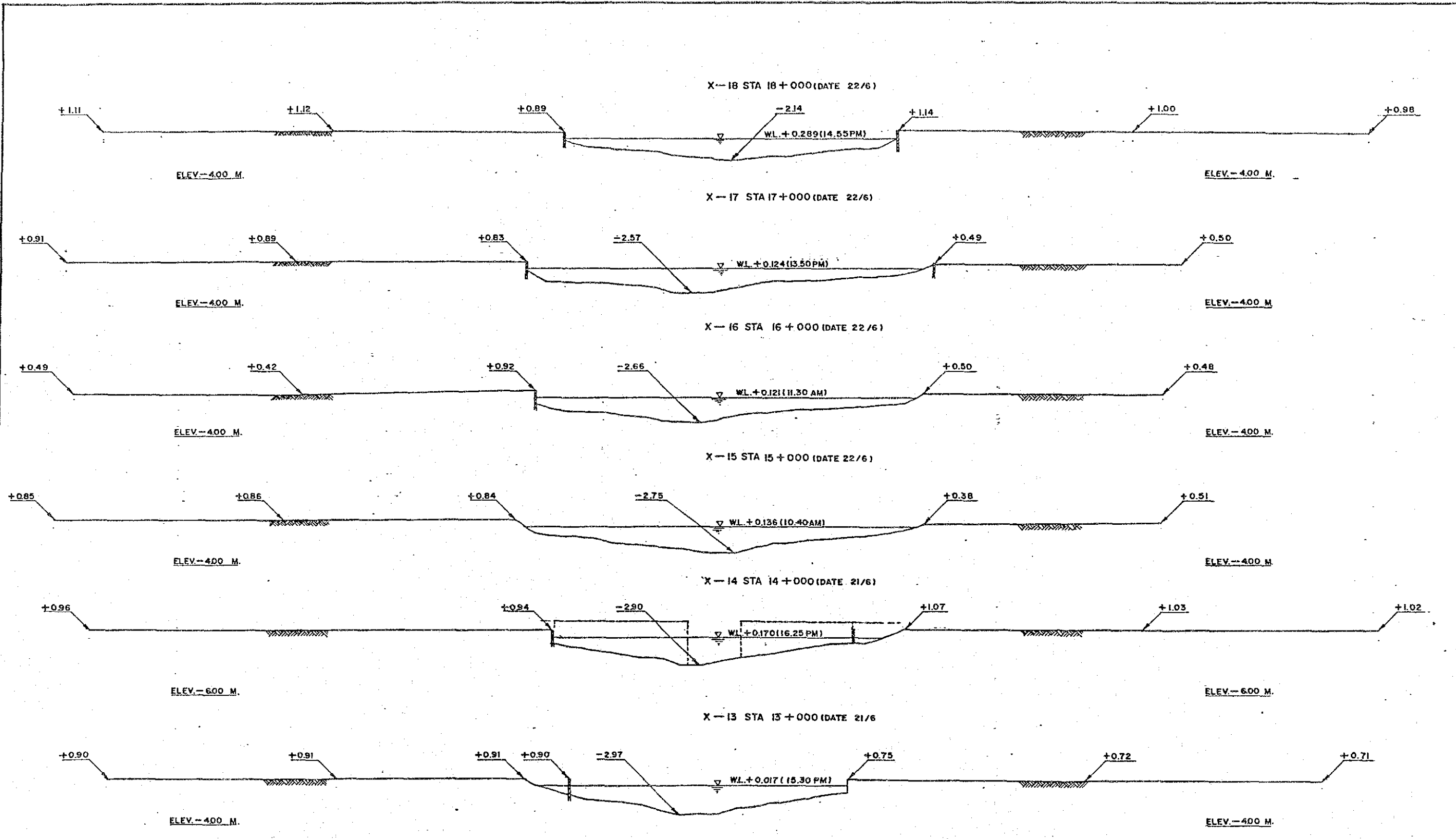
DRAWING NO
SA-3

SCALE	1 : 200
DATE	AUGUST 1983



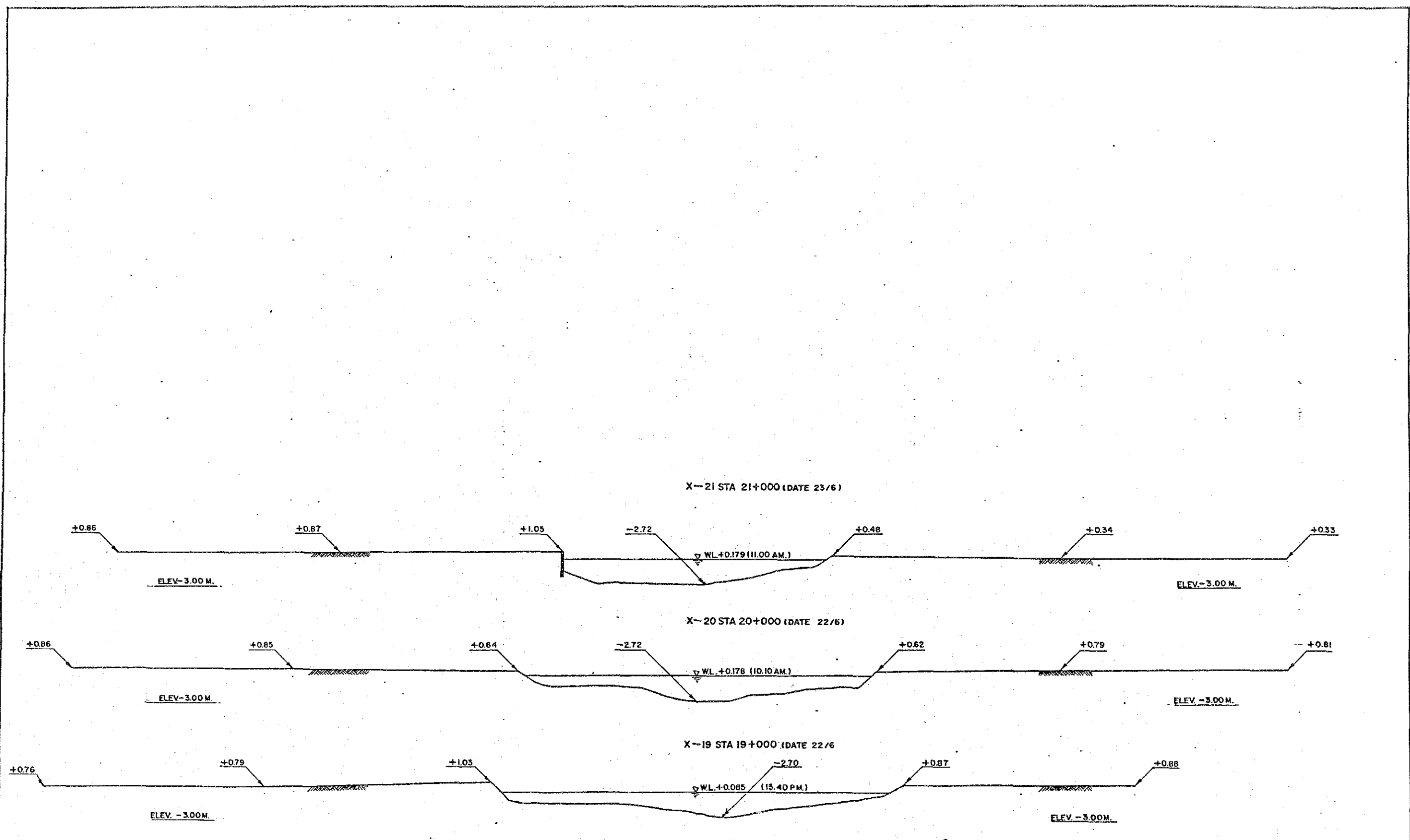
FLOOD PROTECTION/DRAINAGE PROJECT	
IN	
EASTERN SUBURBAN - BANGKOK	
CROSS SECTION	
OF	
KLONG PHAKANONG	
SCALE	1 : 200
DATE	AUGUST 1983

DRAWING NO
SA-4



FLOOD PROTECTION / DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG PHAKANONG	
SCALE	1 : 200
DATE	AUGUST 1983

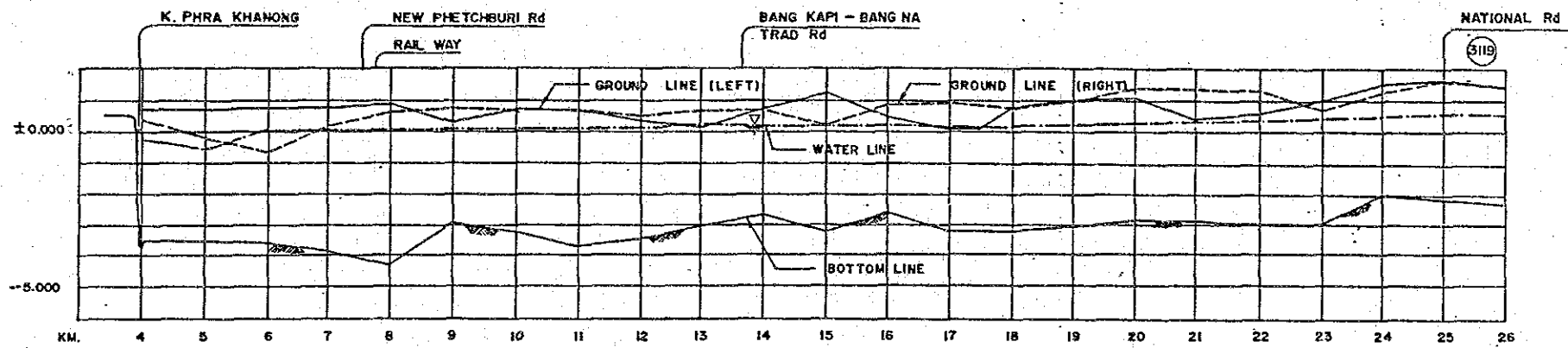
DRAWING NO
SA-5



FLOOD PROTECTION / DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG PHAKANONG	
SCALE	1 : 200
DATE	AUGUST 1983

DRAWING NO
SA-6

KLONG SAEN SAEF



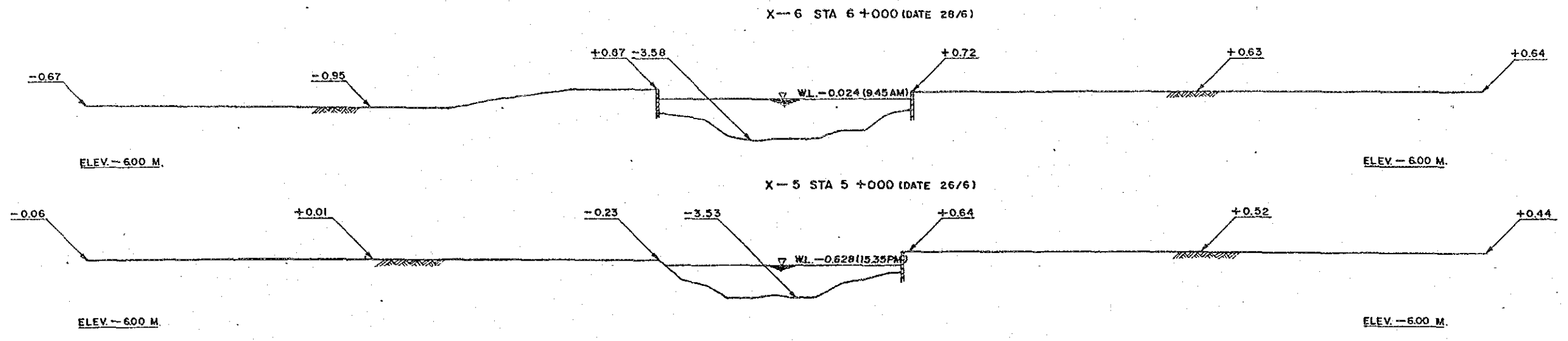
KM.	GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA ELEV. TIME DATE
	RIGHT	LEFT		
4	-0.37	0.77	-3.71	-0.228, 12.00, 8/20
5	-0.33	0.64	-3.83	-0.038, 18.38, 8/28
6	-0.67	0.72	-3.88	-0.024, 8.45, 8/28
7	0.17	0.76	-3.98	-0.007, 10.80, 8/28
8	0.68	0.88	-4.27	0.031, 13.10, 8/21
9	0.78	0.81	-3.95	0.084, 13.80, 8/21
10	0.78	0.70	-3.82	0.074, 14.25, 8/21
11	0.70	0.68	-3.70	0.084, 18.09, 8/21
12	0.48	0.88	-3.43	0.107, 18.40, 8/21
13	0.68	0.10	-3.08	0.149, 15.40, 8/21
14	0.70	0.76	-2.64	0.178, 18.00, 8/22
15	0.18	1.27	-2.28	0.212, 18.28, 8/22
16	0.33	0.44	-2.87	0.219, 18.48, 8/22
17	0.81	0.07	-3.23	0.174, 18.23, 8/22
18	0.77	0.77	-3.21	0.182, 18.40, 8/22
19	0.82	1.00	-3.08	0.246, 2.30, 8/23
20	1.41	1.18	-2.80	0.288, 11.00, 8/23
21	1.34	0.38	-3.58	0.309, 15.00, 8/23
22	1.30	0.60	-3.07	0.330, 12.80, 8/23
23	0.88	0.88	-3.06	0.337, 13.80, 8/23
24	1.19	1.84	-2.12	0.442, 14.05, 8/23
25	1.88	1.62	-2.23	0.488, 10.26, 8/24
26	1.31	1.34	-2.42	0.478, 11.10, 8/24

FLOOD PROTECTION/DRAINAGE PROJECT
IN
EASTERN SUBURBAN - BANGKOK

PROFILE
OF
KLONG SAEN SAEF

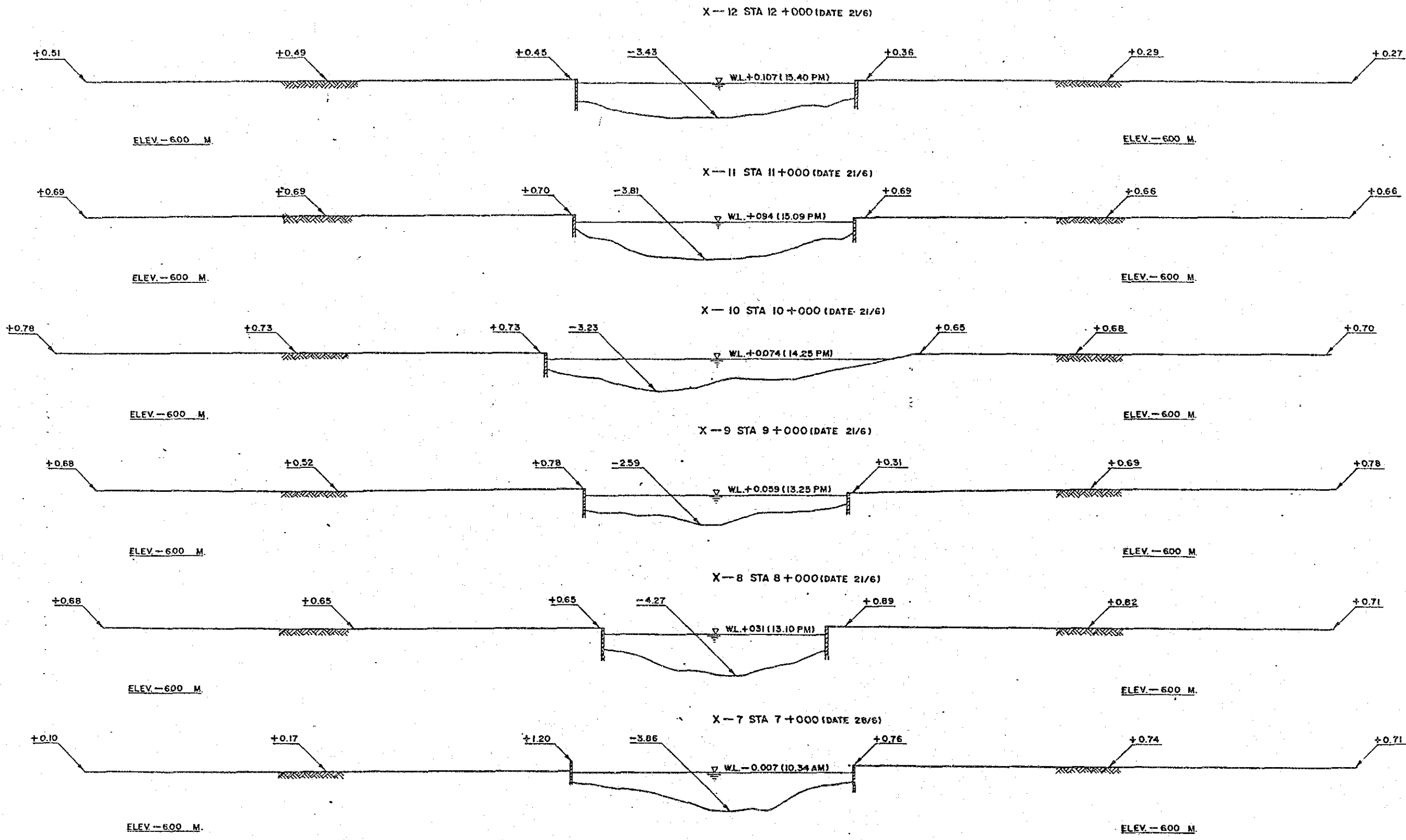
DRAWING NO
SA-7

SCALE H = 1:50,000 V = 1:100
DATE AUGUST 1953



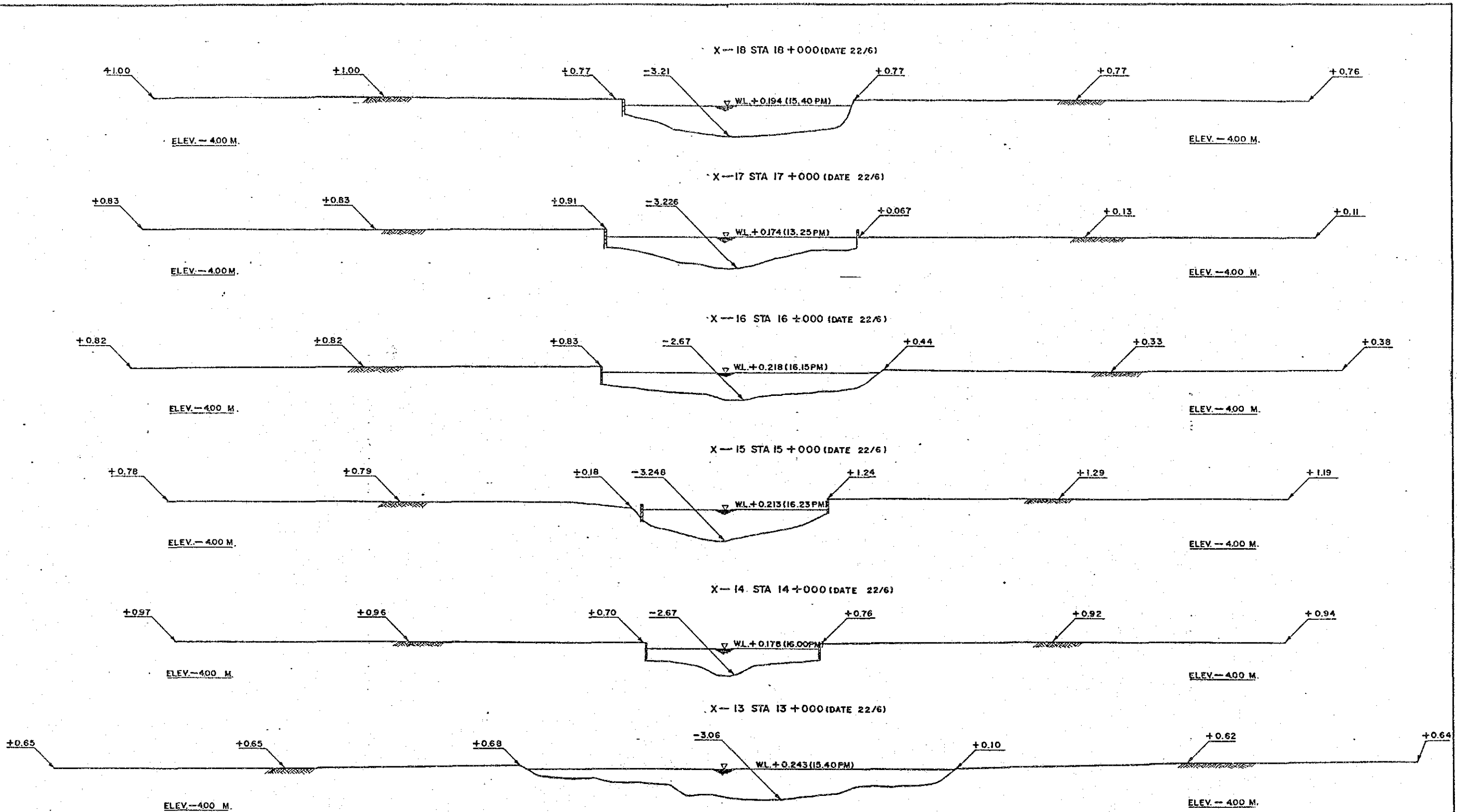
FLOOD PROTECTION/DRAINAGE PROJECT		
IN		
EASTERN SUBURBAN - BANGKOK		
CROSS SECTION		
OF		
KLONG SAEN - SAEP		
SCALE	1 : 200	
DATE	AUGUST 1983	

DRAWING NO
SA - 8



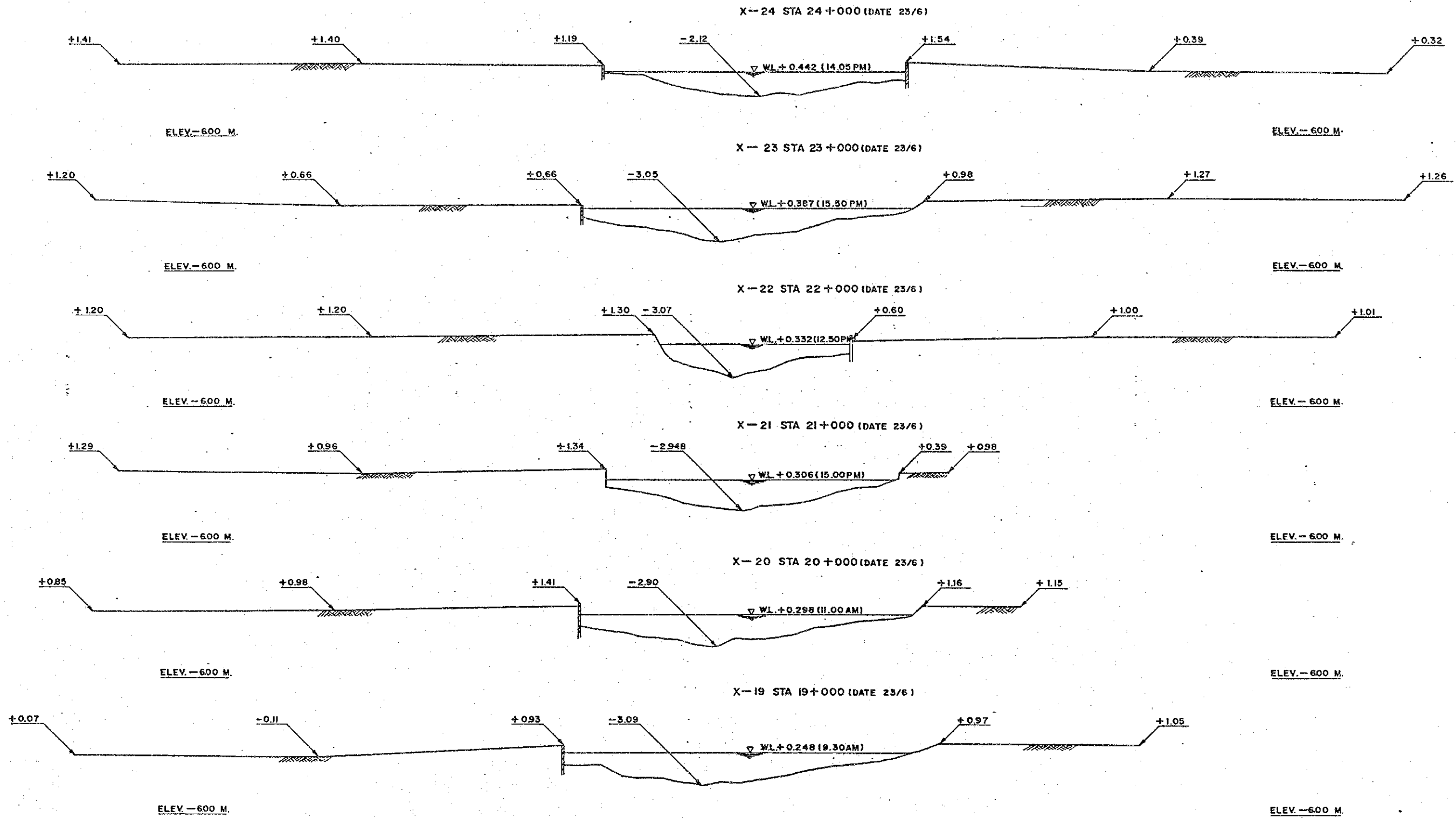
FLOOD PROTECTION / DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG SAEN SAEP	
SCALE	1 : 200
DATE	AUGUST 1983

DRAWING NO
SA-9

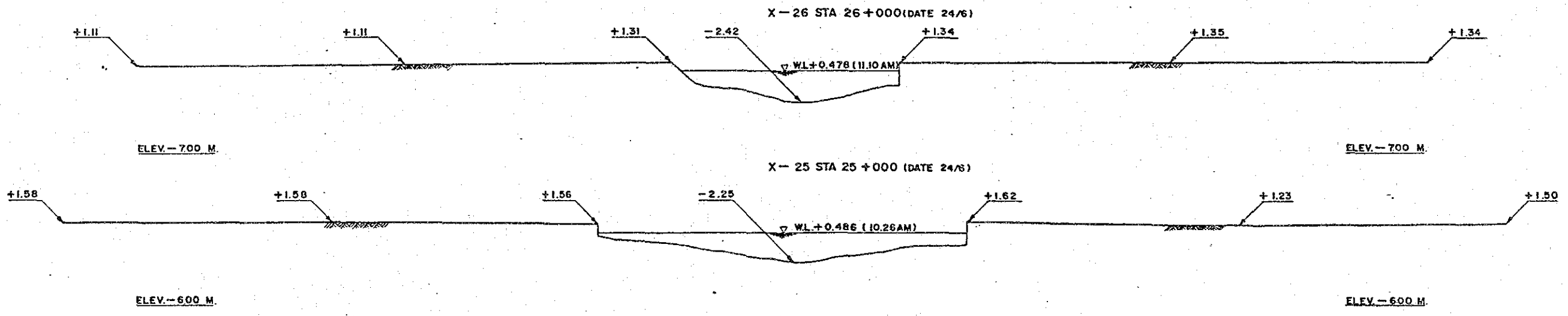


FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG SAEN SAEP	
SCALE	1 : 200
DATE	AUGUST 1983

DRAWING NO
SA-10



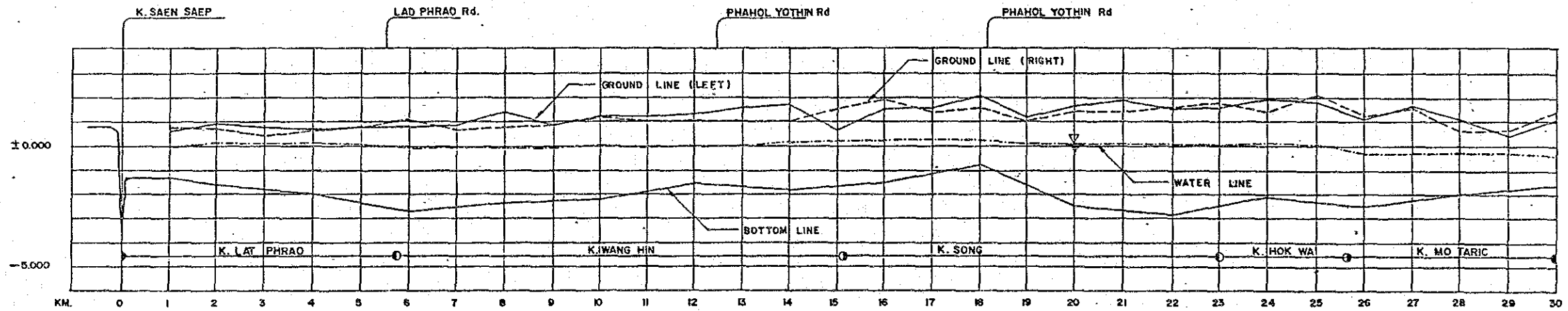
FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG SAEN SAEP	
DRAWING NO	SA-11
SCALE	1 : 200
DATE	AUGUST 1983



FLOOD PROTECTION / DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG SAEN SAEP	
SCALE	1 : 200
DATE	AUGUST 1983

DRAWING NO
SA-12

KLONG LAT PHRAO



GROUND ELEV. RIGHT	LEFT	BOTTOM ELEV.	WATER LEVEL DATA ELEV., TIME, DATE
0.78	0.93	-1.81	+0.188, 11.14, 9/7
0.47	0.77	-1.93	+0.113, 12.42, 9/7
0.72	0.66	-2.01	+0.088, 13.41, 9/7
0.73	0.78	-2.38	+0.076, 14.20, 9/7
1.08	0.76	-2.78	-0.075, 15.07, 9/7
0.87	0.87	-2.87	-0.088, 11.07, 9/7
0.78	1.40	-2.38	-0.080, 13.38, 9/7
0.87	0.92	-3.31	-0.085, 14.10, 9/7
1.18	1.23	-2.34	+0.082, 14.40, 9/7
1.06	1.17	-1.87	-0.048, 16.10, 9/7
1.04	1.28	-1.48	+0.080, 14.48, 7/7
0.88	1.86	-1.73	+0.014, 16.10, 7/7
1.00	1.84	-1.82	+0.018, 16.17, 11/7
1.48	0.84	-1.71	+0.188, 10.42, 11/7
1.80	1.88	-1.83	+0.283, 15.48, 12/7
1.42	1.86	-1.17	+0.284, 12.00, 12/7
1.88	2.08	-0.78	+0.285, 10.48, 12/7
1.08	1.18	-1.84	+0.188, 11.18, 11/7
1.44	1.85	-2.48	+0.187, 11.43, 11/7
1.47	1.92	-2.73	+0.117, 12.18, 11/7
1.81	1.88	-2.81	+0.123, 13.34, 11/7
1.81	1.88	-2.83	+0.183, 14.00, 11/7
1.44	1.94	-2.08	+0.222, 10.00, 12/7
2.20	1.93	-2.34	+0.098, 13.18, 12/7
1.30	1.08	-2.43	-0.208, 16.30, 12/7
1.82	1.87	-3.23	-0.498, 12.20, 12/7
0.82	1.10	-1.99	-0.210, 13.32, 12/7
0.68	0.46	-1.78	-0.201, 12.10, 12/7
1.43	1.15	-1.88	-0.328, 14.05, 12/7

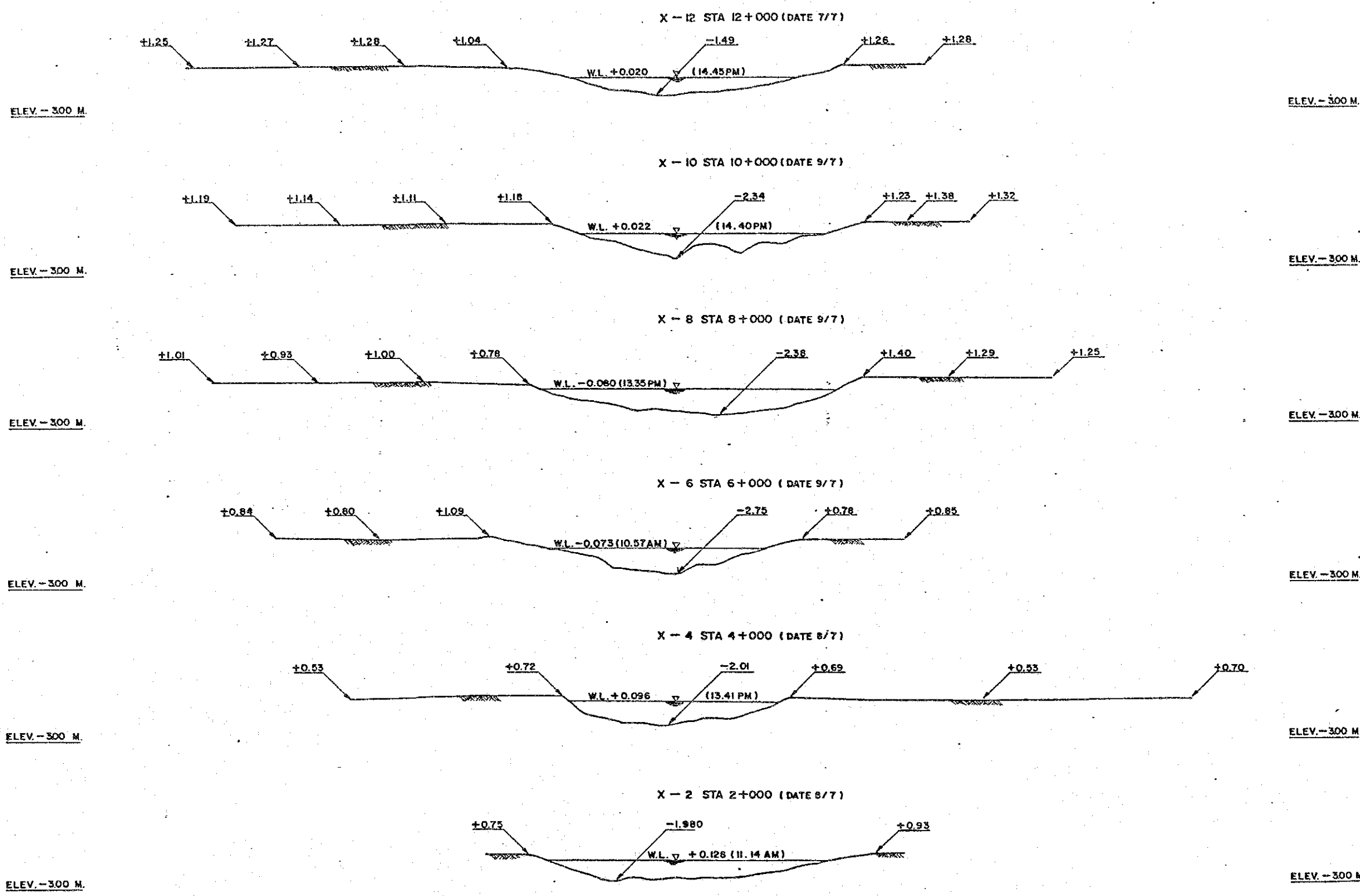
FLOOD PROTECTION/DRAINAGE PROJECT
IN
EASTERN SUBURBAN - BANGKOK

PROFILE
OF
KLONG LAT PHRAO

SCALE H = 1:50,000 V = 1:100

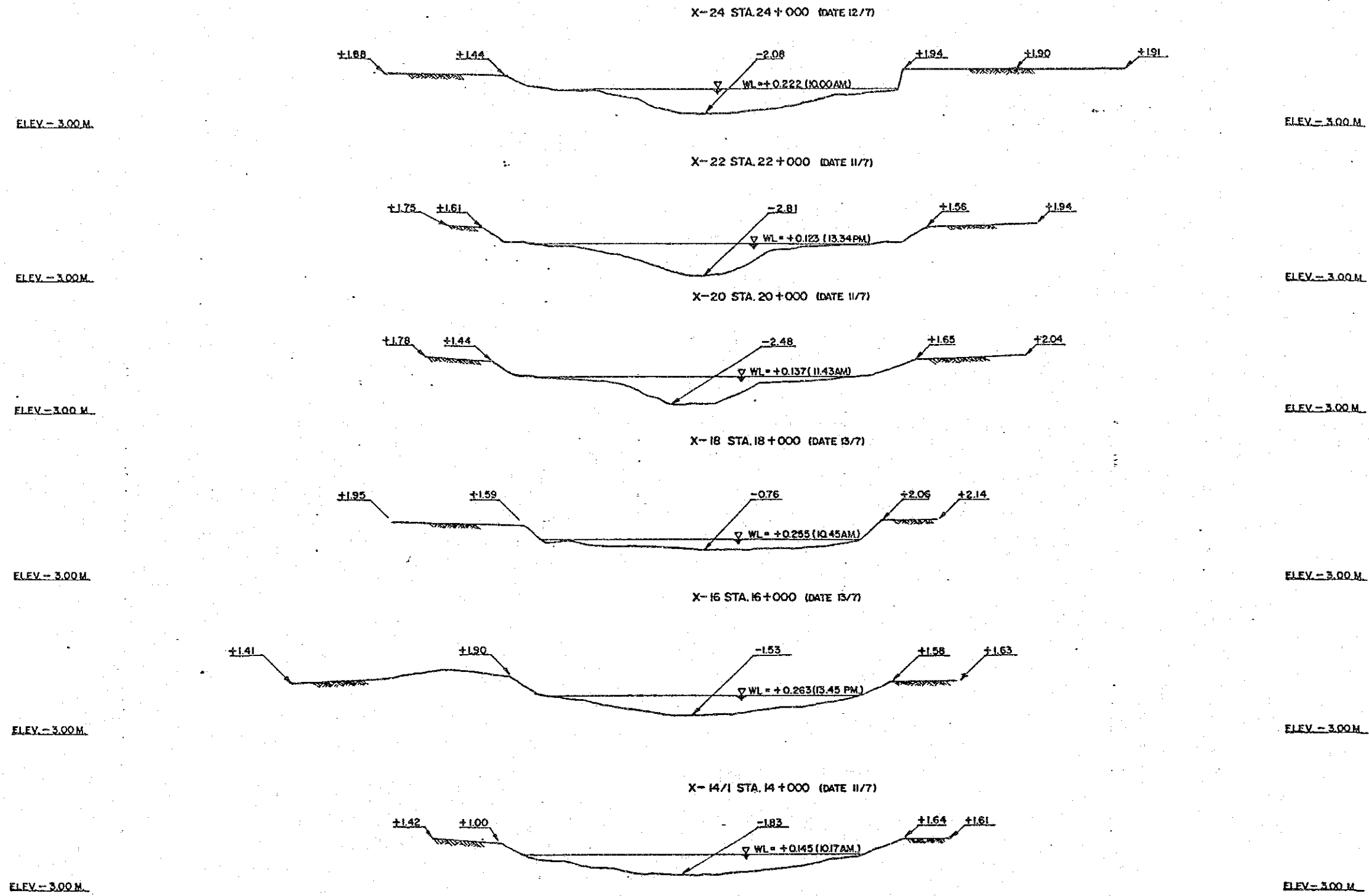
DATE AUGUST 1983

DRAWING NO
SA-13

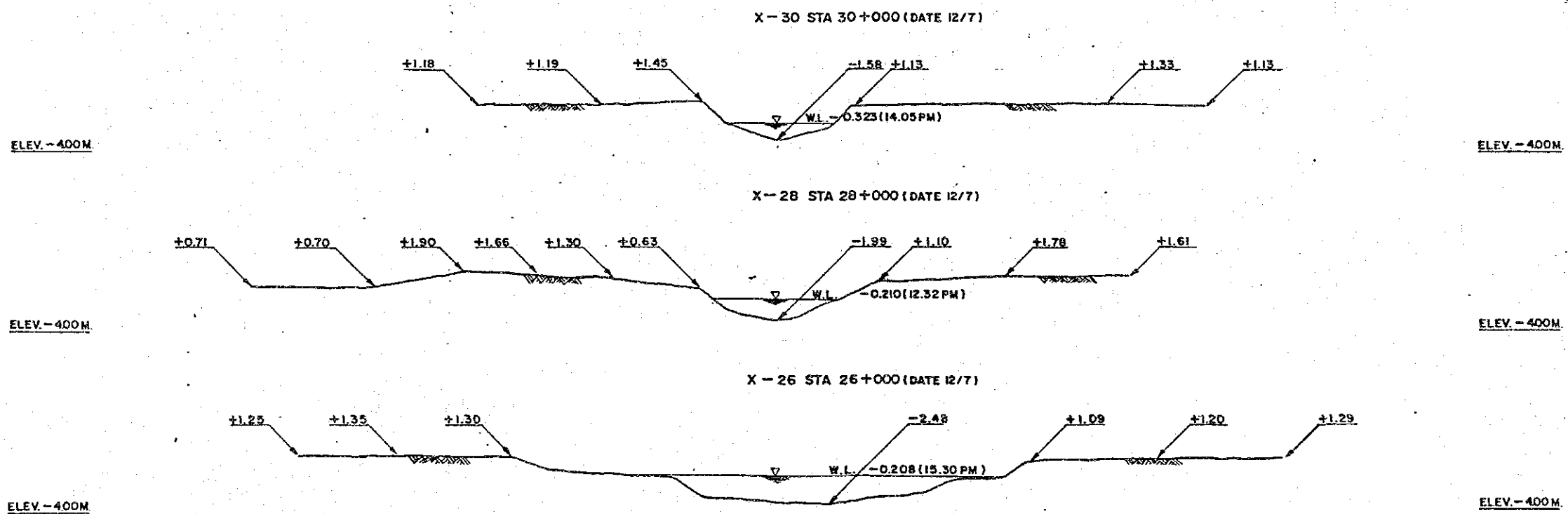


FLOOD PROTECTION/DRAINAGE PROJECT	
IN	
EASTERN SUBURBAN - BANGKOK	
CROSS SECTION	
OF	
KLONG LATPHRAO	
SCALE	1 : 200
DATE	AUGUST 1983

DRAWING NO
SA-14

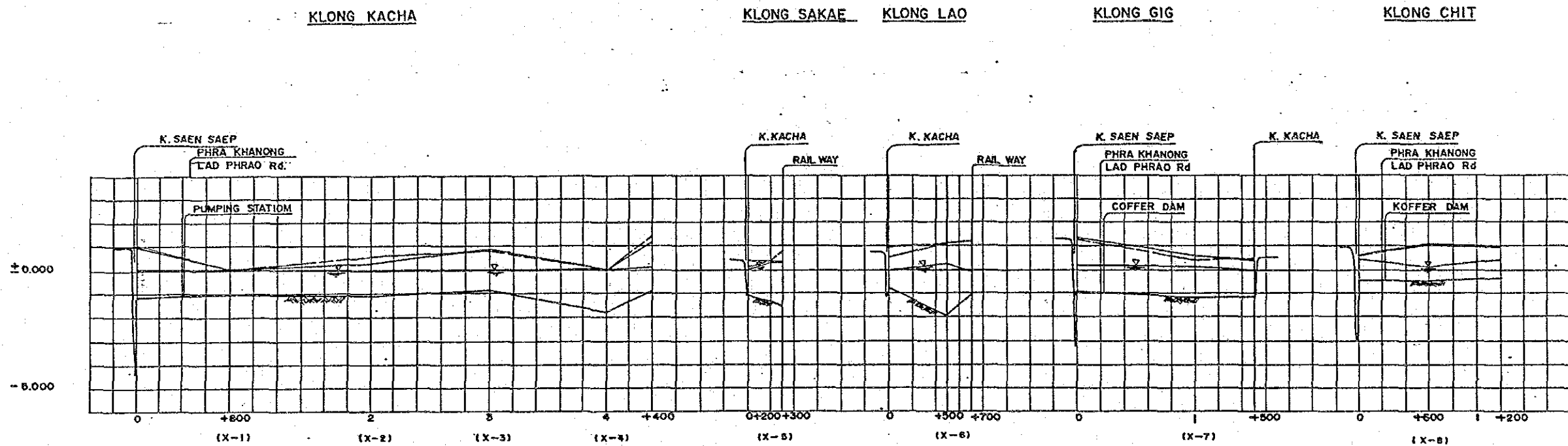


FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG LATPHRAO	
DRAWING NO	SA-15
SCALE	1 : 200
DATE	AUGUST 1983



FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG LATPHRAO	
SCALE	1 : 200
DATE	AUGUST 1983

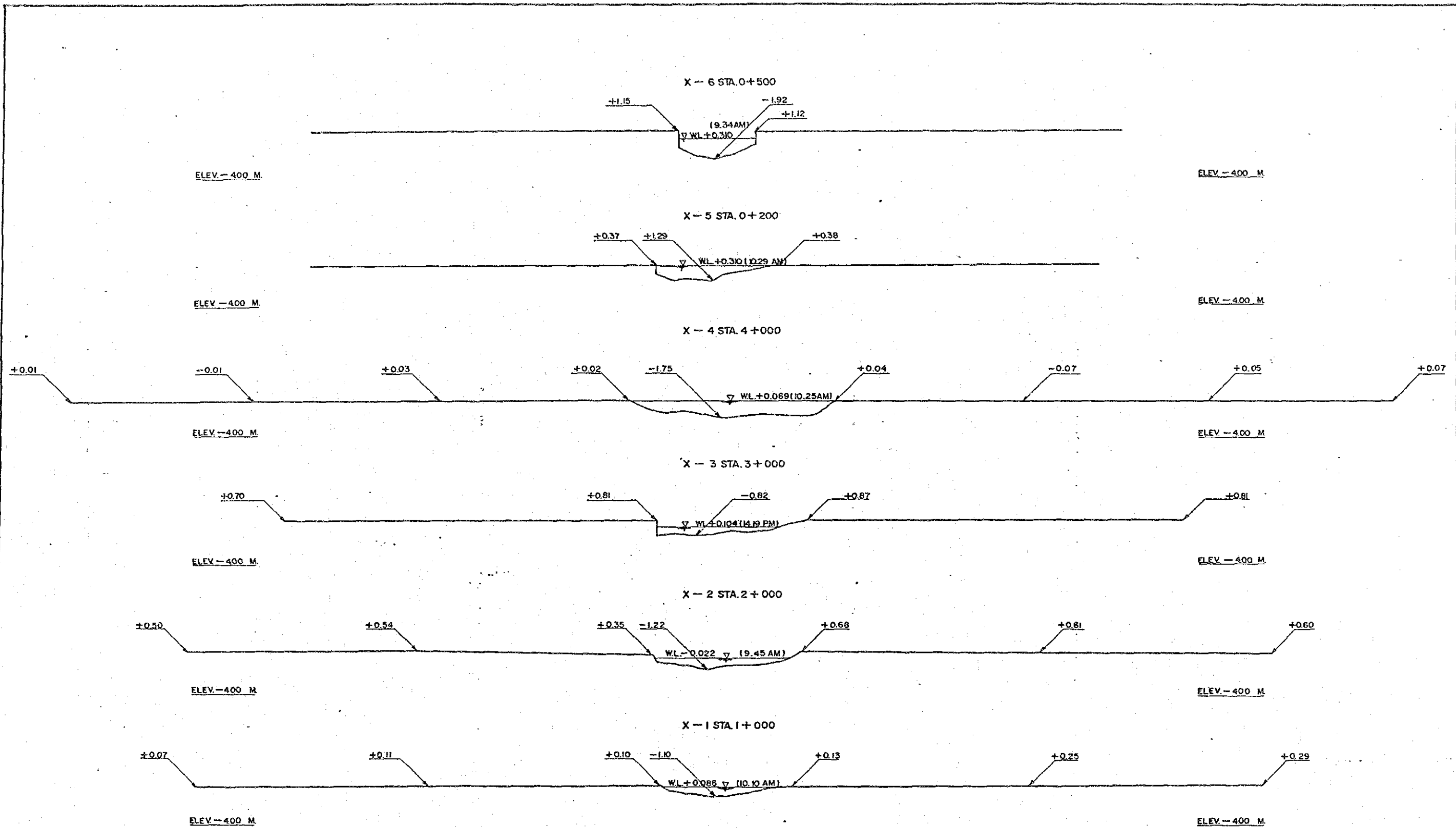
DRAWING NO
SA-16



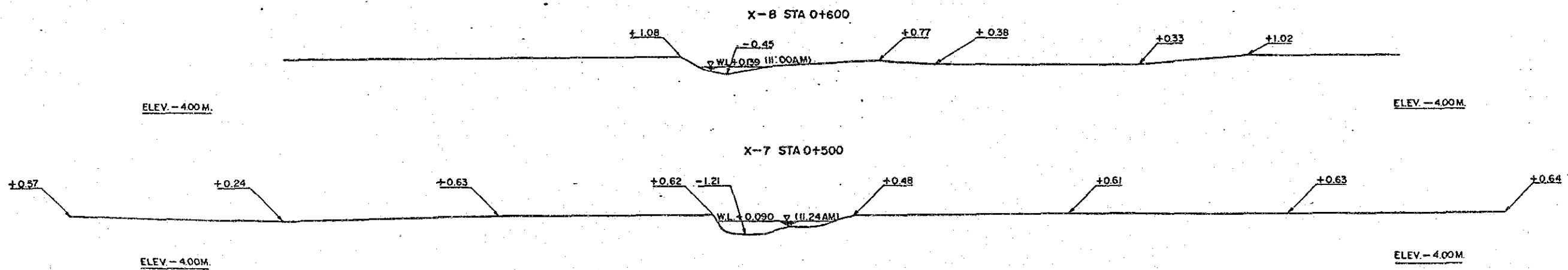
GROUND ELEV.	WATER LEVEL DATA	
	RIGHT	LEFT
1.00	+0.140, 15:49	-1.18
0.15	+0.086, 10:10	-1.10
0.65	+0.025, 9:45	-1.22
0.81	+0.070, 9:40	-0.82
0.40	+0.058, 10:25	-1.75
1.45	+0.140, 13:45	-0.88
0.38	+0.030, 10:35	-1.17
0.37	+0.310, 10:25	-1.79
0.85	+0.310, 10:45	-1.55
0.95	-0.030, 1:45	-0.78
1.12	+0.310, 12:00	-1.92
1.23	-0.020, 1:30	-1.09
1.23	+0.220, 9:35	-0.95
0.48	+0.075, 11:24	-1.21
0.85	-0.040, 11:20	-1.18
0.92	+0.485, 17:00	-0.44
1.02	+0.155, 11:05	-0.45
0.93	+0.450, 16:40	-0.30

DRAWING NO
SA-17

FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
PROFILE OF KLONG IN MODEL AREA	
SCALE	H = 1 : 50,000 V = 1 : 100
DATE	AUGUST 1983



FLOOD PROTECTION / DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG IN MODEL AREA	
DRAWING NO	SA-18
SCALE	1 : 200
DATE	AUGUST 1983



FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG IN MODEL AREA	
DRAWING NO	SA-19
SCALE	1 : 200
DATE	AUGUST 1983

I.B TOPOGRAPHICAL SURVEY IN MASTER PLAN

1985

I.B.1. Introduction

1) General

Urbanization of Bangkok City has been proceeding radially from the center of the city to the suburban areas.

In the process of the urbanization, earth filling on the existing alluvial bed is made, without having systematical city planning, in order to protect residential areas from inundation.

There is only topographical maps of scale 1:20000 and 1:50000 which are insufficient for the study of drainage system in the Master Plan, the data concerning Klongs and drainage facilities has not been summarized yet. Hence, topographical survey is required to supplement the existing data. The location of the survey is shown in Dwg.S-1. According to the results of the survey, artificial ground elevation owing to the urbanization and virgin ground elevation in the study area are found to be 0.4 to 1.8 m and 0.0 to 0.8 m above mean sea level respectively.

As for the topography, the ground surface is inclined from outer area towards the central area. The subsidence due to pumping up of the ground water are observed in almost all of the Study Area and this land subsidence is expanding to outer areas.

2) Objective of the Topographical Survey

The objective of topographical survey is summarized as follows:

- (1) Surveying the ground elevations in the study area.
- (2) Surveying the longitudinal and cross-sectional features of sub klongs.
(Main klongs were surveyed in the stage of Preliminary Study)
- (4) Surveying the level of existing water gauges, Phrakhanong, Bang Sue and Bang Khen Pumping stations.
- (5) Surveying of land subsidence.

3) Scope of work of the Topographical Survey

The survey consists of the following items;

- (1) Control Leveling 190 km
(Spot leveling at interval of 1.0 km and totally 900 points)
- (2) Control Leveling 15 km
(Spot leveling at interval of 1.0 km and totally 300 points)
- (4) Leveling of Flood Marks 60 km
- (5) Leveling of Water Gauge and Pumping Sections 11 points

The allowable accuracy of closure on control leveling is limited to 10 /s mm for main routes and 15 /s mm for others. where;

s; length (km) ;

I.B.2. Bench Marks Survey

In order to obtain the amount of total land subsidence from last year, leveling of the bench marks made in the Preliminary Study was carried out again.

For the installation of bench marks, piles with the length of 10 to 50 m are used, but are affected due to the land subsidence as described before.

Following table shows the results of bench mark survey;

Elevation of BMA Bench Marks (July/1984)

Number	Elevation (m)	Remarks
BM.018	—	JUL/83 ELEV = 4.003
BM.024	1.710	- do - ELEV = 1.829
BM.026	—	- do - ELEV = 2.042
BM.084	1.341	- do - ELEV = 1.407
BM.085	1.310	- do - ELEV = 1.393
BM.086	1.280	- do - ELEV = 1.359
BM.087	1.946	- do - ELEV = 2.015
BM.088	5.157	- do - ELEV = 5.237
BM.100	0.965	- do - ELEV = 1.023
BM.101	0.818	- do - ELEV = 0.908
(BM. 16) *	1.857	- do - ELEV = 2.001

NOTE: 1. BASED ON BM.31 ELEV = 2.425 m
(AIT BENCH MARK)
2. * AIT BENCH MARK

I.B.3 Survey of Existing Water-gauges

Water gauges at 12 points are surveyed in order to clarify the fluctuations due to land subsidence or some other causes.

Table B. Top Elevation of the Foundation for Water Level Gauge

Station	El. on August, 1983	EL. on July, 1984	Difference (m)
A	37.16	37.01	-0.15
B	36.86	36.69	0.17
C	36.99	36.85	-0.14
D	36.75	36.59	0.16
E	36.86	36.71	-0.15
F	36.40	36.32	0.08
G	36.54	36.42	0.12
H	36.80	36.66	0.14
I	35.83	35.71	-0.12
J	36.23	36.13	-0.10
K	36.30	36.21	-0.09
L	36.34	36.20	-0.14

Note: Mean sea level is EL. 35,030 m

I.B.4. Survey of Sub Klongs

Most of the necessary data is acquired from D.S.S.

Existing data concerning Klongs is based on each temporarily measures datum line.

Furthermore, dredging has been carried out in some of the Klongs for the maintenance.

Hence, cross-sectional leveling is made in order to grasp the existing status of the interval of 1.0 km.

the result is summarized in Figure.

I.B.5 Survey of Spot Leveling

Survey of the spot level is conducted to obtain the general features of ground elevations in the study area.

Flood Control Leveling Survey Committee Consisting of RTSD, RID, BMA and Chulalongkoru University has made spot levelings early 1984 in the area enclosed with Klog Saen Saep and National Highway route 34. The data provided by above committee is used as supplemental data for preparation of topographical map at the above mentioned area. Locations of the spot levels executed are shown in Dwg.S-3.

I.B.6 Survey of Flood Marks

Survey of Flood marks of more than 100 points is made when spot leveling and cross-leveling was carried out including re-investigation of 32 flood marks marked on December 1983 by D.D.S.

SURVEY DRAWINGS IN MASTER PLAN

CONTENTS

<u>DWG. NO.</u>	<u>TITLE</u>	<u>PAGE</u>
S-1	Location Map	B-5
S-2	Ground Elevation	B-6
S-3	Spot Elevation	B-7
S-4	Plan of Sub-Klong (1)	B-3
S-5	Plan of Sub-Klong (2)	B-9
S-6	Profile of Sub-Klong (1) - (K. Bang Na, K. Tanang, K. Nam Kaew, K. Bang Jen)	B-10
S-7	-do.- (2) - (K. Lum Phai, K. Wattuk, K. Bang Ao, K. Bang Jak3, K. Sam Khwang Bon)	B-11
S-8	-do.- (3) - (K. Bang Khen, K. Sua Noi, K. San Sab, K. Sakae)	B-12
S-9	-do.- (4) - (K. Bang Jak2, K. Bang Jak1, K. Plub Pla, K. Huai Khwang, K. Khunsakon) ..	B-13
S-10	-do.- (5) - (K. Klet, K. Lam Cheak, K. Bang Sue) .	B-14
S-11	-do.- (6) - (K. Palat Priang, K. Hua Mark, K. Sam Rong)	B-15
S-12	-do.- (7) - (K. Chan, K. Song Kratiam, K. Kwang Bon, K. Kwang Lang).....	B-16
S-13	-do.- (8) - (K. Lad Pra Khao, K. Suan Aoi, K. Ban Lai)	B-17
S-14	Cross Section of Sub Klong (1) - (K. Bang Na, K. Suan Aoi)	B-18
S-15	-do.- (2) - (K. Tanang, K. Nam Daew)	B-19
S-16	-do.- (3) - (K. Palat Priang, K. Lum Phai) .	B-20
S-17	-do.- (4) - (K. Huai Khwang, K. wattuk)	B-21
S-18	-do.- (5) - (K. Bang Ao, K. Bang Jak3, K. Bang Jak2, K. Bang Jak1)	B-22
S-19	-do.- (6) - (K. Sam Saen Nok, K. Sam Saen) .	B-23
S-20	-do.- (7) - (K. Lad Pra Chao, K. Sua Noi) ..	B-24
S-21	-do.- (8) - (K. Bang Khen)	B-25
S-22	-do.- (9) - (K. Bang Sue)	B-26
S-23	-do.- (10) - (K. Hua Mark, K. San Sab)	B-27

<u>DWG. NO.</u>	<u>TITLE</u>	<u>PAGE</u>
S-24	Cross Dection of Sub Klong (11) - (K. Klet, K. Bang Nang Jen, K. Kwang Lang)	B-28
S-25	-do.- (12) - (K. Sam Rong)	B-29
S-26	-do.- (13) - (K. Bang Lai, K. Kwang Bon) ..	B-30
S-27	-do.- (14) - (K. Chan, K. Huai Khwang Bon).	B-31
S-28	-do.- (15) - (K. Khunsakon)	B-32
S-29	-do.- (16) - (K. Lam Cheak, K. Song Kratiam) B-33	

Elevation of BMA Bench Marks (July/1984)

Number	Elevation (m)	Remarks
BM. 018	—	JUL/83 ELEV = 4.003
BM. 024	1.710	- do - ELEV = 1.829
BM. 026	—	- do - ELEV = 2.042
BM. 084	1.341	- do - ELEV = 1.407
BM. 085	1.310	- do - ELEV = 1.393
BM. 086	1.280	- do - ELEV = 1.359
BM. 087	1.946	- do - ELEV = 2.015
BM. 088	5.157	- do - ELEV = 5.237
BM. 100	0.965	- do - ELEV = 1.023
BM. 101	0.818	- do - ELEV = 0.908
(BM. 16) *	1.857	- do - ELEV = 2.001

NOTE: 1. BASED ON BM. 31 ELEV = 2.425 m
(AIT BENCH MARK)

2. * AIT BENCH MARK



LEGEND

- : BOUNDARY OF MASTER PLAN AREA
- : CONTROL LEVELLING SURVEY (INTERVAL OF 1CM)
- - - : CONTROL LEVELLING SURVEY (INTERVAL OF 0.5 KM)
- · - · : CROSS SECTION SURVEY
- FM : LEVELLING SURVEY FOR FLOOD MARKS
- : BENCH MARK

DRAWING NO

S-1

Location Map

FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN-BANGKOK



DRAWING NO:
S-2

Ground Elevation

FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN-BANGKOK



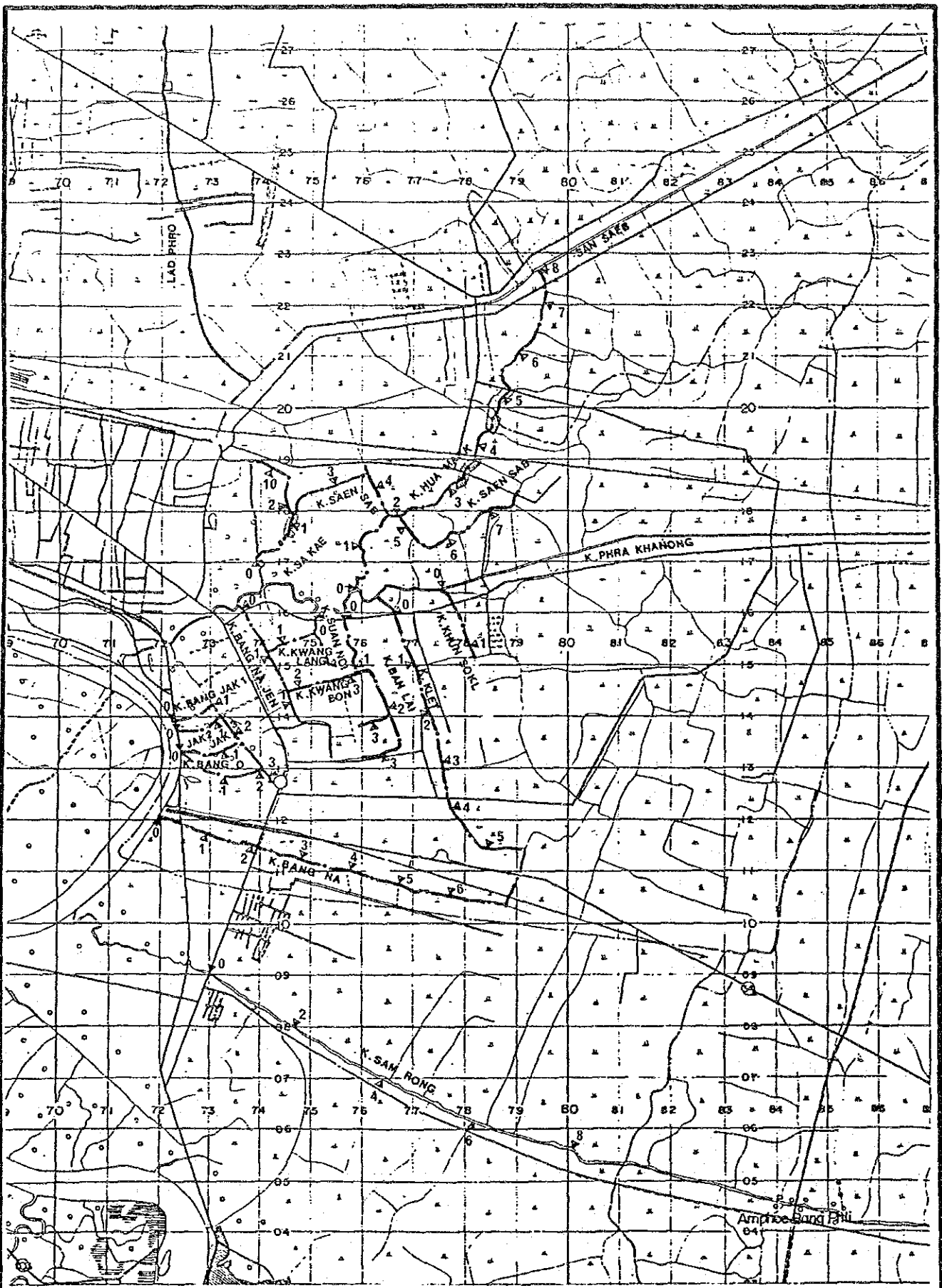
Note : This map are derived based on the survey performed by JICA and "Flood Survey Committee" organized by ASD, RID, RTSD and Chulalongkorn university (1984). Figures in parenthesis show the elevation of the roads.

DRAWING NO

S - 3

Spot Elevation

FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN-BANGKOK

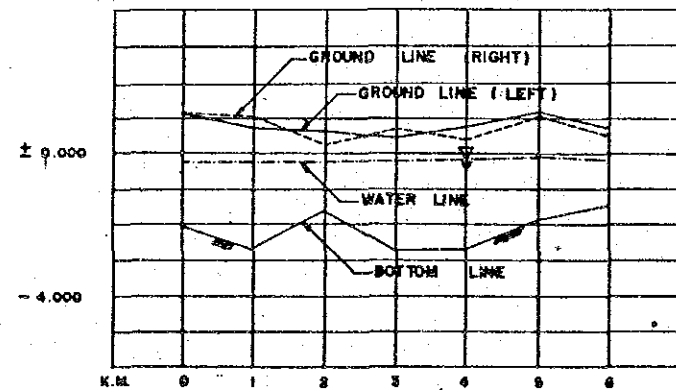


DRAWING NO

S-4

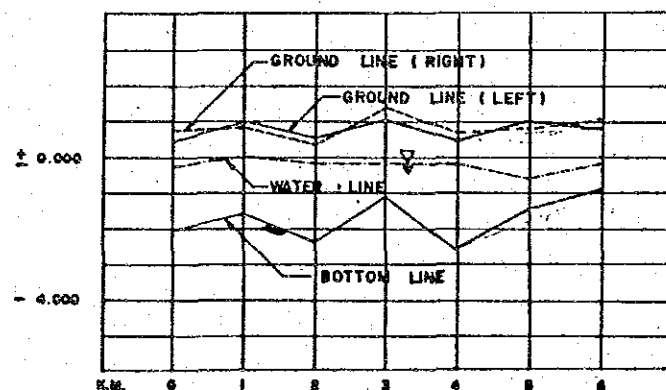
Plan of Sub-Klong (1)

MASTER PLAN ON FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN-BANGKOK



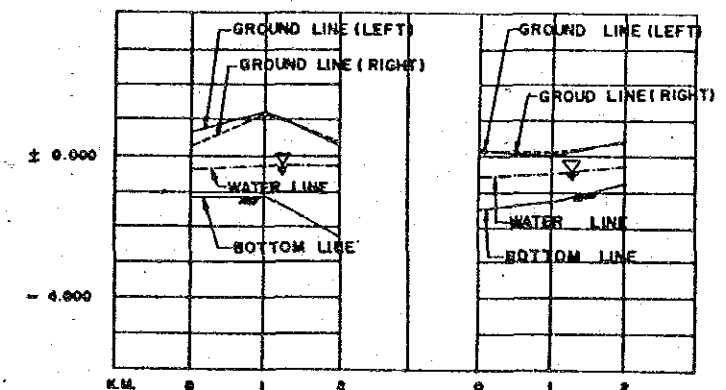
GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
1.15	1.12	-2.02	-0.24	9.30 7/6
1.09	0.71	-2.74	-0.25	14.48 8/22
0.23	0.81	-1.81	-0.25	14.00 8/22
0.08	0.46	-2.72	-0.22	13.25 8/22
0.40	0.75	-2.71	-0.15	11.00 8/22
1.07	1.18	-1.89	-0.09	10.30 8/22
0.31	0.70	-1.48	-0.13	9.48 8/22

KLONG BANG NA H=1:50,000
V=1:100



GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
0.66	0.37	-2.15	-0.34	10.58 7/9
0.73	0.90	-1.99	-0.08	11.17 7/9
0.27	0.48	-2.46	-0.21	12.33 7/9
1.32	1.00	-1.70	-0.21	12.39 7/10
0.82	0.44	-2.82	-0.22	12.10 7/10
0.78	0.02	-1.93	-0.22	13.33 7/10
1.07	0.70	-0.98	-0.21	14.15 7/9

KLONG TANANG H=1:50,000
V=1:100

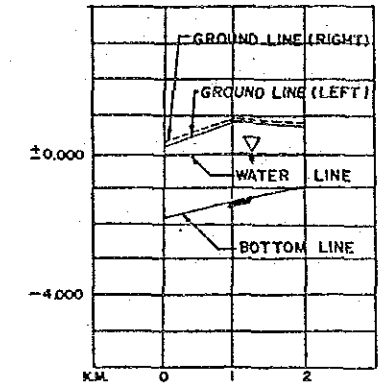
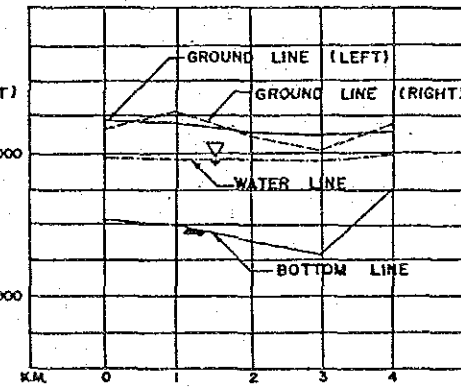
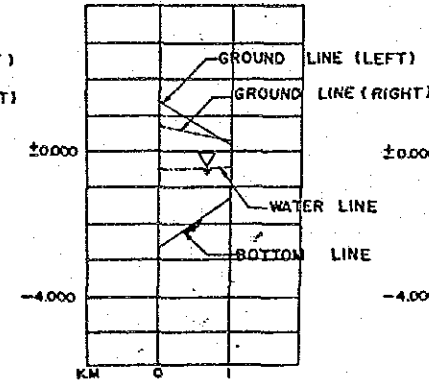
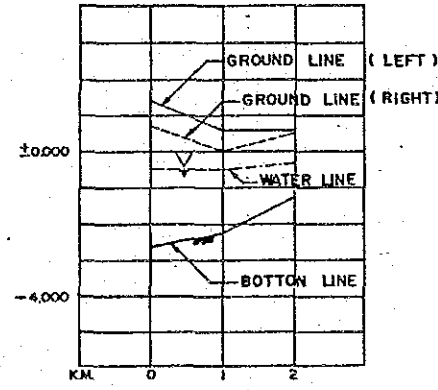
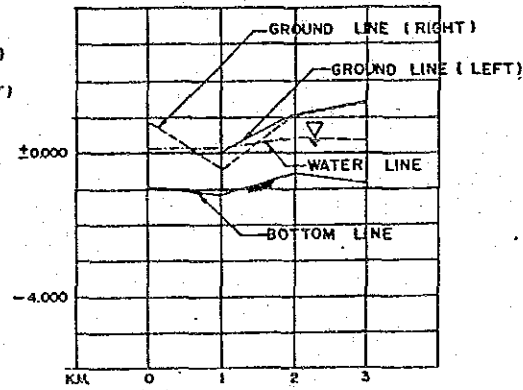
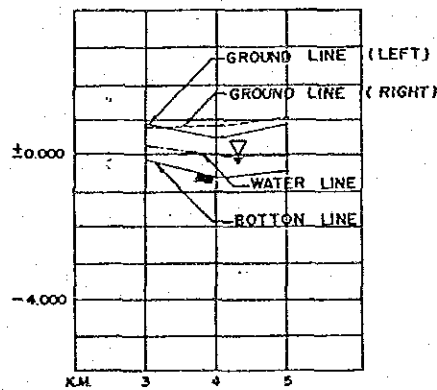


GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
0.33	0.72	-1.12	-0.32	14.40 8/22
1.21	1.23	-1.12	-0.22	13.32 8/22
0.41	0.39	-2.30	-0.20	10.28 8/22
0.13	0.18	-1.44	-0.87	10.40 8/10
0.14	0.07	-1.28	-0.44	11.40 8/10
0.41	0.43	-0.74	-0.20	10.80 8/9

KLONG NAM KAEW H=1:50,000 V=1:100
KLONG BANG NANG JEN H=1:50,000 V=1:100

DRAWING NO
S-6

FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
PROFILE OF KLONG BANGNA; TANANG; NAM KAEW; BANG NANG JEN	
SCALE	H=1:50,000 ; V=1:100
DATE	JUNE 1964



GROUND ELEV.		BOTTOM ELEV.		WATER LEVEL DATA	
RIGHT	LEFT	ELEV.	ELEV.	ELEV.	TIME, DATE
0.73	0.82	-0.16		+0.24	11.20 7/3
0.77	0.46	-0.84		-0.03	11.13 7/3
1.05	0.81	-0.46		-0.05	11.05 7/3

GROUND ELEV.		BOTTOM ELEV.		WATER LEVEL DATA	
RIGHT	LEFT	ELEV.	ELEV.	ELEV.	TIME, DATE
0.85	-	-0.50		+0.11	10.37 7/16
-0.47	0.09	-1.19		+0.11	10.51 7/16
1.03	1.04	-0.50		+0.49	11.21 7/16
1.39	1.23	-0.87		+0.49	11.52 7/16

GROUND ELEV.		BOTTOM ELEV.		WATER LEVEL DATA	
RIGHT	LEFT	ELEV.	ELEV.	ELEV.	TIME, DATE
0.78	1.45	-2.61		-0.44	11.50 6/22
0.02	0.61	-2.23		-0.43	10.50 6/22
0.55	0.56	-1.25		-0.27	10.30 6/22

GROUND ELEV.		BOTTOM ELEV.		WATER LEVEL DATA	
RIGHT	LEFT	ELEV.	ELEV.	ELEV.	TIME, DATE
0.72	1.45	-2.26		-0.44	11.50 6/22
0.35	0.21	-1.23		-0.39	10.50 6/23

GROUND ELEV.		BOTTOM ELEV.		WATER LEVEL DATA	
RIGHT	LEFT	ELEV.	ELEV.	ELEV.	TIME, DATE
0.67	0.91	-1.81		-0.13	10.10 6/28
1.16	0.84	-1.97		-0.17	16.40 6/28
0.52	0.61	-2.36		-0.14	11.35 6/28
0.11	0.57	-2.79		-0.19	12.28 6/27
0.83	0.67	-0.97		-0.02	11.15 6/27

GROUND ELEV.		BOTTOM ELEV.		WATER LEVEL DATA	
RIGHT	LEFT	ELEV.	ELEV.	ELEV.	TIME, DATE
0.40	0.29	-1.71		+0.06	13.20 6/18
1.04	0.97	-1.23		+0.07	2.44 6/18
0.93	0.82	-0.83		+0.07	9.34 6/18

KLONG LUM PHAI H = 1 : 50,000
V = 1 : 100

KLONG WATTUK H = 1 : 50,000
V = 1 : 100

KLONG BANG AO H = 1 : 50,000
V = 1 : 100

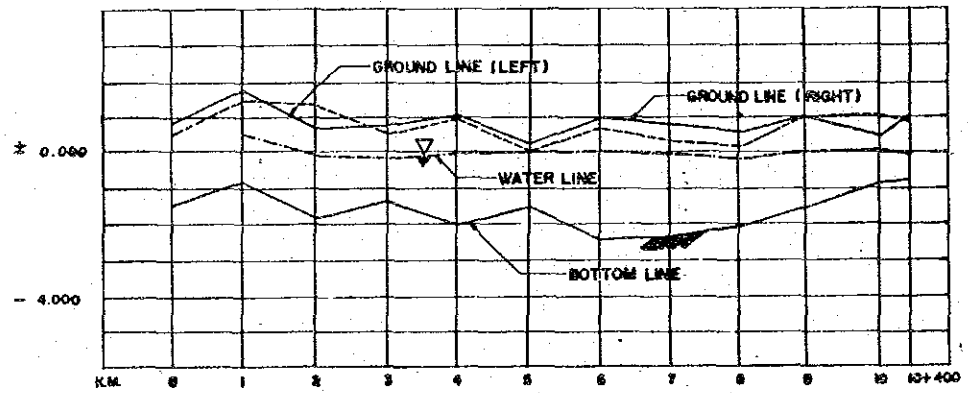
KLONG BANG JAK 3 H = 1 : 50,000
V = 1 : 100

KLONG SAMSAEN H = 1 : 50,000
V = 1 : 100

KLONG HUAI KHUANG BON H = 1 : 50,000
V = 1 : 100

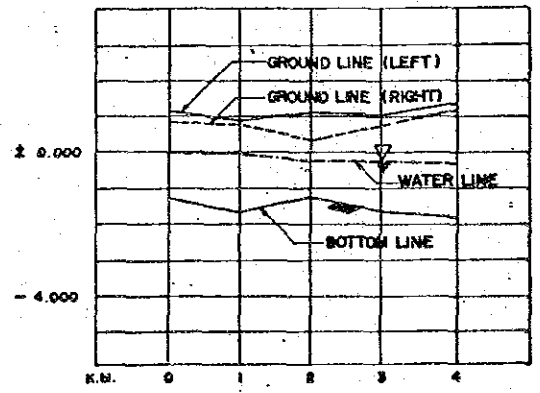
DRAWING NO
S-7

FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
PROFILE OF KLONG LUMPHAI; WATTUK; BANG AO; BANG JAK 3 KLONG SAMSAEN; HUAI KHUANG BON	
SCALE	H=1:50000; V=1:100
DATE	JUNE 1984



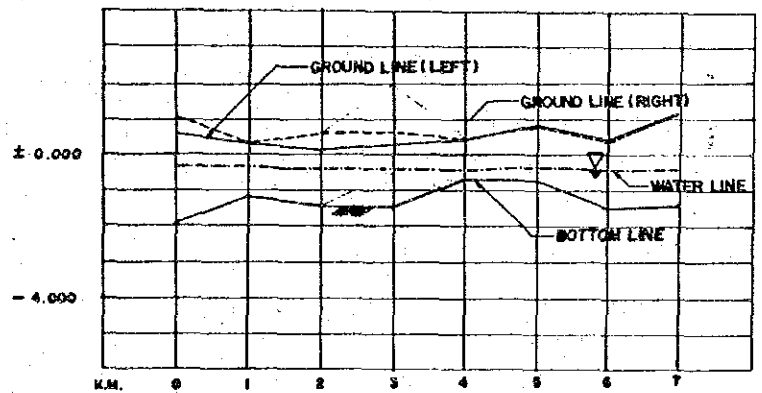
GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME - DATE
0.52	0.91	- 1.49	-	-
1.49	1.75	- 0.90	0.51	11.00 8/12
1.35	0.70	- 1.60	- 0.04	12.25 8/14
0.32	0.77	- 1.32	- 0.17	11.35 8/12
0.83	1.05	- 2.02	- 0.02	12.45 8/12
0.01	0.22	- 1.58	0.02	12.30 8/14
0.89	0.84	- 2.45	0.04	11.00 8/14
0.31	0.70	- 2.35	- 0.04	12.30 8/12
0.17	0.94	- 2.09	- 0.19	11.35 8/12
0.98	0.90	- 1.95	- 0.60	11.30 8/12
1.02	0.44	- 0.89	0.03	11.00 8/12
0.75	1.00	- 0.70	- 0.09	11.30 8/12

KLONG BANG KHEN H = 1 : 50,000
V = 1 : 100



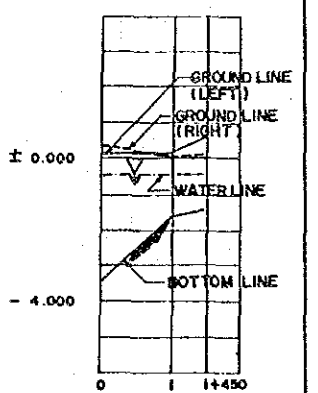
GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME - DATE
0.37	1.16	- 1.28	- 0.02	10.35 8/26
0.77	0.06	- 1.87	- 0.02	10.25 8/26
0.34	1.13	- 1.28	- 0.25	14.30 8/26
0.75	1.05	- 1.83	- 0.33	14.40 8/26
1.19	1.36	- 1.80	- 0.30	15.40 8/26

KLONG SUA NOI H = 1 : 50,000
V = 1 : 100



GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME - DATE
1.01	0.99	- 1.99	- 0.39	10.30 8/26
0.30	0.26	- 1.33	- 0.36	10.30 8/26
0.86	0.10	- 1.46	0.46	10.05 8/26
0.81	0.39	- 1.43	- 0.43	13.31 8/25
0.45	0.40	- 0.71	- 0.43	13.35 8/25
0.77	0.79	- 0.72	- 0.39	13.05 8/26
0.32	0.40	- 1.31	- 0.41	13.21 8/26
0.83	0.85	- 1.46	- 0.41	13.35 8/26

KLONG SAN SAB H = 1 : 50,000
V = 1 : 100



GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME - DATE
0.39	0.11	- 3.49	- 0.49	11.26 8/25
0.04	0.12	- 1.87	- 0.46	11.06 8/26
0.10	0.56	- 1.46	- 0.46	11.03 8/25

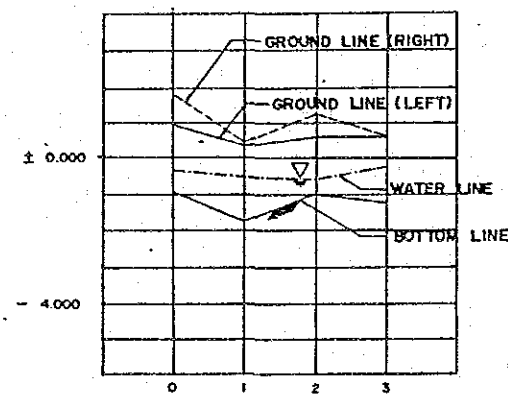
KLONG SAKAE H = 1 : 50,000
V = 1 : 100

FLOOD PROTECTION/ DRAINAGE PROJECT
IN
EASTERN SUBURBAN - BANGKOK

PROFILE
OF
KLONG BANG KHEN ; SUA NOI ; SAN SAB ; SAKAE

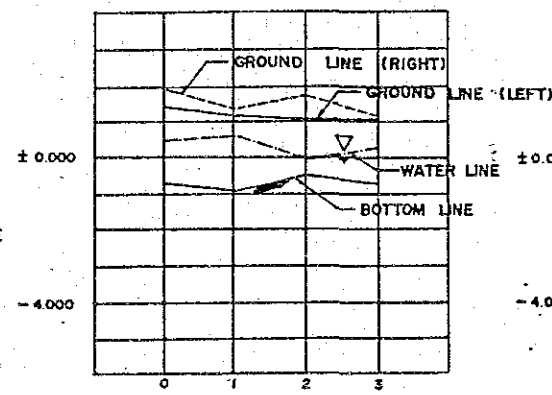
SCALE H = 1 : 50,000 ; V = 1 : 100
DATE JULY 1984

DRAWING NO
S-8



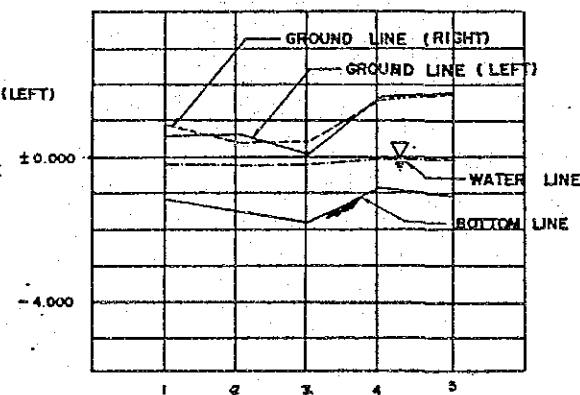
GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT	ELEV.	TIME	DATE
1.75	0.95	-0.93	-0.37	9.30 6/26
0.43	0.32	-1.77	-0.35	9.50 6/26
1.21	0.56	-1.00	-0.58	11.00 6/26
0.63	0.37	-1.23	-0.27	11.30 6/26

KLONG BANG JAK 2 H = 1 : 50,000
V = 1 : 100



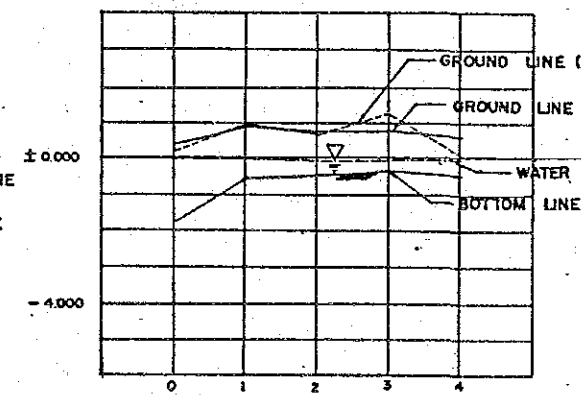
GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT	ELEV.	TIME	DATE
1.38	0.88	-1.22	-0.03	12.30 6/26
0.81	0.64	-1.44	0.08	10.20 6/26
1.21	0.56	-1.00	-0.58	11.00 6/26
0.83	0.37	-1.23	-0.27	11.30 6/26

KLONG BANG JAK 1 H = 1 : 50,000
V = 1 : 100



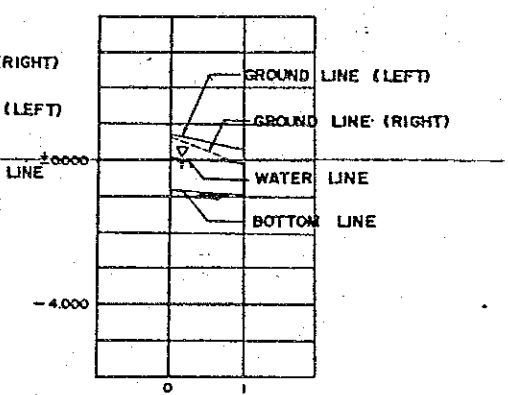
GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT	ELEV.	TIME	DATE
0.91	0.65	-1.13	-0.13	10.40 6/28
0.45	0.69	-1.48	-0.18	14.31 7/4
0.47	0.14	-1.77	-0.15	15.19 7/4
1.60	1.69	-0.83	-0.01	11.30 7/4
1.76	1.80	-1.06	-0.06	11.40 7/4

KLONG PLUB PLA H = 1 : 50,000
V = 1 : 100



GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT	ELEV.	TIME	DATE
0.28	0.40	-1.71	0.08	13.20 6/28
0.90	0.96	-0.95	0.08	16.00 6/28
0.66	0.70	-0.90	-0.07	13.25 6/28
1.20	0.73	-0.39	-0.08	14.25 6/30
0.02	0.56	-0.51	-0.07	15.15 6/30

KLONG HUI KHUANG H = 1 : 50,000
V = 1 : 100



GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT	ELEV.	TIME	DATE
0.60	0.70	-0.88	0.09	10.00 7/6
-0.17	0.26	-0.95	0.11	9.45 7/18

KLONG KHUNSAKON H = 1 : 50,000
V = 1 : 100

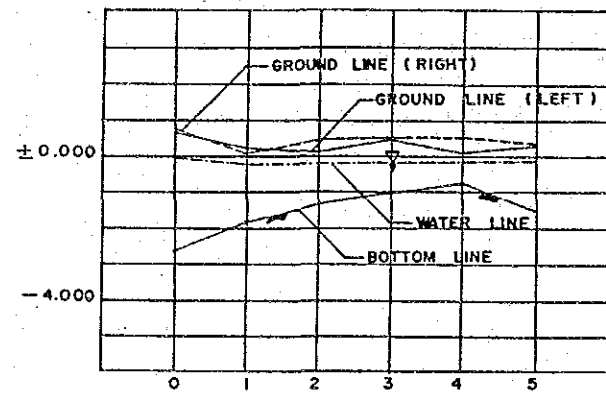
DRAWING NO.

S-9

FLOOD PROTECTION/DRAINAGE PROJECT
IN
EASTERN SUBURBAN - BANGKOK

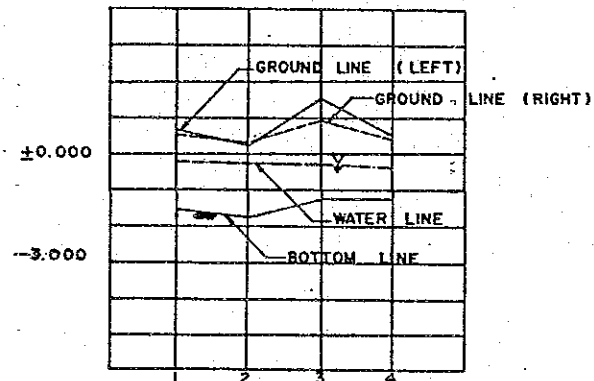
PROFILE
OF
KLONG BANG JAK 2; BANG JAK 1; PLUB PLA
KLONG HUI KHUANG; KHUNSAKON

SCALE	H = 1 : 50,000 ; V = 1 : 100
DATE	JULY 1984



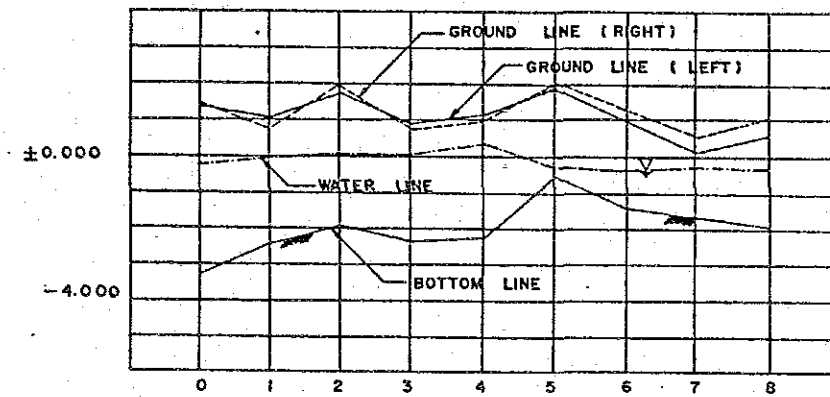
GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
0.77	0.87	-2.83	-0.08	1228 7/6
0.07	0.20	-1.88	-0.22	10.45 7/6
0.47	0.10	-1.32	-0.20	11.20 7/6
0.54	0.49	-1.03	-0.20	11.40 7/6
0.51	0.09	-0.78	-0.16	12.30 7/6
0.39	0.26	-1.34	-0.12	13.30 7/6

KLONG KLET H = 1 : 50,000
V = 1 : 100



GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
0.30	0.68	-1.52	-0.22	12.55 7/7
0.31	0.26	-1.77	-0.27	10.00 7/7
0.59	1.59	-1.24	-0.28	11.30 7/7
0.46	0.56	-1.23	-0.30	12.30 7/7

KLONG LAM CHEAK H = 1 : 50,000
V = 1 : 100

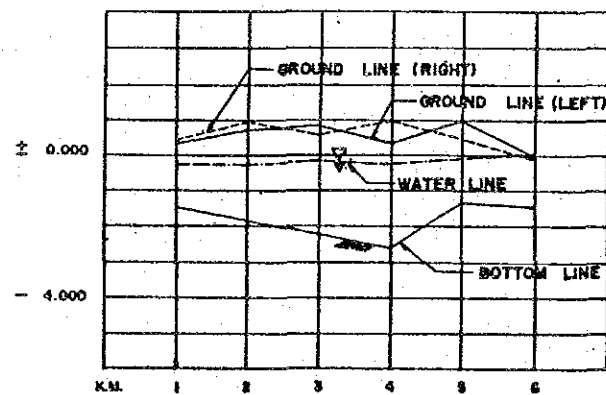


GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
1.42	1.39	-3.37	-0.27	12.05 6/12
0.72	1.04	-2.45	-0.07	10.45 6/12
1.96	1.74	-1.86	+0.04	14.00 6/12
0.78	0.89	-2.35	+0.04	10.00 6/11
0.94	1.16	-2.21	+0.39	12.25 6/11
2.06	1.90	-0.34	-0.30	13.05 6/22
1.29	0.98	-1.40	-0.40	10.06 6/22
0.52	0.14	-1.89	-0.29	13.50 6/22
1.20	0.62	-1.90	-0.30	14.24 6/22

KLONG BANG SUE H = 1 : 50,000
V = 1 : 100

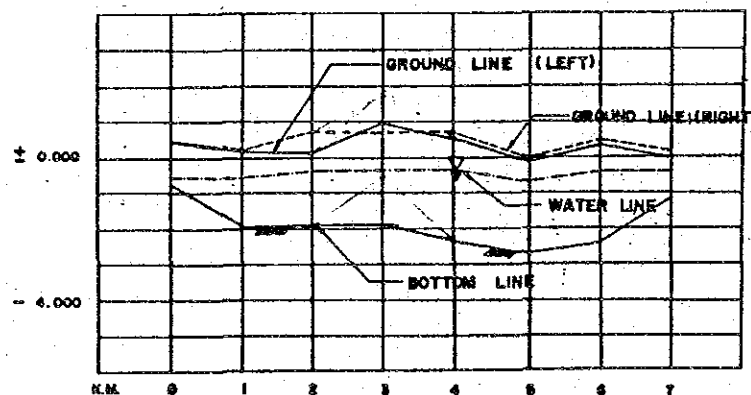
DRAWING NO
S-10

FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
PROFILE OF KLONG KLET; LAMCHEAK; BANG SUE	
SCALE	H=1 : 50,000 ; V=1 : 100
DATE	JUNE 1984



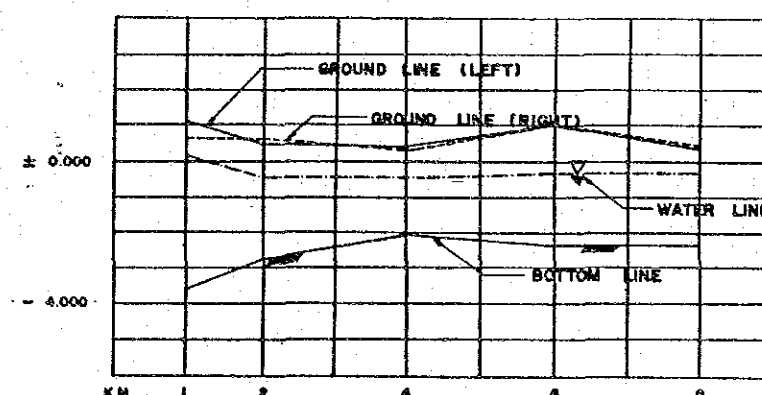
GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
0.42	0.36	-1.48	0.21	10.26 7/77
0.30	0.71	-1.94	0.21	11.34 7/77
0.85	0.83	-2.24	0.16	12.06 7/77
0.97	0.34	-2.82	0.21	13.17 7/77
0.48	0.96	-1.39	0.12	13.48 7/77
0.18	0.08	-1.47	0.05	16.00 7/77

KLONG PALAT PRIANG H = 1 : 50,000
V = 1 : 100



GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
0.44	0.45	-0.77	-0.54	0.10 6/78
0.21	0.18	-1.84	-0.84	0.39 6/78
0.73	0.10	-1.91	-0.39	0.80 6/78
0.72	0.38	-1.64	-0.33	0.88 6/78
0.70	0.88	-2.31	-0.31	0.08 6/78
0.04	-0.06	-2.84	-0.62	0.06 6/78
0.88	0.42	-2.34	-0.33	0.27 6/78
0.28	0.07	-1.82	-0.31	0.16 8/78

KLONG HUA MARK H = 1 : 50,000
V = 1 : 100

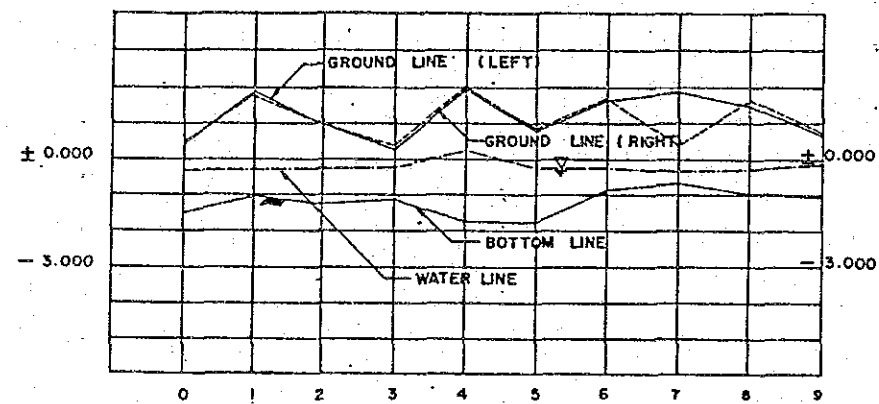


GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
0.64	1.27	-3.85	0.16	0.30 7/78
0.88	0.60	-2.77	-0.48	0.40 7/3
0.32	0.44	-2.05	-0.43	0.00 7/3
1.02	1.01	-2.32	-0.30	0.30 7/3
0.31	0.40	-2.31	-0.30	0.00 7/3

KLONG SAMRONG H = 1 : 50,000
V = 1 : 100

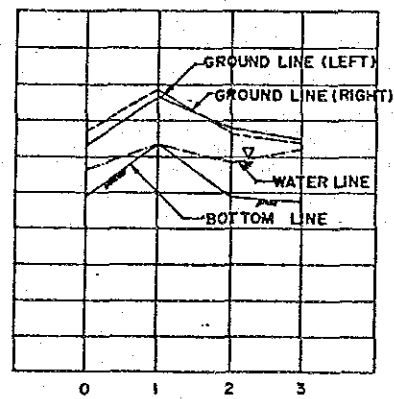
FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN -- BANGKOK	
PROFILE OF KLONG PALAT PRIANG; HUA MARK; SAM RONG	
SCALE	H = 1 : 50,000 ; V = 1 : 100
DATE	JUNE ; JULY 1984

DRAWING NO.
S-11



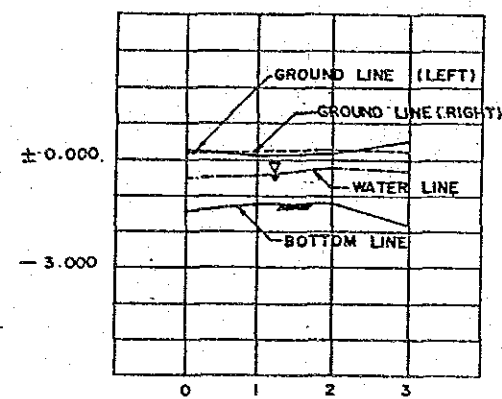
GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
0.49	0.40	-1.50	-0.33	10.46 6/30
1.75	1.65	-1.04	-0.23	12.45 6/28
0.94	0.91	-1.26	-0.29	13.00 6/28
0.33	0.21	-1.16	-0.24	13.25 6/29
1.97	1.96	-1.79	0.22	11.10 6/28
0.81	0.76	-1.77	-0.28	13.40 6/30
1.66	1.60	-0.88	-0.28	13.30 6/30
0.39	1.89	-0.65	-0.30	15.44 7/3
1.61	1.52	-0.96	-0.27	15.52 7/3

KLONG CHAN H=1:50,000
V=1:100



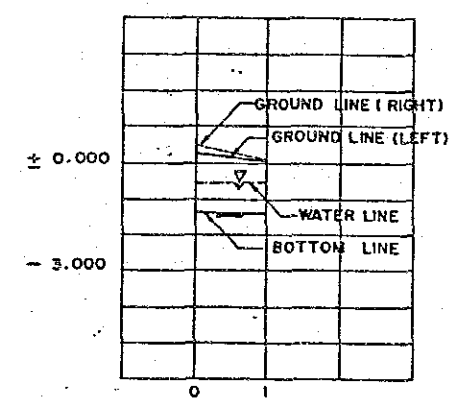
GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
0.72	0.33	-1.12	-0.32	14.40 6/28
1.07	1.67	0.37	NO W.L.	
0.62	0.78	-1.12	-0.12	10.24 6/28
0.30	0.45	-1.28	0.22	10.30 6/28

KLONG SONG KRATIAM
H=1:50,000
V=1:100



GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
0.13	0.18	-1.44	-0.37	9.31 6/23
0.14	0.07	-1.25	-0.44	9.45 6/23
0.23	-0.12	-1.27	-0.28	10.00 6/23
0.17	0.44	-1.87	-0.37	14.00 6/23

KLONG KWANG BON H=1:50,000
V=1:100

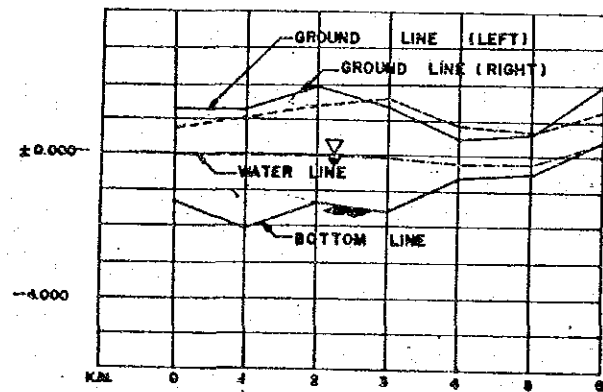


GROUND ELEV.		BOTTOM ELEV.	WATER LEVEL DATA	
RIGHT	LEFT		ELEV.	TIME, DATE
0.46	0.27	-1.36	-0.56	10.55 6/25
0.10	0.06	-1.37	-0.50	11.30 6/25

KLONG KWANG LANG H=1:50,000
V=1:100

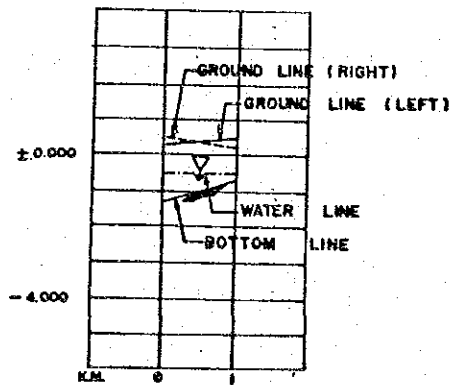
FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
PROFILE OF KLONG CHAN ; SONGKRATIAM ; KWANG BON ; KWANGLANG	
SCALE	H=1:50,000 ; V=1:100
DATE	JUNE 1984

DRAWING NO
S-12



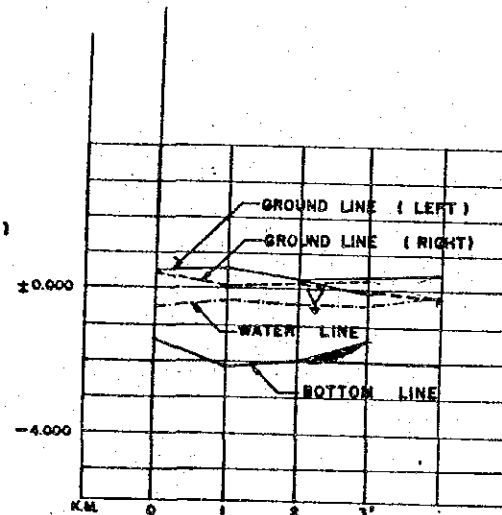
GROUND ELEV.		BOTTOM ELEV.		WATER LEVEL DATA	
RIGHT	LEFT			ELEV.	TIME, DATE
0.71	1.26	-1.27	-1.27	-0.07	11.10 6/24
1.06	1.60	-2.07	-2.07	-0.07	10.28 6/23
1.34	1.86	-1.37	-1.37	-0.07	10.33 6/23
1.55	1.8	-1.20	-1.20	-0.10	13.50 6/24
0.81	0.46	-0.88	-0.88	-0.26	14.27 6/25
0.65	0.59	-0.56	-0.56	-0.26	14.51 6/25
1.24	1.56	0.33	0.33	-	-

KLONG LAD PRA KHAO H = 1 : 50,000
V = 1 : 100



GROUND ELEV.		BOTTOM ELEV.		WATER LEVEL DATA	
RIGHT	LEFT			ELEV.	TIME, DATE
0.48	0.27	-1.35	-1.35	-0.56	10.55 6/10
0.20	0.44	-0.76	-0.76	-0.21	12.00 6/10

KLONG SUAN AOI H = 1 : 50,000
V = 1 : 100

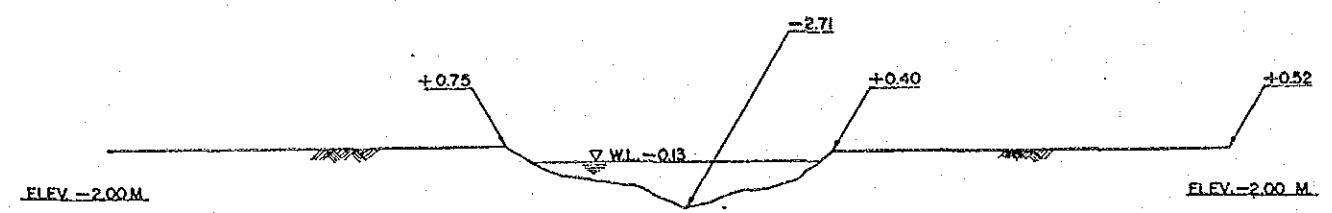


GROUND ELEV.		BOTTOM ELEV.		WATER LEVEL DATA	
RIGHT	LEFT			ELEV.	TIME, DATE
0.36	0.45	-1.44	-1.44	-0.34	11.20 6/18
0.07	0.36	-2.26	-2.26	-0.34	13.00 6/18
0.17	0.24	-2.02	-2.02	-0.27	10.48 6/18
0.25	-0.13	-1.48	-1.48	-0.41	10.30 6/18
-0.25	0.42	-2.05	-2.05	-0.25	14.20 6/18

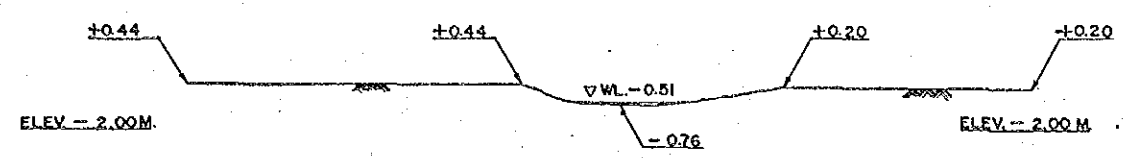
KLONG BAN LAI H = 1 : 50,000
V = 1 : 100

DRAWING NO
S-13

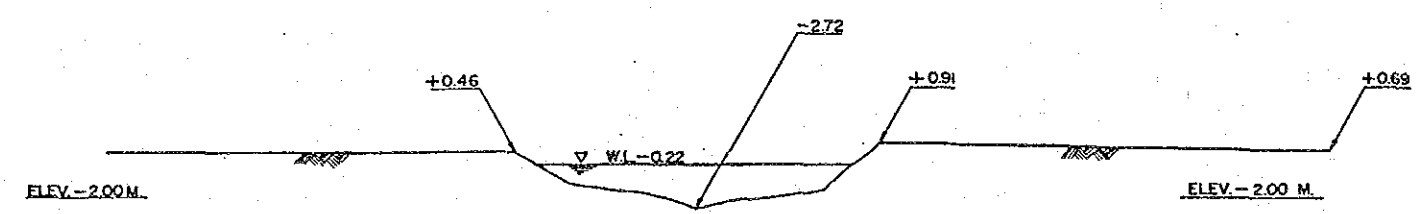
FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
PROFILE OF KLONG LAD PRA KHAO; SUAN AOI; BAN LAI	
SCALE	H = 1 : 50,000 ; V = 1 : 100
DATE	JUNE 1984



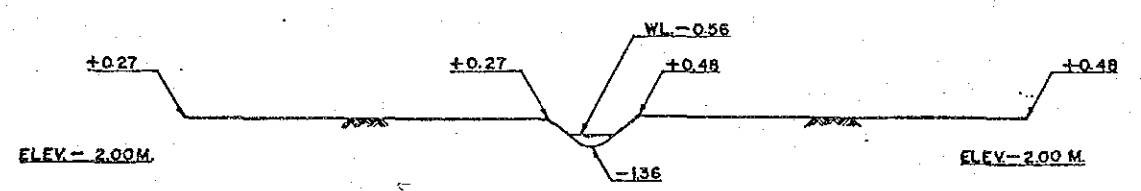
X-4 STA 4+000 (11.00, 22/6)



X-1 STA 1+000 (12.00, 18/6)

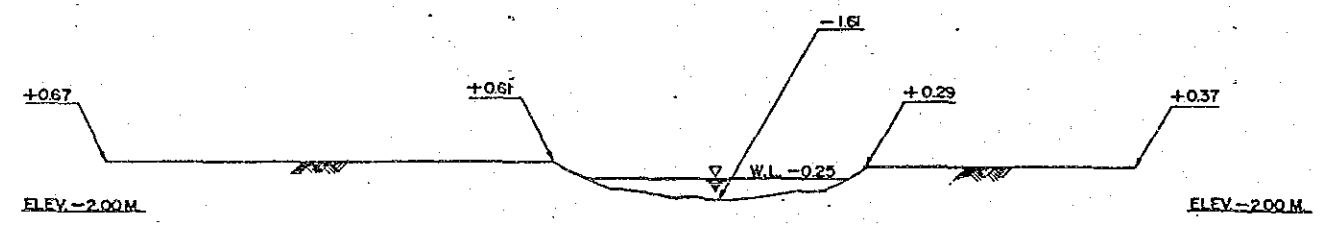


X-3 STA 3+000 (13.25, 22/6)

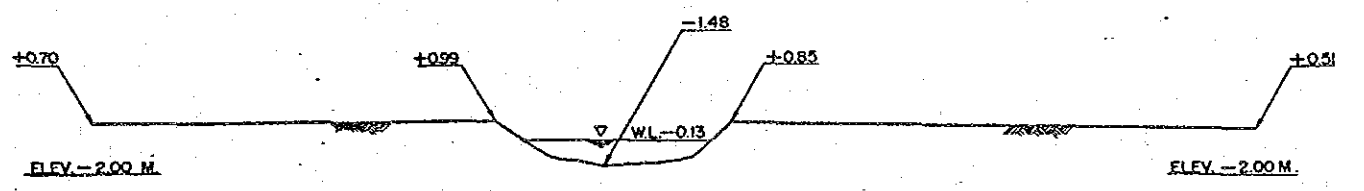


X-0 STA 0+000 (10.55, 18/6)

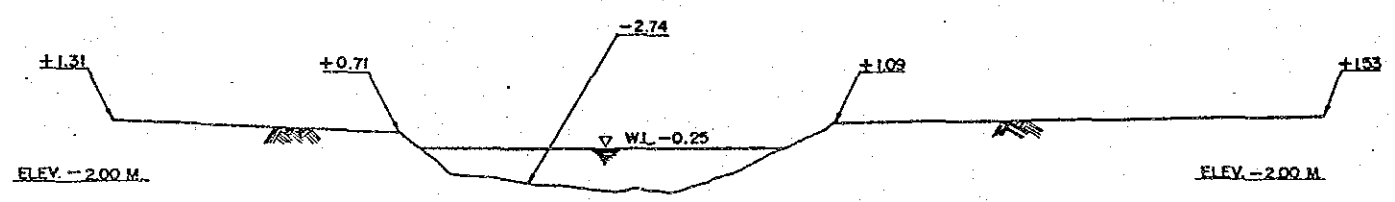
KLONG SUAN AOI



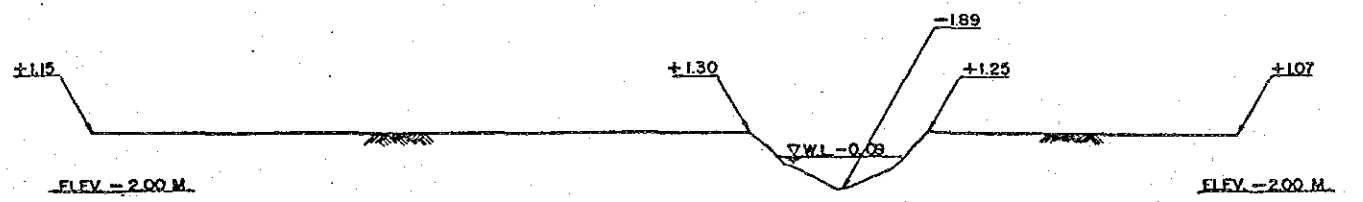
X-2 STA 2+000 (14.00, 22/6)



X-6 STA 6+000 (9.45, 22/6)

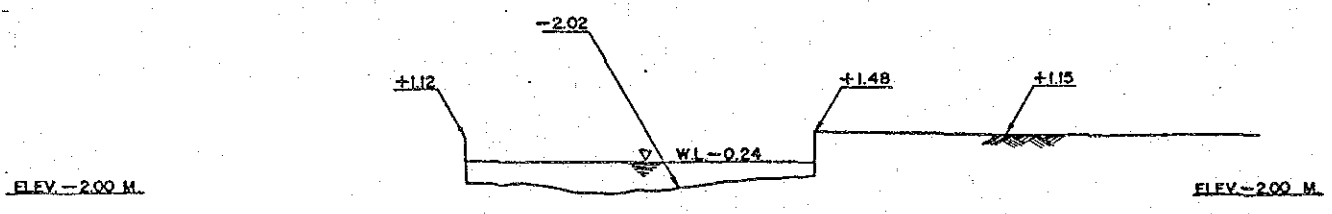


X-1 STA 1+000 (14.45, 22/6)



X-5 STA 5+000 (10.30, 22/6)

KLONG BANG NA

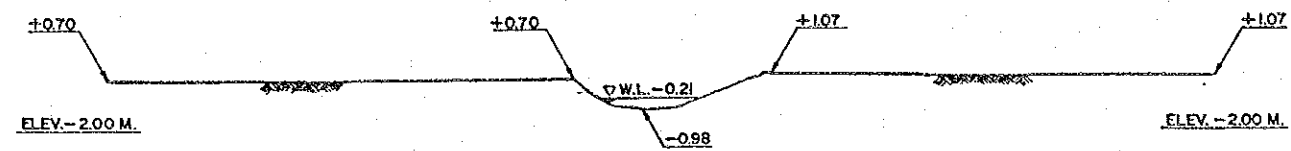


X-0 STA 0+000 (9.35, 6/7)

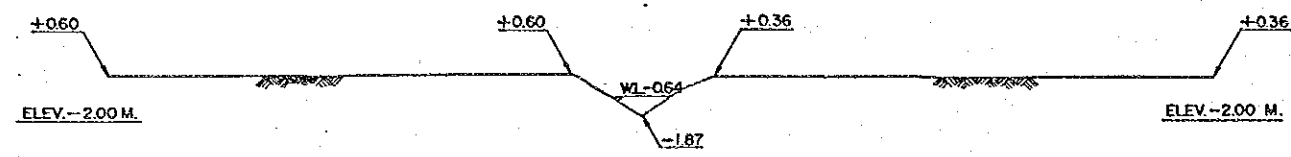
KLONG BANG NA

FLOOD PROTECTION/DRAINAGE PROJECT	
IN	
EASTERN SUBURBAN - BANGKOK	
CROSS SECTION	
OF	
KLONG BANG NA KLONG SUAN AOI	
SCALE	1 : 200
DATE	

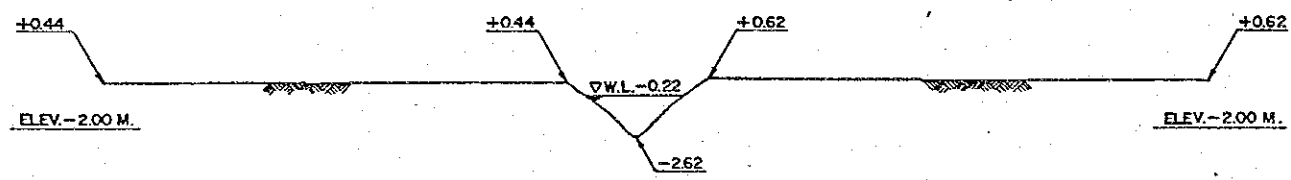
DRAWING NO
S-14



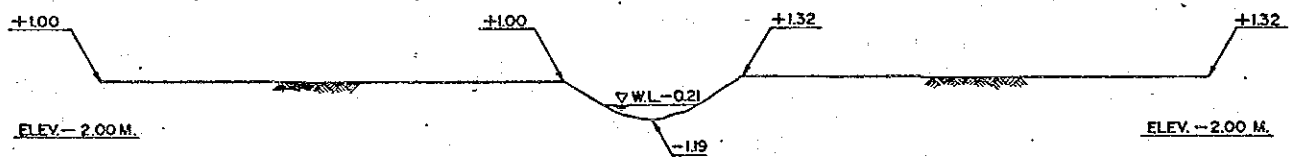
X-6 STA 6+000 (14.15, 9/7)



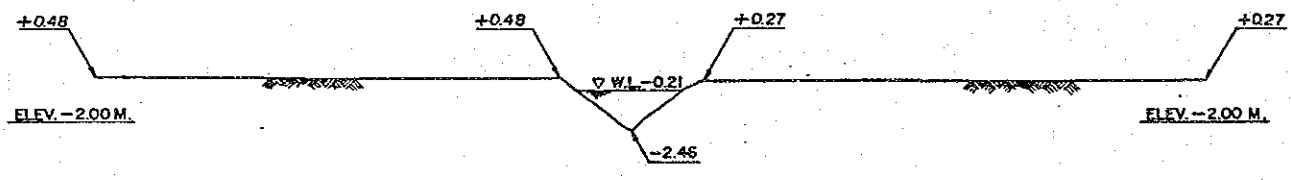
X-5 STA 5+000 (13.33, 10/7)



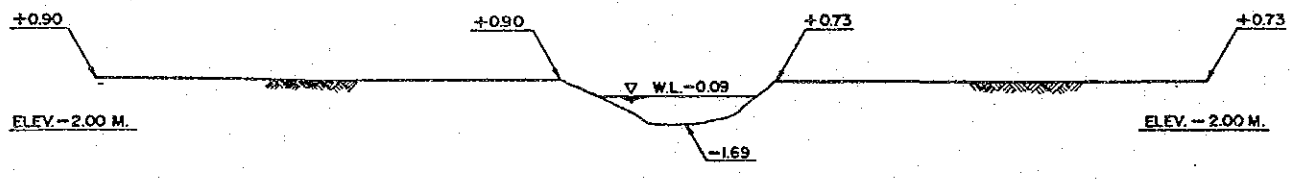
X-4 STA 4+000 (13.15, 10/7)



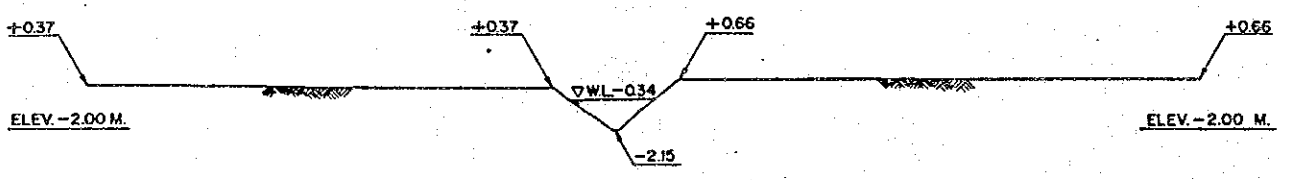
X-3 STA 3+000 (12.39, 10/7)



X-2 STA 2+000 (12.39, 10/7)

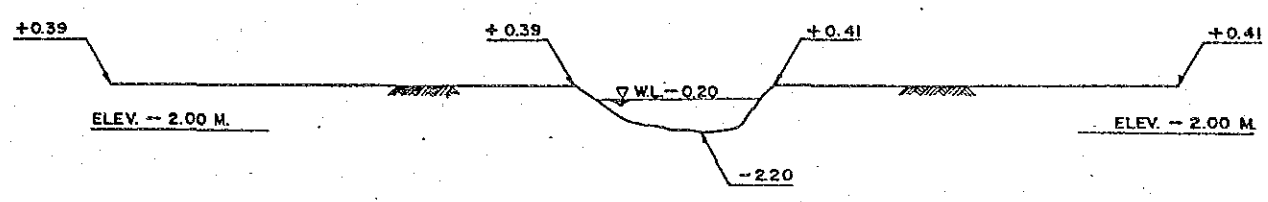


X-1 STA 1+000 (11.17, 9/7)

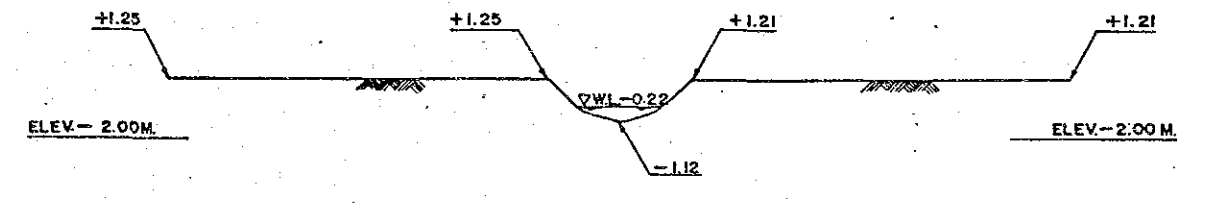


X-0 STA 0+000 (10.56, 9/7)

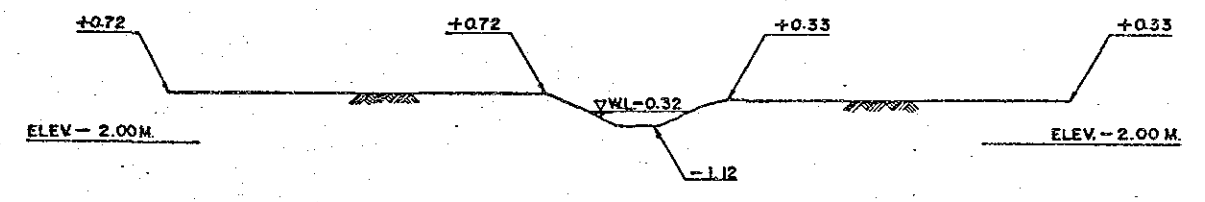
KLONG TANANG



X--2 STA 2+000 (10.26, 6/22)



X-1 STA 1+000 (13.32, 6/22)

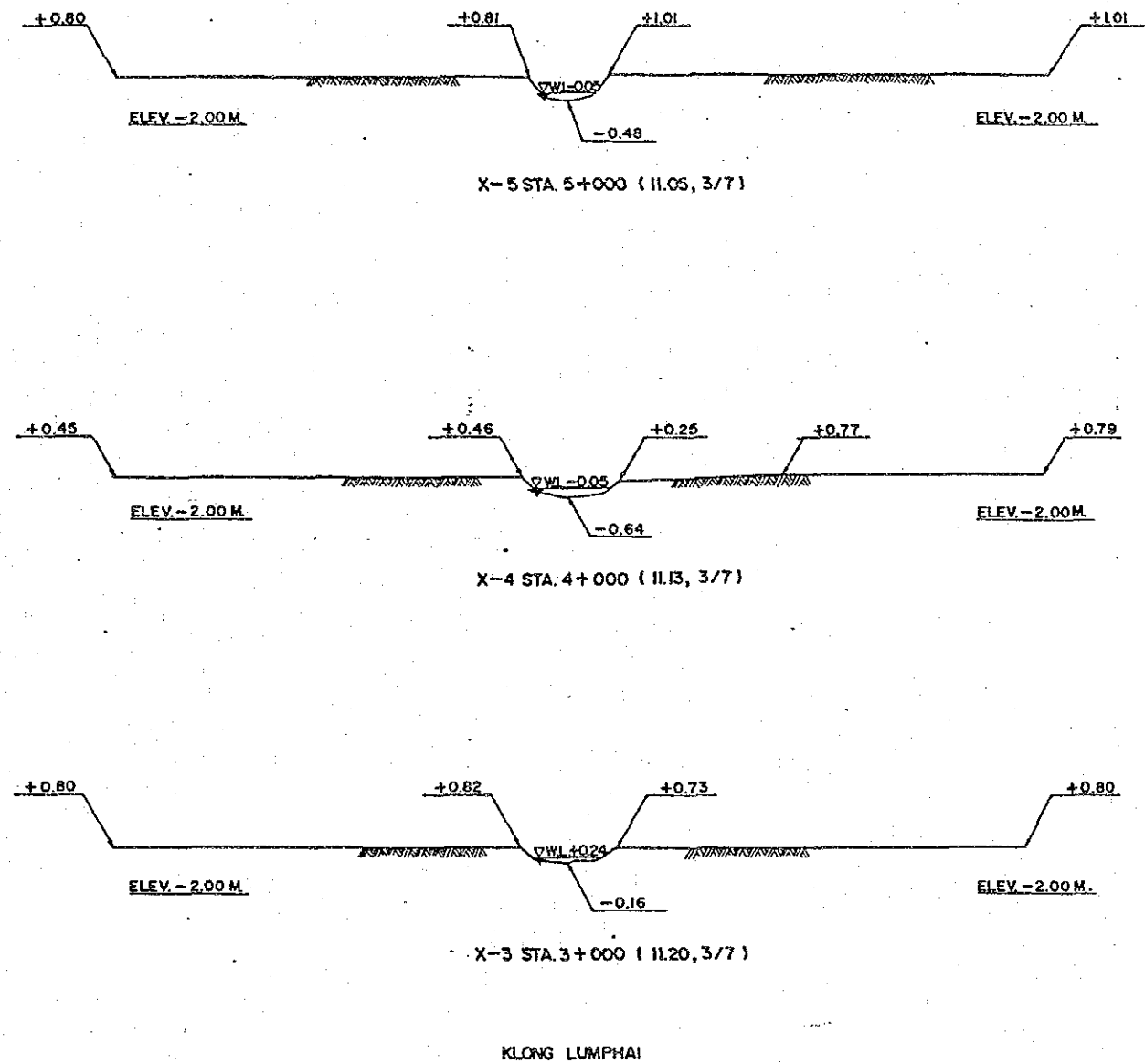
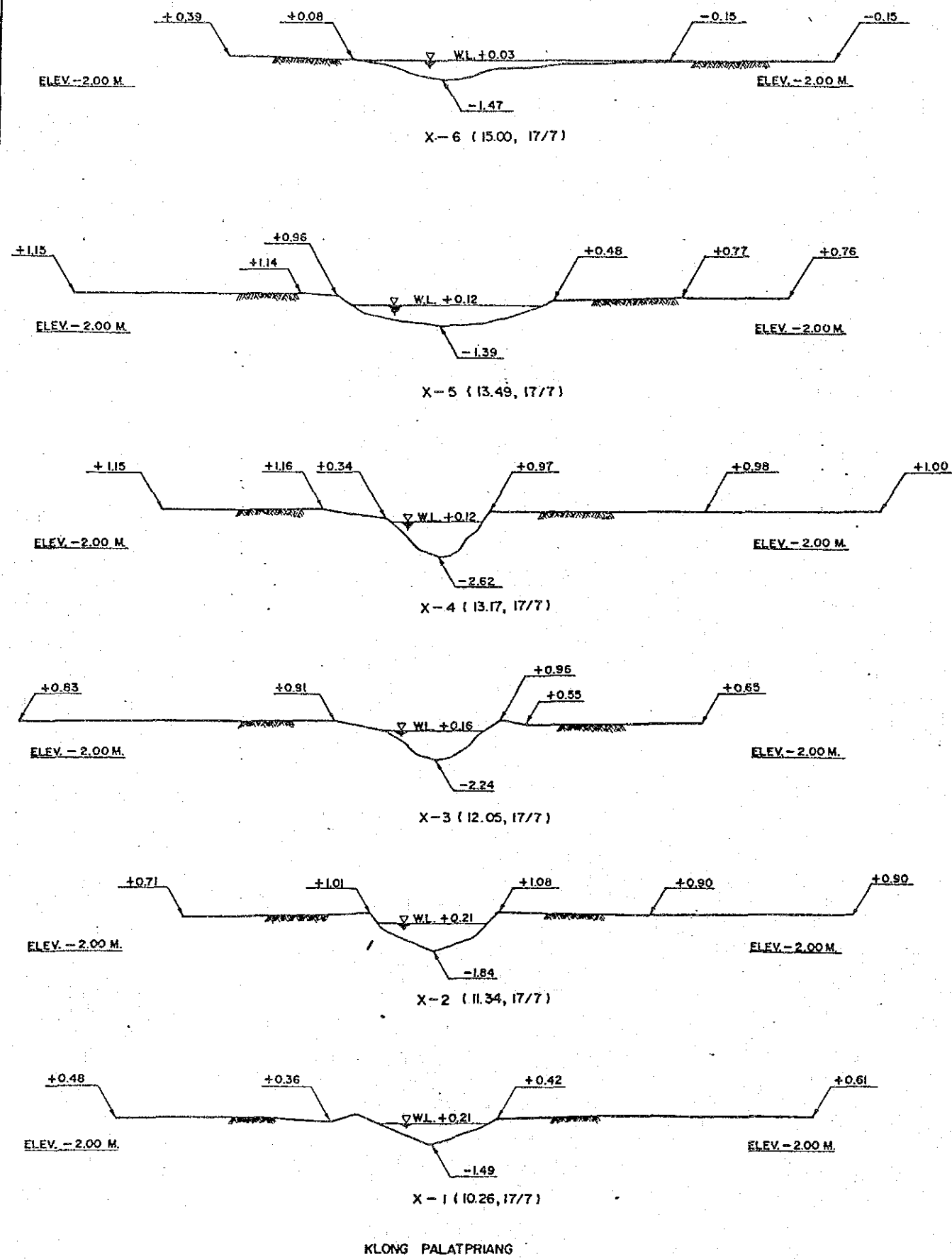


X-0 STA 0+000 (14.40, 6/22)

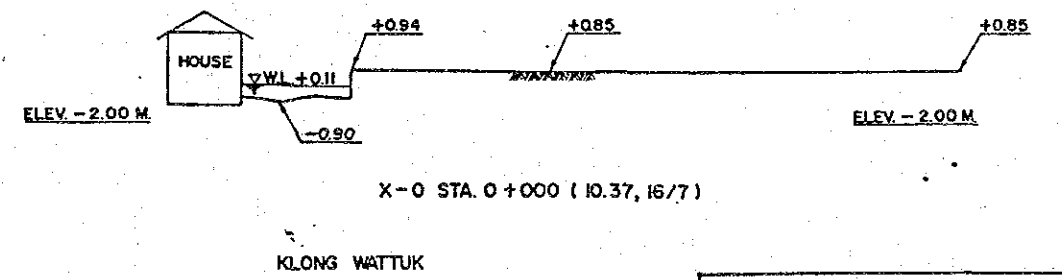
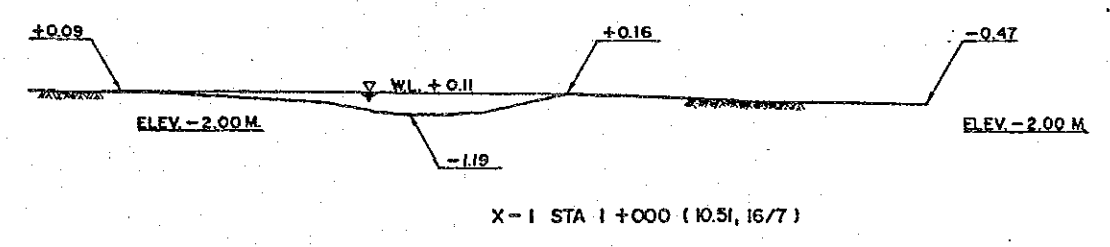
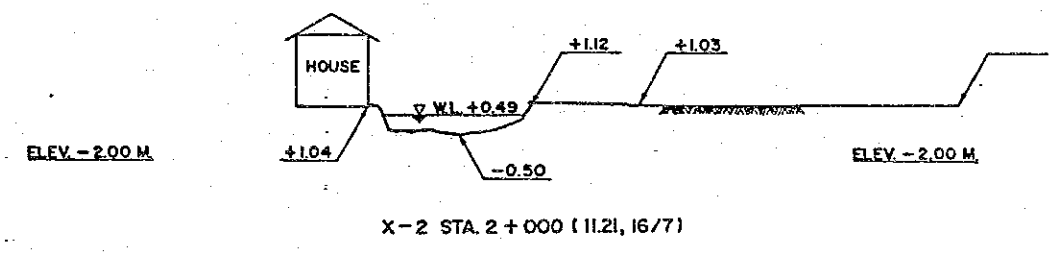
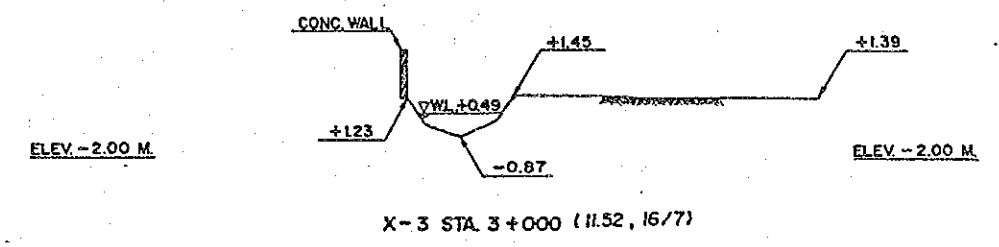
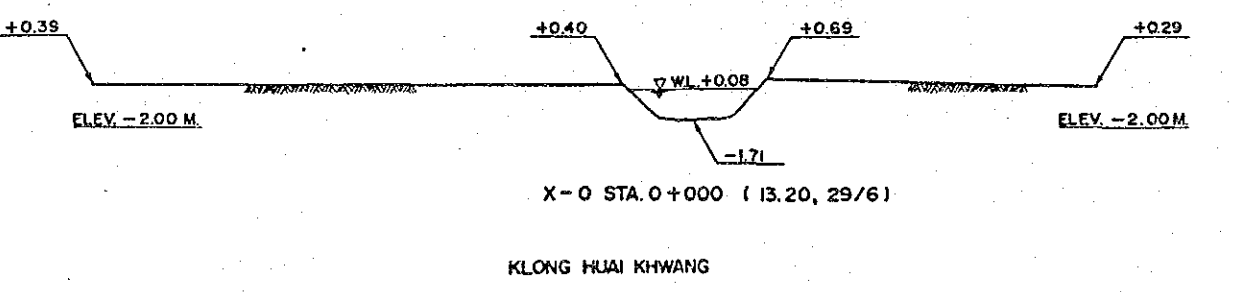
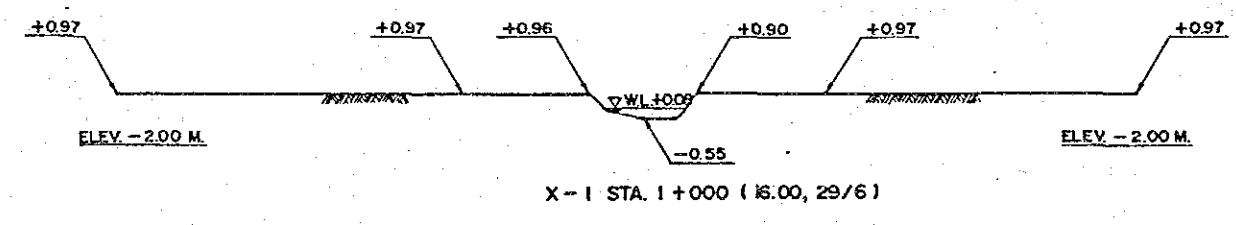
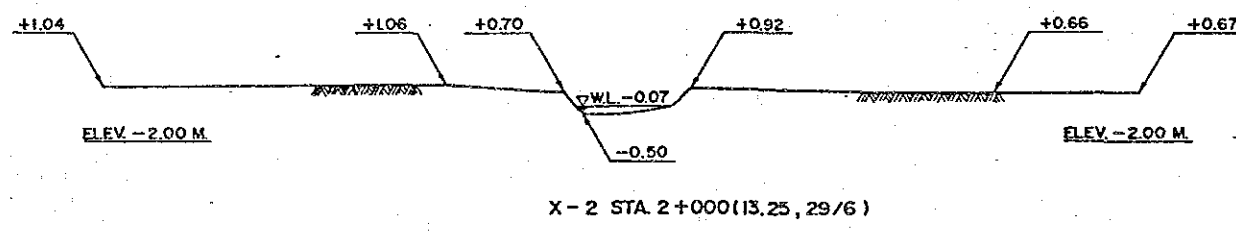
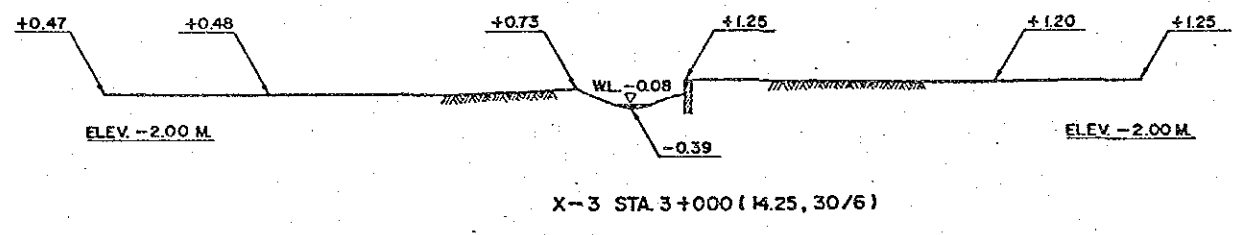
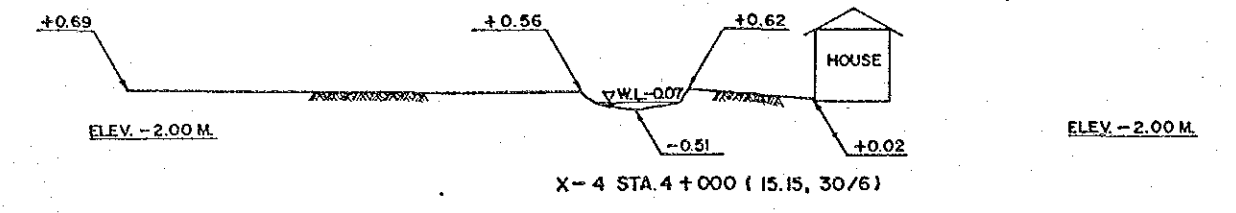
KLONG NAM KAEW

DRAWING NO
S-15

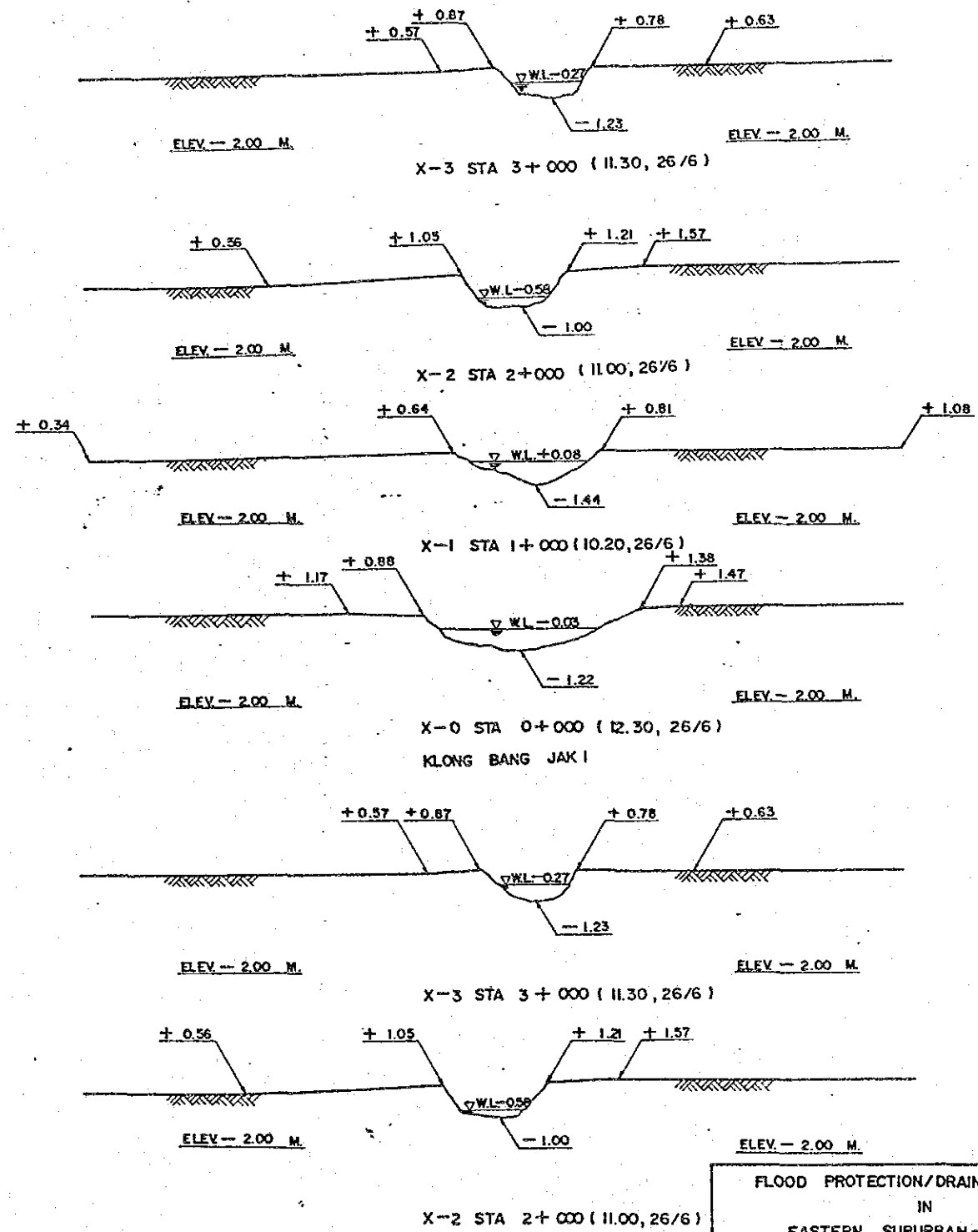
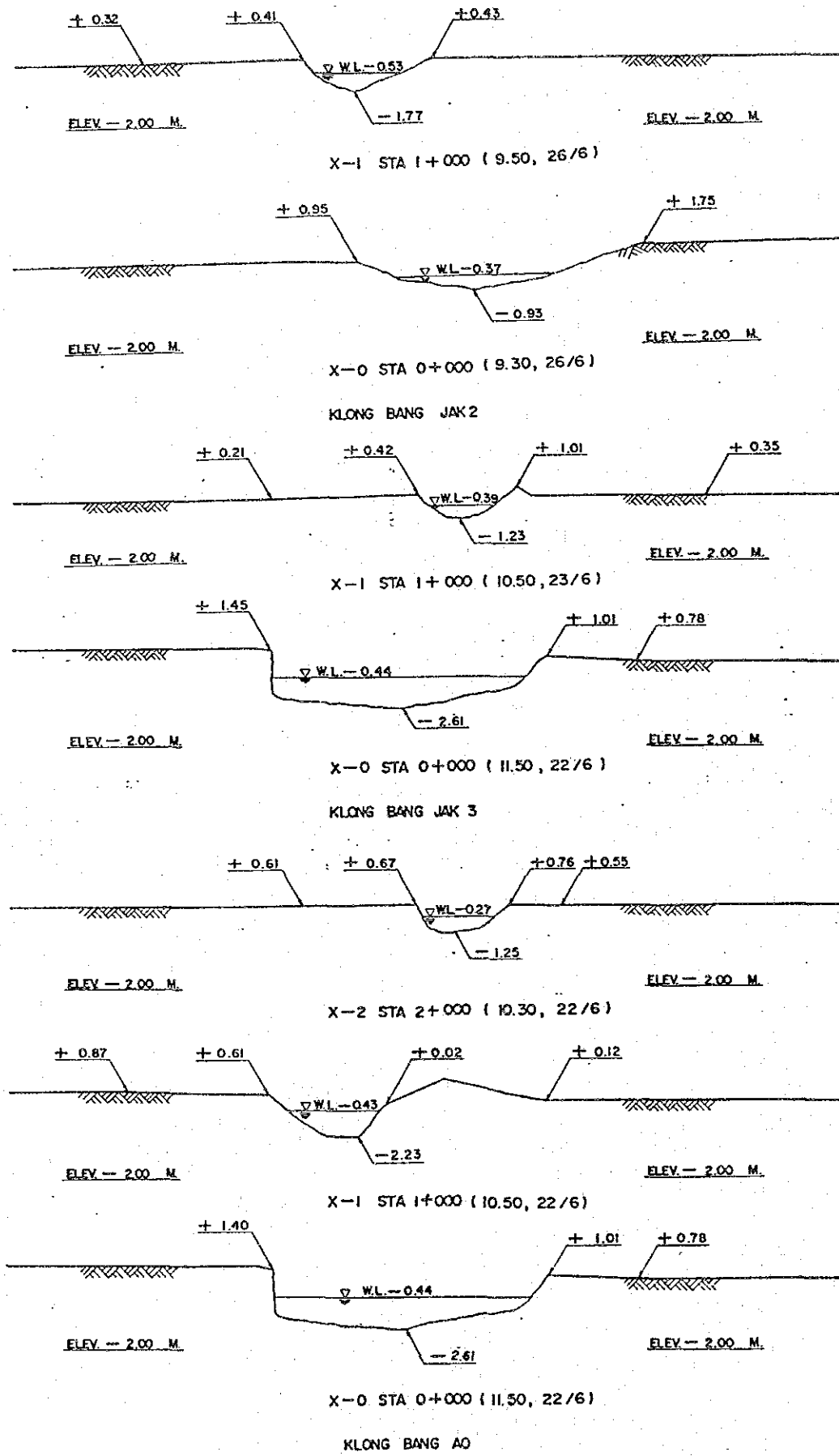
FLOOD PROTECTION/DRAINAGE PROJECT	
IN	
EASTERN SUBURBAN - BANGKOK	
CROSS SECTION	
OF	
KLONG TANANG	KLONG NAM KAEW
SCALE	1 : 200
DATE	JULY 1984



FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG PALATPRIANG KLONG LUMPHAI	
DRAWING NO S-16	SCALE 1 : 200
	DATE

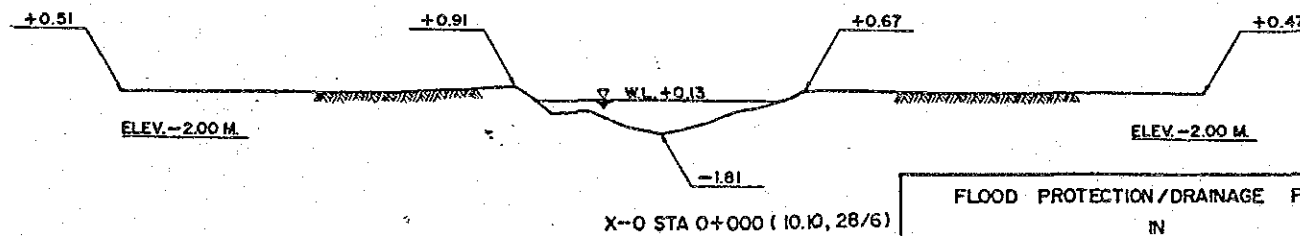
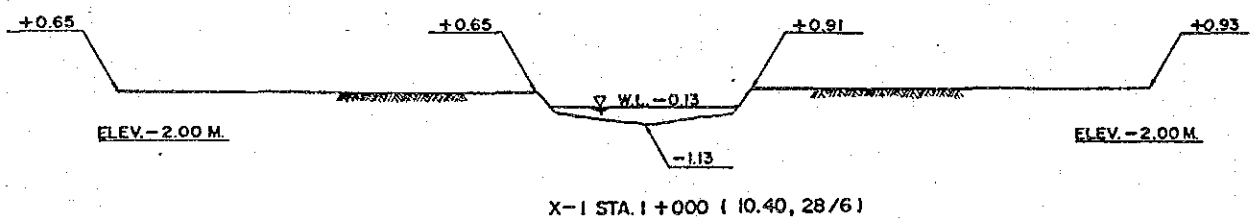
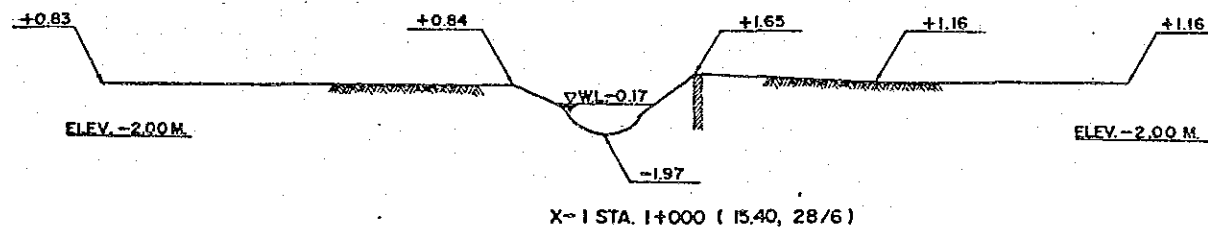
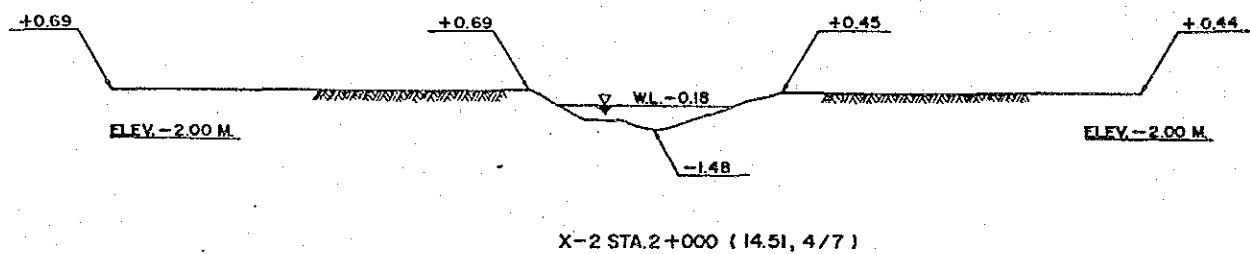
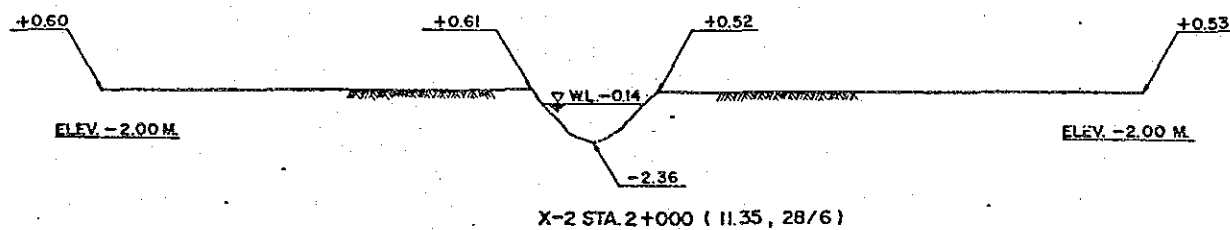
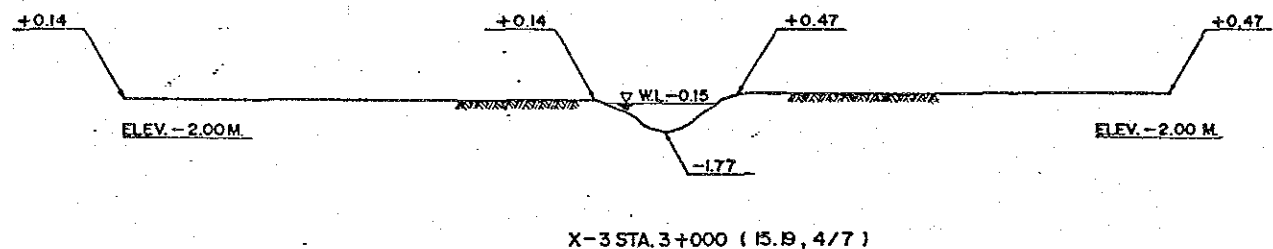
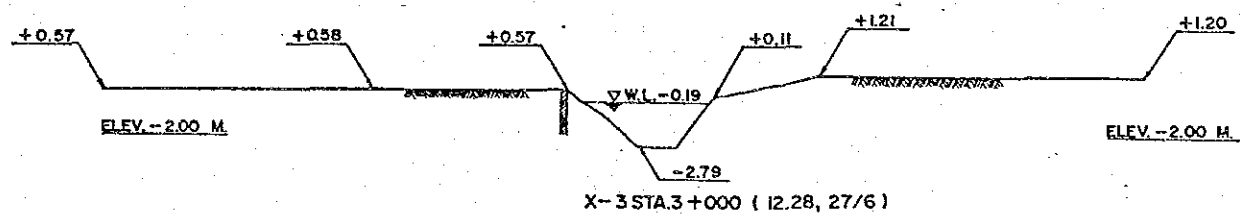
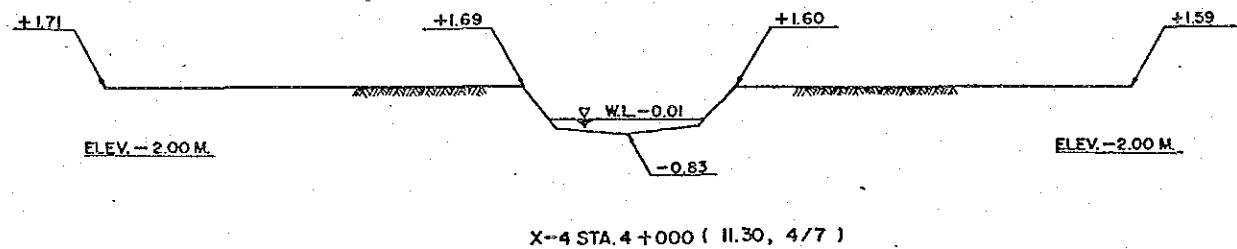
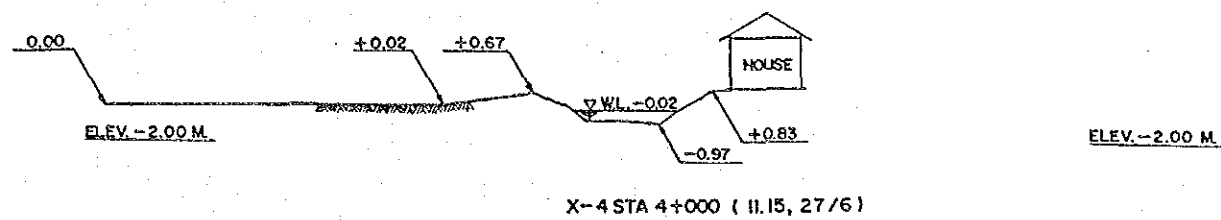
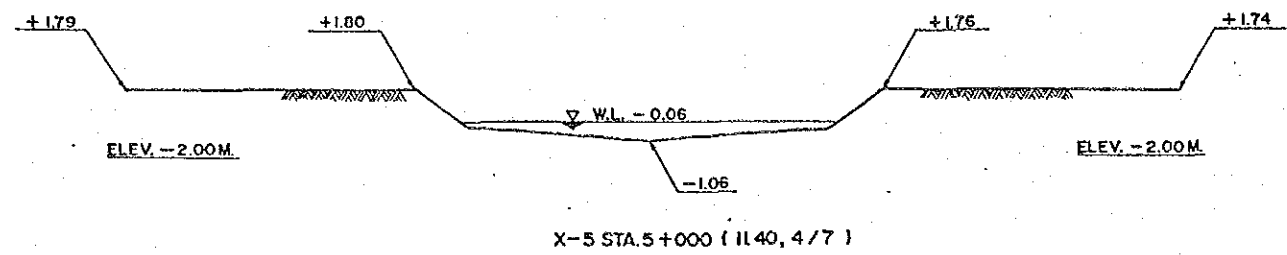


FLOOD PROTECTION/DRAINAGE PROJECT	
IN	
EASTERN SUBURBAN - BANGKOK	
CROSS SECTION	
OF	
KLONG HUAI KHWANG	KLONG WATTUK
DRAWING NO	S-17
SCALE	1 : 200
DATE	JULY 1984



DRAWING NO
S-18

FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN-BANGKOK	
CROSS SECTION OF KLONG BANG AO; BANG JAK 3; BANG JAK 2; BANG JAK 1	
SCALE	1 : 200
DATE	

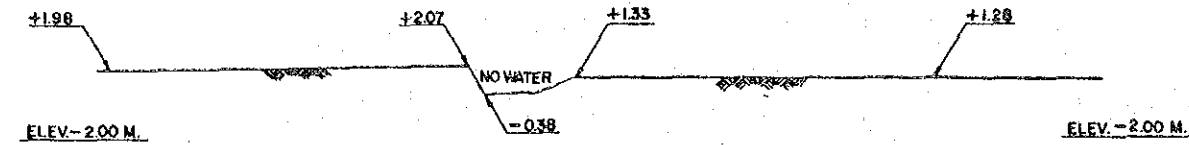


KLONG SAMSAENNOK; HJAI KHWANG

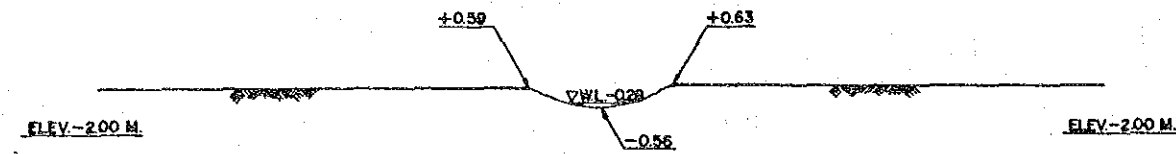
KLONG SAMSAEN

FLOOD PROTECTION/ DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG SAMSAENNOK; HJAI KHWANG; SAMSAEN	
SCALE	1 : 200
DATE	1984

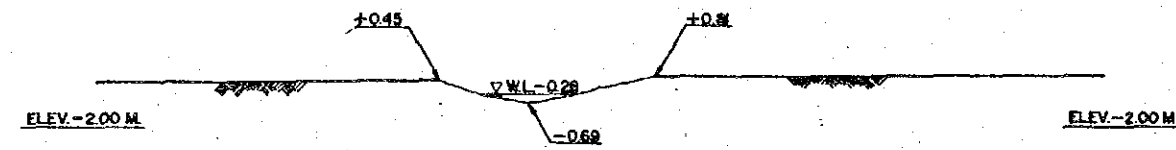
DRAWING NO
S-19



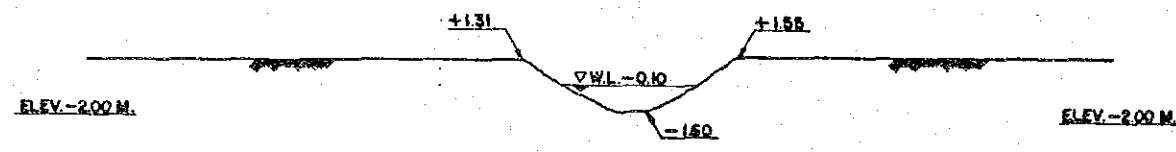
X-6 STA 6+000 (NO)



X-5 STA 5+000 (14.51, 6/25)



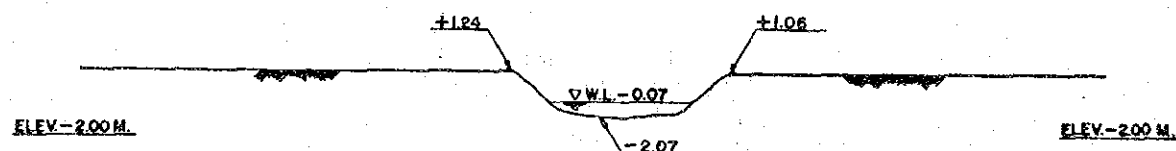
X-4 STA 4+000 (14.27, 6/25)



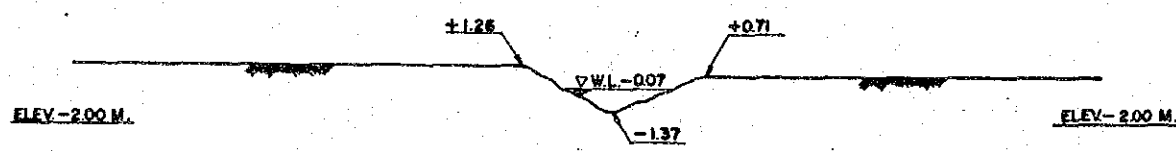
X-3 STA 3+000 (13.50, 6/24)



X-2 STA 2+000 (10.33, 6/23)

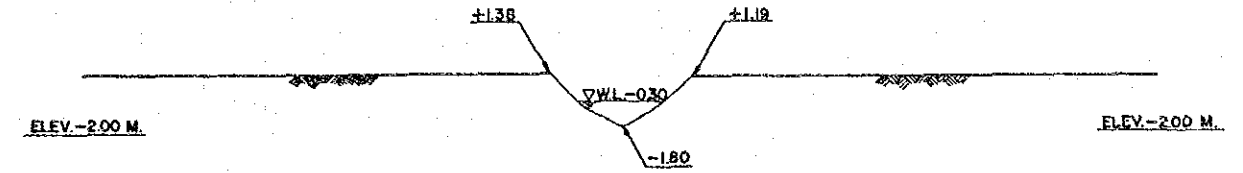


X-1 STA 1+000 (10.25, 6/23)

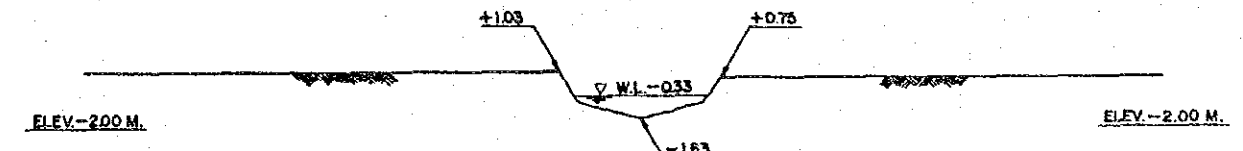


X-0 STA 0+000 (11.10, 6/24)

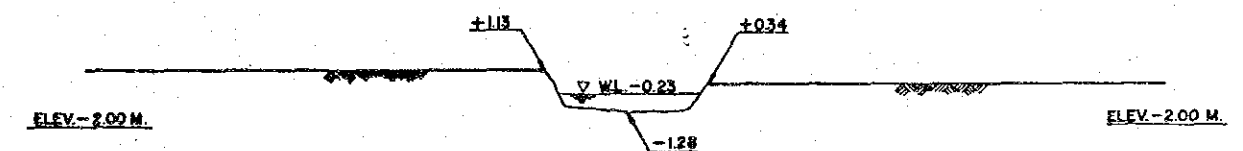
KLONG LAD PRA CHAO



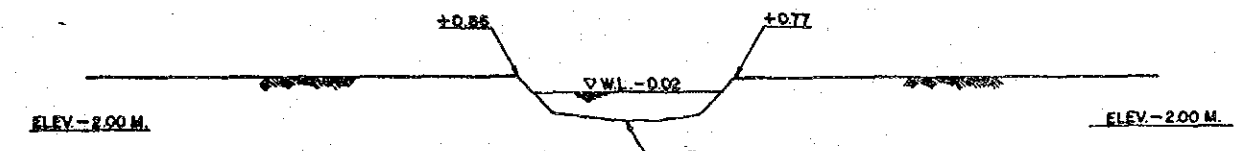
X-4 STA 4+000 (15.40, 6/26)



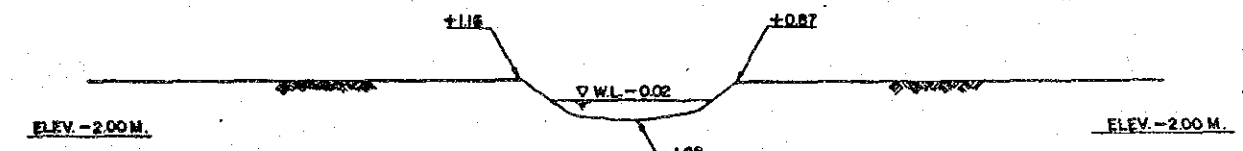
X-3 STA 3+000 (14.40, 6/26)



X-2 STA 2+000 (14.55, 6/26)



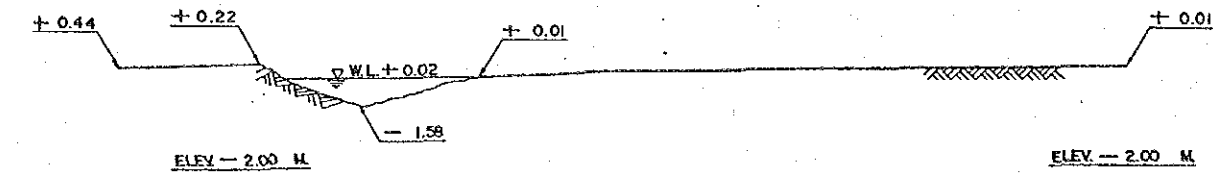
X-1 STA 1+000 (15.25, 6/26)



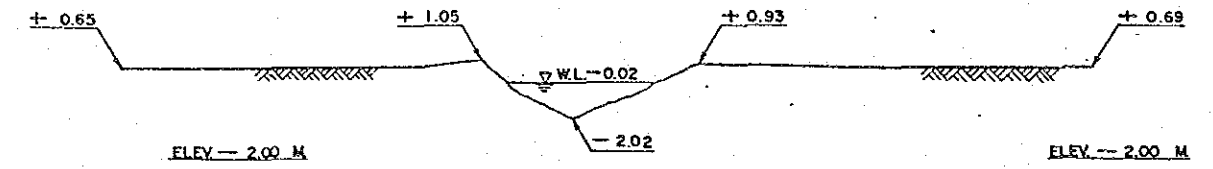
X-0 STA 0+000 (15.35, 6/26)

KLONG SUA NOI

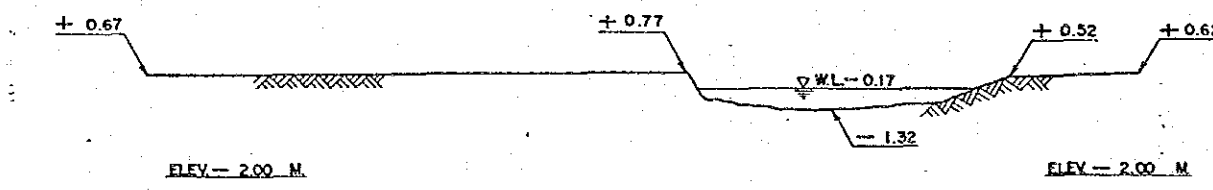
FLOOD PROTECTION/DRAINAGE PROJECT	
IN	
EASTERN SUBURBAN - BANGKOK	
CROSS SECTION	
OF	
KLONG LAD PRA CHAO	KLONG SUA NOI
DRAWING NO	S-20
SCALE	1:200
DATE	JULY 1984



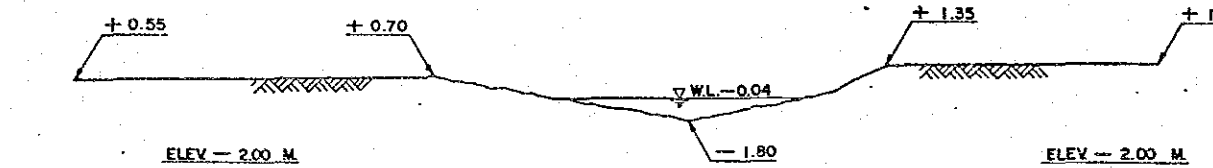
X-5 STA 5+000 (12.50, 6/14)



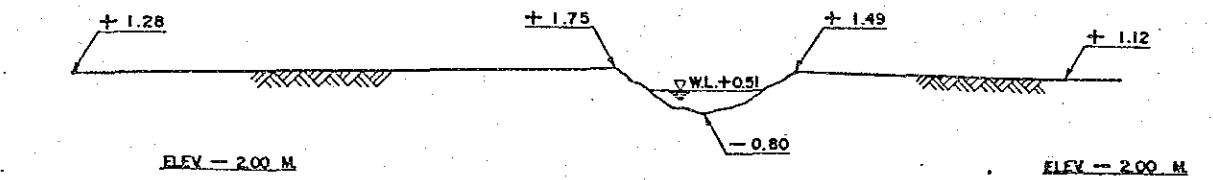
X-4 STA 4+000 (12.45, 6/12)



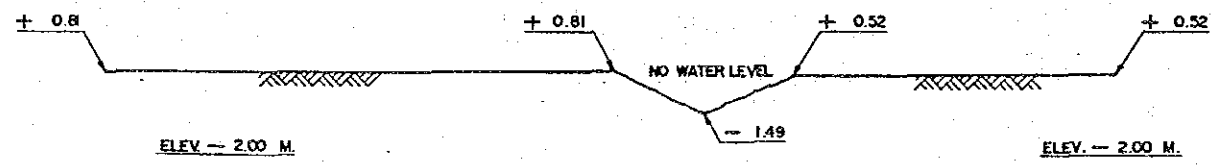
X-3 STA 3+000 (11.35, 6/12)



X-2 STA 2+000 (12.25, 6/14)

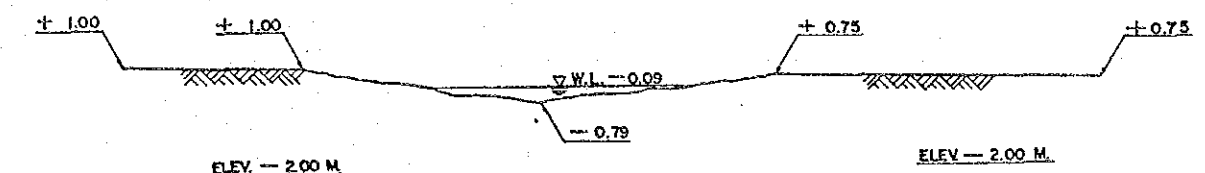


X-1 STA 1+000 (11.00, 6/12)

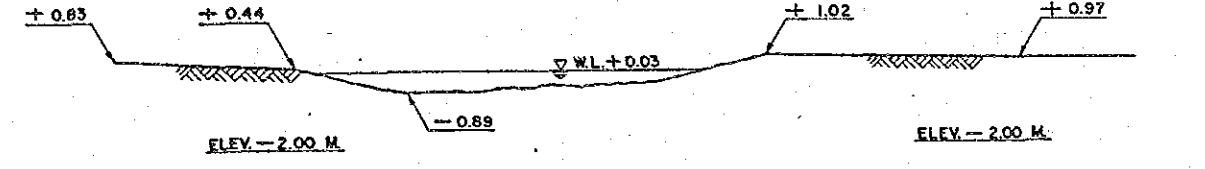


X-0 STA 0+000 (NO)

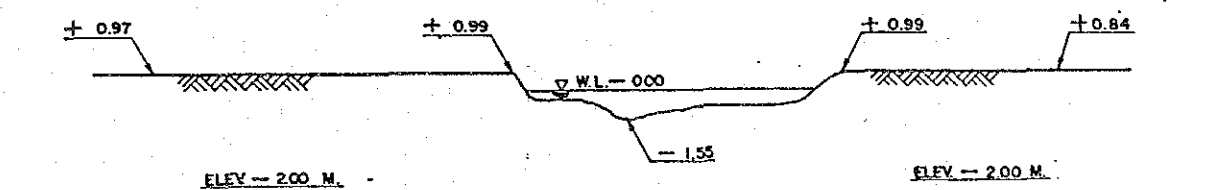
KLONG BANG KHEN



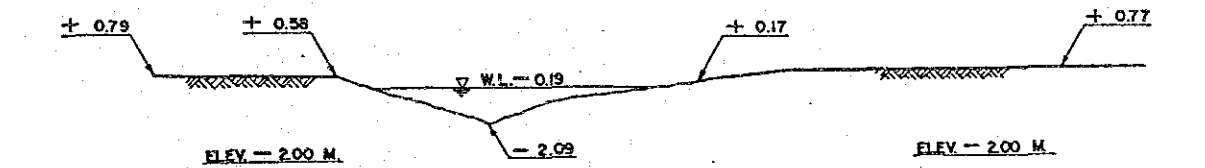
X-10 STA 10+400 (11.50, 6/12)



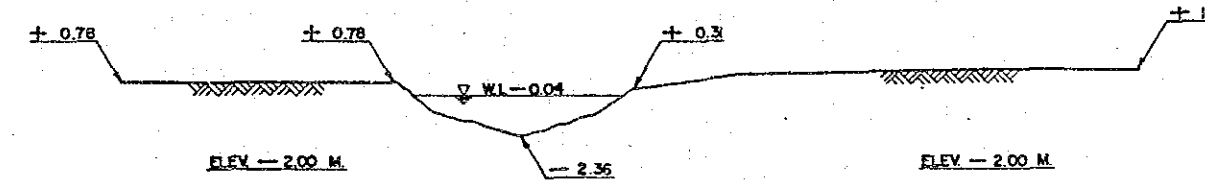
X-10 STA 10+000 (11.00, 6/12)



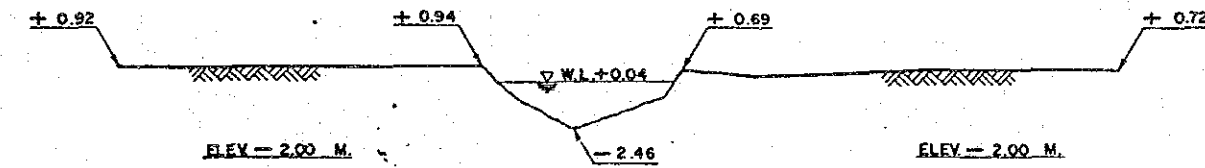
X-9 STA 9+000 (11.30, 6/12)



X-8 STA 8+000 (11.55, 6/12)



X-7 STA 7+000 (10.50, 6/12)

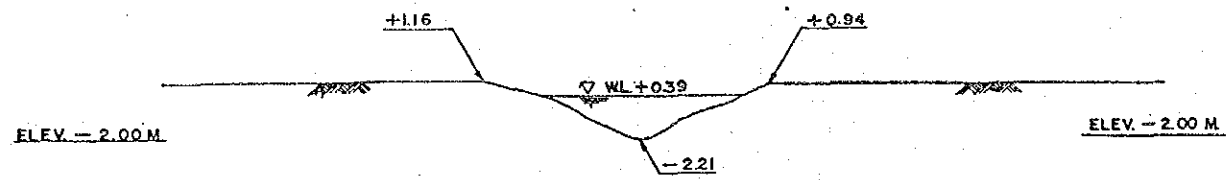


X-6 STA 6+000 (11.00, 6/14)

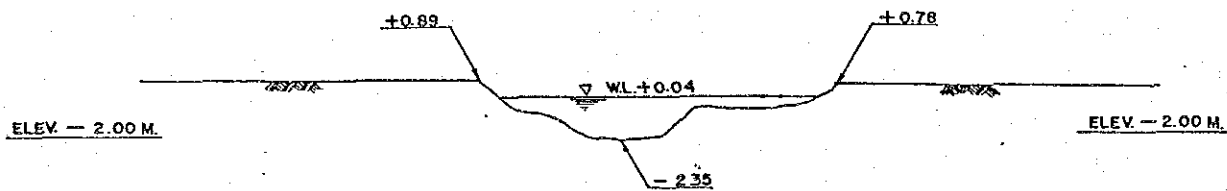
KLONG BANG KHEN

FLOOD PROTECTION/DRAINAGE PROJECT	
IN	
EASTERN SUBURBAN - BANGKOK	
CROSS SECTION	
OF	
KLONG BANG KHEN	
SCALE	1 : 200
DATE	1984

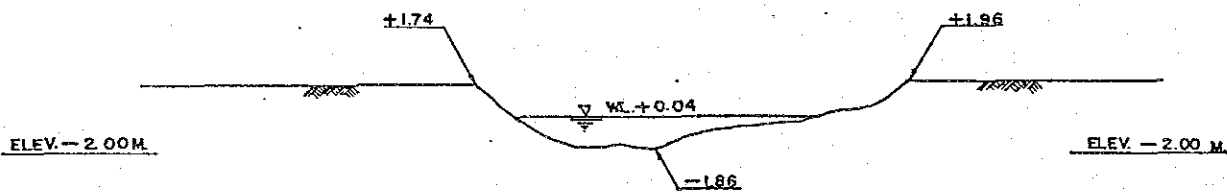
DRAWING NO
S-21



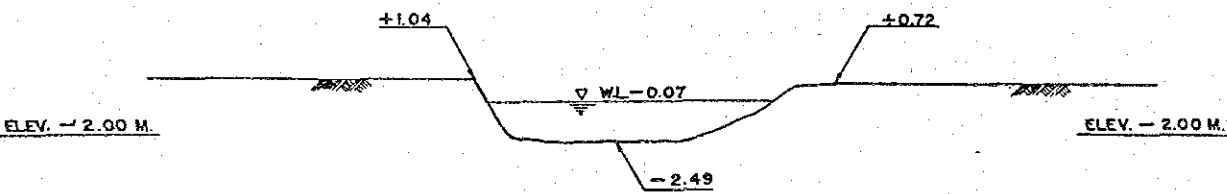
X-4 STA 4+000 (12.15, 11/6)



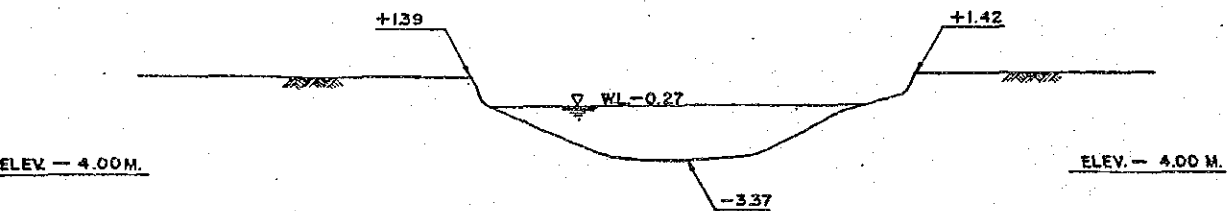
X-3 STA 3+000 (10.00, 11/6)



X-2 STA 2+000 (14.00, 12/6)



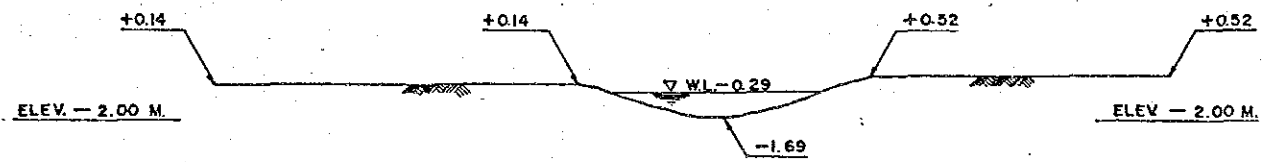
X-1 STA 1+000 (10.45, 12/6)



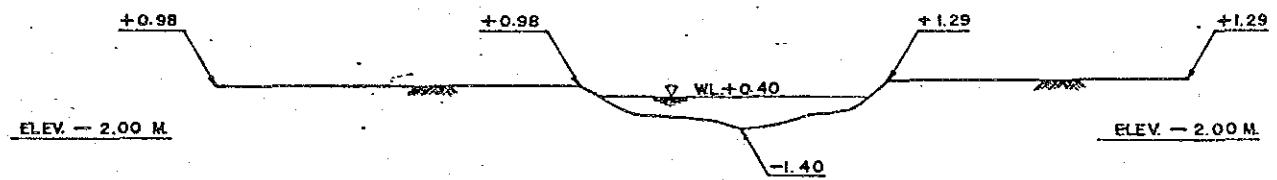
X-0 STA 0+000 (12.05, 12/6)



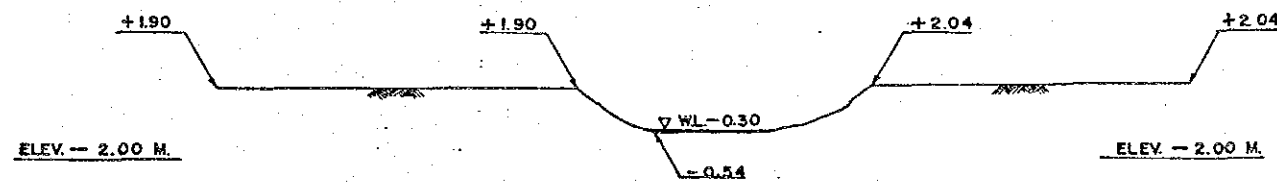
X-8 STA 8+000 (14.24, 22/6)



X-7 STA 7+000 (13.50, 22/6)



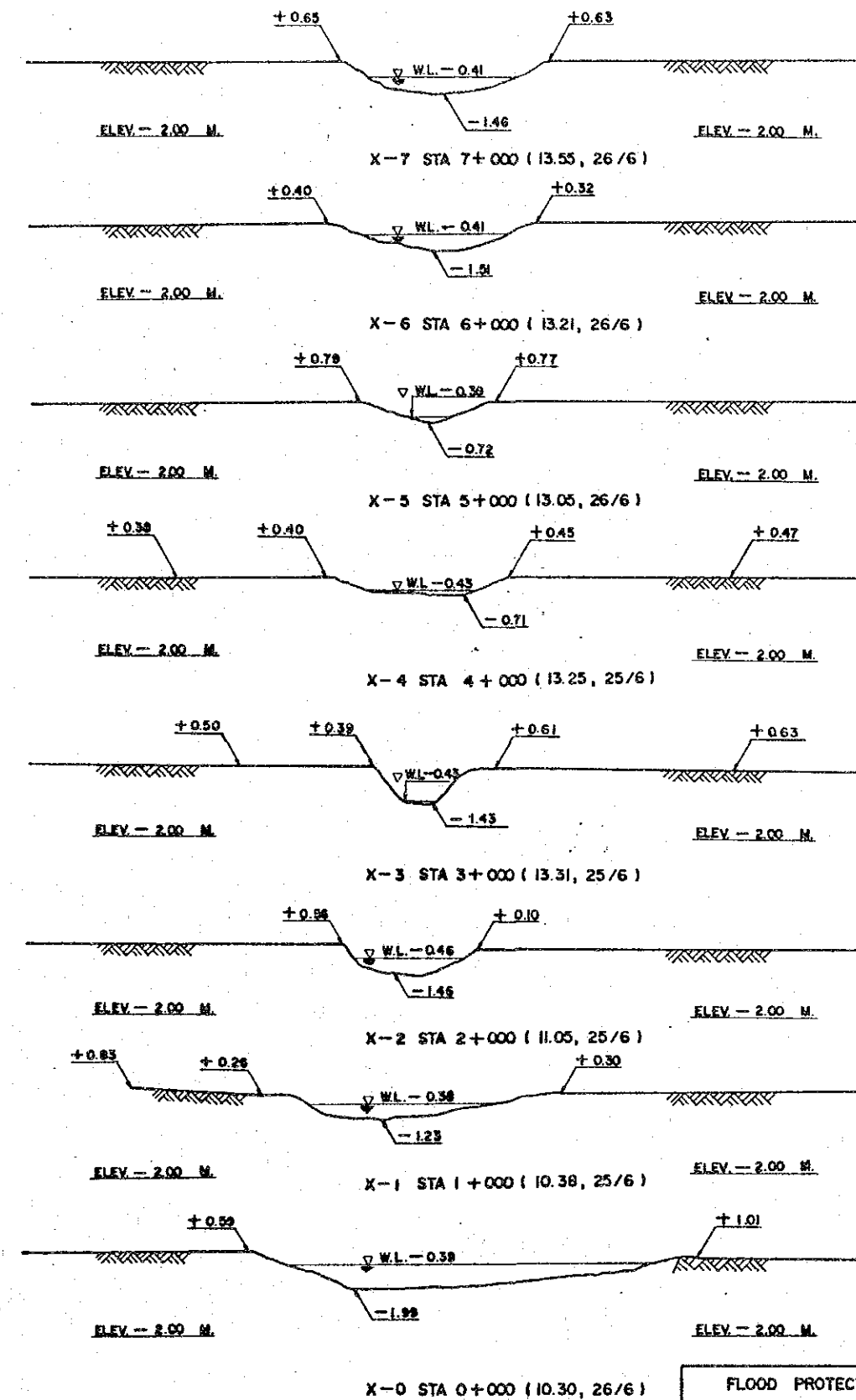
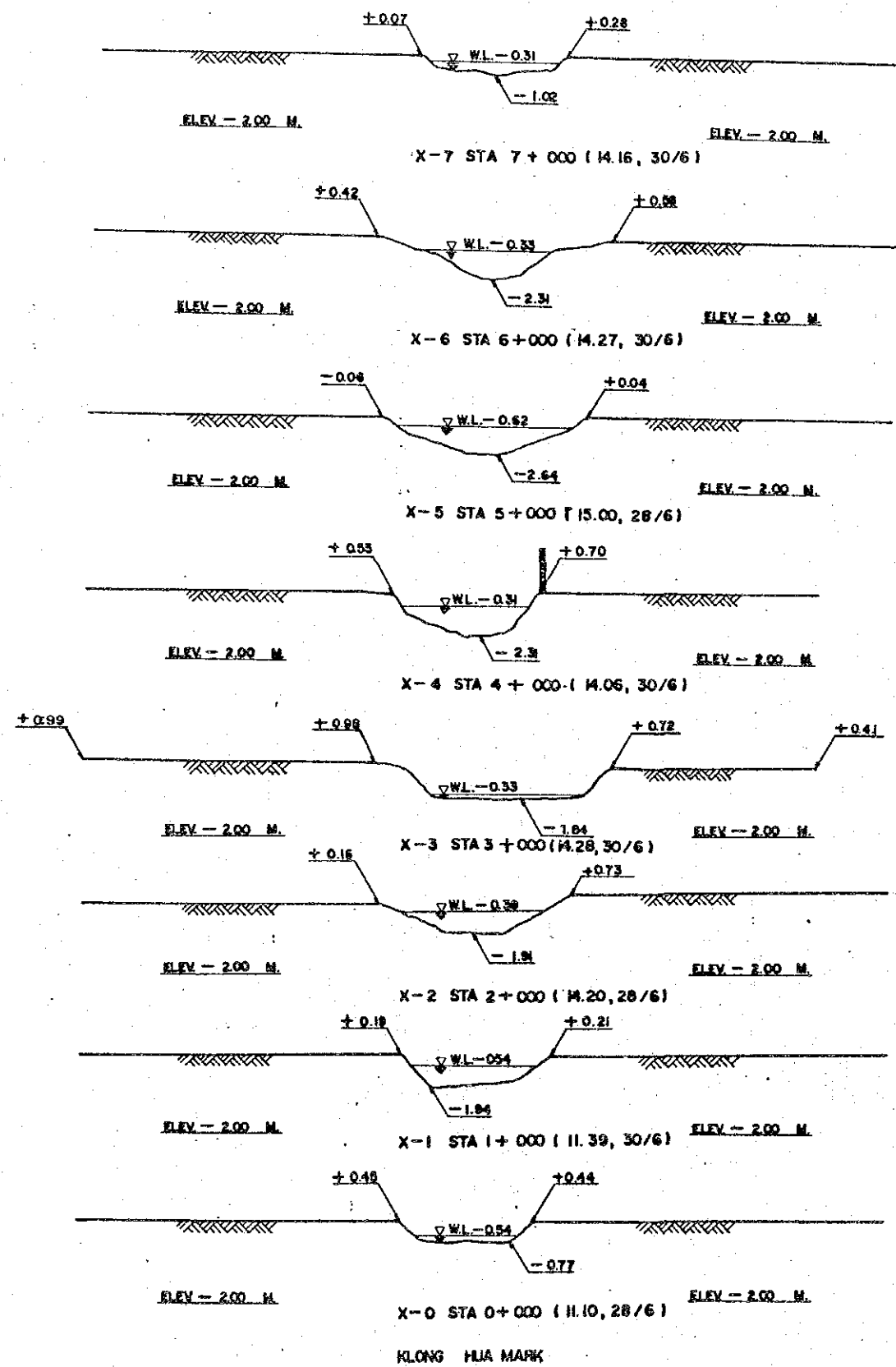
X-6 STA 6+000 (10.06, 22/6)



X-5 STA 5+000 (13.05, 22/6)

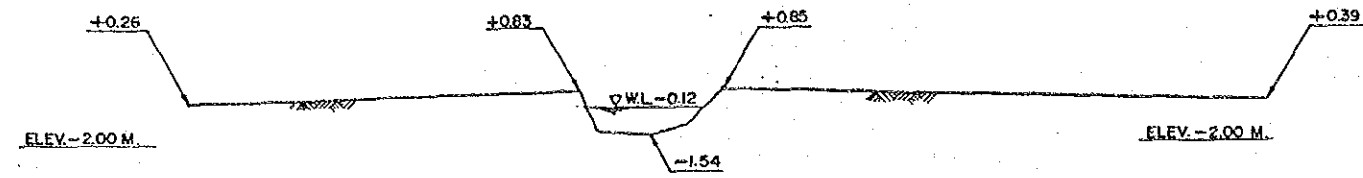
DRAWING NO
S-22

FLOOD PROTECTION/DRAINAGE PROJECT IN EASTERN SUBURBAN - BANGKOK	
CROSS SECTION OF KLONG BANG SUE	
SCALE	1 : 200
DATE	1984

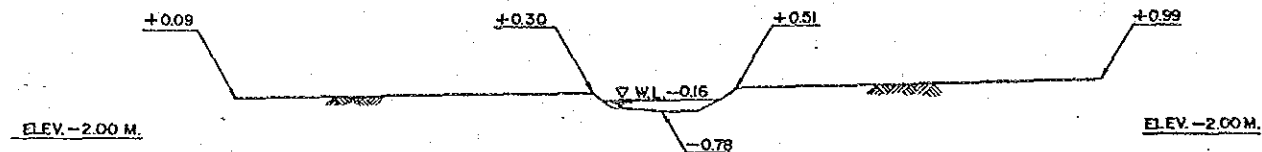


FLOOD PROTECTION/DRAINAGE PROJECT	
IN	
EASTERN SUBURBAN - BANGKOK	
CROSS SECTION	
OF	
KLONG HIA MARK KLONG SAN SAB	
SCALE	1 : 200
DATE	1984

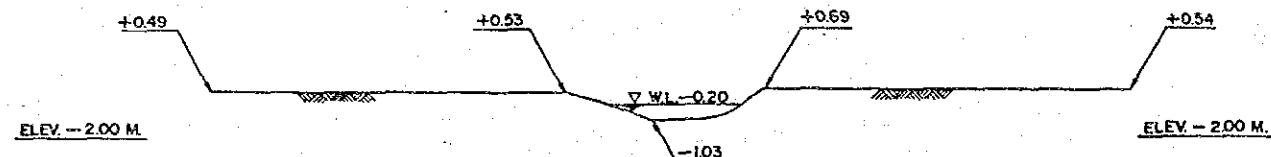
DRAWING NO
S-23



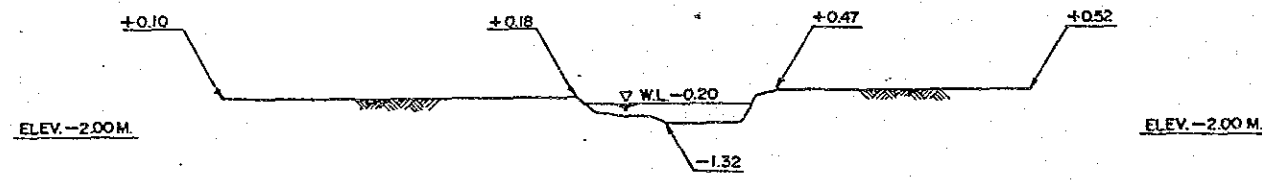
X-5 STA 5+000 (13.30, 6/7)



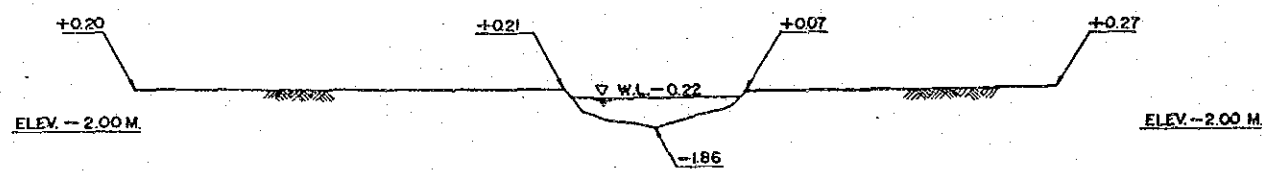
X-4 STA 4+000 (12.50, 6/7)



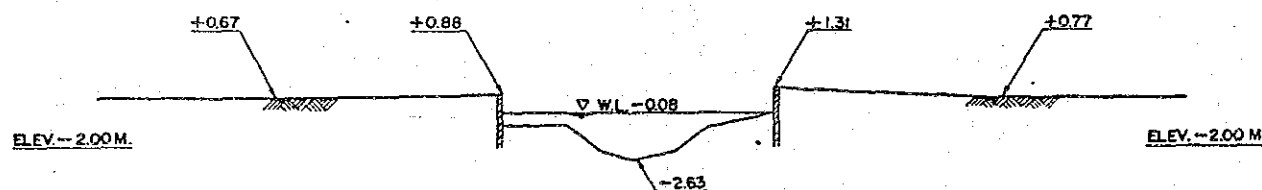
X-3 STA 3+000 (11.40, 6/7)



X-2 STA 2+000 (11.20, 6/7)

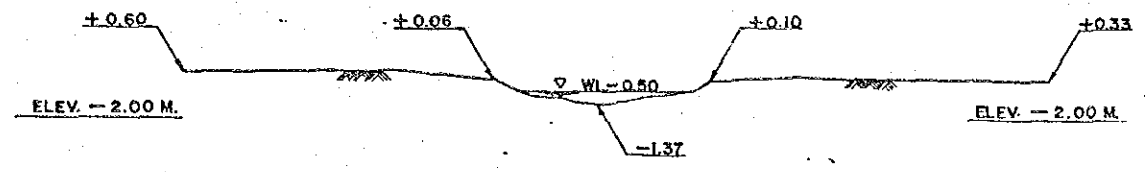


X-1 STA 1+000 (10.45, 6/7)

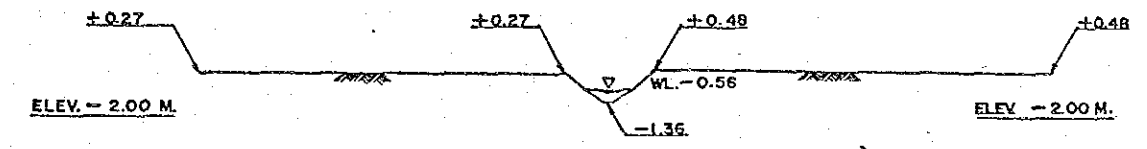


X-0 STA 0+000 (12.28, 6/7)

KLONG KLET

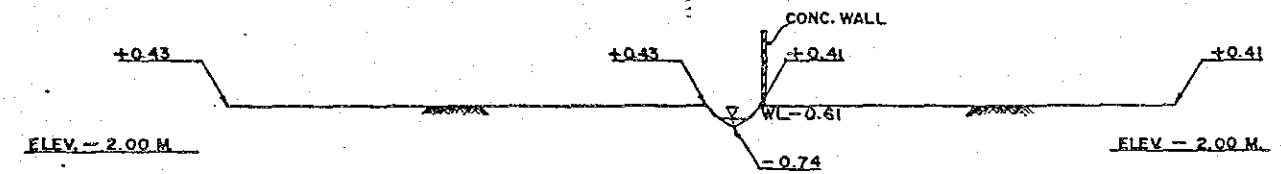


X-1 STA 1+000 (11.50, 25/6)

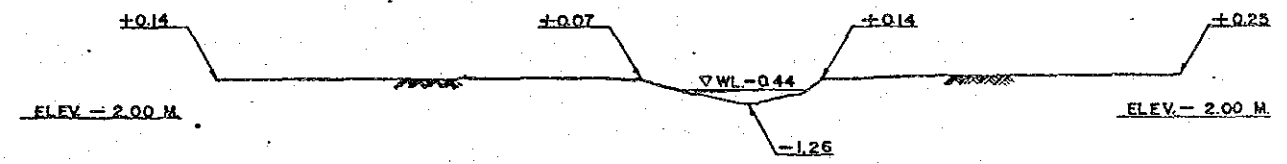


X-0 STA 0+000 (10.55, 25/6)

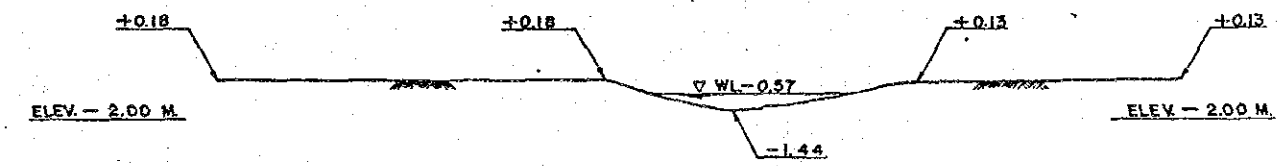
KLONG KWANG LANG



X-2 STA 2+000 (10.50, 19/6)



X-1 STA 1+000 (11.40, 18/6)



X-0 STA 0+000 (10.40, 18/6)

KLONG KWANG LANG

FLOOD PROTECTION/DRAINAGE PROJECT	
IN	
EASTERN SUBURBAN - BANGKOK	
CROSS SECTION	
OF	
KLONG KLET; BANG NANG JEN; KWANG LANG	
DRAWING NO	S-24
SCALE	1 : 200
DATE	