

**CHAPTER 2 PROTECTION WORKS FOR RIVER BANK AND
RIVERBED**



2.1 Revetment for Channel Side Slope of 1:2.0

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF.13L + 35.0 ~ WF.15L + 30.0

CALCULATION			RESULT
SRSTRUCTURAL EXCAVATION			
$A_1 = (1.10 + 2.50) \times \frac{1}{2} \times 0.60$	=	1.080 m ²	
$A_2 = (4.60 + 6.10) \times \frac{1}{2} \times 0.50$	=	2.675 m ²	
$A_3 = (1.118 \times 6.00 + 1.00) \times 0.50$	=	3.854 m ²	
$A_4 = (0.50 + 1.20) \times \frac{1}{2} \times 0.70$	=	0.595 m ²	
A	=	8.204 m ²	
$V = 8.204 \times (42.935 + 27.672 + 60.00)$	=	1071.50	1071.5 m ³
BACKFILL WITH SELECTED SOIL			
$A_1 = (0.50 + 1.00) \times \frac{1}{2} \times 0.50 \times 2$	=	0.75 m ²	
$A_2 = (0.50 + 1.10) \times \frac{1}{2} \times 0.60$	=	0.48 m ²	
A	=	1.23 m ²	
$V = 1.23 \times (42.935 + 27.672 + 60.00)$	=	160.65	160.65 m ³
GRAVEL BEDDING			
$V = (1.118 \times 7.00 + 0.70) \times 0.25 \times 9.70$	=	20.676 m ³ /10.00m	
$V^1 = 20.676 \text{ m}^3/10.00 \text{ m} \times (42.935 + 27.672 + 60.00)$	=	270.043	270.043 m ³
WET STONE MASONRY			
$V = (1.118 \times 7.00) \times 0.25 \times 9.70$	=	20.676 m ³ /10.00 m	
$V^1 = 20.676 \text{ m}^3/10.00 \text{ m} \times 130.607$	=	270.043	270.043 m ³

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF.13L+35.0~WF.15L+30.0

CALCULATION		RESULT
☐ CEMENT MORTAR POINTTING		
$A = (1.118 + 6.00 + 0.70) \times 9.50$	$= 71.858 \text{ m}^2/10.00 \text{ m}$	
$A^1 = 71.858 \text{ m}^2/10.00$	$= 938.516$	938.516 m^2
☐ GABION MATTRESS		
$A = 0.50 \times 3.00$	$= 1.50 \text{ m}^2$	
$V = 1.50 \times (60.00 + 39.531 + 48.694)$	$= 222.338$	222.338 m^3
☐ RUBBLE STONE FILLING		
$A = \frac{1}{2} \times 0.50 \times 1.00$	$= 0.25 \text{ m}^2$	
$V = 0.25 \times (60.00 + 36.895 + 46.60)$	$= 35.874$	35.874 m^3
☐ BASE CONCRETE		
• CONCRETE (TYPE - C1)		
$V = 2.20 \text{ m}^3/10.00 \text{ m} \times 145.889$	$= 32.096$	32.096 m^3
• GRAVEL BEDDING		
$V = 0.70 \text{ m}^3/10.00 \text{ m} \times 145.889$	$= 10.212$	10.212 m^3
• FORM (H < 4.0 m)		
$A = 10.83 \text{ m}^2/10.00 \text{ m} \times 145.889$	$= 157.998$	157.998 m^2
• REINFORCING BAR		
$W = 0.10 \text{ tf}/10.00 \text{ m} \times 145.889$	$= 1.459$	1.459 tf
• JOINT FILLER		
$A = 0.22 \text{ m}^2/10.00 \text{ m} \times 145.889$	$= 3.210$	3.210 m^2
• LOG PILE		
$L = 10.00 \text{ m}/10.00 \text{ m} \times 145.889$	$= 146.000$	146.000 m

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF.13L+35.0~WF.15L+30.0

CALCULATION		RESULT
☞ PARTITON WALL		
n = 12 places		
• CONCRETE (TYPE - C1)		
$V = 1.279 \text{ m}^3/\text{place} \times 12$	=	15.348
		15.348 m ³
• GRAVEL BEDDING		
$V = 0.512 \text{ m}^3/\text{place} \times 12$	=	6.144
		6.144 m ³
• FORM (H < 4.0 m)		
$A = 8.525 \text{ m}^2/\text{place} \times 12$	=	102.300
		102.300 m ²
• REINFORCING BAR		
$W = 0.077 \text{ tf}/\text{place} \times 12$	=	0.924
		0.924 tf
• JOINT FILLER		
$A = 2.131 \text{ m}^2/\text{place} \times 12$	=	25.572
		25.572 m ²
☞ END WALL		
n = 4 places		
• CONCRETE (TYPE - C1)		
$V = 1.535 \text{ m}^3/\text{place} \times 4$	=	6.140
		6.140 m ³
• GRAVEL BEDDING		
$V = 0.682 \text{ m}^3/\text{place} \times 4$	=	2.728
		2.728 m ³
• FORM (H < 4.0 m)		
$A = 10.231 \text{ m}^2/\text{place} \times 4$	=	40.924
		40.924 m ²
• REINFORCING BAR		
$W = 0.08 \text{ tf}/\text{place} \times 4$	=	0.320
		0.320 tf
• JOINT FILLER		
$A = 2.131 \text{ m}^2/\text{place} \times 4$	=	8.524
		8.524 m ²

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF.13L+35.0 ~ WF.15L+30.0

CALCULATION	RESULT
☐ GABION CYLINDER	
• GABION CYLINDER Ø 500	
$V = \pi / 4 \times 0.50^2 \times 11.826 \times 6 \times 2 = 27.864$	27.864 m ³
• SOIL FILLING	
$V = (11.826 \times 3.00 \times 0.50) \times 2 - 27.864 = 7.614$	7.614 m ³
☐ WEEP HOLE	
$N = 510.00 \times 6 \text{ places} / 10.00 \text{ m} = 306 \text{ places}$	
PVC Pipe Ø 50 (L = 0.80 m / pipe)	
$L = 306 \times 0.80 = 244.800$	244.800 m
• FILTER CLOTH	
$A = 0.856 \text{ m}^2/\text{place} \times 306 = 261.936$	261.936 m ²

TYPE OF WORK : REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF. 64R+14.610 ~ WF. 65R+38.00 (LOWER CHANNEL)

CALCULATION	RESULT
• STRUCTURAL EXCAVATION	
AREA OF STRUCTURAL EXCAVATION	
$A = 8.763 \text{ m}^2$ (Refer to Package 1)	
$V = 8.763 \text{ m}^2 \times 61.00 \text{ m} = 534.543$	534.543 m^3
• BACKFILL WITH SELECTED SOIL	
AREA OF BACKFILL	
$A = 1.230 \text{ m}^2$ (Refer to Package 1)	
$V = 1.230 \text{ m}^2 \times 61.00 \text{ m} = 75.030$	75.030 m^3
• GRAVEL BEDDING	
$V = 23.387 \text{ m}^3 / 10.00 \text{ m}$	
$V' = 23.387 \text{ m}^3 / 10.00 \text{ m} \times 61.00 \text{ m} = 142.661$	142.661 m^3
• WET STONE MASONRY	
$V = 23.387 \text{ m}^3 / 10.00 \text{ m}$	
$V' = 23.387 \text{ m}^3 / 10.00 \text{ m} \times 61.00 \text{ m} = 142.661$	142.661 m^3
• CEMENT MORTAR POINTING	
$A = 82.702 \text{ m}^2 / 10.00 \text{ m}$	
$A' = 82.702 \text{ m}^2 / 10.00 \text{ m} \times 61.00 \text{ m} = 504.483$	504.483 m^2
• GABION MATTRESS	
$V = 0.50 \times 3.00 \times 1.00 = 1.50 \text{ m}^3 / \text{m}$	
$V' = 1.50 \text{ m}^3 / \text{m} \times 61.00 \text{ m} = 91.500$	91.500 m^3
• RUBBLE STONE FILLING	
$A = \frac{1}{2} \times 0.50 \times 1.00 = 0.25 \text{ m}^2$	
$V = 0.25 \text{ m}^2 \times 61.00 \text{ m} = 15.250$	15.250 m^3

TYPE OF WORK : REVELMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)
 LOCATION : W.P. 6AR+14.610 ~ W.P. 6SR+38.00 (LOWER CHANNEL)

CALCULATION	RESULT
• BASE CONCRETE	
(CONCRETE : TYPE - C1)	
$V = 2.20 \text{ m}^3 / 10.00 \text{ m} \times 61.00 \text{ m} = 13.420$	13.420 m^3
(GRAVEL BEDDING)	
$V = 0.70 \text{ m}^3 / 10.00 \text{ m} \times 61.00 \text{ m} = 4.270$	4.270 m^3
(FORM)	
$A = 10.83 \text{ m}^2 / 10.00 \text{ m} \times 61.00 \text{ m} = 66.063$	66.063 m^2
(REINFORCING BAR)	
$W = 0.10 \text{ tf} / 10.00 \text{ m} \times 61.00 \text{ m} = 0.610$	0.610 tf
(JOINT FILLER)	
$A = 0.22 \text{ m}^2 / 10.00 \text{ m} \times 61.00 \text{ m} = 1.342$	1.342 m^2
(LOG PILE)	
$L = 10.00 \text{ m} / 10.00 \text{ m} \times 61.00 \text{ m} = 61.000$	61.000 m
• TOP CONCRETE	
(CONCRETE : TYPE - C1)	
$V = 1.80 \text{ m}^3 / 10.00 \text{ m} \times 61.00 \text{ m} = 10.980$	10.980 m^3
(GRAVEL BEDDING)	
$V = 0.75 \text{ m}^3 / 10.00 \text{ m} \times 61.00 \text{ m} = 4.575$	4.575 m^3
(FORM)	
$A = 12.18 \text{ m}^2 / 10.00 \text{ m} \times 61.00 \text{ m} = 74.298$	74.298 m^2
(REINFORCING BAR)	
$W = 0.094 \text{ tf} / 10.00 \text{ m} \times 61.00 \text{ m} = 0.573$	0.573 tf
(JOINT FILLER)	
$A = 2.605 \text{ m}^2 / 10.00 \text{ m} \times 61.00 \text{ m} = 15.891$	15.891 m^2

TYPE OF WORK : REVTMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF 64R + 14.610 ~ WF 65R + 38.00 (LOWER CHANNEL)

CALCULATION	RESULT
- PARTITION WALL	
n = 6 places	
(CONCRETE : TYPE - C1)	
$V = 1.447 \text{ m}^3/\text{place} \times 6 = 8.682$	8.682 m^3
(GRAVEL BEDDING)	
$V = 0.579 \text{ m}^3/\text{place} \times 6 = 3.474$	3.474 m^3
(FORM)	
$A = 9.644 \text{ m}^2/\text{place} \times 6 = 57.864$	57.864 m^2
(REINFORCING BAR)	
$W = 0.087 \text{ tf}/\text{place} \times 6 = 0.522$	0.522 tf
(JOINT FILLER)	
$A = 2.411 \text{ m}^2/\text{place} \times 6 = 14.466$	14.466 m^2
- END WALL	
n = 1 place	
(CONCRETE : TYPE - C1)	
$V = 1.736 \text{ m}^3/\text{place} \times 1 = 1.736$	1.736 m^3
(GRAVEL BEDDING)	
$V = 0.772 \text{ m}^3/\text{place} \times 1 = 0.772$	0.772 m^3
(FORM)	
$A = 11.573 \text{ m}^2/\text{place} \times 1 = 11.573$	11.573 m^2
(REINFORCING BAR)	
$W = 0.091 \text{ tf}/\text{place} \times 1 = 0.091$	0.091 tf
(JOINT FILLER)	
$A = 2.411 \text{ m}^2/\text{place} \times 1 = 2.411$	2.411 m^2

REVTMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)

TYPE OF WORK :

LOCATION : WF. 64R + 14.61 ~ WF. 65R + 38.00 (LOWER CHANNEL)

CALCULATION	RESULT
<ul style="list-style-type: none">GABION CYLINDER	
(GABION CYLINDER)	
$V = \pi/4 \times 0.50^2 \times 11.826 \times 6 = 13.932$	13.932 m ³
(SOIL FILLING)	
$V = (11.826 \times 3.00 \times 0.50) - 13.932 = 3.807$	3.807 m ³
<ul style="list-style-type: none">WEEP HOLE	
$N = 6 \text{ places / } 10.00\text{ m} \times 61.00\text{ m} = 37 \text{ places}$	
(PVC Pipe $\phi 50 : L = 0.80 \text{ m/pipe}$)	
$L = 0.80 \text{ m/pipe} \times 37 = 29.600$	29.600 m
(FILTER CLOTH)	
$A = 0.856 \text{ m}^2/\text{place} \times 37 = 31.672$	31.672 m ²

TYPE OF WORK : REVELMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF. 64L + 14.61 ~ WF. 65L + 28.00 (LOWER CHANNEL)

CALCULATION	RESULT
• STRUCTURAL EXCAVATION	
AREA OF STRUCTURAL EXCAVATION	
$A = 8.763 \text{ m}^2$ (Refer to Package 1)	
$V = 8.763 \text{ m}^2 \times 51.00 \text{ m} = 446.913$	446.913 m^3
• BACKFILL WITH SELECTED SOIL	
$A = 1.230 \text{ m}^2$ (Refer to Package 1)	
$V = 1.230 \text{ m}^2 \times 51.00 \text{ m} = 62.730$	62.730 m^3
• GRAVEL BEDDING	
$V = 23.387 \text{ m}^3 / 10.00 \text{ m}$	
$V' = 23.387 \text{ m}^3 / 10.00 \text{ m} \times 51.00 \text{ m} = 119.274$	119.274 m^3
• WET STONE MASONRY	
$V = 23.387 \text{ m}^3 / 10.00 \text{ m}$	
$V' = 23.387 \text{ m}^3 / 10.00 \text{ m} \times 51.00 \text{ m} = 119.274$	119.274 m^3
• CEMENT MORTAR POINTING	
$A = 82.702 \text{ m}^2 / 10.00 \text{ m}$	
$A' = 82.702 \text{ m}^2 / 10.00 \text{ m} \times 51.00 \text{ m} = 421.780$	421.780 m^2
• GABION MATTRESS	
$V = 0.50 \times 3.00 \times 1.00 = 1.50 \text{ m}^3 / \text{m}$	
$V' = 1.50 \text{ m}^3 / \text{m} \times 51.00 \text{ m} = 76.500$	76.500 m^3
• RUBBLE STONE FILLING	
$A = \frac{1}{2} \times 0.50 \times 1.00 = 0.250 \text{ m}^2$	
$V = 0.250 \times 51.00 = 12.750$	12.750 m^3
• BASE CONCRETE	
(CONCRETE : TYPE - C1)	
$V = 2.20 \text{ m}^3 / 10.00 \text{ m} \times 51.00 \text{ m} = 11.220$	11.220 m^3

REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)

TYPE OF WORK
LOCATION

: W/F. 64L + 14.61 ~ W/F. 65L + 28.00 (LOWER CHANNEL)

CALCULATION	RESULT
(GRAVEL BEDDING)	
$V = 0.70 \text{ m}^3 / 10.00 \text{ m} \times 51.00 \text{ m} = 3.570$	3.570 m^3
(FORM)	
$A = 10.83 \text{ m}^2 / 10.00 \text{ m} \times 51.00 \text{ m} = 55.233$	55.233 m^2
(REINFORCING BAR)	
$W = 0.10 \text{ tf} / 10.00 \text{ m} \times 51.00 \text{ m} = 0.510$	0.510 tf
(JOINT FILLER)	
$A = 0.22 \text{ m}^2 / 10.00 \text{ m} \times 51.00 \text{ m} = 1.122$	1.122 m^2
(LOG PILE)	
$L = 10.00 \text{ m} / 10.00 \text{ m} \times 51.00 \text{ m} = 51.00$	51.00 m
- TOP CONCRETE	
(CONCRETE : TYPE - C1)	
$V = 1.80 \text{ m}^3 / 10.00 \text{ m} \times 51.00 \text{ m} = 9.180$	9.180 m^3
(GRAVEL BEDDING)	
$V = 0.75 \text{ m}^3 / 10.00 \text{ m} \times 51.00 \text{ m} = 3.825$	3.825 m^3
(FORM)	
$A = 12.18 \text{ m}^2 / 10.00 \text{ m} \times 51.00 \text{ m} = 62.118$	62.118 m^2
(REINFORCING BAR)	
$W = 0.094 \text{ tf} / 10.00 \text{ m} \times 51.00 \text{ m} = 0.479$	0.479 tf
(JOINT FILLER)	
$A = 2.605 \text{ m}^2 / 10.00 \text{ m} \times 51.00 \text{ m} = 13.286$	13.286 m^2

REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)
TYPE OF WORK :
LOCATION : WF. 64L + 14.61 ~ WF. 65L + 28.00 (LOWER CHANNEL)

CALCULATION	RESULT
• PARTITION WALL	
n = 5 places	
(CONCRETE : TYPE - C1)	
$V = 1.447 \text{ m}^3/\text{place} \times 5 = 7.235$	7.235 m ³
(GRAVEL BEDDING)	
$V = 0.579 \text{ m}^3/\text{place} \times 5 = 2.895$	2.895 m ³
(FORM)	
$A = 9.644 \text{ m}^2/\text{place} \times 5 = 48.220$	48.220 m ²
(REINFORCING BAR)	
$w = 0.087 \text{ tf}/\text{place} \times 5 = 0.435$	0.435 tf
(JOINT FILLER)	
$A = 2.411 \text{ m}^2/\text{place} \times 5 = 12.055$	12.055 m ²
• END WALL	
n = 1 place	
(CONCRETE : TYPE - C1)	
$V = 1.736 \text{ m}^3/\text{place} \times 1 = 1.736$	1.736 m ³
(GRAVEL BEDDING)	
$V = 0.772 \text{ m}^3/\text{place} \times 1 = 0.772$	0.772 m ³
(FORM)	
$A = 11.573 \text{ m}^2/\text{place} \times 1 = 11.573$	11.573 m ²
(REINFORCING BAR)	
$w = 0.091 \text{ tf}/\text{place} \times 1 = 0.091$	0.091 tf
(JOINT FILLER)	
$A = 2.411 \text{ m}^2/\text{place} \times 1 = 2.411$	2.411 m ²

REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)

TYPE OF WORK :

LOCATION :

WF. 64L + 14.61 ~ WF. 65L + 28.00 (LOWER CHANNEL)

CALCULATION	RESULT
GABION CYLINDER	
(GABION CYLINDER)	
$V = \frac{\pi}{4} \times 0.50^2 \times 11.826 \times 6 = 13.932$	13.932 m ³
(SOIL FILLING)	
$V = (11.826 \times 3.00 \times 0.50) - 13.932 = 3.807$	3.807 m ³
• WEEP HOLE	
$N = 6 \text{ places} / 10.00 \text{ m} \times 51.00 \text{ m} = 31 \text{ places}$	
(PVC Pipe $\phi 50$: L = 0.80 m/pipe)	
$L = 0.80 \text{ m/pipe} \times 31 = 24.800$	24.800 m
(FILTER CLOTH)	
$A = 0.856 \text{ m}^2/\text{place} \times 31 = 26.536$	26.536 m ²

TYPE OF WORK : REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF. 64R+14.610 ~ WF. 65R+38.00 (UPPER CHANNEL)

CALCULATION	RESULT
STRUCTURAL EXCAVATION	
$A_1 = (1.10 + 2.50) \times \frac{1}{2} \times 0.60 = 1.080 \text{ m}^2$	
$A_2 = (4.60 + 6.10) \times \frac{1}{2} \times 0.50 = 2.675 \text{ m}^2$	
$A_3 = (1.118 \times 2.716 + 1.00) \times 0.50 = 2.018 \text{ m}^2$	
$A_4 = (0.50 + 1.20) \times \frac{1}{2} \times 0.70 = 0.665 \text{ m}^2$	
$\Sigma A = 6.438 \text{ m}^2$	
$V = 6.438 \text{ m}^2 \times 43.50 \text{ m} = 280.053$	280.053 m^3
BACKFILL WITH SELECTED SOIL	
AREA OF BACKFILL	
$A = 1.230 \text{ m}^2$ (Refer to Package 1)	
$V = 1.230 \text{ m}^2 \times 43.50 \text{ m} = 53.505$	53.505 m^3
GRAVEL BEDDING	
$V = (1.118 \times 3.716 + 0.70) \times 0.25 \times 9.70 \text{ m} = 11.772 \text{ m}^3/10.00 \text{ m}$	
$V' = 11.772 \text{ m}^3/10.00 \text{ m} \times 43.50 \text{ m} = 51.208$	51.208 m^3
WET STONE MASONRY	
$V = (1.118 \times 3.716 + 0.70) \times 0.25 \times 9.70 \text{ m} = 11.772 \text{ m}^3/10.00 \text{ m}$	
$V' = 11.772 \text{ m}^3/10.00 \text{ m} \times 43.50 \text{ m} = 51.208$	51.208 m^3
CEMENT MORTAR POINTING	
$A = (1.118 \times 2.716 + 0.70) \times 9.70 \text{ m} = 36.244 \text{ m}^2/10.00 \text{ m}$	
$A' = 36.244 \text{ m}^2/10.00 \text{ m} \times 43.50 \text{ m} = 157.661$	157.661 m^2
BASE CONCRETE	
(CONCRETE : TYPE-C1)	
$V = 2.20 \text{ m}^3/10.00 \text{ m} \times 43.50 \text{ m} = 9.570$	9.570 m^3
(GRAVEL BEDDING)	
$V = 0.70 \text{ m}^3/10.00 \text{ m} \times 43.50 \text{ m} = 3.045$	3.045 m^3

REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASOURY)

TYPE OF WORK :

LOCATION :

WF. 64R+14.61 ~ WF. 65R+38.00 (UPPER CHANNEL)

CALCULATION	RESULT
(FORM)	
$A = 10.83 \text{ m}^2/10.00\text{m} \times 43.50\text{m} = 47.111$	47.111 m^2
(REINFORCING BAR)	
$W = 0.10 \text{ tf}/10.00\text{m} \times 43.50\text{m} = 0.435$	0.435 tf
(JOINT FILLER)	
$A = 0.22 \text{ m}^2/10.00\text{m} \times 43.50\text{m} = 0.957$	0.957 m^2
• TOP CONCRETE	
(CONCRETE : TYPE - C1)	
$V = 1.80 \text{ m}^3/10.00\text{m} \times 43.50\text{m} = 7.830$	7.830 m^3
(GRAVEL BEDDING)	
$V = 0.75 \text{ m}^3/10.00\text{m} \times 43.50\text{m} = 3.263$	3.263 m^3
(FORM)	
$A = 12.18 \text{ m}^2/10.00\text{m} \times 43.50\text{m} = 52.983$	52.983 m^2
(REINFORCING BAR)	
$W = 0.094 \text{ tf}/10.00\text{m} \times 43.50\text{m} = 0.409$	0.409 tf
(JOINT FILLER)	
$A = 2.605 \text{ m}^2/10.00\text{m} \times 43.50\text{m} = 11.332$	11.332 m^2
• PARTITION WALL	
$n = 6 \text{ places}$	
(CONCRETE : TYPE - C1)	
$V = (0.50 \times 0.30) \times (1.118 \times 3.716 + 0.70) \times 6 \text{ places}$	
$= 4.369$	4.369 m^3
(GRAVEL BEDDING)	
$V = (0.10 \times 0.70) \times (1.118 \times 3.716 + 0.70) \times 6 \text{ places}$	
$= 2.039$	2.039 m^3

TYPE OF WORK : REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF. 64R+14.61 ~ WF. 65R+38.00 (UPPER CHANNEL)

CALCULATION	RESULT
(FORM)	
$A = 0.50 \times (1.118 \times 3.716 + 0.70) \times 2 \times 6 \text{ places} = 29.127$	29.127 m ²
(REINFORCING BAR)	
$n_1 = (1.118 \times 3.716 + 0.70 - 0.05 \times 2) \div 0.30 = 15.8 \approx 16$	
$L_1 = (0.20 + 0.40) \times 2 + 0.01 \times 15 = 1.350 \text{ m / Bar}$	
$W_1 = 16 \times 1.350 \times 0.617 \text{ kg/m} = 13.327 \text{ kg/place}$	
$n_2 = 6$	
$L_2 = (1.118 \times 3.716 + 0.70 - 0.05 \times 2) = 4.754 \text{ m / Bar}$	
$W_2 = 6 \times 4.754 \times 1.040 \text{ kg/m} = 29.665 \text{ kg/place}$	
$W = W_1 + W_2 = 42.992 \text{ kg/place}$	
$W' = 42.992 \text{ kg/place} \times 6 \text{ places} = 257.95$	258 kg
(JOINT FILLER)	
$A = (1.118 \times 3.716 + 0.70) \times 0.25 = 1.214 \text{ m}^2/\text{place}$	
$A' = 1.214 \text{ m}^2/\text{place} \times 6 \text{ places} = 7.284$	7.284 m ²
• END WALL	
$n = 1 \text{ place}$	
(CONCRETE : TYPE-C1)	
$V = (0.60 \times 0.30) \times (1.118 \times 3.716 + 0.70) = 0.874$	0.874 m ³
(GRAVEL BEDDING)	
$V = (0.10 \times 0.70) \times (1.118 \times 3.716 + 0.70) = 0.340$	0.340 m ³
(FORM)	
$A = (0.60) \times (1.118 \times 3.716 + 0.70) \times 2 = 5.825$	5.825 m ²
(REINFORCING BAR)	
$n_1 = (1.118 \times 3.716 + 0.70 - 0.05 \times 2) \div 0.30 = 15.8 \approx 16$	
$L_1 = (0.20 + 0.50) \times 2 + 0.01 \times 15 = 1.550 \text{ m / Bar}$	
$W_1 = 16 \times 1.550 \times 0.617 \text{ kg/m} = 15.302 \text{ kg/place}$	

REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)

TYPE OF WORK :

LOCATION :

WF. 64R + 14.61 ~ WF. 65R + 38.00 (UPPER CHANNEL)

CALCULATION	RESULT
$n_2 = 6$	
$L_2 = (1.118 \times 3.716 + 0.70 - 0.05 \times 2) = 4.754 \text{ m/Bar}$	
$W_2 = 6 \times 4.754 \times 1.04 \text{ kg/m} = 29.665 \text{ kg/place}$	
$W = W_1 + W_2 = 44.967 \text{ kg/place}$	45 kg
(JOINT FILLER)	
$A = (1.118 \times 3.716 + 0.70) \times 0.25 = 1.214$	1.214 m ²
• WEEP HOLE	
$N = 6 \text{ places} / 10.00 \text{ m} \times 43.50 \text{ m} = 26 \text{ places}$	
(PVC Pipe $\phi 50 : L = 0.80 \text{ m/pipe}$)	
$L = 0.80 \times 26 = 20.800$	20.800 m
(FILTER CLOTH)	
$A = 0.856 \text{ m}^2/\text{place} \times 26 = 22.256$	22.256 m ²

REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)

TYPE OF WORK :

LOCATION :

WF. 64L + 14.61 ~ WF. 65L + 28.00 (UPPER CHANNEL)

CALCULATION	RESULT
• STRUCTURAL EXCAVATION	
AREA OF EXCAVATION	
$A = 6.438 \text{ m}^2$ (Refer to Right Bank)	
$V = 6.438 \times 44.55 = 286.813$	286.813 m^3
• BACKFILL WITH SELECTED SOIL	
AREA OF BACKFILL	
$A = 1.230 \text{ m}^2$ (Refer to Right Bank)	
$V = 1.230 \times 44.55 = 54.797$	54.797 m^3
• GRAVEL BEDDING	
$V = 11.772 \text{ m}^3/10.00\text{m}$ (Refer to Right Bank)	
$V' = 11.772 \text{ m}^3/10.00\text{m} \times 44.55 = 52.444$	52.444 m^3
• WET STONE MASONRY	
$V = 11.772 \text{ m}^3/10.00\text{m}$ (Refer to Right Bank)	
$V' = 11.772 \text{ m}^3/10.00\text{m} \times 44.55 = 52.444$	52.444 m^3
• CEMENT MORTAR POINTING	
$A = 36.244 \text{ m}^2/10.00\text{m}$ (Refer to Right Bank)	
$A' = 36.244 \text{ m}^2/10.00\text{m} \times 44.55 = 161.467$	161.467 m^2
• BASE CONCRETE	
(CONCRETE : TYPE - C1)	
$V = 2.20 \text{ m}^3/10.00\text{m} \times 44.55 = 9.801$	9.801 m^3
(GRAVEL BEDDING)	
$V = 0.70 \text{ m}^3/10.00\text{m} \times 44.55 = 3.119$	3.119 m^3
(FORM)	
$A = 10.83 \text{ m}^2/10.00\text{m} \times 44.55 = 48.248$	48.248 m^2
(REINFORCING BAR)	
$W = 0.10 \text{ tf}/10.00\text{m} \times 44.55 = 0.446$	0.446 tf

REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)

TYPE OF WORK :

LOCATION :

WF. 64L+14.61 ~ WF. 65L+28.00 CUPPER CHANNEL)

CALCULATION	RESULT
(JOINT FILLER)	
$A = 0.22 \text{ m}^2/10.00\text{m} \times 44.55 = 0.980$	0.980 m^2
• TOP CONCRETE	
(CONCRETE : TYPE - C1)	
$V = 1.80 \text{ m}^3/10.00\text{m} \times 44.55 = 8.019$	8.019 m^3
(GRAVEL BEDDING)	
$V = 0.75 \text{ m}^3/10.00\text{m} \times 44.55 = 3.341$	3.341 m^3
(FORM)	
$A = 12.18 \text{ m}^2/10.00\text{m} \times 44.55 = 54.262$	54.262 m^2
(REINFORCING BAR)	
$W = 0.094 \text{ t}^f/10.00\text{m} \times 44.55 = 0.419$	0.419 t^f
(JOINT FILLER)	
$A = 2.605 \text{ m}^2/10.00\text{m} \times 44.55 = 11.605$	11.605 m^2
• PARTITION WALL	
$n = 5 \text{ places}$	
(CONCRETE : TYPE - C1)	
$V = 0.728 \text{ m}^3/\text{place}$ (Refer to Right Bank)	
$V' = 0.728 \text{ m}^3/\text{place} \times 5 \text{ places} = 3.640$	3.640 m^3
(GRAVEL BEDDING)	
$V = 0.340 \text{ m}^3/\text{place} \times 5 \text{ places} = 1.700$	1.700 m^3
(FORM)	
$A = 4.855 \text{ m}^2/\text{place} \times 5 \text{ places} = 24.275$	24.275 m^2
(REINFORCING BAR)	
$W = 42.992 \text{ kg}/\text{place} \times 5 \text{ places} = 214.96$	215 kg
(JOINT FILLER)	
$A = 1.214 \text{ m}^2/\text{place} \times 5 \text{ places} = 6.070$	6.070 m^2

REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)

TYPE OF WORK :

LOCATION :

WF. 64L + 14.61 ~ WF. 65L + 28.00 (UPPER CHANNEL)

CALCULATION	RESULT
• END WALL	
n = 1 place	
(CONCRETE : TYPE-C1)	
V = 0.874 m ³ /place (Refer to Right Bank)	0.874 m ³
(GRAVEL BEDDING)	
V = 0.340 m ³ /place	0.340 m ³
(FORM)	
A = 5.825 m ² /place	5.825 m ²
(REINFORCING BAR)	
W = 44.967 kg/place	45 kg
(JOINT FILLER)	
A = 1.214 m ² /place	1.214 m ²
• WEEP HOLE	
N = 6 places / 10.00m x 44.55 = 27 places	
(PVC Pipe φ50 : L = 0.80 m/pipe)	
L = 0.80 x 27 = 21.600	21.600 m
(FILTER CLOTH)	
A = 0.856 m ² /place x 27 = 23.112	23.112 m ²

TYPE OF WORK : REVTMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF.64R + 26.0 ~ WF.75R - 16.0

CALCULATION		RESULT
☐ STRUCTURAL EXCAVATION		
$A_1 = (1.10 + 2.50) \times \frac{1}{2} \times 0.60$	=	1.080 m ²
$A_2 = (4.60 + 6.10) \times \frac{1}{2} \times 0.50$	=	2.675 m ²
$A_3 = (1.118 \times 7.00 + 1.00) \times 0.50$	=	4.413 m ²
$A_4 = (0.50 + 1.20) \times \frac{1}{2} \times 0.70$	=	0.595 m ²
	A =	8.763 m ²
V = 8.763 x 510.00	=	4469.13
		4469.1 m ³
☐ BACKFILL WITH SELECTED SOIL		
$A_1 = (0.50 + 1.00) \times \frac{1}{2} \times 0.50 \times 2$	=	0.75 m ²
$A_2 = (0.50 + 1.10) \times \frac{1}{2} \times 0.60$	=	0.48 m ²
	A =	1.23 m ²
V = 1.23 x 510.00	=	627.30
		627.3 m ³

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF.64R + 26.0 ~ WF.75R - 16.0

CALCULATION		RESULT
☐ GRAVEL BEDDING		
$V = (1.118 \times 8.00 + 0.70) \times 0.25 \times 9.70$	$=$	$23.387 \text{ m}^3/10.00\text{m}$
$V^1 = 23.387 \text{ m}^3/10.00 \text{ m} \times 510.00$	$=$	1192.737
		1192.737 m^3
☐ WET STONE MASONRY		
$V = (1.118 \times 8.00) \times 0.25 \times 9.70$	$=$	$23.387 \text{ m}^3/10.00 \text{ m}$
$V^1 = 23.387 \text{ m}^3/10.00 \text{ m} \times 510.000$	$=$	1192.737
		1192.737 m^3
☐ CEMENT MORTAR POINTING		
$A = (1.118 + 7.00 + 0.70) \times 9.70$	$=$	$82.702 \text{ m}^2/10.00 \text{ m}$
$A^1 = 82.702 \text{ m}^2/10.00$	$=$	4217.802
		4217.802 m^2
☐ GABION MATTRESS		
$A = 0.50 \times 3.00$	$=$	1.50 m^2
$V = 1.50 \times 510$	$=$	765.000
		765.000 m^3
☐ RUBBLE STONE FILLING		
$A = \frac{1}{2} \times 0.50 \times 1.00$	$=$	0.25 m^2
$V = 0.25 \times 510.00$	$=$	127.500
		127.500 m^3

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF.64R + 26.0 ~ WF.75R - 16.0

CALCULATION		RESULT
☐ BASE CONCRETE		
• CONCRETE (TYPE - C1)		
$V = 2.20 \text{ m}^3/10.00 \text{ m} \times 510.00$	=	112.200
		112.200 m ³
• GRAVEL BEDDING		
$V = 0.70 \text{ m}^3/10.00 \text{ m} \times 510.00$	=	35.700
		35.700 m ³
• FORM (H < 4.0 m)		
$A = 10.83 \text{ m}^2/10.00 \text{ m} \times 510.00$	=	552.330
		552.330 m ²
• REINFORCING BAR		
$W = 0.10 \text{ tf} / 10.00 \text{ m} \times 510.00$	=	5.100
		5.100 tf
• JOINT FILTER		
$A = 0.22 \text{ m}^2/10.00 \text{ m} \times 510.00$	=	11.220
		11.220 m ²
• LOG PILE		
$L = 10.00 \text{ m} / 10.00 \text{ m} \times 510.00$	=	510.000
		510.00 m
☐ TOP CONCRETE		
• CONCRETE (TYPE - C1)		
$V = 1.80 \text{ m}^3/10.00 \text{ m} \times 510.00$	=	91.800
		91.800 m ³
• GRAVEL BEDDING		
$V = 0.75 \text{ m}^3/10.00 \text{ m} \times 510.00$	=	38.250
		38.250 m ³
• FORM (H < 4.0 m)		
$A = 12.18 \text{ m}^2/10.00 \text{ m} \times 510.00$	=	621.180
		621.180 m ²
• REINFORCING BAR		
$W = 0.094 \text{ tf} / 10.00 \text{ m} \times 510.00$	=	4.794
		4.794 tf
• JOINT FILTER		
$A = 2.605 \text{ m}^2/10.00 \text{ m} \times 510.00$	=	132.855
		132.855 m ²

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF.64R + 26.0 ~ WF.75R - 16.0

CALCULATION			RESULT
☐ PARTITION WALL			
n = 50 places			
• CONCRETE (TYPE - C1)			
V = 1.447 m ³ /place x 50	=	72.350	72.350 m ³
• GRAVEL BEDDING			
V = 0.579 m ³ /place x 50	=	28.950	28.950 m ³
• FORM (H < 4.0 m)			
A = 9.644 m ² /place x 50	=	482.200	482.200 m ²
• REINFORCING BAR			
W = 0.087 tf/place x 50	=	4.350	4.350 tf
• JOINT FILTER			
A = 2.411 m ² /place x 50	=	120.550	120.550 tf
☐ END WALL			
n = 2 places			
• CONCRETE (TYPE - C1)			
V = 1.736 m ³ /place x 2	=	3.472	3.472 m ³
• GRAVEL BEDDING			
V = 0.772 m ³ /place x 2	=	1.544	1.544 m ³
• FORM (H < 4.0 m)			
A = 11.573 m ² /place x 2	=	23.146	23.146 m ²
• REINFORCING BAR			
W = 0.091 tf/place x 2	=	0.182	0.182 tf
• JOINT FILTER			
A = 2.411 m ² /place x 2	=	4.822	4.822 m ²
☐ GABION CYLINDER			
• GABION CYLINDER Ø 500			
V = $\pi/4 \times 0.50^2 \times 11.826 \times 6 \times 2$	=	27.864	27.864 m ³
• SOIL FILLING			
V = (11.826 x 3.00 x 0.50) x 2 - 27.864	=	7.614	7.614 m ³
☐ WEEP HOLE			
N = 510.00 x 6 places / 10.00 m	=	306 places	
PVC Pipe Ø 50 (L = 0.80 m / pipe)			
L = 306 x 0.80	=	244.800	244.800 m
• FILTER CLOTH			
A = 0.856 m ² /place x 306	=	261.936	261.936 m ²

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF.64L + 27.0 ~ WF.75L - 17.0

CALCULATION		RESULT
SRSTRUCTURAL EXCAVATION		
$A_1 = (1.10 + 2.50) \times \frac{1}{2} \times 0.60$	=	1.080 m ²
$A_2 = (4.60 + 6.10) \times \frac{1}{2} \times 0.50$	=	2.675 m ²
$A_3 = (1.118 \times 7.00 + 1.00) \times 0.50$	=	4.413 m ²
$A_4 = (0.50 + 1.20) \times \frac{1}{2} \times 0.70$	=	0.595 m ²
	A	= 8.763 m ²
$V = 8.763 \times 510.00$	=	4469.13
		4469.1 m ³
BACKFILL WITH SELECTED SOIL		
$A_1 = (0.50 + 1.00) \times \frac{1}{2} \times 0.50 \times 2$	=	0.75 m ²
$A_2 = (0.50 + 1.10) \times \frac{1}{2} \times 0.60$	=	0.48 m ²
	A	= 1.23 m ²
$V = 1.23 \times 510.00$	=	627.30
		627.3 m ³

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF.64L + 27.0 ~ WF.75L - 17.0

CALCULATION		RESULT
☐ GRAVEL BEDDING		
$V = (1.118 \times 8.00 + 0.70) \times 0.25 \times 9.70$	=	23.387 m ³ /10.00m
$V^1 = 23.387 \text{ m}^3/10.00 \text{ m} \times 510.00$	=	1192.737
		1192.737 m ³
☐ WET STONE MASONRY		
$V = (1.118 \times 8.00) \times 0.25 \times 9.70$	=	23.387 m ³ /10.00 m
$V^1 = 23.387 \text{ m}^3/10.00 \text{ m} \times 510.000$	=	1192.737
		1192.737 m ³
☐ CEMENT MORTAR POINTTING		
$A = (1.118 + 7.00 + 0.70) \times 9.70$	=	82.702 m ² /10.00 m
$A^1 = 82.702 \text{ m}^2/10.00$	=	4217.802
		4217.802 m ²
☐ GABION MATTRESS		
$A = 0.50 \times 3.00$	=	1.50 m ²
$V = 1.50 \times 510$	=	765.000
		765.000 m ³
☐ RUBBLE STONE FILLING		
$A = \frac{1}{2} \times 0.50 \times 1.00$	=	0.25 m ²
$V = 0.25 \times 510.00$	=	127.500
		127.500 m ³

TYPE OF WORK : REVTMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF.64L + 27.0 ~ WF.75L - 17.0

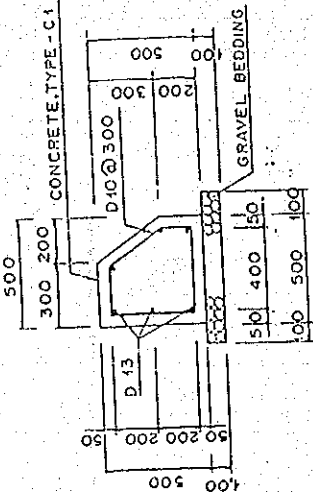
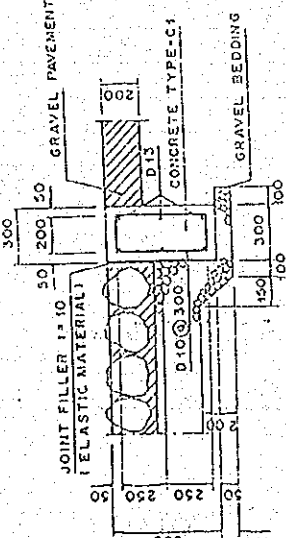
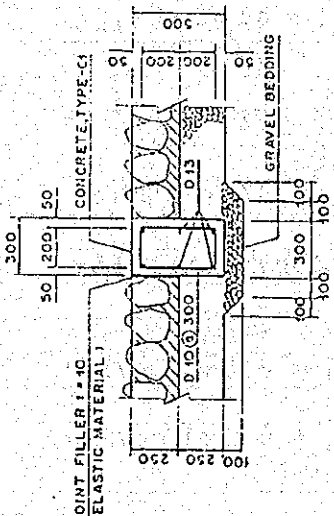
CALCULATION		RESULT
☐ BASE CONCRETE		
• CONCRETE (TYPE - C1)		
$V = 2.20 \text{ m}^3 / 10.00 \text{ m} \times 510.00$	=	112.200
		112.200 m ³
• GRAVEL BEDDING		
$V = 0.70 \text{ m}^3 / 10.00 \text{ m} \times 510.00$	=	35.700
		35.700 m ³
• FORM (H < 4.0 m)		
$A = 10.83 \text{ m}^2 / 10.00 \text{ m} \times 510.00$	=	552.330
		552.330 m ²
• REINFORCING BAR		
$W = 0.10 \text{ tf} / 10.00 \text{ m} \times 510.00$	=	5.100
		5.100 tf
• JOINT FILTER		
$A = 0.22 \text{ m}^2 / 10.00 \text{ m} \times 510.00$	=	11.220
		11.220 m ²
• LOG PILE		
$L = 10.00 \text{ m} / 10.00 \text{ m} \times 510.00$	=	510.000
		510.00 m
☐ TOP CONCRETE		
• CONCRETE (TYPE - C1)		
$V = 1.80 \text{ m}^3 / 10.00 \text{ m} \times 510.00$	=	91.800
		91.800 m ³
• GRAVEL BEDDING		
$V = 0.75 \text{ m}^3 / 10.00 \text{ m} \times 510.00$	=	38.250
		38.250 m ³
• FORM (H < 4.0 m)		
$A = 12.18 \text{ m}^2 / 10.00 \text{ m} \times 510.00$	=	621.180
		621.180 m ²
• REINFORCING BAR		
$W = 0.094 \text{ tf} / 10.00 \text{ m} \times 510.00$	=	4.794
		4.794 tf
• JOINT FILTER		
$A = 2.605 \text{ m}^2 / 10.00 \text{ m} \times 510.00$	=	132.855
		132.855 m ²

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
 LOCATION : WF.64L + 27.00 ~ WF.75L - 17.0

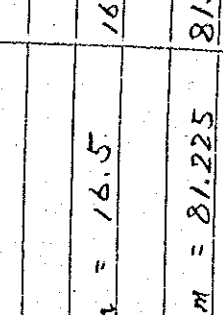
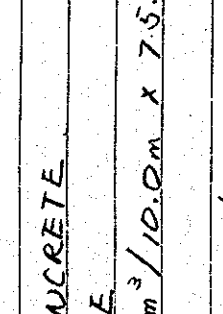
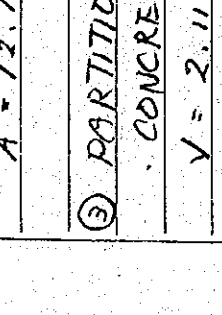
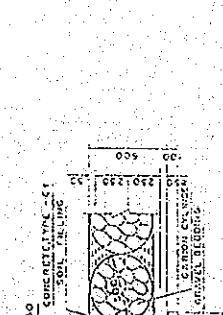
CALCULATION		RESULT
☐ PARTITION WALL		
n = 50 places		
• CONCRETE (TYPE - C1)		
$V = 1.447 \text{ m}^3/\text{place} \times 50$	=	72.350
		72.350 m ³
• GRAVEL BEDDING		
$V = 0.579 \text{ m}^3/\text{place} \times 50$	=	28.950
		28.950 m ³
• FORM (H < 4.0 m)		
$A = 9.644 \text{ m}^2/\text{place} \times 50$	=	482.200
		482.200 m ²
• REINFORCING BAR		
$W = 0.087 \text{ tf}/\text{place} \times 50$	=	4.350
		4.350 tf
• JOINT FILTER		
$A = 2.411 \text{ m}^2/\text{place} \times 50$	=	120.550
		120.550 m ²
☐ END WALL		
n = 2 places		
• CONCRETE (TYPE - C1)		
$V = 1.736 \text{ m}^3/\text{place} \times 2$	=	3.472
		3.472 m ³
• GRAVEL BEDDING		
$V = 0.772 \text{ m}^3/\text{place} \times 2$	=	1.544
		1.544 m ³
• FORM (H < 4.0 m)		
$A = 11.573 \text{ m}^2/\text{place} \times 2$	=	23.146
		23.146 m ²
• REINFORCING BAR		
$W = 0.091 \text{ tf}/\text{place} \times 2$	=	0.182
		0.182 tf
• JOINT FILTER		
$A = 2.411 \text{ m}^2/\text{place} \times 2$	=	4.822
		4.822 m ²
☐ GABION CYLINDER		
• GABION CYLINDER Ø 500		
$V = \pi/4 \times 0.50^2 \times 11.826 \times 6 \times 2$	=	27.864
		27.864 m ³
• SOIL FILLING		
$V = (11.826 \times 3.00 \times 0.50) \times 2 - 27.864$	=	7.614
		7.614 m ³
☐ WEEP HOLE		
N = 510.00 x 6 places / 10.00 m		
	=	306 places
PVC Pipe Ø 50 (L = 0.80 m / pipe)		
$L = 306 \times 0.80$	=	244.800
		244.800 m
• FILTER CLOTH		
$A = 0.856 \text{ m}^2/\text{place} \times 306$	=	261.936
		261.936 m ²

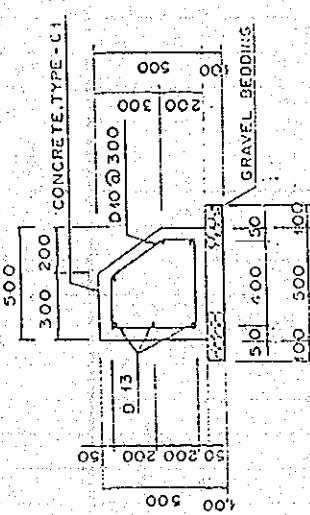
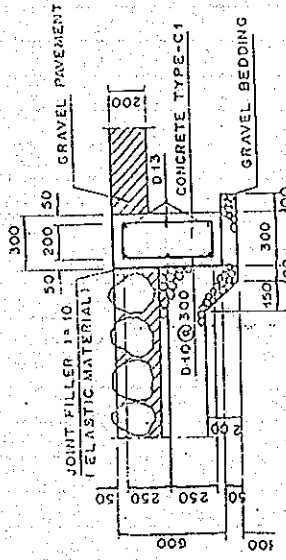
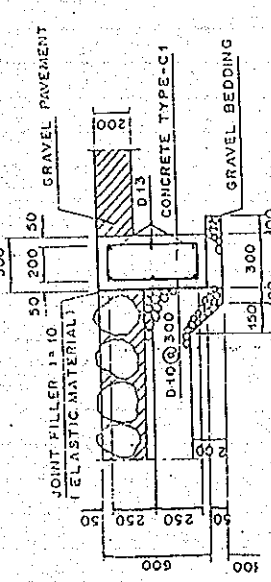
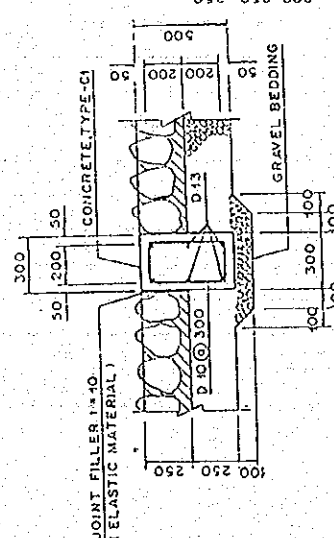
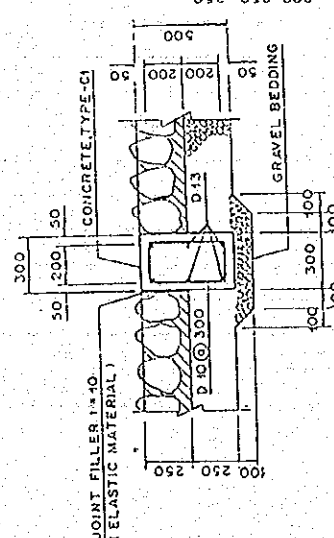
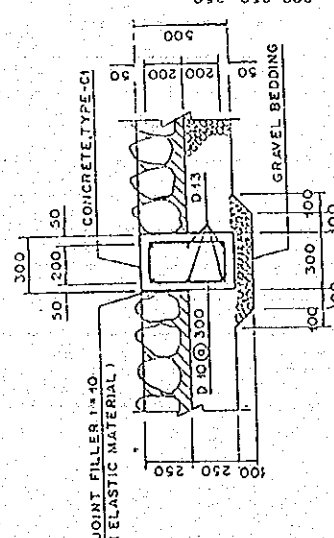
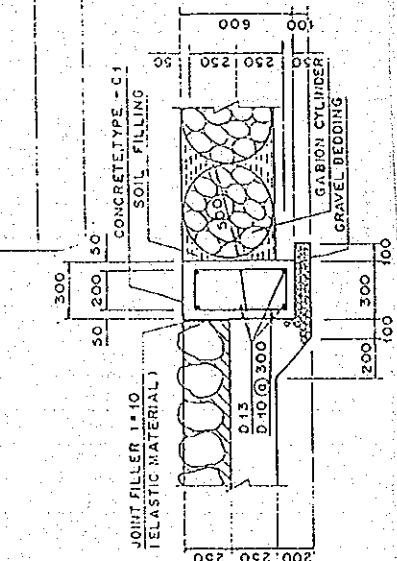
TYPE OF WORK : REVETMENT FOR SLOPE OF 1:2.0 (WET STONE MASONRY TYPE)
 LOCATION : WF.104L ~ WF.105L + 15.0 m
 : WF.104R ~ WF.104R + 17.0 m

CALCULATION		RESULT
STRUCTURAL EXCAVATION		
$L_1 = 15.0 \text{ m}$	(RIGHT BANK)	
$L_1 = 15.0 \times 4 = 60.0$	(LEFT BANK)	
$L = L_1 + L_2 = 15.00 + 60.00$	= 75.000	
$V = 180.390 \text{ m}^3 / 15.0 \text{ m} \times 75.00$	= 901.950	901.950 m ³
BACKFILL WITH SELECTED SOIL		
$V = 20.640 \text{ m}^3 / 15.0 \text{ m} \times 75.00$	= 103.200	103.200 m ³
GRAVEL BEDDING		
REVETMENT		
$V = 51.876 \text{ m}^3 / 15.0 \text{ m} \times 75.00$	= 259.380	259.380 m ³
WET STONE MASONRY		
$V = 51.656 \text{ m}^3 / 15.0 \text{ m} \times 75.00$	= 258.280	258.280 m ³
CEMENT MORTAR POINTING		
$A = 174.636 \text{ m}^2 / 15.0 \text{ m} \times 75.00$	= 873.180	873.180 m ²
WEEP HOLE		
PVC PIPE ϕ 50		
$n = 9 / \text{place} \times 5 \text{ places}$	= 45	
$L = 45 \times 0.80$	= 36.000	36.000 m
FILTER CLOTH		
$A = 0.640 \text{ m}^2 / \text{place} \times 45$	= 28.800	28.800 m ²
GABION MATTRESS		
$t = 500 \text{ mm}$		
$V_1 = 0.50 \times 3.0 \times 75.00$	= 112.500	
$V_2 = 0.50 \times 1.5 \times 75.00$	= 56.250	
TOTAL V	= 168.750	168.750 m³

TYPE OF WORK: LOCATION:	GRAVEL BEDDING	CALCULATION	RESULT
		<p>① FOR BASE CONCRETE</p> $V = 0.70 \text{ m}^3 / 10.0 \text{ m} \times 75.0 \text{ m} = 5.25$	5.250 m ³
		<p>② FOR TOP CONCRETE</p> $V = 0.75 \text{ m}^3 / 10.0 \text{ m} \times 75.0 = 5.625$	5.625 m ³
		<p>③ FOR PARTITION WALL</p> $V = 0.706 \text{ m}^3 / \text{place} \times 5 \text{ places} = 3.530$	3.530 m ³
		<p>④ FOR END WALL</p> $V = 0.706 \text{ m}^3 / \text{place} \times 1 \text{ place} = 0.706$	0.706 m ³

TYPE OF WORK :	DEFORMED REINFORCING BAR	CALCULATION	RESULT
LOCATION :		<p>① BASE CONCRETE</p> <p>$W = 0.1 \text{ tf} / 10.0 \text{ m} \times 75.0 \text{ m} = 0.750$</p> <p>② TOP CONCRETE.</p> <p>$U = 0.094 \text{ tf} / 10.0 \text{ m} \times 75.0 \text{ m} = 0.705$</p> <p>③ PARTITION WALL</p> <p>$W = 0.123 \text{ tf} / \text{place} \times 5 \text{ places} = 0.615$</p> <p>④ END WALL</p> <p>$W = 0.129 \text{ tf} / \text{place} \times 1 \text{ place} = 0.129$</p>	<p>0.750 tf</p> <p>0.705 tf</p> <p>0.615 tf</p> <p>0.129 tf</p>

TYPE OF WORK: LOCATION:	CONCRETE, FORM	CALCULATION	RESULT
		<p>① BASE CONCRETE</p> <p>• CONCRETE</p> <p>$V = 2.20 \text{ m}^3 / 10.0 \text{ m} \times 75.0 \text{ m} = 16.5$</p> <p>• FORM</p> <p>$A = 10.830 \text{ m}^2 / 10.0 \text{ m} \times 75.0 \text{ m} = 81.225$</p>	<p>16.500 m³</p> <p>81.225 m²</p>
		<p>② TDP CONCRETE</p> <p>• CONCRETE</p> <p>$V = 1.80 \text{ m}^3 / 10.0 \text{ m} \times 75.0 \text{ m} = 13.5$</p> <p>• FORM</p> <p>$A = 12.180 \text{ m}^2 / 10.0 \text{ m} \times 75.0 \text{ m} = 91.35$</p>	<p>13.500 m³</p> <p>91.350 m²</p>
		<p>③ PARTITION WALL CONCRETE</p> <p>$V = 2.117 \text{ m}^3 / \text{place} \times 5 \text{ places} = 10.585$</p> <p>• FORM</p> <p>$A = 14.116 \text{ m}^2 / \text{place} \times 5 \text{ places} = 70.58$</p>	<p>10.585 m³</p> <p>70.580 m²</p>
		<p>④ END WALL CONCRETE</p> <p>$V = 2.541 \text{ m}^3 / \text{place} \times 1 \text{ place} = 2.541$</p> <p>• FORM</p> <p>$A = 8.470 \text{ m}^2 / \text{place} \times 1 \text{ place} = 8.470$</p>	<p>2.541 m³</p> <p>8.470 m²</p>

TYPE OF WORK :	JOINT FILLER	CALCULATION	RESULT
LOCATION :		① BASE CONCRETE	
		$A = 0.22 \text{ m}^2 / 10.0 \text{ m} \times 75.0 \text{ m} = 1.65$	1.650 m ²
		② TOP CONCRETE	
		$A = 2.605 \text{ m}^2 / 10.0 \text{ m} \times 75.0 \text{ m} = 19.538$	19.538 m ²
		③ PARTITION WALL	
		$A = 3.529 \text{ m}^2 / \text{place} \times 5 \text{ places} = 17.645$	17.645 m ²
		④ END WALL	
		$A = 3.529 \text{ m}^2 / \text{place} \times 1 \text{ place} = 3.529$	3.529 m ²

