

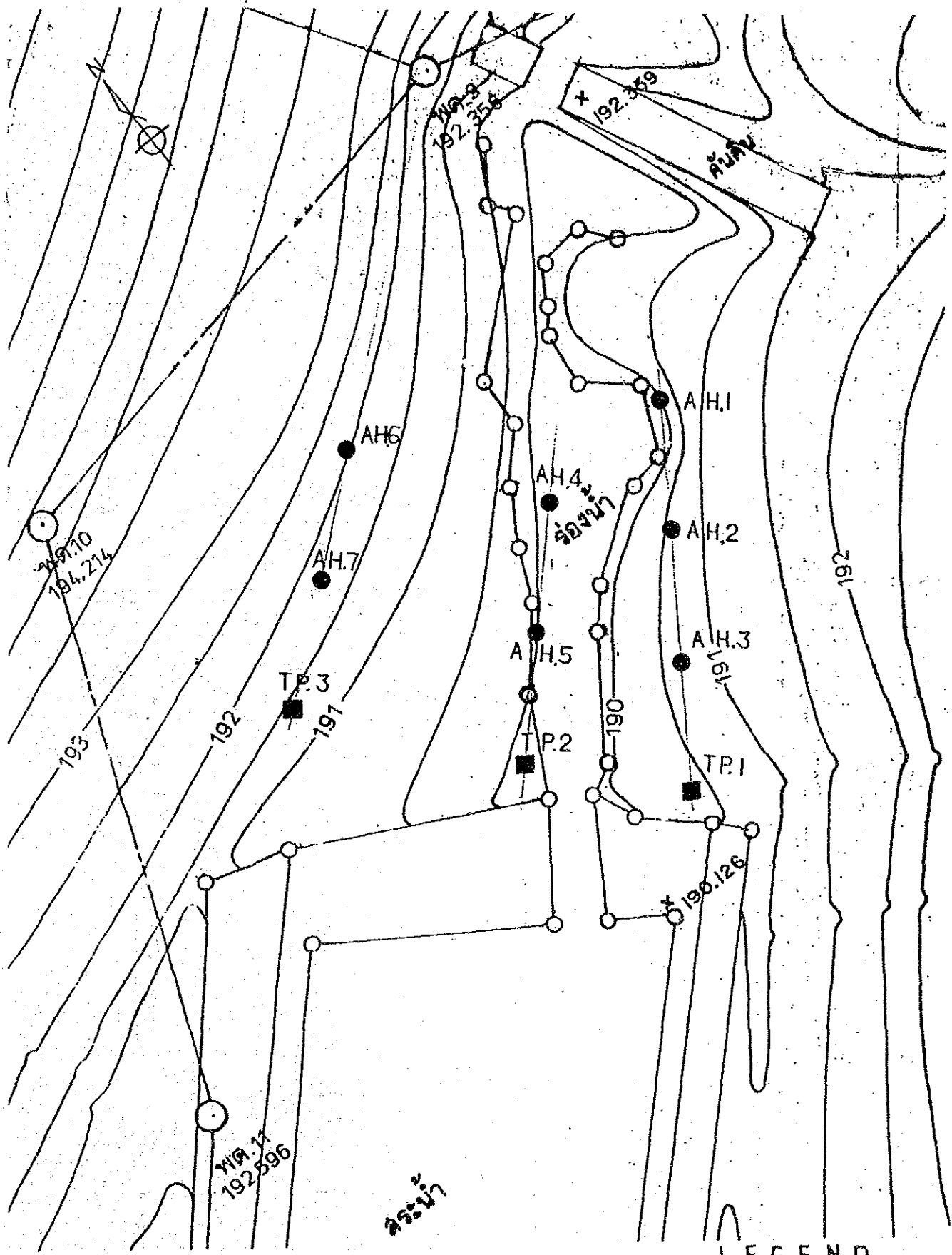
(2) 土質及び基礎

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LEGEND

- TEST PIT
- AUGER BORING

FIG. F-1
 LOCATION OF TEST PIT AND AUGER BORING
 (SCALE 1:1000)

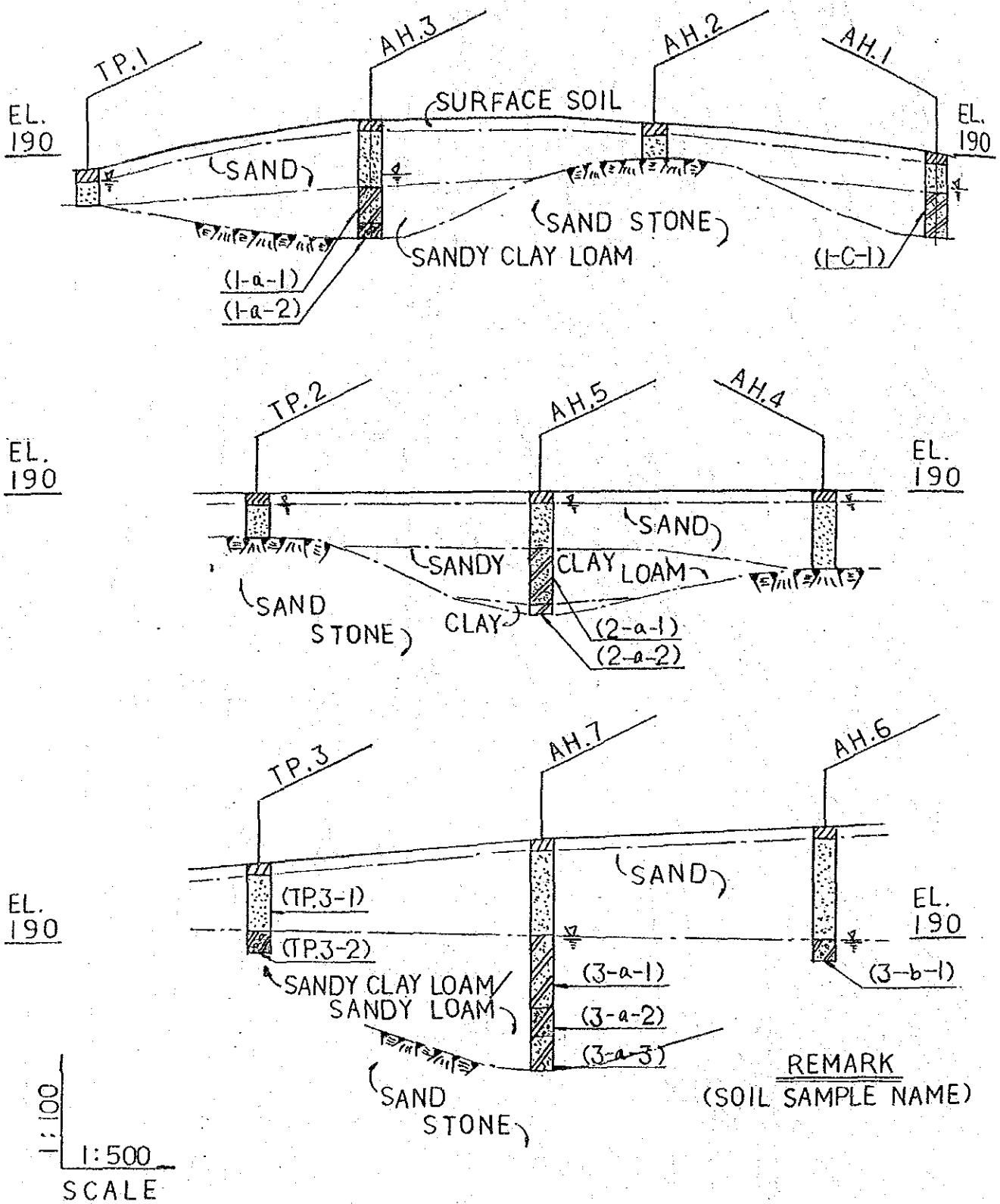


FIG. F-2 GROUND CONDITION AT RESERVOIR SITE

TABLE F-1
RESULTS OF MECHANICAL
ANALYSIS

รายงานผลการวิเคราะห์ดิน

ฝ่ายวิเคราะห์ดิน สำนักงานพัฒนาที่ดินเขต 5

ผู้ส่งตัวอย่าง ชื่อโครงการ
จำนวนตัวอย่าง สถานที่ / จังหวัด **Kao Suan Kwang**
Soil Series Date Reported

Lab. No.	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	
Sender's Code No. KONDO	1-a-(1)	1-a-(2)	1-b-(1)	2-a-(1)	2-a-(2)	TP3-(1)	TP3-(2)	3-a-(1)	3-a-(2)	3-a-(3)	
Depth / Horizon (cm)											
Extractable by NH ₄ OAC IN pH 7.0	K (ppm)										
	Ca (ppm)										
	Mg (ppm)										
	S (ppm)										
Exchangeable Cations	Na ⁺ (me/100g)										
	K ⁺ (me/100g)										
	Ca ⁺⁺ (me/100g)										
	Mg ⁺⁺ (me/100g)										
CEC by NH ₄ OAC IN pH 7.0 (me/100g)											
Base Saturation Percentage											
Seturation Percentage											
Soluble Cations	Na ⁺ (me/l)										
	K ⁺ (me/l)										
	Ca ⁺⁺ (me/l)										
	Mg ⁺⁺ (me/l)										
Sodium Adsorption Ratio (SA ⁻)											
Exchangeable Sodium Percentage (ESP)											
Soluble Anion	Cl ⁻ (me/l)										
	NO ₃ ⁻ (me/l)										
	HCO ₃ ⁻ (me/l)										
	CO ₃ ⁼ (me/l)										
	SO ₄ ⁼ (me/l)										
Particle Size	(sand+silt+clay) in total (%)	87.57	78.51	90.80	99.86	96.10	90.39	55.95	97.57	79.77	98.25
	Sand ϕ 2.00-0.075 mm (%)	66.50	71.94	70.61	66.82	50.57	82.20	79.16	72.06	69.21	76.06
	Silt ϕ 0.075-0.002 mm (%)	6.24	6.79	7.07	11.25	18.83	12.98	12.58	11.67	5.04	7.90
	Clay ϕ <0.002 mm (%)	24.25	21.27	22.32	21.94	30.61	2.82	8.25	16.27	25.75	16.04
Moisture Retention	Gravel in total (%)	12.83	26.88	5.20	0.14	3.90	9.61	44.05	2.43	20.23	1.75
	1/10 bar (%)										
	1/3 bar (%)										
	3 bar (%)										
Permeability Coefficient (K) cc/hr	15 bar (%)										
	Specific gravity	2.65	2.68	2.64	2.65	2.64	2.64	2.64	2.64	2.63	2.63
Moisture Content (% by weight)	Moisture Content (% by weight)	16.8	15.5	18.7	20.2	12.7	22	22	12.0	10.5	12.3
	Maximum of Gravel Diameter (mm)	12.17	10.15	10.17	2.5	10.18	8.10	28.49	8.13	10.20	7.51

รายงานผลการวิเคราะห์ดิน
ฝ่ายวิเคราะห์ดิน สำนักงานพัฒนาที่ดินเขต 5

ผู้ส่งตัวอย่าง ชื่อโครงการ
 จำนวนตัวอย่าง สถานี / จังหวัด
 Soil Series Date Reported

Lab. No.	3-3411								
Sender's Code No.	3-b-01								
Depth / Horizon (cm)									
Extractable by NH ₄ OAC IN pH 7.0	K (ppm)								
	Ca (ppm)								
	Mg (ppm)								
	S (ppm)								
Exchangeable Cations	Na ⁺ (me/100g)								
	K ⁺ (me/100g)								
	Ca ⁺⁺ (me/100g)								
	Mg ⁺⁺ (me/100g)								
CEC by NH ₄ OAC IN pH 7.0 (me/100g)									
Base Saturation Percentage									
Seturation Percentage									
Soluble Cations	Na ⁺ (me/l)								
	K ⁺ (me/l)								
	Ca ⁺⁺ (me/l)								
	Mg ⁺⁺ (me/l)								
Sodium Adsorption Ratio (SAR)									
Exchangeable Sodium Percentage (ESP)									
Soluble Anion	Cl ⁻ (me/l)								
	NO ₃ ⁻ (me/l)								
	HCO ₃ ⁻ (me/l)								
	CO ₃ ⁼ (me/l)								
	SO ₄ ⁼ (me/l)								
Particle Size	(Sand+silt+clay) in total (%)	83.70							
	Sand ϕ 2.00-0.05 mm (%)	83.42							
	Silt ϕ 0.05-0.002 mm (%)	1.36							
	Clay ϕ <0.002 mm (%)	4.12							
Gravel in total (%)		16.30							
Moisture	1/10 bar (%)								
Retention	1/3 bar (%)								
	3 bar (%)								
	15 bar (%)								
Permeability Coefficient (K) cc/hr									
Specific gravity		2.60							
Moisture content (% by weight)		5.9							
Maximum of gravel diameter		22.32							

(3) 気象及び水文

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FIG. M-1	RAINFALL INTENSITY CURVES (KHON KAEN)
FIG. M-2	RAINFALL INTENSITY CURVES (UDON THANI)

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TABLE M-1	CLIMATOLOGICAL DATA FOR THE PERIOD 1956-1985 (KHON KAEN)
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FIG. M-1

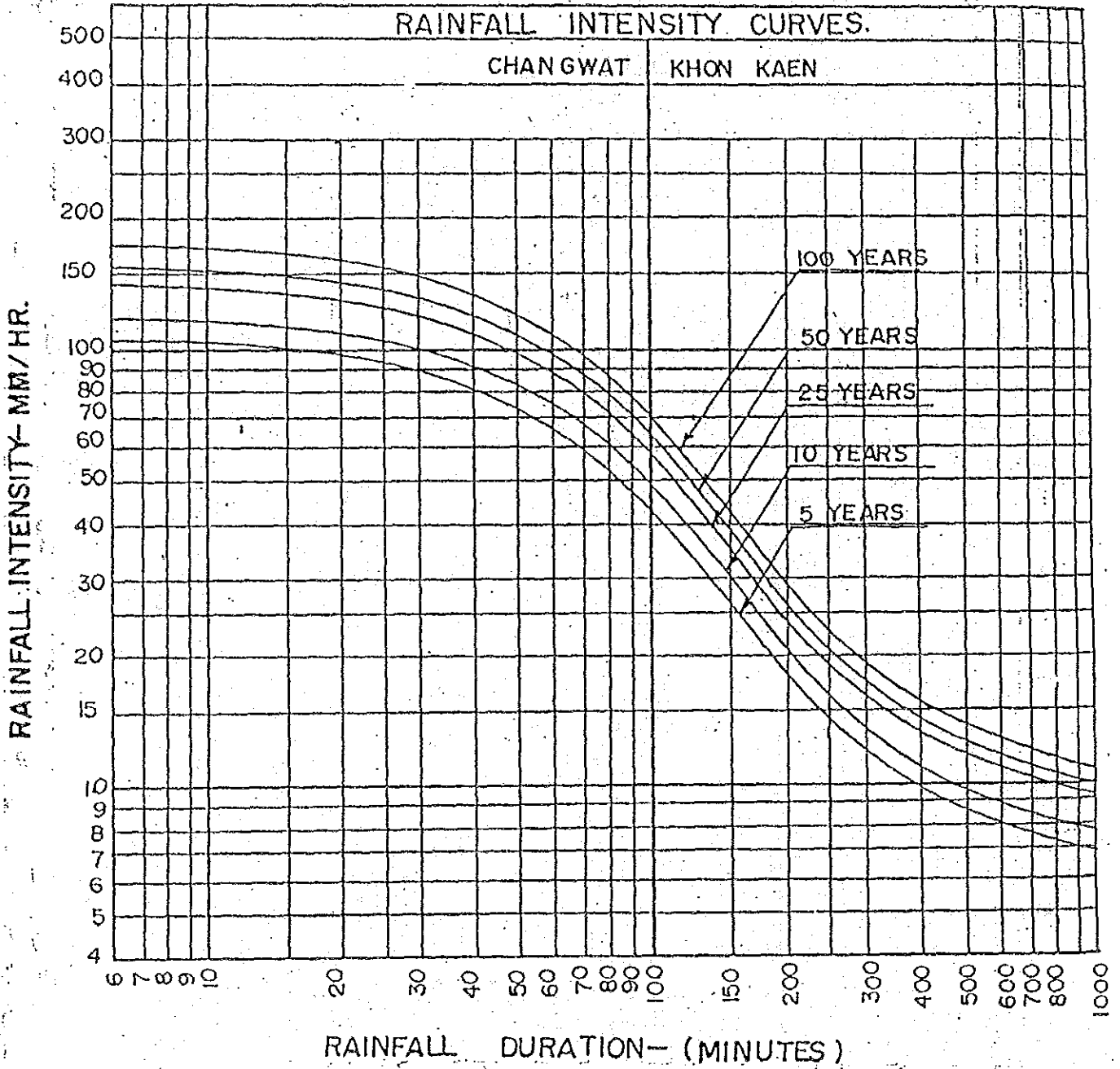


FIG. M-2

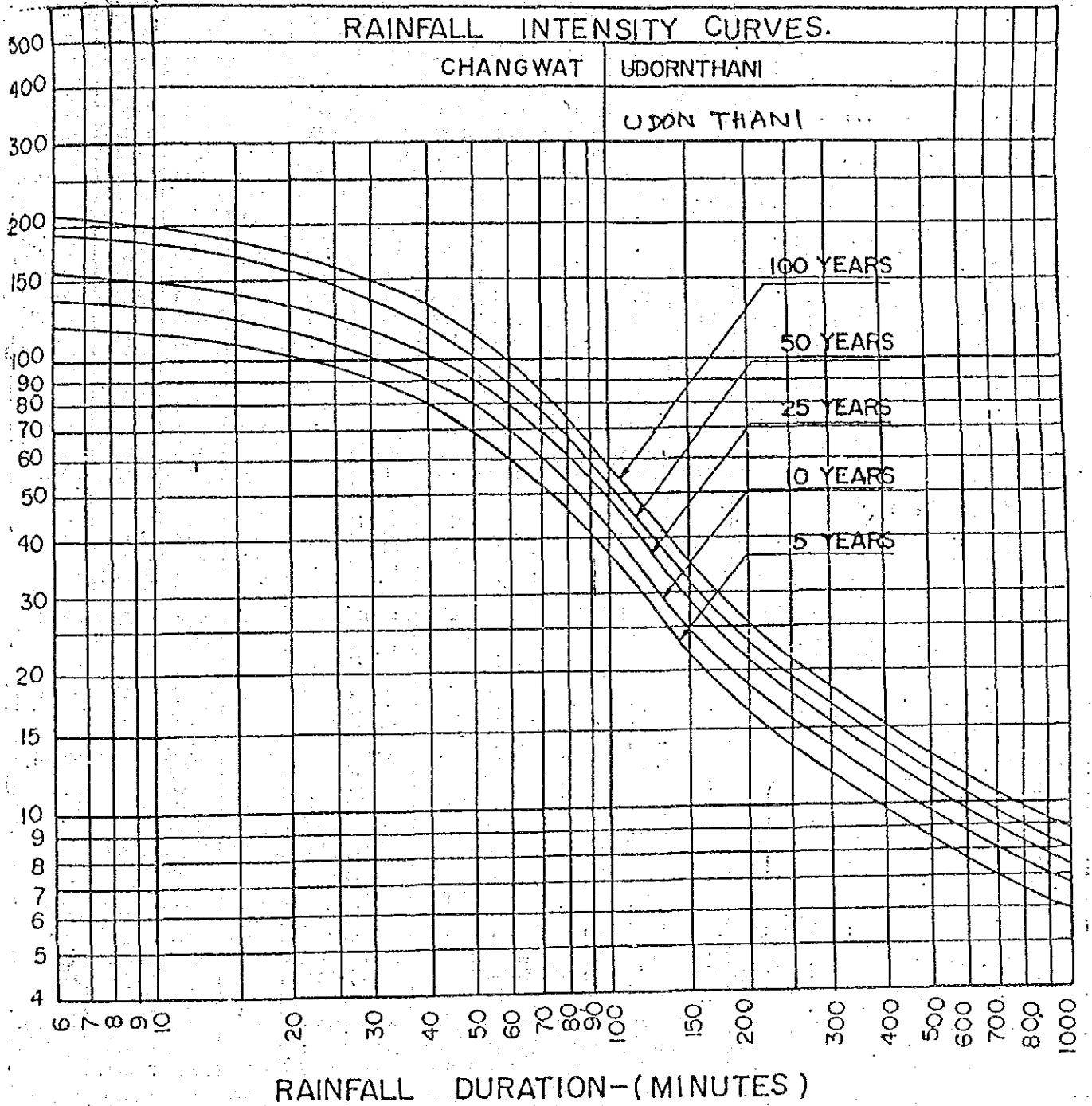


TABLE M-1

CLIMATOLOGICAL DATA FOR THE PERIOD 1956 - 1985

Station **KHON KAEW**

Index Station **48901**

Latitude **16° 26' N.**

Longitude **102° 30' E.**

Elevation of station above MSL

Height of barometer above MSL

Height of thermometer above ground

Height of wind vane above ground

Height of rain gauge

165 meters

166 meters

1.25 meters

10.55 meters

1.00 meters

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Pressure (+1000 or 900 mb.)													
Mean	14.10	11.68	09.72	07.97	06.48	05.21	05.17	05.14	07.23	10.68	13.28	14.32	09.27
Ext. Max.	28.13	24.72	24.74	21.68	14.90	13.70	12.62	13.92	15.46	19.70	23.77	25.08	28.13
Ext. Min.	02.31	00.36	99.98	97.40	97.40	94.92	95.05	95.58	94.32	01.87	04.18	03.44	94.32
Mean daily range	5.57	5.93	5.97	5.68	5.12	4.23	4.04	4.11	4.56	4.71	4.78	5.11	4.98
Temperature (°C)													
Mean	22.8	25.6	28.7	30.1	29.2	28.6	28.0	27.6	27.0	26.5	24.8	22.8	26.8
Mean Max.	30.3	32.7	35.5	36.5	34.8	33.3	32.6	32.0	31.5	31.3	30.8	29.9	32.6
Mean Min.	15.7	19.1	22.2	24.4	24.7	24.7	24.2	24.1	23.6	22.3	19.3	16.3	21.7
Ext. Max.	37.2	41.0	41.8	42.8	41.2	39.4	38.0	38.0	35.9	35.4	35.4	35.8	42.8
Ext. Min.	5.7	10.4	10.3	16.4	19.8	20.7	20.2	20.8	19.3	14.0	9.4	5.6	5.6
Relative Humidity (%)													
Mean	63.9	62.4	59.3	63.0	72.0	75.4	77.4	79.7	82.0	77.1	70.5	66.5	70.8
Mean Max.	85.9	82.9	80.4	82.2	88.0	89.1	90.4	91.6	93.5	91.4	88.8	87.3	87.6
Mean Min.	41.4	40.8	38.6	42.3	52.8	58.7	61.1	64.0	65.6	58.8	49.4	44.1	51.5
Ext. Min.	11.0	10.0	10.0	14.0	26.0	33.0	34.0	37.0	45.0	26.0	21.0	15.0	10.0
Dew Point (°C)													
Mean	15.0	17.0	19.1	21.5	23.0	23.6	23.5	23.6	24.3	21.9	18.6	15.7	20.6
Evaporation (mm.)													
Mean - Pan	134.2	161.4	211.7	216.6	196.5	171.4	165.5	150.0	137.0	152.3	151.0	152.4	2020.0
Cloudiness (0-10)													
Mean	3.0	3.4	3.6	5.0	6.9	8.0	8.0	8.5	7.8	5.7	4.2	3.5	5.6
Sunshine Duration (hr.)													
Mean	285.3	232.8	255.2	252.3	244.6	186.1	182.4	159.5	165.2	236.6	262.3	285.3	2766.0
Visibility (km.)													
0700 L.S.F.	5.3	5.0	5.0	6.6	8.3	8.9	9.0	8.7	8.4	8.8	7.5	6.4	7.3
Mean	7.1	8.4	6.9	7.3	9.1	6.9	9.7	9.4	9.3	9.4	9.0	8.1	8.6
Wind (knots)													
Prevailing wind	NE	NE	NE	SW	SW	SW	SW	SW	NE	NE	NE	NE	-
Mean wind speed	2.0	2.1	2.4	2.4	2.4	2.7	2.8	2.6	1.8	2.1	2.4	2.4	-
Max. wind speed	33 NE	33 N, S SE, SW	40 NE	46 W	47 SW, NW	49 E, SSE, NW	55 W	40 E	55 N, NE SW, W	34 NE	35 NE	35 NE	55 W
Rainfall (mm.)													
Mean	4.6	13.2	31.1	60.7	167.7	176.9	163.4	192.7	262.0	87.2	15.9	3.3	1176.7
Mean rainy days	0.9	2.6	3.8	6.9	15.6	14.4	15.7	17.7	18.2	9.5	1.7	0.7	105.5
Greatest in 24 hr.	29.2	63.4	51.8	65.7	87.7	133.4	92.8	134.8	146.6	124.3	81.0	26.6	146.6
Day/Year	24/69	3/66	2/82	6/65	5/71	26/83	26/63	12/78	7/82	26/69	10/74	20/71	7/82
Number of days with													
Haze	22.5	23.5	26.5	18.3	2.4	0.0	0.1	0.0	0.2	2.1	7.0	14.3	116.9
Fog	0.3	0.4	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.4	0.1	0.4	2.0
Hail	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Thunderstorm	0.2	1.7	4.8	11.8	18.6	14.7	14.0	13.1	14.4	6.3	0.5	0.1	100.2
Squall	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

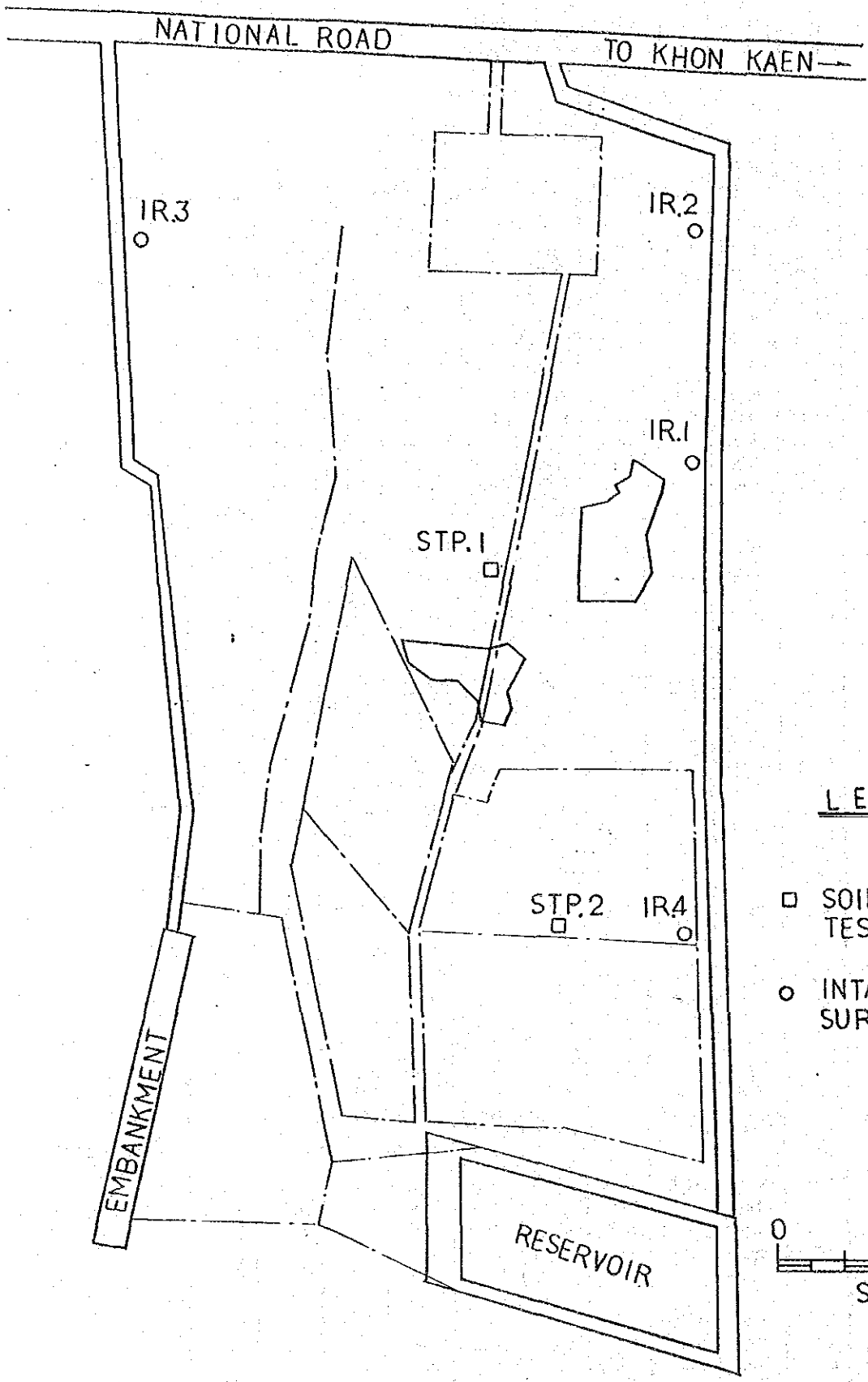
Remark :

1. Sunshine Duration 1957 - 1985
2. Evaporation 1962 - 1985

(4) インテクレート

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FIG. 1-3	CALCULATION OF INTAKE RATE (IR. 2)
FIG. 1-4	CALCULATION OF INTAKE RATE (IR. 3)
FIG. 1-5	CALCULATION OF INTAKE RATE (IR. 4)



LEGEND

- SOIL SURVEY TEST PIT
- INTAKE RATE SURVEY POINT

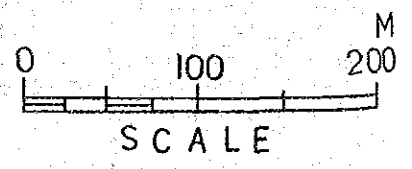
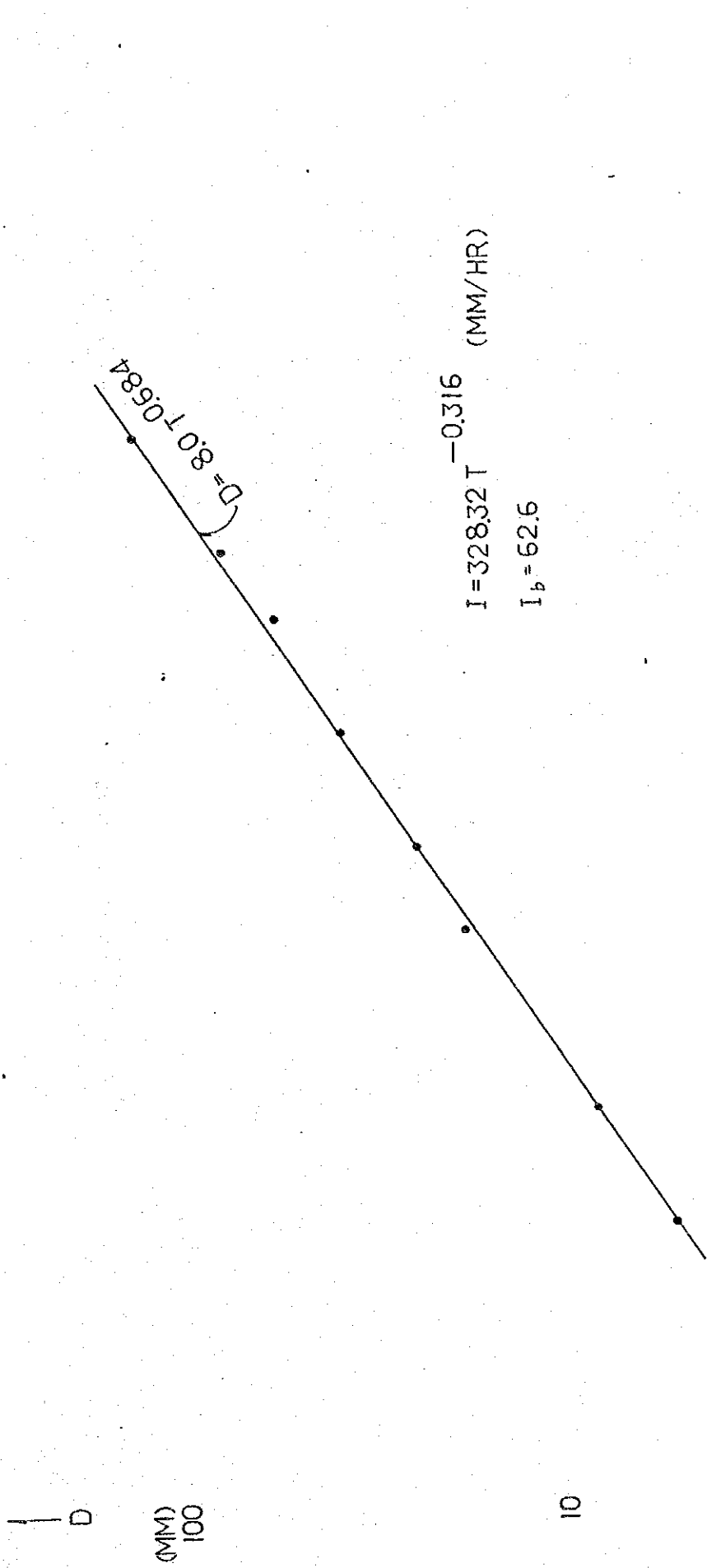


FIG. I-1
LOCATION MAP OF SURVEY POINT



SITE - IRL

FIG. I-2 CALCULATION OF INTAKE RATE'

I 10 100 (MIN) T

D

(MM)
100

$$D = 50.7 T^{0.713}$$

$$I = 213.9 T^{-0.287} \text{ (MM/HR)}$$

$$I_b = 48.8$$

10

FIG. 1-3 CALCULATION OF INTAKE RATE

SITE—IR2

1

10

100 (MIN)

T—

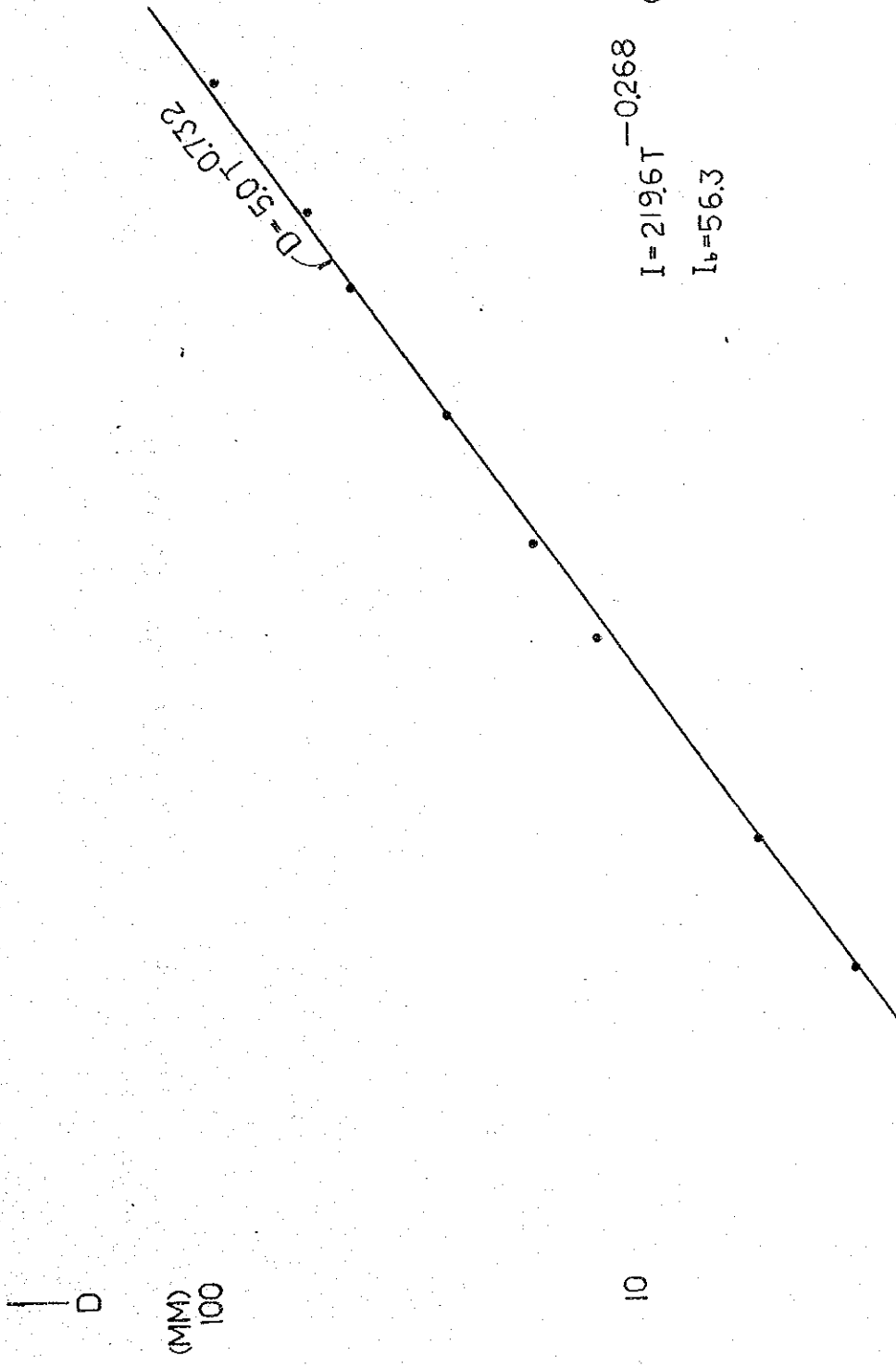


FIG. 1-4

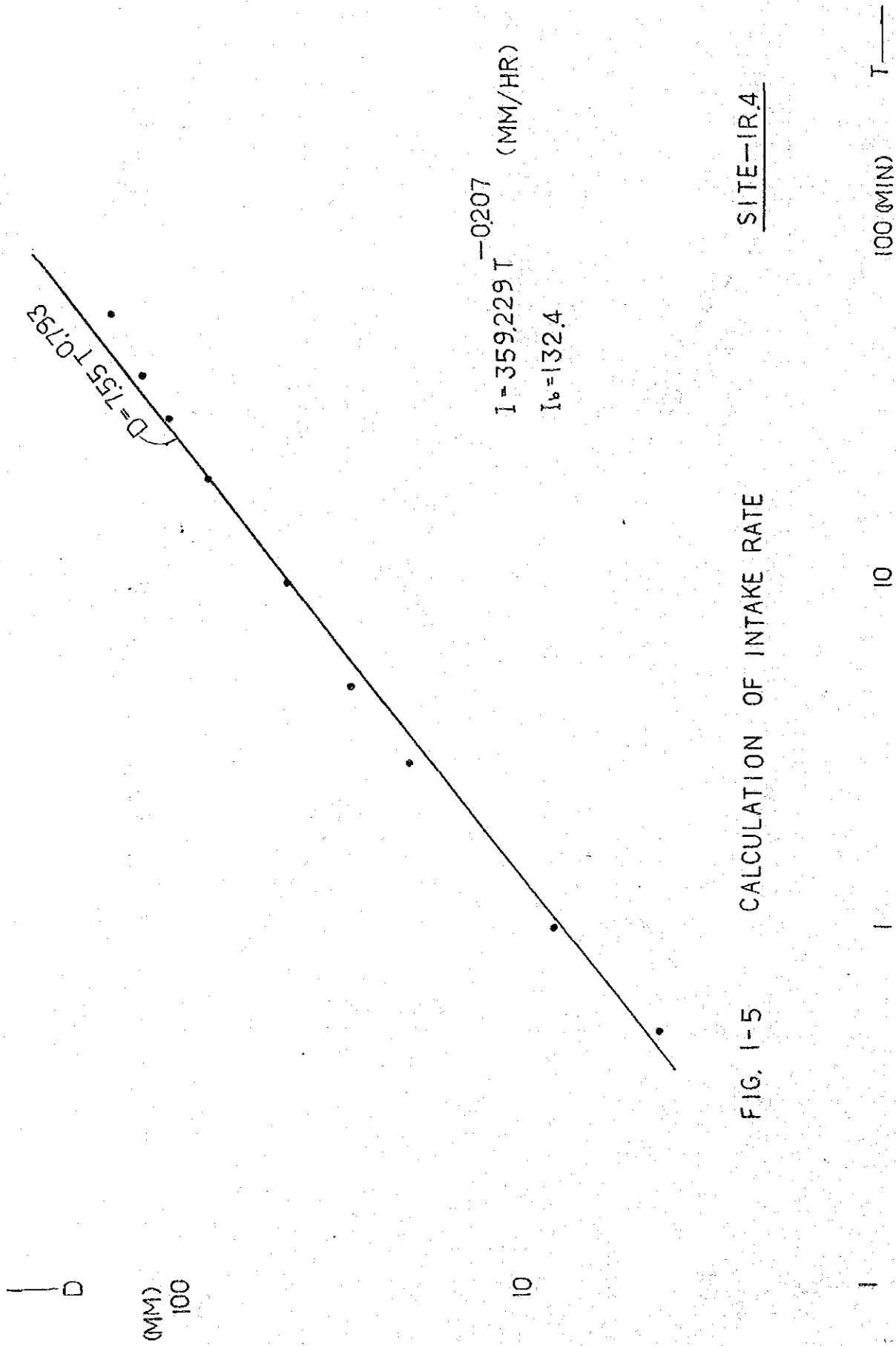


FIG. I-5 CALCULATION OF INTAKE RATE

(5) 工事費積算資料

UNIT COST of LABOUR

December, 1989

No.	Item	Unit	Perdiem
			Baht
1.	Labour	md	90
2.	Foreman	md	300
3.	Operator (Heavy Equipment)	md	280
4.	Assistant of Operator	md	200
5.	Steel Worker	md	250
6.	Mechanician	md	250
7.	Carpenter	md	250
8.	Masonry	md	250
9.	Driver	md	220

UNIT COST of MATERIALS

December, 1989

No.	Item	Unit	Cost	Remark
			(Baht)	
1.	Aggregate			
	Sand	m ³	350	
	Gravel	m ³	300	
2.	Cobble-stone	m ³	300	
3.	Cement	bag	90	1 bag = 50 kg
4.	Iron Bar	kg	15	
5.	Wire for Binding	kg	20	
6.	Nail	kg	20	
7.	Laterite	m ³	100	
8.	Fuel			
	Gasoline	liter	8.80	
	Diesel	liter	6.50	
9.	Block			
	(90 x 190 x 390)	PC	5.50	
	(70 x 190 x 390)	PC	3.50	
10.	Brick	PC	0.40	
11.	Lumber	m ³	7,800.-	for frame
12.	Timber	m ³	12,400.-	
13.	Plywood	m ²	240.-	thickness 6 mm
14.	Log	m ³	6,500.-	
15.	Wire Mesh	m ²	120.-	space 2", #11
16.	Concrete pipe (φ300)	PC	160.-	lit. = 1.0 m
17.	Concrete pipe (φ500)	PC	300.-	lit. = 1.0 m
18.	Steel pipe (φ800)	m	1,540/6	
19.	PVC pipe (φ125)	m	1,472/4	
20.	PVC pipe (φ100)	m	965/4	
21.	PVC pipe (φ75)	m	600/4	
22.	PVC pipe (φ65)	m	430/4	
23.	PVC pipe (φ50)	m	260/4	

No. 1	UNIT COST OF					75.2 B/m ³	Explanation
	Excavation by Manpower (Sand with Gravel)					Calculated by 1 m ³	
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Labour	0.56	md	90	50.4			
Foreman	0.06	md	300	18			
Sub-total				68.4			
2. Temporary Works and Others	10	%		6.8			
Total				75.2			

No. 2		UNIT COST OF		33.8 B/m ³		Explanation
Banking by Manpower		Calculated by 10 m ³				
Item	Quantity	Unit	Unit Cost	Cost	Remarks	
1. Workers						
Labour	2.55	md	90	229.5	Not include compacting	
Foreman	0.26	md	300	78		
Sub-total				307.5		
2. Temporary Works and Others	10	%		30.8		
Total				338.3		
			1 m ³ =	33.8		

No. 3		UNIT COST OF				12.7 B/m ²	Explanation
Smoothing Face of Slope (For Banking Slope)		Quantity	Unit	Unit Cost	Cost	Remarks	
1. Workers							
Labour	0.95	md	90	85.5		Include tamping	
Foreman	0.1	md	300	30.0			
Sub-total				115.5			
2. Temporary Works and Others	10	%		11.6			
Total				127.1	1 m ² =		

No. 3-1	UNIT COST OF					4.2 B/m ²	Explanation
	Smoothing Face of Slope (For Cutting Slope)						
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Labour	0.325	md	90	29.3			
Foreman	0.03	md	300	9			
Sub-total				38.3			
2. Temporary Works and Others							
Total	10	%		3.8			
				42.1			
			1 m ² =	4.2			

No. 4		UNIT COST OF				2.9 B/m ²	Explanation
Arrangement of Road Face		Calculated by 100 m ²					
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Labour	2.25	md	90	202.5			
Foreman	0.2	md	300	60			
Sub-total				262.5			
2. Temporary Works and Others	10	%		26.3			
Total				288.8			
			1 m ² =	2.9			

No. 4-1	UNIT COST OF Spreading by Manpower (for Ballasting)					4.0 B/m ²	Explanation
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers	3.0	md	90	270			
Labour				90			
Foreman	0.3	md	300	90			
Sub-total				360			
2. Temporary Works and Others	10	%		36			
Total				396	1 m ² =		
				4.0			

No. 5		UNIT COST OF				50.3 B/m ³	Explanation
Back Hilling by Manpower		Calculated by 10 m ³					
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Labour	3.75	md	90	337.5			
Foreman	0.4	md	300	120.-			
Sub-total				457.5			
2. Temporary Works and Others	10	%		45.8			
Total				503.3			
			1 m ³ =	50.3			

No. 6		UNIT COST OF				50.9 B/m ²	Explanation
Sod Facing		Calculated by 10 m ²					
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Labour	1.7	md	90	153			
Foreman	0.2	md	300	60			
Sub-total				213			
2. Materials							
Sod	10	m ²	25	250			
3. Temporary Works and Others							
Total	10	%		46.3			
				509.3			
			1 m ² =	50.9			

No. 7		UNIT COST OF				22.5 B/m ³	Explanation
Compacting by Manpower (Compactor 90 kg)		Calculated by 10 m ³					
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Labour	1.1	md	90	99			
Foreman	0.1	md	300	30			
Sub-total				129			
2. Operation Cost							
Operator	0.15	md	250	37.5			
Fuel	0.75	liter	8.8	6.6			
Others	0.15	%		1.0		5 lit/day x 0.15	
Sub-total				45.1			
3. Depreciation	0.15	d	200	30.0			
4. Temporary Works and Others	10	%		20.4		200 B/day	
Total			1 m ³ =	224.5			
				22.5			

No. 8	UNIT COST OF					Explanation
	Hauling by Manpower					
Item	Quantity	Unit	Unit Cost	Cost	Remarks	
1. Sand	0.44	md	90	39.6	per m ³	
2. Gravel	0.54	md	90	48.6	per m ³	
3. Cobble Stone	0.54	md	90	48.6	per m ³	
4. Wood	0.21	md	90	18.9	per m ³	
5. Cement and Others	0.26	md	90	23.4	per ton	

No. 9	UNIT COST OF				1,235.9 B/m ³	Explanation
Reinforced Concrete (Mixed by Portable Mixer)						
Item	Quantity	Unit	Unit Cost	Cost	Remarks	
1. Materials	Calculated by 10 m ³					
Cement (325 kg/m ³)	65	bag	90	5,850		
Hauling cost	3.25	t	23.4	76.1		
Sand	3	m ³	350	1,050		
Hauling cost	3	m ³	39.6	118.8		
Aggregate	6.1	m ³	300	1,830		
Hauling cost	6.1	m ³	48.6	296.5		
Sub-total				9,221.4		
2. Workers						
Labour	3.9	md	90	351		
Foreman	0.4	md	300	120		
Mechanician	2.4	md	250	600		
Sub-total				1,071		
3. Operation Cost						
Fuel (Mixer)	3.3	liter	8.8	29.0		
Others	20	%	8.8	5.8		
Fuel (Vibrator)	0.3	liter	8.8	2.6		
Others	20	%	8.8	0.5		
Sub-total				37.9		

No. 9 (continued)		UNIT COST OF				1,235.9 B/m ³	Explanation
Reinforced Concrete (Mixed by Portable Mixer)		Calculated by 10 m ³					
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
4. Depreciation Cost Mixer	0.66	d	540	356.4			
Vibrator	0.89	d	68	60.5			
Sub-total				416.9			
5. Temporary Works and Others				1,612.1	(1+2+3+4) x 0.15		
Total				12,359.3			
			1 m ³ =	1,235.9			

No. 10		UNIT COST OF				1,143.1 B/m ³	Explanation
Plain Concrete (Mixed by Portable Mixer)		Calculated by 10 m ³					
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Materials							
Cement (275 kg/m ³)	55	bag	90	4,950			
Hauling cost	2.75	1	23.4	64.4			
Sand	3	m ³	350	1,050			
Hauling cost	3	m ³	39.6	118.8			
Aggregate	6.4	m ³	300	1,920			
Hauling cost	6.4	m ³	48.6	311.0			
Sub-total				8,414.2			
2. Workers				1,071	Refer to No. 9.		
3. Operation Cost				37.9	"		
4. Depreciation Cost				416.9	"		
5. Temporary Works and Others	15	%		1,491			
Total			1 m ³ =	11,431			
				1,143.1			

No. 11		UNIT COST OF				1,011.3 B/m ³	Explanation
Lean-mix Concrete (Mixed by Portable Mixer)		Calculated by 10 m ³					
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Materials							
Cement (200 kg/m ³)	40	bag	90	3,600			
Hauling cost	2.0	t	23.4	46.8			
Sand	3.3	m ³	350	1,155			
Hauling cost	3.3	m ³	39.6	130.7			
Aggregate	6.7	m ³	300	2,010			
Hauling cost	6.7	m ³	48.6	325.6			
Sub-total				7,268.1			
2. Workers				1,071	Refer to No. 9.		
3. Operation Cost				37.9	"		
4. Depreciation Cost				416.9	"		
5. Temporary Works and Others	15	%		1,319.1			
Total			1 m ³ =	10,113.0			
				1,011.3			

No. 12		UNIT COST OF				1,719.8 B/m ³	Explanation
Mortar (1:3) (Mixed by Manpower)		Calculated by 1 m ³					
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Materials							
Cement	0.53	ton	1,800	954			
Hauling cost	0.53	ton	23.4	12.4			
Sand	1.05	m ³	350	367.5			
Hauling cost	1.05	m ³	39.6	41.6			
Sub-total				1,375.5			
2. Workers							
Labour	1.0	md	90	90			
Foreman	0.1	md	300	30			
Sub-total				120			
3. Temporary Works and Others							
Total	15	%		224.3			
				1,719.8			

No. 13	UNIT COST OF Processing and Assembling of Reinforced Iron Bar						20.6 B/kg	Explanation
Item	Quantity	Unit	Unit Cost	Cost	Remarks			
1. Materials								
Reinforced I.B.	1.03	ton	15,000	15,450				
Wire for binding	7	kg	20	140				
Sub-total				15,590				
2. Processing and Assembling								
Steel worker	5.9	md	250	1,475				
Labour	5.9	md	90	531				
Foreman	1.2	md	300	360				
Sub-total				2,366				
3. Temporary Works and Others	15	%		2,693.4				
Total			1 kg =	20,649.4				
				20.6				

No. 14		UNIT COST OF		266.3 B/m ²		Explanation
Wooden Form		Calculated by 10 m ²				
Item	Quantity	Unit	Unit Cost	Cost	Remarks	
1. Sheeting						
Wooden plate	0.196	m ³	6,500	344	1,274 x 27%	
Wooden frame	0.113	m ³	6,500	198.3	734.5 x 27%	
Iron nail	3	kg	20	60		
Sub-total				702.3		
2. Support						
Square timber	0.339	m ³	7,800	423.1	2,644.2 x 16%	
Log	0.154	m ³	6,500	160.2	1,001 x 16%	
Nail	1.1	kg	20	22		
Wire	0.8	kg	20	16		
Oil	1.5	liter	50	75		
Sub-total				696.3		
3. Other Materials	3	%		42.0		(1+2) x 0.03
4. Workers						
Carpenter	2.24	md	250	560		
Labour	2.07	md	90	186.3		
Foreman	0.43	md	300	129		
Sub-total				875.3		
5. Temporary Works and Others	15	%		347.4		
Total			1 m ² =	2,663.3		
				266.3		

No. 15		UNIT COST OF				1,974.9 Bset		Explanation
Wire Box for Gabionade (Type I)		Calculated by 1 set						
Item	Quantity	Unit	Unit Cost	Cost	Remarks			
1. Workers								
Labour	2.61	md	90	234.9			Area of wire mesh	
Foreman	0.3	md	300	90			$0.45 \times 0.9 \times 2 = 0.81$	
Sub-total				324.9			$0.9 \times 2.0 \times 2 = 3.60$	
2. Materials							$0.45 \times 2.0 \times 2 = 1.80$	
2-1 Wire mesh	6.21	m ²	120	745.2			Total 6.21 m ²	
Selvedge and binding wire	10	%		74.5			Capacity of wire box	
Sub-sub-total				819.7			$0.45 \times 0.9 \times 2.0$	
2-2 Cobble stone	0.73	m ³	300	219			= 0.81 m ³	
Hauling cost	0.73	m ³	48.6	35.5			Volume of cobble stone	
Sub-sub-total				254.5			$0.81 \times 0.9 = 0.73 \text{ m}^3$	
2-3 Iron bar	3	piece	70	210				
PVC pipe	3	piece	20	60				
Mortar	0.028	m ³	1,719.8	48.2			Constructing	
Sub-sub-total				318.2			of wire box	
Sub-total				1,392.4			Setting	
3. Temporary Works and Others	15	%		257.6			Packing stones	
Total				1,974.9			Total 2.61 md	

No. 16		UNIT COST OF			2,228.1 B/set		Explanation
Wire Box for Gabionade (Type II)		Calculated by 1 set					
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers	2.93	md	90	263.7	Space 2", ø3.05 (# 11)	Area of wire mesh 0.45 x 0.9 x 2 = 0.81 0.9 x 2.4 x 2 = 4.32 0.45 x 2.4 x 2 = 2.16 Total 7.29 m ²	
Labour	0.3	md	300	90			
Foreman				353.7			
Sub-total							
2. Materials	7.29	m ²	120	874.8	Space 2", ø3.05 (# 11)	Capacity of wire box 0.45 x 0.9 x 2.4 = 0.972	
2-1 Wire mesh	10	%		87.5			
Selvedge and binding wire				962.3			
Sub-sub-total							
2-2 Cobble stone	0.87	m ³	300	261	Space 2", ø3.05 (# 11)	Volume of cobble stone 0.972 x 0.9 = 0.87 m ³	
Hauling cost	0.87	m ³	48.6	42.3			
Sub-sub-total				303.3			
2-3 Iron bar	3	piece	70	210	ø25, L = 1.2 ø100, L = 0.5 0.1 x 0.1 x 4 x 1.2 x 3	Constructing of wire box 0.3 md Setting 1.05 md Packing stones 1.58 md Total 2.93 md	
PVC pipe	3	piece	20	60			
Mortar	0.028	m ³	1,719.8	48.2			
Sub-sub-total				318.2			
Sub-total				1,583.8			
3. Temporary Works and Others	15	%		290.6	(1+2) x 0.15		
Total				2,228.1			

No. 17		UNIT COST OF				542.3 B/m ³	Explanation
Cobblestones for Bed		Calculated by 1 m ³					
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Labour	0.63	md	90	56.7			
Foreman	0.06	md	300	18			
Sub-total				74.7			
2. Materials							
Cobblestone	1	m ³	300	300			
Gravel	0.2	m ³	300	60			
Hauling cost	1.2	m ³	48.6	58.3			
Sub-total				418.3			
3. Temporary Works and Others	10	%		49.3			
Total				542.3			

No. 18		UNIT COST OF				11 B/m	Explanation
Setting PVC Pipe		Calculated by 10 pieces (40 m)					
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Piping man	0.4	md	250	100			
Labour	1.75	md	90	157.5			
Foreman	0.2	md	300	60			
Sub-total				317.5			
2. Materials							
Adhesives	0.55	kg	150	82.5			
3. Temporary Works and Others							
Total	10	%		40			
			1 m =	440			
				11			

No. 19	UNIT COST OF Setting Steel Pipe					29.3 B/m	Explanation
Calculated by 10 pieces (40 m)							
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Piping man	1.03	md	250	257.5			
Labour	6.48	md	90	583.2			
Foreman	0.75	md	300	225			
Sub-total				1,065.7			
2. Temporary Works and Others	10	%		106.6			
Total			1 m =	1,172.3			
				29.3			

No. 20		UNIT COST OF				72.6 B/m ²		Explanation
Masonry		Calculated by 10 m ²						
Item	Quantity	Unit	Unit Cost	Cost	Remarks			
1. Workers								
Mason	0.6	md	250	150				
Labour	4	md	90	360				
Foreman	0.5	md	300	150				
Sub-total				660				
2. Temporary Works and Others	10	%		66				
Total				726				
			1 m ² =	72.6				

No. 21	UNIT COST OF Run-off Plot					10,202 B/set	Explanation
Calculated by per 1 set							
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Materials							
Block (70 x 190 x 390)	100	pc	3.5	350			
- ditto - (90 x190 x390)	175	"	5.5	962.5			
Brick	64	"	4.0/10	26			
Concrete	2.76	cum	1,143.1	3,154.9			
Cobblestones for Bed	2.76	"	542.3	1,496.7			
Mortar	0.23	"	1,719.8	395.6			
Iron Bar	24.5	kg	20.6	494.4			
Sub-total				6,880.1			
2. Labour							
Banking	20	cum	33.8	676			
Masonry	23.7	sqm	72.6	1,805.4			
Finishing by Mortar	28	"	30	840			
Sub-total				3,321.4			
Total			=	10,201.5			
				10,202			

No. 22-1		UNIT COST OF				4,795 B/pt	Explanation
Water Supply Valve (φ 25)							
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Materials							
Concrete Pipe φ 300	0.5	m	160	80			
Concrete	0.06	m ³	1,011.3	61			
Vertical Pipe φ 25	0.8	m	10 1/4	20			
Tee	1	pc	152	152			
Angle Valve	1	pc	4,200	4,200			
Adhesive	0.082	kg	150	12			
2. Workers							
Labour	3	md	90	270			
Total				4,795			

No. 22-2		UNIT COST OF				6,829 B/pt		Explanation
Water Supply Valve (φ 50)								
Item	Quantity	Unit	Unit Cost	Cost	Remarks			
1. Materials								
Concrete Pipe φ 300	0.5	m	160	80				
Concrete	0.06	m ³	1,011.3	61				
Vertical Pipe φ 50	0.8	m	260/4	52				
Tee	1	pc	950	950				
Angle Valve	1	pc	5,400	5,400				
Adhesive	0.107	kg	150	16				
2. Workers								
Labour	3	md	90	270				
Total				6,829				

No. 22-3		UNIT COST OF				7,453 B/pt	Explanation
Water Supply Valve (φ 65)							
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Materials							
Concrete Pipe φ 300	0.5	m	160	80			
Concrete	0.06	m ³	1,011.3	61			
Vertical Pipe φ 65	0.8	m	430/4	86			
Tee	1	pc	408	408			
Angle Valve	1	pc	6,530	6,530			
Adhesive	0.123	kg	150	18			
2. Workers Labour	5	md	90	270			
Total				7,453			

No. 22-4		UNIT COST OF		11,436 B/pt		Explanation
Water Supply Valve (φ 80)						
Item	Quantity	Unit	Unit Cost	Cost	Remarks	
1. Materials						
Concrete Pipe φ 300	0.5	m	160	80		
Concrete	0.06	m ³	1,011.3	61		
Vertical Pipe φ 80	0.8	m	600/4	120		
Tee	1	pc	880	880		
Angle Valve	1	pc	10,000	10,000		
Adhesive	0.164	kg	150	25		
2. Workers						
Labour	3	md	90	270		
Total				11,436		

No. 23-1		UNIT COST OF				4,823 B/pt	Explanation
Sand-flash Valve (φ 50)		Quantity	Unit	Unit Cost	Cost	Remarks	
1. Materials							
	Concrete Pipe φ 500	1	m	300	300		
	Concrete	0.04	m ³	1,011.3	41		
	Check Valve φ 50	1	pc	4,200	4,200		
	Adhesive	0.082	kg	150	12		
2. Workers							
	Labour	3	md	90	270		
Total					4,823		

No. 23-2		UNIT COST OF				6,023 B/pt	Explanation
Sand-flash Valve (φ 65)		Quantity	Unit	Unit Cost	Cost	Remarks	
1. Materials							
	Concrete Pipe φ 500	1	m	300	300		
	Concrete	0.04	m ³	1,011.3	41		
	Check Valve φ 65	1	pc	5,400	5,400		
	Adhesive	0.082	kg	150	12		
2. Workers							
	Labour	3	md	90	270		
Total					6,023		

No. 23-3

UNIT COST OF 7,153 B/pt

Sand-flash Valve (φ 75)

Explanation

Item	Quantity	Unit	Unit Cost	Cost	Remarks
1. Materials					
Concrete Pipe φ 500	1	m	300	300	
Concrete	0.04	m ³	1,011.3	41	
Check Valve φ 75	1	pc	6,530	6,530	
Adhesive	0.082	kg	150	12	
2. Workers					
Labour	3	md	90	270	
Total				7,153	

No. 24		UNIT COST OF Drainage by Pump					284.8 B/day	Explanation
		Quantity	Unit	Unit Cost	Cost	Remarks		
1. Gasoline		7.6	lit	8.8	66.9			
Others		15	%		10			
Sub-total					76.9			
2. Workers								
Labour		0.3	md	90	27			
Mechanician		0.3	md	250	75			
Sub-total					102			
3. Depreciation		1	day		80			
4. Temporary Works and Otheres		10	%		25.9			
Total					284.8			

Eq No. 1-1		UNIT COST OF				Remarks	Explanation
Excavation by Bulldozer (11 ton)		Quantity	Unit	Unit Cost	Cost		
1. Operation Cost		1	day		4,831.8	D = 20 m	$Q = \frac{60q \times f \times E}{Cm}$ $60q = 80.64$ $f = 1$ $E = 0.60 \text{ (Sandy soil)}$ $Cm = 0.034 \times 20 + 0.25 = 0.93$
2. Temporary Works and Others		10	%		483.2		
Total					5,315.0		
Sandy soil		1	m ³		14.6	Production per day	$Q = \frac{80.64 \times 1 \times 0.6}{0.93}$ $= 52.0 \text{ m}^3/\text{hr}$
Clay		1	m ³		17.5		-----
							$E = 0.5 \text{ (Clay)}$ $Q = \frac{80.64 \times 1 \times 0.5}{0.93}$ $= 43.4 \text{ m}^3/\text{hr}$

Eq No. 1-2						UNIT COST OF			Explanation
Excavation by Bulldozer (11 ton)						D = 60 m			
Item	Quantity	Unit	Unit Cost	Cost	Remarks				
1. Operation Cost	1	day		4,831.8		$Q = \frac{60q \times f \times E}{Cm}$ $60q = 80.64$ $f = 1$ $E = 0.60 \text{ (Sandy soil)}$ $Cm = 0.034 \times 60 + 0.25 = 2.29$			
2. Temporary Works and Others	10	%		483.2					
Total				5,315.0					
Sandy soil	1	m ³		36.0	Production per day	$Q = \frac{80.64 \times 1 \times 0.6}{2.29}$ $= 21.1 \text{ m}^3/\text{hr}$			
Clay	1	m ³		43.1		-----			
						$E = 0.5 \text{ (Clay)}$ $Q = \frac{80.64 \times 1 \times 0.5}{2.29}$ $= 17.6 \text{ m}^3/\text{hr}$			

Eq No. 1-3		UNIT COST OF				Remarks	Explanation
Excavation by Bulldozer (15 ton)		Quantity	Unit	Unit Cost	Cost		
1.	Operation Cost	1	day		5,781.7		$Q = \frac{60q \times f \times E}{Cm}$ $60q = 107.88$ $Cm = 0.034 \times 20 + 0.25 = 0.93$
2.	Temporary Works and Others	10	%		578.2		
	Total				6,359.9		Rock $f = 0.7, E = 0.35$ $Q = \frac{107.88 \times 0.7 \times 0.35}{0.93}$ $= 28.4 \text{ m}^3/\text{hr}$
	Sandy soil	1	m ³		13.1	Production per day 69.6 x 7 = 487.2 m ³	
	Clay	1	m ³		15.7	58.0 x 7 = 406 m ³	
	Rock	1	m ³		32.0	28.4 x 7 = 198.8 m ³	Sandy $f = 1.0, E = 0.60$ $Q = \frac{107.88 \times 1 \times 0.6}{0.93}$ $= 69.6 \text{ m}^3/\text{hr}$
							Clay $f = 1.0, E = 0.5$ $Q = \frac{107.88 \times 1 \times 0.5}{0.93}$ $= 58 \text{ m}^3/\text{hr}$

UNIT COST OF Excavation by Bulldozer						
Eq No. 1-4				D = 60 m		
Item	Quantity	Unit	Unit Cost	Cost	Remarks	Explanation
1. Operation Cost	1	day		5,781.7		
2. Temporary Works and Others	10	%		578.2		
Total				6,359.9		
Sandy soil	1	m ³		32.1	Production per day 28.3 x 7 = 198.1 m ³	
Clay	1	m ³		38.5	23.6 x 7 = 165.2 m ³	
$Q = \frac{60q \times f \times E}{Cm}$ $60q = 107.88$ $f = 1.0$ $Cm = 0.034 \times 60 + 0.25 = 2.29$ $\text{Sandy } E = 0.60$ $Q = \frac{107.88 \times 1 \times 0.6}{2.29} = 28.3 \text{ m}^3/\text{hr}$ <hr/> $\text{Clay } E = 0.5$ $Q = \frac{107.88 \times 1 \times 0.5}{2.29} = 23.6 \text{ m}^3/\text{hr}$						

UNIT COST OF Excavation by Back Hoe (0.35 m ³)						Explanation
Eq.No. 2-1	Item	Quantity	Unit	Unit Cost	Cost	
	1. Operation Cost	1	day		3,769.9	
	2. Temporary Works and Others	10	%		377.0	
	Total				4,146.9	
	Sandy Soil	1	m ³		19.5	Production per day 30.4 x 7 = 212.8 m ³
						$Q = \frac{3600 \times q \times f \times E}{Cm}$ $q = q_0 \times K$ $= 0.35 \times 0.9 = 0.315$ $f = 1, E = 0.75$ $Cm (\theta 90^\circ) = 28 \text{ sec}$ $Q = \frac{3600 \times 0.315 \times 1 \times 0.75}{28}$ $= 30.4 \text{ m}^3/\text{hr}$

Eq No. 2-2

UNIT COST
OF

Excavation by Back Hoe (0.75 m³)

Item	Quantity	Unit	Unit Cost	Cost	Remarks	Explanation
1. Operation Cost	1	day		6,787.2		$Q = \frac{3600 \times q \times f \times E}{Cm}$ $q = q_0 \times K$ $= 0.75 \times 0.9 = 0.675$ $Cm = 0.054\phi + 23$ $\phi 90^\circ \rightarrow Cm \ 28 \text{ sec}$
2. Temporary Works and Others	10	%		678.7		
Total				7,465.9		
Sandy soil	1	m ³		16.4	Production per day	<u>Rock</u> $f = 0.7, E = 0.5$ $Q = \frac{3600 \times 0.675 \times 0.7 \times 0.5}{28}$ $= 30.4 \text{ m}^3/\text{hr}$
Clay	1	m ³		18.9		
Rock	1	m ³		35.1		
						<u>Sandy</u> $f = 1, E = 0.75$ $Q = \frac{3600 \times 0.675 \times 1 \times 0.75}{28}$ $= 65.1 \text{ m}^3/\text{hr}$
						<u>Clay</u> $f = 1, E = 0.65$ $Q = \frac{3600 \times 0.675 \times 1 \times 0.65}{28}$ $= 56.4 \text{ m}^3/\text{hr}$

UNIT COST OF Spreading by Bulldozer (11 ton)						Explanation
Eq No. 3-1	Item	Quantity	Unit	Unit Cost	Cost	
	1. Operation Cost	1	day		4,831.8	
	2. Temporary Works and Others	10	%		483.2	
	Total				5,315.0	
	Cost per m ³ (D = 0.15)	1	m ³		10.5	Production per day 72.4 x 7 = 506.8
	Cost per m ³ (D = 0.30)	1	m ³		9	84.8 x 7 = 593.6

$$Q = 10E (11D + 8)$$

$$E = 0.75$$

$$D = 0.15$$

$$Q = 10 \times 0.75 (11 \times 0.15 + 8)$$

$$= 72.375$$

$$\approx 72.4$$

$$D = 0.30$$

$$Q = 10 \times 0.75 (11 \times 0.3 + 8)$$

$$= 84.8$$

Eq No. 3-2						
UNIT COST OF Spreading by Bulldozer (15 ton)						
Item	Quantity	Unit	Unit Cost	Cost	Remarks	Explanation
1. Operation Cost	1	day		5,781.7		$Q = 10E (12D + 9)$
2. Temporary Works and Others	10	%		578.2		$E = 0.75$ $D = 0.15$
Total				6,359.9		$Q = 10 \times 0.75(12 \times 0.15 + 9)$ $= 81 \text{ m}^3/\text{hr}$

Cost per m ³ (D = 0.15)	1	m ³		11.2	Production per day 81 x 7 = 567	$D = 0.30$
Cost per m ³ (D = 0.30)	1	m ³		9.6	94.5 x 7 = 661.5	$Q = 10 \times 0.75 (12 \times 0.3 + 9)$ $= 94.5$

UNIT COST OF Compacting by Bulldozer (11 ton)						Explanation
Item	Quantity	Unit	Unit Cost	Cost	Remarks	
1. Operation Cost	1	day		4,831.8		I. $Q = \frac{V \times W \times D \times E}{N} \text{ (m}^3\text{/h)}$ $V = 3,500 \text{ m/h}$ $W = 0.7 \text{ m}$ $D = 0.3 \text{ m}$ $E = 0.65$ $N = 5$
2. Temporary Works and Others	10	%		483.2		
Total				5,315.0		
I. Cost per m ³	1	m ³		7.9	Production per day	$Q = \frac{3500 \times 0.7 \times 0.3 \times 0.65}{5}$ $= 95.6 \text{ m}^3\text{/h}$
II. Cost per m ²	1	m ²		2.4	$95.6 \times 7 = 669.2$ $318.5 \times 7 = 2,229.5$	
						II. $A = \frac{V \times W \times E}{N}$ $= \frac{3500 \times 0.7 \times 0.65}{5}$ $= 318.5 \text{ m}^2\text{/hr}$

UNIT COST OF Compacting by Bulldozer (15 ton)							Explanation
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Operation Cost	1	day		5,781.7			I. $Q = \frac{V \times W \times D \times E}{N} \text{ (m}^3/\text{h)}$ $V = 3,500 \text{ m/h}$ $W = 0.8 \text{ m}$ $D = 0.3 \text{ m}$ $E = 0.65$ $N = 5$
2. Temporary Works and Others	10	%		578.2			
Total				6,359.9			
I. Cost per m ³	1	m ³		8.3	Production per day 109.2 x 7 = 764.4		$Q = \frac{3500 \times 0.8 \times 0.3 \times 0.65}{5}$ $= 109.2 \text{ m}^3/\text{h}$
II. Cost per m ²	1	m ²		2.5	364 x 7 = 2,548		
							II. $A = \frac{V \times W \times E}{N}$ $= \frac{3500 \times 0.8 \times 0.65}{5}$ $= 364 \text{ m}^2/\text{hr}$

Eq No. 5-1		UNIT COST OF				1.9 B/m ²	Explanation
Field Arrangement by Bulldozer (11 ton)		Quantity	Unit	Unit Cost	Cost	Remarks	
1. Operation Cost		1	day		4,831.8		$S = S_o \times E \text{ (m}^2\text{/hr)}$ $S_o = 520.2 \times W$ $W = B - 0.30$ $= 3.40 - 0.30 = 3.10$ $E = 0.25$ $S = 520.2 \times 3.10 \times 0.25$ $= 403.2$
2. Temporary Works and Others		10	%		483.2		
Total					5,314.0		
Cost per m ²		1	m ²		1.9	Production per day 403.2x7 = 2,822.4 m ²	

Eq No. 5-2		UNIT COST OF				2.1 B/m ²	Explanation
Field Arrangement by Bulldozer (15 ton)		Quantity	Unit	Unit Cost	Cost	Remarks	
1. Operation Cost		1	day		5,781.7		$S = S_o \times E \text{ (m}^2\text{/hr)}$ $S_o = 520.2 \times W$ $W = B - 0.30$ $= 3.6 - 0.3 = 3.3$ $E = 0.25$ $S = 520.2 \times 3.3 \times 0.25$ $= 429.2$
2. Temporary Works and Others		10	%		578.2		
Total					6,359.9		
Cost per m ²		1	m ²		2.1	Production per day 429.2x7 = 3,004.4 m ²	

Eq No. 6		UNIT COST OF				20.8 B/m ³	Explanation
Loading by Tractor Shovel (1.2 m ³)		Quantity	Unit	Unit Cost	Cost	Remarks	
1. Operation Cost		1	day		4,385.9		$Q = \frac{3600 \times q \times f \times E}{C_m}$ $q = q_0 \times K = 1.2 \times 0.73 = 0.876$ $f = 1$ $E = 0.55$ $C_m = 45$ $Q = \frac{3600 \times 0.876 \times 0.55}{45} = 38.5 \text{ m}^3/\text{hr}$
2. Temporary Works and Others		10	%		438.6		
Total					4,824.5		
Cost per m ³		1	m ³		17.9	Production per day 38.5 x 7 = 269.5 m ³	

Eq No. 7

UNIT COST
OF

Hauling by Dump Truck

Calculated by 150 m, 550 m

Explanation

Item	Quantity	Unit	Unit Cost	Cost	Remarks
1. Operation Cost	1	day		3,288.9	
2. Temporary Works and Others	10	%		328.9	
Total				3,617.8	
Cost per m ³ (L = 150)	1	m ³		19.4	Production per day 26.7 x 7 = 186.9
Cost per m ³ (L = 550)	1	m ³		22.9	22.6 x 7 = 158.2

$$Q = \frac{60 \times q \times f \times E}{C_m}$$

$$q = \frac{T}{W} = \frac{8}{1.6} = 5.0$$

$$f = 1$$

$$E = 1$$

$$C_m = 0.005L + 10.5$$

$$L = 150$$

$$C_m = 11.25$$

$$Q = \frac{60 \times 5 \times 1 \times 1}{11.25}$$

$$= 26.7 \text{ m}^3/\text{hr}$$

$$L = 550$$

$$C_m = 0.005 \times 550 + 10.5$$

$$= 13.25$$

$$Q = \frac{60 \times 5 \times 1 \times 1}{13.25}$$

$$= 22.6 \text{ m}^3/\text{hr}$$

UNIT COST OF						Explanation
Compacting by Tire Roller (8 - 20 t)						
Eq. No. 8	Item	Quantity	Unit	Unit Cost	Cost	Remarks
	1. Operating Cost	1	day		3,805.6	
	2. Temporary Works and Others	10	%		380.6	
	Total				4,186.2	
	I. For Area					
	Cost per m ²	1	m ²		0.7	Production per day 831.6 x 7 = 5,821.2
	II. For Volume					
	Cost per m ³	1	m ³		12.3	48.6 x 7 = 340.2

Explanation

I. $A = \frac{W \times V \times E}{N}$

W = 1.80, V = 4,200
 E = E₁ x E₂
 = 1.00 x 0.55 = 0.55
 N = 5
 $A = \frac{1.8 \times 4200 \times 0.55}{5}$
 = 831.76 m²/hr

II. $Q = \frac{W \times V \times D \times E}{N}$

W = 1.80, V = 3,000
 D = 0.2
 E = E₁ x E₂
 = 1.0 x 0.45 = 0.45
 N = 10
 $Q = \frac{1.8 \times 3000 \times 0.2 \times 0.45}{10}$
 = 48.6 m³/hr

Op No. 1		OPERATION COST OF 11 ton Bulldozer				4,831.8 B/day	Explanation
						per day	
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Operator	1.0	md	280	280			
Assistant	0.5	md	200	100			
Sub-total				380			
2. Fuel and Others							
Fuel	79.4	liter	6.5	516.1	0.105 x 108 x 7		
Others	20	%		103.2			
Sub-total				619.3			
3. Depreciation Cost							
Total	7	hr	547.5	3,832.5			
				4,831.8			

Op No. 2		OPERATION COST OF				5,781.7 B/day	Explanation
15 ton Bulldozer						per day	
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Operator	1.0	md	280	280			
Assistant	0.5	md	200	100			
Sub-total				380			
2. Fuel and Others							
Fuel	102.9	liter	6.5	668.9	0.105 x 140 x 7		
Others	20	%		133.8			
Sub-total				802.7			
3. Depreciation Cost							
Total	7	hr	657	4,599			
				5,781.7			

Op No. 3		OPERATION COST OF				3,769.9 B/day	Explanation
		Back-hoe (0.35 m ³)				per day	
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Operator	1.0	md	280	280			
Assistant	0.5	md	200	100			
Sub-total				380			
2. Fuel and Others							
Fuel	63.6	liter	6.5	413.4	0.115 x 79 x 7		
Others	20	%		82.7			
Sub-total				496.1			
3. Depreciation Cost	7	hr	413.4	2,893.8			
Total				3,769.9			

Op No. 4		OPERATION COST OF				6,787.2 ₱/day	Explanation
		Back Hoe (0.75 m ³)				per day	
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Operator	1.0	md	280	280			
Assistant	0.5	md	200	100			
Sub-total				380			
2. Fuel and Others							
Fuel	95.8	liter	6.5	622.7	0.115 x 119 x 7		
Others	20	%		124.5			
Sub-total				747.2			
3. Depreciation Cost							
Total	7	hr	810	5,670			
				6,787.2			

Op No. 5		OPERATION COST OF				4,385.9 B/day	Explanation
Tractor Shovel (1.2 m ³)		Quantity	Unit	Unit Cost	Cost	Remarks	
1. Workers							
Operator	1.0	md	280	280			
Assistant	0.5	md	200	100			
Sub-total				380			
2. Fuel and Others							
Fuel	74.9	liter	6.5	486.9		0.115 x 93 x 7	
Others	20	%		97.4			
Sub-total				584.3			
3. Depreciation Cost							
Total	7	hr	488.8	3,421.6			
				4,385.9			

Op No. 6		OPERATION COST OF Tier Roller (8 - 20 t)				3,805.6 B/day	Explanation
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers	1.0	md	280	280			
Operator							
Assistant	-	-	-	-			
2. Fuel and Others	34.9	liter	6.5	226.9	0.056 x 89 x 7		
Fuel							
Others	20	%		22.7			
Sub-total				249.6			
3. Depreciation Cost	7	hr	468	3,276			
Total				3,805.6			

Op No. 7		OPERATION COST OF				3,288.9 B/day	Explanation
Dump Truck (8 ton)						per day	
Item	Quantity	Unit	Unit Cost	Cost	Remarks		
1. Workers							
Driver	1.0	md	220	220			
Assistant	-	-	-	-			
2. Fuel and Others							
Fuel	58.8	liter	6.5	382.2	0.035 x 240 x 7		
Others	20	%		76.4			
Sub-total				458.6			
3. Depreciation Cost	7	hr	372.9	2,610.3			
Total				3,288.9			

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