

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

**THE GOVERNMENT OF THE REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT**

**THE DETAILED DESIGN STUDY
ON MEDAN FLOOD CONTROL PROJECT**

FINAL REPORT

VOL. IV

WORK QUANTITIES

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OCTOBER 1996

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LIST OF REPORTS

VOLUME I	SUMMARY
VOLUME II	MAIN REPORT
VOLUME III	DESIGN NOTES
VOLUME IV	WORK QUANTITIES
VOLUME V	COST ESTIMATE
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**THE DETAILED DESIGN STUDY
ON MEDAN FLOOD CONTROL PROJECT**

FINAL REPORT

VOL. IV

WORK QUANTITIES

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1. RIVER PLANNING

1.1 Percut River

- Earth Works
- Parapet Wall
- Flood Retaining Wall
- Gravel Pavement

PERCUT RIVER, EARTH WORKS (RIGHT BANK)

STRIPPING, CLEARING & GRUBBING, SODDING, EXCAVATION AND EMBANKMENT OF PERCUT RIVER FOR RIVER IMPROVEMENT

STATION NO.	DISTANCE			STRIPPING			CLEARING & GRUBBING			SODDING					EMBANKMENT (m ³)					EXCAVATION (m ³)					
	Partial (m)	Acc. (m)	L (m)	Av. (m ²)	V (m ³)	Acc. (m ³)	L (m)	Av. (m)	A (m ²)	Acc. (m ²)	L ₁ (m)	L ₂ (m)	L ₁ +L ₂ (m)	Av. (m)	A (m ²)	Acc. (m ³)	A (m ²)	Av. (m ²)	V (m ³)	Acc. (m ³)	Up Water Level		Below Water Level		
																					A (m ²)	Av (m ²)	V (m ³)	A (m ²)	Av (m ²)
PE 0-220 m	0.00	0.00	0.0	0.00	0.00	0.00	15.6	7.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PE 0	220.00	220.00	15.6	7.80	0.00	0.00	15.6	7.80	1,716.00	1,716.00	4.02	2.91	6.93	3.47	0.00	0.00	23.28	11.64	0.00	0.00	0.00	0.00	12.36	6.18	0.00
PE 1	120.00	340.00	15.2	15.40	462.00	462.00	15.2	15.40	1,848.00	3,564.00	4.13	3.01	7.14	7.04	844.32	844.32	17.40	20.34	2,440.80	2,440.80	2,440.80	0.00	13.46	12.91	1,548.90
PE 2	92.00	432.00	14.2	14.70	338.10	800.10	14.2	14.70	1,352.40	4,916.40	4.21	3.09	7.30	7.22	664.26	1,308.58	18.90	18.15	1,669.80	4,110.60	0.00	0.00	0.00	0.00	24.88
PE 3	115.50	547.50	18.6	16.40	473.55	1,273.65	13.8	14.00	1,617.00	6,533.40	4.31	3.19	7.50	7.40	854.86	2,363.44	19.10	19.00	2,194.50	6,305.10	0.00	0.00	0.00	0.00	19.17
PE 4	109.00	656.50	19.9	19.25	524.56	1,798.21	14.5	14.15	1,542.35	8,075.75	4.41	3.29	7.70	7.60	828.44	3,191.89	20.46	19.78	2,156.02	8,461.12	0.00	0.00	0.00	0.00	21.94
PE 5	121.00	777.50	28.2	24.05	727.51	2,525.73	14.5	14.50	1,754.50	9,830.25	4.51	3.39	7.91	7.80	944.00	4,135.89	21.10	20.78	2,514.38	10,975.50	0.00	0.00	0.00	0.00	20.73
PE 6	82.00	859.50	29.8	29.00	594.50	3,120.23	18.5	16.50	1,353.00	11,183.25	4.58	3.46	8.05	7.98	654.04	4,789.92	13.29	17.20	1,409.99	12,385.49	0.00	0.00	0.00	0.00	20.73
PE 7	155.00	1,014.50	33.4	31.60	1,224.50	4,344.73	21.0	19.75	3,061.25	14,244.50	4.72	3.60	8.32	8.18	1,268.17	6,058.10	45.88	29.59	4,585.68	16,971.17	0.00	0.00	0.00	0.00	20.73
PE 8	96.00	1,110.50	19.4	26.40	633.60	4,978.33	21.2	21.10	2,025.60	16,270.10	4.80	3.68	8.48	8.40	806.49	6,864.58	27.70	36.79	3,531.84	20,503.01	0.00	0.00	0.00	0.00	20.73
PE 9	98.50	1,209.00	15.0	17.20	423.55	5,401.88	49.0	35.10	3,457.35	19,727.45	4.89	3.81	10.70	9.59	944.88	7,809.47	21.32	24.51	2,414.24	22,917.24	0.00	0.00	0.00	0.00	20.73
PE 10	118.50	1,327.50	14.6	14.80	438.45	5,840.33	47.6	48.30	5,723.55	25,451.00	4.99	3.81	10.80	10.75	1,274.13	9,083.60	22.14	21.73	2,575.01	25,492.25	0.00	0.00	0.00	0.00	20.73
PE 11	108.00	1,435.50	15.6	15.10	407.70	6,248.03	60.0	53.80	5,810.40	31,261.40	5.08	6.04	11.12	10.96	1,183.93	10,267.53	23.52	22.83	2,465.64	27,957.89	0.00	0.00	0.00	0.00	20.73
PE 12	148.00	1,583.50	7.6	11.60	429.20	6,677.23	53.5	56.75	8,399.00	39,660.40	1.57	1.57	3.13	7.13	1,054.70	11,322.23	3.08	13.30	1,968.40	29,926.29	0.00	0.00	0.00	0.00	20.73
PE 13	105.00	1,688.50	15.0	11.30	296.63	6,973.85	54.8	54.15	5,685.75	45,346.15	6.04	6.04	12.07	7.60	798.28	12,120.50	22.14	12.61	1,324.05	31,250.34	0.00	0.00	0.00	0.00	20.73
PE 14	95.00	1,783.50	16.8	15.90	377.63	7,351.48	50.8	52.80	5,016.00	50,362.15	6.71	7.38	14.09	13.08	1,242.69	13,363.20	30.40	26.27	2,495.65	33,745.99	0.00	0.00	0.00	0.00	20.73
PE 15	108.00	1,891.50	13.2	15.00	405.00	7,756.48	24.6	37.70	4,071.60	54,433.75	4.70	5.81	10.51	12.30	1,328.22	14,691.42	20.17	25.29	2,730.78	36,476.77	0.00	0.00	0.00	0.00	20.73
PE 16	94.00	1,985.50	15.0	14.10	331.35	8,087.83	33.4	29.00	2,726.00	57,159.75	6.48	5.81	12.30	11.40	1,071.97	15,763.39	21.58	20.88	1,962.25	38,439.02	0.00	0.00	0.00	0.00	20.73
PE 17	106.00	2,091.50	16.2	15.60	413.40	8,501.23	46.4	39.90	4,229.40	61,389.15	6.93	6.93	13.86	13.08	1,386.59	17,149.98	28.52	25.05	2,655.30	41,094.32	0.00	0.00	0.00	0.00	20.73
PE 18	93.50	2,185.00	14.6	15.40	359.98	8,861.20	53.3	49.85	4,660.98	66,050.13	6.04	6.04	12.07	12.97	1,212.62	18,362.60	22.41	25.47	2,380.98	43,475.29	0.00	0.00	0.00	0.00	20.73
PE 19	90.00	2,275.00	15.6	15.10	339.75	9,200.95	36.8	45.05	4,054.50	70,104.63	6.48	6.48	12.97	12.52	1,126.98	19,489.58	25.53	23.97	2,157.30	45,632.59	0.00	0.00	0.00	0.00	20.73
PE 20	97.50	2,372.50	15.0	15.30	372.94	9,573.89	40.8	38.80	3,783.00	73,887.63	6.26	6.48	12.75	12.86	1,253.60	20,743.17	24.08	24.81	2,418.49	48,051.08	0.00	0.00	0.00	0.00	20.73
PE 21	123.00	2,495.50	15.6	15.30	470.48	10,044.36	40.1	40.45	4,975.35	78,862.98	6.71	6.71	13.42	13.08	1,608.96	22,352.14	26.70	25.39	3,122.97	51,174.05	0.00	0.00	0.00	0.00	20.73
PE 22	97.00	2,592.50	14.4	15.00	363.75	10,408.11	42.6	41.35	4,010.95	82,873.93	6.71	6.71	13.42	13.42	1,301.39	23,653.53	22.41	24.56	2,381.84	53,555.89	0.00	0.00	0.00	0.00	20.73
PE 23	106.50	2,699.00	15.4	14.90	396.71	10,804.83	41.4	42.00	4,473.00	87,346.93	6.71	6.71	13.42	13.42	1,428.85	25,082.37	27.90	25.16	2,679.01	56,234.89	0.00	0.00	0.00	0.00	20.73
PE 24	102.00	2,801.00	16.0	15.70	400.35	11,205.18	46.8	44.10	4,498.20	91,845.13	6.71	6.71	13.42	13.42	1,368.47	26,450.85	27.90	27.90	2,845.80	59,080.69	0.00	0.00	0.00	0.00	20.73
PE 25	123.50	2,924.50	13.6	14.80	456.95	11,662.13	44.1	45.45	5,613.08	97,458.20	5.14	5.59	10.73	12.07	1,491.23	27,942.08	21.47	24.68	3,048.29	62,128.98	0.00	0.00	0.00	0.00	20.73
PE 26	91.00	3,015.50	15.5	14.55	331.01	11,993.14	59.6	51.85	4,718.35	102,176.55	6.71	6.71	13.42	12.07	1,098.80	29,040.89	25.90	23.68	2,155.06	64,284.04	0.00	0.00	0.00	0.00	20.73
PE 27	107.00	3,122.50	13.0	14.25	381.19	12,374.33	41.4	50.50	5,403.80	107,580.05	4.92	4.92	9.84	11.63	1,244.15	30,285.03	17.25	21.57	2,308.47	66,592.51	0.00	0.00	0.00	0.00	20.73
PE 28	104.00	3,226.50	16.3	14.65	380.90	12,755.23	45.5	43.45	4,518.80	112,098.85	6.71	6.71	13.42	11.63	1,209.27	31,494.30	27.00	22.13	2,301.00	68,893.51	0.00	0.00	0.00	0.00	20.73
PE 29	101.00	3,327.50	16.0	16.15	407.79	13,163.01	50.2	47.85	4,832.85	116,931.70	6.26	6.71	12.97	13.19	1,332.47	32,826.77	27.90	27.45	2,772.45	71,665.96	0.00	0.00	0.00	0.00	20.73
PE 30	110.50	3,438.00	15.8	15.90	439.24	13,602.25	48.7	49.45	5,464.23	122,395.93	6.48	6.71	13.19	13.08	1,445.45	34,272.22	25.61	26.75	2,956.37	74,622.34	0.00	0.00	0.00	0.00	20.73
PE 31	96.00	3,534.00	15.6	15.70	376.80	13,979.05	44.2	46.45	4,459.20	126,855.13	6.71	6.71	13.42	13.30	1,277.24	35,549.46	27.00	26.30	2,525.23	77,147.57	0.00	0.00	0.00	0.00	20.73
PE 32	94.50	3,628.50	15.4	15.50	366.19	14,345.24	45.6	44.90	4,243.05	131,098.18	6.48	6.26	12.75	13.08	1,236.15	36,785.62	23.80	25.40	2,400.30	79,547.87	0.00	0.00	0.00	0.00	20.73
PE 33	108.00	3,736.50	16.6	16.00	432.00	14,777.24	34.2	39.90	4,309.20	135,407.38	7.16	7.16	14.31	13.53	1,461.05	38,246.67	29.40	26.60	2,872.80	82,420.67	0.00	0.00	0.00	0.00	20.73
PE 34	106.00	3,842.50	11.6	14.10	373.65	15,150.89	31.2	32.70	3,466.20	138,873.58	4.47	4.47	8.94	8.94	1,232.52	39,479.19	14.15	21.77	2,307.89	84,728.55	0.00	0.00	0.00	0.00	20.73

STATION NO.	DISTANCE			STRIPPING				CLEARING & GRUBBING				SODDING				EMBANKMENT (m ³)				EXCAVATION (m ³)								
	Partial (m)	Acc. (m)	L (m)	Av. (m ²)	V (m ³)	Acc. (m ³)	L (m)	Av. (m)	A (m ²)	Acc. (m ³)	L ₁ (m)	L ₂ (m)	L ₁ +L ₂ (m)	Av. (m)	A (m ²)	Acc. (m ³)	A (m ²)	Av. (m ²)	V (m ³)	Up Water Level	Acc. (m ³)	Av. (m ²)	V (m ³)	Below Water Level				
PE 35	116.00	3,958.5	16.0	13.80	400.20	15,551.09	37.4	34.30	3,978.80	142,852.38	5.59	6.93	12.52	10.73	1,245.04	40,724.23	27.00	20.57	2,386.41	87,114.96	31.98	25.41	2,947.56	60,340.89	19.60	20.03	2,323.89	127,946.29
PE 36	95.00	4,053.5	17.8	16.90	401.38	15,952.46	37.6	37.50	3,562.50	146,414.88	5.37	7.83	13.19	12.86	1,221.45	41,945.68	31.35	29.18	2,771.63	89,886.59	32.90	32.44	3,081.56	63,431.46	21.28	20.44	1,941.80	129,888.09
PE 37	94.00	4,147.5	17.0	17.40	408.90	16,361.36	37.2	37.40	3,515.60	149,930.48	7.60	7.83	15.43	14.31	1,345.22	43,290.90	30.40	30.88	2,902.25	92,788.84	32.93	32.91	3,093.54	66,523.00	16.40	18.84	1,770.96	131,659.05
PE 38	109.50	4,257.0	17.8	17.40	476.33	16,837.69	36.2	36.70	4,018.65	153,949.13	6.15	8.50	14.65	15.04	1,646.61	44,937.51	35.00	32.70	3,580.65	96,369.49	28.92	30.92	3,386.01	69,911.01	20.40	18.40	2,014.80	133,673.85
PE 39	93.00	4,350.0	16.8	17.30	402.23	17,239.91	35.4	35.80	3,375.90	157,278.53	6.04	8.05	14.09	14.37	1,336.11	46,273.62	33.20	34.10	3,171.30	99,540.79	19.57	24.25	2,254.79	72,165.79	33.75	27.08	2,517.98	136,191.82
PE 40	93.00	4,443.0	17.6	17.20	399.90	17,639.81	37.2	36.30	3,329.40	160,654.43	6.04	8.50	14.53	14.31	1,330.91	47,604.53	33.15	33.18	3,085.28	102,626.06	20.34	19.96	1,855.82	74,021.61	28.68	31.22	2,903.00	139,094.82
PE 41	110.50	4,553.5	15.4	16.50	455.81	18,095.63	31.8	34.80	3,812.25	164,466.68	4.70	7.60	12.30	13.42	1,482.51	49,087.04	26.58	29.86	3,299.81	105,925.87	28.05	24.20	2,673.55	76,693.16	23.46	26.07	2,880.74	141,975.55
PE 42	108.00	4,661.5	15.0	15.20	410.40	18,506.03	33.8	32.80	3,542.40	168,009.08	5.93	6.71	12.63	12.47	1,346.34	50,433.38	23.80	25.19	2,720.25	108,646.12	29.40	28.73	3,102.30	79,797.46	20.40	21.93	2,368.44	144,343.99
PE 43	91.00	4,752.5	14.4	14.70	334.43	18,840.45	31.2	32.50	2,957.50	170,966.58	5.14	6.48	11.63	12.13	1,103.89	51,537.27	21.70	22.70	2,065.70	110,711.82	29.25	29.33	2,668.58	82,466.03	19.20	19.80	1,801.80	146,145.79
PE 44	98.50	4,851.0	15.5	14.95	368.14	19,208.59	41.3	36.25	3,570.63	174,537.20	6.93	7.38	14.31	12.97	1,277.47	52,814.73	28.06	24.83	2,445.76	113,157.58	49.60	39.42	3,883.12	86,349.15	31.20	25.20	2,482.20	148,627.99
PE 45	134.50	4,985.5	16.8	16.15	543.04	19,751.64	40.4	40.85	5,494.33	180,031.53	5.59	8.72	14.31	14.31	1,924.81	54,739.54	33.00	30.53	4,106.29	117,263.86	48.12	48.86	6,571.33	92,920.48	30.60	30.90	4,156.05	152,784.04
PE 46	73.00	5,058.5	15.4	16.10	293.83	20,045.46	33.8	37.10	2,708.30	182,739.83	4.02	7.83	11.85	13.08	954.91	55,694.45	27.00	30.00	2,190.00	119,453.86	24.75	36.44	2,659.76	95,580.24	29.52	30.06	2,194.38	154,978.42
PE 47	101.00	5,159.5	18.6	17.00	429.25	20,474.71	23.5	28.65	2,893.65	185,633.48	4.92	9.17	14.09	12.97	1,309.89	57,004.34	31.68	29.34	2,963.34	122,417.20	4.53	14.64	1,478.64	97,988.90	10.63	8.08	791.60	157,540.04
PE 48	98.00	5,257.5	25.4	22.00	539.00	21,013.71	33.5	28.50	2,793.00	188,426.48	8.05	10.96	19.01	16.55	1,621.60	58,625.94	44.00	37.84	3,708.32	126,125.52	14.45	9.49	930.02	97,988.90	10.63	8.08	791.60	157,540.04
PE 49	102.00	5,359.5	16.4	20.90	532.95	21,546.66	19.6	26.55	2,708.10	191,134.58	5.81	7.83	13.64	16.32	1,664.98	60,290.91	27.00	35.50	3,621.00	129,746.52	4.70	9.58	976.65	98,965.55	4.20	7.41	756.08	158,296.12
PE 50	120.00	5,479.5	19.2	17.80	534.00	22,080.66	18.6	19.10	2,292.00	193,426.58	5.14	8.05	13.19	13.42	1,609.97	61,900.88	17.48	22.24	2,668.80	132,415.32	0.70	2.70	324.00	99,289.55	0.00	2.10	252.00	158,548.12
PE 51	76.50	5,556.0	18.4	18.80	359.55	22,440.21	23.0	20.80	1,591.20	195,017.78	5.81	7.83	13.64	13.42	1,026.36	62,927.24	14.90	16.19	1,238.54	133,653.86	7.50	4.10	313.65	99,603.20	0.56	0.28	21.42	158,569.54
PE 52	130.00	5,686.0	16.6	17.50	568.75	23,008.96	16.6	19.80	2,574.00	197,591.78	5.14	7.83	12.97	13.30	1,729.60	64,656.84	12.92	13.91	1,808.30	135,462.16	0.64	4.07	529.10	100,132.30	0.00	0.28	36.40	158,605.94
PE 53	86.00	5,772.0	17.0	16.80	361.20	23,370.16	23.0	19.80	1,702.80	199,294.58	3.80	7.16	10.96	11.96	1,028.81	65,685.65	11.73	12.33	1,059.95	136,522.11	11.02	5.83	501.38	100,633.68	1.32	0.66	56.76	158,662.70
PE 54	94.50	5,866.5	15.4	16.20	382.73	23,752.89	17.2	20.10	1,899.45	201,194.03	4.47	6.26	10.73	10.84	1,024.85	66,710.50	14.00	12.87	1,215.74	137,737.85	1.40	6.21	586.85	101,220.52	0.00	0.66	62.37	158,725.07
PE 55	99.50	5,966.0	16.4	15.90	395.51	24,148.40	25.0	21.10	2,099.45	203,293.48	4.47	6.71	11.18	10.96	1,090.19	67,800.69	15.76	14.88	1,480.56	139,218.41	17.64	9.52	947.24	102,167.76	1.71	0.85	84.82	158,809.89
PE 56	103.50	6,069.5	16.4	16.40	424.35	24,572.75	23.0	24.00	2,484.00	205,777.48	4.47	6.04	10.51	10.84	1,122.45	68,923.14	19.98	17.87	1,849.49	141,067.90	12.78	15.21	1,573.98	103,741.74	0.98	1.34	138.69	158,948.58
PE 57	106.00	6,175.5	12.8	14.60	386.90	24,959.65	18.5	20.75	2,199.50	207,976.98	3.35	5.14	8.50	9.50	1,007.35	69,930.49	14.24	17.11	1,813.61	142,881.51	7.34	10.06	1,066.10	104,807.83	0.00	0.49	51.68	159,000.26
PE 57+8	8.00	6,183.5	10.6	11.70	23.40	24,983.05	41.4	29.95	239.60	208,216.58						71,216.23	22.17	18.21	2,093.69	145,074.32	23.22	15.28	1,757.20	106,644.11	4.04	2.02	232.47	159,232.73
PE 58	115.00	6,298.5	18.8	14.70	422.63	25,405.68	28.2	34.80	4,002.00	212,218.58	6.93	6.93	13.86	11.18	1,285.74	71,216.23	22.17	18.21	2,093.69	145,074.32	23.22	15.28	1,757.20	106,644.11	4.04	2.02	232.47	159,232.73
PE 59	98.50	6,397.0	17.6	18.20	448.18	25,853.85	25.0	26.60	2,620.10	214,838.68	6.04	7.83	13.86	13.86	1,365.57	72,581.80	19.63	20.90	2,058.50	147,132.82	7.00	15.11	1,488.34	108,132.45	0.52	2.28	224.73	159,457.46
PE 60	93.00	6,490.0	15.0	16.30	378.98	26,232.83	34.0	29.50	2,743.50	217,582.18	5.59	7.16	12.75	13.30	1,237.33	73,819.12	21.45	20.54	1,909.99	149,042.81	12.63	9.82	912.80	109,045.24	1.32	0.92	85.56	159,543.02
PE 61	101.50	6,591.5	20.0	17.50	444.06	26,676.89	37.4	35.70	3,623.55	221,205.73	5.81	7.60	13.42	13.08	1,327.72	75,146.85	20.80	21.13	2,144.19	151,187.00	14.60	13.62	1,381.92	110,427.17	2.55	1.94	196.40	159,739.42
PE 62	95.50	6,687.0	18.0	19.00	453.63	27,130.51	40.8	39.10	3,734.05	224,939.78	6.04	7.38	13.42	13.42	1,281.27	76,428.11	18.00	19.40	1,852.70	153,039.70	21.83	18.21	1,739.29	112,166.46	0.00	1.28	121.76	159,861.18
PE 63	99.50	6,786.5	15.0	16.50	410.44	27,540.95	36.3	38.55	3,835.73	228,775.50	6.26	3.35	9.62	11.52	1,145.82	77,573.93	21.90	19.95	1,985.03	155,024.72	23.65	22.74	2,262.38	114,428.84	1.72	0.86	85.57	159,946.75
PE 64	103.00	6,889.5	15.6	15.30	393.98	27,934.93	41.0	38.65	3,980.95	232,736.45	5.59	7.83	13.42	11.52	1,186.12	78,760.05	21.33	21.62	2,226.35	157,251.07	31.28	27.47	2,828.90	117,257.74	1.63	1.67	172.27	160,119.02
PE 65	108.00	6,997.5	17.2	16.40	442.80	28,377.73	31.0	36.00	3,888.00	236,644.45	4.47	7.60	12.97	12.52	1,264.72	81,401.30	17.19	23.33	2,356.58	162,551.12	22.19	22.47	2,269.47	122,444.83	2.16	1.65	177.66	160,296.68
PE 66	101.00	7,098.5	20.0	18.60	469.65	28,847.38	28.9	29.95	3,024.95	239,669.40	5.37	7.60	12.97	12.52	1,264.72	81,401.30	17.19	23.33	2,356.58	162,551.12	22.19	22.47	2,269.47	122,444.83	2.16	1.65	177.66	160,296.68
PE 67	98.00	7,196.5	20.6	20.30	497.35	29,344.73	30.0	29.45	2,886.10	242,555.50	5.81	8.94	14.76	13.86	1,358.63	82,759.93	21.20	19.19	1,880.87	164,231.98	8.00	15.10	1,479.31	123,924.14	2.85	2.51	245.49	160,735.33
PE 68	98.50	7,295.0	16.4	18.50	455.56	29,800.29	22.1	26.05	2,565.93	245,121.43	3.35	8.72	12.07	13.42	1,321.52	84,081.45	28.70	24.95	2,457.33	166,689.31	0.00	4.00	394.00	124,318.14	2.06	2.46	241.82	160,977.15
PE 69	98.50	7,393.5	13.6	15.00																								

STATION NO.	DISTANCE		STRIPPING				CLEARING & GRUBBING				S O D D I N G				EMBANKMENT (m ³)				EXCAVATION (m ³)							
	Partial (m)	Acc. (m)	L (m)	Av. (m ²)	V (m ³)	Acc. (m ³)	L (m)	Av. (m)	A (m ²)	Acc. (m ³)	L ₁ (m)	L ₂ (m)	Av. (m)	A (m ²)	Acc. (m ³)	A (m ²)	Av. (m ²)	V (m ³)	Up Water Level (m)	Av. (m ²)	A (m ²)	Below Water Level (m)	Av. (m ²)	V (m ³)	Acc. (m ³)	
PE 73	150.00	7,794.5	16.8	16.60	622.50	31,672.62	21.0	17.00	2,550.00	253,084.53	4.70	6.71	11.40	1,118	1,677.05	89,470.65	19.00	14.65	2,197.50	410.63	124,866.07	11.01	5.51	825.75	161,904.35	
PE 74	110.00	7,904.5	17.7	17.25	474.38	32,146.99	45.9	33.45	3,679.50	256,764.03	4.02	4.02	8.05	9.73	1,069.96	90,540.61	11.05	15.03	1,652.75	8.86	974.33	125,840.40	25.28	18.15	1,995.95	163,900.30
PE 75	99.50	8,004.0	13.8	15.75	391.78	32,538.78	28.4	37.15	3,696.43	260,460.45	5.37	4.92	10.29	9.17	912.20	91,452.81	18.72	14.89	1,481.06	7.86	1,265.64	127,066.04	18.02	21.63	2,153.93	166,054.23
PE 76	101.50	8,105.5	13.8	13.80	350.18	32,888.95	20.4	24.40	2,476.60	262,937.05	5.37	4.92	10.29	10.29	1,044.02	92,496.83	18.72	18.72	1,900.08	4.77	797.79	127,903.83	9.41	13.71	1,391.72	167,445.95
PE 77	99.00	8,204.5	13.8	13.80	341.55	33,230.50	21.0	20.70	2,049.30	264,986.35	5.37	4.92	10.29	10.29	1,018.31	93,515.14	18.72	18.72	1,833.28	4.77	472.23	128,376.06	13.35	11.38	1,126.72	168,572.67
PE 78	97.00	8,301.5	13.8	13.80	334.65	33,565.15	13.4	17.20	1,668.40	266,654.75	5.37	4.92	10.29	10.29	997.73	94,512.87	18.72	18.72	1,767.34	3.51	340.47	128,716.53	11.55	12.45	1,207.84	169,780.51
PE 79	88.00	8,389.5	10.0	11.90	261.80	33,826.95	26.0	19.70	1,733.60	268,388.35	3.35	3.35	6.71	8.50	747.74	95,260.61	8.70	13.21	1,162.48	9.98	877.80	129,594.33	33.60	22.58	1,986.60	171,767.11
PE 80	89.00	8,478.5	10.0	10.00	222.50	34,049.45	20.0	23.00	2,047.00	270,435.35	3.35	3.35	6.71	6.71	597.03	95,837.64	8.70	8.70	774.30	14.07	1,252.23	130,846.56	25.11	29.35	2,612.55	174,379.66
PE 81	100.50	8,579.0	9.0	9.50	238.69	34,288.14	13.8	16.90	1,698.45	272,133.80	3.58	3.13	6.71	6.71	674.17	96,531.82	12.48	10.59	1,064.30	5.10	512.05	131,358.60	1.65	13.38	1,344.64	175,724.30
PE 82	100.50	8,679.5	12.0	10.50	263.81	34,551.95	26.3	20.05	2,015.03	274,148.83	4.25	4.47	8.72	7.71	775.30	97,307.12	13.80	13.14	1,320.57	13.50	1,356.25	132,714.85	28.87	15.26	1,533.68	177,257.98
PE 83	95.00	8,774.5	10.0	11.00	261.25	34,813.20	26.0	26.15	2,484.25	276,633.08	4.92	4.92	9.84	9.28	881.57	98,188.69	4.87	9.34	886.83	22.33	2,121.35	134,836.20	17.16	23.02	2,186.52	179,444.50
PE 84+28	125.00	8,899.5	16.8	13.40	418.75	35,231.95	40.9	33.45	4,181.25	280,814.33							9.20	7.04	879.38	24.39	3,048.75	137,884.95	3.32	10.24	1,279.75	180,724.25
PE 85	72.00	8,971.5	14.0	15.40	277.20	35,509.15	38.4	39.65	2,854.80	283,669.13	6.04	6.04	12.07	10.96	788.88	98,977.57	22.56	15.88	1,143.36	23.20	1,670.40	139,555.35	8.21	5.76	414.90	181,139.15
PE 86	94.50	9,066.0	15.4	14.70	347.29	35,856.44	30.9	34.65	3,274.43	286,943.55	3.35	5.81	9.17	10.62	1,003.72	99,981.29	24.70	23.63	2,233.04	18.95	1,790.96	141,346.31	15.83	12.02	1,135.75	182,274.90
PE 87	98.50	9,164.5	22.2	18.80	462.95	36,319.39	44.2	37.55	3,698.68	290,642.23	6.93	4.47	11.40	10.29	1,013.16	100,994.45	28.90	26.80	2,639.80	22.44	2,210.04	143,556.36	9.02	12.42	1,223.57	183,498.47
PE 88	105.00	9,269.5	22.4	22.30	585.38	36,904.76	45.5	44.85	4,709.25	295,351.48	4.92	4.47	9.39	10.40	1,091.76	102,086.21	28.16	28.53	2,995.65	32.31	3,392.03	146,548.38	18.40	13.71	1,439.39	184,937.86
PE 89	90.50	9,360.0	17.0	19.70	445.71	37,350.48	36.1	40.80	3,692.40	299,043.88	7.16	6.26	13.42	11.40	1,032.06	103,118.27	9.05	18.61	1,683.75	30.55	2,764.32	149,712.71	15.83	17.11	1,548.73	186,486.59
PE 90	100.00	9,460.0	16.6	16.80	420.00	37,770.48	68.0	52.05	5,205.00	304,248.88	3.35	5.81	9.17	11.29	1,129.21	104,247.48	25.50	17.28	1,727.50	29.23	2,923.00	152,635.71	21.30	18.57	1,856.50	188,343.09
PE 91	98.00	9,558.0	16.6	16.60	406.70	38,177.18	61.4	64.70	6,340.60	310,589.48	7.16	6.48	13.64	11.40	1,117.59	105,365.07	29.10	27.30	2,675.40	20.74	3,055	160,141.04	13.76	17.53	1,717.89	190,060.98
PE 92	98.00	9,656.0	16.0	16.30	399.35	38,576.53	29.4	45.40	4,449.20	315,038.68	3.35	6.04	9.39	11.52	1,128.54	106,493.61	20.70	24.90	2,440.20	62.14	6,089.23	166,230.27	0.70	7.23	708.30	190,769.27
PE 93	112.00	9,768.0	16.0	16.00	448.00	39,024.53	62.2	45.80	5,129.60	320,168.28	3.35	6.04	9.39	10.51	1,051.85	107,545.46	8.56	14.63	1,638.56	14.82	1,660.12	167,890.39	9.38	5.04	564.42	191,333.70
PE 94	87.00	9,855.0	16.0	16.00	348.00	39,372.53	29.6	45.90	3,993.30	324,161.58	6.71	6.04	12.75	11.07	962.96	108,508.42	26.10	17.33	1,507.71	20.56	1,788.72	169,679.11	0.00	4.69	407.99	191,741.68
PE 95	113.00	9,968.0	14.0	15.00	423.75	39,796.28	36.8	33.20	3,751.60	327,913.18	5.59	5.59	11.18	11.96	1,351.81	109,860.24	18.70	22.40	2,531.20	24.76	2,797.77	172,478.87	5.94	2.97	335.55	192,077.24
PE 96	84.50	10,052.5	17.0	15.50	327.44	40,123.71	27.8	32.30	2,729.35	330,642.53	6.71	5.59	12.30	11.74	991.98	110,852.21	26.39	22.55	1,905.05	26.56	2,244.11	174,720.98	7.62	6.78	573.04	192,650.27
PE 97	98.00	10,150.5	17.0	17.00	416.50	40,540.21	29.1	28.45	2,788.10	333,430.63	6.93	7.60	14.53	13.42	1,314.81	112,167.02	11.63	19.01	1,862.74	20.92	2,049.67	176,770.65	12.33	9.98	977.65	193,627.92
PE 98	113.50	10,264.0	17.0	17.00	482.38	41,022.59	29.7	29.40	3,336.90	336,767.53	7.38	6.26	13.64	14.09	1,598.90	113,765.92	6.20	8.91	1,011.46	21.66	2,458.58	179,229.23	10.19	11.26	1,277.90	194,905.82
PE 99	86.00	10,350.0	5.0	11.00	236.50	41,259.09	23.7	26.70	2,296.20	339,063.73	5.14	4.02	9.17	11.40	980.74	114,746.66	1.03	3.61	310.80	27.65	2,377.56	181,606.79	17.70	13.94	1,199.18	196,105.00
PE 100	98.50	10,448.5	12.0	8.50	209.31	41,468.40	27.4	25.55	2,516.68	341,580.40	6.71	6.71	13.42	11.29	1,112.28	115,858.94	6.30	3.67	361.00	25.13	2,475.16	184,081.95	15.39	16.54	1,629.58	197,734.58
PE 101	98.00	10,546.5	14.0	13.00	318.50	41,786.90	29.3	28.35	2,778.30	344,358.70	7.38	6.71	14.09	13.75	1,347.68	117,206.61	7.56	6.93	679.14	27.28	2,673.20	186,755.14	13.41	14.40	1,411.20	199,145.78
PE 102	99.00	10,645.5	23.0	18.50	457.88	42,244.78	30.2	29.75	2,945.25	347,303.95	8.72	8.50	17.22	15.65	1,549.60	118,756.21	20.40	13.98	1,384.02	20.36	2,700.97	189,456.11	19.32	16.37	1,620.14	200,765.92
PE 103	99.50	10,745.0	11.4	17.20	427.85	42,672.63	26.6	28.40	2,825.80	350,129.75	6.04	4.25	10.29	13.75	1,368.31	120,124.51	6.24	13.32	1,325.34	24.79	2,466.11	191,922.22	17.00	18.16	1,806.92	202,572.84
PE 104	99.50	10,844.5	14.0	12.70	315.91	42,988.54	18.4	22.50	2,238.75	352,439.50	6.04	5.59	11.63	10.62	1,099.03	121,114.59	9.00	7.62	758.19	21.36	2,029.20	195,756.84	26.71	13.15	1,308.43	203,881.26
PE 105	95.00	10,939.5	12.0	13.00	308.75	43,297.29	25.2	21.80	2,071.00	354,439.50	6.04	5.59	11.63	10.62	1,099.03	122,123.62	3.71	6.36	603.87	23.08	2,950.68	198,707.52	15.13	20.92	2,102.31	207,693.95
PE 106	100.50	11,040.0	15.4	13.70	344.21	43,641.50	31.7	28.45	2,859.23	357,298.73	6.48	6.48	12.97	12.30	1,235.99	123,359.60	25.52	14.62	1,468.96	29.36	2,950.68	198,707.52	15.13	20.92	2,102.31	207,693.95
PE 107	99.50	11,139.5	11.8	13.60	338.30	43,979.80	23.8	27.75	2,761.13	360,059.85	3.80	4.92	8.72	10.84	1,079.07	124,438.67	14.28	19.76	1,966.12	27.41	2,511.88	201,219.40	9.50	12.31	1,225.29	208,919.25
PE 108	127.00	11,266.5	12.0	11.90	377.83	44,357.63	24.8	24.30	3,086.10	363,145.95	4.70	4.47	9.17	8.94	1,135.92	125,574.60	14.28	14.14	1,795.78	27.38	3,477.26	204,696.66	9.24	9.37	1,189.99	210,109.24
PE 109	69.50	11,336.0	12.6	12.30	213.71	44,571.34	29.6	27.20	1,890.40	365,036.35	4.92	4.92	9.84	9.50	660.48	126,235.07	15.84	15.06	1,046.67	23.90	1,661.22	206,357.88	5.75	7.50	520.90	210,630.14
PE 110	100.00	11,436.0	11.0	11.80	295.00	44,866.34	22.0	25.80	2,580.00	367,616.35	4.02	4.02	8.05	8.94	894.43	127,129.50	12.54	14.19	1,419.00	19.64	1,963.75	208,321.63	7.26	6.51	650.50	211,280.64
PE 111	101.00	11,																								

STATION NO.	DISTANCE		STRIPPING			CLEARING & GRUBBING			S O D D I N G					EMBANKMENT (m ³)					EXCAVATION (m ³)									
	Partial (m)	Acc. (m)	L (m)	Av. (m ²)	V (m ³)	Acc. (m ³)	L (m)	Av. (m)	A (m ²)	Acc. (m ³)	L ₁ (m)	L ₂ (m)	Av. (m)	A (m ²)	Acc. (m ³)	A (m ²)	Av. (m)	V (m ³)	Acc. (m ³)	A (m ²)	Av. (m)	V (m ³)	Acc. (m ³)	Below Water Level				
PE 112	98.50	11,635.5	10.0	10.00	246.25	45,377.71	23.5	19.45	1,915.83	371,420.88	3.35	3.80	7.16	7.27	715.82	128,624.48	9.76	9.23	909.16	233,480.26	17.01	12.19	1,200.22	210,843.95	3.99	2.00	196.51	211,843.78
PE 113	102.50	11,738.0	13.2	11.60	297.25	45,674.96	24.7	24.10	2,470.25	373,891.13	3.35	5.37	8.72	7.94	813.65	129,438.13	13.80	11.78	1,207.45	234,687.71	19.62	18.31	1,877.03	212,700.98	2.80	3.40	347.99	212,191.76
PE 114	95.00	11,833.0	11.4	12.30	292.13	45,967.09	22.2	23.45	2,227.75	376,118.88	3.35	3.35	6.71	7.71	732.87	130,171.00	11.70	12.75	1,211.25	235,898.96	19.96	19.79	1,879.81	214,600.79	0.00	1.40	133.00	212,324.76
PE 114+76	76.00	11,909.0	9.0	10.20	193.80	46,160.89	18.9	20.35	1,561.80	377,680.68							6.36	9.03	686.28	236,585.24	13.54	16.75	1,273.00	215,873.79	0.00	0.00	0.00	212,324.76
PE 115	22.00	11,931.0	9.8	9.40	51.70	46,212.59	20.4	19.65	432.30	378,112.98	3.35	3.58	6.93	6.82	150.04	130,321.04	9.76	10.73	236.06	236,821.30	15.60	17.78	391.16	216,264.95	0.10	0.05	1.10	212,325.86
PE 116	100.00	12,031.0	9.4	9.60	240.00	46,452.59	19.5	19.95	1,995.00	380,107.98	3.35	3.13	6.48	6.71	670.82	130,991.86	7.15	8.46	845.50	237,666.80	15.52	15.56	1,556.00	217,828.56	0.00	0.05	5.00	212,330.86
PE 117	98.50	12,129.5	10.8	10.10	248.71	46,701.30	17.0	18.25	1,797.63	381,905.60	3.35	4.25	7.60	7.04	693.80	131,685.66	11.80	9.48	933.29	238,600.09	9.00	12.26	1,207.61	219,028.56	0.00	0.00	0.00	212,330.86
PE 118	104.00	12,233.5	9.0	9.90	257.40	46,958.70	18.2	17.60	1,830.40	383,736.00	3.35	3.13	6.48	7.04	732.54	132,418.19	7.56	9.68	1,006.72	239,606.81	12.22	10.61	1,103.18	220,131.74	0.00	0.00	0.00	212,330.86
PE 119	96.00	12,329.5	11.5	10.25	246.00	47,204.70	18.8	18.50	1,776.00	385,512.00	3.35	3.80	7.16	6.82	654.72	133,072.91	11.34	9.45	907.20	240,514.01	11.03	11.62	1,115.76	221,247.50	0.00	0.00	0.00	212,330.86
PE 120	100.00	12,429.5	6.2	8.85	221.25	47,425.95	17.2	18.00	1,800.00	387,312.00	3.35	1.57	4.92	6.04	603.74	133,676.65	2.17	6.76	675.50	241,189.51	14.14	12.59	1,258.50	222,506.00	0.00	0.00	0.00	212,330.86
PE 121	102.50	12,532.0	4.8	5.50	140.94	47,566.89	14.3	15.75	1,614.38	388,926.38	3.35	1.79	5.14	5.03	515.69	134,192.35	1.36	1.77	180.91	241,370.42	12.33	13.24	1,356.79	223,862.79	0.00	0.00	0.00	212,330.86
PE 122	98.00	12,630.0	8.2	6.50	159.25	47,726.14	16.6	15.45	1,514.10	390,440.48	3.35	2.68	6.04	5.59	547.84	134,740.18	4.76	3.06	299.78	241,670.20	10.84	11.59	1,135.53	224,998.32	0.00	0.00	0.00	212,330.86
PE 123	98.00	12,728.0	5.6	6.90	169.05	47,895.19	14.0	15.30	1,499.40	391,939.88	3.35	1.34	4.70	5.37	525.92	135,266.10	1.55	3.15	309.09	241,979.30	13.69	12.27	1,201.97	226,200.29	0.00	0.00	0.00	212,330.86
PE 124	104.00	12,832.0	8.6	7.10	184.60	48,079.79	14.4	14.20	1,476.80	393,416.68	3.35	3.35	6.71	5.70	593.01	135,859.11	6.85	4.20	436.80	242,416.10	10.81	12.25	1,274.00	227,474.29	0.00	0.00	0.00	212,330.86
PE 125	97.50	12,929.5	8.8	8.70	212.06	48,291.85	19.6	17.00	1,657.50	395,074.18	3.35	2.68	6.04	6.37	621.35	136,480.46	6.48	6.67	649.84	243,065.93	19.15	14.98	1,460.55	228,934.84	1.80	0.90	87.75	212,418.61
PE 126	102.00	13,031.5	7.0	7.90	201.45	48,493.30	19.2	19.40	1,978.80	397,052.98	3.35	2.24	5.59	5.81	593.01	137,073.46	3.43	4.96	505.41	243,571.34	22.12	20.64	2,104.77	231,039.61	0.00	0.90	91.80	212,510.41
PE 127	91.00	13,122.5	3.4	5.20	118.30	48,611.60	11.8	15.50	1,410.50	398,463.48	3.35	1.12	4.47	5.03	457.83	137,531.30	0.55	1.99	181.09	243,752.43	9.76	15.94	1,450.54	232,490.15	0.00	0.00	0.00	212,510.41
PE 128	108.00	13,230.5	7.0	5.20	140.40	48,752.00	11.6	11.70	1,263.60	399,727.08	3.35	1.79	5.14	4.81	519.21	138,050.51	2.90	1.73	186.30	243,938.73	8.24	9.00	972.00	233,462.15	0.00	0.00	0.00	212,510.41
PE 129	95.50	13,326.0	8.0	7.50	179.06	48,931.06	21.2	16.40	1,566.20	401,293.28	3.35	3.35	6.71	5.93	565.89	138,616.41	3.22	3.06	292.23	244,230.96	18.26	13.25	1,265.38	234,727.52	2.42	1.21	115.75	212,626.16
PE 129+43	53.00	13,379.0	0.0	4.00	53.00	48,984.06	15.0	18.10	959.30	402,252.58							4.79	4.01	212.37	244,443.33	20.33	19.30	1,022.64	235,750.16	4.64	3.53	187.20	212,813.36
PE 130	43.50	13,422.5	8.4	4.20	45.68	49,029.74	17.2	16.10	700.35	402,952.93	4.50	2.91	7.41	7.06	307.00	138,923.41	6.37	4.79	208.54	244,651.87	16.47	17.37	755.40	236,505.56	3.23	2.83	122.89	212,936.24
PE 131	99.00	13,521.5	8.0	8.20	202.95	49,232.69	22.2	19.70	1,950.30	404,903.23	4.50	2.01	6.51	6.96	689.01	139,612.42	4.14	5.25	520.15	245,172.02	40.72	28.60	2,830.95	239,336.51	10.70	6.96	689.09	213,625.33
PE 132	98.00	13,619.5	8.0	8.00	196.00	49,428.69	20.7	21.45	2,102.10	407,005.33	4.50	2.01	6.51	6.51	638.22	140,250.64	4.23	4.19	410.13	245,582.15	38.01	39.36	3,857.62	243,194.14	7.15	8.92	874.55	214,499.88
PE 133	98.50	13,718.0	6.0	7.00	172.38	49,601.06	19.0	19.85	1,955.23	408,960.55	4.50	1.12	5.62	6.07	597.43	140,848.06	1.95	3.09	304.37	245,886.51	40.17	39.09	3,850.22	247,044.35	4.15	5.65	556.43	215,056.31
PE 134	99.50	13,817.5	3.0	4.50	111.94	49,713.00	16.8	17.90	1,781.05	410,741.60	4.50	0.00	4.50	5.06	503.37	141,351.44	0.00	0.98	97.01	245,983.53	39.46	39.81	3,961.44	251,003.80	0.78	2.46	245.02	215,301.33
PE 135	102.00	13,919.5	6.0	4.50	114.75	49,827.75	20.0	18.40	1,876.80	412,618.40	4.50	1.34	5.84	5.17	527.42	141,878.86	2.52	1.26	128.52	246,112.05	27.12	33.29	3,395.58	254,401.38	6.27	3.52	359.50	215,660.83
PE 136	93.00	14,012.5	0.0	3.00	69.75	49,897.50	21.8	20.90	1,943.70	414,562.10	4.50	0.22	4.72	5.28	491.28	142,370.14	0.00	1.26	117.18	246,229.23	55.53	41.33	3,843.55	258,244.93	10.41	8.34	775.57	216,436.40
PE 137	100.50	14,113.0	7.0	3.50	87.94	49,985.44	23.8	22.80	2,291.40	416,853.50	4.50	2.01	6.51	5.62	564.61	142,934.76	4.14	2.07	208.04	246,437.26	45.26	50.40	5,064.85	263,309.78	12.02	11.22	1,127.16	217,563.56
PE 137+39	39.00	14,152.0	5.6	6.30	61.43	50,046.86	20.8	22.30	869.70	417,723.20							1.48	2.81	109.59	246,546.85	40.34	42.80	1,669.08	264,978.86	8.07	10.04	391.74	217,955.30
PE 138	59.50	14,205.5	0.0	2.80	37.45	50,084.31	25.7	23.25	1,243.88	418,967.08	4.50	1.34	5.84	6.18	330.47	143,265.23	0.00	2.07	110.75	246,657.60	49.39	47.33	2,531.91	267,510.77	27.85	19.94	1,066.55	219,021.85
PE 139	107.00	14,312.5	5.6	2.80	74.90	50,159.21	17.8	21.75	2,327.25	421,294.33	4.50	0.89	5.39	5.62	601.13	143,866.36	1.71	0.86	91.49	246,749.08	14.41	31.90	3,413.62	270,924.39	0.84	14.35	1,534.92	220,556.76
PE 140	99.00	14,411.5	7.0	6.30	155.93	50,315.14	32.6	25.20	2,494.80	423,789.13	7.00	2.01	9.01	7.20	713.14	144,579.50	3.68	2.70	266.81	247,015.89	76.06	45.24	4,478.36	275,402.76	12.56	6.70	663.50	221,220.26
PE 141	94.00	14,505.5	8.6	7.80	183.30	50,498.44	32.6	32.60	3,064.40	426,853.53	4.50	2.80	7.30	8.15	766.45	145,345.95	5.81	4.75	446.22	247,462.10	71.10	73.58	6,916.33	282,319.09	10.44	11.50	1,080.95	222,301.21
PE 142	88.00	14,593.5	5.0	6.80	149.60	50,648.04	18.0	25.30	2,226.40	429,079.93	4.50	1.12	5.62	5.45	553.42	145,899.37	1.05	3.43	302.02	247,764.12	23.19	47.14	4,148.67	286,467.76	5.10	7.77	683.54	222,984.75
PE 143	100.00	14,693.5	7.0	6.00	150.00	50,798.04	17.6	17.60	1,780.00	430,859.93	4.50	1.90	6.40	6.01	1,189.85	146,444.41	2.20	1.63	162.50	247,926.62	15.94	19.57	1,956.70	288,424.46	8.44	6.77	677.10	223,661.85
PE 144	198.00	14,891.5	7.4	7.20	356.40	51,154.44	14.0	15.80	3,128.40	433,988.33	4.50	0.67	5.17	5.79	572.79	148,207.05	1.05	2.33	230.18	248,731.00	34.90	21.34	2,112.26	292,844.91	13.83	6.92	684.68	225,182.29
PE 145	99.00	14,990.5	5.0	6.20	153.45	51,307.89</																						

STATION NO.	DISTANCE		STRIPPING				CLEANING & GRUBBING				S O D D I N G						EMBANKMENT (m ³)				EXCAVATION (m ³)								
	Partial (m)	Acc. (m)	L (m)	Av. (m ²)	V (m ³)	Acc. (m ²)	L (m)	Av. (m)	A (m ²)	Acc. (m ²)	L ₁ (m)	L ₂ (m)	L ₃ +L ₄ (m)	Av. (m)	A (m ²)	Acc. (m ²)	A (m ²)	Av. (m ²)	V (m ³)	Acc. (m ²)	A (m ²)	Av. (m ²)	V (m ³)	Below Water Level	V. (m ³)	Acc. (m ³)			
PE 147+58	58.00	15,247.0	7.0	6.50	94.25	51,662.70	20.0	19.80	1,148.40	441,424.73								1.40	1.80	104.40	249,027.59	21.90	29.30	1,699.26	305,228.75	1.26	3.67	212.98	228,327.44
PE 148	39.00	15,286.0	7.0	7.00	68.25	51,730.95	14.8	17.40	678.60	442,103.33	4.50	0.89	5.39	5.51	214.74	149,470.45	2.55	2.38	92.63	249,120.21	12.29	24.49	955.19	306,183.94	0.47	3.28	127.80	228,455.24	
PE 149	92.50	15,378.5	6.0	6.50	150.31	51,881.26	23.6	20.20	1,868.50	443,971.83	0.00	0.89	0.89	3.14	290.86	149,761.30	1.71	2.13	197.03	249,317.24	55.54	33.91	3,136.72	309,320.66	17.58	9.03	834.91	229,290.14	
PE 150	87.50	15,466.0	0.0	3.00	65.63	51,946.89	00.0	12.80	1,120.00	445,091.83	0.00	1.34	1.34	1.12	97.83	149,859.13	84.90	43.31	3,789.19	253,106.43	0.00	27.77	2,429.70	311,750.36	0.00	8.79	769.21	230,059.36	
PE 151	92.50	15,558.5	8.0	4.00	92.50	52,039.39	28.2	14.10	1,304.25	446,396.08	4.50	2.24	6.74	4.04	373.59	150,232.73	4.90	44.90	4,153.25	257,259.68	57.94	28.97	2,679.91	314,430.27	22.37	11.18	1,034.52	231,093.88	
PE 152	102.50	15,661.0	6.0	7.00	179.38	52,218.76	22.7	23.45	2,608.63	449,004.70	4.50	1.12	5.62	6.18	633.15	150,865.87	1.95	3.43	351.06	257,610.74	46.67	52.31	5,361.57	319,791.84	11.89	17.13	1,755.52	232,849.39	
PE 153	104.00	15,765.0	2.0	4.00	104.00	52,322.76	21.0	21.85	2,272.40	451,277.10	0.00	0.67	0.67	3.14	327.02	151,192.89	0.07	1.01	105.04	257,715.78	36.26	41.47	4,312.52	324,104.36	12.13	12.01	1,248.99	234,098.38	
PE 154	95.00	15,860.0	5.6	3.80	90.25	52,413.01	26.0	23.50	2,232.50	453,509.60	4.50	0.78	5.28	2.98	282.79	151,475.68	1.39	0.73	69.21	257,784.99	60.23	48.25	4,583.42	328,687.77	19.21	15.67	1,488.70	235,587.08	
PE 155	93.50	15,953.5	6.4	6.00	140.25	52,553.26	19.0	22.50	2,103.75	455,613.35	4.50	1.34	5.84	5.56	320.06	151,995.74	2.64	2.01	188.26	257,973.25	24.13	42.18	3,944.06	332,631.84	3.08	11.14	1,041.96	236,629.04	
PE 156	102.50	16,056.0	7.0	6.70	171.69	52,724.95	18.0	18.50	1,896.25	457,509.60	4.50	1.79	6.29	6.07	621.69	152,617.43	3.08	2.86	293.15	258,266.40	16.03	20.08	2,058.46	334,690.29	0.36	1.72	176.30	236,805.34	
PE 157	94.50	16,150.5	7.0	7.00	165.38	52,890.33	23.2	20.60	1,946.70	459,456.30	4.50	1.34	5.84	6.07	594.30	153,211.73	4.37	3.72	351.78	258,618.17	44.21	30.12	2,846.53	337,536.82	9.70	5.03	475.24	237,280.58	
PE 158	97.00	16,247.5	6.0	6.50	157.63	53,047.95	34.2	28.70	2,783.90	462,240.20	4.50	1.34	5.84	6.07	588.33	153,800.06	2.00	3.18	308.70	258,926.88	106.70	75.45	7,318.99	344,855.81	22.22	15.96	1,547.88	238,828.46	
PE 159	96.00	16,343.5	0.0	3.00	72.00	53,119.95	00.0	17.10	1,641.60	463,881.80	0.00	1.34	1.34	3.59	344.80	154,144.85	74.70	38.35	3,681.46	262,608.33	0.00	53.35	5,121.36	349,977.17	0.00	11.11	1,066.42	239,894.88	
PE 160	96.50	16,440.0	5.0	2.50	60.31	53,180.26	20.7	10.35	998.78	464,880.58	4.50	1.57	6.07	6.29	584.86	155,087.10	2.46	1.63	151.59	266,402.65	0.00	17.67	1,643.31	353,325.64	0.00	1.95	188.18	240,083.05	
PE 161	93.00	16,533.0	6.6	5.80	134.85	53,315.11	26.0	23.35	2,171.55	467,052.13	4.50	2.01	6.51	6.29	584.86	155,671.96	3.24	2.85	265.05	266,667.70	0.53	0.26	24.41	353,350.05	0.00	0.00	0.00	240,264.40	
PE 162	93.00	16,626.0	6.0	6.30	146.48	53,461.59	08.0	17.00	1,581.00	468,633.13	4.50	1.57	6.07	6.29	584.86	155,671.96	3.24	2.85	265.05	266,667.70	0.53	0.26	24.41	353,350.05	0.00	0.00	0.00	240,264.40	
PE 163	95.00	16,721.0	5.6	5.80	137.75	53,599.34	14.4	11.20	1,064.00	469,697.13	4.50	1.12	5.62	5.84	554.96	156,226.92	1.95	2.60	246.53	266,914.23	5.36	2.94	279.54	353,629.59	5.00	2.50	237.50	240,501.90	
PE 164	111.00	16,832.0	5.0	5.30	147.08	53,746.41	14.8	14.60	1,620.60	471,317.73	4.50	0.67	5.17	5.39	598.78	156,825.70	0.82	1.39	153.74	267,067.96	13.27	9.32	1,033.97	354,663.55	2.18	3.59	398.21	240,900.11	
PE 165	103.00	16,935.0	5.0	5.00	128.75	53,875.16	20.0	17.40	1,792.20	473,109.93	0.00	0.45	0.45	0.45	289.33	157,115.03	0.85	0.84	86.01	267,153.97	10.57	11.92	1,227.76	355,891.31	4.67	3.42	352.41	241,252.53	
PE 166	93.00	17,028.0	5.0	5.00	116.25	53,991.41	18.5	19.25	1,790.25	474,900.18	4.50	0.45	0.45	0.45	250.84	157,363.87	0.88	0.86	80.21	267,234.18	5.66	8.12	754.70	356,646.01	9.51	7.09	659.42	241,911.95	
PE 167	100.00	17,128.0	5.0	5.00	125.00	54,116.41	20.8	19.65	1,965.00	476,865.18	4.50	1.12	5.62	5.28	528.26	157,894.13	1.08	0.98	97.75	267,331.93	39.50	22.58	2,258.15	358,904.16	14.85	12.18	1,218.35	243,130.30	
PE 168	98.00	17,226.0	5.0	5.00	122.50	54,238.91	22.2	21.50	2,107.00	478,972.18	7.00	0.67	7.67	6.64	651.15	158,545.29	0.96	1.02	100.11	267,432.04	47.71	43.61	4,273.58	363,177.74	2.72	8.79	861.13	243,991.42	
PE 169	83.50	17,309.5	4.8	4.90	102.29	54,341.20	12.0	17.10	1,427.85	480,400.03	0.00	0.89	0.89	0.89	357.60	158,902.89	2.08	1.52	127.05	267,559.08	5.75	26.73	2,232.08	365,409.82	4.20	3.46	288.91	244,280.33	
PE 169+59	59.00	17,368.5	0.0	2.40	35.40	54,376.60	20.4	16.20	955.80	481,353.83								6.49	4.29	252.82	267,811.90	76.72	41.24	4,432.87	367,842.69	28.00	16.10	949.90	245,230.23
PE 170	65.00	17,434.0	7.0	3.50	57.31	54,433.91	12.4	16.40	1,074.20	482,430.03	4.50	2.01	6.51	3.70	242.58	159,145.46	3.08	2.58	168.99	267,980.89	5.92	5.84	382.19	368,224.88	0.00	2.10	137.55	245,367.78	
PE 171	104.00	17,538.0	9.0	8.00	208.00	54,641.91	14.0	13.20	1,372.80	483,802.83	4.50	1.57	6.07	6.29	654.04	159,799.50	4.11	3.60	373.88	268,354.77	5.52	5.72	594.88	368,819.76	4.56	2.28	237.12	245,604.90	
PE 172	99.00	17,637.0	5.0	7.00	175.25	54,815.16	27.0	20.50	2,029.50	485,832.33	7.00	0.67	7.67	6.87	679.94	160,479.44	1.08	2.60	256.91	268,611.67	57.19	31.36	3,104.15	371,923.90	12.00	8.28	819.92	246,424.82	
PE 173	91.50	17,728.5	5.0	5.00	114.38	54,929.54	18.7	22.85	2,090.78	487,923.10	4.50	0.45	0.45	0.45	577.28	161,056.71	0.68	0.88	80.52	268,692.19	34.58	45.89	4,198.61	376,122.52	10.07	11.04	1,009.75	247,434.57	
PE 174	100.50	17,829.0	0.0	2.50	62.81	54,992.35	09.0	13.85	1,391.93	489,315.03	4.50	0.00	4.50	4.72	474.72	161,531.43	0.00	0.34	34.17	268,726.36	2.04	18.31	1,840.31	377,962.82	1.26	5.66	569.18	248,003.75	
PE 175	93.00	17,922.0	4.2	2.10	48.83	55,041.18	19.7	14.35	1,334.55	490,640.58	4.50	0.45	0.45	0.45	439.30	161,970.73	0.75	0.38	34.88	268,761.24	48.58	25.31	2,353.60						

STATION NO.	DISTANCE			STRIPPING				CLEARING & CRUBBING				SODDING				EMBANKMENT (m³)				EXCAVATION (m³)									
	Partial (m)	Acc. (m)	L (m)	Av. (m²)	V (m³)	Acc. (m³)	L (m)	Av. (m)	A (m²)	Acc. (m³)	L₁ (m)	L₂ (m)	L₃+L₄ (m)	Av. (m)	A (m²)	Acc. (m³)	V (m³)	A (m²)	Acc. (m³)	Up Water Level		Below Water Level							
																				A (m²)	Av. (m²)	V (m³)	A (m²)	Av. (m²)	V (m³)				
PE 184	96.50	18,843.5	5.0	5.00	120.63	56,128.43	17.2	17.90	1,727.35	507,047.83	4.50	0.45	4.95	4.95	477.41	166,339.06	0.68	0.49	47.29	270,425.79	19.73	29.35	2,832.47	409,494.22	5.16	5.20	501.70	256,491.74	
PE 185	98.50	18,942.0	4.0	4.50	110.81	56,239.24	23.4	20.30	1,999.35	509,047.38	4.50	0.45	4.95	4.95	487.30	166,826.36	0.15	0.49	40.88	270,466.67	58.06	38.89	3,830.81	413,325.03	15.75	10.45	1,029.47	257,521.21	
PE 186	105.50	19,047.5	4.2	4.10	108.14	56,347.38	28.4	25.90	2,732.45	511,779.83	4.50	0.67	5.17	5.06	533.73	167,360.08	0.45	0.30	31.65	270,498.32	93.27	75.66	7,982.34	421,307.37	23.06	19.41	2,047.28	259,568.49	
PE 187	102.50	19,150.0	0.0	2.10	53.81	56,401.19	22.8	25.60	2,624.00	514,403.83	4.50	0.00	4.50	4.84	495.63	167,855.71	0.00	0.23	23.06	270,521.38	63.53	78.40	8,035.64	429,343.01	15.55	15.62	1,475.85	261,554.58	
PE 188	94.50	19,244.5	0.0	0.00	0.00	56,401.19	18.8	20.80	1,965.60	516,369.43	0.00	0.00	0.00	0.00	212.63	168,068.34	0.00	0.00	0.00	270,521.38	38.56	51.04	4,823.47	434,166.48	15.65	15.62	1,475.85	263,030.43	
PE 189	97.00	19,341.5	0.0	0.00	0.00	56,401.19	22.0	20.40	1,978.80	518,348.23	4.50	1.12	5.62	2.81	272.47	168,340.81	0.00	0.00	0.00	270,521.38	51.63	43.09	4,373.92	438,540.40	20.22	17.88	1,734.36	264,764.79	
PE 190	91.50	19,433.0	0.0	0.00	0.00	56,401.19	18.2	20.10	1,839.15	520,187.38	4.50	0.00	4.50	5.06	462.90	168,803.71	0.00	0.00	0.00	270,521.38	47.10	49.36	4,516.53	443,056.94	11.27	15.74	1,440.35	266,205.14	
PE 191	95.00	19,528.0	0.0	0.00	0.00	56,401.19	13.0	15.60	1,482.00	521,669.38	4.50	0.45	4.95	4.72	448.74	169,252.45	0.00	0.00	0.00	270,521.38	15.64	31.37	2,979.96	446,036.90	0.21	5.74	545.21	266,750.35	
PE 192	99.00	19,627.0	0.0	0.00	0.00	56,401.19	29.6	21.30	2,108.70	523,778.08	7.00	0.22	7.22	6.09	602.46	169,854.91	0.00	0.00	0.00	270,521.38	86.93	51.29	5,077.22	451,114.11	23.74	11.97	1,185.28	267,935.62	
PE 193	104.50	19,731.5	0.0	0.00	0.00	56,401.19	16.0	22.80	2,382.60	526,160.68	4.50	1.34	5.84	6.53	682.66	170,337.57	0.00	0.00	0.00	270,521.38	23.56	23.40	2,281.60	459,204.34	3.74	1.97	191.83	269,378.06	
PE 194	97.50	19,829.0	0.0	0.00	0.00	56,401.19	16.7	16.35	1,594.13	527,754.80	4.50	0.22	4.72	5.28	515.06	171,052.62	0.00	0.00	0.00	270,521.38	25.47	24.01	2,233.26	461,437.60	2.32	3.03	281.56	269,659.62	
PE 195	93.00	19,922.0	0.0	0.00	0.00	56,401.19	16.0	16.35	1,520.55	529,275.35	4.50	0.22	4.72	4.72	439.30	171,491.92	0.00	0.00	0.00	270,521.38	46.19	35.83	3,403.42	464,841.02	9.45	5.89	559.12	270,218.74	
PE 196	95.00	20,017.0	0.0	0.00	0.00	56,401.19	18.8	17.40	1,653.00	530,928.35	4.50	0.67	5.17	4.95	469.99	171,961.91	0.00	0.00	0.00	270,521.38	84.14	65.16	6,386.12	471,227.14	26.39	17.92	1,756.21	271,974.95	
PE 197	98.00	20,115.0	0.0	0.00	0.00	56,401.19	28.7	23.75	2,327.50	533,255.85	4.50	0.22	4.72	4.95	484.83	172,446.73	0.00	0.00	0.00	270,521.38	0.48	42.31	4,315.77	475,542.91	0.00	13.20	1,345.89	273,320.84	
PE 198	102.00	20,217.0	0.0	0.00	0.00	56,401.19	04.4	16.55	1,688.10	534,943.95	0.00	0.89	0.89	2.81	286.52	172,733.25	18.04	9.02	920.04	271,441.42	110.60	55.30	7,022.78	482,587.05	42.00	21.00	2,667.00	275,987.84	
PE 199	89.00	20,306.0	0.0	0.00	0.00	56,401.19	00.0	2.20	195.80	535,139.75	4.50	1.12	5.62	3.26	289.80	173,023.06	0.00	9.02	802.78	272,244.20	0.00	0.24	21.36	475,564.27	0.00	0.00	0.00	273,320.84	
PE 200	127.00	20,433.0	5.0	2.50	79.38	56,480.57	46.4	23.20	2,946.40	538,086.15	4.50	0.67	5.17	5.39	683.09	173,708.15	1.28	0.64	81.28	272,325.48	144.78	127.69	3,192.13	483,779.18	31.84	36.92	922.96	276,910.80	
PE 200+25	25.00	20,458.0	0.0	2.50	15.63	56,496.19	32.0	39.20	980.00	539,066.15								0.96	24.00	272,349.48	0.00	0.31	36.95	3,160.86	488,940.04	0.00	21.00	1,165.50	278,076.30
PE 201	55.50	20,513.5	0.0	0.00	0.00	56,496.19	09.7	20.85	1,157.18	540,223.33	4.50	0.89	5.39	5.28	293.19	174,001.33	0.00	0.64	35.52	272,385.00	0.00	3.31	36.95	3,160.86	488,940.04	0.00	21.00	1,165.50	278,076.30
PE 202	111.00	20,624.5	0.0	0.00	0.00	56,496.19	24.6	17.15	1,903.65	542,126.98	4.50	1.12	5.62	5.31	611.19	174,612.53	0.00	0.00	0.00	272,385.00	60.73	32.02	3,554.16	492,494.21	21.62	10.81	1,200.02	279,276.32	
PE 203	93.50	20,718.0	0.0	0.00	0.00	56,496.19	29.5	27.05	2,529.18	544,656.15	4.50	1.34	5.84	5.73	535.74	175,148.27	0.00	0.00	0.00	272,385.00	70.04	63.39	6,113.59	498,607.80	30.57	26.10	2,440.16	281,716.48	
PE 204	99.00	20,817.0	0.0	0.00	0.00	56,496.19	15.6	22.55	2,322.45	546,888.60	4.50	1.34	5.84	5.84	578.32	175,726.59	0.00	0.00	0.00	272,385.00	23.39	46.72	4,624.88	503,232.68	0.55	15.56	1,540.64	283,257.12	
PE 205	96.00	20,913.0	0.0	0.00	0.00	56,496.19	30.0	22.80	2,188.80	549,077.40	4.50	1.57	6.07	5.95	571.53	176,298.12	0.00	0.00	0.00	272,385.00	96.92	60.16	5,774.88	509,007.56	31.93	16.24	1,558.99	284,816.11	
PE 206	86.00	20,999.0	0.0	0.00	0.00	56,496.19	07.8	18.90	1,625.40	550,702.80	0.00	1.57	1.57	3.82	328.11	176,626.23	4.98	2.49	214.14	272,599.14	7.39	52.16	4,485.37	513,492.94	6.97	19.45	1,672.66	286,488.77	
PE 206+8	8.00	21,007.0															2.49	3.74	29.88	272,629.02	10.00	8.70	69.56	513,562.50	9.52	8.25	65.96	286,554.73	
PE 207	107.00	21,114.0	0.0	0.00	0.00	56,496.19	33.4	20.60	2,369.00	553,071.80	7.00	0.67	7.67	6.62	494.13	177,120.36	0.00	2.49	266.43	272,895.45	108.65	58.02	6,208.09	519,770.58	28.71	17.84	1,908.99	288,463.72	
PE 208	100.00	21,214.0	0.0	0.00	0.00	56,496.19	16.2	24.80	2,480.00	555,551.80	4.50	0.67	5.17	6.42	642.08	177,762.44	0.00	0.00	0.00	272,895.45	26.02	67.33	6,733.25	526,503.83	3.84	16.28	1,627.65	290,091.37	
PE 209	133.00	21,347.0	7.0	3.50	116.38	56,612.57	58.6	37.40	4,974.20	560,526.00	7.00	2.46	9.46	7.32	972.93	178,735.37	5.20	2.60	345.80	273,241.25	167.30	96.66	12,855.65	539,359.48	42.00	22.92	3,048.43	293,139.79	
PE 210	85.00	21,432.0	0.0	3.50	74.38	56,686.94	25.6	42.10	3,578.50	564,104.50	4.50	0.22	4.72	7.09	602.79	179,338.16	0.00	2.60	221.00	273,462.25	64.48	115.89	9,850.69	549,210.17	26.64	34.32	2,917.29	296,057.08	
PE 211	81.50	21,513.5	0.0	0.00	0.00	56,686.94	18.7	22.15	1,805.23	565,909.73	4.50	1.12	5.62	5.17	421.42	179,759.58	0.00	0.00	0.00	273,462.25	36.91	50.69	4,131.60	553,341.77	16.80	21.72	1,770.18	297,827.26	
PE 212	105.50	21,619.0	0.0	0.00	0.00	56,686.94	31.2	24.95	2,632.23	568,541.95	7.00	0.67	7.67	6.64	700.99	180,460.57	0.00	0.00	0.00	273,462.25	90.16	63.53	6,702.84	560,044.61	18.16	17.48	1,844.03	299,671.29	
PE 213	120.00	21,739.0	0.0	0.00	0.00	56,686.94	18.8	25.00	3,000.00	571,541.95	4.50	1.34	5.84	6.76	810.75	181,271.32	0.00	0.00	0.00	273,462.25	42.43	66.29	7,955.28	567,999.89	16.00	17.08	2,049.30	301,720.59	
PE 214	82.00	21,821.0	0.0	0.00	0.00	56,686.94	03.2	11.00	902.00	572,443.95	4.50	0.67	5.17	5.51	451.51	181,722.83	0.00	0.00	0.00	273,462.25	92.88	16.68	1,175.80	570,935.00	11.17	5.59	393.88	302,770.27	
PE 215	70.50	21,891.5	0.0	0.00	0.00	56,686.94	17.6	10.40	733.20	573,177.15	4.50	0.56	5.06	5.11	360.60	182,083.43	0.00	0.00	0.00	273,462.25	22.66	27.77	2,693.59	573,628.59	0.52	5.85	567.16	303,337.43	
PE 216	97.00	21,988.5	0.0	0.00	0.00	56,686.94	15.0	16.30	1,581.10	574,758.25	4.50	1.34	5.84	5.45	528.68	182,612.11	0.00	0.00	0.00	273,462.25	47.43	35.05	4,030.46	577,659.06	19.19	9.86	1,133.44	304,470.87	
PE 217	115.00	22,103.5	0.0	0.00	0.00	56,686.94	22.4	18.70	2,150.50	576,908.75	4.50	1.12	5.62	5.73	638.93	183,271.04	0.00	0.00	0.00	273,462.25	19.98	33.71	4,280.73	581,939.78	2.67	10.93	1,388.05	305,458.92	
PE 218	127.00	22,230.5	0.0	0.00	0.00	56,686.94	15.8	19.10	2,425.70	579,334.45	4.50	2.68	7.18	6.40	812.88	184,083.93	0.00	0.00	0.00	273,462.25	75.28	47.63	4,191.35	586,131.13	27.84	15.25	1,342.35	307,201.27	
PE 219	88.00	22,318.5	0.0	0.00	0.00	56,686.94	27.6	21.70	1,909.60	581,24																			

STATION NO.	DISTANCE			STRIPPING			CLEARING & GRUBBING			SODDING					EMBANKMENT (m ³)					EXCAVATION (m ³)							
	Partial (m)	Acc. (m)	L (m)	Av. (m ²)	V (m ³)	Acc. (m ³)	L (m)	Av. (m)	A (m ²)	Acc. (m ²)	L ₁ (m)	L ₁ +L ₂ (m)	Av. (m)	A (m ²)	Acc. (m ²)	V (m ³)	Av. (m ²)	A (m ²)	Acc. (m ²)	Up Water Level V. (m ³)	Av. (m ²)	Acc. (m ²)	Below Water Level V. (m ³)	Av. (m ²)	Acc. (m ²)		
PE 221	106.00	22,540.0	0.0	0.00	0.00	56,686.94	09.0	9.30	983.80	584,378.15	4.50	1.12	5.62	5.73	607.36	185,961.85	0.00	0.00	273,462.25	3.86	4.53	479.92	591,258.65	3.24	1.62	171.72	308,980.81
PE 222	104.50	22,644.5																			34.25	3,579.13	594,837.78	18.01	10.63	1,110.36	310,091.17
PE 223	116.50	22,761.0	0.0	0.00	0.00	56,686.94	16.3	12.65	2,795.65	587,173.80	4.50	1.12	5.62	5.62	654.50	186,616.35	0.00	0.00	273,462.25	23.64	44.14	5,142.72	599,980.49	8.52	13.26	1,545.26	311,636.43
PE 224	112.00	22,873.0	0.0	0.00	0.00	56,686.94	17.8	17.05	1,909.60	589,083.40	4.50	1.34	5.84	5.73	641.74	187,258.09	0.00	0.00	273,462.25	30.98	27.31	3,059.00	603,039.49	7.41	7.96	891.91	312,528.34
PE 225	96.00	22,969.0	0.0	0.00	0.00	56,686.94	12.4	15.10	1,449.60	590,533.00	0.00	1.12	1.12	3.48	334.06	187,592.15	0.00	0.00	273,462.25	14.63	22.81	2,189.42	605,228.92	1.05	4.23	406.08	312,934.42
PE 226	95.50	23,064.5	0.0	0.00	0.00	56,686.94	20.4	16.40	1,566.20	592,099.20	4.50	0.89	5.39	3.26	310.97	187,903.12	0.00	0.00	273,462.25	36.54	25.58	2,443.18	607,672.10	17.60	9.32	890.49	313,824.91
PE 227	97.00	23,161.5	0.0	0.00	0.00	56,686.94	08.8	14.60	1,416.20	593,515.40	4.50	0.78	5.28	5.34	517.84	188,420.96	0.00	0.00	273,462.25	6.03	21.28	2,064.45	609,736.55	0.00	8.80	853.55	314,678.46
PE 228	94.00	23,255.5	7.0	3.50	82.25	56,769.19	12.3	10.55	991.70	594,507.10	0.00	0.00	2.64	0.00	248.28	188,669.24	9.20	4.60	273,894.65	1.40	3.72	349.21	610,085.76	3.96	1.98	186.03	314,864.49
PE 229	98.00	23,353.5	0.0	3.50	85.75	56,854.94	18.8	15.55	1,523.90	596,031.00	4.50	0.67	5.17	2.59	253.37	188,922.61	0.00	4.60	274,345.45	49.70	25.55	2,503.70	612,589.46	18.70	11.33	1,110.29	315,974.78
PE 230	97.00	23,450.5	0.0	0.00	0.00	56,854.94	16.2	17.50	1,697.50	597,728.50	4.50	1.34	5.84	5.51	534.10	189,456.72	0.00	0.00	274,345.45	25.06	37.38	3,625.67	616,215.13	0.58	9.64	934.89	316,909.66
PE 231	67.50	23,518.0	0.0	0.00	0.00	56,854.94	26.2	21.20	1,431.00	599,159.50	4.50	1.12	5.62	5.73	386.76	189,843.48	0.00	0.00	274,345.45	68.33	46.69	3,151.78	619,366.90	30.60	15.59	1,052.16	317,961.82
PE 232	118.50	23,636.5	3.0	1.50	44.44	56,899.38	03.4	14.80	1,753.80	600,913.30	4.50	0.67	5.17	5.39	639.24	190,482.72	0.50	0.25	274,375.08	0.00	34.16	4,048.32	623,415.22	0.00	15.30	1,813.05	319,714.87
PE 233	108.00	23,744.5	4.0	3.50	94.50	56,993.88	17.2	10.30	1,112.40	602,025.70	4.50	0.22	4.72	4.95	534.30	191,017.02	0.15	0.33	274,410.18	23.05	11.52	1,244.48	624,659.70	7.05	3.53	380.70	320,155.57
PE 234	100.00	23,844.5	0.0	2.00	50.00	57,043.88	09.6	13.40	1,340.00	603,365.70	4.50	1.34	5.84	5.28	528.26	191,545.28	0.00	0.08	274,417.68	4.40	13.72	1,372.30	626,032.00	0.00	3.53	352.50	320,508.07
PE 235	88.00	23,932.5	4.2	2.10	46.20	57,090.08	04.2	6.90	607.20	603,972.90	0.10	0.22	0.32	3.08	271.27	191,816.55	0.30	0.15	274,430.88	0.00	2.20	193.60	626,225.60	0.00	0.00	0.00	320,508.07
PE 236	98.00	24,030.5	0.0	2.10	51.45	57,141.53	11.5	7.85	769.30	604,742.20	4.50	1.34	5.84	3.08	302.10	192,118.65	0.00	0.15	274,445.58	11.66	5.83	571.10	626,796.70	0.00	0.00	0.00	320,508.07
PE 237	89.50	24,120.0	6.0	3.00	67.13	57,208.66	06.6	9.05	809.98	605,552.18	6.00	1.34	7.34	6.59	589.95	192,708.60	2.00	1.00	274,535.08	0.00	5.83	521.56	627,318.26	0.00	0.00	0.00	320,508.07
PE 238	86.50	24,206.5	5.8	5.90	127.59	57,336.24	20.2	13.40	1,159.10	606,711.28	4.50	1.12	5.62	6.48	560.51	193,269.11	2.00	2.00	274,708.08	22.40	11.20	968.80	628,287.06	7.48	3.74	323.34	320,831.41
PE 239	116.50	24,323.0	0.0	2.90	84.46	57,420.71	14.6	17.40	2,027.10	608,738.38	4.50	0.45	4.95	5.28	615.43	193,884.53	0.00	1.00	274,824.58	4.51	13.45	1,567.22	629,854.28	0.30	3.89	452.95	321,284.36
PE 240	111.00	24,434.0	12.0	6.00	166.50	57,587.21	27.0	20.80	2,308.80	611,047.18	4.50	0.00	4.50	4.72	524.32	194,408.85	5.32	2.66	275,119.84	26.80	15.65	1,737.43	631,591.70	15.51	7.90	877.29	322,161.65
PE 241	98.00	24,532.0	0.0	6.00	147.00	57,734.21	00.0	13.50	1,323.00	612,370.18	5.00	0.00	5.00	4.75	465.50	194,874.35	2.40	3.86	275,498.12	0.00	13.40	1,313.20	632,904.90	0.00	7.75	759.84	322,921.49
PE 242	192.00	24,724.0	0.0	0.00	0.00	57,734.21	20.6	10.30	1,977.60	614,347.78	4.50	0.00	4.50	4.75	912.00	195,786.35	0.00	1.20	275,728.52	21.81	10.91	2,093.95	634,998.86	14.08	7.04	1,351.97	324,273.46
PE 243	82.00	24,806.0	0.0	0.00	0.00	57,734.21	08.5	14.55	1,193.10	615,540.88	0.00	0.56	0.56	2.53	207.42	195,993.77	7.10	3.55	276,019.62	4.27	13.04	1,069.36	636,068.22	0.80	7.44	610.20	324,883.66
PE 244	33.00	24,839.0	0.0	0.00	0.00	57,734.21	00.0	4.25	140.25	615,681.13	0.00	0.00	0.00	0.28	9.22	196,003.00	41.05	24.08	276,814.11	0.00	2.14	70.46	636,138.67	0.00	0.40	13.20	324,896.86
PE 245	112.00	24,951.0	4.0	2.00	56.00	57,790.21	21.6	10.80	1,209.60	616,890.73	4.50	0.22	4.72	2.36	264.52	196,267.52	0.48	20.77	279,139.85	36.72	18.36	2,056.26	638,194.94	9.09	4.55	509.26	325,406.13
PE 246	95.00	25,046.0	4.6	4.30	102.13	57,892.33	23.6	22.60	2,147.00	619,037.73	4.50	0.45	4.95	4.84	459.36	196,726.88	0.60	0.54	279,190.91	45.40	41.06	3,900.80	642,095.73	14.38	11.74	1,115.16	326,521.28
PE 246+57.5	57.50	25,103.5																		25.01	12.51	1,031.70	653,655.31	9.89	4.94	407.92	328,877.27
PE 247	84.50	25,188.0	8.4	6.50	137.31	58,029.64	34.4	29.00	4,118.00	623,155.73	7.00	2.91	9.91	7.43	627.59	197,354.47	7.58	4.09	279,325.46	73.50	59.45	3,418.46	645,514.19	18.45	16.42	943.95	327,465.23
PE 248	82.00	25,270.0	9.0	8.70	178.35	58,207.99	09.0	21.70	1,779.40	624,935.13	1.30	0.00	1.30	5.60	459.48	197,813.95	4.18	5.88	279,670.64	62.36	53.88	4,552.82	650,067.01	4.76	9.57	808.88	328,274.11
PE 249	108.00	25,378.0	14.0	11.50	310.50	58,518.49	13.8	11.40	1,231.20	626,166.33	4.50	2.24	6.74	4.02	433.95	198,247.90	4.90	4.54	280,152.60	0.00	31.18	2,556.60	652,623.61	0.00	2.38	195.24	328,469.35
PE 250	82.50	25,460.5	8.4	11.20	231.00	58,749.49	23.6	18.70	1,542.75	627,709.08	4.50	2.01	6.51	6.62	546.50	198,794.40	5.98	5.44	280,642.92	0.00	0.00	0.00	652,623.61	0.00	0.00	0.00	328,469.35
PE 251	95.00	25,555.5	14.0	11.20	266.00	59,015.49	20.6	22.10	2,099.50	629,808.58	4.50	6															

STATION NO.	DISTANCE			STRIPPING			CLEARING & GRUBBING				SODDING						EMBANKMENT (m ³)				EXCAVATION (m ³)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	Partial (m)	Acc. (m)	L (m)	Av. (m ²)	V (m ³)	Acc. (m ³)	L (m)	Av. (m)	A (m ²)	Acc. (m ²)	L ₁ (m)	L ₂ (m)	L ₁ +L ₂ (m)	Av. (m)	A (m ²)	Acc. (m ²)	V (m ³)	Av. (m ³)	V (m ³)	Acc. (m ³)	A (m ²)	Av (m ²)	V (m ³)	Acc. (m ²)	Av (m ²)	V (m ³)	Acc. (m ²)	Av (m ²)	V (m ³)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

C(c): Exempt-P7.XL

FILLING ON RIVER BANK

SECTION No	DISTANCE (m)	A (m ²)	Av. (m ²)	V (m ³)
PE 0	0.0	0.00		0.00
PE 1	120.0	1.61	0.81	96.60
PE 2	92.0	1.88	1.75	160.54
PE 3	115.5	4.41	3.15	363.25
PE 4	109.0	3.35	3.88	422.92
PE 5	121.0	1.12	2.24	270.44
PE 6	82.0	0.00	0.56	45.92
PE 7	155.0	40.23	20.12	3117.83
PE 8	96.0	19.47	29.85	2865.60
PE 9	98.5	6.40	12.94	1274.10
PE 10	118.5	7.28	6.84	810.54
PE 11	108.0	10.40	8.84	954.72
PE 12	148.0	4.94	7.67	1135.16
PE 13	105.0	6.08	5.51	578.55
PE 14	95.0	6.25	6.17	585.68
TOTAL (m ³)				12681.83

MFC-3 {

$$\begin{aligned} \text{PE 199R} & \sim 2240 \times 7.0 \times \frac{1}{2} \times 1.1 = 8,630 \text{ m}^3 \\ \text{PE 200L} & \sim 1,470 \times 6.8 \times \frac{1}{2} \times 1.1 = 5,500 \text{ m}^3 \\ \text{PE 209L} & \sim 2,240 \times 7.2 \times \frac{1}{2} \times 1.1 = 8,870 \text{ m}^3 \end{aligned}$$

MFC-4 {

$$\begin{aligned} \text{PE 260L} & \sim 420 \times 1.5 \times \frac{1}{2} \times 1.1 = 350 \text{ m}^3 \\ \text{PE 251R} & \sim 36. \times 120 \times \frac{1}{2} = 2160 \text{ m}^3 \\ \text{PE 255} \sim 256 & \sim (3.25 + 1.0) \times \frac{1}{2} \times 100 = 220 \text{ m}^3 \\ \text{PE 271R} & \sim 4.5 \times 0.6 \times \frac{1}{2} \times 50 = 70 \text{ m}^3 \end{aligned}$$

PERCUT RIVER, EARTH WORKS (LEFT BANK)

STRIPPING, CLEARING & GRUBBING, SODDING, EXCAVATION AND EMBANKMENT OF PERCUT RIVER FOR RIVER IMPROVEMENT

STATION NO.	DISTANCE (m)	STRIPPING				CLEARING & GRUBBING				SODDING				EMBANKMENT (m³)				EXCAVATION (m³)			
		L (m)	Av. (m²)	V (m³)	Acc. (m³)	L (m)	Av. (m)	A (m²)	Acc. (m³)	L ₁ (m)	L ₂ (m)	L ₁ +L ₂ (m)	Av. (m)	A (m²)	Av. (m²)	V (m³)	Acc. (m³)	A (m²)	Av. (m²)	V (m³)	Acc. (m³)
		Partial (m)	Acc. (m)	L (m)	Av. (m²)	L (m)	Av. (m)	A (m²)	Acc. (m³)	L ₁ (m)	L ₂ (m)	L ₁ +L ₂ (m)	Av. (m)	A (m²)	Av. (m²)	V (m³)	Acc. (m³)	A (m²)	Av. (m²)	V (m³)	Acc. (m³)
PE 0-220 m	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 0	220.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 1	120.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 2	92.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 3	115.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 4	109.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 5	121.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 6	82.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 7	155.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 8	96.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 9	98.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 10	118.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 11	108.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 12	148.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 13	105.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 14	95.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 15	108.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 16	94.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 17	106.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 18	93.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 19	90.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 20	97.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 21	123.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 22	97.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 23	106.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 24	102.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 25	123.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 26	91.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 27	107.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 28	104.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 29	101.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 30	110.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 31	96.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 32	94.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PE 33	108.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

STATION NO.	DISTANCE		STRIPPING				CLEARING & GRUBBING				S O D D I N G						EMBANKMENT (m ³)						EXCAVATION (m ³)						
	Partial (m)	Acc. (m)	L (m)	Av. (m ²)	V (m ³)	Acc. (m ³)	L ₁ (m)	L ₂ (m)	L ₁ +L ₂ (m)	Av. (m)	A (m ²)	Acc. (m ³)	A (m ²)	Av. (m ²)	V (m ³)	Acc. (m ³)	A (m ²)	Av. (m ²)	V (m ³)	A (m ²)	Acc. (m ³)	A (m ²)	Av. (m ²)	V (m ³)	A (m ²)	Acc. (m ³)	A (m ²)	Av. (m ²)	V (m ³)
PE 34	106.00	3,842.5	12.8	13.40	355.10	4,678.49	23.0	22.40	2,374.40	30,317.90	4.47	5.37	9.84	6.60	699.22	7,423.91	15.48	19.10	2,024.07	22,257.06	12.60	11.09	1,175.01	4,212.28	9.32	8.57	908.84	43,625.18	
PE 35	116.00	3,958.5	15.8	14.30	414.70	5,093.19	27.8	25.40	2,946.40	33,264.30	6.48	6.04	12.52	11.18	1,296.92	8,720.83	20.80	18.14	2,104.24	24,361.30	19.80	16.20	1,879.20	6,091.48	17.50	13.41	1,555.27	45,180.45	
PE 36	95.00	4,053.5	13.3	14.55	345.56	5,438.75	27.3	27.35	2,617.25	35,881.55	6.04	6.04	12.07	12.30	1,168.35	9,889.17	20.00	20.40	1,938.00	26,299.30	19.60	19.70	1,871.50	7,962.98	17.25	17.38	1,650.63	46,831.08	
PE 37	94.00	4,147.5	15.2	14.25	334.88	5,773.63	27.4	27.35	2,570.90	38,452.45	5.81	6.71	12.52	12.30	1,156.05	11,045.22	22.55	21.27	1,999.62	28,298.92	17.00	18.30	1,720.20	9,683.18	24.12	20.69	1,944.39	48,775.47	
PE 38	109.50	4,257.0	15.5	15.35	420.21	6,193.83	30.1	28.75	3,148.13	41,600.58	5.81	6.26	12.07	12.30	1,346.67	12,391.89	17.25	19.90	2,178.78	30,477.70	21.28	19.14	2,095.83	11,779.01	25.71	24.92	2,728.19	51,503.66	
PE 39	93.00	4,350.0	14.6	15.05	349.91	6,543.74	27.1	28.60	2,659.80	44,260.38	5.59	6.04	11.63	11.85	1,102.16	13,494.05	17.25	17.25	1,604.25	32,081.95	14.38	17.83	1,657.96	13,436.97	26.16	25.94	2,411.96	53,915.62	
PE 40	93.00	4,443.0	15.2	14.90	346.43	6,890.17	29.2	28.15	2,617.95	46,878.33	6.15	5.37	11.52	11.57	1,076.16	14,570.21	13.80	15.53	1,443.83	33,525.77	25.70	20.04	1,863.49	15,300.46	33.60	29.88	2,778.84	56,694.46	
PE 41	110.50	4,553.5	13.6	14.40	397.80	7,287.97	29.1	29.15	3,221.08	50,099.40	5.81	4.92	10.73	11.12	1,229.25	15,799.46	15.95	14.88	1,643.69	35,169.46	22.20	23.95	2,646.48	17,946.93	20.40	27.00	2,983.50	59,677.96	
PE 42	108.00	4,661.5	18.4	16.00	432.00	7,719.97	32.5	30.80	3,326.40	53,425.80	8.27	6.04	14.31	12.52	1,352.37	17,151.84	18.60	17.28	1,865.70	37,035.16	30.58	26.39	2,850.12	20,797.05	24.74	22.57	2,437.29	62,115.25	
PE 43	91.00	4,752.5	17.0	17.70	402.68	8,122.64	33.2	32.85	2,989.35	56,415.15	7.38	5.37	12.75	13.53	1,231.07	18,382.91	15.23	16.91	1,539.04	38,574.20	35.00	32.79	2,983.89	23,780.94	23.68	24.21	2,202.88	64,318.13	
PE 44	98.50	4,851.0	20.0	18.50	455.56	8,578.21	34.3	33.75	3,324.38	59,739.53	8.72	6.71	15.43	14.09	1,387.59	19,770.50	18.60	16.91	1,665.88	40,240.08	26.25	30.63	3,016.56	26,797.51	16.80	20.24	1,993.64	66,311.77	
PE 45	134.50	4,985.5	16.2	18.10	608.61	9,186.82	27.6	30.95	4,162.78	63,902.30	6.71	5.81	12.52	13.98	1,879.69	21,650.19	14.00	16.30	2,192.35	42,432.43	17.63	21.94	2,950.59	29,748.10	10.30	13.55	1,822.48	68,134.24	
PE 46	73.00	5,058.5	15.7	15.95	291.09	9,477.91	31.6	29.60	2,160.80	66,063.10	7.16	6.26	13.42	12.97	946.75	22,596.94	14.00	14.00	1,022.00	43,454.43	26.60	22.11	1,614.21	31,362.31	33.00	21.65	1,580.45	69,714.69	
PE 47	101.00	5,159.5	14.4	15.05	380.01	9,857.92	13.0	22.30	2,252.30	68,315.40	4.25	6.26	10.51	11.96	1,208.26	23,805.20	31.05	22.53	2,275.03	45,729.45	0.00	13.30	1,343.30	32,705.61	0.00	16.50	1,666.50	71,381.19	
PE 48	98.00	5,257.5	12.0	13.20	323.40	10,181.32	11.0	12.00	1,176.00	69,491.40	5.14	5.14	10.29	10.40	1,018.98	24,824.18	37.68	34.37	3,367.77	49,097.22	0.00	0.00	0.00	32,705.61	0.00	0.00	0.00	71,381.19	
PE 49	102.00	5,359.5	14.6	13.30	339.15	10,520.47	22.1	16.55	1,688.10	71,179.50	5.14	5.14	10.29	10.29	1,049.16	25,873.34	12.54	25.11	2,561.22	51,658.44	6.18	3.09	315.18	33,020.79	4.90	2.45	249.90	71,631.09	
PE 50	120.00	5,479.5	18.0	16.30	489.00	11,009.47	23.4	22.75	2,730.00	73,909.50	6.71	5.59	12.30	11.29	1,355.06	27,228.40	18.30	15.42	1,850.40	53,508.84	4.95	5.57	667.80	33,688.59	3.45	4.18	501.00	72,132.09	
PE 51	76.50	5,556.0	13.0	15.50	296.44	11,305.91	17.2	20.30	1,552.95	75,462.45	5.14	4.92	10.06	11.18	855.30	28,083.69	14.00	16.15	1,235.48	54,744.32	2.70	3.83	292.61	33,981.20	0.00	1.73	131.96	72,264.06	
PE 52	130.00	5,686.0	16.6	14.80	481.00	11,786.91	36.4	26.80	3,484.00	78,946.45	6.48	5.37	11.85	10.96	1,424.38	29,508.07	7.86	10.93	1,420.90	56,165.22	18.60	10.65	1,384.50	35,365.70	6.18	3.09	401.38	72,665.43	
PE 53	86.00	5,772.0	14.6	15.60	335.40	12,122.31	30.6	33.50	2,881.00	81,827.45	6.26	3.58	9.84	10.84	932.66	30,440.73	7.95	7.91	679.83	56,845.05	7.72	13.16	1,131.76	36,497.46	0.65	3.41	293.48	72,958.91	
PE 54	94.50	5,866.5	13.0	13.80	326.03	12,448.33	17.5	24.05	2,272.73	84,100.18	5.37	4.25	9.62	9.73	919.19	31,359.93	13.80	10.88	1,027.69	57,872.73	0.90	4.31	407.25	36,904.71	0.00	0.33	30.71	72,989.62	
PE 55	99.50	5,966.0	15.6	14.30	355.71	12,804.04	13.8	15.65	1,557.18	85,657.35	6.04	4.70	10.73	10.17	1,012.32	32,372.25	11.14	12.47	1,240.77	59,113.50	0.35	0.62	62.14	36,966.85	0.00	0.00	0.00	72,989.62	
PE 56	103.50	6,069.5	18.8	17.20	445.05	13,249.09	25.2	19.50	2,018.25	87,675.60	7.16	5.37	12.52	11.63	1,203.45	33,575.70	16.66	13.90	1,438.65	60,552.15	7.44	3.90	403.13	37,369.98	0.35	0.18	18.11	73,007.73	
PE 57	106.00	6,175.5	12.0	15.40	408.10	13,657.19	19.6	22.40	2,374.40	90,050.00	4.70	3.13	7.83	10.17	1,078.46	34,654.16	8.14	12.40	1,314.40	61,866.55	7.15	7.30	773.27	38,143.25	0.23	0.29	30.48	73,038.21	
PE 57+8	8.00	6,183.5	10.4	11.20	22.40	13,679.59	43.0	31.30	2,504.40	90,300.40							8.70	8.42	67.36	61,933.91	47.70	27.43	219.40	38,362.65	1.60	0.91	7.30	73,045.51	
PE 58	115.00	6,298.5	16.4	13.40	385.25	14,064.84	15.0	29.00	3,335.00	93,635.40	5.81	5.81	11.63	9.73	1,196.41	35,850.57	13.41	10.78	1,239.13	63,173.03	0.00	3.58	411.13	38,773.78	0.00	0.11	12.94	73,058.44	
PE 59	98.50	6,397.0	16.0	16.20	398.93	14,463.77	13.6	14.30	1,408.55	95,043.95	5.81	4.92	10.73	11.18	1,101.26	36,951.83	12.83	13.12	1,292.07	64,465.11	0.00	0.00	0.00	38,773.78	0.00	0.00	0.00	73,058.44	
PE 60	93.00	6,490.0	17.4	16.70	388.28	14,852.04	32.9	23.25	2,162.25	97,206.20	5.14	4.81	9.95	10.34	961.79	37,913.62	13.25	13.04	1,212.49	65,677.60	8.39	4.20	390.14	39,163.91	0.00	0.00	0.00	73,058.44	
PE 61	101.50	6,591.5	14.0	15.70	398.39	15,250.43	24.2	28.55	2,897.83	100,104.03	6.93	4.02	10.96	10.45	1,061.04	38,974.66	20.00	16.63	1,687.44	67,365.03	10.05	9.22	935.58	40,099.49	4.32	2.16	219.24	73,277	

STATION NO.	DISTANCE		STRIPPING					CLEARING & GRUBBING					SODDING					EMBANKMENT (m³)					EXCAVATION (m³)				
	Partial (m)	Acc. (m)	L (m)	Av. (m²)	V (m³)	Acc. (m³)	L (m)	Av. (m)	A (m²)	Acc. (m²)	L ₁ (m)	L ₂ (m)	L ₁ +L ₂ (m)	Av. (m)	A (m²)	Acc. (m²)	V (m³)	A (m²)	Acc. (m²)	V (m³)	A (m²)	Acc. (m²)	V (m³)	A (m²)	Acc. (m²)	V (m³)	
PE 71	100.00	7,594.0	14.0	14.20	355.00	19,472.97	44.4	38.20	3,820.00	127,170.63	5.81	5.81	11.63	11.96	1,196.30	51,729.02	90,836.82	22.00	20.68	2,067.50	66.65	61.10	6,109.80	85,763.45			
PE 72	50.50	7,644.5	10.6	12.30	155.29	19,628.26	26.0	35.20	1,777.60	128,948.23	7.83	4.47	12.30	11.96	604.13	52,333.15	91,620.96	11.25	15.53	784.14	48,541.65	15.13	40.89	2,064.97	87,828.42		
PE 73	150.00	7,794.5	15.6	13.10	491.25	20,119.51	32.6	29.30	4,395.00	133,343.23	7.38	4.47	11.85	12.07	1,811.22	54,144.37	94,442.08	8.66	9.95	1,492.88	50,034.53	19.50	17.32	2,597.25	90,425.67		
PE 74	110.00	7,904.5	15.6	15.60	429.00	20,548.51	16.2	24.40	2,684.00	136,027.23	7.60	4.47	12.07	11.96	1,315.93	55,460.29	97,001.51	0.00	4.33	476.03	50,510.55	8.70	14.10	1,550.73	91,976.39		
PE 75	99.50	8,004.0	14.0	14.80	368.15	20,916.66	23.7	19.95	1,985.03	138,012.25	6.04	3.58	9.62	9.62	1,084.10	56,539.36	98,395.75	5.71	2.85	283.82	50,794.38	13.05	10.87	1,081.57	93,057.96		
PE 76	101.50	8,105.5	15.2	14.60	370.48	21,287.13	20.0	21.85	2,217.78	140,230.03	5.37	4.02	9.39	9.50	964.58	57,503.95	99,240.74	6.75	6.23	632.09	51,426.47	16.80	14.92	1,514.63	94,572.59		
PE 77	99.00	8,204.5	17.0	16.10	398.48	21,685.61	21.0	20.50	2,029.50	142,259.53	7.38	3.58	10.96	10.96	1,131.08	58,511.19	100,371.82	9.60	8.18	809.33	52,235.79	15.31	16.05	1,589.35	96,161.94		
PE 78	97.00	8,301.5	19.0	18.00	436.50	22,122.11	23.2	22.10	2,143.70	144,403.23	7.60	4.47	12.07	11.52	1,117.03	59,628.21	101,887.93	5.80	7.70	746.90	52,982.69	21.68	18.49	1,793.82	97,955.76		
PE 79	88.00	8,389.5	15.2	17.10	376.20	22,498.31	13.6	18.40	1,619.20	146,022.43	7.60	3.80	11.40	11.74	1,033.06	60,661.28	102,946.57	0.00	2.90	255.20	53,237.89	0.00	10.84	953.83	98,909.59		
PE 80	89.00	8,478.5	21.0	18.10	402.73	22,901.03	15.0	14.30	1,272.70	147,295.13	7.83	4.70	12.53	11.96	1,064.70	61,725.98	104,684.29	0.00	0.00	0.00	53,237.89	4.14	2.07	184.23	99,093.82		
PE 81	100.50	8,579.0	15.2	18.10	454.76	23,355.79	27.4	21.20	2,130.60	149,425.73	5.81	3.80	9.62	11.07	1,112.39	62,838.37	106,735.50	18.24	9.12	916.56	54,154.45	33.33	18.74	1,883.07	100,976.89		
PE 82	100.50	8,679.5	13.4	14.30	359.29	23,715.08	27.4	27.40	2,753.70	152,179.43	6.26	3.58	9.84	9.73	977.55	63,815.92	107,917.12	4.50	11.37	1,142.69	55,297.14	2.80	18.07	1,815.73	102,792.62		
PE 83	95.00	8,774.5	8.6	11.00	261.25	23,976.33	21.4	24.40	2,318.00	154,497.43	6.71	3.80	10.51	10.17	966.54	64,782.46	108,871.64	4.55	4.53	429.88	55,727.01	3.20	3.00	285.00	103,077.62		
PE 84+28	125.00	8,899.5	11.4	10.00	312.50	24,288.83	47.2	34.30	4,287.50	158,784.93								56.74	30.65	3,830.63	59,557.64	21.73	12.46	1,557.88	104,635.50		
PE 85	72.00	8,971.5	13.6	12.50	225.00	24,513.83	31.8	39.50	2,844.00	161,628.93	4.70	5.59	10.29	10.40	2,048.35	66,830.81	111,236.43	20.19	38.47	2,769.48	62,327.12	13.90	17.81	1,282.57	105,918.07		
PE 86	94.50	9,066.0	16.0	14.80	349.65	24,863.48	46.6	39.20	3,704.40	165,333.33	4.70	3.58	8.27	9.28	876.93	67,707.74	113,303.14	18.28	19.23	1,817.47	64,144.59	11.27	12.59	1,189.38	107,107.45		
PE 87	98.50	9,164.5	15.8	15.90	391.54	25,255.02	36.3	41.45	4,082.83	169,416.15	5.59	6.48	12.07	10.17	1,002.15	68,709.89	115,844.44	27.19	22.73	2,238.91	66,383.50	15.19	13.23	1,303.06	108,410.50		
PE 88	105.00	9,269.5	13.7	14.75	387.19	25,642.21	28.5	32.40	3,402.00	172,818.15	5.14	5.81	10.96	11.52	1,209.15	69,919.05	118,265.48	18.63	22.91	2,405.29	68,788.78	6.18	10.68	1,121.51	109,532.01		
PE 89	90.50	9,360.0	15.6	14.65	331.46	25,973.66	31.6	30.05	2,719.53	175,537.68	5.59	6.93	12.52	11.74	1,062.41	70,981.46	120,298.79	20.99	19.81	1,792.94	70,581.72	1.80	3.99	360.87	109,892.88		
PE 90	100.00	9,460.0	15.4	15.50	387.50	26,361.16	22.4	27.00	2,700.00	178,237.68	4.70	3.35	8.05	10.29	1,028.59	72,010.05	122,669.79	5.40	13.20	1,319.65	71,901.37	2.80	2.30	230.00	110,122.88		
PE 91	98.00	9,558.0	12.4	13.90	340.55	26,701.71	53.6	38.00	3,724.00	181,961.68	0.00	3.35	3.35	5.70	558.79	72,568.84	124,265.72	10.65	8.03	786.45	72,687.82	6.30	4.55	445.90	110,568.78		
PE 92	98.00	9,656.0	17.0	14.70	360.15	27,061.86	76.0	64.80	6,350.40	188,312.08	6.26	3.35	9.62	6.48	635.49	73,204.33	125,013.95	32.14	21.92	2,096.61	74,784.44	14.95	10.63	1,041.25	111,610.03		
PE 93	112.00	9,768.0	10.6	13.80	386.40	27,448.26	37.0	56.50	6,328.00	194,640.08	4.92	3.80	8.72	9.17	1,026.80	74,231.13	125,803.55	11.70	21.92	2,454.93	77,239.36	7.82	11.38	1,274.90	112,884.92		
PE 94	87.00	9,855.0	13.4	12.00	261.00	27,709.26	52.8	44.90	3,906.30	198,546.38	4.70	3.35	8.05	8.39	729.52	74,960.65	126,447.35	45.10	28.40	2,470.80	79,710.16	24.59	16.20	1,409.53	114,294.45		
PE 95	113.00	9,968.0	12.6	13.00	367.25	28,076.51	41.0	46.90	5,299.70	203,846.08	6.04	3.58	9.62	8.83	998.07	75,958.72	127,603.90	24.25	34.68	3,918.28	83,628.44	10.02	17.30	1,955.41	116,249.86		
PE 96	84.50	10,052.5	12.0	12.30	259.84	28,336.35	43.0	42.00	3,549.00	207,395.08	3.80	2.01	5.81	7.71	651.87	76,610.59	128,899.71	19.12	21.69	1,832.55	85,460.99	9.53	9.78	826.07	117,075.94		
PE 97	98.00	10,150.5	12.0	12.00	294.00	28,630.35	30.4	36.70	3,596.60	210,991.68	3.35	3.35	6.71	6.26	613.58	77,224.17	129,842.96	14.33	16.73	1,639.39	87,100.38	9.69	9.61	941.63	118,017.57		
PE 98	113.50	10,264.0	11.0	11.50	326.31	28,956.66	32.8	31.60	3,586.60	214,578.28	4.25	3.35	7.60	7.16	812.14	78,036.31	130,435.43	18.77	16.55	1,878.31	88,978.69	14.86	12.27	1,393.10	119,410.67		
PE 99	86.00	10,350.0	14.4	12.70	273.05	29,229.71	39.4	36.10	3,104.60	217,682.88	4.02	3.58	7.60	7.60	653.83	78,690.13	130,996.37	21.55	20.16	1,733.37	90,712.07	9.10	11.98	1,030.11	120,440.78		
PE 100	98.50	10,448.5	13.4	13.90	342.29	29,572.00	39.4	39.40	3,880.90	221,563.78	4.02	3.35	7.38	7.49	737.85	79,427.98	131,615.09	13.24	17.39	1,713.21	92,425.28	4.25	6.67	657.24	121,098.02		
PE 101	98.00	10,546.5	13.0	13.20	323.40	29,895.40	24.7	32.05	3,140.90	224,704.68	3.80	3.35	7.16	7.27	712.19	80,140.17	132,346.81	17.10	15.17	1,486.66	93,911.94	5.99	5.12	501.76	121,599.78		
PE 102	99.00	10,645.5	13.0	13.00	321.75	30,217.15	39.5	32.10	3,177.90	227,882.58	4.47	3.35	7.83	7.49	741.59	80,881.76	133,075.70	19.28	18.19	1,800.56	95,712.50	5.98	5.99	592.52	122,192.29		
PE 103	99.50	10,745.0	13.5	13.25	329.59	30,546.74	25.8	32.65	3,248.68	231,131.25	4.25	3.58	7.83	7.83	778.71	81,660.47	133,683.14	6.71	12.99	1,292.75	97,005.25	8.36	7.17	713.42	122,905.71		
PE 104	99.50	10,844.5	12.0	12.75	317.16	30,863.90	42.5	34.15	3,397.93	234,529.18	3.35	3.35	6.71	7.27	723.09	82,383.56	134,201.04	38.25	22.48	2,236.76	99,242.01	22.35	15.36	1,527.82	124,433.53		
PE 105	95.00	10,939.5	9.0	10.50	249.38	31,113.28	36.8	39.65	3,766.75	238,295.93	3.13	3.35	6.48	6.60	626.66	83,010.22	134,508.84	18.23	28.24	2,682.80	101,924.81	2.41	12.38	1,175.86	125,60		

STATION NO.	DISTANCE		STRIPPING				CLEARING & GRUBBING				S O D D I N G						EMBANKMENT (m ³)				EXCAVATION (m ³)				Below Water Level				
	Partial (m)	Acc. (m)	L (m)	Av. (m ²)	V (m ³)	Acc. (m ³)	L (m)	Av. (m)	A (m ²)	Acc. (m ³)	L ₁ (m)	L ₂ (m)	Av. (m)	A (m ²)	Acc. (m ³)	V (m ³)	A (m ²)	Av. (m ²)	V (m ³)	Acc. (m ³)	Up Water Level	Down Water Level	A (m ²)	Av. (m ²)	V (m ³)	A (m ²)	Av. (m ²)	V (m ³)	
PE 109	69.50	11,336.0	8.5	11.45	198.94	32,405.62	38.2	38.20	2,654.90	250,135.53	4.02	3.35	7.38	7.49	520.61	86,184.32	0.50	2.89	200.86	136,737.05	25.00	24.52	1,704.00	108,922.37	13.26	13.13	912.36	128,859.91	128,859.91
PE 110	100.00	11,436.0	13.2	10.85	271.25	32,676.87	39.0	38.60	3,860.00	253,995.53	5.14	3.35	8.50	7.94	793.80	86,978.12	2.88	1.69	169.00	136,906.05	26.15	25.58	2,557.50	111,479.87	13.86	13.56	1,355.75	130,215.66	130,215.66
PE 111	101.00	11,537.0	12.0	12.60	318.15	32,995.02	42.4	40.70	4,110.70	258,106.23	4.25	3.35	7.60	8.05	813.03	87,791.15	2.20	2.54	256.54	137,162.59	44.62	35.39	3,574.04	115,053.90	22.31	18.09	1,826.59	132,042.25	132,042.25
PE 112	98.50	11,635.5	8.0	10.00	246.25	33,241.27	40.0	41.20	4,058.20	262,164.43	4.02	3.35	7.38	7.49	737.85	88,529.00	3.60	2.90	285.65	137,448.24	33.89	39.25	3,866.32	118,920.22	15.18	18.75	1,846.38	133,888.63	133,888.63
PE 113	102.50	11,738.0	9.6	8.80	225.50	33,466.77	38.3	39.15	4,012.88	266,177.30	4.02	3.35	7.38	7.38	756.35	89,285.35	8.85	6.23	638.06	138,086.30	32.37	33.13	3,395.57	122,315.79	19.90	17.54	1,798.06	135,686.69	135,686.69
PE 114	95.00	11,833.0	8.0	8.80	209.00	33,675.77	39.0	38.65	3,671.75	269,849.05	3.13	3.35	6.48	6.93	658.52	89,943.87	2.81	5.83	553.85	138,640.15	42.80	37.59	3,570.58	125,886.37	16.38	18.14	1,723.49	137,410.18	137,410.18
PE 114+76	76.00	11,909.0	8.5	8.25	156.75	33,832.52	39.1	39.05	2,967.80	272,816.85							3.04	2.93	222.30	138,862.45	46.50	44.65	3,393.40	129,279.77	14.96	15.67	1,191.03	138,601.21	138,601.21
PE 115	22.00	11,931.0	7.4	7.95	43.73	33,876.24	38.6	38.85	854.70	273,671.55	3.13	3.35	6.48	6.48	635.49	90,579.36	1.90	2.36	51.81	138,914.26	38.31	40.56	892.21	130,171.98	15.30	15.84	348.48	138,949.69	138,949.69
PE 116	100.00	12,031.0	4.8	6.10	152.50	34,028.74	38.2	38.40	3,840.00	277,511.55	3.35	3.35	6.71	6.60	659.64	91,239.00	0.30	1.10	110.00	139,024.26	48.08	43.20	4,319.50	134,491.48	15.98	15.64	1,564.00	140,513.69	140,513.69
PE 117	98.50	12,129.5	0.0	2.40	59.10	34,087.84	39.0	38.60	3,802.10	281,313.65	3.35	3.35	6.71	6.71	660.76	91,899.76	0.00	0.15	14.78	139,039.03	50.54	49.31	4,857.08	139,348.56	15.59	15.78	1,554.77	142,068.46	142,068.46
PE 118	104.00	12,233.5	9.4	4.70	122.20	34,210.04	39.4	39.20	4,076.80	285,390.45	3.80	3.35	7.16	6.93	720.91	92,620.67	8.14	4.07	423.28	139,462.31	46.53	48.54	5,047.69	144,396.25	14.26	14.92	1,551.94	143,620.40	143,620.40
PE 119	96.00	12,329.5	10.0	9.70	232.80	34,442.84	36.4	37.90	3,638.40	289,028.85	0.45	3.35	3.80	5.48	525.92	93,146.59	1.35	4.75	455.52	139,917.83	36.68	41.61	3,994.08	148,390.33	15.55	14.90	1,430.74	145,051.14	145,051.14
PE 120	100.00	12,429.5	9.4	9.70	242.50	34,683.34	40.6	38.50	3,850.00	292,878.85	3.80	3.35	7.16	5.48	547.84	93,694.43	6.40	3.88	387.50	140,305.33	52.09	44.39	4,438.50	152,828.83	19.17	17.36	1,736.20	146,787.34	146,787.34
PE 121	102.50	12,532.0	7.8	8.60	220.38	34,905.72	40.6	40.60	4,161.50	297,040.35	3.35	3.35	6.71	6.93	710.51	94,404.94	3.30	4.85	497.13	140,802.46	56.64	54.37	5,572.52	158,401.35	18.36	18.77	1,923.77	148,711.11	148,711.11
PE 122	98.00	12,630.0	6.6	7.20	176.40	35,082.12	39.5	40.05	3,974.90	300,965.25	2.68	3.35	6.04	6.37	624.53	95,029.47	1.82	2.56	250.88	141,053.34	55.47	56.05	5,493.24	163,894.59	16.44	17.40	1,705.49	150,416.61	150,416.61
PE 123	98.00	12,728.0	7.0	6.80	166.60	35,248.72	35.6	37.55	3,679.90	304,645.15	3.35	3.35	6.71	6.37	624.53	95,654.01	2.18	2.00	195.76	141,249.09	51.06	54.76	5,366.53	169,261.12	17.49	16.97	1,662.67	152,079.27	152,079.27
PE 124	104.00	12,832.0	5.0	6.00	156.00	35,404.72	37.7	36.65	3,811.60	308,456.75	2.24	3.35	5.59	6.15	639.52	96,293.52	0.51	1.34	139.62	141,388.71	52.48	53.27	5,540.08	174,801.20	13.42	15.46	1,607.37	153,686.65	153,686.65
PE 125	97.50	12,929.5	5.2	5.10	124.31	35,529.03	38.0	37.85	3,690.38	312,147.13	2.24	3.35	5.59	5.59	545.04	96,838.56	0.99	0.75	73.13	141,461.84	52.48	52.48	5,117.00	179,918.20	13.42	13.42	1,308.45	154,995.10	154,995.10
PE 126	102.00	13,031.5	8.0	6.60	168.30	35,697.33	40.2	39.10	3,988.20	316,135.33	2.68	3.35	6.04	5.81	593.01	97,431.37	3.24	2.12	215.73	141,677.57	52.58	52.53	5,358.06	185,276.26	21.57	17.49	1,784.29	156,779.38	156,779.38
PE 127	91.00	13,122.5	7.0	7.50	170.63	35,867.96	41.8	41.00	3,731.00	319,866.33	2.01	3.35	5.37	5.70	518.88	97,950.45	2.31	2.78	252.53	141,930.09	63.43	59.00	5,369.23	190,645.48	27.62	24.60	2,238.19	159,017.57	159,017.57
PE 128	108.00	13,230.5	0.0	3.50	94.50	35,962.46	39.0	40.40	4,363.20	324,229.53	2.24	3.35	5.59	5.48	591.66	98,542.11	0.81	1.56	168.48	142,098.57	57.32	61.37	6,628.23	197,273.71	21.00	24.31	2,625.70	161,643.27	161,643.27
PE 129	95.50	13,326.0	10.0	5.00	119.38	36,081.83	30.6	34.80	3,323.40	327,552.93	3.35	3.35	6.71	6.15	587.25	99,129.36	8.17	4.49	428.80	142,527.37	43.74	50.53	4,825.52	202,099.23	11.41	16.21	1,547.72	163,190.99	163,190.99
PE 129+43	53.00	13,379.0	0.0	5.00	66.25	36,148.08	15.0	22.80	1,208.40	328,761.33							7.02	7.60	402.54	142,929.90	23.22	33.48	1,774.47	203,873.70	4.64	8.03	425.38	163,616.37	163,616.37
PE 130	43.50	13,422.5	8.4	4.20	45.68	36,193.76	21.0	18.00	783.00	329,544.33	2.91	4.50	7.41	7.06	681.05	99,810.41	5.87	7.02	305.37	143,235.27	35.12	39.43	1,715.12	205,588.82	10.48	10.95	476.24	164,092.61	164,092.61
PE 131	99.00	13,521.5	2.0	5.20	128.70	36,322.46	17.8	19.40	1,920.60	331,464.93	1.79	4.50	6.29	6.85	677.94	100,488.35	0.49	3.18	314.82	143,550.09	24.92	30.02	2,971.78	208,560.60	0.65	5.57	551.08	164,643.69	164,643.69
PE 132	98.00	13,619.5	8.0	5.00	122.50	36,444.96	19.6	18.70	1,832.60	333,297.53	2.68	4.50	7.18	6.74	660.13	101,148.49	3.38	1.93	189.39	143,739.48	29.92	27.42	2,686.92	211,247.51	1.76	1.21	118.09	164,761.78	164,761.78
PE 133	98.50	13,718.0	0.0	4.00	98.50	36,543.46	17.6	18.60	1,832.10	335,129.63	0.45	4.50	4.95	6.07	597.43	101,745.91	0.00	1.69	166.22	143,905.70	38.23	34.07	3,356.34	214,603.85	4.64	3.20	315.20	165,076.98	165,076.98
PE 134	99.50	13,817.5	5.0	2.50	62.19	36,603.64	21.0	19.30	1,920.35	337,049.98	0.89	4.50	5.59	5.17	514.50	102,260.41	0.76	0.38	37.81	143,943.51	46.83	42.53	4,231.74	218,835.59	6.74	5.69	566.01	165,642.98	165,642.98
PE 135	102.00	13,919.5	5.0	5.00	127.50	36,733.14	18.2	19.60	1,999.20	339,049.18	0.89	4.50	5.59	5.39	550.23	102,810.64	0.88	0.82	83.39	144,026.89	36.25	41.54	4,236.88	223,072.46	2.24	4.49	457.78	166,100.76	166,100.76
PE 136	93.00	14,012.5	5.0	5.00	116.25	36,849.39	16.4	17.30	1,608.90	340,658.08	0.45	4.50	4.95	5.17	480.89	103,291.53	1.00	0.94	87.19	144,114.08	10.98	23.61	2,195.87	225,268.33	0.30	1.27	118.06	166,218.82	166,218.82
PE 137	100.50	14,113.0	5.0	5.00	125.63	36,975.02	12.0	14.20	1,427.10	342,085.18	0.89	4.50	5.59	5.17	519.67	103,811.20	1.48	1.24	124.62	144,238.70	5.98	8.48	851.99	226,120.32	0.00	0.15	15.08	166,233.90	166,233.90
PE 137+39	39.00	14,152.0	5.0	5.00	48.75	37,023.77	17.4	14.70	573.30	342,658.48							0.46	0.97	37.83	144,276.53	26.73	16.35	637.75	226,758.07	2.81	1.40	54.72	166,288.62	166,288.62
PE 138	53.50	14,205.5	7.0	6.00	80.25	37,104.02	06.6	12.00	642.00	343,300.48	1.79	4.50	6.29	5.84	540.35	104,351.55	4.00	2.74	146.59	144,423.12	0.00	2.99	159.97	226,918.03	0.00	0.00	0.00	166,288.62	166,288.62
PE 139	107.00	14,312.5	6.0	6.50	173.88	37,277.89	22.7	14.65	1,567.55	344,868.03	1.24	4.50	5.74	6.01	643.36	104,994.91	1.62	2.81	300.67	144,723.79	45.12	22.56	2,413.92	229,331.95	10.10	5.05	540.19	166,828.81	166,828.81
PE 140	99.00	14,411.5	6.6	6.30	155.93	37,433.82	15.5	19.10	1,890.90																				

STATION NO.	DISTANCE		STRIPPING			CLEARING & GRUBBING			SODDING				EMBANKMENT (m³)				EXCAVATION (m³)			
	Partial (m)	Acc. (m)	L (m)	Av. (m³)	V (m³)	Acc. (m³)	L (m)	Av. (m)	A (m²)	Acc. (m³)	L ₁ (m)	L ₂ (m)	L ₁ +L ₂ (m)	Av. (m)	A (m²)	Acc. (m³)	Av. (m³)	V (m³)	Acc. (m³)	Below Water Level
PE 144	198.00	14,891.5	6.6	3.30	163.35	37,966.32	22.8	20.15	3,989.70	355,229.93	1.34	4.50	5.84	5.39	1,068.10	107,702.85	2.46	1.23	243.54	146,038.68
PE 145	99.00	14,990.5	6.6	6.60	163.35	38,129.67	17.5	20.15	1,994.85	357,224.78	1.34	4.50	5.84	5.84	578.32	108,281.17	2.52	2.49	246.51	146,283.19
PE 146	99.00	15,089.5	7.0	6.80	168.30	38,297.97	10.3	13.90	1,376.10	358,600.88	1.23	4.50	5.73	5.79	572.79	108,853.96	16.99	9.76	963.75	147,250.94
PE 147	99.50	15,189.0	6.0	6.50	161.69	38,459.66	12.6	11.45	1,139.28	359,740.15	1.12	4.50	5.62	5.67	564.56	109,418.52	1.95	9.47	942.27	148,193.20
PE 147+58	58.00	15,247.0	6.0	6.00	87.00	38,546.66	21.2	16.90	980.20	360,720.35							1.33	1.64	95.12	148,288.32
PE 148	39.00	15,286.0	5.0	5.50	53.63	38,600.28	20.3	20.75	809.25	361,529.60	0.78	4.50	5.28	5.45	528.68	109,947.20	1.08	1.52	59.09	148,347.41
PE 149	92.50	15,378.5	6.0	5.50	127.19	38,727.47	10.2	15.25	1,410.63	362,940.23	1.12	4.50	5.62	5.45	504.16	110,451.36	2.90	1.99	184.08	148,531.48
PE 150	87.50	15,466.0	7.0	6.50	142.19	38,869.66	54.2	32.20	2,817.50	365,757.73	1.57	7.00	8.57	7.09	620.52	111,071.87	2.73	2.82	246.31	148,777.79
PE 151	92.50	15,558.5	7.4	7.20	166.50	39,036.16	06.5	30.35	2,807.38	368,565.10	1.12	4.50	5.62	5.62	605.98	111,727.85	3.40	3.07	283.51	149,061.31
PE 152	102.50	15,661.0	6.2	6.80	174.25	39,210.41	17.5	12.00	1,230.00	369,795.10	1.12	4.50	5.62	5.62	575.85	112,303.70	1.95	2.68	274.19	149,335.49
PE 153	104.00	15,765.0	6.0	6.10	158.60	39,369.01	24.3	20.90	2,173.60	371,968.70	1.12	7.00	8.12	6.87	714.28	113,017.97	1.95	1.95	202.80	149,538.29
PE 154	95.00	15,860.0	6.0	6.00	142.50	39,511.51	08.5	16.40	1,558.00	373,526.70	0.89	0.00	0.89	4.51	428.09	113,446.07	20.27	11.11	1,053.45	150,593.74
PE 155	93.50	15,953.5	6.0	6.00	140.25	39,651.76	20.0	14.25	1,332.38	374,859.08	1.57	4.50	6.07	3.48	325.36	113,771.43	2.87	11.37	1,081.80	151,675.54
PE 156	102.50	16,056.0	8.0	7.00	179.38	39,831.13	24.8	22.40	2,296.00	377,155.08	2.24	4.50	6.74	6.40	656.07	114,427.50	4.90	3.89	398.21	152,073.75
PE 157	94.50	16,150.5	6.8	7.40	174.83	40,005.96	17.0	20.90	1,975.05	379,130.13	1.57	0.00	1.57	4.15	392.24	114,819.74	5.82	5.36	506.52	152,580.27
PE 158	97.00	16,247.5	0.0	3.40	82.45	40,088.41	00.0	8.50	824.50	379,954.63	1.34	4.50	5.84	3.70	359.23	115,178.97	66.50	36.16	3,507.52	156,087.79
PE 159	96.00	16,343.5	6.4	3.20	76.80	40,165.21	38.7	19.35	1,857.60	381,812.23	1.34	4.50	5.84	5.84	563.72	116,303.49	2.46	2.99	284.05	156,246.54
PE 160	96.50	16,440.0	6.4	6.40	154.40	40,319.61	19.8	29.25	2,822.63	384,634.85	1.34	4.50	5.84	5.84	543.27	116,846.76	3.01	2.74	254.36	156,538.84
PE 161	93.00	16,533.0	5.8	6.10	141.83	40,461.43	09.0	14.40	1,339.20	385,974.05	1.34	4.50	5.84	5.84	564.07	117,410.83	3.52	3.27	303.65	156,962.49
PE 162	93.00	16,626.0	6.6	6.20	144.15	40,605.58	29.6	19.30	1,794.90	387,768.95	1.79	4.50	6.29	6.07	576.20	117,987.03	2.46	2.99	284.05	156,246.54
PE 163	95.00	16,721.0	6.0	6.30	149.63	40,755.21	19.0	24.30	2,308.50	390,077.45	1.34	4.50	5.84	5.84	648.42	118,635.45	1.52	1.99	220.89	156,467.43
PE 164	111.00	16,832.0	6.0	6.00	166.50	40,921.71	23.4	21.20	2,353.20	392,430.65	1.34	4.50	5.84	5.84	567.14	119,202.59	0.68	1.10	113.30	156,580.73
PE 165	103.00	16,935.0	5.0	5.50	141.63	41,063.33	19.7	21.55	2,219.65	394,650.30	0.67	4.50	5.17	5.51	567.14	119,202.59	0.68	1.10	113.30	156,580.73
PE 166	93.00	17,028.0	4.6	4.80	111.60	41,174.93	16.5	18.10	1,683.30	396,333.60	0.67	4.50	5.17	5.17	480.89	119,683.48	0.54	0.61	56.73	156,637.46
PE 167	100.00	17,128.0	5.0	4.80	120.00	41,294.93	17.0	16.75	1,675.00	398,008.60	0.89	4.50	5.39	5.28	528.26	120,211.74	1.05	0.80	79.50	156,716.96
PE 168	98.00	17,226.0	5.0	5.00	122.50	41,417.43	22.3	19.65	1,925.70	399,934.30	0.89	0.00	0.89	3.14	308.15	120,519.89	1.05	1.05	102.90	156,819.86
PE 169	83.50	17,309.5	6.4	5.70	118.99	41,536.42	27.0	24.65	2,058.28	401,992.58	1.79	7.00	8.79	4.84	404.28	120,924.17	2.94	2.00	166.58	156,986.44
PE 169+59	59.00	17,368.5	0.0	3.20	47.20	41,583.62	14.2	20.60	1,215.40	403,207.98							3.19	3.07	180.84	157,167.27
PE 170	65.50	17,434.0	7.0	3.50	57.31	41,640.93	23.0	18.60	1,218.30	404,426.28	1.79	4.50	6.29	7.34	938.59	121,862.76	3.44	3.19	208.95	157,376.22
PE 171	104.00	17,538.0	6.0	6.50	169.00	41,809.93	19.7	21.35	2,220.40	406,646.68	1.34	4.50	5.84	6.07	630.79	122,493.54	2.11	2.78	288.60	157,664.82
PE 172	99.00	17,637.0	5.4	5.70	141.08	41,951.01	15.6	17.65	1,747.35	408,394.03	0.67	0.00	0.67	3.26	322.37	122,815.91	1.08	1.60	157.91	157,822.72
PE 173	91.50	17,728.5	5.4	5.40	123.53	42,074.53	12.8	14.20	1,299.30	409,693.33	0.89	4.50	5.39	3.03	277.49	123,093.39	1.05	1.07	97.45	157,920.17
PE 174	100.50	17,829.0	5.0	5.20	130.65	42,205.18	21.4	17.10	1,718.55	411,411.88	0.67	4.50	5.17	5.28	530.90	123,624.30	1.02	1.04	104.02	158,024.19
PE 175	93.00	17,922.0	4.6	4.80	111.60	42,316.78	15.6	18.50	1,720.50	413,132.38	0.67	4.50	5.17	5.17	480.89	124,105.18	0.70	0.86	79.98	158,104.17
PE 176	107.00	18,029.0	4.2	4.40	117.70	42,434.48	16.6	16.10	1,722.70	414,855.08	0.45	4.50	4.95	5.06	541.31	124,646.50	0.33	0.52	55.11	158,159.27
PE 176+73	73.00	18,102.0								414,855.08							0.24	0.29	20.81	158,180.08
PE 177	36.00	18,138.0	4.0	4.10	36.90	42,471.38	22.2	19.40	2,114.60	416,969.68	0.00	4.50	4.50	4.72	514.87	125,161.37	0.15	0.24	8.64	158,188.72
PE 178	95.00	18,233.0	4.2	4.10	97.38	42,568.76	19.0	20.60	1,957.00	418,926.68	0.22	4.50	4.72	4.61	438.12	125,599.49	0.31	0.23	21.85	158,210.57

STATION NO.	DISTANCE			STRIPPING			CLEARING & GRUBBING			SODDING			EMBANKMENT (m ³)			EXCAVATION (m ³)												
	Partial	Acc.	L	Av.	V	Acc.	L	Av.	A	Acc.	L ₁	L ₂	L ₃	Av.	A	Acc.	V	Acc.	Av.	A	Acc.	V	Acc.					
PE 179	103.00	18,336.0	7.0	5.60	144.20	42,712.96	21.4	20.20	2,080.60	421,007.28	2.24	4.50	6.74	5.73	590.17	126,189.67	3.15	1.73	178.19	168,388.76	44.50	38.26	3,940.93	363,982.85	12.93	12.61	1,298.57	204,152.29
PE 180	94.00	18,430.0	5.0	6.00	141.00	42,853.96	18.1	19.75	1,856.50	422,863.78	0.67	4.50	5.17	5.95	539.62	126,749.29	0.75	1.95	183.21	168,571.96	25.63	35.06	3,296.06	367,278.92	6.33	9.63	905.22	205,057.51
PE 181	170.50	18,600.5	5.4	5.20	221.65	43,075.61	23.2	20.65	3,520.83	426,384.60	1.34	7.00	8.34	6.76	1,151.94	127,901.23	2.07	1.41	239.98	168,811.94	45.34	35.49	6,050.19	373,329.11	5.00	5.66	965.80	206,023.31
PE 182	55.50	18,656.0	0.0	2.70	37.46	43,113.07	11.0	17.10	949.05	427,333.65	0.00	0.00	0.00	4.17	231.48	128,132.71	7.50	4.78	265.48	169,077.43	9.45	27.40	1,520.53	374,849.64	0.00	2.50	138.75	206,162.06
PE 183	91.00	18,747.0	0.0	0.00	0.00	43,113.07	27.4	19.20	1,747.20	429,080.85	0.22	7.00	7.22	3.61	328.67	128,461.38	0.00	3.75	341.25	169,418.68	66.45	37.95	3,453.54	378,303.18	5.65	2.82	256.94	206,419.00
PE 184	96.50	18,843.5	0.0	0.00	0.00	43,113.07	18.5	22.95	2,214.68	431,295.33	0.45	4.50	4.95	6.09	587.24	129,048.62	0.00	0.00	0.00	169,418.68	39.14	52.80	5,094.86	383,398.05	7.84	6.74	650.55	207,069.55
PE 185	98.50	18,942.0	0.0	0.00	0.00	43,113.07	13.0	15.75	1,551.38	432,846.90	0.89	0.00	0.89	2.92	287.70	129,336.32	5.00	2.50	246.25	169,664.93	8.45	23.80	2,343.86	385,741.90	0.00	3.92	385.92	207,455.47
PE 186	105.50	19,047.5	0.0	0.00	0.00	43,113.07	00.0	6.50	685.75	433,532.65	0.00	0.00	0.00	0.45	47.18	129,383.51	18.40	11.70	1,234.35	170,899.28	0.00	4.23	445.74	386,187.64	0.00	0.00	0.00	207,455.47
PE 187	102.50	19,150.0	0.0	0.00	0.00	43,113.07	03.6	1.80	184.50	433,717.15	0.00	0.00	0.00	0.00	0.00	129,383.51	0.00	9.20	943.00	171,842.28	0.12	0.06	6.15	386,193.79	0.00	0.00	0.00	207,455.47
PE 188	94.50	19,244.5	0.0	0.00	0.00	43,113.07	17.2	10.40	982.80	434,699.95	0.56	7.00	7.56	3.78	357.16	129,740.67	0.00	0.00	0.00	171,842.28	37.84	18.98	1,793.61	387,987.40	0.00	0.00	0.00	207,455.47
PE 189	97.00	19,341.5	0.0	0.00	0.00	43,113.07	10.1	13.65	1,324.05	436,024.00	1.34	4.50	5.84	6.70	649.93	130,390.60	0.00	0.00	0.00	171,842.28	13.37	25.61	2,483.69	390,471.09	0.00	0.00	0.00	207,455.47
PE 190	91.50	19,433.0	0.0	0.00	0.00	43,113.07	12.7	11.40	1,043.10	437,067.10	1.12	4.50	5.62	5.73	524.28	130,914.88	0.00	0.00	0.00	171,842.28	9.16	11.27	1,030.75	391,501.83	6.14	3.07	280.81	207,736.29
PE 191	95.00	19,528.0	3.0	1.50	35.63	43,148.69	20.0	16.35	1,553.25	438,620.35	0.22	4.50	4.72	5.17	491.23	131,406.11	0.15	0.08	7.13	171,849.40	35.04	22.10	2,099.26	393,601.10	12.04	9.09	863.46	208,599.74
PE 192	99.00	19,627.0	0.0	1.50	37.13	43,185.82	10.0	15.00	1,485.00	440,105.35	0.22	0.00	0.22	2.47	244.89	131,651.00	10.66	5.41	535.10	172,384.50	4.74	19.89	1,968.86	395,569.96	0.00	6.02	595.98	209,195.72
PE 193	104.50	19,731.5	0.0	0.00	0.00	43,185.82	20.5	15.25	1,593.63	441,698.98	0.45	4.50	4.95	2.59	270.18	131,921.17	0.00	5.33	556.99	172,941.48	47.03	25.88	2,704.93	398,274.89	12.87	6.44	672.67	209,868.39
PE 194	97.50	19,829.0	0.0	0.00	0.00	43,185.82	21.0	20.75	2,023.13	443,722.10	0.22	4.50	4.72	4.84	471.45	132,392.62	0.00	0.00	0.00	172,941.48	46.94	46.99	4,581.18	402,856.07	13.20	13.03	1,270.86	211,139.25
PE 195	93.00	19,922.0	0.0	0.00	0.00	43,185.82	10.0	15.50	1,441.50	445,163.60	0.22	4.50	4.72	4.72	439.30	132,831.92	0.00	0.00	0.00	172,941.48	40.25	43.60	4,054.66	406,910.73	10.16	11.68	1,086.05	212,225.31
PE 196	95.00	20,017.0	0.0	0.00	0.00	43,185.82	16.8	13.40	1,273.00	446,436.60	0.00	4.50	4.50	4.61	438.12	133,270.04	0.00	0.00	0.00	172,941.48	34.94	37.60	3,571.62	410,482.35	6.48	8.32	790.21	213,015.52
PE 197	98.00	20,115.0	0.0	0.00	0.00	43,185.82	00.0	8.40	823.20	447,259.80	0.00	0.00	0.00	2.25	220.50	133,490.54	0.00	0.00	0.00	172,941.48	0.00	17.47	1,712.01	412,194.36	0.00	3.24	317.28	213,332.79
PE 198	102.00	20,217.0	0.0	0.00	0.00	43,185.82	29.8	14.90	1,519.80	448,779.60	0.22	4.50	4.72	2.36	240.90	133,731.44	0.00	0.00	0.00	172,941.48	91.31	45.63	4,656.56	416,850.92	24.00	12.00	1,224.00	214,556.79
PE 199	89.00	20,306.0	0.0	0.00	0.00	43,185.82	46.0	37.90	3,373.10	452,152.70	0.45	4.50	4.95	4.84	430.35	134,161.80	0.00	0.00	0.00	172,941.48	132.67	111.99	9,966.67	426,817.58	42.00	33.00	2,937.00	217,493.79
PE 200	127.00	20,433.0	0.0	0.00	0.00	43,185.82	00.0	23.00	2,921.00	455,073.70	0.00	4.50	4.50	4.72	599.90	134,761.69	0.00	0.00	0.00	172,941.48	0.00	66.33	8,424.23	435,241.81	0.00	21.00	2,667.00	220,160.79
PE 200+25	25.00	20,458.0	0.0	0.00	0.00	43,185.82	02.0	1.00	25.00	455,098.70							0.00	0.00	0.00	172,941.48	0.00	0.00	0.00	435,241.81	0.00	0.00	0.00	220,160.79
PE 201	55.50	20,513.5	0.0	0.00	0.00	43,185.82	25.4	13.70	760.35	455,859.05	0.89	4.50	5.39	4.95	398.25	135,159.95	0.00	0.00	0.00	172,941.48	62.39	31.20	1,731.43	436,973.25	24.75	12.37	686.67	220,847.47
PE 202	111.00	20,624.5	0.0	0.00	0.00	43,185.82	14.0	19.70	2,186.70	458,045.75	0.89	4.50	5.39	5.39	598.78	135,758.73	0.00	0.00	0.00	172,941.48	14.07	38.23	4,243.59	441,216.83	0.00	12.37	1,373.35	222,220.81
PE 203	93.50	20,718.0	0.0	0.00	0.00	43,185.82	00.0	7.00	654.50	458,700.25	0.00	4.50	4.50	4.95	462.56	136,221.29	24.60	12.30	1,150.05	174,091.53	0.31	7.19	672.12	441,888.96	0.00	0.00	0.00	222,220.81
PE 204	99.00	20,817.0	0.0	0.00	0.00	43,185.82	23.0	11.50	1,138.50	459,838.75	0.78	4.50	5.28	4.89	484.24	136,705.53	0.00	0.00	0.00	175,309.23	55.80	28.06	2,777.54	444,666.50	20.09	10.04	994.31	223,215.12
PE 205	96.00	20,913.0	0.0	0.00	0.00	43,185.82	02.0	12.50	1,200.00	461,038.75	0.22	0.00	0.22	2.75	264.30	136,969.83	0.00	0.00	0.00	175,309.23	0.31	28.06	2,693.38	447,359.88	0.00	10.04	964.18	224,179.30
PE 206	86.00	20,999.0	0.0	0.00	0.00	43,185.82	19.8	10.90	937.40	461,976.15	3.80	4.50	8.30	4.26	366.57	137,336.40	0.00	0.00	0.00	175,309.23	37.91	19.11	1,643.25	449,003.12	14.50	7.25	633.29	224,802.58
PE 206+8	8.00	21,007.0															0.00	0.00	0.00	175,309.23	11.90	24.90	1,999.22	449,202.34	9.80	12.15	97.20	224,899.78
PE 207	107.00	21,114.0	0.0	0.00	0.00	43,185.82	07.2	13.50	1,552.50	463,528.65	0.45	0.00	0.45	4.37	503.04	137,839.44	17.67	8.84	945.35	176,254.58	0.31	19.11	2,044.50	451,246.84	0.00	7.25	775.48	225,675.26
PE 208	100.00	21,214.0	0.0	0.00	0.00	43,185.82	19.6	13.40	1,340.00	464,868.65	1.34	4.50	5.84	3.14	314.44	138,153.88	0.00	8.84	883.50	177,138.08	48.25	24.28	2,427.75	453,674.59	10.90	5.45	545.15	226,220.41
PE 209	133.00	21,347.0	0.0	0.00	0.00	43,185.82	00.0	9.80	1,303.40	466,172.05	0.89	0.00	0.89	3.37	447.95	138,601.83	0.00	0.00	0.00	177,138.08	0.00	24.12	3,208.29	456,882.89	0.00	5.45	725.05	226,945.46
PE 210	85.00	21,432.0	0.0	0.00	0.00	43,185.82	17.5	8.75	743.75	466,915.80	0.45	4.50	4.95	2.92	248.27	138,850.10	0.00	0.00	0.00	177,138.08	2.04	1.02	86.70	456,969.59	0.00	0.00	0.00	226,945.46
PE 211	81.50	21,513.5	0.0	0.00	0.00	43,185.82	15.3	16.40	1,356.60	468,252.40	1.12	4.50	5.62	5.28	430.53	139,280.64	0.00	0.00	0.00	177,138.08	26.79	14.41	1,174.66	458,144.24	5.88	2.94	239.61	227,185.07
PE 212	105.50	21,619.0	0.0	0.00	0.00	43,185.82	14.8	15.05	1,587.78	469,840.18	0.67	0.00	0.67	3.14	331.74	139,612.37	0.00	0.00	0.00	177,138.08	20.88	23.83	2,514.43	460,658.68	7.11	6.50	685.22	227,870.29
PE 213	120.00	21,739.0	0.0	0.00	0.00	43,185.82	17.0	15.90	1,908.00	471,748.18	1.12	4.50	5.62	3.14	377.33	139,989.71	0.00	0.00	0.00	177,138.08	18.45	19.67	2,359.86	463,018.54	13.16	10.14	1,216.44	229,086.73
PE 214	82.00	21,821.0	0.0	0.00	0.00	43,185.82	21.1	19.05																				

STATION NO.	DISTANCE			STRIPPING			CLEARING & GRUBBING			SODDING					EMBANKMENT (m³)					EXCAVATION (m³)								
	Partial (m)	Acc. (m)	L (m)	Av. (m³)	V (m³)	Acc. (m³)	L (m)	Av. (m³)	A (m³)	Acc. (m³)	L ₁ +L ₂ (m)	Av. (m³)	A (m³)	Acc. (m³)	V (m³)	Av. (m³)	A (m³)	Acc. (m³)	Up Water Level		Below Water Level							
																			A (m³)	V (m³)	A (m³)	V (m³)						
PE 215	70.50	21,891.5	0.0	0.00	0.00	43,185.82	20.0	20.55	1,448.78	474,759.05	0.67	4.50	5.17	5.39	380.31	140,830.69	0.00	0.00	177,138.08	45.99	39.16	2,760.46	467,860.78	12.03	17.62	1,241.96	231,819.62	
PE 216	97.00	21,988.5	0.0	0.00	0.00	43,185.82	23.8	21.90	2,124.30	476,883.35	1.12	4.50	5.62	5.39	523.26	141,353.95	0.00	0.00	177,138.08	52.43	49.21	4,773.37	472,634.15	28.96	20.49	1,987.97	233,807.58	
PE 217	115.00	22,103.5	0.0	0.00	0.00	43,185.82	18.8	21.30	2,449.50	479,332.85	1.12	4.50	5.62	5.62	646.07	142,000.02	0.00	0.00	177,138.08	30.43	41.43	4,764.51	477,398.65	7.62	18.29	2,103.35	235,910.93	
PE 218	127.00	22,230.5	0.0	0.00	0.00	43,185.82	23.6	21.20	2,692.40	482,025.25	2.24	4.50	6.74	6.18	784.49	142,784.51	0.00	0.00	177,138.08	69.10	49.76	6,319.96	483,718.62	26.21	16.92	2,148.71	238,059.65	
PE 219	88.00	22,318.5	0.0	0.00	0.00	43,185.82	08.4	16.00	1,408.00	483,433.25	1.34	4.50	5.84	6.29	553.42	143,337.93	0.00	0.00	177,138.08	2.40	35.75	3,146.00	486,864.62	0.00	13.11	1,153.42	239,213.06	
PE 220	115.50	22,434.0	0.0	0.00	0.00	43,185.82	26.4	17.40	2,009.70	485,442.95	1.34	4.50	5.84	5.84	674.71	144,012.64	0.00	0.00	177,138.08	78.10	40.25	4,648.64	491,513.26	29.09	14.54	1,679.72	240,892.78	
PE 221	106.00	22,540.0	0.0	0.00	0.00	43,185.82	22.0	24.20	2,565.20	488,008.15	2.46	4.50	6.96	6.40	678.47	144,691.11	0.00	0.00	177,138.08	56.97	67.53	7,158.39	498,671.65	23.70	26.39	2,797.76	243,690.54	
PE 222	104.50	22,644.5															0.00	0.00	177,138.08	1.20	29.08	3,039.28	501,710.93	5.76	14.73	1,539.39	245,229.93	
PE 223	116.50	22,761.0	0.0	0.00	0.00	43,185.82	19.4	20.70	4,574.70	492,582.85	1.34	4.50	5.84	6.40	1,414.55	146,105.65	0.00	0.00	177,138.08	37.65	19.42	2,262.72	503,973.65	13.00	9.38	1,092.48	246,322.41	
PE 224	112.00	22,873.0	0.0	0.00	0.00	43,185.82	25.0	22.20	2,486.40	495,069.25	1.34	7.00	8.34	7.09	794.26	146,899.92	0.00	0.00	177,138.08	69.32	33.48	5,990.04	509,963.69	13.00	13.00	1,455.72	247,778.13	
PE 225	96.00	22,969.0	0.0	0.00	0.00	43,185.82	34.2	29.60	2,841.60	497,910.85	1.34	7.00	8.34	8.34	800.80	147,700.72	0.00	0.00	177,138.08	109.75	89.53	8,595.26	518,558.96	14.42	13.71	1,315.97	249,094.10	
PE 226	95.50	23,064.5	0.0	0.00	0.00	43,185.82	13.8	24.00	2,292.00	500,202.85	0.00	4.50	4.50	6.42	613.19	148,313.90	0.00	0.00	177,138.08	14.47	62.11	5,931.27	524,490.22	3.00	8.71	831.61	249,925.71	
PE 227	97.00	23,161.5	0.0	0.00	0.00	43,185.82	24.2	19.00	1,843.00	502,045.85	0.22	4.50	4.72	4.61	447.34	148,761.25	0.00	0.00	177,138.08	49.74	32.10	3,113.89	527,604.12	23.84	13.42	1,301.74	251,227.45	
PE 228	94.00	23,255.5	0.0	0.00	0.00	43,185.82	17.0	20.60	1,936.40	503,982.25	1.34	4.50	5.84	5.28	496.57	149,257.82	0.00	0.00	177,138.08	21.62	35.68	3,353.87	530,937.99	10.00	16.92	1,590.29	252,817.75	
PE 229	98.00	23,353.5	0.0	0.00	0.00	43,185.82	00.0	8.50	833.00	504,815.25	0.00	0.00	0.00	2.92	286.24	149,544.06	11.00	5.50	177,677.08	0.00	10.81	1,059.48	532,017.47	0.00	5.00	489.80	253,307.55	
PE 230	97.00	23,450.5	0.0	0.00	0.00	43,185.82	21.2	10.60	1,028.20	505,843.45	1.34	4.50	5.84	2.92	283.32	149,827.38	0.00	5.50	178,210.58	46.07	23.03	2,234.30	534,251.77	16.92	8.46	820.77	254,128.32	
PE 231	67.50	23,518.0	0.0	0.00	0.00	43,185.82	08.0	14.60	985.50	506,828.95	0.45	4.50	4.95	5.39	364.12	150,191.50	0.00	0.00	178,210.58	3.64	24.85	1,677.65	535,929.41	0.00	8.46	571.15	254,699.47	
PE 232	118.50	23,636.5	0.0	0.00	0.00	43,185.82	20.0	14.00	1,659.00	508,487.95	0.89	4.50	5.39	5.17	612.74	150,804.24	0.00	0.00	178,210.58	32.20	17.92	1,213.22	538,052.64	15.41	7.70	912.75	255,612.21	
PE 233	108.00	23,744.5	4.0	2.00	54.00	43,239.82	14.5	17.25	1,863.00	510,350.95	0.00	4.50	4.50	4.95	534.30	151,338.54	0.50	0.25	178,237.58	9.82	21.01	2,269.03	540,321.66	1.47	8.44	911.25	256,523.46	
PE 234	100.00	23,844.5	0.0	2.00	50.00	43,289.82	20.6	17.55	1,755.00	512,105.95	0.00	4.50	4.50	4.50	450.00	151,788.54	0.10	0.30	178,267.58	34.10	21.96	2,196.10	542,517.76	17.09	9.28	927.85	257,451.31	
PE 235	88.00	23,932.5	0.0	0.00	0.00	43,289.82	23.6	22.10	1,944.80	514,050.75	1.57	4.50	6.07	5.28	464.87	152,253.41	0.00	0.05	178,271.98	21.11	27.60	2,429.11	544,946.87	21.39	19.24	1,692.99	259,144.30	
PE 236	98.00	24,030.5	10.0	5.00	122.50	43,412.32	24.2	23.90	2,342.20	516,392.95	4.02	4.50	8.52	7.30	714.92	152,968.33	7.15	3.58	178,622.33	17.70	19.40	1,901.64	546,848.51	12.52	16.96	1,661.64	260,805.94	
PE 237	89.50	24,120.0	0.0	5.00	111.88	43,524.19	22.4	23.30	2,085.35	518,478.30	0.45	4.50	4.95	6.74	602.88	153,571.21	0.00	3.58	178,942.29	37.10	27.40	2,452.21	549,300.72	14.15	13.33	1,193.44	261,999.38	
PE 238	86.50	24,206.5	0.0	0.00	0.00	43,524.19	11.8	17.10	1,479.15	519,957.45	0.45	4.50	4.95	4.95	427.93	153,999.14	0.00	0.00	178,942.29	15.08	26.09	2,256.70	551,557.42	3.11	8.63	746.41	262,745.79	
PE 239	116.50	24,323.0	0.0	0.00	0.00	43,524.19	23.0	17.40	2,027.10	521,984.55	1.34	4.50	5.84	5.39	628.45	154,627.59	0.00	0.00	178,942.29	42.84	28.96	3,373.90	554,931.32	11.11	7.11	828.55	263,574.33	
PE 240	111.00	24,434.0	0.0	0.00	0.00	43,524.19	10.4	16.70	1,853.70	523,838.25	0.45	4.50	4.95	5.39	598.28	155,226.37	0.00	0.00	178,942.29	4.14	23.49	2,607.45	557,538.76	0.00	5.56	616.83	264,191.16	
PE 241	98.00	24,532.0	0.0	0.00	0.00	43,524.19	20.4	15.40	1,509.20	525,347.45	0.56	4.50	5.06	5.00	490.31	155,716.68	0.00	0.00	178,942.29	38.89	21.52	2,108.52	559,647.28	12.62	6.31	618.23	264,809.39	
PE 242	192.00	24,724.0	9.0	4.50	216.00	43,740.19	07.2	13.80	2,649.60	527,997.05	0.00	1.50	1.50	3.28	629.67	156,346.34	3.85	1.93	179,311.89	0.00	19.45	3,733.54	563,380.82	0.00	6.31	1,211.23	266,020.63	
PE 243	82.00	24,806.0	4.6	6.80	139.40	43,879.59	42.0	24.60	2,017.20	530,014.25	0.45	7.00	7.45	4.47	366.84	156,713.18	0.53	2.19	179,338	179,491.27	117.60	58.80	4,821.44	568,202.25	12.05	6.02	494.01	266,514.64
PE 244	33.00	24,839.0	5.0	4.80	39.60	43,919.19	43.5	42.75	1,410.75	531,425.00	0.67	7.00	7.67	7.56	249.45	156,962.63	0.90	0.71	179,514.78	97.15	107.37	3,543.34	571,745.60	16.77	14.41	475.46	266,990.10	
PE 245	112.00	24,951.0	0.0	2.50	70.00	43,989.19	00.0	21.75	2,436.00	533,861.00	0.45	0.00	0.45	4.06	454.61	157,417.24	0.00	0.45	179,565.18	0.07	48.61	5,444.43	577,190.03	0.00	8.3			

Left Bank

STATION NO.	DISTANCE		STRIPPING			CLEANING & GRUBBING			SODDING					EMBANKMENT (m ³)				EXCAVATION (m ³)										
	Partial (m)	Acc. (m)	L (m)	Av. (m ²)	V (m ³)	Acc. (m ³)	L (m)	Av. (m ²)	A (m ²)	Acc. (m ³)	A (m ²)	Av. (m ²)	V (m ³)	Acc. (m ³)	A (m ²)	Av. (m ²)	V (m ³)	Up Water Level V. (m ³)	A (m ²)	Av. (m ²)	V (m ³)	Below Water Level V. (m ³)						
PE 252	93.00	25,648.5	2.0	1.00	23.25	44,544.38	18.6	14.50	1,348.50	541,690.05	0.45	0.00	0.45	2.47	230.05	159,671.63	0.26	0.13	12.09	184,546.45	10.51	17.94	1,668.23	586,232.24	3.00	2.40	223.15	270,417.88
PE 253	89.00	25,737.5	5.0	3.50	77.88	44,622.26	17.2	17.90	1,593.10	543,283.15	0.22	4.50	4.72	2.59	230.10	159,901.73	0.31	0.29	25.37	184,571.81	8.53	9.52	846.88	587,079.12	2.89	2.94	261.84	270,679.72
PE 254	102.00	25,839.5	5.0	5.00	127.50	44,749.76	05.5	11.35	1,157.70	544,440.85	0.67	0.40	1.07	2.90	293.52	160,197.25	1.60	0.96	97.41	184,669.22	0.00	4.26	434.78	587,513.89	3.08	2.98	304.37	270,984.09
PE 255	98.00	25,937.5	5.0	5.00	122.50	44,872.26	19.2	12.35	1,210.30	545,651.15	0.89	4.50	5.39	3.23	316.80	160,514.05	1.23	1.41	138.43	184,807.65	16.96	8.48	830.89	588,344.79	3.64	3.36	329.53	271,313.61
PE 256	100.00	26,037.5	7.0	6.00	150.00	45,022.26	14.5	16.85	1,685.00	547,336.15	1.57	4.50	6.07	5.73	572.98	161,087.03	3.08	2.15	215.25	185,022.90	9.86	13.41	1,340.60	589,685.39	0.50	2.07	207.10	271,520.71
PE 257	92.00	26,129.5	5.0	6.00	138.00	45,160.26	05.0	9.75	897.00	548,233.15	0.89	0.60	1.49	3.78	347.75	161,434.77	2.52	2.80	257.60	185,280.50	0.00	4.93	453.33	590,138.72	0.00	0.25	23.00	271,543.71
PE 258	97.00	26,226.5	4.2	4.60	111.55	45,271.81	04.2	4.60	446.20	548,679.35	0.22	0.10	0.32	0.91	88.17	161,522.95	0.35	1.44	139.20	185,419.69	0.00	0.00	0.00	590,138.72	1.11	0.55	53.59	271,597.31
PE 259	100.00	26,326.5	0.0	2.10	52.50	45,324.31	04.0	4.10	410.00	549,089.35	0.45	0.00	0.45	0.39	38.54	161,561.49	21.28	10.82	1,081.50	186,501.19	0.30	0.15	15.00	590,153.72	0.00	0.55	55.25	271,652.56
PE 260	96.50	26,423.0	0.0	0.00	0.00	45,324.31	20.6	12.30	1,186.95	550,276.30	0.45	4.50	4.95	2.70	260.28	161,821.77	0.00	10.64	1,026.76	187,527.95	53.78	27.04	2,609.55	592,763.27	4.21	2.11	203.23	271,855.79
PE 261	99.50	26,522.5	0.0	0.00	0.00	45,324.31	00.0	10.30	1,024.85	551,301.15	0.00	0.00	0.00	2.47	246.12	162,067.90	32.50	16.25	1,616.88	189,144.83	0.00	26.89	2,675.75	595,439.02	0.00	2.11	209.55	272,065.33
PE 262	98.50	26,621.0	0.0	0.00	0.00	45,324.31	05.6	2.80	275.80	551,576.95	0.22	1.00	1.22	0.61	60.26	162,128.16	0.00	16.25	1,600.63	190,745.45	0.55	0.28	27.09	595,466.11	0.00	0.00	0.00	272,065.33
PE 263	93.00	26,714.0	4.2	2.10	48.83	45,373.13	04.2	4.90	455.70	552,032.65	0.22	0.00	0.22	0.72	67.30	162,193.45	20.81	10.41	967.67	191,713.12	0.00	0.28	25.58	595,491.69	0.00	0.00	0.00	272,065.33
PE 264	88.00	26,802.0	0.0	2.10	46.20	45,419.33	21.4	12.80	1,126.40	553,159.05	0.45	4.50	4.95	2.59	227.52	162,422.97	0.00	10.41	915.64	192,628.76	43.35	21.67	1,907.27	597,398.96	9.30	4.65	409.07	272,474.40
PE 265	248.00	27,050.0	4.6	2.30	142.60	45,561.93	08.6	15.00	3,720.00	556,879.05	0.67	4.50	5.17	5.06	1,254.64	163,677.61	1.05	0.53	130.20	192,738.96	2.98	23.16	5,744.55	603,143.50	0.00	4.65	1,152.83	273,627.23
PE 266	93.50	27,145.5	0.0	2.30	54.91	45,616.84	18.4	13.50	1,289.25	558,168.30	0.22	4.50	4.72	4.95	472.46	164,150.06	0.00	0.53	50.14	192,809.09	15.87	9.42	899.90	604,043.40	3.13	1.56	149.41	273,776.64
PE 267	103.00	27,248.5	0.0	0.00	0.00	45,616.84	22.2	20.30	2,090.90	560,259.20	1.34	4.50	5.84	5.28	544.11	164,694.17	0.00	0.00	0.00	192,809.09	47.65	31.76	3,270.97	607,314.37	8.27	5.70	587.10	274,363.74
PE 268	91.00	27,339.5	0.0	0.00	0.00	45,616.84	16.0	19.10	1,738.10	561,997.30	0.67	4.50	5.17	5.51	501.07	165,193.24	0.00	0.00	0.00	192,809.09	32.31	39.98	3,638.13	610,952.51	0.00	4.14	376.33	274,740.07
PE 269	73.00	27,412.5	3.0	1.50	27.38	45,644.22	22.2	19.10	1,394.30	563,391.60	0.22	4.50	4.72	4.95	361.15	165,556.39	0.16	0.08	5.84	192,814.93	27.14	29.73	2,170.03	613,122.54	9.47	4.73	345.55	275,085.61
PE 269+64	64.00	27,476.5																										
PE 270	93.00	27,569.5	5.0	4.00	93.00	45,737.22	12.6	17.40	2,731.80	566,123.40	1.12	0.00	1.12	2.92	458.57	166,014.96	23.32	11.74	1,843.18	194,638.11	0.44	13.79	2,165.19	615,287.73	0.00	4.73	743.16	275,828.77
PE 271	124.50	27,694.0	5.4	5.20	161.85	45,899.07	22.4	17.50	2,178.75	568,302.15	1.12	4.50	5.62	3.37	419.32	166,434.28	1.93	12.62	1,571.50	196,229.61	27.34	13.89	1,729.43	617,017.16	6.79	3.40	422.68	276,251.45
PE 272	95.50	27,789.5	10.0	7.70	183.84	46,082.91	24.2	23.30	2,225.15	570,527.30	3.13	4.50	7.63	6.62	632.62	167,066.89	8.56	5.24	500.42	196,730.03	27.32	27.33	2,610.02	619,627.17	9.02	7.91	755.07	277,006.52
PE 273	75.00	27,864.5	7.8	8.90	166.88	46,249.78	12.2	18.20	1,365.00	571,892.30	2.01	4.50	6.51	7.07	530.36	167,597.26	5.00	6.78	508.31	197,238.35	26.38	26.85	2,013.53	621,640.70	5.66	7.34	550.58	277,557.10
PE 274	67.00	27,931.5	0.0	3.90	65.33	46,315.11	24.0	18.10	1,212.70	573,105.00	2.24	4.50	6.74	6.62	443.83	168,041.08	0.00	2.50	167.50	197,405.85	49.00	37.69	2,525.03	624,165.73	7.04	6.35	425.32	277,982.41
Total :	27,931.50				46,315.11				573,105.00						168,041.08			197,405.85	624,165.73									277,982.41

**GRAVEL PAVEMENT OF DIKE CROWN FOR INSPECTION ROAD
ALONG PERCUT RIVER**

STATION NO.	L E F T D I K E					R I G H T D I K E				
	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)
PE 0	0.0	-	-	-	-	0.0	2.5	0.2	0.0	0.00
PE 1	120.0	-	-	-	-	120.0	2.5	0.2	60.0	60.00
PE 2	92.0	-	-	-	-	92.0	2.5	0.2	46.0	106.00
PE 3	115.5	-	-	-	-	115.5	2.5	0.2	57.8	163.75
PE 4	109.0	-	-	-	-	109.0	2.5	0.2	54.5	218.25
PE 5	121.0	-	-	-	-	121.0	2.5	0.2	60.5	278.75
PE 6	82.0	-	-	-	-	82.0	2.5	0.2	41.0	319.75
PE 7	155.0	-	-	-	-	155.0	2.5	0.2	77.5	397.25
PE 8	96.0	-	-	-	-	96.0	2.5	0.2	48.0	445.25
PE 9	98.5	-	-	-	-	98.5	2.5	0.2	49.3	494.50
PE 10	118.5	-	-	-	-	118.5	2.5	0.2	59.3	553.75
PE 11	108.0	-	-	-	-	108.0	2.5	0.2	54.0	607.75
PE 12	148.0	-	-	-	-	148.0	2.5	0.2	74.0	681.75
PE 13	105.0	-	-	-	-	105.0	2.5	0.2	52.5	734.25
PE 14	95.0	2.0	0.2	38.0	38.00	95.0	2.5	0.2	47.5	781.75
PE 15	108.0	2.0	0.2	43.2	81.20	108.0	2.5	0.2	54.0	835.75
PE 16	94.0	2.0	0.2	37.6	118.80	94.0	2.5	0.2	47.0	882.75
PE 17	106.0	2.0	0.2	42.4	161.20	135.0	2.5	0.2	67.5	950.25
PE 18	92.0	2.0	0.2	36.8	198.00	45.0	2.5	0.2	22.5	972.75
PE 19	94.0	2.0	0.2	37.6	235.60	49.0	2.5	0.2	24.5	997.25
PE 20	110.0	2.0	0.2	44.0	279.60	75.0	2.5	0.2	37.5	1,034.75
PE 21	114.0	2.0	0.2	45.6	325.20	130.0	2.5	0.2	65.0	1,099.75
PE 22	97.0	2.0	0.2	38.8	364.00	97.0	2.5	0.2	48.5	1,148.25
PE 23	106.5	2.0	0.2	42.6	406.60	106.5	2.5	0.2	53.3	1,201.50
PE 24	102.0	2.0	0.2	40.8	447.40	102.0	2.5	0.2	51.0	1,252.50
PE 25	123.5	2.0	0.2	49.4	496.80	123.5	2.5	0.2	61.8	1,314.25
PE 26	91.0	2.0	0.2	36.4	533.20	91.0	2.5	0.2	45.5	1,359.75
PE 27	107.0	2.0	0.2	42.8	576.00	107.0	2.5	0.2	53.5	1,413.25
PE 28	104.0	2.0	0.2	41.6	617.60	104.0	2.5	0.2	52.0	1,465.25
PE 29	101.0	2.0	0.2	40.4	658.00	101.0	2.5	0.2	50.5	1,515.75
PE 30	110.5	2.0	0.2	44.2	702.20	110.5	2.5	0.2	55.3	1,571.00
PE 31	96.0	2.0	0.2	38.4	740.60	96.0	2.5	0.2	48.0	1,619.00
PE 32	94.5	2.0	0.2	37.8	778.40	94.5	2.5	0.2	47.3	1,666.25
PE 33	108.0	2.0	0.2	43.2	821.60	108.0	2.5	0.2	54.0	1,720.25
PE 34	106.0	2.5	0.2	53.0	874.60	106.0	2.5	0.2	53.0	1,773.25

STATION NO.	L E F T D I K E					R I G H T D I K E				
	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)
PE 35	116.0	2.5	0.2	58.0	932.60	116.0	2.5	0.2	58.0	1,831.25
PE 36	95.0	2.5	0.2	47.5	980.10	95.0	2.5	0.2	47.5	1,878.75
PE 37	94.0	2.5	0.2	47.0	1,027.10	94.0	2.5	0.2	47.0	1,925.75
PE 38	109.5	2.5	0.2	54.8	1,081.85	109.5	2.5	0.2	54.8	1,980.50
PE 39	93.0	2.5	0.2	46.5	1,128.35	93.0	2.5	0.2	46.5	2,027.00
PE 40	93.0	2.5	0.2	46.5	1,174.85	93.0	2.5	0.2	46.5	2,073.50
PE 41	110.5	2.5	0.2	55.3	1,230.10	110.5	2.5	0.2	55.3	2,128.75
PE 42	108.0	2.5	0.2	54.0	1,284.10	108.0	2.5	0.2	54.0	2,182.75
PE 43	91.0	2.5	0.2	45.5	1,329.60	91.0	2.5	0.2	45.5	2,228.25
PE 44	98.5	2.5	0.2	49.3	1,378.85	98.5	2.5	0.2	49.3	2,277.50
PE 45	134.5	2.5	0.2	67.3	1,446.10	134.5	2.5	0.2	67.3	2,344.75
PE 46	73.0	2.5	0.2	36.5	1,482.60	73.0	2.5	0.2	36.5	2,381.25
PE 47	101.0	2.5	0.2	50.5	1,533.10	101.0	2.5	0.2	50.5	2,431.75
PE 48	98.0	2.5	0.2	49.0	1,582.10	98.0	2.5	0.2	49.0	2,480.75
PE 49	102.0	2.5	0.2	51.0	1,633.10	102.0	2.5	0.2	51.0	2,531.75
PE 50	120.0	2.5	0.2	60.0	1,693.10	120.0	2.5	0.2	60.0	2,591.75
PE 51	76.5	2.5	0.2	38.3	1,731.35	76.5	2.5	0.2	38.3	2,630.00
PE 52	130.0	2.5	0.2	65.0	1,796.35	130.0	2.5	0.2	65.0	2,695.00
PE 53	86.0	2.5	0.2	43.0	1,839.35	86.0	2.5	0.2	43.0	2,738.00
PE 54	94.5	2.5	0.2	47.3	1,886.60	94.5	2.5	0.2	47.3	2,785.25
PE 55	99.5	2.5	0.2	49.8	1,936.35	99.5	2.5	0.2	49.8	2,835.00
PE 56	103.5	2.5	0.2	51.8	1,988.10	103.5	2.5	0.2	51.8	2,886.75
PE 57	106.0	2.5	0.2	53.0	2,041.10	106.0	2.5	0.2	53.0	2,939.75
PE 58	123.0	2.5	0.2	61.5	2,102.60	123.0	2.5	0.2	61.5	3,001.25
PE 59	98.5	2.5	0.2	49.3	2,151.85	98.5	2.5	0.2	49.3	3,050.50
PE 60	93.0	2.5	0.2	46.5	2,198.35	93.0	2.5	0.2	46.5	3,097.00
PE 61	101.5	2.5	0.2	50.8	2,249.10	101.5	2.5	0.2	50.8	3,147.75
PE 62	95.5	2.5	0.2	47.8	2,296.85	95.5	2.5	0.2	47.8	3,195.50
PE 63	99.5	2.5	0.2	49.8	2,346.60	99.5	2.5	0.2	49.8	3,245.25
PE 64	103.0	2.5	0.2	51.5	2,398.10	103.0	2.5	0.2	51.5	3,296.75
PE 65	114.0	2.5	0.2	57.0	2,455.10	108.0	2.5	0.2	54.0	3,350.75
PE 66	125.0	2.5	0.2	62.5	2,517.60	86.0	2.5	0.2	43.0	3,393.75
PE 67	96.0	2.5	0.2	48.0	2,565.60	94.0	2.5	0.2	47.0	3,440.75
PE 68	100.0	2.5	0.2	50.0	2,615.60	98.0	2.5	0.2	49.0	3,489.75
PE 69	98.5	2.5	0.2	49.3	2,664.85	95.0	2.5	0.2	47.5	3,537.25
PE 70	108.0	2.5	0.2	54.0	2,718.85	75.0	2.5	0.2	37.5	3,574.75
PE 71	97.0	2.5	0.2	48.5	2,767.35	104.0	2.5	0.2	52.0	3,626.75

STATION NO.	L E F T D I K E					R I G H T D I K E				
	Distance	Width	Height	Volume	Accumulated	Distance	Width	Height	Volume	Accumulated
	(Length) (m)	(m)	(m)	(m ³)	(m ³)	(Length) (m)	(m)	(m)	(m ³)	(m ³)
PE 72	71.0	2.5	0.2	35.5	2,802.85	114.0	2.5	0.2	57.0	3,683.75
PE 73	134.0	2.5	0.2	67.0	2,869.85	40.0	2.5	0.2	20.0	3,703.75
PE 74	0.0	2.5	0.2	0.0	2,869.85	172.0	2.5	0.2	86.0	3,789.75
PE 75	114.0	2.5	0.2	57.0	2,926.85	52.0	2.5	0.2	26.0	3,815.75
PE 76	120.0	2.5	0.2	60.0	2,986.85	20.0	2.5	0.2	10.0	3,825.75
PE 77	71.0	2.5	0.2	35.5	3,022.35	193.0	2.5	0.2	96.5	3,922.25
PE 78	125.0	2.5	0.2	62.5	3,084.85	17.5	2.5	0.2	8.8	3,931.00
PE 79	34.0	2.5	0.2	17.0	3,101.85	245.0	2.5	0.2	122.5	4,053.50
PE 80	124.0	2.5	0.2	62.0	3,163.85	0.0	2.5	0.2	0.0	4,053.50
PE 81	96.0	2.5	0.2	48.0	3,211.85	46.0	2.5	0.2	23.0	4,076.50
PE 82	38.0	2.5	0.2	19.0	3,230.85	149.0	2.5	0.2	74.5	4,151.00
PE 83	110.0	2.5	0.2	55.0	3,285.85	0.0	2.5	0.2	0.0	4,151.00
PE 84+28	110.0	2.5	0.2	55.0	3,340.85	130.0	2.5	0.2	65.0	4,216.00
PE 85	70.0	2.5	0.2	35.0	3,375.85	63.0	2.5	0.2	31.5	4,247.50
PE 86	120.0	2.5	0.2	60.0	3,435.85	35.0	2.5	0.2	17.5	4,265.00
PE 87	105.0	2.5	0.2	52.5	3,488.35	89.0	2.5	0.2	44.5	4,309.50
PE 88	48.0	2.5	0.2	24.0	3,512.35	182.0	2.5	0.2	91.0	4,400.50
PE 89	89.0	2.5	0.2	44.5	3,556.85	95.0	2.5	0.2	47.5	4,448.00
PE 90	91.0	2.5	0.2	45.5	3,602.35	116.0	2.5	0.2	58.0	4,506.00
PE 91	130.0	2.5	0.2	65.0	3,667.35	31.0	2.5	0.2	15.5	4,521.50
PE 92	51.0	2.5	0.2	25.5	3,692.85	123.0	2.5	0.2	61.5	4,583.00
PE 93	102.5	2.5	0.2	51.3	3,744.10	116.0	2.5	0.2	58.0	4,641.00
PE 94	100.0	2.5	0.2	50.0	3,794.10	65.0	2.5	0.2	32.5	4,673.50
PE 95	128.0	2.5	0.2	64.0	3,858.10	91.0	2.5	0.2	45.5	4,719.00
PE 96	87.5	2.5	0.2	43.8	3,901.85	86.5	2.5	0.2	43.3	4,762.25
PE 97	100.0	2.5	0.2	50.0	3,951.85	93.0	2.5	0.2	46.5	4,808.75
PE 98	114.0	2.5	0.2	57.0	4,008.85	112.0	2.5	0.2	56.0	4,864.75
PE 99	85.0	2.5	0.2	42.5	4,051.35	87.0	2.5	0.2	43.5	4,908.25
PE 100	115.0	2.5	0.2	57.5	4,108.85	89.5	2.5	0.2	44.8	4,953.00
PE 101	95.0	2.5	0.2	47.5	4,156.35	105.0	2.5	0.2	52.5	5,005.50
PE 102	99.0	2.5	0.2	49.5	4,205.85	99.0	2.5	0.2	49.5	5,055.00
PE 103	101.0	2.5	0.2	50.5	4,256.35	94.0	2.5	0.2	47.0	5,102.00
PE 104	93.0	2.5	0.2	46.5	4,302.85	1,110.0	2.5	0.2	555.0	5,657.00
PE 105	92.0	2.5	0.2	46.0	4,348.85	100.0	2.5	0.2	50.0	5,707.00
PE 106	87.0	2.5	0.2	43.5	4,392.35	132.0	2.5	0.2	66.0	5,773.00
PE 107	99.5	2.5	0.2	49.8	4,442.10	100.0	2.5	0.2	50.0	5,823.00
PE 108	123.0	2.5	0.2	61.5	4,503.60	134.0	2.5	0.2	67.0	5,890.00

STATION NO.	L E F T D I K E					R I G H T D I K E				
	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)
PE 109	72.5	2.5	0.2	36.3	4,539.85	64.5	2.5	0.2	32.3	5,922.25
PE 110	100.0	2.5	0.2	50.0	4,589.85	100.0	2.5	0.2	50.0	5,972.25
PE 111	99.5	2.5	0.2	49.8	4,639.60	103.0	2.5	0.2	51.5	6,023.75
PE 112	95.0	2.5	0.2	47.5	4,687.10	102.5	2.5	0.2	51.3	6,075.00
PE 113	107.0	2.5	0.2	53.5	4,740.60	95.0	2.5	0.2	47.5	6,122.50
PE 114	93.0	2.5	0.2	46.5	4,787.10	97.0	2.5	0.2	48.5	6,171.00
PE 115	98.0	2.5	0.2	49.0	4,836.10	98.0	2.5	0.2	49.0	6,220.00
PE 116	95.0	2.5	0.2	47.5	4,883.60	84.0	2.5	0.2	42.0	6,262.00
PE 117	94.0	2.5	0.2	47.0	4,930.60	98.5	2.5	0.2	49.3	6,311.25
PE 118	104.0	2.5	0.2	52.0	4,982.60	104.0	2.5	0.2	52.0	6,363.25
PE 119	96.0	2.5	0.2	48.0	5,030.60	96.0	2.5	0.2	48.0	6,411.25
PE 120	100.0	2.5	0.2	50.0	5,080.60	100.0	2.5	0.2	50.0	6,461.25
PE 121	102.5	2.5	0.2	51.3	5,131.85	102.5	2.5	0.2	51.3	6,512.50
PE 122	98.0	2.5	0.2	49.0	5,180.85	98.0	2.5	0.2	49.0	6,561.50
PE 123	98.0	2.5	0.2	49.0	5,229.85	98.0	2.5	0.2	49.0	6,610.50
PE 124	104.0	2.5	0.2	52.0	5,281.85	104.0	2.5	0.2	52.0	6,662.50
PE 125	97.5	2.5	0.2	48.8	5,330.60	97.5	2.5	0.2	48.8	6,711.25
PE 126	102.0	2.5	0.2	51.0	5,381.60	102.0	2.5	0.2	51.0	6,762.25
PE 127	91.0	2.5	0.2	45.5	5,427.10	91.0	2.5	0.2	45.5	6,807.75
PE 128	108.0	2.5	0.2	54.0	5,481.10	108.0	2.5	0.2	54.0	6,861.75
PE 129	95.5	2.5	0.2	47.8	5,528.85	95.5	2.5	0.2	47.8	6,909.50
PE 130	96.5	2.5	0.2	48.3	5,577.10	96.5	2.5	0.2	48.3	6,957.75
PE 131	99.0	2.5	0.2	49.5	5,626.60	99.0	2.5	0.2	49.5	7,007.25
PE 132	98.0	2.5	0.2	49.0	5,675.60	98.0	2.5	0.2	49.0	7,056.25
PE 133	98.5	2.5	0.2	49.3	5,724.85	98.5	2.5	0.2	49.3	7,105.50
PE 134	99.5	2.5	0.2	49.8	5,774.60	99.5	2.5	0.2	49.8	7,155.25
PE 135	102.0	2.5	0.2	51.0	5,825.60	102.0	2.5	0.2	51.0	7,206.25
PE 136	93.0	2.5	0.2	46.5	5,872.10	93.0	2.5	0.2	46.5	7,252.75
PE 137	100.5	2.5	0.2	50.3	5,922.35	100.5	2.5	0.2	50.3	7,303.00
PE 138	92.5	2.5	0.2	46.3	5,968.60	92.5	2.5	0.2	46.3	7,349.25
PE 139	103.0	2.5	0.2	51.5	6,020.10	107.0	2.5	0.2	53.5	7,402.75
PE 140	86.0	2.5	0.2	43.0	6,063.10	97.0	2.5	0.2	48.5	7,451.25
PE 141	102.0	2.5	0.2	51.0	6,114.10	40.0	2.5	0.2	20.0	7,471.25
PE 142	78.0	2.5	0.2	39.0	6,153.10	93.0	2.5	0.2	46.5	7,517.75
PE 143	95.0	2.5	0.2	47.5	6,200.60	103.0	2.5	0.2	51.5	7,569.25
PE 144	104.0	2.5	0.2	52.0	6,252.60	85.0	2.5	0.2	42.5	7,611.75
PE 145	84.0	2.5	0.2	42.0	6,294.60	136.0	2.5	0.2	68.0	7,679.75

STATION NO.	LEFT DIKE					RIGHT DIKE				
	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)
PE 146	97.0	2.5	0.2	48.5	6,343.10	94.0	2.5	0.2	47.0	7,726.75
PE 147	104.0	2.5	0.2	52.0	6,395.10	75.0	2.5	0.2	37.5	7,764.25
PE 148	93.0	2.5	0.2	46.5	6,441.60	102.0	2.5	0.2	51.0	7,815.25
PE 149	101.0	2.5	0.2	50.5	6,492.10	53.0	2.5	0.2	26.5	7,841.75
PE 150	0.0	2.5	0.2	0.0	6,492.10	118.0	2.5	0.2	59.0	7,900.75
PE 151	117.0	2.5	0.2	58.5	6,550.60	88.0	2.5	0.2	44.0	7,944.75
PE 152	102.0	2.5	0.2	51.0	6,601.60	83.0	2.5	0.2	41.5	7,986.25
PE 153	97.0	2.5	0.2	48.5	6,650.10	121.0	2.5	0.2	60.5	8,046.75
PE 154	87.0	2.5	0.2	43.5	6,693.60	112.0	2.5	0.2	56.0	8,102.75
PE 155	99.0	2.5	0.2	49.5	6,743.10	38.0	2.5	0.2	19.0	8,121.75
PE 156	117.0	2.5	0.2	58.5	6,801.60	95.0	2.5	0.2	47.5	8,169.25
PE 157	112.0	2.5	0.2	56.0	6,857.60	63.0	2.5	0.2	31.5	8,200.75
PE 158	95.0	2.5	0.2	47.5	6,905.10	112.0	2.5	0.2	56.0	8,256.75
PE 159	58.0	2.5	0.2	29.0	6,934.10	87.0	2.5	0.2	43.5	8,300.25
PE 160	97.0	2.5	0.2	48.5	6,982.60	87.0	2.5	0.2	43.5	8,343.75
PE 161	93.0	2.5	0.2	46.5	7,029.10	82.0	2.5	0.2	41.0	8,384.75
PE 162	91.0	2.5	0.2	45.5	7,074.60	89.0	2.5	0.2	44.5	8,429.25
PE 163	92.0	2.5	0.2	46.0	7,120.60	98.0	2.5	0.2	49.0	8,478.25
PE 164	110.0	2.5	0.2	55.0	7,175.60	101.0	2.5	0.2	50.5	8,528.75
PE 165	123.0	2.5	0.2	61.5	7,237.10	60.0	2.5	0.2	30.0	8,558.75
PE 166	41.0	2.5	0.2	20.5	7,257.60	154.0	2.5	0.2	77.0	8,635.75
PE 167	91.0	2.5	0.2	45.5	7,303.10	126.0	2.5	0.2	63.0	8,698.75
PE 168	104.0	2.5	0.2	52.0	7,355.10	103.0	2.5	0.2	51.5	8,750.25
PE 169	87.0	2.5	0.2	43.5	7,398.60	45.0	2.5	0.2	22.5	8,772.75
PE 170	94.0	2.5	0.2	47.0	7,445.60	152.0	2.5	0.2	76.0	8,848.75
PE 171	93.0	2.5	0.2	46.5	7,492.10	124.0	2.5	0.2	62.0	8,910.75
PE 172	100.0	2.5	0.2	50.0	7,542.10	32.0	2.5	0.2	16.0	8,926.75
PE 173	90.0	2.5	0.2	45.0	7,587.10	102.0	2.5	0.2	51.0	8,977.75
PE 174	90.0	2.5	0.2	45.0	7,632.10	109.0	2.5	0.2	54.5	9,032.25
PE 175	99.0	2.5	0.2	49.5	7,681.60	62.0	2.5	0.2	31.0	9,063.25
PE 176	108.0	2.5	0.2	54.0	7,735.60	103.0	2.5	0.2	51.5	9,114.75
PE 177	67.0	2.5	0.2	33.5	7,769.10	73.0	2.5	0.2	36.5	9,151.25
PE 178	92.0	2.5	0.2	46.0	7,815.10	107.0	2.5	0.2	53.5	9,204.75
PE 179	101.0	2.5	0.2	50.5	7,865.60	112.0	2.5	0.2	56.0	9,260.75
PE 180	98.0	2.5	0.2	49.0	7,914.60	76.0	2.5	0.2	38.0	9,298.75
PE 181	156.0	2.5	0.2	78.0	7,992.60	209.0	2.5	0.2	104.5	9,403.25
PE 182	55.0	2.5	0.2	27.5	8,020.10	62.0	2.5	0.2	31.0	9,434.25

STATION NO.	L E F T D I K E					R I G H T D I K E				
	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)
PE 183	92.0	2.5	0.2	46.0	8,066.10	45.0	2.5	0.2	22.5	9,456.75
PE 184	68.0	2.5	0.2	34.0	8,100.10	145.0	2.5	0.2	72.5	9,529.25
PE 185	108.0	2.5	0.2	54.0	8,154.10	70.0	2.5	0.2	35.0	9,564.25
PE 186	108.0	2.5	0.2	54.0	8,208.10	90.0	2.5	0.2	45.0	9,609.25
PE 187	102.0	2.5	0.2	51.0	8,259.10	105.0	2.5	0.2	52.5	9,661.75
PE 188	86.0	2.5	0.2	43.0	8,302.10	113.0	2.5	0.2	56.5	9,718.25
PE 189	91.0	2.5	0.2	45.5	8,347.60	100.0	2.5	0.2	50.0	9,768.25
PE 190	94.0	2.5	0.2	47.0	8,394.60	73.0	2.5	0.2	36.5	9,804.75
PE 191	94.0	2.5	0.2	47.0	8,441.60	102.0	2.5	0.2	51.0	9,855.75
PE 192	99.0	2.5	0.2	49.5	8,491.10	92.0	2.5	0.2	46.0	9,901.75
PE 193	100.0	2.5	0.2	50.0	8,541.10	68.0	2.5	0.2	34.0	9,935.75
PE 194	90.0	2.5	0.2	45.0	8,586.10	111.0	2.5	0.2	55.5	9,991.25
PE 195	102.0	2.5	0.2	51.0	8,637.10	72.0	2.5	0.2	36.0	10,027.25
PE 196	94.0	2.5	0.2	47.0	8,684.10	94.0	2.5	0.2	47.0	10,074.25
PE 197	88.0	2.5	0.2	44.0	8,728.10	110.0	2.5	0.2	55.0	10,129.25
PE 198	105.0	2.5	0.2	52.5	8,780.60	101.0	2.5	0.2	50.5	10,179.75
PE 199	70.0	2.5	0.2	35.0	8,815.60	91.0	2.5	0.2	45.5	10,225.25
PE 200	86.0	2.5	0.2	43.0	8,858.60	63.0	2.5	0.2	31.5	10,256.75
PE 201	50.0	2.5	0.2	25.0	8,883.60	53.0	2.5	0.2	26.5	10,283.25
PE 202	116.0	2.5	0.2	58.0	8,941.60	99.0	2.5	0.2	49.5	10,332.75
PE 203	90.0	2.5	0.2	45.0	8,986.60	103.0	2.5	0.2	51.5	10,384.25
PE 204	95.0	2.5	0.2	47.5	9,034.10	95.0	2.5	0.2	47.5	10,431.75
PE 205	78.0	2.5	0.2	39.0	9,073.10	106.0	2.5	0.2	53.0	10,484.75
PE 206	85.0	2.5	0.2	42.5	9,115.60	95.0	2.5	0.2	47.5	10,532.25
PE 207	70.0	2.5	0.2	35.0	9,150.60	54.0	2.5	0.2	27.0	10,559.25
PE 208	100.0	2.5	0.2	50.0	9,200.60	88.0	2.5	0.2	44.0	10,603.25
PE 209	86.0	2.5	0.2	43.0	9,243.60	57.0	2.5	0.2	28.5	10,631.75
PE 210	49.0	2.5	0.2	24.5	9,268.10	48.0	2.5	0.2	24.0	10,655.75
PE 211	95.0	2.5	0.2	47.5	9,315.60	87.0	2.5	0.2	43.5	10,699.25
PE 212	105.0	2.5	0.2	52.5	9,368.10	93.0	2.5	0.2	46.5	10,745.75
PE 213	120.0	2.5	0.2	60.0	9,428.10	93.0	2.5	0.2	46.5	10,792.25
PE 214	76.0	2.5	0.2	38.0	9,466.10	104.0	2.5	0.2	52.0	10,844.25
PE 215	66.0	2.5	0.2	33.0	9,499.10	85.0	2.5	0.2	42.5	10,886.75
PE 216	70.0	2.5	0.2	35.0	9,534.10	67.5	2.5	0.2	33.8	10,920.50
PE 217	106.0	2.5	0.2	53.0	9,587.10	132.0	2.5	0.2	66.0	10,986.50
PE 218	127.0	2.5	0.2	63.5	9,650.60	114.0	2.5	0.2	57.0	11,043.50
PE 219	81.0	2.5	0.2	40.5	9,691.10	95.0	2.5	0.2	47.5	11,091.00

STATION NO.	L E F T D I K E					R I G H T D I K E				
	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)
PE 220	124.0	2.5	0.2	62.0	9,753.10	128.0	2.5	0.2	64.0	11,155.00
PE 221	88.0	2.5	0.2	44.0	9,797.10	57.0	2.5	0.2	28.5	11,183.50
PE 222	98.0	2.5	0.2	49.0	9,846.10	88.0	2.5	0.2	44.0	11,227.50
PE 223	104.0	2.5	0.2	52.0	9,898.10	94.0	2.5	0.2	47.0	11,274.50
PE 224	114.0	2.5	0.2	57.0	9,955.10	92.0	2.5	0.2	46.0	11,320.50
PE 225	29.0	2.5	0.2	14.5	9,969.60	96.0	2.5	0.2	48.0	11,368.50
PE 226	110.0	2.5	0.2	55.0	10,024.60	90.0	2.5	0.2	45.0	11,413.50
PE 227	99.0	2.5	0.2	49.5	10,074.10	98.0	2.5	0.2	49.0	11,462.50
PE 228	83.0	2.5	0.2	41.5	10,115.60	109.0	2.5	0.2	54.5	11,517.00
PE 229	97.0	2.5	0.2	48.5	10,164.10	87.0	2.5	0.2	43.5	11,560.50
PE 230	90.0	2.5	0.2	45.0	10,209.10	90.0	2.5	0.2	45.0	11,605.50
PE 231	55.0	2.5	0.2	27.5	10,236.60	115.0	2.5	0.2	57.5	11,663.00
PE 232	120.0	2.5	0.2	60.0	10,296.60	86.0	2.5	0.2	43.0	11,706.00
PE 233	111.0	2.5	0.2	55.5	10,352.10	95.0	2.5	0.2	47.5	11,753.50
PE 234	89.0	2.5	0.2	44.5	10,396.60	104.0	2.5	0.2	52.0	11,805.50
PE 235	100.0	2.5	0.2	50.0	10,446.60	90.0	2.5	0.2	45.0	11,850.50
PE 236	87.0	2.5	0.2	43.5	10,490.10	81.0	2.5	0.2	40.5	11,891.00
PE 237	97.0	2.5	0.2	48.5	10,538.60	106.0	2.5	0.2	53.0	11,944.00
PE 238	86.5	2.5	0.2	43.3	10,581.85	86.5	2.5	0.2	43.3	11,987.25
PE 239	116.5	2.5	0.2	58.3	10,640.10	116.5	2.5	0.2	58.3	12,045.50
PE 240	111.0	2.5	0.2	55.5	10,695.60	111.0	2.5	0.2	55.5	12,101.00
PE 241	98.0	2.5	0.2	49.0	10,744.60	98.0	2.5	0.2	49.0	12,150.00
PE 242	194.0	2.5	0.2	97.0	10,841.60	112.0	2.5	0.2	56.0	12,206.00
PE 243	0.0	2.5	0.2	0.0	10,841.60	100.0	2.5	0.2	50.0	12,256.00
PE 244	0.0	2.5	0.2	0.0	10,841.60	92.0	2.5	0.2	46.0	12,302.00
PE 245	162.0	2.5	0.2	81.0	10,922.60	86.0	2.5	0.2	43.0	12,345.00
PE 246	95.0	2.5	0.2	47.5	10,970.10	95.0	2.5	0.2	47.5	12,392.50
PE 247	109.0	2.5	0.2	54.5	11,024.60	63.0	2.5	0.2	31.5	12,424.00
PE 248	96.0	2.5	0.2	48.0	11,072.60	40.0	2.5	0.2	20.0	12,444.00
PE 249	58.0	2.5	0.2	29.0	11,101.60	162.0	2.5	0.2	81.0	12,525.00
PE 250	85.0	2.5	0.2	42.5	11,144.10	67.0	2.5	0.2	33.5	12,558.50
PE 251	95.0	2.5	0.2	47.5	11,191.60	91.0	2.5	0.2	45.5	12,604.00
PE 252	94.0	2.5	0.2	47.0	11,238.60	61.0	2.5	0.2	30.5	12,634.50
PE 253	92.0	2.5	0.2	46.0	11,284.60	67.0	2.5	0.2	33.5	12,668.00
PE 254	102.0	2.5	0.2	51.0	11,335.60	102.0	2.5	0.2	51.0	12,719.00
PE 255	75.0	2.5	0.2	37.5	11,373.10	147.0	2.5	0.2	73.5	12,792.50
PE 256	100.0	2.5	0.2	50.0	11,423.10	96.0	2.5	0.2	48.0	12,840.50

STATION NO.	LEFT DIKE					RIGHT DIKE				
	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)	Distance (Length) (m)	Width (m)	Height (m)	Volume (m ³)	Accumulated (m ³)
PE 257	93.5	2.5	0.2	46.8	11,469.85	82.5	2.5	0.2	41.3	12,881.75
PE 258	96.0	2.5	0.2	48.0	11,517.85	107.0	2.5	0.2	53.5	12,935.25
PE 259	95.0	2.5	0.2	47.5	11,565.35	145.0	2.5	0.2	72.5	13,007.75
PE 260	90.0	2.5	0.2	45.0	11,610.35	83.0	2.5	0.2	41.5	13,049.25
PE 261	91.0	2.5	0.2	45.5	11,655.85	57.0	2.5	0.2	28.5	13,077.75
PE 262	94.0	2.5	0.2	47.0	11,702.85	116.0	2.5	0.2	58.0	13,135.75
PE 263	90.0	2.5	0.2	45.0	11,747.85	109.0	2.5	0.2	54.5	13,190.25
PE 264	94.0	2.5	0.2	47.0	11,794.85	32.0	2.5	0.2	16.0	13,206.25
PE 265	251.0	2.5	0.2	125.5	11,920.35	210.0	2.5	0.2	105.0	13,311.25
PE 266	95.5	2.5	0.2	47.8	11,968.10	95.5	2.5	0.2	47.8	13,359.00
PE 267	103.0	2.5	0.2	51.5	12,019.60	103.0	2.5	0.2	51.5	13,410.50
PE 268	83.0	2.5	0.2	41.5	12,061.10	108.0	2.5	0.2	54.0	13,464.50
PE 269	73.0	2.5	0.2	36.5	12,097.60	72.0	2.5	0.2	36.0	13,500.50
PE 270	120.0	2.5	0.2	60.0	12,157.60	110.0	2.5	0.2	55.0	13,555.50
PE 271	127.0	2.5	0.2	63.5	12,221.10	103.0	2.5	0.2	51.5	13,607.00
PE 272	88.0	2.5	0.2	44.0	12,265.10	100.0	2.5	0.2	50.0	13,657.00
PE 273	65.0	2.5	0.2	32.5	12,297.60	99.0	2.5	0.2	49.5	13,706.50
PE 274	67.0	2.5	0.2	33.5	12,331.10	67.0	2.5	0.2	33.5	13,740.00
PE 274+27	27.0	2.5	0.2	13.5	12,344.60	0.0	2.5	0.2	0.0	13,740.00
PE 274+320						320.0	2.5	0.2	160.0	13,900.00
Total :	26,568.5			12,344.60		27,800.0			13,900.00	

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STRIPPING, SDDING AND EMBANKMENT OF PERCUT RIVER FOR ROAD

STATION No.	Partial Distance (m)	STRIPPING				SODDING							EMBANKMENT(m ³)			
		L (m)	T (m ²)	AT. (m ²)	V (m ³)	T ₁ (m)	T ₂ (m)	L ₁ (m)	L ₂ (m)	L ₁ +L ₂ (m)	AL. (m)	A (m ²)	AA. (m ²)	V (m ³)		
PE 14	0.00	0.00	0.00	0.00	0.00	-	-	0.00	1.00	1.00	0.50	0.00	0.00	0.00	0.00	
PE 15	38.00	0.00	0.00	0.00	0.00	-	-	0.00	1.00	1.00	1.00	38.00	0.00	0.00	0.00	
PE 16	94.00	0.00	0.00	0.00	0.00	-	-	0.00	1.00	1.00	1.00	94.00	0.00	0.00	0.00	
PE 17	106.00	5.00	0.25	0.13	13.25	0.40	-	0.89	1.00	1.89	1.45	153.17	0.26	0.13	13.78	
PE 18	93.50	5.00	0.25	0.25	23.38	0.40	-	0.89	1.00	1.89	1.89	176.72	0.60	0.43	40.21	
PE 19	90.00	5.00	0.25	0.25	22.50	0.30	-	0.67	1.00	1.67	1.78	160.20	2.00	1.30	117.00	
PE 20	97.50	5.00	0.25	0.25	24.38	0.40	-	0.89	1.00	1.89	1.78	173.55	1.20	1.60	156.00	
PE 21	123.00	5.00	0.25	0.25	30.75	0.20	-	0.45	1.00	1.45	1.67	205.41	2.00	1.60	196.80	
PE 22	97.00	5.00	0.25	0.25	24.25	0.40	-	0.89	1.00	1.89	1.67	161.99	2.00	2.00	194.00	
PE 23	106.50	5.00	0.25	0.25	26.63	0.40	-	0.89	1.00	1.89	1.89	201.29	1.60	1.80	191.70	
PE 24	102.00	5.00	0.25	0.25	25.50	0.50	-	1.12	1.00	2.12	2.01	204.51	2.75	2.18	221.85	
PE 25	123.50	5.00	0.25	0.25	30.88	0.40	-	0.89	1.00	1.89	2.01	247.62	1.75	2.25	277.88	
PE 26	91.00	5.00	0.25	0.25	22.75	0.50	-	1.12	1.00	2.12	2.01	182.46	2.30	2.03	184.28	
PE 27	107.00	5.00	0.25	0.25	26.75	0.10	-	0.22	1.00	1.22	1.67	178.69	0.75	1.53	163.18	
PE 28	104.00	5.00	0.25	0.25	26.00	0.50	-	1.12	1.00	2.12	1.67	173.68	2.50	1.63	169.00	
PE 29	101.00	5.00	0.25	0.25	25.25	0.30	-	0.67	1.00	1.67	1.90	191.40	2.40	2.45	247.45	
PE 30	110.50	5.00	0.25	0.25	27.63	0.80	-	1.79	1.00	2.79	2.23	246.42	4.00	3.20	353.60	
PE 31	96.00	5.00	0.25	0.25	24.00	0.30	-	0.67	1.00	1.67	2.23	214.08	1.75	2.88	276.00	
PE 32	94.50	5.00	0.25	0.25	23.63	0.80	-	1.79	1.00	2.79	2.23	210.74	4.00	2.88	271.69	
PE 33	108.00	5.00	0.25	0.25	27.00	0.75	-	1.68	1.00	2.68	2.74	295.38	4.50	4.25	459.00	
PE 33+100m	100.00	5.00	0.25	0.25	25.00		-		1.00	1.00	1.84	184.00		2.25	225.00	
TOTAL :	1983.00				449.50							3693.28			3758.40	

LOCATION : LOWER PERCUT RIVER (LEFT BANK)

1 - 28

PACKAGE : MFC-1

WORK ITEM : PARAPET WALL WORKS

TYPE :

NO.	WORK ITEM	Unit	L O C A T I O N			TOTAL
			PE 14 + 57 to PE 17 - 6.5 m L = 254.50 m	PE 48 + 20 to PE 33 L = 1,531 m		
1.	Excavation (common)	m ³	1.060 x 254.50 = 269.77	1.060 x 1,531.00 = 1,622.86		1,892.63
2.	Wet Stone Masonry (1 : 3)	m ³	0.793 x 254.50 = 201.82	0.793 x 1,531.00 = 1,214.08		1,415.90
3.	Formwork FW1	m ²	2.700 x 254.50 = 687.15	2.700 x 1,531.00 = 4,133.70		4,820.85
4.	Crusher Run Bedding	m ³	0.107 x 254.50 = 27.23	0.107 x 1,531.00 = 163.82		191.05
5.	Elastic Joint Filler , 10 mm thick	m ²	0.793 x 24.00 = 19.03	0.793 x 152.00 = 120.54		139.57
6.	Water stop, 30 cm wide	m	1.300 x 24.00 = 31.20	1.300 x 152.00 = 197.60		228.80
7.	Backfill by Selected Soil	m ³	0.568 x 254.50 = 144.56	0.568 x 1,531.00 = 869.61		1,014.16

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B5 NAME OF STRUCTURE: CONCRETE WALL
LOCATION : PEACUT RIVER

L = 120 m.

BILL OF QUANTITY

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
1.	EXCAVATION (Common)	M ³	$(2.7 \times 2.7) \times 0.7 \times 120$		259.20
2.	LEVELING CONCRETE (E)	M ³	$(2.78 \times 0.1) \times 120$		33.60
3.	CONCRETE WALL (C1)	M ³	$[(0.30 \times 0.75) \times 1.125 + (2.58 \times 0.70) + (120 \times 10) \times 0.3] \times 120$		255.60
4.	REINFORCING STEEL BAR	Tg	$913 = (2.5 \times 120) \times 104$	4492.80	
			$916 = (2.41 \times 2.44 \times 0.45 + 0.45 + 0.45 + 0.45) \times (2.75 + 3 + 0.1)$		
			$= (5.78 + 1.50) \times 120 \times 110$	7372.41	11875.21
5.	WATER STOP, 20cm wide.	M	$3.2 \times 119/10 = 1$		35.20
6.	CUSTOMER JUMP FILLER	M ²	$2.13 \times 120/10 = 1$		23.43
7.	CONCRETE STREET PILE TYPE PS-22	PU	$120/15$		240
8.	LOG PILE Ø450, L=4.0, 1.5m Interval	M	$(120/15 + 1) \times 4.0$		324
	FORM WORK				
	BACK FILL	M ²	$(2.7 \times 0.7 + 2.5) / 2 \times 120 + (4.13 \times 2) \times 120$		779.12
		M ³	$[(0.5 \times 0.3) \times 0.8] \times 120$		43.20

NAME OF STRUCTURE: PARAPET WALL
LOCATION : PERCUT RIVER

1 - 31

1.2 Medan Floodway

- Earth Works
- Sodding and Sprigging
- Gravel Pavement
- Kabupaten Road Pavement

EXCAVATION, EMBANKMENT, STRIPPING, CLEARING AND GRUBBING OF FLOODWAY (SURVEY 1995)

STATION NO.	Partial Distance (Left Bank)	Partial Distance (Right Bank)	EXCAVATION				EMBANKMENT				STRIPPING (1)				STRIPPING (2)				CLEARING & GRUBBING			
			Area (m ²)	Av. (m ²)	Volume (m ³)	Accumulated (m ³)	Area (m ²)	Av. (m ²)	Volume (m ³)	Accumulated (m ³)	Length (m)	Area (m ²)	Av. (m ²)	Volume (m ³)	Acc. (m ³)	Length (m)	Av. (m)	Area (m ²)	Accumulated (m ²)			
FW 2	0.0	0.0	40.0												0.0							
PE 274R+320	160.0	160.0	42.0	41.0	6,560.0	6,560.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.0	33.0	5,280.0			
PE 274R+340	20.0	20.0	0.0	21.0	420.0	6,980.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	320.0			
PE 274	0.0	0.0	44.8				0.0				0.0	0.0			0.0		34.0					
FW 0	27.0	20.0	45.0	44.9	1,212.3	1,212.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.0	34.5	931.5			
FW 1	20.0	20.0	48.0	46.5	930.0	2,142.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.0	36.5	730.0			
FW L/R 2	105.0	107.0	130.0	89.0	9,345.0	11,487.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.0	41.0	4,305.0			
FW 3	106.0	106.0	202.3	166.2	17,611.9	29,099.2	1.0	0.5	53.0	53.0	9.2	2.3	1.2	121.9	121.9	0.0	55.0	49.5	5,247.0			
FW 4	110.0	110.0	262.4	232.4	25,558.5	54,657.7	0.0	0.5	55.0	108.0	0.0	0.0	1.2	126.5	248.4	0.0	58.0	56.5	6,215.0			
FW 5	107.5	107.5	198.7	230.6	24,784.1	79,441.8	2.5	1.3	134.4	242.4	10.0	2.5	1.3	134.4	382.8	0.0	57.5	57.8	6,208.1			
FW 6	104.0	104.0	204.5	201.6	20,966.4	100,408.2	39.0	20.8	2,158.0	2,400.4	22.6	5.7	4.1	423.8	806.6	0.0	22.0	39.8	4,134.0			
FW 7	100.5	100.5	236.7	220.6	22,170.3	122,578.5	0.0	19.5	1,959.8	4,360.1	0.0	0.0	2.8	283.9	1,090.5	0.0	58.0	40.0	4,020.0			
FW 8	100.0	100.0	242.1	239.4	23,940.0	146,518.5	0.0	0.0	0.0	4,360.1	0.0	0.0	0.0	0.0	1,090.5	0.0	59.2	58.6	5,860.0			
FW 9	100.0	100.0	246.4	244.3	24,425.0	170,943.5	8.1	4.1	405.0	4,765.1	11.2	2.8	1.4	140.0	1,230.5	0.0	58.0	58.6	5,860.0			
FW 10	100.0	100.0	159.1	202.8	20,275.0	191,218.5	8.5	8.3	830.0	5,595.1	10.5	2.6	2.7	271.3	1,501.7	9.0	55.3	56.7	5,665.0			
FW 11	100.0	100.0	333.0	246.1	24,605.0	215,823.5	0.0	4.3	425.0	6,020.1	0.0	0.0	1.3	131.3	1,633.0	0.0	65.2	60.3	6,025.0			
FW 12	100.0	100.0	299.9	316.5	31,645.0	247,468.5	0.0	0.0	0.0	6,020.1	0.0	0.0	0.0	0.0	1,633.0	0.0	62.8	64.0	6,400.0			
FW 13	100.0	100.0	267.8	283.9	28,385.0	275,853.5	0.0	0.0	0.0	6,020.1	0.0	0.0	0.0	0.0	1,633.0	0.0	59.0	60.9	6,090.0			
FW 14	100.0	100.0	311.6	289.7	28,970.0	304,823.5	2.8	1.4	137.5	6,157.6	11.0	2.8	1.4	137.5	1,770.5	0.0	64.2	61.6	6,160.0			
FW 15	100.0	100.0	276.3	294.0	29,395.0	334,218.5	1.1	1.9	192.5	6,350.1	5.6	1.4	2.1	207.5	1,978.0	0.0	63.5	63.9	6,385.0			
FW 16	100.0	100.0	199.2	237.8	23,775.0	357,993.5	2.6	1.9	185.0	6,535.1	10.0	2.5	2.0	195.0	2,173.0	0.0	57.2	60.4	6,035.0			
FW 17	100.5	100.5	287.7	243.5	24,466.7	382,460.3	0.0	1.3	130.7	6,665.8	0.0	0.0	1.3	125.6	2,298.6	0.0	62.7	60.0	6,025.0			
FW 18	100.0	100.0	351.4	319.6	31,955.0	414,415.3	0.0	0.0	0.0	6,665.8	0.0	0.0	0.0	0.0	2,298.6	0.0	65.2	64.0	6,395.0			
FW 19	101.0	101.0	230.8	291.1	29,401.1	443,816.4	6.5	3.3	328.3	6,994.0	10.8	2.7	1.4	136.4	2,435.0	0.0	67.0	66.1	6,676.1			

SODDING, SPRIGGING AND BOULDER PITCHING OF FLOODWAY

STATION NO.	Partial Distance (m)	LEFT BANK									RIGHT BANK								
		SODDING			SPRIGGING			BOULDER PITCHING			SODDING			SPRIGGING			BOULDER PITCHING		
		L (m)	Av. (m)	A (m ²)	L (m)	Av. (m)	A (m ²)	L (m)	Av. (m)	A (m ²)	L (m)	Av. (m)	A (m ²)	L (m)	Av. (m)	A (m ²)	L (m)	Av. (m)	A (m ²)
FW 0	0.0	3.70	1.85	0.00															
FW 1	20.0	3.70	3.70	74.00															
FW 2	107.0	3.70	3.70	395.90															
FW 3	106.0	3.70	3.70	392.20	2.41	1.20	127.49	1.00	0.50	53.00	3.70	1.85	196.10	2.41	1.20	127.49	1.00	0.50	53.00
FW 4	110.0	3.70	3.70	407.00	0.72	1.56	172.07	1.00	1.00	110.00	3.70	3.70	407.00	0.72	1.56	172.07	1.00	1.00	110.00
FW 5	107.5	3.70	3.70	397.75	1.56	1.14	122.94	1.00	1.00	107.50	3.70	3.70	397.75	1.56	1.14	122.94	1.00	1.00	107.50
FW 6	104.0	3.70	3.70	384.80	1.20	1.38	143.93	1.00	1.00	104.00	3.70	3.70	384.80	1.20	1.38	143.93	1.00	1.00	104.00
FW 7	100.5	3.70	3.70	371.85	1.80	1.50	151.17	1.00	1.00	100.50	3.70	3.70	371.85	1.80	1.50	151.17	1.00	1.00	100.50
FW 8	100.0	3.70	3.70	370.00	3.31	2.56	255.58	1.00	1.00	100.00	3.70	3.70	370.00	3.31	2.56	255.58	1.00	1.00	100.00
FW 9	100.0	3.70	3.70	370.00	2.11	2.71	270.60	1.00	1.00	100.00	3.70	3.70	370.00	2.11	2.71	270.60	1.00	1.00	100.00
FW 10	100.0	3.70	3.70	370.00	1.68	1.89	189.48	1.00	1.00	100.00	3.70	3.70	370.00	1.68	1.89	189.48	1.00	1.00	100.00
FW 11	100.0	3.70	3.70	370.00	5.65	3.67	366.75	1.00	1.00	100.00	3.70	3.70	370.00	5.65	3.67	366.75	1.00	1.00	100.00
FW 12	100.0	3.70	3.70	370.00	4.69	5.17	516.98	1.00	1.00	100.00	3.70	3.70	370.00	4.69	5.17	516.98	1.00	1.00	100.00
FW 13	100.0	3.70	3.70	370.00	3.85	4.27	426.84	1.00	1.00	100.00	3.70	3.70	370.00	3.85	4.27	426.84	1.00	1.00	100.00
FW 14	100.0	3.70	3.70	370.00	5.41	4.63	462.90	1.00	1.00	100.00	3.70	3.70	370.00	5.41	4.63	462.90	1.00	1.00	100.00
FW 15	100.0	3.70	3.70	370.00	3.97	4.69	468.91	1.00	1.00	100.00	3.70	3.70	370.00	3.97	4.69	468.91	1.00	1.00	100.00
FW 16	100.0	3.70	3.70	370.00	2.53	3.25	324.68	1.00	1.00	100.00	3.70	3.70	370.00	2.53	3.25	324.68	1.00	1.00	100.00
FW 17	100.5	3.70	3.70	371.85	4.09	3.31	332.35	1.00	1.00	100.50	3.70	3.70	371.85	4.09	3.31	332.35	1.00	1.00	100.50
FW 18	100.0	3.70	3.70	370.00	5.65	4.87	486.93	1.00	1.00	100.00	3.70	3.70	370.00	5.65	4.87	486.93	1.00	1.00	100.00
FW 19	101.0	3.70	3.70	373.70	6.25	5.95	601.05	1.00	1.00	101.00	3.70	3.70	373.70	6.25	5.95	601.05	1.00	1.00	101.00
FW 20	99.5	3.70	3.70	368.15	6.97	6.61	657.90	1.00	1.00	99.50	3.70	3.70	368.15	6.97	6.61	657.90	1.00	1.00	99.50
FW 21	100.5	3.70	3.70	371.85	5.41	6.19	622.23	1.00	1.00	100.50	3.70	3.70	371.85	5.41	6.19	622.23	1.00	1.00	100.50
FW 22	100.5	3.70	3.70	371.85	3.97	4.69	471.25	1.00	1.00	100.50	3.70	3.70	371.85	3.97	4.69	471.25	1.00	1.00	100.50
FW 23	99.0	3.70	3.70	366.30	2.41	3.19	315.49	1.00	1.00	99.00	3.70	3.70	366.30	2.41	3.19	315.49	1.00	1.00	99.00
FW 24	100.0	3.70	3.70	370.00	0.96	1.68	168.44	1.00	1.00	100.00	3.70	3.70	370.00	0.96	1.68	168.44	1.00	1.00	100.00
FW 25	105.0	3.70	3.70	388.50	0.84	0.90	94.84	1.00	1.00	105.00	3.70	3.70	388.50	0.84	0.90	94.84	1.00	1.00	105.00
FW 26	103.0	3.70	3.70	381.10	2.11	1.47	151.83	1.00	1.00	103.00	3.70	3.70	381.10	2.11	1.47	151.83	1.00	1.00	103.00
FW 27	103.0	3.70	3.70	381.10	3.97	3.04	312.76	1.00	1.00	103.00	3.70	3.70	381.10	3.97	3.04	312.76	1.00	1.00	103.00
FW 28	101.5	3.70	3.70	375.55	5.77	4.87	494.24	1.00	1.00	101.50	3.70	3.70	375.55	5.77	4.87	494.24	1.00	1.00	101.50
FW 29	100.0																		
FW 30	100.0																		
FW 31	100.5																		
FW 32	100.0																		
FW 33	100.0																		
FW 34	101.0																		
FW 35	100.5																		
FW 36	100.0																		
FW 37	101.0																		
FW 38	100.0																		
FW 39	100.0																		
FW 39+50.5	50.5																		
TOTAL:	3,922.0	10,243.45			8,709.64			2,588.50			9,577.45			8,709.64			2,588.50		

GRAVEL PAVEMENT ON INSPECTION ROAD OF FLOODWAY

STATION NO.	LEFT DIKE					RIGHT DIKE			
	Distance (Length) (m)	Width (m)	Thickness (m)	Volume (m ³)	Accumulated (m ³)	Width (m)	Thickness (m)	Volume (m ³)	Accumulated (m ³)
FW 0	0.0	3.0	0.2	0.0	0.00				
FW 1	20.0	3.0	0.2	12.0	12.00				
FW 2	107.0	3.0	0.2	64.2	76.20				
FW 3	106.0	3.0	0.2	63.6	139.80	3.0	0.2	0.0	0.00
FW 4	110.0	3.0	0.2	66.0	205.80	3.0	0.2	66.0	66.00
FW 5	107.5	3.0	0.2	64.5	270.30	3.0	0.2	64.5	130.50
FW 6	104.0	3.0	0.2	62.4	332.70	3.0	0.2	62.4	192.90
FW 7	100.5	3.0	0.2	60.3	393.00	3.0	0.2	60.3	253.20
FW 8	100.0	3.0	0.2	60.0	453.00	3.0	0.2	60.0	313.20
FW 9	100.0	3.0	0.2	60.0	513.00	3.0	0.2	60.0	373.20
FW 10	100.0	3.0	0.2	60.0	573.00	3.0	0.2	60.0	433.20
FW 11	100.0	3.0	0.2	60.0	633.00	3.0	0.2	60.0	493.20
FW 12	100.0	3.0	0.2	60.0	693.00	3.0	0.2	60.0	553.20
FW 13	100.0	3.0	0.2	60.0	753.00	3.0	0.2	60.0	613.20
FW 14	100.0	3.0	0.2	60.0	813.00	3.0	0.2	60.0	673.20
FW 15	100.0	3.0	0.2	60.0	873.00	3.0	0.2	60.0	733.20
FW 16	100.0	3.0	0.2	60.0	933.00	3.0	0.2	60.0	793.20
FW 17	100.5	3.0	0.2	60.3	993.30	3.0	0.2	60.3	853.50
FW 18	100.0	3.0	0.2	60.0	1,053.30	3.0	0.2	60.0	913.50
FW 19	101.0	3.0	0.2	60.6	1,113.90	3.0	0.2	60.6	974.10
FW 20	99.5	3.0	0.2	59.7	1,173.60	3.0	0.2	59.7	1,033.80
FW20+54	54.0	4.0	0.0	0.0	1,173.60	3.0	0.2	32.4	1,066.20
FW 21	46.0	4.0	0.0	0.0	1,173.60	3.0	0.2	27.6	1,061.40
FW 22	100.5	4.0	0.0	0.0	1,173.60	3.0	0.2	60.3	1,121.70
FW 23	99.0	4.0	0.0	0.0	1,173.60	3.0	0.2	59.4	1,181.10
FW 24	100.0	4.0	0.0	0.0	1,173.60	3.0	0.2	60.0	1,241.10
FW 25	105.0	4.0	0.0	0.0	1,173.60	3.0	0.2	63.0	1,304.10
FW 26	103.0	4.0	0.0	0.0	1,173.60	3.0	0.2	61.8	1,365.90
FW 27	103.0	4.0	0.0	0.0	1,173.60	3.0	0.2	61.8	1,427.70
FW 28	101.5	4.0	0.0	0.0	1,173.60	3.0	0.2	60.9	1,488.60
FW28+18	18.0	4.0	0.0	0.0	1,173.60	4.0	0.0	0.0	1,488.60
FW 29	82.0	3.0	0.2	49.2	1,222.80	4.0	0.0	0.0	1,488.60
FW 30	100.0	3.0	0.2	60.0	1,282.80	4.0	0.0	0.0	1,488.60
FW 31	100.5	3.0	0.2	60.3	1,343.10	4.0	0.0	0.0	1,488.60
FW 32	100.0	3.0	0.2	60.0	1,403.10	4.0	0.0	0.0	1,488.60

STATION NO.	LEFT DIKE					RIGHT DIKE			
	Distance (Length) (m)	Width (m)	Thickness (m)	Volume (m ³)	Accumulated (m ³)	Width (m)	Thickness (m)	Volume (m ³)	Accumulated (m ³)
FW 33	100.0	3.0	0.2	60.0	1,463.10	4.0	0.0	0.0	1,488.60
FW3+33	33.0	3.0	0.2	19.8	1,482.90	4.0	0.0	0.0	1,488.60
FW33+80	47.0	3.0	0.2	28.2	1,511.10	3.0	0.2	28.2	1,516.80
FW 34	21.0	3.0	0.2	12.6	1,475.70	3.0	0.2	12.6	1,501.20
FW 35	100.5	3.0	0.2	60.3	1,536.00	3.0	0.2	60.3	1,561.50
FW 36	100.0	3.0	0.2	60.0	1,596.00	3.0	0.2	60.0	1,621.50
FW 37	101.0	3.0	0.2	60.6	1,656.60	3.0	0.2	60.6	1,682.10
FW 38	100.0	3.0	0.2	60.0	1,716.60	3.0	0.2	60.0	1,742.10
FW 39	100.0	3.0	0.2	60.0	1,776.60	3.0	0.2	60.0	1,802.10
FW 39+40	40.0	3.0	0.2	24.0	1,800.60	3.0	0.2	24.0	1,826.10
FW29	0.0	3.0	0.2	0.0	0.00	3.0	0.2	0.0	0.00
FW30	100.0	3.0	0.2	60.0	60.00	3.0	0.2	60.0	60.00
FW31	100.5	3.0	0.2	60.3	120.30	3.0	0.2	60.3	120.30
FW32	100.0	3.0	0.2	60.0	180.30	3.0	0.2	60.0	180.30
FW33	100.0	3.0	0.2	60.0	240.30	3.0	0.2	60.0	240.30
FW34	101.0	3.0	0.2	60.6	300.90	3.0	0.2	60.6	300.90
FW35	100.5	3.0	0.2	60.3	361.20	3.0	0.2	60.3	361.20
FW36	100.0	3.0	0.2	60.0	421.20	3.0	0.2	60.0	421.20
FW37	101.0	3.0	0.2	60.6	481.80	3.0	0.2	60.6	481.80
FW38	100.0	3.0	0.2	60.0	541.80	3.0	0.2	60.0	541.80
FW38+70	70.0	3.0	0.2	42.0	583.80	3.0	0.2	42.0	583.80
Total :	3,911.0			2,432.40				2,470.50	

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KABUPATEN ROAD PAVEMENT

MFC-5

Stretch FW20 + 47 m ~ FW26, L = 561 m

$$\text{Excavation } V = 5.0 \times 0.315 \times 561 = 883.6 \text{ m}^3$$

$$\text{Sub-Base } V = 5.0 \times 0.15 \times 561 = 420.8 \text{ m}^3$$

$$\text{Base-Course } V = 5.0 \times 0.10 \times 561 = 280.5 \text{ m}^3$$

Asphalt (A.T.B)

$$V = 4.0 \times 0.065 \times 561 = 145.9 \text{ m}^3$$

$$W = 145.9 \times 2.2 = 320.9 \text{ t}$$

MFC-6

Stretch FW26 ~ FW28 + 18 m, L = 222.5 m

FW28 + 18 m ~ FW33 + 37 m, L = 519.5 m

$$\Sigma L = 742 \text{ m}$$

$$\text{Excavation } V = 5.0 \times 0.315 \times 742 = 1,169 \text{ m}^3$$

$$\text{Sub-Base } V = 5.0 \times 0.15 \times 742 = 557 \text{ m}^3$$

$$\text{Base-Course } V = 5.0 \times 0.10 \times 742 = 371 \text{ m}^3$$

Asphalt (A.T.B)

$$V = 4.0 \times 0.065 \times 742 = 193 \text{ m}^3$$

$$W = 193 \times 2.2 = 425 \text{ t}$$

1.3 Deli River Retarding Channel

- Earth Works
- Sodding
- Gravel Pavement

WORK ITEM : EARTH WORK (MFC-7)
LOCATION : DELI RETARDING CHANNEL
STRIPPING, CLEARING & GRUBBING AND EMBANKMENT OF DELI RIVER

(1/4)

STATION NO.	DISTANCE Partial (m)	LEFT BANK												
		STRIPPING					CLEARING & GRUBBING					EMBANKMENT (m ³)		
		L (m)	A (m ²)	Av. (m ²)	V (m ³)	Acc. (m ³)	L (m)	Av. (m)	A (m ²)	Acc. (m ³)	A (m ²)	Av. (m ²)	V (m ³)	Acc. (m ³)
UD 12+22	0.0	0.0	0.00	0.00	0.00	0.00	00.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UD 14	65.0	187.0	12,155.00	6,077.50	1,519.38	1,519.38	245.5	122.75	7,978.75	7,978.75	453.30	226.65	14,732.25	14,732.25
UD 16	77.0	162.0	12,474.00	12,314.50	3,078.63	4,598.00	170.5	208.00	16,016.00	23,994.75	267.69	360.50	27,758.12	42,490.37
UD 17	59.0	145.0	8,555.00	10,514.50	2,628.63	7,226.63	158.2	164.35	9,696.65	33,691.40	294.00	280.85	16,569.86	59,060.22
UD 18	53.0	103.2	5,469.60	7,012.30	1,753.08	8,979.70	122.8	140.50	7,446.50	41,137.90	100.66	197.33	10,458.49	69,518.71
UD 19	54.0	24.0	1,296.00	3,382.80	845.70	9,825.40	46.6	84.70	4,573.80	45,711.70	14.64	57.65	3,113.10	72,631.81
UD 20	51.0	49.0	2,499.00	1,897.50	474.38	10,299.78	70.0	58.30	2,973.30	48,685.00	131.25	72.95	3,720.20	76,352.01
UD 21	66.0	92.0	6,072.00	4,285.50	1,071.38	11,371.15	101.6	85.80	5,662.80	54,347.80	257.84	194.55	12,839.97	89,191.98
UD 22	80.0	106.0	8,480.00	7,276.00	1,819.00	13,190.15	127.8	114.70	9,176.00	63,523.80	299.24	278.54	22,283.20	111,475.18
UD 23	40.0	0.0	0.00	4,240.00	1,060.00	14,250.15	00.0	63.90	2,556.00	66,079.80	0.00	149.62	5,984.80	117,459.98
Total :	545.00					14,250.15				66,079.80				117,459.98

WORK ITEM : EARTH WORK (MFC-7)
LOCATION : DELI RETARDING CHANNEL
EXCAVATION OF DELI RIVER

(2/4)

STATION NO.	Partial Distance (m)	LEFT BANK									
		EXCAVATION (m³)									
		Up Water Level					Below Water Level				
		A (m²)	Av. (m²)	V. (m³)	Acc. (m³)	A (m²)	Av. (m²)	V. (m³)	Acc. (m³)		
UD 12	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UD 12+22	27.0	23.26	11.63	314.01	314.01	13.00	6.50	175.50	175.50	175.50	175.50
UD 13	100.0	33.16	28.21	2,821.00	3,135.01	8.48	10.74	1,073.75	1,249.25	1,249.25	1,249.25
UD 14	42.0	1.74	17.45	732.90	3,867.91	28.75	18.61	781.73	2,030.98	2,030.98	2,030.98
UD 15	56.0	3.80	2.77	155.12	4,023.03	0.00	14.38	805.00	2,835.98	2,835.98	2,835.98
UD 16	50.0	11.19	7.50	374.75	4,397.78	8.51	4.26	212.75	3,048.73	3,048.73	3,048.73
UD 17	51.0	28.50	19.84	1,011.99	5,409.77	22.23	15.37	783.87	3,832.60	3,832.60	3,832.60
UD 18	48.0	22.00	25.25	1,211.90	6,621.68	7.80	15.02	720.72	4,553.32	4,553.32	4,553.32
UD 19	50.0	78.26	50.13	2,506.50	9,128.18	22.05	14.93	746.25	5,299.57	5,299.57	5,299.57
UD 20	54.0	15.10	46.68	2,520.72	11,648.90	0.00	11.03	595.35	5,894.92	5,894.92	5,894.92
UD 21	53.0	14.40	14.75	781.75	12,430.65	12.74	6.37	337.61	6,232.53	6,232.53	6,232.53
UD 22	101.0	11.28	12.84	1,296.84	13,727.49	5.78	9.26	935.26	7,167.79	7,167.79	7,167.79
UD 23	90.0	0.00	5.64	507.60	14,235.09	0.00	2.89	260.10	7,427.89	7,427.89	7,427.89
Total :	722.0				14,235.09			7,427.89			

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WORK ITEM : EARTH WORK (MFC-7)
LOCATION : DELI RETARDING CHANNEL

STRIPPING, CLEARING, GRUBBING AND EMBANKMENT OF DELI RIVER

(3/4)

Station No.	Partial Distance (m)	RIGHT BANK												
		STRIPPING					CLEARING & GRUBBING					EMBANKMENT (m ³)		
		L (m)	A (m ²)	Av. (m ²)	V (m ³)	Acc. (m ³)	L (m)	Av. (m)	A (m ²)	Acc. (m ³)	A (m ²)	Av. (m ²)	V (m ³)	Acc. (m ³)
UD 12	0.0	0.0	0.00	0.00	0.00	0.00	00.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UD 13	40.0	0.0	0.00	0.00	0.00	0.00	45.6	22.80	912.00	912.00	0.00	0.00	0.00	0.00
UD 14	45.0	28.0	1,260.00	630.00	157.50	157.50	22.0	33.80	1,521.00	2,433.00	186.69	93.35	4,200.53	4,200.53
UD 15	68.0	103.0	7,004.00	4,132.00	1,033.00	1,190.50	98.5	60.24	4,095.98	6,528.98	449.75	318.22	21,638.96	25,839.49
UD 16	10.0	123.4	1,234.00	4,119.00	1,029.75	2,220.25	132.5	115.49	1,154.85	7,683.83	357.49	403.62	4,036.20	29,875.69
UD 17	42.0	158.0	6,636.00	3,935.00	983.75	3,204.00	158.0	145.25	6,100.50	13,784.33	344.25	350.87	14,736.54	44,612.23
UD 18	43.0	100.5	4,321.50	5,478.75	1,369.69	4,573.69	110.8	134.40	5,779.20	19,563.53	333.02	338.63	14,561.20	59,173.42
UD 19	40.0	92.0	3,680.00	4,000.75	1,000.19	5,573.88	102.8	106.80	4,272.00	23,835.53	202.88	267.95	10,717.90	69,891.32
UD 20	60.0	70.0	4,200.00	3,940.00	985.00	6,558.88	89.8	96.30	5,778.00	29,613.53	129.89	166.39	9,983.10	79,874.42
UD 21	27.0	11.8	318.60	2,259.30	564.83	7,123.70	89.5	89.65	2,420.55	32,034.08	5.00	67.45	1,821.02	81,695.44
UD 22	30.0	0.0	0.00	159.30	39.83	7,163.53	00.0	44.75	1,342.50	33,376.58	0.00	2.50	75.00	81,770.44
TOTAL :	405.0				7,163.53					33,376.58			81,770.44	

WORK ITEM : EARTH WORK (MFC-7)
LOCATION : DELI RETARDING CHANNEL
EXCAVATION OF DELI RIVER

(4/4)

STATION NO.	Partial Distance (m)	RIGHT BANK EXCAVATION (m ³)									
		Up Water Level					Below Water Level				
		A (m ²)		V. (m ³)		Acc. (m ³)		A (m ²)		V. (m ³)	
		Av. (m ²)		Av. (m ²)				Av. (m ²)		V. (m ³)	Acc (m ³)
UD 12	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UD 13	40.0	118.57	59.29	2,371.48	2,371.48	2,371.48	17.23	8.62	344.68	344.68	344.68
UD 14	45.0	0.00	59.29	2,667.92	5,039.40	0.00	8.62	387.77	732.45		
UD 15	90.0	0.00	0.00	0.00	5,039.40	9.30	4.65	418.50	1,150.95		
UD 16	35.0	17.03	8.52	298.03	5,337.42	8.28	8.79	307.65	1,458.60		
UD 17	46.0	1.50	9.27	426.19	5,763.61	0.00	4.14	190.44	1,649.04		
UD 18	45.0	25.00	13.25	596.25	6,359.86	8.90	4.45	200.25	1,849.29		
UD 19	44.0	15.60	20.30	893.20	7,253.06	7.50	8.20	360.80	2,210.09		
UD 20	60.0	25.92	20.76	1,245.60	8,498.66	18.10	12.80	768.00	2,978.09		
UD 21	38.0	79.00	52.46	1,993.48	10,492.14	9.48	13.79	524.02	3,502.11		
UD 22	150.0	3.66	41.33	6,199.50	16,691.64	2.16	5.82	873.00	4,375.11		
Total :	593.0				16,691.64				4,375.11		

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WORK ITEM: EARTH WORK (MFC-7)

LOCATION: DELI RIVER RETARDING CHANNEL, DIKE BETWEEN TWO WEIRS

CLEARING & GRUBBING, STRIPPING, SODDING, EXCAVATION AND EMBANKMENT OF DELI RIVER DIKE

STATION NO.	DISTANCE		CLEARING & GRUBBING (m ²)			STRIPPING (m ³)			EMBANKMENT (m ³)			EXCAVATION (m ³)		
	Partial (m)	Acc. (m)	L (m)	Av. (m)	A (m ²)	Acc. (m ²)	L (m)	Av. (m ²)	V (m ³)	Acc. (m ³)	A (m ²)	Av. (m ²)	V (m ³)	Acc. (m ³)
DRW 1	0.0	0.0												
DRW 2	32.0	32.0												
DRW 3	25.0	57.0	39.0	19.50	487.50	487.50	16.0	8.00	50.00	50.00	25.52	12.76	319.00	319.00
DRW 4	25.0	82.0	41.6	40.30	1,007.50	1,495.00	15.0	15.50	96.88	146.88	29.50	27.51	687.75	1,006.75
DRW 5	25.0	107.0	40.4	41.00	1,025.00	2,520.00	15.6	15.30	95.63	242.50	23.00	26.25	656.25	1,663.00
DRW 6	25.0	132.0	40.6	40.50	1,012.50	3,532.50	15.4	15.50	96.88	339.38	18.72	20.86	521.50	2,184.50
DRW 7	25.0	157.0	39.0	39.80	995.00	4,527.50	11.0	13.20	82.50	421.88	11.90	15.31	382.75	2,567.25
DRW 8	25.0	182.0	37.5	38.25	956.25	5,483.75	09.0	10.00	62.50	484.38	7.00	9.45	236.25	2,803.50
DRW 9	25.0	207.0	39.5	38.50	962.50	6,446.25	00.0	4.50	28.13	512.50	0.00	3.50	87.50	2,891.00
DRW 10	25.0	232.0												
DRW 11	25.0	257.0												
DRW 12	25.0	282.0												
Total :	282.0					6,446.25				512.50			2,891.00	5,930.88

MFC-7

**GRAVEL PAVEMENT OF DELI RIVER RETARDING CHANNEL
for WALKWAY**

STATION	L E F T B A N K				R I G H T B A N K			
	Distance (Length) (m)	Width (m)	Thickness (m)	Volume (m ³)	Distance (Length) (m)	Width (m)	Thickness (m)	Volume (m ³)
Zone A	399.0	3.0	0.2	239.4	-	-	-	-
Zone C	437.0	3.0	0.2	262.2				
Zone D	505.0	3.0	0.2	303.0	632.0	3.0	0.2	379.2
Floodway	-	-	-	-	205.0	3.0	0.2	123.0
Approach	-	-	-	-	150.0	3.0	0.2	90.0
Total :	1,341.0			804.60	987.0			592.20

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EXCAVATION

$$1/2 \times (3.0+3.4) \times 0.2 \times 2.328 = 1,490.0 \text{ m}^3$$

AREA OF SODDING (DELI RETARDING CHANNEL)

1. SOLID SODDING

(A) RIGHT BANK

Location		Length (m)	B (m)	Area (m2)
1	SLOPE (Upper)	238.0	7.8	1,863.54
2	BEAM (Upper)	246.0	3.0	738.00
3	SLOPE (Lower)	251.0	7.2	1,797.16
4	BEAM (Lower)	261.0	3.0	783.00
TOTAL				5,181.70

(B) LEFT BANK

Location		Length (m)	B (m)	Area (m2)
1	SLOPE 1A	80.0	17.9	1,428.00
2	SLOPE 1AB	348.0	7.3	2,540.40
3	SLOPE 2	298.0	7.3	2,175.40
TOTAL				6,143.80

2. CHECK SODDING

ZONE-A = 17,415 m2

1.4 Left Branch Channel of Percut River

- Earth Works
- Sodding

DIKE ALONG LEFT BRANCH AT RIVER MOUTH

SECTION No.	DISTANCE (m)	STRIPPING				EMBANKMENT			SODDING		
		L ₁ (m)	Av. (m)	A (m ²)	V (m ³)	A (m ²)	Av. (m ²)	V (m ³)	L (m)	Av. (m)	A (m ²)
R 10+12m	0	12.60				19.11			11.5		
R10	12	12.60	12.60	3.15	37.80	19.11	19.11	229.32	11.5	11.5	138.00
R9	102	12.20	12.40	3.10	316.20	18.62	18.87	1924.23	11.5	11.5	1173.00
R8	117	12.00	12.10	3.03	353.93	18.00	18.31	2142.27	11.1	11.3	1322.10
R7	99	14.00	13.00	3.25	321.75	22.95	20.48	2027.03	10.5	10.8	1069.20
R6	74	13.60	13.80	3.45	255.30	22.83	22.89	1693.86	12.9	11.7	865.80
R5	65	12.60	13.10	3.28	212.88	19.50	21.17	1375.73	11.5	12.2	793.00
R4	110	13.20	12.90	3.23	354.75	20.25	19.88	2186.25	11.5	11.5	1265.00
R3	97	12.60	12.90	3.23	312.83	18.72	19.49	1890.05	11.1	11.3	1096.10
R2	82	12.80	12.70	3.18	260.35	18.00	18.36	1505.52	11.5	11.3	926.60
R1	123	13.00	12.90	3.23	396.68	20.00	19.00	2337.00	11.7	11.6	1426.80
R0	85	12.00	12.50	3.13	265.63	17.25	18.63	1583.13	10.7	11.2	952.00
R 0-100m	100	12.00	12.00	3.00	300.00	17.25	17.25	1725.00	10.7	10.7	1070.00
R 0-214m	114	7.40	9.70	2.43	276.45	6.13	11.69	1332.66	4.9	7.8	889.20
TOTAL					3664.53			21952.03			12986.80

1.5 Channel Excavation of Lalang River

- Earth Works
- Sodding

RIGHT BANK OF PERCUT RIVER

EARTH WORKS, LALANG RIVER
CLEARING & GRUBBING, STRIPPING, SODDING, EXCAVATION AND EMBANKMENT OF PERCUT RIVER
FOR DRAINAGE CHANNEL OF LATANG RIVER

STATION NO.	Partial Distance (m)	CLEARING & GRUBBING			STRIPPING				SODDING					EMBANKMENT (m³) EXCAVATION (m³)					
		L (m)	Av. (m)	A (m²)	L (m)	A (m²)	Av. (m²)	V (m³)	L1 (m)	L2 (m)	L1+L2 (m)	Av. (m)	A (m²)	Av. (m²)	V (m³)	A (m²)	Av. (m²)	V (m³)	
PE 0 - 60	0.00	27.4	13.70	0.00	10.4	0.00	0.00	0.00	3.00	2.24	5.24	2.62	0.00	8.40	4.20	0.00	28.00	14.00	0.00
PE 0	60.00	27.4	13.70	822.00	10.4	624.00	312.00	78.00	3.00	2.24	5.24	2.62	157.08	8.40	8.40	504.00	28.00	28.00	1,680.00
PE 1	120.00	28.2	27.80	3,336.00	10.4	1,248.00	936.00	234.00	3.00	2.46	5.46	5.35	641.74	7.90	8.15	978.00	31.02	29.51	3,541.20
PE 2	92.00	28.0	28.10	2,585.20	9.6	883.20	1,065.60	266.40	3.00	1.34	4.34	4.90	450.86	4.60	6.25	575.00	33.93	32.48	2,987.70
PE 3	115.50	27.2	27.60	3,187.80	7.0	808.50	845.85	211.46	3.00	0.34	3.34	3.84	443.35	1.54	3.07	354.59	45.37	39.65	4,579.58
PE 4	109.00	27.4	27.30	2,975.70	9.0	981.00	894.75	223.69	3.00	1.34	4.34	3.84	418.40	4.70	3.12	340.08	35.22	40.30	4,392.16
PE 5	121.00	27.8	27.60	3,339.60	10.0	1,210.00	1,095.50	273.88	3.00	1.79	4.79	4.57	552.39	6.70	5.70	689.70	31.68	33.45	4,047.45
PE 6	82.00	27.2	27.50	2,255.00	9.0	738.00	974.00	243.50	3.00	1.12	4.12	4.45	365.18	7.10	6.90	565.80	24.47	28.08	2,302.15
PE 7	155.00	28.9	28.05	4,347.75	16.0	2,480.00	1,609.00	402.25	3.00	4.70	7.70	5.91	915.57	21.42	14.26	2,210.30	10.67	17.57	2,723.35
PE 8	96.00	30.2	29.55	2,836.80	14.8	1,420.80	1,950.40	487.60	3.00	4.25	7.25	7.47	717.33	16.40	18.91	1,815.36	17.21	13.94	1,338.24
PE 8 + 80	80.00	30.2	30.20	2,416.00	14.8	1,184.00	1,302.40	325.60	4.00	6.48	10.48	8.87	709.33	16.40	16.40	1,312.00	17.21	17.21	1,376.80
Total:	1,030.50		28,101.85				2,746.38						5,371.23		9,344.83			28,968.62	

**CLEARING & GRUBBING, SODDING, EXCAVATION AND EMBANKMENT OF PERCUT RIVER
FOR DRAINAGE CHANNEL OF LALANG RIVER**

[illegible]

1.6 Channel Relocation

- Irrigation Channel for SL2
- Drainage Channel

RELOCATION OF EXISTING DRAINAGE CHANNEL

LOCATION: (PE95L + 35 m to PE103L + 10m) (MFC-2)

STATION NO.	Partial Distance (m)	STRIPPING			CLEARING & GRUBBING			EMBANKMENT (m ³)			EXCAVATION		
		L (m)	Av.L (m ²)	V (m ³)	L (m)	Av. (m)	A (m ²)	A (m ²)	Av. (m ²)	V (m ³)	A (m ²)	Av. (m ²)	V (m ³)
PE 95+41	0.00	0.0			00.0			0.00			0.00	0.00	0.00
PE 96-3	40.65	0.0	0.00	0.00	14.8	7.40	300.81	0.00	0.00	0.00	20.62	10.31	419.10
PE 96	3.00	0.0	0.00	0.00	14.8	14.80	44.40	0.00	0.00	0.00	20.62	20.62	61.86
PE 97	102.00	8.0	4.00	102.00	14.2	14.50	1,479.00	5.20	2.60	265.20	16.10	18.36	1,872.72
PE 98	114.00	8.4	8.20	233.70	13.4	13.80	1,573.20	3.75	4.48	510.15	13.80	14.95	1,704.30
PE 99	85.00	6.2	7.30	155.13	13.2	13.30	1,130.50	3.00	3.38	286.88	13.20	13.50	1,147.50
PE 100	103.00	4.6	5.40	139.05	12.0	12.60	1,297.80	1.20	2.10	216.30	6.00	9.60	988.80
PE 101	94.00	6.6	5.60	131.60	12.4	12.20	1,146.80	2.40	1.80	169.20	9.50	7.75	728.50
PE 102	97.00	2.0	4.30	104.28	11.2	11.80	1,144.60	1.00	1.70	164.90	5.20	7.35	712.95
PE 103	101.00	0.0	1.00	25.25	11.7	11.45	1,156.45	0.00	0.50	50.50	6.90	6.05	611.05
PE 103+10	10.00	0.0	0.00	0.00	05.0	8.35	83.50	0.00	0.00	0.00	3.50	5.20	52.00
TOTAL 709.0		891.0			9,357.1			1,663.1			8,298.8		

Drainage channel(RIGHT)
MFC-I

E22

SECTION NO.	区間距離 (m)	掘削			盛り土		
		掘削面積 (m ²)	平均面積 (m ²)	掘削量 (m ³)	盛り土面積 (m ²)	平均面積 (m ²)	盛り土量 (m ³)
	0	4.60	4.60		0	0	
PE. 9	22	4.60	4.60	101.20	0	0	0
PE. 10	151	3.50	4.05	611.55	0.10	0.05	7.55
PE. 11	99	3.73	3.62	357.89	0	0.05	4.95
PE. 12	79	3.95	3.84	303.36	0	0	0
PE. 13	119	3.50	3.73	443.28	0.30	0.15	17.85
PE. 14	45	4.23	3.87	173.93	0.40	0.35	15.75
PE. 15	120	3.15	3.69	442.80	0.20	0.30	36.00
PE. 16	86	4.60	3.88	333.25	0	0.10	8.60
PE. 17	147	1.88	3.24	476.28	0.80	0.40	58.80
PE. 18	35	2.38	2.13	74.55	0.20	0.50	17.50
PE. 19	46	2.95	2.67	122.59	0	0.10	4.60
PE. 20	82	2.50	2.73	223.45	0	0	0
PE. 21	120	2.45	2.48	297.00	0.06	0.03	3.60
PE. 22	94	3.77	3.11	292.34	0	0.03	2.82
PE. 23	104	2.50	3.14	326.04	0	0	0
PE. 24	104	2.35	2.43	252.20	0	0	0
PE. 25	120	4.57	3.46	415.20	0	0	0
PE. 26	92	2.96	3.77	346.38	0.20	0.10	9.20
PE. 27	109	7.10	5.03	548.27	0	0.10	10.9
PE. 28	79	2.61	4.86	383.55	0.18	0.09	7.11
PE. 29	128	2.68	2.65	338.56	0.20	0.19	24.32
PE. 30	111	2.55	2.62	290.27	0.42	0.31	34.41
PE. 31	89	2.95	2.75	244.75	0	0.21	18.69
PE. 32	97	3.10	3.03	293.43	0	0	0
合計	2278	85.16	85.91	7692.09	3.06	3.06	282.65

Clearing & Grubbing

$$A = 7.0 \times 791 + 6.0 \times 1,487 = 14,459 \text{ m}^2$$

Stripping

$$V = 0.3 \times 2,278 \times 0.25 = 170.85 \text{ m}^3$$

2. DIKE AND RIVER BANK PROTECTION WORKS

2.1 Revetment and Groin

(1) Percut River

- Wet Stone Masonry (Type-PA)
- Wet Stone Masonry (Type-PB)
- Wet Stone Masonry (Type-PC)
- Gabion Cylinder Type
- Riprap (Random Masonry)
- Groin

(2) Floodway

- Wet Stone Masonry Type
- Leaning Wall Type

(3) Deli River Retarding Channel

- Wet Stone Masonry
- A.T.B Pavement

a) Percut River

PACKAGE : MFC-II
 WORK ITEM : REVETMENT FOR LOW WATER CHANNEL IN LOWER PERCUT RIVER
 TYPE : WET STONE MASONRY (Type-PA)

N O	W O R K I T E M	Unit	L O C A T I O N						SUB TOTAL (1) L = 160 m
			PE 114L+10 m L = 30 m	PE 114R+10 m L = 30 m	PE 94L+95 m L = 30 m	PE 84 L+15 m L = 30 m	PE 84 R+10 m L = 30 m	PE 71 L+12 m L = 10 m	
1.	Excavation (common)	m ³	427.11	427.11	334.11	427.11	427.11	111.37	2,153.92
2.	Crusher Run Bedding	m ³	142.35	142.35	95.85	142.35	142.35	31.95	697.20
3.	Wet Stone Masonry (1 : 4)	m ³	150.00	150.00	103.50	150.00	150.00	34.50	738.00
4.	Concrete, Type - C1	m ³	29.39	29.39	25.77	29.39	29.39	11.69	155.02
5.	Formwork Concrete Type :C1	m ²	194.94	194.94	157.44	194.94	194.94	78.24	1,015.44
6.	Reinforcing, Steel Bar	Kg	1,585.21	1,585.21	1,393.71	1,585.21	1,585.21	318.36	8,052.91
7.	Elastic Joint Filler, 10 mm thick	m ²	17.50	17.50	14.40	17.50	17.50	4.80	89.20
8.	Log Pile, Dia. 150 mm, L = 3.0 m	m	45.00	45.00	45.00	45.00	45.00	15.00	240.00
	" L = 2.0 m	m	64.00	64.00	64.00	64.00	64.00	64.00	384.00
9.	Gabion Mattress	m ³	67.50	67.50	67.50	67.50	67.50	22.50	360.00
10.	Gabion Cylinder	m ³	26.85	26.85	26.85	26.85	26.85	26.85	161.10
11.	Cobble Stone Filling for 9.	m ³	9.75	9.75	9.75	9.75	9.75	3.25	52.00
12.	" for 10.	m ³	6.80	6.80	6.80	6.80	6.80	6.80	40.80

PACKAGE : MFC-II

PA-2

WORK ITEM : REVETMENT FOR LOW WATER CHANNEL IN LOWER PERCUT RIVER

TYPE : WET STONE MASONRY (Type-PA)

N O	W O R K I T E M	Unit	L O C A T I O N										SUB TOTAL(2) L = 170m	TOTAL L = 330 m
			PE 71 R+15 m L = 10 m	PE 70 L+56 m L =20 m	PE 70 R+56 m L =20 m	PE 56 L+5 m L = 30 m	PE 56 R+5 m L = 30 m	PE 55 R L = 30 m	PE 55 L L = 30 m					
1.	Excavation (common)	m ³	111.37	222.74	222.74	427.11	427.11	427.11	427.11			2,265.29	4,419.21	
2.	Crusher Run Bedding	m ³	31.95	63.90	63.90	142.35	142.35	142.35	142.35			729.15	1,426.35	
3.	Wet Stone Masonry (1 : 4)	m ³	34.50	69.00	69.00	150.00	150.00	150.00	150.00			772.50	1,510.50	
4.	Concrete, Type - C1	m ³	11.69	19.87	19.87	29.39	29.39	29.39	29.39			169.00	324.02	
5.	Formwork FW1 Concrete Type :C1	m ²	78.24	155.34	155.34	194.94	194.94	194.94	194.94			1,168.68	2,184.12	
6.	Reinforcing, Steel Bar	Kg	318.36	698.41	698.41	1,585.21	1,585.21	1,585.21	1,585.21			8,056.02	16,108.93	
7.	Elastic Joint Filler , 10 mm thick	m ²	4.80	9.59	9.59	17.50	17.50	17.50	17.50			93.98	183.18	
8.	Log Pile, Dia. 150 mm, L = 3.0 m	m	15.00	30.00	30.00	45.00	45.00	45.00	45.00			255.00	495.00	
	" L = 2.0 m	m	64.00	64.00	64.00	64.00	64.00	64.00	64.00			448.00	832.00	
9.	Gabion Mattress	m ³	22.50	45.00	45.00	67.50	67.50	67.50	67.50			382.50	742.50	
10.	Gabion Cylinder	m ³	26.85	26.85	26.85	26.85	26.85	26.85	26.85			187.95	349.05	
11.	Cobble Stone Filling for 9.	m ³	3.25	6.50	6.50	9.75	9.75	9.75	9.75			55.25	107.25	
12.	" for 10.	m ³	6.80	6.80	6.80	6.80	6.80	6.80	6.80			47.60	88.40	

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PACKAGE :

WORK ITEM : REVETMENT FOR LOW WATER CHANNEL IN LOWER OF PERCUT RIVER

TYPE :

NO	WORK ITEM	Unit	LOCATION										SUB TOTAL
			PE 115L+10 m L=30 m	PE 115R+10 m L=30 m	PE 94L+95 m L=30 m	PE 85L+55 m L=30 m	PE 85R+55 m L=30 m	PE 72L+60 m L=10 m	PE 160 m				
			(0.244)	(0.244)		(0.145)	(0.145)						
1.	Excavation (common)	m ³	(11.17 + 2.10) 30	(11.17 + 2.10) 30	(11.17 + 2.10) 20	(11.17 + 2.10) 20	(11.17 + 2.10) 30	(11.17 + 2.10) 30					
2.	Crusher Run Bedding	m ³	(3.175 + 1.15) 30	(3.175 + 1.15) 20	(3.175 + 1.15) 20	(3.175 + 1.15) 20	(3.175 + 1.15) 30	(3.175 + 1.15) 30					
3.	Wet Stone Masonry (1 : 4)	m ³	(3.175 + 1.15) 30	(3.175 + 1.15) 30	(3.175 + 1.15) 20	(3.175 + 1.15) 20	(3.175 + 1.15) 30	(3.175 + 1.15) 30					
4.	Concrete, Type - C1	m ³	(0.57 + 0.30) + (2.27 + 1.02) 1 + (2.09 + 1.30) 2	(0.57 + 0.30) + (2.27 + 1.02) 1 + (2.09 + 1.30) 2	(0.57 + 0.30) + (2.27 + 1.02) 1 + (2.09 + 1.30) 2	(0.57 + 0.30) + (2.27 + 1.02) 1 + (2.09 + 1.30) 2	(0.57 + 0.30) + (2.27 + 1.02) 1 + (2.09 + 1.30) 2	(0.57 + 0.30) + (2.27 + 1.02) 1 + (2.09 + 1.30) 2					
5.	Formwork Concrete, Type - C1	m ²	(2.96 + 0.30) + (2.96 + 0.30) 2	(2.96 + 0.30) + (2.96 + 0.30) 2	(2.96 + 0.30) + (2.96 + 0.30) 2	(2.96 + 0.30) + (2.96 + 0.30) 2	(2.96 + 0.30) + (2.96 + 0.30) 2	(2.96 + 0.30) + (2.96 + 0.30) 2					
6.	Reinforcing, Steel Bar	Kg	(1.48 + 0.68) + (0.32 + 0.68) 2	(1.48 + 0.68) + (0.32 + 0.68) 2	(1.48 + 0.68) + (0.32 + 0.68) 2	(1.48 + 0.68) + (0.32 + 0.68) 2	(1.48 + 0.68) + (0.32 + 0.68) 2	(1.48 + 0.68) + (0.32 + 0.68) 2					
7.	Elastic Joint Filler, t = 10 mm	m ²	(1.22 + 1.15) 2	(1.22 + 1.15) 2	(1.22 + 1.15) 2	(1.22 + 1.15) 2	(1.22 + 1.15) 2	(1.22 + 1.15) 2					
8.	Log Pile Dia.150, l=3,000 @ 2.00	nos	15	15	15	15	15	15					
	l = 1.5 m	nos	32	32	32	32	32	32					
9.	Gabion Mattress	m ³	2.25 x 2.4	2.25 x 2.4	2.25 x 2.4	2.25 x 2.4	2.25 x 2.4	2.25 x 2.4					
10.	Gabion Cylinder	m ³	0.325	0.325	0.325	0.325	0.325	0.325					
11.	Cobble Stone Filling	m ³	0.325 x 3.0	0.325 x 3.0	0.325 x 3.0	0.325 x 3.0	0.325 x 3.0	0.325 x 3.0					

PACKAGE :

WORK ITEM : REVETMENT FOR LOW WATER CHANNEL IN LOWER OF PERCUT RIVER

TYPE :

N	WORK ITEM	Unit	PE72R-60m L=10m	PE71R-20m L=20m	PE71R-20m L=20m	PE57R+10m L=30m	PE57R+10m L=30m	SUB TOTAL L=110m
1.	Excavation (common)	m ³	(11.13 x 10)	(11.13 x 20)	(11.13 x 20)	(11.13 x 20)	(11.13 x 20)	
2.	Crusher Run Bedding	m ³	(3.175 x 10)	(3.175 x 20)	(3.175 x 20)	(3.175 x 20)	(3.175 x 20)	
3.	Wet Stone Masonry (1:4)	m ³	(3.15 x 10)	(3.15 x 20)	(3.15 x 20)	(3.15 x 20)	(3.15 x 20)	
4.	Concrete, Type - C1	m ³	(0.59 x 10)	(0.59 x 20)	(0.59 x 20)	(0.59 x 20)	(0.59 x 20)	
5.	Formwork Concrete, Type - C1	m ²	(3.36 x 10) + (19.33) 2	(3.36 x 20) + (19.33) 2	(3.36 x 20) + (19.33) 2	(3.36 x 20) + (19.33) 2	(3.36 x 20) + (19.33) 2	
6.	Reinforcing, Steel Bar	Kg	(3.36 x 10) + (19.33) 2	(3.36 x 20) + (19.33) 2	(3.36 x 20) + (19.33) 2	(3.36 x 20) + (19.33) 2	(3.36 x 20) + (19.33) 2	
7.	Elastic Joint Filler, t = 10 mm	m ²	(0.07 x 10)	(0.07 x 20)	(0.07 x 20)	(0.07 x 20)	(0.07 x 20)	
8.	Log Pile Dia. 150, l=3,000 @ 2.00	nos	5	10	10	15	15	
9.	Gabion Mattress	m ³	2.15 x 10	2.15 x 20	2.15 x 20	2.15 x 20	2.15 x 20	
10.	Gabion Cylinder	m ³	2685	—	—	—	—	
11.	Cobble Stone Filling	m ³	0.325 x 10	0.325 x 20	0.325 x 20	0.325 x 20	0.325 x 20	

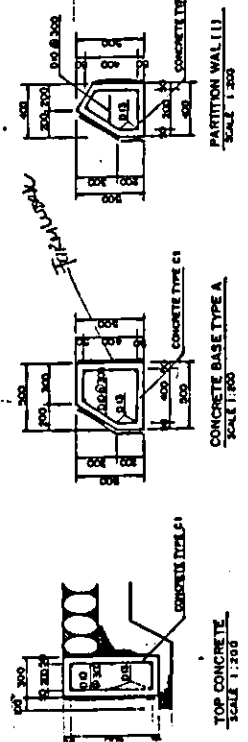
BILL OF QUANTITY

NAME OF STRUCTURE: WET MASONRY TYPE RETMENT FOR LOW WATER CHANNEL
 LOCATION : Below River Lower Division

Per M.

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
		M ²	EXCAVATION $((12.10 \times 2.5) + (4 \times 0.5)) + (0.5 \times 0.5) + (2.5 \times 2) + (3.0 \times 2) + (10 \times 0.5) \times 1/1$ $= (6.5 \times 0.5) + 0.4 \times 1 + 0.25 \times 1/1$		
		M ³	CEMENTER RUN BEDDING $(12.3 \times 0.5) + (2.5 \times 0.5) + (0.5 \times 0.5)$ $= (3.0 \times 0.5) + 0.5 \times 0.5$	11.137	
		M ³	WET STONE MASONRY $(12.3 \times 0.5) + (2.5 \times 0.5) + (0.5 \times 0.5)$	3.175	
		M ³	CONCRETE TYPE C ₁ $[(0.3 \times 0.7) + (0.5 \times 0.5) + (0.5 \times 0.5)] + (0.5 \times 0.5) + (0.5 \times 0.5) + (0.5 \times 0.5)$ $= (0.3 \times 0.5) + 0.8 \times 0.5 + 0.3 \times 0.7 \times 1/1$	3.175	
		M ²	FORM WORK $(0.7 \times 1) + (0.2 \times 0.3 + 0.7) + (0.2 \times 0.3) + (0.5 \times 0.5) + (0.5 \times 0.5)$ $= (0.5 \times 0.5) + 0.8 \times 0.5 + 0.3 \times 0.7 \times 1/1$	0.19	
		M ²	REINFORCING, STEEL BAR $\phi 3 = 7 \times 1 = (7 \times 1.5) \times 1/1 = 10.5$ $\phi 10 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$ $\phi 12 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$ $\phi 16 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$	2.177 & 2.178	
		Kg	CEMENTER RUN BEDDING $\phi 3 = 7 \times 1 = (7 \times 1.5) \times 1/1 = 10.5$ $\phi 10 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$ $\phi 12 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$ $\phi 16 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$	15.12 & 13.32	
			CEMENTER RUN BEDDING $\phi 3 = 7 \times 1 = (7 \times 1.5) \times 1/1 = 10.5$ $\phi 10 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$ $\phi 12 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$ $\phi 16 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$	3.22	
			CEMENTER RUN BEDDING $\phi 3 = 7 \times 1 = (7 \times 1.5) \times 1/1 = 10.5$ $\phi 10 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$ $\phi 12 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$ $\phi 16 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$	18.25	
			CEMENTER RUN BEDDING $\phi 3 = 7 \times 1 = (7 \times 1.5) \times 1/1 = 10.5$ $\phi 10 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$ $\phi 12 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$ $\phi 16 = 1 \times 1 = (1 \times 1.5) \times 1/1 = 1.5$	13.56	

WET MASONRY TYPE RETMENT FOR LOW WATER CHANNEL
 SCALE 1:100



NAME OF STRUCTURE:	LOCATION :

[illegible]

PACKAGE : MFC-1
WORK ITEM : REVETMENT FOR LOWER PERCUT DIKE (LEFT BANK)
TYPE : WET STONE MASONRY (TYPE-PB)

N O	WORK ITEM	UNIT	LOCATION			TOTAL
			PE 33 to PE 18 + 20 m L = 1,531 m	PE 17 - 6.5 m to PE 14 + 57 m L = 254.5 m	PE 17 - 6.5 m to PE 14 + 20 m L = 120 m	
1.	Excavation (common)	m ³	2,904.05	648.97	-	3,553.02
2.	Crusher Run Bedding	m ³	1,929.06	320.67	-	2,249.73
3.	Wet Stone Masonry (1 : 4)	m ³	1,714.72	285.04	-	1,999.76
4.	Cement Mortar Plastering, 20 mm thick	m ²	6,843.57	1,137.61	-	7,981.18
5.	Concrete, Type - C1	m ³	412.52	71.26	-	483.78
6.	Reinforcing, Steel Bar	Kg	21,238.72	3,667.88	-	24,906.60
7.	Formwork FW1	m ²	2,092.68	349.74	-	2,442.42
8.	Log Pile, Dia. 150mm, L=2.0m	m	2,298.00	384.75	-	2,682.75
9.	Elastic Joint Filler, 10mm thick	m ²	686.12	115.60	-	801.72
10.	Weep Hole, PVC Pipe Dia. 50mm with Palm Fiber Filter	nos	-	-	-	0.00
11.	Gabion Mattress	m ³	-	-	540.00	540.00
12.	Gabion Cylinder Filling	m ³	4.40	4.40	-	8.80

31.5

closing dike

closing dike

66.2

333.8

331.1

1,325

88.1

6,608

591

7,200

80.7

31.5

WORK ITEM : REVETMENT (TYPE-)

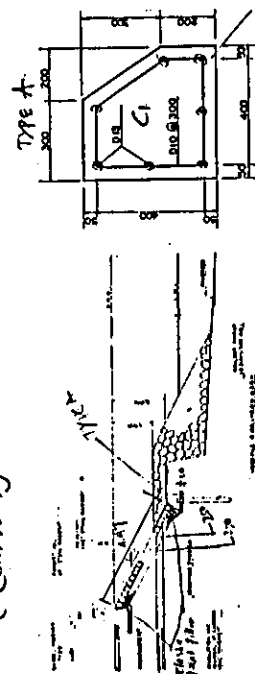
TYPE : WET STONE MASONRY

NO.	I T E M	Unit	L O C A T I O N		
			PE 33 to PE 10 + 20m L = 1531 m	PE 17-6.5m to PE 14 + 57m L = 254.5 m	PE 17-6.5m to PE 18 + 20m L = 120 m
1.	Excavation (common)	m ³	2.55 x 1531 = 2904.05	2.55 x 254.5 = 648.97	
2.	Crusher Run Bedding	m ³	1.26 x 1531 = 1929.06	1.26 x 254.5 = 320.67	
3.	Wet Stone Masonry (1 : 4)	m ³	1.12 x 1531 = 1714.72	1.12 x 254.5 = 285.04	
4.	Cement Mortar Plastering, 20 mm thick	m ²	4.47 x 1531 = 6843.57	4.47 x 254.5 = 1137.61	
5.	Concrete, Type - C1	m ³	0.22 x 1531 = 336.82	0.22 x 254.5 = 55.99	
6.	Reinforcing, Steel Bar	Kg	2.0 + (0.737 x 100) = 75.70	2 + (0.737 x 18) = 15.27	
7.	Formwork FW1	m ²	10.982 x 1531 = 16813.44	10.982 x 254.5 = 2794.92	
8.	Log Pile, Dia. 150 mm, L = 2.0 m	m	93.28 + (43.31 x 100) = 4424.28	93.28 + (43.31 x 18) = 872.86	
9.	Elastic Joint Filler, 10 mm thick	m ²	1 x 1531 = 1531	1 x 254.5 = 254.5	
10.	Weep Hole, PVC Pipe Dia. 50 mm with Palm Fiber Filter	nos	6.678 + (4.92 x 100) = 498.68	6.678 + (4.92 x 18) = 95.24	
11.	Gabion Mattress	m ³	1531/2 + 1 x 3 = 2298	254.5/2 + 1 x 3 = 384.75	
12.	Gabion Cylinder	m ³	0.375 x 1531 = 574.12	0.375 x 254.5 = 95.44	
13.	Cobble Stone Filling	m ³	1.12 x 100 = 112	1.12 x 18 = 20.16	
			-	-	
			-	-	(1.5 x 120) x 3 = 540
			-	-	
			-	-	

BILL OF QUANTITY

NAME OF STRUCTURE: REVENEMENT RE 14257 upto PG 33

LOCATION : PERCUT WIDGE

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
1	EXCAVATION (Common) 	m ³	$[(4.97 \times 0.5) + (0.7 \times 0.5) - (0.2 \times 0.3 \times \frac{1}{2})] \times 1$	2.55	
2	CRUSHER RUN BEDDING	m ³	$[(4.97 \times 0.5) + (0.2 \times 0.7)] \times 1 = 1.26$	1.26	
3	WET STONE MASONRY (1:4)	m ³	$(4.97 \times 0.15) \times 1$	1.12	
4	CEMENT MASTAR WATERING 20 mm THICK	m ²	(4.97×1)	4.97	
5	CONCRETE TYPE C1	m ³	$(0.5 \times 0.5) - (0.2 \times 0.3 \times \frac{1}{2})$	0.22	
6	REINFORCING, STEEL BAR	Kg	portion wall - among end wall $(0.3 \times 0.15) \times 497$ - end of wall $(0.1 \times 0.7) \times 977 \times 2$ $\phi 10 = 7 \times 1 \times 1.14$ $\phi 10 = 9 \times 1.5 \times 0.67$	2.00 2.28 2.732	10.582
7	FORMWORK FW1	m ²	portion wall - among end wall $\phi 10 = 6 \times 1 \times 1.34 \times 497$ $\phi 10 = 9 \times 1.5 \times 0.67 \times 497$ - End wall $\phi 10 = (6 \times 1 \times 1.34 \times 497) \times 2$ $\phi 10 = (9 \times 1.5 \times 0.67 \times 497) \times 2$ $(0.15 \times 0.1 \times 0.3) \times 1$	15.42 15.42 27.20 27.20	93.20
8	LOG PILE, Dia 150 mm, L = 3.0m	m	portion wall = among end wall $= (0.5 \times 1.32) \times 497$	4.82	
9	ELASTIC JANT FILLER, 10mm thick	m ²	end wall $:(0.1 \times 1.2) \times 497 \times 2$	6.670	
10	GABION MATRESS	m ³	$\frac{1}{2} \times 1$ 0.37×1 0.125×1.47 $2 \times 0.15 \times 1$	$\frac{1}{2} \times 1$ 0.37 1.12 1.5	
11	Gabion Cylinder	m ³	$(4.5 + 1) \times 4 \times 0.25^2 \times \pi \times 2$	8.7	

Boulder Riprap for Foot Protection

PE 14+70m~PE 33 (Left Bank)

SECTION NO.	DISTANCE (m)	A (m ²)	Av. (m ²)	V (m ³)
PE 14+70m	0.00	2.00		
PE 15	38.00	2.00	2.00	76.00
PE 16	94.00	2.55	2.28	213.85
PE 17	106.00	0.18	1.37	144.69
PE 18	93.50	12.61	6.40	597.93
PE 19	90.00	1.80	7.21	648.45
PE 20	97.50	1.80	1.80	175.50
PE 21	123.00	2.85	2.33	285.98
PE 22	97.00	3.32	3.09	299.25
PE 23	106.50	7.13	5.23	556.46
PE 24	102.00	5.66	6.40	652.29
PE 25	123.50	3.26	4.46	550.81
PE 26	91.00	9.22	6.24	567.84
PE 27	107.00	3.70	6.46	691.22
PE 28	104.00	8.87	6.29	653.64
PE 29	101.00	8.68	8.78	886.28
PE 30	110.50	8.14	8.41	929.31
PE 31	96.00	5.64	6.89	661.44
PE 32	94.00	2.50	4.07	382.58
PE 33	108.00	2.95	5.55	598.86
TOTAL				9572.37

Boulder ϕ 300~500

$$V = 9618.37 \times 0.45 = 4,328.3 \text{ m}^3$$

Boulder ϕ 200~300

$$V = 9618.37 \times 0.55 = 5,290.1 \text{ m}^3$$

Closing Dike

$$\phi 300 \sim 500 \quad V = 378$$

$$\phi 200 \sim 300 \quad V = 548$$

Total

$$\phi 300 \sim 500 \quad V = 4,328.3 + 378 = 4,706.3 \text{ m}^3$$

$$\phi 200 \sim 300 \quad V = 5,290.1 + 548 = 5,838.1 \text{ m}^3$$

Gabion Cylinder 31.5

NAME OF STRUCTURE: REVENEMENT FOR CLOSING DIKE
LOCATION : PE 8R-54m ~ PE 8R+36m , MFC - I (TYPE - PB)

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
1.	Log Pile $\phi 150$, $L=4.0$ m	NO.	$90 \div 0.15 \times 2$	1200	
2.	PALM FIBER FILTER $\phi=10$ mm	m	$45 \div 0.15 \times 2$	600	1800
3.	Filling with Selected Soil	m ²	4.0×1.800		7.200
		m ³	$2.0 \times 90.0 \times 2 + 2.0 \times 45.0 \times 2$		540
			$1.5 \times 4.0 \times (90.0 + 45.0)$		810
4.	Wet Stone Masonry Area = $(4.808 + 5.0) \times (90.0 + 45.0) = 1324.1$ m ² (1) Wet Stone Masonry (2) Crusher Run Bedding (3) Concrete Type-Ci Top Concrete (A) $L = 90.0 + 45 = 135.0$ m Top Concrete (B) $L = 90.0 + 45 = 135.0$ m Base Concrete $L = 135.0$ m Partition Wall $L = 4.808 \times (5 + 2) = 33.66$ m End Wall $L = 4.808 \times 4 = 19.23$ m (4) Reinforcing Bar 3% of total Concrete Weight (5) Plastering FWI (6) Formwork FWI (7) Elastic Joint Filler Gabion Cylinder $\phi 300$ $L=10.0$ - Riprap $\phi 200 \sim 300$ - Riprap $\phi 300 \sim 500$	m ³	1324.1×0.25		331.1
		m ³	$1324.1 \times 0.25 + (135.0 \times 0.1 + 10.1 \times 2)$		333.8
		m ³	$0.3 \times 0.7 \times 135.0$	28.4	
		"	$0.4 \times 0.5 \times 135.0$	27.0	
		"	$(0.5 \times 0.4 - \frac{1}{2} \times 0.2 \times 0.3) \times 135.0$	23.0	
		"	$0.3 \times 0.55 \times 33.66$	5.6	
		"	$0.3 \times 0.7 \times 19.23$	4.1	88.1
5.		KY	$88.1 \times 2.500 \times 0.03$		6.608
		m ³			1.325
		m ²	$(1.4 + 1.0 + 1.0) \times 135.0 + (0.55 + 0.7) \times 2 \times 4.8 \times 11$		591
		m ²	$0.25 \times 135.0 \times 2 + 0.25 \times 4.8 \times 11$		80.7
		m	$L = 10.0 \times 4 \times 4$		160
		m ³	$0.25^2 \times \pi \times 160.0$		31.5
6.		m ³	$\frac{1}{2} \times (2.7 + 5.5) \times 1.5 \times 60.0 + \frac{1}{2} \times (2.0 + 4.8) \times 1.5 \times 35.0$		548
		m ³	$(3.0 + 4.0) \times 0.6 \times 60.0 + (2.0 + 4.0) \times 0.6 \times 35.0$		378
7.	Excavation (Common)	m ³	1324.1×0.5		662

PACKAGE : MFC-II

WORK ITEM : REVETMENT FOR LOW WATER CHANNEL IN LOWER PERCUT RIVER

TYPE : WET STONE MASONRY (Type-PB)

N O	W O R K I T E M	Unit	L O C A T I O N										S U B	
			PE 115L+10 m L = 30 m	PE 115L+10 m L = 30 m	PE 95L+11 m L = 40 m	PE 89 L+83 m L = 30 m	PE 84 R+15 m L = 30 m	PE 84 R+10 m L = 30 m	PE 82 L+50 m L = 30 m	PE 80 R+100m L = 30 m	PE 79 L+46 m L = 30 m	TOTAL (I) L = 280 m		
1.	Excavation (common)	m ³	115.95	115.95	154.60	115.95	115.95	115.95	115.95	115.95	115.95	115.95	1,082.20	
2.	Crusher Run Bedding	m ³	53.91	53.91	71.88	53.91	53.91	53.91	53.91	53.91	53.91	53.91	503.16	
3.	Wet Stone Masonry (1 : 4)	m ³	50.31	50.31	67.08	50.31	50.31	50.31	50.31	50.31	50.31	50.31	469.56	
4.	Concrete, Type - C1	m ³	16.83	16.83	20.24	16.83	16.83	16.83	16.83	16.83	16.83	16.83	154.88	
5.	Reinforcing, Steel Bar	Kg	913.63	913.63	1,215.05	913.63	913.63	913.63	913.63	913.63	913.63	913.63	8,524.09	
6.	Formwork FW1	m ²	92.47	92.47	121.96	92.47	92.47	92.47	92.47	92.47	92.47	92.47	861.72	
7.	Elastic Joint Filler, 10 mm thick	m ²	10.87	10.87	14.49	10.87	10.87	10.87	10.87	10.87	10.87	10.87	101.45	
8.	Plastering	m ²	201.30	201.30	268.40	201.30	201.30	201.30	201.30	201.30	201.30	201.30	1,878.80	

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PACKAGE : MFC-II

PB-2

WORK ITEM : REVETMENT FOR LOW WATER CHANNEL IN LOWER PERCUT RIVER
TYPE : WET STONE MASONRY (Type-PB)

N O	W O R K I T E M	Unit	L O C A T I O N						SUB TOTAL (2) L = 240 m	SUB TOTAL (1) L = 280 m	T O T A L L = 520 m
			PE 73 L+40 m L = 50 m	PE 70 L+56 m L = 65 m	PE 70 R+56 m L = 65 m	PE 56 L+95 m L = 30 m	PE 56 R+95 m L = 30 m				
1.	Excavation (common)	m ³	193.25	251.22	251.22	251.22	115.95	1,062.86	1,082.20	2,145.06	
2.	Crusher Run Bedding	m ³	89.85	116.80	116.80	116.80	53.91	494.16	503.16	997.32	
3.	Wet Stone Masonry (1 : 4)	m ³	83.85	109.90	109.90	109.90	50.31	463.86	459.56	923.42	
4.	Concrete, Type - C1	m ³	24.62	34.10	34.10	34.10	16.83	143.75	154.88	298.63	
5.	Reinforcing steel bar	m ²	1,447.03	1,866.84	1,866.84	1,866.84	913.63	7,961.18	8,524.11	16,485.29	
6.	Formwork FW1	Kg	143.95	184.58	184.58	184.58	92.47	790.16	861.72	1,651.88	
7.	Elastic Joint Filler , 10 mm thick	m ²	18.12	23.55	23.55	23.55	10.87	99.64	101.45	201.09	
8.	Plastering	m ²	335.50	436.20	436.20	436.20	201.30	1,845.40	1,878.80	3,724.20	

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BILL OF QUANTITY

NAME OF STRUCTURE: REVENUEMENT FOR DIKE (TYPE-PA)
LOCATION : RAJPUT RIVER

$h = 3.0^m$ (Average)

per m³

NO	SKETCHES OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
M ²		M ²	EXCAVATION: (Common) 1 $(6.71 \times 12) + (0.3 \times 0.2) + (0.5 \times 0.6) - (0.3 \times 0.1) = 81.12$	3.865	
M ³		M ³	NET STONE MASONRY $(6.71 \times 0.2) = 1.342$	1.677	
M ³		M ³	CEMENT RUA BEDDING $(6.71 \times 0.2) = (0.2 \times 0.2) + (0.1 \times 0.2) = 0.06$	1.737	
M ³		M ³	CONCRETE TYPE C1 $2 \times 0.2 \times 0.2 = (0.5 \times 0.5) - (0.3 \times 0.3) = 0.12$	0.13	
M ³		M ³	Partition wall - (0.3 x 0.2) x 6.71 = 4.0326 REINFORCING IRON BARS $1/4 \text{ and } 6/8 - 0.3 \times 12 \times 1 = 12 \times 1.04 = 12.48$	1.409 x 1.10 = 1.550	4.2826
M ³		M ³	$1/4 - 1/4 \times 1/3 = 7.31 \times 0.67 = 4.895$	23.358	
M ³		M ³	Partition wall - $0.3 \times 12 \times 1 = 3.6$	67.04 x 1.10 = 73.744	
M ³		M ³	Partition wall - $0.3 \times 12 \times 1 = 3.6$	67.04 x 1.10 = 73.744	
M ³		M ³	Partition wall - $0.3 \times 12 \times 1 = 3.6$	67.04 x 1.10 = 73.744	
M ³		M ³	Partition wall - $0.3 \times 12 \times 1 = 3.6$	67.04 x 1.10 = 73.744	
M ³		M ³	FORM WORK $1/4 \text{ and } 6/8 - (0.5 \times 0.5) + (0.5 \times 0.5) - (0.3 \times 0.3) = 0.14$	2.21	
M ³		M ³	Partition wall - $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	9.304 x 1.30 = 12.095	
M ³		M ³	Partition wall - $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	9.304 x 1.30 = 12.095	
M ³		M ³	Partition wall - $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	9.304 x 1.30 = 12.095	
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M ³		M ³	Partition wall - $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	9.304 x 1.30 = 12.095	
M ³		M ³	CONCRETE BASE $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	5.42	5.42 x 1.30 = 7.046
M ³		M ³	CONCRETE BASE $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	5.42	5.42 x 1.30 = 7.046
M ³		M ³	CONCRETE BASE $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	5.42	5.42 x 1.30 = 7.046
M ³		M ³	CONCRETE BASE $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	5.42	5.42 x 1.30 = 7.046
M ³		M ³	CONCRETE BASE $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	5.42	5.42 x 1.30 = 7.046
M ³		M ³	CONCRETE BASE $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	5.42	5.42 x 1.30 = 7.046
M ³		M ³	CONCRETE BASE $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	5.42	5.42 x 1.30 = 7.046
M ³		M ³	CONCRETE BASE $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	5.42	5.42 x 1.30 = 7.046
M ³		M ³	CONCRETE BASE $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	5.42	5.42 x 1.30 = 7.046
M ³		M ³	CONCRETE BASE $(0.3 \times 0.2) \times 8 = (0.5 \times 0.5) \times 2 = 0.72$	5.42	5.42 x 1.30 = 7.046

PACKAGE : MFC-III/MFC-IV
WORK ITEM : REVETMENT FOR UPPER PERCUT RIVER (TYPE - PC)
TYPE : WET STONE MASONRY

N	O W O R K I T E M	Unit	L O C A T I O N											SUB TOTAL (I) L = 645 m
			PE 137R+23 L = 30 m	PE 137L+20 L = 30 m	PE 139L+45 L = 25 m	PE 140L+20 L = 80 m	PE 144R+24 L = 70 m	PE 149R+57 L = 70 m	PE 152R+63 L = 70 m	PE 153L+85 L = 70 m	PE 157L/R+25 L = 50 m	PE 158R+30 L = 80 m	PE 164R+58 L = 70 m	
1.	Excavation (common)	m ³	382.92	382.92	325.37	958.42	843.32	843.32	843.32	843.32	613.12	1,456.42	843.32	8,335.77
2.	Crusher Run Bedding	m ³	144.60	144.60	120.50	385.60	337.40	337.40	337.40	337.40	241.00	578.40	337.40	3,301.70
3.	Wet Stone Masonry (1:4)	m ³	131.12	131.12	107.49	348.77	304.17	304.17	304.17	304.17	217.65	521.82	304.17	2,978.82
4.	Cement Mortar Plastering, 20 mm thick	m ²	502.50	502.50	418.75	1,340.00	1,172.50	1,172.50	1,172.50	1,172.50	837.50	2,010.00	1,172.50	11,473.75
5.	Concrete, Type - C1	m ³	28.84	28.84	28.90	68.02	60.02	60.02	60.02	60.02	43.90	105.92	60.02	604.52
6.	Reinforcing, Steel Bar	Kg	1,706.65	1,706.65	1,535.54	4,097.68	3,755.48	3,755.48	3,755.48	3,755.48	2,617.72	6,773.20	3,755.48	37,214.84
7.	Formwork FW1	m ²	171.45	171.45	154.45	410.90	476.90	476.90	476.90	476.90	262.60	639.50	476.90	4,194.85
8.	Log Pile, Dia. 150 mm, L = 2.0 m	m	110.00	110.00	106.00	160.00	150.00	150.00	150.00	150.00	130.00	160.00	150.00	1,526.00
9.	Elastic Joint Filler, 10 mm thick	m ³	55.12	55.12	49.02	143.90	131.70	131.70	131.70	131.70	88.78	220.48	131.70	1,270.92
10.	Weep Hole, PVC Pipe Dia. 50 mm with Palm Fiber Filter	nos	64.00	64.00	53.00	170.00	149.00	149.00	149.00	149.00	107.00	170.00	149.00	1,373.00
11.	Gabion Mattress	m ³	51.00	51.00	43.50	126.00	111.00	111.00	111.00	111.00	81.00	192.00	111.00	1,099.50
12.	Gabion Cylinder Filing	m ³	29.28	29.28	29.28	29.28	29.28	29.28	29.28	29.28	29.28	58.56	29.28	351.36
13.	Cobble Stone Filing	m ³	7.50	7.50	6.25	20.00	17.50	17.50	17.50	17.50	12.50	20.00	17.50	161.25

PACKAGE : MFC-III/MFC-IV
WORK ITEM : REVETMENT FOR UPPER PERCUT RIVER
TYPE : WET STONE MASONRY

N	O	W	K	I	T	L O C A T I O N											SUB		
						Unit	PE 167L+69 m L = 60 m	PE 168R+43 m L = 60 m	PE 169L/R+45 m L = 60 m	PE 171L+13 m L = 95 m	PE 174L+42 m L = 70 m	PE 176L/R m L = 40 m	PE 180R+106m L = 60 m	PE 181L+44 m L = 60 m	PE 183R+6 m L = 70 m	PE 184L+27 m L = 70 m		TOTAL (2) L = 645 m	
1.						Excavation (common)	m ³	728.22	728.22	1,456.44	1,131.07	843.32	498.02	728.22	728.22	843.32	843.32	8,528.37	
2.						Crusher Run Bedding	m ³	289.20	289.20	578.40	457.90	337.40	192.80	289.20	289.20	337.40	337.40	3,398.10	
3.						Wet Stone Masonry (1 : 4)	m ³	260.91	260.91	521.82	414.33	304.17	173.05	260.91	260.91	304.17	304.17	3,065.35	
4.						Cement Mortar Plastering, 20 mm thick	m ²	1,005.00	1,005.00	2,010.00	1,591.25	1,172.50	670.00	1,005.00	1,005.00	1,172.50	1,172.50	11,808.75	
5.						Concrete, Type - C1	m ³	51.96	51.96	103.92	80.08	60.02	37.88	51.96	51.96	60.02	60.02	609.78	
6.						Reinforcing, Steel Bar	Kg	3,386.60	3,386.60	6,773.20	4,837.66	3,755.48	2,275.52	3,386.60	3,386.60	3,755.48	3,755.48	38,699.22	
7.						Formwork FW1	m ²	319.75	319.75	639.50	485.05	476.90	228.60	319.75	319.75	476.90	476.90	4,062.85	
8.						Log Pile, Dia. 150 mm, L = 2.0 m	m	140.00	140.00	140.00	175.00	150.00	120.00	140.00	140.00	150.00	150.00	1,445.00	
9.						Elastic Joint Filler , 10 mm thick	m ²	110.24	110.24	220.48	171.46	131.70	136.58	110.24	110.24	131.70	131.70	1,364.58	
10.						Weep Hole, PVC Pipe Dia. 50 mm with Palm Fiber Filter	nos	128.00	128.00	128.00	202.00	149.00	85.00	128.00	128.00	149.00	149.00	1,374.00	
11.						Gabion Mattress	m ³	96.00	96.00	192.00	148.50	111.00	66.00	96.00	96.00	111.00	111.00	1,123.50	
12.						Gabion Cylinder Filing	m ³	29.28	29.28	58.56	29.28	29.28	29.28	29.28	29.28	29.28	29.28	322.08	
13.						Cobble Stone Filling	m ³	15.00	15.00	30.00	23.50	17.50	10.00	15.00	15.00	17.50	17.50	176.00	

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PACKAGE : MFC-III / MFC-IV
WORK ITEM : REVETMENT FOR UPPER PERCUT RIVER
TYPE : WET STONE MASONRY

N	O W O R K I T E M	Unit	L O C A T I O N											SUB	
			PE 187R+80 m L = 60 m	PE 191L+67 m L = 70 m	PE 197R+82 m L = 50 m	PE 199L+33 m L = 30 m	PE 199R+18 m L = 77 m	PE 200L+0 m L = 40 m	PE 202L+58 m L = 80 m	PE 205L+70 m L = 130 m	PE 205L+75 m L = 70 m	PE 208L+25m L = 110 m	TOTAL (3)	L = 717 m	
1.	Excavation (common)	m ³	728.22	843.32	613.12	382.92	924.89	498.02	599.86	1,533.92	843.32	2,048.70	9,016.29		
2.	Crusher Run Bedding	m ³	289.20	337.40	241.00	144.60	371.14	192.80	234.56	626.60	337.40	833.17	3,607.87		
3.	Wet Stone Masonry (1 : 4)	m ³	260.91	304.17	217.65	131.12	335.18	173.05	183.06	566.42	304.17	754.11	3,229.84		
4.	Cement Mortar Plastering, 20 mm thick	m ²	1,005.00	1,172.50	837.50	502.50	1,289.75	670.00	708.85	2,177.50	1,172.50	2,895.36	12,431.46		
5.	Concrete, Type - C1	m ³	51.96	60.02	43.90	28.84	66.71	37.88	46.39	110.26	60.02	144.70	650.68		
6.	Reinforcing, Steel Bar	Kg	3,386.60	3,755.48	2,617.72	1,706.65	4,031.29	2,275.52	2,330.63	6,715.40	3,755.48	8,764.86	39,339.63		
7.	Formwork FW1	m ²	319.75	476.90	262.60	171.45	404.40	228.60	261.44	673.50	476.90	878.74	4,154.28		
8.	Log Pile, Dia. 150 mm, L = 2.0 m	m	140.00	150.00	130.00	110.00	150.00	120.00	120.00	210.00	150.00	190.00	1,470.00		
9.	Elastic Joint Filler, 10 mm thick	m ²	110.24	131.70	88.78	55.12	141.47	136.58	32.43	241.94	131.70	312.75	1,382.71		
10.	Weep Hole, PVC Pipe Dia. 50 mm with Palm Fiber Filter	nos	128.00	149.00	107.00	64.00	164.00	85.00	170.00	277.00	149.00	234.00	1,527.00		
11.	Gabion Mattress	m ³	96.00	111.00	81.00	51.00	121.66	66.00	120.00	201.00	111.00	268.71	1,227.37		
12.	Gabion Cylinder Filing	m ³	29.28	29.28	29.28	29.28	30.06	29.28	17.00	29.28	29.28	46.01	298.03		
13.	Cobble Stone Filing	m ³	15.00	17.50	12.50	7.50	19.25	10.00	20.00	32.50	17.50	43.21	194.96		

PACKAGE : MFC-III/MFC-IV
WORK ITEM : REVETMENT FOR UPPER PERCUT RIVER
TYPE : WET STONE MASONRY

N	O WORK ITEM	Unit	L O C A T I O N											SUB TOTAL (4)
			PE 211L+78 m L = 60 m	PE 220L+30 m L = 50 m	PE 221R+75 m L = 40 m	PE 221L+85 m L = 40 m	PE 224R+8 m L = 105 m	PE 230R+32 m L = 60 m	PE 241L+55 m L = 70 m	PE 242R+85 m L = 90 m	PE 246R+20 m L = 40 m	PE 246L+35m L = 115 m		
1.	Excavation (common)	m ³	728.22	381.91	498.02	498.02	1,246.17	728.22	843.32	1,073.57	498.02	1,361.27	7,856.74	
2.	Crusher Run Bedding	m ³	289.20	146.60	192.80	192.80	506.10	289.20	337.40	433.80	192.80	554.30	3,135.00	
3.	Wet Stone Masonry (1 : 4)	m ³	260.91	116.60	173.05	173.05	457.59	260.91	304.17	392.03	173.05	500.86	2,812.22	
4.	Cement Mortar Plastering, 20 mm thick	m ²	1,005.00	443.37	670.00	670.00	1,758.75	1,005.00	1,172.50	1,507.50	670.00	1,026.25	9,928.37	
5.	Concrete, Type - C1	m ³	51.96	30.31	37.88	37.88	95.18	51.96	60.02	77.03	37.88	98.13	578.23	
6.	Reinforcing Steel Bar	Kg	3,386.60	1,480.64	2,375.52	2,375.52	5,406.54	3,386.60	3,755.48	4,666.56	2,275.52	5,975.42	35,084.40	
7.	Formwork FW1	m ²	319.75	171.91	128.60	128.60	542.20	319.75	476.90	468.05	228.60	599.35	3,383.71	
8.	Log Pile, Dia. 150 mm, L = 2.0 m	m	140.00	90.00	120.00	120.00	185.00	140.00	150.00	170.00	120.00	195.00	1,430.00	
9.	Elastic Joint Filler , 10 mm thick	m ³	110.24	20.27	76.58	76.58	192.20	110.24	131.70	165.36	136.58	214.38	1,234.13	
10.	Weep Hole, PVC Pipe Dia. 50 mm with Palm Fiber Filter	nos	128.00	107.00	85.00	85.00	224.00	128.00	149.00	192.00	85.00	245.00	1,428.00	
11.	Gabion Mattress	m ³	96.00	75.00	66.00	66.00	163.50	96.00	111.00	141.00	66.00	178.50	1,059.00	
12.	Gabion Cylinder Filing	m ³	29.28	17.00	29.28	29.28	29.28	29.28	29.28	29.28	29.28	29.28	280.52	
13.	Cobble Stone Filling	m ³	15.00	12.50	10.00	10.00	26.25	15.00	17.50	22.50	10.00	28.75	167.50	

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PACKAGE : MFC-III / MFC-IV
WORK ITEM : REVETMENT FOR UPPER PERCUT RIVER
TYPE : WET STONE MASONRY

N	O W O R K I T E M	Unit	L O C A T I O N											SUB		
			PE 248R+50 m L = 70 m	PE 254R+44 m L = 95 m	PE 255R+7 m L = 20 m	PE 259L+0 m L = 60 m	PE 259R+0 m L = 15 m	PE 260L+23 m L = 70 m	PE 261R+27 m L = 50 m	PE 262R+35 m L = 50 m	PE 262L+74 m L = 90 m	PE 269 L+118 m L = 12 m	TOTAL (5)	L = 532 m		
1.	Excavation (common)	m ³	843.32	1,124.53	267.82	728.22	210.27	527.21	381.91					1,073.52	160.69	5,699.40
2.	Crusher Run Bedding	m ³	337.40	457.90	96.40	289.20	72.30	205.24	146.60					433.80	57.84	2,243.28
3.	Wet Stone Masonry (1 : 4)	m ³	304.17	413.75	86.52	260.91	64.22	163.24	116.60					392.03	51.91	1,969.95
4.	Cement Mortar Plastering, 20 mm thick	m ²	1,172.50	847.77	33.50	1,005.00	251.25	632.10	443.37					1,507.50	20.10	6,356.47
5.	Concrete, Type - C1	m ³	60.02	81.06	19.78	51.96	16.78	40.50	30.31					77.03	11.87	419.62
6.	Reinforcing Steel Bar	Kg	3,755.48	4,936.22	1,137.76	3,386.60	966.66	2,019.41	1,480.64					4,666.56	682.66	24,512.63
7.	Formwork FW1	m ²	476.90	495.11	134.30	319.75	97.30	228.18	171.91					468.05	80.58	2,644.00
8.	Log Pile, Dia. 150 mm, L = 2.0 m	m	150.00	175.00	100.00	100.00	95.00	110.00	90.00					170.00	52.00	1,132.00
9.	Elastic Joint Filler, 10 mm thick	m ²	131.70	177.10	33.66	110.24	27.56	10.75	20.27					165.36	20.20	717.11
10.	Weep Hole, PVC Pipe Dia. 50 mm with Palm Fiber Filter	nos	149.00	202.00	43.00	128.00	32.00	149.00	107.00					192.00	26.00	1,135.00
11.	Gabion Mattress	m ³	111.00	147.46	36.00	96.00	28.50	105.00	75.00					141.00	21.60	836.56
12.	Gabion Cylinder Filing	m ³	29.28	24.19	29.28	29.28	29.28	17.00	17.00					29.28	17.57	239.16
13.	Cobble Stone Filling	m ³	17.50	23.75	5.00	15.00	3.75	17.50	12.50					22.50	3.00	133.00

PACKAGE : MFC-III / MFC-IV
WORK ITEM : REVETMENT FOR UPPER PERCUT RIVER
TYPE : WET STONE MASONRY

NO	WORK ITEM	Unit	L O C A T I O N										SUB TOTAL (6) L = 120 m
			PE 269L+130 m L = 50 m	PE 271R+73 m L = 70 m									
1.	Excavation (common)	m ³	613.12	843.32									1,456.44
2.	Crusher Run Bedding	m ³	241.00	385.60									626.60
3.	Wet Stone Masonry (1 : 4)	m ³	217.65	348.77									566.42
4.	Cement Mortar Plastering, 20 mm thick	m ²	837.50	1,172.50									2,010.00
5.	Concrete, Type - C1	m ³	43.90	62.00									105.90
6.	Reinforcing, Steel Bar	Kg	2,617.72	3,755.48									6,373.20
7.	Formwork FW1	m ²	262.60	376.90									639.50
8.	Log Pile, Dia. 150 mm, L = 2.0 m	m	100.00	150.00									250.00
9.	Elastic Joint Filler, 10 mm thick	m ²	88.78	131.70									220.48
10.	Weep Hole, PVC Pipe Dia. 50 mm with Palm Fiber Filter	nos	107.00	149.00									256.00
11.	Gabion Mattress	m ³	81.00	111.00									192.00
12.	Gabion Cylinder Filing	m ³	29.28	29.28									58.56
13.	Cobble Stone Filing	m ³	12.50	17.50									30.00

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PACKAGE : MFC-III / MFC-IV
WORK ITEM : REVETMENT FOR UPPER PERCUT RIVER
TYPE : WET STONE MASONRY

N O	W O R K I T E M	Unit	SUB TOTAL (1) L = 645 m	SUB TOTAL (2) L = 645 m	SUB TOTAL (3) L = 717 m	MFC-III 2007 m	SUB TOTAL (4) L = 670 m	SUB TOTAL (5) L = 532 m	SUB TOTAL (6) L = 120 m	MFC-IV 1332 m	T O T A L L = 3,329.0 m
1.	Excavation (common)	m ³	8,335.77	8,528.37	9,016.29	25,880.43	7,856.74	5,699.40	1,456.44	15,012.58	40,893.01
2.	Crusher Run Bedding	m ³	3,301.70	3,398.10	3,607.87	10,307.67	3,135.00	2,243.28	626.60	6,004.88	16,312.55
3.	Wet Stone Masonry (1 : 4)	m ³	2,978.82	3,065.35	3,229.84	9,274.01	2,812.22	1,969.95	566.42	5,348.59	14,622.60
4.	Cement Mortar Plastering, 20 mm thick	m ²	11,473.75	11,808.75	12,431.46	35,713.96	9,928.37	6,356.47	2,010.00	18,294.84	54,008.80
5.	Concrete, Type - C1	m ³	604.52	609.78	650.68	1,864.98	578.23	419.62	105.90	1,103.75	2,968.73
6.	Reinforcing, Steel Bar	Kg	37,214.84	38,699.22	39,339.63	115,253.69	35,084.40	24,512.63	6,373.20	65,970.23	181,223.92
7.	Formwork FW1	m ²	4,194.85	4,062.85	4,154.28	12,411.98	3,383.71	2,644.00	639.50	6,667.21	19,079.19
8.	Log Pile, Dia. 150 mm, L = 2.0 m	m	1,526.00	1,445.00	1,470.00	4,441.00	1,430.00	1,132.00	250.00	2,812.00	7,253.00
9.	Elastic Joint Filler, 10 mm thick	m ²	1,270.92	1,364.58	1,382.71	4,018.21	1,234.13	717.11	220.48	2,171.72	6,189.93
10.	Weep Hole, PVC Pipe Dia. 50 mm with Palm Fiber Filter	nos	1,373	1,374	1,527	4,274	1,428	1,135	256	2,819	7,093
11.	Gabion Mattress	m ³	1,099.50	1,123.50	1,227.37	3,450.37	1,059.00	836.56	192.00	2,087.56	5,537.93
12.	Gabion Cylinder Filing	m ³	351.36	322.08	298.03	971.47	280.52	239.16	58.56	578.24	1,549.71
13.	Cobble Stone Filling	m ³	161.25	176.00	194.96	532.21	167.50	133.00	30.00	330.50	862.71

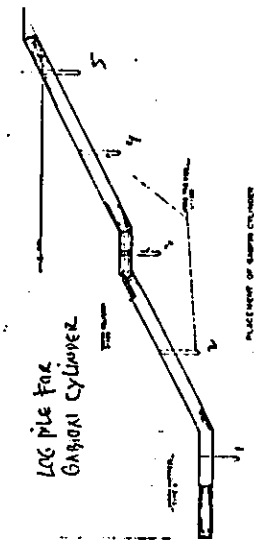
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BILL OF QUANTITY

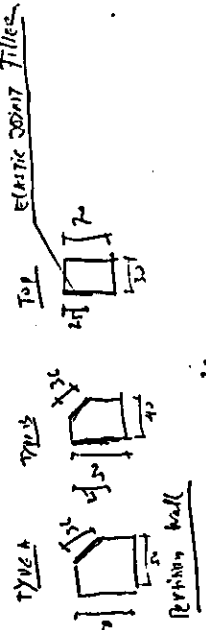
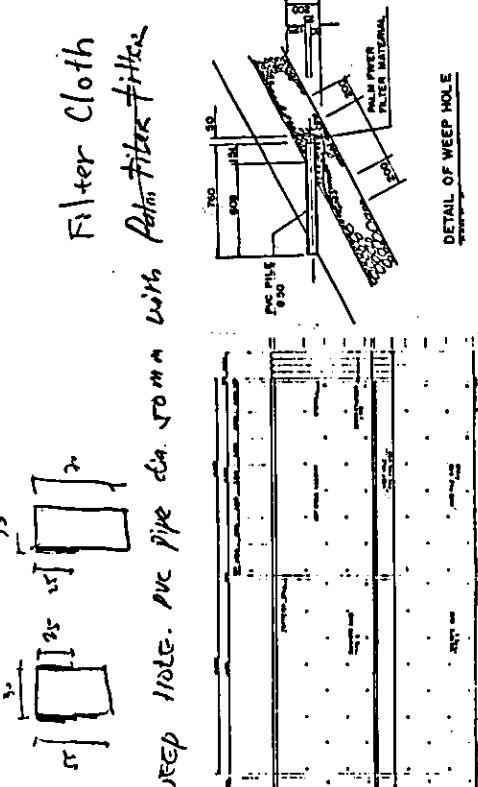
NAME OF STRUCTURE: /
 LOCATION : PERCUT RIVER

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
6.	REINFORCING STEEL BAR				
		kg	$\phi 13 = 12 \times 1 = 12 \text{ m} \times 1.04 = 12.48 \times 1.1$		
			$\phi 10 = 1.04 \times 4 = 4.16 \text{ m} \times 0.617 = 2.57 \times 1.1$		
			$\phi 10 = 1.35 \times 4 = 5.4 \text{ m} \times 0.617 = 3.33 \times 1.1$		
			$\phi 16 = 1.70 \times 4 = 6.8 \text{ m} \times 0.617 = 4.19 \times 1.1$	3.422	3.422
		kg	Perkutan wall		
			- End wall $\phi 13 = 6 \times 1 = 6 \text{ m} \times 1.04 = 6.24 \times 1.1$		
			$\phi 10 = 1.7 \times 4 = 6.8 \text{ m} \times 0.617 = 4.19 \times 1.1$	11.43	
			- Along end wall		
			$\phi 13 = 6 \times 1 = 6 \text{ m} \times 1.04 = 6.24 \times 1.1$		
			$\phi 10 = 1.4 \times 4 = 5.6 \text{ m} \times 0.617 = 3.40 \times 1.1$	13.02	
			Average $\frac{11.43 + 13.02}{2} = 12.24 \times 1.04$	227.17	227.17
7.	FORM WORK F.W.I.				
		m ²	$\frac{(0.5 + 2.0 + 0.5) \times (1.5 + 0.5 + 1.5) + (0.7 + 0.7) \times 1}{2}$	2.4	3.4
			Perkutan wall		
			$\frac{[(0.5 + 1.05) \times (0.7 + 0.7)] \times 1}{2} \times 1.1 = 1.24 \times 1.04$	23.2	2320
8.	LOG PILE FOR GABION CYLINDER	m	$\frac{L}{2} + 1$		
			For Gabion Cylinder		
			5 x 8	5	70
			For Base Concrete @ 2.0 m		



BILL OF QUANTITY

NAME OF STRUCTURE :
LOCATION :

NO	SKETS OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
9.	 Elastic Joint Filler, 10 mm thick.	M ²	$100 \times 2.057 \times 1$ $(0.36 + 0.25 + 0.36 + 0.25) \times 1$ VERTICAL $(0.25 + 10.56)$	1.22	1.22
10	 Filter Cloth Weep Hole. PVC pipe dia. 50 mm with Palm Fiber Filter.	M ²	$64 / 30.0 = 2.13$ per meter	-	2.13
11.	GABION MATRESS	M ³	$(3 \times 0.5) \times 1$	1.5	1.5
12.	GABION CYLINDER FILLING	M ³	$147.05 / 2 = 10.56$ / pc.	3.54	3.54
13	CABLE STONE FILLING	M ³	$1/2 \times 0.5 \times 1$	0.25	0.25

BILL of QUANTITY

NAME OF STRUCTURE: REVENUE WORK (bet Hwa Phangmy)
LOCATION: Pear River (upper portion)

[illegible]

NAME OF STRUCTURE: Revetment wall (Left Stone Masonry)
LOCATION: Percent River (uppose position)

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PACKAGE : MFC-2

WORK ITEM : GABION CYLINDER FOR WATER CHANNEL SLOPE(LOWER PORTION OF PERCUT RIVER)

TYPE :

N O .	WORK ITEM	Unit	LOCATION									TOTAL	
			PE89L+50m L = 30m	PE82L+50m L = 30m	PE80R+100m L = 30m	PE79L+46m L = 30m	PE73L+40m L = 50m	PE71R+70m L = 30m	PE70R+56m L = 70m	PE69R+10m L = 50m	PE68+95m L = 60m	L = 575m	
1.	Excavation (common)	m ³	24.30	24.30	24.30	24.30	40.50	24.30	56.70	40.50	48.60	307.80	
2.	Gabion Cylinder Filling	m ³	188.40	188.40	188.40	188.40	314.00	188.40	439.60	314.00	376.80	2,386.40	
3.	Log Pile, Dia.150mm, L=2.0m	nos	180.00	180.00	180.00	180.00	300.00	180.00	420.00	300.00	360.00	2,280.00	
4.	Cobble Stone Filling	m ³	1.86	1.86	1.86	1.86	2.86	1.86	3.86	2.86	3.36	22.24	
5.	Palm Fiber Filter, t = 10mm	m ²	390.00	390.00	390.00	390.00	649.00	390.00	909.00	649.00	779.00	4,936.00	

GABION CYLINDER FOR LOW WATER CHANNEL SLOPE

LOCATION OF GABION CYLINDER	L (M)	VOLUME			
		EXCAVATION (m ³)	GABION CYLINDER (m ³)	LOG PILE ϕ 150 I=2.00m (nos)	COBBLE STONE FILLING (m ³)
PE 89L + 83m	30	0.81 x 30 = 24.30	3.14 x 30/0.5 = 188.40	3 x 30/0.5 = 180	(0.05 x 30) + 0.36 = 1.86
PE 82L + 50m	30	0.81 x 30 = 24.30	3.14 x 30/0.5 = 188.40	3 x 30/0.5 = 180	(0.05 x 30) + 0.36 = 1.86
PE 80R + 100m	30	0.81 x 30 = 24.30	3.14 x 30/0.5 = 188.40	3 x 30/0.5 = 180	(0.05 x 30) + 0.36 = 1.86
PE 79L + 46m	30	0.81 x 30 = 24.30	3.14 x 30/0.5 = 188.40	3 x 30/0.5 = 180	(0.05 x 30) + 0.36 = 1.86
PE 73L + 40m	50	0.81 x 50 = 40.50	3.14 x 50/0.5 = 314.00	3 x 50/0.5 = 300	(0.05 x 50) + 0.36 = 2.86
PE 70R + 56m	70	0.81 x 70 = 56.70	3.14 x 70/0.5 = 439.60	3 x 70/0.5 = 420	(0.05 x 70) + 0.36 = 3.86
PE 69R + 10m	50	0.81 x 50 = 40.50	3.14 x 50/0.5 = 314.00	3 x 50/0.5 = 300	(0.05 x 50) + 0.36 = 2.86
PE 68L + 95m	60	0.81 x 60 = 48.60	3.14 x 60/0.5 = 336.80	3 x 60/0.5 = 360	(0.05 x 60) + 0.36 = 3.36
PE 71L + 95m	30	0.81 x 30 = 24.30	3.14 x 30/0.5 = 188.40	3 x 30/0.5 = 180	(0.05 x 30) + 0.36 = 1.86

BILL OF QUANTITY

NAME OF STRUCTURE: GABION CYLINDER FOR LOW WATER CHANNEL SLOPE

LOCATION : PERCUT RIVER (LOWER PARTITION)

per Unit

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
		m ³	GABION CYLINDER ($\frac{1}{4} \pi (500)^2 \times 11.12$)	(3.14)	
		m ³	COBBLE STONE FILLING (0.5×0.4) $\frac{1}{2} \times 0.5 \rightarrow$ Along the structure Combined (0.5×0.4) $\frac{1}{2} \times 0.5 \rightarrow$ both side	0.25 0.25	
		nos	LOA PILE Ø 150, L=2.0004 per unit	3	
		m ³	EXCAVATION 1 (18×0.5) $0.5 \times (0.5 \times 0.4) \frac{1}{2} \times 11.12$	0.81	
		m ²	Palm Fiber Filter $\lambda=10 \text{ mm}$ ($11.18 + 1.8$) $\times 1.0$	20.124	

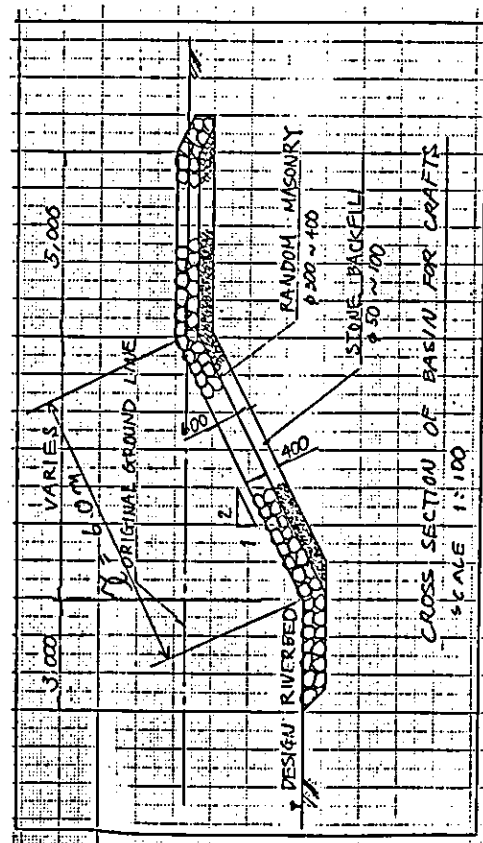
C6 NAME OF STRUCTURE: REVETMENT - RANDOM MASONRY TYPE
LOCATION : River Mouth, MFC-I

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			1. Excavation		
		m ³	$2.0 \times (155.0 + 130.0) \times 0.6$	342	
			$\frac{1}{2} \times (4.5 + 6.3) \times 1.0 \times (155.0 + 130.0)$	1539	1,881
		m ³	2. Stone Backfill ($\phi 50 \sim 100$)		
			$(6.3 + 3.0) \times 0.4 \times (155.0 + 130.0)$		
			$2.8 \times 0.4 \times 30.0$	1,061	
			3. Random Masonry ($\phi 300 \sim 500$)	34	1,095
		m ³	$(2.0 + 6.5 + 3.0 + 2.0 + 1.0) \times 0.6 \times 285$	2,480	
			$2.8 \times 0.6 \times 30.0$	51	2,531

C7 NAME OF STRUCTURE: BASIN FOR CRAFTS

LOCATION : PE15R+0 , PE20R+60M, PE26R+0M (3 places) , MFC-I

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
1.		m ³	Excavation $\{(6.0 + 5.0) \times 1.0 + 3.0 \times 0.6\} \times 70.0$		896
2		m ³	Stone Backfill $\frac{1}{2} \times (35.0 + 30.0) \times 5.0 + \frac{1}{2} \times (22 + 14) \times 5.0 \times 2$ $\frac{1}{2} \times (30 + 24) \times 6.0 + 14.0 \times 6.0 \times 2 + \frac{1}{2} \times (13 + 10) \times 6.0 \times 2 \times 0.4$	137.0	
3		m ³	Random Masonry $\frac{1}{2} \times (35 + 30) \times 5.0 + \frac{1}{2} \times (22 + 14) \times 5.0 \times 2$ $\frac{1}{2} \times (30 + 24) \times 6.0 + 14.0 \times 6.0 \times 2 + \frac{1}{2} \times (13 + 10) \times 6.0 \times 2 \times 0.6$	205.5	
			$6.0 \times 2 \times 0.6$	230.4	436
			Total Quantity (3 places)		
			1. Excavation 896 x 3	m ³	2,688
			2. Stone Backfill 325 x 3	m ³	975
			3. Random Masonry 436 x 3	m ³	1,308



PACKAGE : MFC-I
 WORK ITEM : GROIN
 TYPE :

LOCATION	
NO.	LEFT BANK
1	PE 20 + 40
2	PE 20 + 70
3	PE 19 + 0
4	PE 19 + 30
5	PE 19 + 60
6	PE 18 + 5
7	PE 18 + 35
8	PE 18 + 65
9	PE 17 + 4

NO.	WORK ITEM	Unit	QUANTITY PER ONE PLACE	NO. OF GROIN	TOTAL QUANTITY
1.	Reinforced Concrete Pile				
	Number of Pile	nos	18.000	9	162.00
	Concrete, Type-B	m ³	4.680	9	42.12
	Form Work	m ²	3.900	9	35.10
	Reinforcing, Steel Bar	Kg	917.822	9	8,260.40
	Driving	m	63.000	9	567.00
2.	Concrete Fram, Type-C1				
	Concrete Type-C1	m ³	216.000	9	1,944.00
	Reinforcing, Steel Bar	Kg	289.712	9	2,607.41
	Form Work FW1	m ²	21.600	9	194.40
3.	RipRap Boulder (Ø 300 ~ 500 mm)	m ³	47.328	9	425.95

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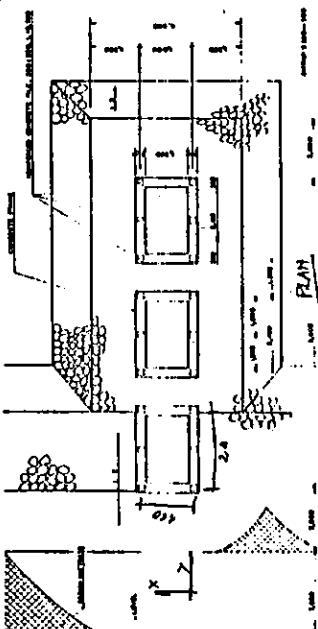
LOCATION

1. PE20+40
2. PE20+70
3. PE19+00
4. PE19+30
5. PE19+50
6. PE18+05
7. PE18+35
8. PE18+65
9. PE17+04

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Bill of Quantity

NAME OF STRUCTURE: GROIN AND BANK PROTECTION
LOCATION : PEROT RIVER

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL PC UNIT
1			REINFORCED CONCRETE PILES		
		NOS	Number of pile		178
		M ³	Concrete type-B $-(0.2 \times 0.2) \times 6.5 \times 18$		468
		M ²	FORM WORK $-(0.2 \times 6.5) \times 18$		3.90
		Kg	REINFORCING, STEEL BAR $A_s = (6.5 \times 0.2) \times 18 = 23.4 \times 1.1 = 517.96 \times 1.14 =$ $A_s = (0.62 \times 7) \times 18 \times 2 = 155.24 \times 1.1 = 171.864 \times 0.617 =$ $A_s = [0.62 \times (\frac{18}{0.1} + 1)] \times 18 = 402.38 \times 1.1 = 442.618 \times 0.617 =$	538.687 106.043 272.075	917.822
		M	DRIVING AREA 3.5m x 17		63.1
			CONCRETE FORM TYPE-Gr		
		M ³	CONCRETE TYPE-C $(0.2 \times 0.2 \times 1.1) \times 6 + (0.2 \times 0.2 \times 2.4) \times 6$		2.016
		Kg	REINFORCING, steel bar $A_s = (1.7 \times 8) \times 6 = 81.20 \times 1.1 = 100.32 \times 1.021 =$ $A_s = [(\frac{1}{2} \times 1.1) \times 0.7] \times 6 \times 1.1 = 3.102 \times 0.617 =$ $A_s = (2.0 \times 8) \times 6 = 112.20 \times 1.1 = 123.42 \times 1.021 =$ $A_s = [(\frac{1}{2} \times 1.1) \times 0.7] \times 6 \times 1.1 = 3.102 \times 0.617 =$	101.333 19.139 131.709 34.451	269.712
		M ²	FORM WORK $[(0.2 \times 8) \times 3] \times 3$		21.60
			RIPEAP: BINDER (4000-5000)		
		M ³	$[2.1 \times 7.1 \times 0.1] \times 13.6$		47.328

(2). FLOODWAY

FLOODWAY

PACKAGE : MFC-5 / MFC-6
 WORK ITEM : REVTMENT FOR FLOODWAY
 TYPE : WET STONE MASONRY

N	WORK ITEM	Unit	MFC-5		MFC-6	
			FW3 to FW24	2,229.0 m	FE24 to FW28 + 28 m	440.5 m
1.	Excavation (common)	m ³	16.07	35,820.0	16.07	7,078.8
2.	Crusher Run Bedding	m ³	10.06	22,423.7	10.06	4,431.4
3.	Wet Stone Masonry (1 : 4)	m ³	6.35	14,143.0	6.35	2,797.2
4.	Cement Mortar Plastering, 20 mm thick	m ²	25.70	57,285.3	25.70	11,320.9
5.	Concrete, Type - C1	m ³	1.20	3,308.1	1.20	656.1
6.	Concrete, Type - C2	m ³	0.66	1,471.1	0.66	290.7
7.	Reinforcing Steel Bar	Kg	56.78	168,731.1	56.78	33,501.9
8.	Formwork FW1	m ²	6.80	19,388.8	6.80	3,847.4
9.	Elastic Joint Filler, 10 mm thick	m ²	0.30	4,822.8	0.30	942.2
10.	Weep Hole, PVC Pipe Dia. 50 mm with Palm Fiber Filter	nos	74 x 149	13,351.0	74 x 30	2,220.0

BILL OF QUANTITY

NAME OF STRUCTURE: GRAPE PROTECTION (Weir from Memory)
 LOCATION : FLOOD WAY (FW) 3+30 — FW 3+49

MFC - V L =

MFC - VI L =

L = 2354.50 M

Both Sides

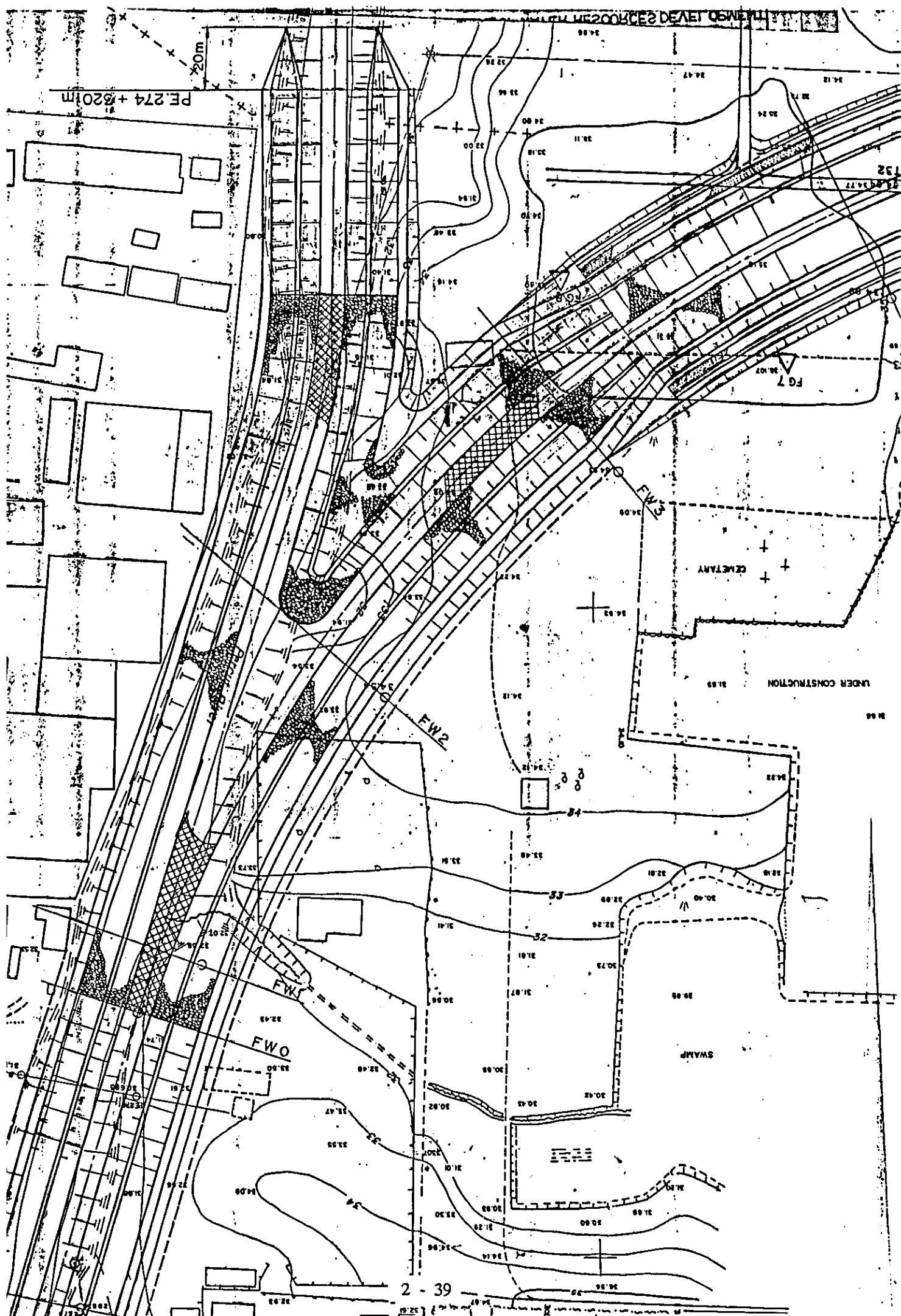
NO	SKETS OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
1.	EXCAVATION (Common)	M ³	$[(5.49 \times 0.5) \times (1 \times 0.3) + (5 \times 0.3) + (0.3 \times 0.3) \times 2] \times 2$	$(16.07) \times 2 = 32.14$	$= 41.050, 82$
2	CRUSHER RUN BEDDING.	M ³	$[(6.49 \times 0.30) \times (1 \times 0.3) + (5 \times 0.3) + (0.3 \times 0.3) \times 2] \times 2$	$10.014 \times 2 = 20.028$	$= 25.708, 44$
3.	Weir from Memory 1:1.	M ³	$[(6.19 \times 0.25) + (0.0 \times 0.25) + (5 \times 0.25) \times 2] \times 2$	$6.348 \times 2 = 12.696$	$= 16.208, 30$
4.	CEMENT MORTAR FURTERING, 20 mm thick	M ²	$(6.49 \times 1.0 + 6.09) \times 2$	$(20.78) \times 2 = 41.56$	$= 61.255, 01$
5.	CONCRETE BASE & TOP	M ³	$[(0.5 \times 0.5) + (0.5 \times 0.5) + (0.5 \times 0.5) \times 2] \times 2$	$(1.20) \times 2 = 2.40$	$= 3.065, 40$
6.	CONCRETE PARTITION WALL	M ³	$(0.3 \times 0.25) \times 1.09 \times 2$	$0.165 \times 2 = 0.33$	$= 26.75$
7.	CONCRETE LINING	M ³	$(4.4 \times 0.15) \times 2$	$1.32 \times 2 = 2.64$	$= 1.681, 97$
8.	REINFORCING, STEEL BAR	Ton	$- 802 \text{ kg} - 913 = 1.0 \times 19 \times 1.09$ $- 10 = (0.6 + 0.2) \times 2 \times 3.33 \times 0.617$ $910 = (0.4 + 0.4 + 0.15 + 0.2 + 0.3) \times 9.33 \times 0.617$ $910 = (0.3 + 0.3 + 0.1 + 0.15 + 0.3) \times 3.33 \times 0.617$ - Partition wall $913 = (6 \times 1) \times 0.9 = 6.24 \times 1 = 6.24$ $910 = 4.4 \times (0.5 + 0.1) \times 0.67 = 2.37 \times 1 = 2.37$	$19.76 \times 2 = 39.52$ $3.29 \times 2 = 6.58$ $2.98 \times 2 = 5.96$ $2.36 \times 2 = 4.72$	$= 35.678, 70$
9.	FORMWORK FW 1	M ²	$- \text{Base & Top } (0.5 \times 0.5) + (0.5 \times 0.5) \times 2$ $- \text{Partition wall } (0.5 \times 0.25) \times 2$	$20.301 \times 2 = 40.602$ $6.80 \times 2 = 13.60$	$= 40.375, 19$ $= 17.370, 60$
10.	ELASTIC JOINT FILLER, 10 mm thick.	M ²	$1.5 \times 0.25 = 0.375 \times 2 = 0.75$	$20.308 \times 2 = 40.616$	$= 4.013, 23$
11.	Weir Hole 950 PVC PIPE	M	$1.280 \times 0.25 = 0.32 \times 2 = 0.64 = 13.04 \times 2$ $32 \times 2 / 1000 + 15 \text{ per } 15 \text{ m}$	$27.00 \times 2 = 54.00$ $79 \times 170 = 10200$	$= 4130, 60$ $= 10200$

PACKAGE : MFC-5

WORK ITEM : REMETMENT FOR JUNCTION

TYPE : WET STONE MASONRY

WORLD ITEM	L = 260		L = 230		L = 210		Total	Unit
① Excavation		$(11.39 \times 260) + 39.12 =$	3000.52	$(11.39 \times 230) + 39.12 =$	2658.82	$(11.39 \times 210) + 39.12 =$	2431.02	m ³
② Crusher Run Bedding		$4.81 \times 260 =$	1250.60	$4.81 \times 230 =$	1106.30	$4.81 \times 210 =$	1010.10	m ³
③ Wet Stone Masonry		$4.46 \times 260 =$	1159.60	$4.46 \times 230 =$	1025.80	$4.46 \times 210 =$	936.60	m ³
④ Plastering		$16.75 \times 260 =$	4355.00	$16.75 \times 230 =$	3852.5	$16.75 \times 210 =$	3517.50	m ²
⑤ Concrete Type-C1		$(0.6 \times 255) + (0.165 \times 7) + 7.78 =$	163.58	$(0.6 \times 255.5) + (0.165 \times 15) + 7.78 =$	145.55	$(0.6 \times 206) + (0.165 \times 14) + 7.78 =$	133.69	m ³
⑥ Reinforcing Steel Bar		$(34.18 \times 255) + (186.3 \times 17) + 397.84 =$	12280.8	$(34.18 \times 255) + (186.3 \times 15) + 397.84 =$	11908.24	$(34.18 \times 225) + (186.3 \times 14) + 397.84 =$	10047.1	kg
⑦ Form Work		$(3.4 \times 255) + (20.42 \times 17) + 51.97 =$	1,266.11	$(3.4 \times 225) + (20.42 \times 15) + 51.97 =$	1,123.27	$(3.4 \times 206) + (20.42 \times 14) + 51.97 =$	1,038.25	m ²
⑧ Log Pile ϕ 150 L = 2,000 & 1,500		$\frac{260}{2} + 40 =$	170	$\frac{230}{2} + 40 =$	155	$\frac{210}{2} + 40 =$	145	nos
⑨ Elastic Joint Filler		$11.696 \times 17.33 =$	202.69	$11.696 \times 15.33 =$	179.29	$11.696 \times 14 =$	163.744	m ²
⑩ Weep Hole PVC Pipe ϕ 150		$2.17 \times 260 =$	564.20	$2.17 \times 230 =$	499.10	$2.17 \times 210 =$	455.70	nos
⑪ Gabion Mattress		$1.5 \times 260 =$	390	$1.5 \times 230 =$	345	$1.5 \times 210 =$	315	m ³
⑫ Gabion Cylinder Filling		$3.64 \times 8 =$	29.12	$3.64 \times 8 =$	29.12	$3.64 \times 8 =$	29.12	m ³
⑬ Cobble Stone Filling		$0.25 \times 260 =$	65	$0.25 \times 230 =$	57.5	$0.25 \times 210 =$	52.50	m ³



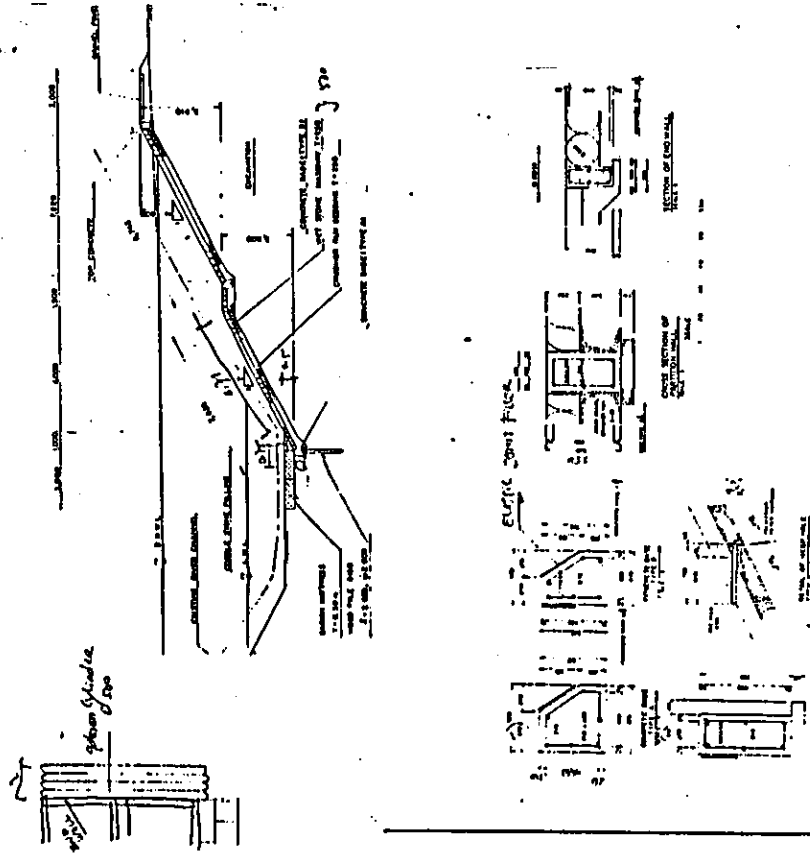
①

ESTIMATE

NAME OF STRUCTURE: RETAINMENT FOR PROTECTION RIVER COMBINED FLOODING AND PERMIT PILE

LOCATION : JOINT FLOODING AND PERMIT PILE

per m

NO	SKETCHES OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
		M ³	EXCAVATION $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$		
		M ³	CRUSHER RUN BEDDING $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$	1139.8	3712
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$	7.21	
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$	4.46	
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$	16.75	
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$	0.6	
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$	0.15	
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$	7.78	
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$		
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$		
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$		
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$		
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$		
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$		
		M ³	CONCRETE MASSIVE $(7.02 \times 0.5) + (4.0 \times 0.5) + (8.74 \times 0.5) + (6.0 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5) + (6.12 \times 0.5)$		

②

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Revetment for Bridge Abutment [MFC-5]
(FW3 to FW24)

Number of Bridge : 3

Area of Revetment

$$A = (5.0 + 4.0 + 3.0) \times 30.0 = 360 \text{ m}^2$$

① Excavation

$$V = 360 \times 0.55 = 198 \text{ m}^3$$

② Wet Stone Masonry

$$V = 360 \times 0.30 = 108.0 \text{ m}^3$$

③ Cement Mortar Plastering 20m thick

$$A = 360 \text{ m}^2$$

④ Concrete (Type-C1)

$$V = 0.30 \times 0.70 \times 30.0 \times 2 \times 3 + 0.3 \times 0.6 \times 12.0 \times 3 \times 3 = 57.3 \text{ m}^3$$

⑤ Reinforcing Steel Bar

$$W = 57.3 \times 2500 \times 0.03 \doteq 4,298 \text{ kg}$$

⑥ Formwork

$$A = 0.70 \times 30.0 \times 2 \times 2 \times 3 + 0.6 \times 12.0 \times 2 \times 3 \times 3 \doteq 382 \text{ m}^2$$

⑦ Elastic Joint Filler

$$0.30 \times 30.0 \times 3 + 0.30 \times 12.0 \times 2 \times 3 \doteq 49 \text{ m}^2$$

⑧ Weep Hole , Dia 50mm

$$n = 360 \div 4 = 90$$

⑨ Crusher Run Bedding

$$V = 360 \times 0.25 = 90 \text{ m}^3$$

Revetment for Bridge Abutment [MFC-6]
(FW24 to FW28 + 28)

Type of Revetment : Wet stone Masonry

Number of Bridge :1

Area of Revetment

$$A = 6.0 \times 30 = 180 \text{ m}^2$$

① Excavation

$$V = 180 \times 0.55 = 99 \text{ m}^3$$

② Wet Stone Masonry

$$V = 180 \times 0.30 = 54 \text{ m}^3$$

③ Cement Mortar Plastering 20mm thick

$$A = 180 \text{ m}^2$$

④ Crusher Run Bedding

$$V = 180 \times 0.25 = 45 \text{ m}^3$$

⑤ Concrete (Type-C1)

$$V = 0.30 \times 0.70 \times 30.0 \times 2 + 0.3 \times 0.6 \times 6.0 \times 3 = 15.9 \text{ m}^3$$

⑥ Reinforcing Steel Bar

$$W = 15.9 \times 2500 \times 0.03 \doteq 1,193 \text{ kg}$$

⑦ Formwork

$$A = 0.70 \times 30.0 \times 2 \times 2 + 0.6 \times 6.0 \times 2 \times 3 \doteq 106 \text{ m}^2$$

⑧ Elastic Joint Filler

$$0.30 \times 30.0 \times 1 + 0.30 \times 6.0 \times 2 \times 1 \doteq 12.6 \text{ m}^2$$

⑨ Weep Hole , PVC Pipe ϕ 50

$$n = 180 \div 4 = 45$$

CHANNEL BED LINING

MFC-5 $l = 2229.0\text{m}$

① Excavation

$$V = (0.15 + 0.15 + 0.20) \times 4.0 \times 2229.0 = 4,458\text{m}^3$$

② Crusher Run Bedding

$$V = 0.35 \times 4 \times 2229 = 3,121\text{m}^3$$

③ Concrete, Type-C2

$$V = 0.66 \times 2229 = 1,471.1\text{m}^3$$

④ Elastic Joint Filler (One Side)

$$t = 10\text{m}$$

$$A = 0.15 \times 2229 = 334.4\text{m}^2$$

⑤ Weep Hole , PVC Pipe Dia 50mm

$$n = 15 \div 3.0 \times 3 \times 149 = 2,235$$

MFC-6 $l = 462.5 + 551.5 = 1014\text{m}$

① Excavation

$$V = 0.50 \times 4.0 \times 462.5 + 0.6 \times 6.9 \times 551.5 = 3,209\text{m}^3$$

② Crusher Run Bedding

$$V = 0.35 \times 4 \times 462.5 + 0.40 \times 6.9 \times 551.5 \doteq 2,170\text{m}^3$$

③ Concrete, Type-C2

$$V = 0.66 \times 462.5 + 1.39 \times 551.5 \doteq 1,071.9\text{m}^3$$

④ Elastic Joint Filler $t = 10\text{m}$ (One Side)

$$A = 0.15 \times 462.5 + 0.20 \times 551.5 = 179.7\text{m}^2$$

⑤ Weep Hole , PVC Pipe ϕ 50mm

$$n = 15 \times 30 + 20 \times 37 = 1,190$$

CHANNEL BED LINING

MFC-5 , L = 2331m

EXCAVATION $V = (0.35 + 0.15) \times 4.4 \times 2331 = 5,129\text{m}^3$

CONCRETE, TYPE-C₂ $V = 0.15 \times 4.4 \times 2331 = 1,539\text{m}^3$

GRAVEL BEDDING $V = 0.35 \times 4.4 \times 2331 = 3,590\text{m}^3$

ELASTIC JOINT FILLER $A = 0.15 \times 2331 = 349.7\text{m}^2$

MFC-6 , L₁ = 254.5m, L₂ = 551.5m

EXCAVATION $V = 0.50 \times 4.4 \times 254.5 + 0.55 \times 6.9 \times 551.5$
 $= 2,653\text{m}^3$

CONCRETE, TYPE-C₂ $V = 0.15 \times 4.4 \times 254.5 + 0.20 \times 6.9 \times 551.5$
 $= 929.1\text{m}^3$

GRAVEL BEDDING $V = 0.35 \times 4.4 \times 254.5 + 0.35 \times 6.9 \times 551.5$
 $= 1,724\text{m}^3$

MFC-7 (FW34~FW38 + 82m) L = 483.5m

EXCAVATION $V = 0.55 \times 6.9 \times 483.5 = 1,835\text{m}^3$

CONCRETE, TYPE-C² $V = 0.20 \times 6.9 \times 1,835 = 2,532.5\text{m}^3$

GRAVEL BEDDING $V = 0.35 \times 6.9 \times 483.5 = 1,168\text{m}^3$

ELASTIC JOINT FILLER $A = 0.20 \times 483.5 = 96.7\text{m}^2$

ELASTIC JOINT FILLER $A = 0.15 \times 254.5 + 0.2 \times 551.5 = 148.5\text{m}^2$

Quantity Calculation of Upper Leaning Wall (Floodway) - PE28:50 to PE34 -

No.	H	B1	B2	h	Number of Block	QUANTITY PER unit m				TOTAL QUANTITY				Excavation (m³)	Backfill Soil (m³)	Leveling Concrete (m³)	Re-Bar kg	Rubble Stone (m³)	Keep Hole nos.	Joint Filler (m²)
						Concrete (m³)	Form FV1 (m²)	Form FV2 (m²)	Backfill (m³)	Concrete (m³)	Form FV1 (m²)	Form FV2 (m²)	Backfill (m³)							
1	6.55	2.45	0.89	5.70	1	7.956	5.251	8.756	3.050	79.56	52.51	87.56	30.5	136.3	22.1	4.13	94.9	5.50	16	7.05
2	6.55	2.45	0.89	5.70	1	7.956	5.251	8.756	3.050	79.56	52.51	87.56	30.5	136.3	22.1	4.13	94.9	5.50	16	7.05
3	6.55	2.45	0.89	5.70	1	7.956	5.251	8.756	3.050	79.56	52.51	87.56	30.5	136.3	22.1	4.13	94.9	5.50	16	7.05
4	6.45	2.45	0.89	5.60	1	7.855	5.251	8.540	2.950	78.55	52.51	85.40	29.5	134.3	22.1	4.13	94.9	5.50	16	6.92
5	6.35	2.45	0.89	5.50	1	7.755	5.251	8.324	2.850	77.55	52.51	83.24	29.5	132.3	22.1	4.13	94.9	5.50	16	6.80
6	6.35	2.45	0.89	5.50	1	7.755	5.251	8.324	2.850	77.55	52.51	83.24	29.5	132.3	22.1	4.13	94.9	5.50	16	6.80
7	6.25	2.30	0.83	5.40	1	7.206	5.259	8.108	2.750	72.06	52.59	81.08	27.5	123.0	21.5	3.90	94.9	5.20	16	6.38
8	6.25	2.30	0.83	5.40	1	7.206	5.259	8.108	2.750	72.06	52.59	81.08	27.5	123.0	21.5	3.90	94.9	5.20	16	6.38
9	6.15	2.30	0.83	5.30	1	7.110	5.259	7.891	2.650	71.10	52.59	78.91	26.5	123.0	21.5	3.90	94.9	5.20	15	6.26
10	6.15	2.30	0.83	5.30	1	7.110	5.259	7.891	2.650	71.10	52.59	78.91	26.5	123.0	21.5	3.90	94.9	5.20	15	6.26
11	6.00	2.30	0.83	5.20	1	6.966	5.259	7.567	2.550	69.66	52.59	75.67	25.0	120.1	21.5	3.90	94.9	5.20	15	6.14
12	6.25	2.30	0.83	5.40	1	7.206	5.259	8.108	2.750	72.06	52.59	81.08	27.5	123.0	21.5	3.90	94.9	5.20	16	6.38
13	6.45	2.45	0.89	5.60	1	7.855	5.251	8.540	2.950	78.55	52.51	85.40	29.5	134.3	22.1	4.13	94.9	5.50	16	6.92
14	6.45	2.45	0.89	5.60	1	7.855	5.251	8.540	2.950	78.55	52.51	85.40	29.5	134.3	22.1	4.13	94.9	5.50	16	6.92
15	6.55	2.45	0.89	5.70	1	7.956	5.251	8.756	3.050	79.56	52.51	87.56	30.5	136.3	22.1	4.13	94.9	5.50	16	7.05
16	6.70	2.55	0.90	5.80	1	8.535	5.243	9.080	3.200	85.35	52.43	90.80	32.0	144.4	22.8	4.28	94.9	5.70	17	7.49
17	6.90	2.55	0.90	6.00	1	8.745	5.243	9.513	3.400	87.45	52.43	95.13	34.0	148.5	22.8	4.28	94.9	5.70	17	7.75
18	7.00	2.55	0.90	6.10	1	8.850	5.243	9.729	3.500	88.50	52.43	97.29	35.0	150.5	22.8	4.28	94.9	5.70	18	7.88
19	7.10	2.55	0.90	6.20	1	8.955	5.243	9.945	3.600	89.55	52.43	99.45	36.0	152.5	22.8	4.28	94.9	5.70	18	8.01
20	7.25	2.70	0.96	6.40	1	9.113	5.243	10.270	3.750	91.13	52.43	102.70	37.5	155.7	22.8	4.28	94.9	5.70	18	8.14
21	7.35	2.70	0.96	6.50	1	9.343	5.235	10.486	3.850	93.43	52.35	104.86	38.5	163.7	23.4	4.50	94.9	6.00	18	8.62
22	7.45	2.70	0.96	6.50	1	9.343	5.235	10.486	3.850	93.43	52.35	104.86	38.5	163.7	23.4	4.50	94.9	6.00	18	8.62
23	7.55	2.85	1.02	6.60	1	9.953	5.227	11.115	4.050	99.53	52.35	109.18	40.5	167.9	23.4	4.50	94.9	6.00	19	8.75
24	7.65	2.85	1.02	6.70	1	10.602	5.227	11.891	4.250	106.02	52.27	116.75	42.5	171.3	24.1	4.73	94.9	6.30	20	9.39
25	7.80	2.85	1.02	6.80	1	11.115	5.227	12.323	4.400	111.15	52.27	121.07	45.0	183.8	24.1	4.73	94.9	6.30	20	9.67
26	7.90	2.85	1.02	6.90	1	11.115	5.227	12.323	4.400	111.15	52.27	121.07	45.0	183.8	24.1	4.73	94.9	6.30	20	9.67
27	8.00	2.85	1.02	7.00	1	11.001	5.227	11.891	4.300	107.73	52.27	116.75	44.0	181.7	24.1	4.73	94.9	6.30	20	9.81
28	8.00	2.85	1.02	7.00	1	11.001	5.227	11.891	4.300	107.73	52.27	116.75	44.0	181.7	24.1	4.73	94.9	6.30	20	9.81
29	8.10	2.85	1.02	7.10	1	11.115	5.227	12.323	4.400	111.15	52.27	121.07	45.0	183.8	24.1	4.73	94.9	6.30	20	9.95
30	8.20	2.85	1.02	7.20	1	11.229	5.227	12.537	4.500	113.15	52.27	123.11	46.0	186.0	24.1	4.73	94.9	6.30	20	10.09
31	8.30	2.85	1.02	7.30	1	11.343	5.227	12.747	4.600	115.15	52.27	125.15	47.0	188.2	24.1	4.73	94.9	6.30	20	10.23
32	8.40	2.85	1.02	7.40	1	11.459	5.227	12.957	4.700	117.15	52.27	127.19	48.0	190.4	24.1	4.73	94.9	6.30	20	10.37
33	8.50	2.85	1.02	7.50	1	11.573	5.227	13.167	4.800	119.15	52.27	129.23	49.0	192.6	24.1	4.73	94.9	6.30	20	10.51
34	8.60	2.85	1.02	7.60	1	11.687	5.227	13.377	4.900	121.15	52.27	131.27	50.0	194.8	24.1	4.73	94.9	6.30	20	10.65
35	8.70	2.85	1.02	7.70	1	11.801	5.227	13.587	5.000	123.15	52.27	133.31	51.0	197.0	24.1	4.73	94.9	6.30	20	10.79
36	8.80	2.85	1.02	7.80	1	11.915	5.227	13.797	5.100	125.15	52.27	135.35	52.0	199.2	24.1	4.73	94.9	6.30	20	10.93
37	8.90	2.85	1.02	7.90	1	12.029	5.227	14.007	5.200	127.15	52.27	137.39	53.0	201.4	24.1	4.73	94.9	6.30	20	11.07
38	9.00	2.85	1.02	8.00	1	12.143	5.227	14.217	5.300	129.15	52.27	139.43	54.0	203.6	24.1	4.73	94.9	6.30	20	11.21
39	9.10	2.85	1.02	8.10	1	12.257	5.227	14.427	5.400	131.15	52.27	141.47	55.0	205.8	24.1	4.73	94.9	6.30	20	11.35
40	9.20	2.85	1.02	8.20	1	12.371	5.227	14.637	5.500	133.15	52.27	143.51	56.0	208.0	24.1	4.73	94.9	6.30	20	11.49
41	9.30	2.85	1.02	8.30	1	12.485	5.227	14.847	5.600	135.15	52.27	145.55	57.0	210.2	24.1	4.73	94.9	6.30	20	11.63
42	9.40	2.85	1.02	8.40	1	12.599	5.227	15.057	5.700	137.15	52.27	147.59	58.0	212.4	24.1	4.73	94.9	6.30	20	11.77
43	9.50	2.85	1.02	8.50	1	12.713	5.227	15.267	5.800	139.15	52.27	149.63	59.0	214.6	24.1	4.73	94.9	6.30	20	11.91
44	9.60	2.85	1.02	8.60	1	12.827	5.227	15.477	5.900	141.15	52.27	151.67	60.0	216.8	24.1	4.73	94.9	6.30	20	12.05
45	9.70	2.85	1.02	8.70	1	12.941	5.227	15.687	6.000	143.15	52.27	153.71	61.0	219.0	24.1	4.73	94.9	6.30	20	12.19
46	9.80	2.85	1.02	8.80	1	13.055	5.227	15.897	6.100	145.15	52.27	155.75	62.0	221.2	24.1	4.73	94.9	6.30	20	12.33
47	9.90	2.85	1.02	8.90	1	13.169	5.227	16.107	6.200	147.15	52.27	157.79	63.0	223.4	24.1	4.73	94.9	6.30	20	12.47
48	10.00	2.85	1.02	9.00	1	13.283	5.227	16.317	6.300	149.15	52.27	159.83	64.0	225.6	24.1	4.73	94.9	6.30	20	12.61
49	10.10	2.85	1.02	9.10	1	13.397	5.227	16.527	6.400	151.15	52.27	161.87	65.0	227.8	24.1	4.73	94.9	6.30	20	12.75
50	10.20	2.85	1.02	9.20	1	13.511	5.227	16.737	6.500	153.15	52.27	163.91	66.0	230.0	24.1	4.73	94.9	6.30	20	12.89
51	10.30	2.85	1.02	9.30	1	13.625	5.227	16.947	6.600	155.15	52.27	165.95	67.0	232.2	24.1	4.73	94.9	6.30	20	13.03
Sub Total														7,974.6	1,156.9	221.18	4,837.4	294.90	909.00	429.71
Concrete														1,369.5						
Form FV1														2,619.23						
Form FV2														5,122.86						
Backfill Gravel														3,739.0						
Backfill Soil														15,949.2	2,313.8	442.35	9,674.7	589.80	1,818.00	859.41
Leveling Concrete														17,820.4	1,699.8	459.00	9,673.2	612.00	1,734.00	412.08
Re-Bar														3,194.3	378.6	100.62	1,782.0	211.50	550.00	88.00
Rubble Stone														141.07	18.06	3.54	142.28	4.73	16.50	15.14

Quantity Calculation of Upper Leaning Wall (Footway) - PE34 to PE38/82.5 -

No.	H (m)	B1 (m)	B2 (m)	h (m)	Number of Block	Length of Block	QUANTITY PER unit m				TOTAL QUANTITY					Backfill Soil (m³)	Leveling Concrete (m³)	Re-Bar kg	Rubble Stone (m³)	Keep Hole nos.	Joint Filler (m²)
							Concrete (m³)	Form FV1 (m²)	Form FV2 (m²)	Backfill (m³)	Concrete (m³)	Form FV1 (m²)	Form FV2 (m²)	Backfill (m³)	Excavation (m³)						
1	7.35	1.05	2.70	0.96	1	10.00	9.734	5.235	10.486	3.850	97.34	52.35	104.86	38.5	163.7	23.4	4.50	104.8	6.00	18	8.62
2	7.10	1.00	2.55	0.90	1	10.00	8.955	5.243	9.945	3.600	89.55	52.43	99.45	36.0	152.6	22.8	4.28	104.8	5.70	18	8.01
3	7.00	1.00	2.55	0.90	1	10.00	8.850	5.243	9.729	3.500	88.50	52.43	97.29	35.0	150.5	22.8	4.28	104.8	5.70	18	7.88
4	6.90	1.00	2.55	0.90	1	10.00	8.745	5.243	9.513	3.400	87.45	52.43	95.13	34.0	148.5	22.8	4.28	104.8	5.70	17	7.75
5	6.80	1.00	2.55	0.90	1	10.00	8.640	5.243	9.297	3.300	86.40	52.43	92.97	33.0	146.4	22.8	4.28	104.8	5.70	17	7.62
6	6.70	1.00	2.55	0.90	1	10.00	8.535	5.243	9.080	3.200	85.35	52.43	90.80	32.0	144.4	22.8	4.28	104.8	5.70	17	7.49
7	6.45	0.95	2.45	0.89	1	10.00	7.855	5.251	8.540	2.950	78.55	52.51	85.40	29.5	134.3	22.1	4.13	104.8	5.50	16	6.92
8	6.45	0.95	2.45	0.89	1	10.00	7.855	5.251	8.540	2.950	78.55	52.51	85.40	29.5	134.3	22.1	4.13	104.8	5.50	16	6.92
9	6.35	0.95	2.45	0.89	1	10.00	7.755	5.251	8.324	2.850	77.55	52.51	83.24	28.5	132.3	22.1	4.13	104.8	5.50	16	6.80
10	6.25	0.90	2.30	0.83	1	10.00	7.206	5.259	7.891	2.750	72.06	52.59	78.91	26.5	125.0	21.5	3.90	104.8	5.20	15	6.38
11	6.15	0.90	2.30	0.83	1	10.00	7.110	5.259	7.676	2.650	71.10	52.59	76.76	25.5	120.1	21.5	3.90	104.8	5.20	15	6.26
12	6.00	0.90	2.30	0.83	1	10.00	6.966	5.259	7.461	2.550	69.66	52.59	73.51	24.0	118.1	21.5	3.90	104.8	5.20	15	6.02
13	5.90	0.90	2.30	0.83	1	10.00	6.870	5.259	7.246	2.450	68.70	52.59	71.35	23.0	116.2	21.5	3.90	104.8	5.20	14	5.90
14	5.80	0.90	2.30	0.83	1	10.00	6.774	5.259	7.031	2.350	67.74	52.59	69.18	22.0	109.3	21.0	3.68	69.9	4.90	14	5.51
15	5.70	0.85	2.15	0.77	1	10.00	6.265	5.267	6.918	2.200	62.65	52.67	67.02	21.0	107.4	21.0	3.68	69.9	4.90	14	5.40
16	5.60	0.85	2.15	0.77	1	10.00	6.174	5.267	6.702	2.100	61.74	52.67	65.01	20.4	104.7	21.0	3.68	69.9	4.90	14	5.29
17	5.45	0.85	2.15	0.77	1	10.00	6.037	5.267	6.378	1.975	60.37	52.67	63.78	19.8	103.3	21.0	3.68	69.9	4.90	13	5.18
18	5.35	0.85	2.15	0.77	1	10.00	5.945	5.267	6.162	1.925	59.45	52.67	61.62	19.3	103.3	21.0	3.68	69.9	4.90	13	5.18
19	5.25	0.80	2.00	0.71	1	10.00	5.472	5.275	5.946	1.875	54.72	52.75	59.46	18.8	95.9	20.4	3.45	69.9	4.60	13	4.81
20	5.15	0.80	2.00	0.71	1	10.00	5.385	5.275	5.729	1.825	53.85	52.75	57.29	18.3	95.9	20.4	3.45	69.9	4.60	13	4.71
21	5.05	0.80	2.00	0.71	1	10.00	5.298	5.275	5.513	1.775	52.98	52.75	55.13	17.8	92.5	20.4	3.45	69.9	4.60	13	4.60
22	4.90	0.80	2.00	0.71	1	10.00	5.167	5.284	5.301	1.700	51.67	52.75	51.89	17.0	92.5	20.4	3.45	69.9	4.60	12	4.49
23	4.70	0.75	1.85	0.65	1	10.00	4.646	5.284	4.756	1.600	46.46	52.84	47.56	16.0	85.6	19.9	3.23	69.9	4.30	12	4.06
24	4.70	0.75	1.85	0.65	1	10.00	4.646	5.284	4.756	1.600	46.46	52.84	47.56	16.0	85.6	19.9	3.23	69.9	4.30	12	4.06
25	4.60	0.75	1.85	0.65	1	10.00	4.564	5.284	4.540	1.550	45.64	52.84	45.40	15.5	84.2	19.9	3.23	69.9	4.30	11	3.96
26	4.50	0.75	1.85	0.65	1	10.00	4.481	5.284	4.324	1.500	44.81	52.84	43.24	15.0	82.9	19.9	3.23	69.9	4.30	11	3.86
27	4.25	0.75	1.85	0.65	1	10.00	4.275	5.284	4.108	1.450	43.98	52.84	41.08	14.5	82.9	19.9	3.23	69.9	4.30	11	3.86
28	4.15	0.70	1.75	0.64	1	10.00	4.192	5.292	3.892	1.375	42.75	52.84	39.84	13.8	79.6	19.9	3.23	69.9	4.30	11	3.65
29	4.05	0.70	1.75	0.64	1	10.00	4.109	5.292	3.676	1.325	41.92	52.92	37.67	13.3	74.9	19.9	3.08	69.9	4.10	10	3.36
30	3.90	0.70	1.75	0.64	1	10.00	4.026	5.292	3.460	1.275	41.09	52.92	35.51	12.8	73.6	19.4	3.08	69.9	4.10	10	3.26
31	3.80	0.70	1.75	0.64	1	10.00	3.943	5.292	3.244	1.225	40.26	52.92	33.27	12.3	71.7	19.4	3.08	69.9	4.10	10	3.17
32	3.70	0.65	1.60	0.58	1	10.00	3.860	5.300	2.811	1.150	39.43	52.92	31.11	11.5	70.4	19.4	3.08	69.9	4.10	9	3.07
33	3.60	0.65	1.60	0.58	1	10.00	3.777	5.300	2.594	1.100	38.60	53.00	29.94	11.0	65.6	18.9	2.85	69.9	3.80	9	2.80
34	3.50	0.65	1.60	0.58	1	10.00	3.694	5.300	2.378	1.050	37.77	53.00	27.78	10.5	64.3	18.9	2.85	69.9	3.80	9	2.80
35	3.25	0.60	1.45	0.52	1	10.00	3.611	5.308	2.162	1.000	36.94	53.08	26.30	10.0	63.1	18.9	2.85	69.9	3.80	9	2.71
36	3.15	0.60	1.45	0.52	1	10.00	3.528	5.308	1.946	0.975	36.11	53.08	25.16	9.5	56.8	18.5	2.63	69.9	3.50	8	2.62
37	3.05	0.60	1.45	0.52	1	10.00	3.445	5.308	1.730	0.925	35.28	53.08	24.05	9.0	55.6	18.5	2.63	69.9	3.50	8	2.53
38	2.95	0.60	1.45	0.52	1	10.00	3.362	5.308	1.514	0.875	34.45	53.08	22.90	8.5	54.4	18.5	2.63	69.9	3.50	8	2.44
39	2.85	0.55	1.30	0.46	1	10.00	3.279	5.316	1.298	0.825	33.62	53.16	21.75	8.0	53.2	18.5	2.63	69.9	3.50	7	2.35
40	2.85	0.55	1.30	0.46	1	10.00	3.196	5.316	1.082	0.775	32.79	53.16	20.59	7.5	49.2	18.0	2.40	34.9	3.20	7	2.04
41	2.85	0.55	1.30	0.46	1	10.00	3.113	5.316	0.866	0.725	31.96	53.16	19.42	7.0	48.2	18.0	2.40	34.9	3.20	7	1.82
42	2.85	0.55	1.30	0.46	1	10.00	3.030	5.316	0.650	0.675	31.13	53.16	18.26	6.8	46.3	18.0	2.40	34.9	3.20	7	1.82
43	2.85	0.55	1.30	0.46	1	10.00	2.947	5.316	0.434	0.625	30.30	53.16	17.10	6.8	45.2	18.0	2.40	34.9	3.20	6	1.67
44	2.85	0.55	1.30	0.46	1	10.00	2.864	5.316	0.218	0.575	29.47	53.16	15.94	6.5	43.9	18.0	2.40	34.9	3.20	6	1.67
45	2.60	0.55	1.30	0.46	1	10.00	2.037	5.316	0.000	0.550	20.37	53.16	14.78	5.5	42.6	18.0	2.40	34.9	3.20	6	1.59
46	2.50	0.55	1.30	0.46	1	10.00	1.954	5.316	0.000	0.550	19.54	53.16	13.62	5.0	41.3	18.0	2.40	34.9	3.20	6	1.59
47	2.50	0.55	1.30	0.46	1	10.00	1.871	5.316	0.000	0.500	18.71	53.16	12.46	4.5	40.0	18.0	2.40	34.9	3.20	6	1.59
48	2.50	0.55	1.30	0.46	1	5.00	1.973	5.316	0.000	0.500	9.86	26.58	0.00	2.5	22.6	9.0	1.20	17.5	1.60	3	1.59
Sub Total (One side)							2.353.241	2.508.853	2.214.969	822.3	4.287.2	955.2	156.525	3.442.0	208.700	549	205.135				

	Concrete	Form FV1	Form FV2	Backfill	Excavation	Backfill	Leveling	Re-Bar	Rubble	Keep	Joint	Gravel
				Soil	Concrete	Stone	Filler	Pavement				
Package-7 Upper Wall	4.706.48	5.017.71	4.429.94	1.644.5	8.574.4	1.910.3	313.05	6.884.1	417.40	1.098	410.27	291.00
Lower Wall	16.772.16	7.895.23	9.649.73	4.838.4	16.772.2	1.599.8	432.00	9.104.2	1.632	387.84	291.00	291.00
TOTAL	21.478.64	12.912.94	14.079.67	6.482.9	25.346.5	3.510.2	745.05	15.988.2	993.40	2.730	798.11	291.00

LEANING WALL FOR FLOODWAY **CONCRETE WALL**

LOWER PORTION

Both Side

NO.	WORK ITEM	Unit	LOWER PORTION		TOTAL VOLUME
			FW 29 + 00 to FW 38 + 82.5 m L = 985.0 m		
1.	Excavation (common)	m ³	(349.42 x 98)	+ (349.42 x 0.5)	34,417.87
2.	Concrete, Type - D	m ³	(198.60 x 98)	+ (198.60 x 0.5)	19,562.10
3.	Formwork FW1	m ²	(356.52 x 98)	+ (356.52 x 0.5)	35,117.22
4.	Reinforcing, Steel Bar Dia. 13, L = 800 mm @ 500	Kg	(189.67 x 98)	+ (189.67 x 0.5)	18,682.50
5.	Gravel Back Fill	m ³	(100.80 x 98)	+ (100.80 x 0.5)	9,928.80
6.	Back Fill Soil	m ³	(33.33 x 98)	+ (33.33 x 0.5)	3,283.01
7.	Rubble Stone Bedding	m ³	(12.00 x 98)	+ (12.00 x 0.5)	1,182.00
8.	Leveling Concrete	m ³	(9.00 x 98)	+ (9.00 x 0.5)	886.50
9.	Weep Hole, PVC Pipe Dia. 150 mm per 4 m ²	nos	(34.00 x 98)	+ (34.00 x 0.5)	3,349.00
10.	Concrete Lining	m ³	(13.80 x 98)	+ (13.80 x 0.5)	1,359.30
11.	Gravel Bedding	m ³	(17.25 x 98)	+ (17.25 x 0.5)	1,699.13
12.	Elastic Joint Filler T=10	m ²	(8.80 x 92)		791.84

NAME OF STRUCTURE: LEARNING WALL (LOSER PRACTICES)
LOCATION : #1000 hallway

Des Interval 10 m Both Side

BILL OF QUANTITY

NAME OF STRUCTURE: Bottom of channel (Concrete Lining)
 LOCATION : Flood Liny.

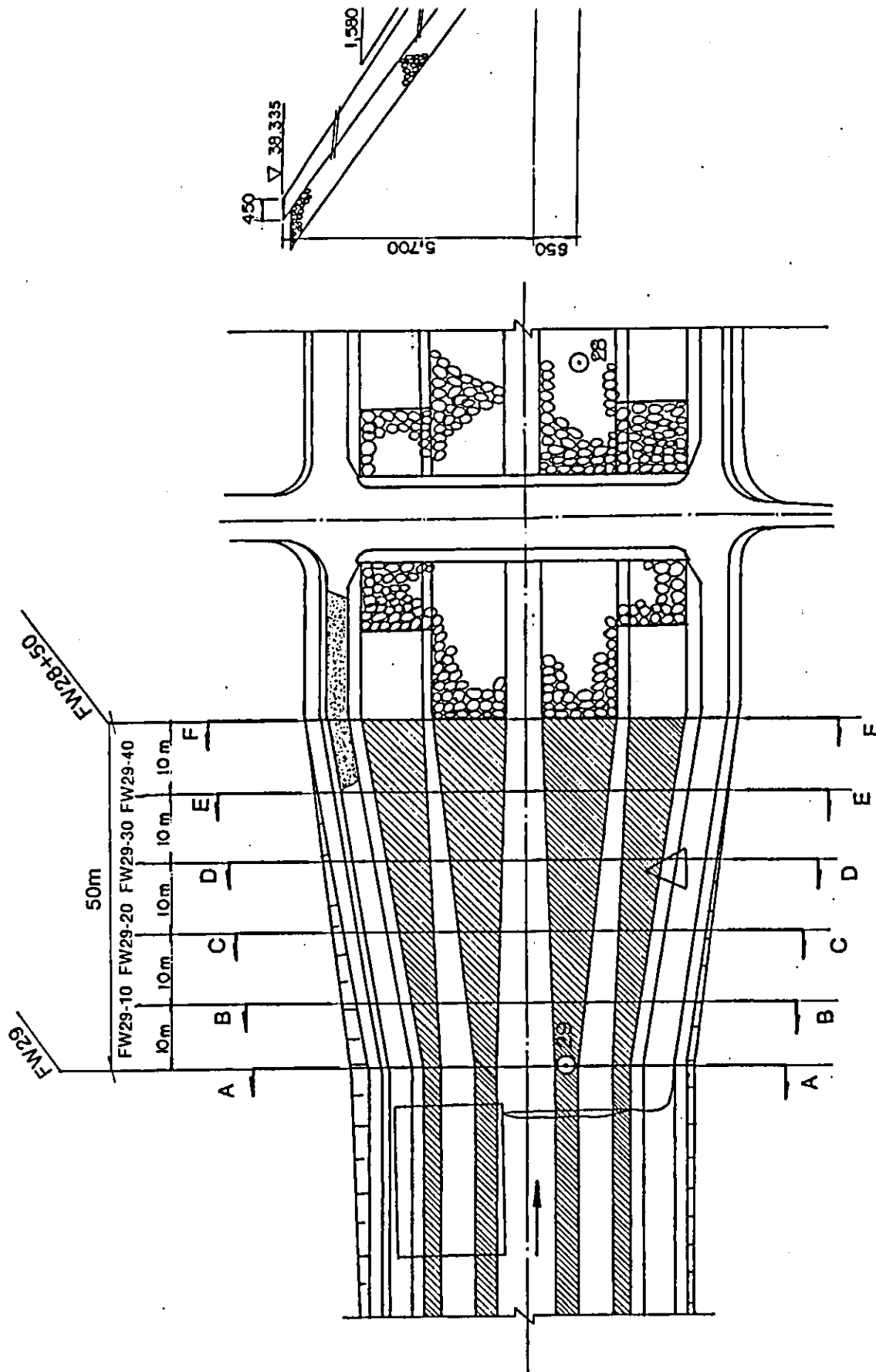
NO	SKETS OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
		m ²	Type II Excavation $(6.2 \times 0.6 \times 1035)$		
		m ³	Concrete Lining	928.50	
			$(0.20 \times 6.20) / 1035.0 =$		
		m ³	Gravel Bedding	1428.30	
			$(0.4 \times 1.5 \times 2) / 1035 + (0.25 \times 0.25) / 145 \times 2 \times 1035 + (0.25 \times 1.0) / 1035$	2476.84	
			Type II		
		m ³	Excavation		
			$(4.40 \times 3.55 \times (2585.50))$	5652.13	
		m ³	Concrete Lining		
			$(4.40 \times 0.15 \times 2585.50)$	1765.13	
		m ³	Gravel Bedding		
			$(0.25 \times 1.0) / 2 \times 2585.5 + (0.25 \times 0.25) / 2 \times 2585.5 + (1.422 \times 2585.5)$	3323.37	
			Type II		
		m ³	Excavation		3373.00
		m ³	Concrete Lining		334.731
		m ³	Gravel Bedding		1398.611
		m ²	Elastic Joint Filler		

PACKAGE : MFC-6

WORK ITEM : SLOPE PROTECTION

TYPE : LEANING WALL (TRANSITION SECTION)

NO.	WORK ITEM	Unit	L O C A T I O N						SUB TOTAL
			FW 29 L = 5 m	FW 29-10m L = 10m	FW 29-20m L = 10 m	FW 29-30m L = 10 m	FW 29-40m L = 10 m	FW 28+50m L = 5 m	
1.	Excavation (common)	m ³	171.60	632.80	632.60	699.10	741.50	316.74	3,194.34
2.	Crusher Run Bedding	m ³	51.00	114.00	102.00	174.80	194.20	114.90	750.90
3.	Concrete, Type - D	m ³	178.78	357.55	357.55	357.55	357.55	178.78	1,787.76
4.	Formwork FW1	m ²	328.87	439.20	863.90	439.20	1,033.34	1,149.42	4,253.93
5.	Reinforcing, Steel Bar Dia. 13, L = 800mm @500	Kg	219.20	17.25	43.92	843.27	439.20	219.20	1,782.04
6.	Leveling Concrete	m ³	8.62	23.00	17.25	17.25	17.25	17.25	100.62
7.	Rubble Stone Bedding	m ²	11.50	108.00	23.00	23.00	23.00	23.00	211.50
8.	Weep Hole, PVC Pipe Dia. 50 mm / 4 m ²	nos	32.00	80.00	88.00	102.00	116.00	132.00	550.00
9.	Back Fill Soil	m ³	44.84	86.40	96.88	62.95	26.34	61.20	378.61
10.	Elastic Joint Filler T = 10	m ²	15.86	15.86	15.86	15.86	15.86	8.08	87.38



PLAN OF TRANSITION CHANNEL
SCALE 1:600

BILL OF QUANTITY

NAME OF STRUCTURE: CONCRETE WALL (TRANSITION AREA)

LOCATION: FLOOD WAY (FW. 29) 5M

4
BOTH SIDE

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
		M ³	EXCAVATION (Concrete)	$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³	CONCRETE PAV. BEDDING	$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³	CONCRETE TYP-DI	$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³	FORM WORK	$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³	REINFORCING STEEL BAR #01	$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³	LEVELING CONCRETE	$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³	RULE STONE BEDDING	$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³	NEEP FILL	$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³	more fill soil	$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³	CLASTIC JUNK FILL 7:10	$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³	(2.45 x 0.25) + (0.75 x 0.25) + 8.08	$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³		$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³		$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³		$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00
		M ³		$5(0.5 \times 2.0) = 5(1.0 \times 2.0) = 10.00$	10.00

PACKAGE: SLOPE PROTECTION
 WORK ITEM: REINFORCING WALL (TRANSITION SECTION)
 TYPE:

APR 1963

104

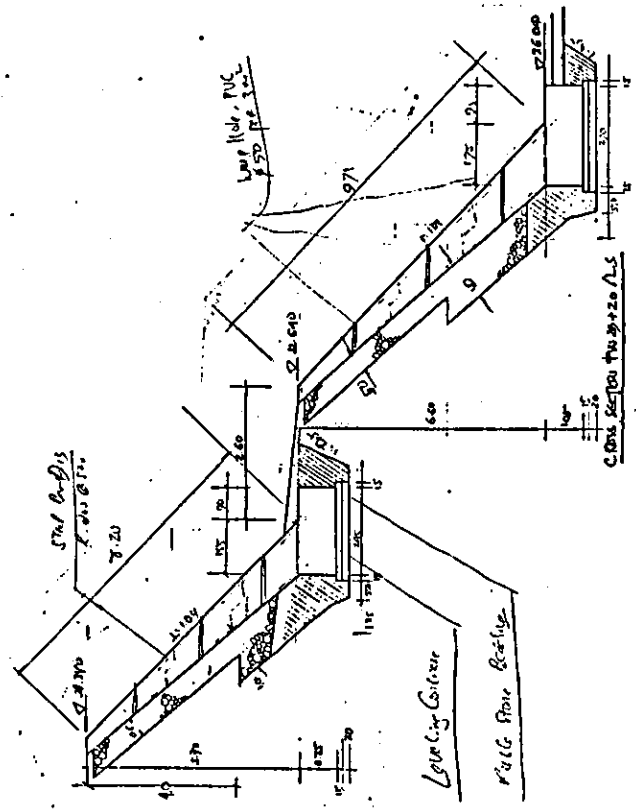
LOCATION

Hand-drawn structural drawing of a building section. The drawing shows a sloped roof structure with a vertical height of 4000 and a horizontal span of 1500. The roof is divided into sections with dimensions 1500, 1500, and 1500. The drawing includes various structural elements like walls, partitions, and a central vertical shaft. Handwritten notes in Hindi are present, including '1500 पर 4000' and '1500 पर 4000'. The drawing is a technical sketch, likely for a construction project.

BILL OF QUANTITY

NAME OF STRUCTURE: CONCRETE WALL (TAPATI AREA)
 LOCATION : 7 Loop way (F.W. 29+20) (10M)

BOTH SIDE

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
1		M ³	EXCAVATION: (Common)		
			$\text{Upper wall: } \left(\frac{1.0 + 0.3}{2} \times 2.0 \right) \times 10 = 14.5 \times 2 = 29.0$	14.5 x 2 = 29.0	
			$\text{Lower wall: } \left(\frac{0.3 + 0.1}{2} \times 2.0 \right) \times 10 = 2.0 \times 2 = 4.0$	17.1 x 2 = 34.2	53.2
		M ³	CONCRETE RAW WEDGING		
			$\text{Upper wall: } \left(\frac{1.0 + 0.3}{2} \times 2.0 \right) \times 10 = 14.5 \times 2 = 29.0$	29 x 2 = 58	
			$\text{Lower wall: } \left(\frac{0.3 + 0.1}{2} \times 2.0 \right) \times 10 = 2.0 \times 2 = 4.0$	26 x 2 = 52	102.2
		M ³	CONCRETE TYPE-D		
			$\text{Upper wall: } \left(\frac{1.0 + 0.3}{2} \times 2.0 \right) \times 10 = 14.5 \times 2 = 29.0$	29.0 x 2 = 58.0	
			$\text{Lower wall: } \left(\frac{0.3 + 0.1}{2} \times 2.0 \right) \times 10 = 2.0 \times 2 = 4.0$	10.9 x 2 = 21.8	357.5
		M ³	FORMWORK		
			$\text{Upper wall: } \left(\frac{1.0 + 0.3}{2} \times 2.0 \right) \times 10 = 14.5 \times 2 = 29.0$	14.5 x 2 = 29.0	
			$\text{Lower wall: } \left(\frac{0.3 + 0.1}{2} \times 2.0 \right) \times 10 = 2.0 \times 2 = 4.0$	2.0 x 2 = 4.0	86.3
		M ³	REINFORCEMENT		
			$\text{Upper wall: } \left(\frac{1.0 + 0.3}{2} \times 2.0 \right) \times 10 = 14.5 \times 2 = 29.0$	14.5 x 2 = 29.0	
			$\text{Lower wall: } \left(\frac{0.3 + 0.1}{2} \times 2.0 \right) \times 10 = 2.0 \times 2 = 4.0$	2.0 x 2 = 4.0	43.9
		M ³	LEVELING		
			$\text{Upper wall: } \left(\frac{1.0 + 0.3}{2} \times 2.0 \right) \times 10 = 14.5 \times 2 = 29.0$	14.5 x 2 = 29.0	
			$\text{Lower wall: } \left(\frac{0.3 + 0.1}{2} \times 2.0 \right) \times 10 = 2.0 \times 2 = 4.0$	2.0 x 2 = 4.0	17.2
		M ³	ROUING		
			$\text{Upper wall: } \left(\frac{1.0 + 0.3}{2} \times 2.0 \right) \times 10 = 14.5 \times 2 = 29.0$	14.5 x 2 = 29.0	
			$\text{Lower wall: } \left(\frac{0.3 + 0.1}{2} \times 2.0 \right) \times 10 = 2.0 \times 2 = 4.0$	2.0 x 2 = 4.0	23.6
		M ³	ROUING		
			$\text{Upper wall: } \left(\frac{1.0 + 0.3}{2} \times 2.0 \right) \times 10 = 14.5 \times 2 = 29.0$	14.5 x 2 = 29.0	
			$\text{Lower wall: } \left(\frac{0.3 + 0.1}{2} \times 2.0 \right) \times 10 = 2.0 \times 2 = 4.0$	2.0 x 2 = 4.0	38.1
		M ³	ROUING		
			$\text{Upper wall: } \left(\frac{1.0 + 0.3}{2} \times 2.0 \right) \times 10 = 14.5 \times 2 = 29.0$	14.5 x 2 = 29.0	
			$\text{Lower wall: } \left(\frac{0.3 + 0.1}{2} \times 2.0 \right) \times 10 = 2.0 \times 2 = 4.0$	2.0 x 2 = 4.0	96.8

BILL OF QUANTITY

NAME OF STRUCTURE: CONCRETE RAIL (TRANSVERSE AREA)

LOCATION : ROAD WAY (74.29+30.83) (10M)

10M 30.83

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
1		M3	EXCAVATION (COMMON) :		
			Upper ball : $\left[\frac{(794 - 340) \times 10}{2} + \left(\frac{340 - 100}{2} \times 10 \right) \right] \times (4.5 \times 2.4) \times 10$	143.20 x 2 = 286.40	
			Lower ball : $\left[\frac{(794 - 340) \times 10}{2} + \left(\frac{340 - 100}{2} \times 10 \right) \right] \times (0.5 \times 2.4) \times 10$	74.78 x 2 = 149.56	699.10
		M3	CONCRETE : RUN-BEDDING :		
			Upper ball : $\left[\frac{(794 - 340) \times 0.5}{2} \right] \times 10$	39.7 x 2 = 79.4	
			Lower ball : $\left[\frac{(794 - 340) \times 0.5}{2} \right] \times 10$	41.7 x 2 = 83.4	174.8
		M3	CONCRETE TYPE-D :		
			100mm		357.45
		M3	REINFORCING STEEL BAR 10 :		
			100mm		979.20
		M3	FORM WORK :		
			Upper ball : $\left[\frac{(794 - 340) \times 10}{2} + \left(\frac{340 - 100}{2} \times 10 \right) \right] \times 2$	152.10 x 2 = 304.20	
			Lower ball : $\left[\frac{(794 - 340) \times 10}{2} + \left(\frac{340 - 100}{2} \times 10 \right) \right] \times 2$	149.56 x 2 = 299.12	883.24
		M3	LEVELING CONCRETE :		
			100mm		17.25
		M3	RUBBLE : STONE BEDDING :		
			100mm		23.1
		M3	KEEP HOLE :		
			100mm : $\frac{794 \times 10}{4} + \frac{100 \times 10}{4}$	57 x 2 = 114	102
		M3	BACKFILL SOIL :		
			Upper ball : $\left[\frac{(794 - 340) \times 10}{2} + \left(\frac{340 - 100}{2} \times 10 \right) \right] \times 2$	152.10 x 2 = 304.20	
			Lower ball : $\left[\frac{(794 - 340) \times 10}{2} + \left(\frac{340 - 100}{2} \times 10 \right) \right] \times 2$	149.56 x 2 = 299.12	62.95

BILL of QUANTITY

NAME OF STRUCTURE: CONCRETE WALL (Timber Area)
 LOCATION : Flood Way (NW. 27 x 10) (10m)

BATH SIDE RIVER

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
1	Cross section 700 x 400 / 15	M ³	EXCAVATION (Campan A)		
			$\frac{1}{2} \times (0.32 + 0.40) \times 1.2 = 0.42 \times 1.2 = 0.504$	10.10 x 2 = 20.20	
			$\frac{1}{2} \times (0.32 + 0.40) \times 0.3 = 0.12 \times 0.3 = 0.036$	20.45 x 2 = 40.90	741.58
		M ³	CONCRETE CUR. BEDDING		
			$\frac{1}{2} \times (0.32 + 0.40) \times 0.3 = 0.12 \times 0.3 = 0.036$	27.10 x 2 = 54.20	194.20
		M ³	CONCRETE TYPE - D		
			Ident.		397.51
		M ³	FORM WORK		
			$\frac{1}{2} \times (0.32 + 0.40) \times 1.2 = 0.42 \times 1.2 = 0.504$	234.30 x 2 = 468.60	
			$\frac{1}{2} \times (0.32 + 0.40) \times 0.3 = 0.12 \times 0.3 = 0.036$	282.11 x 2 = 564.22	1031.34
		Kg	REINFORCING STEEL BAR $\phi 8$		
			10m		457.20
		M ³	LEVELING CONCRETE		
			Ident.		172.1
		M ³	FINISH STONE BEDDING		
			Ident.		83.1
		M ³	KEEP HOLE		
			$\frac{1}{2} \times (0.32 + 0.40) \times 1.2 = 0.42 \times 1.2 = 0.504$	48 x 2 = 96	178.1
		M ³	BACKFILL SOIL		
			$\frac{1}{2} \times (0.32 + 0.40) \times 1.2 = 0.42 \times 1.2 = 0.504$		26.72

NAME OF STRUCTURE: GO-CRISTE WALL (TRUCKS: 100%)
LOCATION : FLOOD WAY (FW: 29.45)

NAME OF STRUCTURE: CONCRETE WALL (TRANS. 1903)

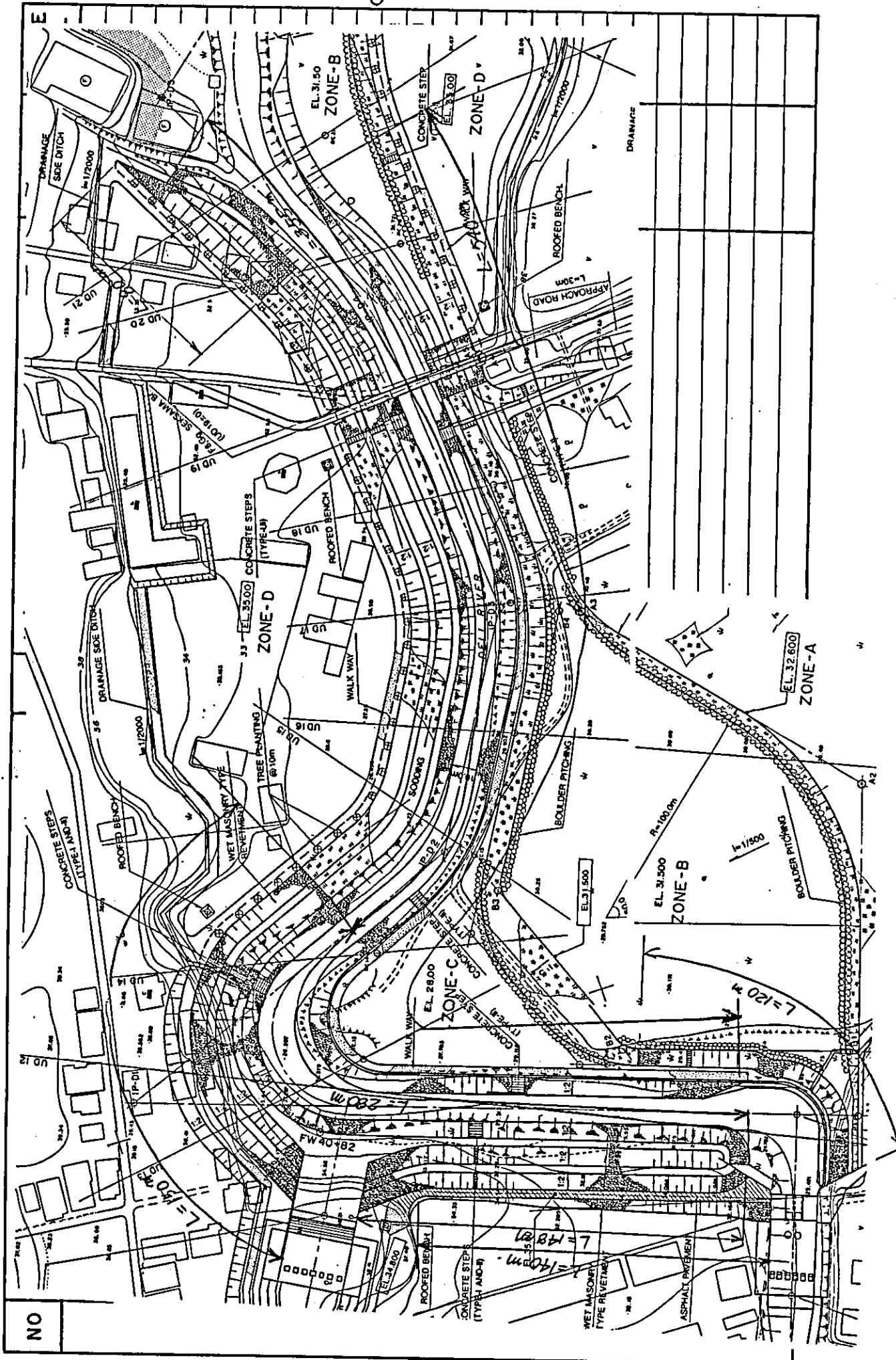
LOCATION : FLOOD WAY (FW. 29 + 50)

EAST SIDE RIVER

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
1		M ³	EXCAVATION (CONCRETE)		
			Upper bed: $(\frac{1.2+1.0}{2}) \times 1.0 \times 1.0 = 1.1 \text{ m}^3$	$1.1 \times 2 = 2.2 \text{ m}^3$	
			Lower bed: $(\frac{1.2+1.0}{2}) \times 1.0 \times 1.0 = 1.1 \text{ m}^3$	$1.1 \times 2 = 2.2 \text{ m}^3$	
		M ³	CHALKER RUN BEDDING		
			Upper bed: $(\frac{1.2+1.0}{2}) \times 1.0 \times 1.0 = 1.1 \text{ m}^3$	$1.1 \times 2 = 2.2 \text{ m}^3$	
			Lower bed: $(\frac{1.2+1.0}{2}) \times 1.0 \times 1.0 = 1.1 \text{ m}^3$	$1.1 \times 2 = 2.2 \text{ m}^3$	
		M ³	CONCRETE TYPE - 0		
			Upper bed: $(\frac{1.2+1.0}{2}) \times 1.0 \times 1.0 = 1.1 \text{ m}^3$	$1.1 \times 2 = 2.2 \text{ m}^3$	
			Lower bed: $(\frac{1.2+1.0}{2}) \times 1.0 \times 1.0 = 1.1 \text{ m}^3$	$1.1 \times 2 = 2.2 \text{ m}^3$	
		M ³	FOUR BEDS		
			Upper bed: $(\frac{1.2+1.0}{2}) \times 1.0 \times 1.0 = 1.1 \text{ m}^3$	$1.1 \times 2 = 2.2 \text{ m}^3$	
			Lower bed: $(\frac{1.2+1.0}{2}) \times 1.0 \times 1.0 = 1.1 \text{ m}^3$	$1.1 \times 2 = 2.2 \text{ m}^3$	
		M ³	CONCRETE TYPE - 0		
			Upper bed: $(\frac{1.2+1.0}{2}) \times 1.0 \times 1.0 = 1.1 \text{ m}^3$	$1.1 \times 2 = 2.2 \text{ m}^3$	
			Lower bed: $(\frac{1.2+1.0}{2}) \times 1.0 \times 1.0 = 1.1 \text{ m}^3$	$1.1 \times 2 = 2.2 \text{ m}^3$	

(3) Deli River Retarding Channel

NAME OF STRUCTURE: WET STONE MASONRY TYPE REVETMENT
LOCATION : DELI RIVER RETARDING CHANNEL



PACKAGE : MFC-7

WORK ITEM : REVETMENT FOR DELI RETARDING CHANNEL

TYPE : WET STONE MASONRY

N O	W O R K I T E M	Unit	Right Bank			Left Bank			TOTAL
			L = 378 m	L = 280 m	L = 140 m	L = 355 m	L = 540 m	L = 120 m	
									L = 1813 m
1.	Excavation (common)	m ³	3,70.40	2,266.60	455.70	2,601.02	3,905.98	427.11	13,360.81
2.	Crusher Run Bedding	m ³	1,776.60	904.40	208.65	930.66	1,397.50	142.35	5,360.16
3.	Wet Stone Masonry (1 : 4)	m ³	1,651.50	763.49	195.65	758.43	1,137.63	150.00	4,656.70
4.	Concrete, Type - C1	m ³	229.67	143.51	60.20	180.69	271.41	29.39	914.87
5.	Formwork FW1 Concrete Type : C1	m ²	1,369.16	793.70	414.61	981.07	827.55	194.94	4,581.03
6.	Reinforcing, Steel Bar	Kg	10,133.00	6,875.70	3,661.03	10,029.20	15,064.37	1,585.21	47,348.51
7.	Elastic Joint Filler, 10 mm thick	m ²	201.97	106.74	49.37	125.53	199.71	17.50	700.82
8.	Log Pile, Dia. 150 mm, L = 2.0 m	Nos	189.00	135.00	0.00	175.00	263.00	47.00	809.00
9.	Gabion Mattress	m ³	567.00	420.00	0.00	533.00	810.00	67.50	2,397.50
10.	Cobble Stone Filling	m ³	283.50	210.00	0.00	266.30	394.60	9.75	1,164.15
11.	Plastering	m ²	6,617.00	2,754.39	755.83	2,302.13	3,457.13		15,886.48

VOLUME RETARDING CHANNEL FOR LOWER POTITION

SECTION. A $\rightarrow$ L = 280 m

① EXCAVATION	= $8.095 \times 280 = 2266.60 \text{ m}^3$
② CRUSHER RUN BEDDING	= $3.23 \times 280 = 904.40 \text{ m}^3$
③ WET STONE MASONRY	= $2.88 \times (280 - 9.2 - 5.7) = 763.49 \text{ m}^3$
④ CONCRETE TYPE C	= $(0.39 \times (280 - 9.2)) + (2.46 \times 2) + (1.94 \times 17) = 143.51 \text{ m}^3$
⑤ REINFORCING, STEEL BAR	= $(22.14 \times (280 - 9.2)) + (53.43 \times 2) + (45.49 \times 17) = 6,875.70 \text{ kg}$
⑥ FORM WORK	= $(2 \times (280 - 9.2)) + (16.4 \times 2) + (12.90 \times 17) = 793.7 \text{ m}^2$
⑦ ELASTIC JOINT FILLER T=10	= $5.93 \times (\frac{280-9.2}{15}) = 106.74 \text{ m}^2$
⑧ LOG PILE ϕ 150 I=2,000 @ 2,000	= $\frac{280-9.2}{2} = 135 \text{ nos}$
⑨ COBBLE STONE FILLING	= $0.75 \times 280 = 210 \text{ m}^3$
⑩ GABION MATTRESS	= $1.50 \times 280 = 420 \text{ m}^3$
⑪ PLASTERING	= $10.39 \times (280 - 9.2 - 5.7) = 2,754.39 \text{ m}^2$

VOLUME RETARDING CHANNEL FOR LOWER POTITION

SECTION. A L = 280 m

① EXCAVATION	=	6,328.85 m ³
② CRUSHER RUN BEDDING	=	2,264.50 m ³
③ WET STONE MASONRY	=	1,843.12 m ³
④ CONCRETE TYPE C	=	441.78 m ³
⑤ REINFORCING, STEEL BAR	=	24,513.76 kg
⑥ FORM WORK	=	1,749.22 m ²
⑦ PLASTERING	=	5,501.58 m ²
⑧ ELASTIC JOINT FILLER T=10	=	325.24 m ²
⑨ LOG PILE ϕ 150 l = 2,000 @ 2,000	=	426.0 nos
⑩ COBBLE STONE FILLING	=	642.90 m ³
⑪ GABION MATTRESS	=	1,306.50 m ³

VOLUME RETARDING CHANNEL FOR LOWER POTITION

RIGHT SIDE = 355 m

① EXCAVATION	=	$7.423 \times (355 - 4.6)$	=	$2,601.02 \text{ m}^3$
② CRUSHER RUN BEDDING	=	$2.656 \times (355 - 4.6)$	=	930.66 m^3
③ WET STONE MASONRY	=	$2.206 \times (355 - 4.6 - 6.6)$	=	758.43 m^3
④ CONCRETE TYPE C	=	$0.43 \times (355 - 4.6)$	=	150.67 m^3
	=	$(1.64 \times 1) \times (1.29 \times 22)$	=	30.02 m^3
⑤ REINFORCING, STEEL BAR	=	$23.35 \times (355 - 4.6)$	=	$8,181.84$
	=	$(82.03) + (79.36 \times 23)$	=	$1,847.31$
⑥ FORM WORK	=	$2.21 \times (355 - 4.6)$	=	774.38
	=	$10.96 + (8.61 \times 23)$	=	206.69
⑦ PLASTERING	=	$6.57 \times (355 - 4.6)$	=	2302.13 m^2
⑧ ELASTIC JOINT FILLER T=10	=	5.706×22	=	125.53 m^2
⑨ LOG PILE ϕ 150 l=2,000 @ 2,000	=	$\frac{355 - 4.6}{2}$	=	175 nos
⑩ COBBLE STONE FILLING	=	$0.75 \times (355)$	=	266.25 m^3
⑪ GABION MATTRESS	=	1.50×355	=	533 m^2

} 180.69 m^3

} $10,029.2 \text{ m}^3$

} 981.07 m^3

VOLUME RETARDING CHANNEL FOR LOWER POTITION

LEFT SIDE = 540 m

① EXCAVATION	=	7.423 x (540 - 13.8)	=	3905.98 m ³
② CRUSHER RUN BEDDING	=	2.656 x (540 - 13.8)	=	1397.58 m ³
③ WET STONE MASONRY	=	2.206 x (540 - 13.8 - 10.5)	=	1137.63 m ³
④ CONCRETE TYPE C	=	0.43 x (540 - 13.0)	=	226.26 m ³
	=	1.29 x 35	=	45.15 m ³
				} 271.41 m ³
⑤ REINFORCING, STEEL BAR	=	23.35 x (540 - 73.8)	=	12286.77 kg
	=	79.36 x 35	=	2777.60 kg
				} 15,064.37 m ³
⑥ FORM WORK	=	2.21 x (540 - 13.8)	=	526.20 kg
	=	8.61 x 35	=	301.35 kg
				} 827.55 m ³
⑦ PLASTERING	=	6.57 x (540 - 13.8)	=	3457.13 m ²
⑧ ELASTIC JOINT FILLER T=10	=	5.706 x 35	=	199.71 m ²
⑨ LOG PILE ϕ 150 l=2,000 @ 2,000	=	$\frac{540 - 13.8}{2}$	=	263 nos
⑩ COBBLE STONE FILLING	=	0.75 x (540 - 13.8)	=	394.65 m ³
⑪ GABION MATTRESS	=	1.50 x 540	=	810 m ²

VOLUME RETARDING CHANNEL FOR UPPER POTITION

SECTION. B → L = 148 & L = 150 + 80 = 378 m

① EXCAVATION	= 9.8 x 378 = 3,704.4 m ³
② CRUSHER RUN BEDDING	= 4.70 x 378 = 1,776.6 m ³
③ WET STONE MASONRY	= 4.5 x (378 - 5 - 6) = 1,651.5 m ³
④ CONCRETE TYPE C	= (0.43 x (378 - 5)) + (3.82 x 24) + (3 x 18) = 229.67 m ³
⑤ REINFORCING, STEEL BAR	= 22.41 x (378 - 5) + (76.09 x 4) + (63.87 x 23) = 10,133 kg
⑥ FORM WORK	= (2.4 x 378) + (25.48 x 4) + (20.02 x 18) = 1,369.16 m ²
⑦ ELASTIC JOINT FILLER T=10	= $(8.3 \times (\frac{140-2.5}{15})) + (8.3 \times (\frac{230-2.5}{15})) = 201.97 \text{ m}^2$
⑧ LOG PILE ϕ 150 l=2,000 @ 2,000	= $\frac{148}{15} + \frac{230}{15} = 189 \text{ nos}$
⑨ COBBLE STONE FILLING	= 0.75 x 378 = 283.5 m ³
⑩ GABION MATTRESS	= 1.50 x 378 = 567 m ³
⑪ PLASTERING	= 18 x (378 - 5 - (18 x 0.3)) = 6,617 m ²

NAME OF STRUCTURE :
LOCATION :

The diagram illustrates a water channel project. The plan view at the top shows a channel with a base width of 18.600m. The channel bed is made of concrete (Type B) with a 1:2.0 slope. The existing ground level is indicated by a dashed line. The channel walls are also concrete (Type B). The cross-section A-A shows the channel depth and the concrete lining.

NAME OF STRUCTURE: RETAINMENT FOR PLGE. DEL RIVER
LOCATION : DEL RIVER

per m'

2 - 67

NAME OF STRUCTURE: Retention for Dike (Wet Stone Masonry Type) L = 140 m
 LOCATION : Dike Between Deli River Weir and Floodway Weir

(L = 140 m) Per unit

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
M ³ 1		M ³ 1	EXCAVATION 1		
			$[(4.59 \times 0.25) + (0.25 \times 0.25) + (0.25 \times 0.25)] \times 140$		955.70
M ³ 2		M ³ 2	CLUSTER RUN BEDDING		
			$(4.59 \times 0.25) \times 140 + (0.25 \times 0.25) \times 140 + (0.25 \times 0.25) \times 140$		202.65
M ³ 3		M ³ 3	WET STONE MASONRY 1		
			$(4.59 \times 0.25) \times 140$		955.65
M ³ 4		M ³ 4	CONCRETE TYPE 1.1		
			$(0.25 \times 0.25) \times 140 + (0.25 \times 0.25) \times 140$		80.20
Eg 1		Eg 1	REINFORCING STEEL BAR 1		
			TOP P BAR $\phi 12 \times 140 = 140 \times 12 \times 140 = 1921.92$		
			$\phi 10 \times 17 \times 140 = 2722 \times 0.62 \times 140 = 537.63$		
			$\phi 8 \times 16 \times 140 = 7456 \times 0.62 \times 140 = 506.04$	2965.63	
			REINFORCING BAR $\phi 12 \times 140 = 140 \times 12 \times 140 = 24.312 \times 140$		
			$\phi 10 \times 17 \times 21 = 35.7 \times 0.62 \times 140 = 24.23$	$(4.72 \times 0.62) \times (0.4 \times 140)$	
			$\phi 8 \times 16 \times 21 = 7456 \times 0.62 \times 140 = 13.25$		2661.03
M ³ 5		M ³ 5	FOAM WORK 1		
			TOP P BAR $(0.25 \times 2) \times 140 + (0.25 \times 2) \times 140$	336	
			REINFORCING BAR $(0.25 \times 2) \times 140 + (0.25 \times 2) \times 140$	30.61	514.61
M ³ 6		M ³ 6	ELASTIC JOINT FILLER T-10		
			$[(0.25 \times 15) + (0.25 \times 15)] \times \frac{1.22}{15}$		922.7
M ³ 7		M ³ 7	FLASING		
			5.59×137		765.82

NAME OF STRUCTURE: RETAINING CHANNEL
LOCATION : DELI RIVER.

2 - 69

NAME OF STRUCTURE	REVENUE FOR PROTECTION CLASSE
LOCATION	: DELI RIVER WEIR

$L = 120 \text{ nm}$. (left size) per unit

2 - 70

REVETMENT-GABION CYLINDER TYPE

Right Bank

① Gabion Cylinder

$$\begin{aligned}
 0.25^2 \cdot \pi \times (8.50 + 1.0 + 3.0 + 7.83 + 3.0 + 7.34) \times 4 \times 2 &= 48.2 \\
 0.25^2 \cdot \pi \times (8.50 + 1.0 + 3.0) \times 4 &= 9.82 \\
 \hline
 &58.02 \text{ m}^3
 \end{aligned}$$

② Cobble Stone Filling

$$\begin{aligned}
 (0.5 \times 0.5 - 0.25^2 \cdot \pi) \times 30.67 \times 4 \times 2 &= 13.16 \\
 (0.5^2 - 0.25^2 \cdot \pi) \times 12.5 \times 4 &= 2.68 \\
 \hline
 &15.84 \text{ m}^3
 \end{aligned}$$

Left Bank

① Gabion Cylinder Type

$$0.25^2 \cdot \pi \times (8.50 + 1.0 + 3.0) \times 4 \times 2 = 19.63 \text{ m}^3$$

② Cobble Stone Filling

$$(0.5^2 - 0.25^2 \times \pi) \times 12.5 \times 4 = 2.68 \text{ m}^3$$

Total

Gabion Cylinder	77.7 m ³
Cobble Stone	18.6 m ³

NAME OF STRUCTURE: A.T.B Pavement.

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL

2.2 Bridge Protection Works

- (1) Titi Runtah Bridge**
- (2) Railway Bridge**
- (3) National Road Bridge**

NAME OF STRUCTURE: PROTECTION WORKS FOR TITI RUNTUH BRIDGE (P4) (✓3)

LOCATION : PE 129 + 43 m , MFC - III

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
1.	Excavation (Common)	m ³	$\textcircled{1} (2.5 \times 0.8 + 0.5 \times 0.5 + 0.8 \times 2.5 + 2.4 \times 2.5) \times (20.0 + 3.0 \times 4) \times 2$ $\textcircled{2} (2.5 \times 0.8 + 0.8 \times 2.5 + 2.4 \times 2.85 + \frac{1}{2} \times 3.5 \times 2.5) \times 5.0 \times 4$ $\textcircled{3} (1.8 \times 0.7 + 1.0 \times 3.9 + \frac{1}{2} \times 5.0 \times 2.5) \times 15.0$ $\textcircled{4} 1.3 \times 0.6 + 1.0 \times 2.5 + \frac{1}{2} \times 2.5 \times 1.5 \times 18.2$ $\textcircled{5} \frac{1}{2} \times (2.5 + 1.8) \times 11.18 + \frac{1}{2} \times (19.5 + 8) \times 11.18 + \frac{1}{2} \times (24.5 + 11.5) \times 16.96 + \frac{1}{2} \times (25.5 + 14.5) \times 16.96 \times 2.9$ $\textcircled{6} \left\{ \frac{1}{2} \times (10 + 12) \times 19 + \frac{1}{2} \times (8 + 12.5) \times 2.9 + 20.0 \times 10.0 + \frac{1}{2} \times (12 + 10) \times 4 \times 2.3 \times 0.5 \right\}$ $\textcircled{7} \frac{1}{2} \times (6 + 2) \times 18 + 2.0 \times 81.0 + 3.0 \times 20.3 \times 0.3$	656.0	
				304.3	
				171.2	
				93.9	
				519.3	
				371.5	
				88.2	2,206
2.	Concrete for Wall (Type-c1)	m ³	$\textcircled{1} \left\{ \frac{1}{2} \times (0.4 + 1.0) \times 5.0 + 2.5 \times 0.7 + 0.2 \right\} \times 20 \times 2$ $\textcircled{2} \frac{1}{2} \times (0.4 + 1.0) \times (5.35 + 5.3) \times 10 + 2.5 \times 0.7 \times 10$ $\textcircled{3} \frac{1}{2} \times (0.4 + 1.0) \times 5.0 \times 5.0 \times 2 + 2.5 \times 0.7 \times 10$ $\textcircled{4} \frac{1}{2} \times (0.4 + 1.0) \times 5.0 \times 9.4 + 2.5 \times 0.7 \times 16.0$ $\textcircled{5} \frac{1}{2} \times (0.4 + 0.8) \times (3.8 + 3.9) \times 5.0 + 1.8 \times 0.6 \times 5.0 \times 2$ $\textcircled{6} \frac{1}{2} \times (0.4 + 0.8) \times (2.6 + 2.35) \times 12 + 1.3 \times 0.5 \times 12.0$ $\textcircled{7} \frac{1}{2} \times (0.4 + 0.8) \times 3.0 \times 5.0 + 1.3 \times 0.5 \times 5.0$ $\textcircled{8} \frac{1}{2} \times (0.4 + 0.8) \times (2.5 + 2.0) \times 6.2 + 1.3 \times 0.5 \times 6.2$	467.4	
3	Concrete for Facing (Type-D) t = 15 cm	m ²	$\textcircled{1} \frac{1}{2} \times (6.0 + 2.0) \times 18.0 + 1.6 \times 29.2 + \frac{1}{2} \times 1.6 \times 15.5 \times 0.15$ $\textcircled{2} \left\{ \frac{1}{2} \times (3.0 + 1.6) \times 12.0 + 3.0 \times 8.0 + 1.6 \times 20 + \frac{1}{2} \times 1.6 \times 15.0 \right\} \times 0.15$	19.8	
4	Reinforcing Steel Bars for Concrete Wall 3% of concrete	Kg	$467.4 \times 2500 \times 0.03$	14.4	34.2
5	Form Work for Concrete Wall (FW1: FW2 = 55%: 45%)	m ²	$(7.07 + 2.4) \times 20.0 \times 2 + (7.07 + 1.4) \times 5.0 \times 2 =$ $(5.35 + 1.4) \times 5.0 + (5.3 + 1.4) \times 5.0 =$	463.5	67.3

NAME OF STRUCTURE: PROTECTION WORKS FOR TITI RUNTUH BRIDGE (P4) (2/3)
 LOCATION : PE 129+43 m , MFC - III

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
6	Back fill (Comp Soil)	m ³	$\circ (3.8+1.2) \times 5.0 + (3.9+1.2) \times 5.0 =$ $\circ (2.35+1.0) \times 5.5 + (2.6+1.0) \times 6.5 =$ $\circ \frac{1}{2} (0.9+4.6) \times 5.0 \times 2 + \frac{1}{2} (0.8+3.5) \times 5.0 \times 2 =$ $\circ 0.7 \times 2 \times (4.6 \times 2 + 3.5 \times 2) =$ $\circ 0.6 \times (2.7+2.0+3.0+2.5) + 0.8 \times 15.2 =$	50.5 41.9 49.0 22.7 18.3	
7	CRUSHER RUN BEDDING	m ³	$\circ \frac{1}{2} \times 2.5 \times 1.5 \times (9.5+9.0+8.5+7.5) =$ $\circ \frac{1}{2} \times 1.5 \times 1.0 \times (5.0+5.0+5.0+5.0) =$ $\circ \frac{1}{2} \times 1.0 \times 0.5 \times (5.5+2.0+7.2+6.5) =$	68.5 15.0 4.6	88.1
8	Log Pile $\phi 150$, $L = 3.0$	m	$\circ 0.4 \times 6.0 \times (20.0 \times 2 + 5.0 \times 4 + 2.0 \times 4) =$ $\circ 0.6 \times 8.0 \times (20.0 \times 2 + 5.0 \times 4 + 3.5 \times 4) =$ $\circ 2.0 \times 20.0 \times 2 \times 0.1 =$ $\circ (0.4 \times 3.0 + 0.6 \times 3.5 + 2.5 \times 0.1) \times (40.0+14.0) =$ $\circ (0.4 \times 3.0 + 0.6 \times 3.0 + 1.8 \times 0.1) \times 5.0 \times 3 =$ $\circ (0.4 \times 3.5 + 1.3 \times 0.1) \times (5.5+4.2+6.5+2.0) =$ $\circ 228.0 \times 0.1 =$	163.2 355.2 8.0 191.7 47.7 27.9 22.8	816.5
9	Elastic Joint Filler	m	$3.0 \times 3 \times 20 \times 2 + 3.0 \times 2 \times 6.9$		774
10	Weep Hole. PVC PIPE $\phi 50$ mm with Filter	m ³	$\frac{1}{2} \times (0.4+1.0) \times 5.0 + 2.5 \times 0.7 + 0.2 \times 2 =$ $\frac{1}{2} \times (0.4+1.0) \times 3.55 \times 2 + \frac{1}{2} \times (0.4+0.8) \times 2.0 \times 2 =$ $L_1 = 0.7m, n = 50$ $L_2 = 0.9m, n = 40$ $L_3 = 1.1m, n = 15$	10.9 18.3	29.2
11	Revetment (I) Area	m ² m ²	$L_4 = 0.8m, n = 583 \div 8.0 = 73$ $\frac{1}{2} \times (25.0+18.0) \times 12.30 + \frac{1}{2} \times (19.5+8.0) \times 12.30$ $3.354 \times 18 + \frac{1}{2} \times (3.354+4.972) \times 9.5 + 7.0 \times 3.0$ $+ \frac{1}{2} \times 4.472 \times 15.0 + 4.472 \times 13.0$	433.6 210.3	178

NAME OF STRUCTURE: PROTECTION WORKS FOR TITI RUNTUH BRIDGE (P4) (3/5)

LOCATION : PE 129 + 43 m, MFC - III

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
	(Type - PC)				
	(2) Wet Stone Masonry	m ²	$4.472 \times (8.0 + 12.0 + 13.0) + 3.0 \times 7.0 + \frac{1}{2} \times 4.5 \times 4.5$	201.2	
	(3) Cement Mortar Plastering		$\frac{1}{2} \times (24.5 + 11.5) \times 18.1 + \frac{1}{2} \times (25.5 + 14.5) \times 18.1$	687.8	1,532.8
	(4) Crusher Run Bedding	m ³	$1.532.8 \times 0.25$		383.2
	(5) Concrete, Type-C1	m ²			1,533
	Base Con. (I) $L = 25.5 + 24.5 + 19.5 + 25.0 = 94.5$ m	m ³	$1.532.8 \times 0.25 + 0.5 \times 450 \times 0.1$		406
	Top Con. $L = 14.5 + 11.5 + 16.0 + 36.0 + 93.0 = 171.0$ m				
	Partition Wall (I) $L = 75.0 \times 1.118 = 83.9$ m		$(10.5 \times 0.5 - \frac{1}{2} \times 0.3 \times 0.2) \times 94.5$	20.8	
	Partition Wall (II) $L = 21.0 + 15.0 = 36.0$ m		$0.3 \times 0.7 \times 171$	35.9	
	End Wall $L = 31.2 + 24.6 + 7.8 = 63.6$ m		$0.3 \times 0.55 \times 83.9$	13.9	
	Base Con. (II) $L = 18.0 + 20.0 = 38.0$ m		$(0.5 \times 0.4 - \frac{1}{2} \times 0.3 \times 0.2 - \frac{1}{2} \times 0.2 \times 0.05) \times 36.0$	5.9	
	Reinforcing Bars		$0.3 \times 0.7 \times 63.6$	13.4	96.4
	2% of Total Concrete Weight	kg	$(0.5 \times 0.4 - \frac{1}{2} \times 0.3 \times 0.2) \times 38.0$	6.5	
	(7) Log Pile $\phi 150$ $L = 3.0 @ 2.0$ m		$96.4 \times 2,500 \times 0.02$		4,820
	(8) Elastic Joint Filler $t = 10$ mm	No.	$94.5 \div 2.0 = 47.25$		48
	(9) GABION MATTRESS	m	$3.0 \times 48 = 144$		144
	$A = \frac{1}{2} \times (8.0 + 10.2) \times 20 + \frac{1}{2} \times (10.2 + 10.0) \times 4.0$ $+ 10.0 \times 16.0 + \frac{1}{2} \times (10.5 + 10.0) \times 4.0 + \frac{1}{2} \times (10.5 + 7.0) \times 24.5$ $= 637.8$ m ²	m ²			
	(10) GABION CYLINDER	m ³	$(\frac{0.5}{2})^2 \times \pi \times 330.2$		64.9
	$L = 18.07 \times 4 \times 2 + 12.30 \times 4 \times 2 + 10.0 \times 4 + 11.8 \times 4 = 330.2$ m		$(72.5 + 18.0 + 19.0 + 66.0 + 80 + 20 + 14 + 19 \times 8) \times 0.25$	25	87.9
	(11) Cobble Stone Filling		637.8×0.5		319
	(12) Formwork FW1	m ³	$\frac{1}{2} \times 0.5 \times 1.0 \times (19.5 + 25.5 + 24.5 + 25.0)$		23.7
		m ²	$0.5 \times 94.5 \times 2 + 0.7 \times 171 \times 2 + 0.55 \times 93.9 \times 2$	426.7	
			$0.5 \times 36 \times 2 + 0.7 \times 38.0 \times 2 + 0.5 \times 38.0 \times 2$	127.2	553.4

2.2.2 Railway Bridge

Bridge Protection		Railway Bridge			
		Main Body	Revetment	Total	
Clearing and Grubbing	m ²	0		0	0
Excavation	m ³	1,621		1,621	1,784
Backfill by Selected Soil	m ³	123		123	135
Backfill by Impermiable Soil	m ³	62		62	68
Wet Ston Masonry	m ³		322	322	338
Crusher Run Bedding	m ³	138	329	467	513
Mortor Plastering	m ²		1,288	1,288	1,352
Concrete Type C1	m ³		25	25	26
Concrete Type D	m ³	1,954		1,954	2,052
Concrete Type E	m ³	18		18	18
Re-Bars	kg		1,411	1,411	1,694
Form FW1	m ²	824	144	968	1,017
Form FW2	m ²	340		340	357
Elastic Joint Filler	m ²		38	38	40
Concrete Block 980x980	nos	688		688	722
Log Pile	m	185	44	229	240
PVC Pipe Drain	m		147	147	161
Cobble Stone Filling	m ³		11	11	12
Gabion Mattress	m ³		66	66	73
Gabion Cylinder	m ³		34	34	37

Percut

Revetment	Width m	Wet Ston Masonry		Base Concrete		Top Concrete m	Partition Wall nos.	Side Wall nos.	Total
		All m ²	Deduction m ²	Type A m	Type B m				
		5.6	1292.40	-4.29	44.00	30.00	9.60	0.00	2.00
Wet Ston Masonry	m ³	323.10	-1.07	0.00	0.00	0.00	0.00	0.00	322.03
Crusher Run Bedding	m ³	323.10	-1.07	3.08	1.80	0.48	0.00	1.86	329.25
Mortor Plastering	m ²	1292.40	-4.29	0.00	0.00	0.00	0.00	0.00	1288.11
Concrete Type C1	m ³	0.00	0.00	9.68	5.10	2.02	0.00	8.00	24.80
Re-Bars	kg	0.00	0.00	479.60	306.00	108.48	0.00	517.27	1411.35
Form FW1	m ²	0.00	0.00	46.64	31.80	11.52	0.00	54.40	144.36
Log Pile	m	0.00	0.00	44.00	0.00	0.00	0.00	0.00	44.00
Joint Filler	m ²	0.00	0.00	15.84	10.80	2.69	0.00	9.00	38.33
PVC Pipe Drain	m	146.60							146.60
Cobble Stone Filling	m ³	0.00	0.00	11.00	0.00	0.00	0.00	0.00	11.00
Gabion Mattress	m ³	0.00	0.00	66.00	0.00	0.00	0.00	0.00	66.00
Gabion Cylinder	m ³	0.00	0.00	0.00	0.00	0.00	0.00	33.60	33.60

NAME OF STRUCTURE: RAILWAY PROTECTIONWORKS (1/2).

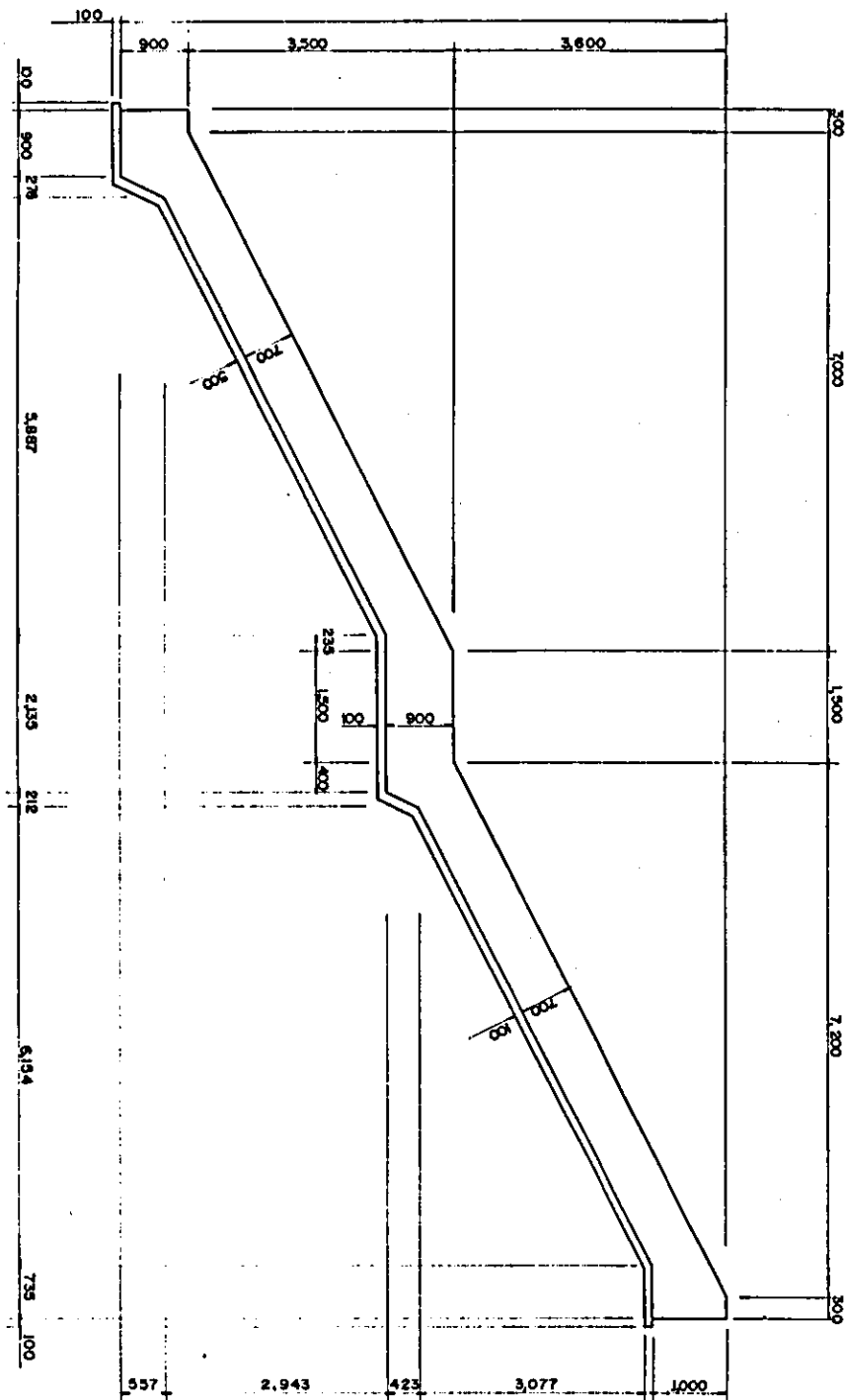
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
C.A.1	EXCAVATION. 	m³	$23.96 \times 2 \times 2.74$	1090	
		m³	$(23.96 + 0) / 2 \times 8 \times 4$	384	1474.3
C.A.2	BACKFILL. 	m³	61.48×2.0	123	
C.A.3	Selected Soil. Gravel In permeable L = $22.74 \times 2 \times 2 = 20A \times L_1 + \frac{A}{2} \times L_2 = A(2L_1 + \frac{L_2}{2})$ $L_2 = 8 \times 4 = 61.48 \times A$	m³	61.48×4.9	301.3	
		m³	61.48×1.0	61.5	
C.A.4	Log Pile. $L = 3m$. pitch. $2m$. 2 lines. $L' = 22.74 \times 2 + 8 \times 4/2 = 61.5m$	m	$61.5/2 \times 2 \times 3$	185	
C.A.5	Wet Stone Masonry. $A = 144.5 \times 4 \times 2.236 = 1292.4 m^2$	m³	1292.4×0.25	323.1	
	Wet Stone Masonry (1/2) Crusher Run Bedding. Mortar Plastering	m³	1292.4×0.25	323.1	
		m²		1292.4	
C.A.6	Concrete Block. $A = 172.0 \times 4 = 688$ $m = 688$	MDS		688	
	Concrete Block. Crusher Run Bedding.	m³	688×0.2	137.6	
C.	Conc. Type D. $11.11 \times (22.74 + 4.284/2 + 2.260) \times 4$ $(4.47 + 7.0) \times 12.062$			1954	

NAME OF STRUCTURE: RAILWAY BR. PROTECTION WORK (2/2)
LOCATION :

NO	SKETS A OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL																																																		
C.A.2	Base & Top Concrete for Retement . Base Concrete, Type A. $L=11m \times 4 = 44m$ Type B. $L=7.5m \times 4 = 30m$ Top concrete $L=2.4m \times 4 = 9.6m$ Unit Quantities (1/m) <table><tr><th></th><th>Type A</th><th>Type B</th><th>Top Conc.</th></tr><tr><td>1. CRUSHER RUN BEDDING. m^3</td><td>0.07</td><td>0.06</td><td>0.05</td></tr><tr><td>2. Conc. Type C1. m^3</td><td>0.22</td><td>0.17</td><td>0.21</td></tr><tr><td>3. Re-Bars kg</td><td>$1.97m \times 6 + 1.97m \times 6 = 23.64m$</td><td>$1.97m \times 6 = 11.82m$</td><td>$11.34m$</td></tr><tr><td>4. FORM F.W.I. m^2</td><td>1.06</td><td>1.06</td><td>1.2 m^2/m</td></tr><tr><td>5. Log PILE. m</td><td>1.0</td><td>—</td><td>—</td></tr><tr><td>6. Joint filler. m^2</td><td>0.36</td><td>0.36</td><td>0.28</td></tr></table> END WALL (LOCATION) <table><tr><th></th><th>END WALL</th></tr><tr><td>1. CRUSHER RUN BEDDING</td><td>$18.65m^2 \times 0.1m \times 0.5m = 0.93m^3$</td></tr><tr><td>2. Conc. Type C1.</td><td>$13.29m^2 \times 0.3m = 4.00m^3$</td></tr><tr><td>3. RE BARS</td><td>183.6kg</td></tr><tr><td>4. FORM FWI</td><td>$13.21m \times 2 + (11m) \times 0.3 = 27.2m^2$</td></tr><tr><td>5. LOG PILE</td><td>$9.5m \times 1 = 9.5m$</td></tr><tr><td>6. JOINT FILLER</td><td>$(17.4m) \times 4 \times 0.25m = 16.8m^3$</td></tr><tr><td>7. GABION CYLINDER</td><td>$3m \times 1m \times 0.5 = 1.5m^3$</td></tr><tr><td>8. GABION MATTRESS</td><td>$5m \times 4m \times 1.5 = 30m^3$</td></tr><tr><td>9. LOG PILE</td><td>$10.5/2 \times 1 = 0.25m^3$</td></tr><tr><td>10. COBBLE STONE FILLING</td><td></td></tr></table>		Type A	Type B	Top Conc.	1. CRUSHER RUN BEDDING. m^3	0.07	0.06	0.05	2. Conc. Type C1. m^3	0.22	0.17	0.21	3. Re-Bars kg	$1.97m \times 6 + 1.97m \times 6 = 23.64m$	$1.97m \times 6 = 11.82m$	$11.34m$	4. FORM F.W.I. m^2	1.06	1.06	1.2 m^2/m	5. Log PILE. m	1.0	—	—	6. Joint filler. m^2	0.36	0.36	0.28		END WALL	1. CRUSHER RUN BEDDING	$18.65m^2 \times 0.1m \times 0.5m = 0.93m^3$	2. Conc. Type C1.	$13.29m^2 \times 0.3m = 4.00m^3$	3. RE BARS	183.6kg	4. FORM FWI	$13.21m \times 2 + (11m) \times 0.3 = 27.2m^2$	5. LOG PILE	$9.5m \times 1 = 9.5m$	6. JOINT FILLER	$(17.4m) \times 4 \times 0.25m = 16.8m^3$	7. GABION CYLINDER	$3m \times 1m \times 0.5 = 1.5m^3$	8. GABION MATTRESS	$5m \times 4m \times 1.5 = 30m^3$	9. LOG PILE	$10.5/2 \times 1 = 0.25m^3$	10. COBBLE STONE FILLING		m^3			
	Type A	Type B	Top Conc.																																																				
1. CRUSHER RUN BEDDING. m^3	0.07	0.06	0.05																																																				
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4. FORM F.W.I. m^2	1.06	1.06	1.2 m^2/m																																																				
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6. JOINT FILLER	$(17.4m) \times 4 \times 0.25m = 16.8m^3$																																																						
7. GABION CYLINDER	$3m \times 1m \times 0.5 = 1.5m^3$																																																						
8. GABION MATTRESS	$5m \times 4m \times 1.5 = 30m^3$																																																						
9. LOG PILE	$10.5/2 \times 1 = 0.25m^3$																																																						
10. COBBLE STONE FILLING																																																							
					</																																																		

Re Bars .



61.010 m x 2

37.772
9.355
1.138
2.857
8.869
1,019.



0.2
0.571
0.2

$$1.742 \times 54.3 = 94.591 \text{ m}$$

$$\begin{aligned} \text{Total} &= (61.010 \times 2 + 94.591) \times 0.995 \text{ m} \\ &= 258.6 \\ &= 185.8 \text{ kg} \end{aligned}$$

ELEVATION OF END WALL
SCALE A

	NAME OF STRUCTURE:	:
	LOCATION	:

[illegible]

NAME OF STRUCTURE: PROTECTION WORKS FOR NATIONAL ROAD BRIDGE (V2)
LOCATION : MFC- IV

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
1	Excavation (Common)	m ³	$\frac{1}{2} \times (0.7 + 1.0) \times 3.5 + 2.5 \times 0.6 + 0.5 \times 0.6 \times 80.0$	382.0	
2	Concrete		$\frac{1}{2} \times (0.5 + 0.7) \times 3.25 + 2.2 \times 0.6 + 0.5 \times 0.6 \times 32.0$	114.3	
	Concrete Wall (Type-C1)		$0.25 \times 4.5 \times 6.5 \times 4 + 0.25 \times 116.3 \times 0.25 \times 11.0$	61.1	557.4
	Protection for Pipe Bridge Pier (Type-C1)	m ³	$\frac{1}{2} \times (0.4 + 0.645) \times 3.5 + 2.145 \times 0.6 + 0.5 \times 0.6 \times 80.0$	273.3	
	Concrete Facing (Type-P)		$\frac{1}{2} \times (0.4 + 0.645) \times 3.25 \times (11.2 \times 2 + 12.0 + 10.0)$	75.4	
	Reinforcing Steel Bar 3.0% of Concrete		$2.0 \times 2.4 \times 0.4 - 7 \times 0.15^2 \times 2.4 + 2.4 \times 0.9 \times 2.0$	6.1	354.8
3	Form Work	m ²	$4.5 \times 6.5 \times 4 \times 0.15 + (116.3 + 11.0) \times 0.15$	36.7	
4	Backfill Gravel (Crusher Run)	Kg			
		m ²	$(273.3 + 75.4) \times 2.5 \times 0.03 \times 1000$		26,153
			$(4.3 + 4.2 + 1.2 + 0.6) \times 80.0$	824	
5			$(7.8 + 7.5 + 1.2 + 0.6) \times (11.2 \times 2 + 12.0 + 10.0)$	760	1,584
6	Log Pile $\phi 150, L = 3.0m$	m ³	$0.4 \times 4.5 \times 80.0 + 0.3 \times 7.4 \times 44.4$	242.6	
			$(116.3 + 11.0) \times 0.1 + 2.2 \times (80.0 + 49.4) \times 0.1$	40.2	282.8
7	Elastic Joint Filler $t = 10mm$	Nos.	$(40.0 \times 2 + 11.2 \times 2 + 10.0 \times 2) \div 2.0 \times 2 + 4$		128
		m	3.0×128		384
8	Concrete Block		$\frac{1}{2} \times (0.4 + 0.645) \times 3.5 + 2.145 \times 0.6 + 0.5 \times 0.6 \times 8$		27.4
	$A = 5.0 \times 40.0 + \frac{1}{2} \times (5.0 + 8.0) \times 10.0 + 5.0 \times 10.0 = 315m^2$	Nos	$315 \div 1.0 = 315$		315
	(FW1 = 63% of Total)				
9.	Weep Hole (1 pc / 4 m ²)	m ³	$\{4.0 \times 40 + \frac{1}{2} \times (4.0 + 7.0) \times 20\} \div 4.0 \times 2$		135

NAME OF STRUCTURE: PROTECTION WORKS FOR NATIONAL ROAD BRIDGE (2/2.)
LOCATION : MFC-IV

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
1	Wet' Masonry Type Revetment (PE269+25 ~ PE 269+118 m)				
	(1) Area	m ²	$\{(7.92+7.0) \times 1.118 + 1.5\} \times (23.0+20.0+15.0+15.0)$ $\frac{1}{2} \times (7.82+5.0) \times (6.8+13.0) \times 1.118$ $(5.0 \times 7.0 \times 4 + 9.0 \times 2.4 \times 4 + 9.5 \times 4.2 \times 2) \times 1.202$ $\frac{1}{2} \times (7.82+5.0) \times (11.2+11.2) \times 1.118$	1,319.1	
	(2) Wet Stone Masonry	m ³	2,004.1 x 0.25	160.6	2,004.1
	(3) Cement Mortar Plastering	m ²			501.1
	(4) Concrete - Typ-C1				2,004.1
	Top Concrete L = 20.0+23.0+30.0+5.0 x 4 + 15.5+7.0+23.0	m ³	0.3 x 0.7 x 138.5	29.1	
	Base Con. Type-A L = 20.0+23.0+15.0 x 2 = 73 m	"	(0.5 x 0.5 - $\frac{1}{2} \times 0.3 \times 0.2$) x 73	16.1	
	Base Con. Type-B L = 20.0+23.0+30.0+80.0+130+80.0+23.0		(0.5 x 0.4 - $\frac{1}{2} \times 0.3 \times 0.2$) x 197	33.5	
	End Wall L = 18.1 x 4 = 72.4 m		0.3 x 0.7 x 72.4	15.2	
	Partition Wall L = 18.1 x 2 + 9.0 + 8.0 x 3 + 5.0 x 4 + 2.5 x 4		0.3 x 0.55 x 99.2	16.4	110.3
	(5) Reinforcing steel Bars	kg			
2	2% of total concrete weight				
	(6) Log Pile $\phi 150$, L = 2.0 m, @ 2.0 m	No.	110.3 x 2,500 x 0.02		5,515
	(7) Crusher Run Bedding	m	(20.0+23.0+30.0) + 2.0		37
	(8) Elastic Joint Filler	m ³	2.0 x 37		74
	(9) Gabion Cylinder	m ³	2,004.1 x 0.25		501
	L = 19.6 x 4 x 4 = 313.6 m		(138.5 + 18.1 x 8 + 73.0 + 9.0 + 8.0 x 2 + 5.0 x 2 + 2.5 x 2) x 0.25		100.4
	(10) Gabion Mattress	m ²			
	A = $\frac{1}{2} \times (6.0+9.0) \times 21.0 + 6.0 \times 15.0 = 247.5$ m ²				
	(11) Cobble Stone Filling	m ³	0.5 x 247.5		123.8
		m ³	$\frac{1}{2} \times 6.5 \times 1.0 \times (23.0+20.0+30.0)$		19.3
(12)	Formwork	m ²	0.7 x 138.5 x 2 + 0.5 x 73 x 2 + 0.5 x 197 x 2 + 0.7 x 247.5 x 2		566
(13)	Weep Hole	nos	+ 0.55 x 99.2 x 2		
			(20.0 + 15.0) x 16.0 + 4.0 x 2		= 280

3. RIPARIAN STRUCTURES

3. RIPARIAN STRUCTURES

3.1 Groundsill for Percut River

No.

Ground Sill (Filling)

Excavation $45.5 \text{ m}^2 \times 10 \text{ m} = 450 \text{ m}^3$

Back Fill

$(5.4 \text{ m}^2 \times 2) \times 6.3 \text{ m} (\times 1.05) = 72 \text{ m}^3$

Sheet Pile

$L = 2 \text{ m}$ $B = 9 \text{ m} + 17 \text{ m} = 26 \text{ m}$

$A = 52 \text{ m}^2$

$L = 52 / 0.4 = 130 \text{ m}$

P.C. Pile

$L = 9 \text{ m}$ $n = 11 \times 2 + 7 \times 2 = 36 \text{ 本}$

$L = 9 \times 36 = 324 \text{ m}$

Conc. Type C.

Apron $A_1 = \frac{3.39}{\cancel{6.25}} \quad L = 9 \text{ m}$

Weir $A_2 = 3.74 \quad L = 17 \text{ m} \quad V = 93.64 \approx 100 \text{ m}^3$

Conc. Type E

Apron $A_1 = 0.84 \text{ m}^2 \quad L = 9.4 \text{ m}$

$V = 18.1 \text{ m}^3 (1.05) \text{ m}^3$

Weir $A = 0.55 \text{ m}^2 \quad L = 17 \text{ m}$

Re Bar $\phi 19 \quad L = 1,000 \quad n = 34 \text{ 本}$

$2.25 \text{ kg/m} \times 34 = 76.5 (\times 1.2) = 91.8 \text{ kg}$

Gabion

D.S. $105 \text{ m}^2 \times 1.0 \text{ m} = 105 \text{ m}^3$

V.S. $33 \text{ m}^2 \times 0.5 \text{ m} + \frac{59}{\cancel{27}} \times 0.5 + \frac{63}{\cancel{27}} \times 0.5 = 75 \text{ m}^3$

$105 + 75 = 180 \text{ m}^3$

Form

Side $6.95 \times 2 \text{ m}^2 \quad 14 \text{ m}^2$

Front $7.46 \text{ m}^2 \quad 8 \text{ m}^2$

Weir Front $L = 1.281 \times 17 = 22 \text{ m}^2$

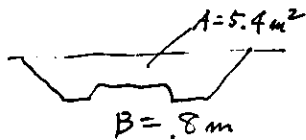
Back 31 m^2

$4 \times 0.5 \times 2 \quad 4$

Total 79 m^2

GROUND SILL (FW 3+00).

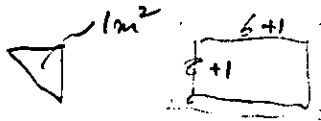
1. Excavation



$$V = 5.4 \times 9^m + \overset{RZL.}{5.4 \times 1.0^m / 2 \times 2} = 54 m^3$$

$$54 \times 1.2 = 65 m^3$$

2. Backfill by Selected Soil.



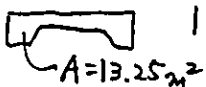
$$(6+8+1+1) \times 2 \times 1 m^2 = \underline{30 m^3}$$

3. Log Pile.

$$\overset{nos}{6} \times \overset{nos}{8} \times 4 m$$

$$= 192 m$$

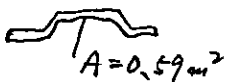
4 Conc. Type D



$$V = 3.26 \times 8.4 m$$

$$= 27.4 m^3$$

5. Conc. Type E.



$$V = 0.59 \times (8.4 + 0.2)$$

$$= 5.1$$

6. Form Work.

$$\text{Main Body. } 13.25 \times 2 + 4.17^m \times 2 = 34.9 m^2$$

$$\text{Leveling Conc. } 8.6 \times 0.1 \times 2 + 0.59 \times 2 = \underline{2.9 m^2}$$

$$\text{Total } 37.8 m^2$$

7. Elastic Joint Filler

$$0.1 \times 8 = 0.8 m^2$$

3.3 Approach Steps

(1) Percut River

- Concrete Steps Type-PA
- Concrete Steps Type-PB
- Concrete Steps Type-PC
- Concrete Steps Type-PD

(2) Floodway

- Maintenance Step

(3) Deli River Retarding Channel

- Concrete Steps Type-DA
- Concrete Steps Type-DB

LOCATION		
NO.	LEFT BANK	RIGHT BANK
1	PE 124 L + 87 m	PE 127 R + 63 m
2	PE 119 L + 43 m	PE 118 R + 32 m
3	PE 109 L + 52 m	PE 112 R + 7 m
4	PE 103 L + 87 m	PE 103 R + 38 m
5	PE 94 L + 90 m	PE 96 R + 51 m
6	PE 88 L + 80 m	PE 88 R + 45 m
7	PE 84 L + 60 m	PE 81 R + 70 m
8	PE 78 L + 100 m	PE 65 R + 60 m
9	PE 63 L + 50 m	PE 60 R + 60 m
10	PE 57 L + 100 m	PE 57 R + 60 m
11	PE 53 L + 85 m	PE 54 R + 23 m
12	PE 48 L + 88 m	PE 49 R + 5 m
13	PE 44 L + 38 m	PE 34 R + 18 m
14	PE 40 L + 82 m	PE 25 R + 17 m
15	PE 35 L + 45 m	
n = 15		n = 14

NO.	WORK ITEM	Unit	QUANTITY PER ONE PLACE	NO. OF STEP	TOTAL QUANTITY (1)	NO. OF STEP	TOTAL QUANTITY (2)
1.	Excavation (common)	m ³	68.389	5	341.9	24	1,641.3
2.	Crusher Run Bedding	m ³	10.144	5	50.7	24	243.5
3.	Top Concrete Beam, Type - C1	m ³	0.360	5	1.8	24	8.6
4.	Formwork Top Concrete Beam, Type - C1	m ³	2.640	5	13.2	24	63.4
5.	Concrete Steps, Type - D	m ²	8.397	5	42.0	24	201.5
6.	Formwork Concrete Steps	m ²	18.320	5	91.6	24	439.7
7.	Base Concrete Type C1	m ²	0.800	5	4.0	24	19.2
8.	Formwork Base Concrete	nos	4.400	5	22.0	24	105.6
9.	Reinforcing Steel Bar	Kg	37.917	5	189.6	24	910.0
10.	Concrete Type E	m ³	0.777	5	3.9	24	18.6
11.	Wet Stone Masonry (1:4)	m ³	6.430	5	32.2	24	154.3
12.	Plastering Wet Stone Masonry	m ²	21.774	5	108.9	24	522.6
13.	Gabion Cylinder Filing	m ³	12.664	5	63.3	24	303.9
14.	Gabion Mattress	m ³	13.500	5	67.5	24	324.0
15.	Log Pile Dia.150, L = 3000	nos	4.000	5	20.0	24	96.0
16.	Log Pile Dia.150, L = 2000	nos	18.000	5	90.0	24	432.0

NAME OF STRUCTURE: PLAN OF APPROACH STEPS
LOCATION : PERCAR RIVER (LOWER PORTION)

NAME OF STRUCTURE: PLAN OF APPROACH STEPS

LOCATION

per UNIT!

NO	SKETCHES OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
		M ² -3	EXCAVATION (COMMON) :		
			$1 \times (0.15 \times 3.00 \times 2 + (0.15 \times 2.00) \times 2.00 + 0.15 \times 1.00 \times 2.00) \times 2$	2.841	
			$2 \times (1.00 \times 3.00 \times 2 + (1.00 \times 2.00) \times 2.00 + 1.00 \times 1.00 \times 2.00) \times 2$	17.626	
			$2 \times (1.00 \times 3.00 \times 2 + (1.00 \times 2.00) \times 2.00 + 1.00 \times 1.00 \times 2.00) \times 2$	7.626	
			$4 \times (1.00 \times 3.00 \times 2 + (1.00 \times 2.00) \times 2.00 + 1.00 \times 1.00 \times 2.00) \times 2$	10.821	
			$2 \times (1.00 \times 3.00 \times 2 + (1.00 \times 2.00) \times 2.00 + 1.00 \times 1.00 \times 2.00) \times 2$	6.000	
			$2 \times (1.00 \times 3.00 \times 2 + (1.00 \times 2.00) \times 2.00 + 1.00 \times 1.00 \times 2.00) \times 2$	16.821	
			$2 \times (0.15 \times 3.00 \times 2)$	0.75	67.229
		M ² -6	CEILING AND ROOFING :		
			$(1.00 \times 3.00 + 1.00 \times 2.00 + 1.00 \times 1.00) \times 2 + (1.00 \times 3.00 + 1.00 \times 2.00 + 1.00 \times 1.00) \times 2$		
			$(1.00 \times 3.00 + 1.00 \times 2.00 + 1.00 \times 1.00) \times 2 + (1.00 \times 3.00 + 1.00 \times 2.00 + 1.00 \times 1.00) \times 2$		10.144
		M ³ -1	TOP CONCRETE BEAM (TYPE-C) :		
			$(0.15 \times 3.00 \times 2)$		0.75
		M ³ -2	FORM WORK TOP CONCRETE BEAM (TYPE-C) :		
			$(0.15 \times 3.00 \times 2) \times 2$		2.64
		M ³ -3	CONCRETE STEPS TYPE-D :		
			$(0.15 \times 3.00 \times 2) \times 2 + (0.15 \times 2.00 \times 2) \times 2 + (0.15 \times 1.00 \times 2) \times 2$		8.227
		M ³ -4	FORM WORK CONCRETE STEPS :		
			$(0.15 \times 3.00 \times 2) \times 2 + (0.15 \times 2.00 \times 2) \times 2 + (0.15 \times 1.00 \times 2) \times 2$		18.320
		M ³ -5	BASE CONCRETE TYPE-E :		
			$(0.15 \times 3.00 \times 2)$		0.75
		M ³ -6	FORM WORK BASE CONCRETE :		
			$(0.15 \times 3.00 \times 2) \times 2$		4.4
		Kg	REINFORCING STEEL BAR :		
			$\phi 12 = 6 \times 1/2 = 24m \times 100 =$	24.00	
			$\phi 13 = 1.5 \times 1/2 = 21m \times 67 =$	12.827	37.517
		M ³ -7	CONCRETE TYPE-E :		
			$(0.15 \times 3.00 \times 2) \times 2$		0.75

NAME OF STRUCTURE:	LOCATION :

3 - 7

PACKAGE : MFC-1 and 2
 WORK ITEM : APPROACH CONCRETE STEPS
 TYPE : Type-PB

N O	W O R K I T E M	Unit	SUB TOTAL (1)	SUB TOTAL (2)	SUB TOTAL (3)	SUB TOTAL (4)	MFC-I	MFC-II	TOTAL
1.	Excavation (common)	m ³	73.401	91.915	71.791	95.538	71.955	260.689	332.645
2.	Crusher Run Bedding	m ³	25.119	31.599	24.556	33.571	24.897	89.948	114.845
3.	Concrete, Type - D	m ³	27.522	34.268	26.543	36.618	27.34	97.612	124.952
4.	Formwork FW1 Type - D	m ²	107.988	138.428	110.623	143.573	108.59	392.021	500.611
5.	Concrete, Type - C1	m ³	4.256	4.256	4.256	4.256	3.192	13.832	17.024
6.	Formwork FW1 Type - C1	m ²	48.640	48.640	48.640	48.640	36.48	158.080	194.560

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PACKAGE : MFC-1 and 2
 WORK ITEM : APPROACH CONCRETE STEPS
 TYPE : TYPE-PB

N	O	W	R	K	I	T	E	M	L O C A T I O N										SUB	
									Unit	PE 124L + 87 m	PE 119L + 43 m	PE 109L + 52 m	PE 103L + 87 m	PE 94L + 90 m	PE 88L + 80 m	PE 84L + 60 m	PE 78L + 100 m	TOTAL (1)		
1.								Excavation (common)	m ³	7.766	8.169	8.974	7.364	6.559	12.596	10.584	11.389			73.401
2.								Crusher Run Bedding	m ³	2.647	2.788	3.069	2.506	2.224	4.337	3.633	3.915			25.119
3.								Concrete, Type - D	m ³	2.854	3.009	3.318	2.700	2.391	5.070	3.936	4.245			27.522
4.								Formwork FW1 Type - D	m ²	11.188	11.846	13.162	10.530	9.214	19.141	15.795	17.111			107.988
5.								Concrete, Type - C1	m ³	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532			4.256
6.								Formwork FW1 Type - C1	m ²	6.080	6.080	6.080	6.080	6.080	6.080	6.080	6.080			48.640

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PACKAGE : MFC-1 and 2
 WORK ITEM : APPROACH CONCRETE STEPS
 TYPE : TYPE-PB

N O	W O R K I T E M	Unit	L O C A T I O N								SUB TOTAL (2)
			PE 71L + 38 m	PE 63L + 50 m	PE 57L + 100 m	PE 53L + 85 m	PE 48L + 88 m	PE 44L + 38 m	PE 40L + 82 m	PE 35L + 45 m	
1.	Excavation (common)	m ³	11.389	11.389	11.389	8.974	10.584	15.011	10.584	12.596	91.915
2.	Crusher Run Bedding	m ³	3.915	3.915	3.915	3.069	3.633	5.183	3.633	4.337	31.599
3.	Concrete, Type - D	m ³	4.245	4.245	4.245	3.318	3.936	5.635	3.936	4.708	34.268
4.	Formwork FW1 Type - D	m ²	17.222	17.111	17.222	13.162	15.795	23.034	15.795	19.086	138.428
5.	Concrete, Type - C1	m ³	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	4.256
6.	Formwork FW1 Type - C1	m ²	6.080	6.080	6.080	6.080	6.080	6.080	6.080	6.080	48.640

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PACKAGE : MFC-1 and 2
 WORK ITEM : APPROACH CONCRETE STEPS
 TYPE : TYPE-PB

N O	W O R K I T E M	Unit	L O C A T I O N								SUB TOTAL (3)
			PE 127R + 63 m	PE 118R + 32 m	PE 112R + 7 m	PE 103R + 38 m	PE 96R + 51 m	PE 88R + 45 m	PE 81R + 70 m	PE 71R + 42 m	
1.	Excavation (common)	m ³	5.754	6.961	7.766	8.974	14.206	9.376	8.974	9.779	71.791
2.	Crusher Run Bedding	m ³	1.942	2.365	2.647	3.069	4.901	3.210	3.069	3.351	24.556
3.	Concrete, Type - D	m ³	2.082	2.545	2.854	3.318	5.326	3.472	3.318	3.627	26.543
4.	Formwork FW1 Type - D	m ²	7.897	9.872	11.488	13.162	21.718	19.402	13.162	13.921	110.623
5.	Concrete, Type - C1	m ³	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	4.256
6.	Formwork FW1 Type - C1	m ²	6.080	6.080	6.080	6.080	6.080	6.080	6.080	6.080	48.640

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PACKAGE : MFC-1 and 2
 WORK ITEM : APPROACH CONCRETE STEPS
 TYPE : TYPE-PB

N O	W O R K I T E M	Unit	L O C A T I O N									SUB TOTAL (4)
			PE 65R + 60 m	PE 60R + 60 m	PE 57R + 60 m	PE 54R +23 m	PE 49R + 5 m	PE 34R + 18 m	PE 25R + 17 m	PE 17R + 0 m		
1.	Excavation (common)	m ³	12.596	12.999	13.804	8.974	13.401	8.974	10.986	13.804	95.538	
2.	Crusher Run Bedding	m ³	4.337	4.478	4.760	3.633	4.619	3.069	3.915	4.760	33.571	
3.	Concrete, Type - D	m ³	4.708	4.863	5.652	3.318	5.017	3.318	4.090	5.652	36.618	
4.	Formwork FW1 Type - D	m ²	19.030	19.244	21.060	13.162	20.402	13.162	16.453	21.060	143.573	
5.	Concrete, Type - C1	m ³	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	4.256	
6.	Formwork FW1 Type - C1	m ²	6.080	6.080	6.080	6.080	6.080	6.080	6.080	6.080	48.640	

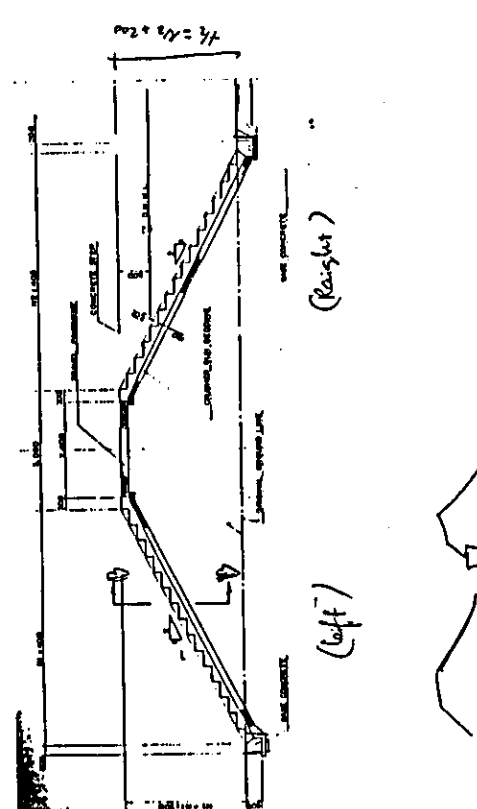
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LOCATION AND DIMENSION OF CONCRETE STEPS

LEFT BANK										RIGHT BANK				
NO.	LOCATION	DIMENSIONS				LOCATION	DIMENSIONS							
		H1 (m)	H2 (m)	N1 (m)	N2 (m)		H1 (m)	H2 (m)	N1 (m)	N2 (m)				
1.	PE 124 L + 87 m	1.80	1.60	9	8	PE 127 R + 63 m	1.60	0.80	8	4				
2.	PE 119 L + 43 m	2.00	1.60	10	8	PE 118 R + 32 m	1.60	1.40	8	7				
3.	PE 109 L + 52 m	2.40	1.60	12	8	PE 112 R + 7 m	1.60	1.80	8	9				
4.	PE 103 L + 87 m	1.60	1.60	8	8	PE 103 R + 38 m	2.80	2.00	14	10				
5.	PE 94 L + 90 m	1.80	1.00	9	5	PE 96 R + 51 m	3.20	3.40	16	17				
6.	PE 88 L + 80 m	2.60	3.20	13	16	PE 88 R + 45 m	2.20	2.00	11	10				
7.	PE 84 L + 60 m	2.20	2.60	11	13	PE 81 R + 70 m	2.00	2.00	10	10				
8.	PE 78 L + 100 m	3.40	1.80	17	9	PE 71 R + 42 m	2.00	2.40	10	12				
9.	PE 71 L + 38 m	2.60	2.60	13	13	PE 65 R + 60 m	2.40	3.40	12	17				
10.	PE 63 L + 50 m	3.00	2.20	15	11	PE 60 R + 60 m	2.60	3.40	13	17				
11.	PE 57 L + 100 m	2.60	2.60	13	13	PE 57 R + 60 m	3.20	3.20	16	16				
12.	PE 53 L + 85 m	2.40	2.00	12	10	PE 54 R + 23 m	2.00	2.80	10	14				
13.	PE 48 L + 88 m	2.40	2.40	12	12	PE 49 R + 5 m	2.60	3.60	13	18				
14.	PE 44 L + 38 m	4.00	3.00	20	15	PE 34 R + 18 m	2.00	2.00	10	10				
15.	PE 40 L + 82 m	2.60	2.20	13	11	PE 25 R + 17 m	2.40	2.60	12	13				
16.	PE 35 L + 45 m	3.00	2.80	15	14	PE 17 R + 0 m	3.20	3.20	16	16				

BILL OF QUANTITY

NAME OF STRUCTURE: ROW of Approach Steps on River Dike.
 LOCATION : FLOOD WAY.

NO	SKETCHES OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
		M ³	EXCAVATION (Diamond) $(0.2 \times 0.2 \times 1.2) \times 2 + (0.4 \times 0.4 \times 2.0) \times 2 + \sqrt{(0.6 \times 0.6 \times 4.0)^2 + (0.8 \times 0.8 \times 1.2)^2} \times 2$ $\sqrt{(0.6 \times 0.6)^2 + (0.8 \times 0.8)^2} \times 2 \times 2.1$ $\approx 0.904 + (\sqrt{(0.6 \times 0.6)^2 + (0.8 \times 0.8)^2}) \times 0.9 + (\sqrt{(0.6 \times 0.6)^2 + (0.8 \times 0.8)^2}) \times 0.9$		
		M ³	CONCRETE TYPE-D1 $(0.2 \times 0.4) \times 1.50 = 0.06 M_2$ $(0.2 \times 0.4) \times 1.50 = 0.06 M_2$ $Right = \sqrt{(0.6 \times 0.6)^2 + (0.8 \times 0.8)^2} \times 1.50 \times 1.50 \times (0.06 M_2) \times 2$ $(0.2 \times 0.2) \times \sqrt{(0.6 \times 0.6)^2 + (0.8 \times 0.8)^2} \times 2 + (0.2 \times 0.2 \times 1.2) \times 2$ $Left = \sqrt{(0.6 \times 0.6)^2 + (0.8 \times 0.8)^2} \times 1.50 \times 1.50 \times (0.06 M_2) \times 2$ $\sqrt{(0.2 \times 0.2)^2 + (0.6 \times 0.6)^2} \times \sqrt{(0.6 \times 0.6)^2 + (0.8 \times 0.8)^2} \times 2 + (0.2 \times 0.2 \times 1.2) \times 2$		Right + Left = Volume
		M ³	CRUMBER RUN BEDDING $(0.15 \times 2.1) \times (\sqrt{(0.6 \times 0.6)^2 + (0.8 \times 0.8)^2}) \times 2 + (\sqrt{(0.6 \times 0.6)^2 + (0.8 \times 0.8)^2}) \times 2$ $(0.6 \times 2.1 \times 2) \times 2 =$		
		M ³	CONCRETE TYPE-C1 $(0.2 \times 0.4) \times (0.2 \times 0.2 \times 2) \times 1.5 \times 2.1$		0.074
		M ³	FORM WORK CONCRETE TYPE-C1 $(0.2 \times 0.2 \times 1.5) \times (0.6 \times 1.5) \times 2$		0.084
		M ³	FORM WORK CONCRETE TYPE-D1 $(0.302 \times \sqrt{(0.6 \times 0.6)^2 + (0.8 \times 0.8)^2}) \times 1.5 \times (0.2 \times 0.2) \times 1.5 \rightarrow Left Side$ $(0.202 \times \sqrt{(0.6 \times 0.6)^2 + (0.8 \times 0.8)^2}) \times 1.5 \times (0.2 \times 0.2) \times 1.5 \rightarrow Right Side$		Left + Right = Volume

PACKAGE : MFC-1

WORK ITEM : CONCRETE STEPS ON PARAPET WALL DIKE

TYPE : TYPE-PC

LOCATION	
NO.	LEFT BANK
1	PE 29 L + 63 m
2	PE 25 L + 52 m
3	PE 21 L + 20 m
4	PE 16 L + 52 m
n = 4	

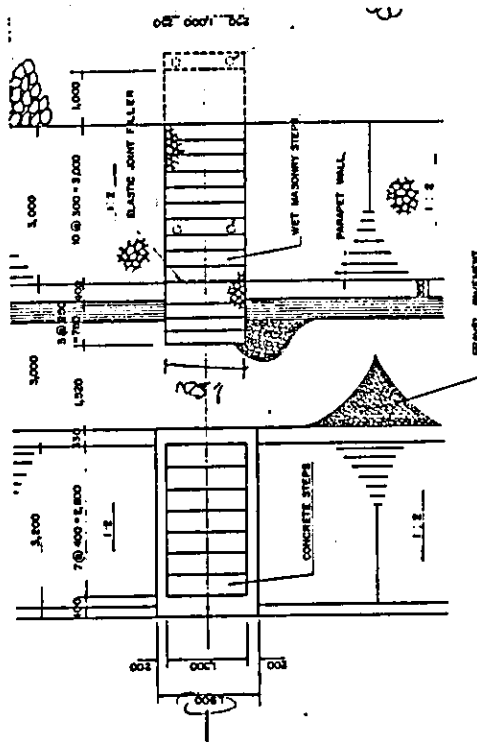
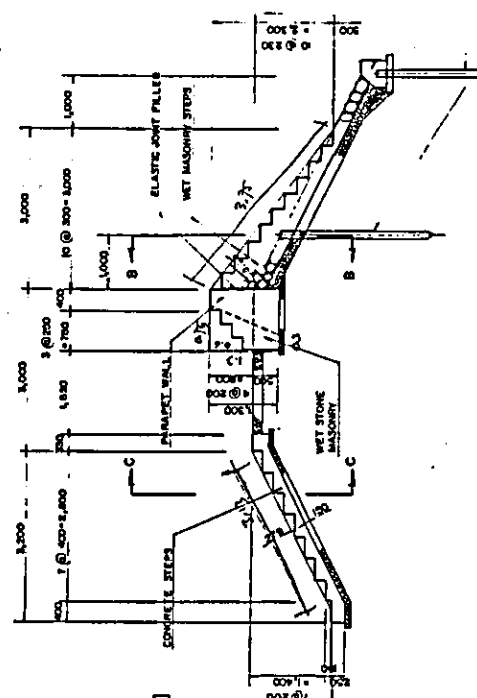
NO.	WORK ITEM	Unit	QUANTITY PER ONE PLACE	NO. OF STEP	TOTAL QUANTITY
1.	Excavation (common)	m ³	3.580	4	14.320
2.	Crusher Run Bedding	m ³	1.280	4	5.120
3.	Concrete Steps, Type - D	m ³	2.052	4	8.208
4.	Formwork FW1	m ²	13.620	4	54.480
5.	Wet Stone Masonry Steps (1:3)	m ³	3.945	4	15.780
6.	Formwork Wet Stone Masonry Steps	m ²	7.700	4	30.800
7.	Elastic Joint Filler	m ²	0.975	4	3.900
8.	Log Pile Dia 150, L = 3000	nos	2.000	4	8.000

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BILL OF QUANTITY

NAME OF STRUCTURE: Steps on Parapet Wall Dike
LOCATION : Pericut River

per Unit:

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
M1	 PLAN OF APPROACH STEPS ON PARAPET WALL DIKE SCALE 1:40	M2	EXCAVATION (Common) $(1.03 \times 2.12) + (0.11 \times 0.15) + (0.33 \times 0.30) \times 0.11 = (0.55 \times 2.12) / 0.5 \times 1.5$	3.78	
M3		M3	CEMENT RUS $(0.1 \times 3.12 \times 0.42) \times 0.15 \times 2.12$	1.28	
M4		M3	CONCRETE TYPE - D $(2.12 \times 0.37) + (0.33 \times 0.11) + (0.33 \times 0.33) \times 1.5 - (0.22 \times 0.11) \times 1.5 \times 2$	2.072	
M5		M2	FORM WORK (CONCRETE TYPE - D) $(0.1 \times 3.12 \times 0.33 \times 1.5) \times 2 + (0.2 \times 1.5) \times 2$	13.62	
M6		M3	WET MASONRY STEPS $(\frac{0.55 \times 0.33}{2}) \times 1.3 + (\frac{1.1 \times 0.6 \times 0.42}{2}) \times 1.5 + (\frac{0.37 \times 0.33 \times 0.33}{2}) \times 1.5$	3.075	
M7		M4	FORM WORK WET MASONRY STEPS $(\frac{0.55 \times 0.6 \times 1.05}{2} \times (0.2 \times 1.5) \times 2) + (\frac{0.37 \times 0.33 \times 1.3}{2} \times (0.2 \times 1.5) \times 2)$	7.72	
M8		M2	ELASTIC JOINT FILLER (0.6×1.5)	0.975	
M9		M2	LOC DILE FLOW L: 3000	2	
					

PACKAGE : MFC-3/4

WORK ITEM : CONCRETE STEPS

TYPE : PD (UPPER PERCUT)

LOCATION		
NO.	LEFT BANK	RIGHT BANK
1	PE 134 L + 65 m	PE 136 R + 65 m
2	PE 137 L + 70 m	PE 142 R + 30 m
3	PE 146 L + 60 m	PE 150 R + 75 m
4	PE 155 L + 25 m	PE 157 R + 70 m
5	PE 164 L + 75 m	PE 163 R + 73 m
6	PE 170 L + 70 m	PE 167 R + 80 m
7	PE 177 L + 50 m	PE 169 R + 130 m
8	PE 183 L + 35 m	PE 177 R + 50 m
9	PE 187 L + 67 m	PE 181 R + 71 m
10	PE 191 L + 50 m	PE 186 R + 90 m
11	PE 196 L + 62 m	PE 191 R + 50 m
12	PE 199 L + 33 m	PE 197 R + 65 m
13	PE 202 L + 13 m	PE 204 R + 85 m
14	PE 207 L + 65 m	PE 208 R + 35 m
15	PE 213 L + 45 m	PE 213 R + 45 m
16	PE 218 L + 40 m	PE 219 R + 45 m
17	PE 224 L + 30 m	PE 226 R + 43 m
18	PE 231 L + 22 m	PE 224 R + 40 m
19	PE 236 L + 50 m	PE 232 R + 58 m
20	PE 240 L + 35 m	PE 237 R + 87 m
21	PE 245 L + 80 m	PE 241 R + 70 m
22	PE 249 L + 30 m	PE 247 R + 12 m
23	PE 252 L + 70 m	PE 250 R + 50 m
24	PE 257 L + 70 m	PE 255 R + 85 m
25	PE 261 L + 50 m	PE 260 R + 55 m
26	PE 264 L + 22 m	PE 266 R + 88 m
27	PE 270 L + 30 m	PE 270 R + 95 m
n = 27		n = 27

NO.	WORK ITEM	Unit	QUANTITY PER ONE PLACE	NO. OF STEP	TOTAL QUANTITY
1.	Excavation (common)	m ³	71.032	54	3,835.728
2.	Crusher Run Bedding	m ³	8.949	54	483.246
3.	Concrete, Type - D	m ³	12.848	54	693.792
4.	Concrete, Type - C1	m ³	3.518	54	189.972
5.	Formwork FW1	m ²	51.281	54	2,769.174
6.	Reinforcing, Steel Bar	Kg	122.736	54	6,627.744
7.	Elastic Joint Filler, 10 mm thick	m ²	3.212	54	173.448
8.	Log Pile, Dia. 150 mm, L = 2.0 m	nos	22.000	54	1,188.000
9.	Gabion Mattress	m ³	6.750	54	364.500
10.	Gabion Cylinder Filing	m ³	26.399	54	1,425.546

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1 place

1 place

LOCATION[illegible]

NAME OF STRUCTURE: MAINTENANCE STEPS (CONCRETE)
LOCATION :

3 - 20

PACKAGE : MFC-7
 WORK ITEM : CONCRETE STEPS
 TYPE : A (DELI RIVER)

(3) Deli River Retarding Channel

N O.	LOCATION	
	LEFT BANK	RIGHT BANK
1	DU 13 L + 90 m	DU 13 R + 70 m
2	DU 15 L + 24 m	DU 14 R + 18 m
3	DU 19 L + 24 m	DU 19 R + 10 m
n = 3		n = 3

N O.	W O R K I T E M	Unit	QUANTITY PER ONE PLACE	N O. OF STEP	TOTAL QUANTITY
1.	Excavation (common)	m ³	39.46	6	236.77
2.	Crusher Run Bedding	m ³	7.91	6	47.48
3.	Concrete Steps, Type - D	m ³	9.41	6	56.44
4.	Formwork Concrete Steps, Type D	m ²	12.80	6	76.80
5.	Concrete Steps Type - C1	m ³	7.21	6	43.27
6.	Formwork Concrete Steps, Type - C1	m ²	37.49	6	224.94
7.	Reinforcing, Steel Bar	Kg	338.33	6	2,030.00
8.	Log Pile Dia. 150, L = 2,000	nos	3.00	6	18.00
9.	Elastic Joint Filler, t = 10 mm	m ²	4.35	6	26.10

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BILL OF QUANTITY

NAME OF STRUCTURE: PLAN OF APPROACH STEP FOR LOW WATER CHANNEL
 LOCATION : PARROT RIVER DEL FIVER

per UNIT

NO	SKETS OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
		sqm	EXCAVATION (CONCRETE)		
			$-(1 \times 1.915) \times \frac{1}{2} \times (10.53) \times \frac{1}{2} \times (\frac{1.915}{2}) \times 4.6 +$ $(0.5 \times 3.4) \times 5$	31.65	
			$-(0.5 \times 0.4) \times (0.2 \times 10) \times 68 \times 2$	7.06	
			$-(0.5 \times 0.1) \times (0.1 \times 0.5) \times 34 \times 2$	0.68	(39.461)
		sqm	CRUTHER RUN BEDDING:		
			$(4 \times 10.2 \times 0.15) + (0.5 \times 0.1 \times 4.6) \times (0.7 \times 0.1 \times 68) \times 2 +$ $+ (0.5 \times 0.1 \times 34) \times 2$		(7.314)
		sqm	CONCRETE STEP (TYPE-D)		
			$(34 \times 0.27) \times 4 + (16 \times 0.3) \times 4 + (9.05 \times 0.27) \times 4 + (0.2 \times 0.2) \times 4 -$ $-(0.2 \times 0.4 \times \frac{1}{2}) \times 4$		(9.406)
		sqm	FULL WORK CONCRETE STEP		
			$(0.2 \times 4) \times 15 + (0.2 \times 4)$		(12.20)
		sqm	IRC CONCRETE TYPE-C:		
			$[(0.5 \times 0.5) - (0.2 \times 0.3 \times \frac{1}{2})] \times 46$		(1.002)
		sqm	FULL WORK IRON CONCRETE		
			$(2.2 \times 0.3 \times 0.5) \times 4.6 + [(0.5 \times 0.5) - (0.2 \times 0.3 \times \frac{1}{2})] \times 2$		(4.14)
		sqm	LOS PILES 150 x 150 x 2000		
					(3)
		sqm	SECTION MATHEMATICS:		
			CONCRETE-SIDE WALL-TYPE-C:-		
			$[(\frac{1.0 \times 0.2}{2}) \times 0.6 + (\frac{0.6 \times 1.0}{2}) \times 0.1 + (1.3 \times 0.1 \times 0.3) + (\frac{1.0 \times 0.5}{2}) \times 0.77 + (0.5 \times 0.5) \times 0.37 +$ $+ (0.3 \times 0.2) \times \frac{1}{2}] \times 2$		(6.3)
		sqm	FULL WORK SIDE WALL		
			$[(\frac{1.0 \times 0.2}{2}) \times 0.6 + (\frac{0.6 \times 1.0}{2}) \times 0.1 + (1.3 \times 0.1 \times 0.3) + (\frac{1.0 \times 0.5}{2}) \times 0.77 + (0.5 \times 0.5) \times 0.37 +$ $+ (0.3 \times 0.2) \times \frac{1}{2}] \times 2$		(32.33)
		sqm	SECTION MATHEMATICS:		

NAME OF SIGNATURE :
LOCATION :

[illegible]

JETTY - LANDING STAGE AND MOORING FACILITIES(PE14+57m)		G-Wall	Step-A	Step-B	Step-C	Step-D	Deck	Endwall	Mooring Post
Excavation (Common)	m ³	240.0							240.0
Backfill with Selected Soil	m ³	170.0							170.0
Supply and Driving of PC Sheet Piles L=4.0 m and 4.75 m	m	288.0							
Log Piles Dia. 150mm, L=4.0m	m	369.0							
Concrete, Type C1 for Base Concrete and Top Concrete	m ³	50.0	4.7	5.0				8.8	
Concrete, Type C2 for Steps	m ³	23.0	13.1	8.5	1.4				
Concrete, Type E	m ³	7.0	7.0						
Wet Stone Masonry (1:3) for Gravity Type Wall	m ³	87.5	72.0			11.3			
Wet Stone Masonry (1:4) for Revetment	m ³	0.0							
Crusher Run Bedding	m ³	24.5		9.0		1.5			
Reinforcing Steel Bars	kg	1,732.4	322.3	477.5				546.0	
Formwork FW1, less than 2.5m high	m ²	202.6		65.9				62.0	
Elastic Joint Filler, 10 mm thick	m ²	0.0		0.0					
Concrete Block Pavement for Landing Stage	m ³	255.0					255.0		
Gabion Mattress	m ³	22.5						22.5	
Gabion Cylinder	m ³	14.1						14.1	
Mooring Post for Jetty	nos	16.0							
R.C. Piles 200mm x 200mm including Driving for Mooring P	m	0.0							

JETTY.

WET MASONRY TYPE GRAVITY WALL $H=1250$ $L = 15.375m$

$H=2,000$ $L = 30.75m$

CONC. SHET PILE $L = 4.000$ $L = 16.50m$

$L = 4.750$

$L = 15.00m$

$$L = (4 \times 16.5 + 4.75 \times 15) / 0.5 =$$

WET MASONRY TYPE REVETMENT
END WALL.

$H=1.2m$

$L = 26.00m$

STEPS

TYPE A

$B = 2m$ $H=1.2$

1

$B = 1m$ $H=1.2$

2

TYPE B

$B = \frac{2.0}{1.0}$ $H = \frac{1.2}{0.75}$

1

$B = 1.0$ $H=1.2$

2

TYPE C

$B = 1.1$ $H=0.75$

3

TYPE D

$B = 1.0$ $H=0.75$

1

$B = 1.1$ $H=1.5$

2

1

Quantities.

Wet Masonry for Gravity Wall.

$$H = \frac{1250}{1000} 1250 \quad A = (0.891 m^2)$$

$$H = \frac{1250}{1000} 2000 \quad A = 1.8 m^2$$

1. Gravity Wall (Wet masonry)

$$H = 1.250 \text{ m} \quad A \quad (\text{m}^2)$$

$$L = 15.375 \text{ m}$$

$$\text{Wet masonry} \quad 0.891 \text{ m}^3/\text{m} \quad (14.5)$$

$$\text{Leveling conc.} \quad 0.123 \text{ m}^3/\text{m} \quad (2.0)$$

$$\text{Wood Pile} \quad 8 \text{ m/m} \quad (123.0)$$

$$H = 2.500 \text{ m}$$

$$L = 30.75 \text{ m}$$

$$\text{Wet masonry} \quad 1.800 \text{ m}^3/\text{m} \quad (58.0)$$

$$\text{Leveling conc.} \quad 0.160 \text{ m}^3/\text{m} \quad (5.0)$$

$$\text{Wood Pile} \quad 8 \text{ m/m} \quad (246.0)$$

2. Conc. Sheet Pile

$$\text{Total } LA = (4 \times 16.5'' + 4.75 \times 15) / 0.5 = 274.5 \times 1.05 = \underline{\underline{288 \text{ m}}}$$

3. Retention

$$H = 1.2 \text{ m}$$

$$\text{Length } L = 2.665 \text{ m}$$

$$\text{Wet masonry} \quad 0.25 \times 2.665 = 0.666 \text{ m}^3/\text{m} \quad \left. \begin{array}{l} \\ \end{array} \right\} \text{River}$$

$$\text{Crusher Run Bedding} \quad 0.789 \text{ m}^3/\text{m}$$

$$\text{Sheet pile Head Conc. (C)} \quad 0.148 \times 31.5'' = 4.662 \text{ m}^3$$

$$\text{Rebars} \quad \square \quad 1.08 \text{ m} \times 31.5 / 0.3 \times 0.995 = 113 \text{ kg}$$

$$\text{—} \quad 31.3 \times 5 \times 0.995 = 157 \text{ kg}$$

4 STEPS

Type A	Conc. for Step	(C2)	$1.458 \text{ m}^2 \times 3.0 \text{ m} \times 3$	$= 13.11$
(34ft)	Base	(C1)	$0.22 \text{ m}^2 \times 3.0 \text{ m} \times 3$	$= 1.98$
	Side Wall	(C1)	$3.250 \text{ m}^2 \times 3.0 \text{ m} \times 3$	$= 29.25$
	Re-Bars SideWall	$\square$	$1.549 \text{ m} \times \frac{3.8}{100} \times 0.995 \text{ kg/m} = 19.5$	
	(D13)	—	$4.60 \text{ m} \times 6 \text{ nos} \times 0.995 \text{ kg/m} = 27.5$	
	Base	$\square$	$1.977 \text{ m} \times \frac{3.0}{100} \times 0.995 \text{ kg/m} = 14.7$	
		—	$2.90 \times 7 \text{ nos} \times 0.995 = 20.2$	

FORM WORK, Fw1.

Base	$(0.5 + 0.2 + 0.361) \times 3 \text{ m} = 3.183$	$81.9 \times 1.26 \times 2 \times 3 \times 1.1 = 295 \text{ ft}$
SideWall	$3.25 \text{ m}^2 \times 2 \times 2 = 13.000$	
Step	$0.25 \times 3.0 \text{ m} \times 8 \text{ nos} + 0.5 \times 3.0 = 7.5$	
Crusher run Bedding	$1.077 \text{ m}^2 \times 3.60 \text{ m} + 23.7$	$\times 3 \times 1.05 = 79.7$
	$= 3.877 \text{ m}^3 \times 3$	
	<u>12.8 m^3</u>	

Type B	Conc. for Step	(C2)	$0.946 \times 3.0 \text{ m} \times 3$	$= 8.514$
(3 Locations)	Base	(C1)	$0.22 \times 3.0 \text{ m} \times 3$	$= 1.980$
	SideWall	(C1)	$3.382 \times 0.3 \times 2 \times 3$	$= 3.044$
			13.538×1.05	14.2
	Re-Bars Base	$\square$	$1.477 \times \frac{3.0}{100} \times 0.995 \times 3 = 14.2$	14.2
		—	$2.90 \times 7 \text{ nos} \times 0.995 \times 3 = 60.6$	60.6
	SideWall	$\square$	$(2.934 + 1.70) / 2 \times 2.925 / 100 \times 0.995 \times 2 \times 3 = 158.8$	158.8
		—	$3.315 \times (10 + 6) / 2 \times 0.995 \times 2 \times 3 = 52.6$	52.6

FORM WORK, BASE $(0.5 + 0.2 + 0.361) \times 3 \text{ m}$ SideWall $3.382 \times 2 \times 2$ Steps $0.25 \times 3 \times 7 \text{ nos}$ Crusher run Bedding $0.816 \times 3.6 \text{ m} = 3.0$

STEPS TYPE C: (3 locations)

Concrete for Steps $0.41 \times 1.1 \text{ m} \times 3 \times 1.05 = 1.42 = 2$

STEPS TYPE D

D₁ Wet masonry Type (1:2) $1.685 \text{ m}^2 \times 3 \text{ m} \times 2 = 10.11$

Crusher Run Bedding $0.198 \text{ m}^2 \times 3.2 \text{ m} \times 2 = 1.267$

D₂ Wet masonry $(0.28 + 0.75 \times 0.15) \times 3 \text{ m} \times 1 = 1.18 \text{ m}^3$

$0.25 \times 0.1 \times 3.2 = 0.24$

Conc. Block EL 1.431 14.9 m^2

EL 0.631 36 m^2

EL -0.069 35 m^2

EL -0.819 35 m^2 Total 255 m^2

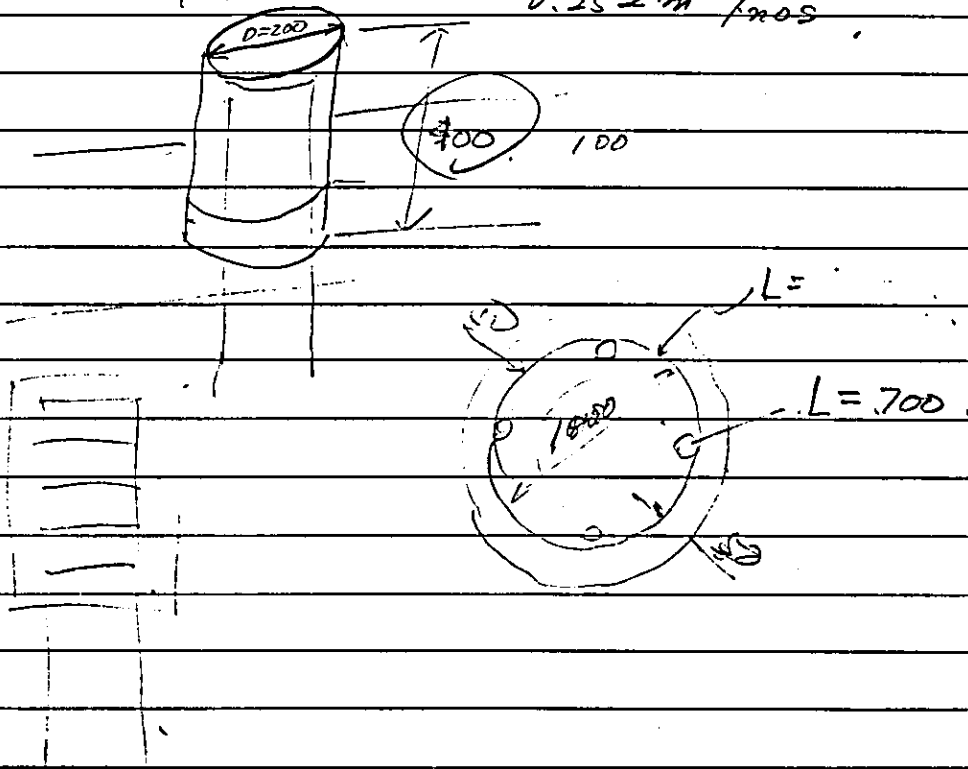
Crusher Run Bedding $255 \times 0.1 = 26 \text{ m}^3$

Mooring Post Block Type = 15 nos.

Unit Conc. Type C₂ $0.0126 \text{ m}^3/\text{nos.}$

Re-Bars $(0.65 \times 4 + 0.314 \times 3) \times 0.921 = 3.52 \text{ kg}$

Form $0.252 \text{ m}^2/\text{nos.}$



END WALL

conc. Type C1 DP $15.38 \text{ m}^2 \times 0.3$
down $14.006 \text{ m}^2 \times 0.3$

Re Bars
2x $\left(\begin{array}{l} 2.596 + 3.259 + 3.109 + 7.803 + 7.203 + 6.603 \\ 6.600 + 1.674 + 4.174 + 3.474 + 2.974 + 2.274 \\ 1.674 + 1.074 + 0.874 + 5.785 \end{array} \right)$
Down
 $= 112.574 \text{ m}$

$\left\{ \begin{array}{l} 0.671 \times 8 + 0.802 + 0.71 + 0.9 \times 13 \\ + (0.687 + 2.037) / 2 \times 10 \end{array} \right\} \times 2$
 $+ 0.2 \times 2 \times 41 = 105.00 \text{ m}$

$W = \{112.574 + 105.000\} \times 0.995 \times 1.2 = \underline{\underline{260 \text{ kg}}}$

UP $18.563 \text{ kg/m}^3 \times 15.38 = \underline{\underline{286 \text{ kg}}}$

Form $15.38 \times 2 + 14.006 \times 2 = \underline{\underline{62 \text{ m}^2}}$

Ex $\left\{ \begin{array}{l} 7.8 \text{ m}^2 \times 15 \text{ m} + 5.5 \times 15 \end{array} \right\} \times 1.2 = \underline{\underline{240 \text{ m}^3}}$

Back Fill $(3.7 + 0.6) \times 15 + (3.2 + 2) \times 15 = 170 \text{ m}^3$

Gabion Cylinder $9 \text{ m} \times \frac{0.5^2}{4} \pi \times 8 = 14.13 \text{ m}^3$

Gabion Mattress $3 \text{ m} \times 15 \times 0.5 = 22.5$

4 DRAINAGE OUTLETS

4.1 Pipe Culvert and Open Ditch Type Outlets

4.1.1 SL 1

SL. 1.

1. Clearing & Grubbing.

$$10m \times 5 = 50m^2.$$

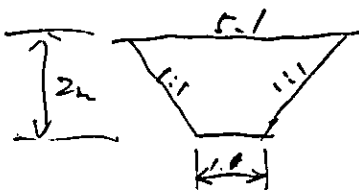
2. Excavation

① Channel to River $A = 37m^2$
 $L = 30m$

$$V = 37 \times 30 = 1110m^3$$

② Pipe Culvert. $A = 6.2m^2$
 $L = 21.4m$

$$V = 6.2 \times 21.4 = 133m^3$$



$$\begin{array}{r} 1110 \\ 133 \\ \hline 1243 \\ \approx 1300m^3 \end{array}$$

③ 3. Back Fill .by Selected Material.

$$79.34m^3 \text{ (Embankment)}$$

4. Back Fill Common

$$133.84m^3 \text{ (High Water Channel).}$$

5. Wet Stone Masonry (1:4).

① Channel to River

$$1.0m^2 + 2.9m^2 = 3.9m^2$$

$$V = 3.9 \times 31m = 121m^3.$$

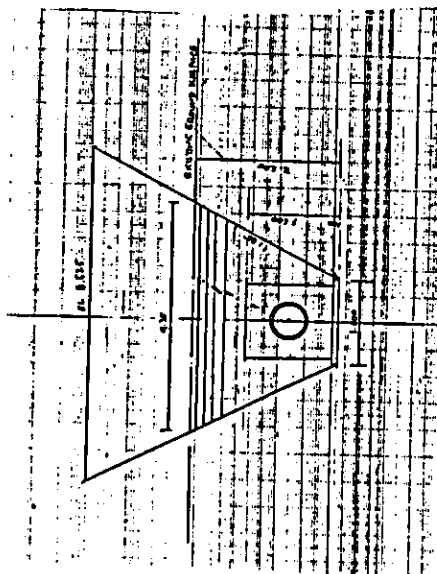
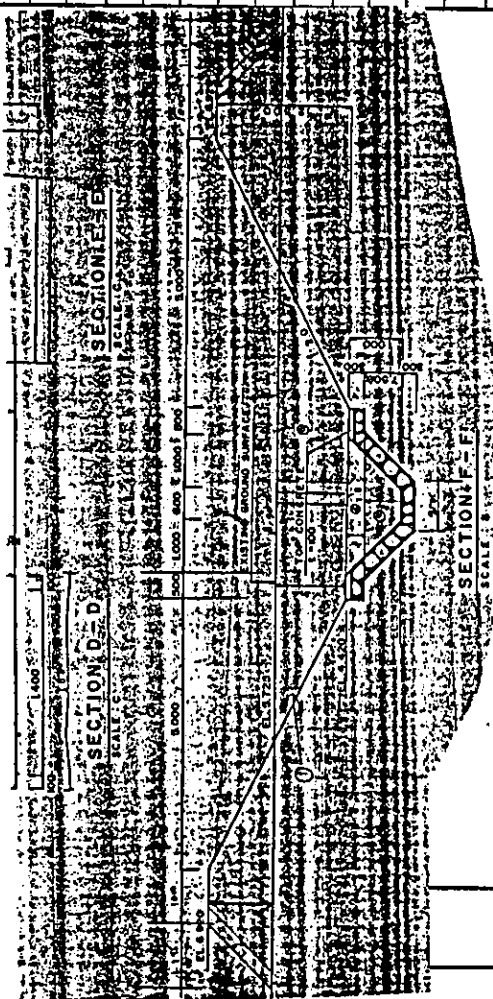
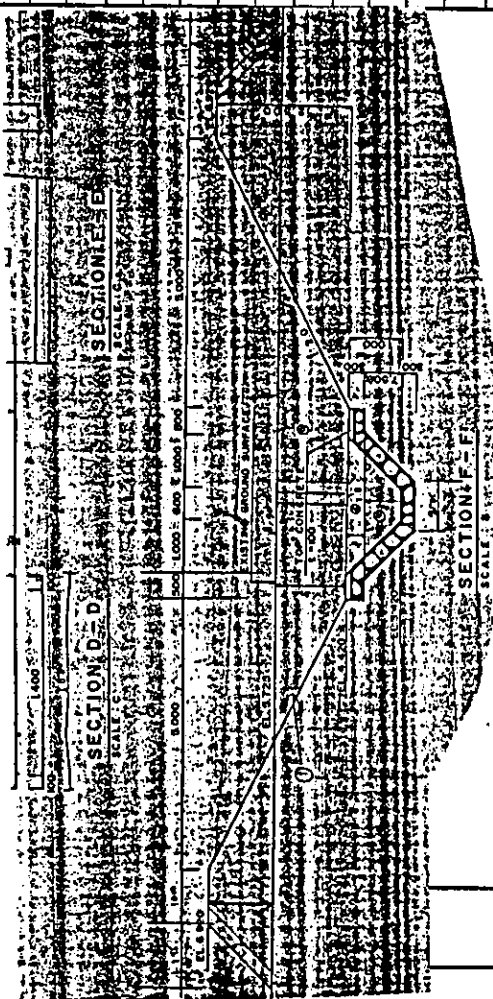
② Connecting Channel.

$$1.6m^2 \times 6m = 9.6 \approx 10m^2$$

$$\begin{array}{r} 121 \\ 10 \\ \hline 131m^3. \end{array}$$

BILL OF QUANTITY

NAME OF STRUCTURE: SL 1
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			BACKFILL BY SELECTED MATERIAL		
		m ³	$\left[\frac{(1.60 + 4.35)}{2} \times 2.2 \right] - \left[\frac{(1.70 + 1.40)}{2} \right] \times 19.05$	79.34	79.34
			FILLING COMMON		
			$\left[\frac{(1.00 + 4.6)}{2} \times 1.195 \right] \times 2.0 \times 2$	133.84	
		UNIT	FLARE 6776	1	

6. Crusher Run Bedding.

$$0.6942 \times 6 \text{ m}$$

$$= 4.2 \text{ m}^3$$

$$4.464 \times 31 \text{ m}$$

$$= 138.3 \text{ m}^3$$

Partition Wall 6.9

$$\frac{138.3}{138.3} = 150 \text{ m}^3$$

7. Cement Mortar Plastering.

$$12 \text{ m}^2 / 0.25 = 484 \text{ m}^2$$

$$10 \text{ m}^2 / 0.35 = 29 \text{ m}^2$$

$$\text{Total } 513 \text{ m}^2$$

8. Log Pile ($\phi 150$ $L=3000$)

$$36 \text{ nos} \times 2 \text{ line} \times 3.0 \text{ m} =$$

$$216 \text{ m}$$

9. Conc. Type C2.

① Connecting Channel. $0.4 \text{ m}^2 \times 6 \text{ m}$

$$2.5 \text{ m}^3$$

② Inlet Wing.

$$7.37 \text{ m}^2 \times 0.4 + 1.042 \times 3.000 \text{ m}$$

$$6.1 \text{ m}^3$$

③ Pipe Base.

$$0.35 \text{ m}^2 \times (21.4 \text{ m}^{18.2} - 2.2 \text{ m} - 1.0) = 6.4 \text{ m}^3$$

④ Joint (Upper Portion).

$$0.252 \text{ m}^2 \times 0.3 \text{ m} \times 8 \text{ nos} = 0.6 \text{ m}^3$$

⑤ Out let.

$$7.744 \text{ m}^2 \times 0.4 + 1.756 \times 1.0 / 2 + 0.6 \times 0.5 \times 3.0$$

$$= 4.9 \text{ m}^3$$

⑥ Top Conc.

$$0.7 \times 0.3 \times 82 \text{ m}$$

$$= 17.2 \text{ m}^3$$

⑦ Base Concrete Type B

$$0.17 \text{ m}^2 \times 31.7 \text{ m} \times 2$$

$$= 10.8 \text{ m}^3$$

⑧ Partition Wall
44 m³

$$\text{Total } 92.5 \text{ m}^3 = 93 \text{ m}^3$$

10. Concrete Type E.

$$\begin{array}{c} L \\ 30.7m \end{array} \times \begin{array}{c} t \\ 0.1 \end{array} \times \begin{array}{c} B \\ 1.2 \end{array} = \underline{3.7m^3}$$

11. Re Bars.

① Connecting Channel.

$$\begin{array}{c} \text{D13} \\ \text{3m} \end{array} \times \begin{array}{c} 6 \text{ nos} \\ 0.3 \end{array} \times 0.995 \text{ kg} = 59.7 \text{ kg}.$$

$$\text{D13 } 5.8m \times 12 \text{ nos} \times 0.995 \text{ kg/m} = 69.3 \text{ kg}.$$

② Top Conc.

$$\begin{array}{c} \text{D13} \\ 1.6m \times 3.3 \text{ nos} \times 0.995 \end{array} \left. \begin{array}{c} 11.2 \text{ kg/m} \\ 1m \times 6 \text{ nos} \times 0.995 \end{array} \right\} \times l = 82m = 920.3 \text{ kg}.$$

③ Base Conc. Type B.

$$\begin{array}{c} \text{D13} \\ 1.5m \times 3.3 \text{ nos} \times 0.995 \end{array} \left. \begin{array}{c} 10.9 \text{ kg/m} \\ 1m \times 6.4 \text{ nos} \times 0.995 \end{array} \right\} \times 31.7 \times 2 = 690.8 \text{ kg}.$$

④ Inlet Structure.

$$\begin{array}{c} \text{D16} \\ (4.26m + 4.33) \times 13 \times 1.56 \end{array} \left. \begin{array}{c} 174.2 \\ \text{D13 } 2.8 \times 32 \times 0.995 \end{array} \right\} 89.1 \\ 0.8m \times 4 \times 0.995 \times 1.2 \end{array} = 266.5 \text{ kg}.$$

⑤ Joint.

$$\begin{array}{c} \text{D13} \\ 3.1m \times 2 \times 0.995 \end{array} \left. \begin{array}{c} 3.42 \times 8 \text{ nos} \\ \text{D13 } 0.2 \times 14 \times 0.995 \end{array} \right\} = 27.4 \text{ kg}.$$

⑥ Outlet Structure.

$$\begin{array}{c} \text{D13} \\ 3.55m \times 25 \times 0.995 \end{array} \left. \begin{array}{c} 160 \text{ kg} \\ \text{D13 } 5.8m \times 12 \times 0.995 \end{array} \right\} 160.0 \text{ kg}.$$

⑦ Outlet Channel.

$$\begin{array}{c} \text{D13} \\ 2.0m \times 9 \text{ nos} \times 0.995 \end{array} \left. \begin{array}{c} 1.791 \\ \text{D13 } 2.3m \times 8 \text{ nos} \times 0.995 \end{array} \right\} = 20.1 \text{ kg}.$$

$$\text{Total } 2214.1 \text{ kg}.$$

⑧ Partition Wall

$$\begin{array}{r} \times 1.2 \\ (904) \\ 2657 \text{ kg} + 904 \\ \hline \hline = 3561 \text{ kg} \end{array}$$

12. Form Work FW1

① Connecting Channel.

$$0.68^m \times 6m \times 2 + 0.41^m \times 2 = 9.0 m^2$$

② Inlet Structure

$$(7.37 m^2 - 0.15 \times 3) + 6.69 + 1.9 \times 2 = 17.4 m^2$$

③ Pipe Base.

$$0.98 \times 2 \times 18.2 m = 35.7 m^2$$

④ Joint

$$(0.47 \times 0.3 \times 2 + 0.47 \times 0.94 \times 2) \times 8 = 9.3 m^2$$

⑤ Outlet Structure.

$$7.75 m^2 + 6 m^2 + 0.61 \times 2 = 15.0 m^2$$

⑥ Outlet Channel

$$0.362 \times 2 \times 2.5 + 0.26 = 2.1 m^2$$

⑦ Top Conc.

$$0.7 \times 2 \times 8.2 m = 114.8 m^2$$

⑧ Base Conc. Type B.

$$(0.5^m + 0.61^m) \times 31.7 \times 2 = 70.4 m^2$$

⑨ Partition Wall

$$\begin{array}{r} 146.0 m^2 \\ 419.2 \\ \hline \text{Total } 273.7 m^2 \\ = 274 m^2 \\ \hline 420 m^2 \quad 0.21 \end{array}$$

13. Form Work FW2.

① Inlet Structure.

$$0.15 \times 3 = 0.45$$

$$\begin{array}{r} 0.5 m^2 \\ 11. \\ \hline 1 m^2 \end{array}$$

14. Elastic Joint Filler.

$$0.31m^2 + 0.26m^2 = 0.57m^2$$

Partition Wall

$$28.5m^2$$

$$\frac{0.6m^2}{Total \quad 29.1m^2 = 30m^2}$$

15. Water Stop.

$$1.2m + 1m = 2.2m$$

$$\frac{2.2m}{}$$

16. Dowel Bar $l=0.6m$ D19.

$$n=4nos. \quad l=2.4m \times 2.25kg$$

$$\frac{5.4kg}{}$$

17. Drain PVC PIPE $\phi 50$

$$L=760$$

$$58nos$$

$$L=500$$

$$16nos$$

Additional Quantities (SF 1)

9A. PARTITION WALL

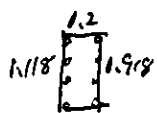
9. Conc. Type C2.

$$(18.215 \times 2)m^2 \times 0.3 \times 4^{nos} = 43.7m^3$$

6. Crusher Run Bedding.

$$0.5 \times 0.1 \times (17.1 \times 2)m \times 4^{nos} = 6.9m^3$$

71. Re-Bars.



$$(0.2 \times 2 + 0.918 \times 2)^m \times 735/0.3 \times 4^{nos} \times 0.995 = 218.0kg$$

$$16.8^m \times 8nos \times 4 \times 0.995$$

$$= 534.9kg$$

12 Formwork FW 1.

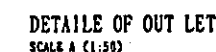
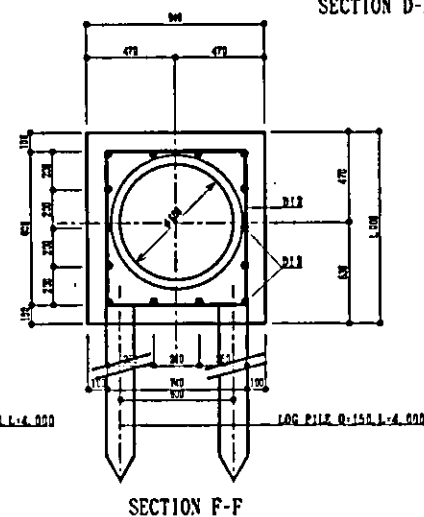
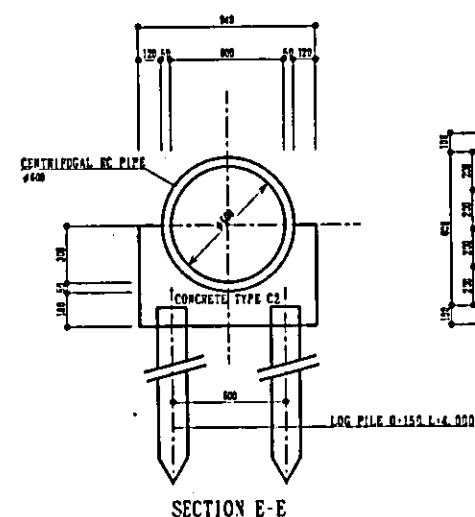
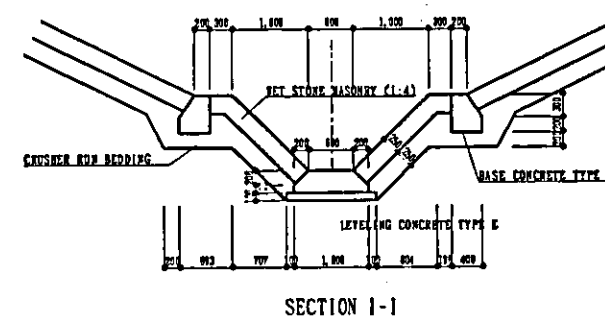
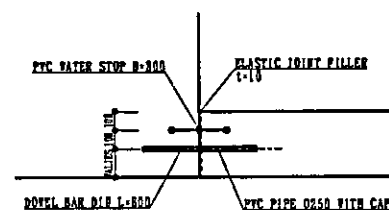
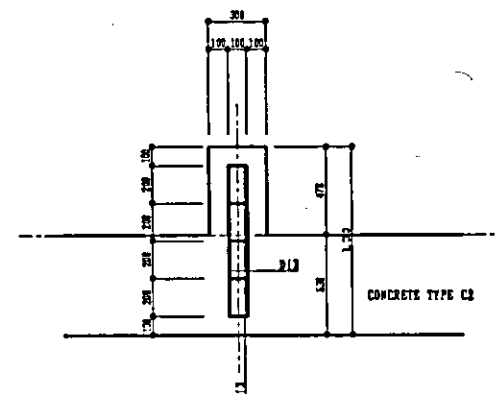
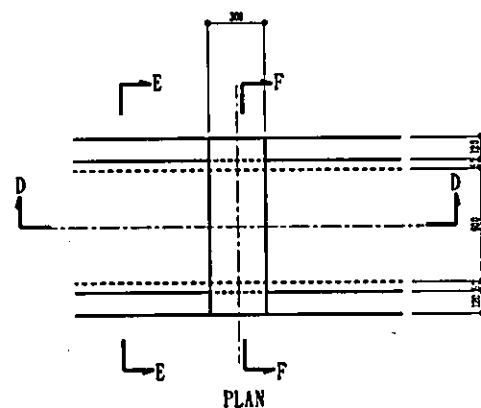
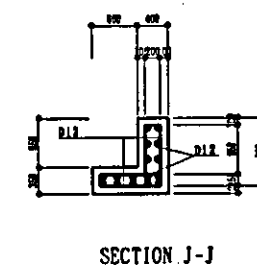
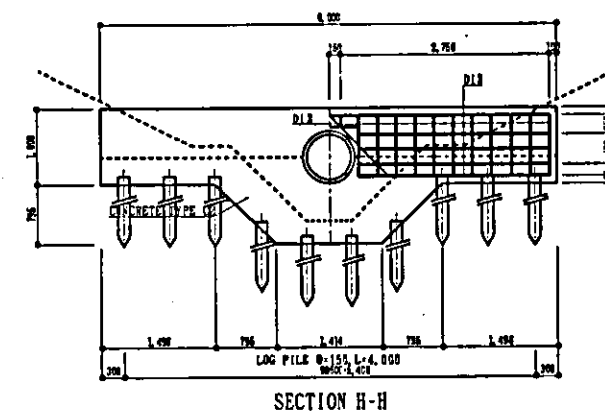
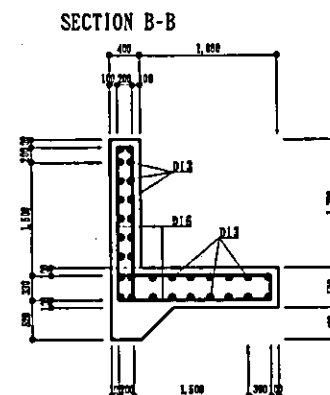
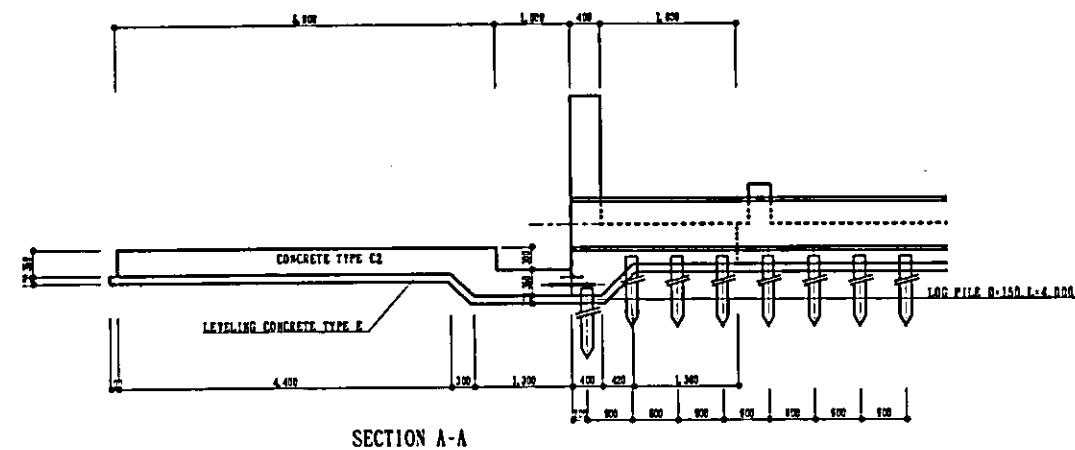
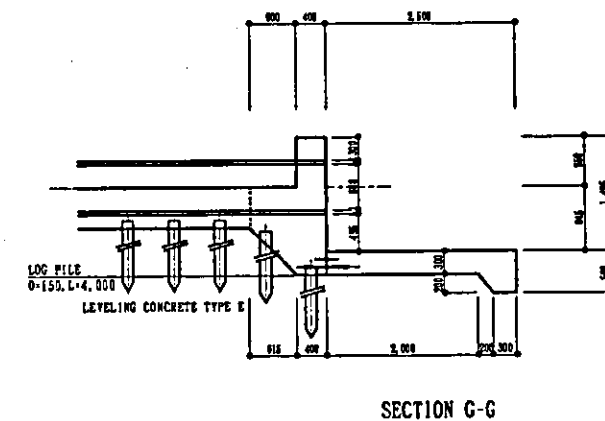
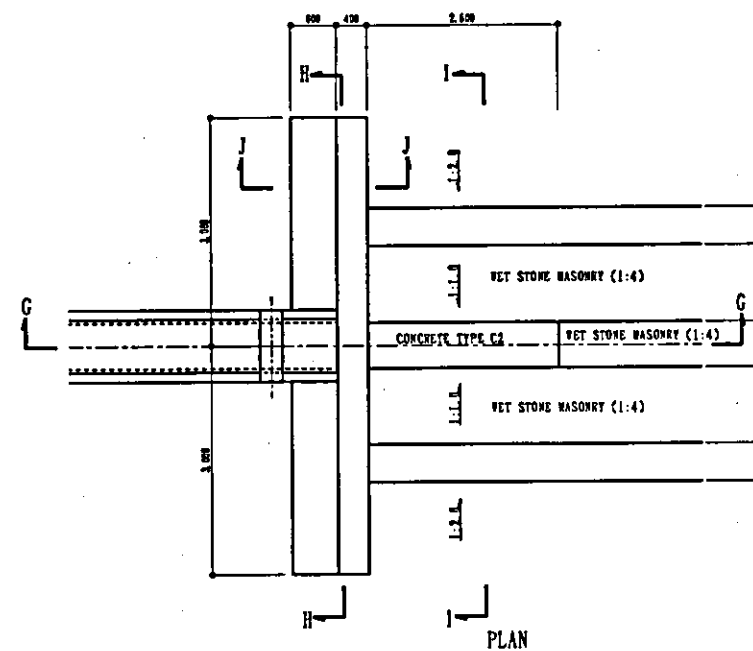
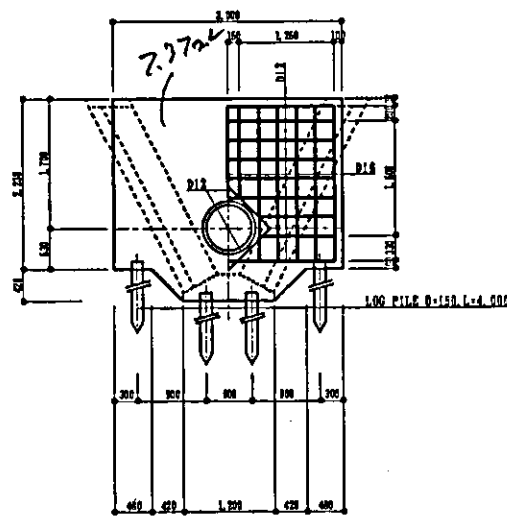
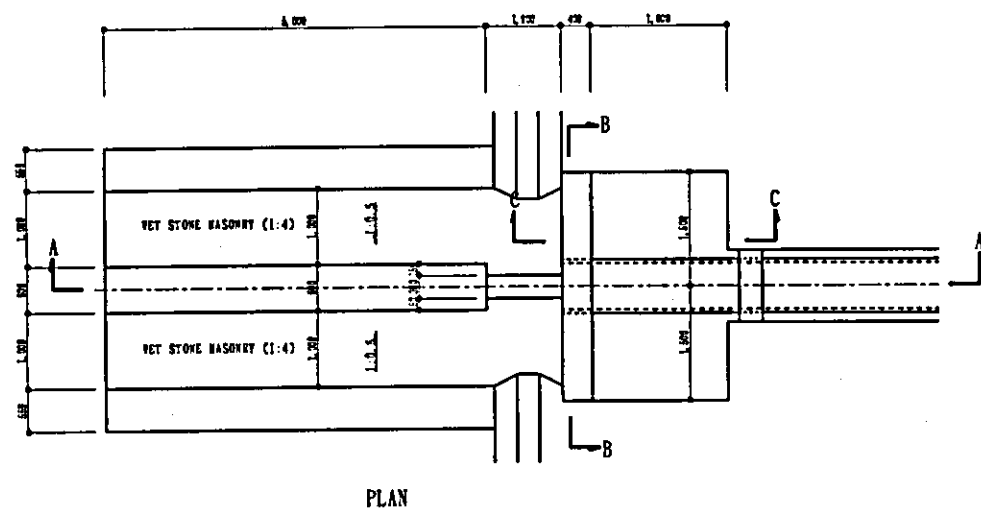
$$(18.215 \times 2)m^2 \times 2 \times 4$$

$$= 146m^2$$

13 ELASTIC JOINT FILLER.

$$(81.7m \times 8.1 \times 4) \times 0.25$$

$$= 28.5m^2$$

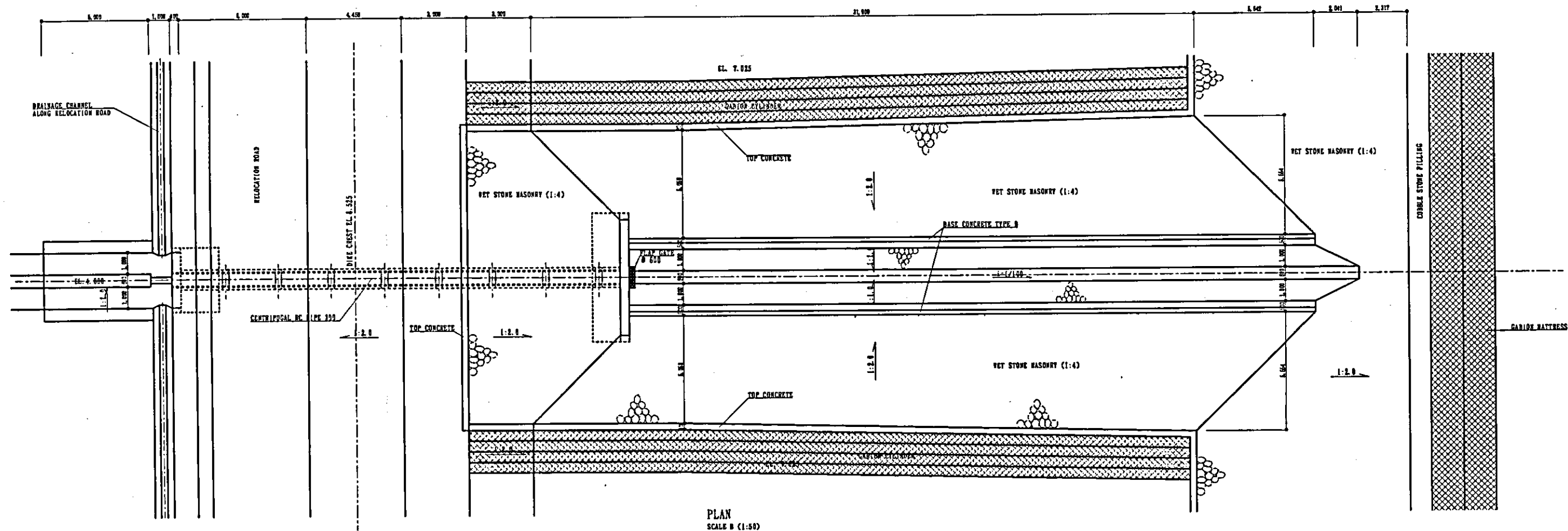


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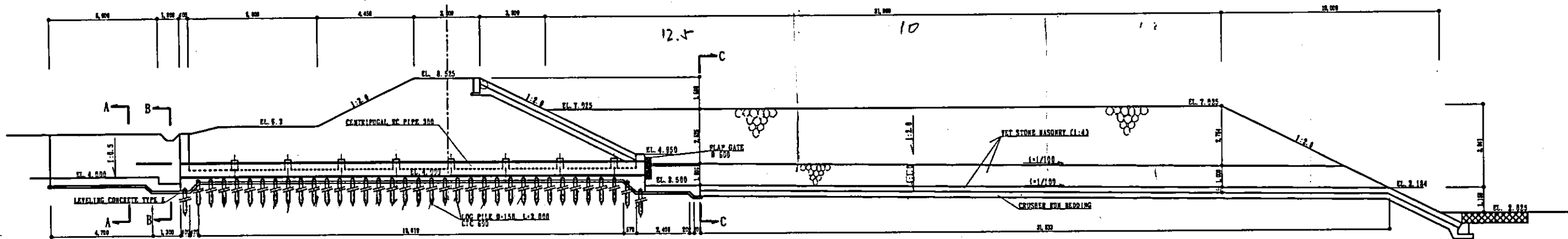
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
DIRECTORATE OF TECHNICAL GUIDANCE

MEDAN FLOOD CONTROL PROJECT

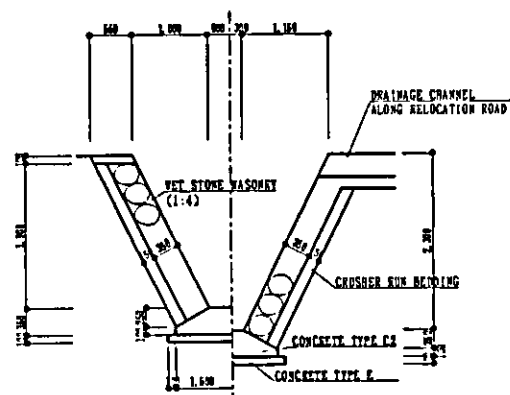
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PLAN
SCALE B (1:50)

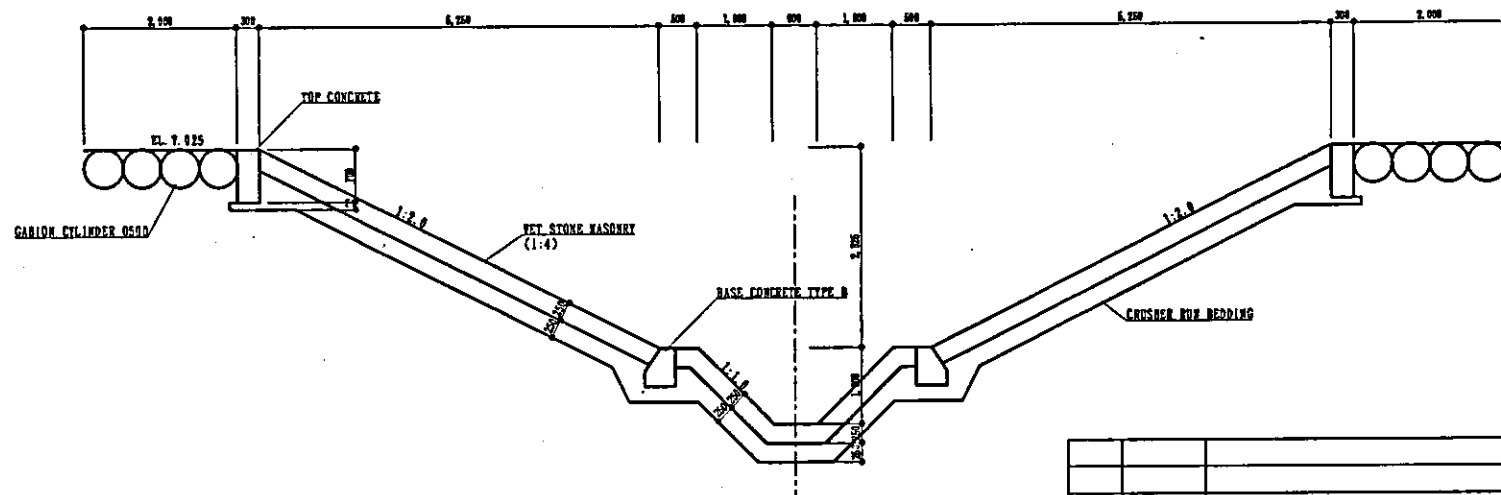


PROFILE
SCALE B (1:50)

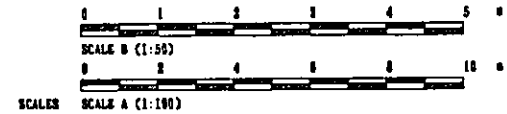


SECTION A-A
SCALE B (1:50)

SECTION B-B
SCALE B (1:50)



SECTION C-C
SCALE B (1:50)



REPUBLIC OF INDONESIA					
MINISTRY OF PUBLIC WORKS DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT DIRECTORATE OF TECHNICAL GUIDANCE					
MEDAN FLOOD CONTROL PROJECT					
PREPARED	CHECKED	SUBMITTED	CERTIFIED	APPROVED	DRAWING NO.
JAPAN INTERNATIONAL COOPERATION AGENCY CTI ENGINEERING CO., LTD					PROYEK PENGALIHAN SUMBER AIR DAN PENGENDALIAN BANJIL SIKUTERA UTARA
SHEET NO.					REV.

4.1.2 Other Pipe Culvert and Open Ditch Type Outlets

QUANTITIES OF PIPE CULVERT

Type	Sluice No.	BASIC CONDITION															QUANTITIES																			
		Dike Cover	G-EL.	Bottom FT	Dia- meter D m	Pipe nos. nos.	Pipe Thicknes I m	Width of Outlet Wo m	Width of Base Wb m	Catch Basin			H1 m	h3 m	h4 m	Nos. of Joint n nos.	Length of Pipe L m	Conc. Type C1					Conc. Type E				Re-Bars				Excavati on m ³	Backfill m ³				
										Ho m	W m	B m						Joint m ²	Base m ²	C-Basin m ²	Total m ²	Outlet m ²	Pipe m ²	C-Basin m ²	Total m ²	Outlet kg	Jount kg	C-Basin kg	Total kg							
																														1.00 m ²			2.00 m ²	3.00 m ²	4.00 m ²	5.00 m ²
Pipe Culvert	SR1	18.05	17.30	14.50	0.80	2.00	0.07	3.02	2.34	2.80	0.60	2.29	3.55	3.25	0.30	7.00	15.40	1.00	2.00	0.27	0.41	0.63	6.15	10.99	8.63	30.08	0.71	3.92	0.63	5.25	58.76	121.77	276.78	457.31	383.61	407.72
Pipe Culvert	SR2	19.28	18.60	15.90	0.80	2.00	0.07	3.02	2.34	2.70	0.60	2.29	3.38	3.15	0.23	7.00	14.60	1.00	2.00	0.27	0.41	0.63	6.15	10.22	8.39	29.07	0.71	3.71	0.63	5.05	58.76	121.77	270.52	451.04	349.80	358.61
Pipe Culvert	SR4	22.12	21.80	20.40	1.00	1.00	0.08	2.00	2.93	1.40	0.60	1.40	1.72	1.85	0.00	3.00	6.40	0.78	1.56	0.18	0.27	0.90	5.71	8.82	4.02	22.24	0.62	2.00	0.47	3.09	62.39	66.28	148.09	276.76	99.41	75.39
Pipe Culvert	SR6	24.30	24.70	23.00	0.60	1.00	0.05	1.60	1.76	1.70	0.60	1.00	1.30	1.75	0.00	2.00	4.90	0.43	0.86	0.14	0.22	0.41	1.38	2.44	3.89	9.77	0.35	0.96	0.40	1.70	28.60	25.39	142.83	196.83	55.40	48.87
Pipe Culvert	SR7	26.24	26.00	24.00	0.80	1.00	0.07	1.80	2.34	2.00	0.60	1.20	2.24	2.45	0.00	4.00	9.10	0.59	1.19	0.16	0.24	0.63	4.88	8.54	4.73	20.96	0.48	2.32	0.43	3.22	44.47	69.58	166.91	280.97	164.67	145.47
Pipe Culvert	SR8	27.70	27.10	26.30	0.80	1.00	0.07	1.80	2.34	0.80	0.60	1.20	1.40	1.25	0.15	3.00	6.50	0.59	1.19	0.16	0.24	0.63	3.66	5.78	2.71	14.97	0.48	1.65	0.43	2.56	44.47	52.19	110.87	207.53	51.68	44.91
Pipe Culvert	SR9	28.77	28.30	27.50	0.60	1.00	0.05	1.60	1.76	0.80	0.60	1.00	1.27	1.25	0.02	3.00	6.50	0.43	0.86	0.14	0.22	0.41	2.06	3.26	2.48	9.87	0.35	1.27	0.40	2.02	28.60	38.09	103.43	170.12	43.11	36.09
Pipe Culvert	SR11	30.93	30.40	28.00	0.80	1.00	0.07	1.80	2.34	2.40	0.60	1.20	2.93	2.85	0.08	6.00	12.50	0.59	1.19	0.16	0.24	0.63	7.32	11.69	5.40	27.23	0.48	3.18	0.43	4.09	44.47	104.37	185.59	334.44	264.79	250.35
Pipe Culvert	SR12	31.10	30.20	29.50	1.00	1.00	0.08	2.00	2.93	0.70	0.60	1.40	1.60	1.15	0.45	3.00	7.10	0.78	1.56	0.18	0.27	0.90	5.71	10.25	2.76	22.41	0.62	2.22	0.47	3.31	62.39	66.28	113.35	242.02	58.40	60.35
Pipe Culvert	SL7	20.81	20.50	18.00	0.80	1.00	0.07	1.80	2.34	2.50	0.60	1.20	2.81	2.95	0.00	5.00	11.60	0.59	1.19	0.16	0.24	0.63	6.10	11.17	5.57	25.65	0.48	2.95	0.43	3.86	44.47	86.98	190.26	321.71	261.80	238.47
Pipe Culvert	SL8	21.87	21.50	20.20	1.00	2.00	0.08	3.53	2.93	1.30	0.60	2.76	1.67	1.75	0.00	3.00	6.30	1.38	2.75	0.32	0.48	0.90	4.12	6.38	5.80	22.12	0.97	1.97	0.71	3.66	84.69	66.28	203.84	354.80	91.42	67.66
Pipe Culvert	SL9	22.12	22.00	20.90	0.60	1.00	0.05	1.60	1.76	1.10	0.60	1.00	1.22	1.55	0.00	2.00	5.60	0.43	0.86	0.14	0.22	0.41	1.38	2.96	2.95	9.35	0.35	1.10	0.40	1.84	28.60	25.39	116.56	170.56	51.44	44.26
Pipe Culvert	SL10	22.13	21.70	20.50	0.60	1.00	0.05	1.60	1.76	1.20	0.60	1.00	1.63	1.65	0.00	3.00	7.90	0.43	0.86	0.14	0.22	0.41	2.06	4.29	3.11	11.53	0.35	1.55	0.40	2.29	28.60	38.09	120.94	187.63	72.77	63.44
Pipe Culvert	SL11	22.77	22.10	20.30	0.60	1.00	0.05	1.60	1.76	1.80	0.60	1.00	2.47	2.25	0.22	5.00	11.70	0.43	0.86	0.14	0.22	0.41	3.44	6.37	4.04	15.91	0.35	2.29	0.40	3.03	28.60	63.48	147.21	239.29	155.56	164.93
Pipe Culvert	SL15	24.78	25.10	21.50	1.00	1.00	0.08	2.00	2.93	3.60	0.60	1.40	3.28	3.73	0.00	5.00	11.40	0.78	1.56	0.18	0.27	0.90	9.52	17.02	7.98	38.21	0.62	3.57	0.47	4.65	62.39	110.47	257.24	430.10	407.69	370.76
Pipe Culvert	SL17	28.28	27.50	26.00	0.60	1.00	0.05	1.60	1.76	1.50	0.60	1.00	2.28	1.95	0.33	5.00	11.20	0.43	0.86	0.14	0.22	0.41	3.44	6.00	3.58	15.07	0.35	2.20	0.40	2.94	28.60	63.48	134.08	226.16	122.15	138.90
Pipe Culvert	SL18	28.77	28.00	26.50	0.80	1.00	0.07	1.80	2.34	1.50	0.60	1.20	2.27	1.95	0.32	5.00	10.30	0.59	1.19	0.16	0.24	0.63	6.10	9.46	3.89	22.26	0.48	2.62	0.43	3.53	44.47	86.98	143.56	275.01	132.14	140.27
Pipe Culvert	SL19	29.13	28.70	27.60	0.60	1.00	0.05	1.60	1.76	1.10	0.60	1.00	1.53	1.55	0.00	3.00	7.50	0.43	0.86	0.14	0.22	0.41	2.06	4.00	2.95	11.07	0.35	1.47	0.40	2.21	28.60	38.09	116.56	183.26	64.13	55.18
Pipe Culvert	SL20	29.29	29.00	28.00	0.60	1.00	0.05	1.60	1.76	1.00	0.60	1.00	1.29	1.45	0.00	3.00	6.30	0.43	0.86	0.14	0.22	0.41	2.06	3.11	2.80	10.03	0.35	1.23	0.40	1.98	28.60	38.09	112.19	178.88	51.28	43.44
Pipe Culvert	SL21	29.67	29.80	26.30	1.00	2.00	0.08	3.53	2.93	3.50	0.60	2.76	3.37	3.82	0.00	6.00	12.10	1.38	2.75	0.32	0.48	0.90	8.24	12.91	11.57	38.54	0.97	3.78	0.71	5.47	84.69	132.57	356.99	574.24	444.65	405.91
Pipe Culvert	SL22	29.91	29.40	26.80	0.60	1.00	0.05	1.60	1.76	2.60	0.60	1.00	3.11	3.05	0.06	6.00	13.90	0.43	0.86	0.14	0.22	0.41	4.13	7.63	5.29	19.11	0.35	2.72	0.40	3.47	28.60	76.18	182.23	287.01	283.53	276.41
Pipe Culvert	SL25	31.23	33.00	29.80	0.80	1.00	0.07	1.80	2.34	3.20	0.60	1.20	1.43	1.88	0.00	0.00	1.90	0.59	1.19	0.16	0.24	0.63	0.00	1.71	6.74	11.27	0.48	0.48	0.43	1.39	44.47	0.00	222.95	267.42	43.27	35.98
Pipe Culvert	SF1	31.69	33.48	31.48	1.00	1.00	0.08	2.00	2.93	2.00	0.60	1.40	2.00	2.00	0.00	3.00	6.90	0.78	1.56	0.18	0.27	0.90	5.71	9.84	5.10	24.34	0.62	2.16	0.47	3.25	62.39	66.28	177.86	306.53	116.19	90.88
Pipe Culvert	SF3	31.97	36.17	34.17	1.00	1.00	0.08	2.00	2.93	2.00	0.60	1.40	2.00	2.00	0.00	3.00	6.90	0.78	1.56	0.18	0.27	0.90	5.71	9.84	5.10	24.34	0.62	2.16	0.47	3.25	62.39	66.28	177.86	306.53	116.19	90.88
Pipe Culvert	SF4	32.09	35.15	33.15	1.00	1.00	0.08	2.00	2.93	2.00	0.60	1.40	2.00	2.00	0.00	3.00	6.90	0.78	1.56	0.18	0															

QUANTITY OF PIPE CULVERT AND OPEN DITCH

MFC Nn	Proposed Pipe Culvert					QUANTITIES							
	Location	Sluice No.	Type	Diameter D m	Numbers nos.	Length of Pipe m	Concrete		Re-Bars kg	Excavation m³	Backfill m³	Form works	
							Type C1 m³	Type E m³				FW1 m²	FW2 m²
3	200	SL9	Pipe Culvert	0.60	1.00	5.60	9.35	1.84	170.56	51.44	44.26	26.47	0.00
3	200	SL10	Pipe Culvert	0.60	1.00	7.90	11.53	2.29	187.63	72.77	63.44	30.90	0.00
3	206	SL11	Pipe Culvert	0.60	1.00	11.70	15.91	3.03	239.29	155.56	164.93	41.84	0.00
						25.20	36.79	7.16	597.49	279.77	272.62	99.21	0.00
						26.00	39.00	8.00	717.00	310.00	300.00	105.00	0.00
3	189	SL7	Pipe Culvert	0.80	1.00	11.60	25.65	3.86	321.71	261.80	238.47	56.01	1.85
						12.00	27.00	5.00	387.00	290.00	263.00	59.00	2.00
3	200	SR4	Pipe Culvert	1.00	1.00	6.40	22.24	3.09	276.76	99.41	75.39	49.07	0.00
						7.00	24.00	4.00	333.00	110.00	83.00	52.00	0.00
3	166	SR1	Pipe Culvert	0.80	2.00	15.40	30.08	5.25	457.31	383.61	407.72	70.73	4.15
3	176	SR2	Pipe Culvert	0.80	2.00	14.60	29.07	5.05	451.04	349.80	358.61	44.43	0.00
						30.00	59.14	10.30	908.35	733.41	766.33	115.16	4.15
						31.00	63.00	11.00	1,091.00	810.00	843.00	121.00	5.00
3	198	SL8	Pipe Culvert	1.00	2.00	6.30	22.12	3.66	354.80	91.42	67.66	54.26	0.00
						7.00	24.00	4.00	426.00	110.00	75.00	57.00	0.00
3	200	SR3	Open Ditch	0.60	1.00	5.00	3.45	0.73	193.59	18.72	12.87	25.00	0.00
3	206	SL12	Open Ditch	1.00	1.00	5.00	4.13	0.97	224.14	21.06	12.87	26.72	0.00
						6.00	4.00	1.00	233.00	30.00	15.00	27.00	0.00
4	218	SR6	Pipe Culvert	0.60	1.00	4.90	9.77	1.70	196.83	55.40	48.87	30.10	0.00
4	250	SL17	Pipe Culvert	0.60	1.00	11.20	15.07	2.94	226.16	122.15	138.90	39.13	0.00
4	255	SR9	Pipe Culvert	0.60	1.00	6.30	9.87	2.02	170.12	43.11	36.09	26.51	0.00
4	258	SL19	Pipe Culvert	0.60	1.00	7.50	11.07	2.21	183.26	64.13	55.18	29.75	0.00
4	259	SL20	Pipe Culvert	0.60	1.00	6.30	10.03	1.98	178.88	51.28	43.44	27.75	0.00
4	265	SL22	Pipe Culvert	0.60	1.00	13.90	19.11	3.47	287.01	283.53	276.41	47.01	1.96
						50.30	74.92	14.30	1,242.26	619.60	598.89	200.25	1.96
						51.00	79.00	16.00	1,491.00	690.00	659.00	211.00	3.00
4	234	SR7	Pipe Culvert	0.80	1.00	9.10	20.96	3.22	280.97	164.67	145.47	49.61	0.31
4	246	SR8	Pipe Culvert	0.80	1.00	6.50	14.97	2.56	207.53	51.68	44.91	34.75	0.00
4	255	SL18	Pipe Culvert	0.80	1.00	10.30	21.29	3.96	341.09	132.14	140.27	54.65	0.00
4	271	SR11	Pipe Culvert	0.80	1.00	12.50	27.23	4.09	334.44	264.79	250.35	59.53	1.54
						38.40	84.45	13.83	1,164.03	613.28	581.00	198.54	1.85
						39.00	89.00	15.00	1,397.00	680.00	640.00	209.00	2.00
4	222	SL15	Pipe Culvert	1.00	1.00	11.40	38.21	4.65	430.10	407.69	370.76	70.13	5.71
4	272	SR12	Pipe Culvert	1.00	1.00	7.10	22.41	3.31	242.02	58.40	60.35	44.43	0.00
						18.50	60.62	7.96	672.13	466.08	431.11	114.55	5.71
						19.00	64.00	9.00	807.00	520.00	475.00	121.00	6.00
						11.00	23.00	5.00	410.00	150.00	155.00	58.00	0.00
4	262	SL21	Pipe Culvert	1.00	2.00	12.10	38.54	5.47	574.24	444.65	405.91	80.76	8.45
						13.00	41.00	6.00	690.00	490.00	447.00	85.00	9.00
4	216	SR5	Open Ditch	0.60	1.00	5.00	3.45	0.73	193.59	18.72	12.87	25.00	0.00
4	269	SL23	Open Ditch	0.60	1.00	5.00	3.45	0.73	193.59	18.72	12.87	25.00	1.96
4	269	SL24	Open Ditch	0.60	1.00	5.00	3.45	0.73	193.59	18.72	12.87	25.00	1.96
						15.00	10.35	2.19	580.76	56.16	38.61	74.99	3.92
						16.00	11.00	3.00	697.00	70.00	43.00	79.00	5.00
5	274	SL25	Pipe Culvert	0.80	1.00	6.50	14.97	2.56	207.53	51.68	44.91	31.05	4.00
						7.00	16.00	3.00	250.00	60.00	50.00	33.00	5.00
5	6	SF1	Pipe Culvert	1.00	1.00	6.90	24.34	3.25	306.53	116.19	90.88	54.49	0.34
5	13	SF3	Pipe Culvert	1.00	1.00	6.90	24.34	3.25	306.53	116.19	90.88	54.49	0.34
5	16	SF4	Pipe Culvert	1.00	1.00	6.90	24.34	3.25	306.53	116.19	90.88	54.49	0.34
						20.70	73.03	9.74	919.58	348.57	272.64	163.46	1.01
						21.00	77.00	11.00	1,104.00	390.00	300.00	172.00	2.00
6	30	SF6	Pipe Culvert	1.00	1.00	6.90	24.34	3.25	306.53	116.19	90.88	54.49	0.34
						7.00	26.00	4.00	368.00	130.00	100.00	58.00	1.00
7	38	SF7	Pipe Culvert	1.00	1.00	6.90	24.34	3.25	306.53	116.19	90.88	54.49	0.34
						7.00	26.00	4.00	368.00	130.00	100.00	58.00	1.00

Quantities of Connecting Channel for Drainage Outlets

Contract Package	Drainage Outlet				Connecting Channel					Clearing		Excavation		Mortar Plastering		Wet Stone Masonry		Crusher Run Bedding		Concrete Type C2			Concrete Type E		Re-Bars		Form FW1			
	Drainage Outlet No.	Location	Type		Bottom Width (m)	Height (m)	Slope (1:n)	Top Width (m)	Length (m)	Clearing Area (m²)	Total by Contract Package					t=250		t=250		Base Conc Type B (0.17m³/m)	Top Channelbed Conc.		0.06m³/m		10.9kg/m		A=1m²/m			
MFC-2	SL1	PE. 85 + 0	Pipe Culvert	D=600mm	0.6	2.0	0.5	5.6	5.0	10.6			33.7		22.4		5.6		5.6		1.8	1.0		0.6		130.8		10.5		
	SL2	PE. 95 + 35	Box Culvert	2.0x1.5x2	5.0	1.8	0.5	9.8	35.0	44.8	55.4	539.3	573.0	140.9	163.2	35.2	40.8	35.2	40.8	12.5	31.2	46.5	4.4	5.0	915.6	1,046.4	10.5	21.0		
MFC-3	SL3	PE. 138 + 55	Box Culvert	1.5x1.5x1	1.5	2.0	0.5	6.5	7.0	13.5			62.1		31.3		7.8		7.8		2.5	2.4		0.9		183.1		10.5		
	SL4	PE. 155 + 90	Box Culvert	2.0x1.5x1	2.0	1.5	0.5	6.5	20.0	26.5			147.5		67.1		16.8		16.8		7.1	8.4		2.5		523.2		10.5		
	SR1	PE. 166 + 80	Pipe Culvert	D=800mmx2	1.6	1.0	0.5	5.6	5.0	10.6			22.3		11.2		2.8		2.8		1.8	1.8		0.6		130.8		10.5		
	SL5	PE. 176 + 55	Box Culvert	1.5x1.5x1	2.0	3.2	0.5	8.2	3.0	11.2			53.6		21.7		5.4		5.4		1.1	1.3		0.4		78.5		10.5		
	SL6	PE. 176 + 85	Box Culvert	2.0x1.5x1	1.5	3.2	0.5	7.7	3.0	10.7			48.0		21.7		5.4		5.4		1.1	1.0		0.4		78.5		10.5		
	SR2	PE. 176 + 85	Pipe Culvert	D=800mmx2	1.0	1.0	0.5	5.0	5.0	10.0			18.5		11.2		2.8		2.8		1.8	1.3		0.6		130.8		10.5		
	SL7	PE. 189 + 40	Pipe Culvert	D=800mm	0.8	1.0	0.5	4.8	5.0	9.8			17.2		11.2		2.8		2.8		1.8	1.2		0.6		130.8		10.5		
	SL8	PE. 198 + 35	Pipe Culvert	D=1000mmx2	2.0	1.0	0.5	6.0	5.0	11.0			24.9		11.2		2.8		2.8		1.8	2.1		0.6		130.8		10.5		
	SR3	PE. 200 + 10	Open Ditch	B=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5		
	SR4	PE. 200 + 25	Pipe Culvert	D=1000mm	1.0	1.0	0.5	5.0	5.0	10.0			18.5		11.2		2.8		2.8		1.8	1.3		0.6		130.8		10.5		
	SL9	PE. 200 + 25	Pipe Culvert	D=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5		
	SL10	PE. 200 + 40	Pipe Culvert	D=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5		
	SL11	PE. 206 + 0	Pipe Culvert	D=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5		
	SL12	PE. 206 + 55	Open Ditch	B=1000mm	1.0	1.0	0.5	5.0	5.0	10.0	161.8	18.5	495.0	11.2	253.7	2.8	63.4	2.8	63.4	1.8	1.3	55.7	0.6	10.5	130.8	2,171.3	10.5	147.0		
MFC-4	SL13	PE. 212 + 0	Box Culvert	1.5x1.5x2	1.4	2.9	0.5	7.3	5.0	12.3			67.7		32.4		8.1		8.1		1.8	1.6		0.6		130.8		10.5		
	SR5	PE. 216 + 0	Open Ditch	B=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5		
	SR6	PE. 218 + 40	Pipe Culvert	D=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5		
	SL14	PE. 222 + 0	Box Culvert	2.1x2.4x2	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		0.0		10.5		
	SL15	PE. 222 + 15	Pipe Culvert	D=1000mm	1.0	1.0	0.5	5.0	5.0	10.0			18.5		11.2		2.8		2.8		1.8	1.3		0.6		130.8		10.5		
	SR7	PE. 234 + 20	Pipe Culvert	D=800mm	0.8	1.0	0.5	4.8	5.0	9.8			17.2		11.2		2.8		2.8		1.8	1.2		0.6		130.8		10.5		
	SR8	PE. 246 + 30	Pipe Culvert	D=800mm	0.8	1.0	0.5	4.8	5.0	9.8			17.2		11.2		2.8		2.8		1.8	1.2		0.6		130.8		10.5		
	SL16	PE. 246 + 40	Box Culvert	2.0x2.0x1	2.0	3.0	0.5	8.0	32.0	40.0			519.4		214.7		53.7		53.7		11.4	13.4		4.0		837.1		10.5		
	SL17	PE. 250 + 90	Pipe Culvert	D=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5		
	SL18	PE. 255 + 15	Pipe Culvert	D=800mm	0.8	1.0	0.5	4.8	5.0	9.8			17.2		11.2		2.8		2.8		1.8	1.2		0.6		130.8		10.5		
		SR9	PE. 255 + 20	Pipe Culvert	D=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5	
		SL19	PE. 258 + 25	Pipe Culvert	D=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5	
	SR10	PE. 259 + 0	Box Culvert	2.0x2.0x2	3.8	3.5	0.5	10.3	30.0	40.3			809.3		234.8		58.7		58.7		10.7	21.1		3.8		784.8		10.5		
	SL20	PE. 259 + 60	Pipe Culvert	D=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5		
	SL21	PE. 262 + 80	Pipe Culvert	D=1000mmx2	2.0	1.0	0.5	6.0	5.0	11.0			24.9		11.2		2.8		2.8		1.8	2.1		0.6		130.8		10.5		
	SL22	PE. 264 + 90	Pipe Culvert	D=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5		
	SL23	PE. 269 + 50	Open Ditch	B=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5		
	SL24	PE. 269 + 80	Open Ditch	B=600mm	0.6	1.0	0.5	4.6	5.0	9.6			16.0		11.2		2.8		2.8		1.8	1.0		0.6		130.8		10.5		
	SR11	PE. 271 + 40	Pipe Culvert	D=800mm	0.8	1.0	0.5	4.8	5.0	9.8			17.2		11.2		2.8		2.8		1.8	1.2		0.6		130.8		10.5		
	SR12	PE. 272 + 85	Pipe Culvert	D=1000mm	1.0	1.0	0.5	5.0	5.0	10.0	249.2	18.5	1,670.8	11.2	660.8	2.8	165.2	2.8	165.2	1.8	1.3	107.0	0.6	18.5	130.8	3,845.5	10.5	210.0		
MFC-5	SL25	PE. 274 + 55	Pipe Culvert	D=800mm	0.8	1.0	0.5	4.8	5.0	9.8			17.2		11.2		2.8		2.8		1.8	1.2		0.6		130.8		10.5		
	SF1	FW. 6 + 50	Pipe Culvert	D=1000mm	1.0	1.0	0.5	5.0	5.0	10.0			18.5		11.2		2.8		2.8		1.8	1.3		0.6		130.8		10.5		
	SF2	FW. 9 + 81	Box Culvert	2.0x2.0x1	3.0	2.0	0.5	8.0	5.0	13.0			62.1		22.4		5.6		5.6		1.8	2.9		0.6		130.8		10.5		
	SF3	FW. 13 + 0	Pipe Culvert	D=1000mm	1.0	1.0	0.5	5.0	5.0	10.0			18.5		11.2		2.8		2.8		1.8	1.3		0.6		130.8		10.5		
	SF4	FW. 16 + 0	Pipe Culvert	D=1000mm	1.0	1.0	0.5	5.0	10.0	15.0	57.8	37.0	153.4	22.4	78.3	5.6	19.6	5.6	19.6	3.6	2.6	20.0	1.3	3.8	261.6	784.8	10.5	52.5		
MFC-6	SF5	FW. 25 + 24	Box Culvert	2.0x2.0x2	3.0	1.6	0.5	7.6	100.0	107.6			982.2		357.8		89.4		89.4		35.7	57.8		12.6		2,616.0		10.5		
	SF6	FW. 30 + 0	Pipe Culvert	D=1000mm	1.0	1.0	0.5	5.0	5.0	10.0	117.6	18.5	1,000.7	11.2	369.0	2.8	92.2	2.8	92.2	1.8	1.3	96.5	0.6	13.2	130.8	2,746.8	10.5	21.0		
MFC-7	SF7	FW. 38 + 50	Pipe Culvert	D=1000mm	1.0	1.0	0.5	5.0	5.0	10.0	10.0	18.5	18.5	11.2	11.2	2.8	2.8	2.8	2.8	1.8	1.3	3.1	0.6	0.6	130.8	130.8	10.5	10.5		

PIPE CULVERT.

Items Concrete Type C1. Inlet (Catch-Basin), Outlet, Base,
 Type E JOINT.
 Lean Concrete.

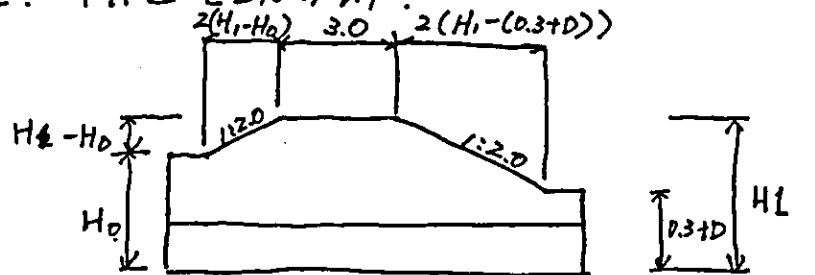
Re-Bars.

Excavation

Back Fill.

Concrete Pipe.

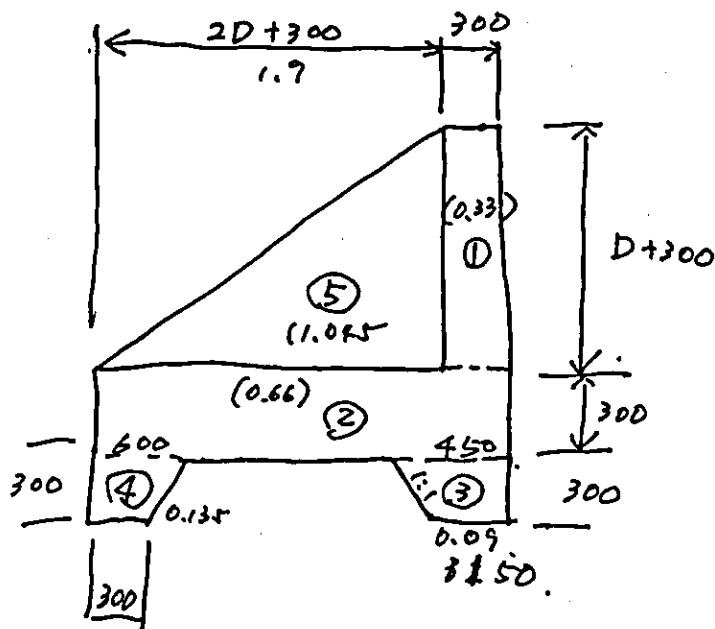
1. PIPE LENGTH.



$$L = 2(H_1 - H_0) + 3.0 + 2(H_1 - (0.3 + D)) + 0.6$$

50cm Extra. and Rounded in 10 cm

conc. Type C1
Out let.



$$3.2D + 47$$

$$n = 2$$

$$D = 0.8$$

$$T = 0.66$$

$$W_b = 2.421$$

$$W_b = 2.344$$

$$\frac{1.332}{1.332}$$

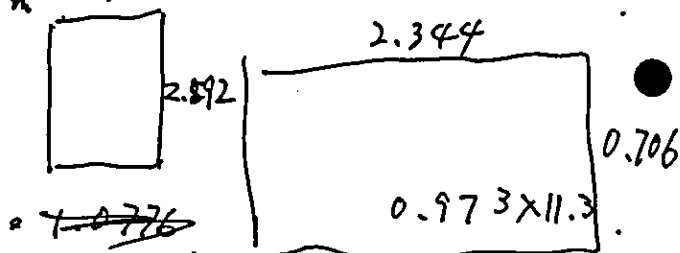
- Joint. ① $0.3 \times (D + 0.3) \times (D + 1.0)$
 ② $0.3 \times (2D + 0.6) \times (D + 1.0)$
 ③ $(0.45 + 0.15) \times 0.3 / 2 \times (D + 1.0)$
 ④ $(0.6 + 0.3) \times 0.3 / 2 \times (D + 1.0)$
 ⑤ $(D + 0.3) \times (2D + 0.3) / 2 \times 0.3 \times 2$

$$\text{Joint. } \textcircled{1} \left\{ \frac{W_b}{(1.4D + 1.7T)} \times (1.5D + 2T) - \pi/4 \times (D + 2T)^2 \right\} \times 0.5 \times D \times n$$

$$\text{FOUNDATION. } \textcircled{3} \left\{ \frac{W_b}{(1.4D + 1.7T)} (0.8D + T) - \pi/8 \times (D + 2T)^2 \right\} \times (L - 0.6 - 0.5n)$$

$$\text{Catch Basin } \textcircled{8} 0.3 \times (H + 0.3) \times 2 \{ (W + 0.3) + (B + 0.3) \} + 0.3 \times (W + 0.6) \times (B + 0.6)$$

$$7.239 n^3$$



$$1.78776 n$$

$$2.1552$$

$$0.6822$$

$$11$$

②. Concrete TYPE E.

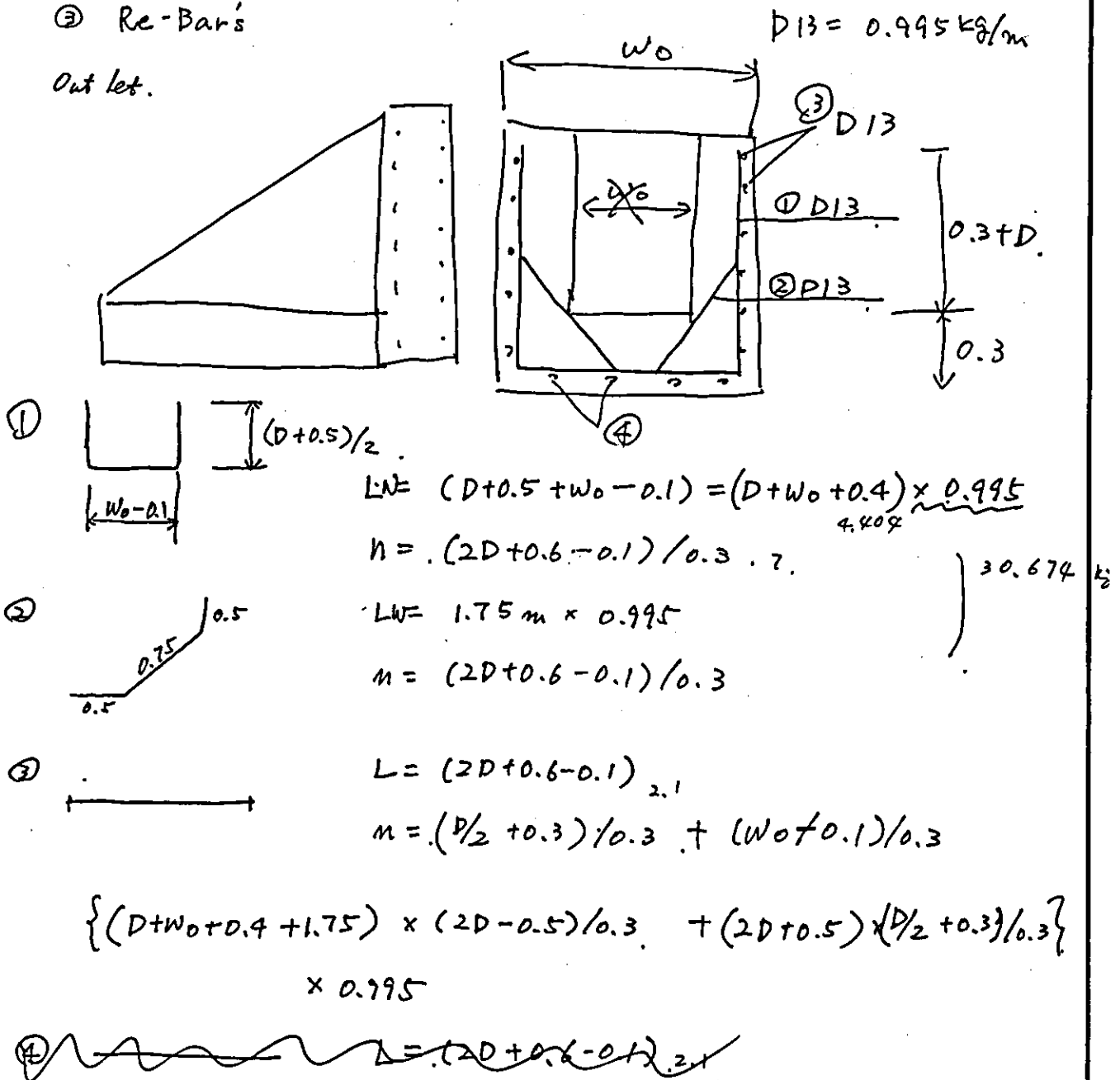
Outlet $(2D+0.3) \times (W_0+0.2) \times 0.10$

Pipe. $L \times (W_0+0.2) \times 0.10$

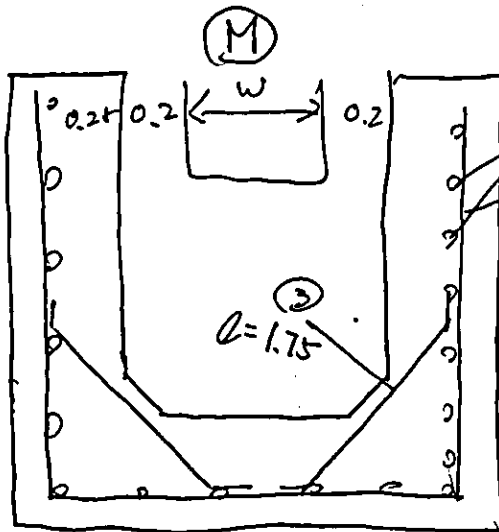
Catch Basin $(W+0.2) \times (B+0.2) \times 0.10$.

③ Re-Bar's

Out let.



Catch Basin



$$\textcircled{1} \quad l = W + 0.9 + 2(H + 0.5)$$

$$\therefore \textcircled{1} \quad l_1 = W + 2H + 1.9 \quad 7.9 \text{ m}$$

$$n = (B + 0.5) / 0.3$$

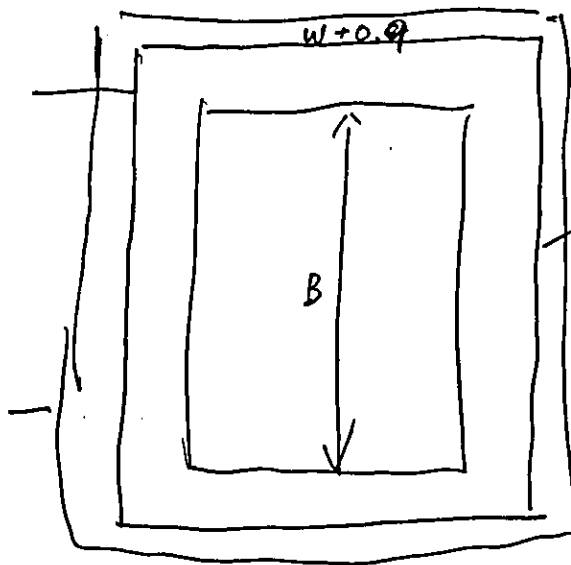
$$\textcircled{2} \quad l_2 = (B + 0.5 + W + 0.9) \times 2$$

$$= 2B + 2W + 2.8$$

$$n = (H + 0.5) / 0.3 \quad \frac{8.589}{10.6}$$

$$\textcircled{3} \quad l_3 = 1.75$$

$$n = l_2 / 0.3$$



$$B + 0.5$$

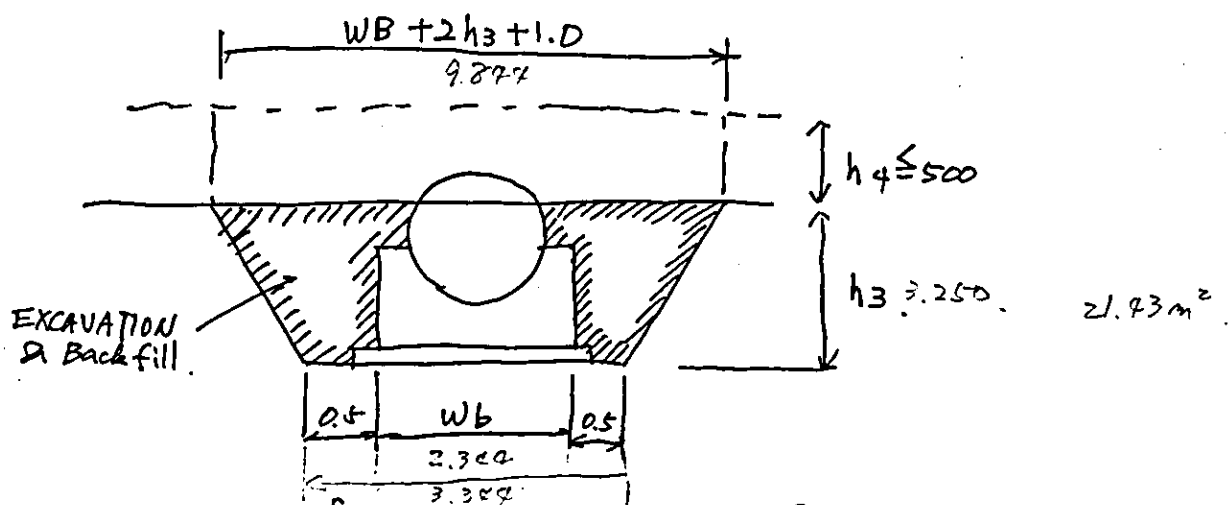
$$\textcircled{4} \quad l_4 = H + 0.5$$

$$n = (2W + 0.9) / 0.3 \times 2 \quad 10$$

$$W \rightarrow M \quad 2.6$$

$$H = L \quad 2.7$$

$$B = N \quad 2.292$$



$$\text{Excavation } A_e = \left\{ (W_b + 2h_3 + 1.0) + (1 + W_b) \right\} h / 2$$

$$= (2W_b + 2h_3 + 2) \times h / 2 = (W_b + h_3 + 1) h$$

Backfill.

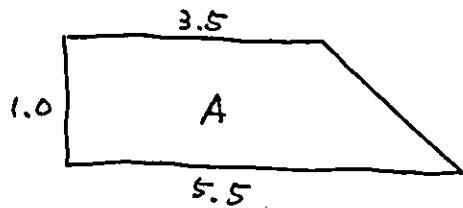
$$\textcircled{1} A_1 = 0.5 \times (W_b + 2h_3 + 1.0)$$

$$\textcircled{2} A_2 = A_e - (0.80 - T) \times W_b$$

Ditch Type.

Type C1.

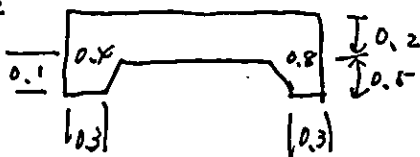
Wall



$$A = 4.5 \text{ m}^2$$

$$V = 4.5 \times 0.2 \times 2 =$$

Base



$$A = 0.2 \times 5.5 + 0.35 \times 0.1 + 0.55 \times 0.5$$

$$= 1.41 \text{ m}^2$$

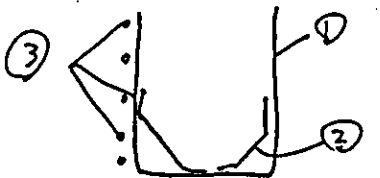
$$V = 1.41 \times (B + 0.4)$$

TYPE C2 (Cover)

$$3.0 \times (B + 0.2) \times 0.1$$

Re-Bar.

Wall



$$\textcircled{1} L = 1.1 \times 2 + (B + 0.3)$$

$$\textcircled{2} L = 1.466$$

$$n = 5.4 / 0.3$$

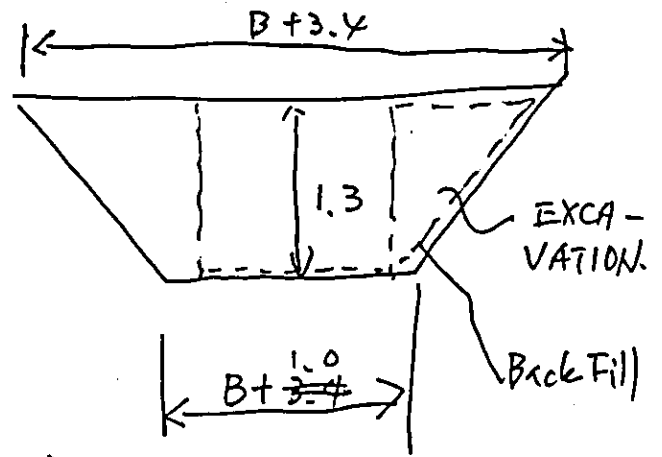
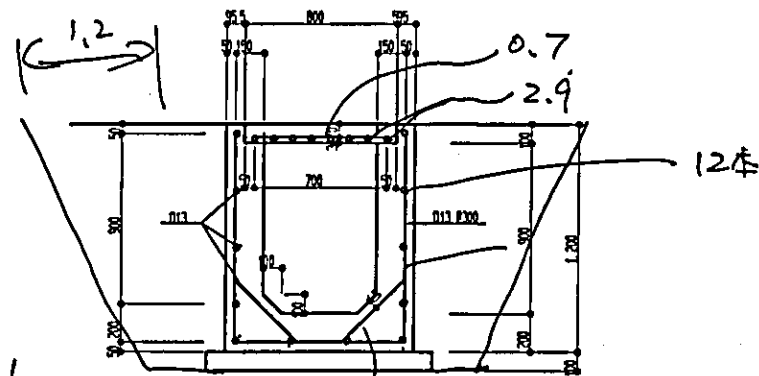
$$\textcircled{3} L = (5.4 + 3.4) / 2 = 4.4 \text{ m}$$

$$n = 12$$

Cover.

$$\textcircled{1} L = \frac{(B + 0.1)}{0.1} \quad n = 2.9 / 0.1$$

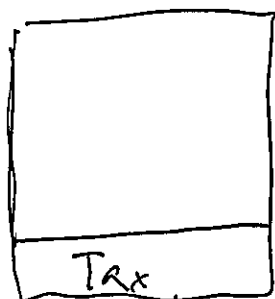
$$\textcircled{2} L = 2.9 \quad n = (B + 0.1) / 0.1$$

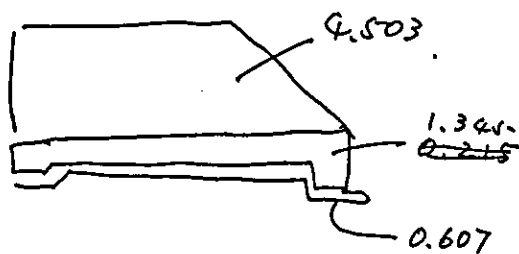
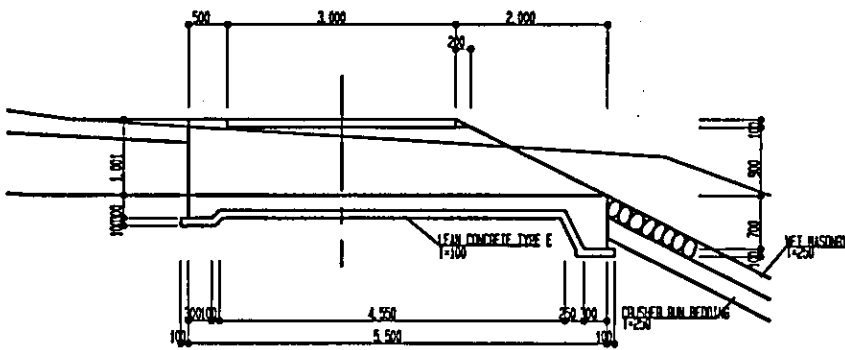
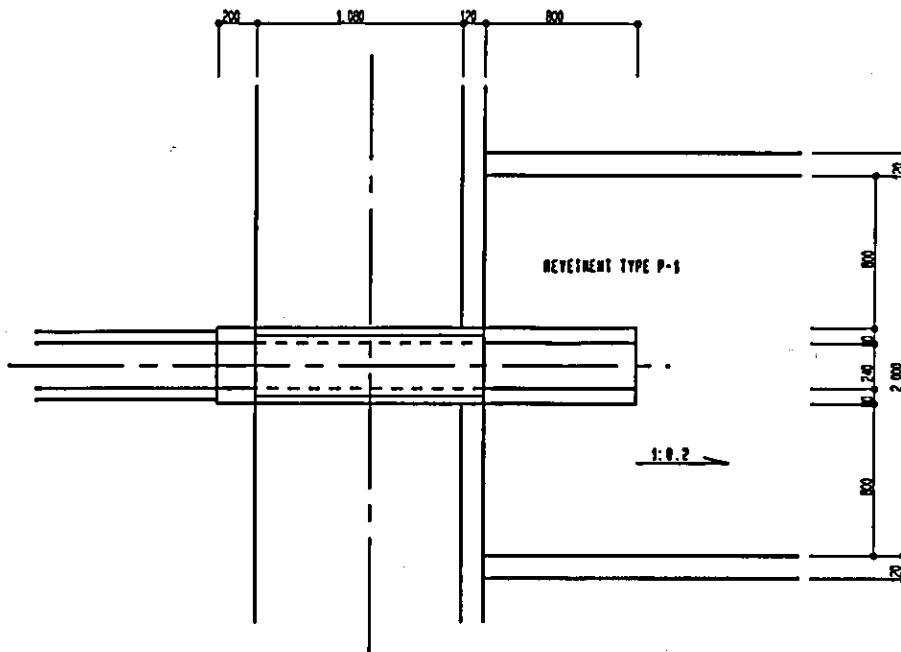


1.2 0.1 1.466 $(B + 3.4) + B + 1.$

$B \neq 2.2$

1.2
1.2
1.2
1.2
1.2
1.2





4.2 Box Culvert

Summary of Quantities for Box Culvert and SL 1 (Drainage Outlet)

			SL1	SL2			SL3			SL4			SL5			SL6			SL13		SL14		SL16		SR10		SF2		SF5		Note
Channel Width	B	m	Pipe	2.0			1.5			2.0			1.5			2.0			1.5		(2.1)		2.0		2.0		2.0		2.0		
Channel Height	H	m	φ601	1.5			1.5			1.5			1.5			1.5			1.5		(2.4)		2.0		2.0		2.0		2.0		
Number	n	m	1	2			1			1			1			1			2		(2)		1		2		1		2		
				Total	Culvert	Outlet C	Total	Culvert	Outlet C	Total	Culvert	Outlet C	Total	Culvert	Inlet C	Total	Culvert	Inlet C	Total	Culvert	Total	Inlet St.	Total	Culvert	Total	Culvert	Total	Culvert	Total	Culvert	
1	Excavation	m ³	1,300.0	539.2	156.2	334.0	186.2	104.7	64.6	671.6	537.3	73.3	252.0	175.5	53.6	129.4	64.0	53.6	928.1	843.7	19.8	18.0	360.9	328.1	1,057.3	961.2	641.8	583.5	2,069.8	1,881.6	x 1.10
2	Backfill with selected soil	m ³	80.0	254.7	231.6	0.0	79.7	72.4	0.0	0.0	0.0	0.0	453.2	412.0	0.0	453.2	412.0	0.0	85.4	77.6	141.9	129.0	123.2	112.0	216.9	197.2	315.0	286.4	553.3	503.0	x 1.10
3	Common Backfill	m ³	134.0	341.2	0.0	310.2	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	x 1.10
4	Crusher run bedding	m ³	150.0	41.7	0.0	39.7	6.6	0.0	6.3	6.3	0.0	6.0	5.7	0.0	5.4	5.7	0.0	5.4	12.1	11.6	0.0	0.0	7.6	7.2	13.1	12.4	0.0	0.0	0.0	0.0	x 1.05
5	Wet stone masonry (1:4)	m ³	131.0	96.9	0.0	92.3	8.3	0.0	7.9	11.6	0.0	11.1	5.7	0.0	5.4	5.7	0.0	5.4	19.0	18.1	0.0	0.0	7.5	7.2	16.3	15.5	0.0	0.0	0.0	0.0	x 1.05
6	Cement mortar plastering	m ²	513.0	276.9	0.0	263.7	33.6	0.0	32.0	46.6	0.0	44.4	22.8	0.0	21.7	22.8	0.0	21.7	73.2	69.7	0.0	0.0	21.6	20.6	37.2	35.4	0.0	0.0	0.0	0.0	x 1.05
7	Steel sheet pile	m ²	0.0	18.6	17.7	0.0	27.1	25.8	0.0	28.7	27.3	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	0.0	0.0	0.0	0.0	0.0	0.0	x 1.05
8	Log pile D=150	m	216.0	99.2	0.0	94.5	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	x 1.05
9	Concrete Type C1	m ³	0.0	130.6	124.4	0.0	250.4	238.4	0.0	106.3	101.2	0.0	72.8	69.3	0.0	67.2	64.0	0.0	63.4	60.4	52.0	49.5	82.9	79.0	177.6	169.1	158.0	150.5	207.6	197.7	x 1.05
10	Concrete Type C2	m ³	93.0	56.9	2.4	51.8	9.7	2.4	6.8	4.5	2.4	1.9	2.5	0.0	2.4	2.5	0.0	2.4	3.8	3.6	0.0	0.0	0.0	0.0	0.8	0.8	0.0	0.0	135.4	128.9	x 1.05
11	Concrete Type E	m ³	3.7	35.0	26.8	6.6	17.8	16.9	0.0	18.2	17.3	0.0	7.9	7.1	0.4	11.7	10.8	0.4	18.0	17.2	13.4	12.8	20.3	19.4	177.5	169.0	14.5	13.8	117.0	111.4	x 1.05
12	Re- Bars	kg	3,561.0	11,885.4	8,749.1	1,155.4	5,678.1	4,731.8	0.0	5,169.1	4,307.6	0.0	4,718.3	3,853.4	78.5	4,956.9	4,052.3	78.5	3,285.4	2,737.8	2,510.0	2,091.7	4,786.9	3,989.1	7,974.0	6,645.0	7,870.6	6,558.9	8,716.5	7,263.8	x 1.20
13	Formwork FW1	m ²	419.0	459.4	331.5	106.0	221.4	210.8	0.0	219.5	209.0	0.0	199.7	179.7	10.5	200.0	180.0	10.5	171.7	163.5	84.0	80.0	233.5	222.4	288.1	274.4	271.7	258.7	431.3	410.8	x 1.05
14	Formwork FW2	m ²	0.5	74.2	70.6	0.0	38.5	36.6	0.0	36.1	34.4	0.0	11.5	11.0	0.0	18.3	17.4	0.0	5.4	5.2	21.0	20.0	43.8	41.8	60.0	57.1	30.1	28.7	68.8	65.5	x 1.05
15	Elastic Joint Filler	m ²	30.0	1.5	1.4	0.0	0.9	0.9	0.0	1.3	1.2	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	0.0	0.0	6.2	5.9	0.0	0.0	x 1.05
16	Water Stop	m	2.2	6.3	6.0	0.0	3.2	3.0	0.0	4.2	4.0	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	0.0	0.0	0.0	0.0	0.0	0.0	x 1.05
17	Dowel bar	kg	5.4	14.2	13.5	0.0	8.5	8.1	0.0	18.9	18.0	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	0.0	0.0	0.0	0.0	0.0	0.0	x 1.05
18	PVC Pipe d=250 with cap	m	1.2	3.2	3.0	0.0	1.9	1.8	0.0	4.2	4.0	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	0.0	0.0	0.0	0.0	0.0	0.0	x 1.05
19	Handrail	kg	0.0	294.7	268.0	0.0	162.4	147.7	0.0	209.4	190.3	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	0.0	0.0	0.0	0.0	0.0	0.0	x 1.10
20	Steel Ladder	kg	0.0	30.5	27.7	0.0	26.5	24.0	0.0	26.5	24.0	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	0.0	0.0	0.0	0.0	0.0	0.0	x 1.10
21	Flap Gate f 600	nos	1.0	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	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	0.0	x 1.00
22	Gate (1.5*1.5)	nos	0.0	0.0	0.0	0.0	1.0	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	x 1.00
23	Gate (1.5*2)	nos	0.0	2.0	2.0	0.0	0.0	0.0	0.0	1.0	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	x 1.00

4.2.1 SL2

ITEM NO	BQ - ITEMS (2nd DRAFT)	UNIT	REVISION Total	CORRECTING CHANGE
	DRAINAGE SLUICE SL2 (PG 95 + 35 m)			
1.	Clearing	m ²	2107, 2	
2.	Grubbing	m ³		
3.	Excavation (Common)	m ³	~~1237, 37~~	046 + 25.45 + 25.1 + 46. + 96 485
4.	Filling (Common)	m ³	(795, 74)	
5.	Back Fill by Selected Material	m ³	(231, 58)	
6.	Wet Stone Masonry (1:4)	m ³	168, 14	20 + 44 + 12 = 76.28
7.	Crusher Run Soil Filling	m ³	210, 54	7.3 + 10 + 111.42
8.	Cement Mortar Plastering 20mm thick 1:4	m ²	766, 38	58 + 122 + 191
9.	Steel Sheet Pile, Type - I including Driving	m ²	17, 70	
10.	Log Piles 150mm including Driving	m ¹	142, 5	48
11.	Concrete Type - C1 (1:2:2)	m ³	135, 91	22.5
12.	Concrete Type - C2	m ³	100, 00	17 + 0.7
13.	Concrete Type - E for leveling	m ³	39, 52	5
14.	Reinforcing Steel Bar	kg	8, 749, 13	
15.	Form Work FW1 H ≤ 2.5 m	m ²	231, 60	
16.	Form Work FW2 H > 2.5 m	m	70, 64	
17.	Elastic Joint Filler, 10mm thick	m ²	1, 44	
18.	Water Stop, 30cm wide	m	4, 80	
19.	Dowel Bar D19 L = 600	mm	6, 00	
20.	PVC Pipe Ø250 with cap	m	3, 00	
21.	Palm Fiber Filter, 20mm thick	m ²	21, 29	
22.	Gabion Mattress / cylinder	m ³	59, 14	19.16
23.	Slide Gate 2,000m x 450m x 2	Ls	2	
24.	Hand rail, Galvanized steel pipe Ø50	m	41, 2	
25.	Hand rail, Galvanized steel pipe Ø30	m	14, 55	
26.	Galvanized Steel ladder, D19	kg	6, 99	
	Neep hole			

3

NAME OF STRUCTURE: DRAINAGE SLUICE SLZ

LOCATION : PG 95 + 35 m

[illegible]

④

LOCATION

4 - 24

NAME OF STRUCTURE: SL2
LOCATION :

65,67

NAME OF STRUCTURE: 22
LOCATION :

4 - 26

BILL OF QUANTITY

NAME OF STRUCTURE: SL 2
LOCATION :

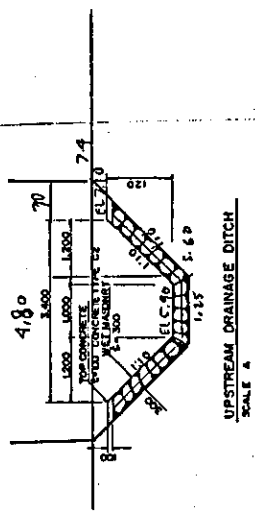
NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			LINED CHANNEL $L = 31,384$		
			EXCAVATION		
			I $\left[\frac{2,30 \times 0,60 + 4,40 \times 0,80 + 4,40 \times 1,10 + 0,70 \times 0,30}{2} \right] \times 31,384$	173,24	
			II $\left[\frac{2,30 \times 0,75 + 4,40 \times 1,10 + 4,40 \times 0,80 + 0,70 \times 0,30}{2} \right] \times 31,384$	178,65	
		m ³	WET MASONRY		351,89
			LEFT $\left(1,45 \times 0,35 \times 31,384 \right) \times 2$	43,84	43,84
			BACK FILL GRAVEL		
		m ³	$2,10 \times 0,15 \times 31,384$	9,88	9,88
			CONCRETE TYPE C2		
			TOP CONCRETE $t = 100$		
			$\left(0,10 \times 0,60 \right) \times 31,384 \times 2$	3,77	
			BASE CONCRETE		
			$\left[\frac{0,55 \times 0,10 \times 0,25 + (0,15 \times 0,10)}{2} \right] \times 31,384 \times 2$	8,55	
			$4,75 \times 0,15 \times (31,384 - 1000)$	20,22	
		m ³	LEAN CONCRETE TYPE C		28,77
		m ³	$\left(\frac{0,75 \times 0,10 \times 31,384}{2} \right) \times 2$	4,71	4,71
			WOOD PILE $\phi 150$ $L = 1500$		
			$(3,5 \times 16) \times 2$	48	48 ✓
			CEMENT MORTAR PUTTERING 20 mm (1:4)		
		m ²	$(1,95 \times 31,384) \times 2$	122,40	122,40 ✓

LOCATION

4 - 28

BILL OF QUANTITY

NAME OF STRUCTURE: SLZ
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			DITCH DRAINAGE L = 8,360		
			EXCAVATION		
		m ³	$\left[\frac{4,80 + 1,25}{2} \times 1,80 \right] \times 8,360$	45,52	45,52
			WET MASONRY		
		m ³	$(1,80 + 1,10 + 1,80 \times 0,30) \times 8,36$	11,79	11,79
			CONCRETE TYPE C2		
			TOP CONCRETE t = 100		
		m ³	$(0,40 \times 0,10) \times 8,36 \times 2$	0,68	0,68

BILLED QUANTITY

NAME OF STRUCTURE: OLMHAGE SLUICE -12
LOCATION : PEG-35M)

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL	
	PROFILE 1:200 SCALE 1:200		CULVERT			
			LEAN CONCRETE TYPE E			
			① $(2,6 \times 0,10) + \frac{(0,20 + 0,40) \times 0,30}{2} \times 4,30$		1,50	
			② $(2,90 \times 0,20) \times 11,90$		6,90	
			③ $(3,20 \times 0,30) \times 7,46$		7,39	
			4 $(3,85 \times 0,20) \times 11,90$		9,16	
			5 $(2,6 \times 4,80) \times 0,10 + \frac{(0,60 \times 0,40) \times 4,80}{2}$		1,82	
		m ³				26,77
				CONCRETE TYPE C1 (K 215)		
				① $(0,30 \times 2,50) + \frac{(0,30 + 0,60) \times 0,30}{2} \times 4,30$	3,81	
			m ³	② $(0,60 \times 2,90) \times 4,30$	7,43	
			m ³	③ $(3,20 \times 0,20) \times 4,80$	7,92	
				④ $(3,85 \times 0,60) + \frac{(1,85 + 2,05) \times 0,20 - (0,70 \times 0,70)}{2} \times 4,80$	13,18	
			m ³	5 $(0,30 \times 2,50) + \frac{(0,30 + 0,60) \times 0,30}{2} \times 4,8$	4,25	
						76,64
			⑥ $(5,30 \times 2) \times 2,4 + \frac{(5,30 \times 1,00) \times 0,40}{2} + \frac{(0,30 \times 0,30) \times 5,10}{2} - (2 \times 1,5 \times 2,4) \times 2$	2,36		

NAME OF STRUCTURE:	502
LOCATION	:

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NAME OF STRUCTURE: 5C
LOCATION :

4 - 32

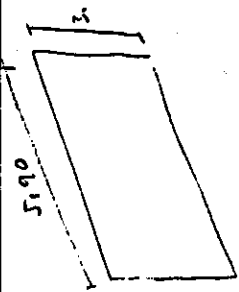
BILL OF QUANTITY

NAME OF STRUCTURE : SL 2
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			LINED CHANNEL B: 4.8m H = 2.6m L = 43.6		
			EXCAVATION MEAN FROM CROSS SECTION		
			EXCAVATION		
			$(4.09 + 2.161 + 0.42 + 3.53 + 4.61) \times 43.6$	333.98	333.98
			FILL		
			$1.90 + 2.87 + 4.31 + 2.70 + 2.105 + 43.6$	310.22	
			WET MASONRY 1:2:4		
			LEFT & RIGHT		
m ³			$(2.77 \times 0.35) \times 43.6 \times 2 + (2.77 \times 0.35) \times 8$	92.30	92.30
m ³			CEMENT MORTAR PLASTERING (1:4)		
			$(2.77 \times 43.6) \times 2 + 8 \times 2.77$	263.71	263.71
			BACK FILL GRAVEL		
m ³			$(2.90 \times 0.15) \times 43.6 \times 2 + (2.90 \times 0.15) \times 8$	39.67	39.67
			CONCRETE TYPE C2		
			TOP CONCRETE		
m ³			$(0.60 \times 0.10) \times 43.6 \times 2$	5.23	5.23
			BOTTOM		
m ³			$(4.80 \times 0.15) \times 41.10 + (4.80 \times 0.15) \times 8$	35.35	35.35
			BASE CONCRETE		
			$\left[\frac{(0.55 + 0.10 \times 0.15 + (0.55 \times 0.10))}{2} \times 41.10 \right] \times 2$	11.20	11.20
m ³			WOOD PIECE 150 CTR 200		51.78
			$(1.5 \times 21) \times 2$	63	63
			CONCRETE TYPE E	4	4
			$(0.75 \times 0.10) \times 43.6 \times 2$	6.54	6.54

BILL OF QUANTITY

NAME OF STRUCTURE: SL 2
 LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			STEEL SHEET PILE TYPE II		
			3,00 x 5,90	17,70	

BILL OF QUANTITY

NAME OF STRUCTURE: SL 2
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			REINFORCEMENT DIRT		
		m ³	WET MASONRY $(4.47 \times 0.25) \times 14.7 \times 2$	32.85	
					32.85
			BACK FILL BRICK		
			$(4.47 \times 0.25) + \left(\frac{0.95 \times 0.125}{2} \right) + \left(\frac{0.70 \times 0.40 \times 0.12}{2} \right) +$ $\left(\frac{0.50 \times 0.20}{2} \right) + (0.40 \times 0.10) + 14.7 \times 2$	42.22	
					42.22
			CEMENT MORTAR PLASTERING (SINGLE)		
			$(4.47 \times 14.7) \times 2$	131.42	
					131.42
			CONCRETE TYPE C1		
			$(0.50 \times 0.20) + \left(\frac{0.50 \times 0.20}{2} \right) \times 0.30 \times 29.4$	9.41	
			$(0.20 \times 0.70) \times 29.4$	6.17	
			CONCRETE FLOOR OF WET MASONRY		
			$(0.70 \times 0.30) \times 4.47 \times 2$	2.82	
		m ³			18.40
			PALM FIBER FILTER		
		m ²	$(0.363 \times 0.815) \times 15$	4.43	
			PIPE PPV		
		m ¹	0.70×15	10.5	
					10.5
			GABION CYLINDER		
			$\pi r^2 \cdot l = (\pi \times 0.25^2 \cdot 4) \times 4$		3.14

NAME OF STRUCTURE: SL2
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION-	VOLUME SUBTOTAL	VOLUME TOTAL
			RETAINMENT RIVER		
			WET MASONRY		
			$(13,10 \times 14,70) \times 0,25 \times 2$	96,28	96,28
			BACK FILL GRAVEL		
			$\left[\frac{13,10 \times 14,70}{2} \times 0,25 + \left(\frac{1,40 + 0,90}{2} \times 0,20 \right) \times 0,40 \times 0,10 \right] \times 2$		
			$\left(\frac{0,90 \times 0,30}{2} \right) + \left(\frac{0,70 + 0,40}{2} \times 0,10 \right) \times 14,70 \times 2$	111,42	111,42
			CONCRETE TYPE C1		
		A	$\left[(0,50 \times 0,20) + \left(\frac{0,50 + 0,20}{2} \right) \times 0,10 \right] \times 14,70 \times 2$	6,47	
			B $[(0,30 \times 0,70) \times 14,70] \times 2$	6,17	
			CONCRETE SPACE WET MASONRY		
			$[(0,70 \times 0,30) \times 13,10] \times 3$	8,25	20,89
			WOOD PILE $\phi 150$ $L = 1500$ CTC = 2000		
		M	$\frac{30}{2} \times 15$	22,5	
			PALM FIBER FILTER		
		M ²	$(0,363 \times 0,815) \times 57$	16,86	
		M	PIPE PPE		
			$59 \times 0,70$	44,84	16,86
			GABION MATRESS		
		M ³	$(0,50 \times 3) \times 20,00$	45	44,34
			PLASTERING MULTIM (STAIRWAY) 1.4		
		M ²	$(13 \times 14,70) \times 1.4$	191,10	45
			GABION CYLINDER		
			$\pi R^2 \times L = [\pi \times 0,25^2 \times 14] \times 4$	11,00	191,10
					11,00

1,44

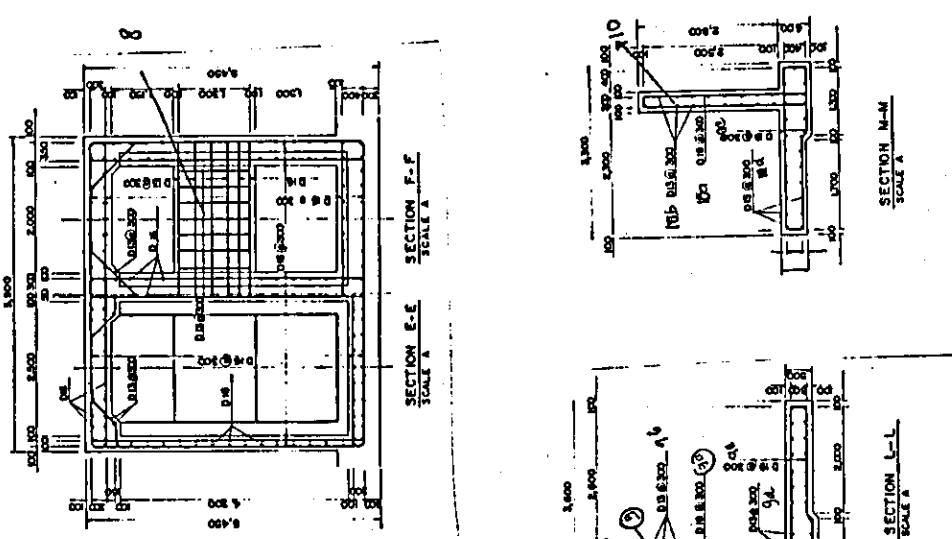
LOCATION

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NAME OF STRUCTURE:	LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			REINFORCEMENT STEEL BAR		
			STEEL Ø13		
		m	12 Ø13 (9 × 4.7) × 2	84.60	
		m	16 Ø13 (17 × 2.80) × 2	95.20	179.8
			2 Ø16 (4 × 10.70)	42.80	
			3 Ø16 (7 × 30.4)	212.80	
			4 Ø16 (12 × 28.80)	345.6	
			5 Ø16 (11 × 30.4)	334.4	
			6 Ø16 (6 × 10.70)	64.20	999.8
			2 Ø13 (3 × 1.4) × 8	33.6	
			3 Ø13 (7 × 0.85) × 8	47.6	
			4 Ø13 (11 × 0.85) × 8	74.80	
			5 Ø13 (11 × 0.85) × 8	74.80	
			20 Ø13 (34 × 2.15)	85	230.80
			26 Ø13 (3 × 9.95) × 2	59.70	
			7 Ø13 (17 × 3)	51	144.7
			7 Ø13 (5 × 4.9)	24.5	
			7 Ø13 (17 × 1.2)	20.4	
			8 Ø13 (2 × 31.6)	63.2	95.9
			8 Ø13 (3 × 19.6)	43.8	
			8 Ø13 (6 × 21.7)	43.2	
					150.20

NAME OF STRUCTURE :
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			8 D13 $7 \times 3,10$	21,70	
			D13 $6 \times 11,8$	70,80	
					92,5
			9a. D19 $[(12 \times 7,10)] \times 2$ L&R	170,40	
			9b. D13 $[(10 \times 7,0)] \times 2$ L&R	140	
			9c. D19 $(7 \times 6,5) \times 2$ L&R	91	
			9d. D13 $(3 \times 7,10) \times 2$ L&R	184,6	
					586
			10a. D19 $(11 \times 6,5) \times 2$	143	
			10b. D13 $(11 \times 7,10) \times 2$	156,2	
			10c. D19 $(10 \times 7) \times 2$	140	
			10d. $[(10 \times 7) + (3,2)] \times 2$	146,40	
					585,6

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NAME OF STRUCTURE: 512
LOCATION :

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ITEM NO	BQ - ITEMS (2nd DRAFT)	UNIT	REVISION
	DRAINAGE SLUICE SL3 (1:1:1)		
1	Cleaning	m ²	450
2	Grubbing	m ²	
3	Excavation (Common)	m ³	290,42
4	Filling (Common)	m ³	
5	Back Fill by Selected Material	m ³	72,43
6	Well Stone Masonry (1:4)	m ³	26,14
7	Crusher Run Graveling	m ²	21,71
8	Cement Mortar Plastering 20mm thick 1:4	m ²	104,03
9	Steel Sheet Pile, Type - II including Driving	m ²	25,8
10	Wood Piles, 150mm including Driving	m ¹	
11	Concrete Type - C1 (K225)	m ³	82,25
12	Concrete Type - C2	m ³	6,84
13	Concrete Type - E For leveling	m ³	16,93
14	Reinforcing Steel Bar	kg	4.301,6
15	Form Work FW1 H ≤ 2,5 m	m ²	210,81
16	Form Work FW2 H > 2,5 m	m ²	36,63
17	Elastic Joint Filler, 10mm thick	m ²	0,40
18	Water Stop, 30cm wide	m	1,50
19	Dowel Bar D19 L = 600	m	1,80
20	PVC Pipe Ø250 With cap	m	0,90
21	Palm Fiber Filter, 20mm thick	m ²	
22	Gabion mattress / Cylinder	m ³	
23	Slide Gate 1,500m x 1,5m	Ls	1
24	Hand rail, Galvanized steel pipe Ø50	m	22,40
25	Hand rail, Galvanized steel pipe Ø35	m	8,5
26	Galvanized steel ladder, D19	kg	2,34

NAME OF STRUCTURE: 213
LOCATION :

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NAME OF STRUCTURE: 513
LOCATION :

4 - 44

BILL OF QUANTITY

NAME OF STRUCTURE: SL3
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			WET STONE MASONRY		
			UPSTREAM CHANNEL (Connecting Channel)		
			WING WALL, LEFT & RIGHT		
			$[(3.65 \times 0.25) \times 10] \times 2$	(18.25)	
			DOWN STREAM (WING WALL)		
			$(2.20 \times 0.25) \times 3 \times 2$	3.45	
			$[(2.20 \times 0.25) \times 3.47] \times 2$	2.00	
			RIVER (END)		
			$(6.50 \times 0.25) \times 1.50$	2.44	
				(26.14)	
			CRUSHER AND BEDDING		
			UPSTREAM CHANNEL		
			$[(3.85 \times 0.20) \times 10] \times 2$	15.40	
			DOWN STREAM		
			$(2.20 \times 0.20) \times 3 \times 2$	2.76	
			$(\frac{2.20 \times 0.20}{2} \times 3.47) \times 2$		
			RIVER END	1.60	
			$(6.15 \times 0.20) \times 1.5$	1.95	
				21.71	
			STEEL SHEET PILE		
		m ²	8.6 x 3	25.8	

NAME OF STRUCTURE:	LOCATION :

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BILL OF QUANTITY

NAME OF STRUCTURE : SL2
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
1		m ³	CONCRETE TYPE C1 $(1.80 + 1.50) \times 2.5 \times 0.10 + (0.10 + 0.60) \times 1.80$	2.05	
2		m ³	$(1.50 \times 2.50) \times 0.10 + (0.10 + 0.60) \times 1.5$	1.800	
3		①	$(2.90 \times 0.40) + (3.60 \times 0.10) +$ $+ (1.50 + 1.40) \times 0.10 \times 2$	13.63	
4		④	$(2.80 \times 0.40) + (3.6 \times 0.10) + (1.50 + 1.40) \times 0.10 \times 2$	13.31	
5a		m	$(0.50 \times 2.50) \times 0.10$	0.62	
5b		m	$(2.50 \times 3.60) - (1.50 \times 1.50) \times 0.40$	2.40	
5c		m	$(0.40 \times 0.30) \times 2.50$	0.15	
5d		m	$(2.6 \times 2.50) - (1.50 \times 1.50) \times 1.60$	6.20	
6		m	$(2.10 \times 2.10) - (1.50 \times 1.50) \times 1$	3.04	
7		m	$(4.20 \times 3.90) - (1.50 \times 1.50) \times 0.40$	4.95	
8		m	$(2.10 \times 2.10) - (1.50 \times 1.50) \times 0.60$	1.22	
9		m	$(2.6 \times 2.10) - (1.50 \times 1.50) \times 2.95$	12.54	
10		m	$(3.8 \times 2.50) - (1.50 \times 1.50) \times 0.40$	2.90	
101		m	$(0.70 \times 0.40) \times 2.50$	0.35	
102		m	$(1.45 \times 0.80) \times 2 - (0.70 \times 0.70 \times 2)$	2.04	
			$(0.22 \times 0.15) \times 7.50 \times 4$	77.88	
			PORT GATE	0.42	
11		m	$(2.5 \times 2.60) \times 0.50 + (2.5 + 1.10) \times 0.15 \times 2.60$	3.95	
				82.25	

NAME OF STRUCTURE: SL
LOCATION :

4 - 48

BILL OF QUANTITY

NAME OF STRUCTURE: S(13)

LOCATION

SKETCHES OF STRUCTURE

UNIT

QUANTITY CALCULATION

VOLUME
SUB TOTAL

DATE	DESCRIPTION	AMOUNT	VOLUME	TOTAL
10/1/20	...	...	...	...
10/2/20	...	...	...	...
10/3/20	...	...	...	...
10/4/20	...	...	...	...
10/5/20	...	...	...	...
10/6/20	...	...	...	...
10/7/20	...	...	...	...
10/8/20	...	...	...	...
10/9/20	...	...	...	...
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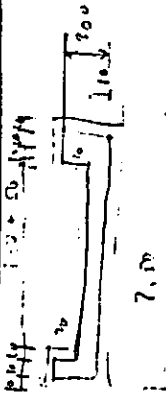
NAME OF STRUCTURE: 5L1
LOCATION :

4 - 50

BILL OF QUANTITY

NAME OF STRUCTURE :
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
		S	PERFORMING		
K5		D16	$(5 \times 46.5) \times 1.56$	352.92	
S8		D16	$(8 \times 5.30) \times 1.56$	66.15	
5C		D16	$(7 \times 4.72) \times 1.56$	51.32	
5D		D16	$(11 \times 5.30) \times 1.56$	90.95	
5E		D16	$(4 \times 6.00) \times 1.56$	37.44	
5F		D16	$(3 \times 5.30) \times 1.56$	24.80	
5G		D16	$(5 \times 45.9) \times 1.56$	358.02	
5H		D16	$(5 \times 5.30) \times 1.56$	41.34	
5I		D16	$(9 \times 4.72) \times 1.56$	56.41	
5J		D16	$(8 \times 5.30) \times 1.56$	66.14	
5K		D16	$(13 \times 2.10) \times 1.56$	46.64	
5L		D16	$(8 \times 1.7) \times 0.995$	13.53	
5M		D16	$(8 \times 1.4) \times 0.995$	11.14	
5N		D16	$(4 \times 2.10) \times 0.995$	9.15	
5O		D16	$(5 \times 3.0) \times 0.995$	14.93	
5P		D16	$(5 \times 2.10) \times 1.56 \times 2$	71.76	
5Q		D16	$(4 \times 3.5) \times 1.56 \times 2$	42.68	
5R		D16	$(6 \times 2.10) \times 2 \times 1.56$	78.62	
5S		D16	$(17 \times 2.10) \times 2 \times 1.56$	243.98	
5T		D16	$(4 \times 6.90) \times 2 \times 0.995$	54.92	
5U		D16	$(3 \times 1.80) \times 2 \times 0.995$	28.66	
5V		D16	$(1 \times 8.60) \times 0.995$	34.23	
5W		D16	$(5 \times 2.10) \times 0.995$	15.42	
					1.832, 15



NAME OF STRUCTURE :

LOCATION :

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BILL OF QUANTITY

NAME OF STRUCTURE : SL3

LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			FORM WORK FW 1 $\leq 2,50m$		
			$(0,60 \times 18,30) \times 2$	21,96	
			$(2,50 \times 15,30) \times 2$	76,50	
			CULVERT		
			$5,6 \times 8,10$	45,36	
			$(2,40 \times 2,70) \times 2$	12,96	
			$(2,50 \times 5,80) \times 2$	29	
		#	$(2,50 \times 2,40) \times 2$	12	
			POST STAIR		
			$(2,50 \times 1,10) \times 2$	2,75	
			$(2,6 \times 2,5) + [(1,50 \times 2,60) + (0,60 \times 2,6) + (2,60 \times 0,50)] \times 2$	6,50	
			$(0,90 \times 1,80) + (1,20 \times 1,80)$	3,78	210,81
			FORM WORK FW 2 $> 2,50m$		
			$(0,40 \times 15,30) \times 2$	12,24	
		#	$(0,70 \times 2,40) \times 2$	4,32	
			$[(2,50 \times 0,50) + (0,50 \times 1,10 \times 0,15)] \times 2$	1,49	
			$[(1,50 \times 2,60) + (0,60 \times 2,60) + (2,60 \times 0,50)] \times 2$	13,52	
			$(4,6 \times 1,10)$	5,06	36,63

SL 4

ITEM NO	BQ - ITEMS (2 nd Draft)	UNIT	Revised
	DRAINAGE FLAPE-GATE- SLUICE GATE		
✓ 1	Clearing & Grubbing	m2	423, 19
✓ 2	Excavation (Common)	m3	800, 91
3	^{Filling} Filling (Common)	m3	.
✓ 4	Back Fill by Selected Material	m3	109, 86
5	Wet Stone Masonry (1:4)	m3	30, 70
6	Crusher Run Bedding	m3	9, 34
7	Cement Mortar Plastering 20 mm thick 1:4	m2	106, 81
8	Steel Sheet Pile, Type II including Driving	m2	27, 30
9	Concrete Type - C1 (K 225)	m3	101, 21
10	Concrete Type - C2	m3	10, 33
11	Concrete Type - E for leveling	m3	17, 31
12	Reinforcing Steel Bar	Kg	3916, 52
13	Form Work FW1 H ≤ 2,5	m2	209, 27
14	Form Work FW2 H ≥ 2,5 m	m	34, 48
15	Elastic Joint Filler, 10 mm thick	m2	0, 60
16	Water Stop, 30 Cm Wide	m	2, 0
17	Dowel bar - D 19 L = 600	m2	4, 00
18	PVC PIPE Ø 250 WITH CAP	m3	2, 10
19	Gabion mattress / cylinder	m ³	.
20	Slide Gate 2,00 x 1,5	mL	1
21	Flape-Gate 2,000 m x 1,5 m x 2	Ls	.
22	Hand rail, Galvanized Steel pipe Ø 50	Kg	34, 70
23	Hand rail, Galvanized Steel pipe Ø 25/35	Kg	9, 50
24	Galvanized Steel Ladder, D19	Kg	3, 34

SS

BILL OF QUANTITY

NAME OF STRUCTURE: SL 4
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			CLEARING AND GRUBBING		
			$(8.50 \times 20) + (13 \times 9.55) + (10.60 \times 300) +$		
			(10.60×9.174)	423.19	423.19
			EXCAVATION		
			UPSTREAM CHANNEL		
			$\frac{(1.10 \times 0.120)}{2} + \frac{(4 \times 1.80)}{2} + \frac{(2.80 \times 1.20)}{2} +$		
			$\frac{(0.75 \times 0.45)}{2} + \frac{(1.00 \times 0.10)}{2} + \frac{(0.50 \times 0.20)}{2} +$		
			$\frac{(2.70 \times 0.70)}{2} + \frac{(0.75 \times 0.45)}{2} + \frac{(2.20 \times 0.60)}{2}$		
			$+ \frac{(2.20 \times 0.10)}{2} + \frac{(0.10 \times 0.20)}{2} + \frac{(0.60 \times 0.10)}{2} \times 20$	178	
			DITCH CHANNEL		
			$\frac{(2.30 \times 0.15)}{2} + \frac{(2.20 \times 0.60)}{2} + \frac{(2.20 \times 0.60)}{2} +$		
			$\frac{(2.20 \times 0.10)}{2} = 1.63 \times 2.25$	3.67	
			$\frac{(2.15 \times 0.95)}{2} + \frac{(2.15 \times 0.20)}{2} + \frac{(1.80 \times 1.00)}{2} +$		
			$\frac{(1.00 \times 0.15)}{2} + \frac{(0.10 \times 0.15)}{2} \times 0.81 \times 3.2$	8.15	

BILL OF QUANTITY

NAME OF STRUCTURE: SL 4
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			EXCAVATION CULVERT 31.94 $\left[\frac{(3.55 \times 9.00) + (15.00 \times 9.55)}{2} \right] \times 3 =$ $\frac{(1.50 + 4.50) \times 1.50}{2} \times 1.50 = 262.800 - 4.50$	258.30	
			$\frac{(4.00 \times 9.00) + (15.00 \times 10.00)}{2} \times 3$	279.0	

BILL OF QUANTITY

NAME OF STRUCTURE: SL 4
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			DOWN STREAM CHANNEL		
			$\left[\frac{8.60 + 2.00}{2} \times 3.30 \right] \times 7.150 =$		
			$\left[\frac{0.70 + 3.70}{2} \right] \times 3 \times 8.60 = 125.054 - 56.76$	68.29	
			$(5 \times 0.00) \times 2$	5.00	
					800.41
			BACK FILL BY SELECTED MATERIAL		
			$\left[\frac{9.45 + 3.40}{2} \right] \times 3 \times 8.75 - [2.40 \times 2.80 \times 8.75]$		
			$168.656 - 58.80$	109.86	
					109.86

NAME OF STRUCTURE: 54
LOCATION :

0.65 : 0.40

NAME OF STRUCTURE: 514
LOCATION :

5

BILL OF QUANTITY

NAME OF STRUCTURE: 514

LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
	CRUSHER RUN BEDDING		UPSTREAM CHANNEL		
			$[(2.75 \times 0.20) \times 20] \times 2$		
			DOWN STREAM CHANNEL		
			$[(3.30 \times 0.20) \times 3] \times 2 + (1.80 \times 0.20) \times 4.70 \times 2$	7.34	
			3.96		
			END CHANNEL		
			$(5 \times 0.20) \times 2$	2.	
		m ³			9.34
			CEMENT MONIAL RACERINC (UPSTREAM)		
		m ³	$(1.55 \times 20) \times 2$	62.00	
			DITCH CHANNEL		
			$(0.55 \times 0.50 \times 0.55 \times 2.5) + (0.65 \times 0.50 \times 0.65) \times 10$		
		m ³	$\div (0.55 \times 0.50 \times 0.55 \times 2)$	10.40	
			DOWNSTREAM CHANNEL		
			$(3.05 \times 3.00) \times 2 + (0.65 \times 4.70) \times 2$	24.41	
			18.30 + 6.11		
			END CHANNEL		
			5 x 2	10	
					106.81
			STEEL SHEET PILE		
			9.10 x 3	27.30	27.30

BILL OF QUANTITY

NAME OF STRUCTURE :
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			Concrete type C1		
1			$\left[\frac{(0.10 + 0.60) \times 0.150}{2} \right] \times 2 + (2 \times 2.50 \times 0.15) \times 2$	3.54	
2			$\left[(1.00 \times 0.40) + (2.60 \times 0.50) + \frac{(1.50 + 1.60) \times 0.10}{2} \right] \times 2$	12.62	
3			$(2.50 \times 0.40) + (3.15 \times 0.50) + \frac{(1.40 + 1.50) \times 0.10}{2} \times 2$	16.32	

BILL OF QUANTITY

NAME OF STRUCTURE: SL4
LOCATION :

0.1"

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
4			$4 \left[(0.60 \times 0.50) \times 3.00 + (2.00 \times 2.00 \times 2.00) + \right. \\ \left. (0.70 \times 0.40) \times 3.00 + (0.25 \times 0.15) \times 3 \times 4 \right. \\ \left. (0.20 \times 0.10) \times 4 \right] - (1.50 \times 2 \times 2)$	11.65	
5			$5 \left[(2.40 \times 2.80) \times 3.30 + (0.15 \times 0.15) \times 3.30 \times 4 \right] - \\ (1.50 \times 2 \times 3.30) +$	12.52	
5a			$5a \left(3.40 + 2.80 + 3.90 \right) \times 0.90 + (0.15 \times 0.15) \times 0.40 \times 4 \\ - (1.50 \times 2 \times 0.90)$	2.67	
6			$6 \left(3.00 \times 2.60 \times 5.60 \right) + (0.65 \times 0.35) \times 3.10 + \\ (0.25 \times 0.15) \times 3.10 - (1.50 \times 2 \times 5.60)$	27.29	
7			$7 \left(3.10 \times 1.95 \right) \times 0.80 - (0.20 \times 0.70 \times 2.50)$	4.49	
8			$8 \left(1.50 \times 2.00 \right) \times 0.40$	1.20	

BILL OF QUANTITY

NAME OF STRUCTURE :
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			CONCRETE TYPE C1		
			POST GRAB		
		m	$\left[(0.55 \times 0.40) + (0.70 \times 0.40) \right] \times 4.12 \times 2$ 3.84	4.20	
			$(3.10 \times 2.50) \times 0.50 + \frac{(2.50 + 3.10 \times 0.15) \times 3.10}{2}$	4.71	
					101.21
			CONCRETE TYPE C2		
			UPPER PART CONCRETE		
			TOP CONCRETE		
			$(0.50 \times 0.10) \times 20 \times 2$	2.00	
			BASE 0.05		
			$\left[(0.55 \times 0.10) + (0.10 \times 0.10 \times 0.15) \right] \times 20 \times 2$	5.2	
			$(1.30 \times 0.10) \times 0.15$	1.08	
			DITCH		
			$(0.35 \times 0.10) \times 5.4$	0.19	

NAME OF STRUCTURE: 514
LOCATION :

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NAME OF STRUCTURE: SL 4
LOCATION :

4 - 65

NAME OF STRUCTURE: 54
LOCATION :

4 - 66

NAME OF STRUCTURE: 514
LOCATION :

4 - 67

NAME OF STRUCTURE :	LOCATION :

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ITEM NO	BQ - ITEMS (2nd DRAFT)	UNIT	REVISION
	DRAINAGE SLUICE SL5 (1.0 - 1.0 m)		
1.	Clearing & Grubbing	m ²	131,54 ✓
2.	Grubbing	m ²	
3.	Excavation (common)	m ³	175,53
4.	Filling (common)	m ³	
5.	Back Fill by Selected Material	m ³	412,02
6.	Wet Stone Masonry (1:4)	m ³	5,27 ✓
7.	Crusher Run Berthing	m ²	4,30 ✓
8.	Cement Mortar Plastering 20mm thick 1:4	m ²	21,06 ✓
9.	Steel Sheet Pile, Type - II including Driving	m ²	
10.	Wood Piles, 150mm including Driving	m ¹	
11.	Concrete Type - C1 (K22c)	m ³	69,33 ✓
12.	Concrete Type - C2	m ³	0,95 ✓
13.	Concrete Type - E For leveling	m ³	7,149
14.	Reinforcing Steel Bar	kg	3853,42 ✓
15.	Form Work FW1 H ≤ 2.5 m	m ²	179,72
16.	Form Work FW2 H > 2.5 m	m ²	10,95
17.	Elastic Joint Filler, 10mm thick	m ²	
18.	Water Stop, 30cm wide	m	
19.	Dowel Bar D19 L = 600	m	
20.	PVC Pipe φ250 With cap	m	
21.	Palm Fiber Filter, 20mm thick	m ²	
22.	Gabion mattress / cylinder	m ³	
23.	Slide Gate 1,500m x 1.5m	Ls	1
24.	Hand rail, Galvanized steel pipe φ50	kg	
25.	Hand rail, Galvanized steel pipe φ50	kg	
26.	Galvanized steel ladder, D19	kg	

BILL OF QUANTITY

NAME OF STRUCTURE: SL5
LOCATION :

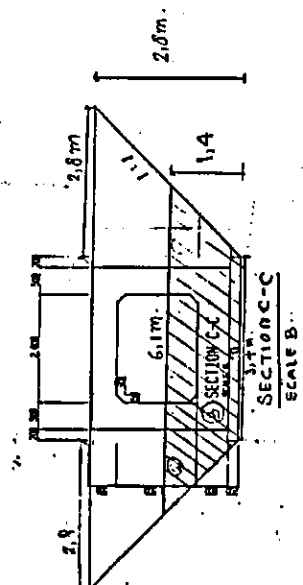
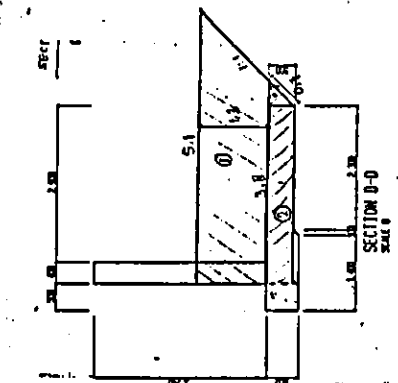
NO		UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			Clearing & Grubbing.		
			①		
		m ²	$(11.8 \times 5.2) + (6.8 \times 6.1) + (3.0 \times 4.1)$	131.54	✓
			Form Work FW1 H ≤ 2.5m.		
			≤ 2.50		
			11.80×2.50	29.50	
			CULVEAT		
			6.80×12.685	86.26	
			3.00×1.24	3.72	
			$(2.60 \times 11.585) \times 2$	60.24	179.72
			Form Work FW2 H ≥ 2.5 m		
			≥ 2.50		
			(0.74×14.80)	10.95	

NAME OF STRUCTURE:	LOCATION

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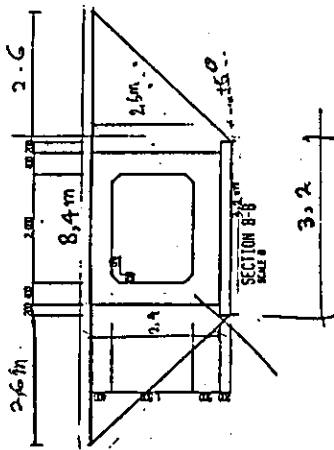
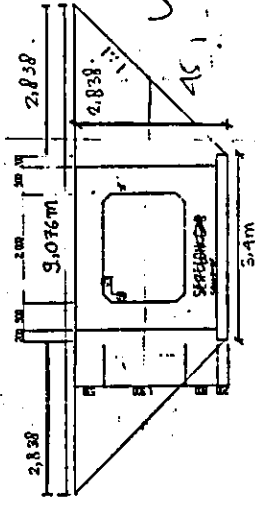
BILL OF QUANTITY

NAME OF STRUCTURE :
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
3			EXCAVATION		
		m ³	$\left[\frac{6,1 + 3,4}{2} \right] \times 1,4 \times 4,1$	27,27	
4			EXCAVATION		
		m ³	$\left[\frac{5,1 + 3,8}{2} \right] \times 1,3 + (2,3 \times 0,5) + \left(\frac{1,0 + 0,9}{2} \right) \times 0,1$		
			$+ \left(\frac{0,7 + 0,3}{2} \right) \times 7,8$	59,59	
					175,53

BILL OF QUANTITY

NAME OF STRUCTURE: SLS
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
1		m ²	BACK FILL BY SELECTED MATERIAL $\left(\frac{8.4 + 3.2}{2} \right) \times 2.6 - (2.4 \times 2.8) + (3.2 \times 0.2)$	9.00	
		m ³	9.01 m ² x 6.1 m	54.9	
2		m ²	$\left(\frac{9.076 + 3.4}{2} \right) \times 2.838 - (2.638 \times 2.0) + (3.4 \times 0.2)$	10.47	
		m ³	10.47 m ² x 1.8 m	18.85	

NAME OF STRUCTURE:	LOCATION :

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BILL OF QUANTITY

NAME OF STRUCTURE :
LOCATION :

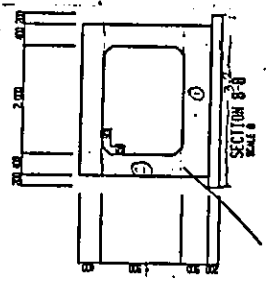
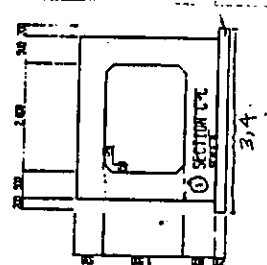
NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
				26.11	
		m ²	Cement Mortar Plastering (3.51 x 3) x 2	21.06 ✓	
		m ³	Wet Stone Masonry (3.51 x 0.25 x 3) x 2	5.27 ✓	
		m ³	CRUSHER RUN BEDDING (0.20 x 3.583 x 3) x 2	4.30 ✓	

NAME OF STRUCTURE: SL5
LOCATION :

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BILL OF QUANTITY

NAME OF STRUCTURE: 9LS
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
	SECTION B-B 	m ³	Concrete type - C ₁ Mass ① $(2.8 \times 0.5) \times 2.8 + [(1.5 \times 0.4) \times 2.8] \times 2$ $+ (3.2 \times 0.2) \times 2.8 + (2.8 \times 0.4) \times 2.8$	12.21	
	SECTION C-C 	m ³	Concrete type - C ₁ ① $(3.0 \times 0.6) \times 3.0 + [(1.5 \times 0.5) \times 3.0] \times 2$ $+ (3.0 \times 0.538) \times 3.0 + (3.4 \times 0.2) \times 3.0$	16.78	69.33 ✓

NAME OF STRUCTURE: SL5
LOCATION :

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BILL OF QUANTITY

NAME OF STRUCTURE: SL5
LOCATION :

NO	SKETSA OF STRUCTURE	SHAPE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
	Reinforcing steel Bar					
	UPSTREAM CHANNEL					
k ₂		1	D13 (6 x 2.3) x 0.995	13.73		
		2	D13 (9 x 1.6) x 0.995	14.33		
k ₃		3	D16 (2 x 13.4) x 1.56	41.81		
		4	D16 (7 x 7.68) x 2.25 x 2	241.92		
		5	D19 (7 x 3.05) x 2.25 x 2	253.58		
		6	D13 (6 x 14.0) x 0.995	83.58		
		7	D13 (7 x 5.2) x 0.995 x 2	72.44		
		8	D13 (9 x 3.68) x 0.995	32.95		
		9	D16 (8 x 10.4) x 1.56	129.79		
		10	D16 (8 x 10.4) x 1.56	129.79		
		11	D13 [(8 x 1.4) + (8 x 1.5) x 2] x 0.995	46.17		
		12	D13 (8 x 1.4) x 0.995	11.14		

BILL OF QUANTITY

NAME OF STRUCTURE :
 LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			Reinforcing Steel Bar		
13			D16 (24 x 9.6) x 1.56	359.42	
14			D16 (24 x 9.6) x 1.56	359.42	
15			D13 (24 x 4.8) x 0.995	114.62	
16			D16 (9 x 10.8) x 1.56	151.63	
17			D16 (9 x 10.8) x 1.56	151.63	
18			D15 (9 x 5.7) x 0.995	51.04	
19			D16 (4 x 5.4) x 1.56	33.70	
20			D16 (1 x 2.3) x 1.56] x 2	7.18	
21			D16 (7 x 26.575) x 1.56	290.20	
22			D16 (7 x 29.746) x 1.56	324.83	
23			D16 (11 x 27.346) x 1.56] x 2	938.52	
					3853.42

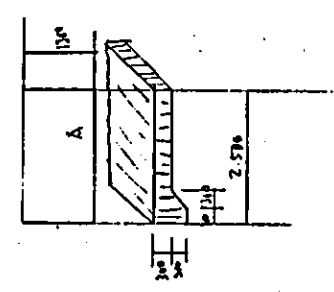
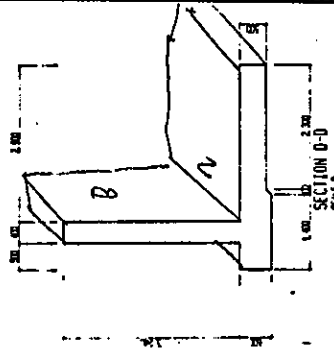
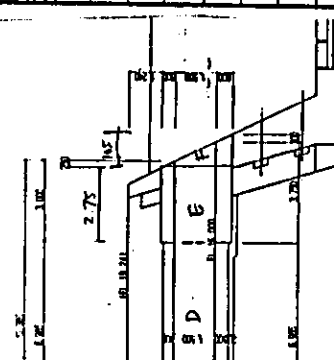
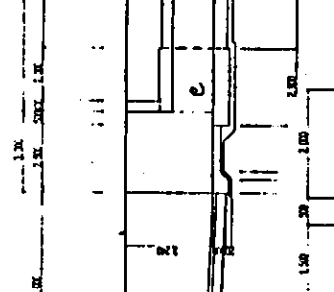
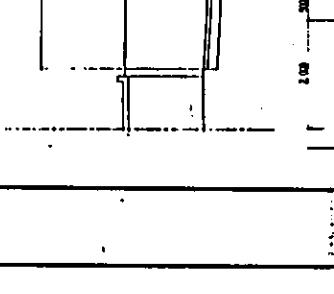
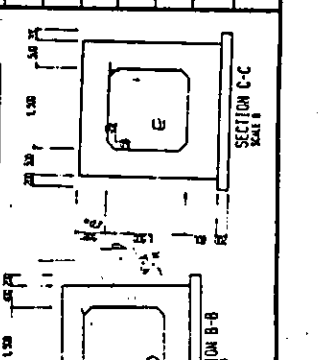
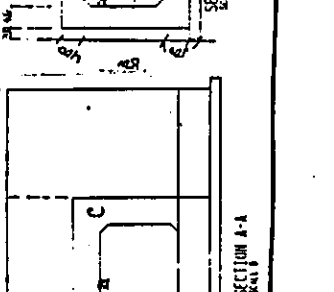
ITEM NO	BQ - ITEMS (2nd DRAFT)	UNIT	REVISION
	DRAINAGE SL6		
1.	Clearing	m ²	140,45
2.	Grubbing	m ³	
3.	Excavation (common)	m ³	64,00
4.	Filling (common)	m ³	—
5.	Back Fill by Selected Material	m ³	—
6.	Wet Stone Masonry (1:4)	m ³	17,55
7.	Crusher Run Graveling	m ²	14,60
8.	Cement Mortar Plastering 20mm thick 1:4	m ²	70,26
9.	Steel Sheet Pile, Type - II including Driving	m ²	—
10.	Wood Piles, 150mm including Driving	m ¹	—
11.	Concrete Type - C1 (K225)	m ³	64
12.	Concrete Type - C2	m ³	5,09
13.	Concrete Type - E For leveling	m ³	10,76
14.	Reinforcing Steel Bar	kg	3.241,82
15.	Form Work FW1 H ≤ 2,5 m	m ²	168,78
16.	Form Work FW2 H > 2,5 m	m ²	17,40
17.	Elastic Joint Filler, 10mm thick	m ²	—
18.	Water Stop, 30cm wide	m	—
19.	Dowel Bar D19 L = 600	m	—
20.	PVC Pipe Ø250 With cap	m	—
21.	Palm Fiber Filter, 20mm thick	m ²	—
22.	Gabion mattress /Cylinder	m ³	—
23.	Slide Gate 2,500m x 45m	Ls	—
24.	Hand rail, Galvanized steel pipe Ø50	kg	—
25.	Hand rail, Galvanized steel pipe Ø25	kg	—
26.	Galvanized steel ladder, D19	kg	—

NAME OF STRUCTURE: SL6
LOCATION :

4 - 82

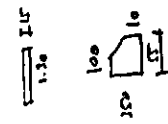
BILL OF QUANTITY

NAME OF STRUCTURE: SL 6
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			CONCRETE TYPE C1		
			UPSTREAM CHAMBER		
A			$1.20 \times 2.50 \times 0.90 + \left(\frac{0.30 + 0.60}{2} \right) \times 0.30 \times 1.20$	1.15	
B			$\left[\frac{(3.24 \times 0.40) + (0.50 \times 3.80) + (1.40 \times 1.50) \times 0.10}{2} \right] \times 2$	13.36	
C			$\left[\frac{(2.60 \times 2.50) \times 2.4 + (0.50 \times 0.60 \times 2.5) + (1.24 \times 2.5 \times 0.40)}{2} \right] - [(1.50 \times 1.50 \times 2.40)]$	12.19	
D			$(2.40 \times 2.30) \times 6.485 - [1.50 \times 1.50 \times 6.485]$	22.84	
E			$\left[\frac{(2.60 \times 2.50) \times 2.35}{2} - [1.50 \times 1.50 \times 2.35] \right]$	11.69	
F			$\frac{(2.60 \times 2.50) \times 1.05}{2} - [1.50 \times 1.50 \times 1.05]$	2.23	
G			$\left(\frac{0.21 \times 0.10}{2} \right) \times 12.885 \times 4$	0.54	64.00
			FORM WORK		
			$\leq 2.5M$		
			11.30×2.50	28.25	
			2.50×1.240	3.10	
			Culvert		
			$(2.60 \times 12.28) \times 2$	63.86	
			5.80×12.635	73.57	152.72
			≥ 2.50		
			11.30×1.54	17.40	

BILL OF QUANTITY

NAME OF STRUCTURE: 166
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			CONCRETE TYPE C2		
			TOP CHAMFER		
			$(0.50 \times 0.10) \times 10 \times 2$	1.00	
			Bed Channel		
			$(0.15 \times 1.30) \times 7$	1.36	
			$((0.55 \times 0.10) + (0.55 + 0.10 \times 0.25)) \times 10 \times 2$	2.73	
					5.09
			CONCRETE TYPE E FOR LEVELING		
1			$(2.70 \times 0.10) \times 1.30 + \frac{(0.20 + 0.60 + 0.40)}{2} \times 1.30$	0.56	
2			$(2.90 \times 2.90) \times 0.20$	1.68	
3			$(6.985 \times 2.80) + 9.20 + \frac{(0.20 + 0.30 + 0.10 \times 2.80)}{2} + \frac{(0.55 + 0.45) \times 0.10 \times 2.80}{2}$	4.12	
4			$(1.80 \times 2.90) \times 0.20$	1.04	
5			$(4.20 \times 2.00) + 0.70 \times 2$	3.36	
					10.76

NAME OF STRUCTURE: 516
LOCATION :

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NAME OF STRUCTURE: 86.
LOCATION :

4 - 86

ITEM NO	BQ - ITEMS (2nd DRAFT)	UNIT	REVISION
	DRAINAGE SL 13		
1.	Clearing & Grubbing	m ²	166,27
2.	~~Grubbing~~	m ²	
3.	Excavation (Common)	m ³	843,73
4.	Filling (Common)	m ³	—
5.	Back Fill by Selected Material	m ³	77,62
6.	Wet Stone Masonry (1:4)	m ³	18,06
7.	Crusher Run Graveling	m ²	11,55
8.	Cement Mortar Plastering 20mm thick 1:4	m ²	69,67
9.	Steel Sheet Pile, Type - A including Driving	m ²	—
10.	Wood Piles, 150mm including Driving	m ¹	—
11.	Concrete Type - C1 (K22C)	m ³	60,35
12.	Concrete Type - C2	m ³	2,60
13.	Concrete Type - E For leveling	m ³	17,19
14.	Reinforcing Steel Bar	kg	2.737,87
15.	Form Work FW1 H ≤ 2,5 m	m ²	163,54
16.	Form Work FW2 H > 2,5 m	m ²	5,16
17.	Elastic Joint Filler, 10mm thick	m ²	—
18.	Water Stop, 30cm wide	m	—
19.	Dowel Bar D19 L = 600	m	—
20.	PVC Pipe Ø250 with cap	m	—
21.	Palm Fiber Filter, 20mm thick	m ²	—
22.	Geobion mattress / Cylinder	m ³	—
23.	Slide Gate 2,500m x 1,5m	LS	4
24.	Hand rail, galvanized steel pipe Ø50	kg	—
25.	Hand rail, galvanized steel pipe Ø50	kg	—
26.	Galvanized steel ladder, D19	kg	—

BILL OF QUANTITY

NAME OF STRUCTURE: SL 13
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			Clearing and Grubbing $(4.20 \times 1.50) + (12.10 \times 7.10) + (9.80 \times 3.00) + (5.10 \times 2.70)$ 85.91	166.27	
			EXCAVATION		
		A	UPPER PART (PIPEL) $(0.55 \times 0.40) \times 2 + (0.80 \times 0.80) + (2.10 + 5.10 \times 2.10) -$ $[1.50 \times 1.00] \times 3.30$	32.58	
		B	$(0.20 \times 4.50) + (4.50 + 10.40) \times 2.14 - [1.50 \times 1] \times$ 5.13	523.43	
		C	$(10.60 + 4.30) \times 2.20 + 4.70$	112.05	
		D	$(0.50 \times 5.10) + 3.13$	9.40	
				843.73	

NAME OF STRUCTURE : SLB

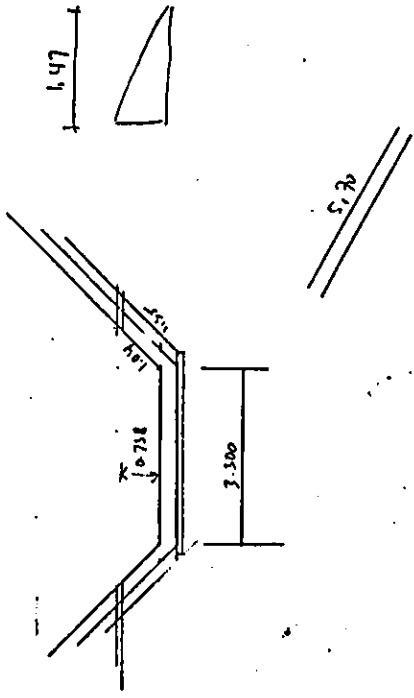
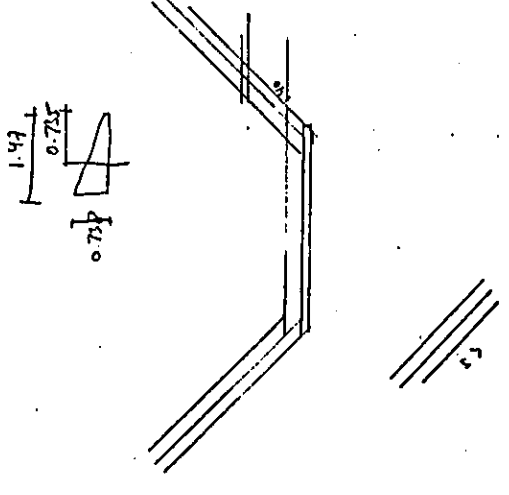
LOCATION :

BILL OF QUANTITY

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			BACK FILL BY SELECTED MATERIAL $\left[\frac{(18.40 + 2.50) \times 2.4}{2} - (4.10 \times 2.40) \right] \times 4.4$	77.62	
			WET STONE MASONRY $A \quad \left(\frac{(3.10 \times 0.25) + (2.90 \times 0.25)}{2} \times 2 \right) \times 3.0$ $B \quad (3.80 \times 0.60) \times 0.30 + ((2.90 \times 0.25) \times 0.30) \times 2$ $C \quad (2.12 \times 0.25) \times 1.70 \times 2$	4.15 1.12 1.80	

BILL OF QUANTITY

NAME OF STRUCTURE : SLIP
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			WET STONE MASONRY (DOWN STREAM)		
			$(5.13 \times 0.25) \times 3$	4.03	
			$\left(\frac{5.13 \times 0.25}{2} \right) \times 1.47$	0.97	
			$(5.170 \times 0.10) \times 3.13$	5.64	
					18.06
			CRUSHER RUN BEDDING		
			$\left(\frac{3.35 \times 0.10}{2} + (3.50 \times 0.10) \right) \times 2 \times 3.13$	4.52	
			$(3.20 \times 0.20) \times 1.70 \times 2$	1.57	
			$(1.35 \times 0.20) \times 3 \times 2$	1.62	
			$\left(\frac{1.40 \times 0.20}{2} \right) \times 1.47 \times 2$	0.91	
			$(5.10 \times 0.20) \times 3.13$	3.50	
					11.55

BILL OF QUANTITY

NAME OF STRUCTURE : SL 1>
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			Cement Mortar		
			LPSMURMS CATHIEL		
A			$\left[\frac{2.10 + 2.90}{2} \right] \times 3 \left[7.2 + \frac{(8.90 + 3.3)}{2} \times 2.8 - (4.50 \times 1.50) \right]$	33.58	
B			POWERSMURMA CATHIEL		
			$\left(\frac{2.89 + 1.04}{2} \right) \times 1.70 \left[7.2 + \frac{(8.90 + 3.3)}{2} \times 2.8 - (4.50 \times 1.50) \right] +$		
			$\left(\frac{1.04}{2} \times 1.30 \right) \times 2.8 + (3.20 + 3.10) +$		
			5.70 + 3.20	69.67	

BILL OF QUANTITY

NAME OF STRUCTURE: SUB
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			Concrete Type CI		
		A	$\frac{(3.30 + 1.90)}{2} \times 2.5 \times 0.30 + (0.60 - 0.30) \times 0.30 \times 1$	1,75	
		B	$(3.30 \times 2.50) \times 0.30 + (0.60 - 0.30) \times 0.30 \times 3.30$	3.17	

NAME OF STRUCTURE: 5113
LOCATION :

4 - 93

NAME OF STRUCTURE :
LOCATION :

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BILL OF QUANTITY

NAME OF STRUCTURE: S.I.D
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			CONCRETE TYPE C2		
			TOP CONCRETE (UPSTREAM)		
			$(0.50 \times 0.10) \times 3.30 \times 2$	0.33	
			DOWN STREAM		
			$(0.60 \times 0.10) \times 6.60 \times 2$	0.79	
			BED CHANNEL		
			$\left[(0.15 \times 0.10) + (0.15 \times 0.10) \times 0.25 \right] \times 3.30 \times 2$	0.90	
			$(0.15 \times 0.10) + \left(\frac{0.15 \times 0.10}{2} + 0.15 \right) \times 5.8 \times 2$	1.58	
					3.60
			CONCRETE TYPE B		
			$\left[1.00 + 3.30 \times 0.10 \right] \times 2.90$	1.25	
			$\left(\frac{1.70 + 0.80 \times 0.15}{2} \times 3.30 + 3.30 - \left(\frac{0.30 + 0.35}{2} \right) \times 0.30 \times 3.30 \right)$	1.74	
			$(0.20 \times 5.4 \times 4.10)$	4.43	
			$\left(\frac{0.40 + 0.70 \times 0.15}{2} \right) \times 3.30$	0.63	
			$(3.20 \times 3.30) \times 0.10$	2.11	
			$(3.30 \times 3.30) \times 0.10$	1.09	
			$(2.97 + 0.20) \times 2 \times 2$	2.38	
			$(2.97 + 0.20) \times 3 \times 2$	3.56	
					17.19

BILL OF QUANTITY

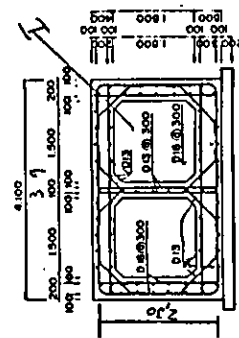
NAME OF STRUCTURE: SL 13
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			REINFORCING STEEL BAR		
			UPSTREAM CHANNEL		
A			D13 $3 \times 2.13 + (1.8 + 1.15 + 0.50) \times 2 + 2.95 + 2.65$		
			$2.35 + 2.10 + 1.85 + 1.55 + 1.30 + 1.00 + 0.80$		
			$26.77 + 0.995$	26.62	
B			D13 $(12 \times 2.20 + 5) \times 3.10$	55.22	
C			D16 $5 \times (6 + 0.60 + 0.2 + 0.5 + 0.70 + 0.15 + 0.20 + 0.6) \times 1.56$	207.48	
D			D16 $(2 \times 7.9 + 1.2 + 7.90) \times 1.56$	53.54	
			D16 $(2 \times 7.7) \times 1.56$	24.65	
F			D19 $(7 \times 8.04) \times 2.25$	253.26	
			D13 $(7 \times 5.10) \times 0.995$	71.54	
			D13 $(10 \times 2.6) \times 0.995$	91.54	
			D19 $(7 \times 6.80) \times 2.25$	219.20	
G			D16 $(2 \times 2.1) \times 1.56$	65.52	
			$(2 \times 9.9) \times 1.56$	30.89	
			D19 $(11 \times 5.8) \times 2.25$	287.1	
			D15 $(10 \times 6.6) \times 0.995$	121.34	
			D9 $(10 \times 5.10) \times 2.25$	224.15	
			D13 $(7 \times 6.7) \times 0.995$	93.331	

BILL OF QUANTITY

NAME OF STRUCTURE: SL 13

LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
	 SECTION B-B		REINFORCING STEEL EST		1.200
		G	D13 (14 x 2,8) x 0,995	39,00	200
			D13 (6 x 3,6) x 0,995	21,49	2,5
		H	D13 (14 x 1,6) x 0,995	22,29	600
			D13 (4 x 3,6) x 0,995	14,33	200
					3,6
		I	D16 (15 x 3,9) x 1,56	182,52	2,7
					3,7
			D16 (15 x 2,30) x 1,56	107,64	2,3
			D13 [(10 x 2,10) x 0,995] x 2	82,39	2,3
					1,40
			D16 (15 x 12,4) x 1,56	290,16	2,30
			D13 (18 x 8) x 0,995	143,28	10,20
				2.737,83	

NAME OF STRUCTURE: 41)
LOCATION :

4 - 98

SL14

1 CONCRETE WORKS.

(1) Concrete Type C1.

• Wall

Section B-B (

	A	L	V
(2) $A_2 = 7.884$	$= 7.9 \text{ m}^2$		
Section C-C $A_3 = 5.626$	$= 5.7 \text{ m}^2$	4.0	27.2
Section D-D $A_4 = 2.938$	$= 3.0 \text{ m}^2$	3.486	15.2
END $A_5 = 0.7 \times 5$	$= 3.5 \text{ m}^2$	0.763	2.5
			<u>44.9 m³</u>

• RETAINING BLOCK

$$V = (1.3 \times 1.447 - 1 \times 1.447) \times 4.4 = 3.3 \text{ m}^3$$

$$V = 1.3 \times 1.447 \times 0.3 \times 2 = 1.2 \text{ m}^3$$

$$4.5 \text{ m}^3$$

$$\text{Total } 44.5 \times 1.1 = \underline{\underline{55 \text{ m}^3}}$$

(2) Leveling concrete.

$$A_1 = 2.258 \text{ m}^2 \text{ (Upstream)}$$

$$A_2 = 1.933 \text{ m}^2 \text{ (down stream)}$$

$$V = (2.228 + 1.933) \times (5.774 + 0.4) / 2 = 12.8 \text{ (x1.1)} = \underline{\underline{14 \text{ m}^3}}$$

(3) RE BARS.

D19

WALL

R1(R)	$(9.223 + 0.792) / 2 = 5.008 \text{ m}$	32 nos	161 m
(L)	$(8.504 + 0.792) / 2 = 4.648 \text{ m}$	26 nos	121 m
R2	$(5.569 + 4.815) / 2 = 5.192$	3 nos x 2	322 m
R2'	$(4.815 + 1.015) / 2 = 2.915$	5 nos x 2	22 m
			<u>626 m</u>

$$W = 626 \times 2.25 \text{ kg/m} \times 1.2 = 1690 \text{ kg}$$

D13.

• Wall

$$R\ 3 \quad (10.8 + 9.143)/2 \times 16 \times 2 = 320\text{ m}$$

R 4

$$(R) \quad (0.744 + 10.8)/2 \times 16 = 93\text{ m}$$

$$(L) \quad (0.6 + 13.138)/2 \times 13 = 90\text{ m}$$

• Retaining Blocks.

$$R\ 6 \quad (1.1 + 1.247) \times 2 \times 15 = 71\text{ m}$$

$$R\ 5 \quad 4.8\text{ m} \times 20 = 96\text{ m}$$

$$R\ 7 \quad 6 \times 1.247 = 8\text{ m}$$

$$R\ 8 \quad 6 \times 1.1 = 7\text{ m}$$

$$\text{Total} = 685\text{ m}$$

$$W = 685 \times 0.995 \times 1.2 = 818$$

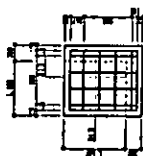
$$\text{Total Re-Bars Weight} \quad 1690 + 818 = \underline{2510\text{ kg}}$$

(4) FORM WORK.

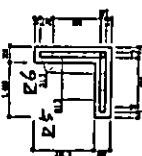
	FW 1	FW 2
• Right Wall.		
Out Side	20.17 m ²	7.283 m ²
in Side	17.18 m ²	3.87 m ²
• Left Wall		
Out Side	16.44 m ²	3.78 m ²
inside	13.12 m ²	1.50 m ²
• UPSTREAM.	6.212	(R) 0.76 m ² (L) 0.93 m ²
	73.12 m ²	18.13 m ²
x 1.1	FW1 = <u>80 m²</u>	FW2 = <u>20 m²</u>

SECTION H-H

SECTION 1-1

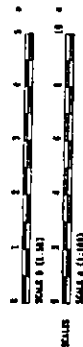


SECTION J-J



SECTION K-K

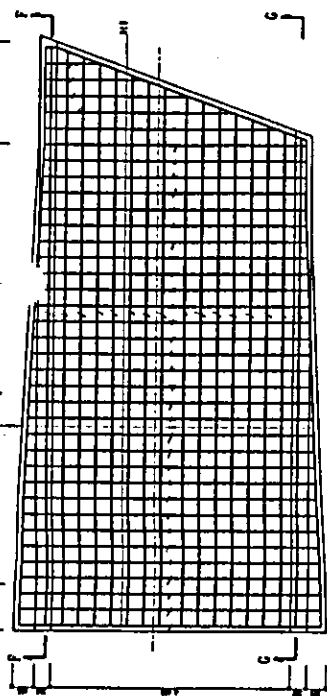
RETAINING BLOCK



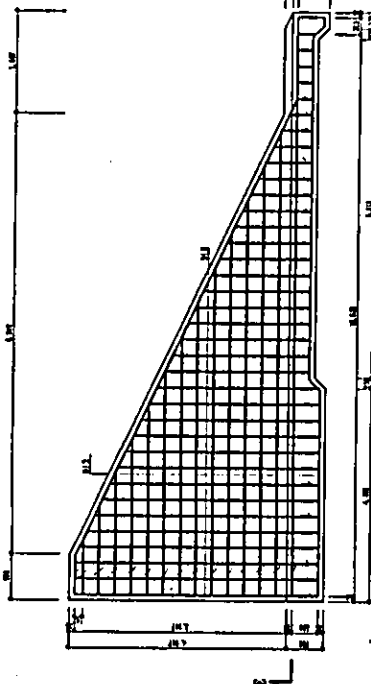
REPUBLIC OF INDONESIA

MINISTER OF PUBLIC WORKS
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
AND UTILIZATION
STATION 2170340 40 ARSIFIA

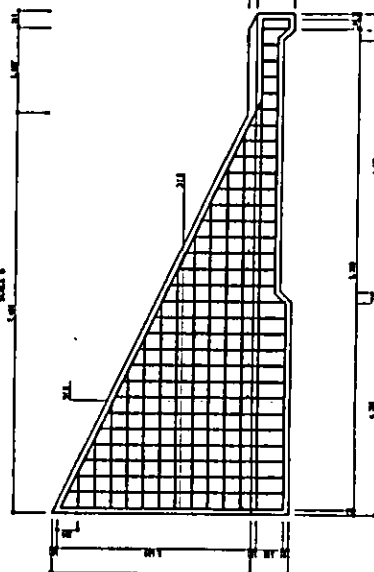
MEDAN FLOOD CONTROL PROJECT

[illegible]

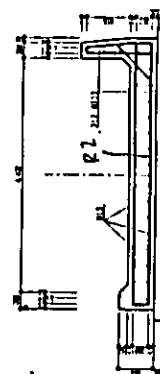
SECTION E-E



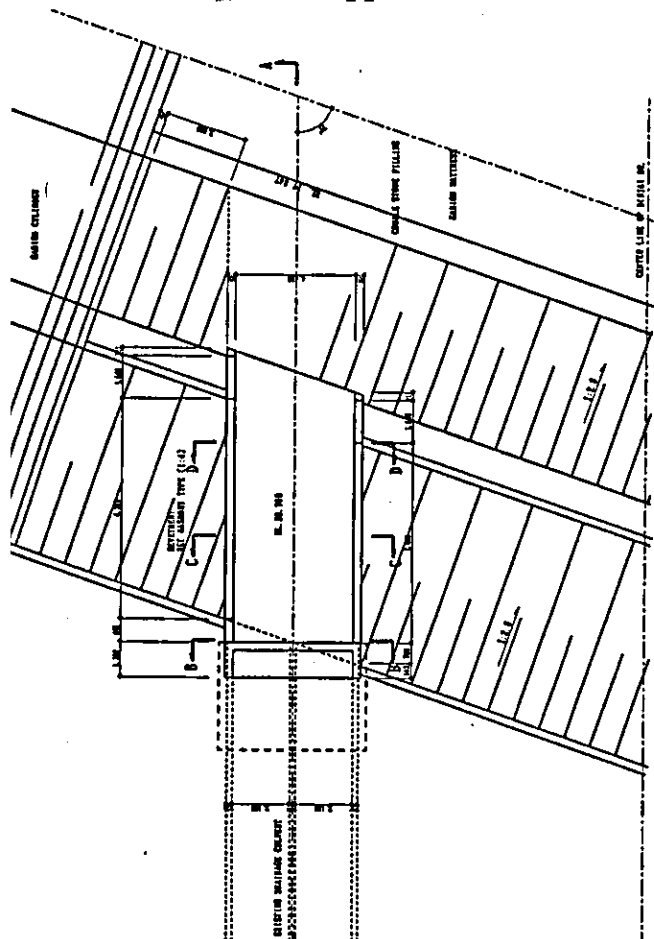
SECTION F-F



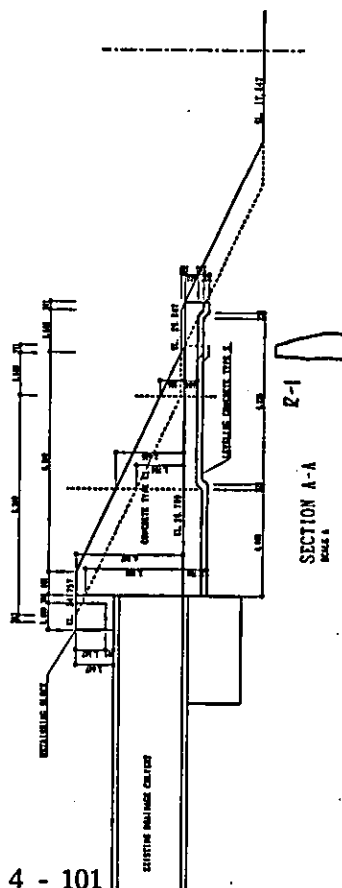
SECTION C-6



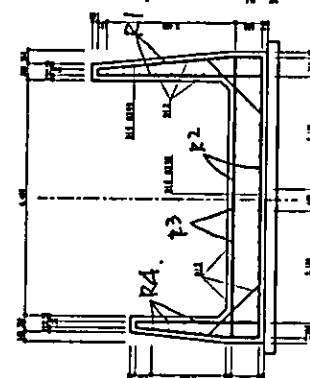
SECTION D-D



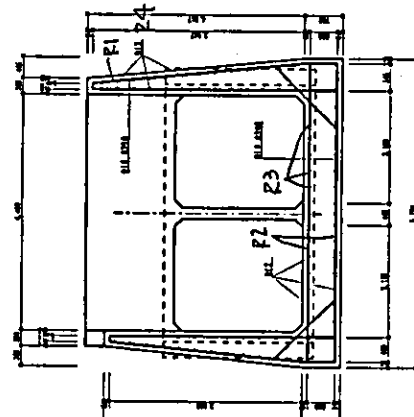
PLAN



SECTION A-A



SECTION C-C



SECTION 8-B

ITEM NO	QA - ITEM	Unit	Revision
	DRAINAGE SL 16		
	1. Clearing & Grubbing	m ²	461,07
	2. Excavation (Common)	m ³	1686,43
	3. Filling (Common)	m ³	
	4. Back Fill by Selected Material	m ³	112,03
	5. Wet Stone masonry	m ³	93,60 ✓
	6. Cement Mortar Plastering 20mm thick 1:4	m ²	335,63 ✓
	7. Crusher run Bedding	m ³	86,00 ✓
	8. Back Fill Concrete Type E for side wall	m ³	35,10 ✓
	9. Impermeable Back Fill	m ³	17,15 ✓
	10. Concrete Type C1 (K225) for main structure	m ³	78,97
	11. Concrete Type C2 for top and base structure	m ³	22,65 ✓
	12. Concrete Type G for leveling	m ³	19,36
	13. Reinforcing Steel Bar	kg	3989,08
	14 Form Work ≤ 2,500	m ²	222,30
	15 Form Work ≥ 2,5 m	m ²	41,76

BILL OF QUANTITY

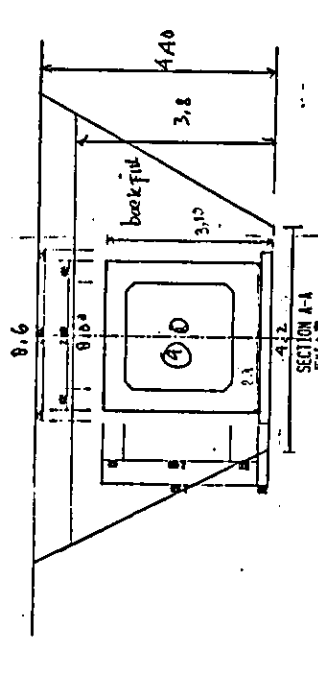
NAME OF STRUCTURE : SL 16

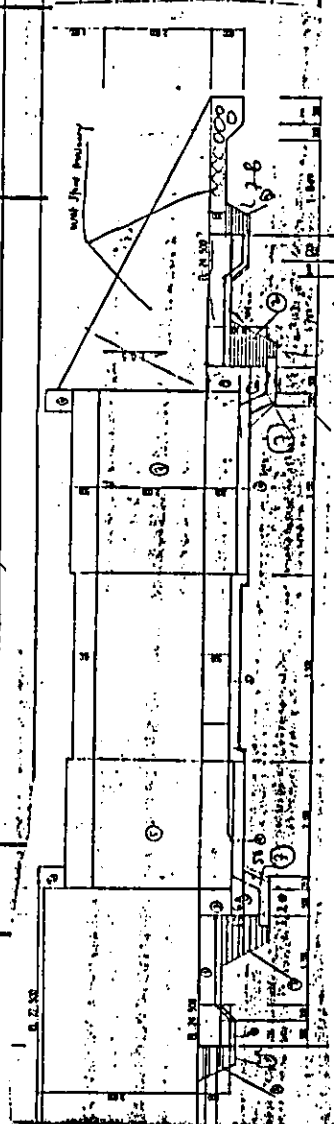
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
1			Clearing and grubbing		
		m ²	(10×96.107)	461.07	
2			Excavation		
		1	$\left(\frac{3.90 + 7.50}{2} \times 4.45 \right) \times 28.207 - \left[\frac{0.30 \times 1.30}{2} \times 28.207 \right]$	700.24	
		2	$\frac{3.90 + 7.50}{2} \times 4.45 - \left[\frac{0.15 \times 1.30}{2} \times 2.50 \right]$	62.74	
		3	$\left(\frac{11.20 + 8.4}{2} \times 4.8 \right) \times 2.4$	124.42	
			Back fill by selected material		
			$\left(\frac{9.20 \times 2.30}{2} + \frac{3.80 \times 0.30}{2} \right) \times 2.0 \times 2$	23.12	

BILL OF QUANTITY

NAME OF STRUCTURE :
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			EXCAVATION		
4			$4 \left[\frac{4.20 + 8.60}{2} \times 4.40 \right] \times 3.50$	98.56	
5			$5 \left[\frac{8.4 + 12.30}{2} + 3.90 \right] \times 3.40$	137.24	
6			$6 \left[\frac{3.90 + 6.20}{2} + 3 \right] \times 5.6$	89.84	
7			$7 \left[\frac{1.20 + 1.60}{2} + 0.09 \right] + \left(\frac{0.70 + 1.00}{2} \right) \times 3 \times 2$	5.22	
7a			$7a \left[\frac{0.80 + 1.20}{2} + 0.30 \right] + \left(\frac{0.40 + 0.50}{2} \right) \times 2$	1.50	
7b			$7b \left[\frac{1 + 1.40}{2} + 0.20 \right] \times 2$	0.72	1215.48
b.			BACK FILL BY SELECTED DISTEND		
1			$1 \left(\frac{0.35 + 0.65}{2} \times 0.15 \right) \times 1.80$	0.67	
2			$2 \left(\frac{0.09 + 0.95}{2} + 0.40 \right) \times 2 \times 2 - (0.20 + 0.20 \times 2) \times 2$	2.45	
3			$3 \left[\frac{0.35 + 0.15}{2} + 0.40 \right] \times 2$	0.36	
4			$4 \left[\frac{4.20 + 8.60}{2} + 3.8 \right] - (2.80 + 3.10) \times 3.5$	50.75	
5			$5 \left[\frac{4.20 + 8.30}{2} + 3.8 \times 0.80 \right] \times 3 \times 2$	34.68	
				112.03	



BILL OF QUANTITY

NAME OF STRUCTURE: 1116

LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			WET STONE MASONRY		
			$(3.35 \times 0.15) \times 21.207 \times 2$	73.18 ✓	
			$(1.80 \times 0.15) \times 28.207$	15.23 ✓	
			DOWN SREATH		
		m ³	$\left(\frac{6.215 \times 2.7}{2} \times 0.35 \right) \times 2 + (2.60 \times 1.80) \times 0.30$ $+ \left(\frac{0.50 \times 0.80}{2} \times 0.30 \right) \times 1.80$	7.19	95.60 ✓
			Cement mortar plastering		
		1	$(3.24 \times 31.207) \times 2 + (40 \times 28.207)$	315.05 ✓	
		2	$\left(\frac{6.215 \times 2.58}{2} \times 2 \right) + (1.80 \times 2.80)$	20.58 ✓	335.63 ✓
			BACK fill concrete type E For Side wall		
		1	$\left(\frac{3.50 \times 0.15}{2} \right) \times 31.207 \times 2$	32.77 ✓	
		2	$\left(\frac{6.215 \times 2.50}{2} \right) \times 0.15 \times 2$	2.33 ✓	
		m ³			35.10 ✓
			CRURER RUN BEDDING		
		1	$\left(\frac{3.5 \times 0.15}{2} \right) + \left(\frac{3.10 \times 0.25}{2} \right) \times 31.207 \times 2$	78.80	
		2	$\left(\frac{1.45 \times 0.10}{2} + \frac{1.40 \times 0.40}{2} \right) \times 5.60 \times 2$	7.20	
		m ³			86. ✓
			IMMOVABLE BACKFILL		
		1	$\left(\frac{0.70 \times 0.15}{2} + \frac{0.70 \times 0.25}{2} + \frac{0.35 \times 0.10}{2} + \frac{0.15 \times 0.05}{2} \right) \times 31.207 \times 2$	14.54	
		2	$\left(\frac{0.70 \times 0.15}{2} + \frac{0.70 \times 0.25}{2} + \frac{0.35 \times 0.10}{2} + \frac{0.15 \times 0.05}{2} \right) \times 5.6 \times 2$	2.61	
		m ³			17.15

NAME OF STRUCTURE: S116
LOCATION :

4 - 106

NAME OF STRUCTURE: SL16
LOCATION :

5

NAME OF SIMULINKURE: SL16

LOCATION :

NO	SHAPE BAR	SHAPE BAR	SHAPE BAR	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
1				1	D13 (9 x 160) x 0.995	9.55	
2				2	D13 (7 x 230) x 0.995	16.02	
3				3	D13 (9 x 160) x 0.995	14.33	
4				4	D13 (7 x 230) x 0.995	16.02	
5				5	D13 (4 x 315) x 0.995 x 2	30.25	
6				6	D13 (9 x 430) x 0.995 x 4	171.94	
7				7	D16 (4 x 144) x 1.56	89.36	
8				8	D16 (7 x 13) x 4 x 1.56	567.84	
9				9	D16 (7 x 75) x 4 x 1.56	327.6	
10				10	D13 (7 x 450) x 0.995 x 4	126.57	
11				11	D13 (4 x 500) x 0.995 x 4	79.6	
12				12	D13 (2 x 14) x 0.995 x 2	55.72	
13				13	D13 (11 x 180) x 0.995 x 2	39.40	
14				14	D16 (20 x 114) x 1.56	355.68	
15				15	D16 (20 x 114) x 1.56	355.68	
16				16	D13 (20 x (1.35 x 2) + (1.95 x 2)) x 0.995	111.44	
17				17	D16 (12 x 96) x 1.56	179.71	
18				18	D16 (12 x 96) x 1.56	179.71	
19				19	D13 (12 x (1.10 x 2) + (1.20 x 2)) x 0.995	54.92	
20				20	D16 (7 x 206) x 1.56	224.95	
21				21	D16 (7 x 243) x 1.56	265.15	
22				22	D13 (11 x 2060) x 1.56 x 2	707.09	
							3982.08

NAME OF STRUCTURE: 3116
LOCATION :

4 - 109

BILL OF QUANTITY

NAME OF STRUCTURE: 916
LOCATION :

[illegible]

ITEM NO	BQ - ITEMS (2nd DRAFT)	UNIT	REVISION
	DRAINAGE SLUICE ~~SLUICE~~ (1000 x 1000 mm)		
	1. Clearing & Grubbing	m ²	1108,62
	2. Grubbing	m ³	
	3. Excavation (common)	m ³	2270,96
	4. Filling (common)	m ³	39,32
	5. Back fill by Selected Material	m ³	454
	6. Wet Stone Masonry (1:4)	m ³	197,18
	7. Crusher Run Bedding	m ²	197,80
	8. Cement Mortar Plastering 20 mm thick 1:4	m ²	568,75
	9. Back Fill Concrete TYPE E	m ³	89,10
→	10. Log piles, 150 mm including Driving	m ¹	10,6
	11. Impermeable back fill	m ³	26,00
	12. Concrete Type - C (K225)	m ³	169,08
	13. Concrete Type C2	m ³	46,44
	14. Concrete Type - E for leveling	m ³	33,40
	15. Reinforcing Steel Bar	kg	7.155,62
cobble stone filling	16. Cobble stone filling	m ³	2,26
?	17. PVC PIPE Ø500 FOR WEIR HOLE	m ¹	20,4
?	18. Palm Fiber Filter, 20 mm thick	m ²	18,36
?	19. Gabion mattress	m ³	16,95
	20. Form Work ≤ 2,5 m	m ²	274,41
	21. Form Work > 2,5 m	m ²	57,14
	22. Form Work	m ³	
	23. Form Work	Ls	1
	24. Form Work	br	
	25. Form Work	kg	
	26. Form Work	kg	

BILL OF QUANTITY

NAME OF STRUCTURE: Bridge
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
		m ³	Back Fill Concrete Type e $\left[\left(0,20 \times 4,05 \right) \times 5 \right] \times 2$	89,10	
		m	Log Piles	10,6	
			Impermeable Back Fill $\left[\left(\frac{0,40 + 0,55}{2} \right) \times 0,45 \right] + \left(\frac{0,35 + 0,10}{2} + 0,10 \right) \times 5 \times 2$	25,99026	
			Concrete Type C1 $\left(\frac{0,50 + 0,80}{2} \right) \times 0,30 \times 4 + \left(\frac{4,00 + 4,30}{2} \right) \times 0,30 \times 2,5$	3,89	
					No.
			$\frac{0,8385}{2}$ $\left(\frac{0,50 + 0,80}{2} \right) \times 0,30 \times 4,30 + \left[4,10 \times 2,50 \right] + 0,30 \times 2,5$	8,53	
			$\left[\left(\frac{3,50 + 0,40}{2} \right) + \left(\frac{4,05 + 0,50}{2} \right) + \left(\frac{1,40 + 1,20}{2} \right) + 0,10 \right] \times 2 \times 2$	14,78	
			$\left[\left(\frac{3,50 + 0,40}{2} \right) + \left(\frac{4,05 + 0,50}{2} \right) + \left(\frac{1,40 + 1,20}{2} \right) + 0,10 \right] \times 3$	32,15	
			$\left[\left(\frac{0,50 + 0,60}{2} \right) \times 0,60 + \left(0,60 \times 0,50 \right) \right] \times 5,3 \times 2$	6,68	
			$\left[1,00 \times 0,40 \right] \times 5,30 \times 2$	4,24	
			$\left(3,10 \times 5,30 \right) \times 2,4 - \left[\left(2 \times 2 \right) + 2,4 \right] \times 2$	20,23	
			$\left(-1,0 \times 2,9 \right) \times 6 - \left[\left(2 \times 2 \right) + 6 \right] \times 2$	40,74	
			$\left(3,10 \times 5,30 \right) \times 3,4 - \left[\left(2 \times 2 \right) + 3,4 \right] \times 2$	28,66	
				157,4	

BILL OF QUANTITY

NAME OF STRUCTURE: S/L 10
 LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			CLEARING AND GRUBBING		
		m ²	$(12.2 \times 32.57) + (8 \times 13.2) + (22.80 \times 15.90)$	1108.62	
			EXCAVATION		
			$\left[\frac{(2.95 + 4.4 \times 3.65)}{2} + \left[\frac{1.2 + 1.15 \times 0.15}{2} \right] \times 2 \right] \times 9$	133.18	
			$\left[\frac{(2.95 + 4.4 \times 3.65)}{2} + \left[\frac{(1.2 + 1.15 \times 0.15)}{2} \right] \times 2 \right] \times 5$	67.95	
			$\left[\frac{(9.5 + 19.1 \times 5.2)}{2} \right] \times 11.80$	901.99	
			$\left[\frac{(4.30 + 5)}{2} \right] \times 4.5 \times 1.37$	36.62	
			$(4 \times 0.59) \times 11.30$	22.6	
				2270.96	

BILL OF QUANTITY

NAME OF STRUCTURE: S210

LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			FILLING (COMMON)		
			$\left(\frac{1.00 + 1.50}{2} \times 0.35 \right) \times 45 \times 2$	39.37	
			Back Fill by Selected Material		
			$\left[\frac{5.50 + 23.15}{2} \times 3.90 \right] - \left[\frac{5.10 \times 2.90}{2} \right] \times 41$	454.00	
			Wet Stone Masonry		
1			$\left[\left(3.90 \times 0.35 \right) \times 55 \right] \times 2$	150.15	
2			$\left(1.55 \times 0.25 \right) \times 4.52 \times 2$	3.50	
3			$\left(1.55 \times 0.25 \right) \times 1.5 \times 2$	1.01	
4			$\left(1.35 \times 0.25 \times 2. \right) \times 2$	0.67	
5			$\left(4.10 \times 4.08 \right) \times 0.25$	4.18	
6			$\left(4.45 \times 0.25 \right) \times 11.2$	12.46	
7			$\left[\frac{2.50 + 0.50}{2} \times 0.30 \right] \times 5 \times 2$	4.5	
8			$\left(2.50 \times 1.50 \right) \times 0.25 \times 2$	1.87	
9			$\left[\left(2.50 + 3.50 \right) \times 0.25 \right] \times 2.2 \times 2$	3.30	
10			$\left(11.30 \times 5.5 \right) \times 0.25$	15.54	
				197.18	
m ³			Cobble Stone filling		
			$\left(\frac{1.00 \times 0.40}{2} \right) \times 11.30$	2.26	

BILL OF QUANTITY

NAME OF STRUCTURE : \$140
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			CRUSHER RUN BEDDING		
			UPSTREAM CHANNEL		
			$\left[\left(\frac{0.15 + 0.20}{2} \times 3.75 \right) \times 55 \right] \times 2$	154.69	
			DOWNSTREAM CHANNEL		
			$\left[\left(\frac{1.70 \times 0.20}{2} \times 4.5 \right) \times 2 \right]$	3.06	
			$\left(1.50 \times 0.20 \right) \times 1.5 \times 2$	0.90	
			$\left(\frac{1.50 \times 0.20}{2} \right) \times 2 \times 2$	0.60	
5			$(4.10 \times 5.2) \times 0.2$	4.26	
6			$\left[\left(4.5 \times 0.20 \right) + \left(0.80 \times 0.10 \right) + \left(\frac{0.25 \times 0.20}{2} \right) \right] \times 11.30$	11.22	
7			$\left[\left(\frac{2.50 + 0.50}{2} \times 0.20 \right) \times 5 \right] \times 2$	3	
8			$\left[\left(\frac{2.50}{2} \times 1.50 \right) \times 0.20 \right] \times 2$	1.50	
9			$\left[\left(\frac{2.50 + 3.50}{2} \right) \times 2.2 \right] \times 9.20 \times 2$	2.64	
10			$(4.30 \times 5.50) \times 0.20$	12.43	
11				197.80	
			Cement Mortar Plastering 20 mm thick 1:4		
			$(3.8 \times 55) \times 2$ Upstream	418	
			Downstream Channel		
			$(1.45 \times 4.5) \times 2$	13.05	
			$(1.35 \times 1.50) \times 2$	4.05	
			$\left(\frac{1.35 \times 1.50}{2} \right) \times 2$	2.02	
5			$\frac{4.30 \times 5.10}{2}$	21.93	
6			(4.5×4.30)	19.35	
7			$(2.50 \times 0.50) \times 5$	7.5	
8			$\left(\frac{2.50 \times 1.50}{2} \right) \times 2$	7.5	
9			$\left[\left(\frac{2.50 + 3.5}{2} \right) \times 2.2 \right] \times 2$	13.2	
10			11.30×5.5	62.15	
				568.75	

BILL OF QUANTITY

NAME OF STRUCTURE: SB-10
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			CONCRETE TYPE C1		
			REVENEMENT		
			TOP CONCRETE		
			$(0.70 \times 0.30) \times 11.90$	2.50	
			PARTITION WALL		
			$[(0.30 \times 0.55) \times 13.82] \times 2$	4.56	
			BACK CONCRETE		
			$[(0.20 \times 0.50) + (0.50 \times 0.30 \times 0.10)] \times 11.90$	2.62	
					169.08
			CONCRETE TYPE C2		
			$(3.80 \times 0.15) \times 52.50$	29.92	
			$[(0.55 \times 0.10) + (0.55 \times 0.10) \times 0.25] \times 52.50 \times 2$	14.31	
			DOWN STAIR		
			$[(0.55 \times 0.10) + (0.55 \times 0.10) \times 0.15] \times 8.1 \times 2$	2.21	
			CONCRETE TYPE C		
			$[(0.75 \times 0.10) \times 5] \times 2$	8.25	
			$[(0.75 \times 0.10) \times 8.10] \times 2$	1.21	
			CHIVEM		
			$(4.05 \times 0.20) \times 2 \times 2 + (4.05 \times 0.20) \times 3 \times 2$	8.10	
1			$(2.5 \times 0.10) \times 4.3$	1.07	
2			$(3.10 \times 0.20) \times 5.3$	3.29	
3			$(6 \times 0.20) \times 5.10$	6.12	
4			$(4 \times 0.20) \times 5.3$	4.24	
5			$(2.6 \times 0.10) \times 4.3$	1.12	
					33.40

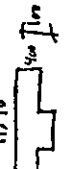
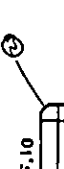
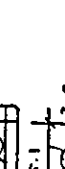
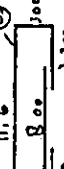
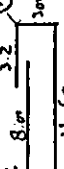
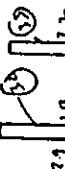
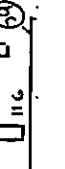
BILL OF QUANTITY

NAME OF STRUCTURE: SL-10
LOCATION :

NO	SKETSA OF STRUCTURE	SHAPE	NO	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			1	REINFORCING STEEL BAR D13 (14 x 2.30) x 0.995	32.04	
			2	D13 (8 x 3.95) x 0.995	31.44	
			3	D13 (14 x 2.3) x 0.995	32.04	
			4	D13 (9 x 4.10) x 0.995	36.72	
			5	D13 (2 x 18.20) x 0.995	36.42	
			6	D13 (3 x 5.12) x 0.995	15.22	
			7	D13 (1 x 5.20) x 0.995	5.27	
			8	D13 (7 x 8.20) x 2.25 x 2	258.3	
			9	D13 (12 x 2.14) x 0.995 x 2	57.32	
			10	D13 (7 x 9.20) x 2.25 x 2	292.95	
			11	D13 (9 x 5.0) x 0.995 x 2	89.55	
			12	D13 (4 x 5.0) x 0.995 x 2	39.80	
			13	D13 (10 x 8.20) x 2.25 x 2	369	
			14	D13 (12 x 3.3) x 0.995 x 2	78.80	
			15	D13 (7 x 9.20) x 2.25 x 2	292.95	
			16	D13 (9 x 6.10) x 0.995 x 2	123.58	
			17	D13 (4 x 7.0) x 0.995 x 2	56	
			18	D13 (4 x 4.5) x 0.995 x 2 x 2	71.64	
			19	D13 (18 x 3.00) x 0.995 x 2	107.46	

BILL OF QUANTITY

NAME OF STRUCTURE: S243
LOCATION :

NO	SKETSA OF STRUCTURE	SHAPE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			20	D13 (1 x 5.30) x 0.945	5.17	
			21	D13 (5 x 5.10) x 0.945	15.21	
			22	D13 (2 x 24.10) x 0.945	47.96	
			23	D16 (21 x 16) x 1.56	524.16	
			24	D16 (21 x 16) x 1.56	524.16	
			25	D13 (21 x 9.7) x 0.945	202.68	
			26	D16 (20 x 15.2) x 1.56	474.24	
			27	D16 (20 x 15.2) x 1.56	474.24	
			28	D13 (20 x 8.3) x 0.945	165.17	
			29	D16 (8 x 25.6) x 1.56 x 2 (2 x 12)	638.98	
			30	D16 (16 x 25.6) x 1.56	638.98	
			31	D13 (14 x 29.7) x 0.945	413.72	
			32	D13 (21 x 6) x 0.945	125.37	
			33	D13 (20 x 5.6) x 0.945	111.44	
			34	D13 11 x 23.4 x 0.945	256.11	6645.2
				REINFORCING FOR PERIMETER WALL		
			1	D10 (65 x 130) x 0.56 x 2	94.64	
			2	D13 (2 x 24.9) x 0.945 x 2 + [(2 x 17) x 2] x 0.945	206.56	
			3	D10 (27 x 1.60) x 0.56	33.15	
			4	D13 (2 x 23.4) x 0.945 + (11.1 x 2 x 0.945)	68.65	
			5	D10 (37 x 1.42) x 0.56	29.42	
			6	D13 (7 x 11.2) x 0.945	78.00	
						510.42
						7155.62

BILL OF QUANTITY

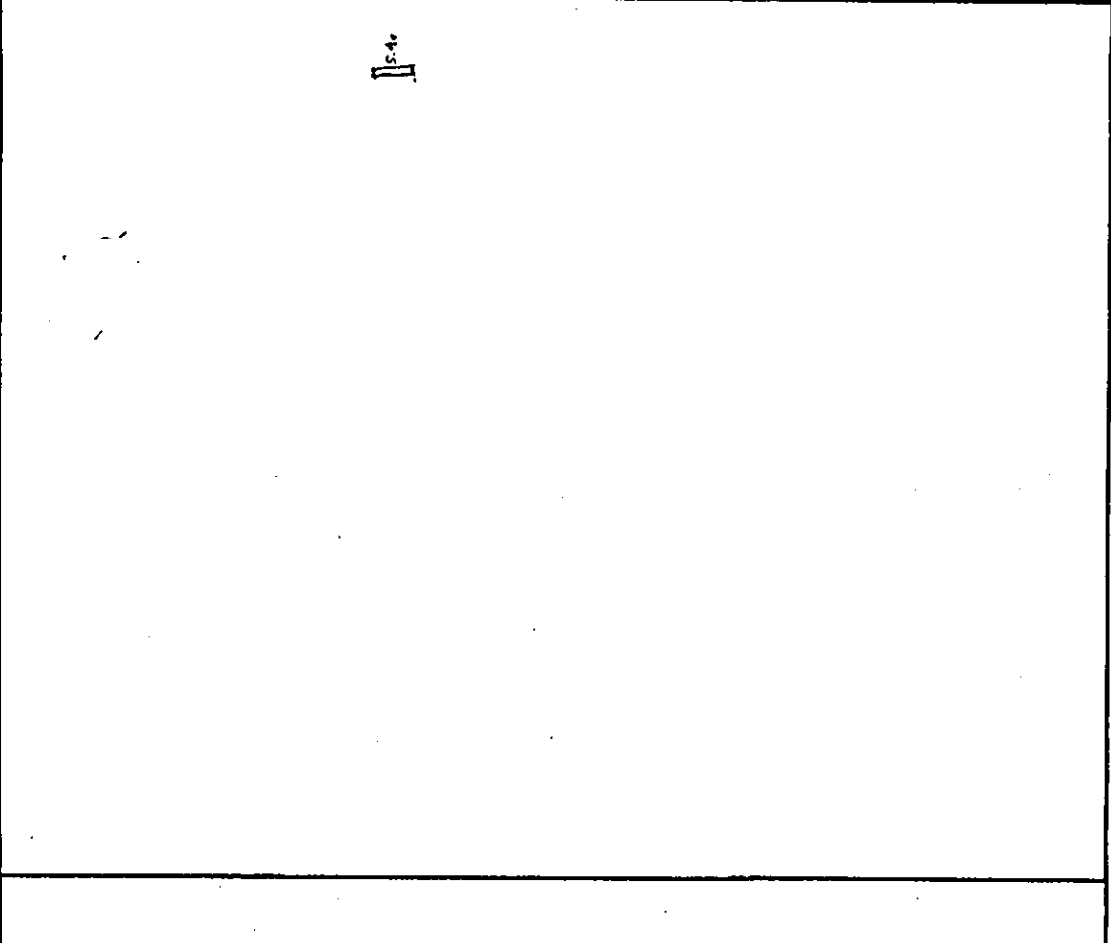
NAME OF STRUCTURE: 5B-10
LOCATION :

[illegible]

ITEM NO	BQ ITEM	UNIT	Revision
	DRAINAGE SF2 AT RIGHT BANK OF FLOODWAY		
	1. Clearing and Grubbing	m ²	219.70
	2. Excavation (Common)	m ³	583.47
	3. Filling (Common)	m ³	
	4. Back fill by Selected material	m ³	286.39
	5. Crusher Run Bedding	m ³	9.90
	6. Concrete Type C1 (K225)	m ³	150.55
	7. Concrete Type E for leveling	m ²	13.8
	8. Reinforcing steel Bar	m ³	6.558, 87
	9. Form work $\leq 2.5m$	m ²	258, 74
	10 Form work $> 2.5m$	m ²	28, 68

BILL OF QUANTITY

NAME OF STRUCTURE: SFZ-
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			Cementing		
		M ²	$(6,6 \times 17,53)$	115,70	
			$(10,00 \times 10,4)$	104,0	
					219,70

NAME OF STRUCTURE : 8F2
LOCATION :

4 - 122

NAME OF STRUCTURE: $\mathbb{F}_2$
LOCATION :

4 - 123

NAME OF STRUCTURE: {F1}
LOCATION :

4 - 124

NAME OF STRUCTURE: 8F²
LOCATION :

4 - 125

4

BILL OF QUANTITY

NAME OF STRUCTURE: 'F2'
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			CONCRETE TYPE C1		
			RED CHAMFER		
M3	1		$(1.40 \times 3.00) \times 0.50 + \left(\frac{0.20 \times 0.10}{2} \right) \times 8.8$	13.2435	2.49
M3	2		$\left(\frac{0.65 \times 0.50}{2} \right) \times 7 + \left[\left(\frac{0.65 \times 0.30}{2} \right) \times 3.3 \right] \times 7 -$		
M3			$\left[\left(\frac{2 + 1.2}{2} \right) \times 0.10 + \left(\frac{0.4 \times 0.30 \times 1.00}{2} \times 2 \right) \right]$	11.65	
M3	3		$\left[(2.80 \times 2.90) \times 5 \right] - \left[(2 \times 2 \times 5) \right] +$		
M3			$+ \left[\left(\frac{0.20 \times 0.10}{2} \right) \times 5 \times 4 \right]$	20.64	
M3	4		$\left[\left(\frac{0.50 \times 0.35}{2} \right) \times 0.15 \times 2.8 \right] \times 2$	1.35	
M3	5		$\left[\left(\frac{0.60 \times 0.30}{2} \right) + \left(\frac{0.20 \times 0.10}{2} \right) \right] \times 4.8 \times 2$	2.16	
M3	6		$\left[\left(\frac{0.50 \times 0.25}{2} \right) + \left(\frac{0.60 \times 0.30 \times 1}{2} \right) \right] \times 2 + \left[5.00 \times 0.50 \right] \times$	16.72	
			1.30×2		
M3	7		$\left(3.2 \times 1.01 \right) + 1.125 + \left(\frac{0.70 \times 0.50 \times 0.60}{2} \right) \times 2.30 +$		
M3			$\left[\left(\frac{0.60 \times 0.30 \times 3}{2} \right) \times 1.125 \right] \times 2 + \left[\left(\frac{0.20 \times 0.10 \times 1.125}{2} \right) \times 2 \right]$	8.33	
			$- \left(\frac{1.35 \times 0.65 \times 0.325}{2} \right) \times 2$		
			5.334		
M3	8		$\left[\left(\frac{0.50 \times 1.05 \times 0.90}{2} \right) + \left(\frac{2.10 \times 0.50}{2} \right) \right] \times 3.15 +$		
			$\left(\frac{0.538 \times 0.30 \times 3.414 \times 2}{2} \right) \times 1.5$		
			$+ \left(\frac{0.216 \times 0.30 \times 2.164}{2} \right) \times 0.60$		
M3			$- \left[\frac{1.80 \times 0.85 \times 0.315}{2} \right] \times 2$	9.68	

BILL OF QUANTITY

NAME OF STRUCTURE: 4F2
LOCATION :

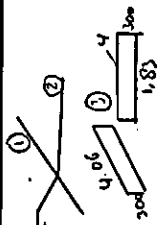
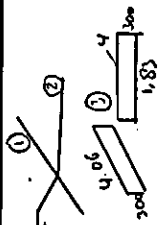
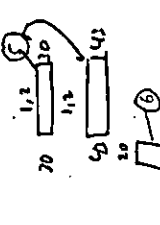
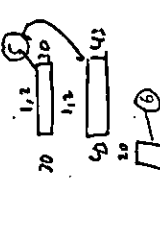
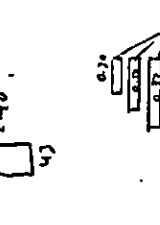
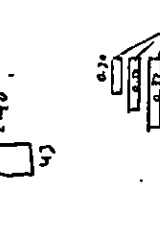
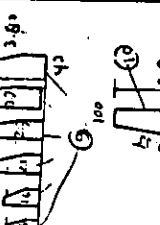
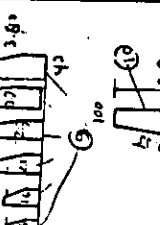
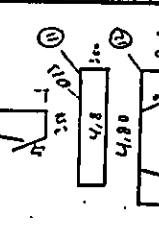
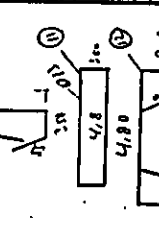
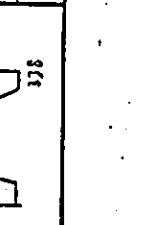
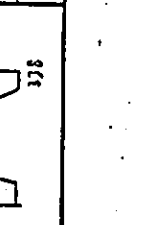
NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	3.15 m ³	VOLUME SUBTOTAL	VOLUME TOTAL
9		m ³	$\left[\frac{0.50 \times 1.05 \times 0.90}{2} + (2.10 \times 0.50) \right] \times 3.15 +$ $\left[\frac{0.661 + 0.130 \times 3.406}{2} + 0.9 \right] \times 2 + \frac{0.20 \times 0.10 \times 2.10}{2} \times 2$ $+ \left[\frac{0.661 + 0.130 + 3.406}{2} \right] \times 1.2$ $- \left[\frac{1.50 + 0.70 \times 0.315}{2} \right] \times 2$		10.11	
10		m ³	$\left[\frac{0.50 + 1.05 \times 0.90}{2} + (2.10 \times 0.50) \right] \times 3.15 +$ $\left[\frac{0.661 + 0.130 + 3.406}{2} \right] \times 2.10 \times 2 +$ $\left[\frac{0.20 \times 0.10 + 2.10}{2} \right] \times 2$ $\left[\frac{2.150 \times 1.2 + 0.315}{2} + 2 \right] \times 2$		15.17	
11		m ³	$\left[\frac{0.50 \times 1.05 \times 3.322}{2} + \left(\frac{0.661 + 0.130}{2} + 3 \right) \times 1.00 \right] \times 2$ $+ \left(\frac{0.120 \times 0.10 + 1}{2} \right) \times 2$		4.56	
12		m ³	$\left[\frac{0.40 + 0.70 \times 0.150 + 2.60}{2} + (4.50 \times 0.50 \times 2.6) + \right.$ $\left. \left[\frac{0.661 + 0.130 + 3}{2} \right] + 4.150 \right] \times 2.1$ $+ \left(\frac{0.12 \times 0.10 + 4.5}{2} \right) \times 2$		13.14	
13		m ³	$(11.2 \times 0.50) \times 6$		33.6	150.55

NAME OF STRUCTURE: SF 2
LOCATION :

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BILL OF QUANTITY

NAME OF STRUCTURE : SF 2
LOCATION :

NO	SKETSA OF STRUCTURE	Bar Shape	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
				REINFORCING STEEL BAR		
1			D13	$(4.0 \times 3.80) \times 0.995$	151.24	
2			D13	$(2.0 \times 11.64) \times 0.995$	231.69	
3			D13	$(1.5 \times 8.72) \times 0.995$	43.38	
4			D13	$(1.0 \times 4.26) \times 0.995$	43.39	
5			D13	$(0.9 \times 3.13) \times 0.995$	28.03	
6			D16	$(0.4 \times 5.43) \times 1.56$	38.88	
7			D13	$(0.6 \times 8.98) \times 0.995$	53.61	
8			D13	$(0.6 \times 14.02) \times 0.995$	83.76	
9			D19	$(0.6 \times 32.98) \times 2.25$	445.73	
10			D19	$(0.6 \times 8.35) \times 2.25$	450.90	
11			D16	$(0.6 \times 19.2) \times 1.56$	95.47	
12			D16	$(0.2 \times 13.47) \times 1.56$	254.01	
13			D16	$(0.3 \times 11.00) \times 1.56$	233.08	
14			D16	$(0.2 \times 12.0) \times 1.56$	74.88	
15			D16	$(0.3 \times 5.2) \times 1.56$	48.67	
16			D13	$(0.7 \times 1.90) \times 0.995$	26.47	
17			D19	$(0.2 \times 3) \times 2.25$	27	
18			D13	$(0.4 \times 10.85) \times 2 \times 0.995$	182.48	
19			D13	$(0.1 \times 1.00) \times 0.995$	19.40	
20			D16	$(0.1 \times 10.6) \times 1.56$	628.37	
21			D13	$(0.17 \times 3.90) \times 0.995$	65.97	

BILL OF QUANTITY

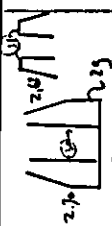
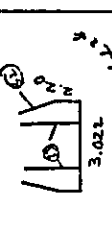
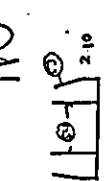
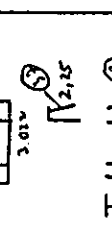
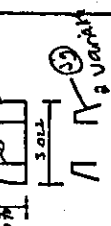
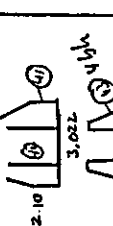
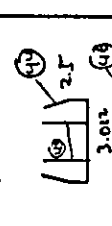
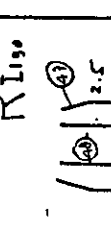
NAME OF STRUCTURE: SF 2

LOCATION :

NO	SHAPE BAR	SHAPE BAR	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
1			1	D19 $(3 \times 8.322) \times 2.15$	56.17	56.17
2			2	D19 $(2 \times 3.022) \times 2.15$	13.60	13.60
3			3	D19 $(3 \times 2.15) \times 2.15 \times 2$	30.39	30.39
4			4	D13 $(3 \times 5.20) \times 0.995 \times 2$	31.04	31.04
5			5	D13 $(11 \times 11.290) \times 0.995$	123.57	123.57
6			6	D19 $(1 \times 9.422) \times 2.15$	21.2	21.2
7			7	D19 $(1 \times 3.022) \times 2.15$	6.80	6.80
8			8	D19 $(1 \times 3.2) \times 2.15 \times 2$	14.40	14.40
9			9	D13 $(2 \times 4.4) \times 0.995$	8.76	8.76
10			10	D19 $(1 \times 9.422) \times 1.56$	14.70	14.70
11			11	D19 $(1 \times 3.022) \times 1.56$	6.80	6.80
12			12	D19 $(1 \times 3.2) \times 1.56 \times 2$	14.4	14.4
13			13	D13 $(2 \times 4) \times 0.995$	7.96	7.96
14			14	D19 $(4 \times 7.222) \times 2.15$	6.50	6.50
15			15	D19 $(4 \times 2.10 \times 2) \times 2.15$	37.8	37.8
16			16	D19 $(4 \times 3.022) \times 2.15$	27.70	27.70
17			17	D13 $(1 \times 2.9) \times 0.995$	28.85	28.85
18			18	D19 $(1 \times 8.422) \times 2.15$	18.95	18.95
19			19	D19 $(2 \times 2.70) \times 2.15$	12.15	12.15
20			20	D19 $(1 \times 3.022) \times 2.15$	6.80	6.80
21			21	D19 $(1 \times 2.60) \times 0.995$	2.59	2.59
22			22	D19 $(5 \times 7.222) \times 2.15$	81.25	81.25
23			23	D19 $(5 \times 2.10) \times 2.15 \times 2$	24.00	24.00
24			24	D13 $(5 \times 6.10) \times 0.995 \times 2$	47.25	47.25
25			25	D19 $(40 \times 3.022) \times 2.15$	60.70	60.70
26			26	D19 $(1 \times 7.322) \times 2.15$	271.98	271.98
27			27	D19 $(1 \times 2.15) \times 2.15 \times 2$	16.43	16.43
28			28	D13 $(1 \times 6.320) \times 0.995 \times 2$	9.67	9.67
					12.54	12.54

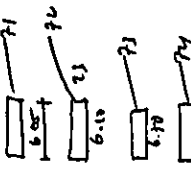
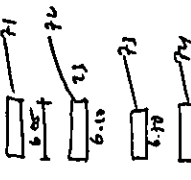
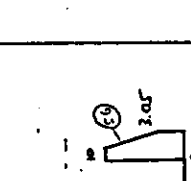
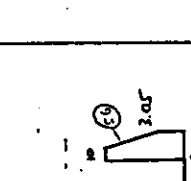
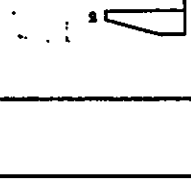
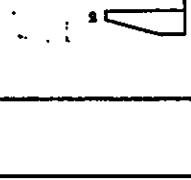
BILL OF QUANTITY

NAME OF STRUCTURE : PF2
LOCATION :

NO	SHAPE BAR	SHAPE BAR	SHAPE BAR	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
				29	D19 (1 x 3.42) x 2.25	18.94	
				30	D19 (1 x 2.70) x 2.25 } x 2	12.15	
				31	D13 (1 x 5.16) x 0.995 } x 2	10.69	
				32	D19 (6 x 7.422) x 2.25	100.20	
				33	D19 (6 x 2.70) x 2.25 } x 2	59.40	
				34	D13 (6 x 7.12) x 0.995	42.506	
				35	D19 (1 x 9.42) x 2.25	21.20	
				36	D19 (2 x 3.2) x 2.25	14.4	
				37	D13 (1 x 9.12) x 0.995	9.15	
				38	D19 (2 x 8.42) x 2.25	37.89	
				39	D19 (2 x 5.40) x 2.25	24.3	
				40	D19 (1 x 16.4) x 0.995	16.32	
				41	D19 (4 x 7.222) x 2.25	65.00	
				42	D19 (4 x 3.10) x 2.25 } x 2	37.8	
				43	D13 (1 x 40.2) x 0.995	20.00	
				44	D19 (1 x 8.022) x 2.25	18.05	
				45	D19 (2 x 2.50) x 2.25	11.25	
				46	D13 (1 x 7.8) x 0.995	7.76	
				47	D19 (1 x 8.022) x 2.25	18.05	
				48	D19 (2 x 2.50) x 2.25	11.25	
				49	D13 (1 x 7.8) x 0.995	7.76	
				50	D19 (1 x 7.12 x 2.25	16.47	
				51	D19 (1 x 4.3) x 2.25	9.69	
				52	D13 (1 x 7.16) x 0.995	7.56	
				53	D19 (4 x 7.222) x 2.25	65	
				54	D19 (4 x 4.20) x 2.25	37.8	
				55	D13 (4 x 8.60) x 0.995	34.40	

BILL OF QUANTITY

NAME OF STRUCTURE: SPV
LOCATION :

NO	SHAPE BAR	SHAPE BAR	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
			56	D19 (15.422 + 5.422) x 1.4 x 2.55	372.06	
			57	D13 (1 x 0.96) x 0.995 x 2	1.91	
			58	D13 (1 x 1.86) x 0.995 x 2	3.70	
			59	D13 (1 x 2.86) x 0.995 x 2	5.70	
			60	D13 (1 x 3.76) x 0.995 x 2	7.48	
			61	D13 (1 x 4.76) x 0.995 x 2	9.47	
			62	D13 (1 x 5.76) x 0.995 x 2	12.15	
			63	D13 (1 x 6.76) x 0.995 x 2	15.22	
			64	D13 (1 x 7.76) x 0.995 x 2	21.81	
			65	D13 (1 x 8.76) x 0.995 x 2	22.80	
			66	D13 (1 x 9.76) x 0.995 x 2	24.80	
			67	D13 (1 x 10.76) x 0.995 x 2	26.59	
			68	D13 (1 x 11.76) x 0.995 x 2	28.38	
			69	D13 (1 x 12.76) x 0.995 x 2	28.97	
			70	D13 (1 x 13.76) x 0.995 x 2	14.03	
			71	D13 (1 x 14.76) x 0.995 x 2	25.00	
			72	D13 (1 x 15.76) x 0.995 x 2	25.19	
			73	D13 (1 x 16.76) x 0.995 x 2	27.58	
			74	D13 (1 x 17.76) x 0.995 x 2	32.95	
			75	D13 (1 x 18.76) x 0.995 x 2	37.78	
			76	D13 (1 x 19.76) x 0.995 x 2	27.17	
			77	D13 (1 x 20.76) x 0.995 x 2	30.37	
			78	D13 (1 x 21.76) x 0.995 x 2	25.19	
			79	D13 (1 x 22.76) x 0.995 x 2	26.39	
			80	D13 (1 x 23.76) x 0.995 x 2	27.78	
			81	D13 (1 x 24.76) x 0.995 x 2	22.61	
			82	D13 (1 x 25.76) x 0.995 x 2	23.80	
			83	D13 (1 x 26.76) x 0.995 x 2	24.77	

NAME OF STRUCTURE: 8F2
LOCATION :

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BILL OF QUANTITY

NAME OF STRUCTURE : ϕ ?
 LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			FORM WORK		
			$\pm 2,5 \text{ m}$		
			$(2,30 + 1,20) \times 1$	5,51	
			$(1,30 \times 3,00)$	3,90	
			$(2,8 \times 2) \times 1$	11,01	
			$(\frac{1,7 \times 0,50}{2} \times 1) \times 2 \times 1$	6,02	
			$(6,00 \times 2,50) \times 1$	30,	
			$(1,10 \times 2,50) \times 2 \times 1$	13	
			$(0,60 \times 5,140) \times 1$	6,92	
			$(4,4 \times 2,50) \times 1$	22,	
		x	$2,5 \times 1,135 \times 1$	5,62	
			$(2,5 \times 1,135) \times 1$	5,62	
			$(2,5 \times 0,60) \times 1$	3	
			$(2,369 \times 0,60) \times 1$	2,84	
			$(2,8 \times 1,130) \times 1$	8,40	
			$(2,5 \times 0,40) \times 1$	4,5	
			$(2,8 \times 1,20) \times 1$	6,72	
			$(2,50 \times 2,2) \times 1 + (2,8 \times 2,20) \times 1 \times 2$	46,64	
			$(2,50 \times 1,00) + (2,50 \times 1,00) \times 2$	10,80	
			$(1,50 \times 2,50) \times 2 + (2,50 \times 1,50) \times 1$	15,00	
			$(\frac{3,50 \times 2,10}{2} \times 2) \times 1$	14,70	
			$6,30 \times 6,00$	37,80	
				250,74	

NAME OF STRUCTURE: # 2
LOCATION :

4 - 135

ITEM NO	BQ - ITEM	Unit	Revision
	DRAINAGE SF5 (BATUAN RIVER)		
1.	Clearing & Grubbing	m ²	1254,67
2.	Excavation (Common)	m ³	1881,64
3.	Filling (Common)	m ³	52,18
4.	Back Fill by Selected Material	m ³	450,78
5.	Wet Stone Masonry	m ³	93,63
6.	Cement Mortar Plastering 20mm thick 1:4	m ²	447,93
7.	Crusher run Bedding	m ³	173,01
8.	Back Fill Concrete Type E for Side Wall	m ³	76,99
9.	Impermeable Back Fill	m ³	27,50
10.	Concrete Type C1 (K225) for main structure	m ³	197,70 ✓
11.	Concrete Type C2 for top and base structure	m ³	128,92
12.	Concrete Type G for leveling	m ³	34,41
D.	Reinforcing Steel Bar	kg	7.263,75
14	Formwork ≤ 2.5	m ²	410,80
15	Formwork > 2.5	m ²	65,51

BILL OF QUANTITY

SUPPORTING DATA

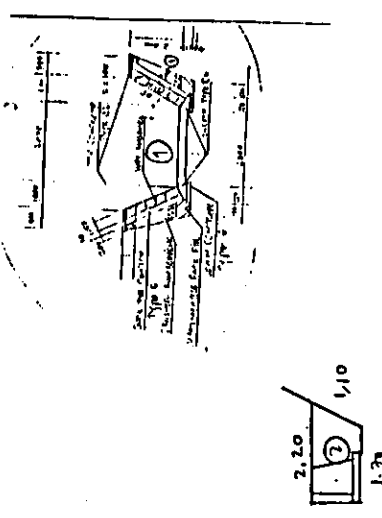
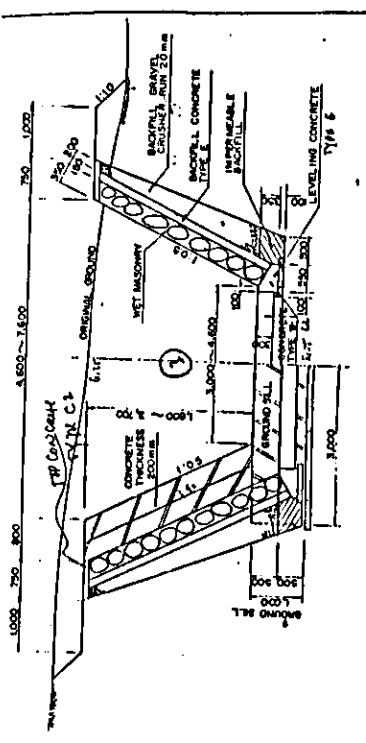
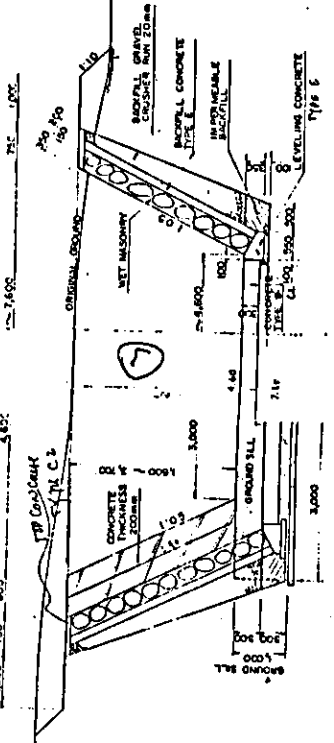
NAME OF STRUCTURE: SFS
LOCATION :

C.C. / m³

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
1			Clearing and Grubbing		
		m ²	$(9.00 \times 85) + (11.00 + 10.00 \times 71.5) + (11.30 \times 67.5)$		
		m ²	$+ (11.20 \times 5.00) + (8.95 \times 17.165) + (12.13 \times 10.30)$	1254.67	
			IMPERMEABLE BACK FILL		
			$[(0.165 \times 0.45) - (0.10 + 0.15 \times 0.10)] \times 100$	27.50	

BILL OF QUANTITY

NAME OF STRUCTURE : GFS
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
2	EXCAVATION 	1	$(1.00 \times 2.20) \times 85 + (0.20 \times 2.20) \times 85$	535.5	
		2	$\frac{(2.20 + 1.70) \times 1.10}{2} \times 5.5$	23.59	
		3	$\frac{(7.25 + 9.90)}{2} \times 3.65 + 14 \left(\frac{5.55 + 8.15}{2} + 3.65 \right) \times 15$	422.94	
			CUVERT		
		1	$\frac{(9.60 + 13.40)}{2} \times 3.65 \times 5$	209.87	
					
					

NAME OF STRUCTURE: \$\$\$
LOCATION :

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BILL OF QUANTITY

NAME OF STRUCTURE: SP
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
	PROFILE SCALE 1" = 10'				
2			$\left(\frac{6.5 \times 9.75}{2} + 8.5 \times 3.40 \right) \times 2.140$	52.22	64.46
3			$\left(\frac{6.02 + 5.18}{2} \times 3.15 \right) \times 0.90$	29.02	24.64
4			$\left(\frac{6.18 + 5.18}{2} + 3.10 \right) \times 4.0$	97.28	110.08
5			$\left(\frac{6.18 + 5.18}{2} \times 3.40 \right) \times 2.140$	52.22	64.46
6			$\left(\frac{6.18 + 5.18}{2} \times 3.54 \right) \times 1$	22.33	29.27
7			$\left[\frac{6.5 \times 10.04}{2} \times 3.54 + \frac{6.15 + 7.12 + 0.70}{2} \right] \times 4.8$	63.70	81.77
8			$\left(\frac{0.20 + 0.30}{2} \times 0.50 \right) \times 5.5 \times 6.1$	4.50	1.83
9			$(5 \times 0.65) \times 4 \times 8.13$	19.5	26.97
10			$(6.2 + 0.80) \times 6 \times 8.13$	29.76	41.17
					1881.64

NAME OF STRUCTURE: 645
LOCATION :

4 - 141

NAME OF STRUCTURE: SF 5
LOCATION :

4 - 142

NAME OF STRUCTURE: 31
LOCATION :

4 - 143

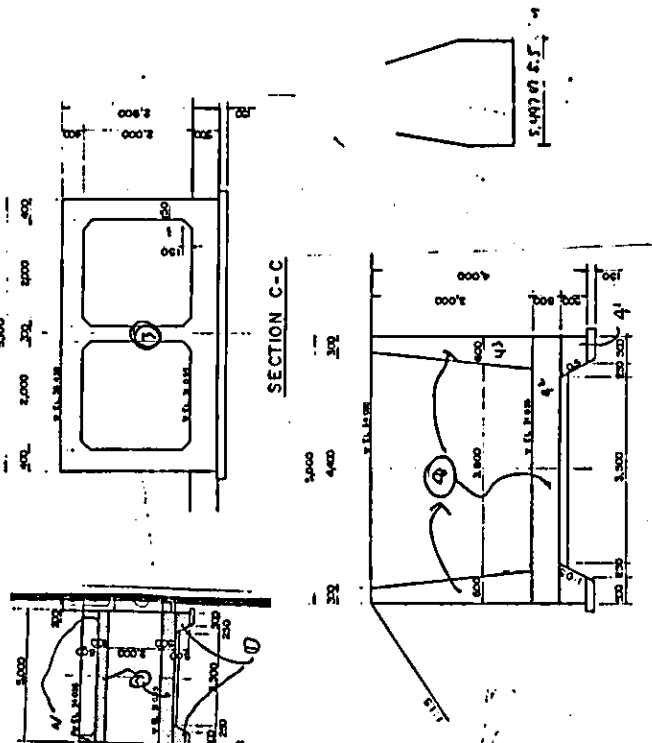
NAME OF STRUCTURE: GFF
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
6			Wet Stone Masonry		
			DITCH CHANNEL		
		m ³ 1	$\left(\frac{2.10 \times 0.30}{2} \right) \times 1.00 \times 2$	1.26	
			UPSTREAM CHANNEL		
		m ³ 2	$\left(\frac{1.10 + 1.35}{2} \right) \times 0.75 \times 85 \times 2$	72.89	
		m ³ 3	$\left(\frac{1.65 + 1.70}{2} \right) \times 0.35 \times 7.50 \times 2$	8.80	
		m ³ 4	$\left(\frac{1.95 + 2.05}{2} \right) \times 0.35 \times 4.60 \times 2$	6.44	
		m ³ 5	$\left(\frac{2.05 + 1.65}{2} \right) \times 0.35 \times 1.50 \times 2$	1.94	
		m ³ 6	$\left(\frac{2.35 \times 0.35}{2} \right) \times 1.40 \times 2$	2.30	
			CEMENT MORTAR PLASTERING		93.63
			DITCH CHANNEL		
		m ²	$(1.60 \times 1) \times 2$	3.20	
			MAIN CHANNEL		
		m ²	$(2.12 \times 85.00) \times 2$	360.4	
			$\left(\frac{3.20 + 3.37}{2} \right) \times 7.30 \times 2$	47.96	
		m ²	$\left(\frac{3.93 + 4.09}{2} \right) \times 4.6$	18.45	
		m ²	$(4.09 \times 2.90) \times 2 - \left(\frac{2.90 + 0.90}{2} \times 1 \right) + (1.00 \times 1.00) \times 2$	17.92	
					447.93

NAME OF STRUCTURE: $\phi f s$
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
7			Crusher run bedding		
			main channel		
			$\left[\frac{(0.50 + 0.20) \times 2.025}{2} + \frac{(0.50 + 0.20)}{2} \times 2.5025 \right] \times 85 \times 2$		
m ³			$-(0.25 \times 0.50) \times 0.50 \times 2$	154.57	
m ³			$\left[\frac{(0.20 + 0.5025 \times 3.05)}{2} + \frac{(0.20 + 0.5025)}{2} \times 3.25 \right] \times 7.5 \times 2$	16.66	
m ³			$\left[\frac{(0.20 + 0.60 \times 3.85)}{2} + \frac{(0.20 + 0.60 \times 4)}{2} \right] \times 4.60 \times 2$	14.44	
m ³			$\left[\frac{(0.20 + 0.60 \times 4)}{2} \times 2.90 \right] \times 2 - \left[\frac{(2.90 + 1.70)}{2} \times 0.70 \right] \times 0.10$		
			$+ \left[\frac{(0.30 + 0.40 \times 1.35)}{2} \times 1.20 \right] \times 2$	7.34	173.01
m ³			Back fill Concrete Type 6 For Side Wall		
			$\left[\frac{(2.35 \times 0.15)}{2} + \frac{(2.80 \times 0.15)}{2} \right] \times 85 \times 2 -$		
m ³			$(0.50 \times 0.50 \times 0.20) \times 2$	65.56	
m ³			$\left[\frac{(3.40 \times 0.15)}{2} + \frac{(3.55 \times 0.15)}{2} \right] \times 7.5 \times 2$	7.82	
m ³			$\left[\frac{(4.05 \times 0.20)}{2} + \frac{(4.30 \times 0.20)}{2} \right] \times 4.60 \times 2$		
m ³			$\left[\frac{(4.30 \times 0.20) \times 2.90}{2} \right] \times 2 - \left[\frac{(2.90 + 1.70)}{2} \times 0.705 \right] \times 0.10$		
			$+ (1.40 \times 1.20 \times 0.20) \times 2$	3.61	
			Impermeable Back Fill		76.99
			$(0.65 \times 0.45) - \left(\frac{0.10 + 0.25}{2} \times 0.10 \right) \times 1.00$	27.50	
m ³					27.50

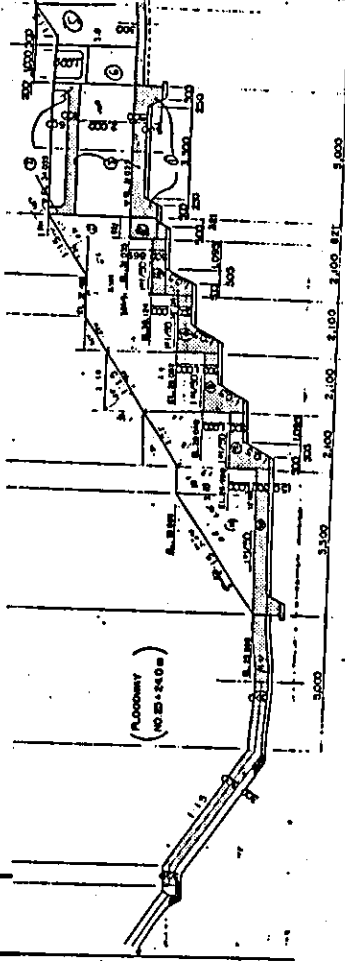
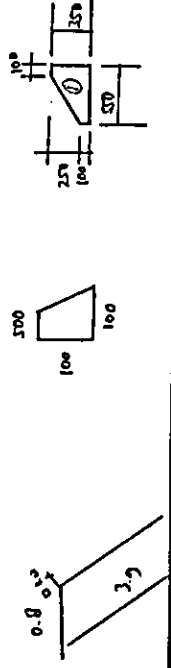
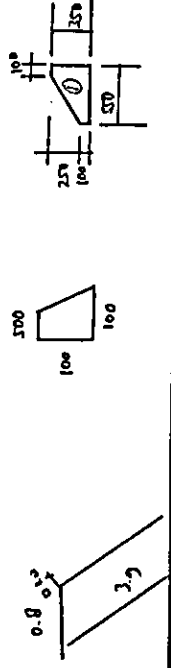
NAME OF STRUCTURE: ϕ FS
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
10			CONCRETE TYPE CI		
m ³		1	$\left[\frac{0.50 + 0.75}{2} \times 0.50 \right] \times 5.10 \times 2$	3.19	
m ³		2	$\left(0.60 \times 0.20 \times 5.10 \right) + \left(\frac{0.25 + 0.15}{2} \times 5.10 \right) \times 2$	1.42	
m ³		3	$\left(5.10 \times 2.90 \right) \times 5.00 + \left(\frac{0.212 \times 0.10}{2} \right) \times 5 \times 8$		
m ³			$- \left[\frac{2.00 \times 2.00}{2} \times 5.00 \times 2.00 \right]$	34.37	
m ³		4	$\left(\frac{0.50 + 0.75}{2} \times 0.50 \right) \times 1.70 \times 2 + \left(5 \times 0.5 \times 1.70 \right) \times 2$	19.80	
		5	$\left(0.821 \times 1.00 \times 5.50 \right) + \left(0.50 + 0.65 \times 0.369 \right) \times 5.15 \times 2$		
			$- \left[\frac{0.60 + 0.30}{2} \times 3.00 \right] \times 2$		
			$- \left[\frac{1.00 \times 0.45}{2} \times 0.35 \times 2 \right]$	7.74	
m ³		6	$\left(2.10 \times 0.50 \right) \times 5.50 + \left(\frac{0.50 + 1.05}{2} \times 1.00 \right) \times 5.15 \times 2$		
			$\left[\left(0.55 + 0.30 \times 2.364 \times 2.10 \right) + \left(1.70 \times 0.80 \times 0.369 \right) \right] \times 2$	14.74	
		7	$\left[\left(2.10 \times 0.50 \right) \times 5.50 + \left(\frac{0.50 + 1.05}{2} \times 1.00 \right) \times 5.15 \right] \times 2$		
			$\left(0.65 + 0.30 \times 3.364 \right) \times 2.10 \times 2 - \left[\frac{1.50 \times 0.65}{2} \times 0.89 \right] \times 2$	16.39	
		8	$\left[\left(2.10 \times 0.50 \right) \times 5.5 + \left(\frac{0.50 + 1.05}{2} \times 1.00 \right) \times 5.15 \right] \times 2$		
			$\left[\left(0.60 + 0.30 \times 2.90 \right) \times 2.10 \right] \times 2 -$		
m ³			$\left[\frac{2.60 \times 1.20}{2} \times 0.375 \right] \times 2$	12.97	
		9	$\left[\left(2.10 \times 0.50 \right) \times 5.5 + \left(\frac{0.50 + 1.05}{2} \times 1.00 \right) \times 5.15 \right] \times 2$		
			$\left[\left(0.60 + 0.30 \times 3.120 \right) \times 2.10 \right] \times 2 -$		
m ³			$\left[\frac{2.35 \times 1.05}{2} \times 0.375 \right] \times 2$	15.16	

BILL OF QUANTITY

NAME OF STRUCTURE: SFS

LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
10		Concrete Type C1			
			$(5.20 \times 0.50) \times 5.48 + \frac{(0.59 + 0.50 \times 2.20) \times 1}{2} \times 2$	17.65	
			$\frac{(0.50 + 0.80 \times 0.50) \times 5.20}{2}$	1.69	
			$\frac{(5.34 \times 2.95 \times 0.45)}{2} \times 2$	5.89	
11			$(11.25 \times 8.30) \times 0.150$	46.69	197.70
		CONCRETE TYPE C2			
		TOP CONCRETE			
		DITCH CURBUREL			
m³ 1			$(0.40 \times 0.10) \times 1 \times 2 \times 2$	0.16	
		MAIN CHANNEL			
1			$(0.80 \times 0.10) \times 85 \times 2 - (0.40 \times 0.10 \times 4.50 \times 2)$	13.48	
2			$(0.75 \times 0.10) \times 7.5 \times 2$	1.12	
3			$(0.75 \times 0.10) \times 6.30 \times 2$	0.94	
4			$(2.80 \times 0.30) \times 84.50$	70.98	
5			$\frac{(9.40 \times 0.30) + (2.80 \times 0.30)}{2} \times 7$	7.56	
6			$\frac{(4.40 \times 0.30) + (4.10 \times 0.30)}{2} \times 7.50$	9.56	
		FOUNDATION			
1			$(0.10 \times 0.15) + \frac{(0.15 + 0.10 \times 0.15)}{2} \times 100$	13.62	
2			$\frac{(1.00 + 0.50 \times 1.00)}{2} \times 6 \times 2$	9.00	
		SILL			
			$(3.90 \times 0.80) \times 0.20 \times 2 \times 2$	2.50	126.42

NAME OF STRUCTURE: \$FS
LOCATION :

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NAME OF STRUCTURE: \$F5
LOCATION :

4 - 149

NAME OF STRUCTURE: \$F5
LOCATION :

4 - 150

NAME OF STRUCTURE: STB
LOCATION :

BILL OF QUANTITY

NO	SHAPE BAT	SHAPE-S&P	SHAPE L&T	UNIT	QUANTITY CALCULATION	VOLUME SUBTOTAL	VOLUME TOTAL
				26	D19 (1 x 8.102) x 2.15	18.94 23.85	
				27	D19 (1 x 2.70) x 2.15] x 2	12.15 ✓	
				28	D13 (1 x 5.16) x 0.995] x 2	10.67 ✓	
				29	D19 (6 x 7.442) x 2.15	100.70 129.46	
				30	D19 (6 x 2.10) x 2.15] x 2	59.40 ✓	
				31	D13 (6 x 7.12) x 0.995	425.06 ✓ ✓	
				32	D19 (1 x 9.45) x 2.15	24.70 26.10	
				33	D19 (2 x 3.12) x 2.15	14.4 ✓	
				34	D13 (1 x 9.12) x 0.995	9.15 ✓	
				35	D19 (2 x 8.102) x 2.15	37.89 47.70	
				36	D19 (2 x 5.40) x 2.15	34.3 ✓	
				37	D13 (1 x 16.4) x 0.995	16.32 ✓	
				38	D19 (4 x 7.442) x 2.15	65.00 89.6	
				39	D19 (4 x 2.10) x 2.15] x 2	37.8 ✓	
				40	D13 (1 x 40.2) x 0.995	40.00 ✓	
				41	D19 (1 x 8.102) x 2.15	18.94 23.85	
				42	D19 (2 x 2.150) x 2.15	11.25 ✓	
				43	D13 (1 x 7.8) x 0.995	7.76 ✓	
				44	D19 (1 x 8.102) x 2.15	18.94 23.85	
				45	D19 (2 x 2.150) x 2.15	11.25 ✓	
				46	D13 (1 x 7.8) x 0.995	7.76 ✓	
				47	D19 (1 x 7.442) x 2.15	16.47 21.37	
				48	D19 (1 x 4.3) x 2.15	9.67 ✓	
				49	D13 (1 x 7.6) x 0.995	7.56 ✓	
				50	D19 (4 x 7.442) x 2.15	65.00 89.6	
				51	D19 (4 x 4.20) x 2.15	37.8 ✓	
				52	D13 (4 x 8.160) x 0.995	34.40 ✓	5140.2

BILL OF QUANTITY

NAME OF STRUCTURE: SF5
LOCATION :

NO	SHAPE BAR	SHAPE BAR	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			125.56	$0.19 \left(\frac{.1776 \dots + 7.6}{2} \right) \times 14 \times 2.55$	449.84	
54			54	$0.13 (1 \times 3) + 0.995 \times 2$	5.51	
55			55	$0.10 (1 \times 2.26) + 0.995 \times 2$	4.57	
56			56	$0.18 (1 \times 2.66) + 0.995 \times 2$	5.29	
57			57	$0.10 (1 \times 4.05) + 0.995 \times 2$	8.08	
58			58	$0.10 (1 \times 8.72) + 0.995 \times 2$	17.15	
59			59	$0.13 (1 \times 9.64) + 0.995 \times 2$	19.22	
60			60	$0.13 (1 \times 10.56) + 0.995 \times 2$	21.81	
61			61	$0.13 (1 \times 11.46) + 0.995 \times 2$	22.80	
62			62	$0.13 (1 \times 12.46) + 0.995 \times 2$	24.80	
63			63	$0.13 (1 \times 13.36) + 0.995 \times 2$	26.59	
64			64	$0.13 (1 \times 14.26) + 0.995 \times 2$	28.38	
65			65	$0.13 (1 \times 14.56) + 0.995 \times 2$	28.97	
66			66	$0.13 (1 \times 7.05) + 0.995 \times 2$	14.03	
67			67	$0.13 (1 \times 12.56) + 0.995 \times 2$	25.00	
68			68	$0.13 (1 \times 12.66) + 0.995 \times 2$	25.19	
69			69	$0.10 (1 \times 12.86) + 0.995 \times 2$	27.58	
70			70	$0.13 (1 \times 16.56) + 0.995 \times 2$	32.95	
71			71	$0.13 (1 \times 13.96) + 0.995 \times 2$	27.78	
72			72	$0.13 (1 \times 14.66) + 0.995 \times 2$	27.17	
73			73	$0.13 (1 \times 15.26) + 0.995 \times 2$	30.37	
74			74	$0.13 (1 \times 12.66) + 0.995 \times 2$	25.19	
75			75	$0.13 (1 \times 13.16) + 0.995 \times 2$	26.39	
76			76	$0.13 (1 \times 13.16) + 0.995 \times 2$	27.78	
77			77	$0.13 (1 \times 11.36) + 0.995 \times 2$	22.61	
78			78	$0.13 (1 \times 11.16) + 0.995 \times 2$	23.80	
79			79	$0.13 (1 \times 12.46) + 0.995 \times 2$	24.79	
						6160.15

NAME OF STRUCTURE : 8F2-
LOCATION :

517

NAME OF STRUCTURE: 4FS
LOCATION :

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NAME OF STRUCTURE: 475
LOCATION :

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