

**REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF CONSTRUCTION
DEPARTMENT OF BRIDGE**

**DETAILED DESIGN STUDY ON
THE BAGO RIVER BRIDGE
CONSTRUCTION PROJECT**

FINAL REPORT ATTACHMENTS

**VOLUME III QUANTITY
CALCULATION REPORT
Part I Road Design**

DECEMBER 2017

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NIPPON KOEI CO., LTD.

ORIENTAL CONSULTANTS GLOBAL CO., LTD.

METROPOLITAN EXPRESSWAY COMPANY LIMITED.

CHODAI CO., LTD.

NIPPON ENGINEERING CONSULTANTS CO., LTD.

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**ROAD DESIGN
(PACKAGE 1)**

1. SUMMARY OF QUANTITY

Grand Summary of Quantity Calculation Sheet for Package 1

Item	Description	Unit	Qty							
			Package1						Total	
			Main Road Before STA 0+177	Main Road After STA 0+177	On-ramp	Star City Access Line	Yangon Access Line	Thilawa Access Line		
Road Structures										
1. Earthworks										
Excavation & Backfilling	Filling for Surcharge W>=4m	m3		13,627.200	-			13,627		
	Sand Mat for Surcharge W>=4m	m3		2,324.000	-			2,324		
	Filling W>=4m	Bulldozer	m3	561.400	1,322.500	-	143.700	3,200	2,031	
	Filling W<4m		m3	416.200	136.400	39.300	68.600	52.800	713	
	Cutting W>=4m	Bulldozer	m3	11,042.400	888.400	288.200	463.800	472.900	13,156	
	Back Fill of Wall W>=4m		m3	1,367.600	940.700				2,308	
	Trimming of Slope	Slope of Embankment	m2	700.100	1,341.314	748.240	28.800	272.100	124.300	3,215
		Cut Slope	m2	-	-	-	-	5.400	11.500	17
	Slope Protection	Sodding	m2	700.100	1,341.314	748.240	28.800	272.100	124.300	3,215
	2. Pavement									
Main Road, On-ramp & Relocation Road to Existing Thanlyin Bridge	Subgrade course	t=1000mm	m2		-				-	
	Subbase course	Aggregate, t=500mm	m2		4,297.900					4,298
		t=350mm	m2		4,805.530					4,806
		t=300mm	m2							-
		t=250mm	m2							-
		t=150mm	m2			2,647.630		983.800	1,125.000	4,756
	Base course	Aggregate, t=250mm	m2		8,670.450					8,670
		t=150mm	m2			2,588.790		938.500	1,077.400	4,605
	Prime Coat		m2		8,456.910	2,405.010		363.300	418.200	11,643
	Surface Base	Coarse asphalt concrete, t=50mm	m2		8,456.910	2,405.010		908.300	1,045.600	12,816
	Binder course	Coarse asphalt concrete, t=50mm	m2		-	-		-	-	-
	Tack Coat		m2		8,250.000	2,433.000		363.300	418.200	11,465
	Surface course	Fine asphalt concrete, t=50mm	m2		8,250.000	2,433.000		908.300	1,045.600	12,637
	Toll Plaza	Subgrade course	Aggregate, t=350mm	m2						-
		Subbase course	Aggregate, t=250mm	m2						-
Base course		Aggregate, t=100mm	m2						-	
Concrete		t=250mm σck=24N/mm	m2							-
		t=250mm σck=18N/mm	m2							-
		Attainment section σck=24N/mm	m3							-
Metal Lath		D6,15000x15000 (3.11kg/m2)	kg						-	
Steel Bar		SS400 Φ28 (round bar)	kg							-
		SD345 D22	kg							-
		SD345 D13	kg							-
	Joint Filleer(bituminous material) t=25mm	m2							-	
Asphalt Emulsion	t							-		
Star Sity Access Main Road	Sand Compacted	t=200mm	m2				613.100		613	
	Hard Core with Sand	t=500mm	m2				613.100		613	
	Plastic Sheet		m2				613.100		613	
	Lean concretev1:3:6	t=80mm	m2				613.100		613	
	Concrete	t=200mm	m2				613.100		613	
	STEEL MESH	Φ10 @150mmc/c	kg				5,051.000		5,051	
	TRANSVERSE JOINT	PLAIN DOWEL BAR,φ28	kg				1,079.000		1,079	
	LONGITUDINAL JOINT	DEFORMED TIE BAR,D22	kg				1,084.000		1,084	
Star Sity Access Side Walk	Sand Compacted	t=300mm	m2				102.400		102	
	Hard Core with compacted sand	t=200mm	m2				46.400		46	
	Expose Aggregate Finished Footpath	t=75mm	m2				46.400		46	
	Soil Aggregate:C-30	t=100mm	m2	581.200			-	210.900	52.000	844
	Sand	t=30mm	m2	567.680			-	210.900	52.000	831
	Precast Concrete Paving Block	t=60mm	m2	580.760			-	210.900	52.000	844
3. Soft Soil Treatment										
Deep Mixing Method	Soil Cement Columns (Working Pile)including Field Test	lm		14,615.500		8,211.300			22,827	
	Soil Cement Colmuns(Preliminary Test Colums; Non-working Pile) including Field Test	lm		75.000		81.250			156	
	Solidifying material addition	unit addition(330kg/m3)	t	11,523.390		6,468.120			17,992	
Shallow Improvement		depth=2.0m (L=42.522m,W=3.708m)	m3						-	
		depth=1.3m	m3	3,582.710		1,286.310			4,869	
	Solidifying material addition	unit addition(230kg/m3)	t	824.020		295.850			1,120	
	Solidifying material addition	unit addition(290kg/m3)	t						-	

Grand Summary of Quantity Calculation Sheet for Package 1

Item	Description	Unit	Qty									
			Package1						Total			
			Main Road Before STA 0+177	Main Road After STA 0+177	On-ramp	Star City Access Line	Yangon Access Line	Thilawa Access Line				
4. Wall Structures	Mechanically Stabilised Earth Wall	Wall Area	Prefabricated Concrete Block	m2		283.380	176.080				459	
		Strip	W=80mm,t=3mm	m		2,562.000	1,664.000				4,226	
		Crushed Stone of Back Wall	C-40	m3		619.210	310.690				930	
		Rising Concrete (Incrude Curb)	Concrete $\sigma_{ck}=24N/mm$	m3		142.070	51.450				194	
			Form	m2		430.130	153.510				584	
			Steel Bar(SD345 D16)	kg		630.500	527.900				1,158	
			Steel Bar(SD345 D13)	kg		7,127.000	2,486.100				9,613	
			Steel Bar(SD345 D10)	kg			-				-	
			Joint Filleer(bituminous material) t=20mm	m2		1.440	1.440				3	
			Joint Filleer(bituminous material) t=10mm	m2		17.550	9.040				27	
		Leveling Concrete	m3		-	-				-		
		Crushed Stone (C-40)	m3		-	-				-		
		Rubber Plate	t=10mm (10x300x600)	m2		30.480	8.680				39	
		Base Concrete of Wall	Concrete $\sigma_{ck}=18N/mm$	m3		23.370	9.330				33	
	Form		m2		40.730	15.640				56		
	Geotextile		m2		406.480	155.600				562		
	Gravity Wall	Concrete	m3							-		
		Form	m2							-		
		Steel Bar	SD345 D16	kg							-	
			SD345 D13	kg							-	
		Joint	t=10mm	m2						-		
Lighting Foundation		Concrete $\sigma_{ck}=24N/mm$	m3		1.380	0.460				2		
	Form	m2		6.042	2.014				8			
	Steel Bar(SD345 D13)	kg		0.120	0.040				-			
5. Miscellaneous	Concrete Kerb and Concrete Block	Concrete Kerb(typeA-1)		m	348.100	358.460	-		190.800	40.000	937	
		Concrete Kerb(typeA-2)		m	1.000	-	-				1	
		Concrete Kerb(typeA-3)		m	3.800	-	-				4	
		Concrete Kerb(typeA-4)		m	-	-	-				-	
		Concrete Kerb(typeA-5)		m	-	-	-				-	
		Concrete Kerb(typeB-1)		m	91.100	-	-				91	
		Concrete Kerb(typeB-2)		m	5.000	-	-				5	
		Concrete Kerb(typeB-3)		m	11.800	-	-				12	
		Concrete Kerb(typeC)		m	-	-	-				-	
		Concrete Kerb(typeD)		m	-	-	-	29.500			30	
		Concrete Kerb(type E)		m	-	-	-				-	
		Guard-rail	Bridge type	m		-	101.695	38.975				141
			Metal type(GR-A)	m		243.300	246.785	-	43.300			533
	Metal type(GR-Am)		m		-	-	-				-	
	Metal type(GR-B)		m		-	-	720.610			131.200	852	
	Guard-pipe	Metal type(GP-A)	m		45.700	-	-				46	
	Road Marking	unbroken ,white W=15cm	m		639.300	-	-	202.400	377.100	393.400	1,612	
		unbroken ,white W=8cm	m		143.200	-	-	29.000			172	
		unbroken ,white W=10cm	m		-	4,540.120	1,420.503					
		unbroken ,white W=30cm	m		19.500	-	-	13.700		4.200	37	
		unbroken ,white W=45cm	m		165.100	-	-	56.800			222	
		broken ,white W=8cm	m		39.000	-	-	6.000			45	
		broken ,white W=10cm	m		-	2,270.060	-					
		Speed Limit Marks	Nos		-	0	1				1	
		Toll Ahead Marks	Nos		-	0	0				-	
		Arrow Mark ,white	Nos		9.000	0	3	3.000		1.000	16	
	Concrete Seal	Median Strip	W=1.5m	m		-	179.230	-	-	-	179	
			W=0.75m	m		-	-	-	-	-	-	
		Side Strip (Toll Plaza Section)	W=1.20m	m2		-	-	-	-	-	-	
		Side Strip next to "Wall"	W=0.50m	m		-	-	-	-	-	-	
		Under Flyover Section (Thaketa Side)	W=Varied	m2		-	-	-	-	-	-	
	Signboard	Informatory Signboard Type A		Nos		-	-	-	-	-	-	
		Informatory Signboard Type B		Nos		-	-	-	-	-	-	
		Informatory Signboard Type C		Nos		2	-	-	-	-	2	
		Regulatory Signs		Nos		12	-	-	-	-	12	
		Warning Signs		Nos		10	-	-	-	-	10	
	Approach Slab for Flyover Section (AF-1)	Concrete	$\sigma_{ck} = 24 N/mm^2$	m3							-	
		Form		m2							-	
		Reinforcement Bar	SD345	t							-	
		Rubber Bearing	t=20mm	m2							-	
Joint Material		t=20mm	m2							-		
Gas Pipe		Sgp4oa	kg							-		
Cap		$\phi 60 \times 3.2$	kg							-		

**ROAD DESIGN
(PACKAGE 1)**

2. MAIN ROAD & ON-RAMP

BILL OF QUANTITIES
CUTTING AND FILLING VOLUME
PACKAGE 1
(MAIN ROAD)

After Settlement

Cut:	5,506.50	+	5,535.93	=	11,042.4 m ³	W > 4m		
	Cut		Surcharge					
Back-Fill	1,367.6			=	1,367.6 m ³	W >= 4m		
	Mechanically							
Fill	217.00	+	344.42	=	561.4 m ³	W >= 4m		
	Fill		Autment A1					
Fill	93.10	+	112.90	+	210.20	=	416.2 m ³	W < 4m
	Mechanically		Shoulder L		Shoulder R			

Left Shoulder Fill

			Area	Ave.	Distance	Volume
STA	0					
STA	0 +	20.000		0.00	20.00	0.00
STA	0 +	24.970		0.00	4.97	0.00
STA	0 +	40.000		0.00	15.03	0.00
STA	0 +	60.000	1.18	0.59	20.00	11.80
STA	0 +	76.170	0.91	1.05	16.17	17.00
STA	0 +	80.000	0.76	0.84	3.83	3.20
STA	0 +	100.000	1.07	0.92	20.00	18.40
STA	0 +	120.000	0.76	0.92	20.00	18.40
STA	0 +	140.000	0.76	0.76	20.00	15.20
STA	0 +	160.000	0.76	0.76	20.00	15.20
STA	0 +	161.513	0.76	0.76	1.51	1.10
STA	0 +	180.000	0.59	0.68	18.49	12.60
STA	0 +	200.000	0.59	0.59	20.00	11.80
STA	0 +	212.713	0.59	0.59	12.71	7.50
STA	0 +	220.000	0.59	0.59	7.29	4.30
STA	0 +	240.000	0.59	0.59	20.00	11.80
STA	0 +	260.000		0.30	20.00	6.00
STA	0 +	280.000		0.00	20.00	0.00
STA	0 +	300.000		0.00	20.00	0.00
STA	0 +	320.000		0.00	20.00	0.00
STA	0 +	340.000		0.00	20.00	0.00
STA	0 +	351.200		0.00	11.20	0.00
合計						112.90

Right Shoulder Fill

			Area	Ave.	Distance	Volume
STA	0					
STA	0 +	20.000		0.00	20.00	0.00
STA	0 +	24.970		0.00	4.97	0.00
STA	0 +	40.000		0.00	15.03	0.00
STA	0 +	60.000		0.00	20.00	0.00
STA	0 +	76.170	1.98	0.99	16.17	16.00
STA	0 +	80.000	2.32	2.15	3.83	8.20
STA	0 +	100.000	2.83	2.58	20.00	51.60
STA	0 +	120.000	2.83	2.83	20.00	56.60
STA	0 +	140.000	1.14	1.99	20.00	39.80
STA	0 +	160.000	0.45	0.80	20.00	16.00
STA	0 +	161.513	1.25	1.20	1.51	1.80
STA	0 +	180.000	0.92	1.09	18.49	20.20
STA	0 +	200.000	0.92	0.92	20.00	18.40
STA	0 +	212.713	0.92	0.92	12.71	11.70
STA	0 +	220.000	0.92	0.92	7.29	6.70
STA	0 +	240.000	0.92	0.92	20.00	18.40
STA	0 +	260.000	0.92	0.92	20.00	18.40
STA	0 +	280.000	0.92	0.92	20.00	18.40
STA	0 +	300.000	0.92	0.92	20.00	18.40
STA	0 +	320.000	0.92	0.92	20.00	18.40
STA	0 +	340.000	0.92	0.92	20.00	18.40
STA	0 +	351.200	0.92	0.92	11.20	10.30
合計						210.20

Enbankment (Thanlyin)

			Area	Ave.	Distance	Volume
STA	0	0.000	3.12			
STA	0 +	20.000		1.56	20.00	31.20
STA	0 +	24.970	5.03	2.52	4.97	12.50
STA	0 +	40.000	0.98	3.01	15.03	45.20
STA	0 +	60.000	6.53	3.76	20.00	75.20
STA	0 +	76.170		3.27	16.17	52.90
STA	0 +	80.000		0.00	3.83	0.00
STA	0 +	100.000		0.00	20.00	0.00
STA	0 +	120.000		0.00	20.00	0.00
STA	0 +	140.000		0.00	20.00	0.00
STA	0 +	160.000		0.00	20.00	0.00
STA	0 +	161.513		0.00	1.51	0.00
STA	0 +	180.000		0.00	18.49	0.00
STA	0 +	200.000		0.00	20.00	0.00
STA	0 +	212.713		0.00	12.71	0.00
STA	0 +	220.000		0.00	7.29	0.00
STA	0 +	240.000		0.00	20.00	0.00
STA	0 +	260.000	4.58	2.29	20.00	45.80
STA	0 +	280.000	5.15	4.87	20.00	97.40
STA	0 +	300.000	3.74	4.45	20.00	89.00
STA	0 +	320.000	4.27	4.01	20.00	80.20
STA	0 +	340.000		2.14	20.00	42.80
STA	0 +	351.200		0.00	11.20	0.00
合計						217.00

Back - Fill for Mechanically Stabilised Earth Work (Thanlyin)

			Area	Ave.	Distance	Volume
STA	0	0.000				
STA	0 +	20.000		0.00	20.00	0.00
STA	0 +	24.970		0.00	4.97	0.00
STA	0 +	40.000		0.00	15.03	0.00
STA	0 +	60.000		0.00	20.00	0.00
STA	0 +	76.170		0.00	16.17	0.00
STA	0 +	80.000		0.00	3.83	0.00
STA	0 +	100.000		0.00	20.00	0.00
STA	0 +	120.000		0.00	20.00	0.00
STA	0 +	140.000		0.00	20.00	0.00
STA	0 +	160.000		0.00	20.00	0.00
STA	0 +	161.513		0.00	1.51	0.00
STA	0 +	180.000		0.00	18.49	0.00
STA	0 +	200.000		0.00	20.00	0.00
STA	0 +	212.713		0.00	12.71	0.00
STA	0 +	220.000		0.00	7.29	0.00
STA	0 +	240.000		0.00	20.00	0.00
STA	0 +	260.000	8.65	4.33	20.00	86.60
STA	0 +	280.000	10.40	9.53	20.00	190.60
STA	0 +	300.000	13.67	12.04	20.00	240.80
STA	0 +	320.000	16.03	14.85	20.00	297.00
STA	0 +	340.000	18.50	17.27	20.00	345.40
STA	0 +	351.200	18.50	18.50	11.20	207.20
合計						1,367.60

Cut and Cover for Mechanically Stabilised Earth Work (Thanlyin)

			Area	Ave.	Distance	Volume
STA	0	0.000				
STA	0 +	20.000		0.00	20.00	0.00
STA	0 +	24.970		0.00	4.97	0.00
STA	0 +	40.000		0.00	15.03	0.00
STA	0 +	60.000		0.00	20.00	0.00
STA	0 +	76.170		0.00	16.17	0.00
STA	0 +	80.000		0.00	3.83	0.00
STA	0 +	100.000		0.00	20.00	0.00
STA	0 +	120.000		0.00	20.00	0.00
STA	0 +	140.000		0.00	20.00	0.00
STA	0 +	160.000		0.00	20.00	0.00
STA	0 +	161.513		0.00	1.51	0.00
STA	0 +	180.000		0.00	18.49	0.00
STA	0 +	200.000		0.00	20.00	0.00
STA	0 +	212.713		0.00	12.71	0.00
STA	0 +	220.000		0.00	7.29	0.00
STA	0 +	240.000		0.00	20.00	0.00
STA	0 +	260.000	0.92	0.46	20.00	9.20
STA	0 +	280.000	0.92	0.92	20.00	18.40
STA	0 +	300.000	0.92	0.92	20.00	18.40
STA	0 +	320.000	0.92	0.92	20.00	18.40
STA	0 +	340.000	0.92	0.92	20.00	18.40
STA	0 +	351.200	0.92	0.92	11.20	10.30
合計						93.10

Cut

			Area	Ave.	Distance	Volume
STA	0		3.88			
STA	0 +	20.000	17.29	10.59	20.00	211.80
STA	0 +	24.970	8.54	12.92	4.97	64.20
STA	0 +	40.000	15.18	11.86	15.03	178.30
STA	0 +	60.000	6.81	11.00	20.00	220.00
STA	0 +	76.170	5.91	6.36	16.17	102.80
STA	0 +	80.000	5.07	5.49	3.83	21.00
STA	0 +	100.000	2.85	3.96	20.00	79.20
STA	0 +	120.000	5.91	4.38	20.00	87.60
STA	0 +	140.000	7.94	6.93	20.00	138.60
STA	0 +	160.000	3.95	5.95	20.00	119.00
STA	0 +	161.513	3.31	5.63	1.51	8.50
STA	0 +	180.000		1.66	18.49	30.70
STA	0 +	200.000		0.00	20.00	0.00
STA	0 +	212.713		0.00	12.71	0.00
STA	0 +	220.000		0.00	7.29	0.00
STA	0 +	240.000		0.00	20.00	0.00
STA	0 +	260.000	57.05	28.53	20.00	570.60
STA	0 +	280.000	53.37	55.21	20.00	1,104.20
STA	0 +	300.000	50.27	51.82	20.00	1,036.40
STA	0 +	320.000	51.54	50.91	20.00	1,018.20
STA	0 +	340.000		25.77	20.00	515.40
STA	0 +	351.200		0.00	11.20	0.00
合計						5,506.50

Surcharge

			Area	Ave.	Distance	Volume
STA	0	140.000	41.14			
STA	0 +	160.000	59.81	50.48	20.00	1,009.60
STA	0 +	161.513	62.84	61.33	1.51	92.79
STA	0 +	180.000	75.38	69.11	18.49	1,277.64
STA	0 +	200.000	79.37	77.38	20.00	1,547.60
STA	0 +	212.713	80.79	80.08	12.71	1,018.06
STA	0 +	220.000	74.80	77.80	7.29	566.93
STA	0 +	240.000	84.55	79.68	20.00	1,593.60
STA	0 +	260.000		42.28	20.00	845.60
STA	0 +	280.000		0.00	20.00	0.00
STA	0 +	300.000		0.00	20.00	0.00
STA	0 +	320.000		0.00	20.00	0.00
合計						7,951.82

Cut

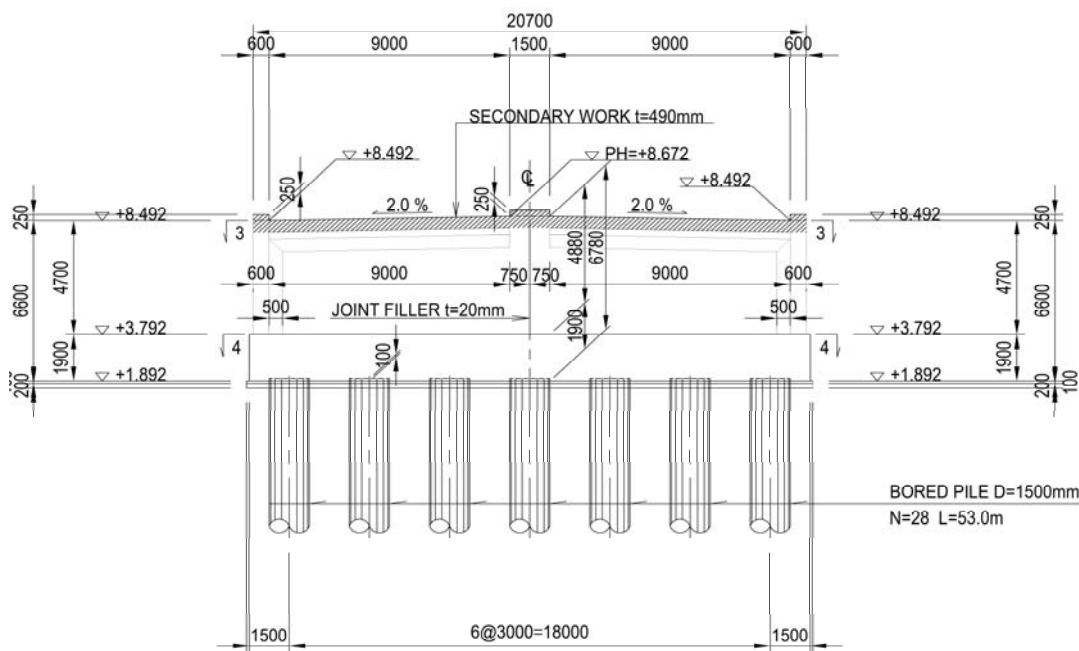
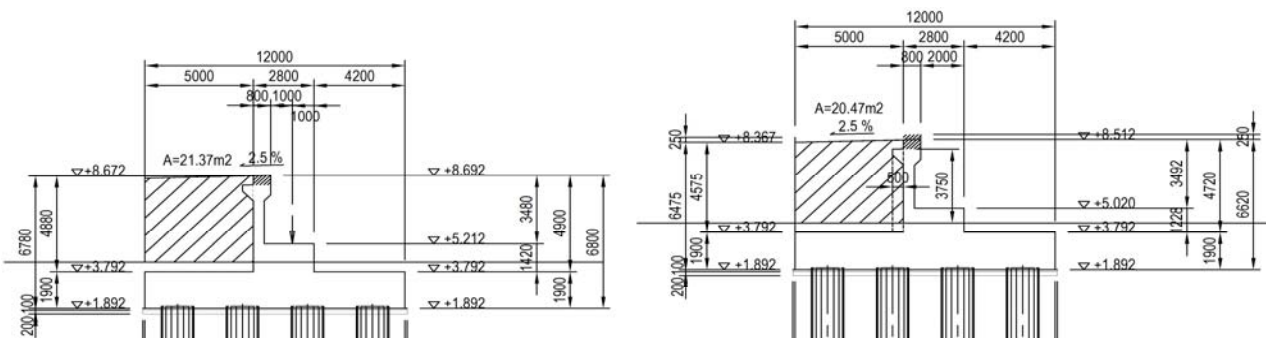
			Area	Ave.	Distance	Volume
STA	0	140.000	10.30			
STA	0 +	160.000	12.57	11.44	20.00	228.80
STA	0 +	161.513	11.95	12.26	1.51	18.55
STA	0 +	180.000	19.78	15.87	18.49	293.39
STA	0 +	200.000	22.69	21.24	20.00	424.80
STA	0 +	212.713	24.96	23.83	12.71	302.95
STA	0 +	220.000	28.12	26.54	7.29	193.40
STA	0 +	240.000	33.63	30.88	20.00	617.60
STA	0 +	260.000		16.82	20.00	336.40
STA	0 +	280.000		0.00	20.00	0.00
STA	0 +	300.000		0.00	20.00	0.00
STA	0 +	320.000		0.00	20.00	0.00
合計						2,415.89

Surcharge - Cut 5,535.93

Back Fill of Abutmentt

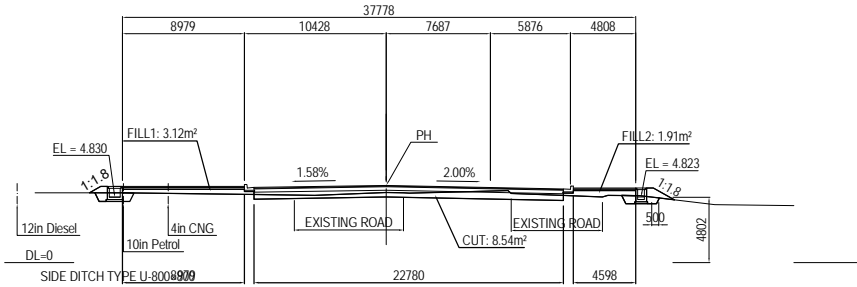
1) A1

$$\begin{aligned}
 & (20.47 + 21.37) / 2 * 9.75 * 2 = 407.94 \text{ m3} \\
 & 0.50 * 0.5 / 2 * 2 * 3.75 = 0.94 \text{ m3} \quad \text{Corner} \\
 & (0.3 + 0.8) / 2 * 0.5 * 1.5 = 0.41 \text{ m3} \quad \text{Chair} \\
 & 0.7 * 18 * 5.0 = 63.00 \text{ m3} \quad \text{Plate} \\
 & 407.94 - 0.94 + 0.41 - 63.00 = 344.42 \text{ m3}
 \end{aligned}$$

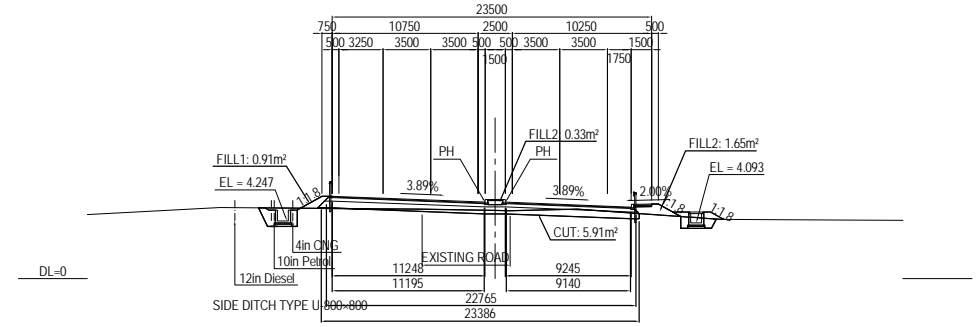


CROSS SECTION (1) S=1:400

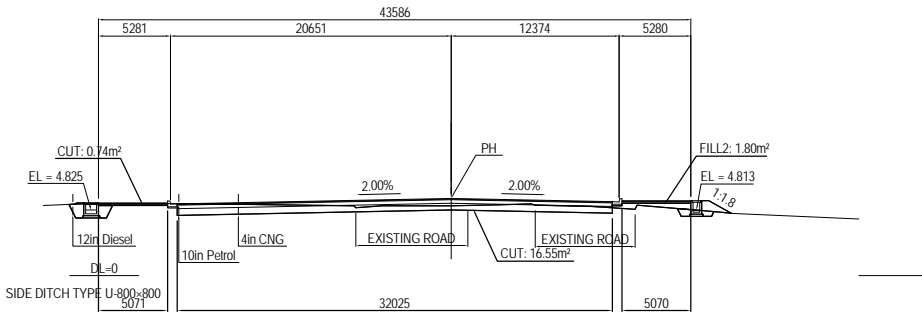
STA.0+24.97
GH = 5.16
PH = 5.670



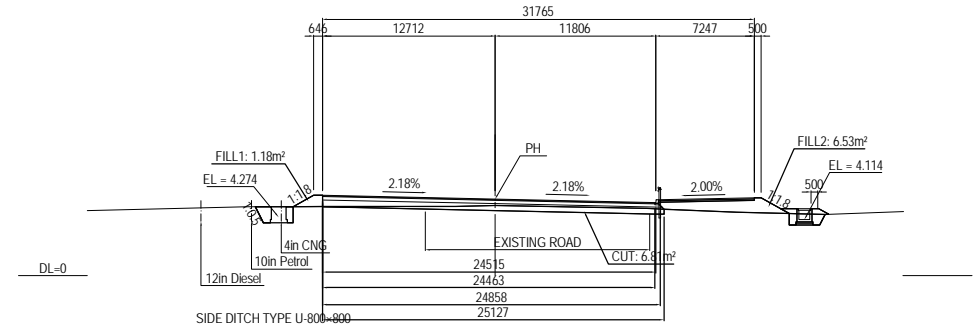
STA.0+76.17
GH = 5.01
PH = 5.619



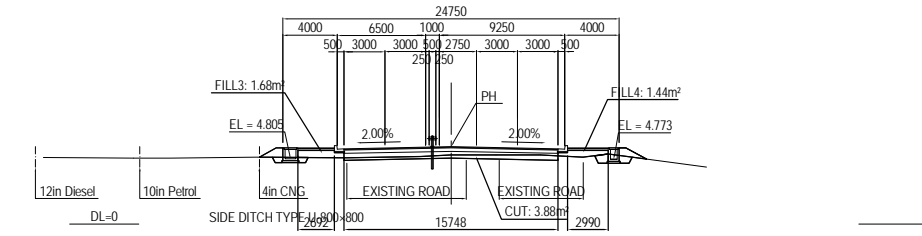
STA.0+20
GH = 5.12
PH = 5.675



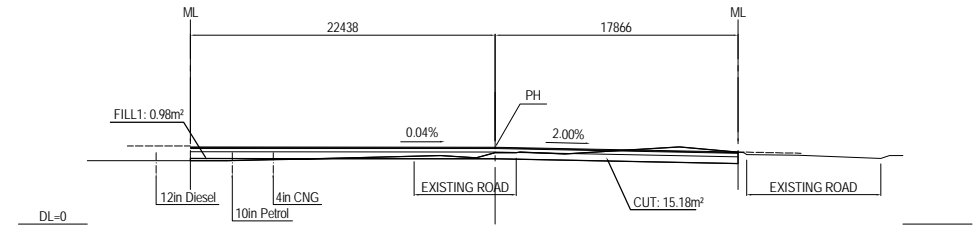
STA.0+60
GH = 5.15
PH = 5.635



STA.0
GH = 5.09
PH = 5.695



STA.0+40
GH = 5.24
PH = 5.655



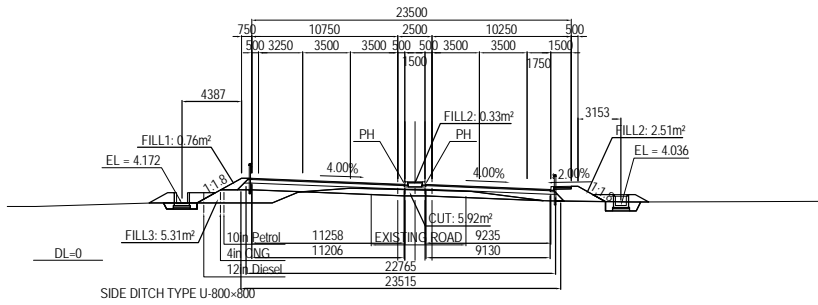
Note: Elevation is based on MSL (Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE	PACKAGE		
				PREPARED BY	E. YOKOTA				CROSS SECTION(1)	1
				CHECKED BY	T. HAYAKAWA					DWG No.
				APPROVED BY	Y. SANO					P1-RD-001

CROSS SECTION (2) S=1:400

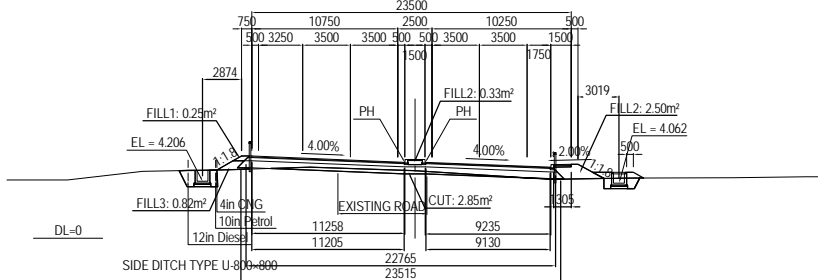
STA.0+120

GH=5.17
PH=5.583



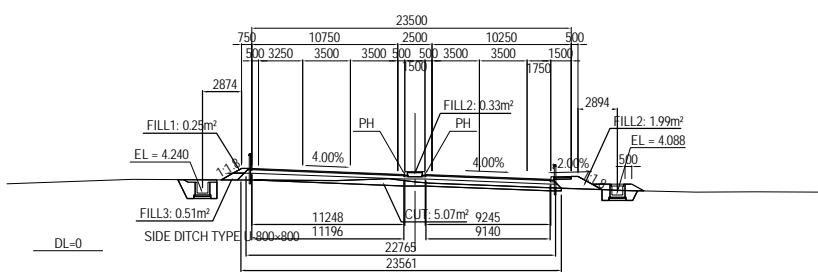
STA.0+100

GH=4.97
PH=5.595



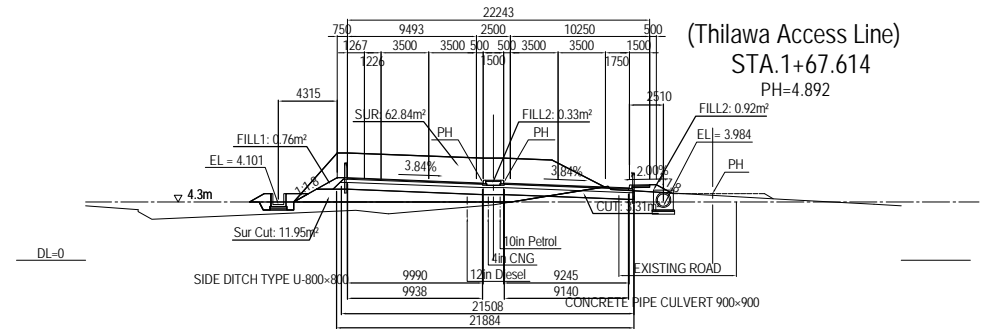
STA.0+80

GH=5.06
PH=5.615



STA.0+161.513

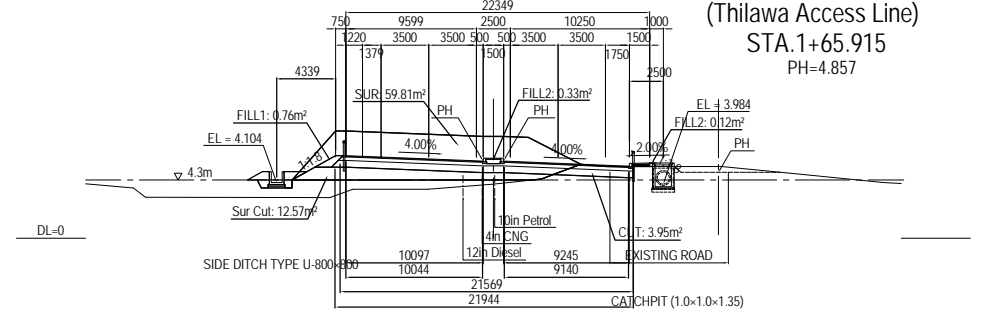
GH=4.08
PH=5.689



(Thilawa Access Line)
STA.1+67.614
PH=4.892

STA.0+160

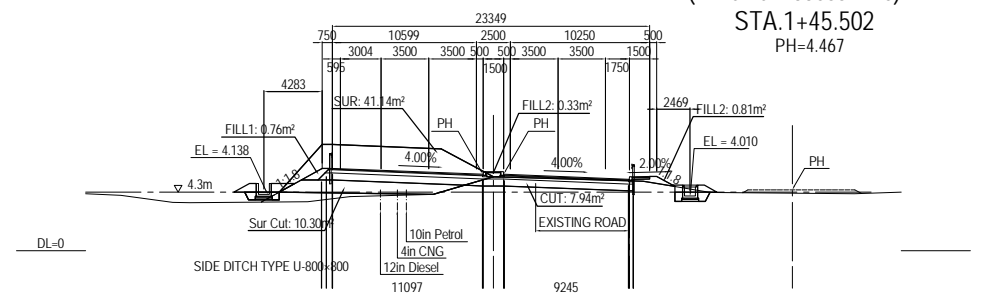
GH=3.99
PH=5.681



(Thilawa Access Line)
STA.1+65.915
PH=4.857

STA.0+140

GH=5.44
PH=5.610



(Thilawa Access Line)
STA.1+45.502
PH=4.467

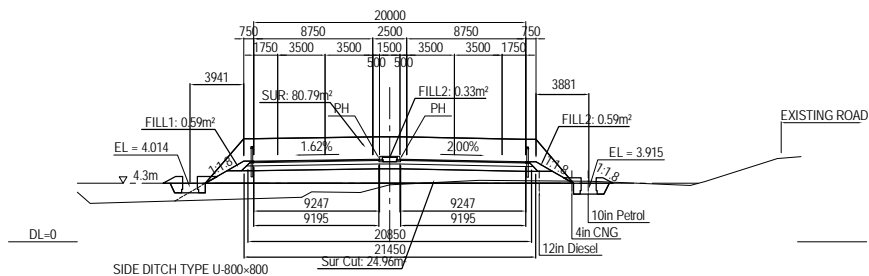
Note: Elevation is based on MSL (Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE	PACKAGE		
				PREPARED BY	E. YOKOTA				CROSS SECTION(2)	1
				CHECKED BY	T. HAYAKAWA					DWG No.
				APPROVED BY	Y. SANO					P1-RD-002

CROSS SECTION(3) S=1:400

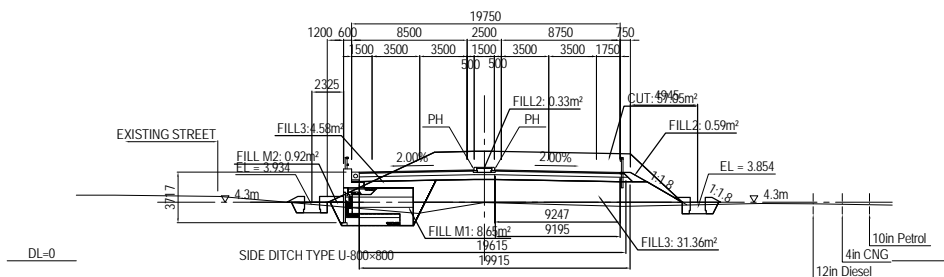
STA.0+212.713

GH=4.19
PH=6.076



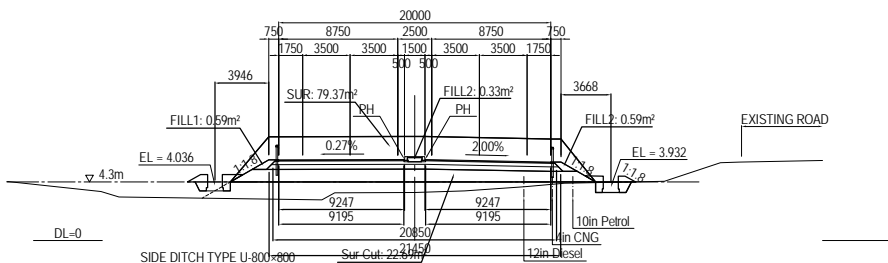
STA.0+260

GH=4.28
PH=6.686



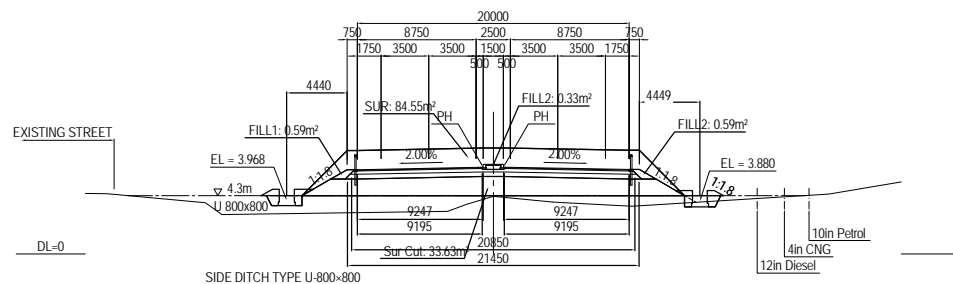
STA.0+200

GH=3.51
PH=5.953



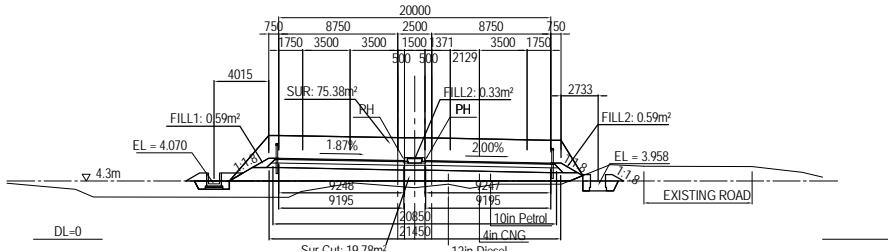
STA.0+240

GH=4.26
PH=6.399



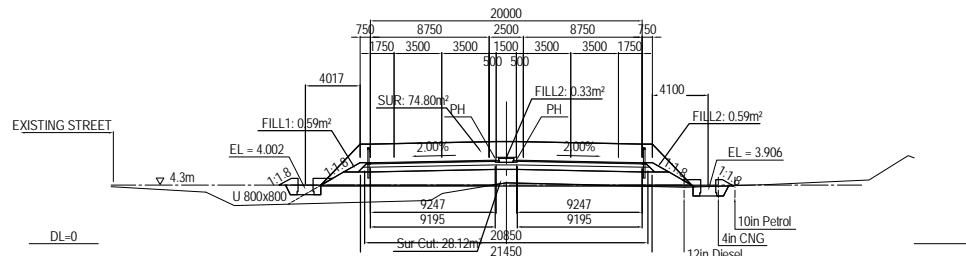
STA.0+180

GH=3.80
PH=5.796



STA.0+220

GH=4.48
PH=6.154



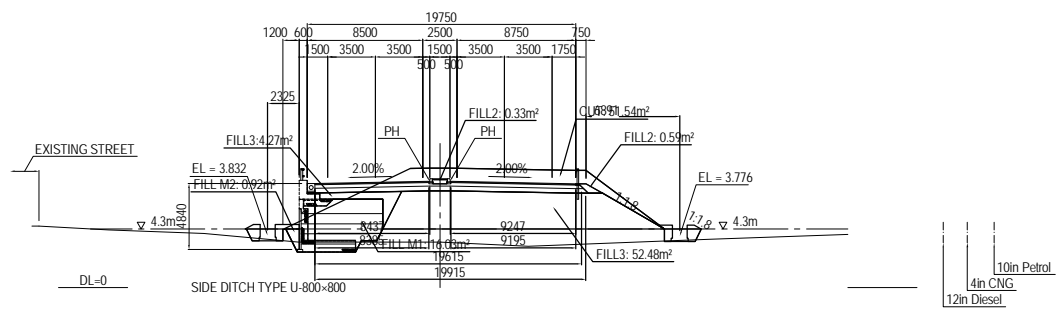
Note: Elevation is based on MSL(Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTRY/PROJ REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE	PACKAGE			
				PREPARED BY	E. YOKOTA				CROSS SECTION(3)	1	
				CHECKED BY	T. HAYAKAWA					DWG No.	
				APPROVED BY	Y. SANO					P1-RD-003	

CROSS SECTION(4) S=1:400

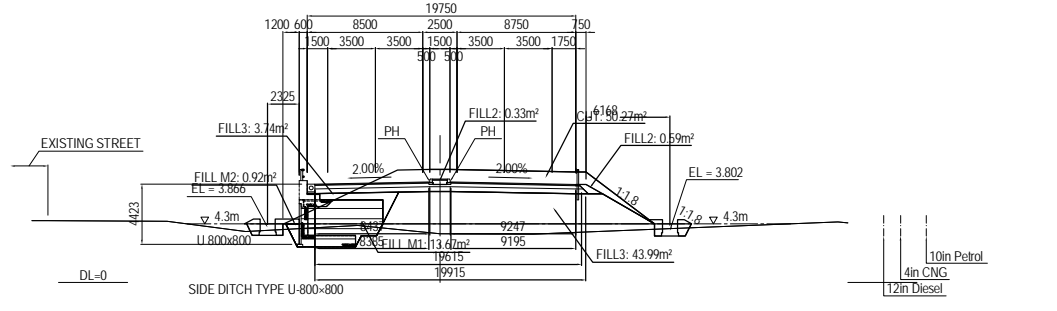
STA.0+320

GH=3.33
PH=7.809



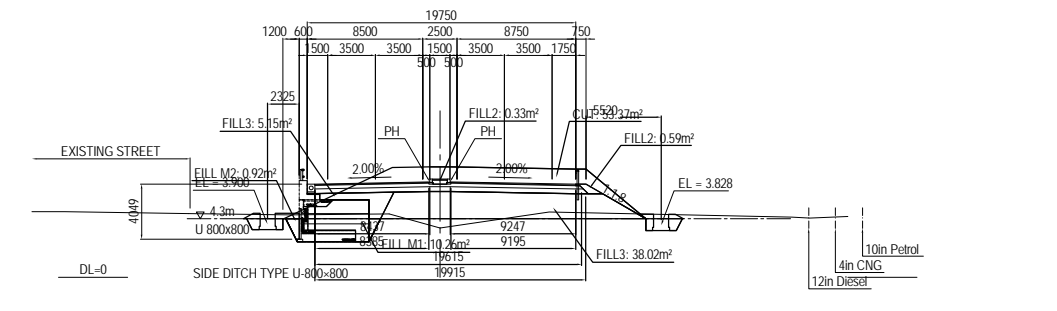
STA.0+300

GH=3.56
PH=7.392



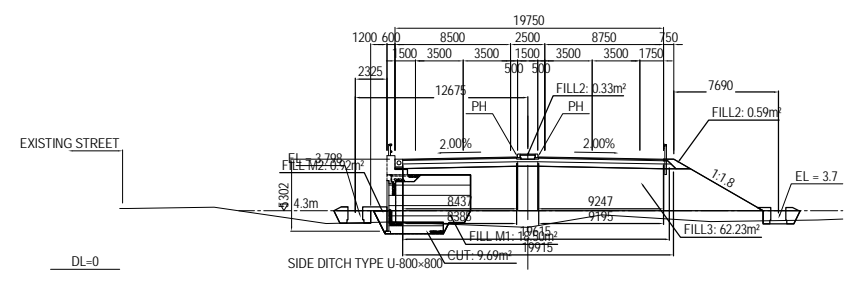
STA.0+280

GH=3.62
PH=7.017



STA.0+340

GH=3.07
PH=8.270



Note: Elevation is based on MSL(Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTRY/PROVINCE REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE CROSS SECTION(4)	PACKAGE 1 DWG No. P1-RD-004	
				PREPARED BY	E. YOKOTA				
				CHECKED BY	T. HAYAKAWA				
				APPROVED BY	Y. SANO				

BILL OF QUANTITIES
CUTTING AND FILLING VOLUME
PACKAGE 1
(ON RAMP)

Cut:		=	888.41 m3	W > 4m
Fill		=	1,322.53 m3	W >= 4m
		=	136.36 m3	W < 4m
Back-Fill	814.13 + Mecanically	73.30 =	887.43 m3	W > 4m
Cut & Caver		=	53.34 m3	W < 4m

Left Shoulder Fill

			Area	Ave.	Distance	Volume
STA	0 +	3.700	0.20			
STA	0 +	4.472	0.20	0.20	0.77	0.15
STA	0 +	20.000	0.23	0.22	15.53	3.42
STA	0 +	40.000	0.23	0.23	20.00	4.60
STA	0 +	58.045	0.19	0.21	18.05	3.79
STA	0 +	60.000	0.16	0.18	1.96	0.35
STA	0 +	80.000	0.16	0.16	20.00	3.20
STA	0 +	100.000	0.16	0.16	20.00	3.20
STA	0 +	105.007	0.16	0.16	5.01	0.80
STA	0 +	120.000	0.20	0.18	14.99	2.70
STA	0 +	140.000	0.26	0.23	20.00	4.60
STA	0 +	148.111	0.29	0.28	8.11	2.27
STA	0 +	160.000	0.30	0.28	11.89	3.33
STA	0 +	180.000	0.30	0.30	20.00	6.00
STA	0 +	200.000	0.30	0.30	20.00	6.00
STA	0 +	220.000	0.30	0.30	20.00	6.00
STA	0 +	240.000	0.30	0.30	20.00	6.00
STA	0 +	260.000	0.30	0.30	20.00	6.00
STA	0 +	280.000	0.30	0.30	20.00	6.00
STA	0 +	300.000	0.30	0.30	20.00	6.00
STA	0 +	320.000	0.30	0.30	20.00	6.00
STA	0 +	340.000	0.30	0.30	20.00	6.00
STA	0 +	360.000	0.30	0.30	20.00	6.00
STA	0 +	367.484	0.00	0.15	7.48	1.12
STA	0 +	380.000	0.00	0.00	12.52	0.00
STA	0 +	400.000	0.00	0.00	20.00	0.00
STA	0 +	406.100	0.00	0.00	6.10	0.00
合計						93.53

Right Shoulder Fill

			Area	Ave.	Distance	Volume
STA	0 +	3.700				
STA	0 +	4.472		0.00	0.77	0.00
STA	0 +	20.000		0.00	15.53	0.00
STA	0 +	40.000		0.00	20.00	0.00
STA	0 +	58.045	0.02	0.01	18.05	0.18
STA	0 +	60.000	0.07	0.05	1.96	0.10
STA	0 +	80.000	0.08	0.08	20.00	1.60
STA	0 +	100.000	0.08	0.08	20.00	1.60
STA	0 +	105.007	0.08	0.08	5.01	0.40
STA	0 +	120.000	0.02	0.05	14.99	0.75
STA	0 +	140.000		0.01	20.00	0.20
STA	0 +	148.111		0.00	8.11	0.00
STA	0 +	160.000		0.00	11.89	0.00
STA	0 +	180.000		0.00	20.00	0.00
STA	0 +	200.000	0.00	0.00	20.00	0.00
STA	0 +	220.000	0.02	0.01	20.00	0.20
STA	0 +	240.000	0.06	0.04	20.00	0.80
STA	0 +	260.000	0.11	0.09	20.00	1.80
STA	0 +	280.000	0.15	0.13	20.00	2.60
STA	0 +	300.000	0.20	0.18	20.00	3.60
STA	0 +	320.000	0.30	0.25	20.00	5.00
STA	0 +	340.000	0.30	0.30	20.00	6.00
STA	0 +	360.000	0.30	0.30	20.00	6.00
STA	0 +	367.484	0.30	0.30	7.48	2.25
STA	0 +	380.000	0.30	0.30	12.52	3.75
STA	0 +	400.000	0.30	0.30	20.00	6.00
STA	0 +	406.100	0.30	0.30	6.10	1.83
合計						42.83

Embankment (Ramp)

			Area	Ave.	Distance	Volume
STA	0 +	3.700				
STA	0 +	4.472		0.00	0.77	0.00
STA	0 +	20.000		0.00	15.53	0.00
STA	0 +	40.000		0.00	20.00	0.00
STA	0 +	58.045		0.00	18.05	0.00
STA	0 +	60.000		0.00	1.96	0.00
STA	0 +	80.000		0.00	20.00	0.00
STA	0 +	100.000		0.00	20.00	0.00
STA	0 +	105.007		0.00	5.01	0.00
STA	0 +	120.000		0.00	14.99	0.00
STA	0 +	140.000		0.00	20.00	0.00
STA	0 +	148.111		0.00	8.11	0.00
STA	0 +	160.000	0.02	0.01	11.89	0.12
STA	0 +	180.000	0.14	0.08	20.00	1.60
STA	0 +	200.000	0.31	0.23	20.00	4.60
STA	0 +	220.000	0.51	0.41	20.00	8.20
STA	0 +	240.000	0.77	0.64	20.00	12.80
STA	0 +	260.000	1.07	0.92	20.00	18.40
STA	0 +	280.000	1.42	1.25	20.00	25.00
STA	0 +	300.000	1.82	1.62	20.00	32.40
STA	0 +	320.000	3.91	2.87	20.00	57.40
STA	0 +	340.000	10.56	7.24	20.00	144.80
STA	0 +	360.000	23.57	17.07	20.00	341.40
STA	0 +	367.484	16.65	20.11	7.48	150.50
STA	0 +	380.000	12.92	14.79	12.52	185.11
STA	0 +	400.000	21.10	17.01	20.00	340.20
STA	0 +	406.100	21.10	21.10	6.10	128.71
合計						1,322.53

Back - Fill for Mechanically Stabilised Earth Work (Ramp)

			Area	Ave.	Distance	Volume
STA	0 +	3.700				
STA	0 +	4.472		0.00	0.77	0.00
STA	0 +	20.000		0.00	15.53	0.00
STA	0 +	40.000		0.00	20.00	0.00
STA	0 +	58.045		0.00	18.05	0.00
STA	0 +	60.000		0.00	1.96	0.00
STA	0 +	80.000		0.00	20.00	0.00
STA	0 +	100.000		0.00	20.00	0.00
STA	0 +	105.007		0.00	5.01	0.00
STA	0 +	120.000		0.00	14.99	0.00
STA	0 +	140.000		0.00	20.00	0.00
STA	0 +	148.111		0.00	8.11	0.00
STA	0 +	160.000		0.00	11.89	0.00
STA	0 +	180.000		0.00	20.00	0.00
STA	0 +	200.000		0.00	20.00	0.00
STA	0 +	220.000		0.00	20.00	0.00
STA	0 +	240.000		0.00	20.00	0.00
STA	0 +	260.000		0.00	20.00	0.00
STA	0 +	280.000		0.00	20.00	0.00
STA	0 +	300.000		0.00	20.00	0.00
STA	0 +	320.000		0.00	20.00	0.00
STA	0 +	340.000		0.00	20.00	0.00
STA	0 +	360.000		0.00	20.00	0.00
STA	0 +	367.484	18.33	9.17	7.48	68.63
STA	0 +	380.000	21.89	20.11	12.52	251.70
STA	0 +	400.000	27.49	24.69	20.00	493.80
STA	0 +	406.100	27.49	27.49	6.10	167.69
合計						814.13

Back - Fill for Mechanically Stabilised Earth Work (Ramp)

			Area	Ave.	Distance	Volume
STA	0 +	3.700				
STA	0 +	4.472		0.00	0.77	0.00
STA	0 +	20.000		0.00	15.53	0.00
STA	0 +	40.000		0.00	20.00	0.00
STA	0 +	58.045		0.00	18.05	0.00
STA	0 +	60.000		0.00	1.96	0.00
STA	0 +	80.000		0.00	20.00	0.00
STA	0 +	100.000		0.00	20.00	0.00
STA	0 +	105.007		0.00	5.01	0.00
STA	0 +	120.000		0.00	14.99	0.00
STA	0 +	140.000		0.00	20.00	0.00
STA	0 +	148.111		0.00	8.11	0.00
STA	0 +	160.000		0.00	11.89	0.00
STA	0 +	180.000		0.00	20.00	0.00
STA	0 +	200.000		0.00	20.00	0.00
STA	0 +	220.000		0.00	20.00	0.00
STA	0 +	240.000		0.00	20.00	0.00
STA	0 +	260.000		0.00	20.00	0.00
STA	0 +	280.000		0.00	20.00	0.00
STA	0 +	300.000		0.00	20.00	0.00
STA	0 +	320.000		0.00	20.00	0.00
STA	0 +	340.000		0.00	20.00	0.00
STA	0 +	360.000		0.00	20.00	0.00
STA	0 +	367.484	1.47	0.74	7.48	5.54
STA	0 +	380.000	1.47	1.47	12.52	18.40
STA	0 +	400.000	1.47	1.47	20.00	29.40
STA	0 +	406.100	1.47	1.47	6.10	8.97
合計						53.34

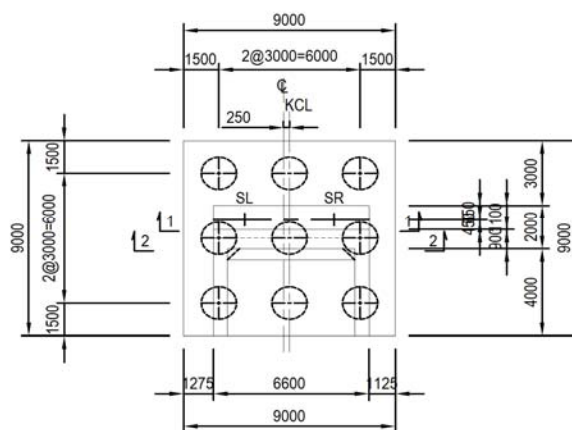
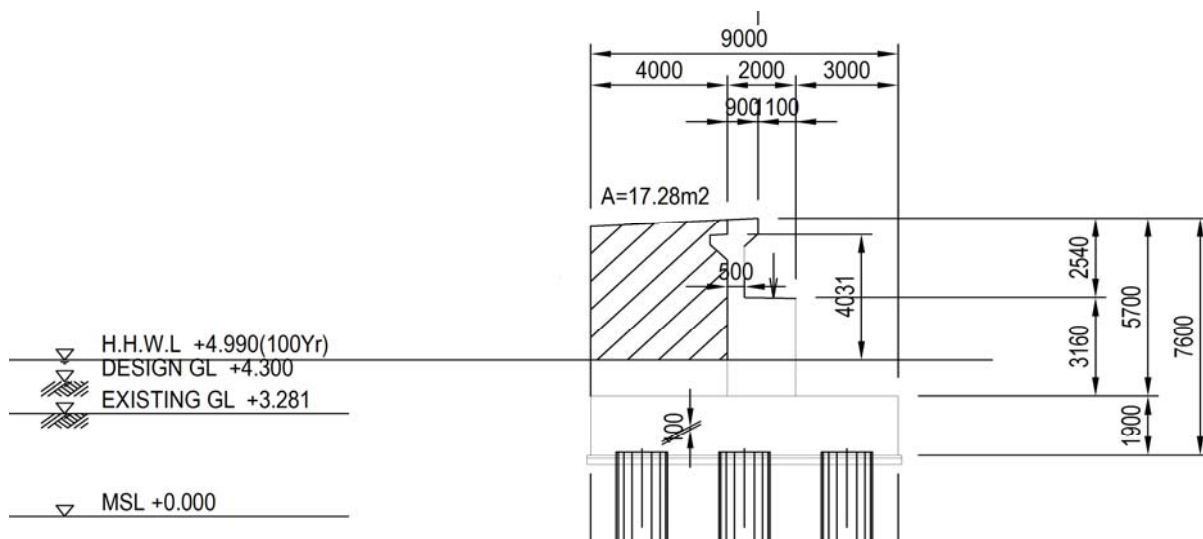
Excavation for Mechanically Stabilised Earth Work (Ramp)

			Area	Ave.	Distance	Volume
STA	0 +	3.700	1.48			
STA	0 +	4.472	1.48	1.48	0.77	1.14
STA	0 +	20.000	1.53	1.51	15.53	23.45
STA	0 +	40.000	1.54	1.54	20.00	30.80
STA	0 +	58.045	1.50	1.52	18.05	27.43
STA	0 +	60.000	1.40	1.45	1.96	2.83
STA	0 +	80.000	1.31	1.36	20.00	27.20
STA	0 +	100.000	1.40	1.36	20.00	27.20
STA	0 +	105.007	1.40	1.40	5.01	7.01
STA	0 +	120.000	1.45	1.43	14.99	21.44
STA	0 +	140.000	1.65	1.55	20.00	31.00
STA	0 +	148.111	1.65	1.65	8.11	13.38
STA	0 +	160.000	1.58	1.62	11.89	19.26
STA	0 +	180.000	1.29	1.44	20.00	28.80
STA	0 +	200.000	1.02	1.16	20.00	23.20
STA	0 +	220.000	0.76	0.89	20.00	17.80
STA	0 +	240.000	0.53	0.65	20.00	13.00
STA	0 +	260.000	0.34	0.44	20.00	8.80
STA	0 +	280.000	0.27	0.31	20.00	6.20
STA	0 +	300.000	0.15	0.21	20.00	4.20
STA	0 +	320.000		0.08	20.00	1.60
STA	0 +	340.000		0.00	20.00	0.00
STA	0 +	360.000		0.00	20.00	0.00
STA	0 +	367.484	13.04	6.52	7.48	48.80
STA	0 +	380.000	13.05	13.05	12.52	163.33
STA	0 +	400.000	13.04	13.05	20.00	261.00
STA	0 +	406.100	13.04	13.04	6.10	79.54
合計						888.41

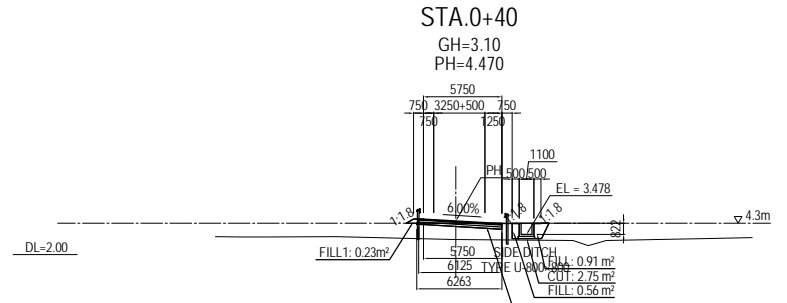
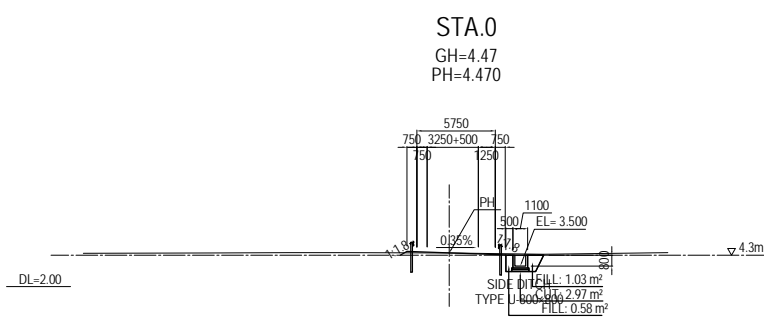
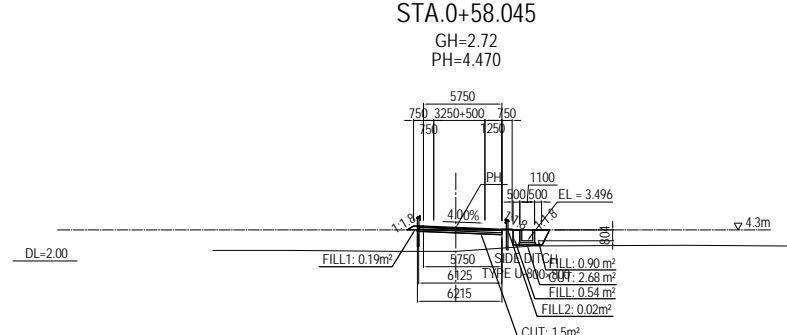
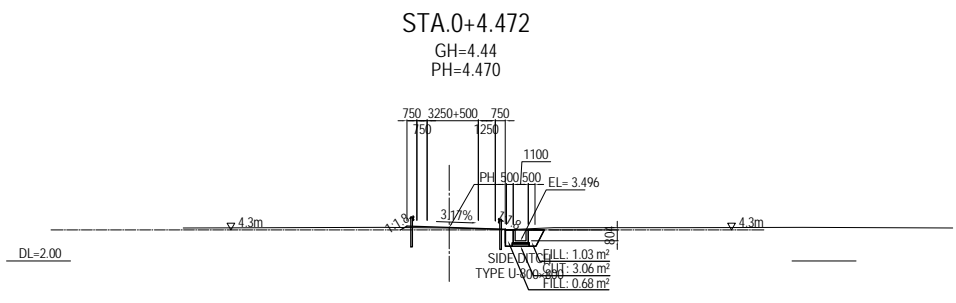
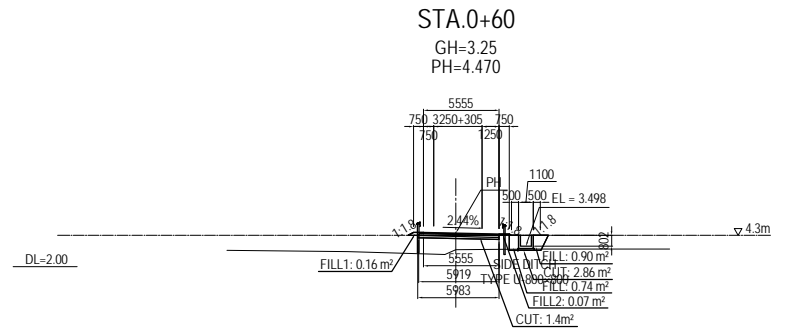
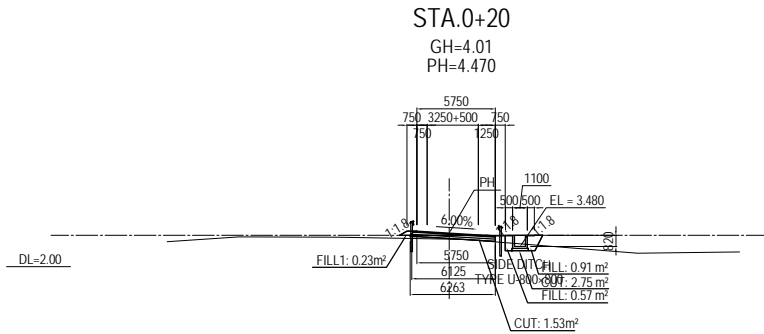
Back Fill of Abutmentt

1) Ao1

(	17.28	+	17.28	) / 2 *	4.8	=	82.94	m3	
	0.50	*	0.5	/ 2 *	2	*	4.0	=	1.00 m3 Corner
(	0	+	0	) / 2 *	0	*	0	=	0.00 m3 Plate
	0.4	*	5.4	*	4.0	=	8.64	m3	Pave
82.94	-	1.00	+	0.00	-	8.64	=	73.30	m3



CROSS SECTION MAIN ROAD (1) S=1:400



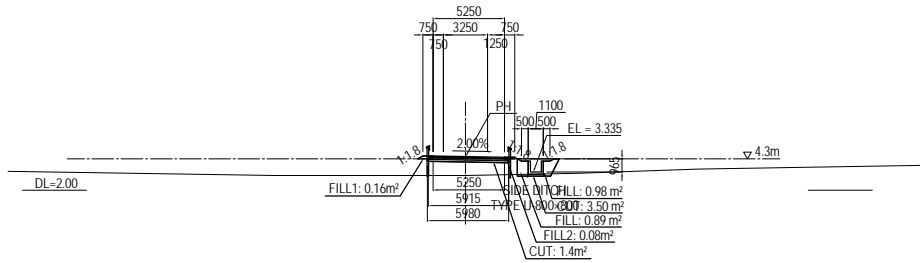
Note: Elevation is based on MSL (Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME M. TORIU T. HAYAKAWA Y. SANO	SIGNATURE 	DATE 15 Jun. 2017 20 Jun. 2017 21 Jun. 2017	DRAWING TITLE CROSS SECTION MAIN ROAD (1)	PACKAGE 1 DWG No. P1-RD-1020
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CROSS SECTION MAIN ROAD (2) S=1:400

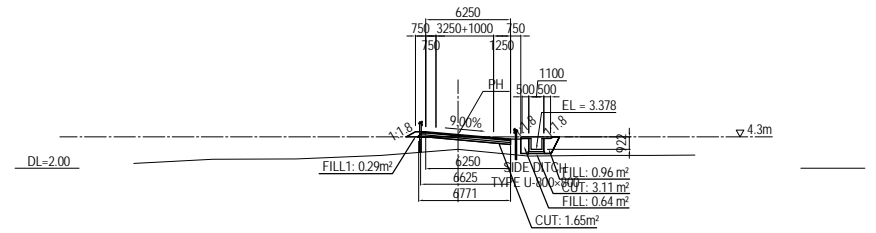
STA.0+105.007

GH=3.09
PH=4.470



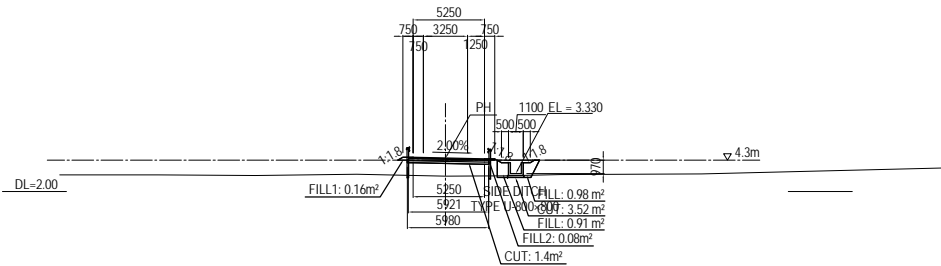
STA.0+148.111

GH=3.38
PH=4.479



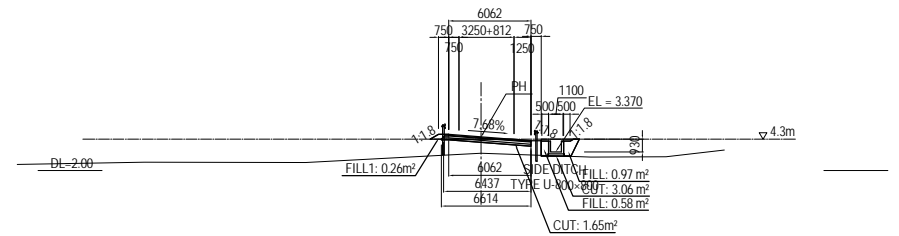
STA.0+100

GH=3.14
PH=4.470



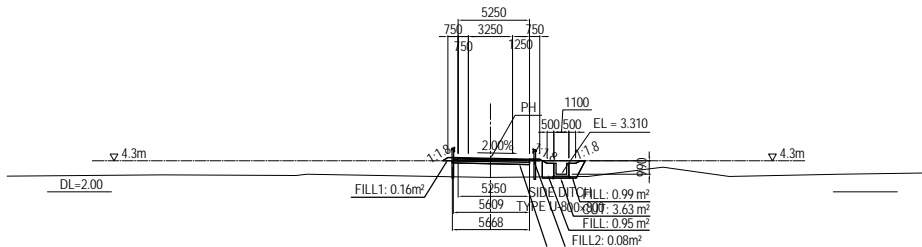
STA.0+140

GH=3.28
PH=4.470



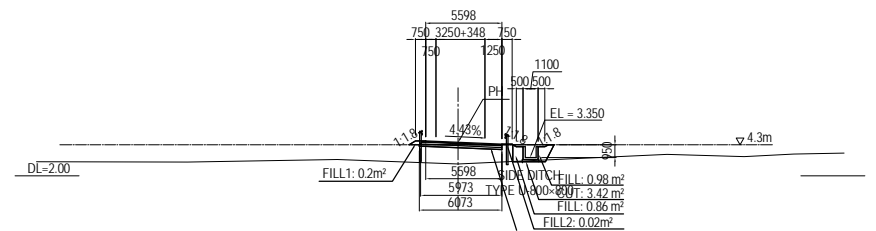
STA.0+80

GH=3.06
PH=4.470



STA.0+120

GH=2.87
PH=4.470

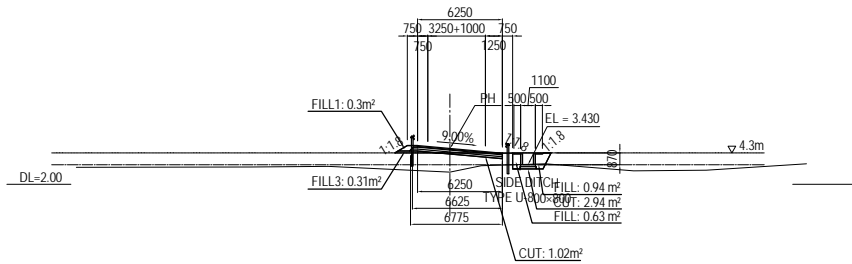


Note: Elevation is based on MSL (Mean Sea Level)

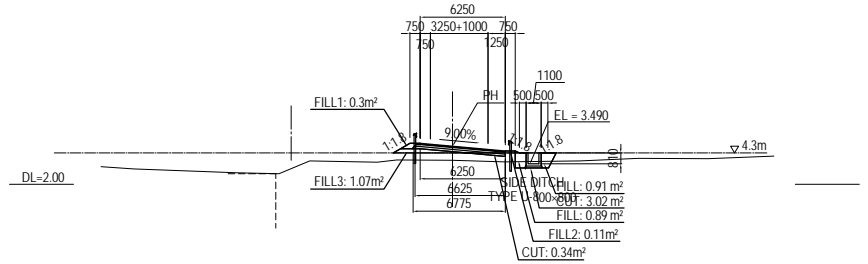
PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME M. TORIU T. HAYAKAWA Y. SANO	SIGNATURE 	DATE 15 Jun. 2017 20 Jun. 2017 21 Jun. 2017	DRAWING TITLE CROSS SECTION MAIN ROAD (2)	PACKAGE 1 DWG No. P1-RD-1030
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CROSS SECTION MAIN ROAD (3) S=1:400

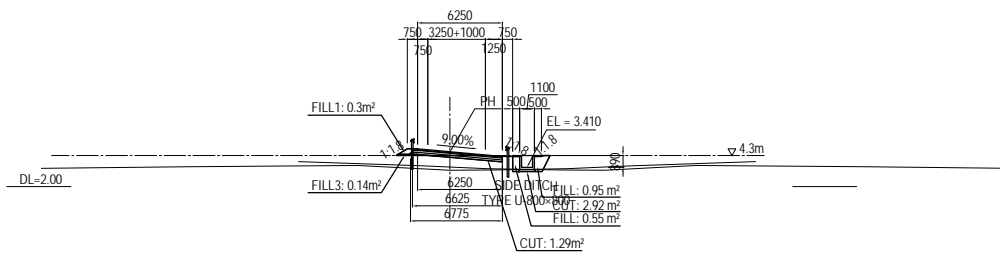
STA.0+200
GH=2.90
PH=4.620



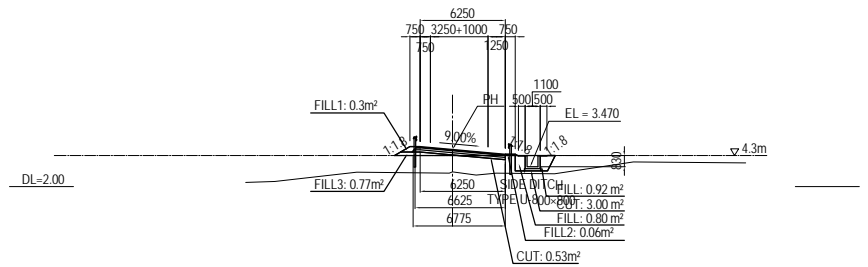
STA.0+260
GH=3.77
PH=4.800



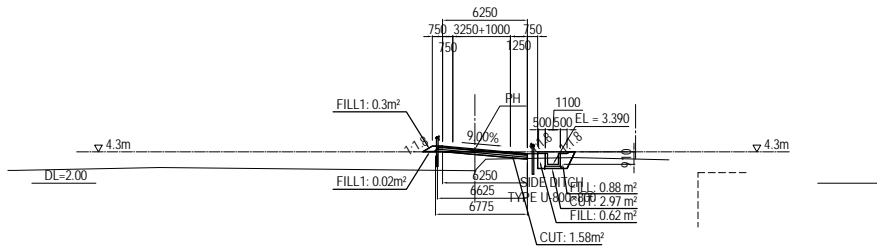
STA.0+180
GH=3.20
PH=4.560



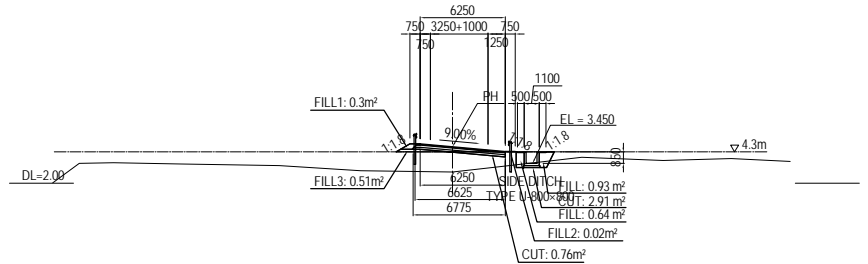
STA.0+240
GH=3.08
PH=4.740



STA.0+160
GH=2.90
PH=4.501



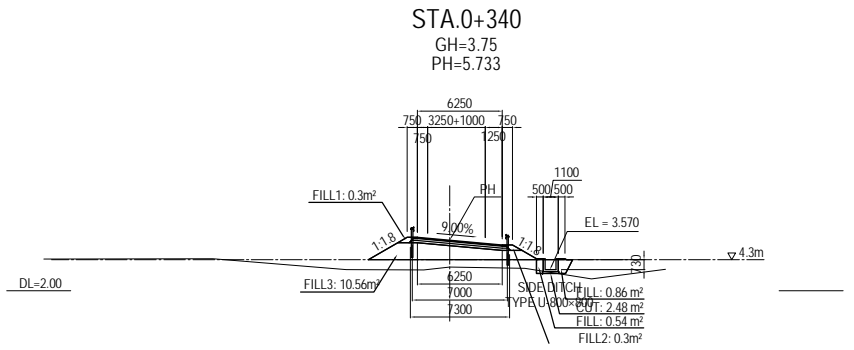
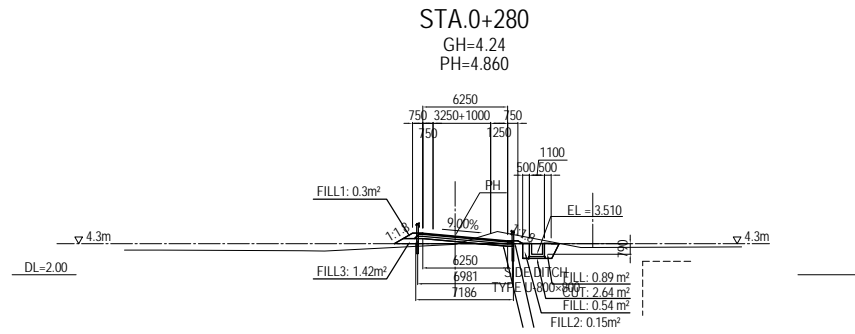
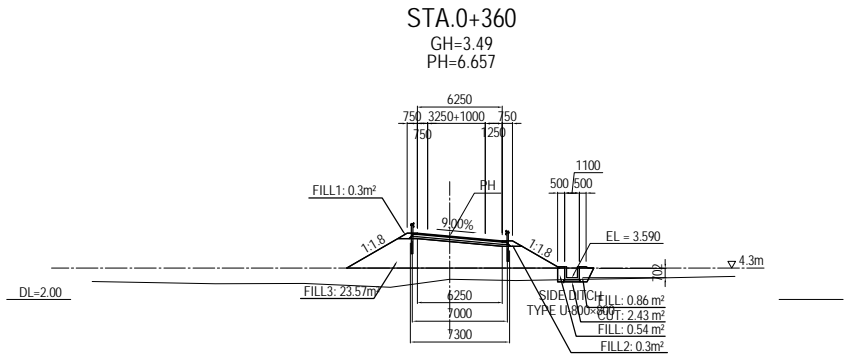
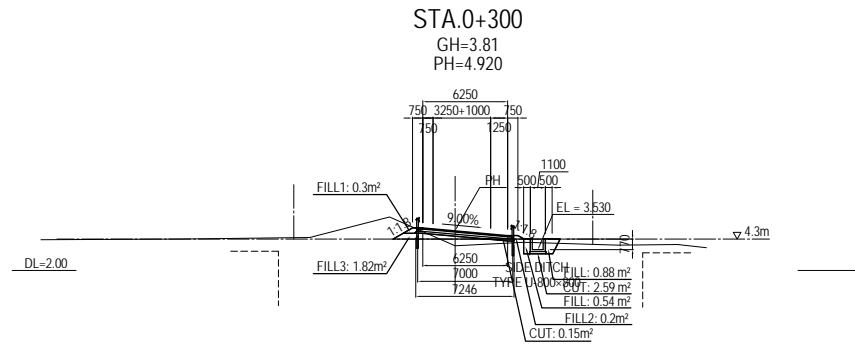
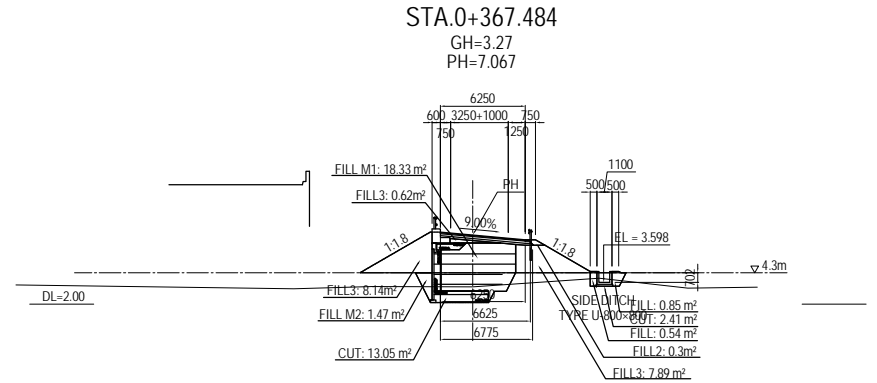
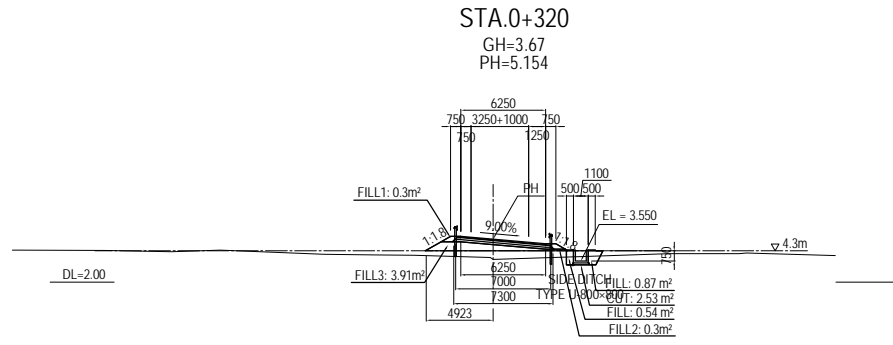
STA.0+220
GH=2.82
PH=4.680



Note: Elevation is based on MSL (Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTRY/PROVINCE REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	PREPARED BY CHECKED BY APPROVED BY	NAME M. TORIU T. HAYAKAWA Y. SANO	SIGNATURE 	DATE 15 Jun. 2017 20 Jun. 2017 21 Jun. 2017	DRAWING TITLE CROSS SECTION MAIN ROAD (3)	PACKAGE 1 DWG No. P1-RD-1040
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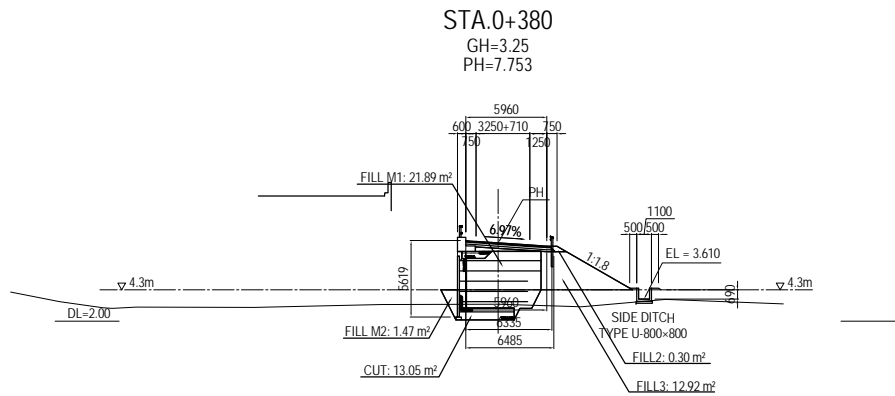
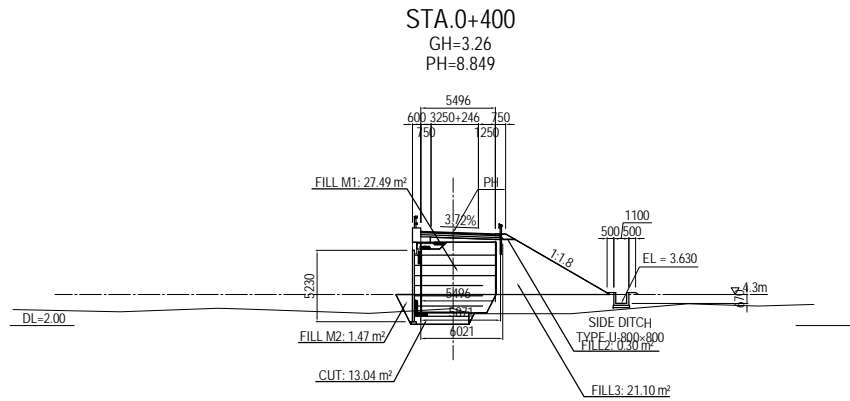
CROSS SECTION MAIN ROAD (4) S=1:400



Note: Elevation is based on MSL (Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME M. TORIU T. HAYAKAWA Y. SANO	SIGNATURE 	DATE 15 Jun. 2017 20 Jun. 2017 21 Jun. 2017	DRAWING TITLE CROSS SECTION MAIN ROAD (4)	PACKAGE 1 DWG No. P1-RD-1050
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CROSS SECTION MAIN ROAD (5) S=1:400



Note: Elevation is based on MSL (Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTRY PARTNER REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME PREPARED BY M. TORIU	SIGNATURE 	DATE 15 Jun. 2017	DRAWING TITLE CROSS SECTION MAIN ROAD (5)	PACKAGE 1 DWG No. P1-RD-1060
				CHECKED BY T. HAYAKAWA		20 Jun. 2017		
				APPROVED BY Y. SANO		21 Jun. 2017		

Sodding (Main Road)
(STA.0 ~ STA.0+177)

EARTHWORK					
ITEM	FORMULA			UNIT	QUANTITY
TRIMMING OF SLOPE SLOPE OF EMBANKMENT	A =	=	700.1	m2	700.1
SLOPE PROTECTION SODDING	A =	=	700.1	m2	700.1

TRIMMING OF SLOPE

No.1

STATION	DISTANCE (m)	SLOPE OF EMBANKMENT												REMARKS	
		L			R										
		Length (m)	Average (m)	Area (m2)	Length (m)	Average (m)	Area (m2)								
STA. 0 + 0.000		1.4			1.7										
STA. 0 + 20.000	20.0	0.2	0.80	16.0	1.9	1.80	36.0								
STA. 0 + 24.970	5.0	0.9	0.55	2.8	1.8	1.85	9.3								
STA. 0 + 40.000	15.0	0.0	0.45	6.8	0.0	0.90	13.5								
STA. 0 + 60.000	20.0	1.7	0.85	17.0	2.5	1.25	25.0								
STA. 0 + 76.170	16.2	2.1	1.90	30.8	2.3	2.40	38.9								
STA. 0 + 80.000	3.8	1.7	1.90	7.2	2.2	2.25	8.6								
STA. 0 + 100.000	20.0	2.1	1.90	38.0	2.1	2.15	43.0								
STA. 0 + 120.000	20.0	3.8	2.95	59.0	2.4	2.25	45.0								
STA. 0 + 140.000	20.0	3.6	3.70	74.0	2.4	2.40	48.0								
STA. 0 + 160.000	20.0	3.7	3.65	73.0	0.0	1.20	24.0								
STA. 0 + 161.513	1.5	3.7	3.70	5.6	1.3	0.65	1.0								
STA. 0 + 177.000	15.5	3.7	3.70	57.4	1.3	1.30	20.2								
Subtotal				387.6			312.5				0.0			0.0	
Total						LRTtotal	700.1				0.0			0.0	

SLOPE PROTECTION															No.1
Station	DISTANCE (m)	SODDING												REMARKS	
		L			R										
		Length (m)	Average (m)	Area (m ²)	Length (m)	Average (m)	Area (m ²)								
STA. 0 + 0.000		1.4			1.7										
STA. 0 + 20.000	20.0	0.2	0.80	16.0	1.9	1.80	36.0								
STA. 0 + 24.970	5.0	0.9	0.55	2.8	1.8	1.85	9.3								
STA. 0 + 40.000	15.0	0.0	0.45	6.8	0.0	0.90	13.5								
STA. 0 + 60.000	20.0	1.7	0.85	17.0	2.5	1.25	25.0								
STA. 0 + 76.170	16.2	2.1	1.90	30.8	2.3	2.40	38.9								
STA. 0 + 80.000	3.8	1.7	1.90	7.2	2.2	2.25	8.6								
STA. 0 + 100.000	20.0	2.1	1.90	38.0	2.1	2.15	43.0								
STA. 0 + 120.000	20.0	3.8	2.95	59.0	2.4	2.25	45.0								
STA. 0 + 140.000	20.0	3.6	3.70	74.0	2.4	2.40	48.0								
STA. 0 + 160.000	20.0	3.7	3.65	73.0	0.0	1.20	24.0								
STA. 0 + 161.513	1.5	3.7	3.70	5.6	1.3	0.65	1.0								
STA. 0 + 177.000	15.5	3.7	3.70	57.4	1.3	1.30	20.2								
Subtotal				387.6			312.5			0.0			0.0		
Total						LRTotal	700.1			0.0			0.0		

Sodding (Main Road)
(After STA.0 ~ STA.0+177)

2.1.4 Sodding for Main Road (After STA. 0+176.970)

Sodding was designed for the fill slope protection. Quantity unit of sodding is square meter (m²).

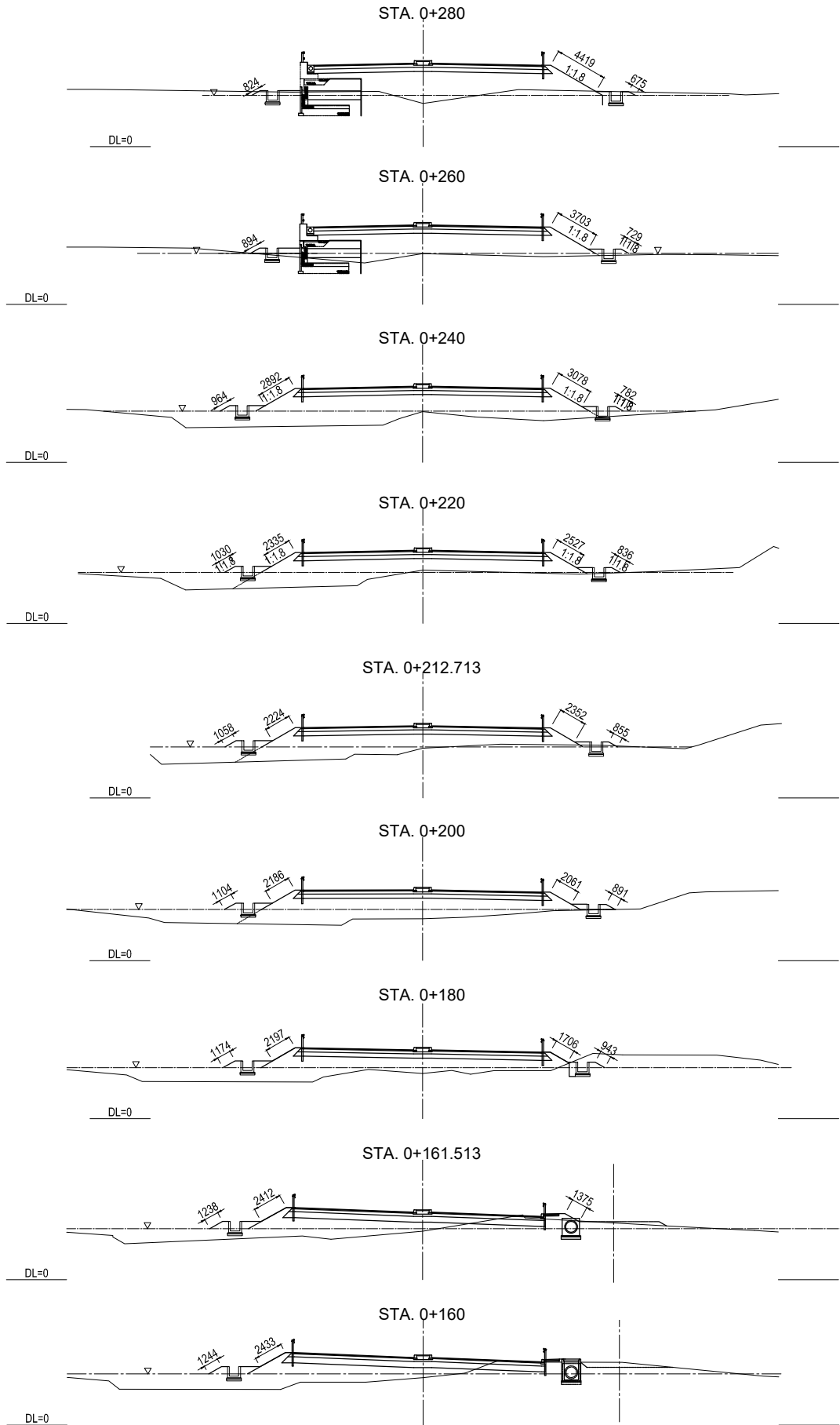
(a) Main Road

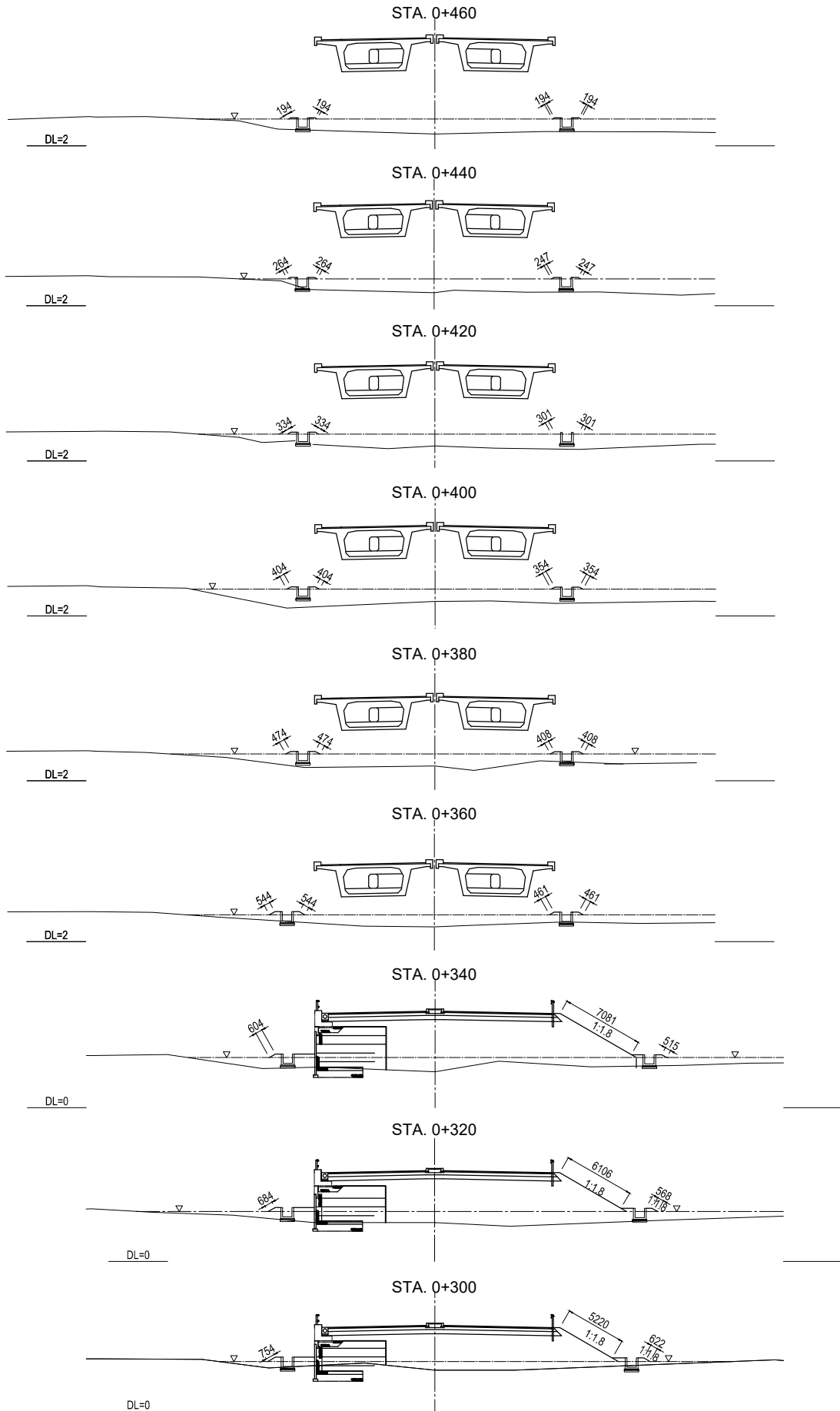
Sodding quantity in this section covers from STA. 0+176.970 to STA. 1+312.000. Since there is no cross section of STA. 0+176.970, the values of closest station, STA. 0+161.513, were applied to represent the value of STA. 0+176.970.

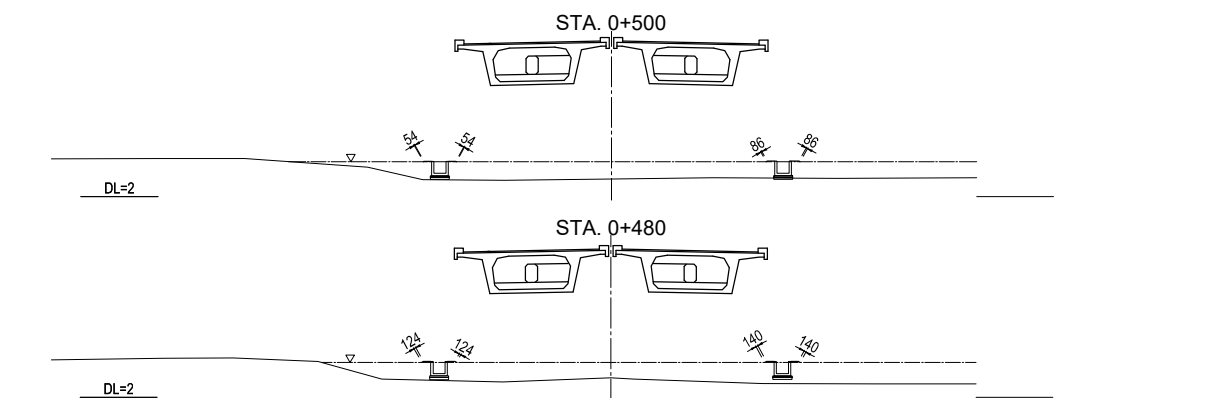
The measured fill slope length is given in the 3 (three) page cross section illustrations attached hereinafter.

Station	Distance	Main Road Fill Slope				Fill Slope for Side Ditch			
		Left Slope		Right Slope		Left		Right	
		Length	Area	Length	Area	Length	Area	Length	Area
0+176.970	-	2.412	-	1.375	-	1.238	-	0.000	-
0+180.000	3.030	2.197	6.983	1.706	4.668	1.174	3.654	0.943	1.429
0+200.000	20.000	2.186	43.830	2.061	37.670	1.104	22.780	0.891	18.340
0+212.713	12.713	2.224	28.032	2.352	28.051	1.058	13.742	0.855	11.098
0+220.000	7.287	2.335	16.611	2.527	17.777	1.030	7.608	0.836	6.161
0+240.000	20.000	2.892	52.270	3.078	56.050	0.964	19.940	0.782	16.180
0+260.000	20.000	0.000	28.920	3.703	67.810	0.894	18.580	0.729	15.110
0+280.000	20.000			4.419	81.220	0.824	17.180	0.675	14.040
0+300.000	20.000			5.220	96.390	0.754	15.780	0.622	12.970
0+320.000	20.000			6.106	113.260	0.684	14.380	0.568	11.900
0+340.000	20.000			7.081	131.870	0.604	12.880	0.515	10.830
30+60.000	20.000			0.000	70.810	1.088	16.920	0.922	14.370
0+380.000	20.000					0.948	20.360	0.816	17.380
0+400.000	20.000					0.808	17.560	0.708	15.240
0+420.000	20.000					0.668	14.760	0.602	13.100
0+440.000	20.000					0.528	11.960	0.494	10.960
0+460.000	20.000					0.388	9.160	0.388	8.820
0+480.000	20.000					0.248	6.360	0.280	6.680
0+500.000	20.000					0.108	3.560	0.172	4.520
0+520.000	20.000					0.000	1.080	0.000	1.720
		Subtotal	176.646	Subtotal	705.576	Subtotal	248.245	Subtotal	210.848

Total = 1341.314 m²





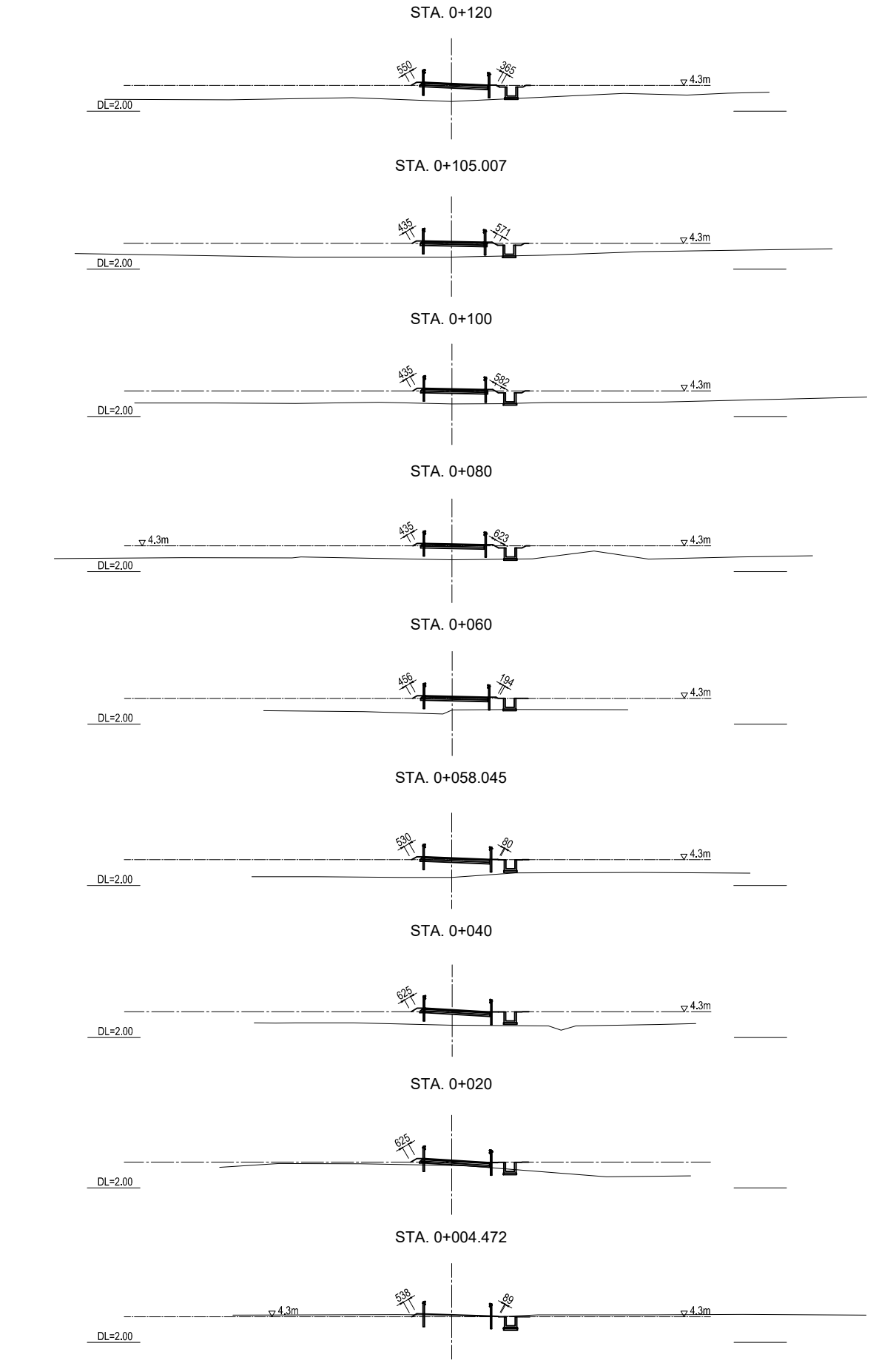


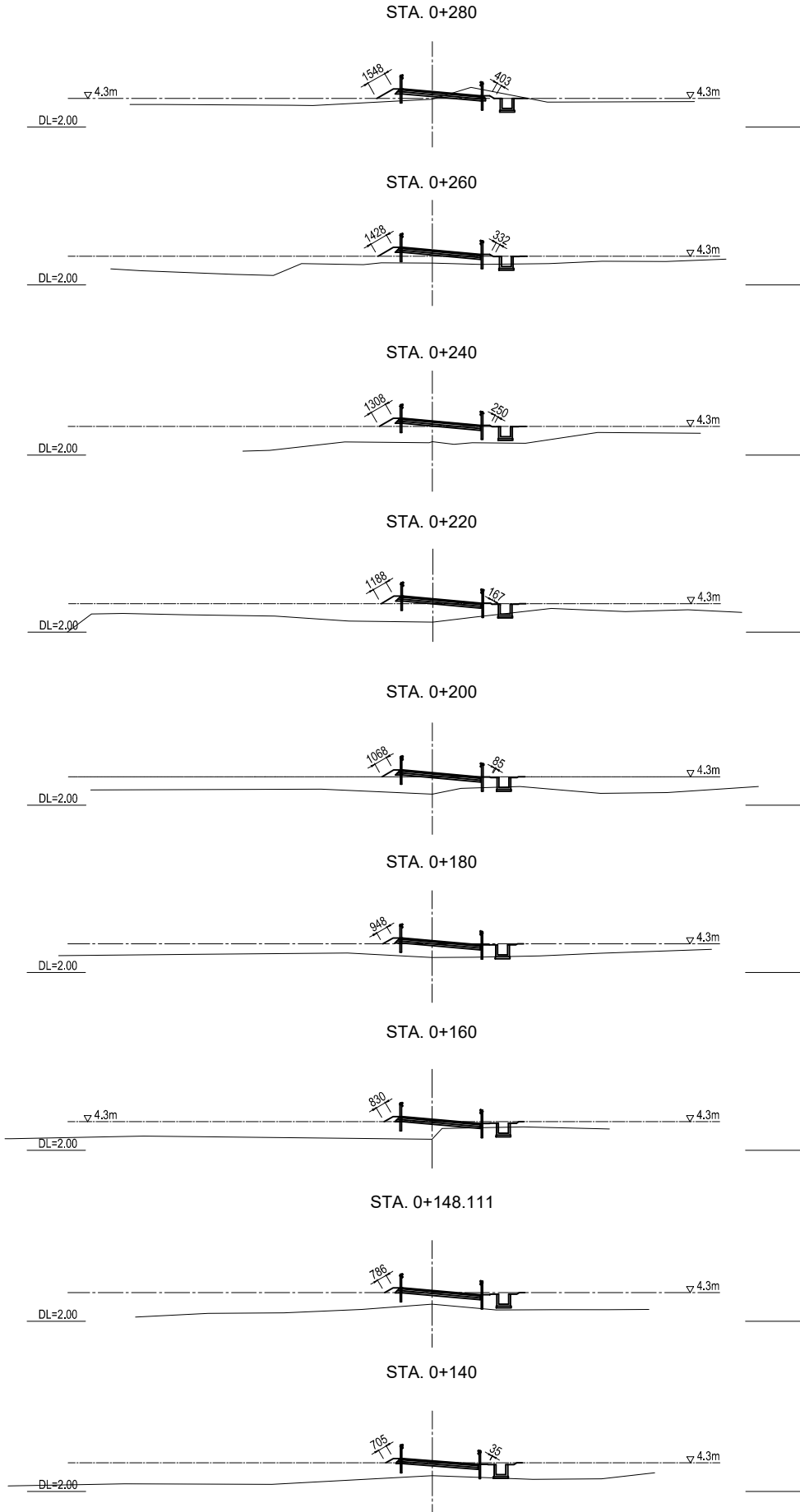
(b) Approach Road from Star City to Bago Bridge

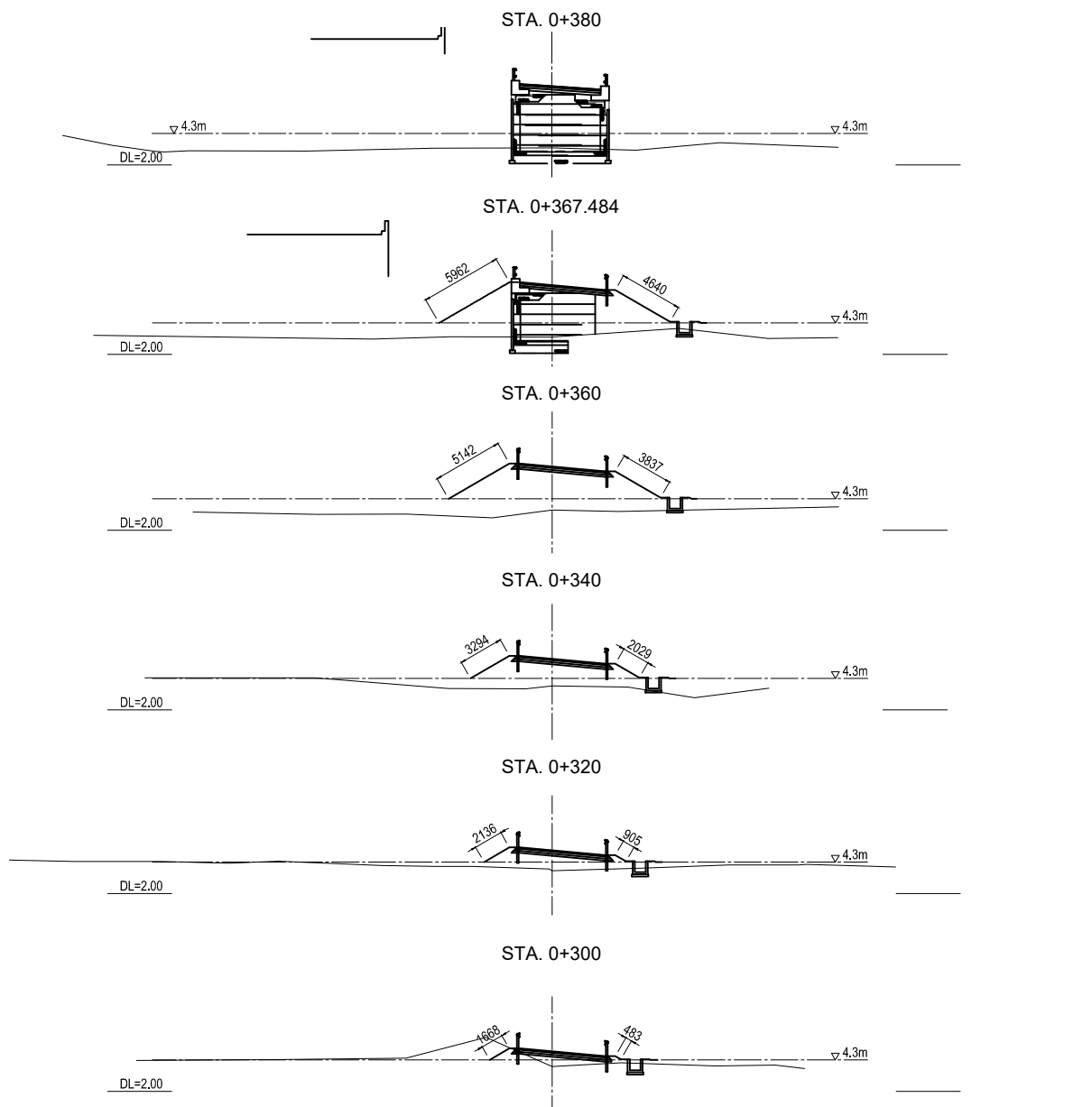
Beginning point (STA. 0+000) of Star City Approach Road is located on the center of existing road. Therefore, there is no sodding work at the beginning point.

Station	Distance	Main Road Fill Slope			
		Left Slope		Right Slope	
		Length	Area	Length	Area
0+000.000	-	0.000	-	0.000	-
0+004.472	4.472	0.538	1.203	0.089	0.199
0+020.000	15.528	0.625	9.030	0.000	0.691
0+040.000	20.000	0.625	12.500	0.000	0.000
0+058.045	18.045	0.530	10.421	0.080	0.722
0+060.000	1.955	0.456	0.964	0.194	0.268
0+080.000	20.000	0.435	8.910	0.623	8.170
0+100.000	20.000	0.435	8.700	0.582	12.050
0+105.007	5.007	0.435	2.178	0.571	2.887
0+120.000	14.993	0.550	7.384	0.365	7.017
0+140.000	20.000	0.705	12.550	0.035	4.000
0+148.111	8.111	0.786	6.046	0.000	0.142
0+160.000	11.889	0.836	9.642	0.000	0.000
0+180.000	20.000	0.948	17.840	0.000	0.000
0+200.000	20.000	1.068	20.160	0.085	0.850
0+220.000	20.000	1.188	22.560	0.167	2.520
0+240.000	20.000	1.308	24.960	0.250	4.170
0+260.000	20.000	1.428	27.360	0.332	5.820
0+280.000	20.000	1.548	29.760	0.403	7.350
0+300.000	20.000	1.668	32.160	0.483	8.860
0+320.000	20.000	2.136	38.040	0.905	13.880
0+340.000	20.000	3.294	54.300	2.029	29.340
0+360.000	20.000	5.142	84.360	3.837	58.660
0+367.483	7.483	5.962	41.548	4.640	31.718
0+380.000	12.517	0.000	37.312	0.000	29.038
		Subtotal	519.888	Subtotal	228.352

Total = 748.240 m²







BILL OF QUANTITIES

PAVEMENT

PACKAGE 1
(MAIN ROAD)

Pavement Thanlyin Main Road

1. Carrige Way

Surface Course	t = 5cm	A= 8,250.00 cm ²
Surface Base	t = 5cm	A= 8,456.91 cm ²
Upper Subbase	t = 25cm	A= 8,670.45 cm ²
Lower Subbase	t = 50cm	A= 4,297.90 cm ²
Lower Subbase	t = 35cm	A= 4,805.53 cm ²

2. Side Walk

Precast Block (300mmx300mm)	t=6cm	A= 580.76 cm ²
Sand	t=3cm	A= 568.68 cm ²
Soil Aggregate	t=10cm	A= 581.20 cm ²

Surface Course

STA0+0.000~STA0+69.000

t=5cm

CENTER	Area	Ave.	Distance	Volume
STA 0	15.748			
STA 0 + 20.000	32.025	23.887	20.00	477.74
STA 0 + 24.970	22.780	27.403	4.97	136.19
STA 0 + 40.000	40.304	31.542	15.03	474.08
STA 0 + 60.000	24.545	32.425	20.00	648.50
STA 0 + 69.000	24.515	24.530	9.00	220.77
STA 0 + 76.170		0.000	7.17	0.00
STA 0 + 80.000		0.000	3.83	0.00
STA 0 + 100.000		0.000	20.00	0.00
STA 0 + 120.000		0.000	20.00	0.00
STA 0 + 140.000		0.000	20.00	0.00
STA 0 + 160.000		0.000	20.00	0.00
STA 0 + 161.513		0.000	1.51	0.00
STA 0 + 180.000		0.000	18.49	0.00
合計				1,957.28

STA0+69.000~

t=5cm

LEFT	Area	Ave.	Distance	Volume
STA 0				
STA 0 + 20.000		0.000	20.00	0.00
STA 0 + 24.970		0.000	4.97	0.00
STA 0 + 40.000		0.000	15.03	0.00
STA 0 + 60.000	11.248	0.000	20.00	0.00
STA 0 + 69.000	11.248	11.248	9.00	101.23
STA 0 + 76.170	11.248	11.248	7.17	80.65
STA 0 + 80.000	11.248	11.248	3.83	43.08
STA 0 + 100.000	11.258	11.253	20.00	225.06
STA 0 + 120.000	11.258	11.258	20.00	225.16
STA 0 + 140.000	11.097	11.178	20.00	223.56
STA 0 + 160.000	10.097	10.597	20.00	211.94
STA 0 + 161.513	9.990	10.044	1.51	15.20
STA 0 + 180.000	9.248	9.619	18.49	177.83
STA 0 + 200.000	9.247	9.248	20.00	184.96
STA 0 + 212.713	9.247	9.247	12.71	117.56
STA 0 + 220.000	9.247	9.247	7.29	67.38
STA 0 + 240.000	9.247	9.247	20.00	184.94
STA 0 + 260.000	8.437	8.842	20.00	176.84
STA 0 + 280.000	8.437	8.437	20.00	168.74
STA 0 + 300.000	8.437	8.437	20.00	168.74
STA 0 + 320.000	8.437	8.437	20.00	168.74
STA 0 + 340.000	8.437	8.437	40.00	337.48
STA 0 + 356.200	8.437	8.437	36.20	305.42
合計				3,184.50

Surface Course			t=5cm			
RIGHT			Area	Ave.	Distance	Volume
STA	0					
STA	0 +	20.000		0.000	20.00	0.00
STA	0 +	24.970		0.000	4.97	0.00
STA	0 +	40.000		0.000	15.03	0.00
STA	0 +	60.000	9.245	0.000	20.00	0.00
STA	0 +	76.170	9.245	9.245	16.17	149.49
STA	0 +	80.000	9.245	9.245	3.83	35.41
STA	0 +	100.000	9.235	9.240	20.00	184.80
STA	0 +	120.000	9.235	9.235	20.00	184.70
STA	0 +	140.000	9.245	9.240	20.00	184.80
STA	0 +	160.000	9.245	9.245	20.00	184.90
STA	0 +	161.513	9.245	9.245	1.51	13.99
STA	0 +	180.000	9.247	9.246	18.49	170.93
STA	0 +	200.000	9.247	9.247	20.00	184.94
STA	0 +	212.713	9.247	9.247	12.71	117.56
STA	0 +	220.000	9.247	9.247	7.29	67.38
STA	0 +	240.000	9.247	9.247	20.00	184.94
STA	0 +	260.000	9.247	9.247	20.00	184.94
STA	0 +	280.000	9.247	9.247	20.00	184.94
STA	0 +	300.000	9.247	9.247	20.00	184.94
STA	0 +	320.000	9.247	9.247	20.00	184.94
STA	0 +	340.000	9.247	9.247	40.00	369.88
STA	0 +	356.200	9.247	9.247	36.20	334.74
Total						3,108.22

Total 8,250.001 m2

Surface Base

t=5cm

CENTER	Area	Ave.	Distance	Volume
STA 0	15.748			
STA 0 + 20.000	32.025	23.887	20.00	477.74
STA 0 + 24.970	22.780	27.403	4.97	136.19
STA 0 + 40.000	40.304	31.542	15.03	474.08
STA 0 + 60.000	24.463	32.384	20.00	647.68
STA 0 + 69.000	24.463	24.463	9.00	220.17
STA 0 + 76.170		0.000	7.17	0.00
STA 0 + 80.000		0.000	3.83	0.00
STA 0 + 100.000		0.000	20.00	0.00
STA 0 + 120.000		0.000	20.00	0.00
STA 0 + 140.000		0.000	20.00	0.00
STA 0 + 160.000		0.000	20.00	0.00
STA 0 + 161.513		0.000	1.51	0.00
STA 0 + 180.000		0.000	18.49	0.00
Total				1,955.86

t=5cm

LEFT	Area	Ave.	Distance	Volume
STA 0				
STA 0 + 20.000		0.000	20.00	0.00
STA 0 + 24.970		0.000	4.97	0.00
STA 0 + 40.000		0.000	15.03	0.00
STA 0 + 60.000	24.463	0.000	20.00	0.00
STA 0 + 69.000	24.463	24.463	9.00	220.17
STA 0 + 76.170	11.195	17.829	7.17	127.83
STA 0 + 80.000	11.196	11.196	3.83	42.88
STA 0 + 100.000	11.205	11.201	20.00	224.02
STA 0 + 120.000	11.206	11.206	20.00	224.12
STA 0 + 140.000	11.044	11.125	20.00	222.50
STA 0 + 160.000	10.044	10.544	20.00	210.88
STA 0 + 161.513	9.938	9.991	1.51	15.12
STA 0 + 180.000	9.195	9.567	18.49	176.87
STA 0 + 200.000	9.195	9.195	20.00	183.90
STA 0 + 212.713	9.195	9.195	12.71	116.90
STA 0 + 220.000	9.195	9.195	7.29	67.00
STA 0 + 240.000	9.195	9.195	20.00	183.90
STA 0 + 260.000	8.385	8.790	20.00	175.80
STA 0 + 280.000	8.385	8.385	20.00	167.70
STA 0 + 300.000	8.385	8.385	20.00	167.70
STA 0 + 320.000	8.385	8.385	20.00	167.70
STA 0 + 340.000	8.385	8.385	40.00	335.40
STA 0 + 356.200	8.385	8.385	36.20	303.54
Total				3,333.92

			t=5cm			
RIGHT			Area	Ave.	Distance	Volume
STA	0					
STA	0 +	20.000		0.000	20.00	0.00
STA	0 +	24.970		0.000	4.97	0.00
STA	0 +	40.000		0.000	15.03	0.00
STA	0 +	60.000	9.140	0.000	20.00	0.00
STA	0 +	69.000	9.140	9.140	9.00	82.26
STA	0 +	76.170	9.140	9.140	16.17	147.79
STA	0 +	80.000	9.140	9.140	3.83	35.01
STA	0 +	100.000	9.130	9.135	20.00	182.70
STA	0 +	120.000	9.130	9.130	20.00	182.60
STA	0 +	140.000	9.140	9.135	20.00	182.70
STA	0 +	160.000	9.140	9.140	20.00	182.80
STA	0 +	161.513	9.140	9.140	1.51	13.83
STA	0 +	180.000	9.195	9.168	18.49	169.49
STA	0 +	200.000	9.195	9.195	20.00	183.90
STA	0 +	212.713	9.195	9.195	12.71	116.90
STA	0 +	220.000	9.195	9.195	7.29	67.00
STA	0 +	240.000	9.195	9.195	20.00	183.90
STA	0 +	260.000	9.195	9.195	20.00	183.90
STA	0 +	280.000	9.195	9.195	20.00	183.90
STA	0 +	300.000	9.195	9.195	20.00	183.90
STA	0 +	320.000	9.195	9.195	20.00	183.90
STA	0 +	340.000	9.195	9.195	40.00	367.80
STA	0 +	356.200	9.195	9.195	36.20	332.86
Total						3,167.14

Total 8,456.913 m2

Upper Subbase

t=25cm

			Area	Ave.	Distance	Volume
STA	0		15.748			
STA	0 +	20.000	32.025	23.887	20.00	477.74
STA	0 +	24.970	22.780	27.403	4.97	136.19
STA	0 +	40.000	40.304	31.542	15.03	474.08
STA	0 +	60.000	24.858	32.581	20.00	651.62
STA	0 +	76.170	22.765	23.812	16.17	385.04
STA	0 +	80.000	22.765	22.765	3.83	87.19
STA	0 +	100.000	22.765	22.765	20.00	455.30
STA	0 +	120.000	22.765	22.765	20.00	455.30
STA	0 +	140.000	22.569	22.667	20.00	453.34
STA	0 +	160.000	21.569	22.069	20.00	441.38
STA	0 +	161.513	21.508	21.539	1.51	32.59
STA	0 +	180.000	20.850	21.179	18.49	391.54
STA	0 +	200.000	20.850	20.850	20.00	417.00
STA	0 +	212.713	20.850	20.850	12.71	265.07
STA	0 +	220.000	20.850	20.850	7.29	151.93
STA	0 +	240.000	20.850	20.850	20.00	417.00
STA	0 +	260.000	19.615	20.233	20.00	404.66
STA	0 +	280.000	19.615	19.615	20.00	392.30
STA	0 +	300.000	19.615	19.615	20.00	392.30
STA	0 +	320.000	19.615	19.615	20.00	392.30
STA	0 +	340.000	19.615	19.615	40.00	784.60
STA	0 +	351.200	19.615	19.615	31.20	611.99
Total						8,670.45

Sub Base

			t=50cm			
			Area	Ave.	Distance	Volume
STA	0		15.748			
STA	0 +	20.000	32.025	23.887	20.00	477.74
STA	0 +	24.970	22.780	27.403	4.97	136.19
STA	0 +	40.000	40.304	31.542	15.03	474.08
STA	0 +	60.000	25.127	32.716	20.00	654.32
STA	0 +	76.170	23.386	24.257	16.17	392.24
STA	0 +	80.000	23.561	23.474	3.83	89.91
STA	0 +	100.000	23.515	23.538	20.00	470.76
STA	0 +	120.000	23.515	23.515	20.00	470.30
STA	0 +	140.000	22.944	23.230	20.00	464.60
STA	0 +	160.000	21.944	22.444	20.00	448.88
STA	0 +	161.513	21.884	21.914	1.51	33.16
STA	0 +	170.000	21.884	21.884	8.49	185.73
Total						4,297.90

			t=35cm			
			Area	Ave.	Distance	Volume
	0 +	161.513	21.884			
STA	0 +	170.000	21.884	21.884	8.49	185.73
STA	0 +	180.000	21.450	21.667	10.00	216.67
STA	0 +	200.000	21.450	21.450	20.00	429.00
STA	0 +	212.713	21.450	21.450	12.71	272.69
STA	0 +	220.000	21.450	21.450	7.29	156.31
STA	0 +	240.000	21.450	21.450	20.00	429.00
STA	0 +	260.000	19.915	20.683	20.00	413.66
STA	0 +	280.000	19.915	19.915	20.00	398.30
STA	0 +	300.000	19.915	19.915	20.00	398.30
STA	0 +	320.000	19.915	19.915	20.00	398.30
STA	0 +	340.000	19.915	19.915	40.00	796.60
STA	0 +	355.700	19.915	19.915	35.70	710.97
Total						4,805.53

Precast Concrete Paving Block (300X300)

Left Side

t=6cm

			Area	Ave.	Distance	Volume
STA	0 +	0.000	2.692			
STA	0 +	20.000	5.071	3.882	20.00	77.64
STA	0 +	24.970	8.979	7.025	4.97	34.91
STA	0 +	40.000		4.490	15.03	67.49
STA	0 +	60.000		0.000	20.00	0.00
STA	0 +	76.170		0.000	16.17	0.00
STA	0 +	80.000		0.000	3.83	0.00
STA	0 +	100.000		0.000	20.00	0.00
STA	0 +	120.000		0.000	20.00	0.00
STA	0 +	140.000		0.000	20.00	0.00
STA	0 +	160.000		0.000	20.00	0.00
STA	0 +	161.513		0.000	1.51	0.00
STA	0 +	180.000		0.000	18.49	0.00
Total						180.04

Right Side

			Area	Ave.	Distance	Volume
STA	0		2.990			
STA	0 +	20.000	5.070	4.030	20.00	80.60
STA	0 +	24.970	4.598	4.834	4.97	24.03
STA	0 +	40.000		2.299	15.03	34.55
STA	0 +	60.000	7.052	3.526	20.00	70.52
STA	0 +	76.170	1.305	4.179	16.17	67.57
STA	0 +	80.000	1.305	1.305	3.83	5.00
STA	0 +	100.000	1.305	1.305	20.00	26.10
STA	0 +	120.000	1.305	1.305	20.00	26.10
STA	0 +	140.000	1.305	1.305	20.00	26.10
STA	0 +	160.000	1.305	1.305	20.00	26.10
STA	0 +	161.513	1.305	1.305	1.51	1.97
STA	0 +	180.000		0.653	18.49	12.07
Total						400.72

Total 580.756 m2

Sand

Left Side

t=3cm

			Area	Ave.	Distance	Volume
STA	0		2.692			
STA	0 +	20.000	5.071	3.882	20.00	77.64
STA	0 +	24.970	8.979	7.025	4.97	34.91
STA	0 +	40.000		4.490	15.03	67.49
STA	0 +	60.000		0.000	20.00	0.00
STA	0 +	76.170		0.000	16.17	0.00
STA	0 +	80.000		0.000	3.83	0.00
STA	0 +	100.000		0.000	20.00	0.00
STA	0 +	120.000		0.000	20.00	0.00
STA	0 +	140.000		0.000	20.00	0.00
STA	0 +	160.000		0.000	20.00	0.00
STA	0 +	161.513		0.000	1.51	0.00
STA	0 +	180.000		0.000	18.49	0.00
Total						180.04

Right Side

t=3cm

			Area	Ave.	Distance	Volume
STA	0		2.990			
STA	0 +	20.000	5.070	4.030	20.00	80.60
STA	0 +	24.970	4.598	4.834	4.97	24.03
STA	0 +	40.000		2.299	15.03	34.55
STA	0 +	60.000	7.052	3.526	20.00	70.52
STA	0 +	76.170	1.305	4.179	16.17	67.57
STA	0 +	80.000	1.305	1.305	3.83	5.00
STA	0 +	100.000	1.305	1.305	20.00	26.10
STA	0 +	120.000	1.305	1.305	20.00	26.10
STA	0 +	140.000	1.305	1.305	20.00	26.10
STA	0 +	160.000	1.305	1.305	20.00	26.10
STA	0 +	161.513	1.305	1.305	1.51	1.97
STA	0 +	180.000		0.000	18.49	0.00
Total						388.65

Total 568.684 m2

Soil Aggregate

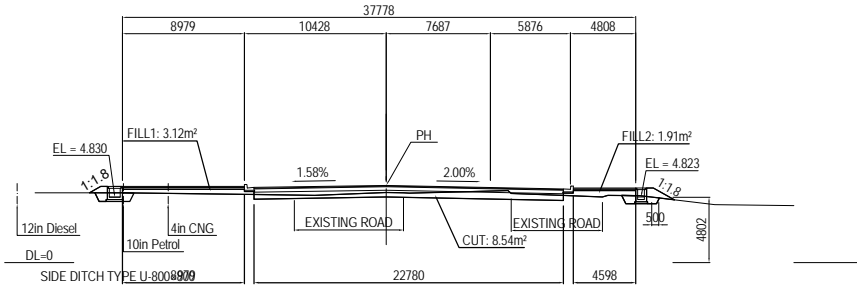
Left Side			t=10cm			
			Area	Ave.	Distance	Volume
STA	0		2.692			
STA	0 +	20.000	5.071	3.880	20.00	77.600
STA	0 +	24.970	8.979	7.030	4.97	34.900
STA	0 +	40.000		4.490	15.03	67.500
STA	0 +	60.000		0.000	20.00	0.000
STA	0 +	76.170		0.000	16.17	0.000
STA	0 +	80.000		0.000	3.83	0.000
STA	0 +	100.000		0.000	20.00	0.000
STA	0 +	120.000		0.000	20.00	0.000
STA	0 +	140.000		0.000	20.00	0.000
STA	0 +	160.000		0.000	20.00	0.000
STA	0 +	161.513		0.000	1.51	0.000
STA	0 +	180.000		0.000	18.49	0.000
Total						180.000

Right Side			t=10cm			
			Area	Ave.	Distance	Volume
STA	0		2.990			
STA	0 +	20.000	5.070	4.030	20.00	80.600
STA	0 +	24.970	4.598	4.830	4.97	24.000
STA	0 +	40.000		2.300	15.03	34.600
STA	0 +	60.000	7.052	3.530	20.00	70.600
STA	0 +	76.170	1.305	4.180	16.17	67.600
STA	0 +	80.000	1.305	1.310	3.83	5.000
STA	0 +	100.000	1.305	1.310	20.00	26.200
STA	0 +	120.000	1.305	1.310	20.00	26.200
STA	0 +	140.000	1.305	1.310	20.00	26.200
STA	0 +	160.000	1.305	1.310	20.00	26.200
STA	0 +	161.513	1.305	1.310	1.51	2.000
STA	0 +	180.000		0.650	18.49	12.000
Total						401.200

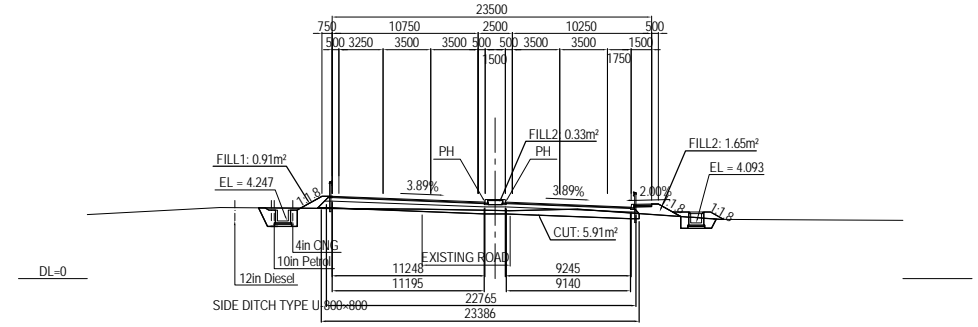
Total 581.200 m2

CROSS SECTION (1) S=1:400

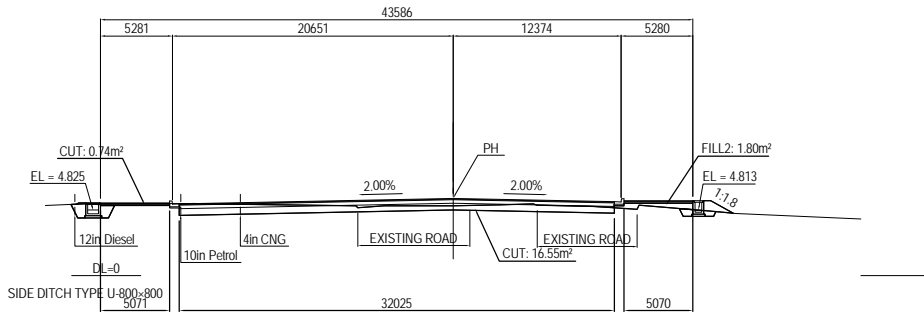
STA.0+24.97
GH = 5.16
PH = 5.670



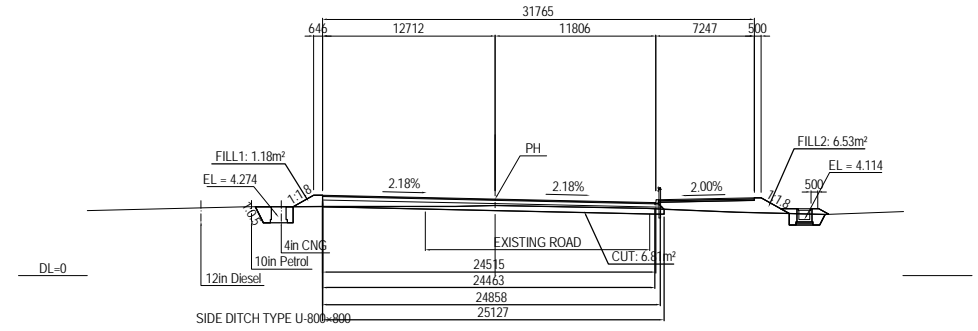
STA.0+76.17
GH = 5.01
PH = 5.619



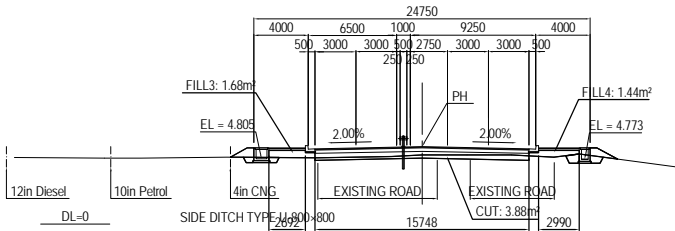
STA.0+20
GH = 5.12
PH = 5.675



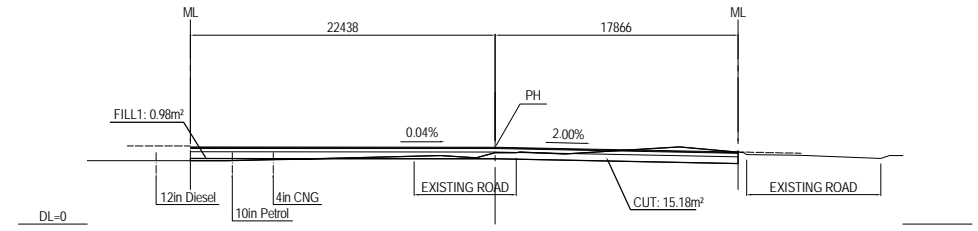
STA.0+60
GH = 5.15
PH = 5.635



STA.0
GH = 5.09
PH = 5.695



STA.0+40
GH = 5.24
PH = 5.655



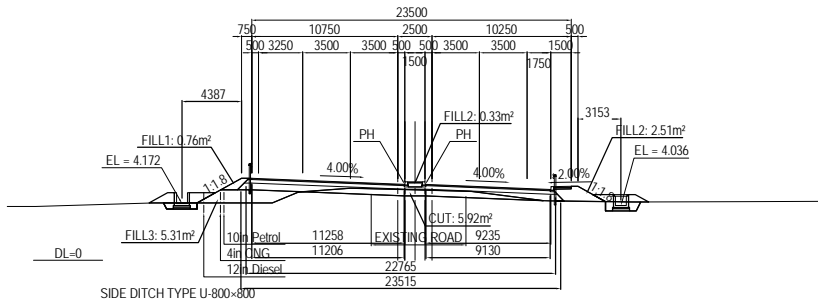
Note: Elevation is based on MSL (Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	PREPARED BY	NAME	SIGNATURE	DATE	DRAWING TITLE	PACKAGE		
				CHECKED BY	E. YOKOTA					CROSS SECTION (1)	1
				APPROVED BY	T. HAYAKAWA						DWG No.
					Y. SANO						P1-RD-001

CROSS SECTION (2) S=1:400

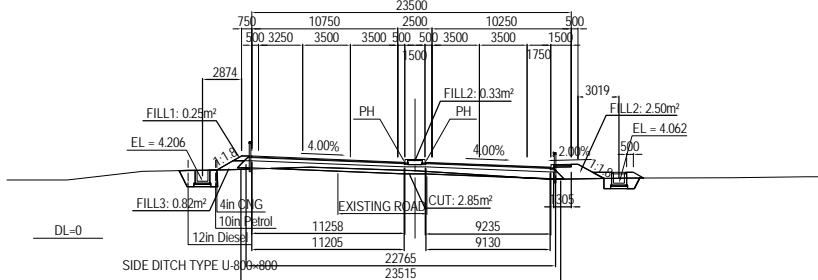
STA.0+120

GH=5.17
PH=5.583



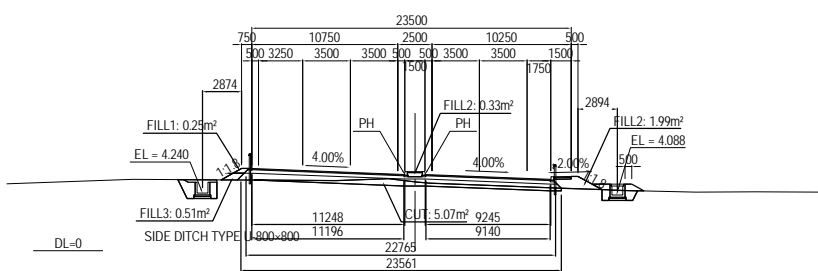
STA.0+100

GH=4.97
PH=5.595



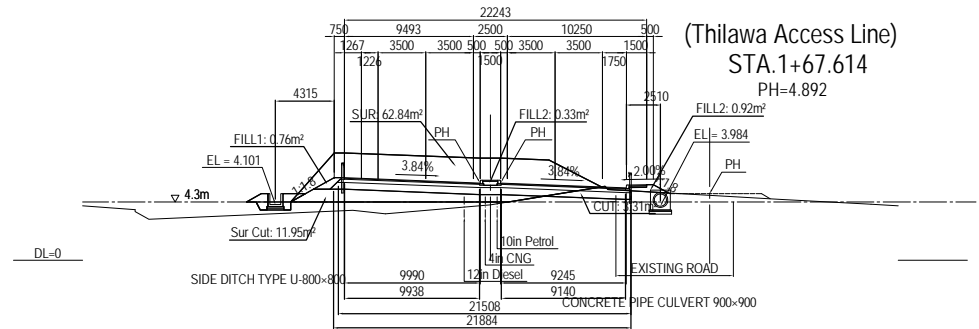
STA.0+80

GH=5.06
PH=5.615



STA.0+161.513

GH=4.08
PH=5.689



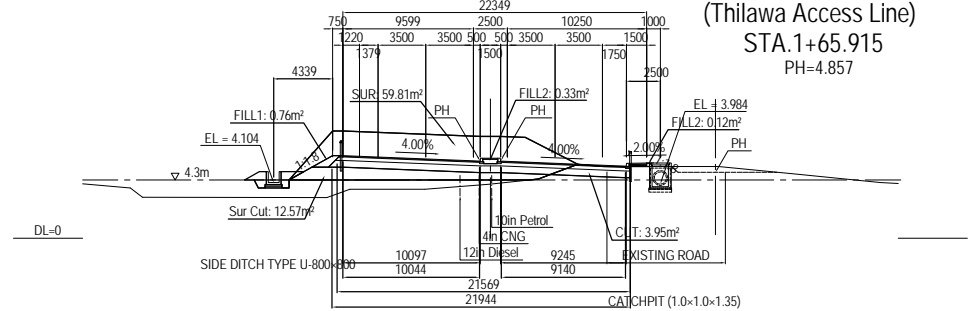
(Thilawa Access Line)

STA.1+67.614

PH=4.892

STA.0+160

GH=3.99
PH=5.681



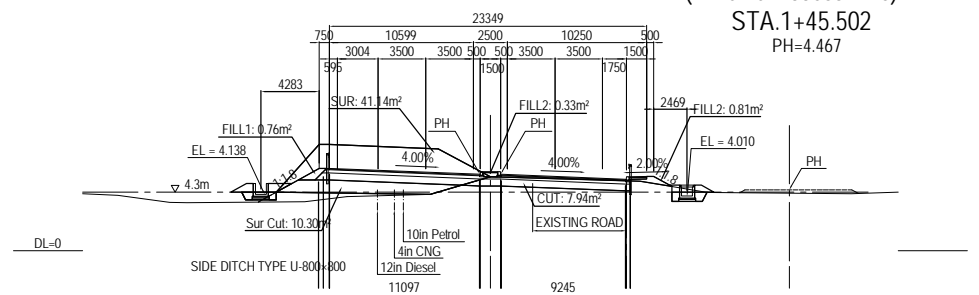
(Thilawa Access Line)

STA.1+65.915

PH=4.857

STA.0+140

GH=5.44
PH=5.610



(Thilawa Access Line)

STA.1+45.502

PH=4.467

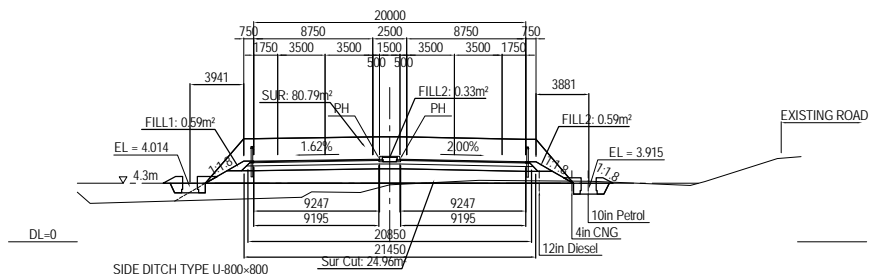
Note: Elevation is based on MSL (Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE	PACKAGE		
				PREPARED BY	E. YOKOTA				CROSS SECTION(2)	1
				CHECKED BY	T. HAYAKAWA					DWG No.
				APPROVED BY	Y. SANO					P1-RD-002

CROSS SECTION(3) S=1:400

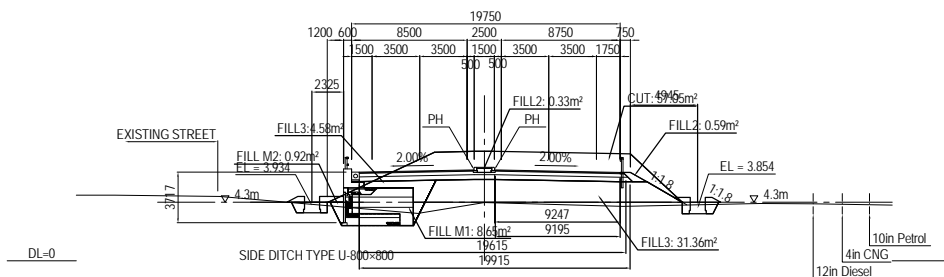
STA.0+212.713

GH=4.19
PH=6.076



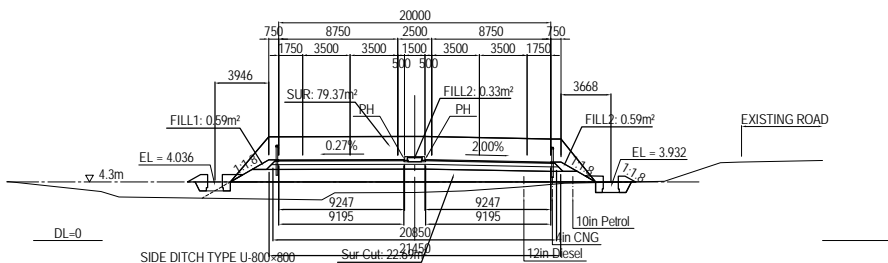
STA.0+260

GH=4.28
PH=6.686



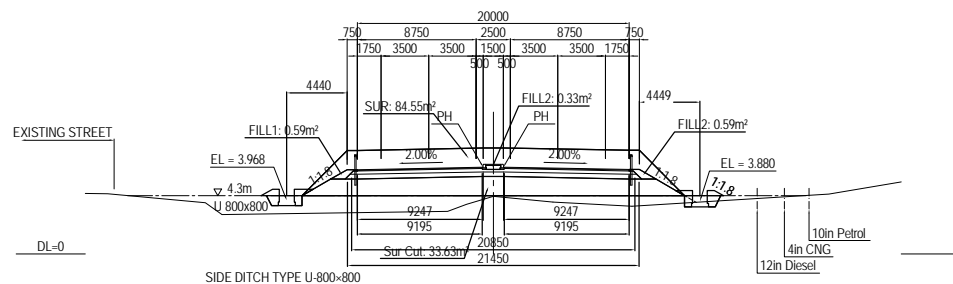
STA.0+200

GH=3.51
PH=5.953



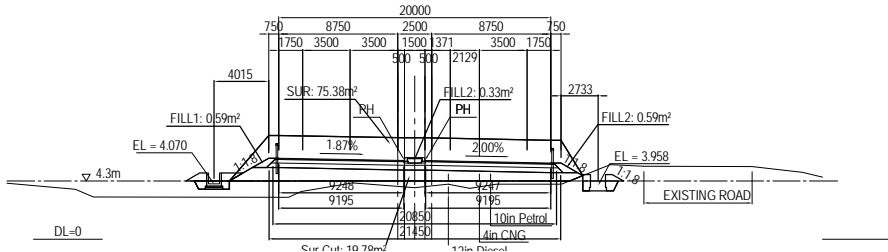
STA.0+240

GH=4.26
PH=6.399



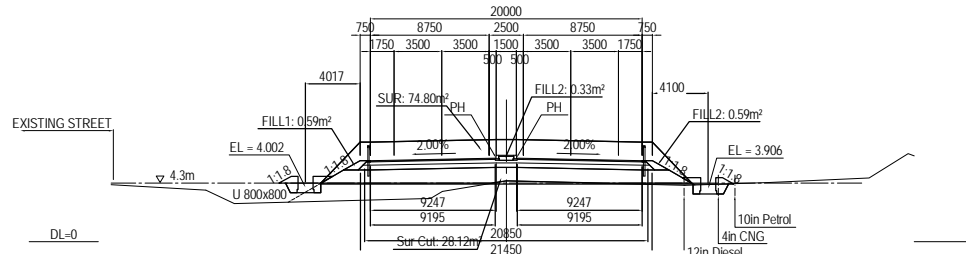
STA.0+180

GH=3.80
PH=5.796



STA.0+220

GH=4.48
PH=6.154

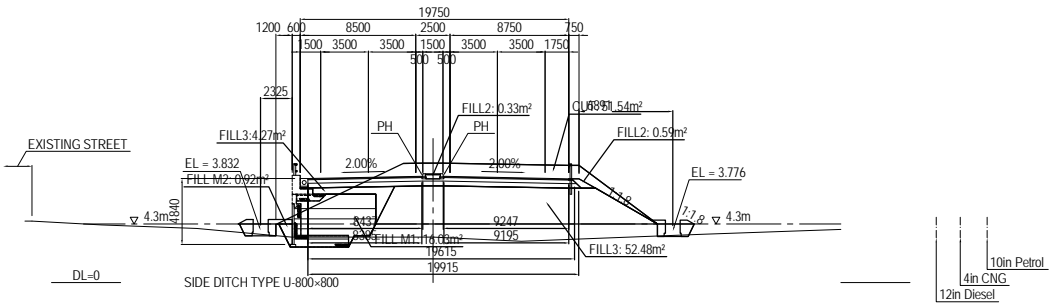


Note: Elevation is based on MSL(Mean Sea Level)

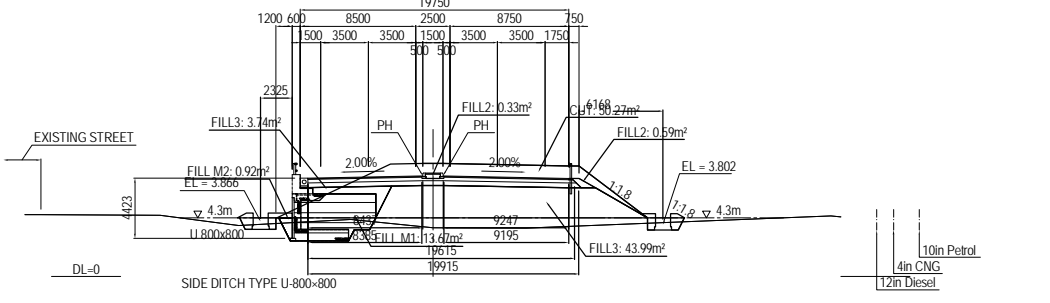
PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTRY/PROJ REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE	PACKAGE			
				PREPARED BY	E. YOKOTA				CROSS SECTION(3)	1	
				CHECKED BY	T. HAYAKAWA						DWG No.
				APPROVED BY	Y. SANO						P1-RD-003

CROSS SECTION(4) S=1:400

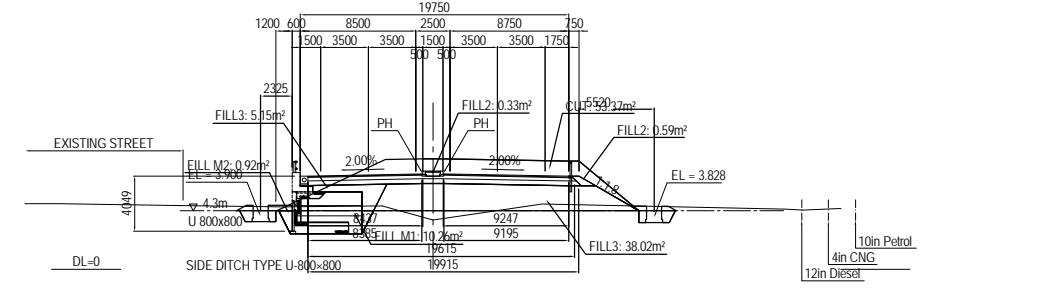
STA.0+320
GH=3.33
PH=7.809



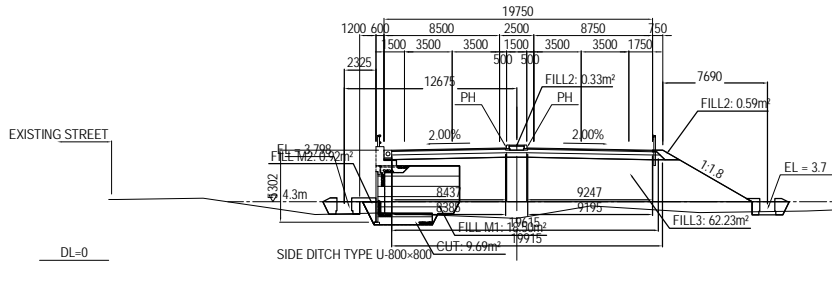
STA.0+300
GH=3.56
PH=7.392



STA.0+280
GH=3.62
PH=7.017



STA.0+340
GH=3.07
PH=8.270



Note: Elevation is based on MSL(Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTRY REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE CROSS SECTION(4)	PACKAGE 1 DWG No. P1-RD-004
				PREPARED BY	E. YOKOTA			
				CHECKED BY	T. HAYAKAWA			
				APPROVED BY	Y. SANO			

BILL OF QUANTITIES

PAVEMENT

PACKAGE 1
(ON RAMP)

Pavement Thanlyin Ramp

Surface Course	t = 5cm	A= 2,432.99 cm ²
Surface Base	t = 5cm	A= 2,405.01 cm ²
Upper Subbase	t = 15cm	A= 2,588.79 cm ²
Lower Subbase	t = 15cm	A= 2,647.63 cm ²

Surface Course			t=5cm			
			width	Ave	distance	Area
STA	0 +	3.700				
STA	0 +	4.472	5.750	2.875	0.77	2.22
STA	0 +	20.000	5.750	5.750	15.53	89.29
STA	0 +	40.000	5.750	5.750	20.00	115.00
STA	0 +	58.045	5.750	5.750	18.05	103.76
STA	0 +	60.000	5.555	5.653	1.96	11.05
STA	0 +	80.000	5.250	5.403	20.00	108.06
STA	0 +	100.000	5.250	5.250	20.00	105.00
STA	0 +	105.007	5.250	5.250	5.01	26.29
STA	0 +	120.000	5.598	5.424	14.99	81.32
STA	0 +	140.000	6.062	5.830	20.00	116.60
STA	0 +	148.111	6.250	6.156	8.11	49.93
STA	0 +	160.000	6.250	6.250	11.89	74.31
STA	0 +	180.000	6.250	6.250	20.00	125.00
STA	0 +	200.000	6.250	6.250	20.00	125.00
STA	0 +	220.000	6.250	6.250	20.00	125.00
STA	0 +	240.000	6.250	6.250	20.00	125.00
STA	0 +	260.000	6.250	6.250	20.00	125.00
STA	0 +	280.000	6.250	6.250	20.00	125.00
STA	0 +	300.000	6.250	6.250	20.00	125.00
STA	0 +	320.000	6.250	6.250	20.00	125.00
STA	0 +	340.000	6.250	6.250	20.00	125.00
STA	0 +	360.000	6.250	6.250	20.00	125.00
STA	0 +	367.484	6.250	6.250	7.48	46.78
STA	0 +	380.000	5.960	6.105	12.52	76.41
STA	0 +	400.000	6.021	5.991	20.00	119.82
STA	0 +	410.009	5.400	5.711	10.01	57.16
Total						2,432.99

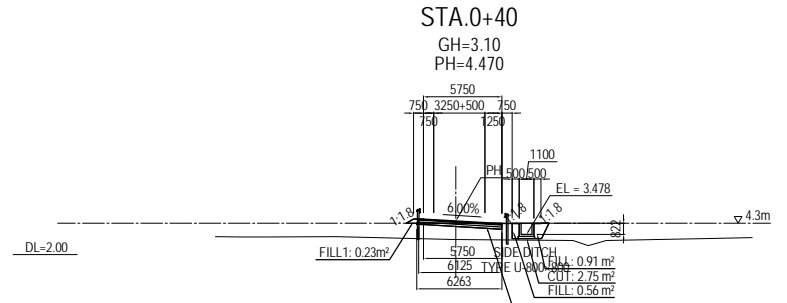
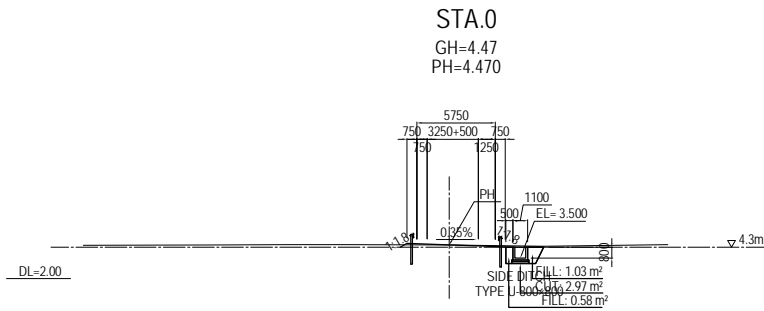
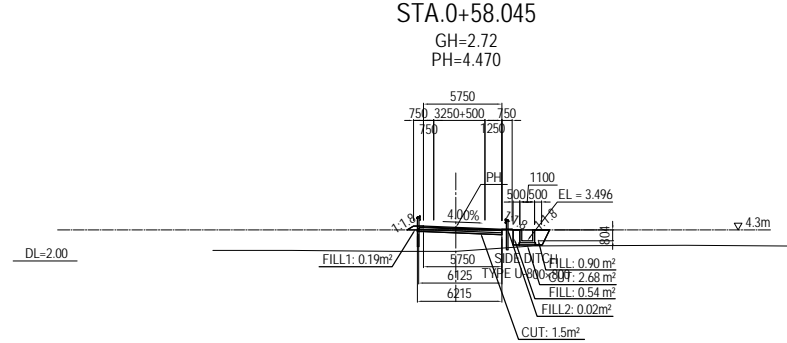
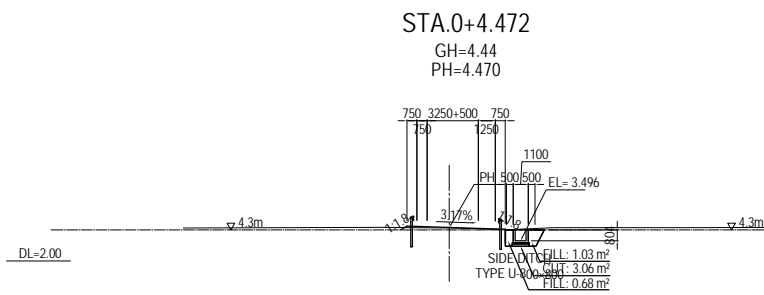
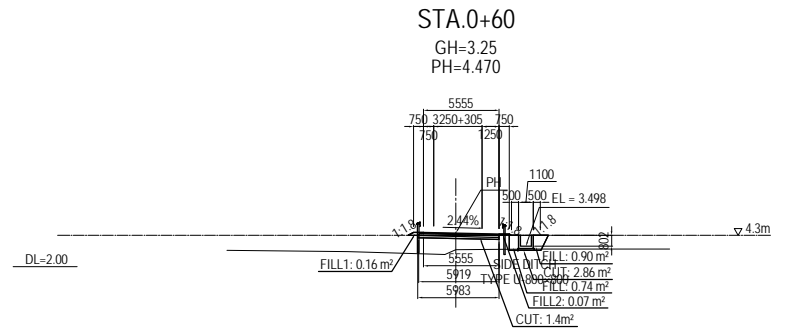
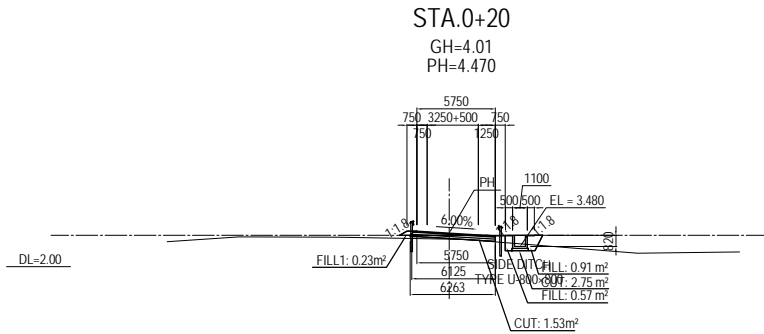
t = 5cm

Surface Base			t=5cm			
			width	Ave	distance	Area
STA	0 +	3.700				
STA	0 +	4.472	5.750	2.875	0.77	2.22
STA	0 +	20.000	5.750	5.750	15.53	89.29
STA	0 +	40.000	5.750	5.750	20.00	115.00
STA	0 +	58.045	5.750	5.750	18.05	103.76
STA	0 +	60.000	5.555	5.653	1.96	11.05
STA	0 +	80.000	5.250	5.403	20.00	108.06
STA	0 +	100.000	5.250	5.250	20.00	105.00
STA	0 +	105.007	5.250	5.250	5.01	26.29
STA	0 +	120.000	5.598	5.424	14.99	81.32
STA	0 +	140.000	6.062	5.830	20.00	116.60
STA	0 +	148.111	6.250	6.156	8.11	49.93
STA	0 +	160.000	6.250	6.250	11.89	74.31
STA	0 +	180.000	6.250	6.250	20.00	125.00
STA	0 +	200.000	6.250	6.250	20.00	125.00
STA	0 +	220.000	6.250	6.250	20.00	125.00
STA	0 +	240.000	6.250	6.250	20.00	125.00
STA	0 +	260.000	6.250	6.250	20.00	125.00
STA	0 +	280.000	6.250	6.250	20.00	125.00
STA	0 +	300.000	6.250	6.250	20.00	125.00
STA	0 +	320.000	6.250	6.250	20.00	125.00
STA	0 +	340.000	6.250	6.250	20.00	125.00
STA	0 +	360.000	6.250	6.250	20.00	125.00
STA	0 +	367.484	6.250	6.250	7.48	46.78
STA	0 +	380.000	5.960	6.105	12.52	76.41
STA	0 +	400.000	6.021	5.991	20.00	119.82
STA	0 +	405.109	5.400	5.711	5.11	29.18
Total						2,405.01

Upper Subbase			t=15cm			
			width	Ave	distance	Area
STA	0 +	3.700				
STA	0 +	4.472	6.123	3.06	0.77	2.36
STA	0 +	20.000	6.125	6.12	15.53	95.09
STA	0 +	40.000	6.125	6.13	20.00	122.50
STA	0 +	58.045	6.125	6.13	18.05	110.53
STA	0 +	60.000	5.919	6.02	1.96	11.77
STA	0 +	80.000	5.609	5.76	20.00	115.28
STA	0 +	100.000	5.921	5.77	20.00	115.30
STA	0 +	105.007	5.919	5.92	5.01	29.64
STA	0 +	120.000	5.973	5.95	14.99	89.15
STA	0 +	140.000	6.437	6.21	20.00	124.10
STA	0 +	148.111	6.625	6.53	8.11	52.97
STA	0 +	160.000	6.625	6.63	11.89	78.77
STA	0 +	180.000	6.625	6.63	20.00	132.50
STA	0 +	200.000	6.625	6.63	20.00	132.50
STA	0 +	220.000	6.625	6.63	20.00	132.50
STA	0 +	240.000	6.625	6.63	20.00	132.50
STA	0 +	260.000	6.625	6.63	20.00	132.50
STA	0 +	280.000	6.981	6.80	20.00	136.06
STA	0 +	300.000	7.000	6.99	20.00	139.82
STA	0 +	320.000	7.000	7.00	20.00	140.00
STA	0 +	340.000	7.000	7.00	20.00	140.00
STA	0 +	360.000	7.000	7.00	20.00	140.00
STA	0 +	367.484	6.625	6.813	7.48	50.99
STA	0 +	380.000	6.335	6.480	12.52	81.10
STA	0 +	400.000	5.871	6.103	20.00	122.06
STA	0 +	405.109	5.400	5.636	5.11	28.79
Total						2,588.79

Lower Subbase			t=15cm			
			Width	Ave.	Distance	Area
STA	0 +	3.700				
STA	0 +	4.472	6.195	3.098	0.77	2.392
STA	0 +	20.000	6.263	6.229	15.53	96.724
STA	0 +	40.000	6.263	6.263	20.00	125.260
STA	0 +	58.045	6.215	6.239	18.05	112.583
STA	0 +	60.000	5.980	6.098	1.96	11.922
STA	0 +	80.000	5.668	5.824	20.00	116.480
STA	0 +	100.000	5.980	5.824	20.00	116.480
STA	0 +	105.007	5.980	5.980	5.01	29.942
STA	0 +	120.000	6.073	6.027	14.99	90.363
STA	0 +	140.000	6.614	6.344	20.00	126.880
STA	0 +	148.111	6.771	6.693	8.11	54.287
STA	0 +	160.000	6.775	6.773	11.89	80.524
STA	0 +	180.000	6.775	6.775	20.00	135.500
STA	0 +	200.000	6.775	6.775	20.00	135.500
STA	0 +	220.000	6.775	6.775	20.00	135.500
STA	0 +	240.000	6.775	6.775	20.00	135.500
STA	0 +	260.000	6.775	6.775	20.00	135.500
STA	0 +	280.000	7.186	6.981	20.00	139.620
STA	0 +	300.000	7.246	7.216	20.00	144.320
STA	0 +	320.000	7.300	7.273	20.00	145.460
STA	0 +	340.000	7.300	7.300	20.00	146.000
STA	0 +	360.000	7.300	7.300	20.00	146.000
STA	0 +	367.484	6.775	7.038	7.48	52.672
STA	0 +	380.000	6.485	6.630	12.52	82.981
STA	0 +	400.000	5.496	5.991	20.00	119.820
STA	0 +	405.109	6.021	5.759	5.11	29.423
Total						2,647.633

CROSS SECTION MAIN ROAD (1) S=1:400



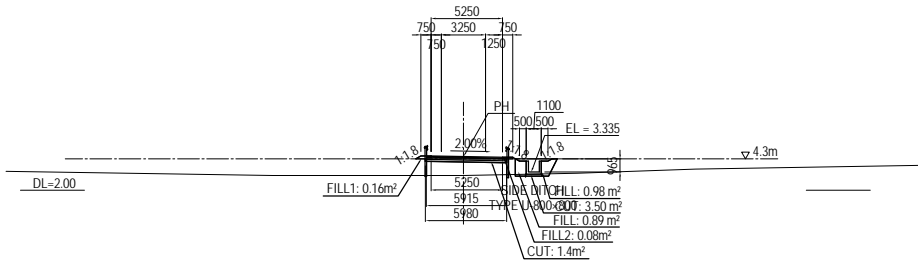
Note: Elevation is based on MSL (Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME M. TORIU T. HAYAKAWA Y. SANO	SIGNATURE 	DATE 15 Jun. 2017 20 Jun. 2017 21 Jun. 2017	DRAWING TITLE CROSS SECTION MAIN ROAD (1)	PACKAGE 1 DWG No. P1-RD-1020
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CROSS SECTION MAIN ROAD (2) S=1:400

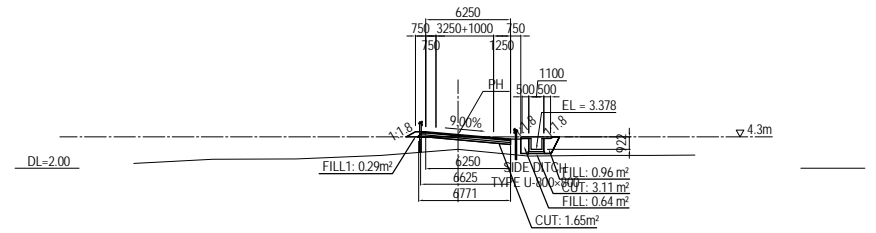
STA.0+105.007

GH=3.09
PH=4.470



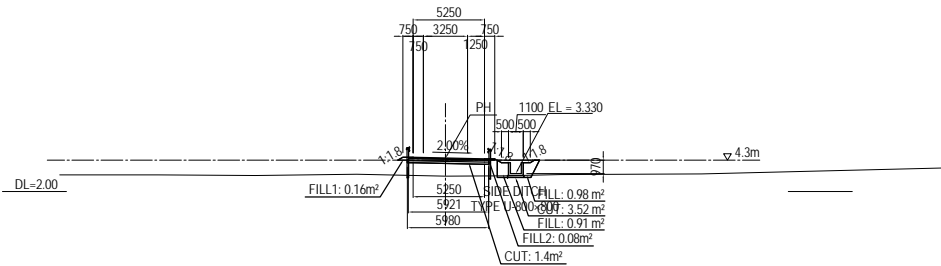
STA.0+148.111

GH=3.38
PH=4.479



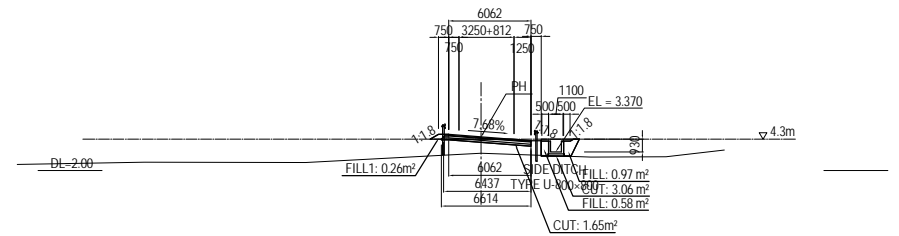
STA.0+100

GH=3.14
PH=4.470



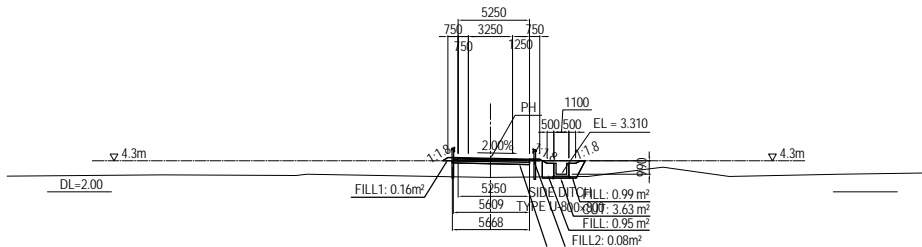
STA.0+140

GH=3.28
PH=4.470



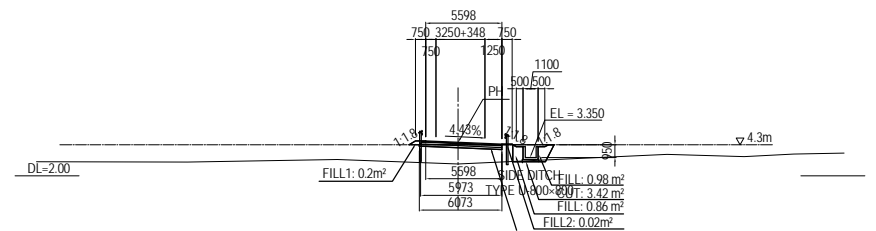
STA.0+80

GH=3.06
PH=4.470



STA.0+120

GH=2.87
PH=4.470

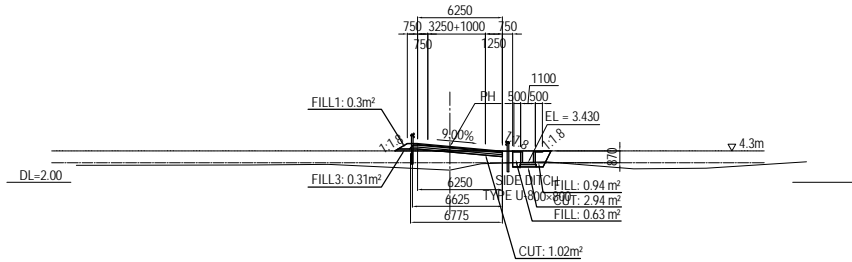


Note: Elevation is based on MSL (Mean Sea Level)

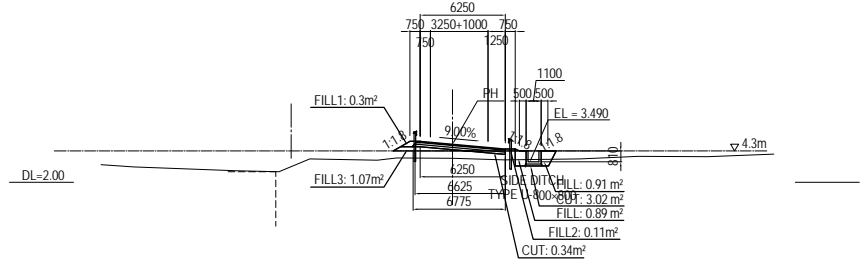
PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME M. TORIU T. HAYAKAWA Y. SANO	SIGNATURE 	DATE 15 Jun. 2017 20 Jun. 2017 21 Jun. 2017	DRAWING TITLE CROSS SECTION MAIN ROAD (2)	PACKAGE 1 DWG No. P1-RD-1030
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CROSS SECTION MAIN ROAD (3) S=1:400

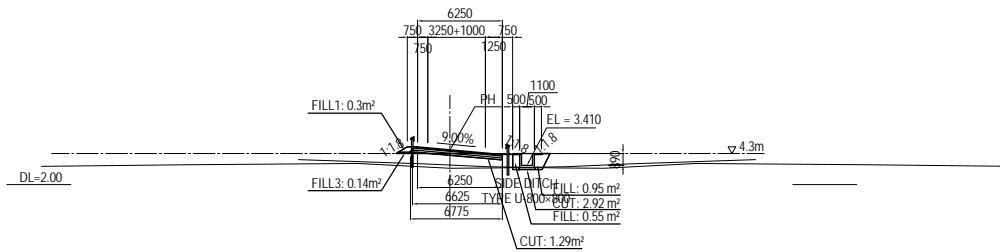
STA.0+200
GH=2.90
PH=4.620



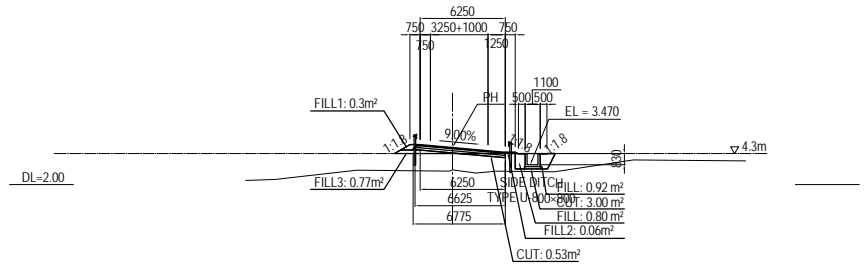
STA.0+260
GH=3.77
PH=4.800



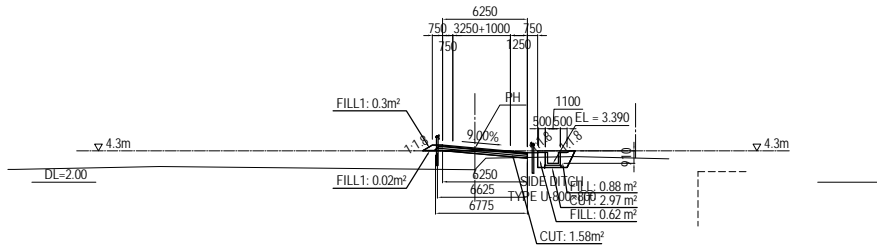
STA.0+180
GH=3.20
PH=4.560



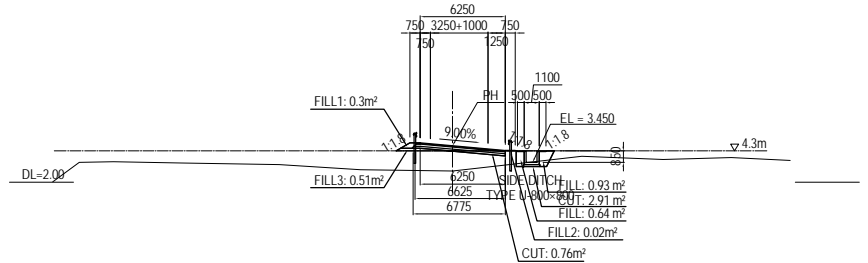
STA.0+240
GH=3.08
PH=4.740



STA.0+160
GH=2.90
PH=4.501



STA.0+220
GH=2.82
PH=4.680

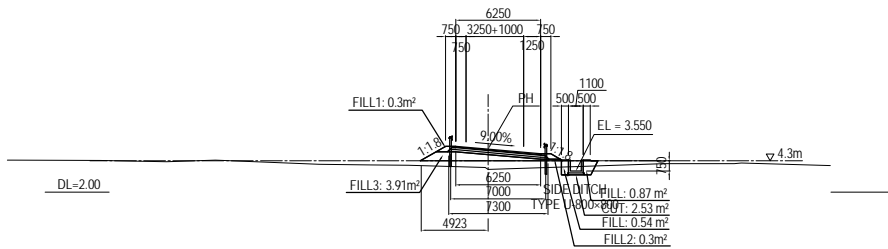


Note: Elevation is based on MSL (Mean Sea Level)

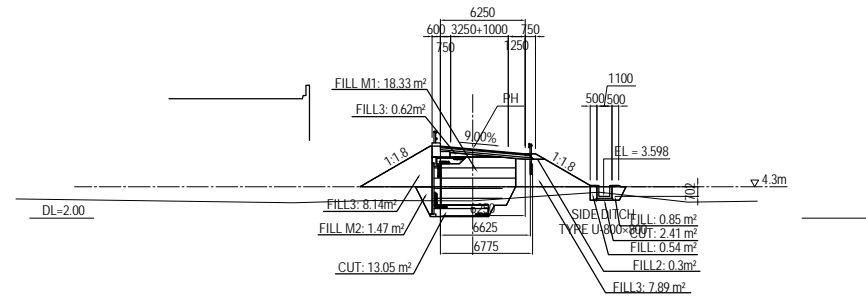
PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTRY REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE CROSS SECTION MAIN ROAD (3)	PACKAGE
				PREPARED BY	M. TORIU	15 Jun. 2017		1
				CHECKED BY	T. HAYAKAWA	20 Jun. 2017		DWG No.
				APPROVED BY	Y. SANO	21 Jun. 2017		P1-RD-1040

CROSS SECTION MAIN ROAD (4) S=1:400

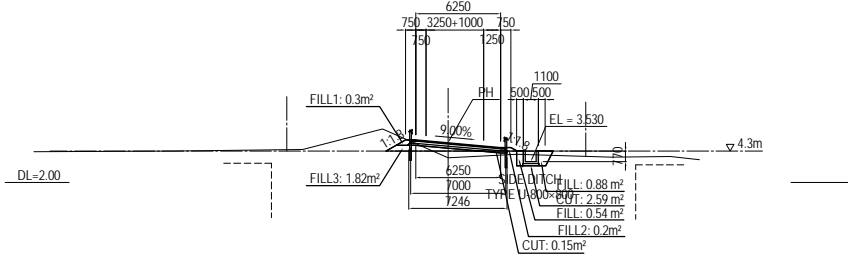
STA.0+320
GH=3.67
PH=5.154



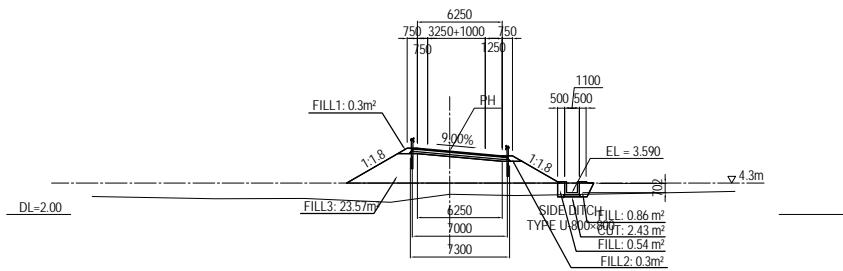
STA.0+367.484
GH=3.27
PH=7.067



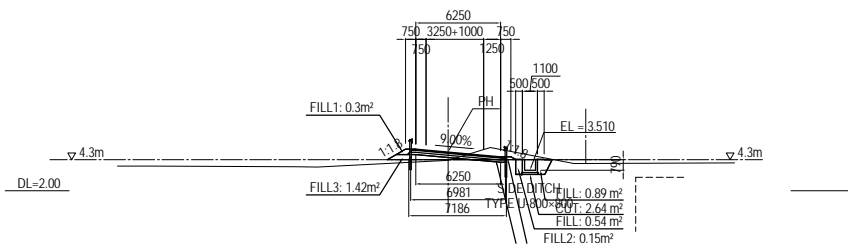
STA.0+300
GH=3.81
PH=4.920



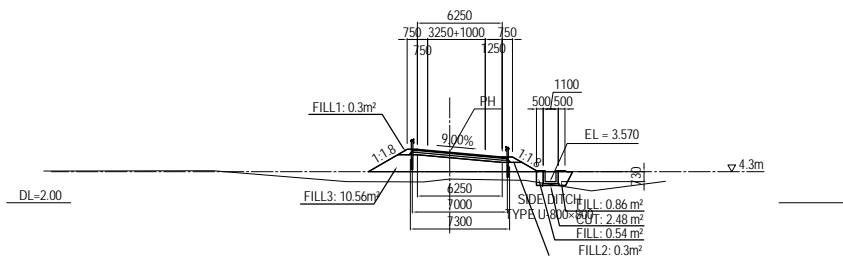
STA.0+360
GH=3.49
PH=6.657



STA.0+280
GH=4.24
PH=4.860



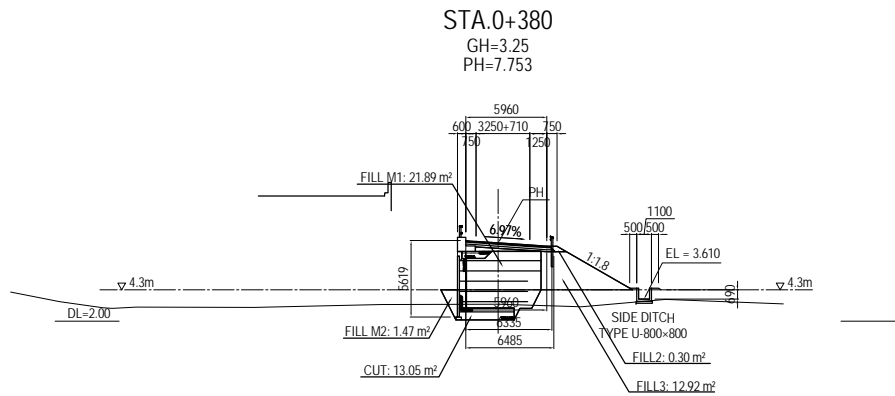
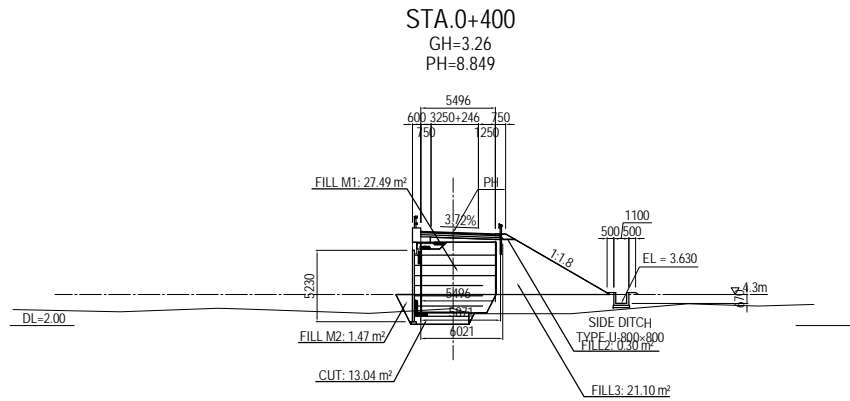
STA.0+340
GH=3.75
PH=5.733



Note: Elevation is based on MSL (Mean Sea Level)

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE CROSS SECTION MAIN ROAD (4)	PACKAGE
				PREPARED BY	M. TORIU	15 Jun. 2017		1
				CHECKED BY	T. HAYAKAWA	20 Jun. 2017		DWG No.
				APPROVED BY	Y. SANO	21 Jun. 2017		P1-RD-1050

CROSS SECTION MAIN ROAD (5) S=1:400



Note: Elevation is based on MSL (Mean Sea Level)

<small>PROJECT NAME</small> DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	<small>FINANCED BY</small> JAPAN INTERNATIONAL COOPERATION AGENCY	<small>COUNTRYPART</small> REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	<small>JICA STUDY TEAM</small> NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	<small>NAME</small> M. TORIU T. HAYAKAWA Y. SANO	<small>SIGNATURE</small> 	<small>DATE</small> 15 Jun. 2017 20 Jun. 2017 21 Jun. 2017	<small>DRAWING TITLE</small> CROSS SECTION MAIN ROAD (5)	<small>PACKAGE</small> 1 DWG No. P1-RD-1060
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Soft Soil Improvement

Deep Mixing Method & Shallow Improvement

for Main Road

Total BoQ of improvement

	Items	Unit	Quantity	Note
DEEP MIXING METHOD	sets	set	638	
	Total improvement long	m	14,054.40	
	Total improvement area	m ³	30,526.16	
	Solidifying material addition	t	11,080.99	cement-based (330kg/m ³)
SHALLOW IMPROVEMENT	Improvement depth	m	1.30	
	Total improvement area	m ²	2,755.93	
	Total improvement volume	m ³	3,582.71	
	Solidifying material addition	t	824.02	cement-based (230kg/m ³)

• DEEP MIXING METHOD

PKG1												
Quck (kN/m ²)	AREA	Improved radial	Section(m ²)	Excavation length(m)	Dry excavation length(m)	Improve long(m)	sets	Total excavation long(m)	Total dry excavation length(m)	Total improve long(m)	Total improve area(m ³)	Note
700	A(L=30000)	1200mm@1000 2-axis	2.172	30.00	1.70	28.30	98	2940.00	166.60	2773.40	6023.82	
	A(L=30000)	1200mm@1000 2-axis	2.172	30.00	0.00	30.00	168	5040.00	0.00	5040.00	10946.88	
	B(L=19700)	1200mm@1000 2-axis	2.172	19.70	1.70	18.00	242	4767.40	411.40	4356.00	9461.23	
	C(L=14500)	1200mm@1000 2-axis	2.172	14.50	0.00	14.50	130	1885.00	0.00	1885.00	4094.22	
Total							638	14632.40	578.00	14054.40	30526.16	

• SHALLOW IMPROVEMENT

PKG1									
Quck (kN/m ²)	AREA	Model used	Work place	Improve depth(m)	Total improve area (m ²)	Total improve volume (m ³)	unit addition (kg/m ³)	Solidifying material addition (t)	Note
420	A(L=1300)	Backhoe	Structure foundation	1.30	2755.93	3582.71	230	824.02	ap=100%
Total					2755.93	3582.71	-	824.02	

Soft Soil Improvement

Deep Mixing Method & Shallow Improvement

for On-ramp

Total BoQ of improvement

	Items	Unit	Quantity	Note
Deep soil mixing	sets	set	247	
	Total improvement long	m	7,484.10	
	Total improvement area	m ³	16,240.50	
	Solidifying material addition	t	5,895.30	cement-based(330kg/m ³)
Shallow improvement	Improvement depth	m	1.30	
	Total improvement area	m ²	989.47	
	Total improvement volume	m ³	1,286.31	
	Solidifying material addition	t	295.85	cement-based(230kg/m ³)

• DEEP MIXING METHOD

PKG1(On-Ramp)												
Quck (kN/m ²)	AREA	Improved radial	Section(m ²)	Excavation length(m)	Dry excavation length(m)	Improve long(m)	sets	Total excavation long(m)	Total dry excavation length(m)	Total improve long(m)	Total improve area(m ³)	Note
700	A(L=32500)	1200mm@1000 2-axis	2.17	32.50	2.20	30.30	247	8027.50	543.40	7484.10	16240.50	
Total							247	8027.50	543.40	7484.10	16240.50	

• SHALLOW IMPROVEMENT

PKG1(On-Ramp)									
Quck (kN/m ²)	AREA	Model used	Work place	Improve depth(m)	Total improve area (m ²)	Total improve volume (m ³)	unit addition (kg/m ³)	Solidifying material addition (t)	Note
420	A(L=1300)	Backhoe	Structure foundation	1.30	989.47	1286.31	230	295.85	ap=100%
Total					989.47	1286.31	-	295.85	

Soft Soil Improvement

Surcharge

FILL1			Area	Ave.	Distance	Volume
STA	0 +	140.000	42.1			
STA	0 +	160.000	61.2	51.7	20.0	1,033.0
STA	0 +	161.513	65.8	63.5	1.5	96.1
STA	0 +	180.000	76.0	70.9	18.5	1,310.7
STA	0 +	200.000	79.7	77.9	20.0	1,557.0
STA	0 +	212.713	81.6	80.7	12.7	1,025.3
STA	0 +	220.000	76.8	79.2	7.3	577.1
STA	0 +	240.000	85.5	81.2	20.0	1,623.0
STA	0 +	260.000	74.9	80.2	20.0	1,604.0
STA	0 +	280.000	77.4	76.2	20.0	1,523.0
STA	0 +	300.000	81.8	79.6	20.0	1,592.0
STA	0 +	320.000	91.2	84.3	20.0	1,686.0
Total amount						13,627.2

SAND MAT	Area	Ave.	Distance	Volume
STA 0 + 140.000	16.3			
STA 0 + 160.000	9.3	12.8	20.0	256.0
STA 0 + 161.513	8.7	9.0	1.5	13.6
STA 0 + 180.000	12.8	10.8	18.5	198.7
STA 0 + 200.000	13.3	13.1	20.0	261.0
STA 0 + 212.713	13.4	13.4	12.7	169.7
STA 0 + 220.000	13.5	13.5	7.3	98.0
STA 0 + 240.000	13.9	13.7	20.0	274.0
STA 0 + 260.000	12.7	13.3	20.0	266.0
STA 0 + 280.000	13.0	12.9	20.0	257.0
STA 0 + 300.000	13.3	13.2	20.0	263.0
STA 0 + 320.000	13.7	13.4	20.0	267.0
Total amount				2,324.0

Wall Structures

SUMMARY OF QUANTITIES FOR MECHANICALLY STABILISED EARTH WALL

【ThanlyinSide : Main Load(STA.0+250~0+350)LEFT SIDE】

ITEM	DISCREPTION	UNIT	QUANTITY	REMARKS	
AREA		m2	283.38		
LENGTH		m	101.620		
MAXIMUM HEIGHT		m	3.730		
TOTAL LENGTH		m	2,562.000		
COVER CONCRETE	CONCRETE	$\sigma_{ck}=24\text{N/mm}^2$	m3	20.17	
	FORM		m2	132.88	
	BAR	D13,SD345	kg	1,307.0	
	JOINT	t=10mm	m2	6.75	
	SCAFFOLDING	CATWALK	m	101.68	
BASE CONCRETE	CONCRETE	$\sigma_{ck}=18\text{N/mm}^2$	m3	8.13	
	FORM		m2	40.73	
	ANCHOR BAR	D13,SD345	kg	53.9	
CONCRETE BARRIER (TYPE1)	CONCRETE	$\sigma_{ck}=24\text{N/mm}^2$	m3	121.90	
	FORM OF CONCRETE		m2	286.84	
	BASE CONCRETE	$\sigma_{ck}=18\text{N/mm}^2$	m3	12.70	
	FORM OF BASE CONCRETE		m2	10.41	
	AGGREGATE		m3	83.81	
	BAR	D13,SD345	kg	5,709.1	
	JOINT FILLER	t=10mm	m2	10.80	
		t=20mm	m2	1.20	
	RUBBER PL	t=10mm	m2	30.48	SIZE:10×300×600 170 SHEETS
	CONCRETE	$\sigma_{ck}=18\text{N/mm}^2$	m3	2.54	
REINFORCEMENT	BAR	D13,SD345	kg	57.0	
GUARDRALL	GUARDRALL	@2000mm	m	101.695	
	REINFORCEMENT	D25,SD345	kg	630.5	62kg(per 10.0m)
EARTH WORKS	AGGREGATE OF BACK WALL	C-40	m3	194.0	
DRAINAGE	AGGREGATE	C-40	m3	341.4	
	EVACUATION PROTECTOR	NONWOVENFABRIC t=2.0mm	m2	406.48	
JOINT		t=20mm	m2	0.24	

TABLE OF MATERIALS FOR MECHANICALLY STABILISED EARTH WALL

【ThanlyinSide : Main Load(STA.0+250~0+350)LEFT SIDE】

(THIN TYPE : t=140 mm)

ITEM	SYMBOL	SIZE	UNIT	QUANTITY	REMARKS
CONCRETE SKIN	A 4	1.50 × 1.50 = 2.2500 m ²	SHEET	57	
	AL 4	1.35 × 1.50 = 2.0250 "	"	2	
	AR 4	1.35 × 1.50 = 2.0250 "	"	1	
	BP 4	1.50 × 1.48 = 2.2200 "	"	32	BAR b=300
	BLP 4	1.35 × 1.48 = 1.9980 "	"	1	BAR b=300
	C 2	1.50 × 0.75 = 1.1250 "	"	32	
	CL 2	1.35 × 0.75 = 1.0125 "	"	1	
	CR 2	1.35 × 0.75 = 1.0125 "	"	1	
	DP 2	1.50 × 0.73 = 1.0950 "	"	32	BAR b=300
	DLP 2	1.35 × 0.73 = 0.9855 "	"	1	BAR b=300
	DRP 2	1.35 × 0.73 = 0.9855 "	"	2	BAR b=300
STRIP	PL (SS400)	80 × 4.0 × 6,000	NUMBER	148	
		" 5,000	"	226	
		" 4,000	"	136	
	TOTAL LENGTH			m	2,562.00
BOLT & NUT		M12 × 40	NUMBER	510	
HORIZONTAL JOINT		85 × 20 × 600	SHEET	188	
PREMEABLE SAND		420 × 4	m	189.9	
INSTALLATION METAL OF EDGE	L	125 × 210 × 3.2×1500	NUMBER	2	θ= 90 °
	L	125 × 210 × 3.2× 750	"	1	θ= 90 °
CONCRETE ANCHOR		M12 × 90	"	6	
STEEL PLATE		ZINC PLATING (100×1.6×750)	SHEET	3	
WALL AREA				283.38 m ²	
WALL HEIGHT				3.730 m	
CONSTRUCTION LENGTH				101.620 m	

SUMMARY OF QUANTITIES FOR MECHANICALLY STABILISED EARTH WALL

【ThanlyinRamp : NEW Star City Approach Road (STA.0+360~0+405)LEFT SIDE】

ITEM	DISCREPTION	UNIT	QUANTITY	REMARKS
AREA		m2	176.08	
LENGTH		m	38.900	
MAXIMUM HEIGHT		m	5.230	
TOTAL LENGTH		m	1,664.000	
COVER CONCRETE	CONCRETE	$\sigma_{ck}=24\text{N/mm}^2$	m3	9.20
	FORM		m2	60.94
	BAR	D13,SD345	kg	539.1
	JOINT	t=10mm	m2	2.83
	SCAFFOLDING	CATWALK	m	38.96
BASE CONCRETE	CONCRETE	$\sigma_{ck}=18\text{N/mm}^2$	m3	3.11
	FORM		m2	15.64
	ANCHOR BAR	D13,SD345	kg	20.6
CONCRETE BARRIER (TYPE1)	CONCRETE	$\sigma_{ck}=24\text{N/mm}^2$	m3	11.30
	FORM OF CONCRETE		m2	25.26
	BASE CONCRETE	$\sigma_{ck}=18\text{N/mm}^2$	m3	1.35
	FORM OF BASE CONCRETE		m2	1.27
	AGGREGATE		m3	9.40
	BAR	D16,SD345	kg	78.0
		D13,SD345	kg	512.0
	JOINT FILLER	t=20mm	m2	1.13
	RUBBER PL	t=10mm	m2	3.00	SIZE:10×300×600 17 SHEETS
CONCRETE	$\sigma_{ck}=18\text{N/mm}^2$	m3	0.25	
CONCRETE BARRIER (TYPE2)	CONCRETE	$\sigma_{ck}=24\text{N/mm}^2$	m3	30.95
	FORM OF CONCRETE		m2	62.88
	BASE CONCRETE	$\sigma_{ck}=18\text{N/mm}^2$	m3	3.90
	FORM OF BASE CONCRETE		m2	3.16
	AGGREGATE		m3	27.19
	BAR	D16,SD345	kg	208.3
		D13,SD345	kg	1,414.4
	JOINT FILLER	t=10mm	m2	3.21
	RUBBER PL	t=10mm	m2	8.68	SIZE:10×300×600 49 SHEETS
CONCRETE	$\sigma_{ck}=18\text{N/mm}^2$	m3	0.72	
GUARDRAIL	GUARDRAIL	@2000mm	m	38.975
	REINFORCEMENT	D25,SD345	kg	241.6	62kg(per 10.0m)
EARTH WORKS	AGGREGATE OF BACK WALL	C-40	m3	141.8
DRAINAGE	AGGREGATE	C-40	m3	132.3
	EVACUATION PROTECTOR	NONWOVENFABRIC t=2.0mm	m2	155.60
JOINT		t=20mm	m2	0.31

TABLE OF MATERIALS FOR MECHANICALLY STABILISED EARTH WALL

【ThanlyinRamp : NEW Star City Approach Road (STA.0+360~0+405)LEFT SIDE】

(THIN TYPE : t=140 mm)

ITEM	SYMBOL	SIZE	UNIT	QUANTITY	REMARKS			
CONCRETE SKIN	A	4	$1.50 \times 1.50 = 2.2500$	m^2	SHEET	51		
	AL	4	$1.35 \times 1.50 = 2.0250$	"	"	2		
	BP	4	$1.50 \times 1.48 = 2.2200$	"	"	12	BAR b=300	
	BLP	4	$1.35 \times 1.48 = 1.9980$	"	"	1	BAR b=300	
	C	2	$1.50 \times 0.75 = 1.1250$	"	"	12		
	CL	2	$1.35 \times 0.75 = 1.0125$	"	"	1		
	DP	2	$1.50 \times 0.73 = 1.0950$	"	"	12	BAR b=300	
	DRP	2	$1.35 \times 0.73 = 0.9855$	"	"	1	BAR b=300	
STRIP	PL (SS400)	80	4.0	6,000	NUMBER	136		
		"	"	5,000	"	128		
		"	"	4,000	"	52		
	TOTAL LENGTH			m	1,664.00			
BOLT & NUT		M12	40		NUMBER	316		
HORIZONTAL JOINT		85	20	600	SHEET	132		
PREMEABLE SAND		420	4		m	118.0		
INSTALLATION METAL OF EDGE	L		125	210	3.2×1500	NUMBER	3	$\theta = 90^\circ$
	L		125	210	3.2×750	"	1	$\theta = 90^\circ$
CONCRETE ANCHOR		M12	90		"	8		
WALL AREA				176.08	m^2			
WALL HEIGHT				5.230	m			
CONSTRUCTION LENGTH				38.900	m			

SUMMARY OF QUANTITIES FOR MECHANICALLY STABILISED EARTH WALL

【ThanlyinRamp : NEW Star City Approach Road (STA.0+360~0+405)RIGHT SIDE】

ITEM	DISCREPTION	UNIT	QUANTITY	REMARKS	
AREA		m2	148.04		
LENGTH		m	34.400		
MAXIMUM HEIGHT		m	5.230		
TOTAL LENGTH		m	1,396.000		
COVER CONCRETE	CONCRETE	$\sigma_{ck}=24N/mm^2$	m3	7.78	
	FORM		m2	51.45	
	BAR	SD345	kg	469.1	
	JOINT	t=10mm	m2	2.50	
	SCAFFOLDING	CATWALK	m	34.31	
BASE CONCRETE	CONCRETE	$\sigma_{ck}=18N/mm^2$	m3	2.75	
	FORM		m2	13.84	
	ANCHOR BAR	D13,SD345	kg	18.3	
CONCRETE BARRIER (TYPE1)	CONCRETE	$\sigma_{ck}=24N/mm^2$	m3	9.27	
	FORM OF CONCRETE		m2	21.73	
	BASE CONCRETE	$\sigma_{ck}=18N/mm^2$	m3	1.15	
	FORM OF BASE CONCRETE		m2	1.12	
	AGGREGATE		m3	7.35	
	BAR	D13,SD345	kg	439.5	
	JOINT FILLER	t=20mm	m2	1.09	
	RUBBER PL	t=10mm	m2	2.55	SIZE:10×300×600 15 SHEETS
FOAM POLYSTYRENE	b=50mm	m3	0.21	SIZE:50×500×1000 9 SHEETS	
CONCRETE BARRIER (TYPE2)	CONCRETE	$\sigma_{ck}=24N/mm^2$	m3	26.55	
	FORM OF CONCRETE		m2	56.19	
	BASE CONCRETE	$\sigma_{ck}=18N/mm^2$	m3	3.48	
	FORM OF BASE CONCRETE		m2	2.85	
	AGGREGATE		m3	22.30	
	BAR	D13,SD345	kg	1,260.4	
	JOINT FILLER	t=10mm	m2	3.09	
	RUBBER PL	t=10mm	m2	7.73	SIZE:10×300×600 43 SHEETS
	FOAM POLYSTYRENE	b=50mm	m3	0.64	SIZE:50×500×1000 26 SHEETS
GUARDRAIL	GUARDRAIL	@2000mm	m	34.325	
	REINFORCEMENT	D25,SD345	kg	212.8	62kg(per 10.0m)
EARTH WORKS	AGGREGATE OF BACK WALL	C-40	m3	117.8	
DRAINAGE	AGGREGATE	C-40	m3	117.0	
	EVACUATION PROTECTOR	NONWOVENFABRIC t=2.0mm	m2	132.03	
JOINT		t=20mm	m2	0.13	

TABLE OF MATERIALS FOR MECHANICALLY STABILISED EARTH WALL

【ThanlyinRamp : NEW Star City Approach Road (STA.0+360~0+405)RIGHT SIDE】

(THIN TYPE : t=140 mm)

ITEM	SYMBOL	SIZE	UNIT	QUANTITY	REMARKS	
CONCRETE SKIN	A	4	1.50 × 1.50 = 2.2500 m ²	SHEETS	41	
	AR	4	1.35 × 1.50 = 2.0250 "	"	2	
	BP	4	1.50 × 1.48 = 2.2200 "	"	11	BAR b=300
	BRP	4	1.35 × 1.48 = 1.9980 "	"	1	BAR b=300
	C	2	1.50 × 0.75 = 1.1250 "	"	11	
	CR	2	1.35 × 0.75 = 1.0125 "	"	1	
	DP	2	1.50 × 0.73 = 1.0950 "	"	10	BAR b=300
	DLP	2	1.35 × 0.73 = 0.9855 "	"	1	BAR b=300
STRIP	PL (SS400)	80 × 4.0 × 6,000	NUMBER	112		
		" 5,000	"	108		
		" 4,000	"	46		
	TOTAL LENGTH			m	1,396.00	
BOLT & NUT		M12 × 40	NUMBER	266		
HORIZONTAL JOINT		85 × 20 × 600	SHEET	110		
PREMEABLE SAND		420 × 4	m	99.3		
INSTALLATION METAL OF EDGE	L	125 × 210 × 3.2×1500	NUMBER	3	θ= 90 °	
	L	125 × 210 × 3.2×750	"	1	θ= 90 °	
CONCRETE ANCHOR		M12 × 90	"	8		
WALL AREA				148.04 m ²		
WALL HEIGHT				5.230 m		
CONSTRUCTION LENGTH				34.400 m		

MISCELLANEOUS(Main Road)
(STA.0~STA.0+173.20)

SCHEDULE OF MISCELLANEOUS

UNIT : m

CONCRETE KERB TYPE A-1						CONCRETE KERB TYPE A-2				CONCRETE KERB TYPE A-3								
R/L	STATION					LENGTH	R/L	STATION			EACH	R/L	STATION		LENGTH			
L	0	+ 64.30	~	0	+ 173.20	108.9	R	0	+ 53.30		1	R	0	+ 53.30	~	0	+ 54.50	3.8
R	0	+ 64.30	~	0	+ 173.20	108.9												
R	0	+ 54.80	~	0	+ 173.20	118.9												
total						336.7	total				1	total				3.8		

SCHEDULE OF MISCELLANEOUS

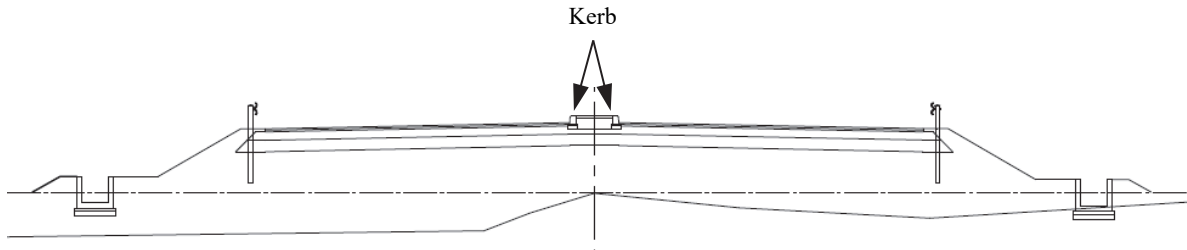
UNIT : m

GUARD RAIL TYPE A (GR-A)			GUARD PIPE TYPE A (GP-A)					
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
L	0 + 65.20 ~ 0 + 173.20	117.0	R	0 + 0.00 ~ 0 + 7.50	5.4			
R	0 + 54.50 ~ 0 + 173.20	118.7	R	0 + 7.50 ~ 0 + 32.00	24.5			
			L	0 + 0.00 ~ 0 + 7.50	5.4			
			L	0 + 9.00 ~ 0 + 20.00	10.4			
total		235.7	total		45.7	total		

2.6.2 Kerb, Guard Rail and Guard Pipe (After STA. 0+176.970)

(a) Kerb

The illustration below shows the typical cross section of Package 1 earthwork section. Kerb, Type A-1, is applied in the median edge up to Bago Bridge A1 Abutment.

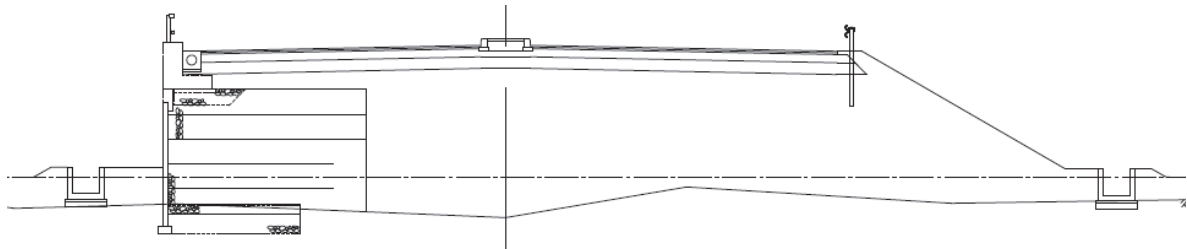


Length from STA. 0+176.970 to STA. 0+356.200 (back face of abutment parapet) is 179.230 m. Therefore, the total kerb length (left and right edge of median) is $179.230 \times 2 = 358.460$ m.

(b) Guard Rail

Main Road

As given in the above cross section, Guard Rail, Type GR-A, is designed to be installed at both end of the road. It is noted that, from STA. 0+249.525 to STA. 0+351.200 (next to the wing wall of Bago Bridge A1 Abutment), the mechanically-stabilised earth wall was designed at the left side as shown in the below illustration.



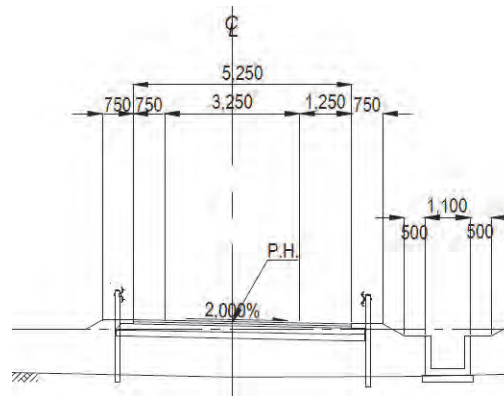
Therefore, the length of guardrail, Type GR-A, is:

Left side:	from STA. 0+176.970 to STA. 0+356.200:	Length = 174.230 m
Right side:	from STA. 0+176.970 to STA. 0+249.525:	Length = 72.555 m
		Total = 246.785 m

Star City Approach Road

Star City Approach Road was designed as a one-lane ramp with design speed of 30 km/h. This road was designed to equip guardrail at both end as given in the cross section below. For the purpose of traffic safety and also prevention of intrusion from outside of approach road.

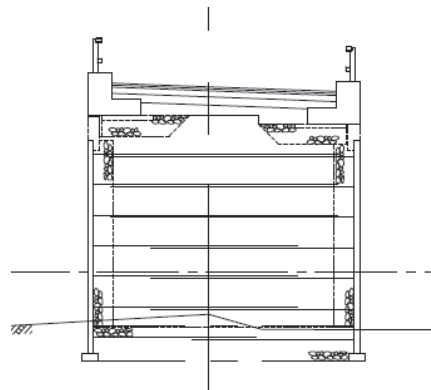
As the design speed is 30 km/h, the guardrail type was selected as Type GR-B.



Guardrail shall be installed from STA. 0+9.000 just after the corner rounding of intersection with the existing road.



The mechanically-stabilised earth wall is designed at both sides as shown in the illustration below for certain lengths before the ramp bridge abutment. The mechanically-stabilised earth wall at the right side starts from STA. 0+370.330 and the left side from STA. 0+368.280.



Therefore, the required guardrail length is estimated as follows:

Right side from STA. 0+9.000 to STA. 0+370.330 = 361.330 m

Left side from STA. 0+9.000 to STA. 0+368.280 = 359.280 m

Total = 720.610 m

ROAD MARKING (Main Road)
(STA.0 ~ STA.0+173.20)

QUANTITY OF ROAD MARKING				
ITEM	CALCULATION		UNIT	QUANTITY
Road Markings unbroken ,white W=15cm	Edge Line	= 631.7 total = 631.7	m	631.7
unbroken ,white W=8cm	Lane Line	= 143.2 total = 143.2	m	143.2
broken ,white W=8cm	Lane Line	= 39.0 total = 39.0	m	39.0
unbroken ,white W=30cm	Stop Line	= 19.5 total = 19.5	m	19.5
unbroken ,white W=45cm	Zebra Zone	= 165.1 total = 165.1	m	165.1
Arrow Mark white	Straight RightTurn Straight and Left Turn	= 3 = 3 = 3 total = 9	each	9

SCHEDULE OF ROAD MARKING

UNIT : m

Edge Line(unbroken ,white) W=15cm			Lane Line(unbroken ,white) W=8cm			Lane Line(broken ,white) W=8cm		
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
L	0 + 0.00 ~ 0 + 23.60	25.2	L	0 + 60.93 ~ 0 + 133.20	68.2	L	0 + 0.00 ~ 0 + 7.90	3.0
L	0 + 0.00 ~ 0 + 7.90	5.4	L	0 + 60.93 ~ 0 + 133.20	68.2	L	0 + 133.20 ~ 0 + 173.20	9.0
L	0 + 0.00 ~ 0 + 7.40	3.8	R	0 + 0.00 ~ 0 + 3.50	3.4	R	0 + 60.90 ~ 0 + 173.20	27.0
L	0 + 65.00 ~ 0 + 173.20	110.0	R	0 + 0.00 ~ 0 + 3.50	3.4			
L	0 + 60.93 ~ 0 + 173.20	112.1						
R	0 + 21.50 ~ 0 + 36.98	41.1						
R	0 + 0.00 ~ 0 + 34.70	39.0						
R	0 + 40.20 ~ 0 + 46.20	27.8						
R	0 + 60.93 ~ 0 + 173.20	106.3						
R	0 + 52.40 ~ 0 + 173.20	124.3						
R	0 + 40.50 ~ 0 + 46.50	25.0						
R	0 + 48.00 ~ 0 + 51.80	11.7						
合計		631.7	合計		143.2	合計		39.0

SCHEDULE OF ROAD MARKING

UNIT : m

Stop Line (unbroken,white) W=30cm			Zebra Zone (unbroken,white) W=45cm					
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
L	0 + 65.25	10.5	C	0 + 7.00	63.0			
R	0 + 3.00	9.0	R	0 + 40.50 ~ 0 + 46.50	23.0			
			R	0 + 32.20 ~ 0 + 54.00	75.9			
			R	0 + 48.00 ~ 0 + 51.80	3.2			
total		19.5	total		165.1	total		

SCHEDULE OF ROAD MARKING

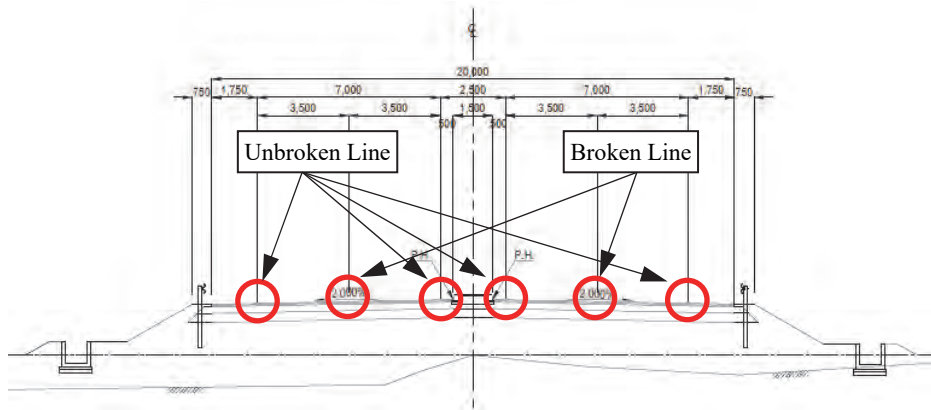
UNIT:each

Arrow Mark(Straight)			Arrow Mark(RightTurn)			Arrow Mark(Straight & Left Turn)		
R/L	STATION	EACH	R/L	STATION	EACH	R/L	STATION	EACH
L	0 +74.40 ~ 0 +175.50	3	L	0 +74.40 ~ 0 +175.50	3	L	0 +74.40 ~ 0 +175.50	3
total		3	total		3	total		3
L= 8.70 × 3			L= 10.00 × 3			L= 20.00 × 3		

2.6.4 Road Marking (After STA. 0+176.970)

(a) Main Road: Unbroken Line, White, Width = 10 cm

The main road is a dual 2-lane road. In order to identify the boundaries between shoulders and carriageways, line marking on the pavement shall be provided as shown below.



Length of unbroken line is:

$$L = 1135.030 \text{ (from STA. 0+176.970 to STA. 1+312.000)} \times 4 = 4540.120 \text{ m}$$

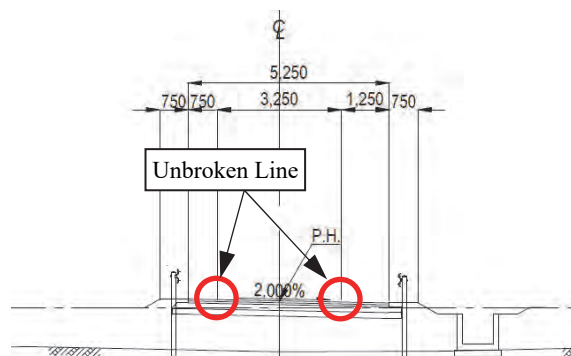
(b) Main Road: Broken Line, White, Width = 10 cm

Length of broken line is:

$$L = 1135.030 \text{ (from STA. 0+176.970 to STA. 1+312.000)} \times 2 = 2270.060 \text{ m}$$

(c) Star City Approach Road: Unbroken Line, White, Width = 10 cm

Star City Approach Road has two (2) unbroken line at both side of carriageway as shown below.



These unbroken lines continue to acceleration lane and taper section. The line length was estimated as follows:

Right side:	6.374 (intersection rounded corner) + 529.342 (up to nose point)	
	+ 254.000 (Acceleration lane + Taper)	= 780.256 m
Left side:	6.163 (intersection rounded corner) + 634.083 (up to parallel point)	= 640.246 m

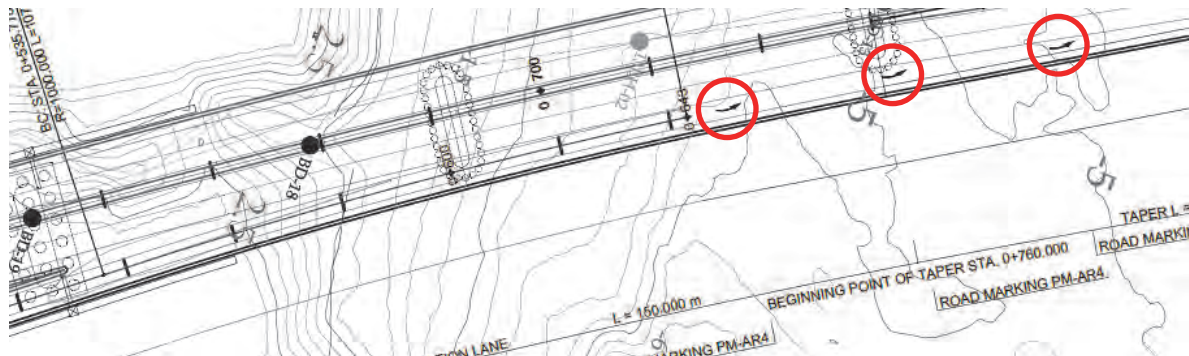
 Total = 1420.503 m
(d) Speed Limit Marks

On the Star City Approach Road, a speed limit marking of 30 km/h was deployed at STA. 0+20.

Quantity: 1 number of Road Marking Type PM-1

(e) Arrow Mark, White, PM-AR4

On the Star City Approach Road, arrow marks, PM AR-4, were deployed in the taper section to prompt for drivers to merge into the through lane.



Quantity: 3 numbers of Road Marking Type PM-AR4

2.6.5 Concrete Seal for Median and Side Strip

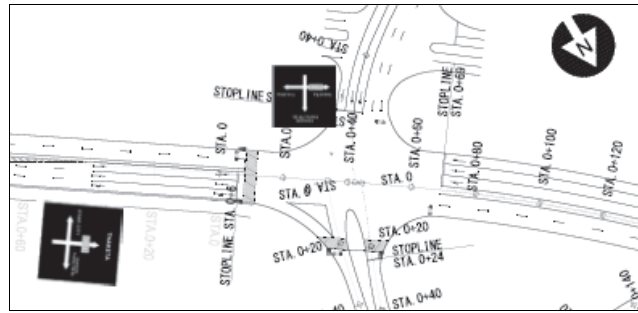
The median of main road shall have concrete seal as illustrated below.



Quantity is: 179.230 m (from STA. 0+176.970 to STA. 0+356.200 of Concrete Seal for Median Strip of
W = 1.5 m)

2.6.6 Signboard**(a) Informatory Signboard Type C**

In the Star City Intersection Area, two (2) numbers of informatory signboard, Type GS-7 and GS-8, are to be installed at the location given in the layout plan below.



Type GS-7



Type GS-8






Quantity: Two (2) numbers of Informatory Signboard Type C (Vertical Clearance is 5.0 m)

(b) Regulatory Signs

In the Star City Intersection area, several traffic signs were arranged to establish the traffic safety.






The following gives deployed regulatory signs.

Type	Number	Type	Number	Type	Number
 TS-1	2	 TS-2	4	 TS-3	2
 TS-4	1	 TS-9	3		

Quantity: 12 numbers of regulatory signs

(c) Warning Signs

The following gives deployed warning signs.

Type	Number	Type	Number	Type	Number
 TS-6	4	 TS-7	5	 TS-13	1

Quantity: 10 numbers of warning signs

**ROAD DESIGN
(PACKAGE 1)**

3. STAR CITY INTERSECTION

1.STARCITY ACCESS LINE
GRAND SUMMARY

GRAND SUMMARY

ITEM	DESCRIPTION		UNIT	QUANTITY	REMARKS
EARTHWORK					
	EXCAVATION				
		MECHANIZED EXCAVATION	m3	288	
	EMBANKMENT				
		EMBANKMENT	m3	39	
	REMOVAL OF SURPLUS SOIL				
		REMOVAL OF SURPLUS SOIL	m3	245	
	TRIMMING OF SLOPE				
		SLOPE OF EMBANKMENT	m3	29	
	SLOPE PROTECTION				
		SODDING	m2	29	
		SODDING	SIDE WALK S	m2	0
PAVEMENT					
	TRAVELLED WAY	TYPE CS			
		RC PAVEMENT	G-30(200mm)	m2	610
		Lean CONCRETE	1:3:6(80mm)	m2	610
		PLASTIC SHEET		m2	610
		HARD CORE WITH SAND ROLLER MACHINE COMPACTED	CBR>10%(500mm)	m2	610
		SAND COMPACTED	(200mm)	m2	610

GRAND SUMMARY

ITEM	DESCRIPTION		UNIT	QUANTITY	REMARKS
	SIDE WALK	SIDE WALK S			
		EXPOSE AGGREGATE FINISHED FOOTPATH (75mm)	m2	46	
		HARD CORE WITH COMPACTED SAND (200mm)	m2	46	
		SAND COMPACTED (300mm)	m2	102	
MISCELLANEOUS					
	KERB				
		CONCRETE KERB TYPE D	m	30	
	GUARDRAIL AND PIPE				
		GUARDRAIL TYPE A(GR-A)	m	43	
ROAD MARKINGS					
	ROAD MARKINGS	unbroken ,white W=15cm	m	202	
		unbroken ,white W=8cm	m	29	
		broken ,white W=8cm	m	6	
		unbroken ,white W=30cm	m	14	
		unbroken ,white W=45cm	m	57	
		Arrow Mark ,white	each	3	

1)EARTHWORK

EARTHWORK OF SCHEDULE				
1 nos				
ITEM	DESCRIPTION	UNIT	QUANTITY	REMARKS
EXCAVATION		set	1	
	MECHANIZED EXCAVATION	m3	288.2	
EMBANKMENT		set	1	
	EMBANKMENT			
	2.5m > W	m3	39.3	
	2.5 ≤ W < 4.0	m3	0.0	
	W > 4.0	m3	0.0	
	TOTAL	m3	39.3	
REMOVAL OF SURPLUS SOIL		set	1	
	REMOVAL OF SURPLUS SOIL	m3	244.5	
TRIMMING OF SLOPE		set	1	
	SLOPE OF EMBANKMENT	m2	28.8	
SLOPE PROTECTION		set	1	
	SODDING	m2	28.8	

Quantities of Earthwork						
ITEM	CALCULATION				UNIT	QUANTITY
EXCAVATION MECHANIZED EXCAVATION	$V =$			$= 288.2$	m3	288.2
EMBANKMENT EMBANKMENT	$2.5m > W$ $V =$			$= 39.3$	m3	39.3
	$2.5 \leq W < 4.0$ $V =$			$= 0.0$	m3	0.0
	$W > 4.0$ $V =$			$= 0.0$	m3	0.0
				Total 39.3		
REMOVAL OF SURPLUS SOIL REMOVAL OF SURPLUS SOIL	$V = (288.2 + 0.0)$ $-(39.3 + 0.0) \times 1/0.9$			$= 244.5$	m3	244.5
TRIMMING OF SLOPE SLOPE OF EMBANKMENT	$A =$			$= 28.8$	m2	28.8
SLOPE PROTECTION SODDING	$A =$			$= 28.8$	m2	28.8

EARTHWORK														
STATION	DISTANCE (m)	EXCAVATION						EMBANKMENT						REMARKS
		MECHANIZED EXCAVATION						EMBANKMENT(2.5m<W)			EMBANKMENT(W>4.0)			
		Area (m ²)	Average (m ²)	Volume (m ³)	Area (m ²)	Average (m ²)	Volume (m ³)	Area (m ²)	Average (m ²)	Volume (m ³)	Area (m ²)	Average (m ²)	Volume (m ³)	
No. 0 + 11.590		11.0						1.5						
No. 0 + 20.000	8.4	11.0	11.00	92.4				1.5	1.50	12.6				
No. 0 + 37.810	17.8	11.0	11.00	195.8				1.5	1.50	26.7				
Subtotal				288.2						39.3				
Total				288.2						39.3				

TRIMMING OF SLOPE

No.1

STATION	DISTANCE (m)	SLOPE OF EMBANKMENT						CUT SLOPE						REMARKS
		Left			Right			Left			Right			
		Length (m)	Average (m)	Area (m2)	Length (m)	Average (m)	Area (m2)	Length (m)	Average (m)	Area (m2)	Length (m)	Average (m)	Area (m2)	
No. 0 + 11.590		1.0			0.1									
No. 0 + 20.000	8.4	1.0	1.00	8.4	0.1	0.10	0.8							
No. 0 + 37.810	17.8	1.0	1.00	17.8	0.1	0.10	1.8							
Subtotal				26.2			2.6			0.0			0.0	
Total							LRTotal	28.8					LRTotal	0.0

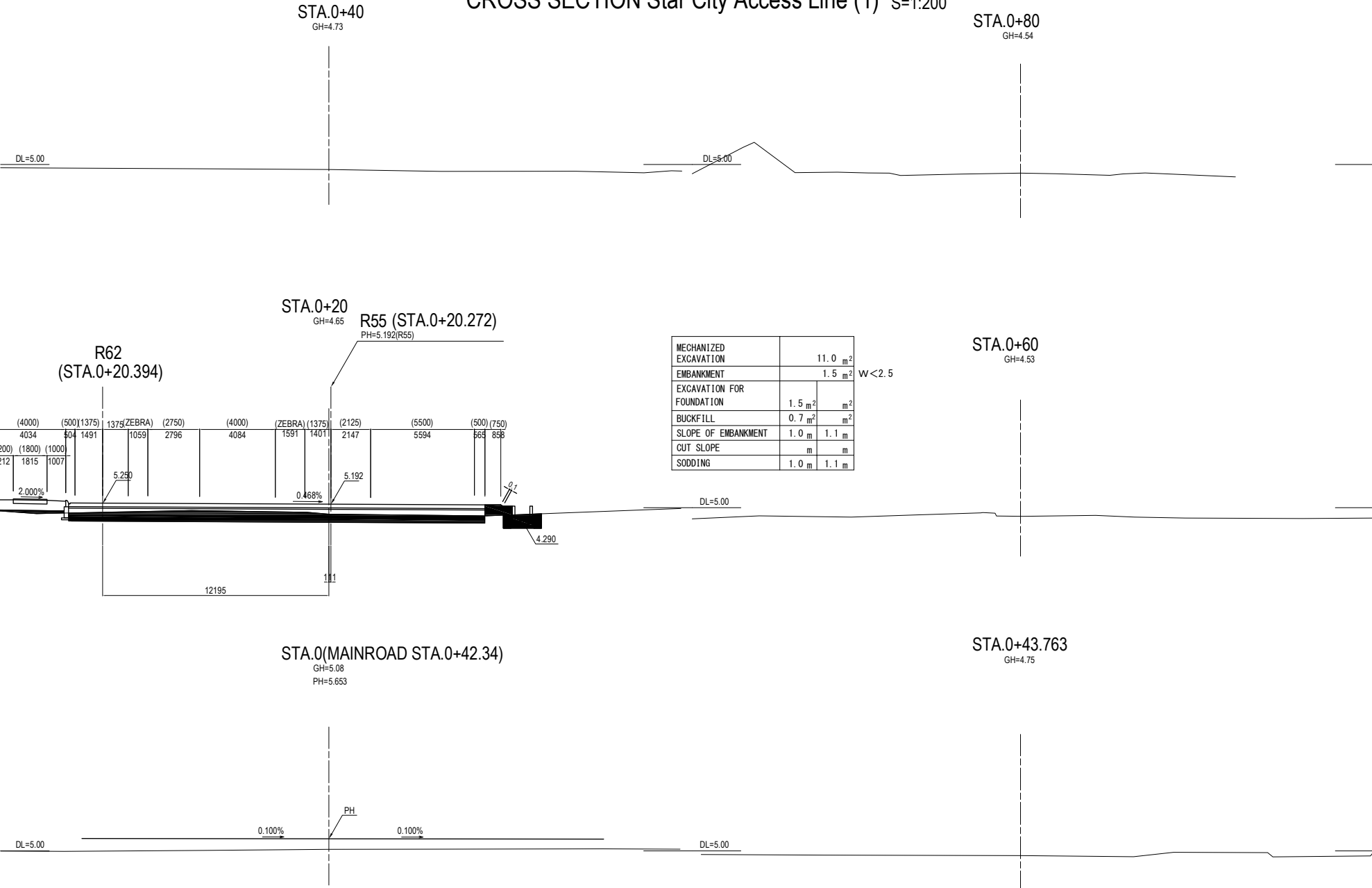
SLOPE PROTECTION

No.1

STATION	DISTANCE (m)	SODDING												REMARKS
		Left			Right			Left			Right			
		Length (m)	Average (m)	Area (m ²)	Length (m)	Average (m)	Area (m ²)	Length (m)	Average (m)	Area (m ²)	Length (m)	Average (m)	Area (m ²)	
No. 0 + 11.590		1.0			0.1									
No. 0 + 20.000	8.4	1.0	1.00	8.4	0.1	0.10	0.8							
No. 0 + 37.810	17.8	1.0	1.00	17.8	0.1	0.10	1.8							
Subtotal				26.2			2.6			0.0				0.0
Total						LRTotal	28.8					LRTotal		0.0


CROSS SECTION Star City Access Line (1) S=1:200

-10-






PROJECT NAME
 DETAILED DESIGN ON
 BAGO RIVER BRIDGE
 CONSTRUCTION PROJECT

FINANCED BY
 JAPAN INTERNATIONAL
 COOPERATION AGENCY

COUNTERPART
 REPUBLIC OF THE UNION OF MYANMAR
 MINISTRY OF CONSTRUCTION
 DEPARTMENT OF BRIDGE

JICA STUDY TEAM
 NIPPON KOEI CO., LTD.
 ORIENTAL CONSULTANTS GLOBAL CO., LTD.
 METROPOLITAN EXPRESSWAY COMPANY LIMITED
 CHODAI CO., LTD.
 NIPPON ENGINEERING CONSULTANTS CO., LTD.

	NAME	SIGNATURE	DATE
PREPARED BY	M. TOMITA		15 JUNE 2017
CHECKED BY	T. HAYAKAWA		20 JUNE 2017
APPROVED BY	Y. SANO		21 JUNE 2017

DRAWING TITLE
 CROSS SECTION Star City Access Line (1)

PACKAGE
 1
 DWG No.
 P1-RD-2050

2)PAVEMENT

SUMMARY OF PAVEMENT					
ITEM	DESCRIPTION	STANDARD	UNIT	QUANTITY	Total REMARKS
PAVEMENT					
RC PAVEMENT	Type CS				
	RC PAVEMENT	G-30(200mm)	m2	613.1	
	Lean CONCRETE	1:3:6(80mm)	m2	613.1	
	PLASTIC SHEET		m2	613.1	
	HARD CORE WITH SAND ROLLER MACHINE COMPACTED	CBR>10%(500mm)	m2	613.1	
	SAND COMPACTED	(200mm)	m2	613.1	
SIDE WALK S	Side Walk S				
	EXPOSE AGGREGATE FINISHED FOOTPATH	(75mm)	m2	46.4	
	HARD CORE WITH COMPACTED SAND	(200mm)	m2	46.4	
	SAND COMPACTED	(300mm)	m2	102.4	41.9m3

Quantities of Pavement			
ITEM	CALCULATION	UNIT	QUANTITY
PAVEMENT RC PAVEMENT G-30(200mm)	A = See calculation for Pavement = 613.1	m2	613.1
Lean CONCRETE 1:3:6(80mm)	A = See calculation for Pavement = 613.1	m2	613.1
PLASTIC SHEET	A = See calculation for Pavement = 613.1	m2	613.1
HARD CORE WITH SAND ROLLER MACHINE COMPACTED CBR>10%(500mm)	A = See calculation for Pavement = 613.1	m2	613.1
SAND COMPACTED (200mm)	A = See calculation for Pavement = 613.1	m2	613.1
SIDE WALK S EXPOSE AGGREGATE FINISHED FOOTPATH (75mm)	A = See calculation for Pavement = 46.4	m2	46.4
HARD CORE WITH COMPACTED SAND (200mm)	A = See calculation for Pavement = 46.4	m2	46.4
SAND COMPACTED (300mm)	A = See calculation for Pavement = 102.4 V = 102.40 × 0.50 - 46.40 × 0.20 = 41.9	m2 m3	102.4 41.9

RC PAVEMENT

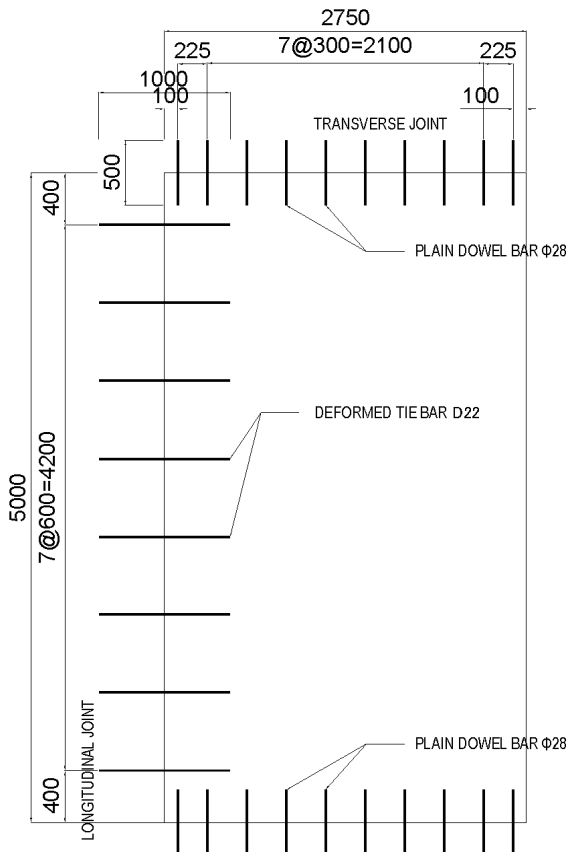
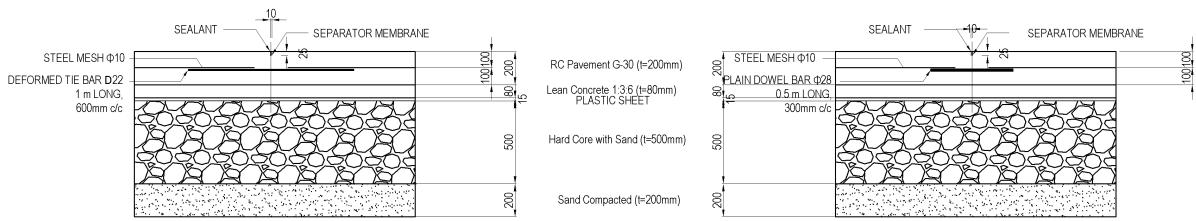
ITEM	DESCRIPTION	UNIT	UNIT QUANTITY	QUANTITY	REMARKS
			Per 2.75×5.00m(13.75m ²)	Per 613.1 m ²	
RC PAVEMENT	t=200 G-30	m ²	13.75	613.1	
STEEL MESH	Φ10 @150mmc/c	m ²	13.01	579.9	
		kg	113.28	5,051	
TRANSVERSE JOINT	PLAIN DOWEL BAR	m	5.00	223	@300mm
	Φ28	kg	24.20	1,079	
LONGITUDINAL JOINT	DEFORMED TIE BAR	m	8.00	356.7	@600mm
	D22	kg	24.32	1,084	
LEAN CONCRETE	t=80 1:3:6	m ²	13.75	613.1	
PLASTIC SHEET		m ²	13.75	613.1	
HARD CORE WITH SAND	CBR>10% 't=500	m ²	13.75	613.1	
SAND COMPACTED	t=200	m ²	13.75	613.1	

RC PAVEMENT

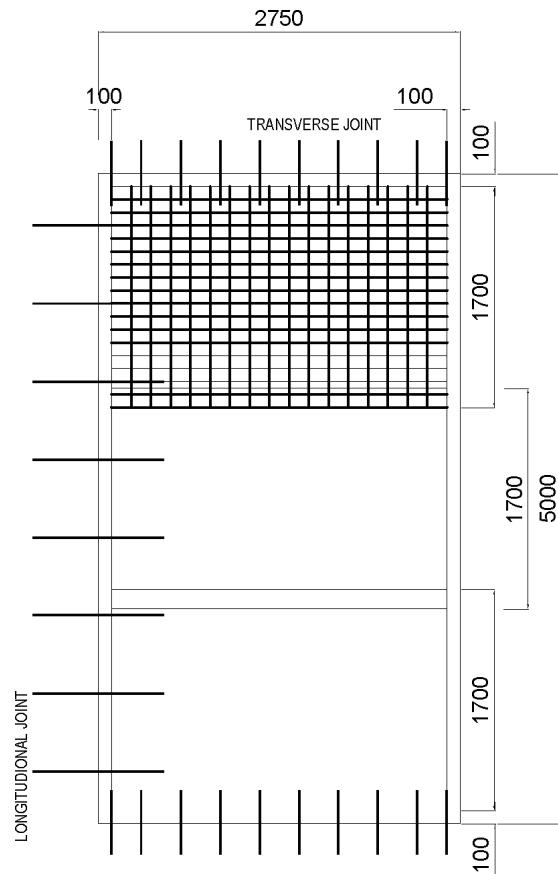
Unit Quantities

Per 2.75×5.00m(13.75m²)

ITEM	CALCULATION	QUANTITY
RC PAVEMENT t=200 G-30	A= 2.75×5.00 = 13.750	13.8 m ²
STEEL MESH Φ10 @150mmc/c φ 10=0.617kg/m	A= 2.55×1.70×3 = 13.005 W= (18 × 1.70+12 × 2.55) × 0.617 × 3 = 113.281	13.0 m ² 113.3 kg
TRANSVERSE JOINT PLAIN DOWEL BAR @300mm φ 28	L= 0.50×10 = 5.000 W= 5.00 × 4.834 = 24.170	5.0 m 24.2 kg
LONGITUDINAL JOINT DEFORMED TIE BAR @600mm D22	L= 1.00×8 = 8.000 W= 8.00 × 3.04 = 24.320	8.0 m 24.3 kg 0
LEAN CONCRETE t=80 1:3:6	A= 2.75×5.00 = 13.750	13.8 m ²
PLASTIC SHEET	A= 2.75×5.00 = 13.750	13.8 m ²
HARD CORE WITH SAND t=500	A= 2.75×5.00 = 13.750	13.8 m ²
SAND COMPACTED t=200	A= 2.75×5.00 = 13.750	13.8 m ²



JOINT ARRANGEMENT S = 1:50



STEEL MESH ARRANGEMENT S = 1:50

3) MISCELLANEOUS

SCHEDULE OF MISCELLANEOUS					
ITEM	DESCRIPTION		UNIT	QUANTITY	REMARKS
KERB			set	1	
	CONCRETE KERB	TYPE D	m	29.5	
GUARDRAIL AND PIPE					
	GARDRAIL	TYPE A(GR-A)	m	43.3	

SCHEDULE OF MISCELLANEOUS

UNIT : m

CONCRETE KERB TYPE D			GARDRAIL TYPE A (GR-A)					
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
L	0 + 11.60 ~ 0 + 37.81	29.5	L	0 + 9.50 ~ 0 + 37.81	43.3			
total		29.5	total		43.3	total		

4)ROAD MARKINGS

SCHEDDULE OF ROAD MARKING					
ITEM	DESEPTION		UNIT	QUANTITY	REMARKS
ROAD MARKINGS					
	ROAD MARKINGS	unbroken ,white W=15cm	m	202.4	
		unbroken ,white W=8cm	m	29.0	
		broken ,white W=8cm	m	6.0	
		unbroken ,white W=30cm	m	13.7	
		unbroken ,white W=45cm	m	56.8	
		Arrow Mark ,white	each	3	

1 set

ROAD MARKINGS				
ITEM	CALCULATION		UNIT	QUANTITY
Road Markings unbroken ,white W=15cm	Edge Line	= 202.4	m	202.4
		total = 202.4		
unbroken ,white W=8cm	Lane Line	= 29.0	m	29.0
		total = 29.0		
broken ,white W=8cm	Lane Line	= 6.0	m	6.0
		total = 6.0		
unbroken ,white W=30cm	Stop Line	= 13.7	m	13.7
		total = 13.7		
unbroken ,white W=45cm	Zebra Zone	= 56.8	m	56.8
		total = 56.8		
Arrow Mark white	Straight and Right Turn	= 1	each	3
	Left Turn	= 2		
		total = 3		

SCHEDULE OF ROAD MARKING

UNIT : m

Edge Line (unbroken ,white) W=15cm			Lane Line(unbroken ,white) W=8cm			Lane Line(broken ,white) W=8cm			
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH	
L	0 + 11.60 ~ 0 + 37.81	27.6	L	0 + 26.30 ~ 0 + 37.81	5.8	R	0 + 20.00 ~ 0 + 37.81	6.0	
L	0 + 7.90 ~ 0 + 14.10	18.5	L	0 + 14.40 ~ 0 + 37.81	23.2				
L	0 + 14.40 ~ 0 + 26.20	34.9							
R	0 + 9.50 ~ 0 + 20.00	40.8							
R	0 + 9.50 ~ 0 + 37.81	34.1							
L	0 + 14.40 ~ 0 + 37.81	46.5							
total		202.4	total		29.0			total 6.0	

SCHEDULE OF ROAD MARKING

UNIT : m

Stop Line (unbroken,white) W=30cm			Zebra Zone (unbroken,white) W=45cm					
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
L	0 + 13.90	13.7	L	0 + 7.90 ~ 0 + 14.10	14.3			
			L	0 + 14.40 ~ 0 + 26.40	7.0			
			L	0 + 14.40 ~ 0 + 37.80	21.2			
			R	0 + 7.90 ~ 0 + 17.00	14.3			
total		13.7	total		56.8		total	

2.YANGON ACCESS LINE
GRAND SUMMARY

GRAND SUMMARY

ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS
EARTHWORK					
	EXCAVATION				
		EXCAVATION	m3	470	
	EMBANKMENT				
		EMBANKMENT	m3	210	
	REMOVAL OF SURPLUS SOIL				
		REMOVAL OF SURPLUS SOIL	m3	230	
	TRIMMING OF SLOPE				
		SLOPE OF EMBANKMENT	m2	270	
		CUT SLOPE	m2	10	
	SLOPE PROTECTION				
		SODDING	m2	270	
PAVEMENT					
	TRAVELLED WAY	TYPE E6			
		AC SURFACE COURSE (50mm)	m2	910	
		TACK COAT 0.4/m2	l	360	
		AC SURFACE BASE (50mm)	m2	910	
		PRIME COAT 0.4/m2	l	360	
		BASE COURSE (150mm)	m2	940	
		SUB BASE (150mm)	m2	980	
	SIDE WALK				
		PRECAST CONCRETE PAVING BLOCK (300mm×300mm×60mm)	m2	220	
		SAND (30mm)	m2	220	
		SOIL AGGREGATE C-30(t=100mm)	m2	220	

GRAND SUMMARY

ITEM	DESCRIPTION			UNIT	QUANTITY	OTHERS
MISCELLANEOUS						
	KERB					
		CONCRETE KERB	TYPE A-1	m	191	
ROAD MARKINGS						
	ROAD MARKINGS					
		unbroken ,white W=15cm		m	377	

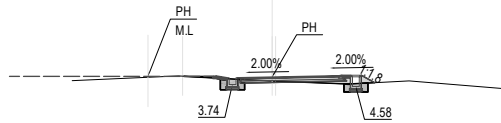
1)EARTHWORK

EARTHWORK OF SCHEDULE					
1 set					
ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS
EXCAVATION			set	1	
	MECHANIZED EXCAVATION		m3	463.8	
EMBANKMENT			set	1	
	EMBANKMENT	2.5m > W	m3	17.1	
		2.5 ≤ W < 4.0	m3	51.5	
		W < 4.0	m3	143.7	
		TOTAL	m3	212.3	
			set	1	
REMOVAL OF SURPLUS SOIL			set	1	
	REMOVAL OF SURPLUS SOIL		m3	227.9	
TRIMMING OF SLOPE					
	SLOPE OF EMBANKMENT		m2	272.1	
	CUT SLOPE		m2	5.4	
SLOPE PROTECTION					
	SODDING		m2	272.1	

Quantities of Earthwork					
ITEM	CALCULATION			UNIT	QUANTITY
EXCAVATION MECHANIZED EXCAVATION	V =	=	463.8	m3	463.8
EMBANKMENT EMBANKMENT	2.5m > W V =	=	17.1	m3	17.1
	2.5 ≤ W < 4.0 V =	=	51.5	m3	51.5
	W < 4.0 V =	=	143.7	m3	143.7
		Total	212.3		
REMOVAL OF SURPLUS SOIL REMOVAL OF SURPLUS SOIL	V = (463.8 + 0.0) - (212.3 + 0.0) × 1/0.9	=	227.9	m3	227.9
TRIMMING OF SLOPE SLOPE OF EMBANKMENT	A =	=	272.1	m2	272.1
CUT SLOPE	A =	=	5.4	m2	5.4
SLOPE PROTECTION SODDING	A =	=	272.1	m2	272.1

CROSS SECTION Yangon Access Line (1) S=1:400

STA.0+20
GH=4.997
PH=5.277
(Thilawa Access Line)
STA.0+16.478
PH=5.348
(R62)
STA.0+19.992

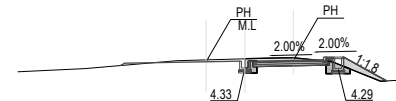


DL=0

MECHANIZED EXCAVATION	0.6 m ²	
EMBANKMENT	1.1 m ²	
EXCAVATION FOR FOUNDATION	1.3 m ²	1.1 m ²
BUCKFILL	0.6 m ²	0.6 m ²
SLOPE OF EMBANKMENT	m 1.2 m	
CUT SLOPE	m m	
SODDING	m m	

W ≥ 4.0

STA.0+60
GH=5.089
PH=4.888
(Thilawa Access Line)
STA.0+55.459
PH=4.790



DL=0

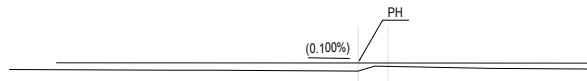
MECHANIZED EXCAVATION	3.2 m ²	
EMBANKMENT	1.5 m ²	
EXCAVATION FOR FOUNDATION	0.6 m ²	1.2 m ²
BUCKFILL	0.3 m ²	0.6 m ²
SLOPE OF EMBANKMENT	m 3.7 m	
CUT SLOPE	m m	
SODDING	m m	

2.5 ≤ W < 4.0

PAVEMENT: 4.97
SIDE WALK PAVE: 0.50

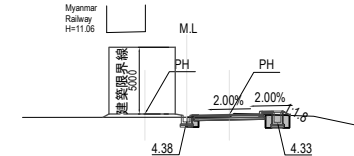
STA.0+1.033
GH=5.032
PH=5.641

(R62)
STA.0+0.744



DL=0

STA.0+40
GH=4.732
PH=4.924
(Thilawa Access Line)
STA.0+36.328
PH=4.965



DL=0

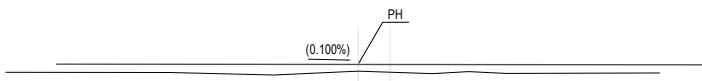
MECHANIZED EXCAVATION	1.6 m ²	
EMBANKMENT	0.2 m ²	
EXCAVATION FOR FOUNDATION	0.6 m ²	1.7 m ²
BUCKFILL	0.3 m ²	0.9 m ²
SLOPE OF EMBANKMENT	m 0.7 m	
CUT SLOPE	m m	
SODDING	m m	

W < 2.5

PAVEMENT: 4.55
SIDE WALK PAVE: 0.50

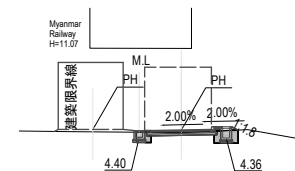
STA.0+0.788(MainRoute STA.0+31.434)
GH=5.168
PH=5.664

(R62)
STA.-0+0.323



DL=0

STA.0+37.628
GH=4.766
PH=4.953
(Thilawa Access Line)
STA.0+33.948
PH=5.002



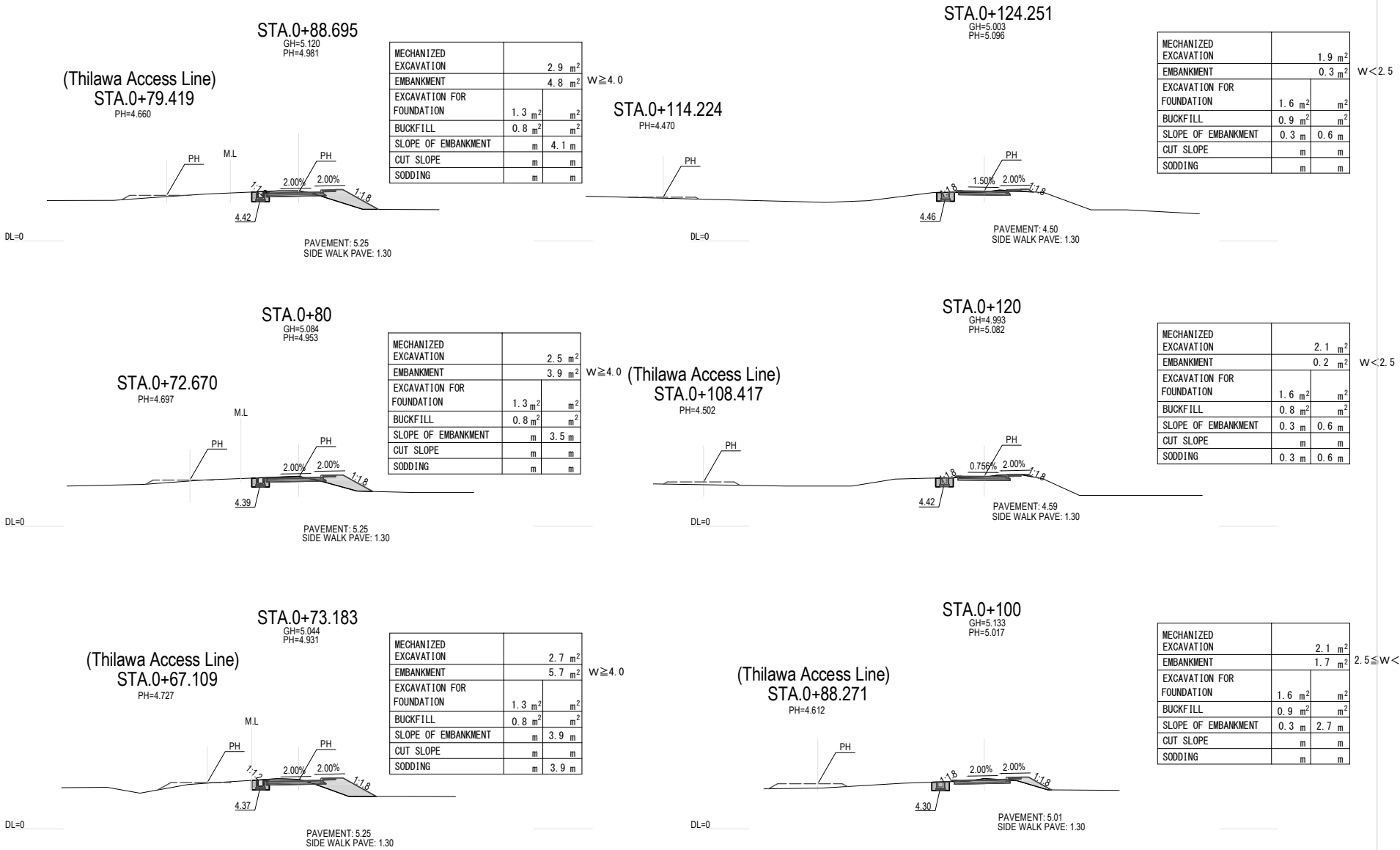
DL=0

MECHANIZED EXCAVATION	1.3 m ²	
EMBANKMENT	0.2 m ²	
EXCAVATION FOR FOUNDATION	0.8 m ²	1.7 m ²
BUCKFILL	0.3 m ²	0.9 m ²
SLOPE OF EMBANKMENT	m 0.5 m	
CUT SLOPE	m m	
SODDING	m m	

W < 2.5

PAVEMENT: 4.50
SIDE WALK PAVE: 0.50

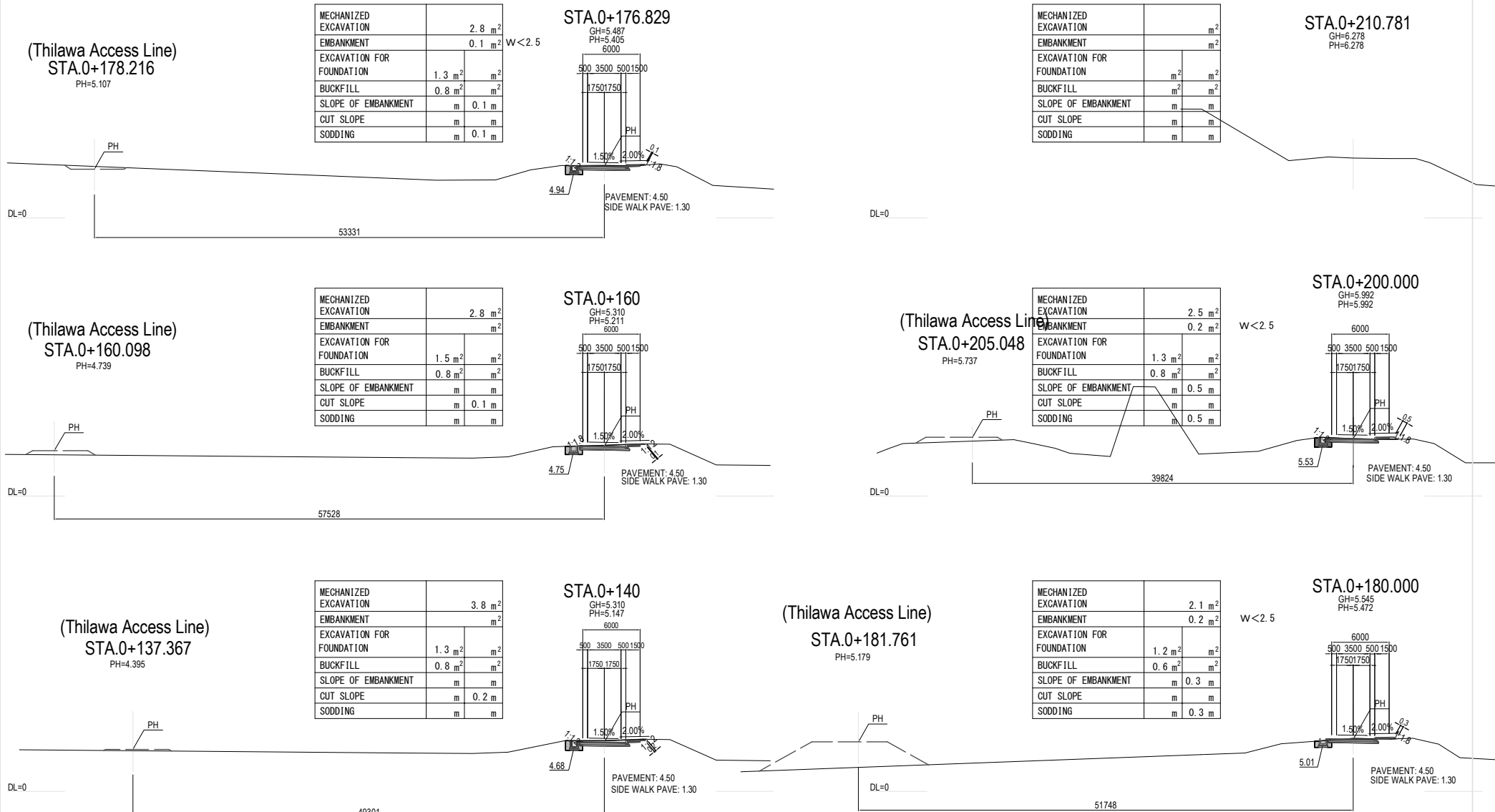
CROSS SECTION Yangon Access Line (2) S=1:400



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PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NAME</th> <th>SIGNATURE</th> <th>DATE</th> </tr> <tr> <td>PREPARED BY M. TOMITA</td> <td></td> <td>15 JUNE 2017</td> </tr> <tr> <td>CHECKED BY T. HAYAKAWA</td> <td></td> <td>20 JUNE 2017</td> </tr> <tr> <td>APPROVED BY Y. SANO</td> <td></td> <td>21 JUNE 2017</td> </tr> </table>	NAME	SIGNATURE	DATE	PREPARED BY M. TOMITA		15 JUNE 2017	CHECKED BY T. HAYAKAWA		20 JUNE 2017	APPROVED BY Y. SANO		21 JUNE 2017	DRAWING TITLE CROSS SECTION (2) (Yangon Access Line)	PACKAGE DWG No.
NAME	SIGNATURE	DATE																
PREPARED BY M. TOMITA		15 JUNE 2017																
CHECKED BY T. HAYAKAWA		20 JUNE 2017																
APPROVED BY Y. SANO		21 JUNE 2017																

CROSS SECTION Yangon Access Line (3) S=1:400



MECHANIZED EXCAVATION	2.8	m ²
EMBANKMENT	0.1	m ²
EXCAVATION FOR FOUNDATION	1.3	m ²
BUCKFILL	0.8	m ²
SLOPE OF EMBANKMENT	m	0.1 m
CUT SLOPE	m	m
SODDING	m	0.1 m

MECHANIZED EXCAVATION		m ²
EMBANKMENT		m ²
EXCAVATION FOR FOUNDATION		m ²
BUCKFILL		m ²
SLOPE OF EMBANKMENT		m
CUT SLOPE		m
SODDING		m

MECHANIZED EXCAVATION	2.8	m ²
EMBANKMENT		m ²
EXCAVATION FOR FOUNDATION	1.5	m ²
BUCKFILL	0.8	m ²
SLOPE OF EMBANKMENT	m	m
CUT SLOPE	m	0.1 m
SODDING	m	m

MECHANIZED EXCAVATION	2.5	m ²
EMBANKMENT	0.2	m ²
EXCAVATION FOR FOUNDATION	1.3	m ²
BUCKFILL	0.8	m ²
SLOPE OF EMBANKMENT	m	0.5 m
CUT SLOPE		m
SODDING	m	0.5 m

MECHANIZED EXCAVATION	3.8	m ²
EMBANKMENT		m ²
EXCAVATION FOR FOUNDATION	1.3	m ²
BUCKFILL	0.8	m ²
SLOPE OF EMBANKMENT	m	m
CUT SLOPE	m	0.2 m
SODDING	m	m

MECHANIZED EXCAVATION	2.1	m ²
EMBANKMENT	0.2	m ²
EXCAVATION FOR FOUNDATION	1.2	m ²
BUCKFILL	0.6	m ²
SLOPE OF EMBANKMENT	m	0.3 m
CUT SLOPE		m
SODDING	m	0.3 m

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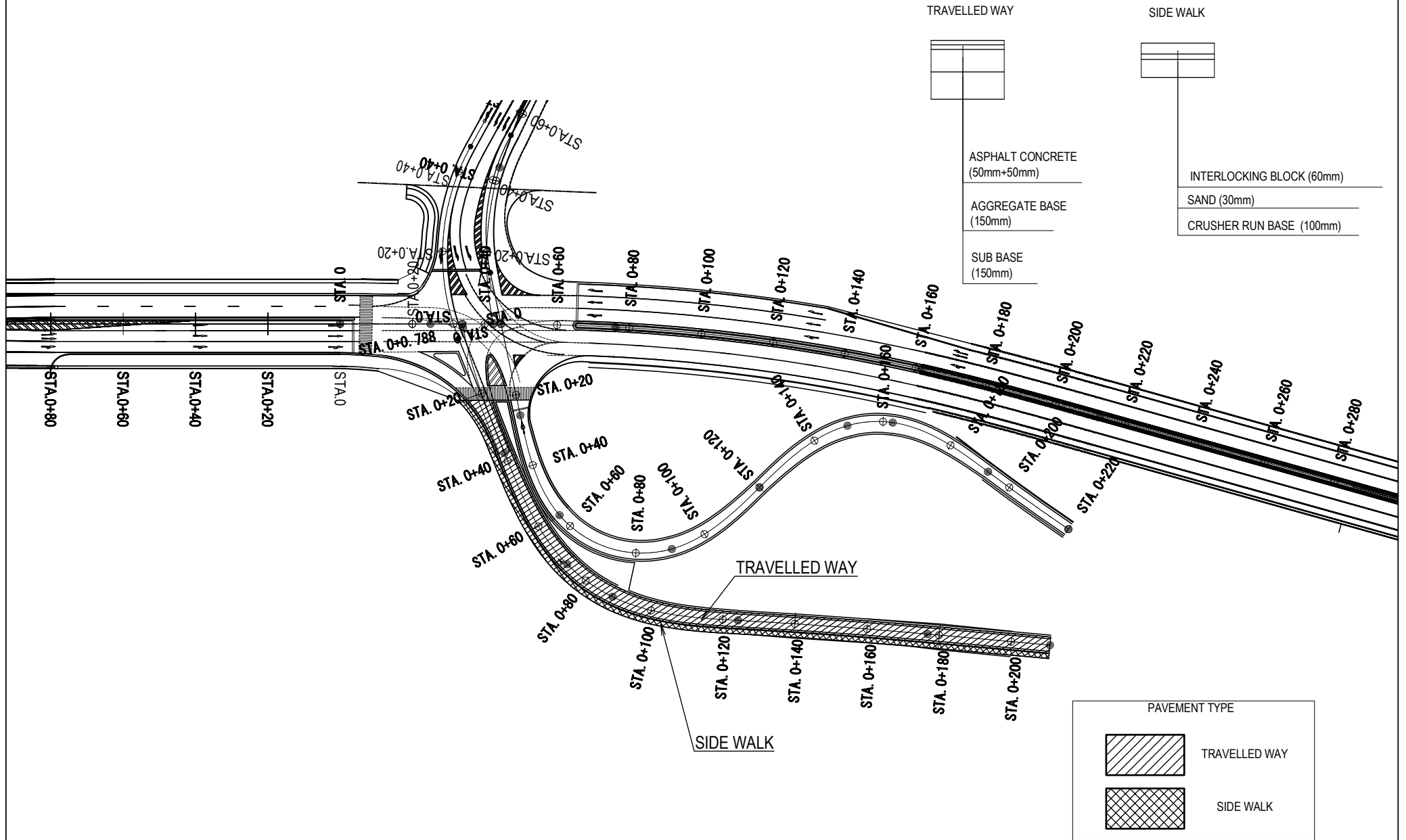
2)PAVEMENT

SCHEDULE OF PAVEMENT				
				1 set
ITEM	DESCRIPTION	UNIT	QUANTITY	REMARKS
PAVEMENT				
TRAVELLED WAY	Type E6			
	AC SURFACE COURSE (50mm)	m2	908.3	
	TACK COAT 0.4/m2	l	363.3	
	AC SURFACE (50mm)	m2	908.3	
	PRIME COAT 0.4/m2	l	363.3	
	BASE COURSE (150mm)	m2	938.5	
	SUB BASE (150mm)	m2	983.8	
PAVEMENT				
SIDE WALK				
	PRECAST PAVING BLOCK (300mm×300mm×60mm)	m2	210.9	
	SAND (30mm)	m2	210.9	
	SOIL AGGREGATE C-30(t=100mm)	m2	210.9	

PAVEMENT						
ITEM	DESCRIPTION				UNIT	QUANTITY
PAVEMENT TRAVELLED WAY						
AC SURFACE COURSE (50mm)	A =	See calculation for Pavement	=	908.3	m2	908.3
TACK COAT 0.4/m2	V=	0.40 × 908.30	=	363.3	l	363.3
AC SURFACE BASE (50mm)	A=	See calculation for Pavement	=	908.3	m2	908.3
PRIME COAT 0.4/m2	V=	0.40 × 908.30	=	363.3	l	363.3
BASE COURSE (150mm)	A =	See calculation for Pavement	=	908.3	m2	938.5
		Edge of Shoulder 0.16 × 188.80	=	30.2		
			Total =	938.5		
SUB BASE (150mm)	A =	See calculation for Pavement	=	908.3	m2	983.8
		Edge of Shoulder 0.40 × 188.80	=	75.5		
			Total =	983.8		
SIDE WALK PRECAST CONCRETE PAVING BLOCK (300mm × 300mm × 60mm)	A =	See calculation for Pavement	=	210.9	m2	210.9
SAND (30mm)	A =		=	210.9	m2	210.9
SOIL AGGREGATE C-30(t=100mm)	A =		=	210.9	m2	210.9

PAVEMENT PLAN (Yangon Access Line)

S=1:1000



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PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE PAVEMENT PLAN (Yangon Access Line)	PACKAGE DWG No.	
				PREPARED BY	M. TOMITA				15 JUNE 2017
				CHECKED BY	T. HAYAKAWA				20 JUNE 2017
				APPROVED BY	Y. SANO				21 JUNE 2017

3) MISCELLANEOUS

SCHEDULE OF MISCELLANEOUS

ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS
KERB			set	1	
	CONCRETE KERB	TYPE A-1	m	190.8	

4)ROAD MARKING

ROAD MARKINGS			
ITEM	FORMURA	UNIT	QUANTITY
Road Markings unbroken ,white W=15cm	Edge Line		
	= 377.1		
	total = 377.1	m	377.1

SCHEDULE OF ROAD MARKING

UNIT : m

Edge Line (unbroken ,white) W=15cm													
R/L	STATION					LENGTH	R/L	STATION					LENGTH
L	0	+ 20.23	~	0	+ 210.00	184.4							
R	0	+ 22.00	~	0	+ 210.00	192.7							
total						377.1	total						
							total						

3.THILAWA ACCESS LINE
GRAND SUMMARY

GRAND SUMMARY

ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS
EARTHWORK					
	EXCAVATION				
		MECHANIZED EXCAVATION	m3	470	
	EMBANKMENT				
		EMBANKMENT	m3	60	
	REMOVAL OF SURPLUS SOIL				
		REMOVAL OF SURPLUS SOIL	m3	410	
	TRIMMING OF SLOPE				
		SLOPE OF EMBANKMENT	m2	120	
		CUT SLOPE	m2	10	
	SLOPE PROTECTION				
		SODDING	m2	120	
PAVEMENT					
	TRAVELLED WAY	Type E6			
		AC SURFACE COURSE	(50mm)	m2	1050
		TACK COAT	0.4/m2	l	420
		AC SURFACE BASE	(50mm)	m2	1050
		PRIME COAT	0.4/m2	l	420
		BASE COURSE	(150mm)	m2	1080
		SUB BASE	(150mm)	m2	1130
	SIDE WALK				
		PRECAST CONCRETE PAVING BLOCK	(300mm×300mm×60mm)	m2	52
		SAND	(30mm)	m2	52
		SOIL AGGREGATE	C-30(t=100mm)	m2	52

GRAND SUMMARY

ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS	
MISCELLANEOUS						
	KERB					
		CONCRETE KERB	TYPE A-1	m	40	
	GUARDRAIL	TYPE B (GR-B)		m	131	
	ROAD MARKINGS					
	ROAD MARKINGS					
		unbroken ,white W=15cm		m	393	
		unbroken ,white W=30cm		m	4	
		Arrow Mark ,white		each	1	

1)EARTHWORK

EARTHWORK OF SCHEDULE					
				UNIT:SET	
ITEM	DESCRIPTION		UNIT	QUANTITY	REMARKS
EXCAVATION			set	1	
	MECHANIZED EXCAVATION		m3	472.9	
EMBANKMENT			set	1	
	EMBANKMENT	2.5m > W	m3	52.8	
		2.5 ≤ W < 4.0	m3	0.0	
		W < 4.0	m3	3.2	
		TOTAL	m3	56.0	
REMOVAL OF SURPLUS SOIL			set	1	
	REMOVAL OF SURPLUS SOIL		m3	410.7	
TRIMMING OF SLOPE					
	SLOPE OF EMBANKMENT		m2	124.3	
	CUT SLOPE		m2	11.5	
SLOPE PROTECTION			set	1	
	SODDING		m2	124.3	

EARTHWORK OF SCHEDULE					
ITEM	CALCULATION			UNIT	QUANTUTY
EXCAVATION MECHANIZED EXCAVATION	$V =$	$=$	472.9	m3	472.9
EMBANKMENT EMBANKMENT	$2.5m > W$ $V =$	$=$	52.8	m3	52.8
	$2.5 \leq W < 4.0$ $V =$	$=$	0.0	m3	0.0
	$W > 4.0$ $V =$	$=$	3.2	m3	3.2
		Total	56.0		
REMOVAL OF SURPLUS SOIL REMOVAL OF SURPLUS SOIL	$V = (472.9 + 0.0)$ $-(56.0 + 0.0) \times 1/0.9$	$=$	410.7	m3	410.7
TRIMMING OF SLOPE SLOPE OF EMBANKMENT	$A =$	$=$	124.3	m2	124.3
CUT SLOPE	$A =$	$=$	11.5	m2	11.5
SLOPE PROTECTION SODDING	$A =$	$=$	124.3	m2	124.3

TRIMMING OF SLOPE

No.1

STATION	DISTANCE (m)	SLOPE OF EMBANKMENT						CUT SLOPE						REMARKS	
		LEFT			RIGHT			LEFT			RIGHT				
		Length (m)	Average (m)	Area (m2)	Length (m)	Average (m)	Area (m2)	Length (m)	Average (m)	Area (m2)	Length (m)	Average (m)	Area (m2)		
No. 0 + 21.484		1.4			0.0										
No. 0 + 25.800	4.3	0.4	0.90	3.9	1.1	0.55	2.4								
No. 0 + 40.000	14.2	0.0	0.20	2.8	0.0	0.55	7.8								
No. 0 + 55.800	15.8	0.2	0.10	1.6											
No. 0 + 60.000	4.2	0.3	0.25	1.1											
No. 0 + 80.000	20.0	0.7	0.50	10.0	0.0										
No. 0 + 90.053	10.1	0.9	0.80	8.1	1.1	0.55	5.6								
No. 0 + 100.000	9.9	0.1	0.50	5.0	1.0	1.05	10.4								
No. 0 + 120.000	20.0	0.2	0.15	3.0	0.1	0.55	11.0								
No. 0 + 140.000	20.0	0.6	0.40	8.0	0.2	0.15	3.0								
No. 0 + 150.053	10.1	0.1	0.35	3.5	0.3	0.25	2.5	0.0							
No. 0 + 160.000	9.9	0.0	0.05	0.5	0.0	0.15	1.5	0.7	0.35	3.5					
No. 0 + 162.708	2.7	0.0	0.00	0.0				0.7	0.70	1.9					
No. 0 + 180.000	17.3	0.2	0.10	1.7				0.0	0.35	6.1					
No. 0 + 192.708	12.7	0.6	0.40	5.1	0.0										
No. 0 + 200.000	7.3	0.4	0.50	3.7	0.3	0.15	1.1								
No. 0 + 220.000	20.0	1.4	0.90	18.0	0.0	0.15	3.0								
Subtotal				76.0			48.3			11.5				0.0	
Total						LRTotal	124.3					LRTotal		11.5	

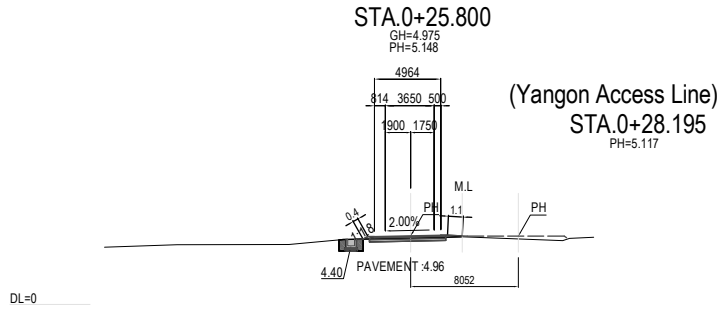
SLOPE PROTECTION

No.1

STATION	DISTANCE (m)	SODDING												REMARKS	
		LEFT			RIGHT										
		Length (m)	Average (m)	Area (m2)	Length (m)	Average (m)	Area (m2)	Length (m)	Average (m)	Area (m2)	Length (m)	Average (m)	Area (m2)		
No. 0 + 21.484		1.4			0.0										
No. 0 + 25.800	4.3	0.4	0.90	3.9	1.1	0.55	2.4								
No. 0 + 40.000	14.2	0.0	0.20	2.8	0.0	0.55	7.8								
No. 0 + 55.800	15.8	0.2	0.10	1.6											
No. 0 + 60.000	4.2	0.3	0.25	1.1											
No. 0 + 80.000	20.0	0.7	0.50	10.0	0.0										
No. 0 + 90.053	10.1	0.9	0.80	8.1	1.1	0.55	5.6								
No. 0 + 100.000	9.9	0.1	0.50	5.0	1.0	1.05	10.4								
No. 0 + 120.000	20.0	0.2	0.15	3.0	0.1	0.55	11.0								
No. 0 + 140.000	20.0	0.6	0.40	8.0	0.2	0.15	3.0								
No. 0 + 150.053	10.1	0.1	0.35	3.5	0.3	0.25	2.5								
No. 0 + 160.000	9.9	0.0	0.05	0.5	0.0	0.15	1.5								
No. 0 + 162.708	2.7	0.0	0.00	0.0											
No. 0 + 180.000	17.3	0.2	0.10	1.7											
No. 0 + 192.708	12.7	0.6	0.40	5.1	0.0										
No. 0 + 200.000	7.3	0.4	0.50	3.7	0.3	0.15	1.1								
No. 0 + 220.000	20.0	1.4	0.90	18.0	0.0	0.15	3.0								
Subtotal				76.0			48.3			0.0				0.0	
Total						LRTotal	124.3						LRTotal	0.0	

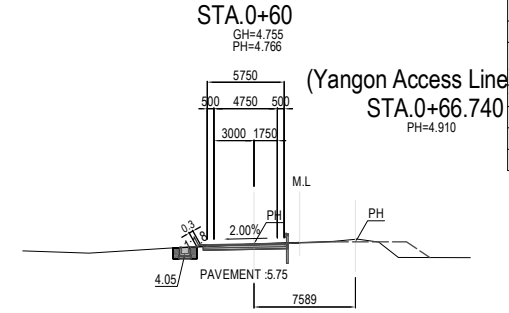
CROSS SECTION (1) (Thilawa Access Line)

S=1:400



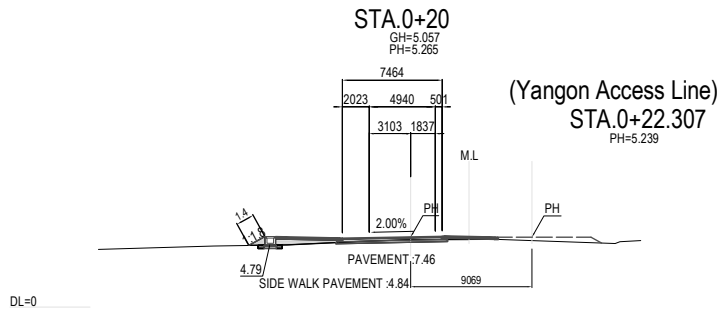
MECHANIZED EXCAVATION	1.3 m ²	
EMBANKMENT	0.3 m ²	
EXCAVATION FOR FOUNDATION	1.6 m ²	m ²
BUCKFILL	0.8 m ²	m ²
SLOPE OF EMBANKMENT	0.4 m	1.1 m
CUT SLOPE	m	m
SODDING	0.4 m	1.1 m

w<2.5



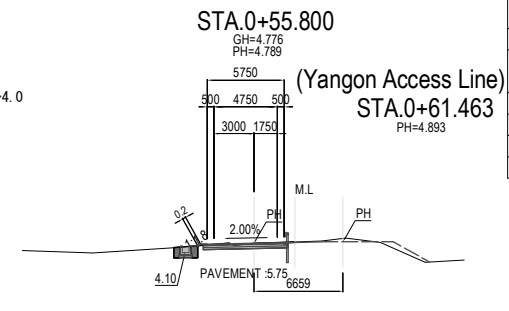
MECHANIZED EXCAVATION	2.3 m ²	
EMBANKMENT	0.1 m ²	
EXCAVATION FOR FOUNDATION	1.5 m ²	m ²
BUCKFILL	0.8 m ²	m ²
SLOPE OF EMBANKMENT	0.3 m	m
CUT SLOPE	m	m
SODDING	0.3 m	m

w<2



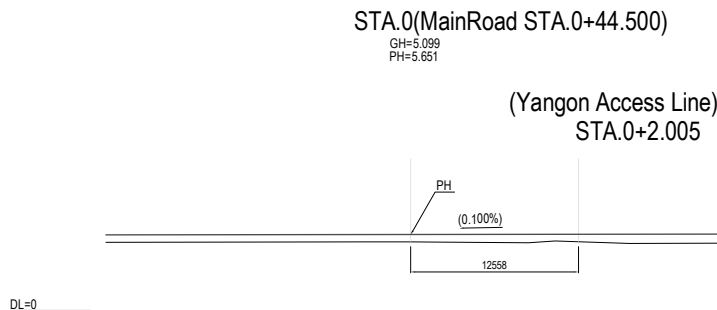
MECHANIZED EXCAVATION	1.3 m ²	
EMBANKMENT	0.5	1.5 m ²
EXCAVATION FOR FOUNDATION	0.5 m ²	m ²
BUCKFILL	0.2 m ²	m ²
SLOPE OF EMBANKMENT	1.4 m	m
CUT SLOPE	m	m
SODDING	1.4 m	m

w<2.5 w>4.0

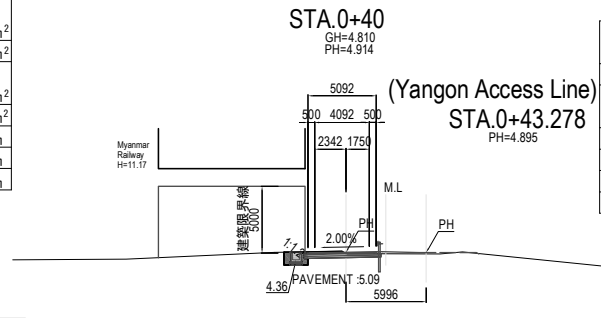


MECHANIZED EXCAVATION	2.4 m ²	
EMBANKMENT	0.1 m ²	
EXCAVATION FOR FOUNDATION	1.5 m ²	m ²
BUCKFILL	0.8 m ²	m ²
SLOPE OF EMBANKMENT	0.2 m	m
CUT SLOPE	m	m
SODDING	0.2 m	m

w<2



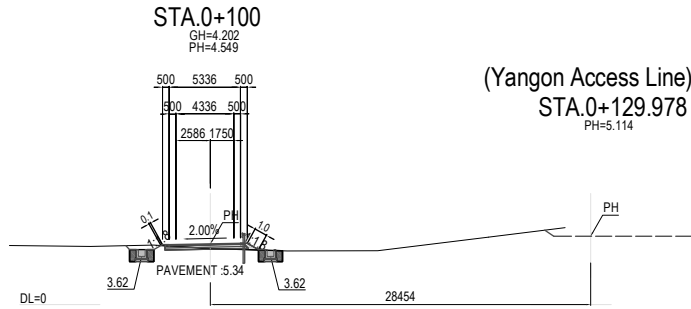
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EMBANKMENT	m ²	
EXCAVATION FOR FOUNDATION	m ²	m ²
BUCKFILL	m ²	m ²
SLOPE OF EMBANKMENT	m	m
CUT SLOPE	m	m
SODDING	m	m



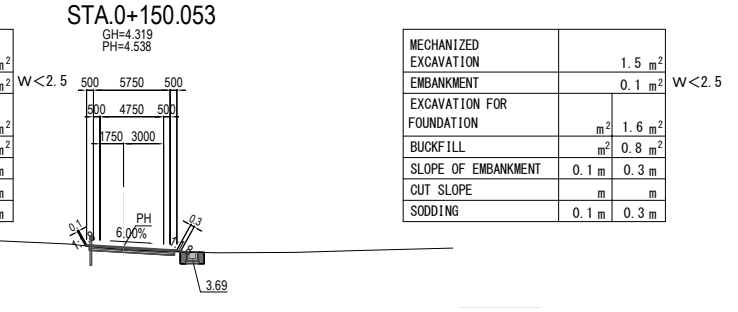
MECHANIZED EXCAVATION	2.2 m ²	
EMBANKMENT	m ²	
EXCAVATION FOR FOUNDATION	1.7 m ²	m ²
BUCKFILL	0.8 m ²	m ²
SLOPE OF EMBANKMENT	m	m
CUT SLOPE	m	m
SODDING	m	m

DL=0

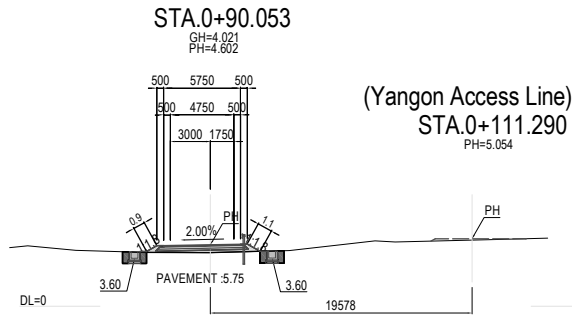
CROSS SECTION (2) (Thilawa Access Line) S=1:400



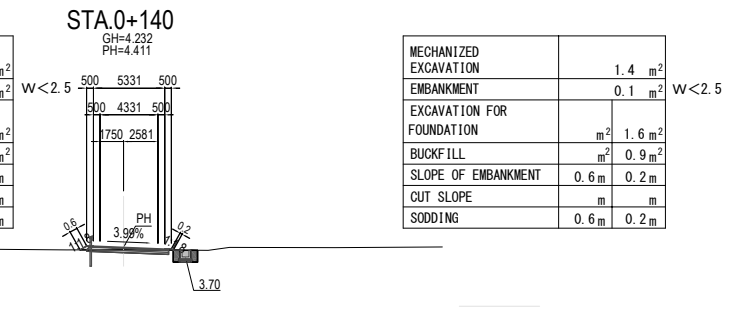
MECHANIZED EXCAVATION	0.7 m ²
EMBANKMENT	0.4 m ²
EXCAVATION FOR FOUNDATION	1.6 m ² 1.5 m ²
BUCKFILL	0.9 m ² 0.8 m ²
SLOPE OF EMBANKMENT	0.1 m 1.0 m
CUT SLOPE	m m
SODDING	0.1 m 1.0 m



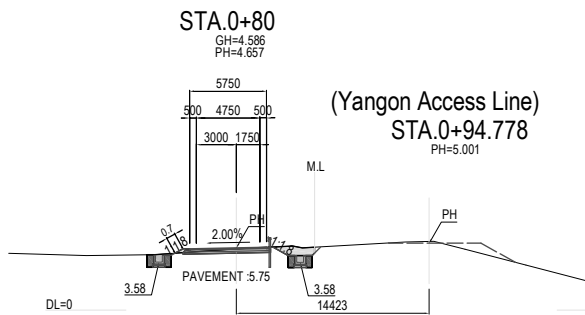
MECHANIZED EXCAVATION	1.5 m ²
EMBANKMENT	0.1 m ²
EXCAVATION FOR FOUNDATION	m ² 1.6 m ²
BUCKFILL	m ² 0.8 m ²
SLOPE OF EMBANKMENT	0.1 m 0.3 m
CUT SLOPE	m m
SODDING	0.1 m 0.3 m



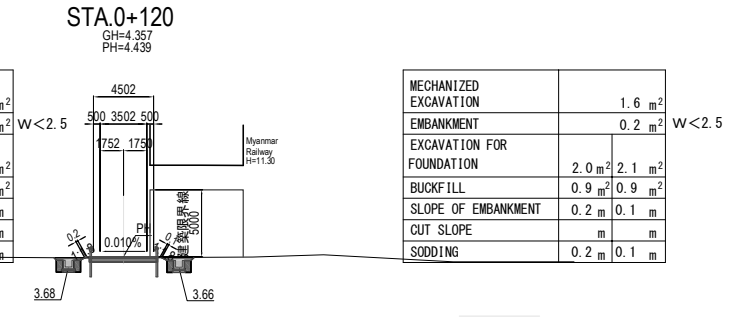
MECHANIZED EXCAVATION	m ²
EMBANKMENT	1.7 m ²
EXCAVATION FOR FOUNDATION	1.5 m ² 1.7 m ²
BUCKFILL	0.8 m ² 0.9 m ²
SLOPE OF EMBANKMENT	0.9 m 1.1 m
CUT SLOPE	m m
SODDING	m m



MECHANIZED EXCAVATION	1.4 m ²
EMBANKMENT	0.1 m ²
EXCAVATION FOR FOUNDATION	m ² 1.6 m ²
BUCKFILL	m ² 0.9 m ²
SLOPE OF EMBANKMENT	0.6 m 0.2 m
CUT SLOPE	m m
SODDING	0.6 m 0.2 m



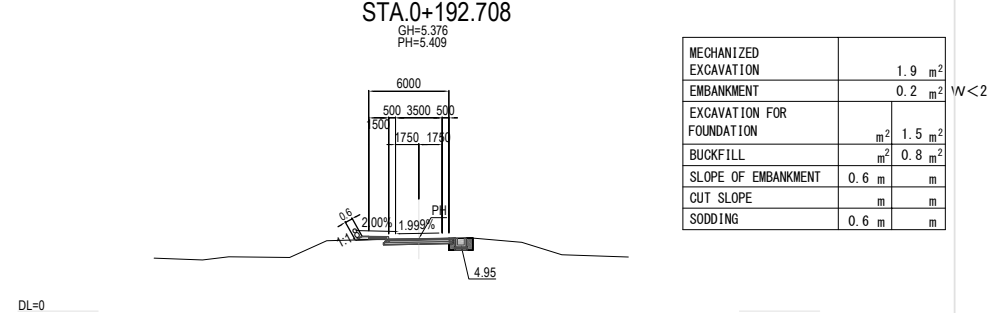
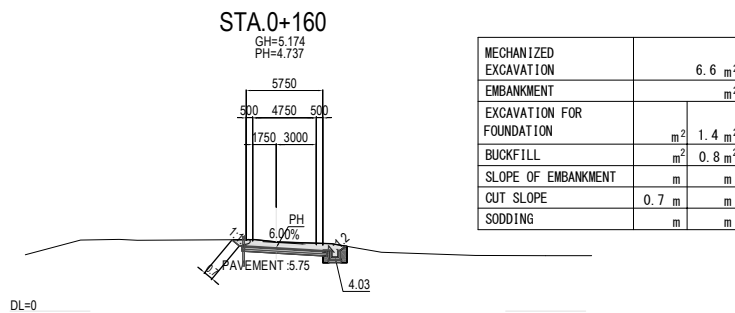
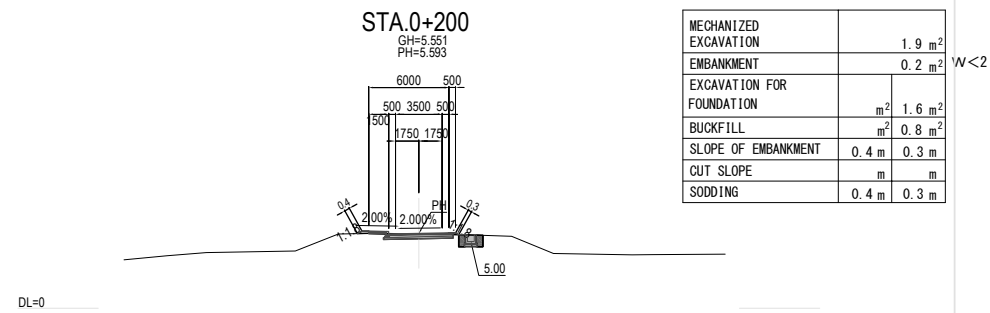
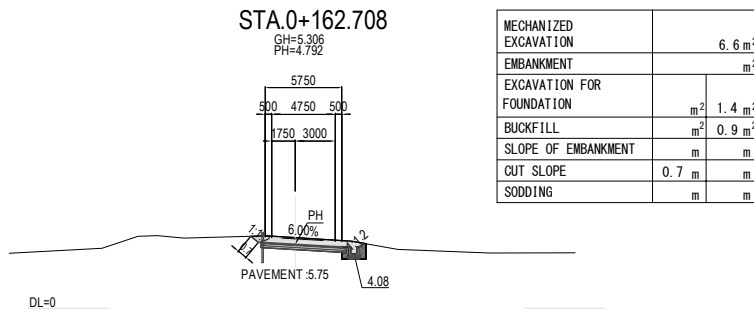
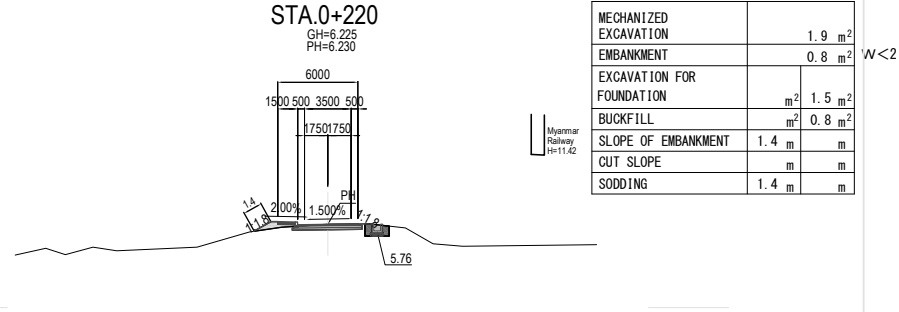
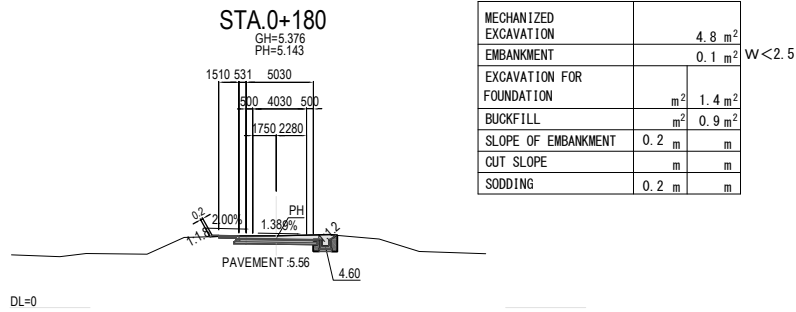
MECHANIZED EXCAVATION	3.4 m ²
EMBANKMENT	0.2 m ²
EXCAVATION FOR FOUNDATION	1.8 m ² 1.6 m ²
BUCKFILL	0.9 m ² 0.9 m ²
SLOPE OF EMBANKMENT	0.7 m m
CUT SLOPE	m m
SODDING	0.7 m m



MECHANIZED EXCAVATION	1.6 m ²
EMBANKMENT	0.2 m ²
EXCAVATION FOR FOUNDATION	2.0 m ² 2.1 m ²
BUCKFILL	0.9 m ² 0.9 m ²
SLOPE OF EMBANKMENT	0.2 m 0.1 m
CUT SLOPE	m m
SODDING	0.2 m 0.1 m

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CROSS SECTION (3) (Thilawa Access Line) S=1:400



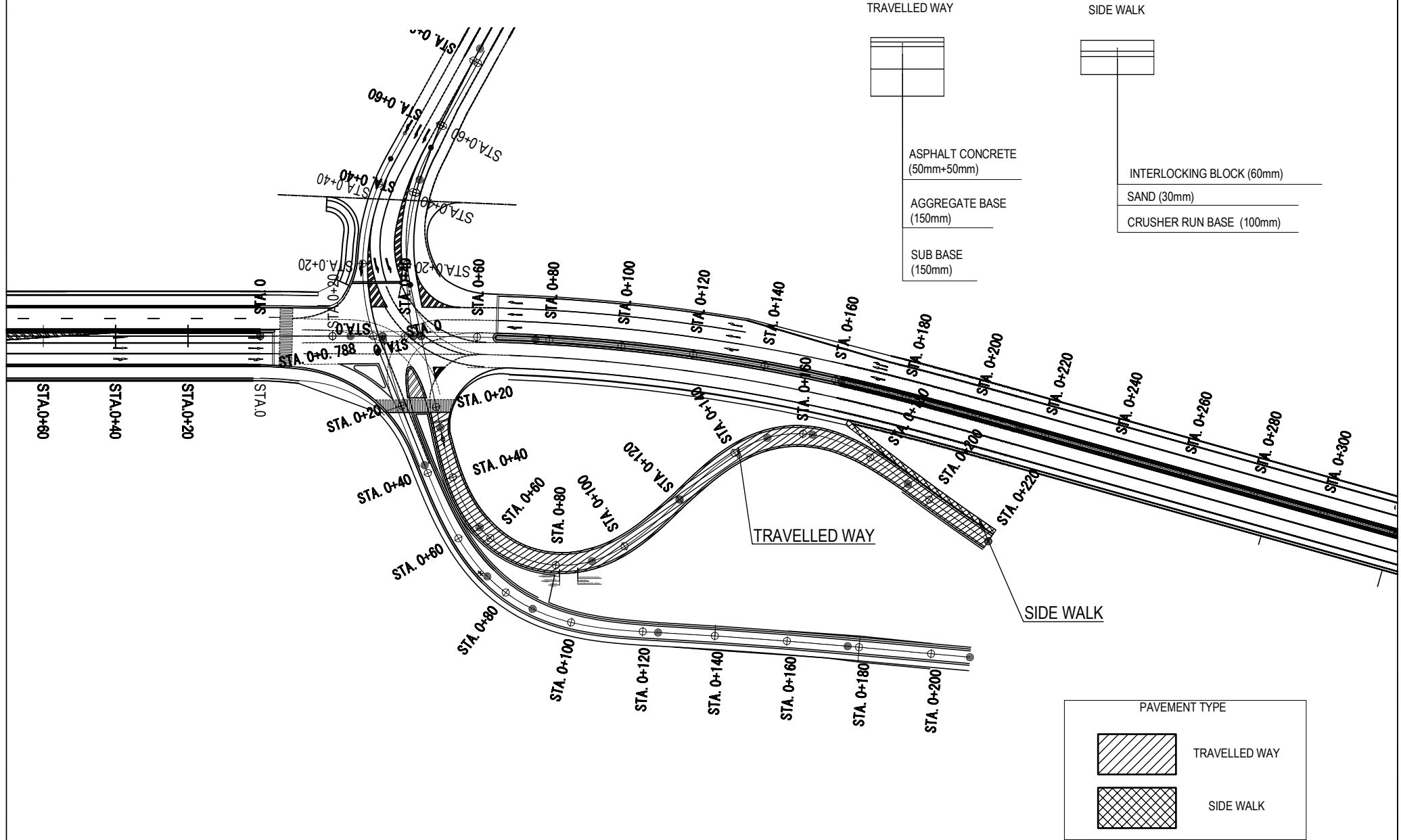
PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTRY/TEAM REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE	PACKAGE	
				PREPARED BY	M. TOMITA				15 JUNE 2017
				CHECKED BY	T. HAYAKAWA				20 JUNE 2017
APPROVED BY	Y. SANO		21 JUNE 2017	CROSS SECTION (3) (Thilawa Access Line)		DWG No.			

2)PAVEMENT

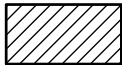
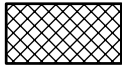
SUMMARY OF PAVEMENT					
					1 set
ITEM	DESCRIPTION	STANDARD	UNIT	QUANTITY	REMARKS
PAVEMENT					
TRAVELLED WAY	Type E6				
	AC SURFACE COURSE	(50mm)	m2	1,045.6	
	TACK COAT	0.4/m2	l	418.2	
	AC SURFACE BASE	(50mm)	m2	1,045.6	
	PRIME COAT	0.4/m2	l	418.2	
	BASE COURSE	(150mm)	m2	1,077.4	
	SUB BASE	(150mm)	m2	1,125.0	
PAVEMENT					
SIDE WALK					
	PRECAST CONCRETE PAVING BLOCK	(300mm×300mm×60mm)	m2	52.0	
	SAND	(30mm)	m2	52.0	
	SOIL AGGREGATE	C-30(t=100mm)	m2	52.0	

Quantities of Pavement						
ITEM	CALCULATION			UNIT	QUANTITY	
PAVEMENT TRAVELLED WAY						
AC SURFACE COURSE (50mm)	A =	See calculation for Pavement	=	1045.6	m ²	1,045.6
TACK COAT 0.4/m ²	V =	0.40 × 1045.60	=	418.2	l	418.2
AC SURFACE BASE (50mm)	A =	See calculation for Pavement	=	1045.6	m ²	1,045.6
PRIME COAT 0.4/m ²	V =	0.40 × 1045.60	=	418.2	l	418.2
BASE COURSE (150mm)	A =	See calculation for Pavement	=	1045.6	m ²	1,077.4
		Edge of Shoulder 0.16 × 198.50	=	31.8		
			Total =	1077.4		
SUB BASE (150mm)	A =	See calculation for Pavement	=	1045.6	m ²	1,125.0
		Edge of Shoulder 0.40 × 198.50	=	79.4		
			Total =	1125.0		
SIDE WALK PRECAST CONCRETE PAVING BLOCK (300mm×300mm×60mm)	A =	See calculation for Pavement	=	52.0	m ²	52.0
			Total	52.0		
SAND (30mm)	A =		=	52.0	m ²	52.0
SOIL AGGREGATE C-30(t=100mm)	A =		=	52.0	m ²	52.0

PAVEMENT PLAN (Thilawa Access Line) S=1:1000



TRAVELLED WAY	SIDE WALK
ASPHALT CONCRETE (50mm+50mm)	INTERLOCKING BLOCK (60mm)
AGGREGATE BASE (150mm)	SAND (30mm)
SUB BASE (150mm)	CRUSHER RUN BASE (100mm)

PAVEMENT TYPE	
	TRAVELLED WAY
	SIDE WALK

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PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY  JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART  REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	CONSULTANT  NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME M. TOMITA	SIGNATURE 	DATE 15 JUNE 2017	DRAWING TITLE PAVEMENT PLAN (Thilawa Access Line)	PACKAGE	
				PREPARED BY T. HAYAKAWA	SIGNATURE 	DATE 20 JUNE 2017			DWG No.
				CHECKED BY Y. SANO	SIGNATURE 	DATE 21 JUNE 2017			
				APPROVED BY					

3) MISCELLANEOUS

SCHEDULE OF MISCELLANEOUS					
ITEM	DESCRIPTION		UNIT	QUANTITY	REMARKS
KERB			set	1	
	CONCRETE KERB	TYPE A-1	m	40.0	
GUARDREIL	TYPE B (GR-B)		m	131.2	

SCHEDULE OF MISCELLANEOUS

UNIT : m

CONCRETE KERB TYPE A-1			GUARDRAIL TYPE B (GR-B)					
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
R	0 + 181.20 ~ 0 + 220.00	40.0	R	0 + 55.00 ~ 0 + 120.00	68.0			
			L	0 + 120.00 ~ 0 + 180.00	63.2			
total		40.0	total		131.2	total		

4)ROAD MARKING

ROAD MARKINGS				
ITEM	CALCULATION		UNIT	QUANTITY
Road Markings unbroken ,white W=15cm	Edge Line	= 393.4	m	393.4
		total = 393.4		
unbroken ,white W=8cm	Stop Line	= 4.2	m	4.2
		total = 4.2		
Arrow Mark white	Straight and Right LeftTurn	= 1	each	1
		total = 1		

SCHEDULE OF ROAD MARKING

UNIT : m

Edge Line (unbroken,white) W=15cm			Stop Line (unbroken,white) W=30cm					
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
L	0 + 22.20 ~ 0 + 220.00	194.5	C	0 + 24.10 ~ 0 + 24.10	4.2			
R	0 + 22.40 ~ 0 + 220.00	198.9						
total		393.4	total		4.2		total	

SCHEDULE OF ROAD MARKING

UNIT : NOS

Arrow Mark(Straight & Right Left Turn)								
R/L	STATION	EACH	R/L	STATION	EACH	R/L	STATION	EACH
C	0 + 27.00 ~ 0 + 31.00	1						
total		1	total			total		
L= 20.00 × 1								

**ROAD DESIGN
(PACKAGE 1)**

4. THILAWA ACCESS ROAD

THILAWA ACCESS ROAD
GRAND SUMMARY

THILAWA ACCESS ROAD

GRAND SUMMARY

ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS
EARTHWORK					
	EXCAVATION		set	1	
		EXCAVATION	m3	870	
	EMBANKMENT		set	1	
		EMBANKMENT	m3	170	
	EXCAVATION FOR FOUNDATION		set	1	
		EXCAVATION FOR FOUNDATION	m3	600	
	BUCKFILL		set	1	
		BUCKFILL	m3	260	
	REMOVAL OF SURPLUS SOIL		set	1	
		REMOVAL OF SURPLUS SOIL	m3	1180	
DRAINAGE					
	SIDE DITCH		set	1	
		800×1000-U	m	106	
		500×850-U	m	107	
		1000×1000-V	m	11	
	CATCH PIT		set	1	
		1000×1000×1350	m	4	
	INLET CURB	INLET CURB	each	23	
		CROSS DRAIN DUCT	m	64	
	BOX CULVERT		set	1	
		BoX-800×800	m	34	
PAVEMENT					
	TRAVELLED WAY		set	1	
		ASPHALT CONCRETE	50mm+140mm	m2	2060
		AGGREGATE BASE	250m m	m2	2060
		SUB BASE	250m m	m2	2060

THILAWA ACCESS ROAD

GRAND SUMMARY

ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS
	SIDE WALK		set	1	
		INTERLOCKING BLOCK	60mm	m2	477
		SAND	30mm	m2	477
		CRUSHER RUN BASE	100mm	m2	477
			m		
	SUB ROAD		set	1	
		ASPHALT CONCRETE	50mm	m2	143
		B.C	200mm	m2	143
		SUB BASE	200mm	m2	143
MISCELLANEOUS					
	CURB				
		TYPE-A	STANDARD BLOCK	m	213
		TYPE-B		m	29
		TYPE-C	SLOPE BLOCK	each	4
		RESTRICTION CONCRETE BLOCK		m	231
GUARD RAIL AND PIPE					
	GUARD RAIL	GR-Am		m	135
	GUARD PIPE	GP-A		m	213
ROAD MARKINGS			set	1	
	ROAD MARKINGS	unbroken ,white W=15cm		m	612
		unbroken ,white W=8cm		m	82
		unbroken ,white W=45cm		m	90
		broken ,white W=8cm		m	69
		Arrow Mark ,white		each	12

1)EARTHWORK

EARTHWORK OF SCHEDULE					1 nos
ITEM	DESCRIPTION	UNIT	QUANTITY	OTHERS	
EXCAVATION		set	1		
	MECHANIZED EXCAVATION	m3	866.9		
EMBANKMENT		set	1		
	EMBANKMENT	m3	168.3		
EXCAVATION FOR FOUNDATION		set	1		
	EXCAVATION FOR FOUNDATION	m3	601.1		
BUCKFILL		set	1		
	BUCKFILL	m3	256.8		
REMOVAL OFSURPLUS SOIL		set	1		
	REMOVAL OFSURPLUS SOIL	m3	1,182.7		

EARTHWORK						
ITEM	FORMULA				UNIT	QUANTITY
EXCAVATION MECHANIZED EXCAVATION	$V =$		$=$	866.9	m ³	866.9
EMBANKMENT EMBANKMENT	$V =$		$=$	168.3	m ³	168.3
EXCAVATION FOR FOUNDATION	$V =$		$=$	601.1	m ³	601.1
BUCKFILL	$V =$		$=$	256.8	m ³	256.8
REMOVAL OF SURPLUS SOIL REMOVAL OF SURPLUS SOIL	$V = ($	866.9	$+$	601.1	$)$	
	$- ($	0.0	$+$	256.8	$) \times 1/0.9$	
			$=$	1182.7	m ³	1182.7

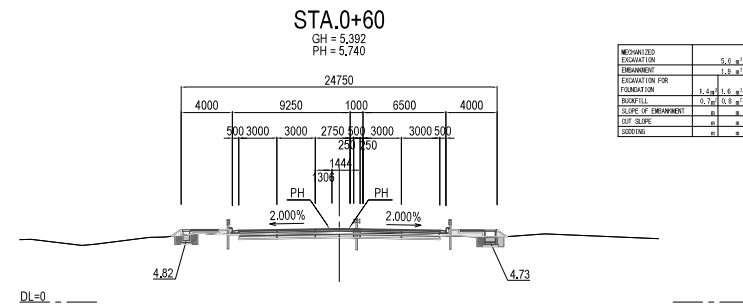
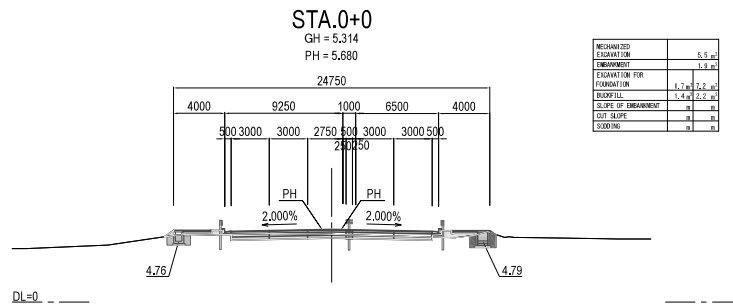
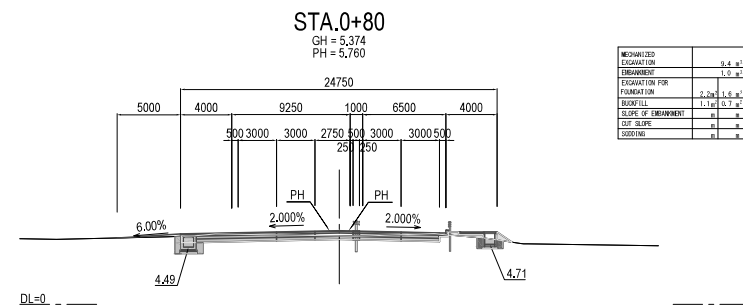
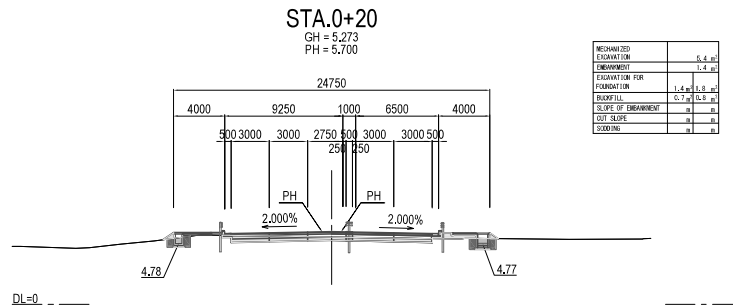
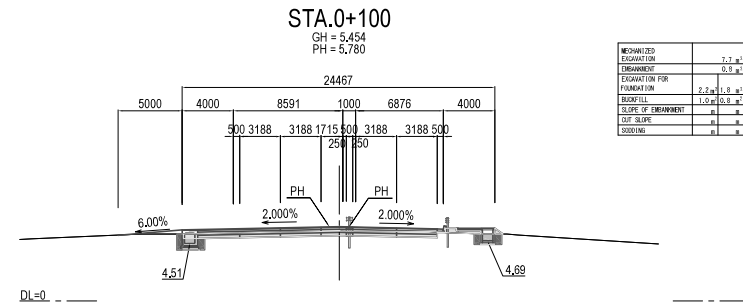
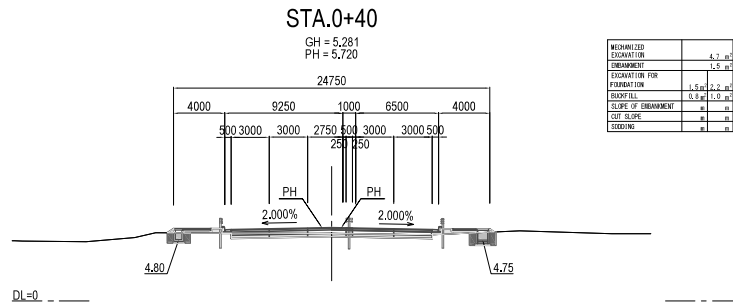
EARTHWORK

STATION	DISTANCE (m)	EXCAVATION FOR FOUNDATION (L)						EXCAVATION FOR FOUNDATION (R)						REMARKS
		EXCAVATION FOR FOUNDATION			EXCAVATION FOR FOUNDATION			EXCAVATION FOR FOUNDATION			EXCAVATION FOR FOUNDATION			
		Area (m ²)	Average (m ²)	Volume (m ³)	Area (m ²)	Average (m ²)	Volume (m ³)	Area (m ²)	Average (m ²)	Volume (m ³)	Area (m ²)	Average (m ²)	Volume (m ³)	
No. 0 + 0.000		1.7								7.2				
No. 0 + 20.000	20.0	1.4	1.55	31.0						1.8	4.50	90.0		
No. 0 + 40.000	20.0	1.5	1.45	29.0						2.2	2.00	40.0		
No. 0 + 60.000	20.0	1.4	1.45	29.0						1.6	1.90	38.0		
No. 0 + 80.000	20.0	2.2	1.80	36.0						1.6	1.60	32.0		
No. 0 + 100.000	20.0	2.2	2.20	44.0						1.8	1.70	34.0		
No. 0 + 115.660	15.7	1.2	1.70	26.7						3.6	2.70	42.4		
No. 0 + 120.000	4.3	1.7	1.45	6.2						7.2	5.40	23.2		
No. 0 + 131.180	11.2	1.7	1.70	19.0						7.2	7.20	80.6		
Subtotal				220.9								380.2		
Total				220.9						LRTotal		601.1		

EARTHWORK

STATION	DISTANCE (m)	BUCKFILL (L)						BUCKFILL (R)						REMARKS
		BUCKFILL						BUCKFILL						
		Area (m2)	Average (m2)	Volume (m3)	Area (m2)	Average (m2)	Volume (m3)	Area (m2)	Average (m2)	Volume (m3)	Area (m2)	Average (m2)	Volume (m3)	
No. 0 + 0.000		1.4							2.2					
No. 0 + 20.000	20.0	0.7	1.05	21.0					0.8	1.50	30.0			
No. 0 + 40.000	20.0	0.8	0.75	15.0					1.0	0.90	18.0			
No. 0 + 60.000	20.0	0.7	0.75	15.0					0.8	0.90	18.0			
No. 0 + 80.000	20.0	1.1	0.90	18.0					0.7	0.75	15.0			
No. 0 + 100.000	20.0	1.0	1.05	21.0					0.8	0.75	15.0			
No. 0 + 115.660	15.7	0.6	0.80	12.6					1.6	1.20	18.8			
No. 0 + 120.000	4.3	1.0	0.80	3.4					1.6	1.60	6.9			
No. 0 + 131.180	11.2	1.0	1.00	11.2					1.6	1.60	17.9			
Subtotal				117.2							139.6			
Total				117.2						LRTotal	256.8			

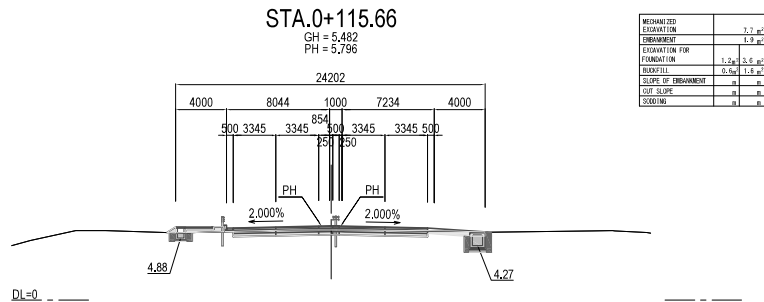
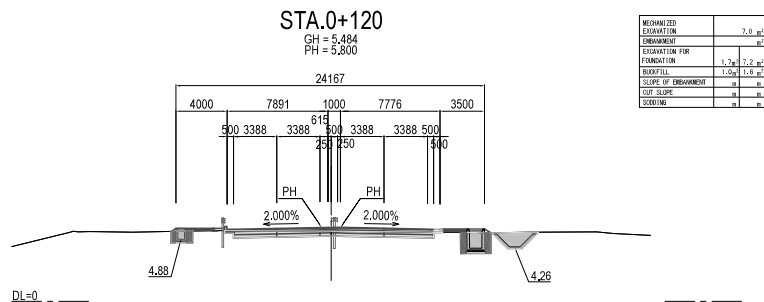
CROSS SECTION (1) (Thilawa Access Road) s=1:400



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PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY jica JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTRY/PROJ REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	M. TOMITA	SIGNATURE	[Signature]	DATE	15 JUNE 2017	DRAWING TITLE CROSS SECTION (1) (Thilawa Access Road)	PACKAGE
				CHECKED BY	T. HAYAKAWA	[Signature]	20 JUNE 2017	DWG No.			
				APPROVED BY	Y. SANO	[Signature]	21 JUNE 2017	003			

CROSS SECTION (2) (Thilawa Access Road) S=1:400



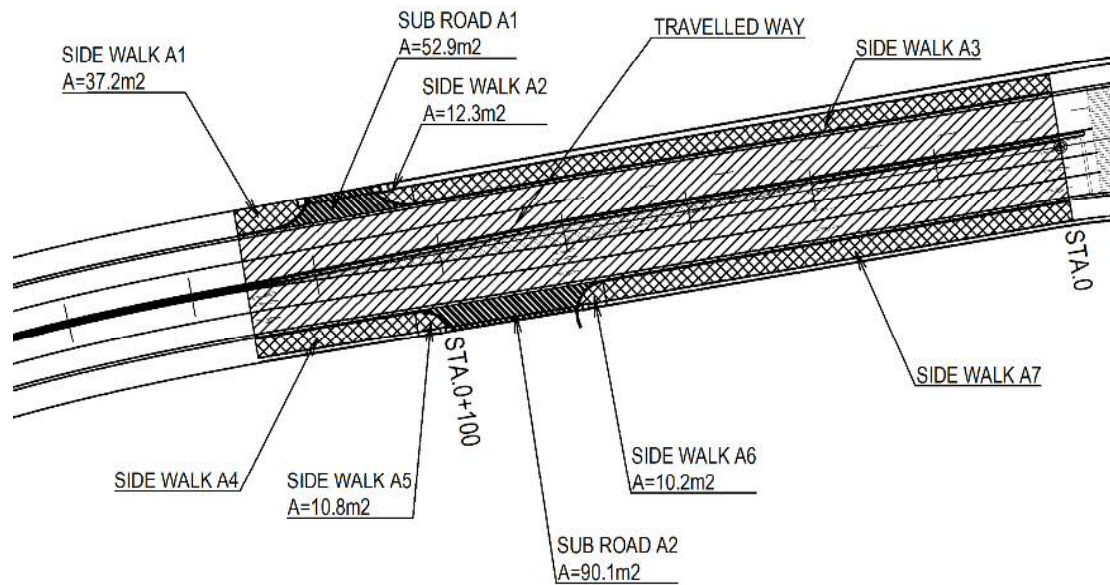
-11-

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JICA JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTRY/PROJ REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA CLIENT TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE CROSS SECTION (2) (Thilawa Access Road)	PACKAGE
				PREPARED BY	M. TOMITA	15 JUNE 2017		DWG No.
				CHECKED BY	T. HAYAKAWA	20 JUNE 2017		004
				APPROVED BY	Y. SANO	21 JUNE 2017		

2) PAVEMENT

SCHEDULE OF PAVEMENT					
ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS
PAVEMENT					
TRAVELLED WAY			set	1	
	ASPHALT CONCRETE	50mm+140mm	m ²	2,055.1	
	AGGREGATE BASE	250m m	m ²	2,055.1	
	SUB BASE	250m m	m ²	2,055.1	
SIDE WALK			set	1	
	INTERLOCKING BLOCK	60m m	m ²	477.2	
	SAND	30m m	m ²	477.2	
	CRUSHER RUN BASE	100m m	m ²	477.2	
SUB ROAD			set	1	
	ASPHALT CONCRETE	50mm	m ²	143.0	
	B.C	200m m	m ²	143.0	
	SUB BASE	200m m	m ²	143.0	

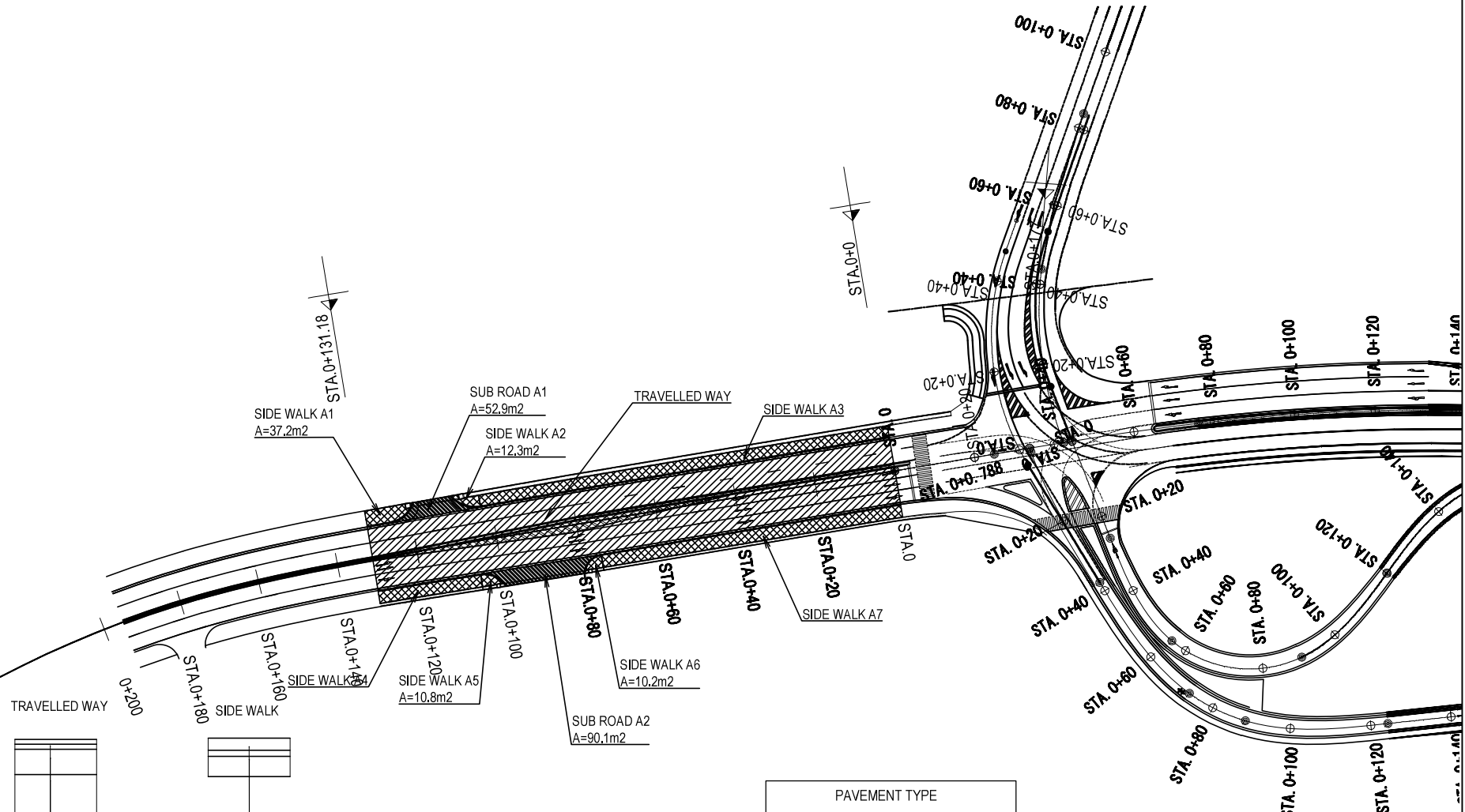
PAVEMENT



ITEM	CALCULATION	UNIT	QUANTITY
TRAVELLED WAY ASPHALT CONCRETE (50mm+140mm)	$A= 2,055.1$	m ²	2,055.1
AGGREGATE BASE (250mm)	$A= 2,055.1$	m ²	2,055.1
SUB BASE (250mm)	$A= 2,055.1$	m ²	2,055.1
SIDE WALK PRECAST CONCRETE PAVING BLOCK (300mm×300mm×60mm)	$A= 228.8+248.4$	m ²	477.2
SAND (30mm)	$A= 228.8+248.4$	m ²	477.2
SOIL AGGREGATE C-30(t=100mm)	$A= 228.8+248.4$	m ²	477.2
SUB ROAD ASPHALT CONCRETE (50mm)	$A= 52.9+90.1$	m ²	143.0
BC (200mm)	$A= 52.9+90.1$	m ²	143.0
SUB BASE (200mm)	$A= 52.9+90.1$	m ²	143.0

SIDE WALK		PAVEMENT AREA CALCULATION				No. 1
		LEFT SIDE				
STATION		DISTANCE (m)	WIDTH (m)	WIDTH(ave) (m)	AREA (m2)	REMARKS
						LEFT SIDE
No.	0 + 0.000		2.04			
No.	0 + 20.000	20.0	2.04	2.040	40.8	
No.	0 + 40.000	20.0	2.04	2.040	40.8	
No.	0 + 60.000	20.0	2.04	2.040	40.8	
No.	0 + 76.200	16.2	2.04	2.040	33.0	
No.	0 + 105.450		2.04			
No.	0 + 120.000	14.5	2.04	2.040	29.6	
No.	0 + 131.180	11.2	2.04	2.040	22.8	
	A5				10.8	
	A6				10.2	
	SUB TOTAL				228.8	
	TOTAL				228.8	

PAVEMENT PLAN (Thilawa Access Road) S=1:1000



ASPHALT CONCRETE (50mm+50mm) AGGREGATE BASE (250mm) SUB BASE (500mm)	INTERLOCKING BLOCK (60mm) SAND (30mm) CRUSHER RUN BASE (100mm)
-------------------------------------------------------------------------------------	----------------------------------------------------------------------

PAVEMENT TYPE	
	TRAVELLED WAY
	SIDE WALK
	SUB ROAD

-18-

PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTRY/PROJ REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	PROJECT TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME PREPARED BY M. TOMITA CHECKED BY T. HAYAKAWA APPROVED BY Y. SANO	SIGNATURE 	DATE 15 JUNE 2017 20 JUNE 2017 21 JUNE 2017	DRAWING TITLE PAVEMENT PLAN (Thilawa Access Road)	PACKAGE DWG No.
---------------------------------------------------------------------------------	----------------------------------------------------------	------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------	---------------	------------------------------------------------------	---------------------------------------------------------	--------------------

3)DRAINAGE SYSTEM

SIDE DITCH

SCHEDULE OF DRAINAGE STRUCTURE

UNIT : m

800×1000-U WITH COVER			500×850-U WITH COVER			1000×1000-V		
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
R	0 + 0.00 ~ 0 + 106.00	106.0	L	0 + 0.00 ~ 0 + 78.00	78.0	R	0 + 120.00 ~ 0 + 131.18	11.2
				0 + 102.00 ~ 0 + 131.18	29.2			
total		106.0	total		107.2	total		11.2

BOX CULVERT

SCHEDULE OF DRAINAGE STRUCTURE

UNIT : m

BoX-800×800											
R/L	STATION		LENGTH	R/L	STATION		LENGTH	R/L	STATION		LENGTH
R	0	+ 105.70 ~ 0	12.0								
L	0	+ 79.00 ~ 0	22.0								
total			34.0	total				total			

CATCH PIT, INLET CURB

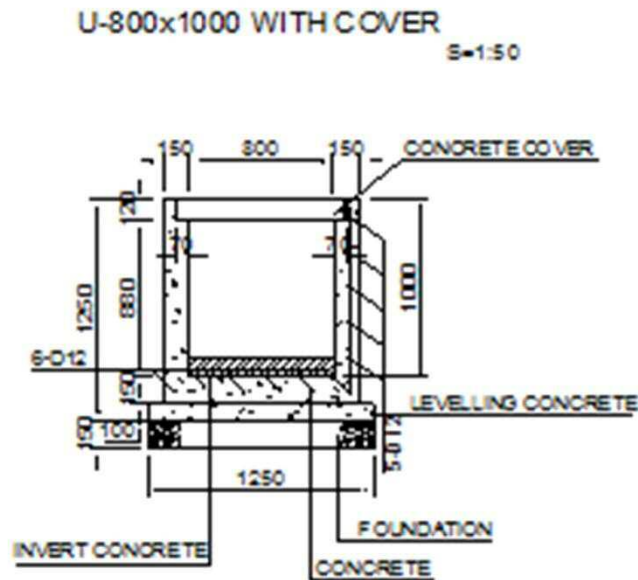
SCHEDULE OF DRAINAGE STRUCTURE

1000×1000×1350			INLET CURB			CROCC DRAIN DUCT			
R/L	STATION	EACH	R/L	STATION	EACH	R/L	STATION		m
R	0 + 107.00	1	R	0 + 0.00 ~ 0 + 106.00	12	R	0 + 0.00 ~ 0 + 106.00		31.7
R	0 + 120.00	1	L	0 + 0.00 ~ 0 + 78.00	9	L	0 + 0.00 ~ 0 + 78.00		26.5
L	0 + 79.00	1	L	0 + 102.00 ~ 0 + 131.18	2	L	0 + 102.00 ~ 0 + 131.18		5.9
L	0 + 101.00	1							
total		4	total		23	total			64.1

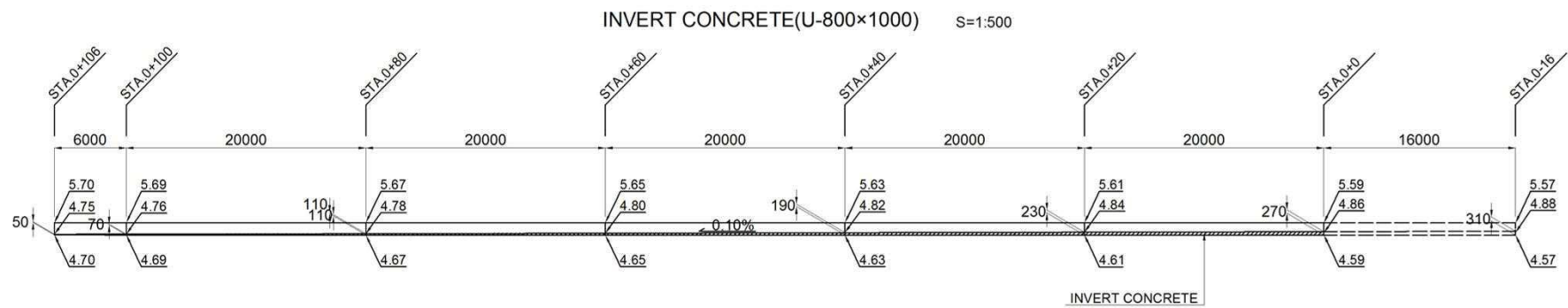
U-800x1000

CALCULATION

Par10m



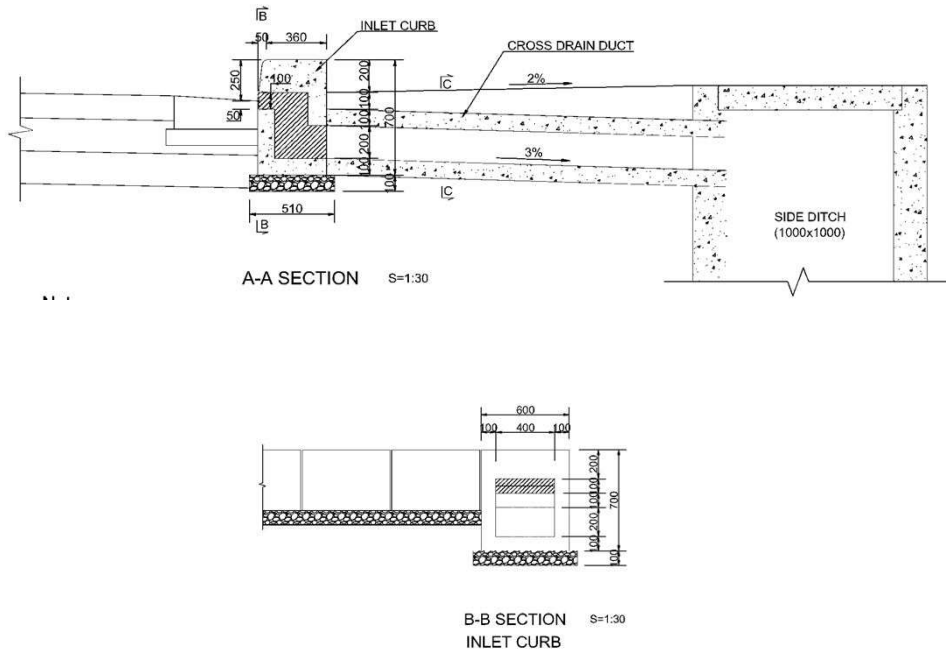
ITEM	CALCULATION	UNIT	QUANTITY
CONCRETE	$V = (1.15 \times 1.10 - 0.94 \times 0.12 - 0.80 \times 1.00) \times 10 = 3.52$	m3	3.5
MOLD	$A = (1.15 + 1.00) \times 10.00 = 21.50$	m2	21.5
LEVELLING CONCRETE	$A = 1.25 \times 10.00 = 12.50$	m2	12.5
	$V = 1.25 \times 0.10 \times 10.00 = 1.25$	m3	1.3
LEVELLING CONCRETE	$A = (0.10 + 0.10) \times 10 = 2.00$	m2	2.0
CONCRETE CAVER	$N = 10.00$	組	10.0
FOUNDATION	$V = 1.25 \times 0.15 \times 10.00 = 1.88$	m3	1.9
REINFORCEMENT BAR D12	$W1 = 6 \times 0.888 \times 10.00 = 53.28$		
	$W2 = 10 \times 0.888 \times 10.00 = 88.80$		
	$W3 = 4 \times 0.888 \times 3.10 \times 10.00 = 110.11$		
	252.19	kg	252
INVERT CONCRETE	$V1 = 1/2 \times (0.05 + 0.07) \times 6 = 0.36$	m3	17.4
	$V2 = 1/2 \times (0.07 + 0.11) \times 20 = 1.80$		
	$V3 = 1/2 \times (0.11 + 0.15) \times 20 = 2.60$		
	$V4 = 1/2 \times (0.15 + 0.19) \times 20 = 3.40$		
	$V5 = 1/2 \times (0.19 + 0.23) \times 20 = 4.20$		
	$V6 = 1/2 \times (0.23 + 0.27) \times 20 = 5.00$		
	total 17.36		



INLET CURB

CALCULATION

Par10each

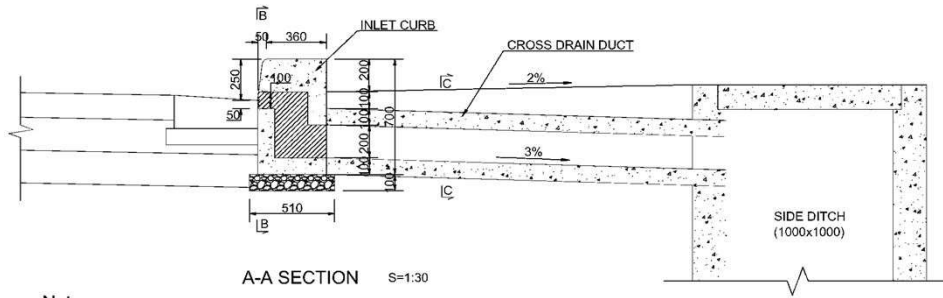


ITEM	CALCULATION	UNIT	QUANTITY
INLET CURB	$N = 1 \times 10 = 10$	each	10
FOUNDATION	$V = 0.51 \times 0.70 \times 0.10 \times 10 = 0.36$	m3	0.4

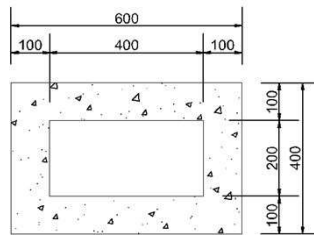
CROSS DRAIN DU

CALCULATION

Par10m



A-A SECTION S=1:30



C-C SECTION S=1:15
CROSS DRAIN DUCT

ITEM	CALCULATION	UNIT	QUANTITY
CROSS DRAIN DUCT	$N = 1 \times 10 = 10$	m	10

4) MISCELLANEOUS

SCHEDULE OF MISCELLANEOUS					
ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS
CURB			set	1	
	TYPE-A	STANDARD BLOCK	m	213.2	
	TYPE-B		m	28.7	
	TYPE-C	SLOPE BLOCK	each	4	
	RESTRICTION CONCRETE BLOCK		m	230.6	
GUARD RAIL AND PIPE			set	1	
	GUARD RAIL	GR-Am	m	135.0	
	GUARD PIPE	GP-A	m	213.2	

SCHEDULE OF MISCELLANEOUS

UNIT : m

CURB(TYPE-A)			CURB(TYPE-B)			CURB(TYPE-C)		
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
右	0 + 0.00 ~ 0 + 102.97	103.0	R	0 + 103.57 ~ 0 + 109.65	8.2	R	0 + 102.97 ~ 0 + 103.57	1
右	0 + 125.36 ~ 0 + 131.18	5.7	R	0 + 118.63 ~ 0 + 124.76	7.3	R	0 + 124.76 ~ 0 + 125.36	1
左	0 + 0.00 ~ 0 + 75.20	79.0	L	0 + 75.80 ~ 0 + 80.00	6.2	L	0 + 75.20 ~ 0 + 75.80	1
左	0 + 105.45 ~ 0 + 131.18	25.5	L	0 + 99.43 ~ 0 + 104.85	7.0	L	0 + 104.85 ~ 0 + 105.45	1
total		213.2	total	28.7		total	4	

SCHEDULE OF MISCELLANEOUS

UNIT : m

RESTRICTION CONCRETE BLOCK														
R/L	STATION					LENGTH	R/L	STATION					LENGTH	
R	0	+	0.00	~	0	+	109.65	107.0						
R	0	+	118.63	~	0	+	131.18	12.0						
L	0	+	0.00	~	0	+	80.00	80.1						
L	0	+	99.43	~	0	+	131.18	31.5						
total							230.6	total			total			

SCHEDULE OF MISCELLANEOUS

UNIT : m

GUARD RAIL(GR-Am)								
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
C	0 - 3.80 ~ 0 + 131.18	135.0						
total		135.0	total			total		

SCHEDULE OF MISCELLANEOUS

UNIT : m

GUARD PIPE(GP-A)														
R/L	STATION					LENGTH	R/L	STATION					LENGTH	
R	0	+	0.00	~	0	+	102.97	103.0						
R	0	+	125.36	~	0	+	131.18	5.7						
L	0	+	0.00	~	0	+	75.20	79.0						
L	0	+	105.45	~	0	+	131.18	25.5						
total							213.2	total			total			

5)ROAD MARKING

SCHEDULE OF ROAD MARKING					
ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS
ROAD MARKINGS					
	ROAD MARKINGS	unbroken ,white W=15cm	m	612.0	
		unbroken ,white W=8cm	m	82.4	
		unbroken ,white W=45cm	m	90.0	
		broken ,white W=8cm	m	69.0	
		Arrow Mark ,white	each	12	

ROAD MARKINGS			
ITEM	FORMULA	UNIT	QUANTITY
Road Markings unbroken ,white W=15cm	Edge Line		
		=	612.0
		total =	612.0
		m	612.0
unbroken ,white W=8cm	Lane Line		
		=	82.4
		total =	82.4
		m	82.4
unbroken ,white W=45cm	Zebra Zone		
		=	90.0
		total =	90.0
		m	90.0
broken ,white W=8cm	Lane Line		
		=	69.0
		total =	69.0
		m	69.0
Arrow Mark white	Straight	=	4
	Left Turn	=	4
	Straight and Right Turn	=	4
		total =	12
		each	12

SCHEDULE OF ROAD MARKING

UNIT : m

Edge Line (unbroken ,white) W=15cm			Lane Line(unbroken ,white) W=8cm			Lane Line(broken ,white) W=8cm		
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
L	0 + 0.00 ~ 0 + 109.65	112.2	R	0 + 0.00 ~ 0 + 41.20	41.2	L	0 + 0.00 ~ 0 + 131.18	33.0
L	0 + 116.50 ~ 0 + 131.18	16.2	R	0 + 0.00 ~ 0 + 41.20	41.2	R	0 + 45.00 ~ 0 + 131.18	27.0
L	0 + 0.00 ~ 0 + 131.18	131.2				R	0 + 45.00 ~ 0 + 75.00	9.0
R	0 + 0.00 ~ 0 + 131.18	131.2						
R	0 + 41.18 ~ 0 + 131.18	90.0						
R	0 + 0.00 ~ 0 + 131.18	131.2						
Total		612.0	Total		82.4	Total		69.0

SCHEDULE OF ROAD MARKING

UNIT : m

Zebra Zone(White ,unbroken) W=45cm								
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
C	0 + 41.18 ~ 0 + 131.18	90.0						
Total		90.0	Total			Total		

SCHEDULE OF ROAD MARKING

UNIT : m

Arrow Mark(Straight)			Arrow Mark(Left Turn)			Arrow Mark(Straight & Right Turn)		
R/L	STATION	EACH	R/L	STATION	EACH	R/L	STATION	EACH
R	0 + 0.00 ~ 0 + 131.18	4	R	0 + 0.00 ~ 0 + 131.18	4	R	0 + 0.00 ~ 0 + 131.18	4
Total		4	Total		4	Total		4
L= 8.70 × 4			L= 10.0 × 4			L= 20.0 × 4		

**ROAD DESIGN
(PACKAGE 1)**

5. DRAINAGE STRUCTURES

Package 1 Drainage Structures

PAY ITEM:			Unit	Qty						Total	
				(1)	(2)	(3)		(4)	(5)		(6)
				Main Road	On Ramp	SCI		Main	Star City Access		Thilawa Access	Yangon Access
04100 Open Ditches	04100-12	Side Ditch Type U-300x300	m	78.780	0.000						78.780
	04100-13	Side Ditch Type U-500x500	m	0.000	0.000					181.000	181.000
	04100-14	Side Ditch Type U-800x800	m	846.550	344.504						1191.054
	04100-15	Side Ditch Type U-1000x1000	m	187.425	0.000						187.425
	04100-05	Side Ditch Type U-1500x1500	m	0.000	0.000						0.000
	04100-01	Side Ditch Type U-500x500 with Concrete Cover	m	0.000	0.000						0.000
	04100-02	Side Ditch Type U-500x850 with Concrete Cover	m	0.000	0.000	37.000		241.900	52.000		330.900
	04100-03	Side Ditch Type U-800x800 with Concrete Cover	m	84.900	0.000						84.900
	04100-16	Side Ditch Type U-800x1000 with Concrete Cover	m			16.000					16.000
	04100-17	Side Ditch Type U-1000x1000 with Concrete Cover	m	0.000	0.000						0.000
	04100-18	Side Ditch Type U-1000x1500 with Concrete Cover	m	0.000	0.000						0.000
	04100-19	Side Ditch Type U-1500x1500 with Concrete Cover	m	0.000	0.000						0.000
04100-20	Side Ditch Type U-1500x2500 with Concrete Cover	m	0.000	0.000						0.000	
04330 Catch Basins/Pits, Inlets, Outlets, Manholes	04330-01	Catch Pit (C=DITCH) Type A	Nos	5.000	0.000						5.000
	04330-04	Catch Pit (C=DITCH) Type C	Nos	3.000	0.000						3.000
	04330-05	Catch Pit (C=DITCH) Type D	Nos	0.000	0.000						0.000
	04330-02	Catch Pit (C=DITCH) Type B	Nos	0.000	0.000						0.000
	04330-06	Catch Pit 700 x 700 x 1050	Nos	3.000	0.000						3.000
	04330-07	Catch Pit 700 x 700 x 1850	Nos					1.000	2.000		3.000
	04330-08	Catch Pit 700 x 700 x 2250	Nos						1.000		1.000
	04330-09	Catch Pit 1000 x 1000 x 1350	Nos	14.000	0.000						14.000
	04330-10	Catch Pit 1200 x 1200 x 1600	Nos	11.000	0.000			1.000			12.000
	04330-03	Catch Pit 600 x 600 x 1100	Nos	0.000	0.000						0.000
04310 Concrete Pipe Culverts	04310-02	Concrete Pipe Culvert φ300 (CON. 360°) TYPE B	m	70.000	0.000						70.000
	04310-01	Concrete Pipe Culvert φ300 (CON. 360°) TYPE A	m	0.000	0.000						0.000
	04310-03	Concrete Pipe Culvert φ900 (CON. 360°)	m	44.630	0.000						44.630
04320 Concrete Box Culverts	04320-03	Box Culvert Type 1000 x 1000	m					20.700			20.700
04400 Vertical Drain	04400-01	Vertical Drain Type A UPVC Pipe φ200mm	m	10.538							10.538
	04400-02	Vertical Drain Type A Joint (90°) φ200mm	Nos	3.000							3.000
	04400-03	Vertical Drain Type B U-Ditch Section A-A	m								0.000
	04400-04	Vertical Drain Type B U-Ditch Section B-B	m								0.000
	04400-05	Vertical Drain Type B U-Ditch Section C-C	m								0.000
	04400-06	Vertical Drain Type C UPVC Pipe φ150mm	m					71.500			71.500
	04600 Drainage Outlet	04600-01	Drainage Outlet Type A Left Side	L.S	1.000						
04600-02		Drainage Outlet Type A Right Side	L.S	1.000							1.000
04600-03		Drainage Outlet Type A Flap Gate 1000 x 1000	Nos	2.000							2.000
04600-04		Drainage Outlet Type B Left Side	L.S								0.000
04600-05		Drainage Outlet Type B Right Side	L.S								0.000
04600-06		Drainage Outlet Type B Flap Gate 2000 x 1500	Nos								0.000

DRAINAGE SYSTEM(Main Road)

SCHEDULE OF DRAINAGE STRUCTURE

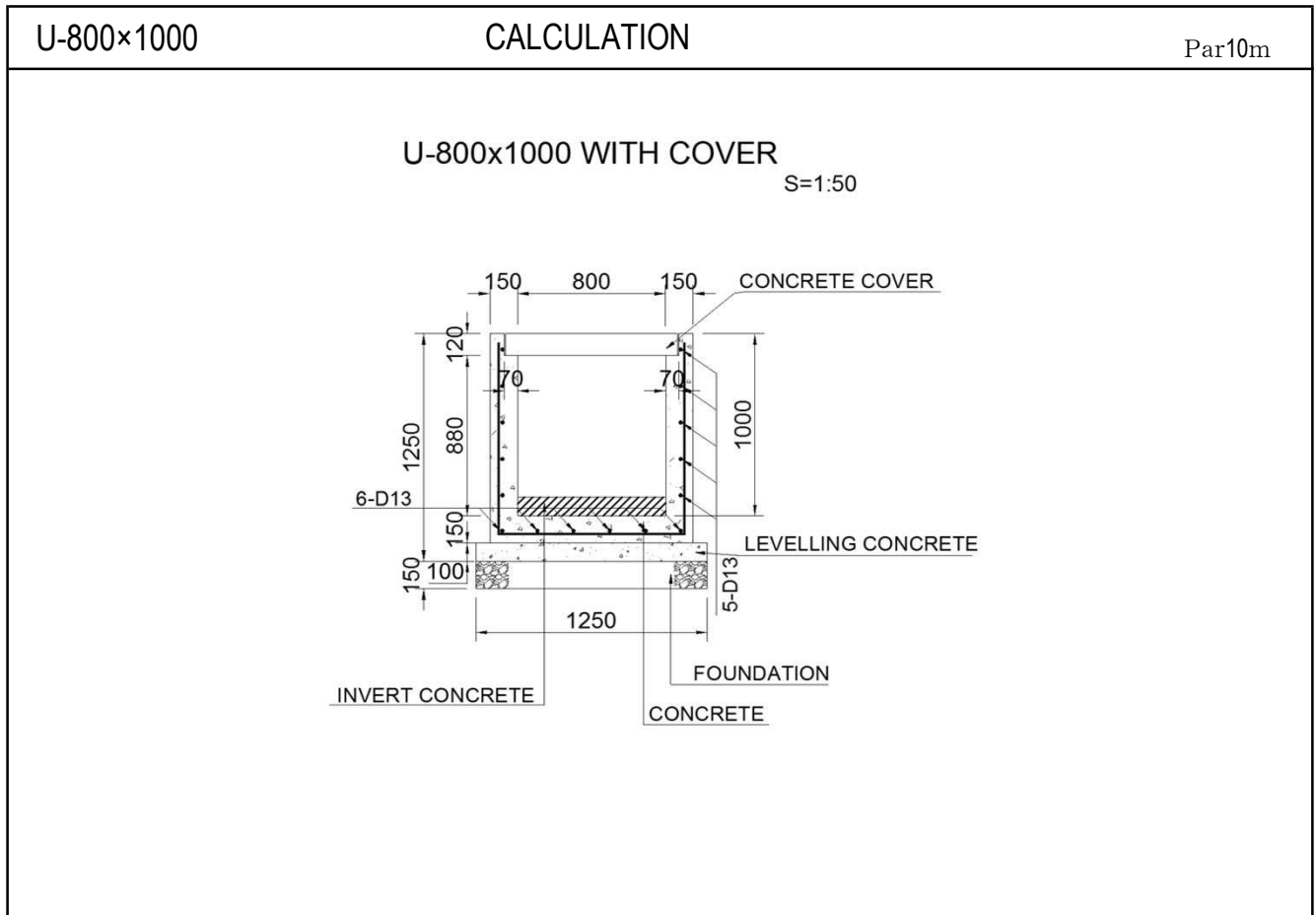
ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS
SIDE DITCH			set	1	
	800×1000-U		m	16.0	WITH CONCRETE COVER
	500×850-U		m	37.0	OPEN CHANNEL

SIDE DITCH

SCHEDULE OF DRAINAGE STRUCTURE

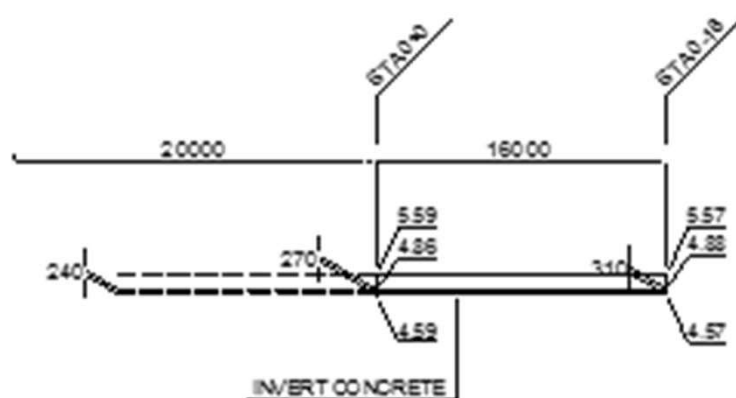
単位：m

800×1000-U			500×850-U					
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
L	0 + 0.00 ~ 0 + 16.00	16.0	R	0 + 0.00 ~ 0 + 34.00	37.0			
total		16.0	total		37.0	total		



ITEM	CALCULATION	UNIT	QUANTITY
CONCRETE	$V = (1.15 \times 1.10 - 0.94 \times 0.12 - 0.80 \times 0.88) \times 10 = 4.48$	m3	4.5
MOLD	$A = (1.15 + 1.00) \times 10.00 = 21.50$	m2	21.5
LEVELLING CONCRETE	$A = 1.25 \times 10.00 = 12.50$	m2	12.5
	$V = 1.25 \times 0.10 \times 10.00 = 1.25$	m3	1.3
LEVELLING CONCRETE	$A = (0.10 + 0.10) \times 10 \times 10 = 20.00$	m2	20.0
CONCRETE CAVER	$N = 10.00$	組	10.0
FOUNDATION	$V = 1.25 \times 0.15 \times 10.00 = 1.88$	m3	1.9
REINFORCEMENT BAR D13	$W1 = 6 \times 0.995 \times 10.00 = 59.70$		
	$W2 = 10 \times 0.995 \times 10.00 = 99.50$		
	$W3 = 4 \times 0.995 \times 3.10 \times 10.00 = 123.38$		
	282.58	kg	283
INVERT CONCRETE	$V1 = 1/2 \times (0.27 + 0.31) \times 16 = 4.64$	m3	4.6
	total 4.64		

INVERT CONCRETE(U-800×1000) S=1:500



1.STARCITY ACCESS LINE
DRAINAGE SYSTEM

SCHEDULE OF DRAINAGE STRUCTURE					
ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS
SIDE DITCH			set	1	
	800×800-U		m	36.0	OPEN CHANNEL

SIDE DITCH

SCHEDULE OF DRAINAGE STRUCTURE

単位 : m

800 × 800-U								
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	LENGTH
R	0 + 60.00 ~ 0 + 180.00	36.0						
total		36.0	total			total		

2.YANGON ACCESS LINE
DRAINAGE SYSTEM

SCHEDULE OF DRAINAGE STRUCTURE					
ITEM	DESCRIPTION		UNIT	QUANTITY	OTHERS
SIDE DITCH			set	1	
		500×850-U	m	52.0	WITH CONCRETE COVER
		500×500-U	m	181.0	OPEN CHANNEL
CATCH PIT		700 × 700 × 1850	each	2	
		700 × 700 × 2250	each	1	
BOX CULVERT		1000 × 1000	m	20.7	
EXCAVATION		EXCAVATION FOR FOUNDATION	m3	309.8	
		BUCKFILL	m3	165.6	

SIDE DITCH

SCHEDULE OF DRAINAGE STRUCTURE

単位 : m

500×850-U			500×500-U			CATCH PIT 700 × 700 × 1850		
R/L	STATION	LENGTH	R/L	STATION	LENGTH	R/L	STATION	EACH
R	0 + 0.00 ~ 0 + 72.00	52.0	L	0 + 20.00 ~ 0 + 72.00	45.0	L	0 + 70.80	1
			L	0 + 66.00 ~ 0 + 210.80	136.0	L	0 + 73.00	1
total		52.0	total		181.0	total		2

9

SCHEDULE OF DRAINAGE STRUCTURE

單位：m

CATCH PIT 700 × 700 × 2250			BOX CULVERT 1000×1000					
R/L	STATION	EACH	R/L	STATION	LENGTH	R/L	STATION	EACH
R	0 + 70.80	1	R	0 + 72.00	20.7			
total		1	total		20.7	total		

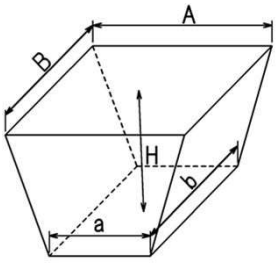
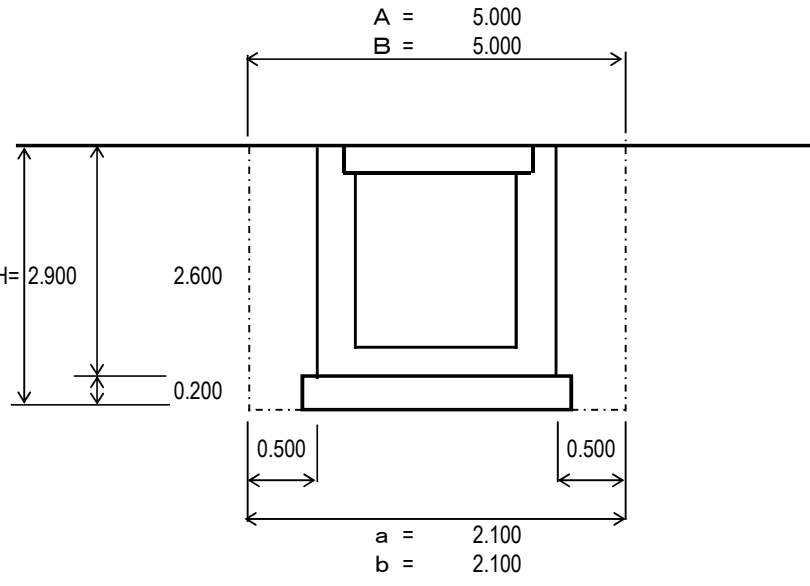
-7-

CATCH PIT 700×700×2250

Item	Size/Type	Unit	Quantity	Remark
Concrete		m ³	1.72	
Form		m ²	16.89	
Leveling Con:		m ³	0.14	
Leveling Con: Form		m ²	0.48	
Foundation		m ²	1.44	
Reinforcing	D13	kg	116	
Excavation		m ³	38.58	
Backfill		m ³	35.00	
REMOVAL OFSURPLUS SOIL		m ³	(0.31)	

CATCH PIT 700×700×2250							
Item	Formula					Quantity	
Concrete	$V = 1.100 \times 1.100 \times 2.600$				$= 3.146$	1.721 m ³	
	$V = 0.700 \times 0.700 \times 2.400$				$= \Delta 1.176$		
					$V = 1.970 \text{ m}^3$		
	Subtraction Concrete Cover						
	$V = 0.840 \times 0.850 \times 0.150$				$= 0.107$		
	$V = 0.500 \times 0.850 \times 0.2$				$= 0.085$		
	$V = 0.600 \times 0.600 \times 3.14 \div 4 \times 0.2$				$= 0.057$		
					$\Delta V = 0.249 \text{ m}^3$		
					$V = 1.970 - 0.249$		
					$= 1.721 \text{ m}^3$		
Form	$A = 0.700 \times 2.450 \times 2$				$= 3.430$	16.885 m ²	
	$A = 0.700 \times 2.450 \times 2$				$= 3.430$		
	$A = 1.100 \times 2.600 \times 2$				$= 5.720$		
	$A = 1.100 \times 2.600 \times 2$				$= 5.720$		
					$\Sigma A = 18.300 \text{ m}^2$		
	Subtraction 500×850						
	$A = 0.500 \times 0.850 \times 2$				$= 0.850$		
	$A = 0.600 \times 0.600 \times 3.14 \div 4 \times 2$				$= 0.565$		
					$\Delta A = 1.415 \text{ m}^2$		
					$A = 18.300 - 1.415$		
				$= 16.885$			
Leveling Con:	$V = 1.200 \times 1.200 \times 0.100$				$= 0.144$	0.144 m ³	
Leveling Con: Form	$A = 1.200 \times 0.100 \times 4$				$= 0.480$	0.480 m ²	
Foundation	$A = 1.200 \times 1.200$				$= 1.440$	1.440 m ²	
Concrete Cover	$N =$				1 Nos	1 Nos	
Reinforcing	D13 (5.700 × 12 + 4.02 × 12) × 0.995				$= 116.057$	116.057 kg	

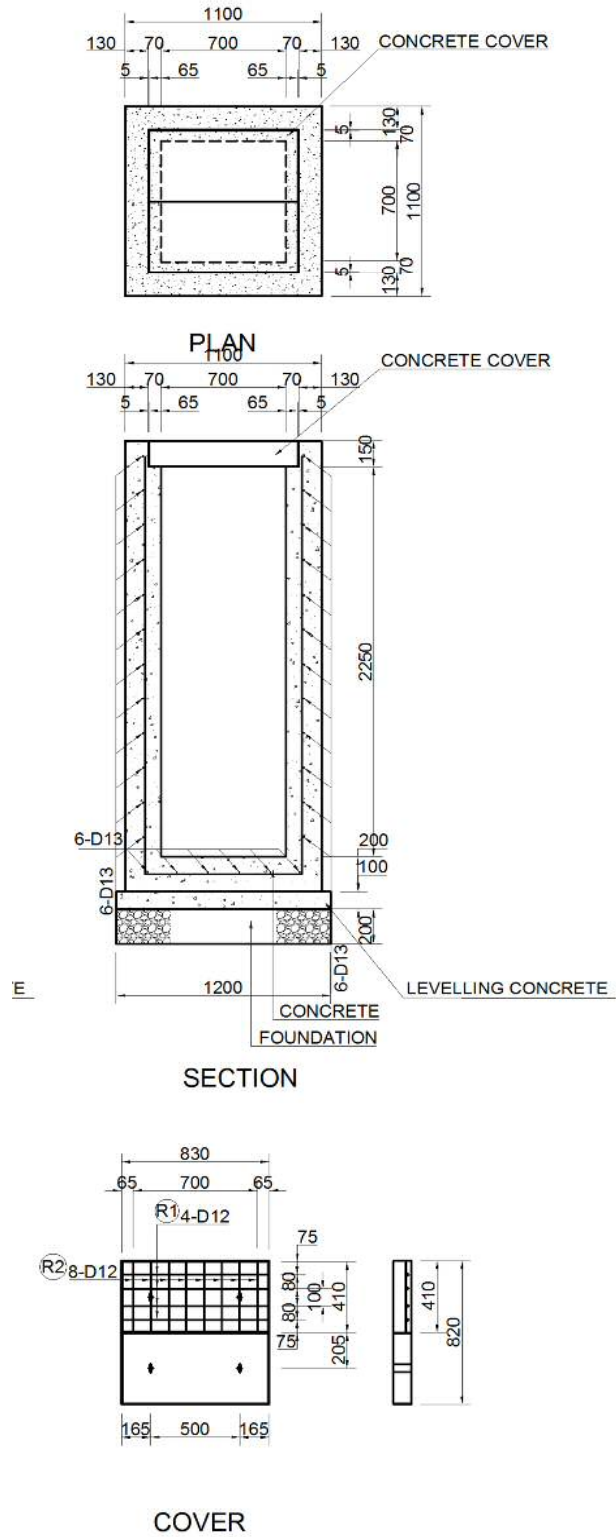
CATCH PIT 700×700×2250

Item	Formula	Quantity
Excavation	 $ \begin{aligned} A &= 5.000 \\ B &= 5.000 \\ a &= 2.100 \\ b &= 2.100 \\ H &= 2.900 \end{aligned} $ $ \begin{aligned} V &= \frac{2.900 \div 6.000 \times \{ 5.000 \times 2.100 + 2.100 \times 5.000 + 5.000 \}}{3} \\ &= 38.580 \text{ m}^3 \end{aligned} $	38.580 m ³
Backfill	$ \begin{aligned} V &= 1.100 \times 1.100 \times 2.600 &= 3.146 \\ V &= 1.200 \times 1.200 \times 0.300 &= 0.432 \\ \Sigma V &= &= 3.578 \text{ m}^3 \\ V &= 38.580 - 3.578 &= 35.002 \text{ m}^3 \end{aligned} $ 	35.002 m ³
REMOVAL OF SURPLUS SOIL	$ V = 38.580 - 35.002 / 0.9 $	-0.311 m ³

CATCH PIT 700 × 700 × 2250

Figure

CATCH PIT (700X700X2250)

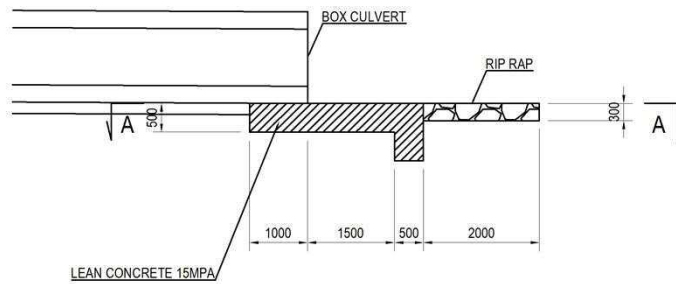


BOX CULVERT OF SCHEDULE

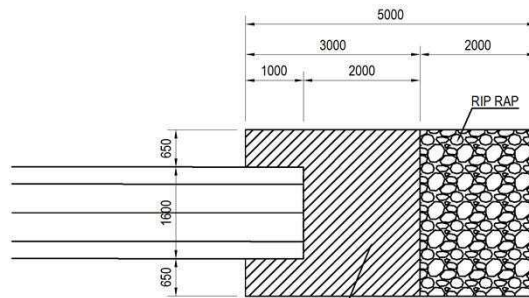
Item	Size/Type	Unit	BOX CULVERT		TOTAL	OTHERS
			BOX CULVERT	DITH OUTRET		
Concrete		m3	32.7	6.5	39.2	
Form		m2	123.1	10.2	133.3	
Foundation	t=200	m2	37.2		37.2	
Reinforcing	D13	kg	2600		2600	
Backfill Granular		m3	26		26.4	
Bip Rap		m3		1.7	1.7	
Excavation		m3	71.7	4.7	76.4	
Backfill		m3	34.5	2.1	36.5	

No	Item	Name	Quantity	Unit																													
	BOXCULVERT	1000 x 1000	1	m																													
<p>SIDE ELEVATION S = 1:150</p>																																	
<p>BACKFILL</p>																																	
<p>MATERIALS (PER 1m)</p> <table border="1"> <thead> <tr> <th>KIND</th> <th>UNIT</th> <th>QUANTITY</th> </tr> </thead> <tbody> <tr> <td rowspan="4">CONCRETE</td> <td>TOP</td> <td>m³ 0.480</td> </tr> <tr> <td>SIDE</td> <td>m³ 0.640</td> </tr> <tr> <td>BOTTOM</td> <td>m³ 0.480</td> </tr> <tr> <td>TOTAL</td> <td>m³ 1.600</td> </tr> <tr> <td>FORM</td> <td>m²</td> <td>5.966</td> </tr> <tr> <td rowspan="4">REINFORCING BAR</td> <td>D19</td> <td>kg 0</td> </tr> <tr> <td>D16</td> <td>kg 0</td> </tr> <tr> <td>D13</td> <td>kg 121.950</td> </tr> <tr> <td>TOTAL</td> <td>kg 121.950</td> </tr> <tr> <td rowspan="2">FOUNDATION</td> <td>LEVELING CONCRETE t=100</td> <td>m² 0</td> </tr> <tr> <td>CRUSHED STONE t=200</td> <td>m² 1.800</td> </tr> </tbody> </table>					KIND	UNIT	QUANTITY	CONCRETE	TOP	m ³ 0.480	SIDE	m ³ 0.640	BOTTOM	m ³ 0.480	TOTAL	m ³ 1.600	FORM	m ²	5.966	REINFORCING BAR	D19	kg 0	D16	kg 0	D13	kg 121.950	TOTAL	kg 121.950	FOUNDATION	LEVELING CONCRETE t=100	m ² 0	CRUSHED STONE t=200	m ² 1.800
KIND	UNIT	QUANTITY																															
CONCRETE	TOP	m ³ 0.480																															
	SIDE	m ³ 0.640																															
	BOTTOM	m ³ 0.480																															
	TOTAL	m ³ 1.600																															
FORM	m ²	5.966																															
REINFORCING BAR	D19	kg 0																															
	D16	kg 0																															
	D13	kg 121.950																															
	TOTAL	kg 121.950																															
FOUNDATION	LEVELING CONCRETE t=100	m ² 0																															
	CRUSHED STONE t=200	m ² 1.800																															
Item	Formula			Quantity																													
Concrete	V1 = 1.600 x 10.320 x 2 = 33.024 m ³			32.685 m ³																													
	-V2 = -0.300 x 0.300 x π x 0.300 x 4 = -0.339 m ³																																
Total				= 32.685																													
Form	A1= 5.966 x 10.320 x 2 = 123.138 m ²			123.138 m ²																													
	A2= 0.600 x 3.14 x 0.300 x 4 = 2.261 m ²																																
Total				= 125.399																													
Reinforcing -ber D13	W1= 121.950 x 10.320 x 2 = 2517.048 kg			2600 kg																													
	H1= 1.390 x 0.995 x 4 x 4 = 22.129 kg																																
	H2= 1.660 x 0.995 x 4 x 4 = 26.427 kg																																
	H3= 1.200 x 0.995 x 4 x 4 = 19.104 kg																																
	H4= 0.950 x 0.995 x 4 x 4 = 15.124 kg																																
Total				= 2599.832																													
Foundation	A= 1.800 x 10.330 x 2 = 37.188 m ²			37.188 m ²																													
Backfill Granular	V= 1.600 x 1.600 x 0.500 x 10.330 x 2 = 26.445 m ³			26.445 m ³																													
Excavation	V= (2.600 + 3.700) x 0.500 x 1.100 x 20.7 = 71.726 m ³			71.726 m ³																													
Backfill	V1 = 71.726 = 71.726 m ²			34.466 m ³																													
	V2 = { (1.600 x 0.900) + (1.800 x 0.200) } x 20.7 = 37.260 m ²																																
	V = V1 - V2 = 71.726 - 37.260 = 34.466 m ³																																

No	Item	Name	Quantity	Unit
	OUTLETS		1	each



SIDE ELEVATION



SECTION A-A

Item	Formula	Quantity
Concrete	$V1 = 2.900 \times 3.000 \times 0.500 = 4.350 \text{ m}^3$	6.525 m ³
	$V2 = 2.900 \times 0.500 \times 1.500 = 2.175 \text{ m}^3$	
	Total = 6.525	
Form	$A1 = (3.000 + 2.900) \times 2 \times 0.500 = 8.700 \text{ m}^2$	10.150 m ²
	$A1 = (2.900 + 0.500) \times 2 \times 0.500 = 1.450 \text{ m}^2$	
	Total = 10.150	
Rip Rap	$V = 2.000 \times 2.900 \times 0.300 = 1.740 \text{ m}^3$	1.740 m ³
Excavation	$V = 3.900 \times 4.000 \times 0.300 = 4.680 \text{ m}^3$	4.680 m ³
Backfill	$V = 4.680 - 2.900 \times 3.000 \times 0.300 = 2.070 \text{ m}^3$	2.070 m ³

3.THILAWA ACCESS LINE
DRAINAGE SYSTEM

SIDE DITCH

SCHEDULE OF DRAINAGE STRUCTURE

単位：m

500×500-U			CATCH PIT 700 × 700 × 1850			CATCH PIT 1200 × 1200 × 1600		
R/L	STATION	LENGTH	R/L	STATION	EACH	R/L	STATION	EACH
L	0 + 26.00 ~ 0 + 65.00	35.7	R	0 + 66.00	1	R	0 + 66.00	1
L	0 + 70.00 ~ 0 + 125.00	51.2						
R	0 + 66.00 ~ 0 + 220.00	155.0						
total		241.9	total		1	total		1

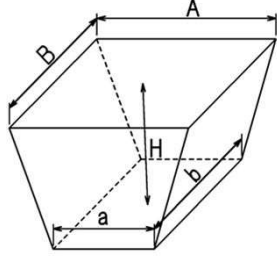
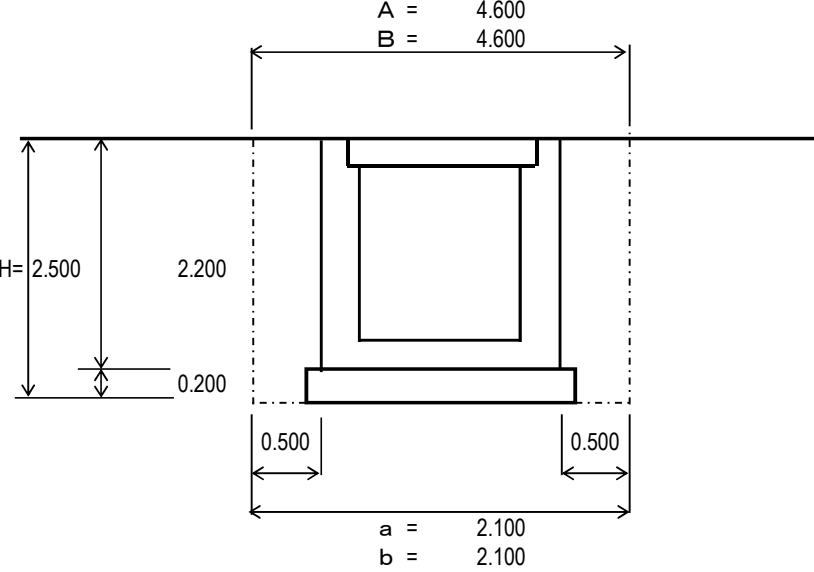
EARTHWORK														
STATION	DISTANCE (m)	EXCAVATION FOR FOUNDATION (L)						EXCAVATION FOR FOUNDATION (R)						REMARKS
		EXCAVATION FOR FOUNDATION			EXCAVATION FOR FOUNDATION			EXCAVATION FOR FOUNDATION			EXCAVATION FOR FOUNDATION			
		Area (m ²)	Average (m ²)	Volume (m ³)	Area (m ²)	Average (m ²)	Volume (m ³)	Area (m ²)	Average (m ²)	Volume (m ³)	Area (m ²)	Average (m ²)	Volume (m ³)	
No.	0 + 21.484	0.0	1.6						0.0					
No.	0 + 25.800	4.3	1.6	1.60	6.9			0.0	0.00	0.0				
No.	0 + 40.000	14.2	1.7	1.65	23.4			0.0	0.00	0.0				
No.	0 + 55.800	15.8	1.5	1.60	25.3			0.0	0.00	0.0				
No.	0 + 60.000	4.2	1.5	1.50	6.3			0.0	0.00	0.0				
No.	0 + 80.000	20.0	1.8	1.65	33.0			1.6	0.80	16.0				
No.	0 + 90.053	10.1	1.5	1.65	16.7			1.7	1.65	16.7				
No.	0 + 100.000	9.9	1.6	1.55	15.3			1.5	1.60	15.8				
No.	0 + 120.000	20.0	2.0	1.80	36.0			2.1	1.80	36.0				
No.	0 + 140.000	20.0	0.0	1.00	20.0			1.6	1.85	37.0				
No.	0 + 150.053	10.1	0.0	0.00	0.0			1.6	1.60	16.2				
No.	0 + 160.000	9.9	0.0	0.00	0.0			1.4	1.50	14.9				
No.	0 + 162.708	2.7	0.0	0.00	0.0			1.4	1.40	3.8				
No.	0 + 180.000	17.3	0.0	0.00	0.0			1.4	1.40	24.2				
No.	0 + 192.708	12.7	0.0	0.00	0.0			1.5	1.45	18.4				
No.	0 + 200.000	7.3	0.0	0.00	0.0			1.6	1.55	11.3				
No.	0 + 220.000	20.0	0.0	0.00	0.0			1.5	1.55	31.0				
Subtotal					182.9					241.3				
Total					182.9				LRTotal	424.2				

EARTHWORK														
STATION	DISTANCE (m)	BUCKFILL (L)						BUCKFILL (R)						REMARKS
		BUCKFILL			BUCKFILL			BUCKFILL			BUCKFILL			
		Area (m2)	Average (m2)	Volume (m3)	Area (m2)	Average (m2)	Volume (m3)	Area (m2)	Average (m2)	Volume (m3)	Area (m2)	Average (m2)	Volume (m3)	
No. 0 + 21.484		0.2								0.0				
No. 0 + 25.800	4.3	0.8	0.50	2.2					0.0	0.00	0.0			
No. 0 + 40.000	14.2	0.8	0.80	11.4					0.0	0.00	0.0			
No. 0 + 55.800	15.8	0.8	0.80	12.6					0.0	0.00	0.0			
No. 0 + 60.000	4.2	0.8	0.80	3.4					0.0	0.00	0.0			
No. 0 + 80.000	20.0	0.9	0.85	17.0					0.9	0.45	9.0			
No. 0 + 90.053	10.1	0.8	0.85	8.6					0.9	0.90	9.1			
No. 0 + 100.000	9.9	0.9	0.85	8.4					0.8	0.85	8.4			
No. 0 + 120.000	20.0	0.9	0.90	18.0					0.9	0.85	17.0			
No. 0 + 140.000	20.0	0.0	0.45	9.0					0.9	0.90	18.0			
No. 0 + 150.053	10.1	0.0	0.00	0.0					0.8	0.85	8.6			
No. 0 + 160.000	9.9	0.0	0.00	0.0					0.8	0.80	7.9			
No. 0 + 162.708	2.7	0.0	0.00	0.0					0.9	0.85	2.3			
No. 0 + 180.000	17.3	0.0	0.00	0.0					0.9	0.90	15.6			
No. 0 + 192.708	12.7	0.0	0.00	0.0					0.8	0.85	10.8			
No. 0 + 200.000	7.3	0.0	0.00	0.0					0.8	0.80	5.8			
No. 0 + 220.000	20.0	0.0	0.00	0.0					0.8	0.80	16.0			
Subtotal				90.6							128.5			
Total				90.6						LRTotal	219.1			

CATCH PIT 700×700×1850

Item	Size/Type	Unit	Quantity	Remark
Concrete		m ³	1.468	
Form		m ²	14.355	
Leveling Con:		m ³	0.144	
Leveling Con: Form		m ²	0.480	
Foundation		m ²	1.440	
Reinforcing	D13	kg	99	
Excavation		m ³	29.358	
Backfill		m ³	26.264	
REMOVAL OFSURPLUS SOIL		m ³	0.176	

CATCH PIT 700×700×1850							
Item	Formula					Quantity	
Concrete	$V = 1.100 \times 1.100 \times 2.200$				$= 2.662$	1.468 m3	
	$V = 0.700 \times 0.700 \times 2.000$				$= \Delta 0.980$		
					$V = 1.682 \text{ m3}$		
	Subtraction Concrete Cover						
	$V = 0.840 \times 0.850 \times 0.150$				$= 0.107$		
	500×500 $V = 0.500 \times 0.500 \times 0.2$				$= 0.050$		
	600 $V = 0.600 \times 0.600 \times 3.14 \div 4 \times 0.2$				$= 0.057$		
					$\Delta V = 0.214 \text{ m3}$		
					$V = 1.682 - 0.214$		
					$= 1.468 \text{ m3}$		
Form	$A = 0.700 \times 2.050 \times 2$				$= 2.870$	14.355 m2	
	$A = 0.700 \times 2.050 \times 2$				$= 2.870$		
	$A = 1.100 \times 2.200 \times 2$				$= 4.840$		
	$A = 1.100 \times 2.200 \times 2$				$= 4.840$		
					$\Sigma A = 15.420 \text{ m2}$		
	Subtraction						
	500×500 $A = 0.500 \times 0.500 \times 2$				$= 0.500$		
	600 $A = 0.600 \times 0.600 \times 3.14 \div 4 \times 2$				$= 0.565$		
					$\Delta A = 1.065 \text{ m2}$		
					$A = 15.420 - 1.065$		
				$= 14.355$			
Leveling Con:	$V = 1.200 \times 1.200 \times 0.100$			$= 0.144$	0.144 m3		
Leveling Con: Form	$A = 1.200 \times 0.100 \times 4$			$= 0.480$	0.480 m2		
Foundation	$A = 1.200 \times 1.200$			$= 1.440$	1.440 m2		
Concrete Cover	$N =$			1 Nos	1 Nos		
Reinforcing	D13 $(4.900 \times 12 + 4.02 \times 10) \times 0.995$			$= 98.505$	98.505 kg		

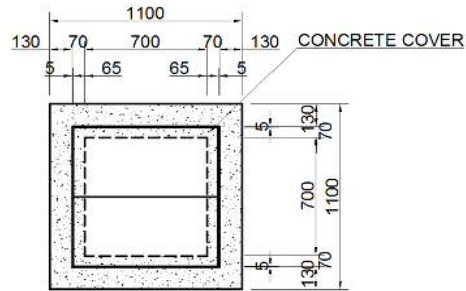
CATCH PIT 700×700×1850		
Item	Formula	Quantity
Excavation	 $ \begin{aligned} A &= 4.600 \\ B &= 4.600 \\ a &= 2.100 \\ b &= 2.100 \\ H &= 2.500 \end{aligned} $ $ \begin{aligned} V &= 2.500 \div 6.000 \times \{ 4.600 \times 2.100 + 2.100 \\ &\times 4.600 + 2.000 \times (2.100 \times 2.100 + 4.600 \\ &\times 4.600) \} \\ &= 29.358 \text{ m}^3 \end{aligned} $	29.358 m ³
Backfill	$ \begin{aligned} V &= 1.100 \times 1.100 \times 2.200 &= 2.662 \\ V &= 1.200 \times 1.200 \times 0.300 &= 0.432 \\ \Sigma V & &= 3.094 \text{ m}^3 \\ V &= 29.358 - 3.094 &= 26.264 \text{ m}^3 \end{aligned} $ 	26.264 m ³
REMOVAL OF SURPLUS SOIL	$ V = 29.358 - 26.264 / 0.9 $	0.000 m ² 0.176 m ³

CATCH PIT 700 × 700 × 1850

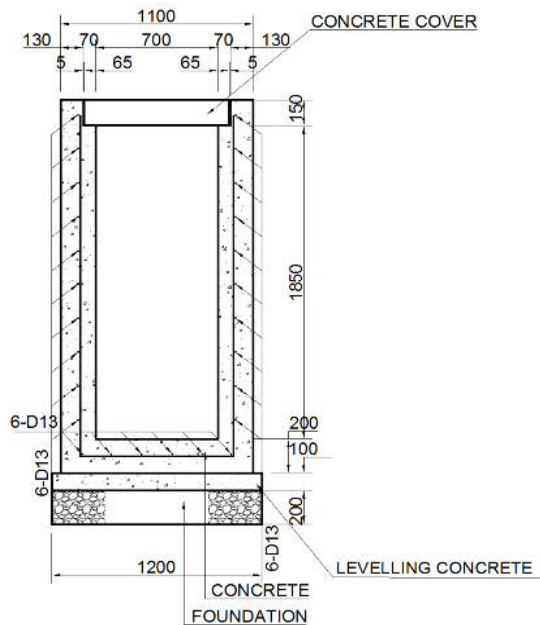
Figure

CATCH PIT (700X700X1850)

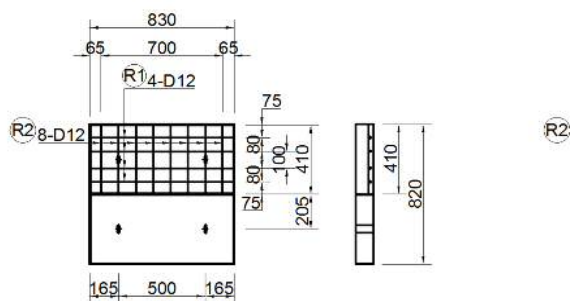
C



PLAN



SECTION

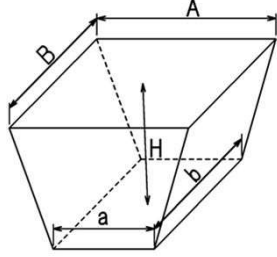
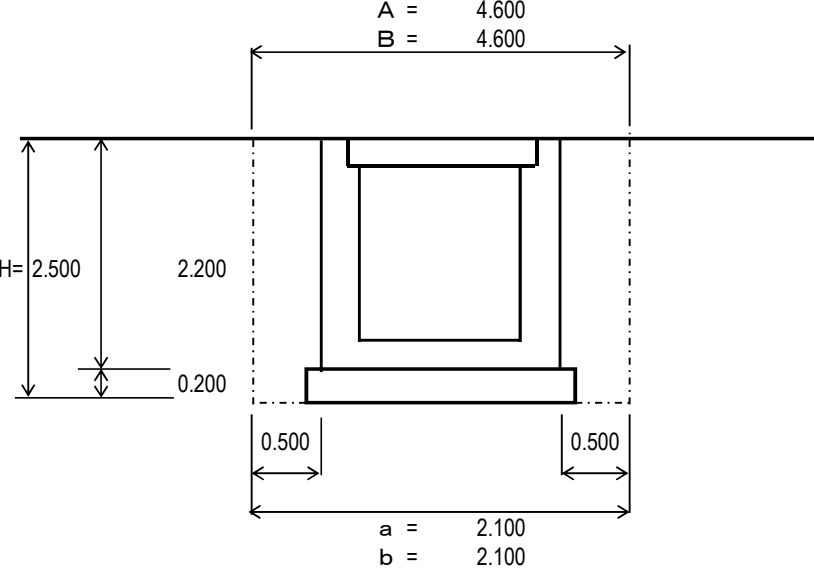


COVER

CATCH PIT 1200×1200×1600

Item	Size/Type	Unit	Quantity	Remark
Concrete		m ³	1.91	
Form		m ²	18.12	
Leveling Con:		m ³	0.29	
Leveling Con: Form		m ²	0.68	
Foundation		m ²	2.89	
Reinforcing	D13	kg	139	
Excavation		m ³	32.17	
Backfill		m ³	26.31	
REMOVAL OFSURPLUS SOIL		m ³	2.94	

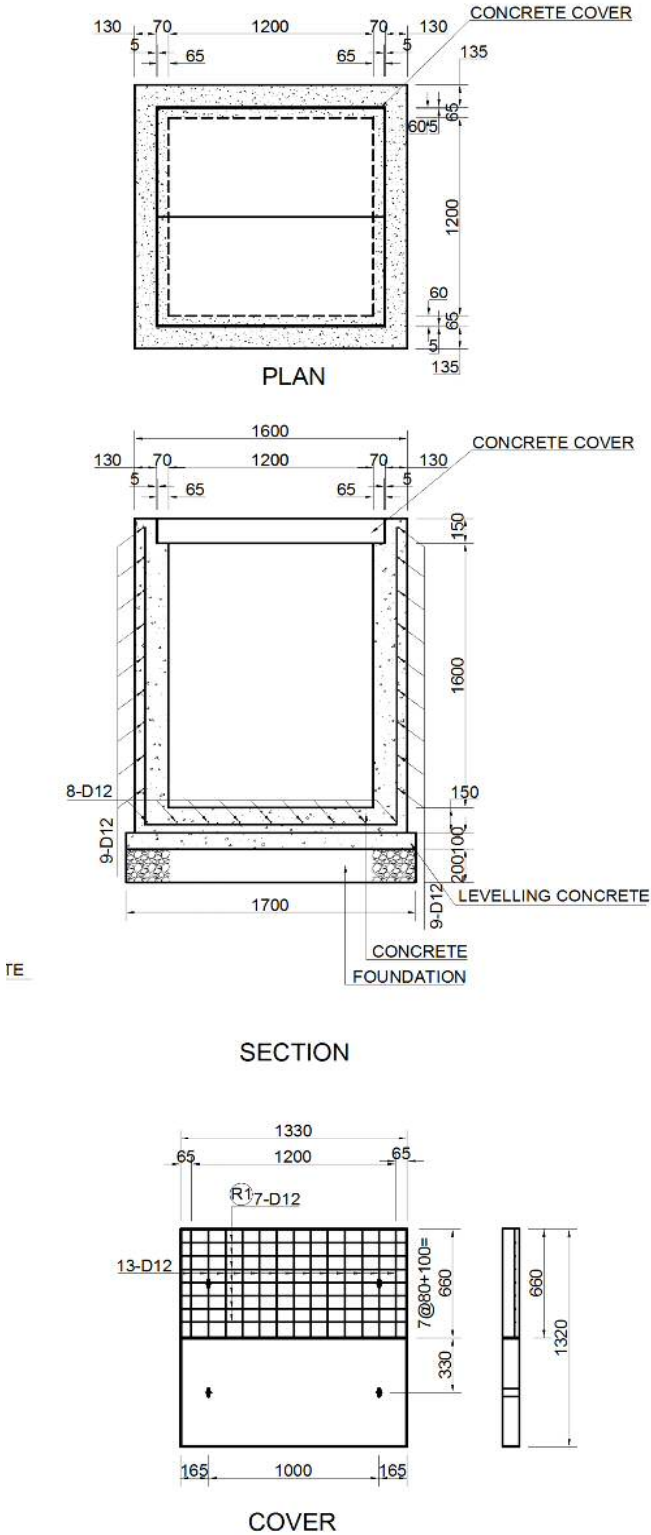
CATCH PIT 700×700×1850							
Item	Formula					Quantity	
Concrete	$V = 1.100 \times 1.100 \times 2.200$	=	2.662			1.468 m3	
	$V = 0.700 \times 0.700 \times 2.000$	=	0.980				
		$V =$	1.682 m3				
	Subtraction Concrete Cover						
	$V = 0.840 \times 0.850 \times 0.150$	=	0.107				
	500×500 $V = 0.500 \times 0.500 \times 0.2$	=	0.050				
	600 $V = 0.600 \times 0.600 \times 3.14 \div 4 \times 0.2$	=	0.057				
		$\Delta V =$	0.214 m3				
	$V = 1.682 - 0.214$	=	1.468 m3				
	Form	$A = 0.700 \times 2.050 \times 2$	=	2.870			14.355 m2
$A = 0.700 \times 2.050 \times 2$		=	2.870				
$A = 1.100 \times 2.200 \times 2$		=	4.840				
$A = 1.100 \times 2.200 \times 2$		=	4.840				
		$\Sigma A =$	15.420 m2				
Subtraction							
500×500 $A = 0.500 \times 0.500 \times 2$		=	0.500				
600 $A = 0.600 \times 0.600 \times 3.14 \div 4 \times 2$		=	0.565				
		$\Delta A =$	1.065 m2				
$A = 15.420 - 1.065$		=	14.355				
Leveling Con:	$V = 1.200 \times 1.200 \times 0.100$	=	0.144		0.144 m3		
Leveling Con: Form	$A = 1.200 \times 0.100 \times 4$	=	0.480		0.480 m2		
Foundation	$A = 1.200 \times 1.200$	=	1.440		1.440 m2		
Concrete Cover	$N =$		1 Nos		1 Nos		
Reinforcing	D13 (4.900 × 12 + 4.02 × 10) × 0.995	=	98.505		98.505 kg		

CATCH PIT 700×700×1850		
Item	Formula	Quantity
Excavation	 $ \begin{aligned} A &= 4.600 \\ B &= 4.600 \\ a &= 2.100 \\ b &= 2.100 \\ H &= 2.500 \end{aligned} $ $ \begin{aligned} V &= \frac{2.500}{6} \times \left\{ \frac{4.600 \times 4.600 + 4.600 \times 2.100 + 2.100 \times 2.100}{2} \right\} \\ &= 29.358 \text{ m}^3 \end{aligned} $	29.358 m ³
Backfill	$ \begin{aligned} V &= 1.100 \times 1.100 \times 2.200 = 2.662 \\ V &= 1.200 \times 1.200 \times 0.300 = 0.432 \\ \Sigma V &= 3.094 \text{ m}^3 \\ V &= 29.358 - 3.094 = 26.264 \text{ m}^3 \end{aligned} $  $ \begin{aligned} A &= 4.600 \\ B &= 4.600 \\ H &= 2.500 \\ a &= 2.100 \\ b &= 2.100 \end{aligned} $	26.264 m ³
REMOVAL OF SURPLUS SOIL	$ V = 29.358 - 26.264 = 3.094 \text{ m}^3 $	0.176 m ³

CATCH PIT 1200 × 1200 × 1600

Figure

CATCH PIT (1200X1200X1600)



DRAINAGE STRUCTURES

Main Road after STA 0+177

PAY ITEM: OPEN DITCHES
 LOCATION: MAIN ROAD

LOCATION	U-DITCH 300X300		U-DITCH 500X500		U-DITCH 800X800		U-DITCH 1000X1000		REMARKS
	L	R	L	R	L	R	L	R	
	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	
START SIDE	3.980	9.549			482.550	364.000	93.042	94.383	
	2.650	2.639							
	2.650	2.639							
	2.650	17.212							
	10.723	8.967							
	5.853	1.250							
		1.150							
		1.150							
END SIDE		5.718							
SUB TOTAL	28.506	50.274	0.000	0.000	482.550	364.000	93.042	94.383	
		78.780		0.000		846.550		187.425	

LOCATION	U-DITCH 1500X1500		U-DITCH 500X500C		U-DITCH 500X850C		U-DITCH 800X800C		REMARKS
	L	R	L	R	L	R	L	R	
	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	
START SIDE							84.900		
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	84.900	0.000	
		0.000		0.000		0.000		84.900	

LOCATION	U-DITCH 1000X1000C		U-DITCH 1000X1500C		U-DITCH 1500X1500C		U-DITCH 1500X2500C		REMARKS
	L	R	L	R	L	R	L	R	
	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	
START SIDE									
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

LOCATION									REMARKS
	L	R	L	R	L	R	L	R	
	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	
START SIDE									
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

PAY ITEM: CATCH PIT
 LOCATION: MAIN ROAD

LOCATION	TYPE A		TYPE C		TYPE D		TYPE B		REMARKS
	L	R	L	R	L	R	L	R	
	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	
START SIDE	5.000		3.000						
END SIDE									
SUB TOTAL	5.000	0.000	3.000	0.000	0.000	0.000	0.000	0.000	
		5.000		3.000		0.000		0.000	

LOCATION	700x700x1050		1000x1000x1350		1200x1200x1600		600x600x1100		REMARKS
	L	R	L	R	L	R	L	R	
	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	
START SIDE		1.000	2.000	1.000	2.000	2.000			
		1.000	1.000	1.000	1.000	2.000			
		1.000	1.000	1.000	1.000	1.000			
			1.000	1.000		0.000			
			1.000	1.000		1.000			
				1.000		1.000			
				1.000					
				1.000					
END SIDE									
SUB TOTAL	0.000	3.000	6.000	8.000	4.000	7.000	0.000	0.000	
		3.000		14.000		11.000		0.000	

LOCATION	L	R	L	R	L	R	L	R	REMARKS
	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	
	START SIDE								
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

LOCATION	L	R	L	R	L	R	L	R	REMARKS
	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	
	START SIDE								
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

PAY ITEM: PIPE CULVERT
 LOCATION: MAIN ROAD

LOCATION	Φ 300 TYPE B		Φ 300 TYPE A		Φ 900		L (m)	R (m)	REMARKS
	L	R	L	R	L	R			
	(m)	(m)	(m)	(m)	(m)	(m)			
START SIDE	70.000				11.905	22.000			
						10.725			
END SIDE									
SUB TOTAL	70.000	0.000	0.000	0.000	11.905	32.725	0.000	0.000	
		70.000		0.000		44.630		0.000	

PAY ITEM: VERTICAL DRAIN
 LOCATION: MAIN ROAD

LOCATION	TYPE A		TYPE B		L (Nos)	R (Nos)	L (Nos)	R (Nos)	REMARKS
	L	R	L	R					
	(Nos)	(Nos)	(Nos)	(Nos)					
START SIDE	3.000								
END SIDE									
SUB TOTAL	3.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		3.000		0.000		0.000		0.000	

PAY ITEM: DRAINAGE OUTLET
 LOCATION: MAIN ROAD

LOCATION	TYPE A		TYPE B		L (Nos)	R (Nos)	L (Nos)	R (Nos)	REMARKS
	L	R	L	R					
	(Nos)	(Nos)	(Nos)	(Nos)					
START SIDE	1.000	1.000							
END SIDE									
SUB TOTAL	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	
		2.000		0.000		0.000		0.000	

EARTH WORK (1)

Thanlyin Side

LOCATION	LENGTH	CUT						REMARKS
		L			R			
		AREA	AVE. AREA	VOLUME	AREA	AVE. AREA	VOLUME	
0 + 0.000		0.970			1.500			
0 + 20.000	20.000	2.710	1.840	36.8	1.120	1.310	26.2	
0 + 24.970	4.970	1.630	2.170	10.8	1.390	1.255	6.2	
0 + 40.000	15.030	0.000	0.815	12.2	0.000	0.695	10.4	
0 + 60.000	20.000	2.950	1.475	29.5	2.020	1.010	20.2	
0 + 76.170	16.170	3.390	3.170	51.3	1.900	1.960	31.7	
0 + 80.000	3.830	3.490	3.440	13.2	1.840	1.870	7.2	
0 + 100.000	20.000	3.010	3.250	65.0	1.860	1.850	37.0	
0 + 120.000	20.000	1.060	2.035	40.7	1.590	1.725	34.5	
0 + 140.000	20.000	1.340	1.200	24.0	1.670	1.630	32.6	
0 + 160.000	20.000	1.430	1.385	27.7	0.000	0.835	16.7	
0 + 161.513	1.513	1.440	1.435	2.2	0.000	0.000	0.0	
0 + 180.000	18.487	1.520	1.480	27.4	1.810	0.905	16.7	
0 + 200.000	20.000	1.600	1.560	31.2	1.880	1.845	36.9	
0 + 212.713	12.713	1.660	1.630	20.7	1.920	1.900	24.2	
0 + 220.000	7.287	1.690	1.675	12.2	1.820	1.870	13.6	
0 + 240.000	20.000	1.780	1.735	34.7	2.010	1.915	38.3	
0 + 260.000	20.000	1.870	1.825	36.5	2.080	2.045	40.9	
0 + 280.000	20.000	1.960	1.915	38.3	2.150	2.115	42.3	
0 + 300.000	20.000	2.050	2.005	40.1	2.220	2.185	43.7	
0 + 320.000	20.000	2.140	2.095	41.9	2.290	2.255	45.1	
0 + 340.000	20.000	2.240	2.190	43.8	2.360	2.325	46.5	
0 + 360.000	20.000	2.540	2.390	47.8	2.670	2.515	50.3	
0 + 380.000	20.000	2.650	2.595	51.9	2.760	2.715	54.3	
0 + 400.000	20.000	2.760	2.705	54.1	2.840	2.800	56.0	
0 + 420.000	20.000	2.870	2.815	56.3	2.930	2.885	57.7	
0 + 440.000	20.000	2.990	2.930	58.6	3.010	2.970	59.4	
0 + 460.000	20.000	3.100	3.045	60.9	3.100	3.055	61.1	
0 480.000	20.000	3.220	3.160	63.2	3.190	3.145	62.9	
0 500.000	20.000	3.330	3.275	65.5	3.280	3.235	64.7	
0 520.000	20.000	3.450	3.390	67.8	3.370	3.325	66.5	
0 521.900	1.900	3.460	3.455	6.6	3.370	3.370	6.4	
0 540.000	18.100	8.110	5.785	104.7	7.710	5.540	100.3	
0 560.000	20.000	7.260	7.685	153.7	6.850	7.280	145.6	
0 580.000	20.000	7.470	7.365	147.3	6.940	6.895	137.9	
0 600.000	20.000	7.670	7.570	151.4	7.030	6.985	139.7	
0 620.000	20.000	7.880	7.775	155.5	7.120	7.075	141.5	
0 640.000	20.000	8.080	7.980	159.6	7.220	7.170	143.4	
SUB-TOTAL				2,045.1			1,918.6	m3
TOTAL							3,963.7	m3

PAY ITEM: OPEN DITCHES
 LOCATION: ON RAMP

LOCATION	U-DITCH 300X300		U-DITCH 500X500		U-DITCH 800X800		U-DITCH 1000X1000		REMARKS
	L	R	L	R	L	R	L	R	
	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	
START SIDE						344.504			
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	344.504	0.000	0.000	
		0.000		0.000		344.504		0.000	

LOCATION	U-DITCH 1500X1500		U-DITCH 500X500C		U-DITCH 500X850C		U-DITCH 800X800C		REMARKS
	L	R	L	R	L	R	L	R	
	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	
START SIDE									
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

LOCATION	U-DITCH 1000X1000C		U-DITCH 1000X1500C		U-DITCH 1500X1500C		U-DITCH 1500X2500C		REMARKS
	L	R	L	R	L	R	L	R	
	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	
START SIDE									
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

LOCATION	L	R	L	R	L	R	L	R	REMARKS
	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	
	START SIDE								
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

PAY ITEM: CATCH PIT
 LOCATION: ON RAMP

LOCATION	TYPE A		TYPE B		TYPE C		TYPE D		REMARKS
	L	R	L	R	L	R	L	R	
	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	
START SIDE									
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

LOCATION	700x700x1050		1000x1000x1350		1200x1200x1600		600x600x1100		REMARKS
	L	R	L	R	L	R	L	R	
	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	
START SIDE									
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

LOCATION	L	R	L	R	L	R	L	R	REMARKS
	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	
	START SIDE								
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

LOCATION	L	R	L	R	L	R	L	R	REMARKS
	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	
	START SIDE								
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

PAY ITEM: PIPE CULVERT
 LOCATION: ON RAMP

LOCATION	Φ 300 TYPE A		Φ 300 TYPE B		Φ 900		L (m)	R (m)	REMARKS
	L	R	L	R	L	R			
	(m)	(m)	(m)	(m)	(m)	(m)			
START SIDE									
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

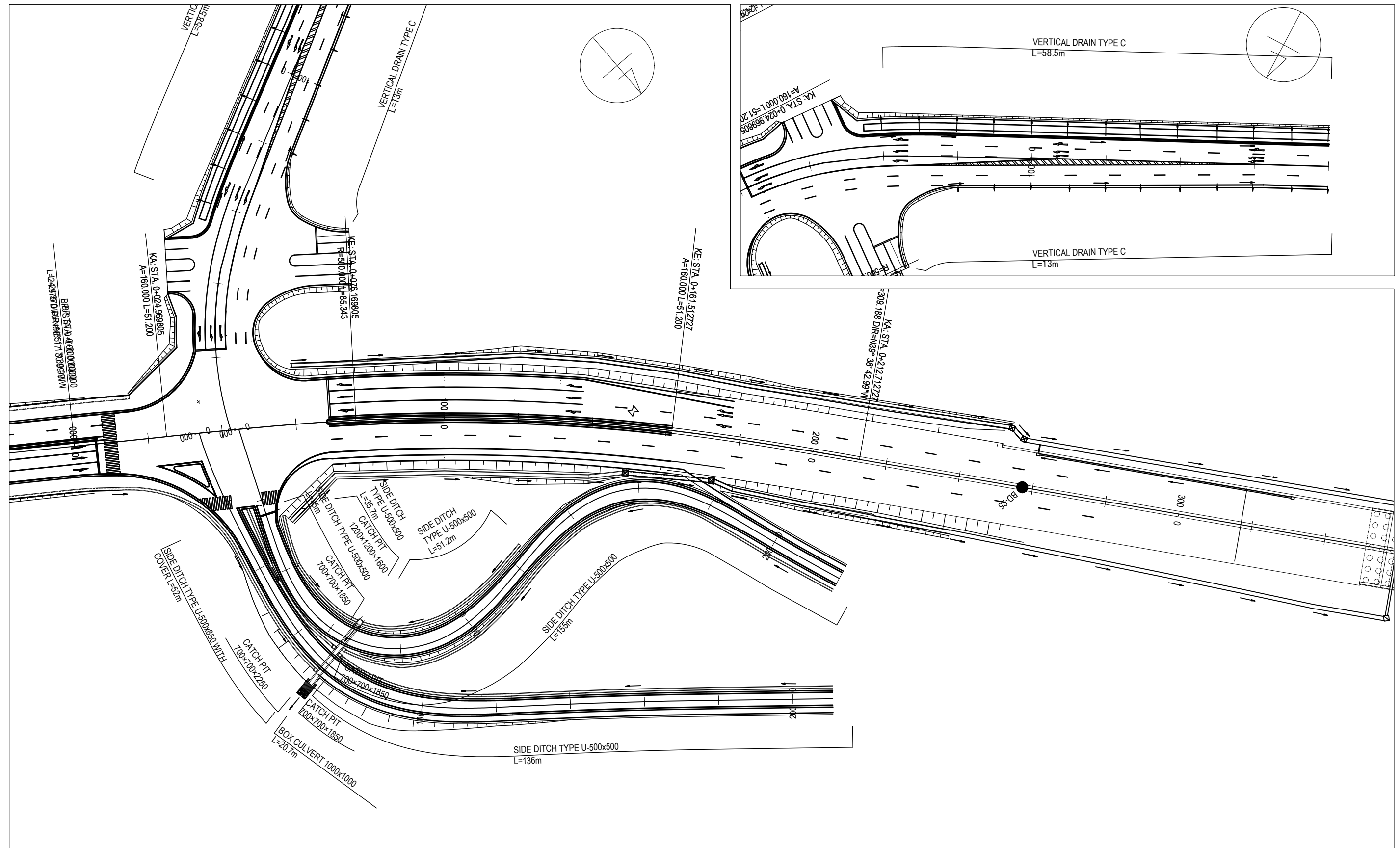
PAY ITEM: VERTICAL DRAIN
 LOCATION: ON RAMP

LOCATION	TYPE A		TYPE B		L (Nos)	R (Nos)	L (Nos)	R (Nos)	REMARKS
	L	R	L	R					
	(Nos)	(Nos)	(Nos)	(Nos)					
START SIDE									
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

PAY ITEM: DRAINAGE OUTLET
 LOCATION: ON RAMP

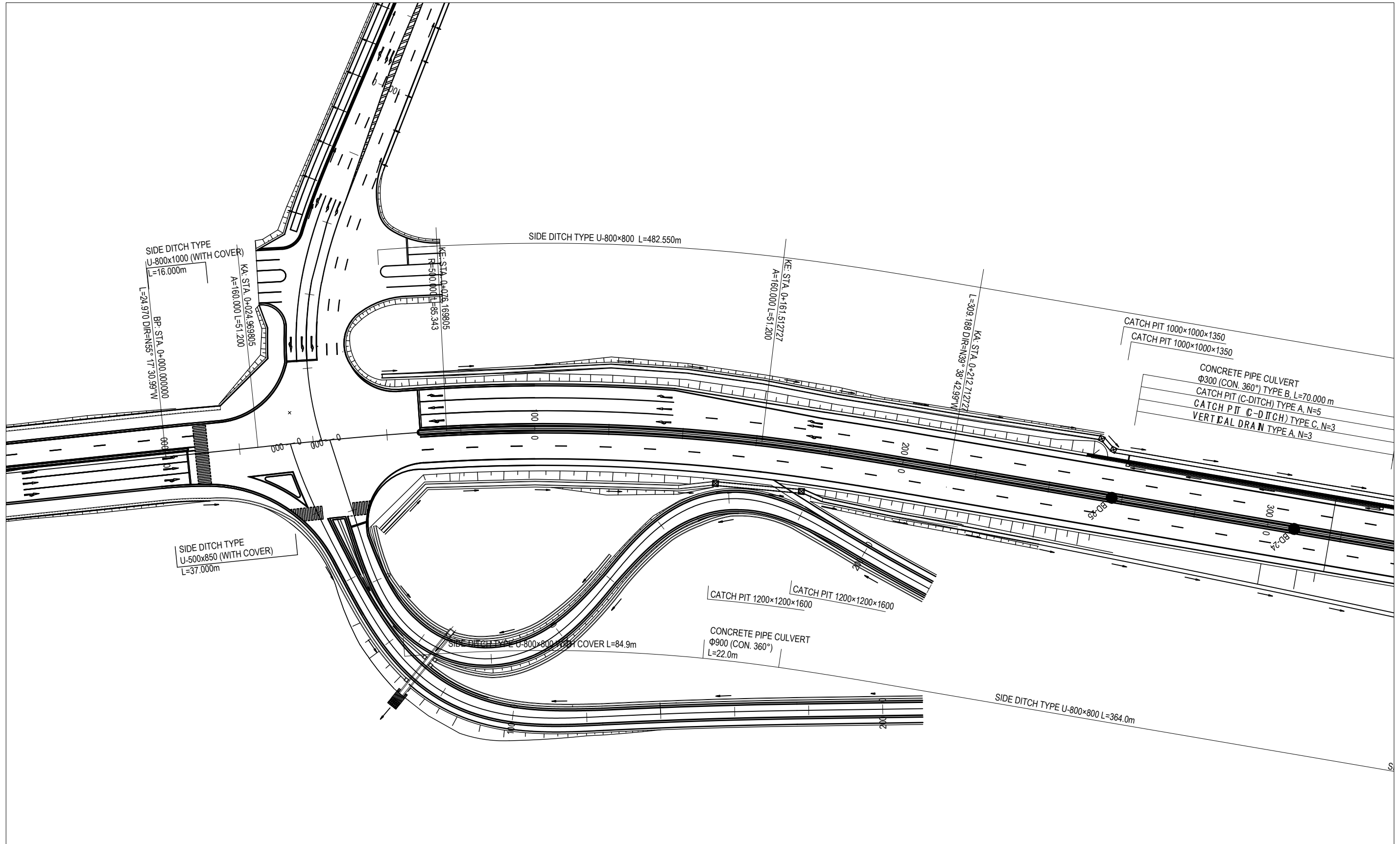
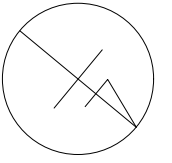
LOCATION	TYPE A		TYPE B		L (Nos)	R (Nos)	L (Nos)	R (Nos)	REMARKS
	L	R	L	R					
	(Nos)	(Nos)	(Nos)	(Nos)					
START SIDE									
END SIDE									
SUB TOTAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.000		0.000		0.000		0.000	

DRAINAGE SYSTEM PLAN (1) S= 1:1000



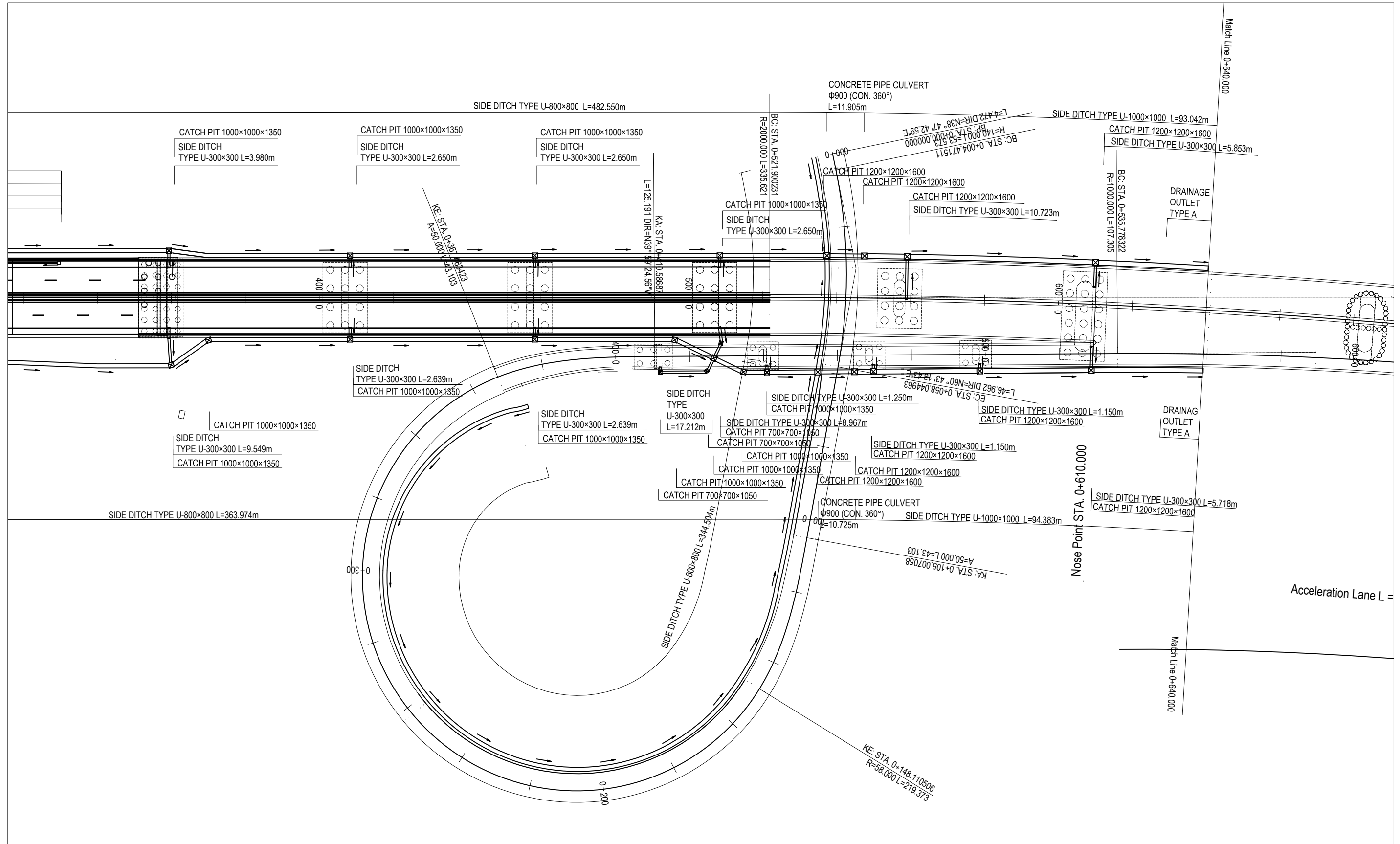
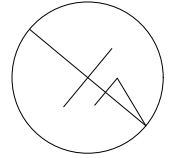
PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 20%;">NAME</th> <th style="width: 20%;">SIGNATURE</th> <th style="width: 20%;">DATE</th> </tr> </thead> <tbody> <tr> <td>PREPARED BY</td> <td>M. TORIU</td> <td></td> <td>15 Jun. 2017</td> </tr> <tr> <td>CHECKED BY</td> <td>T. HAYAKAWA</td> <td></td> <td>20 Jun. 2017</td> </tr> <tr> <td>APPROVED BY</td> <td>Y. SANO</td> <td></td> <td>21 Jun. 2017</td> </tr> </tbody> </table>		NAME	SIGNATURE	DATE	PREPARED BY	M. TORIU		15 Jun. 2017	CHECKED BY	T. HAYAKAWA		20 Jun. 2017	APPROVED BY	Y. SANO		21 Jun. 2017	DRAWING TITLE DRAINAGE SYSTEM PLAN(1) S=1:1000	PACKAGE 1 DWG No. P1-RD-3010
	NAME	SIGNATURE	DATE																			
PREPARED BY	M. TORIU		15 Jun. 2017																			
CHECKED BY	T. HAYAKAWA		20 Jun. 2017																			
APPROVED BY	Y. SANO		21 Jun. 2017																			

DRAINAGE SYSTEM PLAN (2) S= 1:1000



PROJECT NAME DETAILED DESIGN ON BAGO RIVER BRIDGE CONSTRUCTION PROJECT	FINANCED BY JAPAN INTERNATIONAL COOPERATION AGENCY	COUNTERPART REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF CONSTRUCTION DEPARTMENT OF BRIDGE	JICA STUDY TEAM NIPPON KOEI CO., LTD. ORIENTAL CONSULTANTS GLOBAL CO., LTD. METROPOLITAN EXPRESSWAY COMPANY LIMITED CHODAI CO., LTD. NIPPON ENGINEERING CONSULTANTS CO., LTD.	NAME	SIGNATURE	DATE	DRAWING TITLE DRAINAGE SYSTEM PLAN(2) S=1:1000	PACKAGE 1 DWG No. P1-RD-3011	
				PREPARED BY	M. TORIU				15 Jun. 2017
				CHECKED BY	T. HAYAKAWA				20 Jun. 2017
				APPROVED BY	Y. SANO				21 Jun. 2017

DRAINAGE SYSTEM PLAN (3) S= 1:1000



PROJECT NAME
 DETAILED DESIGN ON
 BAGO RIVER BRIDGE
 CONSTRUCTION PROJECT

FINANCED BY
 JAPAN INTERNATIONAL
 COOPERATION AGENCY

COUNTERPART
 REPUBLIC OF THE UNION OF MYANMAR
 MINISTRY OF CONSTRUCTION
 DEPARTMENT OF BRIDGE

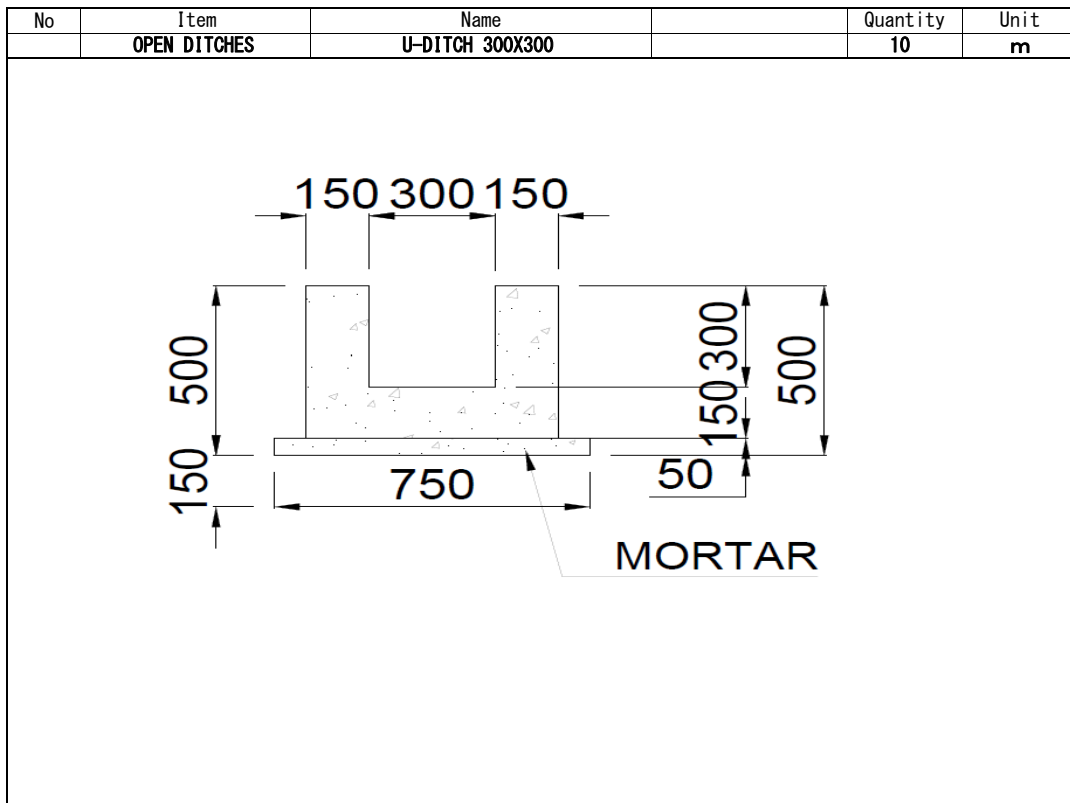
JICA STUDY TEAM
 NIPPON KOEI CO., LTD.
 ORIENTAL CONSULTANTS GLOBAL CO., LTD.
 METROPOLITAN EXPRESSWAY COMPANY LIMITED
 CHODAI CO., LTD.
 NIPPON ENGINEERING CONSULTANTS CO., LTD.

	NAME	SIGNATURE	DATE
PREPARED BY	M. TORIU		15 Jun. 2017
CHECKED BY	T. HAYAKAWA		20 Jun. 2017
APPROVED BY	Y. SANO		21 Jun. 2017

DRAWING TITLE
 DRAINAGE SYSTEM PLAN(3)
 S=1:1000

PACKAGE
 1
 DWG No.
 P1-RD-3012

UNIT QUANTITY CALCULATION SHEET



Item	Formula	Quantity
U-300 x 300 Concrete	$V1 = 0.600 \times 0.150 \times 10.000 = 0.900 \text{ m}^3$	1.800 m ³
	$V2 = 0.300 \times 0.150 \times 10.000 \times 2 = 0.900 \text{ m}^3$	
Form	$A1 = (0.450 + 0.300) \times 2 \times 10.000 = 15.000 \text{ m}^2$	15.000 m ²
Mortar	$V = 0.750 \times 0.050 \times 10.000 = 0.375 \text{ m}^3$	0.375 m ³
Excavation	$V = \left(\frac{2.250 + 1.750}{2} \right) \times 0.500 \times 10.000 = 10.000 \text{ m}^3$	10.000 m ³
Backfill	$V1 = \left(\frac{0.750 + 0.500}{2} \right) \times 0.500 = 0.313 \text{ m}^2$	6.940 m ³
	$V2 = 0.450 \times 0.075 = 0.034 \text{ m}^2$	
	$V = (0.313 + 0.034) \times 2.000 \times 10.000 = 6.940 \text{ m}^3$	

No	Item	Name	Quantity	Unit																												
	OPEN DITCHES	U-DITCH 500X500	10	m																												
Item	Formula			Quantity																												
U-500 x 500 Concrete	$V1 = 0.800 \times 0.150 \times 10.000 = 1.200 \text{ m}^3$ $V2 = 0.500 \times 0.150 \times 10.000 \times 2 = 1.500 \text{ m}^3$ $\underline{\hspace{1.5cm}} = 2.700 \text{ m}^3$			2.700 m ³																												
Form	$A1 = (0.650 + 0.500) \times 2 \times 10.000 = 23.000 \text{ m}^2$			23.000 m ²																												
Foundation	$V = 0.950 \times 0.150 \times 10.000 = 1.425 \text{ m}^3$			1.425 m ³																												
Leveling Con:	$V = 0.950 \times 0.100 \times 10.000 = 0.950 \text{ m}^3$			0.950 m ³																												
Excavation	$V = \frac{(2.850 + 1.950)}{2} \times 0.900 \times 10.000 = 21.600 \text{ m}^3$			21.600 m ³																												
Backfill	$V1 = \frac{(0.950 + 0.500)}{2} \times 0.900 = 0.653 \text{ m}^2$			0.653 m ²																												
	$V2 = 0.650 \times 0.075 = 0.049 \text{ m}^2$			0.049 m ²																												
	$V = (0.653 + 0.049) \times 2.000 \times 10.000 = 14.040 \text{ m}^3$			14.040 m ³																												
Reinforcing -bar D13	<table border="1"> <thead> <tr> <th>BAR MARK</th> <th>SIZE (mm)</th> <th>LENGTH (mm)</th> <th>NO. OF BARS</th> <th>UNIT WEIGHT (kgf/m)</th> <th>WEIGHT (kgf/NOS)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>R1</td> <td>D13</td> <td>1,760</td> <td>50</td> <td>0.995</td> <td>1.75</td> <td>88</td> </tr> <tr> <td>R2</td> <td>D13</td> <td>10,000</td> <td>11</td> <td>0.995</td> <td>9.95</td> <td>109</td> </tr> <tr> <td colspan="5" style="text-align: right;">Total</td> <td>197 kg</td> <td></td> </tr> </tbody> </table>			BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS	R1	D13	1,760	50	0.995	1.75	88	R2	D13	10,000	11	0.995	9.95	109	Total					197 kg		
	BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS																									
	R1	D13	1,760	50	0.995	1.75	88																									
	R2	D13	10,000	11	0.995	9.95	109																									
Total					197 kg																											
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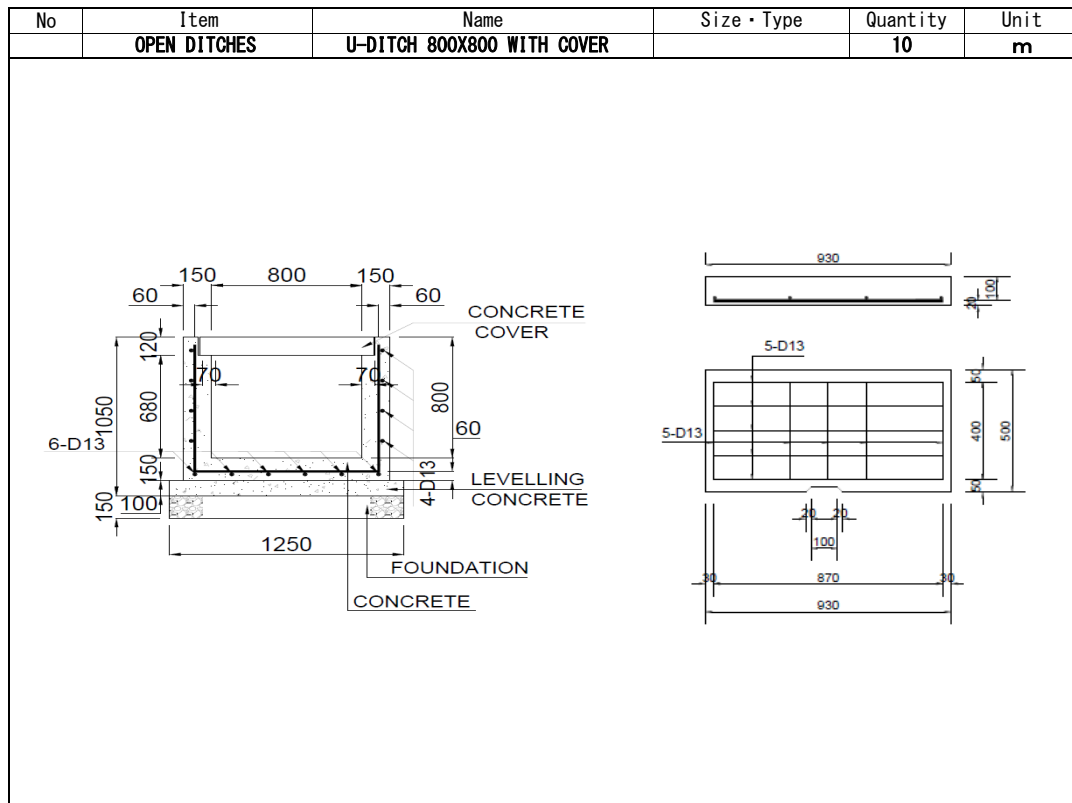
No	Item	Name	Size · Type	Quantity	Unit																												
	OPEN DITCHES	U-DITCH 800X800		10	m																												
Item	Formula				Quantity																												
U-800 x 800 Concrete	$V1 = 1.100 \times 0.150 \times 10.000 = 1.650 \text{ m}^3$				4.050 m ³																												
	$V2 = 0.800 \times 0.150 \times 10.000 \times 2 = 2.400 \text{ m}^3$																																
Form	$A1 = (0.950 + 0.800) \times 2 \times 10.000 = 35.000 \text{ m}^2$				35.000 m ²																												
Foundation	$V = 1.250 \times 0.150 \times 10.000 = 1.875 \text{ m}^3$				1.875 m ³																												
Leveling Con:	$V = 1.250 \times 0.100 \times 10.000 = 1.250 \text{ m}^3$				1.250 m ³																												
Excavation	$V = \frac{(3.450 + 2.250)}{2} \times 1.200 \times 10.000 = 34.200 \text{ m}^3$				34.200 m ³																												
Backfill	$V1 = \frac{(1.100 + 0.500)}{2} \times 1.200 \times H = 0.960 \text{ m}^2$				20.620 m ³																												
	$V2 = 0.950 \times 0.075 = 0.071 \text{ m}^2$																																
	$V = (0.960 + 0.071) \times 2.000 \times 10.000 = 20.620 \text{ m}^3$																																
Reinforcing -bar D13	<table border="1"> <thead> <tr> <th>BAR MARK</th> <th>SIZE (mm)</th> <th>LENGTH (mm)</th> <th>NO. OF BARS</th> <th>UNIT WEIGHT (kgf/m)</th> <th>WEIGHT (kgf/NOS)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>R1</td> <td>D13</td> <td>2,660</td> <td>50</td> <td>0.995</td> <td>2.65</td> <td>133</td> </tr> <tr> <td>R2</td> <td>D13</td> <td>10,000</td> <td>14</td> <td>0.995</td> <td>9.95</td> <td>139</td> </tr> <tr> <td colspan="5" style="text-align: center;">Total</td> <td>272 kg</td> <td></td> </tr> </tbody> </table>					BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS	R1	D13	2,660	50	0.995	2.65	133	R2	D13	10,000	14	0.995	9.95	139	Total					272 kg	
	BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS																										
	R1	D13	2,660	50	0.995	2.65	133																										
	R2	D13	10,000	14	0.995	9.95	139																										
Total					272 kg																												
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No	Item	Name	Size · Type	Quantity	Unit																													
	OPEN DITCHES	U-DITCH 1000X1000		10	m																													
Item	Formula				Quantity																													
U-1000 x 1000 Concrete	$V1 = 1.300 \times 0.150 \times 10.000 = 1.950 \text{ m}^3$				4.950 m ³																													
	$V2 = 1.000 \times 0.150 \times 10.000 \times 2 = 3.000 \text{ m}^3$																																	
Form	$A1 = (1.150 + 1.000) \times 2 \times 10.000 = 43.000 \text{ m}^2$				43.000 m ²																													
Foundation	$V = 1.450 \times 0.200 \times 10.000 = 2.900 \text{ m}^3$				2.900 m ³																													
Leveling Con:	$V = 1.450 \times 0.100 \times 10.000 = 1.450 \text{ m}^3$				1.450 m ³																													
Excavation	$V = \frac{3.900 + 2.450}{2} \times 1.450 \times 10.000 = 46.038 \text{ m}^3$				46.038 m ³																													
Backfill	$V1 = \left(\frac{1.225 + 0.500}{2} \right) \times 1.450 \times H = 1.251 \text{ m}^2$				26.740 m ³																													
	$V2 = 1.150 \times 0.075 = 0.086 \text{ m}^2$																																	
	$V = (1.251 + 0.086) \times 2.000 \times 10.000 = 26.740 \text{ m}^3$																																	
Reinforcing -bar D13	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>BAR MARK</th> <th>SIZE (mm)</th> <th>LENGTH (mm)</th> <th>NO. OF BARS</th> <th>UNIT WEIGHT (kgf/m)</th> <th>WEIGHT (kgf/NOS)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>R1</td> <td>D13</td> <td>3,260</td> <td>50</td> <td>0.995</td> <td>3.24</td> <td>162</td> </tr> <tr> <td>R2</td> <td>D13</td> <td>10,000</td> <td>20</td> <td>0.995</td> <td>9.95</td> <td>199</td> </tr> <tr> <td colspan="5" style="text-align: center;">Total</td> <td>361 kg</td> <td></td> </tr> </tbody> </table>						BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS	R1	D13	3,260	50	0.995	3.24	162	R2	D13	10,000	20	0.995	9.95	199	Total					361 kg	
	BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS																											
	R1	D13	3,260	50	0.995	3.24	162																											
	R2	D13	10,000	20	0.995	9.95	199																											
Total					361 kg																													
					361 kg																													

No	Item	Name	Size · Type	Quantity	Unit																												
	OPEN DITCHES	U-DITCH 1500X1500		10	m																												
Item	Formula				Quantity																												
U-1500 x 1500 Concrete	$V1 = 1.800 \times 0.150 \times 10.000 = 2.700 \text{ m}^3$				7.200 m ³																												
	$V2 = 1.500 \times 0.150 \times 10.000 \times 2 = 4.500 \text{ m}^3$																																
Form	$A1 = (1.650 + 1.500) \times 2 \times 10.000 = 63.000 \text{ m}^2$				63.000 m ²																												
Foundation	$V = 1.950 \times 0.200 \times 10.000 = 3.900 \text{ m}^3$				3.900 m ³																												
Leveling Con:	$V = 1.950 \times 0.100 \times 10.000 = 1.950 \text{ m}^3$				1.950 m ³																												
Excavation	$V = \left(\frac{4.900 + 2.950}{2} \right) \times 1.950 \times 10.000 = 76.538 \text{ m}^3$				76.538 m ³																												
Backfill	$V1 = \left(\frac{1.475 + 0.500}{2} \right) \times 1.950 \times H = 1.926 \text{ m}^2$				41.000 m ³																												
	$V2 = 1.650 \times 0.075 = 0.124 \text{ m}^2$																																
	$V = (1.926 + 0.124) \times 2.000 \times 10.000 = 41.000 \text{ m}^3$																																
Reinforcing -bar D13	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>BAR MARK</th> <th>SIZE (mm)</th> <th>LENGTH (mm)</th> <th>NO. OF BARS</th> <th>UNIT WEIGHT (kgf/m)</th> <th>WEIGHT (kgf/NOS)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>R1</td> <td>D13</td> <td>4,760</td> <td>50</td> <td>0.995</td> <td>4.74</td> <td>237</td> </tr> <tr> <td>R2</td> <td>D13</td> <td>10,000</td> <td>27</td> <td>0.995</td> <td>9.95</td> <td>269</td> </tr> <tr> <td colspan="5" style="text-align: center;">Total</td> <td>506 kg</td> <td></td> </tr> </tbody> </table>					BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS	R1	D13	4,760	50	0.995	4.74	237	R2	D13	10,000	27	0.995	9.95	269	Total					506 kg	
	BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS																										
	R1	D13	4,760	50	0.995	4.74	237																										
	R2	D13	10,000	27	0.995	9.95	269																										
Total					506 kg																												
					506 kg																												

No	Item	Name	Size · Type	Quantity	Unit																																										
	OPEN DITCHES	U-DITCH 500X500 WITH COVER		10	m																																										
Item	Formula				Quantity																																										
U-500 x 500 with cover																																															
Concrete	$V1 = 0.800 \times 0.150 \times 10.000$	=	1.200	m^3																																											
	$V2 = 0.380 \times 0.150 \times 10.000 \times 2$	=	1.140	m^3																																											
	$V3 = 0.120 \times 0.080 \times 10.000 \times 2$	=	0.192	m^3																																											
	$V4(cover) = 0.630 \times 0.120 \times 10.000$	=	0.756	m^3																																											
			3.288	m^3																																											
Form	$A1 = (0.650 + 0.380 + 0.12) \times 2 \times 10.000$	=	23.000	m^2																																											
	$A2-a(cover) = (0.500 + 0.630) \times 0.12 \times \frac{10.000}{0.500} \times 2$	=	5.424	m^2																																											
	$A2-b(cover) = 0.630 \times 10.000$	=	6.300	m^2																																											
	$A2(a+b) = 5.424 + 6.300$	=	11.724	m^2																																											
	Total A = A1 + A2 = 23.000 + 11.724 = 34.724	=	34.724	m^2																																											
Foundation	$V = 0.950 \times 0.150 \times 10.000$	=	1.425	m^3																																											
Leveling Con:	$V = 0.950 \times 0.100 \times 10.000$	=	0.950	m^3																																											
Excavation	$V = \frac{2.850 + 1.950}{2} \times 0.900 \times 10.000$	=	21.600	m^3																																											
Backfill	$V1 = \frac{0.950 + 0.500}{2} \times 0.900$	=	0.653	m^2																																											
	$V2 = 0.650 \times 0.075$	=	0.049	m^2																																											
	$V = (0.653 + 0.049) \times 2.000 \times 10.000$	=	14.040	m^3																																											
Concrete Cover	$N = \frac{10.000}{0.500}$	=	20.000	Nos																																											
Reinforcing -bar D13	<table border="1"> <thead> <tr> <th>BAR MARK</th> <th>SIZE (mm)</th> <th>LENGTH (mm)</th> <th>NO. OF BARS</th> <th>WEIGHT (kgf/m)</th> <th>WEIGHT (kgf/NOS)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>R1</td> <td>D13</td> <td>1,760</td> <td>50</td> <td>0.995</td> <td>1.75</td> <td>88</td> </tr> <tr> <td>R2</td> <td>D13</td> <td>10,000</td> <td>11</td> <td>0.995</td> <td>9.95</td> <td>109</td> </tr> <tr> <td>R3(cover)</td> <td>D13</td> <td>570</td> <td>80</td> <td>0.995</td> <td>0.567</td> <td>45</td> </tr> <tr> <td>R4(cover)</td> <td>D13</td> <td>400</td> <td>60</td> <td>0.995</td> <td>0.398</td> <td>24</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td></td> <td>266 kg</td> <td></td> </tr> </tbody> </table>					BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS	R1	D13	1,760	50	0.995	1.75	88	R2	D13	10,000	11	0.995	9.95	109	R3(cover)	D13	570	80	0.995	0.567	45	R4(cover)	D13	400	60	0.995	0.398	24	Total					266 kg	
	BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS																																								
	R1	D13	1,760	50	0.995	1.75	88																																								
	R2	D13	10,000	11	0.995	9.95	109																																								
	R3(cover)	D13	570	80	0.995	0.567	45																																								
	R4(cover)	D13	400	60	0.995	0.398	24																																								
Total					266 kg																																										
					266	kg																																									

No	Item	Name	Size · Type	Quantity	Unit		
	OPEN DITCHES	U-DITCH 500X850 WITH COVER		10	m		
Item	Formula				Quantity		
U-500 x 850 with cover							
Concrete	$V1 = 0.800 \times 0.150 \times 10.000$	= 1.200	m^3				
	$V2 = 0.730 \times 0.150 \times 10.000 \times 2$	= 2.190	m^3				
	$V3 = 0.120 \times 0.080 \times 10.000 \times 2$	= 0.192	m^3				
	$V4(\text{cover}) = 0.630 \times 0.120 \times 10.000$	= 0.756	m^3				
		<u>4.338</u>	m^3	4.338 m^3			
Form	$A1 = (1.000 + 0.730 + 0.12) \times 2 \times 10.000$	= 37.000	m^2				
	$A2\text{-a}(\text{cover}) = (0.500 + 0.630) \times 0.12 \times (\frac{10.000}{0.500}) \times 2$	= 5.424	m^2				
	$A2\text{-b}(\text{cover}) = 0.630 \times 10.000$	= 6.300	m^2				
	$A2(a+b) = 5.424 + 6.300$	= 11.724	m^2				
	$\text{Total A} = A1 + A2$ = 37.000 + 11.724 = 48.724	= 48.724	m^2	48.724 m^2			
Foundation	$V = 0.950 \times 0.150 \times 10.000$	= 1.425	m^3	1.425 m^3			
Leveling Con:	$V = 0.950 \times 0.100 \times 10.000$	= 0.950	m^3	0.950 m^3			
Excavation	$V = (\frac{3.200 \times 1.950}{2}) \times 1.250 \times 10.000$	= 32.188	m^3	32.188 m^3			
Backfill	$V1 = (\frac{1.125 + 0.500}{2}) \times 1.250$	= 1.016	m^2				
	$V2 = 1.000 \times 0.075$	= 0.075	m^2				
	$V = (1.016 + 0.075) \times 2.000 \times 10.000$	= 21.820	m^3	21.820 m^3			
Concrete Cover	$N = \frac{10.000}{0.500}$	= 20.000	Nos	20.000 Nos			
Reinforcing -bar D13	NO. UNIT						
	BAR MARK	SIZE (mm)	LENGTH (mm)	OF BARS	WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS
	R1	D13	2,460	50	0.995	2.45	123
	R2	D13	10,000	15	0.995	9.95	149
	R3(cover)	D13	570	80	0.995	0.567	45
	R4(cover)	D13	400	60	0.995	0.398	24
	Total					341 kg	341 kg

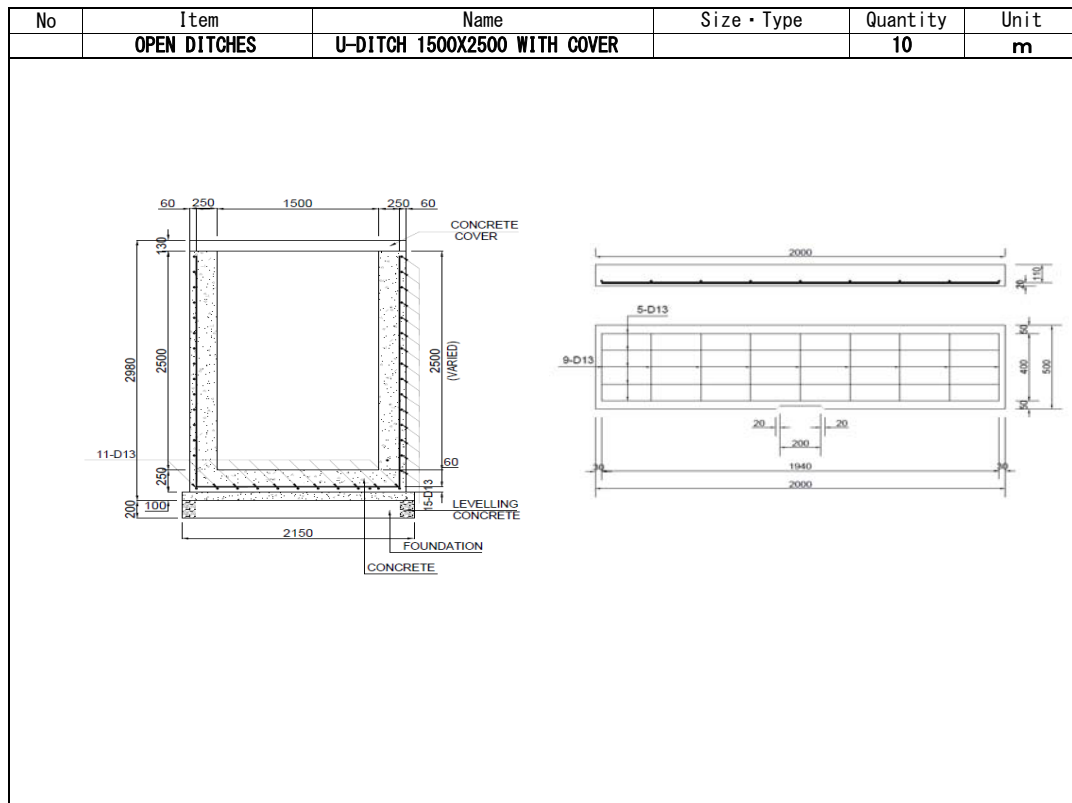


Item	Formula		Quantity		
U-800 x 800 with cover					
Concrete	$V1 = 1.100 \times 0.150 \times 10.000$	$= 1.650 \text{ m}^3$			
	$V2 = 0.680 \times 0.150 \times 10.000 \times 2$	$= 2.040 \text{ m}^3$			
	$V3 = 0.120 \times 0.080 \times 10.000 \times 2$	$= 0.192 \text{ m}^3$			
	$V4(\text{cover}) = 0.930 \times 0.120 \times 10.000$	$= 1.116 \text{ m}^3$			
		<u>4.998</u> m^3	4.998 m^3		
Form	$A1 = (0.950 + 0.680 + 0.12) \times 2 \times 10.000$	$= 35.000 \text{ m}^2$			
	$A2\text{-a}(\text{cover}) = (0.500 + 0.930) \times 0.12 \times \frac{10.000}{0.500} \times 2$	$= 6.864 \text{ m}^2$			
	$A2\text{-b}(\text{cover}) = 0.930 \times 10.000$	$= 9.300 \text{ m}^2$			
	$A2(a+b) = 6.864 + 9.300$	$= 16.164 \text{ m}^2$			
	$\text{Total A} = 35.000 + 16.164$ $= 51.164$	$= 51.164 \text{ m}^2$	51.164 m^3		
Foundation	$V = 1.250 \times 0.150 \times 10.000$	$= 1.875 \text{ m}^3$	1.875 m^3		
Leveling Con:	$V = 1.250 \times 0.100 \times 10.000$	$= 1.250 \text{ m}^3$	1.250 m^3		
Excavation	$V = \frac{(3.450 + 2.250)}{2} \times 1.200 \times 10.000$	$= 34.200 \text{ m}^3$	34.200 m^3		
Backfill	$V1 = \frac{(1.100 + 0.500)}{2} \times 1.200$	$= 0.960 \text{ m}^2$			
	$V2 = 0.950 \times 0.075$	$= 0.071 \text{ m}^2$			
	$V = (0.960 + 0.071) \times 2.000 \times 10.000$	$= 20.620 \text{ m}^3$	20.620 m^3		
Concrete Cover	$N = \frac{10.000}{0.500}$	$= 20.000 \text{ Nos}$	20.000 Nos		
Reinforcing -bar D13	NO. UNIT				
	BAR MARK	SIZE (mm)	LENGTH (mm)	OF BARS	
	R1	D13	2.660	50	
	R2	D13	10.000	14	
	R3 (cover)	D13	870	100	
	R4 (cover)	D13	400	100	
			WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS
			0.995	2.65	133
			0.995	9.95	139
			0.995	0.866	87
			0.995	0.398	40
			Total	399 kg	
					399 kg

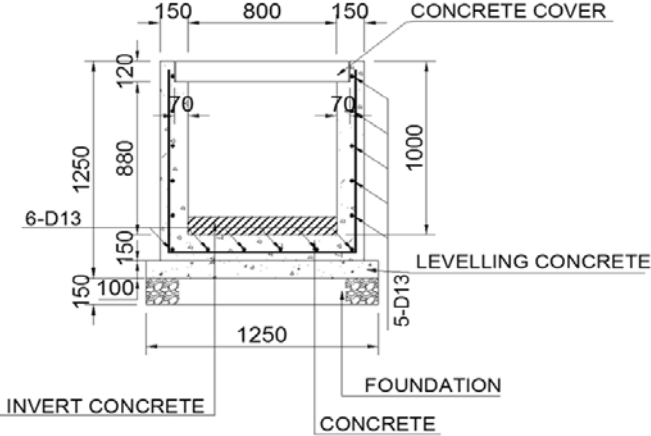
No	Item	Name	Size · Type	Quantity	Unit																																																			
	OPEN DITCHES	U-DITCH 1000X1000 WITH COVER		10	m																																																			
Item	Formula				Quantity																																																			
U-1000 x 1000 with cover																																																								
Concrete	V1 = 1.300 x 0.150 x 10.000 = 1.950 m ³				6.640 m ³																																																			
	V2 = 1.000 x 0.150 x 10.000 x 2 = 3.000 m ³																																																							
	V3 (cover) = 1.300 x 0.130 x 10.000 = 1.690 m ³																																																							
				6.640 m ³																																																				
Form	A1 = (1.150 + 1.000) x 2 x 10.000 = 43.000 m ²				65.360 m ²																																																			
	A2-a (cover) = (0.500 + 1.300) x 0.13 x (10.000 / 0.500) x 2 = 9.360 m ²																																																							
	A2-b (cover) = 1.300 x 10.000 = 13.000 m ²																																																							
	A2 (a+b) = 9.360 + 13.000 = 22.360 m ²																																																							
	Total A = A1 + A2 = 43.000 + 22.360 = 65.360 m ²																																																							
Foundation	V = 1.450 x 0.200 x 10.000 = 2.900 m ³				2.900 m ³																																																			
Leveling Con:	V = 1.450 x 0.100 x 10.000 = 1.450 m ³				1.450 m ³																																																			
Excavation	V = (3.900 + 2.450) / 2 x 1.450 x 10.000 = 46.038 m ³				46.038 m ³																																																			
Backfill	V1 = (1.230 + 0.500) / 2 x 1.450 = 1.254 m ²				26.800 m ³																																																			
	V2 = 1.150 x 0.075 = 0.086 m ²																																																							
	V = (1.254 + 0.086) x 2.000 x 10.000 = 26.800 m ³																																																							
Concrete Cover	N = 10.000 / 0.500 = 20.000 Nos				20.000 Nos																																																			
Reinforcing -bar D13	<table border="1"> <thead> <tr> <th>BAR MARK</th> <th>SIZE (mm)</th> <th>LENGTH (mm)</th> <th>NO. OF BARS</th> <th>UNIT</th> <th>WEIGHT (kgf/m)</th> <th>WEIGHT (kgf/NOS)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>R1</td> <td>D13</td> <td>3,260</td> <td>50</td> <td></td> <td>0.995</td> <td>3.24</td> <td>162</td> </tr> <tr> <td>R2</td> <td>D13</td> <td>10,000</td> <td>20</td> <td></td> <td>0.995</td> <td>9.95</td> <td>199</td> </tr> <tr> <td>R3 (cover)</td> <td>D13</td> <td>1,240</td> <td>100</td> <td></td> <td>0.995</td> <td>1.23</td> <td>123</td> </tr> <tr> <td>R4 (cover)</td> <td>D13</td> <td>400</td> <td>120</td> <td></td> <td>0.995</td> <td>0.398</td> <td>48</td> </tr> <tr> <td colspan="5" style="text-align: center;">Total</td> <td></td> <td>532 kg</td> <td></td> </tr> </tbody> </table>							BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT	WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS	R1	D13	3,260	50		0.995	3.24	162	R2	D13	10,000	20		0.995	9.95	199	R3 (cover)	D13	1,240	100		0.995	1.23	123	R4 (cover)	D13	400	120		0.995	0.398	48	Total						532 kg		
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Total						532 kg																																																		
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No	Item	Name	Size · Type	Quantity	Unit																																										
	OPEN DITCHES	U-DITCH 1000X1500 WITH COVER		10	m																																										
Item	Formula				Quantity																																										
U-1000 x 1500 with cover																																															
Concrete	$V1 = 1.300 \times 0.150 \times 10.000$				$= 1.950 \text{ m}^3$																																										
	$V2 = 1.500 \times 0.150 \times 10.000 \times 2$				$= 4.500 \text{ m}^3$																																										
	$V3(\text{cover}) = 1.300 \times 0.130 \times 10.000$				$= 1.690 \text{ m}^3$																																										
					8.140 m³																																										
Form	$A1 = (1.650 + 1.500) \times 2 \times 10.000$				$= 63.000 \text{ m}^2$																																										
	$A2\text{-a}(\text{cover}) = (0.500 + 1.300) \times 0.13 \times \frac{10.000}{0.500} \times 2$				$= 9.360 \text{ m}^2$																																										
	$A2\text{-b}(\text{cover}) = 1.300 \times 10.000$				$= 13.000 \text{ m}^2$																																										
	$A2(a+b) = 9.360 + 13.000$				$= 22.360 \text{ m}^2$																																										
	Total A = A1 + A2 = 63.000 + 22.360 = 85.360				= 85.360 m²																																										
					85.360 m²																																										
Foundation	$V = 1.450 \times 0.200 \times 10.000$				$= 2.900 \text{ m}^3$																																										
					2.900 m³																																										
Leveling Con:	$V = 1.450 \times 0.100 \times 10.000$				$= 1.450 \text{ m}^3$																																										
					1.450 m³																																										
Excavation	$V = \frac{(4.400 + 2.450)}{2} \times 1.950 \times 10.000$				$= 66.788 \text{ m}^3$																																										
					66.788 m³																																										
Backfill	$V1 = \frac{(1.475 + 0.500)}{2} \times 1.950$				$= 1.926 \text{ m}^2$																																										
	$V2 = 1.650 \times 0.075$				$= 0.124 \text{ m}^2$																																										
	$V = (1.926 + 0.124) \times 2.000 \times 10.000$				$= 41.000 \text{ m}^3$																																										
					41.000 m³																																										
Concrete Cover	$N = \frac{10.000}{0.500}$				$= 20.000 \text{ Nos}$																																										
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Reinforcing -bar D13	<table border="1"> <thead> <tr> <th>BAR MARK</th> <th>SIZE (mm)</th> <th>LENGTH (mm)</th> <th>NO. OF BARS</th> <th>UNIT WEIGHT (kgf/m)</th> <th>WEIGHT (kgf/NOS)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>R1</td> <td>D13</td> <td>4,260</td> <td>50</td> <td>0.995</td> <td>4.24</td> <td>212</td> </tr> <tr> <td>R2</td> <td>D13</td> <td>10,000</td> <td>24</td> <td>0.995</td> <td>9.95</td> <td>239</td> </tr> <tr> <td>R3(cover)</td> <td>D13</td> <td>1,240</td> <td>100</td> <td>0.995</td> <td>1.23</td> <td>123</td> </tr> <tr> <td>R4(cover)</td> <td>D13</td> <td>400</td> <td>120</td> <td>0.995</td> <td>0.398</td> <td>48</td> </tr> <tr> <td colspan="5" style="text-align: right;">Total</td> <td>622 kg</td> <td></td> </tr> </tbody> </table>					BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS	R1	D13	4,260	50	0.995	4.24	212	R2	D13	10,000	24	0.995	9.95	239	R3(cover)	D13	1,240	100	0.995	1.23	123	R4(cover)	D13	400	120	0.995	0.398	48	Total					622 kg	
	BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS																																								
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Total					622 kg																																										
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No	Item	Name	Size · Type	Quantity	Unit		
	OPEN DITCHES	U-DITCH 1500X1500 WITH COVER		10	m		
Item	Formula				Quantity		
U-1500 x 1500 with cover							
Concrete	$V1 = 1.800 \times 0.150 \times 10.000$				$= 2.700 \text{ m}^3$		
	$V2 = 1.500 \times 0.150 \times 10.000 \times 2$				$= 4.500 \text{ m}^3$		
	$V3(\text{cover}) = 1.800 \times 0.130 \times 10.000$				$= 2.340 \text{ m}^3$		
					9.540 m^3		
Form	$A1 = (1.650 + 1.500) \times 2 \times 10.000$				$= 63.000 \text{ m}^2$		
	$A2\text{-a}(\text{cover}) = (0.500 + 1.800) \times 0.13 \times \frac{10.000}{0.500} \times 2$				$= 11.960 \text{ m}^2$		
	$A2\text{-b}(\text{cover}) = 1.800 \times 10.000$				$= 18.000 \text{ m}^2$		
	$A2(\text{a+b}) = 11.960 + 18.000$				$= 29.960 \text{ m}^2$		
	$\text{Total A} = A1 + A2$				$= 63.000 + 29.960$		
	$= 92.960$				$= 92.960 \text{ m}^2$		
Foundation	$V = 1.950 \times 0.200 \times 10.000$				$= 3.900 \text{ m}^3$		
Leveling Con:	$V = 1.950 \times 0.100 \times 10.000$				$= 1.950 \text{ m}^3$		
Excavation	$V = \frac{4.900 + 2.950}{2} \times 1.950 \times 10.000$				$= 76.538 \text{ m}^3$		
Backfill	$V1 = \frac{1.475 + 0.500}{2} \times 1.950$				$= 1.926 \text{ m}^2$		
	$V2 = 1.650 \times 0.075$				$= 0.124 \text{ m}^2$		
	$V = (1.926 + 0.124) \times 2.000 \times 10.000$				$= 41.000 \text{ m}^3$		
Concrete Cover	$N = \frac{10.000}{0.500}$				$= 20.000 \text{ Nos}$		
Reinforcing -bar D13	NO. UNIT						
	BAR MARK	SIZE (mm)	LENGTH (mm)	OF BARS	WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS
	R1	D13	4,760	50	0.995	4.74	237
	R2	D13	10,000	27	0.995	9.95	269
	R3 (cover)	D13	1,740	100	0.995	1.73	173
	R4 (cover)	D13	400	160	0.995	0.398	64
Total					743 kg	743 kg	



Item	Formula	Quantity																																																	
U-1500 x 2500 with cover																																																			
Concrete	$V1 = 2.000 \times 0.250 \times 10.000 = 5.000 \text{ m}^3$	20.100 m ³																																																	
	$V2 = 2.500 \times 0.250 \times 10.000 \times 2 = 12.500 \text{ m}^3$																																																		
	$V3(\text{cover}) = 2.000 \times 0.130 \times 10.000 = 2.600 \text{ m}^3$																																																		
		20.100 m ³																																																	
Form	$A1 = (2.750 + 2.500) \times 2 \times 10.000 = 105.000 \text{ m}^2$	138.000 m ²																																																	
	$A2\text{-a}(\text{cover}) = (0.500 + 2.000) \times 0.13 \times \frac{10.000}{0.500} \times 2 = 13.000 \text{ m}^2$																																																		
	$A2\text{-b}(\text{cover}) = 2.000 \times 10.000 = 20.000 \text{ m}^2$																																																		
	$A2(\text{a+b}) = 13.000 + 20.000 = 33.000 \text{ m}^2$																																																		
	$\text{Total A} = A1 + A2 = 105.000 + 33.000 = 138.000 \text{ m}^2$																																																		
Foundation	$V = 2.150 \times 0.200 \times 10.000 = 4.300 \text{ m}^3$	4.300 m ³																																																	
Leveling Con:	$V = 2.150 \times 0.100 \times 10.000 = 2.150 \text{ m}^3$	2.150 m ³																																																	
Excavation	$V = \frac{(6.200 + 3.150)}{2} \times 3.050 \times 10.000 = 142.588 \text{ m}^3$	142.588 m ³																																																	
Backfill	$V1 = \frac{(2.025 + 0.500)}{2} \times 3.050 \times H = 3.851 \text{ m}^2$	81.140 m ³																																																	
	$V2 = 2.750 \times 0.075 = 0.206 \text{ m}^2$																																																		
	$V = (3.851 + 0.206) \times 2.000 \times 10.000 = 81.140 \text{ m}^3$																																																		
Concrete Cover	$N = \frac{10.000}{0.500} = 20.000 \text{ Nos}$	20.000 Nos																																																	
Reinforcing -bar D13	<table border="1"> <thead> <tr> <th>BAR MARK</th> <th>SIZE (mm)</th> <th>LENGTH (mm)</th> <th>NO. OF BARS</th> <th>UNIT</th> <th>WEIGHT (kgf/m)</th> <th>WEIGHT (kgf/NOS)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>R1</td> <td>D13</td> <td>7,160</td> <td>50</td> <td></td> <td>0.995</td> <td>7.12</td> <td>356</td> </tr> <tr> <td>R2</td> <td>D13</td> <td>10,000</td> <td>41</td> <td></td> <td>0.995</td> <td>9.95</td> <td>408</td> </tr> <tr> <td>R3 (cover)</td> <td>D13</td> <td>1,940</td> <td>100</td> <td></td> <td>0.995</td> <td>1.93</td> <td>193</td> </tr> <tr> <td>R4 (cover)</td> <td>D13</td> <td>400</td> <td>180</td> <td></td> <td>0.995</td> <td>0.398</td> <td>72</td> </tr> <tr> <td colspan="5" style="text-align: center;">Total</td> <td></td> <td>1,029 kg</td> <td></td> </tr> </tbody> </table>		BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT	WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS	R1	D13	7,160	50		0.995	7.12	356	R2	D13	10,000	41		0.995	9.95	408	R3 (cover)	D13	1,940	100		0.995	1.93	193	R4 (cover)	D13	400	180		0.995	0.398	72	Total						1,029 kg		1,029 kg
	BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT	WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS																																											
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Total						1,029 kg																																													

U-800x1000	CALCULATION	Par10m	
<p data-bbox="533 286 916 315">U-800x1000 WITH COVER</p> <p data-bbox="919 320 995 342">S=1:50</p> 			
ITEM	CALCULATION	UNIT	QUANTITY
CONCRETE	$V = (1.15 \times 1.10 - 0.94 \times 0.12 - 0.80 \times 0.88) \times 10 = 4.48$	m3	4.5
MOLD	$A = (1.15 + 1.00) \times 10.00 = 21.50$	m2	21.5
LEVELLING CONCRETE	$A = 1.25 \times 10.00 = 12.50$	m2	12.5
	$V = 1.25 \times 0.10 \times 10.00 = 1.25$	m3	1.3
LEVELLING CONCRETE	$A = (0.10 + 0.10) \times 10 \times 10 = 20.00$	m2	20.0
CONCRETE CAVER	$N = 10.00$	組	10.0
FOUNDATION	$V = 1.25 \times 0.15 \times 10.00 = 1.88$	m3	1.9
REINFORCEMENT BAR D13	$W1 = 6 \times 0.995 \times 10.00 = 59.70$		
	$W2 = 10 \times 0.995 \times 10.00 = 99.50$		
	$W3 = 4 \times 0.995 \times 3.10 \times 10.00 = 123.38$		
INVERT CONCRETE	$V1 = 1/2 \times (0.27 + 0.31) \times 16 = 4.64$	m3	4.6
	<p style="text-align: right;">total 4.64</p>		

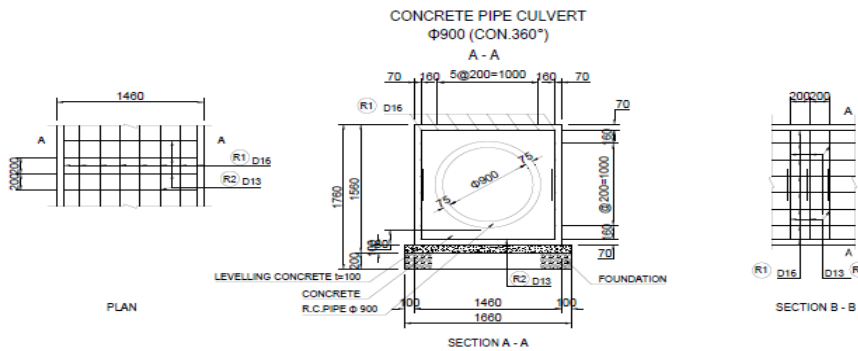
Excavation	$V = \left(\frac{3.600 + 2.200}{2} \right) \times 1.400 \times 10.000 = 40.600$	m^3	40.600 m^3
Backfill	$V1 = \left(\frac{1.200 + 0.500}{2} \right) \times 1.400 \times H = 1.190$	m^2	
	$V2 = 1.150 \times 0.050 = 0.058$	m^2	
	$V = \left(1.190 + 0.058 \right) \times 2.000 \times 10.000 = 24.960$	m^3	24.960 m^3

INVERT CONCRETE(U-800×1000) S=1:500



No	Item	Name	Quantity	Unit
	CONCRETE PIPE CULVERT	PC900	10	m

DETAIL OF CONCRETE PIPE CULVERT Φ900 (CON.360°) S= 1:30



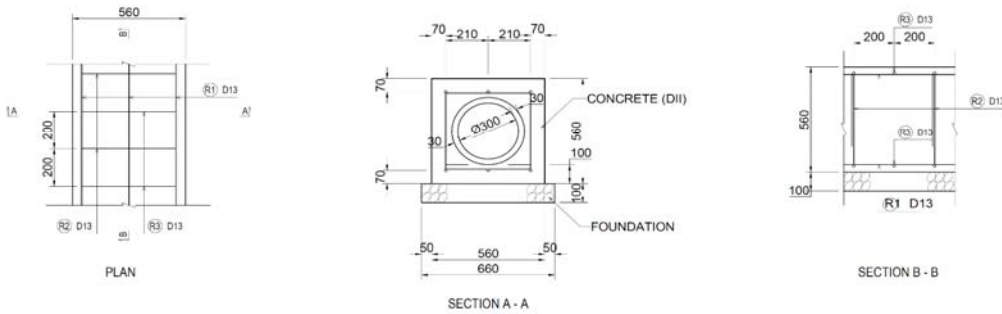
WORK QUANTITIES PER UNIT (PER 10m)			
ITEM	UNIT	QUANTITY	REMARKS
R.C.PIPE Φ 900	m	10.000	JIS A5303 CLASS 1
CONCRETE	m ³	12.657	28 days = 180 kg/cm ²
FOUNDATION	m ²	16.600	GRAVEL / F200mm
FORM	m ²	29.200	
LEVELLING CONCRETE	m ³	1.660	H=100

WORK QUANTITIES PER UNIT FOR REINFORCEMENT BAR (PER 1.0m)					
Dia	Nos	Length (mm)	Unit Weight (kg/m)	Weight (kg)	Remarks
D16	10	3,110	0.995	30.945	R2 / SD345
D13	28	1,000	1.560	42.580	R1 / SD345
TOTAL				74.625	

Item	Formula	Quantity																												
R. C. pipe φ 0.900	by Japanese Standard Design φ 0.900 (con. 360°) Type P4-D900 L= 10.000 m	10.000 m																												
Concrete	$V = (1.460 \times 1.460 - 0.525^2 \times \pi) \times 10.000 = 12.657 \text{ m}^3$	12.657 m ³																												
Form	$A = 1.460 \times 2 \times 10.000 = 29.200 \text{ m}^2$	29.200 m ²																												
Reinforcing -ber D13	<table border="1"> <thead> <tr> <th>BAR MARK</th> <th>SIZE (mm)</th> <th>LENGTH (mm)</th> <th>NO. OF BARS</th> <th>UNIT WEIGHT (kgf/m)</th> <th>WEIGHT (kgf/NOS)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>R1</td> <td>D16</td> <td>1,000</td> <td>280</td> <td>1.56</td> <td>437</td> <td>SD345</td> </tr> <tr> <td>R2</td> <td>D13</td> <td>3,110</td> <td>100</td> <td>0.995</td> <td>309</td> <td>SD345</td> </tr> <tr> <td colspan="4">Total</td> <td></td> <td>746 kg</td> <td></td> </tr> </tbody> </table>	BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS	R1	D16	1,000	280	1.56	437	SD345	R2	D13	3,110	100	0.995	309	SD345	Total					746 kg		746 kg
BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS																								
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R2	D13	3,110	100	0.995	309	SD345																								
Total					746 kg																									
Foundation	$V = 1.660 \times 0.200 \times 10.000 = 3.320 \text{ m}^3$	3.320 m ³																												
Leveling Conc:	$V = 1.660 \times 0.100 \times 10.000 = 1.660 \text{ m}^3$	1.660 m ³																												
Excavation	$V = \frac{4.920 + 2.660}{2} \times (1.760 + 0.500) \times 10.000 = 85.654 \text{ m}^3$	85.654 m ³																												
Backfill	$V_1 = 85.654$ $V_2 = (1.460 \times 1.460) \times 3.320 + 1.660$ $V = V_1 - V_2 = 85.654 - 7.112 = 78.542 \text{ m}^3$	78.542 m ³																												

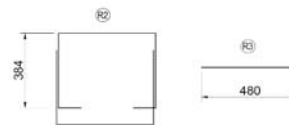
No	Item	Name	Quantity	Unit
	CONCRETE PIPE CULVERT	Type A	PC300	10
				m

CONCRETE PIPE CULVERT
Φ300 (CON.360°)TYPE A
A - A



WORK QUANTITIES PER UNIT		(PER 10m)	
ITEM	UNIT	QUANTITY	REMARKS
R.C PIPE Φ 300	m	10.000	JIS A 5303 CLASS 1
CONCRETE (DII)	m ³	2.118	28 days = 240 kg/cm ²
FOUNDATION	m ²	6.600	GRAVEL / t=100mm
FORM	m ²	11.200	

DETAIL OF STEEL REINFORCEMENT

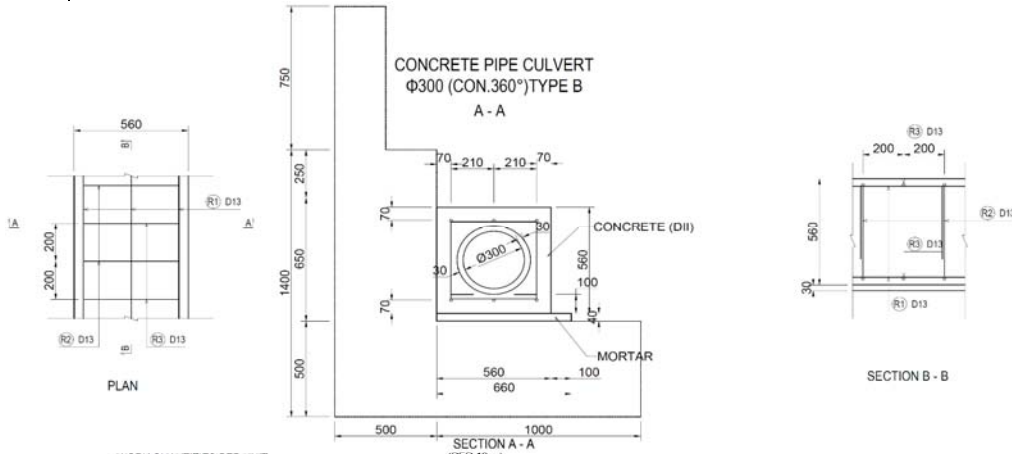


WORK QUANTITIES PER UNIT FOR REINFORCEMENT BAR		(PER 1.0m)			
Dia	No.	Length (mm/No)	Unit Weight (kg/m)	Weight (kg)	Remarks
D13	6	1,000	0.995	5.970	(R1) / SD345
D13	5	420	0.995	2.090	(R2) / SD345
D13	5	1,310	0.995	6.517	(R3) / SD345
TOTAL				14.557	

Note: Precast R.C. Pipe Φ300, Reinforced Spun and Centrifugal Reinforced Concrete Pipes shall be Selected.

Item	Formula	Quantity																																			
R. C. pipe φ 0.300	by Japanese Standard Design φ 0.300 (con. 360°) Type P3-D300 L= 10.000 m	10.000 m																																			
Concrete	$V = (0.560 \times 0.560 - 0.180^2 \times \pi) \times 10.000 = 2.118 \text{ m}^3$	2.118 m ³																																			
Form	$A = 0.560 \times 2 \times 10.000 = 11.200 \text{ m}^2$	11.200 m ²																																			
Reinforcing -ber D13	<table border="1"> <thead> <tr> <th>BAR MARK</th> <th>SIZE (mm)</th> <th>LENGTH (mm)</th> <th>NO. OF BARS</th> <th>UNIT WEIGHT (kgf/m)</th> <th>WEIGHT (kgf/NOS)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>R1</td> <td>D13</td> <td>1,000</td> <td>60</td> <td>0.995</td> <td>0.995</td> <td>60 Grade 40</td> </tr> <tr> <td>R2</td> <td>D13</td> <td>420</td> <td>50</td> <td>0.995</td> <td>0.418</td> <td>21 Grade 40</td> </tr> <tr> <td>R3</td> <td>D13</td> <td>1,310</td> <td>50</td> <td>0.995</td> <td>1.3</td> <td>65 Grade 40</td> </tr> <tr> <td colspan="6">Total</td> <td>146 kg</td> </tr> </tbody> </table>	BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS	R1	D13	1,000	60	0.995	0.995	60 Grade 40	R2	D13	420	50	0.995	0.418	21 Grade 40	R3	D13	1,310	50	0.995	1.3	65 Grade 40	Total						146 kg	146 kg
BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS																															
R1	D13	1,000	60	0.995	0.995	60 Grade 40																															
R2	D13	420	50	0.995	0.418	21 Grade 40																															
R3	D13	1,310	50	0.995	1.3	65 Grade 40																															
Total						146 kg																															
Foundation	$V = 0.660 \times 0.150 \times 10.000 = 0.990 \text{ m}^3$	0.990 m ³																																			

No	Item	Name	Quantity	Unit
	CONCRETE PIPE CULVERT	Type B	PC300	10
				m



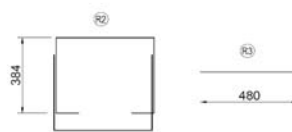
WORK QUANTITIES PER UNIT (PER 10m)

ITEM	UNIT	QUANTITY	REMARKS
R.C PIPE Φ 300	m	10.000	JIS A 5303 CLASS 1
CONCRETE (DII)	m ³	2.118	28 days = 240 kg/m ²
MORTAR	m ²	0.264	
FORM	m ²	11.200	

WORK QUANTITIES PER UNIT FOR REINFORCEMENT BAR (PER 1.0m)

Dia	Nos	Length (mm/nos)	Unit Weight (kg/m)	Weight (kg)	Remarks
D13	6	1,000	0.995	5.970	R1 / SD345
D13	5	420	0.995	2.090	R2 / SD345
D13	5	1,310	0.995	6.517	R3 / SD345
TOTAL				14.557	

DETAIL OF STEEL REINFORCEMENT



Note: Precast R.C. Pipe Φ300, Reinforced Spun and Centrifugal Reinforced Concrete Pipes shall be Selected.

Item	Formula	Quantity																																			
R. C. pipe φ 0.3	by Japanese Standard Design φ 0.300 (con. 360°) Type P3-D300 L= 10.000 m	10.000 m																																			
Concrete	$V = (0.560 \times 0.560 - 0.180^2 \times \pi) \times 10.000 = 2.118 \text{ m}^3$	2.118 m ³																																			
Form	A1= 0.560 x 2 x 10.000 = 11.200 m ² A2= 0.040 x 2 x 10.000 = 0.800 m ² A= 11.200 + 0.800 = 12.000 m ²	12.000 m ²																																			
Reinforcing -ber D13	<table border="1"> <thead> <tr> <th>BAR MARK</th> <th>SIZE (mm)</th> <th>LENGTH (mm)</th> <th>NO. OF BARS</th> <th>WEIGHT (kgf/m)</th> <th>WEIGHT (kgf/NOS)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>R1</td> <td>D13</td> <td>1,000</td> <td>60</td> <td>0.995</td> <td>0.995</td> <td>Grade 40</td> </tr> <tr> <td>R2</td> <td>D13</td> <td>420</td> <td>50</td> <td>0.995</td> <td>0.418</td> <td>Grade 40</td> </tr> <tr> <td>R3</td> <td>D13</td> <td>1,310</td> <td>50</td> <td>0.995</td> <td>1.3</td> <td>Grade 40</td> </tr> <tr> <td colspan="4">Total</td> <td></td> <td>146 kg</td> <td></td> </tr> </tbody> </table>	BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS	R1	D13	1,000	60	0.995	0.995	Grade 40	R2	D13	420	50	0.995	0.418	Grade 40	R3	D13	1,310	50	0.995	1.3	Grade 40	Total					146 kg		146 kg
BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS																															
R1	D13	1,000	60	0.995	0.995	Grade 40																															
R2	D13	420	50	0.995	0.418	Grade 40																															
R3	D13	1,310	50	0.995	1.3	Grade 40																															
Total					146 kg																																
Mortar	$V = 0.660 \times 0.040 \times 10.000 = 0.264 \text{ m}^3$	0.264 m ³																																			

BOX CULVERT OF SCHEDULE

Item	Size/Type	Unit	BOX CULVERT		TOTAL	OTHERS
			BOX CULVERT	DITH OUTRET		
Concrete		m3	32.7	6.5	39.2	
Form		m2	123.1	10.2	133.3	
Foundation	t=200	m2	7.4		7.4	
Reinforcing	D13	kg	2600		2600	
Backfill Granular		m3	26		26.4	
Bip Rap		m3		1.7	1.7	
Excavation		m3	71.7	4.7	76.4	
Backfill		m3	34.5	2.1	36.5	

No	Item	Name	Quantity	Unit																																													
	BOXCULVERT	1000 x 1000	1	m																																													
<p>SIDE ELEVATION S = 1:150</p>																																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">MATERIALS</th> <th colspan="2">(PER 1m)</th> </tr> <tr> <th>KIND</th> <th>UNIT</th> <th>QUANTITY</th> <th></th> </tr> </thead> <tbody> <tr> <td rowspan="4">CONCRETE</td> <td>TOP</td> <td>m³</td> <td>0.480</td> </tr> <tr> <td>SIDE</td> <td>m³</td> <td>0.640</td> </tr> <tr> <td>BOTTOM</td> <td>m³</td> <td>0.480</td> </tr> <tr> <td>TOTAL</td> <td>m³</td> <td>1.600</td> </tr> <tr> <td>FORM</td> <td>m²</td> <td>5.966</td> <td></td> </tr> <tr> <td rowspan="4">REINFORCING BAR</td> <td>D19</td> <td>kg</td> <td>0</td> </tr> <tr> <td>D16</td> <td>kg</td> <td>0</td> </tr> <tr> <td>D13</td> <td>kg</td> <td>121.950</td> </tr> <tr> <td>TOTAL</td> <td>kg</td> <td>121.950</td> </tr> <tr> <td rowspan="2">FOUNDATION</td> <td>LEVELING CONCRETE t=100</td> <td>m²</td> <td>0</td> </tr> <tr> <td>CRUSHED STONE t=200</td> <td>m²</td> <td>1.800</td> </tr> </tbody> </table>					MATERIALS		(PER 1m)		KIND	UNIT	QUANTITY		CONCRETE	TOP	m ³	0.480	SIDE	m ³	0.640	BOTTOM	m ³	0.480	TOTAL	m ³	1.600	FORM	m ²	5.966		REINFORCING BAR	D19	kg	0	D16	kg	0	D13	kg	121.950	TOTAL	kg	121.950	FOUNDATION	LEVELING CONCRETE t=100	m ²	0	CRUSHED STONE t=200	m ²	1.800
MATERIALS		(PER 1m)																																															
KIND	UNIT	QUANTITY																																															
CONCRETE	TOP	m ³	0.480																																														
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REINFORCING BAR	D19	kg	0																																														
	D16	kg	0																																														
	D13	kg	121.950																																														
	TOTAL	kg	121.950																																														
FOUNDATION	LEVELING CONCRETE t=100	m ²	0																																														
	CRUSHED STONE t=200	m ²	1.800																																														
Item	Formula			Quantity																																													
Concrete	$V1 = 1.600 \times 10.320 \times 2 = 33.024 \text{ m}^3$ $-V2 = -0.300 \times 0.300 \times \pi \times 0.300 \times 4 = -0.339 \text{ m}^3$ Total = 32.685			32.685 m ³																																													
Form	$A1 = 5.966 \times 10.320 \times 2 = 123.138 \text{ m}^2$ $A2 = 0.600 \times 3.14 \times 0.300 \times 4 = 2.261 \text{ m}^2$ Total = 125.399			123.138 m ²																																													
Reinforcing -ber D13	$W1 = 121.950 \times 10.320 \times 2 = 2517.048 \text{ kg}$ $H1 = 1.390 \times 0.995 \times 4 \times 4 = 22.129 \text{ kg}$ $H2 = 1.660 \times 0.995 \times 4 \times 4 = 26.427 \text{ kg}$ $H3 = 1.200 \times 0.995 \times 4 \times 4 = 19.104 \text{ kg}$ $H4 = 0.950 \times 0.995 \times 4 \times 4 = 15.124 \text{ kg}$ Total = 2599.832			2600 kg																																													
Foundation	$A = 0.360 \times 10.330 \times 2 = 7.438 \text{ m}^2$			7.438 m ²																																													
Backfill Granular	$V = 1.600 \times 1.600 \times 0.500 \times 10.330 \times 2 = 26.445 \text{ m}^3$			26.445 m ³																																													
Excavation	$V = (2.600 + 3.700) \times 0.500 \times 1.100 \times 20.7 = 71.726 \text{ m}^3$			71.726 m ³																																													
Backfill	$V1 = 71.726 = 71.726 \text{ m}^2$ $V2 = [(1.600 \times 0.900) + (1.800 \times 0.200)] \times 20.7 = 37.260 \text{ m}^2$ $V = V1 - V2 = 71.726 - 37.260 = 34.466 \text{ m}^3$			34.466 m ³																																													

No	Item	Name	Quantity	Unit
	OUTLETS		1	each
<p style="text-align: center;">SIDE ELEVATION</p> <p style="text-align: center;">SECTION A-A</p>				
Item	Formula			Quantity
Concrete	$V1 = 2.900 \times 3.000 \times 0.500$		$= 4.350 \text{ m}^3$	6.525 m ³
	$V2 = 2.900 \times 0.500 \times 1.500$		$= 2.175 \text{ m}^3$	
	Total		$= 6.525$	
Form	$A1 = (3.000 + 2.900) \times 2 \times 0.500$		$= 8.700 \text{ m}^2$	10.150 m ²
	$A1 = (2.900 + 0.500) \times 2 \times 0.500$		$= 1.450 \text{ m}^2$	
	Total		$= 10.150$	
Rip Rap	$V = 2.000 \times 2.900 \times 0.300$		$= 1.740 \text{ m}^3$	1.740 m ³
Excavation	$V = 3.900 \times 4.000 \times 0.300$		$= 4.680 \text{ m}^3$	4.680 m ³
Backfill	$V = 4.680 - 2.900 \times 3.000 \times 0.300$		$= 2.070 \text{ m}^3$	2.070 m ³

CATCH PIT 700×700×1850

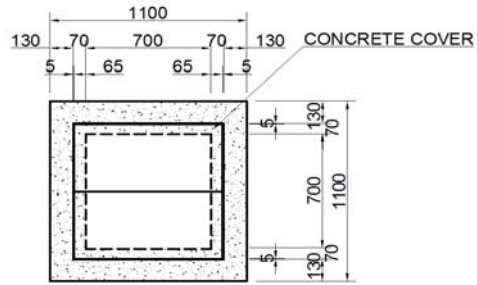
Item	Size/Type	Unit	Quantity	Remark
Concrete		m ³	1.468	
Form		m ²	14.355	
Leveling Con:		m ³	0.144	
Leveling Con: Form		m ²	0.480	
Foundation		m ²	1.440	
Reinforcing	D13	kg	99	
Excavation		m ³	29.358	
Backfill		m ³	26.264	
REMOVAL OFSURPLUS SOIL		m ³	0.176	

CATCH PIT 700 × 700 × 1850

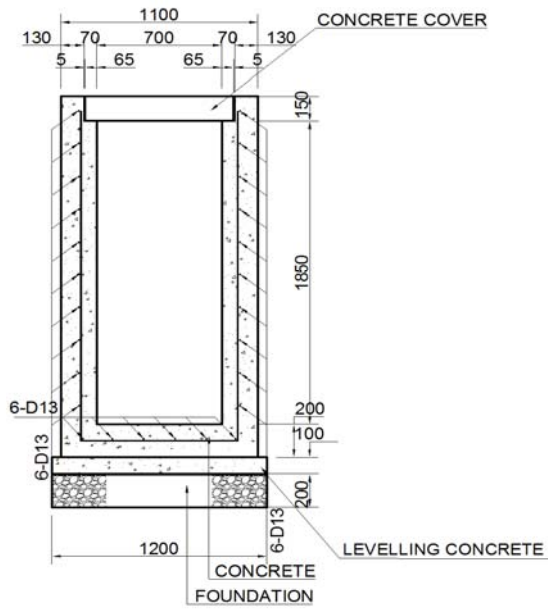
General View

CATCH PIT (700X700X1850)

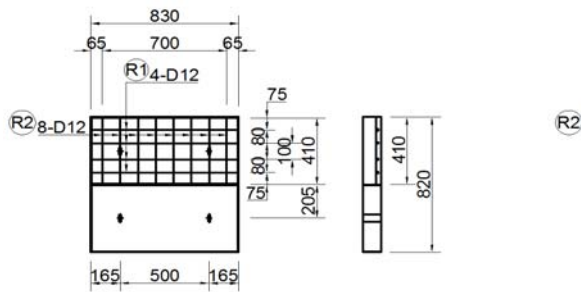
C



PLAN



SECTION



COVER

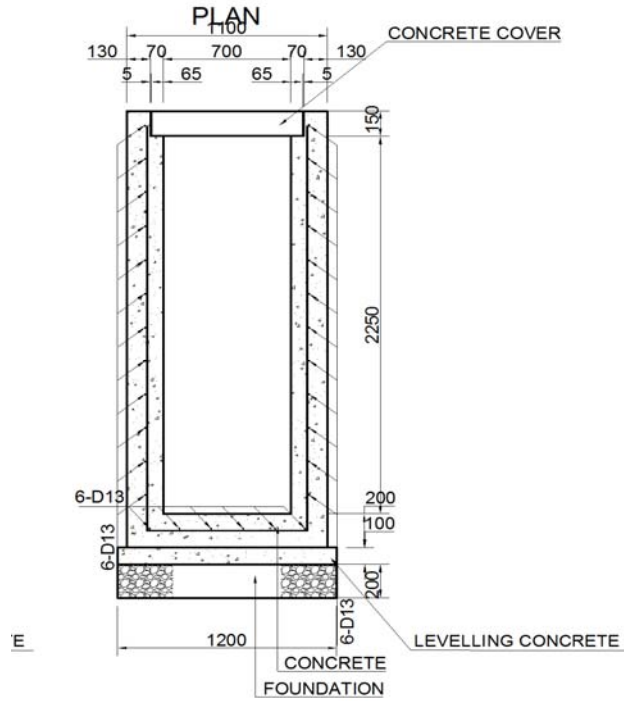
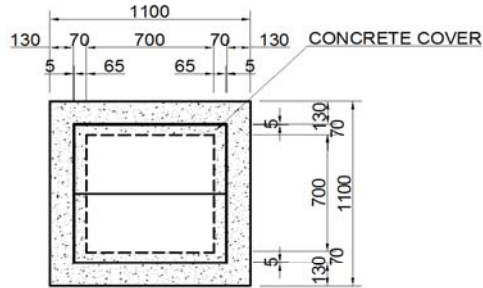
CATCH PIT 700×700×2250

Item	Size/Type	Unit	Quantity	Remark
Concrete		m ³	1.72	
Form		m ²	16.89	
Leveling Con:		m ³	0.14	
Leveling Con: Form		m ²	0.48	
Foundation		m ²	1.44	
Reinforcing	D13	kg	116	
Excavation		m ³	38.58	
Backfill		m ³	35.00	
REMOVAL OFSURPLUS SOIL		m ³	(0.31)	

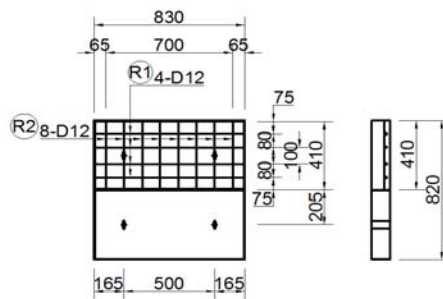
CATCH PIT 700 × 700 × 2250

General View

CATCH PIT (700X700X2250)



SECTION



COVER

No	Item	Name	Size · Type	Quantity	Unit									
	CATCH PIT	C-DITCH TYPE A	0.60x0.40x0.50	1	nos									
SECTION A-A														
Item	Formula				Quantity									
Concrete	Catch Pit (0.6 x 0.4 x 0.50)													
	V1 =	0.900	x	0.650	x	0.610	=	0.357						
	-V2 =	0.600	x	0.522	x	0.056	=	-0.018						
	-V3 =	0.600	x	0.400	x	0.454	=	-0.109						
	-V4 =	0.180	x	0.180	x	3.142	x	0.150	x	2	=	-0.031		
-V5 =	0.108	x	0.108	x	3.142	x	0.100	=	-0.004					
									0.195	m ³	0.195	m ³		
Form	A1 =	0.900	x	0.610	x	2	+	0.650	x	0.610	x	2	=	1.891
	A2 =	0.600	x	0.610	x	2	+	0.400	x	0.610	x	2	=	1.220
	-A3 =	0.180	x	0.180	x	3.142	x	4	=	-0.407				
	-A4 =	0.108	x	0.108	x	3.142	x	2	=	-0.073				
									2.631	m ²	2.631	m ²		
Mortar	V =	1.100	x	0.750	x	0.040	=	0.033	m ³	0.033	m ³			
Grating	N =	600 x 500 x 56			=	1	nos	1	Nos					

No	Item	Name	Size · Type	Quantity	Unit
	CATCH PIT	C-DITCH TYPE C	0.50x0.50x0.70	1	nos
Item	Formula				Quantity
Concrete	Catch Pit (0.5 x 0.5 x 0.70)				
	V1 = 0.800 x 0.800 x 0.900 + 0.600 x 0.200 x 0.900 = 0.684				
	-V2 = 0.500 x 0.500 x 0.700 = -0.175				
	-V3 = 0.500 x (0.585 + 0.550) x 0.350 x 0.300 = -0.060				
				0.449 m ³	0.449 m ³
Form	A1 = 0.800 x 0.900 x 3 + 0.500 x 0.900 x 4 = 4.140				
	+ 0.100 x 0.900 x 2 = 0.360				
	A2 = 0.200 x 0.900 x 2 = 0.397				
	A3 = 0.500 x (0.585 + 0.550) x 0.350 x 2 = 4.897 m ²				4.897 m ²
Foundation	V = 1.000 x 1.000 x 0.150 = 0.150 m ³				0.150 m ³
Excavation	V = 1.000 x 1.000 x 1.050 = 1.050 m ³				1.050 m ³
Backfill	V = 0.200 x 0.900 x 0.200 x 2 + 0.800 x 0.900 x 0.100 x 2 = 0.216 m ³				0.216 m ³

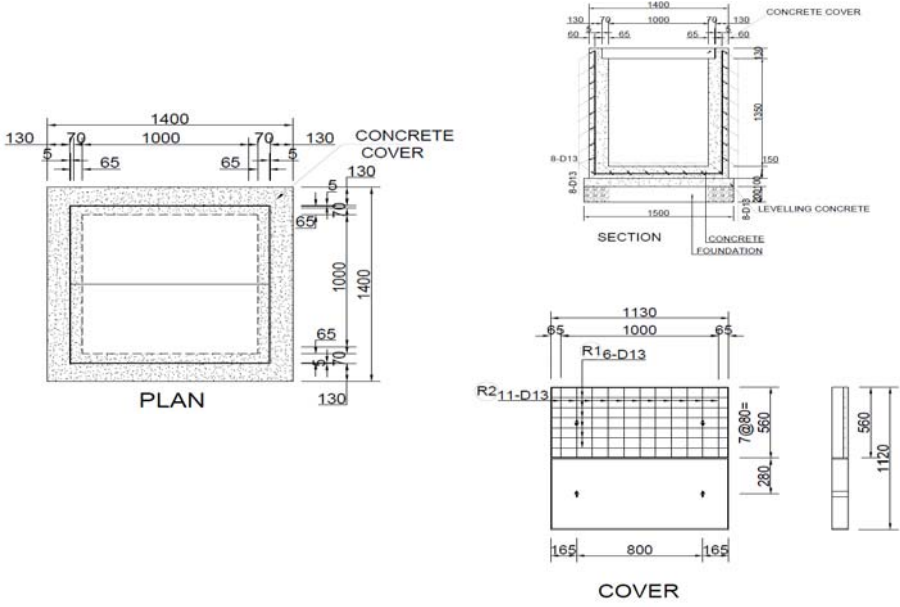
No	Item	Name	Size · Type	Quantity	Unit									
	CATCH PIT	C-DITCH TYPE D	0.435x0.60x0.75	1	nos									
Item	Formula				Quantity									
Concrete	Catch Pit (0.435 x 0.6 x 0.75)													
	V1 =	0.735	x	0.900	x	0.900	=	0.595						
	-V2 =	0.600	x	0.522	x	0.056	+	0.435	x	0.600	x	0.694	=	-0.199
	-V3 =	0.108	x	0.108	x	3.142	x	0.150	=	-0.005				
	-V4 =	0.300	x	0.300	x	0.150	=	-0.014						
								0.377	m ³	0.377	m ³			
Form	A1 =	0.735	x	0.900	x	2	+	0.435	x	0.900	x	2	=	2.106
	A2 =	0.900	x	0.900	x	2	+	0.600	x	0.900	x	2	=	2.700
	-A3 =	0.108	x	0.108	x	3.142	x	2	=	-0.073				
	-A4 =	0.300	x	0.300	x	2	=	-0.180						
									4.553	m ²	4.553	m ²		
Foundation	V =	1.100	x	0.835	x	0.150	=	0.138	m ³	0.138	m ³			
Grating	N =	600 x 500 x 56			=	1	nos	1	Nos					

No	Item	Name	Size · Type	Quantity	Unit
	CATCH PIT	C-DITCH TYPE B		10	Nos
Item	Formula			Quantity	
Excavation	$0.90/6 \times (2.0 \times 2.9 + 2.9 \times 2.0 + 2 \times (2.9 \times 2.9 + 2.0 \times 2.0)) \times 10$			= 54.630	= 54.600 m3
Backfilling	$54.60 - (1.0 \times 1.0 \times 0.8 + 1.2 \times 1.1 \times 0.10) \times 10$			= 45.280	= 45.300 m3
Surplus soil	$54.60 - 45.30 \times 1/0.9$			= 4.267	= 4.300 m3
Body					
Concrete (E1)	$(1.00 \times 1.00 \times 1.30 - 0.60 \times 0.60 \times 1.10) \times 10$			= 9.040	=
	[Deduction] $-(1/4 \times 3.14 \times 0.36 \times 0.36) \times 0.20 \times 10$			= -0.203	=
	$-(1/4 \times 3.14 \times 0.36 \times 0.36) \times 0.20 \times 10$			= -0.203	=
	$-0.07 \times 0.081 \times 0.60 \times 2 \times 10$			= -0.068	=
				8.565	8.570 m3
Reinforcing bar					kg
Form	$(1.00 \times 1.30 \times 4 + 0.60 \times 1.10 \times 4) \times 10$			= 78.400	= 78.400 m2
Foundation	$1.10 \times 1.20 \times 10$			= 13	= 13.200 m2
	$1.10 \times 1.20 \times 0.10 \times 10$			= 1.320	= 1.320 m3
Cover					
Grating Cover 600x720				=	= 10 each

No	Item	Name	Size · Type	Quantity	Unit									
	CATCH PIT	CATCH PIT 700X700X1050	700X700X1050	1	nos									
Item	Formula				Quantity									
Concrete	Catch Pit (0.7 x 0.7 x 1.05)													
	V1 =	1.000	x	0.150	x	1.000	x	1.000	=	0.150	m ³			
	V2 =	1.000	x	0.150	x	1.050	x	2.000	=	0.315	m ³			
	V3 =	0.700	x	0.150	x	1.050	x	2.000	=	0.221	m ³			
	V4 =	0.080	x	0.150	x	1.000	x	2.000	=	0.024	m ³			
	V5 =	0.080	x	0.150	x	0.840	x	2.000	=	0.020	m ³			
	V6(cover) =	0.830	x	0.410	x	0.150	x	2.000	=	0.102	m ³			
										0.832	m ³			
Form	A1 =	(1.000	+	1.000	+	1.000	+	1.000)x	1.350	=	5.400	m ²
	A2 =	(0.700	+	0.700	+	0.700	+	0.700)x	1.200	=	3.360	m ²
	A3(cover) =	(0.830	+	0.410)x	2.000	x	2.000	x	0.150	=	0.744	m ²
	Total =	A1	+	A2	+	A3	=	5.400	3.360	0.744	=	9.504	m ²	
													9.504	m ²
Foundation	V =	1.100	x	0.200	x	1.100	=	0.242	m ³	0.242	m ³			
Leveling Con:	V =	1.100	x	0.100	x	1.100	=	0.121	m ³	0.121	m ³			
Cover	N =						=	2	nos	2	Nos			
Reinforcing-bar														
	BAR	SIZE	LENGTH	NO. OF	UNIT WEIGHT	WEIGHT	REMARKS							
	MARK	(mm)	(mm)	BARS	(kgf/m)	(kgf/NOS)	(kgf)							
	R1	D13	3,360	5	0.995	3.340	17							
	R2	D13	1,000	18	0.995	0.995	18							
	R3(cover)	D13	820	8	0.995	0.816	7							
	R4(cover)	D13	400	16	0.995	0.398	6							
				Total		D13	48	kg			48	kg		

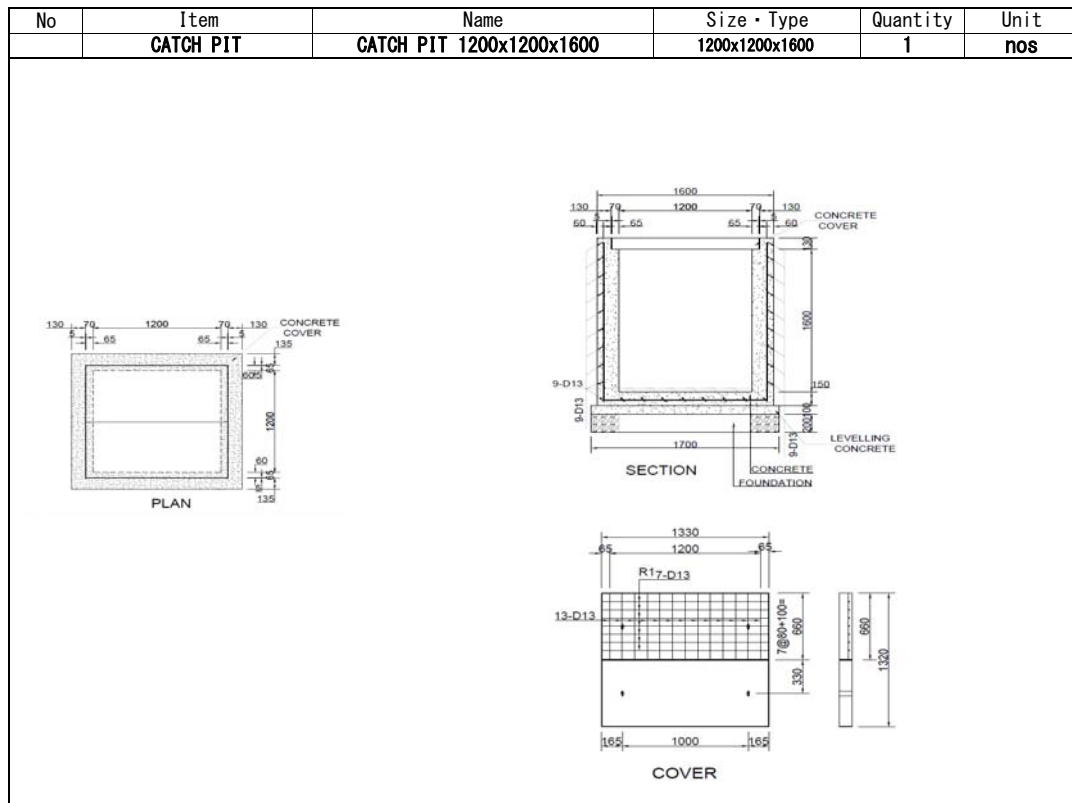
Excavation	$V = \left(\frac{3.750 + 2.100}{2} \right) \times 1.650 \times 2.100$	= 10.135 m ³	10.135 m ³
Backfill	$V1 = \left(\frac{1.325 + 0.500}{2} \right) \times 1.650 \times H$	= 1.506 m ²	
	$V2 = 1.350 \times 0.050$	= 0.068 m ²	
	$V = (1.506 + 0.068) \times 2.000 \times 2.100$	= 6.611 m ³	6.611 m ³

No	Item	Name	Size · Type	Quantity	Unit
	CATCH PIT	CATCH PIT 1000x1000x1350	1000x1000x1350	1	nos



Item	Formula	Quantity				
Concrete	Catch Pit (0.7 x 0.7 x 0.55)					
	V1 = 1.400 x 0.150 x 1.400 x 1.000	= 0.294 m ³				
	V2 = 1.400 x 0.200 x 1.350 x 2.000	= 0.756 m ³				
	V3 = 1.000 x 0.200 x 1.350 x 2.000	= 0.540 m ³				
	V4 = 0.130 x 0.150 x 1.400 x 2.000	= 0.055 m ³				
	V5 = 0.130 x 0.150 x 1.140 x 2.000	= 0.044 m ³				
V6 (cover) = 1.130 x 0.560 x 0.150 x 2.000	= 0.190 m ³					
	1.879 m³	1.879 m³				
Form	A1 = (1.400 + 1.400 + 1.400 + 1.400) x 1.650	= 9.240 m ²				
	A2 = (1.000 + 1.000 + 1.000 + 1.000) x 1.500	= 6.000 m ²				
	A3 (cover) = (1.130 + 0.560) x 2.000 x 2.000 x 0.150	= 1.014 m ²				
	Total = A1 + A2 + A3 = 9.240 + 6.000 + 1.014 = 16.254	= 16.254 m ²	16.254 m²			
Foundation	V = 1.500 x 0.200 x 1.500	= 0.450 m ³	0.450 m³			
Leveling Con:	V = 1.500 x 0.100 x 1.500	= 0.225 m ³	0.225 m³			
Cover	N =	= 2 nos	2 Nos			
Reinforcing-bar						
BAR	SIZE	LENGTH	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS
R1	D13	4,360	7	0.995	4.34	30
R2	D13	1,400	24	0.995	1.39	33
R3 (cover)	D13	1,120	12	0.995	1.11	13
R4 (cover)	D13	550	22	0.995	0.547	12
			Total		D13	88 kg

Excavation	$V = \left(\frac{4.450 + 2.500}{2} \right) \times 1.950 \times 2.500$	$= 16.941 \text{ m}^3$	16.941 m^3
Backfill	$V1 = \left(\frac{1.475 + 0.500}{2} \right) \times 1.950$	$= 1.926 \text{ m}^2$	
	$V2 = 1.650 \times 0.050$	$= 0.083 \text{ m}^2$	
	$V = (1.926 + 0.083) \times 2.000 \times 2.500$	$= 10.045 \text{ m}^3$	10.045 m^3

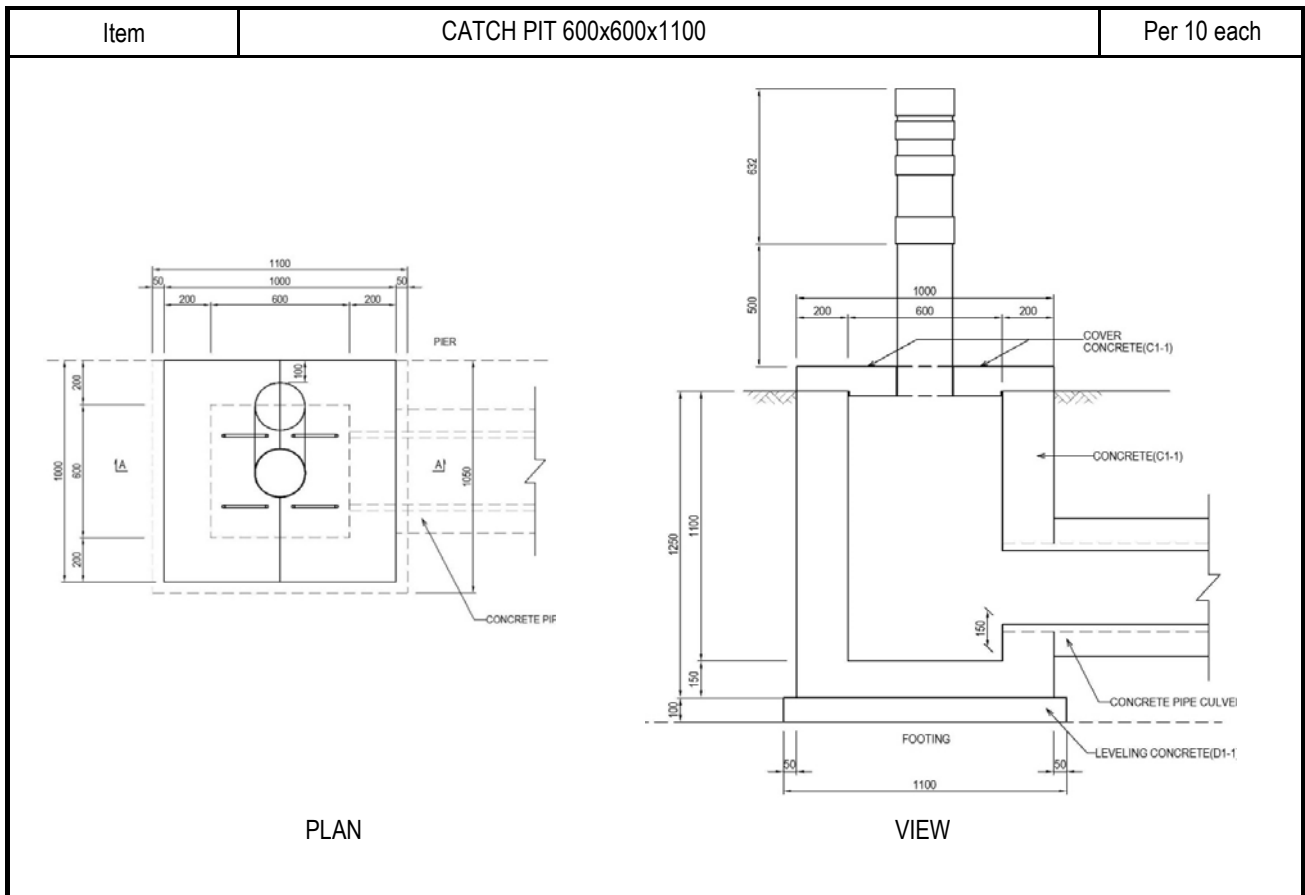


Item	Formula	Quantity				
Concrete	Catch Pit (1.2 x 1.2 x 1.60)					
	V1 = 1.600 x 0.150 x 1.600 x 1.000	= 0.384 m ³				
	V2 = 1.600 x 0.200 x 1.600 x 2.000	= 1.024 m ³				
	V3 = 1.200 x 0.200 x 1.600 x 2.000	= 0.768 m ³				
	V4 = 0.130 x 0.150 x 1.600 x 2.000	= 0.062 m ⁴				
	V5 = 0.130 x 0.150 x 1.340 x 2.000	= 0.052 m ⁵				
V6 (cover) = 1.330 x 0.660 x 0.150 x 2.000	= 0.263 m ³					
	2.553 m³	2.553 m³				
Form	A1 = (1.600 + 1.600 + 1.600 + 1.600) x 1.900	= 12.160 m ²				
	A2 = (1.200 + 1.200 + 1.200 + 1.200) x 1.750	= 8.400 m ²				
	A3 (cover) = (1.330 + 0.660) x 2.000 x 2.000 x 0.150	= 1.194 m ²				
	Total = A1 + A2 + A3 = 12.160 + 8.400 + 1.194 = 21.754	= 21.754 m ²	21.754 m²			
Foundation	V = 1.700 x 0.200 x 1.700	= 0.578 m ³	0.578 m³			
Leveling Con:	V = 1.700 x 0.100 x 1.700	= 0.289 m ³	0.289 m³			
Cover	N =	= 2 nos	2 Nos			
Reinforcing-bar						
BAR MARK	SIZE (mm)	LENGTH (mm)	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS
R1	D13	5,060	8	0.995	5.03	40
R2	D13	1,600	27	0.995	1.59	43
R3 (cover)	D13	1,320	14	0.995	1.31	18
R4 (cover)	D13	650	26	0.995	0.647	17
				Total	D13	118 kg

Excavation	$V = \left(\frac{4.900 + 2.700}{2} \right) \times 2.200 \times 2.700$	$= 22.572 \text{ m}^3$	22.572 m^3
Backfill	$V1 = \left(\frac{1.600 + 0.500}{2} \right) \times 2.200 \times H$	$= 2.310 \text{ m}^2$	
	$V2 = 1.900 \times 0.050$	$= 0.095 \text{ m}^2$	
	$V = \left(\frac{2.310 + 0.095}{2} \right) \times 2.000 \times 2.700$	$= 12.987 \text{ m}^3$	12.987 m^3

No	Item	Name	Size · Type	Quantity	Unit																																																					
	CATCH PIT	CATCH PIT 1500x1500x1850	1500x1500x1850	1	nos																																																					
Item	Formula				Quantity																																																					
Concrete	Catch Pit (1.5 x 1.5 x 1.85)																																																									
	V1 =	1.900	x	0.150	x	1.900	x	1.000	=	0.542	m ³																																															
	V2 =	1.900	x	0.200	x	1.850	x	2.000	=	1.406	m ³																																															
	V3 =	1.500	x	0.200	x	1.850	x	2.000	=	1.110	m ³																																															
	V4 =	0.130	x	0.150	x	1.900	x	2.000	=	0.074	m ⁴																																															
	V5 =	0.130	x	0.150	x	1.640	x	2.000	=	0.064	m ⁵																																															
	V6 (cover) =	1.630	x	0.810	x	0.150	x	2.000	=	0.396	m ⁵																																															
										3.592	m ³																																															
Form	A1 =	(1.900	+	1.900	+	1.900	+	1.900)	x	2.150	=	16.340	m ²																																											
	A2 =	(1.500	+	1.500	+	1.500	+	1.500)	x	2.000	=	12.000	m ²																																											
	A3 (cover) =	(1.630	+	0.810)	x	2.000	x	2.000	x	0.150	=	1.464	m ²																																											
	Total =	A1	+	A2	+	A3	=	16.340	+	12.000	+	1.464	=	29.804	m ²																																											
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Foundation	V =	2.000	x	0.200	x	2.000	=	0.800	m ³	0.800	m ³																																															
Leveling Con:	V =	2.000	x	0.100	x	2.000	=	0.400	m ³	0.400	m ³																																															
Cover	N =						=	2	nos	2	Nos																																															
	<table border="1"> <thead> <tr> <th>Reinforcing-bar</th> <th>BAR</th> <th>SIZE</th> <th>LENGTH</th> <th>NO. OF BARS</th> <th>UNIT WEIGHT (kgf/m)</th> <th>WEIGHT (kgf/NOS)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td></td> <td>R1</td> <td>D13</td> <td>5,860</td> <td>10</td> <td>0.995</td> <td>5.83</td> <td>58</td> </tr> <tr> <td></td> <td>R2</td> <td>D13</td> <td>1,900</td> <td>27</td> <td>0.995</td> <td>1.89</td> <td>51</td> </tr> <tr> <td></td> <td>R3 (cover)</td> <td>D13</td> <td>1,620</td> <td>14</td> <td>0.995</td> <td>1.61</td> <td>23</td> </tr> <tr> <td></td> <td>R4 (cover)</td> <td>D13</td> <td>800</td> <td>32</td> <td>0.995</td> <td>0.796</td> <td>25</td> </tr> <tr> <td></td> <td>Total</td> <td></td> <td></td> <td></td> <td></td> <td>D13</td> <td>157 kg</td> </tr> </tbody> </table>											Reinforcing-bar	BAR	SIZE	LENGTH	NO. OF BARS	UNIT WEIGHT (kgf/m)	WEIGHT (kgf/NOS)	REMARKS		R1	D13	5,860	10	0.995	5.83	58		R2	D13	1,900	27	0.995	1.89	51		R3 (cover)	D13	1,620	14	0.995	1.61	23		R4 (cover)	D13	800	32	0.995	0.796	25		Total					D13
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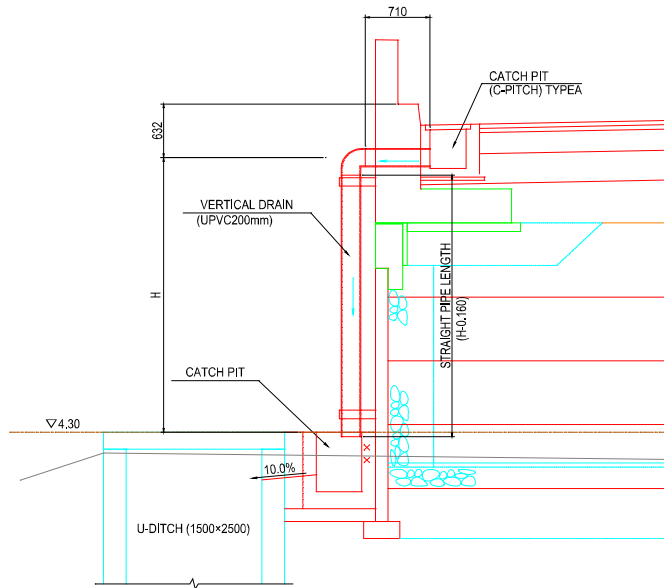
Excavation	$V = \left(\frac{5.450 + 3.000}{2} \right) \times 2.450 \times 3.000$	$= 31.054 \text{ m}^3$	31.054 m^3
Backfill	$V1 = \left(\frac{1.725 + 0.500}{2} \right) \times 2.450$	$= 2.726 \text{ m}^2$	
	$V2 = 2.150 \times 0.050$	$= 0.108 \text{ m}^2$	
	$V = \left(\frac{2.726 + 0.108}{2} \right) \times 2.000 \times 3.000$	$= 17.004 \text{ m}^3$	17.004 m^3



Title	Specification	Calculation Formula	Quantity
Body			
Concrete	18N/mm2	$(1.00 \times 1.00 \times 1.25 - 0.60 \times 0.60 \times 1.10) \times 10 = 8.54$	
		[Deduction] $-(1/4 \times 3.14 \times 0.30 \times 0.30) \times 0.20 \times 10 = -0.141$	
		8.399	8.40 m3
Form	Body	$(1.00 \times 1.25 \times 4 + 0.60 \times 1.10 \times 4) \times 10 = 76.400$	
	Leveling Concrete	$(1.10 \times 0.10 \times 2 + 1.00 \times 0.10 \times 2) \times 10 = 4.200$	
		80.600	80.60 m2
Leveling Concrete	t=100	$1.10 \times 1.05 \times 10 = 11.55$	11.55 m2
		$1.155 \times 0.10 \times 10 = 1.155$	1.16 m3
Cover			
Concrete	24N/mm2	$(0.50 \times 1.00 \times 0.10 \times 2 + 0.60 \times 0.60 \times 0.02) \times 10 = 1.072$	
		[Deduction] $-(1/4 \times 3.14 \times 0.22 \times 0.22) \times 0.12 \times 10 = -0.046$	
		1.026	1.03 m3
Reinforcing bar	D10	$(0.89 \times 7 + 0.40 \times 11) \times 2 \times 0.560 \times 10 = 119.056$	119.06 kg
	D13	$0.76 \times 2 \times 2 \times 1.042 \times 10 = 31.677$	31.68 kg
Form		$(1.00 \times 0.12 + 0.50 \times 0.12) \times 2 \times 2 \times 10 = 7.200$	7.20 m2
Pipe	VPφ200	2 Straight Pipes / each $(0.70 + 0.15) \times 10 = 8.50$	8.50 m
Pipe Elbow	45°	2 Elbows / each	20 each

No	Item	Name	Size · Type	Quantity	Unit
	VERTICAL DRAIN	TYPE A		1	nos

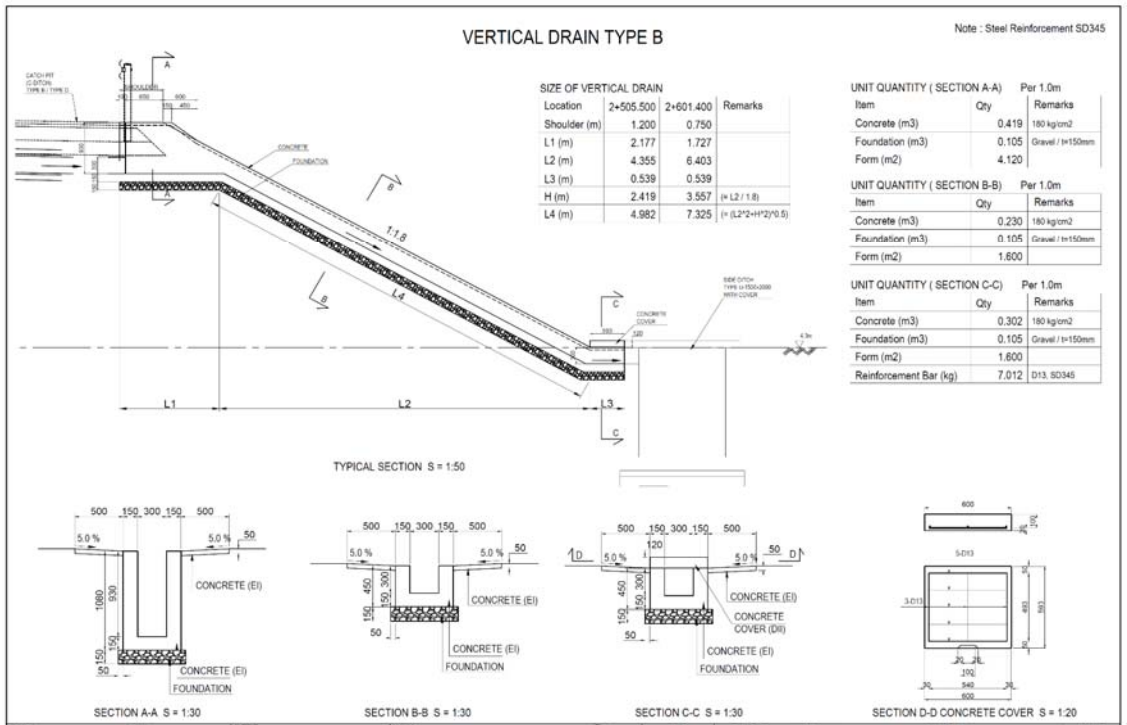
DETAIL OF VERTICAL DRAIN



Item	Formula	Quantity																																																																																																																																																																												
L1=Pipe Length	<table border="1"> <thead> <tr> <th rowspan="2">Vertical Drain Location</th> <th rowspan="2">Ground</th> <th rowspan="2">H</th> <th colspan="3">Pipe Length (m)</th> <th rowspan="2">Elbow (nos.)</th> <th rowspan="2">PK1: L1 = 10.538 m</th> <th rowspan="2">Nos = 3 nos</th> </tr> <tr> <th>Straight</th> <th>Cross</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td rowspan="3">PK1(Thakda side)</td> <td>0+280,000</td> <td>4.30</td> <td>1.684</td> <td>1.524</td> <td>0.710</td> <td>2.8570</td> <td>1</td> <td rowspan="3">PK2: L1 = 66.151 m Nos = 17 nos</td> </tr> <tr> <td>0+285,000</td> <td>4.30</td> <td>2.261</td> <td>2.101</td> <td>0.710</td> <td>3.434</td> <td>1</td> </tr> <tr> <td>0+325,000</td> <td>4.30</td> <td>3.074</td> <td>2.914</td> <td>0.710</td> <td>4.247</td> <td>1</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Total</td> <td>10,538</td> <td>3</td> </tr> <tr> <td rowspan="16">PK2(Thakda side)</td> <td>2+428,400</td> <td>4.30</td> <td>3.429</td> <td>3.268</td> <td>0.710</td> <td>4.601</td> <td>1</td> </tr> <tr> <td>2+448,400</td> <td>4.30</td> <td>3.125</td> <td>2.965</td> <td>0.710</td> <td>4.298</td> <td>1</td> </tr> <tr> <td>2+458,400</td> <td>4.30</td> <td>2.996</td> <td>2.836</td> <td>0.710</td> <td>4.169</td> <td>1</td> </tr> <tr> <td>2+468,400</td> <td>4.30</td> <td>2.920</td> <td>2.760</td> <td>0.973</td> <td>4.356</td> <td>1</td> </tr> <tr> <td>2+478,400</td> <td>4.30</td> <td>2.859</td> <td>2.699</td> <td>0.973</td> <td>4.295</td> <td>1</td> </tr> <tr> <td>2+488,400</td> <td>4.30</td> <td>2.849</td> <td>2.689</td> <td>0.973</td> <td>4.285</td> <td>1</td> </tr> <tr> <td>2+505,500</td> <td>4.30</td> <td>2.719</td> <td>2.559</td> <td>0.973</td> <td>4.155</td> <td>1</td> </tr> <tr> <td>2+518,700</td> <td>4.30</td> <td>2.814</td> <td>2.654</td> <td>0.973</td> <td>4.250</td> <td>1</td> </tr> <tr> <td>2+528,700</td> <td>4.30</td> <td>2.853</td> <td>2.693</td> <td>0.973</td> <td>4.289</td> <td>1</td> </tr> <tr> <td>2+538,700</td> <td>4.30</td> <td>2.901</td> <td>2.741</td> <td>0.973</td> <td>4.337</td> <td>1</td> </tr> <tr> <td>2+548,700</td> <td>4.30</td> <td>2.987</td> <td>2.827</td> <td>0.710</td> <td>4.160</td> <td>1</td> </tr> <tr> <td>2+558,700</td> <td>4.30</td> <td>3.086</td> <td>2.926</td> <td>0.710</td> <td>4.259</td> <td>1</td> </tr> <tr> <td>2+578,700</td> <td>4.30</td> <td>3.363</td> <td>3.203</td> <td>0.710</td> <td>4.536</td> <td>1</td> </tr> <tr> <td>2+600,000</td> <td>4.30</td> <td>3.728</td> <td>3.568</td> <td>0.710</td> <td>4.901</td> <td>1</td> </tr> <tr> <td>2+705,000</td> <td>4.30</td> <td>1.246</td> <td>1.086</td> <td>0.710</td> <td>2.419</td> <td>1</td> </tr> <tr> <td>2+750,000</td> <td>4.30</td> <td>0.277</td> <td>0.117</td> <td>0.710</td> <td>1.450</td> <td>1</td> </tr> <tr> <td>2+760,900</td> <td>4.30</td> <td>0.218</td> <td>0.058</td> <td>0.710</td> <td>1.391</td> <td>1</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Total</td> <td>66,151</td> <td>17</td> </tr> </tbody> </table>	Vertical Drain Location	Ground	H	Pipe Length (m)			Elbow (nos.)	PK1: L1 = 10.538 m	Nos = 3 nos	Straight	Cross	Total	PK1(Thakda side)	0+280,000	4.30	1.684	1.524	0.710	2.8570	1	PK2: L1 = 66.151 m Nos = 17 nos	0+285,000	4.30	2.261	2.101	0.710	3.434	1	0+325,000	4.30	3.074	2.914	0.710	4.247	1							Total	10,538	3	PK2(Thakda side)	2+428,400	4.30	3.429	3.268	0.710	4.601	1	2+448,400	4.30	3.125	2.965	0.710	4.298	1	2+458,400	4.30	2.996	2.836	0.710	4.169	1	2+468,400	4.30	2.920	2.760	0.973	4.356	1	2+478,400	4.30	2.859	2.699	0.973	4.295	1	2+488,400	4.30	2.849	2.689	0.973	4.285	1	2+505,500	4.30	2.719	2.559	0.973	4.155	1	2+518,700	4.30	2.814	2.654	0.973	4.250	1	2+528,700	4.30	2.853	2.693	0.973	4.289	1	2+538,700	4.30	2.901	2.741	0.973	4.337	1	2+548,700	4.30	2.987	2.827	0.710	4.160	1	2+558,700	4.30	3.086	2.926	0.710	4.259	1	2+578,700	4.30	3.363	3.203	0.710	4.536	1	2+600,000	4.30	3.728	3.568	0.710	4.901	1	2+705,000	4.30	1.246	1.086	0.710	2.419	1	2+750,000	4.30	0.277	0.117	0.710	1.450	1	2+760,900	4.30	0.218	0.058	0.710	1.391	1						Total	66,151	17	
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No. of Pipe Brace	PK1: 3 x 2 = 6 Nos Nos/1set PK2: 17 x 2 = 34 Nos Nos/1set																																																																																																																																																																													

No	Item	Name	Size · Type	Quantity	Unit
	PIPE BRACE	PIPE BRACE	200mm	1	nos
Item	ormula				Quantity
FB (Flat Bar)	Pipe Brace (200mm) N = 100 × 6 × 440				2 Nos
FB	N = 100 × 6 × 700				2 Nos
BN (Bolt and Nut)	N = M12 × 40				4 Nos
Anchor	N = M12				4 Nos

No	Item	Name	Quantity	Unit
	VERTICAL DRAIN	TYPE B	1	nos



Item	Formula	Quantity
A-A Section	CONCRETE (m3)	
	CONCRETE DITCH	
	V1= 0.600 X 1.080 X 1 X 1 = 0.648 m3	
	V2= 0.300 X 0.930 X 1 X 1 = 0.279 m3	
	V3= V1 - V2 = 0.369 m3	
	CONCRETE SIDE PROTECTION	
	V4= 0.500 X 0.050 X 2 X 1 = 0.050 m3	
	CONCRETE (SIDE+DITCH)	
	V5= V3 + V4 = 0.419 m3	0.419 m3 (Per 1m)
	FOUNDATION (m3)	
V6= 0.700 X 0.150 X 1 = 0.105 m3	0.105 m3 (Per 1m)	
FORM (m2)		
	A1= 1.080 X 2 X 1 = 2.160 m2	
	A2= 0.930 X 2 X 1 = 1.860 m2	
	A3= 0.050 X 2 X 1 = 0.100 m2	
A4= A1 + A2 + A3 = 4.120 m2	4.120 m2 (Per 1m)	
Excavation		
V= 2.600 X 1.230 X 1.000 = 3.198 m3	3.198 m3 (Per 1m)	
Back Filling		
V= 1.000 X 1.230 X 1.000 X 2 = 2.460 m3	2.460 m3 (Per 1m)	

B-B Section	CONCRETE (m3)							
	CONCRETE DITCH							
	V1=	0.600	X	0.450	X	1.000	X	= 0.270 m3
	V2=	0.300	X	0.300	X	1.000	X	= 0.090 m3
	V3=	V1	-	V2				= 0.180 m3
	CONCRETE SIDE PROTECTION							
	V4=	0.500	X	0.050	X	2.000	X 1	= 0.050 m3
	CONCRETE (SIDE+DITCH)							
	V5=	V3	+	V4				= 0.230 m3
								(Per 1m)
	FOUNDATION (m3)							
	V6=	0.700	X	0.150	X	1		= 0.105 m3
								(Per 1m)
	FORM (m2)							
	A1=	0.450	X	2	X	1		= 0.900 m2
A2=	0.300	X	2	X	1		= 0.600 m2	
A3=	0.050	X	2	X	1		= 0.100 m2	
A4=	A1	+	A2	+	A3		= 1.600 m2	
							(Per 1m)	
Excavation								
V=	2.600	X	0.600	X	1.000		= 1.560 m3	
							(Per 1m)	
Back Filling								
V=	1.000	X	0.600	X	1.000	X 2	= 1.200 m3	
							(Per 1m)	
C-C Section	CONCRETE (m3)							
	CONCRETE DITCH							
	V1=	0.600	X	0.450	X	1.000		= 0.270 m3
	V2=	0.300	X	0.300	X	1.000		= 0.090 m3
	V3=	V1	-	V2				= 0.180 m3
	CONCRETE SIDE PROTECTION							
	V4=	0.500	X	0.050	X	2.000	X 1	= 0.050 m3
	COVER							
	V5=	0.600	X	0.120	X	1		= 0.072 m3
	CONCRETE (DITCH+SIDE+COVER)							
	V6=	V3	+	V4	+	V5		= 0.302 m3
								(Per 1m)
	FOUNDATION (m3)							
	V6=	0.700	X	0.150	X	1		= 0.105 m3
								(Per 1m)
FORM (m2)								
A1=	0.450	X	2	X	1		= 0.900 m2	
A2=	0.300	X	2	X	1		= 0.600 m2	
A3=	0.050	X	2	X	1		= 0.100 m2	
A4=	A1	+	A2	+	A3		= 1.600 m2	
							(Per 1m)	
REINFORCING-BAR D13 (kg)								
L1=	0.493	X	3	/	0.593		= 2.494 m	
L2=	0.540	X	5	/	0.593		= 4.553 m	
L3=	L1	+	L2				= 7.047 m	
W1=	L3	X	0.995				= 7.012 kg	
			(kgf/m)				(Per 1m)	
Excavation								
V=	2.600	X	0.600	X	1.000		= 1.560 m3	
							(Per 1m)	
Back Filling								
V=	1.000	X	0.600	X	1.000	X 2	= 1.200 m3	
							(Per 1m)	

TOTAL QTY

SIZE OF VERTICAL DRAIN

Location	2+505.500	2+601.400	Remarks
Shoulder (m)	1.200	0.750	
L1 (m)	2.177	1.727	
L2 (m)	4.355	6.403	
L3 (m)	0.539	0.539	
H (m)	2.419	3.557	(= L2 - 1.8)
L4 (m)	4.982	7.325	(= (L2*2+H*2)/0.5)

Length for Section A-A = 2.177 + 1.727 = 3.904 m
 Length for Section B-B = 4.982 + 7.325 = 12.307 m
 Length for Section C-C = 0.539 + 0.593 = 1.132 m

CONCRETE (m3)

$$V = 0.419 \times 3.904 + 0.230 \times 12.307 + 0.302 \times 1.132 = 4.808 \text{ m}^3$$

(m3/m: A-A) (m) (m3/m: B-B) (m) (m3/m: C-C) (m)

FOUNDATION (m3)

$$V = 0.105 \times 3.904 + 0.105 \times 12.307 + 0.105 \times 1.132 = 1.821 \text{ m}^3$$

(m3/m: A-A) (m) (m3/m: B-B) (m) (m3/m: C-C) (m)

FORM (m2)

$$A = 4.120 \times 3.904 + 1.600 \times 12.307 + 1.600 \times 1.132 = 37.587 \text{ m}^2$$

(m2/m: A-A) (m) (m2/m: B-B) (m) (m2/m: C-C) (m)

REINFORCING-BAR D13 (kg)

$$W = 7.012 \times 1.132 = 7.938 \text{ kg}$$

(kg/m: C-C) (m)

Excavation

$$V = 3.198 \times 3.904 + 1.560 \times 12.307 + 1.560 \times 1.132 = 33.450 \text{ m}^3$$

(m3/m: A-A) (m) (m3/m: B-B) (m) (m3/m: C-C) (m)

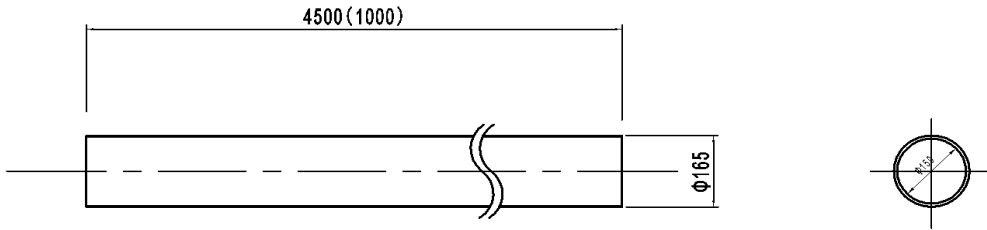
Back Filling

$$V = 2.460 \times 3.904 + 1.200 \times 12.307 + 1.200 \times 1.132 = 25.731 \text{ m}^3$$

(m3/m: A-A) (m) (m3/m: B-B) (m) (m3/m: C-C) (m)

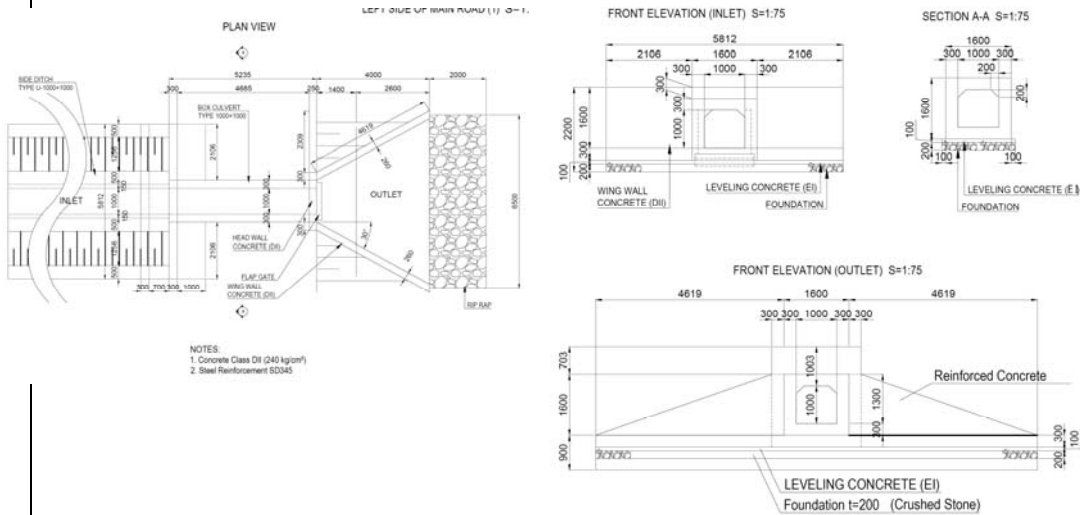
No	Item	Name	Quantity	Unit
	Vertical Drain Type C	φ 150mm uPVC Pipe (CI-8.5)	10	m

Φ150mm uPVC Pipe(CI-8.5) S=1:10



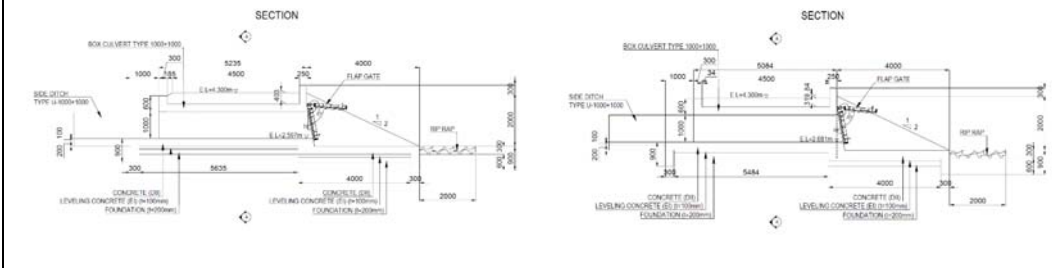
Item	Formula	Quantity
φ 150mm uPVC Pipe (CI-8.5)	L=	10.000 m
		10.000 m

No	Item	Name	Size · Type	Quantity	Unit
	DRAINAGE OUTLET	TYPE A Left & Right SIDE		1	nos



Left Side

Right Side



Item	Formula	Quantity
------	---------	----------

Summary for Drainage Outlet Type A, Size of Left and Right Side are same.
 For each side

No.	Description	Width	Length	Thickness	Height	Number	Unit	Quantity
		W	L	T	H			
1	Box 1000x1000		5235				m	5.235
2	Leveling concrete						m ³	2.794
	Outlet Slab1	2.200	4.000	0.100		1	m ³	0.880
	Outlet Slab2	2.309	3.950	0.100		1	m ³	0.912
	Inlet Slab	5.812	1.000	0.100		1	m ³	0.581
	Inlet Wall	2.106	1.000	0.100		2	m ³	0.421
3	Foundation						m ³	5.588
	Outlet Slab1	2.200	4.000	0.200		1	m ³	1.760
	Outlet Slab2	2.309	3.950	0.200		1	m ³	1.824
	Inlet Slab	5.812	1.000	0.200		1	m ³	1.162
	Inlet Wall	2.106	1.000	0.200		2	m ³	0.842
4	Reinforced Concrete (DII)						m ³	15.845
	Inlet Front Slab	5.812	0.700	0.300		1	m ³	1.221
	Inlet Back Slab	2.106	1.000	0.300		2	m ³	1.264
	Inlet Wall1	5.812		0.300	2.500	1	m ³	4.359
	Inlet Wall2	1.600		0.300	1.300	-1	m ³	-0.624
	Outlet Slab1	1.600	4.000	0.300		1	m ³	1.920
	Outlet Slab2	2.309	4.000	0.300		1	m ³	2.771
	Outlet Slab3	6.518		0.300	0.600	1	m ³	1.173
	Outlet Wing Wall1	4.619		0.300	1.600	1	m ³	2.217
	Outlet Wing Wall2	4.619		0.260	0.300	2	m ³	0.721
	Outlet Wing Wall3	0.300		0.300	1.900	2	m ³	0.342
	Outlet Head Wall1	1.600		0.300	0.703	1	m ³	0.337
	Outlet Head Wall2	1.600		0.300	0.300	1	m ³	0.144
5	Formwork of out-let						m ²	83.942
	Inlet Wall1	5.812			2.500	2	m ²	29.060
	Inlet Wall2	1.600			1.000	-2	m ²	-3.200
	Outlet Slab	6.518			0.900	2	m ²	11.732
	Outlet Wing Wall	4.619			1.600	2	m ²	14.781
	Outlet Head Wall1	2.200			2.603	2	m ²	11.453
	Outlet Head Wall2	1.600			1.000	-2	m ²	-3.200
	Leveling Concrete1	5.812			0.100	2	m ²	1.162
	Leveling Concrete2	10.768			0.100	2	m ²	2.154
6	Riprap for Bedding Stone	6.500	2.000	0.300		1	m ³	3.900

Reinforced Bar Left and Right Side are same amount

Inlet

LIST OF REINFORCEMENT(INLET)							
MARK	SEC.	LENGTH (mm)	EACH	WEIGHT (kg/m)	WEIGHT/one (kg)	WEIGHT (kg)	REMARKS
A 1	D13	2 380	32	0.995	2.368	76	L
A 2	"	800	16	"	0.796	13	I
A 3	"	1 500	18	"	1.493	27	I
A 4	"	1 500	34	"	1.493	51	I
A 5	D10	2 256	52	0.560	1.263	66	—
A 6	D13	2 440	68	0.995	2.428	165	←
A 7	"	1 670	22	"	1.662	37	←
A 8	D10	5 712	16	0.560	3.199	51	—
C 1	"	2 300	49	"	1.288	63	0
D 1	D13	1 610	11	0.995	1.602	18	⊥
D 2	"	2 960	4	"	2.945	12	—
SUB TOTAL						579	kg
						D10	180 kg
						D13	399 kg
						Total	579 kg

Outlet

LIST OF REINFORCEMENT(INLET)							
MARK	SEC.	LENGTH (mm)	EACH	WEIGHT (kg/m)	WEIGHT/one (kg)	WEIGHT (kg)	REMARKS
E 1	D16	2 300	44	1.560	3.588	158	L
E 2	"	1 859	12	"	2.900	35	L (AVE)
E 3	"	1 090	10	"	1.700	17	I
E 4	"	1 295	42	"	2.020	85	I (AVE)
E 5	D13	1 233	54	0.995	1.227	66	I (AVE)
E 6	D10	3 449	36	0.560	1.931	70	— (AVE)
E 7	"	5 715	4	"	3.200	13	—
E 8	D13	4 880	9	0.995	4.856	44	←
E 9	"	2 630	22	"	2.617	58	← (AVE)
E 10	D10	5 064	53	0.560	2.836	150	— (AVE)
E 11	"	6 430	4	"	3.601	14	—
E 12	"	7 117	4	"	3.986	20	—
E 13	D13	4 880	9	0.995	4.856	16	←
G 1	"	2 300	35	"	2.289	80	0
H 1	D13	2 318	15	0.995	2.306	35	⊥
H 2	"	2 100	10	"	2.090	21	—
SUB TOTAL						906	kg
						D10	263 kg
						D13	348 kg
						D16	295 kg
						Total	906 kg

Total

	Inlet	Outlet	Total
D16	= 0.000	+ 295.000	= 295.000 kg
D13	= 399.000	+ 348.000	= 747.000 kg
D10	= 180.000	+ 263.000	= 443.000 kg
Grand Total			= 1485.000 kg

For Each Side
1485.000 kg

Earthworks

For Left Side
Excavation

	Width	Height	Length	
Inlet V1	= 7.812	X 2.500	X 4.000	= 78.120 m3
Outlet V2	= 8.500	X 3.200	X 6.000	= 163.200 m3
V3	= 8.500	X -0.300	X 6.000	= -15.300 m3
Total				= 226.020 m3

226.020 m3

Backfill

	Width	Height	Length	nos	
Inlet V1	= 3.106	X 2.500	X 2.000	X 2	= 31.060 m3
V2	= 3.106	X 1.703	X 2.000	X 2	= 21.158 m3
Outlet V2	= 2.309	X 2.900	X 4.000	X 0.5 x 2	= 26.784 m3
Total					= 79.002 m3

79.002 m3

For Right Side
Excavation

	Width	Height	Length	
Inlet V1	= 7.812	X 2.500	X 4.000	= 78.120 m3
Outlet V2	= 8.500	X 3.200	X 6.000	= 163.200 m3
V3	= 8.500	X -0.384	X 6.000	= -19.584 m3
Total				= 221.736 m3

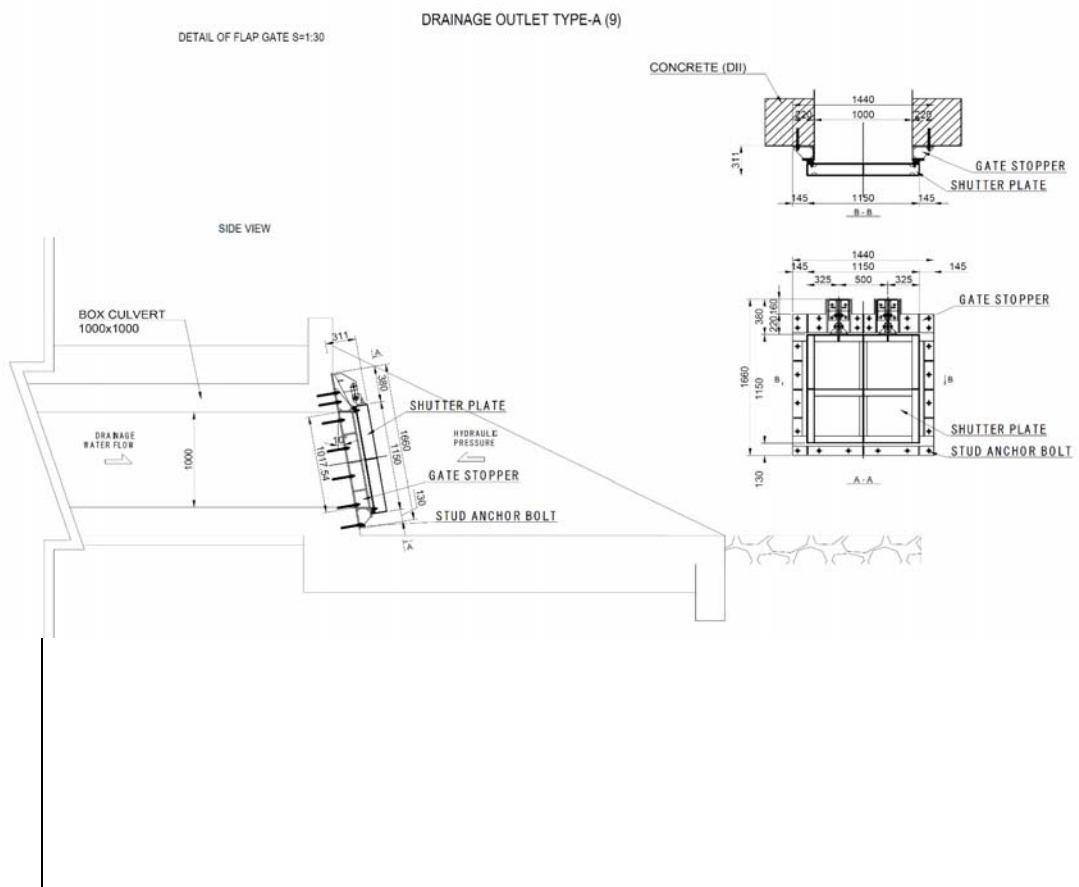
221.736 m3

Backfill

	Width	Height	Length	nos	
Inlet V1	= 3.106	X 2.500	X 2.000	X 2	= 31.060 m3
V2	= 3.106	X 1.703	X 2.000	X 2	= 21.158 m3
Outlet V2	= 2.309	X 2.816	X 4.000	X 0.5 x 2	= 26.009 m3
Total					= 78.227 m3

78.227 m3

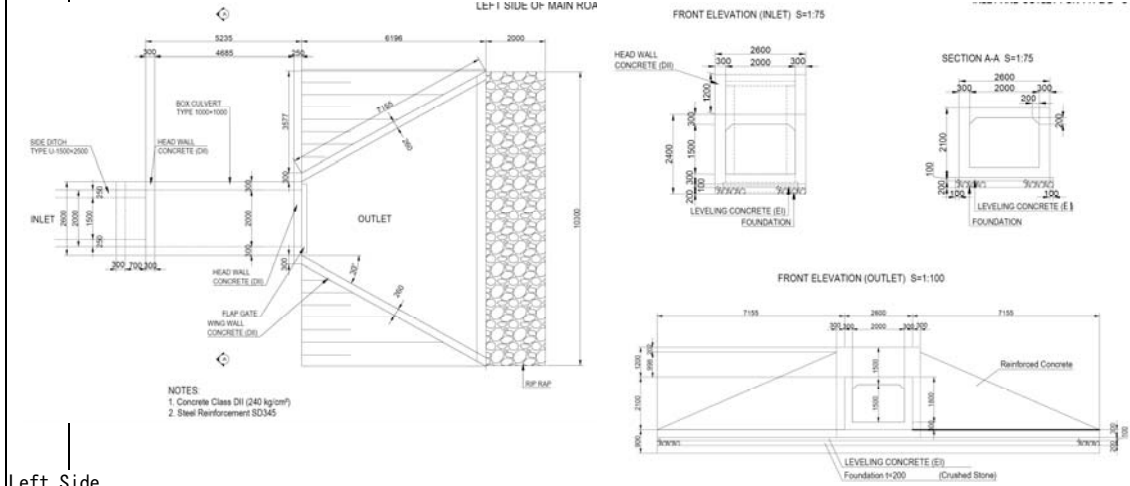
No	Item	Name	Size · Type	Quantity	Unit
	DRAINAGE OUTLET	TYPE A Flap Gate 1000x1000		1	nos



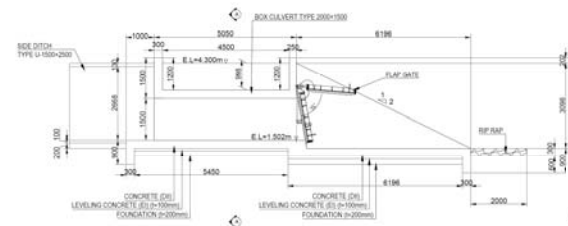
Item	Formula	Quantity
No. of Flap Gate	Left Side =	1 Nos
	Right Side =	1 Nos

No	Item	Name	Size · Type	Quantity	Unit																																																																																																																																																																																																																																																																										
	DRAINAGE OUTLET	TYPE A Box Culvert 1000x1000		1	m																																																																																																																																																																																																																																																																										
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>TOP SLAB</p> </div> <div style="width: 45%;"> <p>SIDE SLAB</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p>SECTION S=1:50</p> </div> <div style="width: 45%;"> <p>(PER 1m)</p> </div> </div> <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th>MARK</th> <th>No.</th> <th>SEC.</th> <th>EACH</th> <th>LENGTH (mm)</th> <th>L 1 (mm)</th> <th>L 2 (mm)</th> <th>L 3 (mm)</th> <th>L 4 (mm)</th> <th>H (mm)</th> <th>R (mm)</th> </tr> </thead> <tbody> <tr><td>S 1</td><td>4</td><td>D13</td><td>4</td><td>3080</td><td>820</td><td>220</td><td>1120</td><td>820</td><td></td><td>140</td></tr> <tr><td>S 2</td><td>1</td><td>D13</td><td>4</td><td>1400</td><td>1400</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>S 3</td><td>1</td><td>D13</td><td>16</td><td>1000</td><td>1000</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>S 4</td><td>5</td><td>D13</td><td>8</td><td>1040</td><td>195</td><td>649</td><td></td><td></td><td>459</td><td></td></tr> <tr><td>S 5</td><td>3</td><td>D13</td><td>3</td><td>880</td><td></td><td>126</td><td></td><td></td><td></td><td></td></tr> <tr><td>W 1</td><td>1</td><td>D13</td><td>8</td><td>1390</td><td>1390</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>W 2</td><td>1</td><td>D13</td><td>20</td><td>1000</td><td>1000</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>W 3</td><td>2</td><td>D13</td><td>12</td><td>360</td><td></td><td>152</td><td></td><td></td><td></td><td></td></tr> <tr><td>F 1</td><td>4</td><td>D13</td><td>4</td><td>3080</td><td>800</td><td>220</td><td>1120</td><td>820</td><td></td><td>140</td></tr> <tr><td>F 2</td><td>1</td><td>D13</td><td>4</td><td>1400</td><td>1400</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>F 3</td><td>1</td><td>D13</td><td>16</td><td>1000</td><td>1000</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>F 4</td><td>5</td><td>D13</td><td>8</td><td>850</td><td>195</td><td>255</td><td></td><td></td><td>190</td><td></td></tr> <tr><td>F 5</td><td>3</td><td>D13</td><td>3</td><td>940</td><td></td><td>108</td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <div style="margin-top: 10px;"> <table border="1" style="width: 100%;"> <thead> <tr> <th>MARK</th> <th>SEC.</th> <th>LENGTH (mm)</th> <th>EACH</th> <th>WEIGHT (kg/m)</th> <th>WEIGHT(1one) (kg)</th> <th>WEIGHT (kg)</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr><td>S 1</td><td>D13</td><td>3080</td><td>4</td><td>0.995</td><td>3.065</td><td>12.260</td><td></td></tr> <tr><td>S 2</td><td>D13</td><td>1400</td><td>4</td><td>0.995</td><td>1.393</td><td>5.572</td><td></td></tr> <tr><td>S 3</td><td>D13</td><td>1000</td><td>16</td><td>0.995</td><td>0.995</td><td>15.920</td><td></td></tr> <tr><td>S 4</td><td>D13</td><td>1040</td><td>8</td><td>0.995</td><td>1.035</td><td>8.280</td><td></td></tr> <tr><td>S 5</td><td>D13</td><td>880</td><td>3</td><td>0.995</td><td>0.975</td><td>2.925</td><td></td></tr> <tr><td>W 1</td><td>D13</td><td>1390</td><td>8</td><td>0.995</td><td>1.383</td><td>11.064</td><td></td></tr> <tr><td>W 2</td><td>D13</td><td>1000</td><td>20</td><td>0.995</td><td>0.995</td><td>19.900</td><td></td></tr> <tr><td>W 3</td><td>D13</td><td>360</td><td>12</td><td>0.995</td><td>0.358</td><td>4.296</td><td></td></tr> <tr><td>F 1</td><td>D13</td><td>3080</td><td>4</td><td>0.995</td><td>3.065</td><td>12.260</td><td></td></tr> <tr><td>F 2</td><td>D13</td><td>1400</td><td>4</td><td>0.995</td><td>1.393</td><td>5.572</td><td></td></tr> <tr><td>F 3</td><td>D13</td><td>1000</td><td>16</td><td>0.995</td><td>0.995</td><td>15.920</td><td></td></tr> <tr><td>F 4</td><td>D13</td><td>850</td><td>8</td><td>0.995</td><td>0.847</td><td>5.176</td><td></td></tr> <tr><td>F 5</td><td>D13</td><td>940</td><td>3</td><td>0.995</td><td>0.935</td><td>2.805</td><td></td></tr> </tbody> </table> </div>						MARK	No.	SEC.	EACH	LENGTH (mm)	L 1 (mm)	L 2 (mm)	L 3 (mm)	L 4 (mm)	H (mm)	R (mm)	S 1	4	D13	4	3080	820	220	1120	820		140	S 2	1	D13	4	1400	1400						S 3	1	D13	16	1000	1000						S 4	5	D13	8	1040	195	649			459		S 5	3	D13	3	880		126					W 1	1	D13	8	1390	1390						W 2	1	D13	20	1000	1000						W 3	2	D13	12	360		152					F 1	4	D13	4	3080	800	220	1120	820		140	F 2	1	D13	4	1400	1400						F 3	1	D13	16	1000	1000						F 4	5	D13	8	850	195	255			190		F 5	3	D13	3	940		108					MARK	SEC.	LENGTH (mm)	EACH	WEIGHT (kg/m)	WEIGHT(1one) (kg)	WEIGHT (kg)	REMARKS	S 1	D13	3080	4	0.995	3.065	12.260		S 2	D13	1400	4	0.995	1.393	5.572		S 3	D13	1000	16	0.995	0.995	15.920		S 4	D13	1040	8	0.995	1.035	8.280		S 5	D13	880	3	0.995	0.975	2.925		W 1	D13	1390	8	0.995	1.383	11.064		W 2	D13	1000	20	0.995	0.995	19.900		W 3	D13	360	12	0.995	0.358	4.296		F 1	D13	3080	4	0.995	3.065	12.260		F 2	D13	1400	4	0.995	1.393	5.572		F 3	D13	1000	16	0.995	0.995	15.920		F 4	D13	850	8	0.995	0.847	5.176		F 5	D13	940	3	0.995	0.935	2.805	
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F 1	4	D13	4	3080	800	220	1120	820		140																																																																																																																																																																																																																																																																					
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F 3	1	D13	16	1000	1000																																																																																																																																																																																																																																																																										
F 4	5	D13	8	850	195	255			190																																																																																																																																																																																																																																																																						
F 5	3	D13	3	940		108																																																																																																																																																																																																																																																																									
MARK	SEC.	LENGTH (mm)	EACH	WEIGHT (kg/m)	WEIGHT(1one) (kg)	WEIGHT (kg)	REMARKS																																																																																																																																																																																																																																																																								
S 1	D13	3080	4	0.995	3.065	12.260																																																																																																																																																																																																																																																																									
S 2	D13	1400	4	0.995	1.393	5.572																																																																																																																																																																																																																																																																									
S 3	D13	1000	16	0.995	0.995	15.920																																																																																																																																																																																																																																																																									
S 4	D13	1040	8	0.995	1.035	8.280																																																																																																																																																																																																																																																																									
S 5	D13	880	3	0.995	0.975	2.925																																																																																																																																																																																																																																																																									
W 1	D13	1390	8	0.995	1.383	11.064																																																																																																																																																																																																																																																																									
W 2	D13	1000	20	0.995	0.995	19.900																																																																																																																																																																																																																																																																									
W 3	D13	360	12	0.995	0.358	4.296																																																																																																																																																																																																																																																																									
F 1	D13	3080	4	0.995	3.065	12.260																																																																																																																																																																																																																																																																									
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F 3	D13	1000	16	0.995	0.995	15.920																																																																																																																																																																																																																																																																									
F 4	D13	850	8	0.995	0.847	5.176																																																																																																																																																																																																																																																																									
F 5	D13	940	3	0.995	0.935	2.805																																																																																																																																																																																																																																																																									
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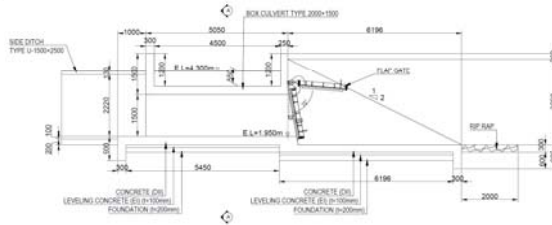
No	Item	Name	Size · Type	Quantity	Unit
	DRAINAGE OUTLET	TYPE B LEFT & Right SIDE		1	nos



Left Side



Right Side



Item	Formula	Quantity
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Summary for Drainage Outlet Type A, Size of Left and Right Side are same.
For each side

No.	Description	Width	Length	Thickness	Height	Number	Unit	Quantity
		W	L	T	H			
1	Box 2000x1500		5.050				m	5.050
2	Leveling concrete						m ³	4.258
	Outlet Slab1	3.200	6.146	0.100		1	m ³	1.967
	Outlet Slab2	3.577	5.896	0.100		1	m ³	2.109
	Inlet Slab	2.600	0.700	0.100		1	m ³	0.182
3	Foundation						m ³	8.515
	Outlet Slab1	3.200	6.146	0.200		1	m ³	3.933
	Outlet Slab2	3.577	5.896	0.200		1	m ³	4.218
	Inlet Slab	2.600	0.700	0.200		1	m ³	0.364
4	Reinforced Concrete (DII)						m ³	26.919
	Inlet Front Slab	2.600	0.700	0.300		1	m ³	0.546
	Inlet Head Wall1	2.600		0.300	3.900	1	m ³	3.042
	Inlet Head Wall2	2.600		0.300	1.500	-1	m ³	-1.170
	Outlet Slab1	3.200	6.446	0.300		1	m ³	6.188
	Outlet Slab2	3.577	6.196	0.300		1	m ³	6.649
	Outlet Slab3	3.200	0.500	0.300		1	m ³	0.480
	Outlet Wing Wall1	7.155		0.260	3.098	1	m ³	5.763
	Outlet Wing Wall2	10.300		0.300	0.900	1	m ³	2.781
	Outlet Wing Wall3	0.300		0.250	3.300	2	m ³	0.495
	Outlet Head Wall	2.600		0.250	3.300	1	m ³	2.145
5	Formwork of out-let						m ²	90.673
	Inlet Wall1	2.600			3.900	2	m ²	20.280
	Inlet Wall2	2.600			1.500	-2	m ²	-7.800
	Outlet Slab	10.300			0.900	2	m ²	18.540
	Outlet Wing Wall1	7.155			3.098	2	m ²	44.332
	Outlet Wing Wall2	0.300			3.400	4	m ²	4.080
	Outlet Head Wall	2.600			1.500	2	m ²	7.800
	Leveling Concrete1	3.300			0.100	2	m ²	0.660
	Leveling Concrete2	27.810			0.100	1	m ²	2.781
6	Riprap for Bedding Stone	10.300	2.000	0.300		1	m ³	6.180

Reinforced Bar Left and Right Side are same amount

Inlet

LIST OF REINFORCEMENT(INLET)

MARK	SEC.	LENGTH (mm)	EACH	WEIGHT (kg/m)	WEIGHT/one (kg)	WEIGHT (kg)	REMARKS
A 1	D13	2 380	0	0.995	2.368	0	L
A 2	"	800	0	"	0.796	0	I
A 3	"	1 500	0	"	1.493	0	I
A 4	"	1 500	0	"	1.493	0	I
A 5	D10	2 256	0	0.560	1.263	0	—
A 6	D13	2 440	0	0.995	2.428	0	←
A 7	"	1 670	38	"	1.662	63	←
A 8	D10	2 500	16	0.560	1.400	22	—
C 1	"	2 300	23	"	1.288	30	0
D 1	D13	3 410	19	0.995	3.393	64	∩
D 2	"	2 500	14	"	2.488	35	—
SUB TOTAL						214	kg
						D10	52 kg
						D13	162 kg
						Total	214 kg

Outlet

LIST OF REINFORCEMENT(INLET)

MARK	SEC.	LENGTH (mm)	EACH	WEIGHT (kg/m)	WEIGHT/one (kg)	WEIGHT (kg)	REMARKS
E 1	D16	2 300	62	1.560	3.588	222	L
E 2	"	1 837	24	"	2.866	69	L (AVE)
E 3	"	1 672	18	"	2.608	47	I
E 4	"	1 370	68	"	2.137	145	I (AVE)
E 5	D13	1 462	90	0.995	1.455	131	I (AVE)
E 6	D10	4 069	60	0.560	2.279	137	— (AVE)
E 7	"	7 472	4	"	4.184	17	—
E 8	D13	4 880	16	0.995	4.856	78	←
E 9	"	3 363	68	"	3.346	228	← (AVE)
E 10	D10	6 282	89	0.560	3.518	313	— (AVE)
E 11	"	9 966	4	"	5.581	22	—
E 12	"	10 197	4	"	5.710	23	—
E 13	D13	7 319	16	0.995	7.282	117	←
G 1	"	2 300	50	"	2.289	114	0
H 1	D13	3 210	25	0.995	3.194	80	∩
H 2	"	3 100	14	"	3.085	43	—
SUB TOTAL						1 786	kg
						D10	512 kg
						D13	791 kg
						D16	483 kg
						Total	1 786 kg

Total

	Inlet	Outlet	Total
D16	= 0.000 +	483.000	= 483.000 kg
D13	= 162.000 +	791.000	= 953.000 kg
D10	= 52.000 +	512.000	= 564.000 kg
Grand Total			= 2000.000 kg

For Each Side
2000.000 kg

Earthworks

For Left Side
Excavation

		Width	Height	Length	
Inlet	V1	= 4.600 X	3.698 X	3.300	= 56.136 m3
Outlet	V2	= 12.300 X	4.200 X	10.446	= 539.640 m3
	V3	= 12.300 X	-0.202 X	10.446	= -25.954 m3
Total					= 569.822 m3

569.822 m3

Backfill

		Width	Height	Length	nos	
Inlet	V1	= 2.000 X	3.698 X	3.300 X	2	= 48.814 m3
Outlet	V2	= 4.877 X	3.998 X	10.446 X	0.5 x 2	= 203.679 m3
Total						= 252.493 m3

252.493 m3

For Right Side
Excavation

		Width	Height	Length	
Inlet	V1	= 4.600 X	3.698 X	3.300	= 56.136 m3
Outlet	V2	= 12.300 X	4.200 X	10.446	= 539.640 m3
	V3	= 12.300 X	-0.650 X	10.446	= -83.516 m3
Total					= 512.260 m3

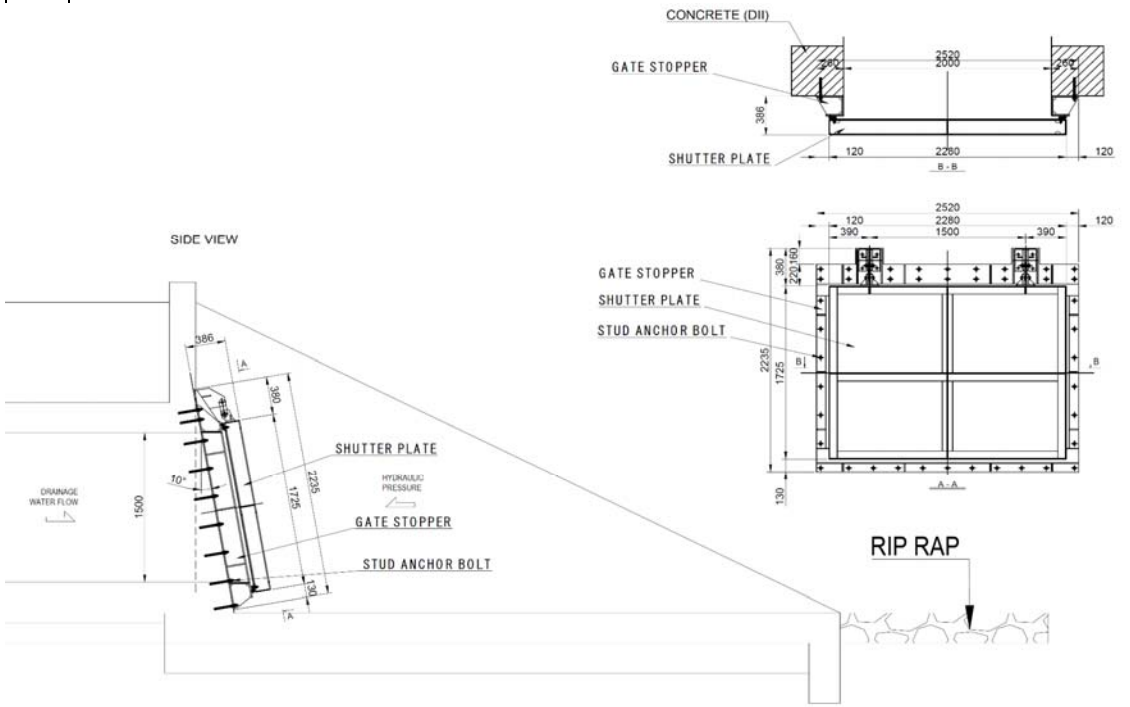
512.260 m3

Backfill

		Width	Height	Length	nos	
Inlet	V1	= 2.000 X	3.698 X	3.300 X	2	= 48.814 m3
Outlet	V2	= 4.877 X	3.550 X	10.446 X	0.5 x 2	= 180.855 m3
Total						= 229.669 m3

229.669 m3

No	Item	Name	Size · Type	Quantity	Unit
	DRAINAGE OUTLET	TYPE B Flap Gate 2000x1500		1	nos



Item	Formula	Quantity
No. of Flap Gate	Left Side =	1 Nos
	Right Side =	1 Nos

No	Item	Name	Size · Type	Quantity	Unit																																																																																																																																																																																																										
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	Width	Height	Length																																																																																																																																																																																																												
V1	= 3.525	X 2.450	X 1.000	= 8.636 m ³																																																																																																																																																																																																											
V2	= 2.600	X 2.900	X -1.000	= -7.540 m ³																																																																																																																																																																																																											
Total				= 1.096 m³																																																																																																																																																																																																											