

1.2 Floodwall

STRUCTURAL EXCAVATION LEFT BANK

STATION NO.	PARTIAL DISTANCE	AREA (m ²)	AVERAGE (m ²)	VOLUME (m ³)
WF15L+3	0.00			
WF16L	46.02	0.942	0.471	21.675
WF17L	49.86	1.436	1.189	59.284
WF18L	49.99	0.000	0.718	35.893
WF19L	60.05	1.103	0.552	33.118
WF20L	40.55	1.104	1.104	44.747
WF21L	49.67	0.868	0.986	48.975
WF22L	50.03	1.550	1.209	60.486
WF23L	50.14	1.350	1.450	72.703
WF24L	49.96	0.784	1.067	53.307
WF25L	50.15	1.036	0.910	45.637
WF26L	49.89	0.966	1.001	49.940
WF27L	49.05	0.798	0.882	43.262
WF28L	51.81	0.885	0.842	43.598
WF29L	49.63	2.006	1.446	71.740
WF30L	50.06	0.756	1.381	69.133
WF31L	53.94	0.791	0.774	41.723
WF32L	46.26	1.051	0.921	42.605
WF33L	49.98	1.550	1.301	64.999
WF34L	50.10	2.760	2.155	107.966
WF35L	50.10	1.785	2.273	113.852
WF36L	50.27	0.840	1.313	65.979
WF37L	49.85	1.080	0.960	47.856
WF38L	49.99	1.160	1.120	55.989
WF39L	49.93	0.770	0.965	48.182
WF40L	50.15	0.700	0.735	36.860
WF41L	49.81	0.783	0.742	36.934
WF42L	50.03	0.840	0.812	40.599
WF43L	50.10	1.001	0.921	46.117
WF44L	49.84	1.520	1.261	62.823
WF45L	50.06	0.928	1.224	61.273
WF46L	49.87	1.200	1.064	53.062
WF47L	50.28	1.260	1.230	61.844
WF48L	49.92	1.443	1.352	67.467
WF49L	49.96	1.815	1.629	81.385
WF50L	49.91	1.760	1.788	89.214
WF51L	50.21	1.972	1.866	93.692
WF52L	49.88	1.724	1.848	92.178
WF53L	50.04	2.040	1.882	94.175
WF54L	49.97	1.087	1.564	78.128
WF55L	49.98	0.538	0.813	40.609
WF56L	50.09	0.957	0.748	37.442
WF57L	50.04	0.980	0.969	48.464
WF58L	50.02	1.051	1.016	50.795
WF59L	50.09	1.627	1.339	67.071
WF60L	49.06	1.318	1.473	72.241
WF61L	50.94	1.240	1.279	65.152
WF62L	49.96	1.240	1.240	61.950
WF63L	50.30	1.015	1.128	56.713
WF64L	49.99	0.729	0.872	43.591
WF64L+14.610	13.00			
TOTAL				2882.430

RIGHT BANK

STATION NO.	PARTIAL DISTANCE	AREA (m ²)	AVERAGE (m ²)	VOLUME (m ³)
WF15R+7	0.00			
WF16R	54.60	0.812	0.406	22.168
WF17R	42.14	1.305	1.059	44.605
WF18R	50.52	1.305	1.305	65.929
WF19R	62.32	1.418	1.362	84.849
WF20R	52.92	1.230	1.324	70.066
WF21R	54.37	1.473	1.352	73.481
WF22R	52.50	1.473	1.473	77.333
WF23R	51.56	1.215	1.344	69.297
WF24R	42.78	1.350	1.283	54.865
WF25R	39.11	1.581	1.466	57.316
WF26R	49.39	1.650	1.616	79.790
WF27R	58.23	1.680	1.665	96.953
WF28R	55.02	0.980	1.330	73.177
WF29R	55.52	1.320	1.150	63.848
WF30R	55.27	0.520	0.920	50.848
WF31R	56.15	0.901	0.711	39.895
WF32R	59.13	0.715	0.808	47.777
WF33R	56.92	0.854	0.785	44.654
WF34R	58.83	1.131	0.993	58.389
WF35R	37.48	1.377	1.254	47.000
WF36R	37.42	1.322	1.350	50.498
WF37R	48.53	2.581	1.952	94.706
WF38R	47.93	2.520	2.551	122.245
WF39R	61.94	0.756	1.638	101.458
WF40R	40.67	1.087	0.922	37.477
WF41R	56.29	0.776	0.932	52.434
WF42R	52.44	1.218	0.997	52.283
WF43R	45.99	0.520	0.869	39.965
WF44R	51.29	1.160	0.840	43.084
WF45R	55.05	1.050	1.105	60.830
WF46R	52.82	0.797	0.924	48.779
WF47R	44.07	0.628	0.713	31.400
WF48R	53.33	2.640	1.634	87.141
WF49R	53.62	2.706	2.673	143.326
WF50R	47.44	0.894	1.800	85.392
WF51R	46.28	1.170	1.032	47.761
WF52R	48.88	1.749	1.460	71.340
WF53R	54.21	1.595	1.672	90.639
WF54R	55.08	0.596	1.096	60.340
WF55R	46.64	1.472	1.034	48.226
WF56R	50.57	1.350	1.411	71.354
WF57R	50.52	0.316	0.833	42.083
WF58R	53.78	1.080	0.698	37.538
WF59R	44.52	1.410	1.245	55.427
WF60R	51.52	1.600	1.505	77.538
WF61R	55.15	0.910	1.255	69.213
WF62R	48.01	1.200	1.055	50.651
WF63R	45.00	0.749	0.975	43.853
WF64R	53.72	2.080	1.415	75.987
WF64R+14.610	12.00			
TOTAL				3115.207

BACKFILL WITH SELECTED SOIL
LEFT BANK

STATION NO.	PARTIAL DISTANCE	AREA (m ²)	AVERAGE (m ²)	VOLUME (m ³)
WF15L+3	0.00			
WF16L	46.02	0.313	0.157	7.202
WF17L	49.86	0.313	0.313	15.606
WF18L	49.99	0.313	0.313	15.647
WF19L	60.05	0.313	0.313	18.796
WF20L	40.55	0.313	0.313	12.692
WF21L	49.67	0.313	0.313	15.547
WF22L	50.03	0.313	0.313	15.659
WF23L	50.14	0.313	0.313	15.694
WF24L	49.96	0.313	0.313	15.637
WF25L	50.15	0.313	0.313	15.697
WF26L	49.89	0.313	0.313	15.616
WF27L	49.05	0.313	0.313	15.353
WF28L	51.81	0.313	0.313	16.217
WF29L	49.63	0.313	0.313	15.534
WF30L	50.06	0.313	0.313	15.669
WF31L	53.94	0.313	0.313	16.883
WF32L	46.26	0.313	0.313	14.479
WF33L	49.98	0.313	0.313	15.644
WF34L	50.10	0.313	0.313	15.681
WF35L	50.10	0.313	0.313	15.681
WF36L	50.27	0.313	0.313	15.735
WF37L	49.85	0.313	0.313	15.603
WF38L	49.99	0.313	0.313	15.647
WF39L	49.93	0.313	0.313	15.628
WF40L	50.15	0.313	0.313	15.697
WF41L	49.81	0.313	0.313	15.591
WF42L	50.03	0.313	0.313	15.659
WF43L	50.10	0.313	0.313	15.681
WF44L	49.84	0.313	0.313	15.600
WF45L	50.06	0.313	0.313	15.669
WF46L	49.87	0.313	0.313	15.609
WF47L	50.28	0.313	0.313	15.738
WF48L	49.92	0.313	0.313	15.625
WF49L	49.96	0.313	0.313	15.637
WF50L	49.91	0.313	0.313	15.622
WF51L	50.21	0.313	0.313	15.716
WF52L	49.88	0.313	0.313	15.612
WF53L	50.04	0.313	0.313	15.663
WF54L	49.97	0.313	0.313	15.641
WF55L	49.98	0.313	0.313	15.644
WF56L	50.09	0.313	0.313	15.678
WF57L	50.04	0.313	0.313	15.663
WF58L	50.02	0.313	0.313	15.656
WF59L	50.09	0.313	0.313	15.678
WF60L	49.06	0.313	0.313	15.356
WF61L	50.94	0.313	0.313	15.944
WF62L	49.96	0.313	0.313	15.637
WF63L	50.30	0.313	0.313	15.744
WF64L	49.99	0.313	0.313	15.647
WF64L+14.610	14.61			
			TOTAL	758.953

RIGHT BANK

STATION NO.	PARTIAL DISTANCE	AREA (m ²)	AVERAGE (m ²)	VOLUME (m ³)
WF15R+7	0.00			
WF16R	54.60	0.313	0.157	8.545
WF17R	42.14	0.313	0.313	13.190
WF18R	50.52	0.313	0.313	15.813
WF19R	62.32	0.313	0.313	19.506
WF20R	52.92	0.313	0.313	16.564
WF21R	54.37	0.313	0.313	17.018
WF22R	52.50	0.313	0.313	16.433
WF23R	51.56	0.313	0.313	16.138
WF24R	42.78	0.313	0.313	13.390
WF25R	39.11	0.313	0.313	12.241
WF26R	49.39	0.313	0.313	15.459
WF27R	58.23	0.313	0.313	18.226
WF28R	55.02	0.313	0.313	17.221
WF29R	55.52	0.313	0.313	17.378
WF30R	55.27	0.313	0.313	17.300
WF31R	56.15	0.313	0.313	17.575
WF32R	59.13	0.313	0.313	18.508
WF33R	56.92	0.313	0.313	17.816
WF34R	58.83	0.313	0.313	18.414
WF35R	37.48	0.313	0.313	11.731
WF36R	37.42	0.313	0.313	11.712
WF37R	48.53	0.313	0.313	15.190
WF38R	47.93	0.313	0.313	15.002
WF39R	61.94	0.313	0.313	19.387
WF40R	40.67	0.313	0.313	12.730
WF41R	56.29	0.313	0.313	17.619
WF42R	52.44	0.313	0.313	16.414
WF43R	45.99	0.313	0.313	14.395
WF44R	51.29	0.313	0.313	16.054
WF45R	55.05	0.313	0.313	17.231
WF46R	52.82	0.313	0.313	16.533
WF47R	44.07	0.313	0.313	13.794
WF48R	53.33	0.313	0.313	16.692
WF49R	53.62	0.313	0.313	16.783
WF50R	47.44	0.313	0.313	14.849
WF51R	46.28	0.313	0.313	14.486
WF52R	48.88	0.313	0.313	15.299
WF53R	54.21	0.313	0.313	16.968
WF54R	55.08	0.313	0.313	17.240
WF55R	46.64	0.313	0.313	14.598
WF56R	50.57	0.313	0.313	15.828
WF57R	50.52	0.313	0.313	15.813
WF58R	53.78	0.313	0.313	16.833
WF59R	44.52	0.313	0.313	13.935
WF60R	51.52	0.313	0.313	16.126
WF61R	55.15	0.313	0.313	17.262
WF62R	48.01	0.313	0.313	15.027
WF63R	45.00	0.313	0.313	14.085
WF64R	53.72	0.313	0.313	16.814
WF64R+14.610	14.61			
			TOTAL	773.163

GRAVEL BEDDING

STATION NO.	PARTIAL DISTANCE (m)	AREA OF GRAVEL BEDDING (m ²)	GRAVEL BEDDING VOLUME (m ³)	STATION NO.	PARTIAL DISTANCE (m)	AREA OF GRAVEL BEDDING (m ²)	GRAVEL BEDDING VOLUME (m ³)
WF15L+3	0.00	0.070		WF15R+7	0.00	0.070	
WF16L	46.02	0.070	3.221	WF16R	54.60	0.070	3.822
WF17L	49.86	0.070	3.490	WF17R	42.14	0.070	2.950
WF18L	49.99	0.070	3.499	WF18R	50.52	0.070	3.536
WF19L	60.05	0.070	4.204	WF19R	62.32	0.070	4.362
WF20L	40.55	0.070	2.839	WF20R	52.92	0.070	3.704
WF21L	49.67	0.070	3.477	WF21R	54.37	0.070	3.806
WF22L	50.03	0.070	3.502	WF22R	52.50	0.070	3.675
WF23L	50.14	0.070	3.510	WF23R	51.56	0.070	3.609
WF24L	49.96	0.070	3.497	WF24R	42.78	0.070	2.995
WF25L	50.15	0.070	3.511	WF25R	39.11	0.070	2.738
WF26L	49.89	0.070	3.492	WF26R	49.39	0.070	3.457
WF27L	49.05	0.070	3.434	WF27R	58.23	0.070	4.076
WF28L	51.81	0.070	3.627	WF28R	55.02	0.070	3.851
WF29L	49.63	0.070	3.474	WF29R	55.52	0.070	3.886
WF30L	50.06	0.070	3.504	WF30R	55.27	0.070	3.869
WF31L	53.94	0.070	3.776	WF31R	56.15	0.070	3.931
WF32L	46.26	0.070	3.238	WF32R	59.13	0.070	4.139
WF33L	49.98	0.070	3.499	WF33R	56.92	0.070	3.984
WF34L	50.10	0.070	3.507	WF34R	58.83	0.070	4.118
WF35L	50.10	0.070	3.507	WF35R	37.48	0.070	2.624
WF36L	50.27	0.070	3.519	WF36R	37.42	0.070	2.619
WF37L	49.85	0.070	3.490	WF37R	48.53	0.070	3.397
WF38L	49.99	0.070	3.499	WF38R	47.93	0.070	3.355
WF39L	49.93	0.070	3.495	WF39R	61.94	0.070	4.336
WF40L	50.15	0.070	3.511	WF40R	40.67	0.070	2.847
WF41L	49.81	0.070	3.487	WF41R	56.29	0.070	3.940
WF42L	50.03	0.070	3.502	WF42R	52.44	0.070	3.671
WF43L	50.10	0.070	3.507	WF43R	45.99	0.070	3.219
WF44L	49.84	0.070	3.489	WF44R	51.29	0.070	3.590
WF45L	50.06	0.070	3.504	WF45R	55.05	0.070	3.854
WF46L	49.87	0.070	3.491	WF46R	52.82	0.070	3.697
WF47L	50.28	0.070	3.520	WF47R	44.07	0.070	3.085
WF48L	49.92	0.070	3.494	WF48R	53.33	0.070	3.733
WF49L	49.96	0.070	3.497	WF49R	53.62	0.070	3.753
WF50L	49.91	0.070	3.494	WF50R	47.44	0.070	3.321
WF51L	50.21	0.070	3.515	WF51R	46.28	0.070	3.240
WF52L	49.88	0.070	3.492	WF52R	48.88	0.070	3.422
WF53L	50.04	0.070	3.503	WF53R	54.21	0.070	3.795
WF54L	49.97	0.070	3.498	WF54R	55.08	0.070	3.856
WF55L	49.98	0.070	3.499	WF55R	46.64	0.070	3.265
WF56L	50.09	0.070	3.506	WF56R	50.57	0.070	3.540
WF57L	50.04	0.070	3.503	WF57R	50.52	0.070	3.536
WF58L	50.02	0.070	3.501	WF58R	53.78	0.070	3.765
WF59L	50.09	0.070	3.506	WF59R	44.52	0.070	3.116
WF60L	49.06	0.070	3.434	WF60R	51.52	0.070	3.606
WF61L	50.94	0.070	3.566	WF61R	55.15	0.070	3.861
WF62L	49.96	0.070	3.497	WF62R	48.01	0.070	3.361
WF63L	50.30	0.070	3.521	WF63R	45.00	0.070	3.150
WF64L	49.99	0.070	3.499	WF64R	53.72	0.070	3.760
WF64L+14.610	14.61	0.070	1.023	WF64R+14.610	14.61	0.070	1.023
		TOTAL	162.156			TOTAL	169.074

CHIPPING ON EXISTING FLOODWALL SURFACE (RIVER SIDE) : LEFT BANK

STATION NO.	PARTIAL DISTANCE (m)	DESIGN FLOODWALL CROWN (EL m)	EXISTING FLOODWALL CROWN (EL m)	DIFFERENCE OF HEIGHT (m)	HEIGHT OF FLOODWALL (m)	HEIGHT (m)	DESIGN CROWN WIDTH (m)	LENGTH OF CHIPPING (m)	AVERAGE (m)	AREA OF CHIPPING (m ²)
WF15L+3	0.00	2.212	0.960	1.252	2.300	1.45	0.50	1.948		
WF16L	46.02	2.241	0.960	1.281	2.300	1.42	0.50	1.919	1.934	88.980
WF17L	49.86	2.264	1.050	1.214	2.300	1.49	0.50	1.986	1.953	97.352
WF18L	49.99	2.290	1.380	0.910	2.300	1.79	0.50	2.290	2.138	106.879
WF19L	60.05	2.322	1.650	0.672	2.300	2.03	0.50	2.528	2.409	144.660
WF20L	40.55	2.345	1.540	0.805	2.300	1.90	0.50	2.395	2.462	99.814
WF21L	49.67	2.372	1.500	0.872	2.300	1.83	0.50	2.328	2.362	117.296
WF22L	50.03	2.398	1.570	0.828	2.300	1.87	0.50	2.372	2.350	117.571
WF23L	50.14	2.424	1.730	0.694	2.300	2.01	0.50	2.506	2.439	122.291
WF24L	49.96	2.448	1.650	0.798	2.300	1.90	0.50	2.402	2.454	122.602
WF25L	50.15	2.471	1.850	0.621	2.300	2.08	0.50	2.579	2.491	124.899
WF26L	49.89	2.497	1.820	0.677	2.300	2.02	0.50	2.523	2.551	127.269
WF27L	49.89	2.497	1.820	0.677	2.100	1.82	0.50	2.323		
WF27L	49.05	2.524	1.780	0.744	2.100	1.76	0.50	2.256	2.290	112.300
WF28L	51.81	2.551	1.790	0.761	2.100	1.74	0.50	2.239	2.248	116.443
WF28L	51.81	2.551	1.790	0.761	1.900	1.54	0.50	2.039		
WF29L	49.63	2.578	1.980	0.598	1.900	1.70	0.50	2.202	2.121	105.240
WF30L	50.06	2.605	2.250	0.355	1.900	1.95	0.50	2.445	2.324	116.314
WF31L	53.94	2.633	2.280	0.373	1.900	1.93	0.50	2.427	2.436	131.398
WF32L	46.26	2.660	2.200	0.460	1.900	1.84	0.50	2.340	2.384	110.261
WF33L	49.98	2.688	2.240	0.448	1.900	1.85	0.50	2.352	2.346	117.253
WF34L	50.10	2.715	1.850	0.865	1.900	1.44	0.50	1.935	2.144	107.389
WF35L	50.10	2.738	1.920	0.818	1.900	1.48	0.50	1.982	1.959	98.121
WF36L	50.27	2.781	2.180	0.601	1.900	1.70	0.50	2.199	2.091	105.089
WF37L	49.85	2.786	2.170	0.616	1.900	1.68	0.50	2.184	2.192	109.246
WF38L	49.99	2.811	2.200	0.611	1.900	1.69	0.50	2.189	2.187	109.303
WF39L	49.93	2.839	2.340	0.499	1.900	1.80	0.50	2.301	2.245	112.093
WF40L	50.15	2.862	2.280	0.582	1.900	1.72	0.50	2.218	2.260	113.314
WF41L	49.81	2.890	2.390	0.500	1.900	1.80	0.50	2.300	2.259	112.521
									SUBTOTAL	2945.898

STATION NO.	PARTIAL DISTANCE (m)	DESIGN FLOODWALL CROWN (EL m)	EXISTING FLOODWALL CROWN (EL m)	DIFFERENCE OF HEIGHT (m)	HEIGHT OF FLOODWALL (m)	HEIGHT (m)	DESIGN CROWN WIDTH (m)	LENGTH OF CHIPPING (m)	AVERAGE (m)	AREA OF CHIPPING (m ²)
WF42L	50.03	2.916	2.470	0.446	1.900	1.85	0.50	2.354	2.327	116.420
WF43L	50.10	2.941	2.500	0.441	1.900	1.86	0.50	2.359	2.357	118.061
WF44L	49.84	2.966	2.640	0.326	1.900	1.97	0.50	2.474	2.417	120.438
WF45L	50.06	2.993	2.620	0.373	1.900	1.93	0.50	2.427	2.451	122.672
	50.06	2.993	2.620	0.373	1.700	1.73	0.50	2.227		
WF46L	49.87	3.020	2.810	0.210	1.700	1.89	0.50	2.390	2.309	115.125
	49.87	3.020	2.810	0.210	1.500	1.69	0.50	2.190		
WF47L	50.28	3.044	3.000	0.044	1.500	1.86	0.50	2.356	2.273	114.286
WF48L	49.92	3.070	3.050	0.020	1.500	1.88	0.50	2.380	2.368	118.211
WF49L	49.96	3.097	3.010	0.087	1.500	1.81	0.50	2.313	2.347	117.231
WF50L	49.91	3.122	2.970	0.152	1.500	1.75	0.50	2.248	2.281	113.820
WF51L	50.21	3.147	3.140	0.007	1.500	1.89	0.50	2.393	2.321	116.512
WF52L	49.88	3.209	3.190	0.019	1.500	1.88	0.50	2.381	2.387	119.064
WF53L	50.04	3.274	3.030	0.244	1.500	1.66	0.50	2.156	2.269	113.516
WF54L	49.97	3.339	3.290	0.049	1.500	1.85	0.50	2.351	2.254	112.607
WF55L	49.98	3.400	3.100	0.300	1.500	1.60	0.50	2.100	2.226	111.230
WF56L	50.09	3.462	3.270	0.192	1.500	1.71	0.50	2.208	2.154	107.894
WF57L	50.04	3.525	3.240	0.285	1.500	1.62	0.50	2.115	2.162	108.161
WF58L	50.02	3.590	3.220	0.370	1.500	1.53	0.50	2.030	2.073	103.666
WF59L	50.09	3.649	3.410	0.239	1.500	1.66	0.50	2.161	2.096	104.964
WF60L	49.06	3.712	3.400	0.312	1.500	1.59	0.50	2.088	2.125	104.228
WF61L	50.94	3.779	3.540	0.239	1.500	1.66	0.50	2.161	2.125	108.222
WF62L	49.96	3.840	3.590	0.250	1.500	1.65	0.50	2.150	2.156	107.689
	49.96	3.840	3.590	0.250	1.300	1.45	0.50	1.950		
WF63L	50.30	3.899	3.650	0.249	1.300	1.45	0.50	1.951	1.951	98.110
WF64L	49.99	3.964	3.790	0.174	1.300	1.53	0.50	2.026	1.989	99.405
WF64L+14.610	14.61	4.024	3.790	0.234	1.300	1.47	0.50	1.966	1.996	29.162
									SUBTOTAL	2600.694
									TOTAL	5546.592

CHIPPING ON EXISTING FLOODWALL SURFACE (RIVER SIDE) : RIGHT BANK

STATION NO.	PARTIAL DISTANCE (m)	DESIGN FLOODWALL CROWN (EL m)	EXISTING FLOODWALL CROWN (EL m)	DIFFERENCE OF HEIGHT (m)	HEIGHT OF FLOODWALL (m)	HEIGHT (m)	DESIGN CROWN WIDTH (m)	LENGTH OF CHIPPING (m)	AVERAGE (m)	AREA OF CHIPPING (m ²)
WF15R+7	0.00	2.212	1.610	0.602	1.700	1.50	0.50	1.998		
WF16R	54.60	2.241	1.610	0.631	1.700	1.47	0.50	1.969	1.984	108.299
WF17R	42.14	2.264	1.610	0.654	1.700	1.45	0.50	1.946	1.958	82.489
	42.14	2.264	1.610	0.654	1.500	1.25	0.50	1.746		
WF18R	50.52	2.290	1.610	0.680	1.500	1.22	0.50	1.720	1.733	87.551
WF19R	62.32	2.322	1.550	0.772	1.500	1.13	0.50	1.628	1.674	104.324
WF20R	52.92	2.345	1.580	0.765	1.500	1.14	0.50	1.635	1.632	86.339
WF21R	54.37	2.372	1.620	0.752	1.500	1.15	0.50	1.648	1.642	89.248
WF22R	52.50	2.398	1.660	0.738	1.500	1.16	0.50	1.662	1.655	86.888
WF23R	51.56	2.424	1.720	0.704	1.500	1.20	0.50	1.698	1.679	86.569
WF24R	42.78	2.448	1.750	0.698	1.500	1.20	0.50	1.702	1.699	72.683
WF25R	39.11	2.471	1.830	0.641	1.500	1.26	0.50	1.759	1.731	67.680
WF26R	48.39	2.497	1.850	0.647	1.500	1.25	0.50	1.753	1.756	86.729
WF27R	58.23	2.524	1.840	0.684	1.500	1.22	0.50	1.716	1.735	101.000
WF28R	55.02	2.551	1.850	0.701	1.500	1.20	0.50	1.699	1.708	93.947
WF29R	55.52	2.578	1.900	0.678	1.500	1.22	0.50	1.722	1.711	94.967
WF30R	55.27	2.605	1.880	0.725	1.500	1.18	0.50	1.675	1.699	93.876
WF31R	56.15	2.633	1.920	0.713	1.500	1.19	0.50	1.687	1.681	94.388
WF32R	59.13	2.660	1.840	0.820	1.500	1.08	0.50	1.580	1.634	96.589
WF33R	56.92	2.688	2.110	0.578	1.500	1.32	0.50	1.822	1.701	96.821
WF34R	58.83	2.715	2.160	0.555	1.500	1.35	0.50	1.845	1.834	107.865
WF35R	37.48	2.738	2.200	0.538	1.500	1.36	0.50	1.862	1.854	69.469
WF36R	37.42	2.791	2.200	0.581	1.500	1.32	0.50	1.819	1.841	68.872
WF37R	48.53	2.786	2.310	0.476	1.500	1.42	0.50	1.924	1.872	90.824
WF38R	47.93	2.811	2.410	0.401	1.500	1.50	0.50	1.999	1.962	94.015
	47.93	2.811	2.410	0.401	1.700	1.70	0.50	2.199		
WF39R	61.94	2.839	2.390	0.449	1.700	1.65	0.50	2.151	2.175	134.720
WF40R	61.94	2.839	2.390	0.449	1.900	1.85	0.50	2.351		
WF41R	40.67	2.862	2.420	0.442	1.900	1.86	0.50	2.358	2.355	95.758
WF41R	56.29	2.890	2.360	0.530	1.900	1.77	0.50	2.270	2.314	130.255
									SUBTOTAL	2422.163

STATION NO.	PARTIAL DISTANCE (m)	DESIGN FLOODWALL CROWN (EL m)	EXISTING FLOODWALL CROWN (EL m)	DIFFERENCE OF HEIGHT (m)	HEIGHT OF FLOODWALL (m)	HEIGHT (m)	DESIGN CROWN WIDTH (m)	LENGTH OF CHIPPING (m)	AVERAGE (m)	AREA OF CHIPPING (m ²)
WF42R	52.44	2.916	2.520	0.396	1.900	1.90	0.50	2.404	2.337	122.552
WF43R	52.44	2.916	2.520	0.396	2.100	2.10	0.50	2.604	2.587	118.953
WF44R	45.99	2.941	2.510	0.431	2.100	2.07	0.50	2.569	2.607	133.887
WF45R	51.29	2.966	2.610	0.356	2.100	2.14	0.50	2.644	2.436	134.074
WF46R	51.29	2.966	2.610	0.356	1.900	1.94	0.50	2.444	2.227	117.709
WF47R	55.05	2.993	2.620	0.373	1.900	1.93	0.50	2.227	2.229	99.510
WF48R	52.82	2.993	2.620	0.373	1.700	1.73	0.50	2.230	2.258	123.086
WF49R	44.07	3.044	2.730	0.314	1.700	1.79	0.50	2.286	2.308	126.356
WF50R	53.33	3.070	2.800	0.270	1.700	1.83	0.50	2.330	2.416	114.103
WF51R	53.62	3.097	2.880	0.217	1.700	1.88	0.50	2.383	2.466	111.300
WF52R	47.44	3.122	2.970	0.152	1.700	1.95	0.50	2.448	2.244	121.820
WF53R	46.28	3.147	3.030	0.117	1.700	1.98	0.50	2.483	2.249	123.847
WF54R	48.88	3.209	3.080	0.129	1.500	1.78	0.50	2.283	2.301	107.295
WF55R	54.21	3.274	3.090	0.184	1.500	1.77	0.50	2.271	2.292	115.502
WF56R	55.08	3.339	3.220	0.119	1.500	1.72	0.50	2.216	2.333	125.442
WF57R	46.64	3.400	3.320	0.080	1.500	1.78	0.50	2.281	2.266	100.860
WF58R	50.57	3.462	3.310	0.152	1.500	1.82	0.50	2.320	2.240	115.379
WF59R	50.52	3.525	3.460	0.065	1.500	1.75	0.50	2.248	2.280	124.611
WF60R	53.78	3.590	3.520	0.070	1.500	1.84	0.50	2.335	2.231	107.086
WF61R	44.52	3.649	3.450	0.199	1.500	1.83	0.50	2.330	1.986	89.348
WF62R	51.52	3.712	3.590	0.122	1.500	1.70	0.50	2.201	2.014	108.165
WF63R	55.15	3.779	3.620	0.159	1.500	1.78	0.50	2.278	2.047	29.899
WF64R	48.01	3.840	3.660	0.180	1.500	1.74	0.50	2.241	SUBTOTAL	2700.744
WF65R	48.01	3.840	3.660	0.180	1.300	1.52	0.50	2.020	TOTAL	5122.907
WF66R	45.00	3.899	3.650	0.249	1.300	1.45	0.50	1.951		
WF67R	53.72	3.964	3.840	0.124	1.300	1.58	0.50	2.076		
WF68R	14.61	4.023	3.840	0.183	1.300	1.52	0.50	2.017		

CHIPPING ON EXISTING FLOODWALL SURFACE (LAND SIDE) : LEFT BANK

STATION NO.	PARTIAL DISTANCE (m)	LENGTH (m)	AVERAGE (m)	AREA OF CHIPPING (m ²)
WF15L+3	0.00	0.19		
WF16L	46.02	0.19	0.194	8.946
WF17L	49.86	0.49	0.340	16.962
WF18L	49.99	0.86	0.675	33.743
WF19L	60.05	0.65	0.756	45.398
WF20L	40.55	0.30	0.475	19.269
WF21L	49.67	0.21	0.254	12.606
WF22L	50.03	0.00	0.103	5.133
WF23L	50.14	0.59	0.297	14.892
WF24L	49.96	0.76	0.675	33.723
WF25L	50.15	0.97	0.864	43.330
WF26L	49.89	0.76	0.864	43.105
WF27L	49.05	0.86	0.810	39.731
WF28L	51.81	0.96	0.913	47.282
WF29L	49.63	0.92	0.940	46.632
WF30L	50.06	2.14	1.528	76.502
WF31L	53.94	2.11	2.122	114.471
WF32L	46.26	1.79	1.949	90.179
WF33L	49.98	1.62	1.706	85.286
WF34L	50.10	1.73	1.674	83.867
WF35L	50.10	1.84	1.782	89.278
WF36L	50.27	1.21	1.523	76.551
WF37L	49.85	1.51	1.361	67.836
WF38L	49.99	1.46	1.485	74.235
WF39L	49.93	1.87	1.663	83.044
WF40L	50.15	1.84	1.852	92.888
WF41L	49.81	1.78	1.809	90.106
SUBTOTAL				1434.996

STATION NO.	PARTIAL DISTANCE (m)	LENGTH (m)	AVERAGE (m)	AREA OF CHIPPING (m ²)
WF42L	50.03	1.74	1.760	88.073
WF43L	50.10	1.67	1.706	85.491
WF44L	49.84	1.50	1.588	79.126
WF45L	50.06	1.49	1.496	74.880
WF46L	49.87	1.33	1.409	70.287
WF47L	50.28	1.30	1.312	65.977
WF48L	49.92	0.86	1.080	53.914
WF49L	49.96	0.00	0.432	21.583
WF50L	49.91	1.30	0.648	32.342
WF51L	50.21	1.64	1.469	73.748
WF52L	49.88	1.73	1.685	84.038
WF53L	50.04	1.57	1.647	82.416
WF54L	49.97	1.62	1.593	79.602
WF55L	49.98	1.51	1.566	78.269
WF56L	50.09	1.19	1.350	67.622
WF57L	50.04	0.97	1.080	54.043
WF58L	50.02	0.95	0.961	48.079
WF59L	50.09	0.73	0.842	42.196
WF60L	49.06	0.76	0.745	36.560
WF61L	50.94	0.92	0.837	42.637
WF62L	49.96	0.86	0.891	44.514
WF63L	50.30	0.65	0.756	38.027
WF64L	49.99	0.49	0.567	28.344
WF64L+14.610	14.61	0.49	0.486	7.100
SUBTOTAL				1378.866
TOTAL				2813.862

CHIPPING ON EXISTING FLOODWALL SURFACE (LAND SIDE) : RIGHT BANK

STATION NO.	PARTIAL DISTANCE (m)	LENGTH (m)	AVERAGE (m)	AREA OF CHIPPING (m ²)
WF15R+7	0.00	0.66		
WF16R	54.60	0.66	0.659	35.970
WF17R	42.14	0.62	0.637	26.852
WF18R	50.52	0.33	0.475	24.007
WF19R	62.32	0.38	0.356	22.211
WF20R	52.92	0.38	0.378	20.004
WF21R	54.37	0.54	0.459	24.956
WF22R	52.50	0.43	0.486	25.515
WF23R	51.56	0.41	0.421	21.717
WF24R	42.78	0.32	0.367	15.709
WF25R	39.11	0.24	0.281	10.982
WF26R	49.39	0.29	0.265	13.069
WF27R	58.23	0.10	0.194	11.320
WF28R	55.02	0.18	0.140	7.725
WF29R	55.52	0.24	0.211	11.693
WF30R	55.27	0.12	0.178	9.849
WF31R	56.15	0.02	0.070	3.942
WF32R	59.13	0.00	0.011	0.639
WF33R	56.92	0.23	0.113	6.455
WF34R	58.83	0.02	0.124	7.307
WF35R	37.48	0.18	0.103	3.845
WF36R	37.42	0.16	0.173	6.466
WF37R	48.53	0.22	0.189	9.172
WF38R	47.93	0.27	0.243	11.647
WF39R	61.94	1.73	0.999	61.878
WF40R	40.67	1.73	1.728	70.278
WF41R	56.29	1.65	1.690	95.141
SUBTOTAL				558.347

STATION NO.	PARTIAL DISTANCE (m)	LENGTH (m)	AVERAGE (m)	AREA OF CHIPPING (m ²)
WF42R	52.44	1.89	1.771	92.882
WF43R	45.99	1.77	1.831	84.189
WF44R	51.29	1.84	1.804	92.507
WF45R	55.05	1.77	1.804	99.288
WF46R	52.82	1.49	1.631	86.139
WF47R	44.07	1.40	1.447	63.778
WF48R	53.33	1.64	1.523	81.211
WF49R	53.62	1.29	1.463	78.468
WF50R	47.44	1.19	1.237	58.664
WF51R	46.28	1.26	1.226	56.730
WF52R	48.88	1.22	1.242	60.709
WF53R	54.21	1.18	1.199	64.987
WF54R	55.08	1.30	1.237	68.112
WF55R	46.64	1.11	1.204	56.164
WF56R	50.57	0.97	1.042	52.704
WF57R	50.52	1.11	1.042	52.652
WF58R	53.78	1.06	1.085	58.373
WF59R	44.52	1.08	1.069	47.601
WF60R	51.52	1.13	1.107	57.033
WF61R	55.15	0.91	1.021	56.286
WF62R	48.01	0.70	0.805	38.629
WF63R	45.00	0.65	0.675	30.375
WF64R	53.72	0.16	0.405	21.757
WF64R+14.610	14.61	0.16	0.162	2.367
SUBTOTAL				1461.603
TOTAL				2019.950

CONCRETE (TYPE-C1) LEFT BANK

STATION NO.	PARTIAL DISTANCE (m)	DESIGN FLOODWALL CROWN (EL m)	EXISTING FLOODWALL CROWN (EL m)	DIFFERENCE OF HEIGHT (m)	HEIGHT OF FLOODWALL (m)	EXISTING CROWN WIDTH (m)	DESIGN CROWN WIDTH (m)	AREA OF FLOODWALL (m ²)	AVERAGE (m ²)	CONCRETE VOLUME (m ³)
WF15L+3	0.00	2.212	0.960	1.252	2.300	0.50	0.50	1.368		
WF16L	48.02	2.241	0.960	1.281	2.300	0.50	0.50	1.378	1.373	63.198
WF17L	49.86	2.264	1.050	1.214	2.300	0.50	0.50	1.355	1.367	68.140
WF18L	49.99	2.290	1.380	0.910	2.300	0.50	0.50	1.249	1.302	65.072
WF19L	60.05	2.322	1.650	0.672	2.300	0.50	0.50	1.165	1.207	72.471
WF20L	40.55	2.345	1.540	0.805	2.300	0.50	0.50	1.212	1.188	48.193
WF21L	49.67	2.372	1.500	0.872	2.300	0.50	0.50	1.235	1.223	60.770
WF22L	50.03	2.398	1.570	0.828	2.300	0.50	0.50	1.220	1.228	61.412
WF23L	50.14	2.424	1.730	0.694	2.300	0.50	0.50	1.173	1.196	59.985
WF24L	49.96	2.448	1.650	0.798	2.300	0.50	0.50	1.209	1.191	59.507
WF25L	50.15	2.471	1.850	0.621	2.300	0.50	0.50	1.147	1.178	59.093
WF26L	49.89	2.497	1.820	0.677	2.300	0.50	0.50	1.167	1.157	57.730
	49.89	2.497	1.820	0.677	2.100	0.50	0.50	1.107		
WF27L	49.05	2.524	1.780	0.744	2.100	0.50	0.50	1.130	1.119	54.871
WF28L	51.81	2.551	1.790	0.761	2.100	0.50	0.50	1.136	1.133	58.720
	51.81	2.551	1.790	0.761	1.900	0.50	0.50	1.078		
WF29L	49.63	2.578	1.980	0.598	1.900	0.60	0.50	1.049	1.063	52.746
WF30L	50.06	2.605	2.250	0.355	1.900	0.50	0.50	0.934	0.992	49.646
WF31L	53.94	2.633	2.260	0.373	1.900	0.50	0.50	0.941	0.937	50.563
WF32L	46.26	2.660	2.200	0.460	1.900	0.60	0.50	0.994	0.967	44.746
WF33L	49.98	2.688	2.240	0.448	1.900	0.50	0.50	0.967	0.980	49.000
WF34L	50.10	2.715	1.850	0.865	1.900	0.50	0.50	1.113	1.040	52.093
WF35L	50.10	2.738	1.920	0.818	1.900	0.50	0.50	1.096	1.105	55.337
WF36L	50.27	2.781	2.180	0.601	1.900	0.50	0.50	1.020	1.058	53.202
WF37L	49.85	2.786	2.170	0.616	1.900	0.50	0.50	1.028	1.023	50.995
WF38L	49.99	2.811	2.200	0.611	1.900	0.50	0.50	1.024	1.025	51.226
WF39L	49.93	2.839	2.340	0.499	1.900	0.50	0.50	0.985	1.004	50.142
WF40L	50.15	2.862	2.280	0.582	1.900	0.50	0.50	1.014	0.999	50.109
WF41L	49.81	2.890	2.390	0.500	1.900	0.50	0.50	0.985	0.999	49.778
									SUBTOTAL	1448.745

STATION NO.	PARTIAL DISTANCE (m)	DESIGN FLOODWALL CROWN (EL m)	EXISTING FLOODWALL CROWN (EL m)	DIFFERENCE OF HEIGHT (m)	HEIGHT OF FLOODWALL (m)	EXISTING CROWN WIDTH (m)	DESIGN CROWN WIDTH (m)	AREA OF FLOODWALL (m ²)	AVERAGE (m ²)	CONCRETE VOLUME (m ³)
WF42L	50.03	2.916	2.470	0.446	1.900	0.50	0.50	0.966	0.990	49.525
WF43L	50.10	2.941	2.500	0.441	1.900	0.50	0.50	0.964	0.965	48.358
WF44L	49.84	2.966	2.640	0.326	1.900	0.50	0.50	0.924	0.944	47.060
WF45L	50.06	2.993	2.620	0.373	1.900	0.40	0.50	0.922	0.923	46.205
WF46L	50.06	2.993	2.620	0.373	1.700	0.40	0.50	0.862		
WF46L	49.87	3.020	2.810	0.210	1.700	0.50	0.50	0.824	0.843	42.025
WF46L	49.87	3.020	2.810	0.210	1.500	0.50	0.50	0.764		
WF47L	50.28	3.044	3.000	0.044	1.500	0.50	0.50	0.705	0.734	36.928
WF48L	49.92	3.070	3.050	0.020	1.500	0.00	0.50	0.692	0.699	34.879
WF49L	49.96	3.097	3.010	0.087	1.500	0.30	0.50	0.712	0.702	35.066
WF50L	49.91	3.122	2.970	0.152	1.500	0.40	0.50	0.738	0.724	36.119
WF51L	50.21	3.147	3.140	0.007	1.500	0.00	0.50	0.691	0.713	35.807
WF52L	49.88	3.209	3.190	0.019	1.500	0.00	0.50	0.692	0.691	34.482
WF53L	50.04	3.274	3.030	0.244	1.500	0.50	0.50	0.775	0.734	36.712
WF54L	49.97	3.339	3.290	0.049	1.500	0.50	0.50	0.707	0.741	37.042
WF55L	49.98	3.400	3.100	0.300	1.500	0.50	0.50	0.795	0.751	37.539
WF56L	50.09	3.462	3.270	0.192	1.500	0.50	0.50	0.757	0.776	38.875
WF57L	50.04	3.525	3.240	0.285	1.500	0.50	0.50	0.790	0.773	38.705
WF58L	50.02	3.590	3.220	0.370	1.500	0.50	0.50	0.820	0.805	40.247
WF59L	50.09	3.649	3.410	0.239	1.500	0.30	0.50	0.750	0.785	39.302
WF60L	49.06	3.712	3.400	0.312	1.500	0.60	0.50	0.815	0.782	38.378
WF61L	50.94	3.779	3.540	0.239	1.500	0.50	0.50	0.774	0.794	40.458
WF62L	49.96	3.840	3.590	0.250	1.500	0.50	0.50	0.778	0.776	38.748
WF62L	49.96	3.840	3.590	0.250	1.300	0.50	0.50	0.718		
WF63L	50.30	3.899	3.650	0.249	1.300	0.50	0.50	0.717	0.717	36.081
WF64L	49.99	3.964	3.790	0.174	1.300	0.40	0.50	0.682	0.700	34.977
WF64L+14.610	14.61	4.024	3.790	0.234	1.300	0.40	0.50	0.700	0.691	10.230
SUBTOTAL										913.747
TOTAL										2362.492

CONCRETE (TYPE-C1) RIGHT BANK

STATION NO.	PARTIAL DISTANCE (m)	DESIGN FLOODWALL CROWN (EL. m)	EXISTING FLOODWALL CROWN (EL. m)	DIFFERENCE OF HEIGHT (m)	HEIGHT OF FLOODWALL (m)	EXISTING CROWN WIDTH (m)	DESIGN CROWN WIDTH (m)	AREA OF FLOODWALL (m ²)	AVERAGE (m ²)	CONCRETE VOLUME (m ³)
WF15R+7	0.00	2.212	1.610	0.602	1.700	0.60	0.50	0.991		
WF16R	54.60	2.241	1.610	0.631	1.700	0.60	0.50	1.002	0.997	54.414
	42.14	2.264	1.610	0.654	1.700	0.50	0.50	0.979	0.991	41.746
WF17R	42.14	2.264	1.610	0.654	1.500	0.50	0.50	0.919		
WF18R	50.52	2.290	1.610	0.680	1.500	0.50	0.50	0.928	0.923	46.653
WF19R	62.32	2.322	1.550	0.772	1.500	0.60	0.50	0.999	0.963	60.039
WF20R	52.92	2.345	1.580	0.765	1.500	0.40	0.50	0.920	0.959	50.758
WF21R	54.37	2.372	1.620	0.752	1.500	0.40	0.50	0.916	0.918	49.887
WF22R	52.50	2.398	1.680	0.738	1.500	0.60	0.50	0.985	0.950	49.896
WF23R	51.56	2.424	1.720	0.704	1.500	0.60	0.50	0.972	0.978	50.446
WF24R	42.78	2.448	1.750	0.698	1.500	0.50	0.50	0.934	0.953	40.787
WF25R	39.11	2.471	1.830	0.641	1.500	0.50	0.50	0.914	0.924	36.150
WF26R	49.39	2.497	1.850	0.647	1.500	0.50	0.50	0.916	0.915	45.212
WF27R	58.23	2.524	1.840	0.684	1.500	0.50	0.50	0.929	0.923	53.742
WF28R	55.02	2.551	1.850	0.701	1.500	0.60	0.50	0.970	0.950	52.263
WF29R	55.52	2.578	1.900	0.678	1.500	0.60	0.50	0.961	0.968	53.621
WF30R	55.27	2.605	1.880	0.725	1.500	0.50	0.50	0.944	0.952	52.643
WF31R	56.15	2.633	1.920	0.713	1.500	0.50	0.50	0.940	0.942	52.874
WF32R	59.13	2.660	1.840	0.820	1.500	0.50	0.50	0.977	0.958	56.663
WF33R	56.92	2.688	2.110	0.578	1.500	0.50	0.50	0.892	0.935	53.200
WF34R	58.83	2.715	2.160	0.555	1.500	0.60	0.50	0.912	0.902	53.073
WF35R	37.48	2.738	2.200	0.538	1.500	0.50	0.50	0.878	0.895	33.550
WF36R	37.42	2.781	2.200	0.581	1.500	0.50	0.50	0.893	0.886	33.148
WF37R	48.53	2.786	2.310	0.476	1.500	0.50	0.50	0.857	0.875	42.463
WF38R	47.93	2.811	2.410	0.401	1.500	0.50	0.50	0.830	0.843	40.428
	47.93	2.811	2.410	0.401	1.700	0.50	0.50	0.890	0.899	55.689
WF39R	61.94	2.839	2.390	0.449	1.700	0.50	0.50	0.907	0.907	
	61.94	2.839	2.390	0.449	1.900	0.50	0.50	0.967		
WF40R	40.67	2.862	2.420	0.442	1.900	0.50	0.50	0.965	0.968	39.284
WF41R	56.29	2.890	2.360	0.530	1.900	0.50	0.50	0.986	0.980	55.170
									SUBTOTAL	1253.760

STATION NO.	PARTIAL DISTANCE (m)	DESIGN FLOODWALL CROWN (EL m)	EXISTING FLOODWALL CROWN (EL m)	DIFFERENCE OF HEIGHT (m)	HEIGHT OF FLOODWALL (m)	EXISTING CROWN WIDTH (m)	DESIGN CROWN WIDTH (m)	AREA OF FLOODWALL (m ²)	AVERAGE (m ²)	CONCRETE VOLUME (m ³)
WF42R	52.44	2.916	2.520	0.396	1.900	0.50	0.50	0.949	0.972	50.974
WF43R	52.44	2.916	2.520	0.396	2.100	0.50	0.50	1.009		
WF44R	45.99	2.941	2.510	0.431	2.100	0.50	0.50	1.021	1.015	46.667
WF45R	51.29	2.966	2.610	0.356	2.100	0.50	0.50	0.995	1.008	51.686
WF46R	55.05	2.966	2.610	0.356	1.900	0.50	0.50	0.935		
WF47R	55.05	2.993	2.620	0.373	1.900	0.50	0.50	0.941	0.938	51.614
WF48R	52.82	2.993	2.620	0.373	1.700	0.50	0.50	0.881		
WF49R	44.07	3.044	2.650	0.370	1.700	0.50	0.50	0.880	0.880	46.483
WF50R	53.33	3.070	2.730	0.314	1.700	0.50	0.50	0.860	0.870	38.328
WF51R	53.62	3.097	2.800	0.270	1.700	0.30	0.50	0.818	0.839	44.728
WF52R	47.44	3.122	2.880	0.217	1.700	0.50	0.50	0.826	0.822	44.061
WF53R	46.28	3.147	2.970	0.152	1.700	0.60	0.50	0.811	0.818	38.824
WF54R	46.28	3.147	3.030	0.117	1.700	0.50	0.50	0.791	0.801	37.064
WF55R	48.88	3.209	3.030	0.117	1.500	0.50	0.50	0.731		
WF56R	54.21	3.274	3.080	0.129	1.500	0.50	0.50	0.735	0.733	35.831
WF57R	55.08	3.339	3.090	0.184	1.500	0.50	0.50	0.754	0.745	40.374
WF58R	46.64	3.400	3.220	0.119	1.500	0.50	0.50	0.732	0.743	40.926
WF59R	50.57	3.462	3.320	0.080	1.500	0.20	0.50	0.706	0.719	33.526
WF60R	50.52	3.525	3.310	0.152	1.500	0.50	0.50	0.743	0.725	36.643
WF61R	53.78	3.590	3.460	0.085	1.500	0.40	0.50	0.710	0.726	36.695
WF62R	44.52	3.649	3.520	0.070	1.500	0.50	0.50	0.715	0.712	38.291
WF63R	51.52	3.712	3.450	0.199	1.500	0.50	0.50	0.760	0.737	32.815
WF64R	55.15	3.779	3.590	0.122	1.500	0.50	0.50	0.733	0.746	38.443
WF65R	48.01	3.840	3.620	0.159	1.500	0.50	0.50	0.746	0.739	40.766
WF66R	48.01	3.840	3.660	0.180	1.300	0.40	0.50	0.744	0.745	35.759
WF67R	45.00	3.899	3.660	0.180	1.300	0.40	0.50	0.684		
WF68R	53.72	3.964	3.650	0.249	1.300	0.50	0.50	0.717	0.701	31.526
WF69R	14.61	4.023	3.840	0.124	1.300	0.40	0.50	0.667	0.692	37.184
WF70R			3.840	0.183	1.300	0.40	0.50	0.685	0.676	9.877
WF71R										
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WF234R										

FORM (H<4.0m) LEFT BANK

STATION NO.	PARTIAL DISTANCE (m)	HEIGHT OF FLOODWALL (m)	AVERAGE (m)	AREA (m ²)
WF15L+3	0.00	2.800		
WF16L	46.02	2.800	2.800	128.856
WF17L	49.86	2.800	2.800	139.608
WF18L	49.99	2.800	2.800	139.972
WF19L	60.05	2.800	2.800	168.140
WF20L	40.55	2.800	2.800	113.540
WF21L	49.67	2.800	2.800	139.076
WF22L	50.03	2.800	2.800	140.084
WF23L	50.14	2.800	2.800	140.392
WF24L	49.96	2.800	2.800	139.888
WF25L	50.15	2.800	2.800	140.420
WF26L	49.89	2.800	2.800	139.692
WF27L	49.89	2.600	2.700	134.703
WF28L	49.05	2.600	2.600	127.530
WF29L	51.81	2.600	2.600	134.706
WF30L	51.81	2.400	2.500	129.525
WF31L	49.63	2.400	2.400	119.112
WF32L	50.06	2.400	2.400	120.144
WF33L	53.94	2.400	2.400	129.456
WF34L	46.26	2.400	2.400	111.024
WF35L	49.98	2.400	2.400	119.952
WF36L	50.10	2.400	2.400	120.240
WF37L	50.10	2.400	2.400	120.240
WF38L	50.27	2.400	2.400	120.648
WF39L	49.85	2.400	2.400	119.640
WF40L	49.99	2.400	2.400	119.976
WF41L	49.93	2.400	2.400	119.832
WF42L	50.15	2.400	2.400	120.360
WF43L	49.81	2.400	2.400	119.544
			SUBTOTAL	3616.300

STATION NO.	PARTIAL DISTANCE (m)	HEIGHT OF FLOODWALL (m)	AVERAGE (m)	AREA (m ²)
WF42L	50.03	1.900	2.150	107.565
WF43L	50.10	1.900	1.900	95.190
WF44L	49.84	1.900	1.900	94.696
WF45L	50.06	1.900	1.900	95.114
WF46L	50.06	1.700	1.800	90.108
WF47L	49.87	1.700	1.700	84.779
WF48L	49.87	1.500	1.600	79.792
WF49L	50.28	1.500	1.500	75.420
WF50L	49.92	1.500	1.500	74.880
WF51L	49.96	1.500	1.500	74.940
WF52L	49.91	1.500	1.500	74.865
WF53L	50.21	1.500	1.500	75.315
WF54L	49.88	1.500	1.500	74.820
WF55L	50.04	1.500	1.500	75.060
WF56L	49.97	1.500	1.500	74.955
WF57L	49.98	1.500	1.500	74.970
WF58L	50.09	1.500	1.500	75.135
WF59L	50.04	1.500	1.500	75.060
WF60L	50.02	1.500	1.500	75.030
WF61L	50.09	1.500	1.500	75.135
WF62L	49.06	1.500	1.500	73.590
WF63L	50.94	1.500	1.500	76.410
WF64L	49.96	1.500	1.500	74.940
WF65L	49.96	1.300	1.400	69.944
WF66L	50.30	1.300	1.300	65.390
WF67L	49.99	1.300	1.300	64.987
WF68L	14.61	1.300	1.300	18.993
			SUBTOTAL	2067.083
			TOTAL	5683.383

JOINT FILLER : RIGHT BANK

STATION NO.	PARTIAL DISTANCE (m)	SUBTOTAL DISTANCE (m)	NUMBER OF JOINT	AREA OF FLOODWALL (m ²)	AVERAGE (m ²)	AREA (m ²)
WF15R+7	0.00			0.991		
WF16R	54.60			1.002		
	42.14	96.74	11	0.979	0.991	10.898
WF17R	42.14			0.919		
WF18R	50.52			0.928		
WF19R	62.32			0.999		
WF20R	52.92			0.920		
WF21R	54.37			0.916		
WF22R	52.50			0.985		
WF23R	51.56			0.972		
WF24R	42.78			0.934		
WF25R	39.11			0.914		
WF26R	49.39			0.916		
WF27R	58.23			0.929		
WF28R	55.02			0.970		
WF29R	55.52			0.961		
WF30R	55.27			0.944		
WF31R	56.15			0.940		
WF32R	59.13			0.977		
WF33R	56.92			0.892		
WF34R	58.83			0.912		
WF35R	37.48			0.878		
WF36R	37.42			0.893		
WF37R	48.53			0.857		
WF38R	47.93	1081.90	109	0.830	0.927	101.008
	47.93			0.890		
WF39R	61.94			0.907		
	61.94			0.967		
WF40R	40.67			0.965		
WF41R	56.29			0.998		
	52.44	273.28	28	0.949	0.946	26.476
WF42R	52.44			1.009		
WF43R	45.99			1.021		
	51.29	97.28	11	0.995	1.008	11.088
WF44R	51.29			0.935		
	55.05	55.05	7	0.941	0.938	6.563
WF45R	55.05			0.881		
WF46R	52.82			0.880		
WF47R	44.07			0.860		
WF48R	53.33			0.818		
WF49R	53.62			0.826		
WF50R	47.44			0.811		
	46.28	297.56	31	0.791	0.838	25.974
WF51R	46.28			0.731		
WF52R	48.88			0.735		
WF53R	54.21			0.754		
WF54R	55.08			0.732		
WF55R	46.64			0.706		
WF56R	50.57			0.743		
WF57R	50.52			0.710		
WF58R	53.78			0.715		
WF59R	44.52			0.760		
WF60R	51.52			0.733		
WF61R	55.15			0.746		
	48.01	558.88	57	0.744	0.734	41.835
WF62R	48.01			0.684		
WF63R	45.00			0.717		
WF64R	53.72			0.667		
WF64R+14.610	14.61	113.33	12	0.685	0.688	8.260
TOTAL						232.102

WATER STOP : LEFT BANK

STATION NO.	PARTIAL DISTANCE (m)	SUBTOTAL DISTANCE (m)	NUMBER OF JOINT	HEIGHT OF FLOODWALL (m)	ADDITIONAL LENGTH (m)	TOTAL LENGTH (m)	LENGTH OF WATER STOP (m)
WF15L+3	0.00						
WF16L	46.02						
WF17L	49.86						
WF18L	49.99						
WF19L	60.05						
WF20L	40.55						
WF21L	49.67						
WF22L	50.03						
WF23L	50.14						
WF24L	49.96						
WF25L	50.15						
WF26L	49.89	546.31	56	2.300	0.700	3.000	168.000
WF27L	49.05						
WF28L	51.81	100.86	11	2.100	0.700	2.800	30.800
WF29L	49.63						
WF30L	50.06						
WF31L	53.94						
WF32L	46.26						
WF33L	49.98						
WF34L	50.10						
WF35L	50.10						
WF36L	50.27						
WF37L	49.85						
WF38L	49.99						
WF39L	49.93						
WF40L	50.15						
WF41L	49.81						
WF42L	50.03						
WF43L	50.10						
WF44L	49.84						
WF45L	50.06	850.10	86	1.900	0.700	2.600	223.600
WF46L	49.87	49.87	6	1.700	0.700	2.400	14.4
WF47L	50.28						
WF48L	49.92						
WF49L	49.96						
WF50L	49.91						
WF51L	50.21						
WF52L	49.88						
WF53L	50.04						
WF54L	49.97						
WF55L	49.98						
WF56L	50.09						
WF57L	50.04						
WF58L	50.02						
WF59L	50.09						
WF60L	49.06						
WF61L	50.94						
WF62L	49.96	800.35	81	1.500	0.700	2.200	178.200
WF63L	50.30						
WF64L	49.99						
WF64L+14.610	14.61	114.90	12	1.300	0.700	2.000	24.000
						TOTAL	639.000

CEMENT MORTAR POINTING (LAND SIDE) : LEFT BANK

STATION NO.	PARTIAL DISTANCE (m)	LENGTH (m)	AVERAGE (m)	AREA OF POINTING (m ²)
WF15L+3	0.00	0.19		
WF16L	46.02	0.19	0.194	8.946
WF17L	49.86	0.49	0.340	16.962
WF18L	49.99	0.86	0.675	33.743
WF19L	60.05	0.65	0.756	45.398
WF20L	40.55	0.30	0.475	19.269
WF21L	49.67	0.21	0.254	12.606
WF22L	50.03	0.00	0.103	5.133
WF23L	50.14	0.59	0.297	14.892
WF24L	49.96	0.76	0.675	33.723
WF25L	50.15	0.97	0.864	43.330
WF26L	49.89	0.76	0.864	43.105
WF27L	49.05	0.86	0.810	39.731
WF28L	51.81	0.96	0.913	47.282
WF29L	49.63	0.92	0.940	46.632
WF30L	50.06	2.14	1.528	76.502
WF31L	53.94	2.11	2.122	114.471
WF32L	46.26	1.79	1.949	90.179
WF33L	49.98	1.62	1.706	85.286
WF34L	50.10	1.73	1.674	83.867
WF35L	50.10	1.84	1.782	89.278
WF36L	50.27	1.21	1.523	76.551
WF37L	49.85	1.51	1.361	67.836
WF38L	49.99	1.46	1.485	74.235
WF39L	49.93	1.87	1.663	83.044
WF40L	50.15	1.84	1.852	92.888
WF41L	49.81	1.78	1.809	90.106
SUBTOTAL				1434.996

STATION NO.	PARTIAL DISTANCE (m)	LENGTH (m)	AVERAGE (m)	AREA OF POINTING (m ²)
WF42L	50.03	1.74	1.760	88.073
WF43L	50.10	1.67	1.706	85.491
WF44L	49.84	1.50	1.588	79.126
WF45L	50.06	1.49	1.496	74.880
WF46L	49.87	1.33	1.409	70.287
WF47L	50.28	1.30	1.312	65.977
WF48L	49.92	0.86	1.080	53.914
WF49L	49.96	0.00	0.432	21.583
WF50L	49.91	1.30	0.648	32.342
WF51L	50.21	1.64	1.469	73.748
WF52L	49.88	1.73	1.685	84.038
WF53L	50.04	1.57	1.647	82.416
WF54L	49.97	1.62	1.593	79.602
WF55L	49.98	1.51	1.566	78.269
WF56L	50.09	1.19	1.350	67.622
WF57L	50.04	0.97	1.080	54.043
WF58L	50.02	0.95	0.961	48.079
WF59L	50.09	0.73	0.842	42.196
WF60L	49.06	0.76	0.745	36.560
WF61L	50.94	0.92	0.837	42.637
WF62L	49.96	0.86	0.891	44.514
WF63L	50.30	0.65	0.756	38.027
WF64L	49.99	0.49	0.567	28.344
WF64L+14.610	14.61	0.49	0.486	7.100
SUBTOTAL				1378.866
TOTAL				2813.862

CEMENT MORTAR POINTING (LAND SIDE) : RIGHT BANK

STATION NO.	PARTIAL DISTANCE (m)	LENGTH (m)	AVERAGE (m)	AREA OF POINTING (m ²)
WF15R+7	0.00	0.66		
WF16R	54.60	0.66	0.659	35.970
WF17R	42.14	0.62	0.637	26.852
WF18R	50.52	0.33	0.475	24.007
WF19R	62.32	0.38	0.356	22.211
WF20R	52.92	0.38	0.378	20.004
WF21R	54.37	0.54	0.459	24.956
WF22R	52.50	0.43	0.486	25.515
WF23R	51.56	0.41	0.421	21.717
WF24R	42.78	0.32	0.367	15.709
WF25R	39.11	0.24	0.281	10.982
WF26R	49.39	0.29	0.265	13.069
WF27R	58.23	0.10	0.194	11.320
WF28R	55.02	0.18	0.140	7.725
WF29R	55.52	0.24	0.211	11.693
WF30R	55.27	0.12	0.178	9.849
WF31R	56.15	0.02	0.070	3.942
WF32R	59.13	0.00	0.011	0.639
WF33R	56.92	0.23	0.113	6.455
WF34R	58.83	0.02	0.124	7.307
WF35R	37.48	0.18	0.103	3.845
WF36R	37.42	0.16	0.173	6.466
WF37R	48.53	0.22	0.189	9.172
WF38R	47.93	0.27	0.243	11.647
WF39R	61.94	1.73	0.999	61.878
WF40R	40.67	1.73	1.728	70.278
WF41R	56.29	1.65	1.690	95.141
SUBTOTAL				558.347

STATION NO.	PARTIAL DISTANCE (m)	LENGTH (m)	AVERAGE (m)	AREA OF POINTING (m ²)
WF42R	52.44	1.89	1.771	92.882
WF43R	45.99	1.77	1.831	84.189
WF44R	51.29	1.84	1.804	92.507
WF45R	55.05	1.77	1.804	99.288
WF46R	52.82	1.49	1.631	86.139
WF47R	44.07	1.40	1.447	63.778
WF48R	53.33	1.64	1.523	81.211
WF49R	53.62	1.29	1.463	78.468
WF50R	47.44	1.19	1.237	58.664
WF51R	46.28	1.26	1.226	56.730
WF52R	48.88	1.22	1.242	60.709
WF53R	54.21	1.18	1.199	64.987
WF54R	55.08	1.30	1.237	68.112
WF55R	46.64	1.11	1.204	56.164
WF56R	50.57	0.97	1.042	52.704
WF57R	50.52	1.11	1.042	52.652
WF58R	53.78	1.06	1.085	58.373
WF59R	44.52	1.08	1.069	47.601
WF60R	51.52	1.13	1.107	57.033
WF61R	55.15	0.91	1.021	56.286
WF62R	48.01	0.70	0.805	38.629
WF63R	45.00	0.65	0.675	30.375
WF64R	53.72	0.16	0.405	21.757
WF64R+14.610	14.61	0.16	0.162	2.367
SUBTOTAL				1461.603
TOTAL				2019.950

RAISING THE EXISTING FLOOD WALL

TYPE OF WORK

: REINFORCING BAR

(1/3)

LOCATION

CALCULATION	RESULT
(WF. 15L+3 ~ WF. 26L) L = 546.3) m	
D10 (w = 0.617 kgf/m)	
$W_1 = (10.00 - 0.05 \times 2) \times 25 \text{ Bars} \times 0.617 \times 54.6 = 8.338 \text{ tf}$	
D13 (w = 1.04 kgf/m)	
$W_2 = (1.15 + 2.65 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 54.6 = 18.322 \text{ tf}$	
(WF. 26L ~ WF. 28L) L = 100.86m	
D10	
$W_3 = (10.00 - 0.05 \times 2) \times 25 \text{ Bars} \times 0.617 \times 10.1 = 1.542 \text{ tf}$	
D13	
$W_4 = (1.15 + 2.45 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 10.1 = 3.217 \text{ tf}$	
(WF. 28L ~ WF. 45L) L = 850.10m	
D10	
$W_5 = (10.00 - 0.05 \times 2) \times 23 \text{ Bars} \times 0.617 \times 85.1 = 11.956 \text{ tf}$	
D13	
$W_6 = (1.15 + 2.25 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 85.1 = 25.655 \text{ tf}$	

RAISING THE EXISTING FLOOD WALL

TYPE OF WORK

: REINFORCING BAR

(2/3)

LOCATION

CALCULATION	RESULT
(WF. 45L ~ WF. 46L) L = 49.87m	
Ø10	
$W_7 = (10.00 - 0.05 \times 2) \times 15 \text{ Bars} \times 0.617 \times 49.9 = 0.457 \text{ tf}$	
Ø13	
$W_8 = (1.15 + 2.05 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 49.9 = 1.419 \text{ tf}$	
(WF. 46L ~ WF. 62L) L = 800.35m	
Ø10	
$W_9 = (10.00 - 0.05 \times 2) \times 15 \text{ Bars} \times 0.617 \times 80.1 = 7.339 \text{ tf}$	
Ø13	
$W_{10} = (1.15 + 1.85 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 80.1 = 21.415 \text{ tf}$	
(WF. 62L ~ WF. 64L + 14.61) L = 114.90m	
Ø10	
$W_{11} = (10.00 - 0.05 \times 2) \times 14 \text{ Bars} \times 0.617 \times 11.5 = 0.983 \text{ tf}$	
Ø13	
$W_{12} = (1.15 + 1.65 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 11.5 = 2.878 \text{ tf}$	
(WF. 15R+7 ~ WF. 17R) L = 96.74m	
Ø10	
$W_{13} = (10.00 - 0.05 \times 2) \times 15 \text{ Bars} \times 0.617 \times 9.7 = 0.889 \text{ tf}$	
Ø13	
$W_{14} = (1.15 + 2.05 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 9.7 = 2.759 \text{ tf}$	
(WF. 17R ~ WF. 38R) L = 1081.90m	
Ø10	
$W_{15} = (10.00 - 0.05 \times 2) \times 15 \text{ Bars} \times 0.617 \times 108.2 = 9.914 \text{ tf}$	
Ø13	
$W_{16} = (1.15 + 1.85 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 108.2 = 28.928 \text{ tf}$	
(WF. 38R ~ WF. 42R) L = 273.28m	
Ø10	
$W_{17} = (10.00 - 0.05 \times 2) \times 15 \text{ Bars} \times 0.617 \times 27.3 = 2.501 \text{ tf}$	
Ø13	
$W_{18} = (1.15 + 2.05 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 27.3 = 7.764 \text{ tf}$	

RAISING THE EXISTING FLOODWALL

TYPE OF WORK

: REINFORCING BAR

(3/3)

LOCATION

CALCULATION	RESULT
(WF. 42R ~ WF. 44R) L = 97.28m	
Ø10	
$W_{19} = (10.00 - 0.05 \times 2) \times 17 \text{ Bars} \times 0.617 \times 9.7 = 1.007 \text{ tf}$	
Ø13	
$W_{20} = (1.15 + 2.45 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 9.7 = 3.090 \text{ tf}$	
(WF. 44R ~ WF. 45R) L = 55.05m	
Ø10	
$W_{21} = (10.00 - 0.05 \times 2) \times 16 \text{ Bars} \times 0.617 \times 5.5 = 0.538 \text{ tf}$	
Ø13	
$W_{22} = (1.15 + 2.25 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 5.5 = 1.658 \text{ tf}$	
(WF. 45R ~ WF. 51R) L = 297.56m	
Ø10	
$W_{23} = (10.00 - 0.05 \times 2) \times 15 \text{ Bars} \times 0.617 \times 29.8 = 2.730 \text{ tf}$	
Ø13	
$W_{24} = (1.15 + 2.05 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 29.8 = 8.475 \text{ tf}$	
(WF. 51R ~ WF. 62R) L = 558.88m	
Ø10	
$W_{25} = (10.00 - 0.05 \times 2) \times 15 \text{ Bars} \times 0.617 \times 55.9 = 5.122 \text{ tf}$	
Ø13	
$W_{26} = (1.15 + 1.85 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 55.9 = 14.945 \text{ tf}$	
(WF. 62R ~ WF. 64R + 14.61) L = 113.33m	
Ø10	
$W_{27} = (10.00 - 0.05 \times 2) \times 14 \text{ Bars} \times 0.617 \times 11.3 = 0.966 \text{ tf}$	
Ø13	
$W_{28} = (1.15 + 1.65 \times 2 + 1.42) \times 41 \text{ Bars} \times 1.04 \times 11.3 = 2.828 \text{ tf}$	
TOTAL (W ₁ + W ₂ ~ + W ₂₇ + W ₂₈) = 197.635	197.635 tf

RAISING THE EXISTING FLOODWALL

TYPE OF WORK

: LOG PILE

LOCATION

(1/2)

CALCULATION	RESULT
Log Pile, Dia 150, L = 2.0m/pile	
(WF. 15L + 3 ~ WF. 26L) L = 546.31m	
$n_1 = 546.31 \div 2.0 = 273 \text{ piles}$	
(WF. 26L ~ WF. 28L) L = 100.86m	
$n_2 = 100.86 \div 2.0 = 50 \text{ piles}$	
(WF. 28L ~ WF. 45L) L = 850.10m	
$n_3 = 850.10 \div 2.0 = 425 \text{ piles}$	
(WF. 45L ~ WF. 46L) L = 49.87m	
$n_4 = 49.87 \div 2.0 = 25 \text{ piles}$	
(WF. 46L ~ WF. 62L) L = 800.35m	
$n_5 = 800.35 \div 2.0 = 400 \text{ piles}$	
(WF. 62L ~ WF. 64L + 14.61) L = 114.90m	
$n_6 = 114.90 \div 2.0 = 57 \text{ piles}$	
(WF. 15R + 7 ~ WF. 17R) L = 96.74m	
$n_7 = 96.74 \div 2.0 = 48 \text{ piles}$	
(WF. 17R ~ WF. 38R) L = 1081.90m	
$n_8 = 1081.90 \div 2.0 = 541 \text{ piles}$	

RAISING THE EXISTING FLOODWALL

TYPE OF WORK

: LOG PILE

LOCATION

(2/2)

CALCULATION	RESULT
(WF. 38R ~ 42R) L = 273.28 m	
$n_9 = 273.28 \div 2.0 \doteq 137 \text{ piles}$	
(WF. 42R ~ WF. 44R) L = 97.28 m	
$n_{10} = 97.28 \div 2.0 \doteq 49 \text{ piles}$	
(WF. 44R ~ WF. 45R) L = 55.05 m	
$n_{11} = 55.05 \div 2.0 \doteq 28 \text{ piles}$	
(WF. 45R ~ WF. 51R) L = 297.56 m	
$n_{12} = 297.56 \div 2.0 \doteq 149 \text{ piles}$	
(WF. 51R ~ WF. 62R) L = 558.88 m	
$n_{13} = 558.88 \div 2.0 \doteq 279 \text{ piles}$	
(WF. 62R + WF. 64R + 14.61) L = 113.33 m	
$n_{14} = 113.33 \div 2.0 \doteq 57 \text{ piles}$	
$\sum n = (n_9 + n_{10} + n_{11} + n_{12} + n_{13} + n_{14}) = 2518 \text{ piles}$	
$L = 2518 \text{ piles} \times 2.00 = 5036.0$	5036.0 m

RAISING THE EXISTING FLOODWALL

TYPE OF WORK

: HOLE WITH NON-SHRINKAGE MORTAR

LOCATION

(1/2)

CALCULATION	RESULT
0.50m INTERVAL	
(WF. 15L + 3 ~ WF. 26L) L = 546.31m	
$n_1 = 546.31 \div 0.50 \times 4 \doteq 4368 \text{ nos.}$	
(WF. 26L ~ WF. 28L) L = 100.86m	
$n_2 = 100.86 \div 0.50 \times 4 \doteq 804 \text{ nos.}$	
(WF. 28L ~ WF. 45L) L = 850.10m	
$n_3 = 850.10 \div 0.50 \times 4 \doteq 6800 \text{ nos.}$	
(WF. 45L ~ WF. 46L) L = 49.87m	
$n_4 = 49.87 \div 0.50 \times 4 \doteq 396 \text{ nos.}$	
(WF. 46L ~ WF. 62L) L = 800.35m	
$n_5 = 800.35 \div 0.50 \times 4 \doteq 6400 \text{ nos.}$	
(WF. 62L ~ WF. 64L + 14.61) L = 114.90m	
$n_6 = 114.90 \div 0.50 \times 4 \doteq 916 \text{ nos}$	
(WF. 15R + 7 ~ WF. 17R) L = 96.74m	
$n_7 = 96.74 \div 0.50 \times 4 \doteq 772 \text{ nos.}$	
(WF. 17R ~ WF. 38R) L = 1081.90m	
$n_8 = 1081.90 \div 0.50 \times 4 \doteq 8652 \text{ nos}$	

RAISING THE EXISTING FLOODWALL
 TYPE OF WORK : HOLE WITH NON-SHRINKAGE MORTAR
 LOCATION :

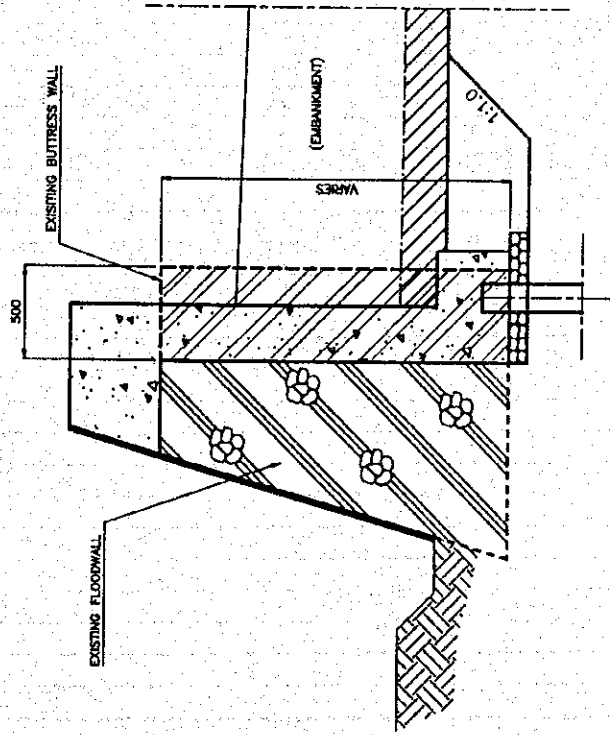
(2/2)

CALCULATION	RESULT
(WF. 38R ~ WF. 42R) $L = 273.28m$	
$n_9 = 273.28 \div 0.50 \times 4 \hat{=} 2184 \text{ nos.}$	
(WF. 42R ~ WF. 44R) $L = 97.28m$	
$n_{10} = 97.28 \div 0.50 \times 4 \hat{=} 776 \text{ nos.}$	
(WF. 44R ~ WF. 45R) $L = 55.05m$	
$n_{11} = 55.05 \div 0.50 \times 4 \hat{=} 440 \text{ nos.}$	
(WF. 45R ~ WF. 51R) $L = 297.56m$	
$n_{12} = 297.56 \div 0.50 \times 4 \hat{=} 2380 \text{ nos.}$	
(WF. 51R ~ WF. 62R) $L = 558.88m$	
$n_{13} = 558.88 \div 0.50 \times 4 \hat{=} 4468 \text{ nos.}$	
(WF. 62R ~ WF. 64R + 14.61) $L = 113.33m$	
$n_{14} = 113.33 \div 0.50 \times 4 \hat{=} 904 \text{ nos.}$	
TOTAL ($n_1 + n_2 \sim + n_{13} + n_{14}$) = 40260	40260 nos

TYPE OF WORK : RAISING WORK
 LOCATION : WF.135R + 30.0 ~ WF.137R - 15.00

CALCULATION		RESULT
☐ CONCRETE (TYPE - C1)		
• CONCRETE (TYPE - C1)		
A =	$(0.50 + 1.30) \times \frac{1}{2} \times 0.90 + 1.30 \times 0.30 + 0.40 \times 0.60$	
	=	1.440 m ² /m
V =	1.44 x 180.00	
	=	259.200
		259.200 m ³
• FORM		
A ₁ =	$(2.60 + 1.20) \times 180.00$	
	=	648.00
A ₂ =	1.44 m ² /place x 19 places	
	=	27.360
	TOTAL	
	=	711.360
		711.630 m ²
• REINFORCING		
W =	0.044 tf/m ³ x 259.00	
	=	11.237
		11.237 tf
☐ LOG PILE		
• LOG PILE		
L =	10.00 m / 10.00 m x 180.00	
	=	180.00
		180.00 m
• NON - SHRINKAGE MORTAR		
n =	100 nos / 10.00 m x 180.00	
	=	1800.0
		1800.0 nos
• JOINT FILTER		
A =	1.44 m ² /place x 18 places	
	=	25.920
		25.920 m ²
• WATER STOP		
L =	2.60 m / place x 18 places	
	=	46.800
		46.800 m
• CEMENT MORTAR PLASTERING		
A =	0.20 x 180.00	
	=	90.00
		90.00 m ²

TYPE OF WORK :	DEMOLITION OF EXISTING BUTRESS WALL		RESULT
LOCATION :	WALL		
	Estimated height of existing floodwall : $h = 1.26 \text{ m}$		
	Number of placement at West Floodway (Right Bank)		
	$N_r = 2544 \text{ m} \div 10.0 \text{ m/place} = 254 \text{ places}$ (Left Bank)		
	$N_L = 2496 \text{ m} \div 10.0 \text{ m/place} = 250 \text{ places}$		
	Number of placement at Garang River		
	$N_z = 160.00 \text{ m} \div 10.0 \text{ m/place} = 16 \text{ places}$		
	Demolition volume per one place		
	$V = 0.50 \times 0.50 \times 1.26 = 0.315 \text{ m}^3/\text{place}$		
	Total volume		
	$V = 0.315 \times (254 + 250 + 16) = 163.80$		163.80 m ³



TYPE OF WORK : FLOODWALL / PARAPET WALL (WET STONE MASONRY)

LOCATION : WF.64 + 14.6 ~ WF.65 - 8.00

CALCULATION			RESULT
☐ STRUCTURAL EXCAVATION			
$A_1 = (2.10 + 2.70) \times \frac{1}{2} \times 0.60$	=	1.440 m ²	
$A_2 = (2.35 + 1.85) \times \frac{1}{2} \times 1.00$	=	3.553 m ²	
	A	= 4.993 m ²	
$V = 4.993 \times (35.00 + 35.49)$	=	351.96	351.96 m ³
☐ BACKFILL WITH SELECTED SOIL			
$A_1 = (0.50 + 0.80) \times \frac{1}{2} \times 0.60$	=	0.390 m ²	
$A_2 = (0.50 + 2.00) \times \frac{1}{2} \times 2.192$	=	2.740m ²	
	A	= 3.130 m ²	
$V = 3.130 \times (35.00 + 35.49)$	=	220.63	220.63 m ³

TYPE OF WORK : FLOODWALL / PARAPET WALL (WET STONE MASOONRY)
 LOCATION : WF.64 + 14.6 ~ WF.65 - 8.00

CALCULATION		RESULT
☐ JOINT FILTER		
• JOINT FILTER		
$A = (1.275 + 3.648) \times \frac{1}{2}$	=	2.462 m ² /place
$\Sigma A = 2.462 \text{ m}^2/\text{place} \times 5 \text{ place} \times 2$	=	24.620
		24.620 m ²
• STEEL FENCE		
$L = 35.00 + 35.49$	=	70.49
		70.50 m
☐ WET STONE MASONRY		
• WET STONE MASONRY		
$A_1 = (0.40 + 1.30) \times \frac{1}{2} \times 1.50$	=	1.275 m ²
$A_2 = (0.40 + 2.13) \times \frac{1}{2} \times 2.884$	=	3.648 m ²
$V = (1.275 + 3.648) \times \frac{1}{2} \times (35.00 + 35.49)$	=	173.511
		173.511 m ³
• GRAVEL BEDDING		
$A_1 = 0.10 \times 1.50$	=	0.150 m ²
$A_2 = 0.10 \times 2.33$	=	0.233 m ²
$V = (0.15 + 0.233) \times \frac{1}{2} \times (35.00 + 35.49)$	=	13.499
		13.499 m ³
• CEMENT MORTAR POINTING		
$A = (1.00 + 2.384) \times \frac{1}{2} \times (35.00 + 35.49)$	=	119.269
		119.269 m ²

TYPE OF WORK : FLOODWALL / PARAPET WALL (WET STONE MASONRY)

LOCATION : WF.75L - 20.0 m ~ WF.80L + 10.0 m

CALCULATION		RESULT
STRUCTURAL EXCAVATION		
$A_1 = (2.10 + 2.70) \times \frac{1}{2} \times 0.60$	= 1.440	
$A_2 = (2.35 + 1.85) \times \frac{1}{2} \times 1.00$	= 2.100	
TOTAL A	= 3.540 m ²	
$V = 3.54 \times (10.047 + 250.00 + 10.051)$	= 956.150	956.200 m ³
BACKFILL WITH SELECTED SOIL		
$A_1 = (0.50 + 0.80) \times \frac{1}{2} \times 0.60$	= 0.390	
$A_2 = (0.50 + 2.00) \times \frac{1}{2} \times 1.60$	= 2.000	
TOTAL A	= 2.390 m ²	
$V = 2.390 \times (10.047 + 250.00 + 10.051)$	= 645.53	645.500 m ³
WET STONE MASONRY		
$A = (0.35 + 1.10) \times \frac{1}{2} \times 1.50$	= 1.088	
$V = 1.088 \times (10.047 + 250.00 + 10.051)$	= 293.867	293.867 m ³
GRAVEL BEDDING		
$A = 0.10 \times 1.30$	= 0.130	
$V = 0.130 \times (10.047 + 250.00 + 10.051)$	= 35.113	35.113 m ³
CEMENT MORTAR POINTING		
$A = (1.00 + 0.35) \times (10.047 + 250.00 + 10.051)$	= 364.632	364.632 m ³
JOINT FILLER		
JOINT FILLER		
$A = (0.35 + 1.10) \times \frac{1}{2} \times 1.50$	= 1.088 m ² / place	
$A^3 = 1.088 \text{ m}^2/\text{place} \times 26 \text{ places}$	= 28.288	28.288 m ²
WATER STOP		
$L = 1.50 \text{ m} / \text{place} \times 26 \text{ places}$	= 39.000	39.000 m

TYPE OF WORK : FLOODWALL / PARAPET WALL (WET STONE MASONRY)
 LOCATION : WF.75L - 20.0 ~ WF.80L + 10.0

CALCULATION	RESULT
☐ CEMENT MORTAR POINTING	
A = (1.00 + 0.35) x (10.047 + 250.00 + 10.051) = 364.632	364.632 m ²
☐ JOINT FILTER	
• JOINT FILTER	
A = (0.35 + 1.10) x ½ x 1.50 = 0.130 m ²	
A ¹ = 1.088 m ² /place x 26 places = 28.288	28.288 m ²
• WATER STOP	
L = 1.50 m/place x 26 places = 39.000	39.000 m