Package 2: D Asin Pumping Station

Name of Structure	ASIN PUMPING STATION	Category Calculation	Work Volume	Page	1/7

SUMMARY OF ASIN PUMPING STATION WORK VOLUME

1.	STRUCTURE EXCAVATION	=	1,264	m^3
2.	STRUCTURE EMBANKMENT (SANDY SOIL)	=	913	m^3
3.	BACK FILL	=	104	m^3
4.	LEVELING CONCRETE, TYPE E	=	66	m^3
	FORM WORK	=	17	m^2
5.	CONCRETE FOR STRUCTURE, TYPE C1	=	1,120	m^3
	FORM WORK	=	1,891	m^2
6.	WET STONE MASONRY	=	29	m^3
7.	SECONDARY CONCRETE FOR SCREW (C2)	=	131	m^3
8.	CONCRETE SHEET PILE (W=500, t=220, L=13,000)	=	484	m'
9.	STEEL SHEET PILE (W=400, L=5,300)	=	488	m'
10.	CONCRETE PILE (Ø 500)	=	3,655	m'
11.	GABION MATTRESS (3,000 × 1,500 × 500)	=	49	m^3
12.	SAFETY HAND RAIL (TYPE I)	=	1,123	Kg
13.	SAFETY HAND RAIL (TYPE II)	=	595	Kg
14.	REINFORCING STEEL BAR	=	77,567	Kg
15.	STEEL FOR STRENGTHENING OF STOPLOG GROVE (L. 100 – 200 – 10)	=	3,533	Kg
16.	DOWEL BAR (Ø 19, L=1,240)	=	293	Kg
17.	WEEP HOLE Ø 50	=	12	nos
18.	POINTING	=	42	m^2
19.	WATER STOP (W=200, t=20)	=	44	m'
20.	SCAFFOLDING	=	1,342	m^2
21.	FALSE WORKS	=	941	m^3

Name of Structure	ASIN PUMPING STATION	Category Calculation	Work Volume	Page	2/7

1. STRUCTURE EXCAVATION

(a.) Section B-B, $A = 41.625\ m^2$

$L = 10\ m$

$V = A \times L = 416.250\ m^3$

(b.) Section C-C, $A = 88.225\ m^2$

$L = 7.599\ m$

$V = A \times L = 670.422\ m^3$

(c.) Section D-D, $A = \frac{55.935 + 0}{2}$

$= 27.967\ m^2$

$L = 6.33\ m$

$V = A \times L = 177.034\ m^3$ [+]

V (a)+(b)+(c) $= 1236.034\ m^3 \sim 1264\ m^3$

2. STRUCTURE EMBANKMENT WITH SANDY SOIL

(a.) Section D-D, $A = \frac{88.197 + 0}{2}$

$= 44.099\ m^2$

$L = 2.703\ m$

$V = A \times L = 119.198\ m^3$

(b.) Section E-E, $A = 88.197\ m^2$

$L = 8.998\ m$

$V = A \times L = 793.597\ m^3$ [+]

V (a)+(b) $= 912.795\ m^3 \sim 913\ m^3$

3. BACKFILL

(a.) Section B-B, $A = 4.205\ m^2$

$L = 10\ m$

$V = A \times L = 42.050\ m^3$

(b.) Section C-C, $A = 6.48\ m^2$

$L = 7.599\ m$

$V = A \times L = 49.242\ m^3$

(c.) Section D-D, $A = \frac{3.784 + 0}{2}$

$= 1.892\ m^2$

$L = 6.328\ m$

$V = A \times L = 11.973\ m^3$ [+]

V (a)+(b)+(c) $= 103.265\ m^3$

Name of Structure	ASIN PUMPING STATION	Category Calculation	Work Volume	Page	3/7

4. LEVELING CONCRETE TYPE E

Volume = 0.10 × 35 × 16.00 = 56.00 m³

0.10 × 9.50 × 10.00 = 9.50 m³

= 65.50 m³ ~ 66 m³

5. CONCRETE FOR STUCTURE

(a.) Section B-B (L=10,000 m)

- Walls	= 4 × 1.0 × 4.90 × 10.00	= 196.000 m³		
	4 × 3.0 × 0.4 × 1.0	= -4.800 m³		
	4 × 2.4 × 0.4 × 1.0	= -3.840 m³		
	Total for Walls		=	187.360 m³
- Bottom Slab	= 0.8 × 10 × 16	= 128.000 m³		
	3 × 1.2 × 1.0 × 0.25	= -0.900 m³		
	3 × 0.65 × 0.4 × 4.8	= -3.744 m³		
	Total for Walls		=	123.356 m³
- TOE	$= \frac{0.4+1.0}{2} \times 0.8 \times (16+10)$		=	5.040 m³
- Bridge No.1 & 2	= 3 × 3.0 × 0.25 × 4.8	= 10.800 m³		
	3 × 2.4 × 0.25 × 4.8	= 7.740 m³		
			=	18.540 m³
Total (a) Section B-B			=	343.816 m³

(b.) Section C-C (L=7,559 m)

- Walls	= 4 × 1.0 × 6.40 × 7.599	= 194.534 m³		
	4 × 3.0 × 0.4 × 1.0	= -4.800 m³		
	Total for Walls		=	189.734 m³
- Bottom Slab	= 1.3 × 16 × 7.599	= 158.059 m³		
	3 × 1.4 × 0.3	= -1.260 m³		
	Total for Walls		=	156.799 m³
- TOE	$= \frac{0.4+1.0}{2} \times 7.599$		=	5.319 m³
- Bridge No.1 & 2	= 3 × 3.0 × 0.4 × 4.80		=	17.280 m³
Total (b) Section C-C			=	179.398 m³

(c.) Section D-D (L_4=8.403 m)

(L_5=9.727 m)

- Walls	= 4 × 1.0 × 5.427 × 8.403		=	182.412 m³
- Bottom Slab	= 0.924 × 16.0 × 8.403		=	124.230 m³
- TOE	$= \frac{0.4+1.0}{2} \times 0.8 \times 9.727$		=	5.447 m³
Total (c) Section D-D			=	323.089 m³

(d.) Section E-E (L=2,00 m)

- Walls	= 4 × 1.0 × 4.80 × 2.00	= 28.800 m³		
	1.225 × 4.8 × 2.0	= 11.760 m³		
	Total for Walls		=	40.560 m³
- Top Slab	= 0.5 × 16.225 × 2.0		=	16.225 m³
- Bottom Slab	= 1.3 × 16.225 × 2.0		=	42.185 m³
- TOE	$= \frac{0.4+1.0}{2} \times 0.8 \times (16+10)$		=	0.560 m³
Total (d) Section E-E			=	**99.530 m³**

(e.) Section F-F (L=7,00 m)

- Walls	= 3 × 1.0 × 1.90 × 7.0	= 39.900 m³		
	1.225 × 1.90 × 7.0	= 16.293 m³		
	Total for Walls		=	56.193 m³
- Top Slab	= 0.5 × 16.225 × 7.0		=	56.788 m³
- TOE	$= \frac{0.4+1.0}{2} \times 0.8 \times (7+16.225)$		=	13.006 m³
Total (e) Section F-F			=	**125.987 m³**

(f.) Deck Slab = 0.5 × 10 × 9.5 = 47.500 m³

Total (a)+(b)+(c)+(d)+(e)+(f) = **1119.320 m³**

6. WET STONE MASONRY

$V = \frac{0.3+1.15}{2} \times 1.9 \times (10+9.5)$ = 28.714 m³

7. SECONDARY CONCRETE FOR SCREW

$V = \left\{3 \times 4 \times 2.0 - \left(\frac{1}{2} \times \pi \times 1.5^2 \times 3\right)\right\} \times 9.727$ = 130.314 m³

8. CONCRETE SHEET PILE (W = 500, t = 220, L = 13,000)

$V = \left(28 + \frac{16}{0.4}\right) \times 8$ = 484 m'

9. STEEL SHEET PILE (W = 400; t = 5,300)

$\left(52 + \frac{16}{0.4}\right) \times 5.3$ = 488 m'

10. CONCRETE PILE Ø500

a. Section B-B	: 9 × 6 × 21.6	= 1,166.4 m'
b. Section C-C	: 10 × 5 × 20	= 1,000.0 m'
c. Section D-D	: (6×21.9)+(6×23.6)+(6×25.2)	= 424.2 m'

d. Section E-E : (4×7×25.8)+(3×4×28.5) = 1,064.4 m³

Total Length of Concrete Pile Ø 500 = 3,655.0 m³

11. GABION MATTRESS (3,000 × 1,500 × 500)

V = 2 × 16.225 × 3 × 0.5 = 48.675 m³

12. FORM WORK

a. Section B-B (L=10 m) = 507.241 m²

$10\times(5.7+0.8)+10\times5.7+10\times6\times4.9+10\times6\times\sqrt{0.15^2+0.15^2}+10\times\sqrt{0.4^2+0.8^2}+4.9\times2\times6\times0.4+4.9\times6\times0.65\times4.9+3\times\pi\times0.5\times4.9+\tfrac{1}{2}\pi\times0.5\times4.9 = 507.241\ m^2$

b. Section C-C (L=7.599 m) = 431.374 m²

$7.599\times(7.7+0.8)+7.599\times7.7+7.599\times6\times6.4+7.599\times6\times\sqrt{0.15^2+0.15^2}+7.599\times\sqrt{0.4^2+0.8^2} = 431.374\ m^2$

c. Section D-D (L=8.403 m) = 513.386 m²

$8.403\times(6.351+0.8)+8.403\times6.351+8.403\times6\times5.427+8.403\times\sqrt{0.4^2+0.8^2}+3\times8.403\times\tfrac{1}{2}\times\pi\times3.0 = 513.386\ m^2$

d. Section E-E (L=2.0 m) = 106.480 m²

$2.0\times(5.6+0.8)+2.0\times5.6+2.0\times4.3\times6+2.0\times4.0\times3+4\times3\times2.0\times\sqrt{0.15^2+0.15^2}+2.0\times\sqrt{0.4^2+0.8^2} = 106.480\ m^2$

e. Section F-F (L=6.403 m) = 317.488 m²

$6.403\times(3.2+0.8)+6.403\times3.2+6.403\times1.9\times6+6.403\times4.0\times3+4\times3\times6.403\times\sqrt{0.15^2+0.15^2}+6.403\times\sqrt{0.4^2+0.8^2} = 317.488\ m^2$

f. Slab (9 × 10 m)

2 × 10 × 0.5 + 9.5 × 0.5 = 14.75 m²

Total Form Work (a)+(b)+(c)+(d)+(e)+(f) = 1,890.719 m²

13. DOWEL BAR

$\left\{\left(\frac{16}{0.5}+1\right)+\left(\frac{9.5}{0.5}+1\right)\right\}\times2\times1.24\times2.23$ = 293.11 kg

14. WEEP HOLE

$\left(\frac{21.8}{2.0}+1\right)nos$ = 12.00 nos

15. POINTING

$21.8 \times \sqrt{1.7^2 + 0.85^2}$ = 41.43 m²

16. FORM WORK (For Concrete Type E)

$2 \times 0.1 \times (16 + 35 + 16) + 0.1 \times 35$ = 16.9 m²

17. SAFETY HANDRAIL

(Ø42.7 mm; t = 2.3 mm ; weight = 2.29 kg/m)

(Ø60.5 mm; t = 4.0 mm ; weight = 5.57 kg/m)

(a.) Type I

- Handrail Pipe

L=6.6+16+4×3×4.0+3×4.0+7×5.15 = 118.65 m

Weight of handrail pipe = (2.29 + 5.57)× 118.65 = 932.59 kg

- Column Pipe

$$L=0.8\times\left\{\left(\frac{6.6}{1.66}+1\right)+\left(\frac{16}{1.66}+1\right)+(4\times3\times4)+(4\times3)+(4\times7)\right\} = 83.20 \text{ m}$$

Weight of handrail pipe = 83.20 × 2.29 = 190.53 kg

Total Weight of Type I = 1123.12 kg

(b.) Type II

- Handrail Pipe

L = 8 × 8.3 = 66.4 m

Weight of handrail pipe = (2.29 + 5.57)× 66.4 = 521.90 kg

- Column Pipe

L = 0.8 × 8 × 5 = 32 m

Weight of handrail pipe = 32 × 2.29 = 73.28 kg

Total Weight of Type II = 595.18 kg

18. WATER STOP

16 + 4 × 7.05 = 44.2 m'

19. ANCHOR BAR

L = 300; D = 19 mm; Weight = 2.23 kg/m

N =	4 × 10 × 3	=	120 nos
	3 × 10 × 6	=	180 nos
	3 × 10 × 3	=	90 nos
	3 × 3 × 3	=	27 nos
	Total	=	417 nos

Name of Structure	ASIN PUMPING STATION	Category Calculation	Work Volume	Page	7/7

20. ANCHOR PAD

L = 1,050; D = 19 mm

N = 10 x 6 = 60 nos → W = 60 x 1.05 x 2.23 = 140.49 kg

L = 650; D = 19 mm

N = 10 x 6 = 60 nos → W = 60 x 0.65 x 2.23 = 86.97 kg

Total of weight = 227.46 kg

21. REINFORCING BAR

a. Structure reinforcing	=	77,567 kg
b. Anchor Bar	=	278 kg
c. Anchor Pad	=	228 kg
Total of Steel Reinforcing	=	78,073 kg

Name of Structure	ASIN PUMPING STATION, FOR SCAFOLDING AND FORM SUPPORT	Category Calculation	Work Volume	Page	1/2

SUMMARY OF SCAFOLDING AND FORM SUPPORT VOLUME FOR ASIN RIVER DRAINAGE SYSTEM IMPROVEMENT.

No	Structure	Volume	
		Scafolding (m^2)	Form Support (m^3)
1	Asin Pumping Station	1342	941
2	Asin Pumping Station, Gate	732	254
3	Asin Box Culvert	1843	1358
4	Asin Box Culvert Inlet Structure	54	11
5	Asin Box Culvert Outlet Structure	62	16
6	Secondary Channel Outlet on Asin River	-	34
7	Fuel Tank Box for Asin Pumping Station	133	62
8	Asin Pumping Station Bridge, Sub Structure	166	-
9	Asin No.1 Bridge, Sub Structure	293	-
10	Asin No.2 Bridge, Sub Structure	251	-
Total		4876	2676

Name of Structure	ASIN PUMPING STATION, FOR SCAFOLDING AND FORM SUPPORT	Category Calculation	Work Volume	Page	2/2

1. SCAFFOLDING

(a) Section A – A (L=10.0 m)

$(6.5 + 5.7 + 6 \times 4.9) \times 10.0$ = 416.00 m²

$\left\{\left(\frac{1}{2} \times 3 \times \pi \times \frac{1.0}{2}\right) + \left(\frac{1}{4} \times \pi \times \frac{1.0}{2}\right)\right\} \times 4.9$ = 13.47 m²

Total (a) = 429.47 m²

(b) Section C – C (L=7.599 m)

$(8.5 + 7.7 + 6 \times 6.4) \times 7.599$ = 414.905 m²

(c) Section D – D (L=7.901 m)

$(7.151 + 6.351 + 6 \times 5.427) \times 7.901$ = 363.952 m²

(d) Section E – E (L=2.0 m)

$(6.4 + 5.6 + 6 \times 4.3) \times 2.0$ = 75.60 m²

(e) Section F – F (L=7.0 m)

$(4.0 + 3.2) \times 7$ = 50.400 m²

$\left\{\left(\frac{1}{2} \times \pi \times \frac{1.225}{2}\right) + \left(\frac{1}{2} \times 2 \times \pi \times \frac{1.0}{2}\right) + \left(\frac{1}{2} \times \pi \times \frac{1.0}{2}\right)\right\} \times 2.4$ = 7.021 m²

Total (e) = 57.421 m²

Total (a)+(b)+(c)+(d)+(e) =1,341.348 m²

2. SUPPORT AREA

(a) Section B – B & C - C

$(3 \times 4.0 \times 3.0 \times 4.9) + (3 \times 4.0 \times 5.4 \times 6.4)$ = 591.12 m³

(b) Section E – E & F – F

$(3 \times 4.0 \times 4.8 \times 3.298) + 3 \times 4.0 \times 1.9 \times 7.0)$ = 349.56 m³

Total (a)+(b) = 940.68 m³

Name of Structure	INSPECTION BRIDGE	Category Calculation	Work Volume	Page	1/3

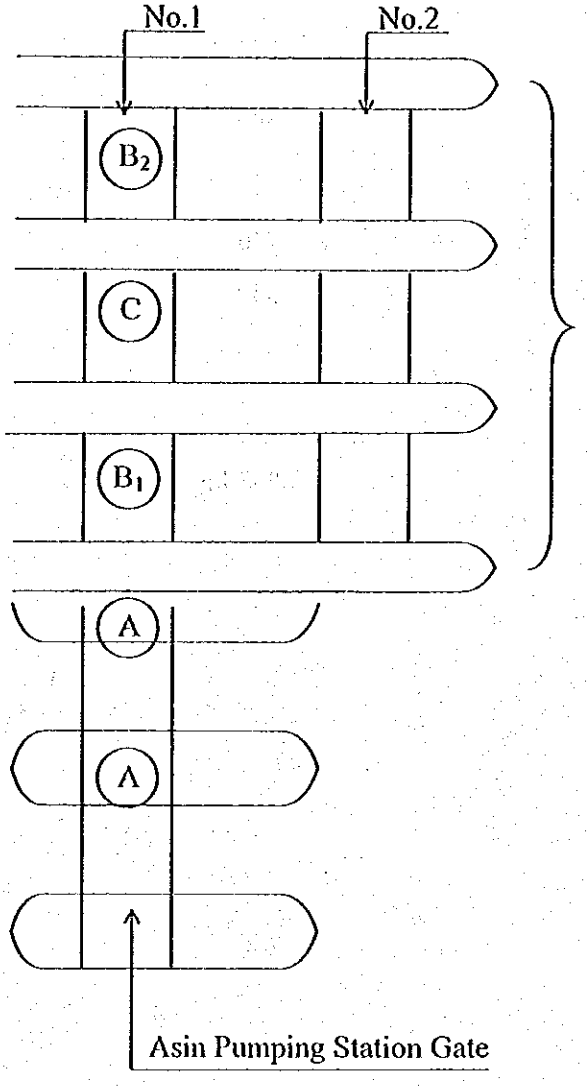
SUMMARY OF WORK VOLUME

1.	CONCRETE, TYPE B	=	54.38	m^3
2.	REINFORCING BAR, U 30	=	2,968	Kg

Name of Structure	INSPECTION BRIDGE	Category Calculation	Work Volume	Page	2/3

D.7 Maintenance Bridge

D.7.1 Concrete (B)



Bridge of No.1

B1	$\frac{0.4+0.65}{2} \times 3.00 \times 5.50$	=	8.66
C	$0.4 \times 3.00 \times 5.00$	=	6.00
B2	$0.4 \times 3.00 \times 5.50$	=	6.60

Bridge of No.2

B2	$0.4 \times 3.00 \times 5.50 \times 2$	=	13.20
C	$0.4 \times 3.00 \times 5.00$	=	6.00

Bridge of Asin Pump Station Gate

A	$0.4 \times 3.00 \times 5.80 \times 2$	=	13.92
Volume D.7.1		=	**54.38 m³**

Name of Structure	INSPECTION BRIDGE	Category Calculation	Work Volume	Page	3/3

D.7.2 Reinforcing Bar (SII U 30)

Bridge of No.1

(B1) (B2)	(2.89 + 84) × 2	=	746
(C)	(262 + 78) × 1	=	340

Bridge of No.2

(B2)	(289 + 84) × 2	=	746
(C)	(262 + 78) × 1	=	340

Bridge of Asin Pump Station Gate

(A)	(305 + 93) × 2	=	796
Volume D.7.1		=	**2,968 kg**

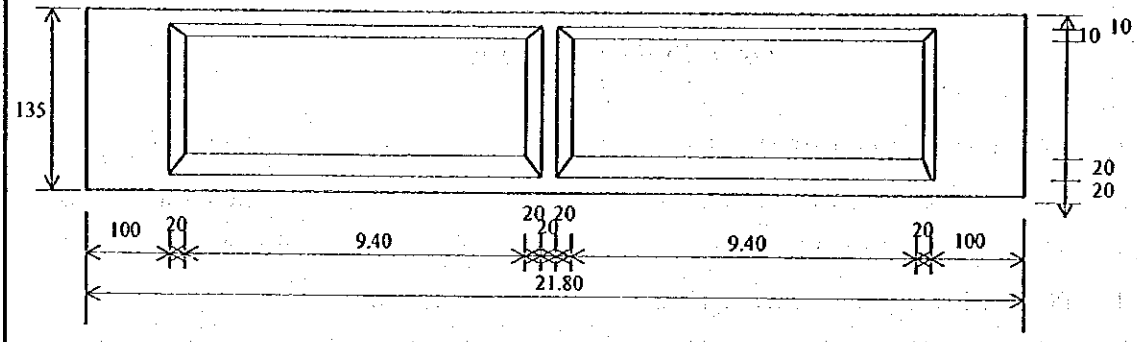
Name of Structure	ASIN PUMPING STATION BRIDGE	Category Calculation	Concrete Volume	Page	1/5

SUMMARY OF QUANTITIES OF SUPER STRUCTURE

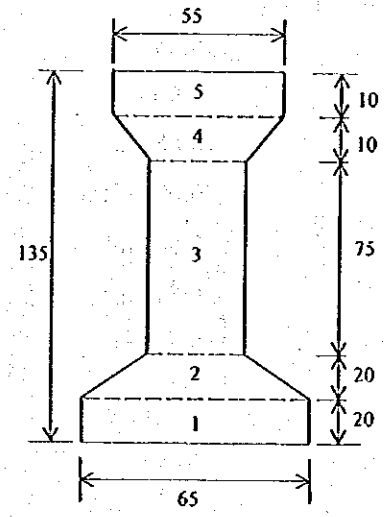
1.	STRUCTURE CONCRETE K400		=	33.32	m^3
2.	STRUCTURE CONCRETE K250		=	36.60	m^3
3.	REINFORCING STEEL		=	10.486	m^3
4.	PC CABLE K1 Ø12.7 7 STRANDS	= 385.0 kg			
	PC CABLE K2 Ø12.7 12 STRANDS	= 660.0 kg			
	PC CABLE K1 Ø12.7 7 STRANDS	= 386.0 kg			
	PC CABLE MONO STRAND CABLE/FS	= 22.5 kg			
	TOTAL		=	1453.5	kg
5.	BRIDGE RAILLING		=	43.60	m
6.	EXPANSION JOINT		=	10.88	m
7.	BEARING SHOE AND RUBBER SHEET		=	6.00	pieces
8.	PVC DRAINAGE PIPE Ø10 cm		=	10.50	m'
9.	ASPHALT PAVEMENT AC ON TOP OF SLAB		=	6.81	m^3
10.	FORM WORK		=	456.45	m^2

Name of Structure	ASIN PUMPING STATION BRIDGE	Category Calculation	Concrete Volume	Page	2/5

1. Main Girder K400



Center Beam



Wide $A_1 = 0.65 \times 0.20 = 0.1300\ m^2$

$A_2 = \frac{0.20 + 0.65}{2} \times 0.20 = 0.0850\ m^2$

$A_3 = 0.20 \times 0.75 = 0.1500\ m^2$

$A_4 = \frac{0.55 + 0.20}{2} \times 0.10 = 0.0375\ m^2$

$A_5 = 0.55 \times 0.10 = 0.130\ m^2$

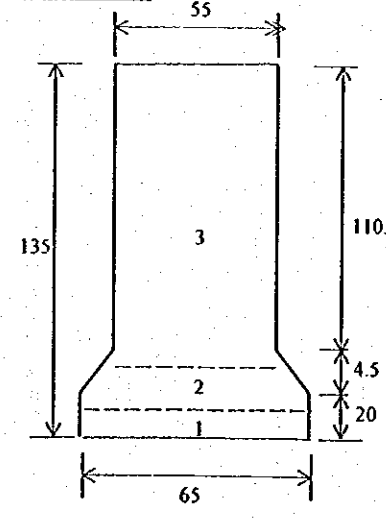
Sub Total $= 0.4575\ m^2$

Length of Center Beam = 18.80 m

Volume : $\Sigma A \times L$

$V_1 : 0.4575 \times 18.80 = 8.601\ m^3$

End Beam



Wide $A_1 = 0.65 \times 0.20 = 0.130\ m^2$

$A_2 = \frac{0.65 + 0.55}{2} \times 0.045 = 0.027\ m^2$

$A_3 = 0.55 \times 1.105 = 0.108\ m^2$

Sub Total $= 0.765\ m^2$

Volume $= \Sigma A \times L$

$$2 \times \left((0.765 \times 1) + \times \left(\frac{0.4575 + 0.765}{2} \times 0.20 \right) \right) + (0.765 \times 0.20)$$

$V_2 = 2.172\ m^3$

- Volume Total one beam $= V_1 + V_2$

  $V = 8.601 + 2.172 = 10.773\ m^3$

- Total Volume for all Beam in Bridge (V_G)

  $V_G = 3 \times \Sigma V = 3 \times 10.003 = 32.319\ m^3$

Name of Structure	ASIN PUMPING STATION BRIDGE SUB STRUCTURE	Category Calculation	Form Work Volume	Page	1/5

SUMMARY OF WORK VOLUME

1. Structural Excavation	=	302	m^3
2. Backfill	=	265	m^3
3. PC Pile	=	900	m
4. Concrete Type C_I	=	193	m^3
5. Form Work for C_I	=	271	m^2
6. Concrete Type E	=	9	m^3
7. Form Work for E	=	4	m^2
8. Deformed Reinforcing Bar	=	13782	kg

Name of Structure	ASIN PUMPING STATION BRIDGE, FOR SCAFOLDING AND FORM SUPPORT	Category Calculation	Work Volume	Page	1/2

SUMMARY OF SCAFOLDING AND FORM SUPPORT VOLUME FOR ASIN RIVER DRAINAGE SYSTEM IMPROVEMENT.

No	Structure	Volume	
		Scafolding (m^2)	Form Support (m^3)
1	Asin Pumping Station	1342	941
2	Asin Pumping Station, Gate	732	254
3	Asin Box Culvert	1843	1358
4	Asin Box Culvert Inlet Structure	54	11
5	Asin Box Culvert Outlet Structure	62	16
6	Secondary Channel Outlet on Asin River	-	34
7	Fuel Tank Box for Asin Pumping Station	133	62
8	Asin Pumping Station Bridge, Sub Structure	166	-
9	Asin No.1 Bridge, Sub Structure	293	-
10	Asin No.2 Bridge, Sub Structure	251	-
Total		4876	2676

Name of Structure	ASIN PUMPING STATION BRIDGE, FOR SCAFOLDING AND FORM SUPPORT	Category Calculation	Work Volume	Page	2/2

1. **Scafolding Area**

   $(2 \times 5.9 \times 5.6) + (2 \times 5.9 \times 1.43) = 82.954\ m^2$

   For both side abutment $= 2 \times 82.954 = 165.908\ m^2$

2. **Form Support Area**

   -

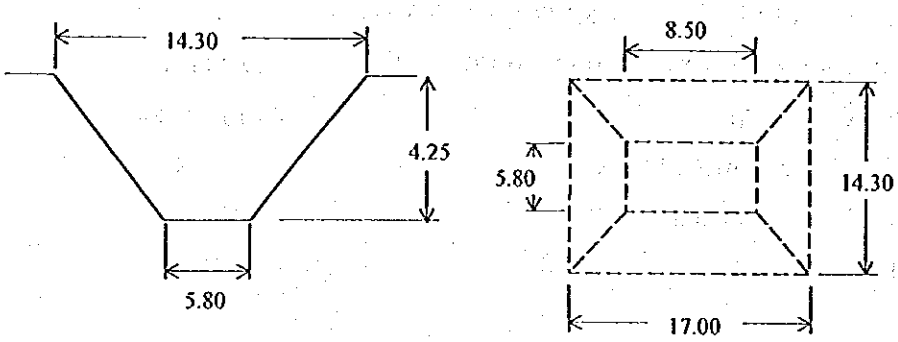
Name of Structure	FUEL TANK FOR ASIN PUMPING STATION	Category Calculation	VOLUME CALCULATION	Page	1/10

SUMMARY OF WORK VOLUME

1.	SOIL EXCAVATION	=	621.35 m^3
2.	BACK FILL	=	511.66 m^3
3.	LEVELING CONCRETE, TYPE E	=	3.24 m^3
4.	CONCRETE FOR STRUCTURE, TYPE C1	=	49.21 m^3
5.	REINFORCING BAR	=	6,810.034 Kg
6.	FORM WORK FOR CONCRETE, TYPE C1	=	166.69 m^2
7.	FORM WORK FOR CONCRETE, TYPE E	=	3 m^2

Name of Structure	FUEL TANK FOR BARU PUMPING STATION	Category Calculation	VOLUME CALCULATION	Page	2/10

(A) SOIL EXCAVATION



Volume = $\frac{(5.80 \times 8.50) + (14.30 \times 17.00)}{2}$ x 4.25 = 621.35 m³

(B) LEVELLING CONCRETE (TYPE E)

4.5 x 7.20 x 0.10 = 3.240 m³

(C) BACK FILL

621.35 – (4.30 x 7.00 x 3.60) – 0.1 x 0.1 x 4.5 x 2 – 0.1
x 0.1 x 7.0 x 2 – 1.2 x 1.2 x 0.65 – 0.5 x 0.5 x 0.65 = 511.66 m³

(D) CONCRETE (TYPE C_1)

1. 0.35 x (7.00 x 4.30 – ¼ π x 0.70^2
   – ¼ π x 0.2^2 – 0.8 x 0.8) = 10.167 m³
2. 0.45 x 7.00 x 4.30 = 13.55 m³

(3+4) 2 x 0.35 x 2.70 x 6.3 = 11.907 m³

(5+6) 2 x 0.35 x 2.70 x 4.30 = 8.127 m³

7. 1 x 4 x 1.05 x 0.20 = 0.84 m³
8. 0.35 x 4 x 1.05 x 0.15 = 0.221 m³
9. (0.9 + 0.9) x 1.05 x 0.20 = 0.38 m³
10. (1 + 1.35) x 1.05 x 0.20 = 0.864 m³
11. a. 0.2 x 3.20 x 0.20 = 0.128 m³

    b. ((3.2 + 2.40)/ 2 x 1.00 – 0.5 x ¼ x π x 2.0^2) x 0.2 = 0.246 m³

    Number of Concrete Tank Support = 5 nos.

    Volume of Concrete = 5 x (0.128 + 0.246) = 1.87 m³
12. Cover of Tank Drain

    0.35 x 0.35 x 0.15 = 0.0184 m³
13. Cover of Man Hole

    0.90 x 0.90 x 0.15 = 0.122 m³
14. Concrete Corner

    0.5 x 0.24 x 0.2 x 6.3 x 4
    + 0.5 x 0.24 x 0.24 x 3.6 x 4 = 1.14 m³

Name of Structure	FUEL TANK FOR BARU PUMPING STATION	Category Calculation	VOLUME CALCULATION	Page	3/10

Total Volume Concrete Type C_1

10.167 + 13.55 + 11.907 + 8.127 + 0.84 + 0.221

+ 0.38 + 0.864 + 1.87 + 0.0184 + 0.122 + 1.14 = 49.206 m³

(E) REINFORCING BAR = 6,810.034 kg

(F) FUEL TANK AND ACCESSORY = 1 Set

(G) GROUNDING BC 50 mm = 1 Set

(H) FUEL PIPE SET = 1 Set

Name of Structure	FUEL TANK FOR BARU PUMPING STATION	Category Calculation	FORM WORK VOLUME	Page	10/10

FORM WORK

(A) Wall Slab

2 x 3.5 x 4.30 + 2 x 3.5 x 7.0	=	79.10 m²
2 x 2.4 x 3.30 + 2 x 2.4 x 6.0	=	44.64 m²
Total A	=	123.74 m²

(B) Top Slab

3.30 x 6.0 - 2 x 0.8 x 0.8 – 0.20 x 0.20	=	18.48 m²

(C) Fuel Pipe Hole

4 x 1.20 x 0.75 + 4 x 0.8 x 0.85 + 4 x 1.0 x 0.10	=	6.72 m²

(D) Man Hole

4 x 1.20 x 0.85 + 4 x 0.8 x 0.75 + 4 x 1.0 x 0.10	=	6.88 m²

(E) Main Hole

4 x 0.50 x 0.85 + 4 x 0.20 x 1.10 + 4 x 0.35 x 0.10	=	2.72 m²

(F) Slope Concrete in the Corner

$(\sqrt{0.15^2 + 0.15^2}) \times (4 \times 6.15 + 4 \times 3.45)$	=	8.15 m²
Total Form Work	=	166.69 m²

Name of Structure	SCAFOLDING AND FORM SUPPORT, FOR ASIN DRAINAGE SYSTEM	Category Calculation	WORK VOLUME	Page	1/1

SUMMARY OF SCAFOLDING AND FORM SUPPORT VOLUME, FOR ASIN DRAINAGE SYSTEM

No.	VOLUME STRUCTURE	SCAFFOLDING (m^2)	FORM SUPPORT (m^3)
1	ASIN PUMPING STATION	1342	941
2	ASIN PUMPING STA. GATE	732	254
3	ASIN BOX CULVERT	1843	1358
4	ASIN BOX CULVERT INLET STRUCTURE	54	11
5	ASIN BOX CULVERT OUTLET STRUCTURE	62	16
6	SECONDARY CHANNEL OUTLET STRUCTURE ON ASIN RIVER	-	34
7	FUEL TANK BOX FOR ASIN PUMPING STATION	133	62
8	ASIN PUMPING STATION BRIDGE, SUB STRUCTURE	166	-
9	ASIN NO. 1 BRIDGE, SUB STRUCTURE	293	-
10	ASIN NO. 1 BRIDGE, SUB STRUCTURE	251	-
TOTAL		4625	2676

Name of Structure	FUEL TANK BOX SCAFFOLDING AND FORM SUPPORT	Category Calculation	WORK VOLUME	Page	1/1

1. SCAFFOLDING

(A) Outer of Side Walls

3.5 x (2 x 4.3 + 2 x 7.0) = 79.10 m²

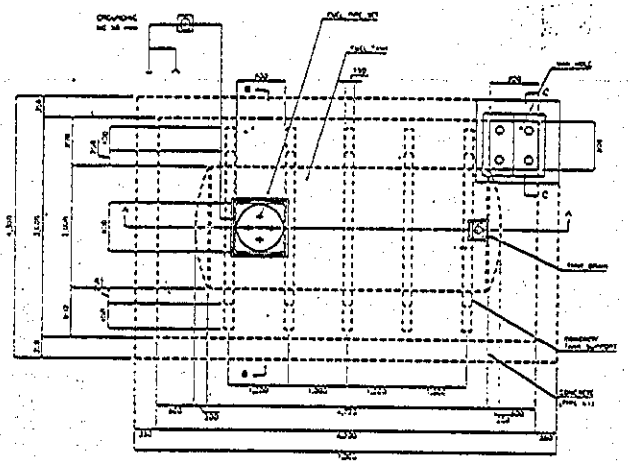
(B) Inner of Side Walls

2.7 x (2 x 6.3 + 2 x 3.6) = 53.46 m²

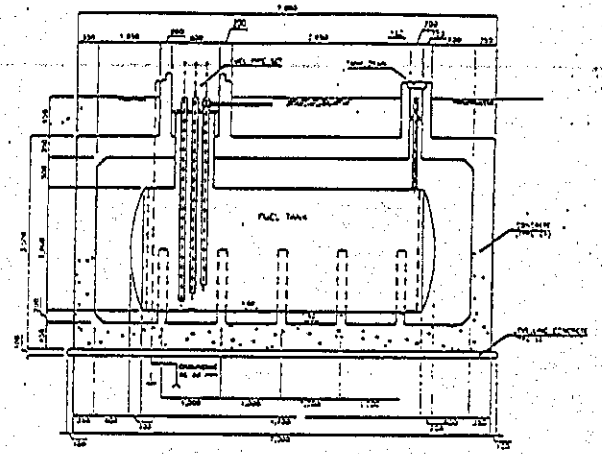
Total A + B = 132.56 m²

2. SUPPORT AREA

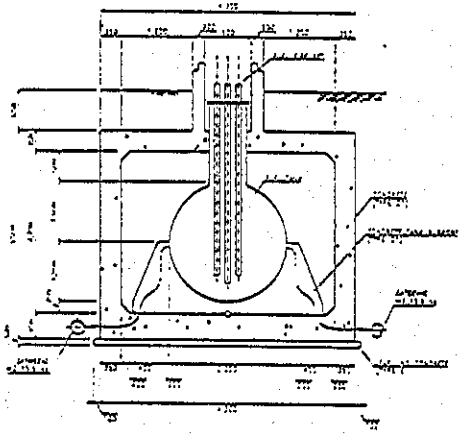
6.3 x 3.6 x 2.7 = 61.24 m³



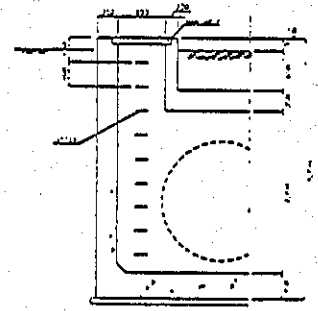
PLAN



SECTION A–A



SECTION B–B



SECTION C–C

SCALE 1 : 40 0 1 2 3 4m

THE REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
AND DIRECTORATE GENERAL OF HUMAN SETTLEMENT

JAKARTA SELATAN FLOOD CONTROL PROJECT
COMPONENT 1 URBAN DRAINAGE SYSTEM IMPROVEMENT

FUEL TANK BOX
PLAN AND SECTIONS

PROVINCE DKI JAKARTA

MUNICIPALITY JAKARTA SELATAN

DRAWING NO. 4

Name of Structure	FUEL TANK BOX SCAFFOLDING AND FORM SUPPORT	Category Calculation	WORK VOLUME	Page	1/1

1. SCAFFOLDING

(A) Outer of Side Walls

3.5 x (2 x 4.3 + 2 x 7.0) = 79.10 m²

(B) Inner of Side Walls

2.7 x (2 x 6.3 + 2 x 3.6) = 53.46 m²

Total A + B = 132.56 m²

2. SUPPORT AREA

6.3 x 3.6 x 2.7 = 61.24 m³

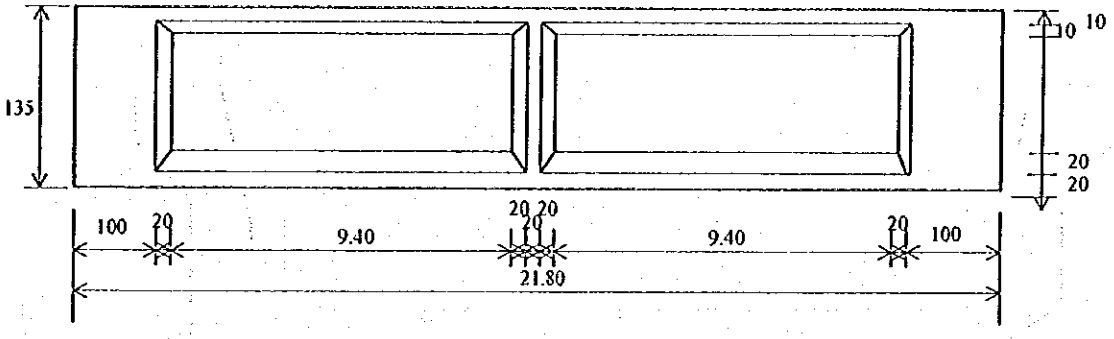
Name of Structure	ASIN PUMPING STATION BRIDGE	Category Calculation	Concrete Volume	Page	1/5

SUMMARY OF QUANTITIES OF SUPER STRUCTURE

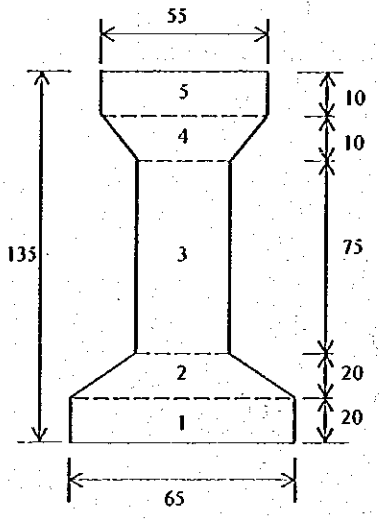
1.	STRUCTURE CONCRETE K400		=	33.32	m^3
2.	STRUCTURE CONCRETE K250		=	36.60	m^3
3.	REINFORCING STEEL		=	10.486	m^3
4.	PC CABLE K1 Ø12.7 7 STRANDS	= 385.0 kg			
	PC CABLE K2 Ø12.7 12 STRANDS	= 660.0 kg			
	PC CABLE K1 Ø12.7 7 STRANDS	= 386.0 kg			
	PC CABLE MONO STRAND CABLE/FS	= 22.5 kg			
	TOTAL		=	1453.5	kg
5.	BRIDGE RAILLING		=	43.60	m
6.	EXPANSION JOINT		=	10.88	m
7.	BEARING SHOE AND RUBBER SHEET		=	6.00	pieces
8.	PVC DRAINAGE PIPE Ø10 cm		=	10.50	m'
9.	ASPHALT PAVEMENT AC ON TOP OF SLAB		=	6.81	m^3
10.	FORM WORK		=	456.45	m^2

Name of Structure	ASIN PUMPING STATION BRIDGE	Category Calculation	Concrete Volume	Page	2/5

1. Main Girder K400



Center Beam



Wide $A_1 = 0.65 \times 0.20 = 0.1300\ m^2$

$A_2 = \frac{0.20 + 0.65}{2} \times 0.20 = 0.0850\ m^2$

$A_3 = 0.20 \times 0.75 = 0.1500\ m^2$

$A_4 = \frac{0.55 + 0.20}{2} \times 0.10 = 0.0375\ m^2$

$A_5 = 0.55 \times 0.10 = 0.130\ m^2$

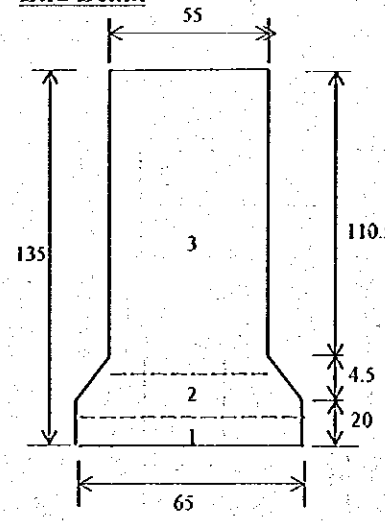
Sub Total = $0.4575\ m^2$

Length of Center Beam = 18.80 m

Volume : $\Sigma A \times L$

$V_1 : 0.4575 \times 18.80 = 8.601\ m^3$

End Beam



Wide $A_1 = 0.65 \times 0.20 = 0.130\ m^2$

$A_2 = \frac{0.65 + 0.55}{2} \times 0.045 = 0.027\ m^2$

$A_3 = 0.55 \times 1.105 = 0.108\ m^2$

Sub Total = $0.765\ m^2$

Volume $= \Sigma A \times L$

$$2 \times \left((0.765 \times 1) + \times \left(\frac{0.4575 + 0.765}{2} \times 0.20 \right) \right) + (0.765 \times 0.20)$$

$V_2 = 2.172\ m^3$

- Volume Total one beam = $V_1 + V_2$

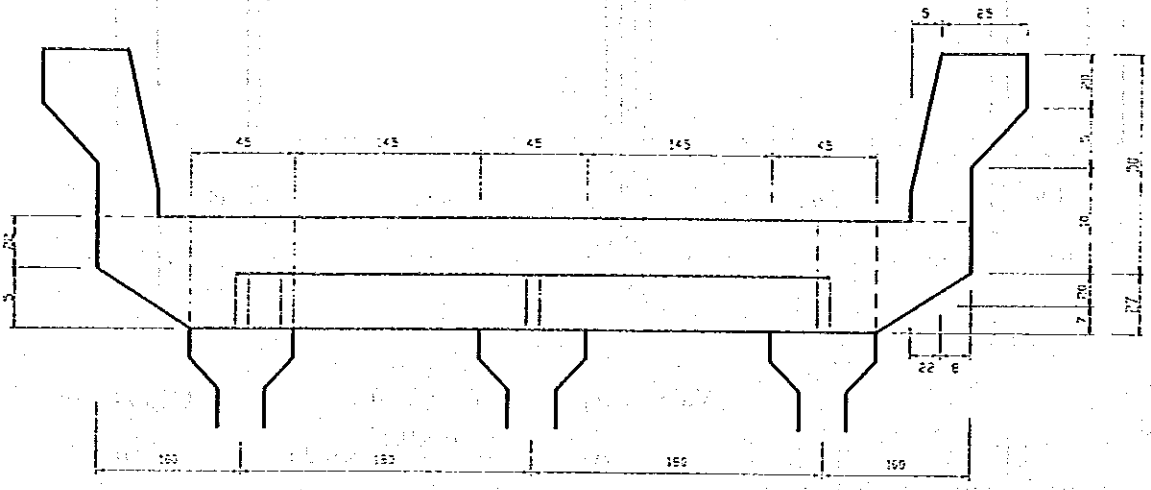
  $V = 8.601 + 2.172 = 10.773\ m^3$

- Total Volume for all Beam in Bridge (V_G)

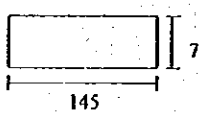
  $V_G = 3 \times \Sigma V = 3 \times 10.003 = 32.319\ m^3$

Name of Structure	ASIN PUMPING STATION BRIDGE	Category Calculation	Concrete Volume	Page	3/5

2. **Bed Plate and Panel Plate**



Panel Plate



For One Panel Plate

Volume : $1.45 \times 1.00 \times 0.07 = 0.1015\ m^3$

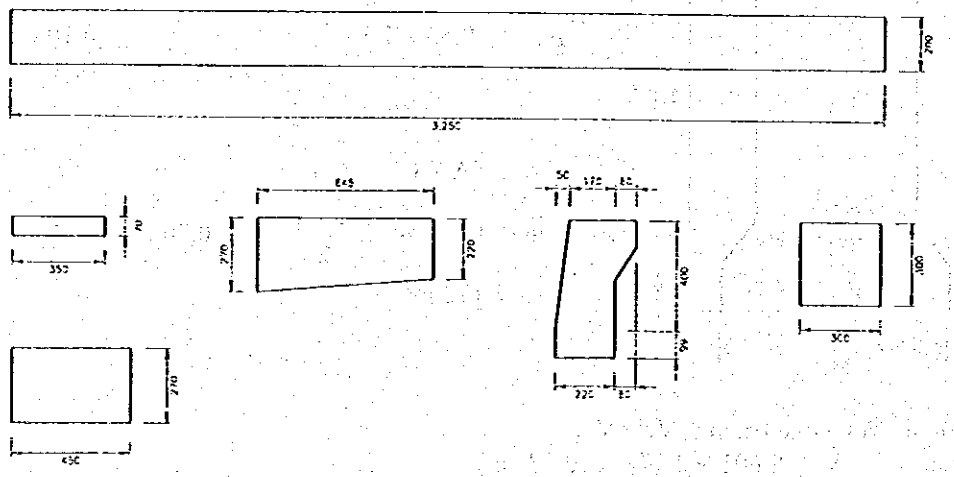
For One Girder (L= 21.8- - 60 = 2120 cm)

Volume : $21 \times 0.1015 + (1.45 \times 0.20 \times 0.07) = 2.152\ m^3$

Total Volume for all Panel Plate in Bridge (V_P)

$V_P = 2 \times v = 2 \times 2.152 = 4.304\ m^3$

Bed Plate



Name of Structure	ASIN PUMPING STATION BRIDGE	Category Calculation	Concrete Volume	Page	4/5

Wide

A_1 3.25×0.20 = 0.650 m²

A_2 $0.35 \times 0.07 \times 1$ = 0.025 m²

A_3 $0.45 \times 0.27 \times 2$ = 0.243 m²

A_4 $\frac{0.27 + 0.22}{2} \times 0.645 \times 2$ = 0.316 m²

A_1 = 1.254 m²

End Plate

Wide A = $0.30 \times 0.30 \times 2$ = 0.180 m²

Volume = $\Sigma A \times L \rightarrow L = 21.80 - 60 = 21.20$ m

= $(1.234 \times 21.20) + (0.180 - 5.44)$

= $26.161 + 0.979$

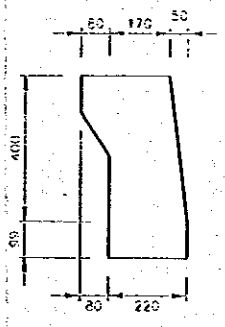
V = 27.140 m³

Total Volume Slab in Bridge (V_S)

V_g = 27.140 m³

Handrail

Wide =



A_5 = $0.22 \times 0.10 \times 2$ = 0.044 m²

A_6 = $\frac{0.17 \times 0.22}{2} \times 0.40 \times 2$ = 0.156 m²

A_7 = $\frac{0.20 + 0.25}{2} \times 0.08 \times 2$ = 0.036 m²

= 0.236 m²

Concrete Volume Handrail :

= $\Sigma A \times L$

= $0.236 \times 21.80 = 5.145$ m³

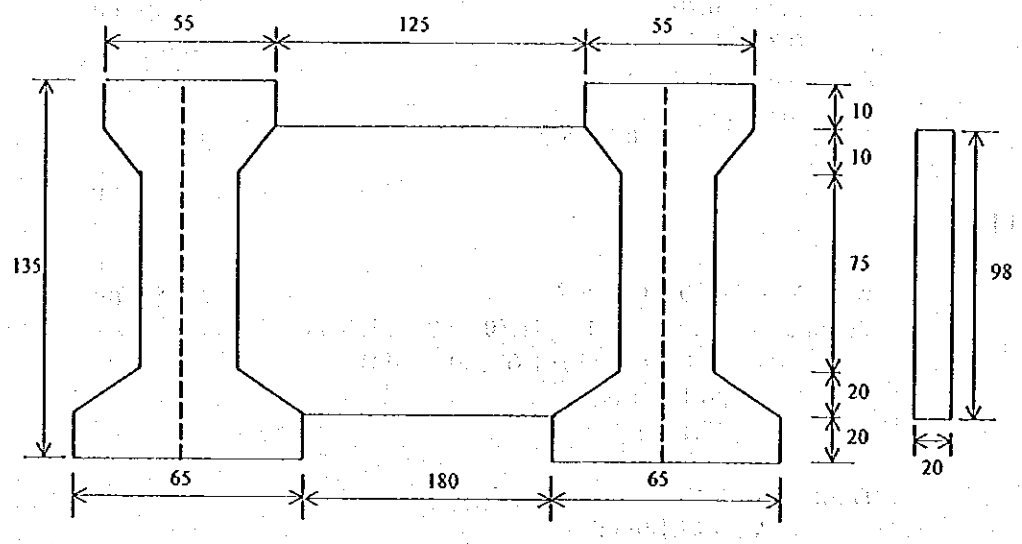
Total Volume of Handrail in Bridge (V_{LAR})

V_{LAR} = 5.145 m³

Total Slab (V_S) and Handrail (V_{LAR}) = 32.285 m³

Name of Structure	ASIN PUMPING STATION BRIDGE	Category Calculation	Concrete Volume	Page	5/5

3. Cross Beam / Diapraghm K400



For One Cross Beam
Volume = 0.20 × 0.98 × 1.25 = 0.245 m³

Total volume Cross Beam in Bridge (V_{CB})
V_{CB} = 2 × 3 × 0.245 = 1.470 m³

Name of Structure	ASIN PUMPING STATION BRIDGE	Category Calculation	Reinforcing Volume	Page	1/4

SUMMARY OF REINFORCING BAR

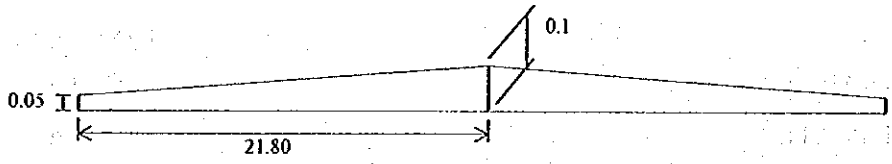
-	MAIN GIRDER		=	4,488 kg
-	SLAB		=	4,485 kg
-	HAND RAIL AND KERB		=	757 kg
-	PANEL PLATE		=	610 kg
-	DIAPRAGHM		=	146 kg
		TOTAL	=	10,486 kg
-	PC CABLE			
	K1 Ø12.7 7 STRANDS		=	385.0 kg
	K2 Ø12.7 12 STRANDS		=	660.0 kg
	K1 Ø12.7 7 STRANDS		=	386.0 kg
	DIAPRAGHM Ø12.5		=	22.5 kg
		TOTAL	=	1,453.5 kg

Name of Structure		Category Calculation	Pavement Volume	Page	1/1

7. Pavement

Span of bridge : 21.80 m

Thick of Asphalt at side : 5 cm



$$A = 0.05 + \frac{2}{100} \times 2.5 = 0.10 \text{ m}$$

$$\text{Volume} = \frac{(0.1 + 0.05)}{2} \times 2.5 \times 2 = 0.375$$

$$= 0.375 \times 21.80 = 8.175 \text{ m}^3$$

Name of Structure	ASIN PUMPING STATION BRIDGE SUPER STRUCTURE	Category Calculation	Form Work Volume	Page	1/5

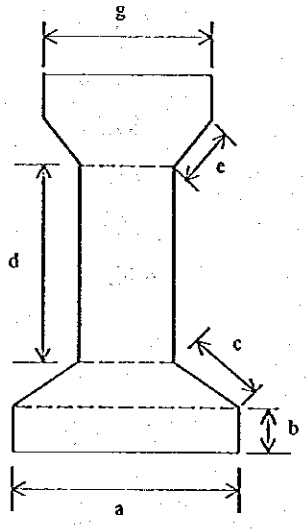
SUMMARY OF BOARD FORM WORK

-	MAIN GIRDER	=	459.50	m²
-	SLAB	=	4.38	m²
-	SIDE WALK	=	89.31	m²
-	PANEL PLATE	=	83.20	m²
-	DIAPRAGHM	=	20.05	m²
	TOTAL	=	656.44	m²

Name of Structure	ASIN PUMPING STATION BRIDGE SUPER STRUCTURE	Category Calculation	Form Work Volume	Page	2/5

1. Main Girder

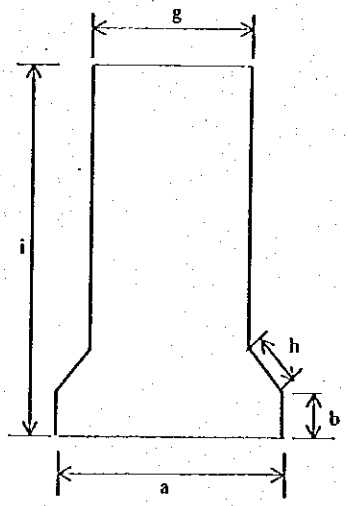
Center Beam



Thick of Plate = 3 cm

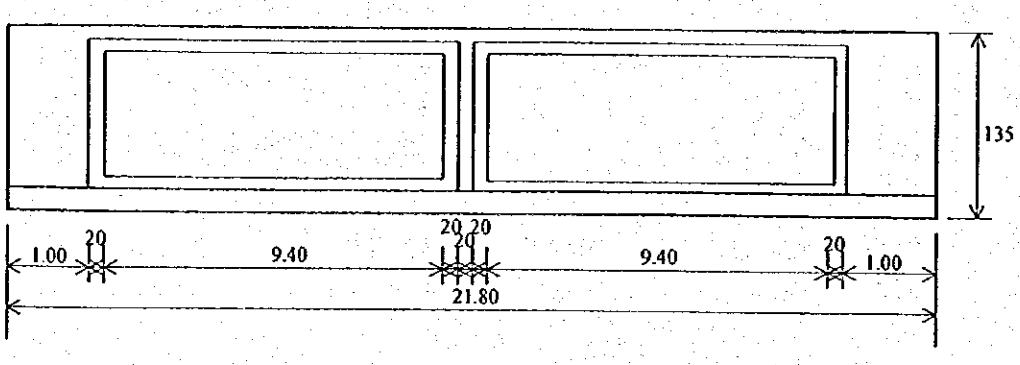
a	$= 65 + \frac{3}{2} \times 2$	=	68 cm
b	$= 20 + \frac{3}{2} \times 2$	=	23 cm
c	$= 35 + \frac{3}{2} \times 2$	=	38 cm
d	$= 75 + \frac{3}{2} \times 2$	=	78 cm
e	$= 12 + \frac{3}{2} \times 2$	=	15 cm
f	$= 10 + \frac{3}{2}$	=	11.5 cm

End Beam



a	= 68 cm		
b	= 23 cm		
h	$= 6.75 + \frac{3}{2} \times 2$	=	9.75 cm
i	$= 110.5 + \frac{3}{2}$	=	112 cm
g	= 55 cm		

Length of Beam = 21.80 m



Wide

- Center

$$A_1 = (a + 2b + 2c + 2d + 2e + 2f) \times L$$
$$= (0.68 + 0.46 + 0.76 + 1.56 + 0.30 + 0.23) \times 18.80$$
$$= 3.99 \times 18.80$$
$$= 75.012 \text{ m}^2$$

- End

$$A_2 = (a + 2b + 2h + 2i) \times L$$
$$= (0.68 + 0.46 + 0.76 + 0.195 + 2.24) \times 2.20$$
$$= 3.575 \times 2.20$$
$$= 7.865 \text{ m}^2$$

- Between

$$A_3 = \left[\left(\frac{0.75 + 1.05}{2} \times 0.20 + 2 \times \tfrac{1}{2} \times 0.20 \times 0.20\right) \times 4\right] \times 2$$
$$= (0.18 + 0.04) \times 4 \times 2$$
$$= 1.76 \text{ m}^2$$

Cover End Beam

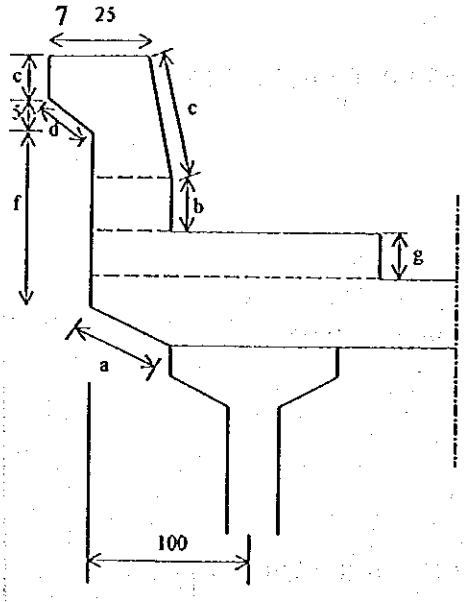
$$A_4 = \left[(0.68 \times 0.23) + \left(\frac{0.68 + 0.58}{2} \times 0.20\right) + (0.58 \times 1.12)\right] \times 2$$
$$= (0.1564 + 0.126 + 0.6496) \times 2$$
$$= 0.932 \times 2$$
$$= 1.864 \text{ m}^2$$

Total Form in Bridge (F_G)

$$F_G = \Sigma A \times 3$$
$$= (75.012 + 7.865 + 1.76 + 1.864) \times 3$$
$$= 86.501 \times 3$$
$$= 259.503 \text{ m}^2$$

Name of Structure	ASIN PUMPING STATION BRIDGE SUPER STRUCTURE	Category Calculation	Form Work Volume	Page	4/5

2. Bed Plate and Hand Rail + Side Walk



Thick of Plate = 3 cm

a	=	$64.69 + 3/2$	= 66.19 cm
b	=	$10 + 3/2$	= 11.50 cm
c	=	$40.31 + 3/2$	= 41.81 cm
d	=	$9.43 + 3/2 \times 2$	= 12.43 cm
e	=	$20 + 3/2$	= 21.50 cm
f	=	$72 + 3/2 \times 2$	= 75.00 cm
g	=		= 25.00 cm

Handrail + Sidewalk

Length of Beam = 21.80 m

Wide : $A_1 = [a + b + c + d + e + (f - g)] \times L \times 2$

$= [66.19 + 11.5 + 41.81 + 12.43 + 21.5 + (75 - 25)] \times 2180 \times 2$

$= 8869548 \text{ cm}^2 \sim 88.70 \text{ m}^2$

End Cover

Bridge: $A_2 = \left[(b \times 0.28) + \left(\frac{0.20 + 0.28}{2} \times 0.40\right) + \left(\frac{0.20 + 0.25}{2} \times 0.11\right)\right] \times 4$

$= 0.153 \times 4$

$= 0.612 \text{ m}^2$

Total Wide F_{SW1} = 88.70 + 0.612 = 89.312 m²

Total Wide in Bridge = 89.312 m²

Slab : End of Slab

$A = [(0.33 \times 3.25) - 2 \times (\frac{1}{2} \times 0.645 \times 0.05) + 2 \times (0.30 \times 1.25) + 2(0.30 \times 0.661)] \times 2$

$= 2.187 \times 2$

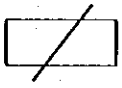
$A = 4.375 \text{ m}^3$

Name of Structure	ASIN PUMPING STATION BRIDGE SUPER STRUCTURE	Category Calculation	Form Work Volume	Page	5/5

Panel Plate

Thick of Plate = 3 cm

Thick of Plate = 7 cm

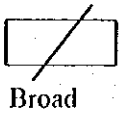


145 × 100

Broad $A_1 = (1.48 \times 1.03) + 2 \times (0.0085 \times 1.48) + 2 \times (0.085 \times 1.03)$

$= 1.5244 + 0.2516 + 0.1751$

$= 1.951\ m^2$



145 × 20

Broad $A_2 = (1.48 \times 0.23) + 2 \times (0.085 \times 1.48) + 2 \times (0.085 \times 0.23)$

$= 0.3404 + 0.2516 + 0.0391$

$= 0.6311\ m^2$

Total Broad = (21 × 1.9511) + 0.6311 = **41.602 m²**

Total Broad in Bridge F_P = 2 × 41.602 = **83.204 m²**

Cross Beam

Broad : $A = 2 \times (1.25 \times 0.98) + (1.25 \times 0.26) + 4 \times (0.175 \times 0.81)$

$= 2.45 + 0.325 + 0.567$

$= 3.342\ m^2$

Total Broad = 2 × 3.342 = **6.684 m²**

Total Broad in Bridge F_{CB} = 3 × 6.684 = **20.052 m²**

SUBSTRUCTURE QUANTITY CALCULATION

ASIN PUMP BRIDGE

Name of Structure	ASIN PUMPING STATION BRIDGE SUB-STRUCTURE	Category of calculation	WORK VOLUME	Page	

SUMMARY OF WORK VOLUME

1. Structure Excavation = 302 m^3
2. Back Fill = 265 m^3
3. PC Pile = 900 m
4. Concrete Type C_1 = 193 m^3
5. Form Work for C_1 = 271 m^2
6. Concrete Type E = 9 m^3
7. Form work for E = 4 m^2
8. Deformed Reinforcing Bar = 13782 kg.

SUBSTRUCTURE QUANTITY CALCULATION

SUMMARY ASIN PUMPING STATION

			A1	A2			TOTAL
STATION							
STRUCTURE EXCAVATION	0-2m	(m^3)	84.5	84.5			169
	2-4m	(m^3)	66.8	66.8			133.6
	>4m	(m^3)	0	0			0
	TOTAL	(m^3)	151.3	151.3			302.6
	WATER	(m^3)	261.1	261.1			522.2
	IN RIVER	(m^3)					0
BLINDING STONE		(m^3)	8.98	8.98			17.96
BACK FILE		(m^3)	132.03	132.03			264.06
PC PILE		(m)	450	450			900
STEEL-PILE		(m)					
CONCRETE	A-2-5						0
	B-1-2	(m^3)					0
	B-1-3	(m^3)					0
	B-1-4	(m^3)					0
	C-1	(m^3)	96.17	96.17			192.34
	E	(m^3)	4.49	4.49			8.98
FORM	TYPE-1	(m^2)	135.61	135.61			271.22
	TYPE-2	(m^2)					0
	TYPE-3	(m^2)					0
	TYPE-4	(m^2)					0
R-BAR		(kg)	6891	6891			13782
REMARK							

PC PILE

			A1	A2			TOTAL
STATION							
ELEVATION	FL	m					
	GH	m					
HEIGHT	HW	m					
	H1	m					
	H2-1	m					
	H2-2	m					
	H3	m					
	Hh	m					
	WT	m					
DIMENSION	A	m					
	B	m					
	D1	m	0.5	0.5			
	DL	m					
NUMBER OF PIER							
PILE	NUMBER	m	25	25			50
	LENGTH	m	18	18			900

EXCAVATION

			A1	A2			TOTAL
STATION							
A*B		(m^2)					
GH-FL		(m)					
EXCAVATION	0-2m	(m^3)	84.50	84.50			169.00
	2-4m	(m^3)	66.80	66.80			133.60
	>4m	(m^3)	0.00	0.00			0.00
	TOTAL	(m^3)	151.30	151.30			302.60
	WATER	(m^3)	261.10	261.10			522.20
BLINDING STONE		(m^3)	8.98	8.98			17.96
STEEL-PILE		(m)					

CONCRETE (m^3)

			A1	A2			TOTAL
STATION							
LEVELING CONCRETE (E)	a	(m^2)					
	t	(m)					
	V	(m^3)	4.49	4.49			8.98
FOOTING (C-1)	a1	(m^2)					
	a2	(m^2)					
	h1	(m)	REFER TO ABUTMENT				
	h2	(m)					
	V	(m^3)	96.17	96.17			192.34
COLUMN (B-1-2)	a1	(m^2)					
	a2	(m^2)					
	h1	(m)					
	h2	(m)					
	V	(m^3)					
C-PIER HEAD (B-1-2)							
RC PORTAL							
PC PORTAL							
REMARK							

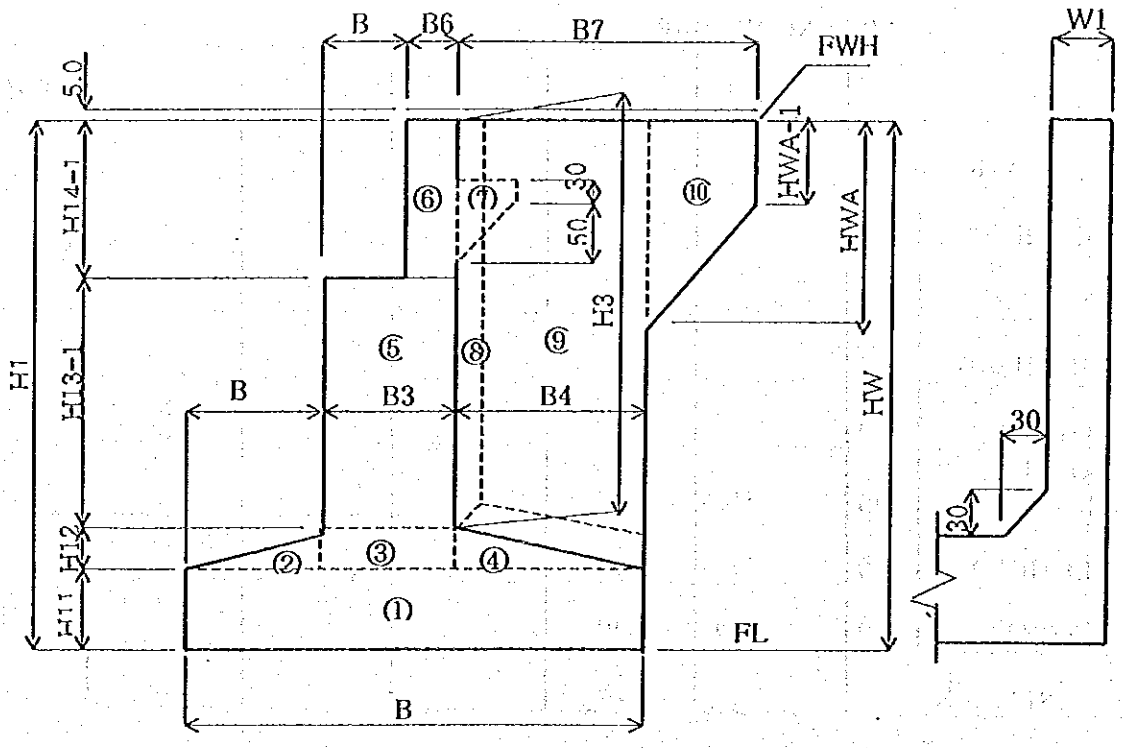
FORM AREA (m^2)

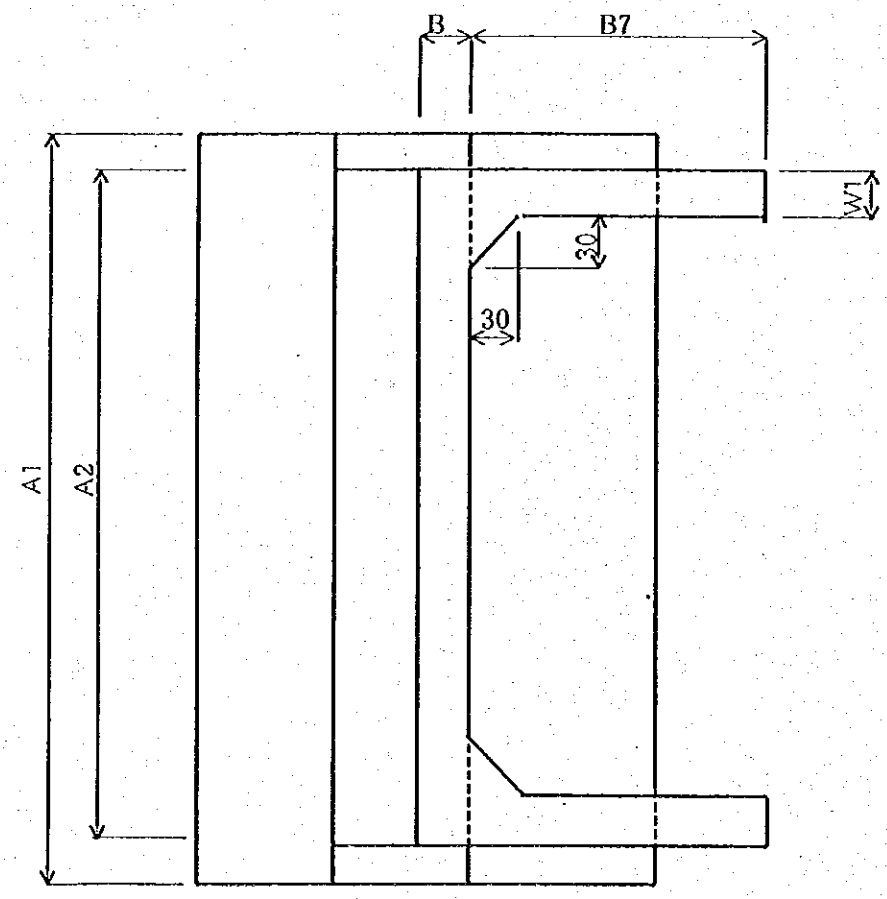
			A1	A2			TOTAL
STATION							
	a1	(m^2)					
	a2	(m^2)					
	A	(m^2)					
	D2	(m)					
	D3	(m)					
	h1	(m)					
	h2	(m)					
	a1	(m^2)					
	a2	(m^2)					
	A	(m^2)	135.61	135.61			271.22
C-PIER HEAD	TYPE-1						
	TYPE-4						
RC PORTAL	TYPE-6						
PC PORTAL	TYPE-6						
REMARK							

REINFORCING BAR

		A1	A2				TOTAL
STATION							
FOOTING	(kg)						
COLUMN	(kg)						
C-PIER HEAD	(kg)						
OTHER	(kg)						
TOTAL of STRUCTURE	(kg)	5166	5166				10332
PILE HEAD	(kg)	1725	1725				3450
TOTAL	(kg)	6891	6891				13782
REMARK							

CONCRETE (C-1)


B
B6
B7
FWH
W1
5.0
H14-1
H13-1
H1
H12
H11
HWA-1
HWA
HW
H3
30
50
B
B3
B4
FL
⑥
⑦
⑩
⑧
⑨
①
②
③
④


B
B7
W1
30
30
A1
A2

ABUTMENT A-1

CONCRETE (C-1)

Vn	= C *	Bn	* Hnn	* An	= VOLUME	ni		
		m	m	m	m3	n	nn	n
1	= 1.0 *	6.50	* 1.20	* 6.50	= 50.70 m3	1	11	1
2	= 0.5 *	6.50	* 0.00	* 6.50	= 0.00 m3	2	12	1
3	= 1.0 *	1.43	* 0.00	* 6.50	= 0.00 m3	3	12	1
4	= 0.5 *	2.57	* 0.00	* 6.50	= 0.00 m3	4	12	1
5	= 1.0 *	1.43	* 4.96	* 5.60	= 39.70 m3	3	13	1
6	= 1.0 *	0.50	* 1.84	* 5.60	= 5.16 m3	6	14	1
7				5.60	= m3			
8	= 0.5 *	0.30	* 0.30	* 6.80 * 2	= 0.61 m3			
9	= *		*	* *	= 0.00 m3			
10	= *		*	*	= m3			
11	= *		*	* *	= 0.00 m3			
12	= *		*	* *	= 0.00 m3			
					V = 96.17 m3			

RUBBER SHEET

0.28 * 0.35 * 5 = 0.49 m^2

t = 73 mm

ABUTMENT A-1

FORM AREA

Vn	=	C	*	N	*	Bn,An	*	Hnn	=	VOLUME	ni		
						m		m		m^2	n	nn	n
1	=	1.0	*	2	*	6.50	*	1.20	=	15.60 m^2	1	11	1
	=	1.0	*	2	*	6.50	*	1.20		15.60 m^2	1	11	1
2	=	0.5	*	2	*	2.50	*		=	0.00 m^2	2	12	1
3	=	1.0	*	2	*	1.43	*		=	0.00 m^2	3	12	1
4	=	0.5	*	2	*	2.57	*		=	0.00 m^2	4	12	1
5	=	1.0	*	2	*	1.43	*	4.96	=	14.18 m^2	3	13	1
	=	1.0	*	2	*	5.60	*	4.96	=	55.52 m^2	3	13	1
6	=	1.0	*	2	*	1.84	*	1.84	=	6.79 m^2	6	14	1
	=	1.0	*	2	*	5.60	*	1.84	=	20.64 m^2	6	14	1
7	=									m^2			
	=			0.3	*	1.414	=	0.42					
8	=			2	*	0.42	*	2.00	=	1.68 m^2			
9	=			4	*	0.70	*	2.00	=	5.60 m^2			
10	=									m^2			
11	=				*		*		=	0.00 m^2			
12	=				*		*		=	0.00 m^2			
									V =	135.61 m^2			

LEVELING CONCRETE (CLASS E)

V = (B1 + 0.20)*(A1 + 0.20)* 0.10

= (6.50 + 0.20)*(6.50 + 0.20)* 0.10 = 4.49 m3

(A-1,A-2 = 8.98 m3)

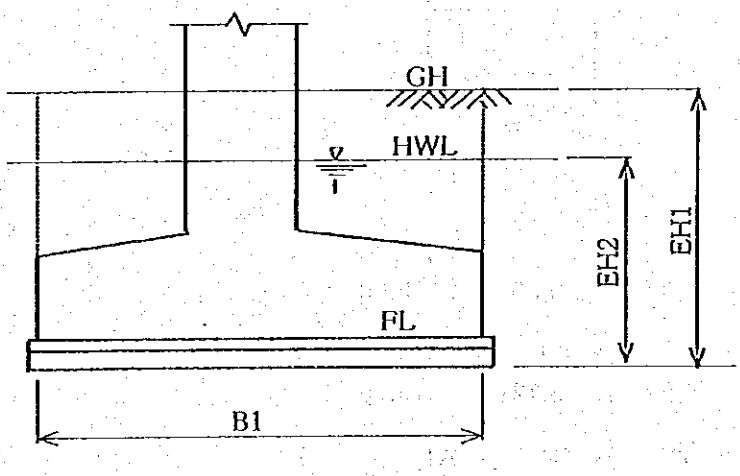
BLINDING STONE

V = (B1 + 0.20)*(A1 + 0.20)* 0.20

= (6.50 + 0.20)*(6.50 + 0.20)* 0.20 = 8.98 m3

(A-1,A-2 = 17.96 m3)

EXCAVATION



EH1=GH-FL+0.3

EH2=HWL-FL+0.3

GH = -2.700

HWL = -0.100

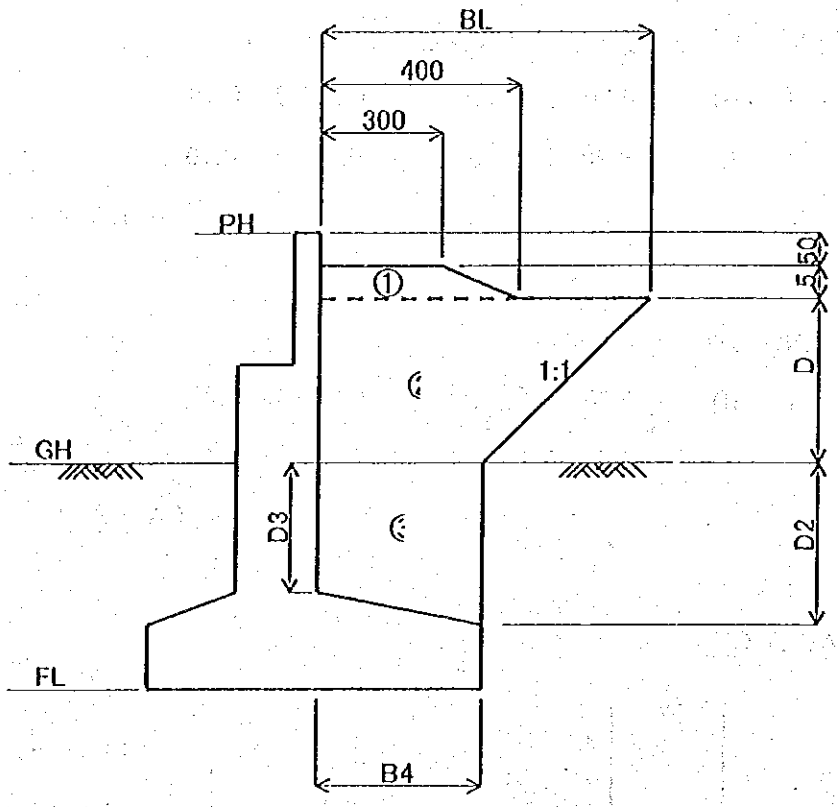
FL = -5.980

EH1 = 3.58

EH2 = 6.18

			B1		A1		Hn		V
1. EXC.<2m	:	V1 =	6.50	*	6.50	*	2.00	=	84.5 m^3
2. 2m<EXC.<4m	:	V2 =	6.50	*	6.50	*	1.58	=	66.8 m^3
3. EXC.>=4m	:	V3 =	6.50	*	6.50	*	0.00	=	0.0 m^3
4. INTO GROUND WATE	:	V4 =	6.50	*	6.50	*	6.18	=	261.1 m^3

GRANULAR BACKFILL



A1

V1 = 0.5 *(3.00 + 4.00)* 0.50 * 5.60 = 9.8 m^3

V2 = 0.5 *(B4 + BL)* D1 * A1
= 0.5 *(2.57 + 6.29)* 3.72 * 5.60 = 92.29 m^3

V3 = 0.5 *(D2 + D3)* B4 * A1
= 0.5 *(2.08 + 2.08)* 2.57 * 5.60 = 29.94 m^3

TOTAL = 132.03 m^3

Name of Structure	ASIN PUMPING STATION BRIDGE, FOR SCAFOLDING AND FORM SUPPORT	Category Calculation	Work Volume	Page	1/2

SUMMARY OF SCAFOLDING AND FORM SUPPORT VOLUME
FOR ASIN RIVER DRAINAGE SYSTEM IMPROVEMENT.

No	Structure	Volume	
		Scafolding (m^2)	Form Support (m^3)
1	Asin Pumping Station	1342	941
2	Asin Pumping Station, Gate	732	254
3	Asin Box Culvert	1843	1358
4	Asin Box Culvert Inlet Structure	54	11
5	Asin Box Culvert Outlet Structure	62	16
6	Secondary Channel Outlet on Asin River	-	34
7	Fuel Tank Box for Asin Pumping Station	133	62
8	Asin Pumping Station Bridge, Sub Structure	166	-
9	Asin No.1 Bridge, Sub Structure	293	-
10	Asin No.2 Bridge, Sub Structure	251	-
Total		4876	2676

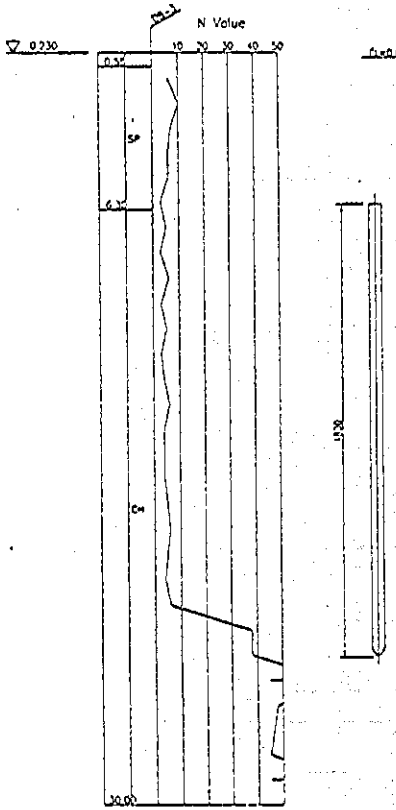
Name of Structure	ASIN PUMPING STATION BRIDGE, FOR SCAFOLDING AND FORM SUPPORT	Category Calculation	Work Volume	Page	2/2

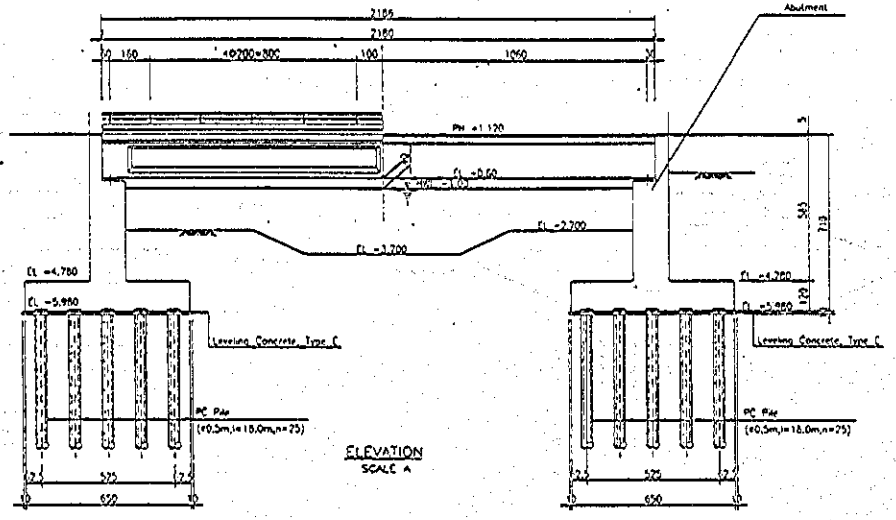
1. Scafolding Area

   $(2 \times 5.9 \times 5.6) + (2 \times 5.9 \times 1.43) = 82.954\ m^2$

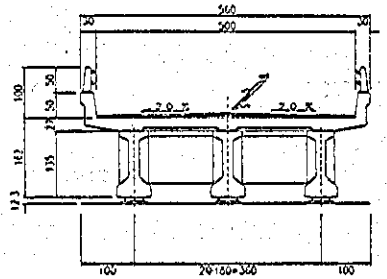
   For both side abutment $= 2 \times 82.954 = 165.908\ m^2$

2. Form Support Area

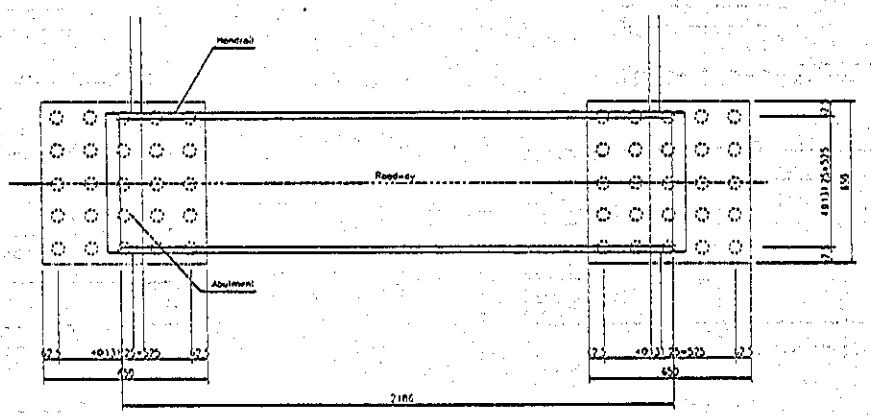




ELEVATION
SCALE A



TYPICAL CROSS SECTION
SCALE B



PLAN
SCALE A

Notes :
1. The dimension in cm
2. The elevation in m
3. Concrete for structure, Type C1

SCALE A 1:100 — 0 5 10m

SCALE B 1:50 — 0 1 5m

THE REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
AND DIRECTORATE GENERAL OF HUMAN SETTLEMENT

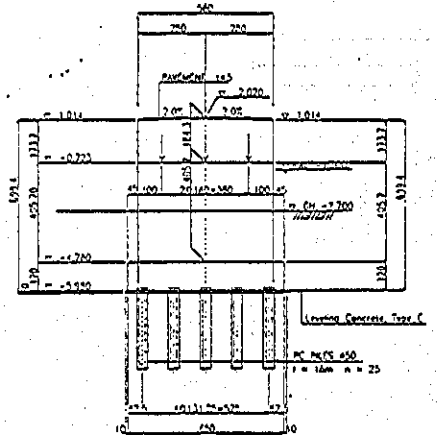
PROVINCE: CENTRAL JAVA
PROJECT POINT: SEMARANG CITY

JRATUNSELUNA FLOOD CONTROL PROJECT
COMPONENT : URBAN DRAINAGE SYSTEM IMPROVEMENT
ASIN PUMPING STATION BRIDGE
SUBSTRUCTURE
GENERAL ARRANGEMENT

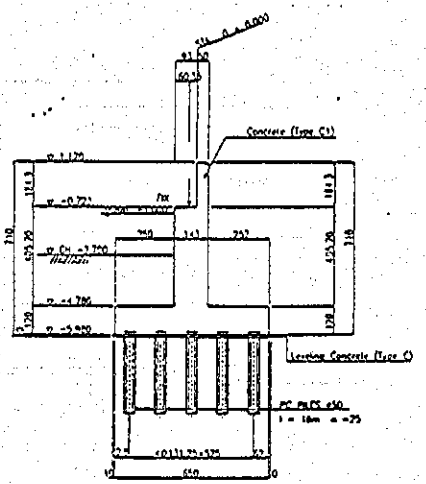
DESIGNED
CHECKED
CITY OF PLANNING AND DESIGN

DATE
CONTRACT NO.

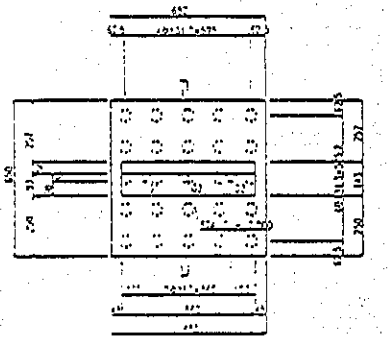
NO. DATE REVISIONS ORIGINATOR DRAWING APPROVED



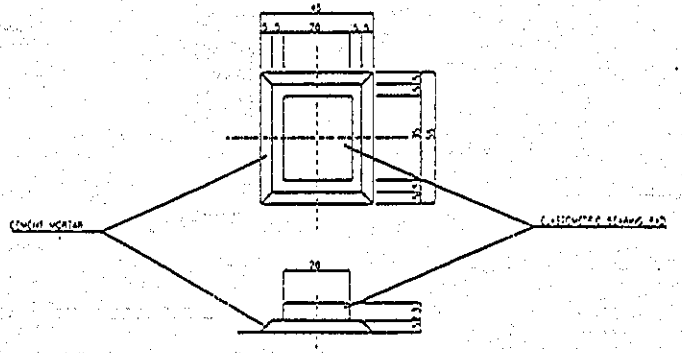
ELEVATION
SCALE A



PROFILE
SCALE A



PLAN
SCALE A



BEARING PAD
SCALE B

Notes :
1. The dimension in cm
2. The elevation in m
3. Concrete for structure, Type C1

SCALE A 1:100 0 1 2 3 4 5 m

SCALE B 1:10 0 0.1 0.2 0.3 0.4 0.5 m

THE REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
AND DIRECTORATE GENERAL OF HUMAN SETTLEMENT

JRATUNSELUNA FLOOD CONTROL PROJECT
COMPONENT : URBAN DRAINAGE SYSTEM IMPROVEMENT
ASIN PUMPING STATION IMAGE
SUBSTRUCTURE
DIMENSION OF ABUTMENT

PROVINCE CENTRAL JAVA
SEMARANG CITY

Name of Structure	INSPECTION BRIDGE	Category Calculation	Work Volume	Page	1/3

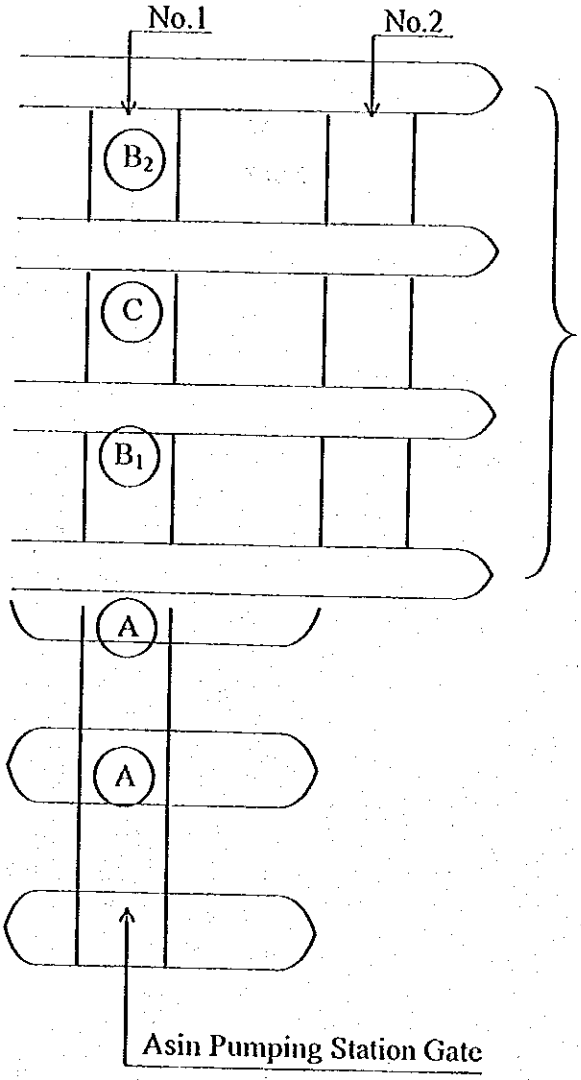
SUMMARY OF WORK VOLUME

1.	CONCRETE, TYPE B	=	54.38	m^3
2.	REINFORCING BAR, U 30	=	2,968	Kg

Name of Structure	INSPECTION BRIDGE	Category Calculation	Work Volume	Page	2/3

D.7 Maintenance Bridge

D.7.1 Concrete (B)



Bridge of No.1

(B1)	$\frac{0.4+0.65}{2} \times 3.00 \times 5.50$	=	8.66
(C)	$0.4 \times 3.00 \times 5.00$	=	6.00
(B2)	$0.4 \times 3.00 \times 5.50$	=	6.60

Bridge of No.2

(B2)	$0.4 \times 3.00 \times 5.50 \times 2$	=	13.20
(C)	$0.4 \times 3.00 \times 5.00$	=	6.00

Bridge of Asin Pump Station Gate

(A)	$0.4 \times 3.00 \times 5.80 \times 2$	=	13.92
Volume D.7.1		=	**54.38 m³**

Name of Structure	INSPECTION BRIDGE	Category Calculation	Work Volume	Page	3/3

D.7.2 Reinforcing Bar (SII U 30)

Bridge of No.1

(B1) (B2)	(2.89 + 84) × 2	=	746
(C)	(262 + 78) × 1	=	340

Bridge of No.2

(B2)	(289 + 84) × 2	=	746
(C)	(262 + 78) × 1	=	340

Bridge of Asin Pump Station Gate

(A)	(305 + 93) × 2	=	796

Volume D.7.1 = **2,968 kg**