

TABLES

Table 3.1.1 (1/2) CYCLE TIME OF DIVERSION TUNNEL UPPER HALF SECTION

Description		Unit		Remarks
Designed excavation area	A1	m ²	19.8	Excluding overbreak
Excavation area	A2	m ²	21.3	Including overbreak
Progress per cycle	B	m	1.00	
Shotcrete area per cycle	M	m ²	10.7	
Shotcrete designed thickness	N	mm	150.0	
Rockbolt per cycle	P	nos	9	L = 3.0 m
Excavation By Loadheader				
Preparation		min	15.0	
Excavation		min	63.9	25.0 m ³ /hr E = 0.80
Clean up		min	10.0	
Surveying		min	10.0	
Subtotal	T1	min	98.9	
Primary Shotcrete				
Preparation		min	15.0	t = 50 mm
Shotcreting		min	8.9	1.20 m ² /min
Clean up		min	10.0	
Subtotal	T2	min	33.9	
Steel Mesh				
Setting		min	30.0	
Subtotal	T3	min	30.0	
Steel Support				
Preparation		min	15.0	H-beam 125x125
Installation		min	30.0	
Subtotal	T4	min	45.0	
Secondary Shotcrete				
Preparation		min	15.0	t = 100 mm
Shotcreting		min	11.9	0.90 m ² /min
Clean up		min	10.0	
Subtotal	T5	min	36.9	
Rockbolt				
Preparation		min	15.0	
Drilling		min	90.0	0.30 m/min
Setting		min	18.0	
Subtotal	T6	min	123.0	
Loss, Others	T7	min	5.3	
Total	Q	min	373.0	
Progress per day		m/day	3.8	
Progress per Month		m	95.0	25 days/month

Table 3.1.1 (2/2) CYCLE TIME OF DIVERSION TUNNEL LOWER HALF SECTION

Description		Unit		Remarks
Designed excavation area	A1	m ²	21.2	Excluding overbreak
Excavation area	A2	m ²	21.9	Including overbreak
Progress per cycle	B	m	2.00	
Shotcrete area per cycle	M	m ²	11.2	
Shotcrete designed thickness	N	mm	150.0	
Rockbolt per cycle	P	nos	8	L = 3.0 m
Excavation By Loadheader				
Preparation		min	10.0	
Excavation		min	123.7	25.0 m ³ /hr E = 0.85
Clean up		min	10.0	
Surveying		min	10.0	
Subtotal	T1	min	153.7	
Steel Mesh				
Setting		min	-	
Subtotal	T2	min	0.0	
Steel Support				
				H-beam 125x125
Preparation		min	10.0	
Installation		min	25.0	
Subtotal	T3	min	35.0	
Shotcrete				
				t = 150 mm
Preparation		min	10.0	
Shotcreting		min	17.2	0.65 m ² /min
Clean up		min	10.0	
Subtotal	T4	min	37.2	
Rockbolt				
Preparation		min	10.0	
Drilling		min	60.0	0.40 m/min
Setting		min	16.0	
Subtotal	T5	min	86.0	
Loss, Others	T6	min	3.1	
Total	Q	min	315.0	
Progress per day		m/day	9.1	
Progress per Month		m	227.5	25 days/month

Table 6.1.1 CYCLE TIME OF OUTLET TUNNEL FULL SECTION

Description		Unit		Remarks
Designed excavation area	A1	m ²	5.45	Excluding overbreak
Excavation area	A2	m ²	6.10	Including overbreak
Progress per cycle	B	m	1.50	
Shotcrete area per cycle	M	m ²	9.26	
Shotcrete designed thickness	N	mm	100.0	
Rockbolt per cycle	P	nos	3	L = 1.5 m
Muckig				Excavation time is included in.
Preparation		min	15.0	
Muckig		min	112.1	4.9 m ³ /hr (from hauling cycle time)
Clean up		min	10.0	
Surveying		min	10.0	
Subtotal	T1	min	147.1	
Steel Mesh				
Setting		min	10.0	
Subtotal	T2	min	10.0	
Steel Support				H-beam 100x100
Preparation		min	10.0	
Installation		min	25.0	
Subtotal	T3	min	35.0	
Shotcrete				t = 100 mm
Preparation		min	15.0	
Shotcreting		min	18.6	0.50 m ² /min
Clean up		min	20.0	
Subtotal	T4	min	53.6	
Rockbolt				
Preparation		min	10.0	
Drilling		min	18.0	0.25 m/min
Setting		min	9.0	
Subtotal	T5	min	37.0	
Loss, Others	T6	min	1.3	
Total	Q	min	284.0	
Progress per day		m/day	7.6	
Progress per Month		m	190.0	25 days/month

Table 11.1.1 (1/3) MONTHLY WORKABLE DAYS FOR CONSTRUCTION WORKS
[EXCAVATION WORK AND DAM EMBANKMENT WORK FOR PERVIOUS ZONES]

Item	Month												Total	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(1) Calender	31	28	31	30	31	30	31	31	30	31	30	31	365	
Rainy Days & Suspended Days														
0 < R ≤ 5 mm	Rainy Days	4.5	2.3	2.8	2.3	2.1	2.6	0.9	1.5	1.1	2.4	3.5	3.1	29.1
	Suspended Days (Rainy days x 0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
5 < R ≤ 10 mm	Rainy Days	2.1	2.0	3.1	2.4	1.0	0.9	0.6	0.8	0.6	1.8	2.0	3.5	20.8
	Suspended Days (Rainy days x 0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
10 < R ≤ 15 mm	Rainy Days	2.0	2.8	2.1	2.1	1.2	0.9	0.5	0.4	0.5	1.2	2.2	1.8	17.7
	Suspended Days (Rainy days x 0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
15 < R ≤ 30 mm	Rainy Days	4.2	5.3	3.9	2.3	1.1	1.6	0.3	0.4	0.5	1.9	3.0	3.8	28.3
	Suspended Days (Rainy days x 1.0)	4.2	5.3	3.9	2.3	1.1	1.6	0.3	0.4	0.5	1.9	3.0	3.8	28.3
30 mm <	Rainy Days	6.5	4.8	4.6	2.3	1.8	0.7	0.3	0.4	0.6	0.6	2.8	6.3	31.7
	Suspended Days (Rainy days x 2.0)	13.0	9.6	9.2	4.6	3.6	1.4	0.6	0.8	1.2	1.2	5.6	12.6	63.4
(2) Total of Rainy Days	19.3	17.2	16.5	11.4	7.2	6.7	2.6	3.5	3.3	7.9	13.5	18.5	127.6	
(3) Total of Suspended Days	17.2	14.9	13.1	6.9	4.7	3.0	0.9	1.2	1.7	3.1	8.6	16.4	91.7	
(4) Suspended Rate (3)/(1) %	55.5	53.2	42.3	23.0	15.2	10.0	2.9	3.9	5.7	10.0	28.7	52.9	25.3	
(5) Sunday & National Holiday	7.0	4.0	5.0	7.0	7.0	4.0	5.0	6.0	4.0	4.0	6.0	5.0	64	
(6) Rainy Days in Sunday & National Holiday (5)x(4)	3.9	2.1	2.1	1.6	1.1	0.4	0.1	0.2	0.2	0.4	1.7	2.6	16.4	
(7) Non Workable D (3)+(5)-(6)	20.3	16.8	16.0	12.3	10.6	6.6	5.8	7.0	5.5	6.7	12.9	18.8	139.3	
(8) Workable Days : (1)-(7)	10.7	11.2	15.0	17.7	20.4	23.4	25.2	24.0	24.5	24.3	17.1	12.2	225.7	
(9) Workable Rate : (8)/(1) %	34.5	40.0	48.4	59.0	65.8	78.0	81.3	77.4	81.7	78.4	57.0	39.4	61.7	
(10) Applied Workable Days	11	11	15	18	20	23	25	24	25	24	17	12	225	

Note : Data of average rainy days is given from 1987 to 1996 at Semarang Meteorological Station (BMG)

Table 11.1.1 (2/3) MONTHLY WORKABLE DAYS FOR CONSTRUCTION WORKS
[DAM EMBANKMENT WORK FOR IMPERVIOUS AND SEMI-PERVIOUS ZONE]

Item	Month												Total	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(1) Calender	31	28	31	30	31	30	31	31	30	31	30	31	365	
Rainy Days & Suspended Days														
0 < R ≤ 5 mm	Rainy Days	4.5	2.3	2.8	2.3	2.1	2.6	0.9	1.5	1.1	2.4	3.5	3.1	29.1
	Suspended Days (Rainy days x 1.0)	4.5	2.3	2.8	2.3	2.1	2.6	0.9	1.5	1.1	2.4	3.5	3.1	29.1
5 < R ≤ 10 mm	Rainy Days	2.1	2.0	3.1	2.4	1.0	0.9	0.6	0.8	0.6	1.8	2.0	3.5	20.8
	Suspended Days (Rainy days x 1.0)	2.1	2.0	3.1	2.4	1.0	0.9	0.6	0.8	0.6	1.8	2.0	3.5	20.8
10 < R ≤ 15 mm	Rainy Days	2.0	2.8	2.1	2.1	1.2	0.9	0.5	0.4	0.5	1.2	2.2	1.8	17.7
	Suspended Days (Rainy days x 1.0)	2.0	2.8	2.1	2.1	1.2	0.9	0.5	0.4	0.5	1.2	2.2	1.8	17.7
15 < R ≤ 30 mm	Rainy Days	4.2	5.3	3.9	2.3	1.1	1.6	0.3	0.4	0.5	1.9	3.0	3.8	28.3
	Suspended Days (Rainy days x 1.0)	4.2	5.3	3.9	2.3	1.1	1.6	0.3	0.4	0.5	1.9	3.0	3.8	28.3
30 mm <	Rainy Days	6.5	4.8	4.6	2.3	1.8	0.7	0.3	0.4	0.6	0.6	2.8	6.3	31.7
	Suspended Days (Rainy days x 2.0)	13.0	9.6	9.2	4.6	3.6	1.4	0.6	0.8	1.2	1.2	5.6	12.6	63.4
(2) Total of Rainy Days	19.3	17.2	16.5	11.4	7.2	6.7	2.6	3.5	3.3	7.9	13.5	18.5	127.6	
(3) Total of Suspended Days	25.8	22.0	21.1	13.7	9.0	7.4	2.9	3.9	3.9	8.5	16.3	24.8	159.3	
(4) Suspended Rate (3)/(1) %	83.2	78.6	68.1	45.7	29.0	24.7	9.4	12.6	13.0	27.4	54.3	80.0	43.8	
(5) Sunday & National Holiday	7.0	4.0	5.0	7.0	7.0	4.0	5.0	6.0	4.0	4.0	6.0	5.0	64	
(6) Rainy Days in Sunday & National Holiday (5)x(4)	5.8	3.1	3.4	3.2	2.0	1.0	0.5	0.8	0.5	1.1	3.3	4.0	28.7	
(7) Non Workable D (3)+(5)-(6)	27.0	22.9	22.7	17.5	14.0	10.4	7.4	9.1	7.4	11.4	19.0	25.8	194.6	
(8) Workable Days : (1)-(7)	4.0	5.1	8.3	12.5	17.0	19.6	23.6	21.9	22.6	19.6	11.0	5.2	170.4	
(9) Workable Rate : (8)/(1) %	12.9	18.2	26.8	41.7	54.8	65.3	76.1	70.6	75.3	63.2	36.7	16.8	46.5	
(10) Applied Workable Days	4	5	8	13	17	20	24	22	23	20	11	5	172	

Note : Data of average rainy days is given from 1987 to 1996 at Semarang Meteorological Station (BMG)

Table 11.1.1 (3/3) MONTHLY WORKABLE DAYS FOR CONSTRUCTION WORKS
[CONCRETE WORK, GROUTING WORK AND ATERH STRUCTURE WORKS]

Item	Month												Total	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(1) Calender	31	28	31	30	31	30	31	31	30	31	30	31	365	
Rainy Days & Suspended Days														
0 < R ≤ 5 mm	Rainy Days	4.5	2.3	2.8	2.3	2.1	2.6	0.9	1.5	1.1	2.4	3.5	3.1	29.1
	Suspended Days (Rainy days x 0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
5 < R ≤ 10 mm	Rainy Days	2.1	2.0	3.1	2.4	1.0	0.9	0.6	0.8	0.6	1.8	2.0	3.5	20.8
	Suspended Days (Rainy days x 0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
10 < R ≤ 15 mm	Rainy Days	2.0	2.8	2.1	2.1	1.2	0.9	0.5	0.4	0.5	1.2	2.2	1.8	17.7
	Suspended Days (Rainy days x 0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
15 < R ≤ 30 mm	Rainy Days	4.2	5.3	3.9	2.3	1.1	1.6	0.3	0.4	0.5	1.9	3.0	3.8	28.3
	Suspended Days (Rainy days x 1.0)	4.2	5.3	3.9	2.3	1.1	1.6	0.3	0.4	0.5	1.9	3.0	3.8	28.3
30 mm <	Rainy Days	6.5	4.8	4.6	2.3	1.8	0.7	0.3	0.4	0.6	0.6	2.8	6.3	31.7
	Suspended Days (Rainy days x 1.0)	6.5	4.8	4.6	2.3	1.8	0.7	0.3	0.4	0.6	0.6	2.8	6.3	31.7
(2) Total of Rainy Days	19.3	17.2	16.5	11.4	7.2	6.7	2.6	3.5	3.3	7.9	13.5	18.5	127.6	
(3) Total of Suspended Days	10.7	10.1	8.5	4.6	2.9	2.3	0.6	0.8	1.1	2.5	5.8	10.1	60	
(4) Suspended Rate (3)/(1) %	34.5	36.1	27.4	15.3	9.4	7.7	1.9	2.6	3.7	8.1	19.3	32.6	16.6	
(5) Sunday & National Holiday	7.0	4.0	5.0	7.0	7.0	4.0	5.0	6.0	4.0	4.0	6.0	5.0	64	
(6) Rainy Days in Sunday & National Holiday (5)x(4)	2.4	1.4	1.4	1.1	0.7	0.3	0.0	0.2	0.1	0.3	1.2	1.6	10.7	
(7) Non Workable D (3)+(5)-(6)	15.3	12.7	12.1	10.5	9.2	6.0	5.6	6.6	5.0	6.2	10.6	13.5	113.3	
(8) Workable Days : (1)-(7)	15.7	15.3	18.9	19.5	21.8	24.0	25.4	24.4	25.0	24.8	19.4	17.5	251.7	
(9) Workable Rate : (8)/(1) %	50.6	54.6	61.0	65.0	70.3	80.0	81.9	78.7	83.3	80.0	64.7	56.5	68.9	
(10) Applied Workable Days	16	15	19	20	22	24	25	24	25	25	19	18	252	

Note : Data of average rainy days is given from 1987 to 1996 at Semarang Meteorological Station (BMG)

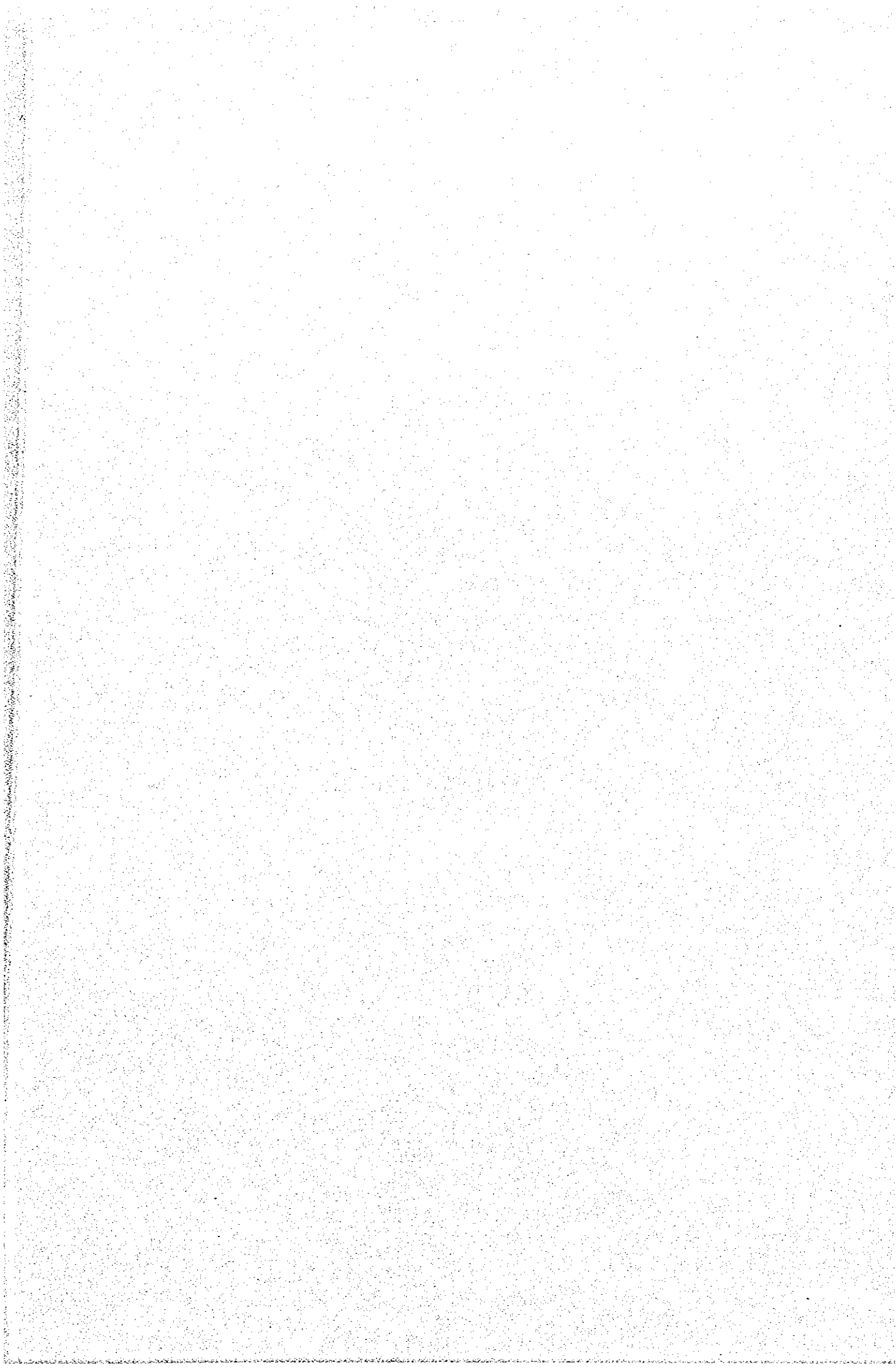


Table 11.4.1 JATIBARANG MULTIPURPOSE DAM CONSTRUCTION SCHEDULE OF PACKAGE 1

☐ Dry season (April-November)
 ☐ Rainy season (December-March)

Item	Unit	Quantity	1st year												2nd year												3rd year												4th year												5th year																																																																																																																																																																																																																																																											
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12																																																																																																																																																																																																																																																
1. Preparation Works																																																																																																																																																																																																																																																																																																														
Temporary Construction Road	m	5,670																																																																																																																																																																																																																																																																																																												
Aggregate and Batcher Plant	L.S.	1																																																																																																																																																																																																																																																																																																												
Other Temporary Facilities	L.S.	1																																																																																																																																																																																																																																																																																																												
2. River Diversion																																																																																																																																																																																																																																																																																																														
Diversion Tunnel (2r = 5.60m)	m	441																																																																																																																																																																																																																																																																																																												
Inlet & Outlet Excavation & Concrete	L.S.	1																																																																																																																																																																																																																																																																																																												
Up/Downstream Cofferdam	L.S.	1																																																																																																																																																																																																																																																																																																												
3. Zoned Rockfill Dam																																																																																																																																																																																																																																																																																																														
Excavation	m ³	174,000																																																																																																																																																																																																																																																																																																												
Foundation Treatment																																																																																																																																																																																																																																																																																																														
Dental Concrete	L.S.	1																																																																																																																																																																																																																																																																																																												
Blanket Grouting	m	2,000																																																																																																																																																																																																																																																																																																												
Curtain Grouting	m	16,200																																																																																																																																																																																																																																																																																																												
Embankment	m ³	802,000																																																																																																																																																																																																																																																																																																												
Impervious Zone	m ³	119,000																																																																																																																																																																																																																																																																																																												
Semi-pervious Zone	m ³	82,000																																																																																																																																																																																																																																																																																																												
Pervious Zone	m ³	601,000																																																																																																																																																																																																																																																																																																												
4. Gallery																																																																																																																																																																																																																																																																																																														
Excavation	m ³	7,000																																																																																																																																																																																																																																																																																																												
Concrete	m ³	5,700																																																																																																																																																																																																																																																																																																												
5. Spillway																																																																																																																																																																																																																																																																																																														
Excavation & Embankment	m ³	453,500																																																																																																																																																																																																																																																																																																												
Contact Grouting	m	400																																																																																																																																																																																																																																																																																																												
Concrete	m ³	52,000																																																																																																																																																																																																																																																																																																												
6. Outlet Facilities																																																																																																																																																																																																																																																																																																														
Outlet Tunnel																																																																																																																																																																																																																																																																																																														
Tunnel Excavation	m	393																																																																																																																																																																																																																																																																																																												
Steel Outlet Pipe (φ=1.40m) & Concrete	L.S.	1																																																																																																																																																																																																																																																																																																												
Intake Structure																																																																																																																																																																																																																																																																																																														
Excavation	m ³	11,000																																																																																																																																																																																																																																																																																																												
Concrete	m ³	900																																																																																																																																																																																																																																																																																																												
Gates & Trash Rack Installation	L.S.	1																																																																																																																																																																																																																																																																																																												
7. Plug Work (Concrete & Contact Grouting)																																																																																																																																																																																																																																																																																																														
Diversion Tunnel	L.S.	1																																																																																																																																																																																																																																																																																																												
Outlet Tunnel	L.S.	1																																																																																																																																																																																																																																																																																																												
8. Powerhouse																																																																																																																																																																																																																																																																																																														
Excavation & Embankment	m ³																																																																																																																																																																																																																																																																																																													
Concrete	m ³																																																																																																																																																																																																																																																																																																													
Plant Installation	L.S.	1																																																																																																																																																																																																																																																																																																												
Transmission Line (Foundation)	m	14,000																																																																																																																																																																																																																																																																																																												
Operation Tests	L.S.	1																																																																																																																																																																																																																																																																																																												
9. Quarry Development & Operation																																																																																																																																																																																																																																																																																																														
Preparation	month	6																																																																																																																																																																																																																																																																																																												
Development & Operation	month	32																																																																																																																																																																																																																																																																																																												
10. Batcher and Aggregate Plant																																																																																																																																																																																																																																																																																																														
Batcher Plant Operation	month	31																																																																																																																																																																																																																																																																																																												
Aggregate Plant Operation	month	32																																																																																																																																																																																																																																																																																																												

LEGEND
 ☐ Free Float Pass
 ☐ Critical Pass

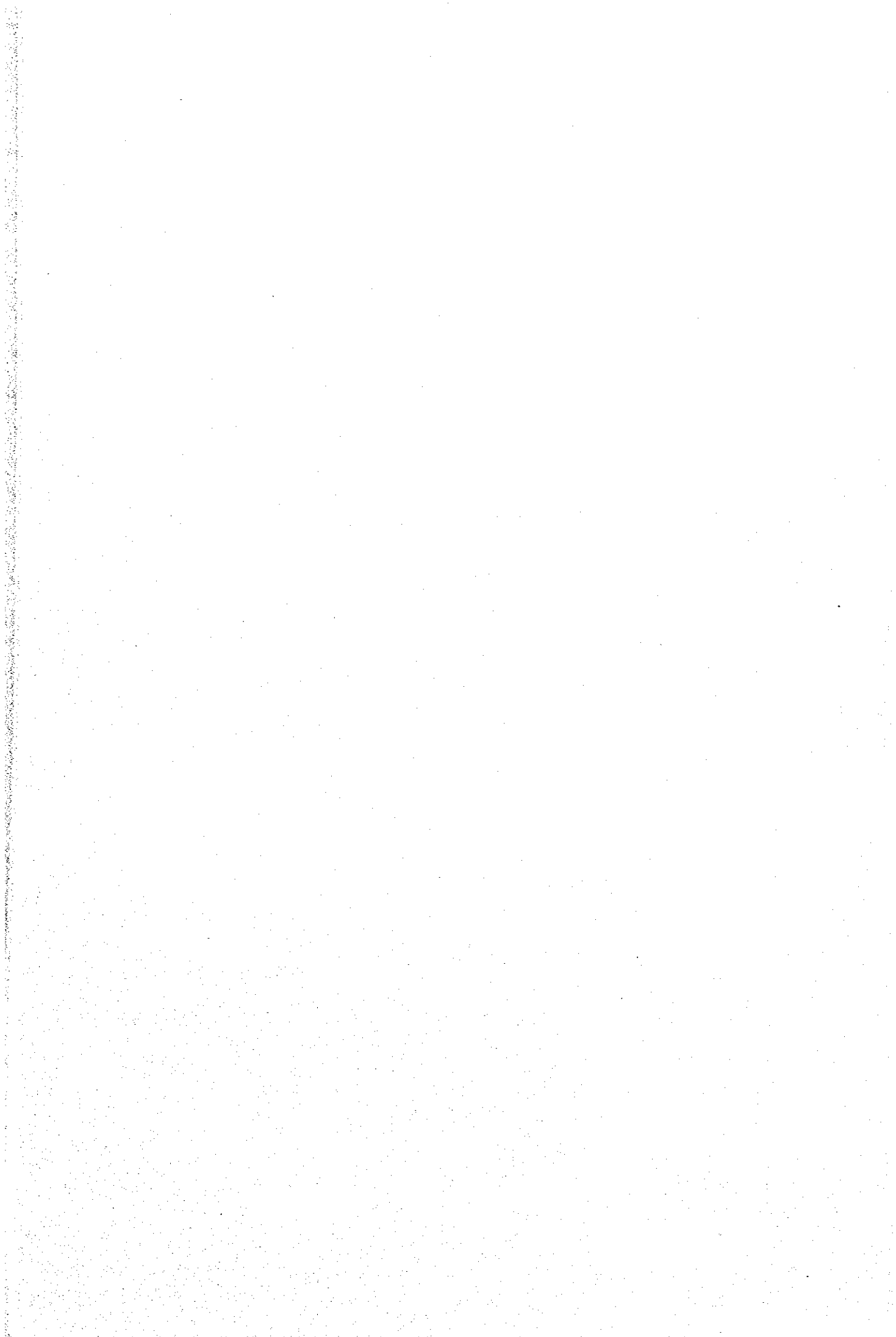
Table 11.4.1 JATIBARANG MULTIPURPOSE DAM CONSTRUCTION SCHEDULE OF PACKAGE 1

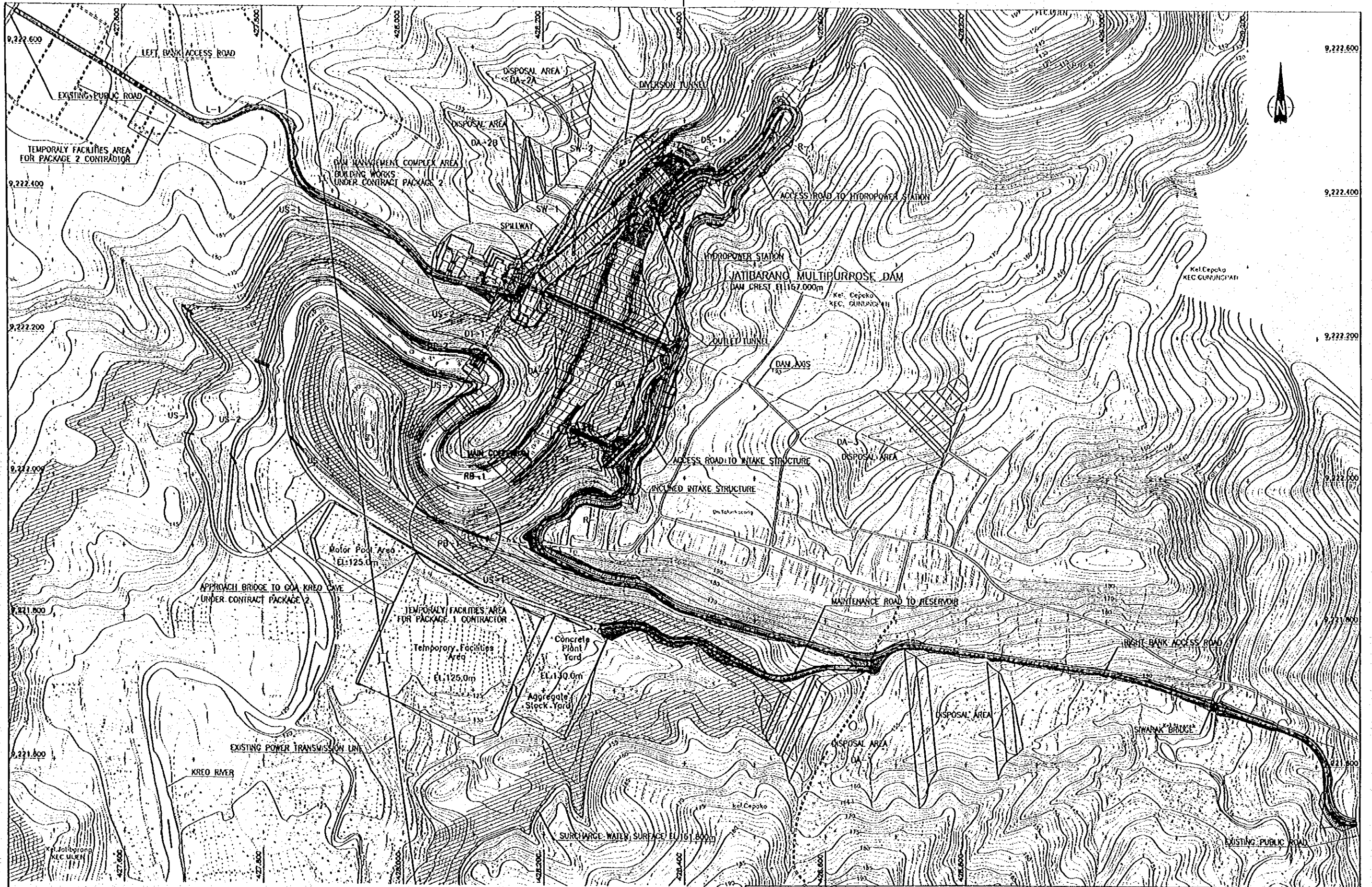
☐ Dry season (April-November)

☐ Rainy season (December-March)

Item	Unit	Quantity	1st year												2nd year												3rd year												4th year												5th year																																																																							
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12																																																												
1. Preparation Works																																																															LEGEND																																																											
Temporary Construction Road	m	5,670																																																																																																																								
Aggregate and Batch Plant	L.S.	1																																																																																																																								
Other Temporary Facilities	L.S.	1																																																																																																																								
2. River Diversion																																																																																																																										
Diversion Tunnel (2r = 5.60m)	m	441																																																																																																																								
Inlet & Outlet Excavation & Concrete	L.S.	1																																																																																																																								
Up/Downstream Cofferdam	L.S.	1																																																																																																																								
3. Zoned Rockfill Dam																																																																																																																										
Excavation	m³	174,000																																																																																																																								
Foundation Treatment																																																																																																																										
Dental Concrete	L.S.	1																																																																																																																								
Blanket Grouting	m	2,000																																																																																																																								
Curtain Grouting	m	16,200																																																																																																																								
Embankment	m³	802,000																																																																																																																								
Impervious Zone	m³	119,000																																																																																																																								
Semi-pervious Zone	m³	82,000																																																																																																																								
Pervious Zone	m³	601,000																																																																																																																								
4. Gallery																																																																																																																										
Excavation	m³	7,000																																																																																																																								
Concrete	m³	5,700																																																																																																																								
5. Spillway																																																																																																																										
Excavation & Embankment	m³	453,500																																																																																																																								
Contact Grouting	m	400																																																																																																																								
Concrete	m³	52,000																																																																																																																								
6. Outlet Facilities																																																																																																																										
Outlet Tunnel																																																																																																																										
Tunnel Excavation	m	393																																																																																																																								
Steel Outlet Pipe (φ = 1.40m) & Concrete	L.S.	1																																																																																																																								
Intake Structure																																																																																																																										
Excavation	m³	11,000																																																																																																																								
Concrete	m³	900																																																																																																																								
Gates & Trash Rack Installation	L.S.	1																																																																																																																								
7. Plug Work (Concrete & Contact Grouting)																																																																																																																										
Diversion Tunnel	L.S.	1																																																																																																																								
Outlet Tunnel	L.S.	1																																																																																																																								
8. Powerhouse																																																																																																																										
Excavation & Embankment	m³																																																																																																																									
Concrete	m³																																																																																																																									
Plant Installation	L.S.	1																																																																																																																								
Transmission Line (Foundation)	m	14,000																																																																																																																								
Operation Tests	L.S.	1																																																																																																																								
9. Quarry Development & Operation																																																																																																																										
Preparation	month	6																																																																																																																								
Development & Operation	month	32																																																																																																																								
10. Batcher and Aggregate Plant																																																																																																																										
Batcher Plant Operation	month	31																																																																																																																								
Aggregate Plant Operation	month	32																																																																																																																								

FIGURES





THE DETAILED DESIGN OF FLOOD CONTROL, URBAN
 DRAINAGE AND WATER RESOURCES DEVELOPMENT
 IN SEMARANG IN THE REPUBLIC OF INDONESIA
 JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 2.1.1
 GENERAL ARRANGEMENT OF CONSTRUCTION
 FACILITIES

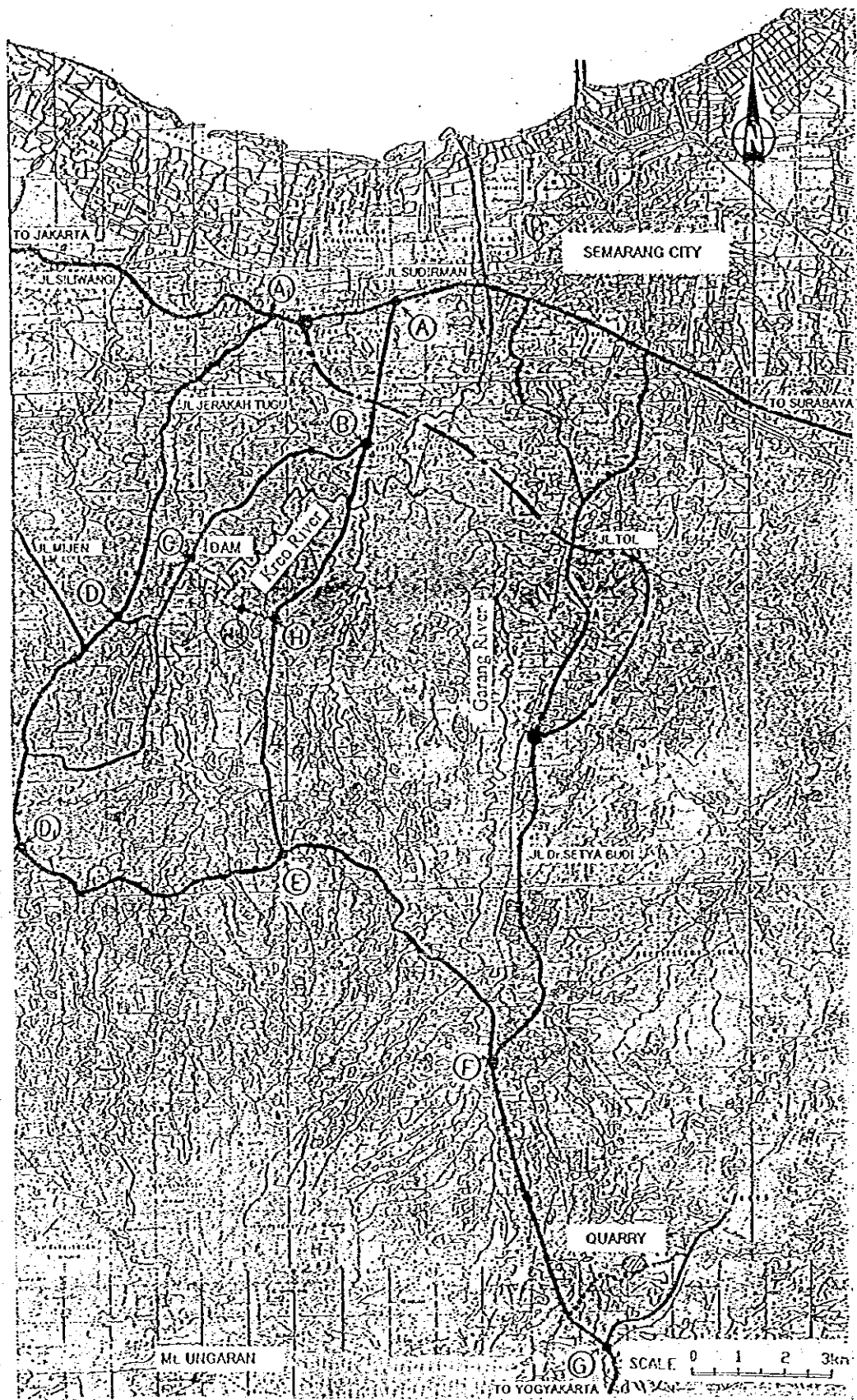
SCALE 0 50 100 150 200 250m



THE DETAILED DESIGN OF FLOOD CONTROL, URBAN
 DRAINAGE AND WATER RESOURCES DEVELOPMENT
 IN SEMARANG IN THE REPUBLIC OF INDONESIA
 JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 2.1.1
 GENERAL ARRANGEMENT OF CONSTRUCTION
 FACILITIES

SCALE 0 50 100 150 200 250m

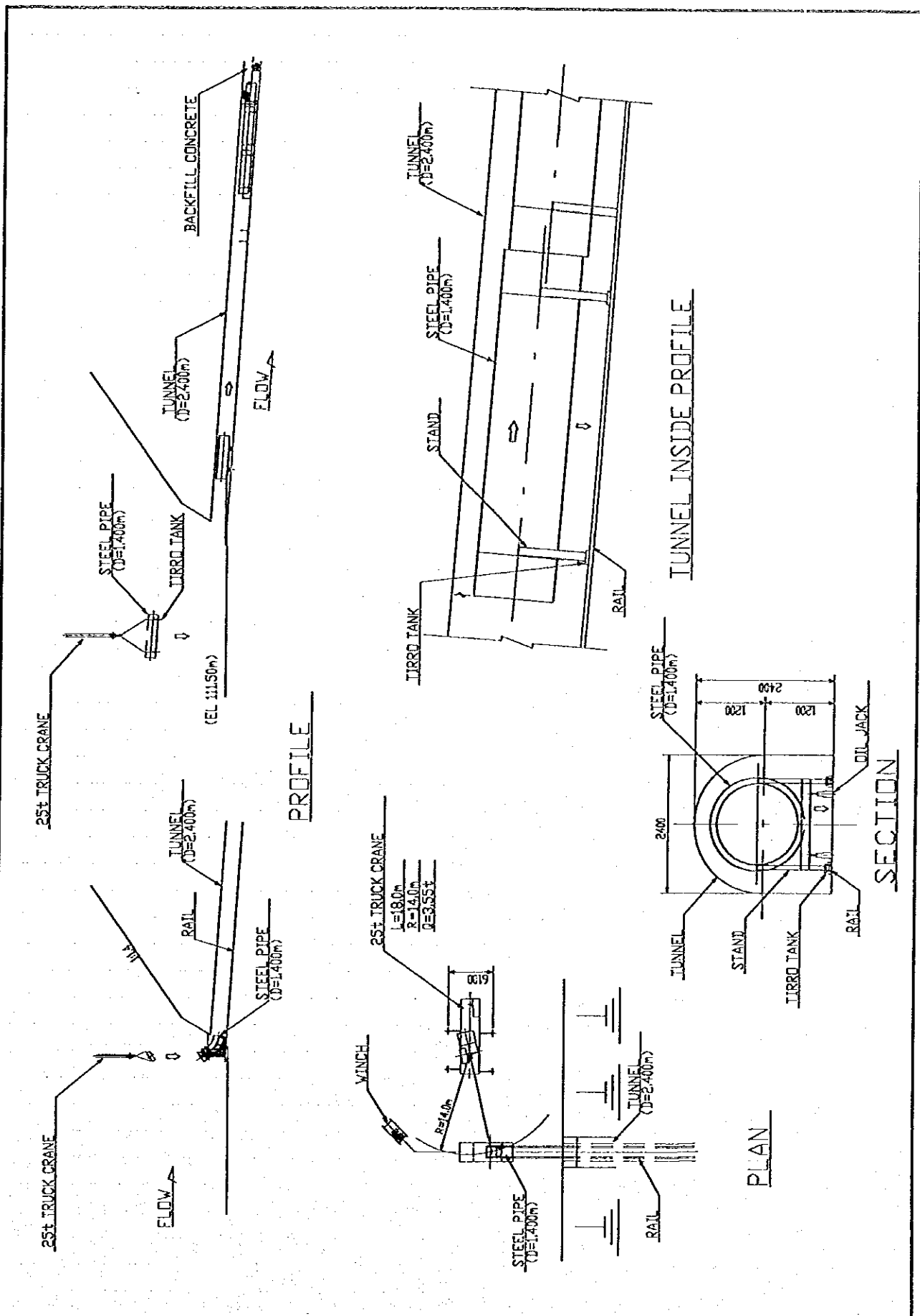


THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 2.1.2

ROUTE CONNECTING ROCK QUARRY AND DAMSITE



THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 6.1.1
STEEL CONDUIT PIPE SET OUTLINE

