JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PEOPLE'S COMMITTEE OF HO CHI MINH CITY (PCHCMC)
MINISTRY OF PLANNING AND INVESTMENT (MPI)
THE SOCIALIST REPUBLIC OF VIET NAM

THE DETAILED DESIGN STUDY
ON
HO CHI MINH CITY
WATER ENVIRONMENT IMPROVEMENT PROJECT
IN
THE SOCIALIST REPUBLIC OF VIET NAM

FINAL REPORT

DESIGN REPORT

VOLUME 3

JUNE 2001

PACIFIC CONSULTANTS INTERNATIONAL

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TABLE A.1 (1/12) WORK QUANTITIES OF TAU HU - BEN NGHE CANAL IMPROVEMENT

Item	Calculation	Quantity
1. Clearing and Grubbing		(m2)
1.1 Ben Nghe Canal		
(1) North bank	5.0m x 2,909.6m =	14,548.00
(2) South Bank	5.0m x 2,777.4m =	13,887.00
	Total	28,435.00
	Allowance: 3%	**29,290 m2**
1.2 Tau Hu Canal		
(1) North bank	5.0m x 3,997.3m =	19,986.50
(2) South Bank	5.0m x 3,927.4m =	19,637.00
	Total	39,623.50
	Allowance: 3%	**40,810 m2**
2. Demolition of Existing Revetment		(m3)
2.1 Ben Nghe Canal		
		0.00
	Allowance: 3%	**0 m3**
2.2 Tau Hu Canal		(m3)
(1) BP.3 (R) (4.50km - 4.74km)	216.0 + 72.0 + 57.6 =	345.60
(2) BP.4 (R) (5.85km - 6.25km)	360.0 + 120 0 + 96.0 =	576.00
(3) BP.5 (R) (6.95km - 7.24km)	279.0 + 93.0 + 74.4 =	446.40
(4) BP.6 (R) (7.24km - 7.42km)	162.0 + 54.0 + 43.2 =	259.20
(5) BP.7 (L) (7.14km - 7.24km)	67.5 + 22.5 + 18.0 =	108.00
	Total	1735.20
	Allowance: 3%	**1,790 m3**
3. Excavation		
3.1 Ben Nghe Canal (Channel Excavation)		(m^3)
(1) Revetment Type A		250,953
(2) Revetment Type B		0
(3) OWM Project		(183,250)
	Sub-total	67,703
	Allowance: 5%	**71090m3**
3.2 Ben Nghe Canal (Revetment Type A)		(m^3)
(1) E-W Highway Project		323
(2) Left Bank		35,135
(3) Right Bank		36,333
	Sub-total	71,791
	Allowance: 5%	**75,390m3 (71,620 + 3,770)**
3.3 Ben Nge Canal (Revetment Type B)		(m^3)
(1) E-W Highway Project		0
(2) Left Bank		0
(3) Right Bank		0
	Sub-total	0
	Allowance: 5%	**0m3**
Toatl of Ben Nghe Canal	Total	139,494
	Allowance: 5%	**146,480m3**
3.4 Tau Hu Canal (Channel Excavation)	(m^3)	(m^3)
(1) Revetment Type A		169,116
(2) Revetment Type B		105,469
(3) OWM Project		(150,570)
	Sub-total	124,015
	Allowance: 5%	**130,220m3**
3.5 Tau Hu Canal (Revetment Type A)		(m^3)
(1) E-W Highway Project		21
(2) Left Bank		26,017
(3) Right Bank		29,242
	Sub-total	55,280
	Allowance: 5%	**58,050m3 (55,150 + 2,900)**

TABLE A.1 (2/12) WORK QUANTITIES OF TAU HU - BEN NGHE CANAL IMPROVEMENT

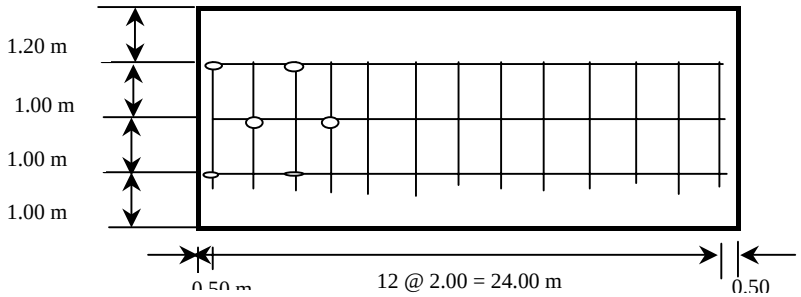
Item	Calculation	Quantity
3.6 Tau Hu Canal (Revetment Type B)		(m^3)
(1) E-W Highway Project		63
(2) Left Bank		22,470
(3) Right Bank		19,828
Sub-total	Sub-total	42,361
	Allowance: 5%	**44,420m3 (42,200 + 2,220)**
Total of Tau Hu Canal	Total	221,656
	Allowance: 5%	**232,690m3**
	Total	361,150
Grand Total	**Allowance: 5%**	**379,170m3**
4. Filling		
4.1 Ben Nghe Canal (Channel)		(m^3)
(1) Revetment Type A		0
(2) Revetment Type B		0
(3) OWM Project		0
	Sub-total	0
	Allowance: 5%	**0m3**
4.2 Ben Nghe Canal (Revetment Type A)		(m^3)
(1) E-W Highway Project		27,943
(2) Left Bank		25,153
(3) Right Bank		37,935
	Sub-total	91,031
	Allowance: 5%	**95,590m3(91,820 +3,770)**
3.3 Ben Nge Canal (Revetment Type B)		(m^3)
(1) E-W Highway Project		0
(2) Left Bank		0
(3) Right Bank		0
	Sub-total	0
	Allowance: 5%	**0m3**
Total of Ben Nghe Canal	Total	91,031
	Allowance: 5%	**95,590m3(91,820 +3,770)**
4.4 Tau Hu Canal (Channel)	(m^3)	(m^3)
(1) Revetment Type A	0	0
(2) Revetment Type B	0	0
(3) OWM Project	0	0
	Sub-total	0
	Allowance: 5%	**0m3**
4.5 Tau Hu Canal (Revetment Type A)		(m^3)
(1) E-W Highway Project		26,256
(2) Left Bank		27,578
(3) Right Bank		46,003
	Sub-total	99,837
	Allowance: 5%	**104,830 (101,930 + 2,900)**
4.6 Tau Hu Canal (Revetment Type B)		(m^3)
(1) E-W Highway Project		841
(2) Left Bank		2,833
(3) Right Bank		3,187
Sub-total	Sub-total	6,861
	Allowance: 5%	**7,220m3 (5,000 + 2,220)**
Total of Tau Hu Canal	Sub-total	106,698
	Allowance: 5%	**112,050 (106,930+5,120)**
	Sub-total	197,729
Grand Total	**Allowance: 5%**	**207,640m3**

TABLE A.1 (3/12) WORK QUANTITIES OF TAU HU - BEN NGHE CANAL IMPROVEMENT

Item		Calculation	Quantity
5.Timber Piling			(m)
5.1 Foundation of Revetment			**(m) (Allowance : 1%)**
(1)	Ben Nghe (Type A)	Length = (L) 2,910 + (R) 2,780 = 5,690m Area of Foundation = 0.80 x 5,690 = 4,552 m˂ Number of Piles = 25 pcs/m˂ x 4,552 = 113,800 pcs. Length of Piles = 113,800 x 4.5 m = 512,100 m	517,220
(2)	Tau Hu (Type A)	Length = (L) 2,654 + (R) 2,539 = 5,193m Area of Foundation = 0.80 x 5,193 = 4,154 m˂ Number of Piles = 25 pcs/m˂ x 4,154 = 103,850 pcs. Length of Piles = 103,850 x 4.5 m = 467,350 m	472,030
(3)	Tau Hu (Type B)	Length = (L) 1,344 + (R) 1,389 = 2,733m Area of Foundation = 1.00 x 2,733 = 2,733 m˂ Number of Piles = 25 pcs/m˂ x 2,733 = 68,325 pcs. Length of Piles = 68,325 x 4.5 m = 307,500 m	310,580
		Sub-total	**1,299,830**
5.2 Bank Protection for Sliding			**(m) (Allowance : 1%)**
(1)	Ben Nghe (North Bank)	127,125nos. x 4.5m/nos. = 5,722,062.5	577,930
(2)	Ben Nghe (South Bank)	79,425nos. x 4.5m/nos. = 357,412.50	360,990
(3)	Tau Hu (Type A North Bank)	113,850nos. x 4.5m/nos. = 512,325.00	517,450
(4)	Tau Hu (Type A South Bank)	83,025nos. x 4.5m/nos. = 373,612.50	377,350
(5)	Tau Hu (Type B North Bank)	0	0
(6)	Tau Hu (Type B South Bank)	0	0
		Sub-total	**1,833,720**
5.3 Total			**(m) (Allowance : 1%)**
(1)	Ben Nghe Canal	517,220m + 577,930m + 360,990 =	**1,456,140**
(2)	Tau Hu canal (Type A)	472,030m + 517,450m + 377,350m =	**1,366,830**
(3)	Tau Hu Canal (Type B)	310,580m	**310,580**
		Total	**3,133,550**
6. Gravel Bedding			
6.1 Ben Nghe Canal			**(m3) (Alloance: 3%)**
(1)	Revetment Type A	455.00	470.00
(2)	Revetment Type B	0.00	0.00
	Sub-total	455.00	**470**
6.2 Tau Hu Canal			**(m3) (Alloance: 3%)**
(1)	Revetment Type A	415.00	430
(2)	Revetment Type B	273.00	280
	Sub-total	688.00	**710**
	Total	1143.00	**1,180**
7. Free Draining Gravel			
7.1 Ben Nghe Canal			**(m3) (Alloance: 3%)**
(1)	Revetment Type A	13,308.00	13,700
(2)	Revetment Type B	0.00	0.00
	Sub-total	13,308.00	**13,700**
7.2 Tau Hu Canal			**(m3) (Alloance: 3%)**
(1)	Revetment Type A	12,151.00	12,520
(2)	Revetment Type B	4,699.00	4,840
	Sub-total	16,850.00	**17,360**
	Total	30,158.00	**31,060**
8. Geotextile Cloth			
8.1 Ben Nghe Canal			**(m2) (Alloance: 3%)**
(1)	Revetment Type A	8.60m x (2,910 + 2,780) = 48,934	50,400
(2)	Revetment Type B	0	0
	Sub-total	48,934	**50,400**
8.2 Tau Hu Canal			**(m2) (Alloance: 3%)**
(1)	Revetment Type A	8.60m x (2,654 + 2,539) = 44,660	46,000
(2)	Revetment Type B	5.70m x (1,344 + 1,389) = 15,578	16,050
	Sub-total	60,238	**62,050**
	Total	109,172	**112,450**

TABLE A.1 (4/12) WORK QUANTITIES OF TAU HU - BEN NGHE CANAL IMPROVEMENT

Item	Calculation	Quantity
9. Precast Concrete Toe Block (Type A: 600Wx400Hx4000L, Type B: 800Wx400Hx4000L)		(m3)
9.1 Ben Nghe Canal		**(m3) (Alloance: 1%)**
(1) Revetment Type A	(2,910 + 2,780)/4.00m = 1,423	1,570
(2) Revetment Type B	0	0
Sub-total	1,423	**1,570**
9.2 Tau Hu Canal		**(m3) (Alloance: 1%)**
(1) Revetment Type A	(2,654 + 2,539)/4.00m = 1,298	1,310
(2) Revetment Type B	(1,344 + 1,389) /4.00m = 683	690
Sub-total	1,981	**2,000**
Total	3,404	**3,570**
10. Concrete Type F (Backfill Concrete)		(m3)
10.1 Ben Nghe Canal		**(m3) (Alloance: 3%)**
(1) Revetment Type A	0.81m2 x (2,910 + 2,780) = 4,609	4,750
(2) Revetment Type B	0	0
Sub-total	4,609	**4,750**
109.2 Tau Hu Canal		**(m3) (Alloance: 3%)**
(1) Revetment Type A	0.81m2 x (2,654 + 2,539)= 4,206	4,330
(2) Revetment Type B	0.72m2 x (1,344 + 1,389) = 1,968	2,030
Sub-total	6,174	**6,360**
Total	10,783	**11,110**
11. Concrete Type G (Leveling Concrete)		
11.1 Ben Nghe Canal		**(m3) (Alloance: 3%)**
(1) Revetment Type A	0.08m2 x (2,910 + 2,780) = 436	450
(2) Revetment Type B	0	0
Sub-total	436	**450**
11.2 Tau Hu Canal		**(m3) (Alloance: 3%)**
(1) Revetment Type A	0.08m2 x (2,654 + 2,539)= 415	430
(2) Revetment Type B	0.10m2 x (1,344 + 1,389) = 273	280
Sub-total	688	**710**
Total	1,124	**1,160**
12. Wet Stone Masonry		(m3)
12.1 Ben Nghe Canal		**(m3) (Alloance: 3%)**
(1) Revetment Type A	2.48m2 x (2,910 + 2,780) = 14,111	14,530
(2) Revetment Type B	0	0
Sub-total	12,879	**14,530**
12.2 Tau Hu Canal		**(m3) (Alloance: 3%)**
(1) Revetment Type A	2.48m2 x (2,654 + 2,539)= 12,879	13,270
(2) Revetment Type B	2.17m2 x (1,344 + 1,389) = 5,931	6,110
Sub-total	18,860	**19,380**
Total	31,739	**33,910**
13. Weep Holes		



Number of Weep Holes: 7 + 6 +7 = 20 nos.

13.1 Ben Nghe Canal		**Nos. (Alloance: 1%)**
(1) Revetment Type A	20 pcs x (2,910 + 2,780)/25.00 = 4,552	4,600
(2) Revetment Type B	0	0
Sub-total	4,552	**4,600**

TABLE A.1 (5/12) WORK QUANTITIES OF TAU HU - BEN NGHE CANAL IMPROVEMENT

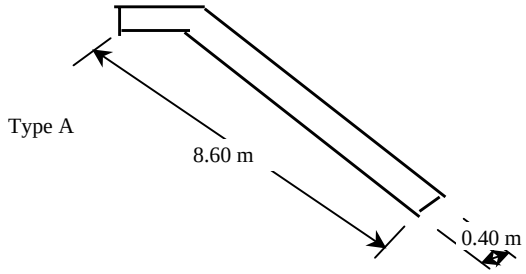
Item		Calculation	Quantity
13.2 Tau Hu Canal			**Nos. (Alloance: 1%)**
(1)	Revetment Type A	20 pcs x (2,654 + 2,539)/25.00 = 4,155	4,200
(2)	Revetment Type B	20 pcs x (1,344 + 1,389)/25.00 = 2,186	2,200
	Sub-total	6,341	**6,400**
	Total	10,893	**11,000**
14. Joint Filler			
			
14.1 Ben Nghe Canal			**(m2) (Alloance: 1%)**
(1)	Revetment Type A	0.4 x 8.60 x (2,910 + 2,780)/25.00 = 783 m2	810
(2)	Revetment Type B	0	0
	Sub-total	783	**810**
14.2 Tau Hu Canal			**(m2) (Alloance: 1%)**
(1)	Revetment Type A	0.40x 8.60 x (2,654 + 2,539)/25.00 = 715 m2	740
(2)	Revetment Type B	0.55 x 5.70 x (1,344 + 1,389)/25.00 = 343 m2	350
	Sub-total	1,058	**1,090**
	Total	1,841	**1,900**
15. Rip Rap			
15.1 Ben Nghe Canal			**(m3) (Alloance: 1%)**
(1)	Revetment Type A	3.00 x 0.50 x (2,961 + 2,825) = 8,679	8,770
(2)	Revetment Type B	0	0
	Sub-total	8,679	**8,770**
15.2 Tau Hu Canal			**(m3) (Alloance: 1%)**
(1)	Revetment Type A	3.00 x 0.50 x (2,663 + 2,548)= 7,817	**7,890**
(2)	Revetment Type B	3.00 x 0.50 x (1,344 + 1,389) = 4,100	**4,140**
	Sub-total	11,916	**12,030**
	Total	20,595	**20,800**
16. Road Construction			
16.1 Excavation			**(m3) (Allowance: 5%)**
(1)	Sp - No. 77	1/2 x (0.53 + 0.38) x 8.0 x 20.958 = 76.3	
(2)	No. 77 - No. 78	1/2 x (0.38 + 0.32) x 8.0 x 54.414 = 152.4	
(3)	No. 78 - No. 79	1/2 x (0.32 + 0.39) x 8.0 x 52.081 = 147.9	
(4)	No. 79 - No. 80	1/2 x (0.39 + 0.22) x 8.0 x 44.289 = 108.1	
(5)	No. 80 - No. 81	1/2 x (0.22 + 0.24) x 8.0 x 39.375 = 72.5	
(6)	No. 81 - No. 82	1/2 x (0.24 + 0.45) x 8.0 x 39.375 = 108.7	
(7)	No. 82 - No. 83	1/2 x (0.45 + 0.48) x 8.0 x 39.375 = 146.5	
(8)	No. 83 - No. 84	1/2 x (0.48 + 0.31) x 8.0 x 41.572 = 131.4	
(9)	No. 84 - EP	1/2 x (0.31 + 0.53) x 8.0 x 30.700 = 103.2	
	Total	1047.0	**1,100 m3**
16.2 Pavement			**(Allowance: 1%)**
(1)	Subgrade Preparation	1/2x(5.0+8.0)x80.0+8.0x281.11=2,500 m2	**2,530 m2**
(2)	SubBase Course	2,500 x 0.15 = 375 m3	**420 m3**
(3)	Base Course (Crushed Aggra	2,500 x 0.26 = 650 m3	**660 m3**
(4)	Asphalt Binder Course	2,500 x 0.07 x 2.65 ton/m3 = 464 ton	**470 ton**
(5)	Asphalt Surface Course	2,500 x 0.05 x 2.65 ton/m3 = 330 ton	**340 ton**
(6)	Prime Coat	2,500 x 1.5 l/m2 =3,750 litre	**3,790 litre**
(7)	Tack Coat	2,500 x 0.45 l/m2 =1,125 litre	**1,140 litre**
16.3 Curb including Concrete Ditch Plate, Mortal Rining of 20 mm and			
		40.0 + 281.11 + 40 = 362 m	**365 m**

TABLE A.1 (6/12) WORK QUANTITIES OF TAU HU - BEN NGHE CANAL IMPROVEMENT

Item			Calculation	Quantity
16.4 Sand Bed for Foot Path			0.10 x 4.00 x (40.0 + 281.11 + 40) = 145 m3	**145 m3**
16.5 Precast Concrete Block (			4.00 x (40.0 + 281.11 + 40) =1,444 m2	**1,460 m2**
17. Storm Water Drainage System (refer to other calculation papers prepared by Local Engineer, Ms. Nguyan)				
17.1 Earth Works				
	(1)	Excavation	Allowance: 5%: (1,704.17+ 82.66 + 52.40) x 1.05	**1,930 m3**
	(2)	Sand Backfill	Allowance: 5%: (551.23 + 25.93 + 10.64)x 1.05 =	**620 m3**
	(3)	Sandy Soil Backfill	Allowance: 5%: (815.92 + 42.72 + 28.04) x 1.05 =	**930 m3**
17.2 Pipe Installation				
	(1)	Precast RC Pipe (ϕ400)	10.8m + 14.0m =	**25 m**
	(2)	Precast RC Pipe (ϕ800)	345.8m	**346 m**
	(3)	Precast RC Pipe (ϕ1200)	12.0m	**12 m**
17.3 Construction of Manhole and Inlet Pit				
	(1)	Concrete Type E	(m3)	
			62.809 + 21.57 =	84.38
			Allowance: 3%	**90 m3**
	(2)	Concrete Type F	(m3)	
			11.28 + 0	11.28
			Allowance: 3%	**12 m3**
	(3)	Concrete Type G	(m3)	
			6.33 + 2.352 =	8.68
			Allowance: 3%	**10 m3**
	(4)	Sand Bedding	(m3)	
			12.66 + 4.704 =	17.37
			Allowance: 3%	**18 m3**
	(5)	Granolithic Topping	(m2)	
			28.20 + 0 =	28.20
			Allowance: 1%	**30 m2**
	(6)	Ladder Rungs	(No.)	
			71 + 84 =	155
			Allowance: 1%	**160 No.**
	(7)	Deformed Reinforcing Bars		
			3,874.6 + 1,579.68 =	5,454.28
			Allowance: 3%	**5,620 kg**
	(8)	Cast Iron Manhole Cover (Type A)		**12 No.**
	(9)	Cast Iron Manhole Cover (Type C)		**2 No.**
	(10)	Cast Iron Manhole Cover (type E)		**12 No.**
18. Sewer Outlet (refer to the other sheets prepared by local Engineer)				
18.1Excavation			Additional Sewer Pipe + Outlet	(m3)
	(1)	Ben Nghe Canal	4,867.14m3 + 788.06m3 =	5,655.20
			Allowance: 5%	**5,940 m3**
			Hauling to the designed site	**5,640 m3**
			Hauling to the stockpile in vicinity of the Site	**300 m3**
	(2)	Tau Hu Canal	3,122.44m3 + 695.36m3 =	3,817.80
			Allowance: 5%	**4,010 m3**
			Hauling to the designed site	**3,810 m3**
			Hauling to the stockpile in vicinity of the Site	**200 m3**
18.2 Sandy Soil Backfill				
	(1)	Ben Nghe Canal	4,069.87m3 + 343.85m3 =	4,413.72
			Allowance: 5%	**4,640 m3**
			Backfill by Sandy Soil purchased	**4,340 m3**
			Backfill from the stockpile	**300 m3**
	(2)	Tau Hu Canal	2,808.25 m3 + 299.82 m3 =	3,108.07
			Allowance: 5%	**3,270 m3**
			Backfill by Sandy Soil purchased	**3,070 m3**
			Backfill from the stockpile	**200 m3**

TABLE A.1 (7/12) WORK QUANTITIES OF TAU HU - BEN NGHE CANAL IMPROVEMENT

Item			Calculation	Quantity
18.3 Foundation Pile (Timber Pile)				
	(1) Ben Nghe Cana;			(m)
		Sewer Pipe	8,334.0 x 4.5m =	37,503.0
		Outlet	7,491.0 x 4.5m =	33,721.0
			Total	71,224.0
			Allowance: 1%	**71,940 m**
	(2) Tau Hu Canal			(m)
		Sewer Pipe	5,023.0 x 4.5m =	22,603.5
		Outlet	6,512.0 x 4.5m =	29,313.0
			Total	51,916.5
			Allowance: 1%	**52,440 m**
18.4 Sand Bedding				
	(1) Ben Nghe Cana;			(m3)
		Sewer Pipe		136.68
		Outlet		47.85
			Total	184.53
			Allowance: 3%	**190 m3**
	(2) Tau Hu Canal			(m3)
		Sewer Pipe	5,023.0 x 4.5m =	89.84
		Outlet	6,512.0 x 4.5m =	64.06
			Total	153.90
			Allowance: 3%	**160 m3**
18.5 Reinforced Concrete (Type E)				
	(1) Ben Nghe Cana;			(m3)
		Head Wall		13.46
		Wing Wall		66.53
		Base		163.18
			Total	243.17
			Allowance: 3%	**250 m3**
	(2) Tau Hu Canal			(m3)
		Head Wall		25.49
		Wing Wall		68.85
		Base		163.20
			Total	257.54
			Allowance: 3%	**270 m3**
18.6 Leveling Concrete (Concrete Type G)				
	(1) Ben Nghe Cana;			(m3)
		Sewer Pipe		68.34
		Outlet		24.03
			Total	92.37
			Allowance: 3%	**100 m3**
	(2) Tau Hu Canal			(m3)
		Sewer Pipe	5,023.0 x 4.5m =	44.92
		Outlet	6,512.0 x 4.5m =	32.02
			Total	76.94
			Allowance: 3%	**80 m3**
18.7 Precast Reinforced Concrete Pipe				
	(1) Ben Nghe Cana;			(m)
		400 dia	76 **Allowance:**	**77 m**
		600 dia	48 **Allowance:**	**49 m**
		800 dia	68 **Allowance:**	**69 m**
		1000 dia	168 **Allowance:**	**170 m**
		1200 dia	4 **Allowance:**	**5 m**
		1500 dia	24 **Allowance:**	**25 m**
			Total	**395 m**

TABLE A.1 (8/12) WORK QUANTITIES OF TAU HU - BEN NGHE CANAL IMPROVEMENT

Item			Calculation		Quantity
	(2) Tau Hu Canal				
		400 dia	122	**Allowance:**	**124 m**
		600 dia	16	**Allowance:**	**17 m**
		800 dia	104	**Allowance:**	**105 m**
		1000 dia	204	**Allowance:**	**206 m**
		1200 dia	0	**Allowance:**	**0 m**
		1500 dia	4	**Allowance:**	**5 m**
			Total		**357 m**
	18.8 Precast reinforced Box Culvert				
	(1) Ben Nghe Cana;				(m)
		1200 x 1200	0	**Allowance:**	**0 m**
		1500 x 1500	25.2	**Allowance:**	**26 m**
		1600 x 2000	6	**Allowance:**	**7 m**
		1800 x 2000	6	**Allowance:**	**7 m**
		2000 x 2000	14.5	**Allowance:**	**15 m**
		2000 x 2000 x 2	8.5	**Allowance:**	**9 m**
		2800 x 2400	0	**Allowance:**	**0 m**
		3000 x 1500	26.4	**Allowance:**	**27 m**
			Total		**91 m**
	(2) Tau Hu Canal				(m)
		1000 x 1000	5	**Allowance:**	**6 m**
		1200 x 1200	15	**Allowance:**	**16 m**
		1500 x 1500	11	**Allowance:**	**12 m**
		1600 x 2000	0	**Allowance:**	**0 m**
		1800 x 2000	0	**Allowance:**	**0 m**
		2000 x 2000	0	**Allowance:**	**0 m**
		2000 x 2000 x 2	0	**Allowance:**	**0 m**
		2800 x 2400	6.3	**Allowance:**	**7 m**
		3000 x 1500	0	**Allowance:**	**0 m**
			Total		**357 m**
	18.8 Deformed Reinforcing Bars				
		(1) Ben Nghe Canal	28 Outlets: 243.17m3 x 65kg/m3 =		15,806.05
				Allowance: 3%	**16,280 kg**
		(2) Tau Hu Canal	30 Outlets: 257.54m3 x 65kg/m3 =		16,740.10
				Allowance: 3%	**17,240 kg**
				Total	32,546.15
				Allowance: 3%	**33,520 kg**
19 Landscape Work					
	19.1 Excavation				(m3)
		(1) Ben Nge Canal			
		Left Bank	0.80W x 0.50H x 2,909.62L =		1,163.85
		Right Bank	0.80W x 0.50H x 2,785.63L =		1,114.25
				Sub-total	2,278.10
				Alloance: 5%	**2,390 m3**
		(2) Tau Hu Canal			
		Left Bank	0.80W x 0.50H x 3,999.07L =		1599.63
		Right Bank	0.80W x 0.50H x 3,927.16L =		1570.86
				Sub-total	3,170.49
				Alloance: 5%	**3,330 m3**
	19.2 Sandy Soil Backfill				(m3)
		(1) Ben Nge Canal			
		Left Bank	(0.80x0.50 - 0.20x0.30-0.20x0.40)x2,909.62 =		756.50
		Right Bank	(0.80x0.50 - 0.20x0.30-0.20x0.40)x2,785.63 =		724.26
				Sub-total	1,480.76
				Alloance: 5%	**1,550 m3**

TABLE A.1 (9/12) WORK QUANTITIES OF TAU HU - BEN NGHE CANAL IMPROVEMENT

Item	Calculation	Quantity
(2) Tau Hu Canal		
Left Bank	(0.80x0.50 - 0.20x0.30-0.20x0.40)x3,999.07 =	1039.76
Right Bank	(0.80x0.50 - 0.20x0.30-0.20x0.40)x3,927.16 =	1021.06
	Sub-total	2,060.82
	Alloance: 5%	**2,160 m3**
19.3 Agriculture Soil Filling		(m3)
(1) Ben Nge Canal		
Left Bank	72modulas x 10.36m3/modulas =	745.92
Right Bank	70modulas x 10.36m3/modulas =	725.20
	Sub-total	1,471.12
	Alloance: 3%	**1,520 m3**
(2) Tau Hu Canal		
Left Bank	100modulas x 10.36m3/modulas =	1,036.00
Right Bank	98modulas x 10.36m3/modulas =	1,015.28
	Sub-total	2,051.28
	Alloance: 3%	**2,110 m3**
19.4 Curb		(m3)
(1) Ben Nghe Canal		
Planting Bed (Left Bank)	72modulas x 3.808m3/modulas =	274.18
Planting Bed (Right Bank)	70modulas x 3.808m3/modulas =	266.56
O/M Space (Left Bank)	0.13m3/m x 2,909.62m =	378.25
O/M Space (Right Bank)	0.13m3/m x 2,785.63m =	362.13
	Total	1,281.12
	Allowance:3%	**1,320 m3**
(2) Tau Hu Canal		
Planting Bed (Left Bank)	100modulas x 3.808m3/modulas =	380.80
Planting Bed (Right Bank)	98modulas x 3.808m3/modulas =	373.18
O/M Space (Left Bank)	0.13m3/m x 3,997.07m =	519.62
O/M Space (Right Bank)	0.13m3/m x 3,927.16m =	510.53
	Total	1,784.13
	Allowance:3%	**1,840 m3**
19.5 Deformed Reinforcing Bars		
D9: L = 0.60 + 1.0x3 = 3.6m/	W = 0.499kg/m x 3.60m = 1.7964kg/m	(kg)
(1) Ben Nge Canal		
Left Bank	1.7964kg/m x 2,909.62m =	5,226.84
Right Bank	1.7964kg/m x 2,785.63m =	5,004.11
	Sub-total	10,230.95
	Alloance: 5%	**10,540 kg**
(2) Tau Hu Canal		
Left Bank	1.7964kg/m x 3,997.07m =	7,180.33
Right Bank	1.7964kg/m x 3,927.16m =	7,054.75
	Sub-total	14,235.08
	Alloance: 5%	**14,660 kg**
19.6 Leveling Concrete		(m3)
(1) Ben Nghe Canal		
Planting Bed (Left Bank)	72modulas x 0.952m3/modulas =	68.54
Planting Bed (Right Bank)	70modulas x 0.952m3/modulas =	66.64
O/M Space (Left Bank)	0.02m3/m x 2,909.62m =	58.19
O/M Space (Right Bank)	0.02m3/m x 2,785.63m =	55.71
	Total	249.08
	Allowance:3%	**260 m3**
(2) Tau Hu Canal		
Planting Bed (Left Bank)	100modulas x 0.952m3/modulas =	95.20
Planting Bed (Right Bank)	98modulas x 0.952m3/modulas =	93.30
O/M Space (Left Bank)	0.02m3/m x 3,997.07m =	79.98
O/M Space (Right Bank)	0.02m3/m x 3,927.16m =	78.54
	Total	347.02
	Allowance:3%	**360 m3**

TABLE A.1 (10/12) WORK QUANTITIES OF TAU HU - BEN NGHE CANAL IMPROVEMENT

Item			Calculation	Quantity
19.7 Sand Bedding				(m3)
	(1) Ben Nge Canal			
		Left Bank	8,879.3m2 x 0.10m =	887.93
		Right Bank	8,468.6m3 x 0.10m =	846.86
			Sub-total	1,734.79
			Alloance: 3%	**1,790 m3**
	(2) Tau Hu Canal			
		Left Bank	12,164.9m2 x 0.10m =	1,216.49
		Right Bank	10,634.9m2 x 0.10m =	1,063.49
			Sub-total	2,279.98
			Alloance: 3%	**2,350 m3**
19.8 Precast Concrete Block				(m2)
	(1) Ben Nge Canal			
		Left Bank	11,056.6 - 72 x 1.8 x (1.8 x 4 + 9.6) =	8,879.30
		Right Bank	10,585.4 - 70 x 1.8 x (1.8 x 4 + 9.6) =	8,468.60
			Sub-total	17,347.90
			Alloance: 1%	**17,520 m2**
	(2) Tau Hu Canal			
		Left Bank	15,188.9 - 100 x 1.8 x (1.8 x 4 + 9.6) =	12,164.90
		Right Bank	13,598.4 - 98 x 1.8 x (1.8 x 4 + 9.6) =	10,634.90
			Sub-total	22,799.80
			Alloance: 1%	**23,030 m2**
19.9 Gravel Bedding				(m3)
	(1) Ben Nghe Canal			
		Planting Bed (Left Bank)	72modulas x 1.904m3/modulas =	137.09
		Planting Bed (Right Bank)	70modulas x 1.904m3/modulas =	133.28
		O/M Space (Left Bank)	0.04m3/m x 2,909.62m =	116.38
		O/M Space (Right Bank)	0.04m3/m x 2,785.63m =	111.43
			Total	498.18
			Allowance:3%	**510 m3**
	(2) Tau Hu Canal			
		Planting Bed (Left Bank)	100modulas x 1.904m3/modulas =	190.40
		Planting Bed (Right Bank)	98modulas x 1.904m3/modulas =	186.59
		O/M Space (Left Bank)	0.04m3/m x 3,997.07m =	159.96
		O/M Space (Right Bank)	0.04m3/m x 3,927.16m =	157.09
			Total	694.04
			Allowance:3%	**715 m3**
19.10 Sodding				(m3)
	(1) Ben Nge Canal			
		Left Bank	72modulas x 4.74m2/modulas =	341.28
		Right Bank	70modulas x 4.74m2/modulas =	331.80
			Sub-total	673.08
			Alloance: 1%	**680 m2**
	(2) Tau Hu Canal			
		Left Bank	100modulas x 4.74m2/modulas =	474.00
		Right Bank	98modulas x 4.74m2/modulas =	464.52
			Sub-total	938.52
			Alloance: 1%	**950 m2**
19.11 Flowering Shrubs and Ground Cover Plant				(m2)
	(1) Ben Nge Canal			
		Left Bank	72modulas x 11.0m2/modulas =	792.00
		Right Bank	70modulas x 11.0m2/modulas =	770.00
			Sub-total	1,562.00
			Alloance: 1%	**1,580 m2**
	(2) Tau Hu Canal			
		Left Bank	100modulas x 11.0m2/modulas =	1,100.00
		Right Bank	98modulas x 11.0m2/modulas =	1,078.00
			Sub-total	2,178.00
			Alloance: 1%	**2,200 m2**

TABLE A.1 (11/12) WORK QUANTITIES OF TAU HU - BEN NGHE CANAL IMPROVEMENT

Item	Calculation	Quantity
19.12 Tree		(No.)
(1) Ben Nge Canal		
Left Bank	72modulas x 5 Nos./modulas =	360.00
Right Bank	70modulas x 5 Nos./modulas =	350.00
	Sub-total	710.00
	Alloance: 0%	**710 No.**
(2) Tau Hu Canal		
Left Bank	100modulas x 5Nos./modulas =	500.00
Right Bank	98modulas x 5Nos./modulas =	490.00
	Sub-total	990.00
	Alloance: 0%	**990 No.**
20. Electrical Work		
20.1 Installation of Power receiving Pole		(No.)
(1) Ben Nghe Canal		
Left Bank		1
Right Bank		1
	Sub-total	2
	Allowance: 0%	**2 No.**
(2) Tau Hu Canal		
Left Bank		1
Right Bank		1
	Sub-total	2
	Allowance: 0%	**2 No.**
20.2 Installation of Lighting Pole		(No.)
(1) Ben Nghe Canal		
Left Bank	N = (1 + 2,910m / 40.0m) =	74
Right Bank	N = (1 + 2,800m / 40.0m) =	71
	Sub-total	145
	Allowance: 0%	**145 No.**
(2) Tau Hu Canal		
Left Bank	N = (1 + 4,000m / 40.0m) =	101
Right Bank	N = (1 + 3,930m / 40.0m) =	99
	Sub-total	200
	Allowance: 0%	**200 No.**
20.3 Installation of Cable		(m)
(1) Ben Nghe Canal		
Left Bank		2,910.00
Right Bank		2,800.00
	Sub-total	5,710.00
	Allowance: 3%	**5,880 m**
(2) Tau Hu Canal		
Left Bank		4,000.00
Right Bank		3,930.00
	Sub-total	7,930.00
	Allowance: 0%	**8,170 m**
20.4 Cable Connection Work by Power Company		
(1) Number of connection site		**4 sites**
(2) Main Equipment		
	Transformer	**4 sets**
	Metering Cubicle (LV Panel)	**4 sets**
	Cable	**100m x 4 sites = 400 m**
21. Survey		
21.1 Topographic Survey		
(1) Ben Nghe Canal		
Left Bank (North Bank)	60m x 3,160m =	189,600.0
Right Bank (South Bank)	40m x 3160m =	126,400.0
	Sub-total	316,000.0

TABLE A.1 (12/12) WORK QUANTITIES OF TAU HU - BEN NGHE CANAL IMPROVEMENT

Item	Calculation	Quantity
(2) Tau Hu Canal		
Left Bank (North Bank)	40m x 4,140m =	165,600.0
Right Bank (South Bank)	30m x 4,140m =	124,200.0
	Sub-total	289,800.0
	Total	605,800.0
	Allowance: 8%	**650,000 m2**
21.2 Cross Section Survey		
(1) Ben Nghe Canal	N = (1+ 3,160m/ 25m) =	128
(2) Tau Hu Canal	N = (1 + 4,140m/25m) =	167
	Total	295
	Allowance: 2%	**300 No.**
22. Soil Investigation		
22.1 Boring		(m)
(1) Ben Nghe Canal	5 places x 10 m/place =	50.0
(2) Tau Hu Canal	5 places x 10 m/place =	50.0
	Total	**100.0**
22.2 Laboratory Test		(Nos)
(1) Ben Nghe Canal	5 places x 3 nos./place =	15.0
(2) Tau Hu Canal	5 places x 3 nos./place =	15.0
	Total	**30.0**
23. Test Pit		
23.1 Number of Site		(place)
(1) Ben Nghe Canal	3.1 km x 7 place/km =	21.0
(2) Tau Hu Canal	4.1 km x 7 place/km =	29.0
	Total	**50.0**
23.2 Excavation Volume		(m3)
(1) Ben Nghe Canal	0.80m x 2.0m x 1.5m x 21 places =	50.40
(2) Tau Hu Canal	0.80m x 2.0m x 1.5m x 29 places =	69.60
	Total	**120.0**
23.3 Temporary Pavement		
(1) Ben Nghe Canal	0.80m x 2.0m x 21 places =	33.60
(2) Tau Hu Canal	0.80m x 2.0m x 21 places =	46.40
	Total	**80.0**

TABLE A.2 SUMMARY OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL

Canal	Revetment	Section	Excavation Volume (m^3)					Filling Volume (m^3)				
			East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
Ben Nghe	Type A	No.0 - SP11	323	35,135	250,953	36,333	322,744	27,943	25,153	0	37,935	91,031
		Allowance : 5%	**339**	**36,892**	**263,501**	**38,150**	**338,881**	**29,340**	**26,411**	**0**	**39,832**	**95,583**
	Type B	No.0 - SP11	0	0	0	0	0	0	0	0	0	0
		Allowance : 5%	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Sub-total	No.0 - SP11	662	35,135	250,953	36,333	322,744	27,943	25,153	0	37,935	91,031
		Allowance : 5%	**695**	**36,892**	**263,501**	**38,150**	**338,881**	**29,340**	**26,411**	**0**	**39,832**	**95,583**
Tau Hu	Type A	SP11 - No.117	21	26,017	169,116	29,242	224,396	26,256	27,578	0	46,003	99,837
		Allowance : 5%	22	27,318	177,572	30,704	235,616	27,569	28,957	0	48,303	104,829
	Type B	No.117 - IP24	63	22,470	105,469	19,828	147,830	841	2,833	0	3,187	6,861
		Allowance : 5%	66	23,594	110,742	20,819	155,222	883	2,975	0	3,346	7,204
	Sub-total	SP11 - IP24	84	48,487	274,585	49,070	372,226	27,097	30,411	0	49,190	106,698
		Allowance : 5%	**88**	**50,911**	**288,314**	**51,524**	**390,837**	**28,452**	**31,932**	**0**	**51,650**	**112,033**
Total		No.0 - IP24	746	83,622	525,538	85,403	694,970	55,040	55,564	0	87,125	197,729
		Allowance : 5%	**783**	**87,803**	**551,815**	**89,673**	**729,719**	**57,792**	**58,342**	**0**	**91,481**	**207,615**

Note: Bold figures include safety allowance of 5% for the estimated excavation and filling volume.

TABLE A.3 (1/12) BRAKDOWN OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Excavation									
				Area					Volume				
				East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
				EWHA	LBA	CA	RBA	TEA	EWHV	LBV	CV	RBV	TDV
		(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Ben Nghe	No.0 (BP)	0.00	0.00	0.00	0.00	82.70	0.00	82.70	0.00	0.00	0.00	0.00	0.0
	No.1	50.00	50.00	0.00	0.00	82.61	0.00	82.61	0.00	0.00	4,132.80	0.00	4,132.8
	No.2	50.00	100.00	0.00	0.00	64.57	0.00	64.57	0.00	0.00	3,679.38	0.00	3,679.4
	No.3	50.00	150.00	0.00	0.00	69.31	0.00	69.31	0.00	0.00	3,346.83	0.00	3,346.8
	No.4	50.00	200.00	2.47	25.15	139.38	8.24	175.24	61.63	628.68	5,217.20	206.08	6,113.6
	No.5	50.00	250.00	0.00	12.29	129.59	14.99	156.87	61.63	935.93	6,724.20	580.75	8,302.5
	No.6	50.00	300.00	0.00	8.61	105.53	16.75	130.89	0.00	522.45	5,877.83	793.53	7,193.8
	No.7	50.00	350.00	0.00	5.58	105.25	25.25	136.08	0.00	354.60	5,269.48	1,050.15	6,674.2
	No.8	50.00	400.00	0.00	3.74	106.92	29.53	140.18	0.00	232.80	5,304.23	1,369.58	6,906.6
	No.9	50.00	450.00	0.00	2.69	109.24	23.57	135.50	0.00	160.70	5,403.93	1,327.50	6,892.1
	No.10	50.00	500.00	0.00	19.60	99.89	12.00	131.49	0.00	557.40	5,228.35	889.18	6,674.9
	No.11	50.00	550.00	0.00	9.90	104.30	21.92	136.12	0.00	737.50	5,104.70	848.03	6,690.2
	No.12	50.00	600.00	0.00	7.33	116.27	28.99	152.59	0.00	430.68	5,514.23	1,272.80	7,217.7
	No.13	50.00	650.00	0.00	7.53	86.53	23.72	117.77	0.00	371.40	5,070.03	1,317.60	6,759.0
	No.14	50.00	700.00	0.00	9.15	87.48	17.27	113.90	0.00	416.80	4,350.13	1,024.68	5,791.6
	No.15	50.00	750.00	0.00	8.35	81.87	20.78	111.00	0.00	437.33	4,233.78	951.20	5,622.3
	No.16	50.00	800.00	4.00	24.73	89.94	5.16	123.84	100.08	826.98	4,295.45	648.45	5,871.0
	No.17	50.00	850.00	0.00	6.05	77.07	18.06	101.17	100.08	769.53	4,175.30	580.45	5,625.4
	No.18	50.00	900.00	0.00	10.77	84.06	9.96	104.79	0.00	420.50	4,028.23	700.38	5,149.1
	No.19	50.00	950.00	0.00	11.73	80.27	15.21	107.21	0.00	562.65	4,108.28	629.10	5,300.0
	No.20	50.00	1,000.00	0.00	2.87	82.19	17.34	102.41	0.00	365.10	4,061.55	813.73	5,240.4
	No.21	50.00	1,050.00	0.00	1.85	84.49	21.77	108.11	0.00	118.05	4,167.00	977.80	5,262.9
	No.22	50.00	1,100.00	0.00	1.75	81.47	21.64	104.86	0.00	90.03	4,148.93	1,085.20	5,324.2
	No.23	50.00	1,150.00	0.00	2.01	70.08	17.55	89.63	0.00	93.93	3,788.83	979.63	4,862.3
	No.24	50.00	1,200.00	0.00	3.73	79.34	22.06	105.13	0.00	143.35	3,735.63	990.15	4,869.0
	No.25	50.00	1,250.00	0.00	12.17	82.51	19.67	114.36	0.00	397.45	4,046.35	1,043.33	5,487.1
	No.26	50.00	1,300.00	0.00	9.94	77.30	10.71	97.95	0.00	552.78	3,995.35	759.63	5,307.8

TABLE A.3 (2/12) BRAKDOWN OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Excavation									
				Area					Volume				
				East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
				EWHA	LBA	CA	RBA	TEA	EWHV	LBV	CV	RBV	TDV
		(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Ben Nghe	No.27	50.00	1,350.00	0.00	9.72	75.76	12.46	97.93	0.00	491.40	3,826.43	579.33	4,897.1
	No.28	50.00	1,400.00	0.00	9.86	79.31	13.97	103.14	0.00	489.43	3,876.70	660.65	5,026.8
	No.29	50.00	1,450.00	0.00	10.32	83.06	15.80	109.17	0.00	504.43	4,059.20	744.15	5,307.8
	No.30	50.00	1,500.00	0.00	8.47	78.04	14.20	100.71	0.00	469.78	4,027.38	750.03	5,247.2
	No.31	50.00	1,550.00	0.00	8.33	82.86	15.85	107.04	0.00	420.08	4,022.40	751.25	5,193.7
	No.32	50.00	1,600.00	0.00	22.21	84.17	15.63	122.01	0.00	763.35	4,175.78	787.08	5,726.2
	No.33	50.00	1,650.00	0.00	26.75	105.21	17.96	149.92	0.00	1,223.95	4,734.58	839.78	6,798.3
	No.34	50.00	1,700.00	0.00	7.19	101.50	26.74	135.43	0.00	848.48	5,167.75	1,117.50	7,133.7
	No.35	50.00	1,750.00	0.00	22.28	90.11	7.97	120.35	0.00	736.53	4,790.23	867.70	6,394.5
	No.36	50.00	1,800.00	0.00	24.34	94.49	6.06	124.89	0.00	1,165.43	4,615.00	350.60	6,131.0
	No.37	50.00	1,850.00	0.00	24.43	91.78	5.61	121.82	0.00	1,219.40	4,656.70	291.65	6,167.8
	No.38	50.00	1,900.00	0.00	25.76	94.61	7.96	128.33	0.00	1,254.90	4,659.68	339.05	6,253.6
	No.39	50.00	1,950.00	0.00	27.17	97.97	6.62	131.75	0.00	1,323.30	4,814.40	364.30	6,502.0
	No.40	50.00	2,000.00	0.00	21.02	82.14	5.76	108.92	0.00	1,204.68	4,502.70	309.43	6,016.8
	No.41	50.00	2,050.00	0.00	14.64	80.48	6.19	101.31	0.00	891.38	4,065.68	298.78	5,255.8
	No.42	50.00	2,100.00	0.00	14.48	72.63	6.82	93.93	0.00	727.98	3,827.80	325.28	4,881.1
	No.43	50.00	2,150.00	0.00	5.07	70.62	10.07	85.77	0.00	488.78	3,581.28	422.33	4,492.4
	No.44	50.00	2,200.00	0.00	7.38	76.76	11.60	95.74	0.00	311.25	3,684.65	541.70	4,537.6
	No.45	50.00	2,250.00	0.00	13.87	87.03	13.95	114.85	0.00	531.18	4,094.85	638.68	5,264.7
	No.46	50.00	2,300.00	0.00	24.49	85.35	9.55	119.39	0.00	959.03	4,309.53	587.48	5,856.0
	No.47	50.00	2,350.00	0.00	26.55	75.40	6.52	108.48	0.00	1,276.20	4,018.85	401.78	5,696.8
	No.48	50.00	2,400.00	0.00	10.37	68.62	5.31	84.30	0.00	923.03	3,600.65	295.83	4,819.5
	No.49	50.00	2,450.00	0.00	9.92	73.13	6.27	89.32	0.00	507.23	3,543.78	289.40	4,340.4
	No.50	50.00	2,500.00	0.00	11.32	85.27	10.17	106.76	0.00	531.05	3,960.00	410.90	4,902.0
	No.51	50.00	2,550.00	0.00	13.11	68.09	7.96	89.16	0.00	610.80	3,833.95	453.18	4,897.9
	No.52	50.00	2,600.00	0.00	14.79	68.22	2.53	85.54	0.00	697.60	3,407.65	262.23	4,367.5
	No.53	50.00	2,650.00	0.00	16.26	68.72	0.00	84.98	0.00	776.25	3,423.48	63.28	4,263.0

TABLE A.3 (3/12) BRAKDOWN OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Excavation									
				Area					Volume				
				East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
				EWHA	LBA	CA	RBA	TEA	EWHV	LBV	CV	RBV	TDV
		(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Ben Nghe	No.54	50.00	2,700.00	0.00	19.09	65.82	7.86	92.77	0.00	883.65	3,363.43	196.58	4,443.7
	No.55	50.00	2,750.00	0.00	3.51	61.14	9.19	73.84	0.00	564.95	3,174.00	426.33	4,165.3
	No.56	50.00	2,800.00	0.00	3.75	58.46	8.65	70.86	0.00	181.40	2,990.13	446.00	3,617.5
	No.57	50.00	2,850.00	0.00	3.79	64.68	9.31	77.78	0.00	188.43	3,078.65	448.95	3,716.0
	No.58	50.00	2,900.00	0.00	3.16	48.89	0.00	52.05	0.00	173.70	2,839.43	232.70	3,245.8
	No.59	50.00	2,950.00	0.00	7.33	29.38	0.00	36.71	0.00	262.08	1,956.90	0.00	2,219.0
	No.60	50.00	3,000.00	0.00	3.57	26.64	0.00	30.21	0.00	272.35	1,400.65	0.00	1,673.0
	No.61	50.00	3,050.00	0.00	0.00	1.12	0.00	1.12	0.00	89.20	694.13	0.00	783.3
	No.62	50.00	3,100.00	0.00	20.76	16.27	0.00	37.03	0.00	519.10	434.73	0.00	953.8
	No.63	50.00	3,150.00	0.00	0.26	10.45	0.00	10.71	0.00	525.58	667.95	0.00	1,193.5
	SP11(EP,BP)	7.42	3,157.42	0.00	0.12	6.85	0.00	6.98	0.00	1.42	64.20	0.00	65.6
	Sub-total			**6.47**	**702.93**	**5,071.21**	**726.65**	**6,507.26**	**323.4**	**35,135.2**	**250,953.1**	**36,332.7**	**322,744.2**
Tau Hu (Down-stream)	SP11 (EP, BP)	0.00	3,157.42	0.00	0.12	6.85	0.00	6.98	0.00	0.00	0.00	0.00	0.0
	No.64	42.58	3,200.00	0.00	0.12	6.85	0.00	6.98	0.00	5.28	291.84	0.00	297.1
	No.65	50.00	3,250.00	0.00	0.66	12.74	0.00	13.40	0.00	19.60	489.83	0.00	509.4
	No.66	50.00	3,300.00	0.00	0.00	4.86	0.00	4.86	0.00	16.50	440.03	0.00	456.5
	No.67	50.00	3,350.00	0.00	1.06	35.50	5.86	42.41	0.00	26.38	1,009.00	146.48	1,181.9
	No.68	50.00	3,400.00	0.00	3.41	43.50	5.68	52.59	0.00	111.70	1,975.00	288.45	2,375.2
	No.69	50.00	3,450.00	0.00	3.96	46.14	6.81	56.91	0.00	184.35	2,241.03	312.33	2,737.7
	No.70	50.00	3,500.00	0.00	1.78	41.49	12.12	55.39	0.00	143.63	2,190.83	473.25	2,807.7
	No.71	50.00	3,550.00	0.00	1.67	39.05	8.95	49.67	0.00	86.45	2,013.50	526.53	2,626.5
	No.72	50.00	3,600.00	0.00	1.21	44.72	13.02	58.95	0.00	72.20	2,094.13	549.00	2,715.3
	No.73	50.00	3,650.00	0.41	10.23	43.76	13.41	67.81	10.33	286.00	2,211.95	660.70	3,169.0
	No.74	50.00	3,700.00	0.00	9.76	40.74	14.44	64.94	10.33	499.55	2,112.48	696.35	3,318.7
	No.75	50.00	3,750.00	0.00	19.64	46.44	6.06	72.14	0.00	734.88	2,179.53	512.40	3,426.8
	No.76	50.00	3,800.00	0.00	14.59	39.77	8.31	62.67	0.00	855.68	2,155.35	359.18	3,370.2
	No.77	50.00	3,850.00	0.00	10.76	39.67	10.83	61.26	0.00	633.65	1,986.10	478.50	3,098.3

TABLE A.3 (4/12) BRAKDOWN OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Excavation									
				Area					Volume				
				East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
				EWHA	LBA	CA	RBA	TEA	EWHV	LBV	CV	RBV	TDV
		(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Tau Hu (Down-stream)	No.78	50.00	3,900.00	0.00	16.90	46.79	12.69	76.38	0.00	691.35	2,161.60	587.85	3,440.8
	No.79	50.00	3,950.00	0.00	16.98	50.14	16.44	83.56	0.00	846.83	2,423.38	728.08	3,998.3
	No.80	50.00	4,000.00	0.00	0.89	57.81	23.91	82.61	0.00	446.60	2,698.75	1,008.70	4,154.1
	No.81	50.00	4,050.00	0.00	2.01	120.99	27.94	150.94	0.00	72.38	4,469.95	1,296.38	5,838.7
	No.82	50.00	4,100.00	0.00	0.07	94.09	27.07	121.22	0.00	51.93	5,377.00	1,375.23	6,804.2
	No.83	50.00	4,150.00	0.00	0.89	99.54	28.50	128.93	0.00	23.90	4,840.85	1,389.10	6,253.9
	No.84	50.00	4,200.00	0.00	1.36	52.68	19.46	73.50	0.00	56.28	3,805.50	1,198.98	5,060.8
	No.85	50.00	4,250.00	0.00	17.99	39.29	1.22	58.49	0.00	483.73	2,299.05	516.98	3,299.8
	No.86	50.00	4,300.00	0.00	27.49	105.88	0.08	133.45	0.00	1,136.83	3,629.18	32.58	4,798.6
	No.87	50.00	4,350.00	0.00	29.51	111.15	0.86	141.51	0.00	1,424.83	5,425.78	23.55	6,874.2
	No.88	50.00	4,400.00	0.00	29.04	85.04	1.25	115.33	0.00	1,463.68	4,904.83	52.63	6,421.1
	No.89	50.00	4,450.00	0.00	32.26	68.51	0.16	100.93	0.00	1,532.43	3,838.80	35.20	5,406.4
	No.90	50.00	4,500.00	0.00	30.65	65.77	0.87	97.28	0.00	1,572.53	3,356.88	25.70	4,955.1
	No.91	50.00	4,550.00	0.00	7.60	46.94	6.77	61.31	0.00	956.08	2,817.53	191.03	3,964.6
	No.92	50.00	4,600.00	0.00	6.86	51.55	9.34	67.74	0.00	361.33	2,462.03	402.90	3,226.3
	No.93	50.00	4,650.00	0.00	5.55	57.23	13.58	76.36	0.00	310.10	2,719.40	573.10	3,602.6
	No.94	50.00	4,700.00	0.00	5.79	53.13	6.52	65.44	0.00	283.50	2,758.95	502.50	3,545.0
	No.95	50.00	4,750.00	0.00	4.24	54.74	7.70	66.67	0.00	250.68	2,696.65	355.43	3,302.8
	No.96	50.00	4,800.00	0.00	4.18	68.28	11.06	83.51	0.00	210.33	3,075.38	468.93	3,754.6
	No.97	50.00	4,850.00	0.00	3.55	83.36	15.03	101.93	0.00	193.13	3,790.88	652.08	4,636.1
	No.98	50.00	4,900.00	0.00	5.13	82.86	21.47	109.46	0.00	217.00	4,155.35	912.28	5,284.6
	No.99	50.00	4,950.00	0.00	4.12	82.46	20.84	107.42	0.00	231.33	4,132.90	1,057.70	5,421.9
	No.100	50.00	5,000.00	0.00	4.37	74.67	10.89	89.94	0.00	212.35	3,928.28	793.30	4,933.9
	No.101	50.00	5,050.00	0.00	7.40	73.71	3.85	84.95	0.00	294.25	3,709.53	368.45	4,372.2
	No.102	50.00	5,100.00	0.00	26.42	97.12	10.52	134.06	0.00	845.48	4,270.85	359.10	5,475.4
	No.103	50.00	5,150.00	0.00	12.86	92.59	8.16	113.62	0.00	982.18	4,742.90	467.00	6,192.1
	No.104	50.00	5,200.00	0.00	12.83	97.85	9.59	120.27	0.00	642.40	4,761.05	443.80	5,847.3

TABLE A.3 (5/12) BRAKDOWN OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Excavation									
				Area					Volume				
				East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
				EWHA	LBA	CA	RBA	TEA	EWHV	LBV	CV	RBV	TDV
		(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Tau Hu (Down-stream)	No.105	50.00	5,250.00	0.00	3.27	95.71	9.08	108.06	0.00	402.58	4,838.98	466.68	5,708.2
	No.106	50.00	5,300.00	0.00	7.57	92.50	7.87	107.94	0.00	271.13	4,705.10	423.63	5,399.9
	No.107	50.00	5,350.00	0.00	7.45	79.27	9.69	96.41	0.00	375.53	4,294.20	438.90	5,108.6
	No.108	50.00	5,400.00	0.00	7.73	64.26	10.51	82.49	0.00	379.35	3,588.28	504.93	4,472.6
	No.109	50.00	5,450.00	0.00	10.06	69.00	19.04	98.11	0.00	444.70	3,331.50	738.78	4,515.0
	No.110	50.00	5,500.00	0.00	5.43	76.99	29.13	111.54	0.00	387.23	3,649.75	1,204.28	5,241.3
	No.111	50.00	5,550.00	0.00	5.92	71.98	24.10	102.00	0.00	283.73	3,724.10	1,330.75	5,338.6
	No.112	50.00	5,600.00	0.00	10.54	67.61	21.48	99.63	0.00	411.60	3,489.53	1,139.60	5,040.7
	No.113	50.00	5,650.00	0.00	13.67	60.60	12.78	87.05	0.00	605.35	3,205.08	856.58	4,667.0
	No.114	50.00	5,700.00	0.00	14.33	60.73	3.88	78.93	0.00	699.90	3,033.13	416.53	4,149.6
	No.115	50.00	5,750.00	0.00	18.25	60.24	4.33	82.81	0.00	814.25	3,024.15	205.15	4,043.6
	No.116	50.00	5,800.00	0.00	13.24	54.01	7.85	75.10	0.00	787.18	2,856.20	304.43	3,947.8
	No.117	50.00	5,850.00	0.00	14.19	55.28	7.74	77.20	0.00	685.70	2,732.10	389.83	3,807.6
	No.118	50.00	5,900.00	0.00	13.85	66.74	6.82	87.41	0.00	700.90	3,050.48	364.05	4,115.4
	No.119	50.00	5,950.00	0.00	22.64	71.77	5.83	100.23	0.00	912.15	3,462.80	316.13	4,691.1
	No.120	50.00	6,000.00	0.00	23.13	79.51	4.57	107.21	0.00	1,144.08	3,781.88	259.98	5,185.9
	No.121	50.00	6,050.00	0.00	14.07	75.64	6.90	96.61	0.00	929.88	3,878.58	286.88	5,095.3
	No.122	50.00	6,100.00	0.62	24.45	91.32	20.45	136.85	15.53	962.95	4,174.00	683.90	5,836.4
	No.123	50.00	6,150.00	0.65	12.71	80.67	18.47	112.50	31.78	928.95	4,299.80	973.20	6,233.7
	No.124	50.00	6,200.00	0.00	9.76	84.05	19.33	113.13	16.25	561.58	4,117.98	945.05	5,640.9
	No.125	50.00	6,250.00	0.00	9.78	82.39	20.71	112.88	0.00	488.45	4,161.13	1,000.88	5,650.5
	No.126	50.00	6,300.00	0.00	10.88	77.16	19.24	107.28	0.00	516.50	3,988.88	998.68	5,504.1
	No.127	50.00	6,350.00	0.00	11.21	81.75	17.46	110.42	0.00	552.08	3,972.83	917.50	5,442.4
	No.128	50.00	6,400.00	0.00	11.41	80.75	18.30	110.47	0.00	565.45	4,062.60	894.08	5,522.1
	No.129	50.00	6,450.00	0.00	13.43	79.82	16.30	109.55	0.00	620.95	4,014.28	865.10	5,500.3
	No.130	50.00	6,500.00	0.00	12.60	75.44	14.88	102.92	0.00	650.60	3,881.58	779.45	5,311.6
	No.131	50.00	6,550.00	0.00	13.56	77.10	14.77	105.42	0.00	653.83	3,813.60	741.10	5,208.5

TABLE A.3 (6/12) BRAKDOWN OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Excavation									
				Area					Volume				
				East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
				EWHA	LBA	CA	RBA	TEA	EWHV	LBV	CV	RBV	TDV
		(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Tau Hu (Down-stream)	No.132	50.00	6,600.00	0.00	14.45	81.64	16.19	112.28	0.00	700.10	3,968.50	773.88	5,442.5
	No.133	50.00	6,650.00	0.00	14.90	81.29	16.78	112.97	0.00	733.68	4,073.28	824.25	5,631.2
	No.134	50.00	6,700.00	0.00	18.59	76.87	11.63	107.09	0.00	837.18	3,954.10	710.25	5,501.5
	No.135	50.00	6,750.00	0.00	18.63	78.48	15.92	113.03	0.00	930.58	3,883.70	688.63	5,502.9
	No.136	50.00	6,800.00	0.00	19.33	71.88	16.41	107.63	0.00	949.18	3,758.98	808.28	5,516.4
	No.137	50.00	6,850.00	0.00	19.37	74.16	16.44	109.97	0.00	967.63	3,651.08	821.33	5,440.0
	No.138	50.00	6,900.00	0.00	18.07	66.82	15.07	99.96	0.00	935.98	3,524.48	787.75	5,248.2
	No.139	50.00	6,950.00	0.00	17.07	68.40	15.73	101.21	0.00	878.48	3,380.58	770.08	5,029.1
	No.140	50.00	7,000.00	0.00	14.83	65.40	15.27	95.50	0.00	797.60	3,345.10	774.98	4,917.7
	No.141	50.00	7,050.00	0.00	21.64	70.78	15.34	107.76	0.00	911.80	3,404.43	765.15	5,081.4
	No.142	50.00	7,100.00	0.00	18.11	70.89	14.77	103.77	0.00	993.78	3,541.65	752.65	5,288.1
	No.143	50.00	7,150.00	0.00	15.80	64.08	10.97	90.84	0.00	847.75	3,374.13	643.33	4,865.2
	No.144	50.00	7,200.00	0.00	17.61	70.38	6.18	94.18	0.00	835.28	3,361.38	428.75	4,625.4
	No.145	50.00	7,250.00	0.00	12.04	42.16	2.27	56.47	0.00	741.35	2,813.43	211.33	3,766.1
	IP24 (EP)	36.72	7,286.72	0.00	0.00	0.00	0.00	0.00	0.00	221.09	774.00	41.66	1,036.8
	Sub-total			**1.68**	**971.42**	**5,501.74**	**981.70**	**7,456.55**	**84.20**	**48,487.12**	**274,584.97**	**49,069.88**	**372,226.2**
Total				**8.15**	**1,674.35**	**10,572.95**	**1,708.35**	**13,963.80**	**407.60**	**83,622.37**	**525,538.10**	**85,402.58**	**694,970.3**

TABLE A.3 (7/12) BRAKDOWN OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Filling									
				Area					Volume				
				East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
				EWHA	LBA	CA	RBA	TFA	EWHPV	LBV	CV	RBV	TFV
		(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m3)	(m3)	(m3)	(m3)	(m^3)
Ben Nghe	No.0 (BP)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	No.1	50.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	No.2	50.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	No.3	50.00	150.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	No.4	50.00	200.00	0.00	0.00	0.00	14.63	14.63	0.00	0.00	0.00	365.63	365.6
	No.5	50.00	250.00	3.55	4.40	0.00	4.77	12.72	88.80	110.05	0.00	484.88	683.7
	No.6	50.00	300.00	10.00	9.95	0.00	6.92	26.87	338.73	358.83	0.00	292.25	989.8
	No.7	50.00	350.00	14.11	15.23	0.00	4.71	34.05	602.70	629.58	0.00	290.73	1,523.0
	No.8	50.00	400.00	9.56	16.67	0.00	0.00	26.22	591.65	797.43	0.00	117.73	1,506.8
	No.9	50.00	450.00	5.25	15.82	0.00	4.34	25.42	370.13	812.20	0.00	108.55	1,290.9
	No.10	50.00	500.00	0.16	1.20	0.00	9.19	10.54	135.25	425.45	0.00	338.28	899.0
	No.11	50.00	550.00	1.61	4.94	0.00	5.22	11.77	44.35	153.35	0.00	360.15	557.9
	No.12	50.00	600.00	12.18	11.02	0.00	3.85	27.05	344.80	399.08	0.00	226.65	970.5
	No.13	50.00	650.00	12.89	10.51	0.00	1.19	24.59	626.78	538.35	0.00	125.90	1,291.0
	No.14	50.00	700.00	27.21	11.53	0.00	3.97	42.71	1,002.58	551.00	0.00	128.95	1,682.5
	No.15	50.00	750.00	13.76	9.08	0.00	0.95	23.79	1,024.25	515.28	0.00	122.90	1,662.4
	No.16	50.00	800.00	0.00	1.07	0.00	36.62	37.70	344.00	253.83	0.00	939.20	1,537.0
	No.17	50.00	850.00	21.30	13.91	0.00	3.88	39.09	532.60	374.45	0.00	1,012.48	1,919.5
	No.18	50.00	900.00	9.39	8.23	0.00	12.55	30.17	767.38	553.35	0.00	410.63	1,731.4
	No.19	50.00	950.00	18.25	9.62	0.00	7.73	35.60	691.00	446.28	0.00	507.00	1,644.3
	No.20	50.00	1,000.00	24.22	16.18	0.00	5.66	46.06	1,061.80	645.05	0.00	334.65	2,041.5
	No.21	50.00	1,050.00	39.43	23.98	0.00	3.87	67.28	1,591.20	1,004.08	0.00	238.13	2,833.4
	No.22	50.00	1,100.00	20.89	19.90	0.00	3.37	44.16	1,507.90	1,097.03	0.00	181.00	2,785.9
	No.23	50.00	1,150.00	7.21	18.06	0.00	4.49	29.76	702.43	948.98	0.00	196.45	1,847.9
	No.24	50.00	1,200.00	23.15	17.89	0.00	1.94	42.98	758.95	898.90	0.00	160.65	1,818.5
	No.25	50.00	1,250.00	4.93	5.44	0.00	12.57	22.94	702.15	583.35	0.00	362.65	1,648.2
	No.26	50.00	1,300.00	2.30	7.10	0.00	16.18	25.58	180.78	313.45	0.00	718.80	1,213.0

TABLE A.3 (8/12) BRAKDOWN OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Filling									
				Area					Volume				
				East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
				EWHA	LBA	CA	RBA	TFA	EWHPV	LBV	CV	RBV	TFV
		(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m3)	(m3)	(m3)	(m3)	(m^3)
Ben Nghe	No.27	50.00	1,350.00	5.36	8.45	0.00	8.27	22.07	191.40	388.58	0.00	611.35	1,191.3
	No.28	50.00	1,400.00	13.64	9.42	0.00	13.11	36.18	475.00	446.73	0.00	534.58	1,456.3
	No.29	50.00	1,450.00	8.27	7.33	0.00	13.87	29.46	547.80	418.75	0.00	674.50	1,641.1
	No.30	50.00	1,500.00	5.15	9.59	0.00	6.46	21.20	335.48	422.85	0.00	508.20	1,266.5
	No.31	50.00	1,550.00	6.87	10.05	0.00	10.30	27.22	300.45	490.93	0.00	418.93	1,210.3
	No.32	50.00	1,600.00	4.99	3.25	0.00	5.58	13.82	296.45	332.50	0.00	396.83	1,025.8
	No.33	50.00	1,650.00	2.22	2.44	0.00	2.82	7.48	180.13	142.18	0.00	209.98	532.3
	No.34	50.00	1,700.00	12.46	11.11	0.00	1.06	24.63	366.83	338.58	0.00	97.15	802.6
	No.35	50.00	1,750.00	3.69	2.52	0.00	30.80	37.01	403.58	340.70	0.00	796.63	1,540.9
	No.36	50.00	1,800.00	1.17	1.21	0.00	43.05	45.43	121.48	93.23	0.00	1,846.20	2,060.9
	No.37	50.00	1,850.00	2.51	1.98	0.00	37.97	42.46	92.13	79.63	0.00	2,025.30	2,197.1
	No.38	50.00	1,900.00	9.35	1.93	0.00	30.67	41.94	296.55	97.55	0.00	1,715.85	2,110.0
	No.39	50.00	1,950.00	2.09	1.90	0.00	26.95	30.94	286.08	95.50	0.00	1,440.40	1,822.0
	No.40	50.00	2,000.00	7.15	3.07	0.00	26.85	37.06	231.10	124.00	0.00	1,344.80	1,699.9
	No.41	50.00	2,050.00	4.67	4.34	0.00	21.45	30.45	295.50	185.00	0.00	1,207.33	1,687.8
	No.42	50.00	2,100.00	9.69	2.51	0.00	25.62	37.82	359.05	171.00	0.00	1,176.78	1,706.8
	No.43	50.00	2,150.00	10.26	10.53	0.00	13.12	33.92	498.90	325.90	0.00	968.63	1,793.4
	No.44	50.00	2,200.00	12.84	9.64	0.00	6.30	28.77	577.53	504.15	0.00	485.43	1,567.1
	No.45	50.00	2,250.00	9.92	3.68	0.00	7.91	21.50	568.88	332.85	0.00	355.03	1,256.8
	No.46	50.00	2,300.00	6.86	2.27	0.00	12.16	21.28	419.45	148.63	0.00	501.60	1,069.7
	No.47	50.00	2,350.00	10.56	2.57	0.00	13.19	26.31	435.38	120.80	0.00	633.60	1,189.8
	No.48	50.00	2,400.00	9.22	6.41	0.00	31.08	46.71	494.35	224.40	0.00	1,106.60	1,825.4
	No.49	50.00	2,450.00	6.88	4.37	0.00	15.04	26.29	402.58	269.50	0.00	1,152.95	1,825.0
	No.50	50.00	2,500.00	7.42	6.21	0.00	7.90	21.53	357.63	264.48	0.00	573.45	1,195.6
	No.51	50.00	2,550.00	6.90	5.10	0.00	5.36	17.36	358.00	282.75	0.00	331.55	972.3
	No.52	50.00	2,600.00	4.43	2.41	0.00	50.33	57.17	283.15	187.73	0.00	1,392.38	1,863.3
	No.53	50.00	2,650.00	4.50	2.77	0.00	0.00	7.27	223.13	129.55	0.00	1,258.28	1,611.0

TABLE A.3 (9/12) BRAKDOWN OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Filling									
				Area					Volume				
				East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
				EWHA	LBA	CA	RBA	TFA	EWHPV	LBV	CV	RBV	TFV
		(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m3)	(m3)	(m3)	(m3)	(m^3)
Ben Nghe	No.54	50.00	2,700.00	4.39	3.28	0.00	19.84	27.51	222.23	151.40	0.00	495.90	869.5
	No.55	50.00	2,750.00	1.16	13.94	0.00	11.38	26.47	138.65	430.45	0.00	780.38	1,349.5
	No.56	50.00	2,800.00	2.78	11.52	0.00	13.06	27.36	98.35	636.40	0.00	610.88	1,345.6
	No.57	50.00	2,850.00	10.35	10.35	0.00	12.78	33.48	328.25	546.78	0.00	645.88	1,520.9
	No.58	50.00	2,900.00	23.38	15.07	0.00	0.00	38.44	843.18	635.48	0.00	319.48	1,798.1
	No.59	50.00	2,950.00	22.19	13.72	0.00	65.89	101.80	1,139.15	719.68	0.00	1,647.25	3,506.1
	No.60	50.00	3,000.00	6.36	12.30	0.00	0.00	18.66	713.70	650.45	0.00	1,647.25	3,011.4
	No.61	50.00	3,050.00	10.91	20.36	0.00	0.00	31.27	431.70	816.48	0.00	0.00	1,248.2
	No.62	50.00	3,100.00	0.66	1.38	0.00	0.00	2.04	289.28	543.40	0.00	0.00	832.7
	No.63	50.00	3,150.00	9.68	19.14	0.00	0.00	28.81	258.40	512.88	0.00	0.00	771.3
	SP11(EP,BP)	7.42	3,157.42	9.68	19.14	0.00	0.00	28.81	71.79	142.01	0.00	0.00	213.8
	Sub-total			**571.93**	**528.93**	**0.00**	**758.71**	**1,859.57**	**27,942.76**	**25,153.09**	**0.00**	**37,935.45**	**91,031.3**
Tau Hu (Down-stream)	SP11 (EP, BP)	0.00	3,157.42	9.68	19.14	0.00	0.00	28.81	0.00	0.00	0.00	0.00	0.0
	No.64	42.58	3,200.00	15.83	20.88	0.00	0.00	36.71	542.96	852.05	0.00	0.00	1,395.0
	No.65	50.00	3,250.00	13.80	20.15	0.00	0.00	33.95	740.68	1,025.85	0.00	0.00	1,766.5
	No.66	50.00	3,300.00	23.21	22.07	0.00	0.00	45.28	925.13	1,055.60	0.00	0.00	1,980.7
	No.67	50.00	3,350.00	9.18	17.83	0.00	42.64	69.65	809.55	997.58	0.00	1,066.10	2,873.2
	No.68	50.00	3,400.00	8.02	8.75	0.00	17.76	34.53	429.88	664.53	0.00	1,510.03	2,604.4
	No.69	50.00	3,450.00	12.12	14.96	0.00	15.07	42.15	503.48	592.83	0.00	820.60	1,916.9
	No.70	50.00	3,500.00	8.74	13.59	0.00	13.92	36.25	521.60	713.73	0.00	724.75	1,960.1
	No.71	50.00	3,550.00	17.36	17.75	0.00	16.33	51.44	652.65	783.40	0.00	756.35	2,192.4
	No.72	50.00	3,600.00	11.95	13.58	0.00	10.97	36.49	732.68	783.18	0.00	682.50	2,198.4
	No.73	50.00	3,650.00	0.00	0.00	0.00	5.97	5.97	298.63	339.43	0.00	423.50	1,061.6
	No.74	50.00	3,700.00	0.10	0.57	0.00	5.67	6.34	2.60	14.23	0.00	290.93	307.8
	No.75	50.00	3,750.00	1.80	2.28	0.00	16.58	20.66	47.70	71.23	0.00	556.13	675.1
	No.76	50.00	3,800.00	3.85	2.70	0.00	9.38	15.93	141.23	124.58	0.00	648.95	914.8
	No.77	50.00	3,850.00	1.06	3.15	0.00	8.27	12.48	122.50	146.33	0.00	441.30	710.1

TABLE A.3 (10/12) BRAKDOWN OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Filling									
				Area					Volume				
				East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
				EWHA	LBA	CA	RBA	TFA	EWHPV	LBV	CV	RBV	TFV
		(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m3)	(m3)	(m3)	(m3)	(m^3)
Tau Hu (Down-stream)	No.78	50.00	3,900.00	0.84	1.03	0.00	3.18	5.05	47.38	104.43	0.00	286.38	438.2
	No.79	50.00	3,950.00	0.34	0.66	0.00	2.72	3.72	29.43	42.25	0.00	147.45	219.1
	No.80	50.00	4,000.00	0.05	5.40	0.00	3.23	8.68	9.55	151.68	0.00	148.63	309.9
	No.81	50.00	4,050.00	54.55	33.57	0.00	2.62	90.74	1,364.83	974.40	0.00	146.30	2,485.5
	No.82	50.00	4,100.00	48.39	35.95	0.00	1.89	86.24	2,573.53	1,738.15	0.00	112.83	4,424.5
	No.83	50.00	4,150.00	58.77	31.73	0.00	3.14	93.64	2,679.00	1,692.20	0.00	125.73	4,496.9
	No.84	50.00	4,200.00	14.51	26.87	0.00	4.21	45.59	1,831.90	1,465.15	0.00	183.80	3,480.9
	No.85	50.00	4,250.00	0.56	1.13	0.00	28.25	29.95	376.73	700.15	0.00	811.68	1,888.6
	No.86	50.00	4,300.00	1.03	2.05	0.00	104.27	107.34	39.70	79.58	0.00	3,313.03	3,432.3
	No.87	50.00	4,350.00	1.36	1.44	0.00	102.37	105.18	59.75	87.28	0.00	5,166.00	5,313.0
	No.88	50.00	4,400.00	0.44	1.72	0.00	88.47	90.62	45.00	79.08	0.00	4,770.95	4,895.0
	No.89	50.00	4,450.00	0.85	0.86	0.00	58.43	60.14	32.10	64.48	0.00	3,672.43	3,769.0
	No.90	50.00	4,500.00	0.96	1.23	0.00	22.23	24.41	45.10	52.13	0.00	2,016.43	2,113.7
	No.91	50.00	4,550.00	1.11	5.77	0.00	6.62	13.51	51.75	175.03	0.00	721.23	948.0
	No.92	50.00	4,600.00	18.80	12.77	0.00	4.18	35.75	497.85	463.53	0.00	270.08	1,231.5
	No.93	50.00	4,650.00	23.07	14.73	0.00	5.25	43.05	1,046.70	687.43	0.00	235.75	1,969.9
	No.94	50.00	4,700.00	13.59	18.96	0.00	15.72	48.26	916.30	842.30	0.00	524.18	2,282.8
	No.95	50.00	4,750.00	29.01	20.63	0.00	19.32	68.96	1,064.83	989.85	0.00	876.00	2,930.7
	No.96	50.00	4,800.00	10.86	13.98	0.00	9.96	34.80	996.65	865.30	0.00	732.15	2,594.1
	No.97	50.00	4,850.00	17.55	18.23	0.00	4.33	40.10	710.20	805.15	0.00	357.28	1,872.6
	No.98	50.00	4,900.00	2.40	11.22	0.00	2.15	15.77	498.60	736.15	0.00	162.00	1,396.8
	No.99	50.00	4,950.00	1.76	9.18	0.00	0.89	11.84	103.98	510.08	0.00	76.03	690.1
	No.100	50.00	5,000.00	14.66	15.60	0.00	12.65	42.90	410.55	619.45	0.00	338.53	1,368.5
	No.101	50.00	5,050.00	1.73	10.95	0.00	48.00	60.68	409.70	663.53	0.00	1,516.30	2,589.5
	No.102	50.00	5,100.00	2.31	2.12	0.00	77.63	82.06	100.93	326.55	0.00	3,140.83	3,568.3
	No.103	50.00	5,150.00	2.79	4.07	0.00	13.13	19.98	127.33	154.63	0.00	2,268.93	2,550.9
	No.104	50.00	5,200.00	1.74	5.89	0.00	7.96	15.60	113.25	249.03	0.00	527.10	889.4

TABLE A.3 (11/12) BRAKDOWN OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Filling									
				Area					Volume				
				East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
				EWHA	LBA	CA	RBA	TFA	EWHPV	LBV	CV	RBV	TFV
		(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m3)	(m3)	(m3)	(m3)	(m^3)
Tau Hu (Down-stream)	No.105	50.00	5,250.00	40.47	21.00	0.00	13.25	74.72	1,055.40	672.28	0.00	530.10	2,257.8
	No.106	50.00	5,300.00	1.24	9.06	0.00	30.20	40.51	1,042.85	751.48	0.00	1,086.23	2,880.6
	No.107	50.00	5,350.00	0.67	10.68	0.00	11.48	22.83	47.88	493.43	0.00	1,042.13	1,583.4
	No.108	50.00	5,400.00	5.44	8.11	0.00	5.52	19.07	152.75	469.70	0.00	425.08	1,047.5
	No.109	50.00	5,450.00	1.53	3.84	0.00	2.87	8.23	174.10	298.78	0.00	209.68	682.6
	No.110	50.00	5,500.00	3.07	9.06	0.00	0.55	12.68	114.85	322.58	0.00	85.25	522.7
	No.111	50.00	5,550.00	3.43	5.35	0.00	2.65	11.43	162.50	360.20	0.00	79.95	602.7
	No.112	50.00	5,600.00	3.72	3.77	0.00	3.94	11.43	178.80	227.75	0.00	164.93	571.5
	No.113	50.00	5,650.00	6.18	1.94	0.00	3.98	12.10	247.40	142.73	0.00	198.13	588.3
	No.114	50.00	5,700.00	0.68	1.43	0.00	16.93	19.05	171.43	84.45	0.00	522.83	778.7
	No.115	50.00	5,750.00	0.45	1.11	0.00	11.59	13.15	28.35	63.63	0.00	712.95	804.9
	No.116	50.00	5,800.00	3.96	2.40	0.00	1.00	7.36	110.28	87.78	0.00	314.63	512.7
	No.117	50.00	5,850.00	0.68	2.39	0.00	1.47	4.54	115.80	119.83	0.00	61.73	297.4
	No.118	50.00	5,900.00	1.26	3.49	0.00	5.23	9.98	48.43	147.05	0.00	167.53	363.0
	No.119	50.00	5,950.00	2.02	1.27	0.00	11.90	15.19	82.00	118.98	0.00	428.25	629.2
	No.120	50.00	6,000.00	0.11	0.91	0.00	3.34	4.36	53.15	54.45	0.00	381.03	488.6
	No.121	50.00	6,050.00	0.74	1.94	0.00	7.19	9.88	21.23	71.20	0.00	263.40	355.8
	No.122	50.00	6,100.00	0.00	0.00	0.00	0.00	0.00	18.53	48.50	0.00	179.85	246.9
	No.123	50.00	6,150.00	0.00	0.88	0.00	0.00	0.88	0.00	21.95	0.00	0.00	22.0
	No.124	50.00	6,200.00	1.32	3.86	0.00	0.58	5.76	32.93	118.43	0.00	14.48	165.8
	No.125	50.00	6,250.00	0.80	4.43	0.00	0.11	5.35	53.00	207.25	0.00	17.28	277.5
	No.126	50.00	6,300.00	0.81	4.45	0.00	2.20	7.46	40.40	221.95	0.00	57.78	320.1
	No.127	50.00	6,350.00	0.90	3.17	0.00	2.20	6.27	42.93	190.33	0.00	109.95	343.2
	No.128	50.00	6,400.00	0.80	2.55	0.00	1.12	4.47	42.58	142.98	0.00	83.00	268.6
	No.129	50.00	6,450.00	1.22	3.22	0.00	1.42	5.86	50.40	144.43	0.00	63.60	258.4
	No.130	50.00	6,500.00	0.94	3.52	0.00	2.18	6.64	53.90	168.50	0.00	90.13	312.5
	No.131	50.00	6,550.00	1.38	2.95	0.00	2.42	6.74	57.93	161.58	0.00	114.95	334.5

TABLE A.3 (12/12) BRAKDOWN OF EARTH WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Filling									
				Area					Volume				
				East-West Highway	Left Bank	Channel	Right Bank	Total	East-West Highway	Left Bank	Channel	Right Bank	Total
				EWHA	LBA	CA	RBA	TFA	EWHPV	LBV	CV	RBV	TFV
		(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m3)	(m3)	(m3)	(m3)	(m^3)
Tau Hu (Down-stream)	No.132	50.00	6,600.00	2.92	2.17	0.00	1.70	6.79	107.50	128.00	0.00	102.83	338.3
	No.133	50.00	6,650.00	1.22	2.55	0.00	1.76	5.53	103.48	118.05	0.00	86.48	308.0
	No.134	50.00	6,700.00	0.24	1.55	0.00	2.23	4.02	36.43	102.43	0.00	99.83	238.7
	No.135	50.00	6,750.00	0.00	1.75	0.00	1.75	3.50	6.00	82.35	0.00	99.53	187.9
	No.136	50.00	6,800.00	0.00	1.33	0.00	0.54	1.87	0.00	76.80	0.00	57.25	134.1
	No.137	50.00	6,850.00	0.00	1.19	0.00	0.75	1.94	0.00	62.78	0.00	32.25	95.0
	No.138	50.00	6,900.00	0.00	1.24	0.00	0.90	2.13	0.00	60.50	0.00	41.20	101.7
	No.139	50.00	6,950.00	0.00	1.04	0.00	0.93	1.97	0.00	56.80	0.00	45.70	102.5
	No.140	50.00	7,000.00	0.00	1.29	0.00	0.69	1.99	0.00	58.23	0.00	40.60	98.8
	No.141	50.00	7,050.00	0.00	1.15	0.00	0.96	2.11	0.00	61.13	0.00	41.33	102.5
	No.142	50.00	7,100.00	0.00	0.79	0.00	1.29	2.08	0.00	48.48	0.00	56.20	104.7
	No.143	50.00	7,150.00	0.00	1.00	0.00	1.40	2.40	0.00	44.65	0.00	67.20	111.9
	No.144	50.00	7,200.00	0.00	1.26	0.00	4.02	5.28	0.00	56.50	0.00	135.35	191.9
	No.145	50.00	7,250.00	0.00	0.64	0.00	4.84	5.48	0.00	47.48	0.00	221.30	268.8
	IP24 (EP)	36.72	7,286.72	0.00	0.00	0.00	0.00	0.00	0.00	11.73	0.00	88.81	100.5
	Sub-total			**548.87**	**620.85**	**0.00**	**984.44**	**2,154.16**	**27,106.96**	**30,411.40**	**0.00**	**49,189.68**	**106,708.0**
Total				**1,120.80**	**1,149.78**	**0.00**	**1,743.15**	**4,013.73**	**55,049.72**	**55,564.49**	**0.00**	**87,125.13**	**197,739.3**

TABLE A.4 (1/6) BREAKDOWN OF REVETMENT WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Type A									Type B							
				Length		Volume							Length		Volume					
				Left Bank	Right Bank	Stone Masonry	Concrete Type F	Concrete Type G	F.D-Gravel	F-Gravel	RC Block		Left Bank	Right Bank	Stone Masonry	Concrete Type F	Concrete Type G	F.D-Gravel	F-Gravel	RC Block
						2.48m^2/m	0.81m^2/m	0.08m^2/m	2.34m^2/m	0.08m^2/m	0.24m^2/m				2.17m^2/m	0.72m^2/m	0.10m^2/m	1.72m^2/m	0.10m^2/m	0.32m2/m
		(m)	(m)	(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m)	(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Ben Nghe	No.0 (BP)	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No.1	50.00	50.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No.2	50.00	100.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No.3	50.00	150.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No.4	50.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	No.5	50.00	250.00	39.87	39.87	197.76	64.59	6.38	186.59	6.38	19.14	-	-	-	-	-	-	-	-	-
	No.6	50.00	300.00	50.25	50.25	249.24	81.41	8.04	235.17	8.04	24.12	-	-	-	-	-	-	-	-	-
	No.7	50.00	350.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.8	50.00	400.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.9	50.00	450.00	51.50	48.50	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.10	50.00	500.00	57.12	42.88	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.11	50.00	550.00	57.12	42.88	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.12	50.00	600.00	51.43	48.56	247.98	80.99	8.00	233.98	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.13	50.00	650.00	50.50	50.50	250.48	81.81	8.08	236.34	8.08	24.24	-	-	-	-	-	-	-	-	-
	No.14	50.00	700.00	50.50	50.50	250.48	81.81	8.08	236.34	8.08	24.24	-	-	-	-	-	-	-	-	-
	No.15	50.00	750.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.16	50.00	800.00	27.15	45.65	180.54	58.97	5.82	170.35	5.82	17.47	-	-	-	-	-	-	-	-	-
	No.17	50.00	850.00	21.65	24.45	114.33	37.34	3.69	107.87	3.69	11.06	-	-	-	-	-	-	-	-	-
	No.18	50.00	900.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.19	50.00	950.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.20	50.00	1,000.00	46.82	53.18	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.21	50.00	1,050.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.22	50.00	1,100.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.23	50.00	1,150.00	54.51	45.49	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.24	50.00	1,200.00	56.14	43.86	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.25	50.00	1,250.00	52.85	47.15	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-
	No.26	50.00	1,300.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-	-

TABLE A.4 (2/6) BREAKDOWN OF REVETMENT WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Type A										Type B							
				Length		Volume								Length		Volume					
				Left Bank	Right Bank	Stone Masonry	Concrete Type F	Concrete Type G	F.D-Gravel	F-Gravel	RC Block	Left Bank	Right Bank	Stone Masonry	Concrete Type F	Concrete Type G	F.D-Gravel	F-Gravel	RC Block
						2.48m^2/m	0.81m^2/m	0.08m^2/m	2.34m^2/m	0.08m^2/m	0.24m^2/m			2.17m^2/m	0.72m^2/m	0.10m^2/m	1.72m^2/m	0.10m^2/m	0.32m2/m
		(m)	(m)	(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Ben Nghe	No.27	50.00	1,350.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.28	50.00	1,400.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.29	50.00	1,450.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.30	50.00	1,500.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.31	50.00	1,550.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.32	50.00	1,600.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.33	50.00	1,650.00	45.03	54.97	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.34	50.00	1,700.00	44.92	55.08	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.35	50.00	1,750.00	48.40	51.60	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.36	50.00	1,800.00	50.00	87.00	339.76	110.97	10.96	320.58	10.96	32.88	-	-	-	-	-	-	-	-
	No.37	50.00	1,850.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.38	50.00	1,900.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.39	50.00	1,950.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.40	50.00	2,000.00	50.54	49.46	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.41	50.00	2,050.00	51.05	48.95	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.42	50.00	2,100.00	51.05	48.95	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.43	50.00	2,150.00	51.05	48.95	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.44	50.00	2,200.00	51.05	48.95	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.45	50.00	2,250.00	50.37	49.63	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.46	50.00	2,300.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.47	50.00	2,350.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.48	50.00	2,400.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.49	50.00	2,450.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.50	50.00	2,500.00	51.34	48.66	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.51	50.00	2,550.00	51.46	48.54	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.52	50.00	2,600.00	50.00	53.49	256.66	83.83	8.28	242.17	8.28	24.84	-	-	-	-	-	-	-	-
	No.53	50.00	2,650.00	50.00	36.50	214.52	70.07	6.92	202.41	6.92	20.76	-	-	-	-	-	-	-	-

TABLE A.4 (3/6) BREAKDOWN OF REVETMENT WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Type A								Type B							
				Length		Volume						Length		Volume					
				Left Bank	Right Bank	Stone Masonry	Concrete Type F	Concrete Type G	F.D-Gravel	F-Gravel	RC Block	Left Bank	Right Bank	Stone Masonry	Concrete Type F	Concrete Type G	F.D-Gravel	F-Gravel	RC Block
						2.48m^2/m	0.81m^2/m	0.08m^2/m	2.34m^2/m	0.08m^2/m	0.24m^2/m			2.17m^2/m	0.72m^2/m	0.10m^2/m	1.72m^2/m	0.10m^2/m	0.32m2/m
		(m)	(m)	(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Ben Nghe	No.54	50.00	2,700.00	50.00	74.71	309.28	101.02	9.98	291.82	9.98	29.93	-	-	-	-	-	-	-	-
	No.55	50.00	2,750.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.56	50.00	2,800.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.57	50.00	2,850.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.58	50.00	2,900.00	52.82	5.00	143.39	46.83	4.63	135.30	4.63	13.88	-	-	-	-	-	-	-	-
	No.59	50.00	2,950.00	55.97	44.76	249.81	81.59	8.06	235.71	8.06	24.18	-	-	-	-	-	-	-	-
	No.60	50.00	3,000.00	48.50	88.48	339.71	110.95	10.96	320.53	10.96	32.88	-	-	-	-	-	-	-	-
	No.61	50.00	3,050.00	44.04	0.00	109.22	35.67	3.52	103.05	3.52	10.57	-	-	-	-	-	-	-	-
	No.62	50.00	3,100.00	44.04	0.00	109.22	35.67	3.52	103.05	3.52	10.57	-	-	-	-	-	-	-	-
	No.63	50.00	3,150.00	44.04	0.00	109.22	35.67	3.52	103.05	3.52	10.57	-	-	-	-	-	-	-	-
	SP11(EP,BP)	7.42	3,157.42	6.54	0.00	16.22	5.30	0.52	15.30	0.52	1.57	-	-	-	-	-	-	-	-
	Sub-total			**2,909.6**	**2,777.4**	**14,103.8**	**4,606.49**	**454.96**	**13,307.63**	**454.96**	**1,364.88**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Tau Hu (Down-stream)	P11 (EP, BP	0.00	3,157.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-
	No.64	42.58	3,200.00	37.94	0.00	94.09	30.73	3.04	88.78	3.04	9.11	-	-	-	-	-	-	-	-
	No.65	50.00	3,250.00	44.67	0.00	110.78	36.18	3.57	104.53	3.57	10.72	-	-	-	-	-	-	-	-
	No.66	50.00	3,300.00	44.82	0.00	111.15	36.30	3.59	104.88	3.59	10.76	-	-	-	-	-	-	-	-
	No.67	50.00	3,350.00	22.67	0.00	56.22	18.36	1.81	53.05	1.81	5.44	-	-	-	-	-	-	-	-
	No.68	50.00	3,400.00	38.50	40.00	194.68	63.59	6.28	183.69	6.28	18.84	-	-	-	-	-	-	-	-
	No.69	50.00	3,450.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.70	50.00	3,500.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.71	50.00	3,550.00	40.00	50.00	223.20	72.90	7.20	210.60	7.20	21.60	-	-	-	-	-	-	-	-
	No.72	50.00	3,600.00	51.10	48.90	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.73	50.00	3,650.00	54.99	45.10	248.22	81.07	8.01	234.21	8.01	24.02	-	-	-	-	-	-	-	-
	No.74	50.00	3,700.00	54.99	45.10	248.22	81.07	8.01	234.21	8.01	24.02	-	-	-	-	-	-	-	-
	No.75	50.00	3,750.00	50.10	49.00	245.77	80.27	7.93	231.89	7.93	23.78	-	-	-	-	-	-	-	-
	No.76	50.00	3,800.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.77	50.00	3,850.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-

TABLE A.4 (4/6) BREAKDOWN OF REVETMENT WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Type A										Type B							
				Length		Volume								Length		Volume					
				Left Bank	Right Bank	Stone Masonry	Concrete Type F	Concrete Type G	F.D-Gravel	F-Gravel	RC Block	Left Bank	Right Bank	Stone Masonry	Concrete Type F	Concrete Type G	F.D-Gravel	F-Gravel	RC Block
						2.48m^2/m	0.81m^2/m	0.08m^2/m	2.34m^2/m	0.08m^2/m	0.24m^2/m			2.17m^2/m	0.72m^2/m	0.10m^2/m	1.72m^2/m	0.10m^2/m	0.32m2/m
		(m)	(m)	(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Tau Hu (Down-stream)	No.78	50.00	3,900.00	53.06	46.94	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.79	50.00	3,950.00	51.53	48.47	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.80	50.00	4,000.00	54.18	45.82	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.81	50.00	4,050.00	57.76	42.24	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.82	50.00	4,100.00	57.76	42.24	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.83	50.00	4,150.00	57.76	42.24	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.84	50.00	4,200.00	56.25	43.75	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.85	50.00	4,250.00	45.92	54.08	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.86	50.00	4,300.00	45.05	54.95	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.87	50.00	4,350.00	45.05	54.95	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.88	50.00	4,400.00	45.05	54.95	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.89	50.00	4,450.00	45.05	54.95	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.90	50.00	4,500.00	45.05	54.95	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.91	50.00	4,550.00	46.26	53.78	248.10	81.03	8.00	234.09	8.00	24.01	-	-	-	-	-	-	-	-
	No.92	50.00	4,600.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.93	50.00	4,650.00	45.52	54.48	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.94	50.00	4,700.00	46.17	53.83	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.95	50.00	4,750.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.96	50.00	4,800.00	50.10	50.10	248.50	81.16	8.02	234.47	8.02	24.05	-	-	-	-	-	-	-	-
	No.97	50.00	4,850.00	50.10	50.10	248.50	81.16	8.02	234.47	8.02	24.05	-	-	-	-	-	-	-	-
	No.98	50.00	4,900.00	56.20	43.80	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.99	50.00	4,950.00	52.66	47.34	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.100	50.00	5,000.00	45.64	41.00	214.87	70.18	6.93	202.74	6.93	20.79	-	-	-	-	-	-	-	-
	No.101	50.00	5,050.00	49.38	78.54	317.24	103.62	10.23	299.33	10.23	30.70	-	-	-	-	-	-	-	-
	No.102	50.00	5,100.00	50.00	109.82	396.35	129.45	12.79	373.98	12.79	38.36	-	-	-	-	-	-	-	-
	No.103	50.00	5,150.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.104	50.00	5,200.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-

TABLE A.4 (5/6) BREAKDOWN OF REVETMENT WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Type A										Type B							
				Length		Volume								Length		Volume					
				Left Bank	Right Bank	Stone Masonry	Concrete Type F	Concrete Type G	F.D-Gravel	F-Gravel	RC Block	Left Bank	Right Bank	Stone Masonry	Concrete Type F	Concrete Type G	F.D-Gravel	F-Gravel	RC Block
						2.48m^2/m	0.81m^2/m	0.08m^2/m	2.34m^2/m	0.08m^2/m	0.24m^2/m			2.17m^2/m	0.72m^2/m	0.10m^2/m	1.72m^2/m	0.10m^2/m	0.32m2/m
		(m)	(m)	(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Tau Hu (Down-stream)	No.105	50.00	5,250.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.106	50.00	5,300.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.107	50.00	5,350.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.108	50.00	5,400.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.109	50.00	5,450.00	51.92	48.08	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.110	50.00	5,500.00	53.06	46.95	248.02	81.01	8.00	234.02	8.00	24.00	-	-	-	-	-	-	-	-
	No.111	50.00	5,550.00	53.06	46.95	248.02	81.01	8.00	234.02	8.00	24.00	-	-	-	-	-	-	-	-
	No.112	50.00	5,600.00	53.06	46.95	248.02	81.01	8.00	234.02	8.00	24.00	-	-	-	-	-	-	-	-
	No.113	50.00	5,650.00	51.60	48.40	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.114	50.00	5,700.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.115	50.00	5,750.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.116	50.00	5,800.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	-	-	-	-	-	-	-	-
	No.117	50.00	5,850.00	50.00	50.00	248.00	81.00	8.00	234.00	8.00	24.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
	No.118	50.00	5,900.00	-	-	12,877.97	4,206.11	415.42	12,150.99	415.42	1,246.26	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.119	50.00	5,950.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.120	50.00	6,000.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.121	50.00	6,050.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.122	50.00	6,100.00	-	-	-	-	-	-	-	-	33.50	32.50	143.22	47.52	6.6	113.5	6.6	21.1
	No.123	50.00	6,150.00	-	-	-	-	-	-	-	-	17.00	17.00	73.78	24.48	3.4	58.5	3.4	10.9
	No.124	50.00	6,200.00	-	-	-	-	-	-	-	-	42.00	50.00	199.64	66.24	9.2	158.2	9.2	29.4
	No.125	50.00	6,250.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.126	50.00	6,300.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.127	50.00	6,350.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.128	50.00	6,400.00	-	-	-	-	-	-	-	-	51.12	48.88	217.00	72.00	10.0	172.0	10.0	32.0
	No.129	50.00	6,450.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.130	50.00	6,500.00	-	-	-	-	-	-	-	-	50.74	49.26	217.00	72.00	10.0	172.0	10.0	32.0
	No.131	50.00	6,550.00	-	-	-	-	-	-	-	-	44.45	48.50	201.70	66.92	9.3	159.9	9.3	29.7

TABLE A.4 (6/6) BREAKDOWN OF REVETMENT WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Distance	Accumulate Distance	Type A								Type B							
				Length		Volume						Length		Volume					
				Left Bank	Right Bank	Stone Masonry	Concrete Type F	Concrete Type G	F.D-Gravel	F-Gravel	RC Block	Left Bank	Right Bank	Stone Masonry	Concrete Type F	Concrete Type G	F.D-Gravel	F-Gravel	RC Block
						2.48m^2/m	0.81m^2/m	0.08m^2/m	2.34m^2/m	0.08m^2/m	0.24m^2/m			2.17m^2/m	0.72m^2/m	0.10m^2/m	1.72m^2/m	0.10m^2/m	0.32m2/m
		(m)	(m)	(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m)	(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Tau Hu (Down-stream)	No.132	50.00	6,600.00	-	-	-	-	-	-	-	-	50.76	49.24	217.00	72.00	10.0	172.0	10.0	32.0
	No.133	50.00	6,650.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.134	50.00	6,700.00	-	-	-	-	-	-	-	-	45.00	50.00	206.15	68.40	9.5	163.4	9.5	30.4
	No.135	50.00	6,750.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.136	50.00	6,800.00	-	-	-	-	-	-	-	-	42.00	50.00	199.64	66.24	9.2	158.2	9.2	29.4
	No.137	50.00	6,850.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.138	50.00	6,900.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.139	50.00	6,950.00	-	-	-	-	-	-	-	-	45.00	50.00	206.15	68.40	9.5	163.4	9.5	30.4
	No.140	50.00	7,000.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.141	50.00	7,050.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.142	50.00	7,100.00	-	-	-	-	-	-	-	-	45.00	50.00	206.15	68.40	9.5	163.4	9.5	30.4
	No.143	50.00	7,150.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.144	50.00	7,200.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	No.145	50.00	7,250.00	-	-	-	-	-	-	-	-	50.00	50.00	217.00	72.00	10.0	172.0	10.0	32.0
	IP24 (EP)	36.72	7,286.72	-	-	-	-	-	-	-	-	26.72	43.23	151.79	50.36	7.0	120.3	7.0	22.4
	Sub-total			**2,654.0**	**2,538.8**	**25,755.9**	**8,412.2**	**830.8**	**24,302.0**	**830.8**	**2,492.5**	**1,343.3**	**1,388.6**	**5,928.2**	**1,967.0**	**273.2**	**4,698.9**	**273.2**	**874.2**
Total				**5,563.6**	**5,316.2**	**39,859.8**	**13,018.7**	**1,285.8**	**37,609.6**	**1,285.8**	**3,857.4**	**1,343**	**1,389**	**5,928.2**	**1,967.0**	**273.2**	**4,698.9**	**273.2**	**874.2**

TABLE A.5 (1/6) BREAKDOWN OF RIP RAP AND PAVEMENT WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Length	Accumulate Length	Rip Rap					Colour Concrete Paving Block and Compacted Sand Bed						
				Length		Volume			Length		Width		Area include. Flower Bed		
				Left Bank	Right Bank	Left Bank	Right Bank	Total	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Total
						1.50m^2	1.50m^2		LL	RL	LRL	RRL	LRA	RRA	TRA
		(m)	(m)	(m)	(m)	(m^2)	(m^2)	(m^2)	(m)	(m)	(m)	(m)	(m^2)	(m^2)	(m^3)
Ben Nghe	No.0 (BP)	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-
	No.1	50.00	50.00	-	-	-	-	-	-	-	-	-	-	-	-
	No.2	50.00	100.00	-	-	-	-	-	-	-	-	-	-	-	-
	No.3	50.00	150.00	-	-	-	-	-	-	-	-	-	-	-	-
	No.4	50.00	200.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	3.80	3.80	0.0	0.0	0.0
	No.5	50.00	250.00	50.25	50.25	75.4	75.4	150.8	39.87	39.87	3.80	3.80	151.5	151.5	303.0
	No.6	50.00	300.00	50.25	50.25	75.4	75.4	150.8	50.25	50.25	3.80	3.80	191.0	191.0	381.9
	No.7	50.00	350.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.8	50.00	400.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.9	50.00	450.00	51.23	48.77	76.8	73.2	150.0	51.50	48.50	3.80	3.80	195.7	184.3	380.0
	No.10	50.00	500.00	55.85	44.15	83.8	66.2	150.0	57.12	42.88	3.80	3.80	217.1	162.9	380.0
	No.11	50.00	550.00	55.85	44.15	83.8	66.2	150.0	57.12	42.88	3.80	3.80	217.1	162.9	380.0
	No.12	50.00	600.00	51.18	48.82	76.8	73.2	150.0	51.43	48.56	3.80	3.80	195.4	184.5	380.0
	No.13	50.00	650.00	50.50	50.50	75.8	75.8	151.5	50.50	50.50	3.80	3.80	191.9	191.9	383.8
	No.14	50.00	700.00	50.50	50.50	75.8	75.8	151.5	50.50	50.50	3.80	3.80	191.9	191.9	383.8
	No.15	50.00	750.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.16	50.00	800.00	46.13	53.86	69.2	80.8	150.0	27.15	45.65	3.80	3.80	103.2	173.5	276.6
	No.17	50.00	850.00	45.26	54.74	67.9	82.1	150.0	21.65	24.45	3.80	3.80	82.3	92.9	175.2
	No.18	50.00	900.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.19	50.00	950.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.20	50.00	1,000.00	47.47	52.53	71.2	78.8	150.0	46.82	53.18	3.80	3.80	177.9	202.1	380.0
	No.21	50.00	1,050.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.22	50.00	1,100.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.23	50.00	1,150.00	53.59	46.41	80.4	69.6	150.0	54.51	45.49	3.80	3.80	207.1	172.9	380.0
	No.24	50.00	1,200.00	54.88	45.12	82.3	67.7	150.0	56.14	43.86	3.80	3.80	213.3	166.7	380.0
	No.25	50.00	1,250.00	52.26	47.73	78.4	71.6	150.0	52.85	47.15	3.80	3.80	200.8	179.2	380.0
	No.26	50.00	1,300.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0

TABLE A.5 (2/6) BREAKDOWN OF RIP RAP AND PAVEMENT WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Length	Accumulate Length	Rip Rap					Colour Concrete Paving Block and Compacted Sand Bed						
				Length		Volume			Length		Width		Area include. Flower Bed		
				Left Bank	Right Bank	Left Bank	Right Bank	Total	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Total
						1.50m^2	1.50m^2		LL	RL	LRL	RRL	LRA	RRA	TRA
		(m)	(m)	(m)	(m)	(m^2)	(m^2)	(m^2)	(m)	(m)	(m)	(m)	(m^2)	(m^2)	(m^3)
Ben Nghe	No.27	50.00	1,350.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.28	50.00	1,400.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.29	50.00	1,450.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.30	50.00	1,500.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.31	50.00	1,550.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.32	50.00	1,600.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.33	50.00	1,650.00	46.05	53.95	69.1	80.9	150.0	45.03	54.97	3.80	3.80	171.1	208.9	380.0
	No.34	50.00	1,700.00	45.97	54.03	69.0	81.0	150.0	44.92	55.08	3.80	3.80	170.7	209.3	380.0
	No.35	50.00	1,750.00	48.73	51.28	73.1	76.9	150.0	48.40	51.60	3.80	3.80	183.9	196.1	380.0
	No.36	50.00	1,800.00	50.00	87.00	75.0	130.5	205.5	50.00	95.23	3.80	3.80	190.0	361.9	551.9
	No.37	50.00	1,850.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.38	50.00	1,900.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.39	50.00	1,950.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.40	50.00	2,000.00	50.43	49.57	75.6	74.4	150.0	50.54	49.46	3.80	3.80	192.1	187.9	380.0
	No.41	50.00	2,050.00	50.83	49.17	76.2	73.8	150.0	51.05	48.95	3.80	3.80	194.0	186.0	380.0
	No.42	50.00	2,100.00	50.83	49.17	76.2	73.8	150.0	51.05	48.95	3.80	3.80	194.0	186.0	380.0
	No.43	50.00	2,150.00	50.83	49.17	76.2	73.8	150.0	51.05	48.95	3.80	3.80	194.0	186.0	380.0
	No.44	50.00	2,200.00	50.83	49.17	76.2	73.8	150.0	51.05	48.95	3.80	3.80	194.0	186.0	380.0
	No.45	50.00	2,250.00	50.29	49.70	75.4	74.6	150.0	50.37	49.63	3.80	3.80	191.4	188.6	380.0
	No.46	50.00	2,300.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.47	50.00	2,350.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.48	50.00	2,400.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.49	50.00	2,450.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.50	50.00	2,500.00	51.06	48.94	76.6	73.4	150.0	51.34	48.66	3.80	3.80	195.1	184.9	380.0
	No.51	50.00	2,550.00	51.15	48.85	76.7	73.3	150.0	51.46	48.54	3.80	3.80	195.5	184.5	380.0
	No.52	50.00	2,600.00	50.00	55.60	75.0	83.4	158.4	50.00	53.49	3.80	3.80	190.0	203.3	393.3
	No.53	50.00	2,650.00	50.00	36.00	75.0	54.0	129.0	50.00	36.50	3.80	3.80	190.0	138.7	328.7

TABLE A.5 (3/6) BREAKDOWN OF RIP RAP AND PAVEMENT WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Length	Accumulate Length	Rip Rap					Colour Concrete Paving Block and Compacted Sand Bed						
				Length		Volume			Length		Width		Area include. Flower Bed		
				Left Bank	Right Bank	Left Bank	Right Bank	Total	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Total
						1.50m^2	1.50m^2		LL	RL	LRL	RRL	LRA	RRA	TRA
		(m)	(m)	(m)	(m)	(m^2)	(m^2)	(m^2)	(m)	(m)	(m)	(m)	(m^2)	(m^2)	(m^3)
Ben Nghe	No.54	50.00	2,700.00	50.00	67.50	75.0	101.3	176.3	50.00	74.71	3.80	3.80	190.0	283.9	473.9
	No.55	50.00	2,750.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.56	50.00	2,800.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.57	50.00	2,850.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.58	50.00	2,900.00	52.23	5.00	78.3	7.5	85.8	52.82	5.00	3.80	3.80	200.7	19.0	219.7
	No.59	50.00	2,950.00	54.71	45.00	82.1	67.5	149.6	55.97	44.76	3.80	3.80	212.7	170.1	382.8
	No.60	50.00	3,000.00	48.50	88.00	72.8	132.0	204.8	48.50	88.48	3.80	3.80	184.3	336.2	520.5
	No.61	50.00	3,050.00	45.37	0.00	68.1	0.0	68.1	44.04	0.00	3.80	3.80	167.4	0.0	167.4
	No.62	50.00	3,100.00	45.51	0.00	68.3	0.0	68.3	44.04	0.00	3.80	3.80	167.4	0.0	167.4
	No.63	50.00	3,150.00	45.65	0.00	68.5	0.0	68.5	44.04	0.00	3.80	3.80	167.4	0.0	167.4
	SP11(EP,BP)	7.42	3,157.42	6.79	0.00	10.2	0.0	10.2	6.54	0.00	3.80	3.80	24.9	0.0	24.9
	Sub-total			**2,960.96**	**2,824.88**	**4,441.4**	**4,237.3**	**8,678.8**	**2,909.62**	**2,785.63**	**-**	**-**	**11,056.6**	**10,585.4**	**21,642.0**
Tau Hu (Down-stream)	P11 (EP, BP	0.00	3,157.42	0.00	0.00	0.0	0.0	0.0	0.00	0.00	3.80	0.00	0.0	0.0	0.0
	No.64	42.58	3,200.00	39.00	0.00	58.5	0.0	58.5	37.94	0.00	3.80	0.00	144.2	0.0	144.2
	No.65	50.00	3,250.00	45.93	0.00	68.9	0.0	68.9	44.67	0.00	3.80	0.00	169.7	0.0	169.7
	No.66	50.00	3,300.00	46.07	0.00	69.1	0.0	69.1	44.82	0.00	3.80	0.00	170.3	0.0	170.3
	No.67	50.00	3,350.00	24.15	0.00	36.2	0.0	36.2	22.67	0.00	3.80	3.80	86.1	0.0	86.1
	No.68	50.00	3,400.00	39.00	41.50	58.5	62.3	120.8	38.50	40.00	3.80	3.80	146.3	152.0	298.3
	No.69	50.00	3,450.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.70	50.00	3,500.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.71	50.00	3,550.00	50.00	50.00	75.0	75.0	150.0	40.00	50.00	3.80	3.80	152.0	190.0	342.0
	No.72	50.00	3,600.00	50.82	49.17	76.2	73.8	150.0	51.10	48.90	3.80	3.80	194.2	185.8	380.0
	No.73	50.00	3,650.00	53.73	46.27	80.6	69.4	150.0	54.99	45.10	3.80	3.80	209.0	171.4	380.3
	No.74	50.00	3,700.00	53.73	46.27	80.6	69.4	150.0	54.99	45.10	3.80	3.80	209.0	171.4	380.3
	No.75	50.00	3,750.00	50.07	49.92	75.1	74.9	150.0	50.10	49.00	3.80	3.80	190.4	186.2	376.6
	No.76	50.00	3,800.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.77	50.00	3,850.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0

TABLE A.5 (4/6) BREAKDOWN OF RIP RAP AND PAVEMENT WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Length	Accumulate Length	Rip Rap					Colour Concrete Paving Block and Compacted Sand Bed						
				Length		Volume			Length		Width		Area include. Flower Bed		
				Left Bank	Right Bank	Left Bank	Right Bank	Total	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Total
						1.50m^2	1.50m^2		LL	RL	LRL	RRL	LRA	RRA	TRA
		(m)	(m)	(m)	(m)	(m^2)	(m^2)	(m^2)	(m)	(m)	(m)	(m)	(m^2)	(m^2)	(m^3)
Tau Hu (Down-stream)	No.78	50.00	3,900.00	52.28	47.72	78.4	71.6	150.0	53.06	46.94	3.80	3.80	201.6	178.4	380.0
	No.79	50.00	3,950.00	51.14	48.86	76.7	73.3	150.0	51.53	48.47	3.80	3.80	195.8	184.2	380.0
	No.80	50.00	4,000.00	53.12	46.88	79.7	70.3	150.0	54.18	45.82	3.80	3.80	205.9	174.1	380.0
	No.81	50.00	4,050.00	55.79	44.21	83.7	66.3	150.0	57.76	42.24	3.80	3.80	219.5	160.5	380.0
	No.82	50.00	4,100.00	55.79	44.21	83.7	66.3	150.0	57.76	42.24	3.80	3.80	219.5	160.5	380.0
	No.83	50.00	4,150.00	55.79	44.21	83.7	66.3	150.0	57.76	42.24	3.80	3.80	219.5	160.5	380.0
	No.84	50.00	4,200.00	54.66	45.34	82.0	68.0	150.0	56.25	43.75	3.80	3.80	213.8	166.3	380.0
	No.85	50.00	4,250.00	46.96	53.05	70.4	79.6	150.0	45.92	54.08	3.80	3.80	174.5	205.5	380.0
	No.86	50.00	4,300.00	46.31	53.68	69.5	80.5	150.0	45.05	54.95	3.80	3.80	171.2	208.8	380.0
	No.87	50.00	4,350.00	46.31	53.68	69.5	80.5	150.0	45.05	54.95	3.80	3.80	171.2	208.8	380.0
	No.88	50.00	4,400.00	46.31	53.68	69.5	80.5	150.0	45.05	54.95	3.80	3.80	171.2	208.8	380.0
	No.89	50.00	4,450.00	46.31	53.68	69.5	80.5	150.0	45.05	54.95	3.80	3.80	171.2	208.8	380.0
	No.90	50.00	4,500.00	46.31	53.68	69.5	80.5	150.0	45.05	54.95	3.80	3.80	171.2	208.8	380.0
	No.91	50.00	4,550.00	47.21	52.79	70.8	79.2	150.0	46.26	53.78	3.80	2.80	175.8	177.5	353.3
	No.92	50.00	4,600.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	2.80	190.0	140.0	330.0
	No.93	50.00	4,650.00	46.66	53.34	70.0	80.0	150.0	45.52	54.48	3.80	3.80	173.0	179.8	352.8
	No.94	50.00	4,700.00	47.14	52.85	70.7	79.3	150.0	46.17	53.83	3.80	3.80	175.4	204.6	380.0
	No.95	50.00	4,750.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.96	50.00	4,800.00	50.10	50.10	75.2	75.2	150.3	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.97	50.00	4,850.00	50.10	50.10	75.2	75.2	150.3	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.98	50.00	4,900.00	54.94	45.06	82.4	67.6	150.0	56.20	43.80	3.80	2.80	213.6	144.5	358.1
	No.99	50.00	4,950.00	52.12	47.88	78.2	71.8	150.0	52.66	47.34	3.80	3.80	200.1	156.2	356.3
	No.100	50.00	5,000.00	46.53	41.00	69.8	61.5	131.3	45.64	41.00	3.80	3.80	173.4	155.8	329.2
	No.101	50.00	5,050.00	49.51	78.54	74.3	117.8	192.1	49.38	78.54	3.80	3.80	187.6	298.5	486.1
	No.102	50.00	5,100.00	50.00	109.82	75.0	164.7	239.7	50.00	109.82	3.80	3.80	190.0	417.3	607.3
	No.103	50.00	5,150.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.104	50.00	5,200.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0

TABLE A.5 (5/6) BREAKDOWN OF RIP RAP AND PAVEMENT WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Length	Accumulate Length	Rip Rap					Colour Concrete Paving Block and Compacted Sand Bed						
				Length		Volume			Length		Width		Area include. Flower Bed		
				Left Bank	Right Bank	Left Bank	Right Bank	Total	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Total
						1.50m^2	1.50m^2		LL	RL	LRL	RRL	LRA	RRA	TRA
		(m)	(m)	(m)	(m)	(m^2)	(m^2)	(m^2)	(m)	(m)	(m)	(m)	(m^2)	(m^2)	(m^3)
Tau Hu (Down-stream)	No.105	50.00	5,250.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.106	50.00	5,300.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.107	50.00	5,350.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.108	50.00	5,400.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.109	50.00	5,450.00	51.43	48.57	77.1	72.9	150.0	51.92	48.08	3.80	3.80	197.3	182.7	380.0
	No.110	50.00	5,500.00	52.26	47.73	78.4	71.6	150.0	53.06	46.95	3.80	2.80	201.6	154.9	356.6
	No.111	50.00	5,550.00	52.26	47.73	78.4	71.6	150.0	53.06	46.95	3.80	3.80	201.6	154.9	356.6
	No.112	50.00	5,600.00	52.26	47.73	78.4	71.6	150.0	53.06	46.95	3.80	3.80	201.6	178.4	380.0
	No.113	50.00	5,650.00	51.18	48.82	76.8	73.2	150.0	51.60	48.40	3.80	3.80	196.1	183.9	380.0
	No.114	50.00	5,700.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.115	50.00	5,750.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.116	50.00	5,800.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.117	50.00	5,850.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.118	50.00	5,900.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.119	50.00	5,950.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.120	50.00	6,000.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.121	50.00	6,050.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.122	50.00	6,100.00	33.45	32.54	50.2	48.8	99.0	33.50	32.50	3.80	3.80	127.3	123.5	250.8
	No.123	50.00	6,150.00	17.00	17.00	25.5	25.5	51.0	17.00	17.00	3.80	3.80	64.6	64.6	129.2
	No.124	50.00	6,200.00	42.00	50.00	63.0	75.0	138.0	42.00	50.00	3.80	1.80	159.6	140.0	299.6
	No.125	50.00	6,250.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	1.80	190.0	90.0	280.0
	No.126	50.00	6,300.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	2.80	190.0	115.0	305.0
	No.127	50.00	6,350.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	165.0	355.0
	No.128	50.00	6,400.00	51.02	48.98	76.5	73.5	150.0	51.12	48.88	3.80	3.80	194.3	185.7	380.0
	No.129	50.00	6,450.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.130	50.00	6,500.00	50.67	49.32	76.0	74.0	150.0	50.74	49.26	3.80	3.80	192.8	187.2	380.0
	No.131	50.00	6,550.00	44.36	48.64	66.5	73.0	139.5	44.45	48.50	3.80	2.80	168.9	160.1	329.0

TABLE A.5 (6/6) BREAKDOWN OF RIP RAP AND PAVEMENT WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

Name of Canal	Section	Length	Accumulate Length	Rip Rap					Colour Concrete Paving Block and Compacted Sand Bed						
				Length		Volume			Length		Width		Area include. Flower Bed		
				Left Bank	Right Bank	Left Bank	Right Bank	Total	Left Bank	Right Bank	Left Bank	Right Bank	Left Bank	Right Bank	Total
						1.50m^2	1.50m^2		LL	RL	LRL	RRL	LRA	RRA	TRA
		(m)	(m)	(m)	(m)	(m^2)	(m^2)	(m^2)	(m)	(m)	(m)	(m)	(m^2)	(m^2)	(m^3)
Tau Hu (Down-stream)	No.132	50.00	6,600.00	50.69	49.31	76.0	74.0	150.0	50.76	49.24	3.80	1.80	192.9	113.3	306.1
	No.133	50.00	6,650.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	1.80	190.0	90.0	280.0
	No.134	50.00	6,700.00	45.00	50.00	67.5	75.0	142.5	45.00	50.00	3.80	1.80	171.0	90.0	261.0
	No.135	50.00	6,750.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	1.80	190.0	90.0	280.0
	No.136	50.00	6,800.00	42.00	50.00	63.0	75.0	138.0	42.00	50.00	3.80	1.80	159.6	90.0	249.6
	No.137	50.00	6,850.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	2.30	190.0	102.5	292.5
	No.138	50.00	6,900.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	2.30	190.0	115.0	305.0
	No.139	50.00	6,950.00	45.00	50.00	67.5	75.0	142.5	45.00	50.00	3.80	2.80	171.0	127.5	298.5
	No.140	50.00	7,000.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	2.80	190.0	140.0	330.0
	No.141	50.00	7,050.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	2.80	190.0	140.0	330.0
	No.142	50.00	7,100.00	45.00	50.00	67.5	75.0	142.5	45.00	50.00	3.80	3.20	171.0	150.0	321.0
	No.143	50.00	7,150.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	175.0	365.0
	No.144	50.00	7,200.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	No.145	50.00	7,250.00	50.00	50.00	75.0	75.0	150.0	50.00	50.00	3.80	3.80	190.0	190.0	380.0
	IP24 (EP)	36.72	7,286.72	26.72	43.23	40.1	64.8	104.9	26.72	43.23	3.80	3.80	101.5	164.3	265.8
	Sub-total			**4,006.19**	**3,937.09**	**6,009.3**	**5,905.6**	**11,914.9**	**3,997.07**	**3,927.16**	**-**	**-**	**15,188.9**	**13,598.4**	**28,787.3**
Total				**6,967.15**	**6,761.97**	**10,450.7**	**10,143.0**	**20,593.7**	**6,906.69**	**6,712.79**	**-**	**-**	**26,245.4**	**24,183.8**	**50,429.3**

A. Colour Concrete Paving Block

1. Standard module span: 40.0 m

2. Number of moduleof landscapework on each canal

Ben Nghe Canal: Left Bank = 2,909.6/40.0 = 72 module

Right Bank = 2,785.6/40.0 = 70 module

Tau Hu Canal: Left Bank = 3,997.1/40.0 = 100 module

Right Bank = 3,927.2/40.0 = 98 module

3. Area of Colour Concrete Paving Block

Ben Nghe Canal: Left Bank = 11,056.6-72x1.8(1.8x4+9.6) = 8,879.3 m^2

Right Bank = 10,585.4-70X1.8x(1.8x4+9.6) = 8,468.6 m^2

Sub-total = 17,347.9 m^2 (17,880m^2)

Tau Hu Canal: Left Bank = 15,188.9-100x1.8x(1.8x4+9.6) = 12,164.9 m^2

Right Bank = 13,598.4-98x1.8x(1.8x4+9.6) = 10,634.9 m^2

Sub-total = 22,799.8 m^2 (23,480 m^2)

Total = 40,144.7 m^2

B. Compacted Sand Base

Ben Nghe Canal: Left Bank = 8,879.3 m^2 x 0.1 m = 887.9 m^3

Right Bank = 8,468.6 m^2 x 0.1 m = 846.9 m^3

Sub-total = 1,734.8 m^3 (1,790 m^3)

Tau Hu Canal: Left Bank = 12,164.9 m^2 x 0.1 m = 1,216.5 m^3 (1,253

Right Bank = 10,634.9 m^2 x 0.1 m = 1,063.5 m3 (1,09

Sub-total = 2,280 m^3 (2,350 m^3)

Total = 4,014.8 m^3 (4.,140 m^3)

TABLE A.6 (1/2) BREAKDOWN OF LANDSCAPE WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

A. Curb of Planting Bed (Cast-in-situ Concrete: Concrete Type E)

1. Concrete volume of one flower bed

Small flower bed: V1 = (1.80 x 1.80 - 1.40 x 1.40) x 0.40 = 0.512 m^3

Big flower bed: V2 = (1.80 x 9.60 - 1.40 x 9.20) x 0.40 = 1.760 m^3

2. Concrete volume of one standard module

V = 4 x V1 + 1 x V2 = 4 x 0.512 + 1 x 1.76 = 3.808 m^3

3. Concrete volume for each canal

Ben Nghe Canal: Left Bank = 72 module x 3.808 m^3 = 274.2 m^3

Right Bank = 70 module x 3.808 m^3 = 266.6 m^3

Sub-total = 540.8 m^3 (570 m^3)

Tau Hu Canal: Left Bank = 100 module x 3.808 m^3 = 380.8 m^3

Right Bank = 98 module x 3.808 m^3 = 373.2 m^3

Sub-total = 754.0 m^3 (775 m^3)

Total = 1,294.8 m^3 (1,345 m^3)

B. Curb of O/M Space (Cast-in-situ Reinforced Concrete: TypeE)

1. Concrete volume per meter

V1 = 0.20 m x 0.65 m in average x 1.0 m = 0.13 m^3/m

2. Concrete volume of each canal

Ben Nghe Canal: Left Bank = 0.13 m^3/m x 2,909.62 m = 378.3 m^3

Right Bank = 0.13 m^3/m x 2,785.63 m = 362.1 m^3

Sub-total = 740.4 m^3 (765 m^3)

Tau Hu Canal: Left Bank = 0.13 m^3/m x 3,997.07 m = 519.6 m^3

Right Bank = 0.13 m^3/m x 3,927.16 m = 510.5 m^3

Sub-total = 1,030.1 $m^3$1,060 m^3)

Total = 1,770.5 m^3 (1,825 m^3)

C. Leveling Concrete for Curb of Planting Bed

1. Concrete volume of one flower bed

Small flower bed: V1 = (2.00 x 2.00 - 1.20 x 1.20) x 0.05 = 0.128 m^3

Big flower bed: V2 = (2.00 x 9.80 - 1.20 x 9.00) x 0.05 = 0.44 m^3

2. Concrete volume of one standard module

V = 4 x V1 + 1 x V2 = 4 x 0.128 + 1 x 0.440 = 0.952 m^3

3. Concrete volume for each canal

Ben Nghe Canal: Left Bank = 72 module x 0.952 m^3 = 68.5 m^3

Right Bank = 70 module x 0.952 m^3 = 66.6 m^3

Sub-total = 135.1 m^3 (140 m^3)

Tau Hu Canal: Left Bank = 100 module x 0.952 m^3 = 95.2 m^3

Right Bank = 98 module x 0.952 m^3 = 93.3 m^3

Sub-total = 188.5 m^3 (195 m^3)

Total = 323.6 m^3 (235 m^3)

D. Leveling Concrete for Curb of O/M Space

1. Concrete volume per meter

V1 = 0.40 m x 0.05 m x 1.0 m = 0.02 m^3/m

2. Concrete volume of each canal

Ben Nghe Canal: Left Bank = 0.02 m^3/m x 2,909.62 m = 58.2 m^3

Right Bank = 0.02 m^3/m x 2,785.63 m = 55.7 m^3

Sub-total = 113.9 m^3 (120 m^3)

Tau Hu Canal: Left Bank = 0.02 m^3/m x 3,997.07 m = 79.9 m^3

Right Bank = 0.02 m^3/m x 3,927.16 m = 78.5 m^3

Sub-total = 158.4 m^3 (165 m^3)

Total = 272.3 m^3 (285 m^3)

E. Gravel for Curb of Planting Bed

Ben Nghe Canal: Left Bank = 68.5 m3 x 2 = 137.0 m^3

Right Bank = 66.6 m3 x 2 = 133.2 m^3

Sub-total = 270.2 m^3 (280 m^3)

Tau Hu Canal: Left Bank = 95.2 m3 x 2 = 190.4 m^3

Right Bank = 93.3 m3 x 2 = 186.6 m^3

Sub-total = 377.0 m^3 (390 m^3)

Total = 647.2 m^3 (670m^3)

F. Gravel for Curb of O/M Space

Ben Nghe Canal: Left Bank = 58.2 m3 x 2 = 116.4 m^3

Right Bank = 55.7 m3 x 2 = 111.4 m^3

Sub-total = 227.8 m^3 (235 m^3)

Tau Hu Canal: Left Bank = 79.9 m3 x 2 = 159.8 m^3

Right Bank = 78.5 m3 x 2 = 157.0 m^3

Sub-total = 316.8 m^3 (330 m^3)

Total = 544.6 m^3 (565 m^3)

TABLE A.6 (2/2) BREAKDOWN OF LANDSCAPE WORK QUANTITIES FOR TAU HU - BEN NGHE CANAL IMPROVEMENT

H. Agriculture Soil Filling

1. Agriculture soil volume of one flower bed

Small flower bed: V1 = 1.40 m x 1.40 m x 0.50 m= 0.98 m^3

Big flower bed: V2 = 1.40 m x 9.20 m x 0.50 m = 6.44 m^3

2. Agriculture soil volume of one standard module

V = 4 x V1 + 1 x V2 = 4 x 0.98 + 1 x 6.44 = 10.36 m^3

3. Agriculture soil volume for each canal

Ben Nghe Canal: Left Bank = 72 module x 10.36 m^3 = 745.9 m^3

Right Bank = 70 module x 10.36 m^3 = 725.2 m^3

Sub-total = 1,471.1 m^3 (1,520m^3)

Tau Hu Canal: Left Bank = 100 module x 10.36 m^3 = 1,036.0 m^3

Right Bank = 98 module x 10.36 m^3 = 1,015.3 m^3

Sub-total = 2,051.3 m^3 (2,150 m^3)

Total = 3,522.4 m^3 (3,670 m^3)

I. Tree

TABLE A.7 (1/4) BREAKDOWN OF FOUNDATION PILING QUANTITIES FOR SLIDING PROTECTION FOR FILLING WORK

ID	From Section	To Section	Length (m)	Left bank				Right bank				Both banks	
				Penetrated Width(m)	Density (Pcs/m²)	Number of Piles(Pcs)	Total Length(m)	Penetrated Width(m)	Density (Pcs/m²)	Number of Piles(Pcs)	Total Length(m)	Number of Piles(Pcs)	Total Length(m)
1. Ben Nghe Canal													
1	No.0	No.1	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	No.1	No.2	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	No.2	No.3	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	No.3	No.4	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	No.4	No.5	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	No.5	No.6	50	8.00	9.00	3,600.00	16,200.00	0.00	0.00	0.00	0.00	3,600.00	16,200.00
7	No.6	No.7	50	8.50	9.00	3,825.00	17,212.50	0.00	0.00	0.00	0.00	3,825.00	17,212.50
8	No.7	No.8	50	9.00	9.00	4,050.00	18,225.00	0.00	0.00	0.00	0.00	4,050.00	18,225.00
9	No.8	No.9	50	10.00	9.00	4,500.00	20,250.00	0.00	0.00	0.00	0.00	4,500.00	20,250.00
10	No.9	No.10	50	10.00	9.00	4,500.00	20,250.00	0.00	0.00	0.00	0.00	4,500.00	20,250.00
11	No.10	No.11	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	No.11	No.12	50	3.00	9.00	1,350.00	6,075.00	0.00	0.00	0.00	0.00	1,350.00	6,075.00
13	No.12	No.13	50	8.50	9.00	3,825.00	17,212.50	0.00	0.00	0.00	0.00	3,825.00	17,212.50
14	No.13	No.14	50	8.00	9.00	3,600.00	16,200.00	0.00	0.00	0.00	0.00	3,600.00	16,200.00
15	No.14	No.15	50	8.00	9.00	3,600.00	16,200.00	0.00	0.00	0.00	0.00	3,600.00	16,200.00
16	No.15	No.16	50	7.50	9.00	3,375.00	15,187.50	0.00	0.00	0.00	0.00	3,375.00	15,187.50
17	No.16	No.17	50	0.00	0.00	0.00	0.00	8.50	9.00	3,825.00	17,212.50	3,825.00	17,212.50
18	No.17	No.18	50	8.50	9.00	3,825.00	17,212.50	0.00	0.00	0.00	0.00	3,825.00	17,212.50
19	No.18	No.19	50	6.50	9.00	2,925.00	13,162.50	6.50	9.00	2,925.00	13,162.50	5,850.00	26,325.00
20	No.19	No.20	50	6.00	9.00	2,700.00	12,150.00	0.00	0.00	0.00	0.00	2,700.00	12,150.00
21	No.20	No.21	50	10.00	9.00	4,500.00	20,250.00	0.00	0.00	0.00	0.00	4,500.00	20,250.00
22	No.21	No.22	50	11.00	9.00	4,950.00	22,275.00	0.00	0.00	0.00	0.00	4,950.00	22,275.00
23	No.22	No.23	50	11.00	9.00	4,950.00	22,275.00	0.00	0.00	0.00	0.00	4,950.00	22,275.00
24	No.23	No.24	50	11.00	9.00	4,950.00	22,275.00	0.00	0.00	0.00	0.00	4,950.00	22,275.00
25	No.24	No.25	50	9.00	9.00	4,050.00	18,225.00	0.00	0.00	0.00	0.00	4,050.00	18,225.00
26	No.25	No.26	50	6.50	9.00	2,925.00	13,162.50	6.50	9.00	2,925.00	13,162.50	5,850.00	26,325.00
27	No.26	No.27	50	6.00	9.00	2,700.00	12,150.00	6.00	9.00	2,700.00	12,150.00	5,400.00	24,300.00
28	No.27	No.28	50	6.00	9.00	2,700.00	12,150.00	5.00	9.00	2,250.00	10,125.00	4,950.00	22,275.00
29	No.28	No.29	50	7.00	9.00	3,150.00	14,175.00	5.50	9.00	2,475.00	11,137.50	5,625.00	25,312.50
30	No.29	No.30	50	7.00	9.00	3,150.00	14,175.00	6.00	9.00	2,700.00	12,150.00	5,850.00	26,325.00
31	No.30	No.31	50	6.00	9.00	2,700.00	12,150.00	0.00	0.00	0.00	0.00	2,700.00	12,150.00
32	No.31	No.32	50	6.00	9.00	2,700.00	12,150.00	5.00	9.00	2,250.00	10,125.00	4,950.00	22,275.00
33	No.32	No.33	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	No.33	No.34	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	No.34	No.35	50	7.50	9.00	3,375.00	15,187.50	0.00	0.00	0.00	0.00	3,375.00	15,187.50
36	No.35	No.36	50	0.00	0.00	0.00	0.00	6.00	9.00	2,700.00	12,150.00	2,700.00	12,150.00
37	No.36	No.37	50	0.00	0.00	0.00	0.00	9.00	9.00	4,050.00	18,225.00	4,050.00	18,225.00

TABLE A.7 (2/4) BREAKDOWN OF FOUNDATION PILING QUANTITIES FOR SLIDING PROTECTION FOR FILLING WORK

ID	From Section	To Section	Length (m)	Left bank				Right bank				Both banks	
				Penetrated Width(m)	Density (Pcs/m²)	Number of Piles(Pcs)	Total Length(m)	Penetrated Width(m)	Density (Pcs/m²)	Number of Piles(Pcs)	Total Length(m)	Number of Piles(Pcs)	Total Length(m)
38	No.37	No.38	50	0.00	0.00	0.00	0.00	9.00	9.00	4,050.00	18,225.00	4,050.00	18,225.00
39	No.38	No.39	50	0.00	0.00	0.00	0.00	8.00	9.00	3,600.00	16,200.00	3,600.00	16,200.00
40	No.39	No.40	50	0.00	0.00	0.00	0.00	7.50	9.00	3,375.00	15,187.50	3,375.00	15,187.50
41	No.40	No.41	50	0.00	0.00	0.00	0.00	8.00	9.00	3,600.00	16,200.00	3,600.00	16,200.00
42	No.41	No.42	50	5.00	9.00	2,250.00	10,125.00	7.50	9.00	3,375.00	15,187.50	5,625.00	25,312.50
43	No.42	No.43	50	0.00	0.00	0.00	0.00	7.50	9.00	3,375.00	15,187.50	3,375.00	15,187.50
44	No.43	No.44	50	8.00	9.00	3,600.00	16,200.00	6.00	9.00	2,700.00	12,150.00	6,300.00	28,350.00
45	No.44	No.45	50	7.00	9.00	3,150.00	14,175.00	0.00	0.00	0.00	0.00	3,150.00	14,175.00
46	No.45	No.46	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
47	No.46	No.47	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48	No.47	No.48	50	0.00	0.00	0.00	0.00	5.00	9.00	2,250.00	10,125.00	2,250.00	10,125.00
49	No.48	No.49	50	5.00	9.00	2,250.00	10,125.00	8.00	9.00	3,600.00	16,200.00	5,850.00	26,325.00
50	No.49	No.50	50	0.00	0.00	0.00	0.00	6.00	9.00	2,700.00	12,150.00	2,700.00	12,150.00
51	No.50	No.51	50	5.00	9.00	2,250.00	10,125.00	0.00	0.00	0.00	0.00	2,250.00	10,125.00
52	No.51	No.52	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
53	No.52	No.53	50	0.00	0.00	0.00	0.00	9.00	9.00	4,050.00	18,225.00	4,050.00	18,225.00
54	No.53	No.54	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
55	No.54	No.55	50	0.00	0.00	0.00	0.00	5.00	9.00	2,250.00	10,125.00	2,250.00	10,125.00
56	No.55	No.56	50	5.00	9.00	2,250.00	10,125.00	5.00	9.00	2,250.00	10,125.00	4,500.00	20,250.00
57	No.56	No.57	50	5.00	9.00	2,250.00	10,125.00	5.00	9.00	2,250.00	10,125.00	4,500.00	20,250.00
58	No.57	No.58	50	7.00	9.00	3,150.00	14,175.00	5.00	9.00	2,250.00	10,125.00	5,400.00	24,300.00
59	No.58	No.59	50	8.00	9.00	3,600.00	16,200.00	0.00	0.00	0.00	0.00	3,600.00	16,200.00
60	No.59	No.60	50	8.00	9.00	3,600.00	16,200.00	11.00	9.00	4,950.00	22,275.00	8,550.00	38,475.00
61	No.60	No.61	50	7.00	9.00	3,150.00	14,175.00	0.00	0.00	0.00	0.00	3,150.00	14,175.00
62	No.61	No.62	50	7.00	9.00	3,150.00	14,175.00	0.00	0.00	0.00	0.00	3,150.00	14,175.00
63	No.62	No.63	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
64	No.63	No.64	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub.Total					**127,125.00**	**572,062.50**			**79,425.00**	**357,412.50**	**206,550.00**	**929,475.00**
2. Tau Hu Canal													
65	No.64	No.65	50	8.00	9.00	3,600.00	16,200.00	0.00	0.00	0.00	0.00	3,600.00	16,200.00
66	No.65	No.66	50	8.00	9.00	3,600.00	16,200.00	0.00	0.00	0.00	0.00	3,600.00	16,200.00
67	No.66	No.67	50	8.00	9.00	3,600.00	16,200.00	0.00	0.00	0.00	0.00	3,600.00	16,200.00
68	No.67	No.68	50	11.00	9.00	4,950.00	22,275.00	9.00	9.00	4,050.00	18,225.00	9,000.00	40,500.00
69	No.68	No.69	50	8.00	9.00	3,600.00	16,200.00	8.00	9.00	3,600.00	16,200.00	7,200.00	32,400.00
70	No.69	No.70	50	9.00	9.00	4,050.00	18,225.00	7.00	9.00	3,150.00	14,175.00	7,200.00	32,400.00
71	No.70	No.71	50	9.00	9.00	4,050.00	18,225.00	6.50	9.00	2,925.00	13,162.50	6,975.00	31,387.50
72	No.71	No.72	50	10.00	9.00	4,500.00	20,250.00	7.00	9.00	3,150.00	14,175.00	7,650.00	34,425.00
73	No.72	No.73	50	10.00	9.00	4,500.00	20,250.00	0.00	0.00	0.00	0.00	4,500.00	20,250.00

TABLE A.7 (3/4) BREAKDOWN OF FOUNDATION PILING QUANTITIES FOR SLIDING PROTECTION FOR FILLING WORK

ID	From Section	To Section	Length (m)	Left bank				Right bank				Both banks	
				Penetrated Width(m)	Density (Pcs/m²)	Number of Piles(Pcs)	Total Length(m)	Penetrated Width(m)	Density (Pcs/m²)	Number of Piles(Pcs)	Total Length(m)	Number of Piles(Pcs)	Total Length(m)
74	No.73	No.74	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	No.74	No.75	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	No.75	No.76	50	0.00	0.00	0.00	0.00	6.00	9.00	2,700.00	12,150.00	2,700.00	12,150.00
77	No.76	No.77	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	No.77	No.78	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	No.78	No.79	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	No.79	No.80	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81	No.80	No.81	50	5.00	9.00	2,250.00	10,125.00	0.00	0.00	0.00	0.00	2,250.00	10,125.00
82	No.81	No.82	50	11.00	9.00	4,950.00	22,275.00	0.00	0.00	0.00	0.00	4,950.00	22,275.00
83	No.82	No.83	50	11.00	9.00	4,950.00	22,275.00	0.00	0.00	0.00	0.00	4,950.00	22,275.00
84	No.83	No.84	50	11.00	9.00	4,950.00	22,275.00	0.00	0.00	0.00	0.00	4,950.00	22,275.00
85	No.84	No.85	50	11.00	9.00	4,950.00	22,275.00	0.00	0.00	0.00	0.00	4,950.00	22,275.00
86	No.85	No.86	50	0.00	0.00	0.00	0.00	7.00	9.00	3,150.00	14,175.00	3,150.00	14,175.00
87	No.86	No.87	50	0.00	0.00	0.00	0.00	11.00	9.00	4,950.00	22,275.00	4,950.00	22,275.00
88	No.87	No.88	50	0.00	0.00	0.00	0.00	11.00	9.00	4,950.00	22,275.00	4,950.00	22,275.00
89	No.88	No.89	50	0.00	0.00	0.00	0.00	11.00	9.00	4,950.00	22,275.00	4,950.00	22,275.00
90	No.89	No.90	50	0.00	0.00	0.00	0.00	11.00	9.00	4,950.00	22,275.00	4,950.00	22,275.00
91	No.90	No.91	50	0.00	0.00	0.00	0.00	10.00	9.00	4,500.00	20,250.00	4,500.00	20,250.00
92	No.91	No.92	50	5.00	9.00	2,250.00	10,125.00	5.00	9.00	2,250.00	10,125.00	4,500.00	20,250.00
93	No.92	No.93	50	7.00	9.00	3,150.00	14,175.00	0.00	0.00	0.00	0.00	3,150.00	14,175.00
94	No.93	No.94	50	7.00	9.00	3,150.00	14,175.00	0.00	0.00	0.00	0.00	3,150.00	14,175.00
95	No.94	No.95	50	8.00	9.00	3,600.00	16,200.00	8.00	9.00	3,600.00	16,200.00	7,200.00	32,400.00
96	No.95	No.96	50	9.00	9.00	4,050.00	18,225.00	6.00	9.00	2,700.00	12,150.00	6,750.00	30,375.00
97	No.96	No.97	50	6.00	9.00	2,700.00	12,150.00	0.00	0.00	0.00	0.00	2,700.00	12,150.00
98	No.97	No.98	50	9.00	9.00	4,050.00	18,225.00	0.00	0.00	0.00	0.00	4,050.00	18,225.00
99	No.98	No.99	50	7.00	9.00	3,150.00	14,175.00	0.00	0.00	0.00	0.00	3,150.00	14,175.00
100	No.99	No.100	50	8.00	9.00	3,600.00	16,200.00	0.00	0.00	0.00	0.00	3,600.00	16,200.00
101	No.100	No.101	50	8.00	9.00	3,600.00	16,200.00	0.00	0.00	0.00	0.00	3,600.00	16,200.00
102	No.101	No.102	50	7.00	9.00	3,150.00	14,175.00	0.00	0.00	0.00	0.00	3,150.00	14,175.00
103	No.102	No.103	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
104	No.103	No.104	50	0.00	0.00	0.00	0.00	7.00	9.00	3,150.00	14,175.00	3,150.00	14,175.00
105	No.104	No.105	50	4.00	9.00	1,800.00	8,100.00	4.00	9.00	1,800.00	8,100.00	3,600.00	16,200.00
106	No.105	No.106	50	9.00	9.00	4,050.00	18,225.00	7.00	9.00	3,150.00	14,175.00	7,200.00	32,400.00
107	No.106	No.107	50	7.00	9.00	3,150.00	14,175.00	8.00	9.00	3,600.00	16,200.00	6,750.00	30,375.00
108	No.107	No.108	50	7.00	9.00	3,150.00	14,175.00	7.00	9.00	3,150.00	14,175.00	6,300.00	28,350.00
109	No.108	No.109	50	7.00	9.00	3,150.00	14,175.00	6.00	9.00	2,700.00	12,150.00	5,850.00	26,325.00
110	No.109	No.110	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
111	No.110	No.111	50	8.00	9.00	3,600.00	16,200.00	6.00	9.00	2,700.00	12,150.00	6,300.00	28,350.00

TABLE A.7 (4/4) BREAKDOWN OF FOUNDATION PILING QUANTITIES FOR SLIDING PROTECTION FOR FILLING WORK

ID	From Section	To Section	Length (m)	Left bank				Right bank				Both banks	
				Penetrated Width(m)	Density (Pcs/m²)	Number of Piles(Pcs)	Total Length(m)	Penetrated Width(m)	Density (Pcs/m²)	Number of Piles(Pcs)	Total Length(m)	Number of Piles(Pcs)	Total Length(m)
112	No.111	No.112	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	No.112	No.113	50	0.00	0.00	0.00	0.00	9.00	9.00	4,050.00	18,225.00	4,050.00	18,225.00
114	No.113	No.114	50	0.00	0.00	0.00	0.00	7.00	9.00	3,150.00	14,175.00	3,150.00	14,175.00
115	No.114	No.115	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
116	No.115	No.116	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
117	No.116	No.117	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
118	No.117	No.118	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
119	No.118	No.119	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	No.119	No.120	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
121	No.120	No.121	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
122	No.121	No.122	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
123	No.122	No.123	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
124	No.123	No.124	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
125	No.124	No.125	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
126	No.125	No.126	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
127	No.126	No.127	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
128	No.127	No.128	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
129	No.128	No.129	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	No.129	No.130	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
131	No.130	No.131	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
132	No.131	No.132	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
133	No.132	No.133	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
134	No.133	No.134	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	No.134	No.135	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
136	No.135	No.136	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
137	No.136	No.137	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
138	No.137	No.138	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
139	No.138	No.139	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	No.139	No.140	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
141	No.140	No.141	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
142	No.141	No.142	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
143	No.142	No.143	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
144	No.143	No.144	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	No.144	No.145	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
146	No.145	No.146	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	No.146	No.147	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub.total						**113,850.00**	**512,325**			**83,025**	**373,613**	**196,875**	**885,938**
Total						240,975.00	**1,084,388**			**162,450**	**731,025**	**403,425**	**1,815,413**

TABLE A.8 (1/3) BREAKDOWN OF EARTH WORK QUANTITIES FOR CONSTRUCTION OF OUTLET AND ADDITIONAL SEWER

Outlet Number	Excavation								Backfill			
	Additional sewer				Outlet				Additional Sewer		Outlet	
	Excavated Length (m)	Excavated Width (m)	Everage Height (m)	Excaated Volume (m^3)	Excaveted Length (m)	Excavated Width (m)	Everage Height (m)	Excavated Volume (m^3)	Backfill Area (m^2)	Backfill Volume (m^3)	Backfill Area (m^2)	Backfill Volume (m^3)
1. Ben Nghe Canal												
BN - L2	16.00	3.00	3.50	168.00	5.80	3.85	1.20	26.80	9.71	155.43	8.65	10.38
BN - L3	24.00	3.00	3.20	230.40	6.13	3.85	1.20	28.32	8.81	211.55	8.98	10.78
BN - L8	28.00	3.00	4.37	367.08	4.23	3.85	0.60	9.77	12.32	345.09	7.09	4.25
BN - L9	12.00	3.00	3.72	133.92	4.90	3.85	0.80	15.09	10.37	124.50	7.75	6.20
BN - L10	16.00	3.00	3.15	151.20	5.46	3.85	1.10	23.12	8.66	138.63	8.32	9.15
BN - L12	24.00	3.50	4.06	341.04	5.29	4.50	1.80	42.85	12.44	298.63	8.79	15.82
BN - L14	24.00	3.00	3.58	257.76	5.11	3.85	1.30	25.58	9.95	238.91	7.96	10.35
BN - L16	28.00	3.00	1.67	140.28	7.83	3.85	0.50	15.07	4.22	118.29	10.69	5.35
BN - R7	4.00	3.20	3.23	41.34	6.04	4.11	1.60	39.72	9.21	36.82	9.15	14.64
BN - R10	4.00	3.00	3.24	38.88	5.17	3.85	1.40	27.87	8.93	35.74	8.02	11.23
BN - R17	16.00	3.00	2.66	127.68	6.64	3.85	-	-	7.19	115.11	9.49	-
BN - L15	12.00	2.80	2.85	95.76	5.77	3.48	-	-	7.48	89.73	8.25	-
BN - R3	4.00	2.60	2.86	29.74	5.65	3.22	0.20	3.64	7.15	28.61	7.87	1.57
BN - R4	16.00	2.60	2.88	119.81	5.65	3.22	0.20	3.64	7.21	115.28	7.87	1.57
BN - R8	12.00	2.80	4.13	138.77	4.08	3.48	-	-	11.06	132.74	6.57	-
BN - R12	12.00	2.80	3.47	116.59	5.01	3.48	1.70	29.64	9.21	110.56	7.50	12.75
BN - R13	12.00	2.80	3.50	117.60	4.84	3.48	1.20	20.21	9.30	111.57	7.32	8.78
BN - R14	4.00	2.80	3.50	39.20	4.84	3.48	1.20	20.21	9.30	37.19	7.32	8.78
BN - R15	24.00	2.60	2.40	149.76	5.86	3.22	-	-	5.96	142.97	8.08	-
BN - R16	16.00	2.80	3.03	135.74	5.53	3.48	0.30	5.77	7.98	127.70	8.01	2.40
BN - R18	12.00	2.60	3.17	98.90	5.22	3.22	0.90	15.13	7.96	95.51	7.45	6.71
BN - L11	8.50	6.60	4.00	224.40	5.86	8.50	1.90	94.64	15.36	130.56	20.56	39.06
BN - R9	26.40	5.60	3.50	517.44	6.18	7.35	1.70	77.22	12.04	317.86	25.36	43.11
BN - L13	7.25	4.40	4.60	146.74	5.05	6.21	1.60	50.18	14.48	104.98	14.31	22.90
BN - L17	7.25	4.40	4.60	146.74	5.05	6.21	1.60	50.18	14.48	104.98	14.31	22.90
BN - L4	6.00	4.00	4.40	105.60	6.88	6.16	1.50	63.57	11.88	71.28	18.25	27.38
BN - L5	6.00	4.20	3.50	88.20	7.93	6.36	1.20	60.52	8.46	50.76	25.15	30.18
BN - L7	25.20	3.90	4.50	442.26	6.05	5.91	1.10	39.33	13.14	331.13	16.01	17.61
BN - R6	10.00	1.50	2.20	33.00					3.17	31.74		

TABLE A.8 (2/3) BREAKDOWN OF EARTH WORK QUANTITIES FOR CONSTRUCTION OF OUTLET AND ADDITIONAL SEWER

Outlet Number	Excavation								Backfill			
	Additional sewer				Outlet				Additional Sewer		Outlet	
	Excavated Length (m)	Excavated Width (m)	Everage Height (m)	Excaated Volume (m^3)	Excaveted Length (m)	Excavated Width (m)	Everage Height (m)	Excavated Volume (m^3)	Backfill Area (m^2)	Backfill Volume (m^3)	Backfill Area (m^2)	Backfill Volume (m^3)
BN - R11	2.00	1.50	1.10	3.30					1.52	3.05		
BN - R19	12.00	1.50	1.50	27.00					2.12	25.49		
BN - R20	6.00	1.50	1.80	16.20					2.57	15.45		
BN - R21	14.00	1.50	1.60	33.60					2.27	31.84		
BN - R22	24.00	1.50	1.20	43.20					1.67	40.19		
Sub.Total				**4,867.14**				**788.06**		**4,069.87**		**343.85**
2. Tau Hu Canal												
TH - L3	16.00	3.00	2.61	125.28	6.97	3.85	1.50	40.25	7.04	112.71	9.82	14.73
TH - L4	32.00	3.00	3.01	288.96	6.30	3.85	1.48	35.90	8.24	263.83	9.16	13.56
TH - L5	44.00	3.00	2.90	382.80	6.28	3.85	1.45	35.06	7.91	348.24	9.13	13.24
TH - L7	24.00	3.00	2.81	202.32	6.48	3.85	1.40	34.93	7.64	183.47	9.34	13.08
TH - L11	4.00	3.50	3.96	55.44	5.49	4.50	1.25	30.88	12.09	48.37	9.01	11.26
TH - L12	8.00	3.00	3.18	76.32	5.91	3.85	1.25	28.44	8.75	70.04	8.77	10.96
TH - L13	20.00	3.00	3.14	188.40	6.31	3.85	0.20	4.86	8.63	172.69	9.16	1.83
TH - L17	4.00	3.00	2.66	31.92	6.79	3.85	2.00	52.28	7.19	28.78	9.64	19.28
TH - L23	8.00	3.00	2.63	63.12	6.84	3.85	1.50	39.50	7.10	56.84	9.70	14.55
TH - R1	28.00	3.00	2.19	183.96	6.84	3.85	-	-	5.78	161.97	9.70	-
TH - R4	4.00	3.00	3.63	43.56	4.96	3.85	0.80	15.28	10.10	40.42	7.81	6.25
TH - R9	4.00	3.00	3.06	36.72	6.25	3.85	1.10	26.47	8.39	33.58	9.10	10.01
TH - R18	4.00	3.00	3.01	36.12	6.21	3.85	1.20	28.69	8.24	32.98	9.07	10.88
TH - L8	32.00	2.80	2.50	224.00	4.87	3.48	0.50	8.47	6.50	207.92	7.35	3.68
TH - L16	4.00	2.60	2.86	29.74	5.59	3.22	0.30	5.40	7.15	28.61	7.81	2.34
TH - L24	4.00	2.60	2.91	30.26	2.21	1.33	0.85	2.50	7.28	29.13	0.53	0.45
TH - L21	4.00	2.80	2.21	24.75	2.30	1.63	1.10	4.12	5.69	22.74	0.88	0.97
TH - R7	4.00	2.60	4.18	43.47	2.80	1.44	0.80	3.23	10.59	42.34	0.22	0.18
TH - R10	4.00	2.60	2.31	24.02	2.15	1.31	1.40	3.94	5.72	22.89	0.54	0.76
TH - R11	4.00	2.80	2.42	27.10	2.20	1.61	1.00	3.54	6.27	25.09	0.90	0.90
TH - R5	4.00	2.80	4.60	51.52	2.70	4.30	0.80	9.28	12.38	49.51	7.74	6.19
TH - R6	4.00	2.80	4.66	52.19	2.60	4.30	0.80	8.93	12.55	50.18	7.31	5.85
TH - L15	-	-	-	-	6.99	8.69	1.90	115.41		-	29.30	55.67

TABLE A.8 (3/3) BREAKDOWN OF EARTH WORK QUANTITIES FOR CONSTRUCTION OF OUTLET AND ADDITIONAL SEWER

Outlet Number	Excavation								Backfill			
	Additional sewer				Outlet				Additional Sewer		Outlet	
	Excavated Length (m)	Excavated Width (m)	Everage Height (m)	Excaated Volume (m^3)	Excaveted Length (m)	Excavated Width (m)	Everage Height (m)	Excavated Volume (m^3)	Backfill Area (m^2)	Backfill Volume (m^3)	Backfill Area (m^2)	Backfill Volume (m^3)
TH - L10	6.30	5.30	4.70	156.93	7.15	7.53	0.70	37.69	18.07	113.84	19.83	13.88
TH - L6	6.00	3.90	3.50	81.90	7.10	5.91	0.90	37.76	13.29	79.74	22.22	20.00
TH - L9	7.50	3.45	3.90	100.91	5.96	5.39	0.50	16.06	11.38	85.36	16.02	8.01
TH - L14	7.50	3.45	2.40	62.10	7.52	5.39	1.20	48.64	6.21	46.55	24.43	29.32
TH - L18	5.00	3.90	2.30	44.85	2.50	5.10	0.75	9.56	5.73	28.65	8.22	6.17
TH - L22	5.00	3.45	2.20	37.95	2.30	4.50	0.80	8.28	5.52	27.58	7.28	5.82
TH - L27	10.00	1.50	1.20	18.00					1.67	16.74		
TH - L28	10.00	1.50	1.60	24.00					2.27	22.74		
TH - L30	10.00	1.50	0.90	13.50					1.22	12.24		
TH - L32	10.00	1.50	1.40	21.00					1.97	19.74		
TH - L34	10.00	1.50	1.20	18.00					1.67	16.74		
TH - L35	10.00	1.50	1.20	18.00					1.67	16.74		
TH - L36	10.00	1.50	1.80	27.00					2.57	25.74		
TH - L38	10.00	1.50	1.80	27.00					2.57	25.74		
TH - L39	10.00	1.50	1.80	27.00					2.57	25.74		
TH - L40	10.00	1.50	1.80	27.00					2.57	25.74		
TH - LR2	6.00	1.50	1.80	16.20					2.57	15.45		
TH - LR3	6.00	1.50	1.90	17.10					2.72	16.35		
TH - R12	10.00	1.50	1.80	27.00					2.57	25.74		
TH - R13	10.00	1.50	1.80	27.00					2.57	25.74		
TH - R14	10.00	1.50	1.80	27.00					2.57	25.74		
TH - R15	10.00	1.50	1.80	27.00					2.57	25.74		
TH - R16	10.00	1.50	1.80	27.00					2.57	25.74		
TH - R17	10.00	1.50	1.80	27.00					2.57	25.74		
Sub.Total				**3,122.44**				**695.36**		**2,808.25**		**299.82**
Total				**7,989.58**				**1,483.42**		**6,878.12**		**643.67**

TABLE A.9 (1/2) BREAKDOWN OF FOUNDATION PILING WORK QUANTITIES FOR CONSTRUCTION OF OUTLET AND ADDITIONAL SEWER

Outlet name	Additional Sewer (16pcs/m^2)				Outlet structure(25pcs/m^2)		
	Pilling Length (m)	Piling Width (m)	Number of Pile	Total Length(m)	Pilling Area(m2)	Number of Pile	Total Length(m)
1. Ben Nghe Canal							
BN - L2	16.00	1.00	256.00	1,152.00	8.66	217.00	977.00
BN - L3	24.00	1.00	384.00	1,728.00	8.66	217.00	977.00
BN - L8	28.00	1.00	448.00	2,016.00	8.66	217.00	977.00
BN - L9	12.00	1.00	192.00	864.00	8.66	217.00	977.00
BN - L10	16.00	1.00	256.00	1,152.00	8.66	217.00	977.00
BN - L12	24.00	1.50	576.00	2,592.00	13.26	332.00	1,494.00
BN - L14	24.00	1.00	384.00	1,728.00	8.66	217.00	977.00
BN - L16	28.00	1.00	448.00	2,016.00	8.66	217.00	977.00
BN - R7	4.00	1.20	77.00	346.50	10.38	260.00	1,170.00
BN - R10	4.00	1.00	64.00	288.00	8.66	217.00	977.00
BN - R17	16.00	1.00	256.00	1,152.00	8.66	217.00	977.00
BN - L15	12.00	0.80	154.00	693.00	5.80	145.00	653.00
BN - R3	4.00	0.60	38.00	171.00	4.53	113.00	509.00
BN - R4	16.00	0.60	154.00	693.00	4.53	113.00	509.00
BN - R8	12.00	0.80	154.00	693.00	5.80	145.00	653.00
BN - R12	12.00	0.80	154.00	693.00	5.80	145.00	653.00
BN - R13	12.00	0.80	154.00	693.00	5.80	145.00	653.00
BN - R14	4.00	0.80	51.00	229.50	5.80	145.00	653.00
BN - R15	24.00	0.60	230.00	1,035.00	4.53	113.00	509.00
BN - R16	16.00	0.60	154.00	693.00	4.53	113.00	509.00
BN - R18	12.00	0.60	115.00	517.50	4.53	113.00	509.00
BN - L11	8.50	4.60	626.00	2,817.00	33.15	829.00	3,731.00
BN - R9	26.40	3.60	1,521.00	6,844.50	22.74	569.00	2,561.00
BN - L13	7.25	2.40	278.00	1,251.00	18.16	454.00	2,043.00
BN - L17	7.25	2.40	278.00	1,251.00	18.16	454.00	2,043.00
BN - L4	6.00	1.60	154.00	693.00	19.01	475.00	2,138.00
BN - L5	6.00	1.80	173.00	778.50	19.97	499.00	2,246.00
BN - L7	25.20	1.50	605.00	2,722.50	15.03	376.00	1,692.00
Sub.Total			**8,334.00**	**37,503.00**		**7,491.00**	**33,721.00**
2. Tau Hu Canal							
TH - L3	16.00	1.00	256.00	1,152.00	8.66	217.00	977.00
TH - L4	32.00	1.00	512.00	2,304.00	8.66	217.00	977.00
TH - L5	44.00	1.00	704.00	3,168.00	8.66	217.00	977.00
TH - L7	24.00	1.00	384.00	1,728.00	8.66	217.00	977.00
TH - L11	4.00	1.50	96.00	432.00	13.26	332.00	1,494.00
TH - L12	8.00	1.00	128.00	576.00	8.66	217.00	977.00
TH - L13	20.00	1.00	320.00	1,440.00	8.66	217.00	977.00
TH - L17	4.00	1.00	64.00	288.00	8.66	217.00	977.00
TH - L23	8.00	1.00	128.00	576.00	8.66	217.00	977.00
TH - R1	28.00	1.00	448.00	2,016.00	8.66	217.00	977.00
TH - R4	4.00	1.00	64.00	288.00	8.66	217.00	977.00

TABLE A.9 (2/2) BREAKDOWN OF FOUNDATION PILING WORK QUANTITIES FOR CONSTRUCTION OF OUTLET AND ADDITIONAL SEWER

Outlet name	Additional Sewer (16pcs/m^2)				Outlet structure(25pcs/m^2)		
	Pilling Length (m)	Piling Width (m)	Number of Pile	Total Length(m)	Pilling Area(m2)	Number of Pile	Total Length(m)
TH - R9	4.00	1.00	64.00	288.00	8.66	217.00	977.00
TH - R18	4.00	1.00	64.00	288.00	8.66	217.00	977.00
TH - L8	32.00	0.80	410.00	1,845.00	5.80	145.00	653.00
TH - L16	4.00	0.60	38.00	171.00	4.53	113.00	509.00
TH - L24	4.00	0.60	38.00	171.00	2.41	60.00	270.00
TH - L21	4.00	0.80	51.00	229.50	2.86	72.00	324.00
TH - R7	4.00	0.60	38.00	171.00	3.82	96.00	432.00
TH - R10	4.00	0.60	38.00	171.00	2.28	57.00	257.00
TH - R11	4.00	0.80	51.00	229.50	2.64	66.00	297.00
TH - R5	4.00	0.50	32.00	144.00	3.86	97.00	437.00
TH - R6	4.00	0.50	32.00	144.00	2.96	74.00	333.00
TH - L15	-	4.75	-	-	31.51	788.00	3,546.00
TH - L10	6.30	3.30	333.00	1,498.50	26.24	656.00	2,952.00
TH - L6	6.00	1.50	144.00	648.00	15.03	376.00	1,692.00
TH - L9	7.50	1.44	173.00	778.50	10.08	252.00	1,134.00
TH - L14	7.50	1.44	173.00	778.50	10.08	252.00	1,134.00
TH - L18	5.00	1.70	136.00	612.00	4.58	115.00	518.00
TH - L22	5.00	1.30	104.00	468.00	3.23	81.00	365.00
Addi	-	-	-	-	11.05	276.00	1,242.00
Sub.Total			**5,023.00**	**22,603.50**		**6,512.00**	**29,313.00**
Total			**13,357.00**	**60,106.50**		**14,003.00**	**63,034.00**

TABLE A.10(1/2) BREAKDOWN OF BEDDING WORK QUANTITIES FOR CONSTRUCTION OF OUTLET AND ADDITIONAL SEWER

Name of Outlet	Additional Sewer				Outlet		
	Length (m)	Width (m)	Volume of Concrete (m^3)	Volume of Bedding sand (m^3)	Area (m^2)	Volume of Concrete (m^3)	Volume of Bedding sand (m^3)
1. Ben Nghe Canal							
BN - L2	16.00	1.40	2.24	4.48	8.66	0.87	1.73
BN - L3	24.00	1.40	3.36	6.72	8.66	0.87	1.73
BN - L8	28.00	1.40	3.92	7.84	8.66	0.87	1.73
BN - L9	12.00	1.40	1.68	3.36	8.66	0.87	1.73
BN - L10	16.00	1.40	2.24	4.48	8.66	0.87	1.73
BN - L12	24.00	1.90	4.56	9.12	13.26	1.33	2.65
BN - L14	24.00	1.40	3.36	6.72	8.66	0.87	1.73
BN - L16	28.00	1.40	3.92	7.84	8.66	0.87	1.73
BN - R7	4.00	1.60	0.64	1.28	10.38	1.04	2.08
BN - R10	4.00	1.40	0.56	1.12	8.66	0.87	1.73
BN - R17	16.00	1.40	2.24	4.48	8.66	0.87	1.73
BN - L15	12.00	1.20	1.44	2.88	8.66	0.87	1.73
BN - R3	4.00	1.00	0.4	0.8	8.66	0.87	1.73
BN - R4	16.00	1.00	1.6	3.2	8.66	0.87	1.73
BN - R8	12.00	1.20	1.44	2.88	8.66	0.87	1.73
BN - R12	12.00	1.20	1.44	2.88	13.26	1.33	2.65
BN - R13	12.00	1.20	1.44	2.88	8.66	0.87	1.73
BN - R14	4.00	1.20	0.48	0.96	8.66	0.87	1.73
BN - R15	24.00	1.00	2.4	4.8	8.66	0.87	1.73
BN - R16	16.00	1.00	1.6	3.2	8.66	0.87	1.73
BN - R18	12.00	1.00	1.2	2.4	8.66	0.87	1.73
BN - L11	8.50	5.00	4.25	8.5	8.66	0.87	1.73
BN - R9	26.40	4.00	10.56	21.12	8.66	0.87	1.73
BN - L13	7.25	2.80	2.03	4.06	8.66	0.87	1.73
BN - L17	7.25	2.80	2.03	4.06	5.80	0.58	1.16
BN - L4	6.00	2.00	1.2	2.4	4.53	0.45	0.91
BN - L5	6.00	2.20	1.32	2.64	4.53	0.45	0.91
BN - L7	25.20	1.90	4.79	9.58	5.80	0.58	1.16
Sub.Total			**68.34**	**136.68**		**24.03**	**47.85**
2. Tau Hu Canal							
TH - L3	16.00	0.40	0.64	1.28	5.80	0.58	1.16
TH - L4	32.00	1.40	4.48	8.96	5.80	0.58	1.16
TH - L5	44.00	1.40	6.16	12.32	5.80	0.58	1.16
TH - L7	24.00	1.40	3.36	6.72	4.53	0.45	0.91
TH - L11	4.00	1.40	0.56	1.12	4.53	0.45	0.91
TH - L12	8.00	1.90	1.52	3.04	4.53	0.45	0.91
TH - L13	20.00	1.40	2.8	5.6	5.80	0.58	1.16
TH - L17	4.00	1.40	0.56	1.12	4.53	0.45	0.91
TH - L23	8.00	1.40	1.12	2.24	2.41	0.24	0.48
TH - R1	28.00	1.40	3.92	7.84	2.86	0.29	0.57
TH - R4	4.00	1.40	0.56	1.12	3.82	0.38	0.76

TABLE A.10(2/2) BREAKDOWN OF BEDDING WORK QUANTITIES FOR CONSTRUCTION OF OUTLET AND ADDITIONAL SEWER

Name of Outlet	Additional Sewer				Outlet		
	Length (m)	Width (m)	Volume of Concrete (m^3)	Volume of Bedding sand (m^3)	Area (m^2)	Volume of Concrete (m^3)	Volume of Bedding sand (m^3)
TH - R9	4.00	1.40	0.56	1.12	2.28	0.23	0.46
TH - R18	4.00	1.40	0.56	1.12	2.64	0.26	0.53
TH - L8	32.00	1.40	4.48	8.96	3.86	0.39	0.77
TH - L16	4.00	1.20	0.48	0.96	2.96	0.3	0.59
TH - L24	4.00	1.00	0.4	0.8	33.15	3.32	6.63
TH - L21	4.00	1.00	0.4	0.8	31.51	3.15	6.30
TH - R7	4.00	1.20	0.48	0.96	22.74	2.27	4.55
TH - R10	4.00	1.00	0.4	0.8	26.24	2.62	5.25
TH - R11	4.00	1.00	0.4	0.8	18.16	1.82	3.63
TH - R5	4.00	1.20	0.48	0.96	18.16	1.82	3.63
TH - R6	4.00	0.90	0.36	0.72	19.01	1.9	3.80
TH - L15	-	0.90	0	0	19.97	2	3.99
TH - L10	6.30	5.15	3.24	6.49	15.03	1.5	3.01
TH - L6	6.00	3.70	2.22	4.44	15.03	1.5	3.01
TH - L9	7.50	1.90	1.43	2.85	10.08	1.01	2.02
TH - L14	7.50	1.84	1.38	2.76	10.08	1.01	2.02
TH - L18	5.00	1.84	0.92	1.84	4.58	0.46	0.92
TH - L22	5.00	2.10	1.05	2.1	3.23	0.32	0.65
Addi	-	1.70	0	0	11.05	1.11	2.21
Sub.Total			**44.92**	**89.84**		**32.02**	**64.06**
Total			**113.26**	**226.52**		**56.05**	**111.91**

TABLE A.11 (1/2) BREAKDOWN OF CONCRETE WORK QUANTITIES FOR CONSTRUCTION OF OUTLET AND ADDITIONAL SEWER

Outlet name	Headwall t = 300		Wingwall t = 300		Apron t = 300		Total
	Area(m^2)	Volume (m^3)	Area(m^2)	Volume (m^3)	Area(m^2)	Volume (m^3)	Volume(m^3)
1. Ben Nghe Canal							
BN - L2	1.03	0.31	6.22	1.87	18.22	5.47	7.65
BN - L3	1.03	0.31	6.22	1.87	19.42	5.83	8.01
BN - L8	1.03	0.31	6.22	1.87	12.48	3.74	5.92
BN - L9	1.03	0.31	6.22	1.87	14.94	4.48	6.66
BN - L10	1.03	0.31	6.22	1.87	16.96	5.09	7.27
BN - L12	0.36	0.11	9.65	2.90	19.37	5.81	8.82
BN - L14	1.03	0.31	6.22	1.87	15.70	4.71	6.89
BN - L16	1.03	0.31	6.22	1.87	25.60	7.68	9.86
BN - R7	0.81	0.24	7.50	2.25	20.58	6.17	8.66
BN - R10	1.03	0.31	6.22	1.87	15.92	4.78	6.96
BN - R17	3.36	1.01	6.22	1.87	21.28	6.38	9.26
BN - L15	2.73	0.82	4.14	1.24	16.22	4.87	6.93
BN - R3	2.30	0.69	3.20	0.96	14.35	4.31	5.96
BN - R4	2.30	0.69	3.20	0.96	14.35	4.31	5.96
BN - R8	2.73	0.82	4.14	1.24	10.87	3.26	5.32
BN - R12	2.73	0.82	4.14	1.24	13.80	4.14	6.20
BN - R13	2.73	0.82	4.14	1.24	8.54	2.56	4.62
BN - R14	2.73	0.82	4.14	1.24	8.54	2.56	4.62
BN - R15	2.30	0.69	3.20	0.96	14.94	4.48	6.13
BN - R16	2.73	0.82	4.14	1.24	15.46	4.64	6.70
BN - R18	2.30	0.69	3.20	0.96	13.12	3.94	5.59
BN - L11	1.36	0.41	14.40	4.32	35.76	10.73	15.46
BN - R9	0.72	0.22	10.88	3.26	32.27	9.68	13.16
BN - L13	0.96	0.29	17.44	5.23	30.61	9.18	14.70
BN - L17	0.96	0.29	17.44	5.23	30.61	9.18	14.70
BN - L4	0.80	0.24	18.56	5.57	27.21	8.16	13.97
BN - L5	0.88	0.26	18.56	5.57	34.59	10.38	16.21
BN - L7	0.76	0.23	13.64	4.09	22.21	6.66	10.98
Sub.Total	**44.79**	**13.46**	**221.69**	**66.53**	**543.92**	**163.18**	**243.17**
2. Tau Hu Canal							
TH - L3	3.36	1.01	6.22	1.87	19.42	5.83	8.71
TH - L4	3.36	1.01	6.22	1.87	20.02	6.01	8.89
TH - L5	3.36	1.01	6.22	1.87	19.97	5.99	8.87
TH - L7	3.36	1.01	6.22	1.87	20.68	6.20	9.08
TH - L11	4.58	1.37	9.65	2.90	20.24	6.07	10.34
TH - L12	3.36	1.01	6.22	1.87	18.60	5.58	8.46
TH - L13	3.36	1.01	6.22	1.87	19.42	5.83	8.71
TH - L17	3.36	1.01	6.22	1.87	21.83	6.55	9.43
TH - L23	3.36	1.01	6.22	1.87	21.99	6.60	9.48
TH - R1	3.36	1.01	6.22	1.87	21.99	6.60	9.48
TH - R4	3.36	1.01	6.22	1.87	15.16	4.55	7.43

TABLE A.11 (2/2) BREAKDOWN OF CONCRETE WORK QUANTITIES FOR CONSTRUCTION OF OUTLET AND ADDITIONAL SEWER

Outlet name	Headwall t = 300		Wingwall t = 300		Apron t = 300		Total
	Area(m^2)	Volume (m^3)	Area(m^2)	Volume (m^3)	Area(m^2)	Volume (m^3)	Volume(m^3)
TH - R9	3.36	1.01	6.22	1.87	19.86	5.96	8.84
TH - R18	3.36	1.01	6.22	1.87	19.69	5.91	8.79
TH - L8	2.73	0.82	4.14	1.24	13.38	4.01	6.07
TH - L16	2.30	0.69	3.20	0.96	14.18	4.25	5.90
TH - L24	4.00	1.20	5.94	1.78	7.97	2.39	5.37
TH - L21	4.36	1.31	10.08	3.02	7.74	2.32	6.65
TH - R7	5.89	1.77	4.91	1.47	5.48	1.64	4.88
TH - R10	3.58	1.07	5.28	1.58	7.27	2.18	4.83
TH - R11	3.98	1.19	10.08	3.02	7.99	2.40	6.61
TH - R5	2.73	0.82	2.99	0.90	5.97	1.79	3.51
TH - R6	2.73	0.82	2.21	0.66	5.97	1.79	3.27
TH - L15	0.80	0.24	15.51	4.65	45.63	13.69	18.58
TH - L10	0.99	0.30	22.76	6.83	41.45	12.44	19.57
TH - L6	0.76	0.23	13.64	4.09	27.65	8.30	12.62
TH - L9	0.81	0.24	10.64	3.19	21.56	6.47	9.90
TH - L14	0.81	0.24	10.64	3.19	26.36	7.91	11.34
TH - L18	1.53	0.46	8.88	2.66	14.90	4.47	7.59
TH - L22	1.20	0.36	6.73	2.02	13.12	3.94	6.32
Addi	0.81	0.24	7.50	2.25	18.43	5.53	8.02
Sub.Total	**84.91**	**25.49**	**229.42**	**68.85**	**543.91**	**163.20**	**257.54**
Total	**129.70**	**38.95**	**451.11**	**135.38**	**1087.83**	**326.38**	**500.71**

TABLE A.12 (1/2) BREAKDOWN OF BAR ARRANGEMENT WORK QUANTITIES FOR CONSTRUCTION OF OUTLET AND ADDITIONAL SEWER

No	Name of Outlet	Concrete Volume (m3)	Specific Reinforcing Bar weight (kg/m3)	Reinforcing Bar Weight (kg)
1. Ben Nghe Canal				
1	BN - L2	7.65	65.00	497.25
2	BN - L3	8.01	65.00	520.65
3	BN - L8	5.92	65.00	384.80
4	BN - L9	6.66	65.00	432.90
5	BN - L10	7.27	65.00	472.55
6	BN - L12	8.82	65.00	573.30
7	BN - L14	6.89	65.00	447.85
8	BN - L16	9.86	65.00	640.90
9	BN - R7	8.66	65.00	562.90
10	BN - R10	6.96	65.00	452.40
11	BN - R17	9.26	65.00	601.90
12	BN - L15	6.93	65.00	450.45
13	BN - R3	5.96	65.00	387.40
14	BN - R4	5.96	65.00	387.40
15	BN - R8	5.32	65.00	345.80
16	BN - R12	6.20	65.00	403.00
17	BN - R13	4.62	65.00	300.30
18	BN - R14	4.62	65.00	300.30
19	BN - R15	6.13	65.00	398.45
20	BN - R16	6.70	65.00	435.50
21	BN - R18	5.59	65.00	363.35
22	BN - L11	15.46	65.00	1,004.90
23	BN - R9	13.16	65.00	855.40
24	BN - L13	14.70	65.00	955.50
25	BN - L17	14.70	65.00	955.50
26	BN - L4	13.97	65.00	908.05
27	BN - L5	16.21	65.00	1,053.65
28	BN - L7	10.98	65.00	713.70
	Sub.Total	**243.17**	**65.00**	**15,806.05**
2. Tau Hu Canal				
1	TH - L3	8.71	65.00	566.15
2	TH - L4	8.89	65.00	577.85
3	TH - L5	8.87	65.00	576.55
4	TH - L7	9.08	65.00	590.20
5	TH - L11	10.34	65.00	672.10
6	TH - L12	8.46	65.00	549.90
7	TH - L13	8.71	65.00	566.15
8	TH - L17	9.43	65.00	612.95
9	TH - L23	9.48	65.00	616.20
10	TH - R1	9.48	65.00	616.20
11	TH - R4	7.43	65.00	482.95

TABLE A.12 (2/2) BREAKDOWN OF BAR ARRANGEMENT WORK QUANTITIES FOR CONSTRUCTION OF OUTLET AND ADDITIONAL SEWER

No	Name of Outlet	Concrete Volume (m3)	Specific Reinforcing Bar weight (kg/m3)	Reinforcing Bar Weight (kg)
12	TH - R9	8.84	65.00	574.60
13	TH - R18	8.79	65.00	571.35
14	TH - L8	6.07	65.00	394.55
15	TH - L16	5.90	65.00	383.50
16	TH - L24	5.37	65.00	349.05
17	TH - L21	6.65	65.00	432.25
18	TH - R7	4.88	65.00	317.20
19	TH - R10	4.83	65.00	313.95
20	TH - R11	6.61	65.00	429.65
21	TH - R5	3.51	65.00	228.15
22	TH - R6	3.27	65.00	212.55
23	TH - L15	18.58	65.00	1,207.70
24	TH - L10	19.57	65.00	1,272.05
25	TH - L6	12.62	65.00	820.30
26	TH - L9	9.90	65.00	643.50
27	TH - L14	11.34	65.00	737.10
28	TH - L18	7.59	65.00	493.35
29	TH - L22	6.32	65.00	410.80
30	Addi	8.02	65.00	521.30
	Sub.Total	**257.54**	**65.00**	**16,740.10**
	Total	**500.71**	**65.00**	**32,546.15**

TABLE A.13 (1/3) BREAKDOWN OF ADDITIONAL SEWER CONSTRUCTION LENGTH

Name of Outlet	Length due to sewer dimension (m)														
	D400	D600	D800	D1000	D1200	D1500	H10x10	H12x12	H15x15	H16x20	H18x20	H20x20	H20x20D	H28x24	H30x15
1. Ben Nghe Canal															
BN - L2				16											
BN - L3				24											
BN - L4										6					
BN - L5											6				
BN - L7									25.2						
BN - L8				28											
BN - L9				12											
BN - L10				16											
BN - L11													8.5		
BN - L12						24									
BN - L13												7.25			
BN - L14				24											
BN - L15			12												
BN - L16				28											
BN - L17												7.25			
BN - R3		4													
BN - R4		16													
BN - R5	8														
BN - R6	10														
BN - R7					4										
BN - R8			12												
BN - R9															26.4
BN - R10				4											
BN - R11	2														
BN - R12			12												
BN - R13			12												
BN - R14			4												
BN - R15		24													
BN - R16			16												
BN - R17				16											

TABLE A.13 (2/3) BREAKDOWN OF ADDITIONAL SEWER CONSTRUCTION LENGTH

Name of Outlet	Length due to sewer dimension (m)														
	D400	D600	D800	D1000	D1200	D1500	H10x10	H12x12	H15x15	H16x20	H18x20	H20x20	H20x20D	H28x24	H30x15
BN - R18		4													
BN - R19	12														
BN - R20	6														
BN - R21	14														
BN - R22	24														
Sub-total	**76**	**48**	**68**	**168**	**4**	**24**	**0**	**0**	**25.2**	**6**	**6**	**14.5**	**8.5**	**0**	**26.4**
TH - L3				24											
TH - L4				32											
TH - L5				44											
TH - L6									6						
TH - L7				24											
TH - L8			32												
TH - L9								7.5							
TH - L10														6.3	
TH - L11						4									
TH - L12				8											
TH - L13				20											
TH - L14								7.5							
TH - L15													0		
TH - L16		4													
TH - L17				4											
TH - L18									5						
TH - L22							5								
TH - L23				8											
TH - L24		4													
TH - L27	10														
TH - L28	10														
TH - L30	10														
TH - L32	10														
TH - L34	10														
TH - L35	10														

TABLE A.13 (3/3) BREAKDOWN OF ADDITIONAL SEWER CONSTRUCTION LENGTH

Name of Outlet	Length due to sewer dimension (m)														
	D400	D600	D800	D1000	D1200	D1500	H10x10	H12x12	H15x15	H16x20	H18x20	H20x20	H20x20D	H28x24	H30x15
TH - L36	10														
TH - L38	10														
TH - L39	10														
TH - L40	10														
TH - L42	10														
TH - R1				28											
TH - R2	6														
TH - R3	6														
TH - R4				4											
TH - R5			4												
TH - R6			4												
TH - R7		4													
TH - R9				4											
TH - R10		4													
TH - R11			4												
TH - R12			10												
TH - R13			10												
TH - R14			10												
TH - R15			10												
TH - R16			10												
TH - R17			10												
TH - R18				4											
Sub-total	**122**	**16**	**104**	**204**	**0**	**4**	**5**	**15**	**11**	**0**	**0**	**0**	**0**	**6.3**	**0**
Total	**198**	**64**	**172**	**372**	**4**	**28**	**5**	**15**	**36.2**	**6**	**6**	**14.5**	**8.5**	**6.3**	**26.4**

Table A. 14 (1) Pipe Installation Work for ϕ 400

Bill of Quantity

Area : TH Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : C.Pipe Foundation Type : T OK ! T

Manhole No. : I6 I13

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) $_m$ 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I6	1.500	0.000	1.50	0.33		1.83														pipes	m			
M6	1.500	-0.075	1.58	0.33	1.40	1.90	1.87	2.50	1.15	1.35	6.55	0.00	6.55	0.37	3.50	1.72	1.33	3.51	6.55	0	1.35	1.35	2.50	0.00
I7	1.530	0.030	1.50	0.33		1.83																		
M7	1.530	-0.045	1.58	0.33	1.40	1.90	1.87	2.50	1.15	1.35	6.55	0.00	6.55	0.37	3.50	1.72	1.33	3.51	6.55	0	1.35	1.35	2.50	0.00
I8	1.607	0.107	1.50	0.33		1.83																		
M8	1.607	0.032	1.58	0.33	1.40	1.90	1.87	2.50	1.15	1.35	6.55	0.00	6.55	0.37	3.50	1.72	1.33	3.51	6.55	0	1.35	1.35	2.50	0.00
I9	1.677	0.177	1.50	0.33		1.83																		
M9	1.677	0.102	1.58	0.33	1.40	1.90	1.87	2.50	1.15	1.35	6.55	0.00	6.55	0.37	3.50	1.72	1.33	3.51	6.55	0	1.35	1.35	2.50	0.00
I10	1.710	0.210	1.50	0.33		1.83																		
M10	1.710	0.135	1.58	0.33	1.40	1.90	1.87	2.50	1.15	1.35	6.55	0.00	6.55	0.37	3.50	1.72	1.33	3.51	6.55	0	1.35	1.35	2.50	0.00
I11	1.720	0.220	1.50	0.33		1.83																		
M11	1.720	0.145	1.58	0.33	1.40	1.90	1.87	2.50	1.15	1.35	6.55	0.00	6.55	0.37	3.50	1.72	1.33	3.51	6.55	0	1.35	1.35	2.50	0.00
I12	1.600	0.100	1.50	0.33		1.83																		
M12	1.600	0.025	1.58	0.33	1.40	1.90	1.87	2.50	1.15	1.35	6.55	0.00	6.55	0.37	3.50	1.72	1.33	3.51	6.55	0	1.35	1.35	2.50	0.00
I13	1.540	0.040	1.50	0.33		1.83																		
M13	1.540	-0.035	1.58	0.33	1.40	1.90	1.87	2.50	1.15	1.35	6.55	0.00	6.55	0.37	3.50	1.72	1.33	3.51	6.55	0	1.35	1.35	2.50	0.00
								20.00	9.20	10.80	52.40	0.00	52.40	2.96	28.00	13.72	10.64	28.04	52.40	0	10.80	10.80	20.00	0.00

Concrete (0.8208 m3

Timber pile 864 m

192 trees

Table A.14 (2) Pipe Installation Work for ϕ 800

Bill of Quantity

Area : TH Pipe Diameter : 800 Shoring Type : TIMBER

Sewer Line Name : 800 Foundation Type : T OK ! T

Manhole No. : M1 M14

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.49 V_5	Backfill (m^3) Yellow Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type N pipes	Pipe Number Concrete Length (m) 4.00 N m	Pipe Bedding Length (m) L_2	Sheeting (m) $_m$ 2.5 L_3	Waling & Strut (ton) W_2
M1	1.740	-0.200	1.94	0.41		2.35																		
M2	1.680	-0.290	1.97	0.41	1.90	2.38	2.37	37.00	1.20	35.80	166.62	0.00	166.62	35.44	70.30	34.45	57.07	75.10	166.62	8	3.80	35.80	37.00	0.00
M2	1.680	-0.290	1.97	0.41		2.38																		
M3	1.640	-0.355	2.00	0.41	1.90	2.41	2.40	25.00	1.20	23.80	114.00	0.00	114.00	23.56	47.50	23.28	37.94	52.79	114.00	5	3.80	23.80	25.00	0.00
M3	1.640	-0.355	2.00	0.41		2.41																		
M4	1.650	-0.440	2.09	0.41	1.90	2.50	2.46	35.00	1.20	33.80	163.59	0.00	163.59	33.46	66.50	32.59	53.88	77.13	163.59	8	1.80	33.80	35.00	0.00
M4	1.650	-0.440	2.09	0.41		2.50																		
M5	1.680	-0.530	2.21	0.41	1.90	2.62	2.56	35.00	1.20	33.80	170.24	0.00	170.24	33.46	66.50	32.59	53.88	83.78	170.24	8	1.80	33.80	35.00	0.00
M5	1.680	-0.530	2.21	0.41		2.62																		
M6	1.500	-0.615	2.12	0.41	1.90	2.53	2.58	34.00	1.20	32.80	166.67	0.00	166.67	32.47	64.60	31.65	52.29	82.73	166.67	8	0.80	32.80	34.00	0.00
M6	1.500	-0.615	2.12	0.41		2.53																		
M7	1.530	-0.695	2.23	0.41	1.90	2.64	2.58	32.00	1.50	30.50	156.87	0.00	156.87	30.20	60.80	29.79	48.61	78.47	156.87	7	2.50	30.50	32.00	0.00
M7	1.530	-0.695	2.23	0.41		2.64																		
M8	1.607	-0.550	2.16	0.41	1.90	2.57	2.61	25.00	1.50	23.50	123.98	0.00	123.98	23.27	47.50	23.28	37.45	63.26	123.98	5	3.50	23.50	25.00	0.00
M8	1.607	-0.550	2.16	0.41		2.57																		
M9	1.677	-0.495	2.17	0.41	1.90	2.58	2.58	21.00	1.20	19.80	102.95	0.00	102.95	19.60	39.90	19.55	31.56	51.84	102.95	4	3.80	19.80	21.00	0.00
M9	1.677	-0.495	2.17	0.41		2.58																		
M10	1.710	-0.435	2.15	0.41	1.90	2.56	2.57	24.00	1.20	22.80	117.20	0.00	117.20	22.57	45.60	22.34	36.35	58.51	117.20	5	2.80	22.80	24.00	0.00
M10	1.710	-0.435	2.15	0.41		2.56																		
M11	1.720	-0.384	2.10	0.41	1.90	2.51	2.54	22.00	1.20	20.80	106.18	0.00	106.18	20.59	41.80	20.48	33.16	52.54	106.18	5	0.80	20.80	22.00	0.00
M11	1.720	-0.384	2.10	0.41		2.51																		
M12	1.600	-0.330	1.93	0.41	1.90	2.34	2.43	25.00	1.20	23.80	115.43	0.00	115.43	23.56	47.50	23.28	37.94	54.22	115.43	5	3.80	23.80	25.00	0.00
M12	1.600	-0.330	1.93	0.41		2.34																		
M13	1.540	-0.250	1.79	0.41	1.90	2.20	2.27	27.00	1.20	25.80	116.46	0.00	116.46	25.54	51.30	25.14	41.13	50.19	116.46	6	1.80	25.80	27.00	0.00
M13	1.540	-0.250	1.79	0.41		2.20																		
M14	1.600	-0.206	1.81	0.41	1.90	2.22	2.21	20.00	1.20	18.80	83.98	0.00	83.98	18.61	38.00	18.62	29.97	35.39	83.98	4	2.80	18.80	20.00	0.00
								362.00	16.20	345.80	1704.17	0.00	1704.17	342.33	687.80	337.02	551.23	815.92	1704.17	78	33.80	345.80	362.00	0.00

Concrete 91.637 m3

Timber pil 28670.4 m

6371.2 trees

Table A.14 (3) Pipe Installation Work for ϕ 1200

Bill of Quantity

Area : TH Pipe Diameter : 1200 Shoring Type : TIMBER

Sewer Line Name : 1200 Foundation Type : T OK ! T

Manhole No. : M7 OUTLET

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 3.00	Pipe Bedding Length (m)	Sheeting (m) $_m$ 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M7	1.530	-0.695	2.23	0.50		2.73														pipes	m			
OUTLET	1.450	-1.100	2.55	0.50	2.60	3.05	2.89	11.00	1.00	10.00	82.66	0.00	82.66	21.91	28.60	14.01	25.93	42.72	82.66	3	1.00	10.00	11.00	0.00
								11.00	1.00	10.00	82.66	0.00	82.66	21.91	28.60	14.01	25.93	42.72	82.66	3	1.00	10.00	11.00	0.00

Concrete 5.62 m3

Timber pil 1346.4 m

299.2 trees

Table A.14 (4) Manhole Construction (1/3)

Package A

Summary of Bill of Quantity: Manhole Tau Hu Canal

Class E Class G Class F

	Concrete Volume (m^3)				Total	Level Conc	Sand	Timber Pile		Invert			Ladder	Bar	
	Slub		Wall							Vol	Area				
	Bottom S_b (m^3)	Up S_u (m^3)	Main C_m (m^3)	Up C_u (m^3)	(m^3)	L_e (m^3)	S_a (m^3)	T_w (no)	4.5m/no (BQ) (m)	I_v (m^3)	BQ I_{a1} (m^2)	cost est I_{a2} (m^2)	L_a (no)	Wt (kg)	Unit Wt (kg/m3)
Tau Hu	15.990	10.760	35.275	0.784	62.809	6.330	12.660	1,015	4,568	11.280	28.200	36.525	71	3,874.6	56.4

	Cover		Frame Work			
			Slub		Wall	
	Type A	Type C	Bottom F_b (m^2)	Up F_u (m^2)	Main F_m (m^2)	Up F_u (m^2)
Tau Hu	12	2	32.780	57.290	321.520	7.840

Table A. 14 (5) Manhole Construction (2/3)

List of Manhole along Tau Hu Canal

Route	Manhole No.	Type of Manhole	Type of Manhole Cover	Main Sewer						Connection Pipe						GL	Dimension (mm)					
				IN			OUT										H	h_1	h_2	h_3	h_4	h_5
				Invert I_1 (m)	Dia D_1 (mm)	degree θ_1	Invert I_2 (m)	Dia D_2 (mm)	degree θ_2	Invert I_3 (m)	Dia D_3 (mm)	degree θ_3	Invert I_4 (m)	Dia D_4 (mm)	degree θ_4	(m)						
	M1	2-A	C				-0.200	800	180							1.740	2,500	2,200	300	1,650	260	400
	M2	2-C-1	A	-0.200	800	0	-0.290	800	180	0.180	400	90				1.680	2,500	2,200	300	1,650	230	400
	M3	2-C-1	A	-0.290	800	0	-0.355	800	180	0.250	400	90				1.640	2,500	2,200	300	1,650	205	400
	M4	2-C-1	A	-0.355	800	0	-0.440	800	180	0.150	400	90				1.650	2,600	2,300	300	1,750	210	400
	M5	2-C-1	A	-0.440	800	0	-0.530	800	180	0.180	400	90				1.680	2,800	2,500	300	1,950	290	400
	M6	2-C-1	A	-0.530	800	0	-0.615	800	180	0.000	400	90				1.500	2,700	2,400	300	1,850	285	400
	M7	3-D-2	A	-0.615	800	0	-0.695	800	180	0.030	400	90	-1.100	1200	270	1.530	2,800	2,500	300	1,900	225	400
	M8	2-C-1	A	-0.695	800	0	-0.550	800	180	0.107	400	90				1.607	2,700	2,400	300	1,850	243	400
	M9	2-C-1	A	-0.550	800	0	-0.495	800	180	0.177	400	90				1.677	2,700	2,400	300	1,850	228	400
	M10	2-C-1	A	-0.495	800	0	-0.435	800	180	0.210	400	90				1.710	2,700	2,400	300	1,850	255	400
	M11	2-C-1	A	-0.435	800	0	-0.384	800	180	0.220	400	90				1.720	2,600	2,300	300	1,750	196	400
	M12	2-C-1	A	-0.384	800	0	-0.330	800	180	0.100	400	90				1.600	2,500	2,200	300	1,650	270	400
	M13	2-C-1	A	-0.330	800	0	-0.250	800	180	0.040	400	90				1.540	2,300	2,000	300	1,450	210	400
	M14	2-A	C	-0.250	800	0										1.600	2,100	1,800	300	1,250	200	0

Type A 12
Type C 2

Table A. 14 (6) Manhole Construction (3/3)

List of Manhole

Route	Manhole No.	Concrete Volume (m^3)				Level Conc	Sand	Timber Pile	Invert			Frame Work				Ladder	Bar
		Slub		Wall					Vol	Area		Slub		Wall			
		Bottom S_b (m^3)	Up S_u (m^3)	Main C_m (m^3)	Up C_u (m^3)	L_e (m^3)	S_a (m^3)	T_w (no)	I_v (m^3)	BQ I_{a1} (m^2)	I_{a2} (m^2)	Bottom F_b (m^2)	Up F_u (m^2)	Main F_m (m^2)	Up F_u (m^2)	L_a (no)	W (kg)
	M1	1.020	0.690	2.459	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	21.120	0.560	5	253.6
	M2	1.020	0.690	2.229	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	21.120	0.560	5	253.6
	M3	1.020	0.690	2.229	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	21.120	0.560	5	253.6
	M4	1.020	0.690	2.389	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	22.400	0.560	5	263.2
	M5	1.020	0.690	2.709	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	24.960	0.560	6	282.3
	M6	1.020	0.690	2.549	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	23.680	0.560	5	272.7
	M7	2.730	1.790	4.718	0.056	0.896	1.792	144	1.950	4.800	6.002	3.920	7.760	38.000	0.560	6	510.8
	M8	1.020	0.690	2.549	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	23.680	0.560	5	272.7
	M9	1.020	0.690	2.549	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	23.680	0.560	5	272.7
	M10	1.020	0.690	2.549	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	23.680	0.560	5	272.7
	M11	1.020	0.690	2.389	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	22.400	0.560	5	263.2
	M12	1.020	0.690	2.229	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	21.120	0.560	5	253.6
	M13	1.020	0.690	1.909	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	18.560	0.560	4	234.5
	M14	1.020	0.690	1.819	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	16.000	0.560	5	215.4
	Type A	9.870	6.620	21.831	0.448	3.822	7.644	613	6.974	17.400	22.438	19.460	34.430	196.1	4.5	42	2362.5
	Type C																

Table A.14 (7) Inlet Pit Construction (1/2)

Package A

Summary of Bill of Quantity: Inlet Pit Tau Hu Canal

Class E Class G

	Concrete Volume (m^3)			Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile		Ladder L_a (no)	Bar		Cover	
	Slub	Wall	Total									
	Bottom S (m^3)	Main W (m^3)	(m^3)			T_w (no)	4.5m/no (BQ) (m)		Wt (kg)	Unit Wt (kg/m3)	Type D	Type E
Tau Hu	0.000	0.000	0.000	0.000	0.000	0	0	0	0.000	71.7	0	12

	Frame Work	
	Slub	Wall
	Bottom F_b (m^2)	Main $F_{\square}$ (m^2)
Total	0.0	0.0

Concrete Volume for each inlet

	Min	Max	Ave
Tau Hu	0.000	0.000	0.000

Volume reduction of connection pipe (m3)

Total 0.471

Table A. 14 (8) Inlet Pit Construction (2/2)

Inlet Pit Tau Hu Canal

Area	Sewer Line	Dia D (mm)	Found	Inlet No.	Type of Inlet	Type of Cover	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol			Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work	
											Slub S (m^3)	Wall W (m^3)	Total (m^3)						Slub F_s (m^2)	Wall F_w (m^2)
TH	C.Pipe	400	S360	I2	1	E	1.5	0	2,380	1,900	0.360	1.438	1.798	0.196	0.392	32	7	131.6	1.2	14.9
TH	C.Pipe	400	S360	I3	1	E	1.5	0	2,380	1,900	0.360	1.438	1.798	0.196	0.392	32	7	131.6	1.2	14.9
TH	C.Pipe	400	S360	I4	1	E	1.5	0	2,380	1,900	0.360	1.438	1.798	0.196	0.392	32	7	131.6	1.2	14.9
TH	C.Pipe	400	S360	I5	1	E	1.5	0	2,380	1,900	0.360	1.438	1.798	0.196	0.392	32	7	131.6	1.2	14.9
TH	C.Pipe	400	S360	I6	1	E	1.5	0	2,380	1,900	0.360	1.438	1.798	0.196	0.392	32	7	131.6	1.2	14.9
TH	C.Pipe	400	S360	I7	1	E	1.53	0.03	2,380	1,900	0.360	1.438	1.798	0.196	0.392	32	7	131.6	1.2	14.9
TH	C.Pipe	400	S360	I8	1	E	1.607	0.107	2,380	1,900	0.360	1.438	1.798	0.196	0.392	32	7	131.6	1.2	14.9
TH	C.Pipe	400	S360	I9	1	E	1.677	0.177	2,380	1,900	0.360	1.438	1.798	0.196	0.392	32	7	131.6	1.2	14.9
TH	C.Pipe	400	S360	I10	1	E	1.71	0.21	2,380	1,900	0.360	1.438	1.798	0.196	0.392	32	7	131.6	1.2	14.9
TH	C.Pipe	400	S360	I11	1	E	1.72	0.22	2,380	1,900	0.360	1.438	1.798	0.196	0.392	32	7	131.6	1.2	14.9
TH	C.Pipe	400	S360	I12	1	E	1.6	0.1	2,380	1,900	0.360	1.438	1.798	0.196	0.392	32	7	131.6	1.2	14.9
TH	C.Pipe	400	S360	I13	1	E	1.54	0.04	2,380	1,900	0.360	1.438	1.798	0.196	0.392	32	7	131.6	1.2	14.9
			Total			Type E	12				4.320	17.250	21.570	2.352	4.704	384	84	1,579.7	14.4	178.5

CHAPTER 2
PUMP DRAINAGE IMPROVEMENT (PACKAGE B)

1. THANH DA PUMPING DRAINAGE AREA

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TABLE B.1.1 (1/2) WORK QUANTITY OF DIKE CONSTRUCTION IN THANH DA

Item			Calculation	Quantity
1. Clearing and Grubbing				(m^2)
	(1)	O/M Space	75.0m x 5.0m =	375.00
			Total	375.00
			Allowance: 3%	**390 m2**
2. Excavation				(m3)
	(1)	Lower Coupling	{1/2 x (1.00 + 1.50) x 0.70 + 1/2 x 1.50 x 0.40} x 75.00 =	88.10
	(2)	Rip Rap	0.50 x 3.00 x 75.00 =	112.00
	(3)	O/M Road Pavement	0.20 x 5.00 x 75.00 =	75.00
			Total	275.10
			Allowance: 3%	**290 m3**
3. Sandy Soil Filling				
	(1)	Bank Filling	(1/2 x 5.60 x 1.20 + 1/2 x 5.60 x 0.60) x 75.00 =	378.00
			Total	378.00
			Allowance: 3%	**400 m3**
4. Reinforced Concrete pile (250 x 250, L=12.00)				(No.)
	(1)	Lower Coupling		26.00
	(2)	Upper		26.00
			Total	52.00
			Allowance: 3%	**52 No.**
5. Reinforced Concrete (Concrete Type E)				
	(1)	Lower Coupling	(0.421 x 0.40 - 1/2 x 0.212 x 0.212) x 75.00 =	10.67
	(2)	Beam	0.30 x 0.30 x 4.10 x 26 =	9.60
	(3)	Upper Coupling	(0.40 x 0.40 + 0.30 x 0.20 + 0.35 x 0.20) x 75.00 =	21.75
	(4)	Slab	2.70 x 4.30 x 0.15 x 25 =	43.54
			Total	85.56
			Allowance: 3%	**90 m2**
6. Reinforcing Bars				(kg)
	(1)	Lower coupling	0.888 x {1.00 x 6 + (0.30 + 0.10 + 0.30 + 0.31 + 0.10) x 4} x 75.0 x	664.00
	(2)	Beam	0.888 x (1.00 x 4 + 0.85 x 4) x 4.30 x 26 =	735.00
	(3)	Upper Coupling	0.888 x (1.00x 18 + 1.62 x 4 + 1.70 x 4 + 0.90 x 4) x 1.05 x 75.00 =	2,442.00
			Total	3,841.00
			Allowance: 3%	**3,960 kg**
7. Forming				(m2)
	(1)	Lower coupling	0.40 x 2 x75.00 + 0.40 x 0.40 x 2 =	60.32
	(2)	Beam	0.30 x 2 x 4.10 x 26 =	63.96
	(3)	Upper Coupling	(0.40+0.30+0.20)x2x75.00+(0.40x0.40+0.20x0.30;0.35x0.12)x 2 =	135.58
			Total	259.86
			Allowance: 3%	**270 m2**
8. Leveling Concrete (Concrete Type G)				(m3)
	(1)	Lower coupling	0.612 x 0.10 x 75.20 =	4.60
	(2)	Beam	0.50 x 0.10 x 4.10 x 26 =	5.33
	(3)	Upper Coupling	0.60 x 0.10 x 75.20 =	4.51
	(4)	Slab	2.70 x 4.30 x 0.10 x 25 =	29.03
			Total	43.47
			Allowance: 3%	**45 m3**

TABLE B.1.1 (2/2) WORK QUANTITY OF DIKE CONSTRUCTION IN THANH DA

Item			Calculation	Quantity
9. Gravel Bedding				(m3)
	(1)	Lower coupling	0.612 x 0.20 x 75.20 =	9.20
	(2)	Upper Coupling	0.60 x 0.20 x 75.20 =	9.02
			Total	18.22
			Allowance: 3%	**20 m3**
10. Free Drain Gravel				(m3)
	(1)		0.20 x 4.10 x 75.00 =	61.50
			Total	61.50
			Allowance: 3%	**65 m3**
11. O/M Space Pavement				
11.1 Concrete Curb including gravel bedding, leveling concrete, supply and construction				(m)
	(1)		75.0m + 5.0m =	80.00
			Total	80.00
			Allowance: 0%	**80 m**
11.2 Concrete Block Paving including sand bedding, supply and placement				(m2)
	(1)		4.80m x 75.0m =	360.00
			Total	360.00
			Allowance: 0%	**360 m2**
11.3 Fence with Concrete Post (type B)				(m)
	(1)		75.00 + 5.00 =	80.00
			Total	80.00
			Allowance: 0%	**80 m**
12 Rip Rap				(m3)
	(1)		0.50 x 3.50 x 75.00 =	131.25
			Total	131.25
			Allowance: 0%	**135 m3**
13. Joint Filler				(m2)
	(1)	Lower coupling	0.412 x 0.40 x 4 =	0.66
	(2)	Beam	0.30 x 4.30 x 2 =	2.58
	(3)	Upper Coupling	0.15 x (2.70 + 4.40) x 2 x 25 =	52.50
	(4)	Slab	(0.40 x 0.40 + 0.20 x 0.30 + 0.20 x 0.35) x 4 =	1.16
			Total	56.90
			Allowance: 3%	**60 m2**

TABLE B.1.2 (1/5) WORK QUANTITY OF SEWER LINE CONSTRUCTION IN THANH DA

Item			Calculation	Quantity
1. Clearing and Grubbing				(m2)
	(1)	TD2 (M1 - M6)	1.90m x 154.0m =	292.60
	(2)	TD4 (M1 - MP1)	2.60m x 216.4m =	562.64
	(3)	TD5 (M1 - M7)	1.90m x 145.0m =	275.50
	(4)	TD6 - 7 (M1 - MP2)	2.10m x 235.0m =	493.50
	(5)	TD4 (17 - M17)	1.40m x 9.8m =	13.72
	(6)	TD4 (15 - M6)	1.90m x 6.00m =	11.40
	(7)	TD4 (18 - M8)	2.10m x 7.00m =	14.70
	(8)	TD5 (15 - M5)	1.60m x 10.80m =	17.28
	(9)	TD6 (17 - M8)	1.40m x 8.20m =	11.48
	(10)	TD6 (19 - M9)	2.10m x 4.40m =	9.24
			Total	1,702.06
			Allowance: 3%	**1,750 m2**
2. Earth Work (refer to the other sheets prepared by local Engineer)				(m^2)
	2.1 Excavation (Depth: D<= 6.0m)			
	(1)	TD2 (M1 - M6)	1.90m x 154.0m x (2.35 - 2.50)m =	710.22
	(2)	TD4 (M1 - MP1)	2.60m x 216.4m x (2.00 - 3.09)m =	1688.89
	(3)	TD5 (M1 - M7)	1.90m x 145.0m x (2.14 - 2.33)m =	629.16
	(4)	TD6 - 7 (M1 - MP2)	2.10m x 235.0m x (2.50 - 2.84)m =	1293.36
	(5)	TD4 (17 - M17)	1.40m x 9.8m x 1.70m =	23.33
	(6)	TD4 (15 - M6)	1.90m x 6.0m x (1.94 - 1.98)m =	22.35
	(7)	TD4 (18 - M8)	2.1m x 7.0m x 2.57m =	37.78
	(8)	TD5 (15 - M5)	1.60m x 10.8m x (1.94 - 2.07)m =	34.87
	(9)	TD6 (17 - M8)	1.40m x 8.2m x (2.29 - 2.31)m =	26.41
	(10)	TD6 (19 - M9)	2.10m x 4.4m x 2.52m =	23.29
			Total	4,489.66
			Allowance: 5%	**4,710 m3**
	2.2 Excavation for Road Works			
			Total	
			Allowance: 5%	
	2.3 Sand Backfill (Yellow Sand)			
	(1)	TD2 (M1 - M6)	800 dia.	235.93
	(2)	TD4 (M1 - MP1)	1200 dia.	533.40
	(3)	TD5 (M1 - M7)	800 dia.	219.66
	(4)	TD6 - 7 (M1 - MP2)	1000 dia.	409.38
	(5)	TD4 (17 - M17)	400 dia.	8.30
	(6)	TD4 (15 - M6)	800 dia.	5.10
	(7)	TD4 (18 - M8)	1000 dia.	10.22
	(8)	TD5 (15 - M5)	600 dia.	9.57
	(9)	TD6 (17 - M8)	400 dia.	5.92
	(10)	TD6 (19 - M9)	1000 dia.	6.03
			Total	1,443.51
			Allowance: 5%	**1,520 m3**

TABLE B.1.2 (2/5) WORK QUANTITY OF SEWER LINE CONSTRUCTION IN THANH DA

Item			Calculation	Quantity
2.4 Sandy Soil Backfill (Black Sand)				
	(1)	TD2 (M1 - M6)	800 dia.	330.92
	(2)	TD4 (M1 - MP1)	1200 dia.	879.80
	(3)	TD5 (M1 - M7)	800 dia.	274.51
	(4)	TD6 - 7 (M1 - MP2)	1000 dia.	642.17
	(5)	TD4 (17 - M17)	400 dia.	8.31
	(6)	TD4 (15 - M6)	800 dia.	11.66
	(7)	TD4 (18 - M8)	1000 dia.	20.36
	(8)	TD5 (15 - M5)	600 dia.	16.83
	(9)	TD6 (17 - M8)	400 dia.	14.86
	(10)	TD6 (19 - M9)	1000 dia.	12.73
			Total	2,212.15
			Allowance: 5%	**2,320 m3**
3. Pipe Installation				(m)
3.1 Pipe				
	(1)	Precast R/C Pipe (800 dia)	148.0 + 138.0 = Allowanc	**286.0**
	(2)	Precast R/C Pipe (1000 dia)	224.2 Allowanc	**225.0**
	(3)	Precast R/C Pipe (1200 dia)	205.7 Allowanc	**206.0**
			Total	717.0
				720 m
3.2 Foundation Piles (Timber Pile)				(m)
	(1)	Precast R/C Pipe (800 dia)	16pcs./m2 x 1.10m x 285.8m x 4.5m =	22,636.0
	(2)	Precast R/C Pipe (1000 dia)	16pcs./m2 x 1.36m x 224.2m x 4.5m =	21,954.0
	(3)	Precast R/C Pipe (1200 dia)	16pcs./m2 x 1.63m x 205.7m x 4.5m =	24,141.0
			Total	68,731.0
			Allowance: 1%	**69,420 m**
3.3 Foundation Concrete (Concrete Type G)				
	(1)	Precast R/C Pipe (800 dia)	0.265m3/m x 285.8m =	75.73
	(2)	Precast R/C Pipe (1000 dia)	0.398m3/m x 224.2m =	89.23
	(3)	Precast R/C Pipe (1200 dia)	0.562m3/m x 205.7m =	115.60
			Total	280.56
			Allowance: 3%	**290 m3**
4. Construction of Manholes (refer to other sheets prepared by Mr. Sato)				
4.1 Foundation Piles (Timber Piles)				(m)
			2,337pcs. x 4.5m =	10,516.5
			Total	10,516.50
			Allowance: 1%	**10,620 m**
4.2 Sand Bedding				(m3)
			Total	29.08
			Allowance: 5%	**30 m3**
4.3 Concrete Type E				(m3)
				146.47
			Total	146.47
			Allowance: 3%	**150 m3**

TABLE B.1.2 (3/5) WORK QUANTITY OF SEWER LINE CONSTRUCTION IN THANH DA

Item	Calculation	Quantity
4.4 Concrete Type F		(m3)
	Total	25.52
	Allowance: 3%	**27 m3**
4.5 Concrete Type G		(m3)
	Total	14.54
	Allowance: 3%	**15 m3**
4.6 Invert Mortal (Granolithic Topping)		(m2)
	Total	64.80
	Allowance: 1%	**65 m2**
4.7 Reinforcing Bars		(kg)
		9,161.00
	Total	9,161.00
	Allowance: 3%	**9,440 kg**
4.8 Cast Iron Manhole Covers (Type A)		(set)
	Total	5
	Allowance: 0%	**5 set**
4.9 Cast Iron Manhole Covers (Type C)		(set)
	Total	25
	Allowance: 0%	**25 set**
4.10 Ladder Rungs		(No.)
	Total	157.00
	Allowance: 1%	**160 set**
5. Construction of Inlet Pit (refer to other sheets prepared by Mr. Sato)		
5.1 Foundation Piles (Timber Piles)		(m)
	256nos. x 4.5m =	1,152.00
	Total	1,152.00
	Allowance: 1%	**1,170 m**
5.2 Sand Bedding		(m3)
		3.14
	Total	3.14
	Allowance: 3%	**5 m3**
5.3 Concrete Type E		(m3)
		14.56
	Total	14.56
	Allowance: 3%	**15 m3**
5.4 Concrete Type G (for Leveling Concrete)		(m3)
		1.57
	Total	1.57
	Allowance: 3%	**2 m3**

TABLE B.1.2 (4/5) WORK QUANTITY OF SEWER LINE CONSTRUCTION IN THANH DA

Item		Calculation	Quantity
5.5 Reinforcing Bars			(kg)
			1,099.73
		Total	1,099.73
		Allowance: 3%	**1,130 kg**
5.6 Precast Concrete Manhole Covers (Type D)			(set)
			3
		Total	3
		Allowance: 0%	**3 No.**
5.7 Cast Iron Manhole Covers (Type E)			(set)
			5
		Total	5
		Allowance: 0%	**5 No.**
5.8 Ladder Rungs			(set)
			55
		Total	55
		Allowance: 1%	**60 No.**
5.9 Connection Pipe			(m)
(1)	Precast R/C Pipe (400 dia)	14.40 m	**15.0**
(2)	Precast R/C Pipe (600 dia)	7.5 m	**8.0**
(3)	Precast R/C Pipe (800 dia)	3.2 m	**4.0**
(4)	Precast R/C Pipe (1000 dia)	8.9 m	**9.0**
		Total	36.0
		Allowance: 0%	**36 m**
6. Rehabilitation of Existing Flap gate (refer to other sheets)			(set)
	TD1-1, TD1-2, TD3-1,TD3-2, TD8: 1000 x100		5
		Total	5
		Allowance: 0%	**5 set**
7. Road works			
7.1 Concrete Curb			(m2)
(1)	TD.7, TD.6-2, TD.6-3	2 x 206.0m =	412.00
(2)	TD.4-1, 4-3, 4-5, 4-6	2 x 222.0m =	444.00
(3)	TD.5	2 x 134.0m =	268.00
(4)	TD.2	2 x 147.0m =	294.00
		Total	1,418.00
		Allowance: 3%	**1,460 m**
7.2 Subgrade Preparation			(m2)
(1)	TD.7, TD.6-2, TD.6-3	4,40m x 206.0m =	906.00
(2)	TD.4-1, 4-3, 4-5, 4-6	4.17m x 222.0m =	926.00
(3)	TD.5	4.80m x 134.0m =	643.00
(4)	TD.2	4.00m x 147.0m =	588.00
		Total	3,063.00
		Allowance: 3%	**3,160 m2**

TABLE B.1.2 (5/5) WORK QUANTITY OF SEWER LINE CONSTRUCTION IN THANH DA

Item		Calculation	Quantity
7.3 Sub Base Course			
(1)	TD.7, TD.6-2, TD.6-3	906.0m2 x 0.20m =	181.20
(2)	TD.4-1, 4-3, 4-5, 4-6	926.0m2 x 0.20m =	185.20
(3)	TD.5	643.0m2 x 0.20m =	128.60
(4)	TD.2	588.0m2 x 0.20m =	117.60
		Total	612.60
		Allowance: 3%	**630 m3**
7.4 Base Course (crushed Aggragate)			(m3)
(1)	TD.7, TD.6-2, TD.6-3	906.0m2 x 0.19m =	172.14
(2)	TD.4-1, 4-3, 4-5, 4-6	926.0m2 x 0.19m =	175.94
(3)	TD.5	643.0m2 x 0.19m =	122.17
(4)	TD.2	588.0m2 x 0.19m =	111.72
		Total	581.97
		Allowance: 3%	**600 m3**
7.5 Asphalt Binder Course			(ton)
(1)	TD.7, TD.6-2, TD.6-3	906.0m2 x 0.05m x 2.2ton/m3 =	99.66
(2)	TD.4-1, 4-3, 4-5, 4-6	926.0m2 x 0.05m x 2.2ton/m3 =	101.86
(3)	TD.5	643.0m2 x 0.05m x 2.2ton/m3 =	70.73
(4)	TD.2	588.0m2 x 0.05m x 2.2ton/m3 =	64.68
		Total	336.93
		Allowance: 3%	**345 ton**
7.6 Asphalt Surface Course			(ton)
(1)	TD.7, TD.6-2, TD.6-3	906.0m2 x 0.05m x 2.2ton/m3 =	99.66
(2)	TD.4-1, 4-3, 4-5, 4-6	926.0m2 x 0.05m x 2.2ton/m3 =	101.86
(3)	TD.5	643.0m2 x 0.05m x 2.2ton/m3 =	70.73
(4)	TD.2	588.0m2 x 0.05m x 2.2ton/m3 =	64.68
		Total	336.93
		Allowance: 3%	**345 ton**
7.7 Prime Coat			(litre)
(1)	TD.7, TD.6-2, TD.6-3	906.0m2 x 1.5l/m2 =	1,359.00
(2)	TD.4-1, 4-3, 4-5, 4-6	926.0m2 x 1.5l/m2 =	1,389.00
(3)	TD.5	643.0m2 x 1.5l/m2 =	964.50
(4)	TD.2	588.0m2 x 1.5l/m2 =	882.00
		Total	4,594.50
		Allowance: 3%	**4,740 l**
7.8 Tack Coat			(litre)
(1)	TD.7, TD.6-2, TD.6-3	906.0m2 x 0.5l/m2 =	453.00
(2)	TD.4-1, 4-3, 4-5, 4-6	926.0m2 x 0.5l/m2 =	463.00
(3)	TD.5	643.0m2 x 0.5l/m2 =	321.50
(4)	TD.2	588.0m2 x 0.5l/m2 =	294.00
		Total	1,531.50
		Allowance: 3%	**1,580 l**

TABLE B.1.3 (1/8) WORK QUANTITY FOR CONSTRUCTION OF THANH DA PUMPING STATION

Item		Calculation	Quantity
1. Clearing and Grubbing			(m^2)
(1)	Pumping Station	1/2 x (24.0 + 28.0) x 23.5 =	611.0
(2)	Pumping Station	1/2 x (8.0 + 22.0) x 18.0 =	270.0
			881.0
		Allowance:3%	**900m2**
2. Demolish of Existing Stone Masonry (refer to other sheets prepared by local Engineer)			(m3)
(1)	Stone Masonry	6.0mL x 3.4mW x 0.25T =	5.10
(2)	Foundation Concrete	4.0m x 0.6mW x 0.4mH =	0.96
		Total	6.06
		Allowance: 3%	**7.0 m3**
3. Demolish od Existing Revetment along Saigon River (refer to other sheet prepared by local Engineer)			(m3)
(1)	RC Beam (300 x 350)		1.32
(2)	RC Coupling (400 x 450)		1.08
(3)	RC Foundation (400 x 600)		1.44
(4)	RC Top Coupling (450 x400)		1.08
(5)	Revetment Concrete (4,200W x 300t)		7.56
(6)	Leveling Concrete (4200W x 100t)		2.52
		Sub-total	15.00
		Alloance: 3%	**16 m3**
4. Excavation (refer to other sheets prepared by local Engineer)			(m3)
(1)	Intake Pit	5.50 x 5.50 x 3.95 =	119.49
(2)	Intake Box Culvert	3.90 x 3.60 x 25.00 =	351.00
(3)	Inlet Chamber	15.00 x 3.65 x 7.18 =	393.11
(4)	Pump Pit	8.00 x 4.75 x 4.40 =	167.27
(5)	Discharge Basin	15.00 x 3.75 x 3.20 =	180.00
(6)	Sluice Way	3.90 x 3.75 x 36.30 =	530.89
(7)	Outlet	6.00 x 1.50 x 9.00 =	40.50
		Sub-total	1,782.26
		Allowance: 5%	**1870 m3**
5. Backfill (refer to other sheets prepared by local Engineer)			(m3)
(1)	Intake Pit		71.10
(2)	Intake Box Culvert		257.14
(3)	Inlet Chamber		235.86
(4)	Pump Pit		41.80
(5)	Discharge Basin		24.00
(6)	Sluice Way		399.84
(7)	Outlet		20.70
		Sub-total	1,050.44
		Allowance: 5%	**1,100 m3**

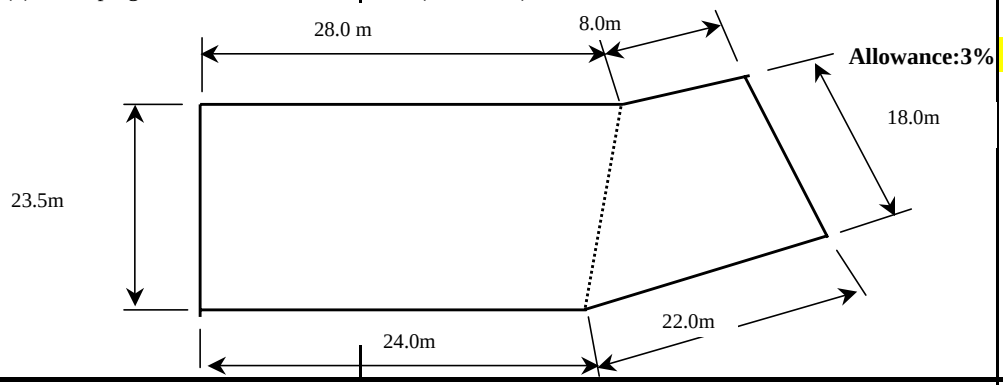


TABLE B.1.3 (2/8) WORK QUANTITY FOR CONSTRUCTION OF THANH DA PUMPING STATION

Item		Calculation	Quantity
6.Reinforced Concrete (Concrete Type E)			
6.1 Intake Pit			(m^3)
(1)	Base	(3.50x3.50-1/2x1.40x1.40)x0.35=	3.94
(2)	Wall	(1.80x2+3.50+3.20)x3.25x0.30-1.40x1.40x0.30}=	9.45
(3)	Upper Slab	(2.90x2.90-1/2x1.10x1.10)x 0.25=	1.95
(4)	Haunch	1/2x0.20x0.20x{(1.80+2.90)x4+3.05x3}=	0.56
(5)	Collar	(2.44x2.62-1.99x1.94)x0.50=	1.27
		Sub-total	17.17
6.2 Box Culvert (Upstream)		(1.90x1.95-1.40x1.40+1/2x0.15x0.15x4)x27.00=	48.33
6.3 Pumping Station			(m^3)
(1)	Base: Intake Basin	{1/2x(2.40+6.00)x0.60+6.00x2.30}x0.45=	7.34
(2)	Base: Pump Pit	{(3.40+2.07+2.50)x2.30x2+1.40x7.70}x0.45=	21.35
(3)	Base: Discharge Basin	2.20x6.00x0.45=	5.94
(4)	Wall: Intake Basin	{1/2x(2.4+6.0)x0.60+6.00x2.30-1/2x(2.3+5.2)x0.50+6.00x2.0}x3.1	7.57
(5)	Box Culvert and Gate Open	(1.40x1.40+1.00x1.00+1.20x1.20)x0.30=	-2.05
(6)	Wall: Pump Pit	{3.40x3.10+1/2x(3.10+4.10)x1.80+4.10x2.1}x0.40x4=	41.01
(7)	same	(4.70x0.40x2.30x2+2.30x0.40x1.40)=	10.72
(8)	Wall: Discharge Basin	(6.00x2.20-5.20x1.80)x3.70-{3.14x(0.5x0.5+0.6x0.6)+1.40x1.40}x	12.65
(9)	Haunch (1)	1/2x0.20x0.20x{(3.40+2.07+2.1)x4+(3.40+1.80+2.1)x2}=	0.90
(10)	Haunch (2)	1/2x0.30x0.30x(1.50x2+3.80x4)=	0.82
(11)	Slab: Bridge	1.50x0.3x1.50x2=	1.35
(12)	Slab: Pump Pit	(1.50x3.0-3.14x0.45x0.45)x0.30x2=	2.08
(13)	Slab: Discharge Basin	(2.30x1.80-0.25x1.60)xo.25=	0.91
(14)	Collar	(2.44x2.62-1.99x1.94)x0.50=	1.27
		Sub-total	111.86
6.4 Pit (Left: Upstream)			(m^3)
(1)	Base	1.25x2.30x0.45	1.29
(2)	Wall	{(1.25x2+1.80)x3.10-3.14x0.72x0.72}x0.25	2.92
(3)	Upper Slab	1.80x0.70x0.20=	0.25
		Sub-total	4.46
6.5 Pit (Right: Upstream)			(m^3)
(1)	Base	2.30x2.35x0.45=	2.43
(2)	Wall	{(2.35x2+1.80)x3.10-3.14x0.60x0.60x2}x0.25	4.47
(3)	Upper Slab	1.80x1.80x0.20=	0.65
		Sub-total	7.55
6.6 Pit (Right: Downstream)			(m^3)
(1)	Base	2.05x2.35x0.45=	2.17
(2)	Wall	{(2.05x2+1.80)x3.10-3.14x0.60x0.60x2}x0.25	4.00
(3)	Upper Slab	1.80x1.80x0.20=	0.65
		Sub-total	6.82
6.7 Sluice Way (Box Culvert)			(m^3)
(1)	Box Culvert	(1.95x1.90-1.40x1.40+1/2x0.15x0.15x4)x(20.00+17.3)=	66.77
(2)	Gate: Base	1.50x2.40x0.50=	1.80
(3)	Gate: Wall	1.50x0.50x1.65x2	2.48
(4)	Gate: Colum	(1.00x2.40-0.70x1.80)x2.30	2.62
(5)	Gate: Slab	1.80x0.40x0.30=	0.22
(6)	Outlet: Base	1/2(1.90+4.10)x5.50x0.30+1/2x(0.30+0.65)x0.70x4.10=	6.31
(7)	Outlet: Wall	1/2x1.65x5.50x0.25x2=	2.27
(8)	Collar	(2.44x2.62-1.99x1.94)x1.00=	2.54
		Sub-total	85.01

TABLE B.1.3 (3/8) WORK QUANTITY FOR CONSTRUCTION OF THANH DA PUMPING STATION

Item			Calculation	Quantity
6.8 Sewer Manhole (Left: Upstream)				(m^3)
	(1)	Base	2.50x2.50x0.30=	1.88
	(2)	Lower Wall	(2.50x2.50-2.0x2.0)x2.50-3.14x0.72x0.72x0.25x3=	4.41
	(3)	Slab	(2.50x2.50-0.80x0.80)x0.25=	1.40
	(4)	Upper Wall	(1.00x1.00-0.80x0.80)x0.25=	0.09
			Sub-total	7.78
6.9 Sewer Manhole (Left: Downstream)				(m^3)
	(1)	Base	2.50x2.50x0.30=	1.88
	(2)	Lower Wall	(2.50x2.50-2.0x2.0)x2.50-3.14x0.72x0.72x0.25x2=	4.82
	(3)	Slab	(2.50x2.50-0.80x0.80)x0.25=	1.40
	(4)	Upper Wall	(1.00x1.00-0.80x0.80)x0.25=	0.09
			Sub-total	8.19
6.10 Sewer Manhole (Right)				(m^3)
	(1)	Base	2.00x2.00x0.30=	1.20
	(2)	Lower Wall	(2.00x2.00-1.50x1.50)x2.50-3.14x0.60x0.60x0.25x2=	3.81
	(3)	Slab	(2.00x2.00-0.80x0.80)x0.25=	0.84
	(4)	Upper Wall	(1.00x1.00-0.80x0.80)x0.25=	0.09
			Sub-total	5.94
			Total	237.61
			Allowance: 3%	**250 m3**
7. Plain Concrete (Concrete Type F)				
7.1 Sewer Pipe				(m^3)
	(1)	Pipe Fundation (ϕ1000)	[0.405x1.80-{1/4x3.14x0.87x0.87-1/2x0.87x0.87}]x(24.50+2.7)=	13.95
	(2)	Pipe Fundation (ϕ1200)	[0.255x1.80-{1/4x3.14x0.87x0.87-1/2x0.87x0.87}]x1.70=	0.41
	(3)	Invert Concrete	(2.00x2.00x0.50)-(3.14x0.60x0.60x160.8/360-0.60x0.10)x2.00=	1.11
	(4)	Invert Concrete	(2.00x2.00x0.50)-(3.14x0.60x0.60x160.8/360-0.60x0.10)x1/2x3.14	1.13
	(5)	Invert Concrete	(1.50x1.50x0.50)-(3.14x0.50x0.50x1/2)x1/2x3.14x1.00=	0.51
			Total	17.11
			Allowance: 3%	**20 m3**
8. Leveling Concrete (Concrete Type G)				(m3)
8.1		Intake Pit	(3.70x3.70-1/2x1.50x1.50+2.64x0.60)x0.10=	1.42
8.2		Box Culvert (Upstream)	2.10x27.00x0.10=	5.67
8.3		Pumping Station	{6.2x(6.282+2.03+2.753+2.30)+2.6x0.6x2-1/2x0.70x1.90x2)}x0.1	8.46
8.4		Pit (Left)	1.35x2.50x0.10=	0.34
8.5		Pit (Right: Upstream)	2.45x2.50x0.10=	0.61
8.6		Pit (Right: downstream)	2.150x2.50x0.10=	0.54
8.7		Sluice Way	{2.10x37.30+2.60x1.70+1/2x(2.10+4.30)x5.60}x0.10=	10.07
8.8		Manhole (Left: Upstream)	2.70x2.70x0.10=	0.73
8.9		Manhole (Left: Downstream)	2.70x2.70x0.10=	0.73
8.10		Manhole (Right)	2.20x2.20x0.10=	0.48
			Total	29.05
			Allowance: 3%	**30 m3**
9. Forming				
9.1 Intake Pit				(m^2)
	(1)	Base	(2.10+3.50+0.53+0.53+2.10+1.98)x0.35=	3.76
	(2)	Wall (Outside)	(2.10+3.50+0.53+0.53+2.10)x3.30+2.44X1.03+0.3x1.98+0.3x2x3.3	34.00
	(3)	Wall (Inside)	(1.80+2.90+2.90+1.80)x3.05+1.98x0.30-1.40x1.40+1.40x4x0.30=	28.98
	(4)	Slab	2.90x2.90-1/2x1.40x1.40+1.73x0.30=	7.95
	(5)	Collar	(2.44x2.62-1.94x1.99)+(2.44+2.62+1.94+1.99)x2x0.50=	11.52
			Sub-total	86.21

TABLE B.1.3 (4/8) WORK QUANTITY FOR CONSTRUCTION OF THANH DA PUMPING STATION

Item		Calculation	Quantity
9.2 Box Culvert (Upstream)			
(1)	Base and Wall (Outside)	1.95x2x27.00=	105.30
(2)	Wall and Slab (Inside)	(0.21+1.10+0.21+1.10+0.21+1.10+0.21)x27.00=	111.78
(3)	Wall (Section)	(1.90x1.90-1.40x1.40)x2=	3.30
		Sub-total	220.38
9.3 Pumping Station			
(1)	Collar	(2.44x2.62-1.94x1.99)+(2.44+2.62+1.94+1.99)x2x0.50=	11.52
(2)	Wall (Outside, Left) - 1	(1.90+1.25+2.30+1.25+3.40)x3.55-3.14x0.72x0.72=	34.23
(3)	Wall (Outside, Left) - 2	1/2x(3.55+4.55)x1.80+4.55x2.50+0.40x0.60+2.20x4.15=	28.04
(4)	Wall (Outside, Right) - 1	(1.90+2.35+2.30+2.35+3.40)x3.55-3.14x0.59x0.59x2=	41.48
(5)	Wall (Outside, Right) - 2	1/2x(3.55+4.55)x1.80+4.55x2.50+(2.05+2.30+2.05+0.15)x4.15=	45.85
(6)	Wall (Outside, Back)	6.00x4.15-2.40x2.20=	19.62
(7)	Pit (Inside,Left)	(1.00+1.80)x2x2.90+1.00x1.80-3.14x0.72x0.72x2=	14.78
(8)	Intake Pit (Inside)	(1.50+1.50+2.40)x3.10-1.40x1.40+1.40x4x0.40=	16.46
(9)	Wall (Inside, Left)	(1.90+3.40)x3.10+1/2x(3.10+4.10)x1.80+2.10x4.10-(1.50+3.0)x0.3	30.17
(10)	Wall (Center)	{3.40x3.10+1/2x(3.10+4.10)x1.80+2.10x4.10-(1.50+3.0)x0.30}x4=	97.12
(11)	Wall (Inside, Right)	(1.90+3.40)x3.10+1/2x(3.10+4.10)x1.80+2.10x4.10-(1.50+3.0)x0.3	30.17
(12)	Wall (Inside, Back)	1.50x3.80x2=	11.40
(13)	Discharge Wall (Inside)	(1.80+5.20)x2x3.70-1.40x3.10-1.40x1.40-3.14x(0.59x0.59+0.72x0.	42.78
(14)	Pit (Inside,Right) - 1	(1.80+2.10)x2x2.90+1.80x2.10-3.14x0.59x0.59x3=	23.12
(15)	Pit (Inside,Right) - 2	(1.80+1.80)x2x2.80+1.80x1.80-3.14x0.59x0.59x2=	21.21
(16)	Collar	(2.44x2.62-1.94x1.99)+(2.44+2.62+1.94+1.99)x2x0.50=	11.52
		Sub-total	479.47
9.4 Sluice Way			(m^2)
(1)	Box Culvert Base	0.30x(20.00+17.30)x2=	22.38
(2)	Box Culvert Wall	(1.40+1.52)x2x(20.00+17.30)=	158.75
(3)	Box Culvert Slab	(0.25x2+0.21+1.10+0.21)x(20.00+17.30)=	75.35
(4)	Gate Base	(1.50x2+2.40)x0.50+0.20x2.40=3.18	3.45
(5)	Gate Wall (Outside)	{(0.3+1.50+0.5)x1.65x2=	7.59
(6)	Gate Wall (Inside)	(1.40x3+0.25)x0.30+(0.20+0.50+0.20+0.70)x1.65x2=	6.62
(7)	Colum	(2.40+1.00+0.25+0.70+1.80+0.70+0.25+1.00)x1.75=	14.18
(8)	Colum Slab	(1.00+2.40)x2x0.30+0.30x1.40+(1.40+0.40)x2x0.30=	3.54
(9)	Outlet Base	0.30x5.61x2+1/2x(0.30+0.65)x0.70x2+1.00x4.1+0.7x4.1=	8.13
(10)	Outlet Wall	{1/2x(2.00+2.90)x3.50+2.00x3.50}x2=	31.15
(11)	Outlet Wall	1/2x1.30x5.61x4	14.59
		Sub-total	345.73
9.5 Sewer Manhole (Left: Upstream)			(m^2)
(1)	Base	2.50x4x0.30=	3.00
(2)	LowerWall	(2.50+2.00)x4x2.50-3.14x0.60x0.60x2x3=	38.21
(3)	Slab	(2.00x2.00-0.80x0.80)+2.50x4x0.25+0.80x4x0.25=	6.66
(4)	Upper Wall	1.00x4x0.25=	1.00
		Sub-total	48.87
9.6 Sewer Manhole (Left: Downstream)			(m^2)
(1)	Base	2.50x4x0.30=	3.00
(2)	LowerWall	(2.50+2.00)x4x2.50-3.14x0.60x0.60x2x2=	40.48
(3)	Slab	(2.00x2.00-0.80x0.80)+2.50x4x0.25+0.80x4x0.25=	6.66
(4)	Upper Wall	1.00x4x0.25=	1.00
		Sub-total	51.14

TABLE B.1.3 (5/8) WORK QUANTITY FOR CONSTRUCTION OF THANH DA PUMPING STATION

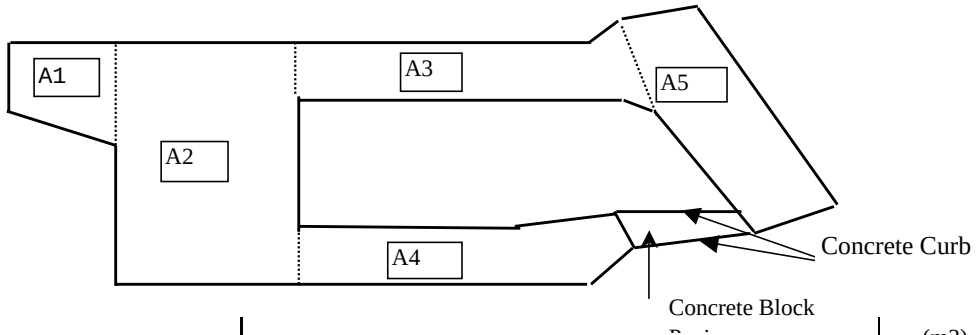
Item			Calculation	Quantity
9.7 Sewer Manhole (Right)				(m^2)
	(1)	Base	2.00x4x0.30=	2.40
	(2)	LowerWall	(2.00+1.50)x4x2.50-3.14x0.50x0.50x2x2=	31.86
	(3)	Slab	(1.50x1.50-0.80x0.80)+2.00x4x0.25+0.80x4x0.25=	4.41
	(4)	Upper Wall	1.00x4x0.25=	1.00
			Sub-total	39.67
9.8 Sewer Pipe				(m^2)
	(1)	Base (ϕ1000)	0.45x(4.50+7.45)x2=	10.76
	(2)	Base (f1200)	0.55x(1.50+7.25+2.75)x2=	12.65
			Sub-total	23.41
			Total	1,294.88
			Allowance: 3%	**1,330 m2**
10. Reinforcig Bar				(kg)
	(1)	Intake Pit	95kg/m3 x 17.2 =	1,630.00
	(2)	Box Culvert	80kg/m3 x 48.3m3	3,860.00
	(3)	Pumping Station	W = 65kg/m3 x 111.9m3	7,270.00
	(4)	Dischrege Basin	W = 55kg/m3 x 18.8m3	1,030.00
	(5)	Sluice Way	80kg/m3 x 85.0m3	6,800.00
			Total	20,590.00
			Allowance: 5%	**21,620 kg**
11. Sand Bed				(m3)
11.1		Intake Pit	(3.70x3.70-1/2x1.50x1.50+2.64x0.60)x0.20=	2.84
11.2		Box Culvert (Upstream)	2.10x27.00x0.20=	11.34
11.3		Pumping Station	{6.2x(6.282+2.03+2.753+2.30)+2.6x0.6x2-1/2x0.70x1.90x2)}x0.2	16.92
11.4		Pit (Left)	1.35x2.50x0.20=	0.68
11.5		Pit (Right: Upstream)	2.45x2.50x0.20=	1.22
11.6		Pit (Right: downstream)	2.150x2.50x0.20=	1.08
11.7		Sluice Way	2{2.10x37.30+2.60x1.70+1/2x(2.10+4.30)x5.60}x0.0=	20.14
11.8		Manhole (Left: Upstream)	2.70x2.70x0.20=	1.46
11.9		Manhole (Left: Downstream)	2.70x2.70x0.20=	1.46
11.10		Manhole (Right)	2.20x2.20x0.20=	0.97
			Total	58.11
			Allowance: 3%	**60 m3**
12. Foundation Pile				
12.1 Reinforced Concrete Pile (300x300, L=12,000)				(No.)
	(1)	Pump Room	Weight of Reinforced Concrete = 130.69x1.03x2.65 = 357 ton	
	(2)	Discharge Basin	Weight of Pump Equipment = 5 ton	
	(3)	Pit	Number of Pile = (357 + 5)/19 ton/pcs. = 19 nos.	19
			Total	19
			Allowance: 0%	**19 No.**
12.2 Wooden Pile (ϕ80 - 100mm, L=4,500mm)				(nos).
	(1)	Intake Pit	25 pcs./m^2 x (3.50x3.50-1/2x1.40x1.40) x 4.5m =	1,158
	(2)	Box Culvert	25 pcs./m^2 x 1.90x27.00 x 4.5m =	5,771
	(3)	Sluice Way	25 pcs./m^2 x {1.90x(20.00+17.30)+1.50x2.40} x 4.5m =	8,378
	(4)	Outlet	25 pcs./m^2x1/2x(1.90+4.10)x5.50 x 4.5m =	1,856
	(5)	Manhole (Left: Upstream)	16 pcs./m2 x 2.50x2.50 x 4.5m =	450
	(6)	Manhole (Left: Downstream)	16 pcs./m2 x 2.50x2.50 x 4.5m =	450
	(7)	Manhole (Right)	16 pcs./m2 x 2.00 x 2.00 x 4.5m =	288
	(8)	Sewer (ϕ1000)	16 pcs./m2 x 1.25x(4.50+7.45) x 4.5m =	1,076
	(9)	Sewer (ϕ1200)	16 pcs./m2 x 1.45x(1.50+7.25+2.75) x 4.5m =	828
			Total	20,255
			Allowance: 1%	**20,460 m**

TABLE B.1.3 (6/8) WORK QUANTITY FOR CONSTRUCTION OF THANH DA PUMPING STATION

Item	Calculation	Quantity
13. Rip Rap		(m^3)
11.1 Retarding Pond Site	1/2x(2.00+7.50)x3.00x0.30=	4.28
11.2 Canal Side	{8.00x10.00-1/2x(1.90+4.10)x5.50}x0.50	31.75
	Total	36.03
	Allowance: 3%	**37 m3**
14. Precast Reinforced Concrete Pipe		
(1) ϕ1000	8.0 m + 5.0 m =	13.0 m
(2) ϕ1200	8.0 m + 2.0 m + 4.0 m =	14.0 m
15. Expansion Joint		(m)
(1) Intake Pit - Box Culvert	(1.65 + 1.70) x 2 =	6.70
(2) Box Culvert - Pump Station	(1.65 + 1.70) x 2 =	6.70
(3) Discharge Pit - Sluice Way	(1.65 + 1.70) x 2 =	6.70
(4) Sluice Way - Sluice Way	(1.65 + 1.70) x 2 =	6.70
	Sub-total	26.80
	Allowance: 3%	**28 m**
16. Cast Iron Manhole Cover		(set)
(1) Sewer Manhole		4
(2) Gate Pit		1
	Total	**5**
17. Fabricated Manhole		
(1) Pump Pit		2
	Total	**2**
18. Wet Stone Masonry Restoration (refer to other sheets prepared by local Engineer)		
(1) Stone Masonry	6.0mL x 3.4mW x 0.25T =	5.10
(2) Foundation Concrete	4.0m x 0.6mW x 0.4mH =	0.96
	Total	6.06
	Allowance: 3%	**7.0 m3**
19. Existing Revetment Restiration (refer to other sheets prepared by local Engineer)		
(1) Leveling Concrete (4.0m, t=100)		1.20
(2) RC Beam (300 x 350)	Length to be Reconstructed: 8m	0.84
(3) RC Coupling (450 x 400)	Length to be Reconstructed: 6m	1.08
(4) RC Foundation (450 x 400)	Length to be Reconstructed: 6m	1.08
(5) RC Revetment (4.0m, t=300)	Length to be Reconstructed: 6m	4.80
	Sub-total	9.00
	Allowance: 3%	**10 m3**
20. Landscape Work		
20.1 Steel Fence (Type A) and Gate with Concrete Post		(m)
(1) Pump Station	13.61+31.13+7.50+8.72+22.83 =	83.79
	Allowance: 3%	**85 m**
20.2 Concrete Curb including Leveling Concrete and Gravel Bedding		(m)
(1) Pump Station	1.50+3.00+3.00+1.00+2.00+1.50+2.00+1.20 =	15.20
(2) Park	1.80 x 12 + 1.80 + 8.0 + 3.0 +1.80 + 1.20 + 11.0 + 8.0 + 11.0 + 13.(	80.40
	Sub-total	95.60
	Allowance: 3%	**100 m**
20.3 Concrete Block Pavement including Sand Bedding		(m2)
(1) Park	1/2 x(8.5 + 13.0) x 10.5 - 1.80x1.80 x 3 - 1.80 x8.00 - 1.20x1.80 =	86.60
	Sub-total	86.60
	Allowance: 3%	**90 m2**
20.4 Concrete Pvement including Sand Bedding		(m2)
(1) Pumping Station	1.50x8.0+3.0x5.5+2.2x3.5+7.5x5.6+2.2x3.5+3.0x9.0+1.5x3.0+1.4x	130.00
	Allowance: 3%	**140 m2**

TABLE B.1.3 (7/8) WORK QUANTITY FOR CONSTRUCTION OF THANH DA PUMPING STATION

Item	Calculation	Quantity
20.5 Planting Work		
(1) Tree	Lagerstroemia reginae	**3 No.**
(2) Tree	Mimusops elengi	**2 No.**
(3) Tree	Plumeria alba (white Flower)	**1 No.**
(4) Shrub	Ixora coccina	**12.6 m2**
(5) Shrub	Lantana camara	**19.0 m2**
(6) Shrub	Musaenda pubescens	**18.0 m2**
(7) Grass Sod	Axonopus compressues	**5.9 m2**
(8) Grass Sprigs	Axonopus compressues	**78.9 m2**
21. Road Work		
21.1 Subgrade Preparation		



		(m2)
A1	7.00 x 13.00 - 1/4 x 3.14 x 7.00 x 7.00 =	52.54
A2	12.00 x 22 00 =	264.00
A3	4.00 x (30.50 + 8.50) + 1/2 x 2.00 x 2.00 + 1/2 x 1.00 x 1.00 =	158.50
A4	4.00 x 28.00 + 1/2 x 6.00 x 2.00 =	118.00
A5	4.00 x 19.00 =	76.00
	Total	669.04
	Allowance: 3%	**690 m2**
21.2 Sub Base Course		(m3)
	669.04m2 x 0.20m =	133.81
	Total	133.81
	Allowance: 3%	**140 m3**
21.3 Base Course (Crushed Aggragate)		(m3)
	669.04m2 x 0.19m =	127.12
	Total	127.12
	Allowance: 3%	**130 m3**
21.4 Asphalt Binder Course		(ton)
	669.04m2 x 0.05 x 2.2ton/m3 =	73.59
	Total	73.59
	Allowance: 3%	**75 ton**
21.5 Asphalt Surface Course		(ton)
	669.04m2 x 0.05 x 2.2ton/m3 =	73.59
	Total	73.59
	Allowance: 3%	**75 ton**
21.6 Prime Coat		(litre)
	669.04m2 x 0.05 x 1.5l/m2 =	1,003.56
	Total	1,003.56
	Allowance: 3%	**1,040 l**

TABLE B.1.3 (8/8) WORK QUANTITY FOR CONSTRUCTION OF THANH DA PUMPING STATION

	Item	Calculation	Quantity
	21.7 Tack Coat		(litre)
		669.04m2 x 0.5l/m2 =	334.52
		Total	334.52
		Allowance: 3%	**350 l**
	21.8 Concrete Curb		(m)
	(1) North Road	49.0 + 7.0 + 3.0 +31.5 + 7.5 + 1.7 =	100.00
	(2) East Road	19.5 + 11.5 =	31.00
	(3) South Road	34.2 + 4.0 +16.8 + 23.0 + 22.0 + 2.0 =	102.00
	(4) West Road	9.5 + 1/4 x 2 x 3.14 x 7.0 =	20.50
		Total	253.50
		Allowance: 3%	**260 m**
	21.9 Concrete Block Paving		(m2)
		2.00m x 16.5m =	33.00
		Total	33.00
		Allowance: 3%	**35 m2**

TABLE B.1.4 WORK QUANTITIES FOR CONSTRUCTION OF RETARDING POND IN THANH DA

Item			Calculation	Quantity
1. Clearing and Grubbing			**No need to consider**	
2. Earth Work (refer to the other sheets prepared by local Engineer)				(m^2)
2.1 Excavation (Depth: D<= 6.0m)				
	(1)	No.0 - No.1	8.86 x 1.00 =	8.86
	(2)	No.1 - N0.2	1/2 x (8.86 + 10.72) x 15.00 =	146.85
	(3)	No.2 - No.3	1/2 x (10.72 + 18.81) x 20.00 =	295.30
	(4)	No.3 - No.4	1/2 x (18.81 + 7.73) x 16.00 =	212.32
	(5)	No.4 - No.5	1/2 x (7.73 + 16.89) x 8.00 =	98.48
	(6)	No.5 - No.6	1/2 x (16.89 + 20.46) x 26.00 =	485.55
	(7)	No62 - No.7	1/2 x (20.46 + 14.31) x 18.00 =	312.93
			Total	1,560.29
			Allowance: 3%	**1,640 m2**
3. Stone Masonry				
3.1 Wooden Pile				
			25 pcs/ m2 x 0.50m x 247m x 4.5m =	13,893
			Allowance: 1%	**14,030**
3.2 Stone Masonry				
	(1)	Revetment	1/2 x (0.20 + 0.40) x 0.50 x 247.0 =	37.10
	(2)	Bed	0.20 x 1.00 x 247.0 =	49.40
			Total	86.50
			Allowance: 3%	**90 m3**
3.3 Leveling Concrete				
	(1)	Revetment	0.50 x 0.10 x 247.0 =	12.35
			Allowance: 3%	**13 m3**

TABLE B.1.5 WORK QUANTITIES OF O/M OFFICE CONSTRUCTION

Table B.1.5 (1)	Work Quantities of O/M Office Construction (Reinforcing Bar)
Table B.1.5 (2)	Work Quantities of O/M Office Construction (Concrete, Formwork, Pile)
Table B.1.5 (3)	Work Quantities of O/M Office Construction (Brick, Roofing, Plastering and Finishing)
Table B.1.5 (4)	Work Quantities of O/M Office Construction (Door and Window)

BAÛNG KHOÂI LÖÔÛNG

TABLE B.1.5 (1) BREAKDOWN OF QUANTITIES

HAÏNG MUÏC : TRAÏM BÔM THANH ÑA
ITEM : THANH ÑA PUMP STATION
CONG TAÏC : COÂT THEÙP VAØ THEÙP KEÁT CAÁU
WORK : REINFORCEMENT & STRUCTURE STEEL

VÒ TRÍ	Ñ.K.	CHIEU DAI THANH - LENGTH OF BAR							SO THANH - NOS OF BAR				TONG CHIEU DAI - TOTAL LENGTH									
LOCATION	DIA.	1	2	3	4	8D	42D	TOTAL	L	a	n	TOTAL	6	8	10	12	14	16	18	20	22	25	28
Mong -Foundation																							
-M1 (8 No)																							
1	18	2.05	0.25					2.30	8	1	8	64							147.2				
3	12	2.4	0.2	0.2				2.80	1.6	0.15	8	88				246.4							
4	12	1.6	0.2	0.2				2.00	2.4	0.2	8	96				192							
2	6	0.25	0.25	0.25	0.25	2		1.10	0.4	0.2	8	16	17.6										
	GRANT TOTAL WEIGHT (Ton)							**0.68**	TOTAL LENGTH (m)				17.6	0	0	438.4	0	0	147.2	0	0	0	0
	TONG TROÏNG LÖÔÛNG								UNIT WEIGHT (Kg/m)				0.222	0.394	0.616	0.888	1.208	1.579	1.998	2.466	2.984	3.854	4.834
									TOTAL WEIGHT (Ton)				**0**	**0**	**0**	**0.39**	**0**	**0**	**0.29**	**0**	**0**	**0**	**0**
Cot - Columns																							
-C1 (8 No)																							
1	18	3.55						3.55	8	1	8	64							227.2				
2	6	0.25	0.25	0.25	0.25	2		1.10	2.35	0.1	8	192	211.2										
	6	0.25	0.25	0.25	0.25	2		1.10	1.2	0.2	8	48	52.8										
	GRANT TOTAL WEIGHT (Ton)							491.20	TOTAL LENGTH (m)				264	0	0	0	0	0	227.2	0	0	0	0
	TONG TROÏNG LÖÔÛNG								UNIT WEIGHT (Kg/m)				0.222	0.394	0.616	0.888	1.208	1.579	1.998	2.466	2.984	3.854	4.834
									TOTAL WEIGHT (Ton)				**0.06**	**0**	**0**	**0**	**0**	**0**	**0.45**	**0**	**0**	**0**	**0**
Ña Kieng- Ground beams																							
DK1 (2No)																							
1	16	10.3	0.35	0.35				11.00	2	1	2	4						44					
2	16	10.3	0.2	0.2				10.70	2	1	2	4						42.8					
3	16	4						4.00	2	1	2	4						16					
4	16	2						2.00	4	1	2	8						16					
5	6	0.15	0.15	0.3	0.3	2		1.00	7.4	0.15	2	98	98										
	6	0.15	0.15	0.3	0.3	2		1.00	8	0.2	2	80	80										
DK2 (3No)																							
1	16	5.3	0.35	0.35				6.00	2	1	2	4						24					
2	20	5.3	0.2	0.2				5.70	2	1	2	4								22.8			
3	16	4						4.00	2	1	2	4						16					
4	6	0.15	0.15	0.3	0.3	2		1.00	2.4	0.15	2	32	32										
	6	0.15	0.15	0.3	0.3	2		1.00	2.9	0.2	2	30	30										

VÒ TRÍ	Ñ.K.	CHIEU DAI THANH - LENGTH OF BAR							SO THANH - NOS OF BAR				TONG CHIEU DAI - TOTAL LENGTH										
LOCATION	DIA.	1	2	3	4	8D	42D	TOTAL	L	a	n	TOTAL	6	8	10	12	14	16	18	20	22	25	28
DK3 (1No)																							
1	16	5.3	0.2	0.2				5.70	2	1	2	4						22.8					
2	16	5.3	0.1	0.1				5.50	2	1	2	4						22					
3	6	0.15	0.15	0.15	0.15	2		0.70	2.4	0.15	2	32	22.4										
	6	0.15	0.15	0.15	0.15	2		0.70	2.9	0.2	2	30	21										
DAM MAI																							
DM1 (2 No)																							
1	16	10.3	0.35	0.35				11.00	2	1	2	4						44					
2	16	10.3	0.2	0.2				10.70	2	1	2	4						42.8					
3	16	4						4.00	2	1	2	4						16					
4	16	2						2.00	2	1	2	4						8					
5	6	0.15	0.15	0.3	0.3	2		1.00	4.1	0.15	2	54	54										
	6	0.15	0.15	0.3	0.3	2		1.00	5	0.2	2	50	50										
DM2 (4 No)																							
1	20	7.2	0.15	0.15				7.50	2	1	4	8								60			
2	16	7.3	0.1	0.1				7.50	2	1	4	8						60					
3	16	4						4.00	2	1	4	8						32					
4	16	2.4						2.40	4	1	4	16						38.4					
5	6	0.25	0.25	0.3	0.3	2		1.20	2.3	0.15	4	60	72										
	6	0.25	0.25	0.3	0.3	2		1.20	2.4	0.2	4	48	57.6										
	6	0.2	0.2	0.2	0.2	2		0.90	1.9	0.15	4	52	46.8										
-Bo tru (4No)-sub column BTM																							
1	12	0.6						0.60	4	1	4	16				9.6							
2	6	0.15	0.15	0.15	0.15	2		0.70	0.4	0.1	4	16	11.2										
	6	0.15	0.15	0.15	0.15	2		0.70	0.2	0.2	4	4	2.8										
DG1 (4No)																							
1	12	7.6	0.2	0.2				8.00	2	1	4	8				64							
2	12	7.6	0.1	0.1				7.80	2	1	4	8				62.4							
3	6	0.15	0.15	0.15	0.15	2		0.70	3.8	0.15	4	100	70										
	6	0.15	0.15	0.15	0.15	2		0.70	3.8	0.2	4	76	53.2										
Ña lanh to - Lintels																							
- D01 (1 N0.)	16	1.15	0.2	0.2				1.55	4	1	1	4						6.2					
	6	0.15				2		0.25	1.15	0.15	1	8	2										
- D02 (2 No)	16	1.05	0.2	0.2				1.45	2	1	2	4						5.8					
	6	0.15				2		0.25	1.05	0.15	2	14	3.5										
- D03 (3 No)	16	1.30	0.2	0.2				1.70	4	1	3	12						20.4					
	6	0.15	0.15	0.15	0.15	2		0.70	1.3	0.15	3	27	18.9										

VÒ TRÍ	Ñ.K.	CHIEU DAI THANH - LENGTH OF BAR							SO THANH - NOS OF BAR				TONG CHIEU DAI - TOTAL LENGTH										
LOCATION	DIA.	1	2	3	4	8D	42D	TOTAL	L	a	n	TOTAL	6	8	10	12	14	16	18	20	22	25	28
- D04 (1 No)	16	1.90	0.2	0.2		2		2.56	4	1	1	4						10.24					
	6	0.15	0.15	0.15	0.15	2		0.70	1.9	0.15	1	13	9.1										
-W01 (1 No)	16	1.00	0.2	0.2		2		1.66	4	1	1	4						6.64					
	6	0.15	0.15	0.15	0.15	2		0.70	1	0.15	1	7	4.9										
- W02 (5 No)	16	2.40	0.2	0.2		2		3.06	4	1	5	20						61.2					
	6	0.15	0.15	0.15	0.15	2		0.70	2.4	0.15	5	80	56										
	GRANT TOTAL WEIGHT (Ton)							1.38	TOTAL LENGTH			(m)	795.4	0	0	136	0	555.28	0	82.8	0	0	0
	TONG TRONG LÖÔNG								UNIT WEIGHT			(Kg/m)	0.222	0.394	0.616	0.888	1.208	1.579	1.998	2.466	2.984	3.854	4.834
									TOTAL WEIGHT			(Ton)	**0.18**	**0**	**0**	**0.12**	**0**	**0.88**	**0**	**0.2**	**0**	**0**	**0**
Nen nha -Ground floor slab																							
	12	10.4						10.40	5.4	0.2	1	27				280.8							
	12	5.4						5.40	10.4	0.2	1	52				280.8							
	GRANT TOTAL WEIGHT (Ton)							0.50	TOTAL LENGTH			(m)	0	0	0	561.6	0	0	0	0	0	0	0
	TONG TRONG LÖÔNG								UNIT WEIGHT			(Kg/m)	0.222	0.394	0.616	0.888	1.208	1.579	1.998	2.466	2.984	3.854	4.834
									TOTAL WEIGHT			(Ton)	**0**	**0**	**0**	**0.499**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

BAÛNG KHOÛI LÖÔÛNG
TABLE B.1.5.(2) BREAKDOWN OF QUANTITIES

HAÛNG MUÏC : BLOWER BUILDING
ITEM : BLOWER BUILDING
COÂNG TAÙC : BEÂ TOÂNG VAØ VAÙN KHUOÂN
WORK : CONCRETE AND FORMWORK

Moâ taû Description	K.H SIGN	KHOÁI LÖÔÏNG - QUANTITY L	W	H	n	TOTAL	PL	EW1	EW2	EW3	CF1	CF2	CC1	CB1	CS	FF	FC	FB
A. Coâng taùc ñaøt - EARTH WORK (m3)																		
Ñaøo ñaát hoá moùng - Excavation for footings																		
- M1 (8No)	EW1	2.60	1.80	1.50	8.0	56.16		56.16										
Ñaép vaø ñaàm ñaát neàn nhaø- Fill and compact soil base (m3)																		
	EW2	10.00	5.00	0.20	1.0	10.00			10.00									
Tam nhöïa Polyethylene - Polyethylene Sheet (m2)																		
	EW3	10.00	5.00	1.00	1.0	50.00				50.00								
B. Cöø tram - WOODEN PILES (No.)																		
Cöø tram d=80~100, L=5m, 25piles/m2 - Wooden piles (No)																		
- M1 (8 No)	PL	2.40	1.60	25.00	8	768.00	768.00											
C. Beâ toâng - Concrete																		
Beâ toâng loùt, maùc 100, ñaù 4x6 Lean concrete garde 100, stone 40x60 (CF1)																		
- M1 (8 No)	CF1	2.60	1.80	0.10	8	3.74					3.74							
- Ground slab	CF1	10.40	5.40	0.10	1	5.62					5.62							
Beâ toâng maùc 300, ñaù 1x2 - Concrete garde 300, stone 10x20 (CC1)																		
Moùng (m3)																		
-M1 (8 No.)	CF2	2.40	1.60	0.25	8	7.68						7.68						
	CF2	0.42	1.00	1.00	8	3.36						3.36						
2. Ñaù kieng (m3)																		
DK1(2No)	CB1	9.10	0.20	0.35	2	1.27								1.27				
DK2(3No)	CB1	4.70	0.20	0.35	3	0.99								0.99				
DK3(1No)	CB1	4.70	0.20	0.20	1	0.19								0.19				
3. Coät - Columns (m3)																		
C1(8No)	CC1	0.30	0.30	3.95	8	2.84							2.84					
BTM (4No)	CC1	0.20	0.20	0.40	4	0.06							0.06					
4. Ñaø - Beam (m3)																		
Beâ toâng maùc 300, ñaù 1x2 - Concrete garde 300, stone 10x20 (CB1)																		
DM1(2No)	CB1	9.10	0.20	0.35	2	1.27								1.27				
DM2(4No)	CB1	4.70	0.30	0.35	4	1.97								1.97				
	CB1	0.26	2.00	0.30	4	0.63								0.63				
DG1 (4No)	CB1	7.60	0.20	0.20	4	1.22								1.22				
Ñaù lanh toâ - Lintels																		
- D01 (1 N0.)	CB1	1.15	0.10	0.20	1	0.02								0.02				
- D02 (2 No)	CB1	1.05	0.10	0.20	2	0.04								0.04				
- D03 (3 No)	CB1	1.30	0.20	0.20	3	0.16								0.16				
- D04 (1 No)	CB1	1.90	0.20	0.20	1	0.08								0.08				
- W01 (1 No)	CB1	1.20	0.20	0.20	1	0.05								0.05				
- W02 (5 No)	CB1	2.80	0.20	0.20	5	0.56								0.56				
Neàn																		
	CS	10.00	5.00	0.15	1	7.50									7.50			
D. Vaùn khuoân - Formwork																		
1. Moùng																		
-M1 (8 No.)	FF	8.00	1.00	0.25	8	16.00										16.00		
2. Ñaù kieng																		
DK1(2No)	FB	18.20	1.00	0.35	2	12.74												12.74
DK2(2No)	FB	9.40	1.00	0.35	3	9.87												9.87
DK3(1No)	FB	9.40	1.00	0.20	1	1.88												1.88
3. Coät - Columns (m2)																		
C1(8No)	FC	1.00	1.20	3.95	6	28.44											28.44	
BTM(4No)	FC	1.00	0.80	0.40	4	1.28											1.28	
4. Ñaø - Beam (m2)																		
DM1 (2No)	FB	27.30	0.35	1.00	2	19.11												19.11
DM2 (4No)	FB	14.10	3.50	1.00	4	197.40												197.40
	FB	5.70	0.90	1.00	4	20.52												20.52
DG1 (4No)	FB	15.20	0.20	1.00	4	12.16												12.16
Ñaù lanh toâ - Lintels																		
- D01 (1 N0.)	FB	1.15	0.50	1.00	1	0.58												0.58
- D02 (2 No)	FB	1.05	0.50	1.00	2	1.05												1.05
- D03 (3 No)	FB	1.30	0.60	1.00	3	2.34												2.34
- D04 (1 No)	FB	1.90	0.60	1.00	1	1.14												1.14
- W01 (1 No)	FB	1.20	0.60	1.00	1	0.72												0.72
- W02 (5 No)	FB	2.80	0.60	1.00	5	8.40												8.40
	TOTAL						768.00	56.16	10.00	50.00	9.36	11.04	2.91	8.45	7.50	16.00	29.72	287.91

MOÂ TAÛ - DESCRIPTION	K. HIEÄU SIGN	Ñ. VÒ UNIT	Khoái löôïng Quantity
Cöø tram L= 5m Wooden pile	WP	No	768.00
Ñaøo mong, laáp ñaát hoá mong Excavation and backfill soil for footings	EW1	m3	56.16
Ñaép vaø ñaàm ñaát neàn nhaø Fill and compact soil base	EW2	m3	10.00
Tam nhöïa Polyethylene Polyethylene sheet	EW3	m2	50.00
Beâ tong loùt , maùc 100, ñaù 4x6 Lean concrete, garde 100, stone 40x60	CF1	m3	9.36
Beâ tong moùng maùc 300, ñaù 4x6 Concrete garde 300, stone 10x20 - Footings	CF2	m3	11.04
Beâ tong coät maùc 300, ñaù 1x2 Concrete garde 300, stone 10x20 - Coloumns	CC1	m3	2.91

MOÂ TAÛ - DESCRIPTION	KYÙ HIEÄU SIGN	ÑÔN VÒ UNIT	Khoái löôïng Quantity
Beâ tong ñaù maùc 300, ñaù 1x2 Concrete garde 300, stone 10x20 - Beams	CB1	m3	8.45
Beâ tong saøn maùc 300, ñaù 4x6 Slab concrete garde 300, stone 10x20 - Slab	CS	m3	7.50
Vaùn khuoân moùng Formwork - Footings	FF	m2	16.00
Vaùn khuoân coät Formwork - Columns	FC	m2	29.72
Vaùn khuoân ñaù Formwork - Beams	FB	m2	287.91

BAÛNG KHOÁI LÖÔÏNG
TABLE B.1.5 (3) BREAKDOWN OF QUANTITIES

HAÏNG MUÏC : TRAÏM BÔM THANH ÑA
ITEM : THANH ÑA PUMP STATION
COÂNG TAÙC : XAÂY TOÂ, MAÙI,HOAØN THIEÄN
WORK : BRICK WORKS, ROOFING AND FINISHES

Moâ taû	K.H	KHOÁI LÖÔÏNG - QUANTITY					XAÂY TÖÔØNG BRICK WALL		MAÙI ROOFING					HOAØN THIEÄN FINISHES								
Description	SIGN	L	W	H	n	TOTAL	BR1	BR2	RF1	RF2	RF3	RF4	RF5	PL1	PL2	FR1	FR2	CL1	CL2	CL3	WL1	WL2
A. Xaây töôøng - Brickwork																						
BR1: daøy 200mm, BR2: daøy 100mm (m2)																						
BR1: 190mm thick, BR2:90mm thick																						
- Truïc - Gridline 1,4	BR1	4.70	1.00	3.2	2	29.61	29.61															
	BR1	2.50	1.00	0.3	4	3.00	3.00															
D04	BR1	1.50	1.00	2.2	-1	-3.30	-3.30															
W02	BR1	2.00	1.00	1.2	-2	-4.80	-4.80															
- Truïc - Gridline 2'	BR2	9.40	1.00	3.2	1	29.61		29.61														
D03	BR2	0.90	1.00	2.2	-1	-1.98		-1.98														
- Truïc - Gridline 3	BR2	4.80	1.00	3.2	1	15.12		15.12														
D03	BR2	0.90	1.00	2.2	-1	-1.98		-1.98														
- Truïc - Gridline A,B	BR1	9.10	1.00	3.6	2	64.61	64.61															
D03	BR1	0.90	1.00	2.2	-1	-1.98	-1.98															
W02	BR1	2.00	1.00	1.2	-2	-4.80	-4.80															
W01	BR1	0.60	1.00	0.6	-1	-0.36	-0.36															
Khu Veä Sinh																						
- Truïc - Gridline B'	BR2	2.10	1.00	3.6	2	14.91		14.91														
D01	BR2	0.90	1.00	2.2	-1	-1.98		-1.98														
D02	BR2	0.60	1.00	2.0	-2	-2.40		-2.40														
B. Maùi - Roofing																						
Taám lôïp maùi Spandek (BHP) - Spandek Hi-ten roofsheet (BHP) (m2) - RF1																						
	RF1	11.60	7.20	1.00	1	83.52			83.52													
Xaø goà theùp C203x71x1.5 - Purlin (BHP) (m) - RF2																						
	RF2	11.60	1.00	1.00	9	104.40				104.40												
Maùng xoái treo (BHP) - Eave gutter (BHP) (m) - RF3																						
	RF3	11.60	1.00	1.00	2	23.20					23.20											
Oáng xoái - Down spout 72x105 (BHP) - RF4																						
	RF4	4.45	1.00	1.00	4	17.80						17.80										
Flashing H=400 (BHP) - RF5 (M)																						
	RF5	11.60	1.00	1.00	2	23.20							23.20									
	RF5	7.20	1.00	1.00	2	14.40							14.40									

Mo ta	K.H	KHOI LÖÔNG - QUANTITY					XAY TÖÔNG BRICK WALL		MAI ROOFING					HOAN THIEN FINISHES								
Description	SIGN	L	W	H	n	TOTAL	BR1	BR2	RF1	RF2	RF3	RF4	RF5	PL1	PL2	FR1	FR2	CL1	CL2	CL3	WL1	WL2
C. To trat - Plastering (m2)																						
Trat töông day 20mm - 20mm thick cement/sand plastering on wall																						
- Töông 190mm - 190mm thick wall																						
= BR1X2	PL1	81.98	1.00	1.00	2	163.96								163.96								
Trat cot day 20mm - 20mm thick cement/sand plastering on columns																						
- C1 (8 No.)	PL2	1.00	0.90	3.20	8	23.04									23.04							
BTM(4No)	PL2	1.00	0.40	0.40	4	0.64									0.64							
Trat dam day 20mm																						
-DM1(2No)	PL2	1.00	0.70	9.10	2	12.74									12.74							
-DM2(4No)	PL2	1.00	0.70	4.70	4	13.16									13.16							
	PL2	1.00	2.00	0.26	4	2.09									2.09							
-DG1(4No)	PL2	1.00	0.40	7.60	4	12.16									12.16							
D. Hoan thien nen -Floor finishing (m2))																						
FR1 - Gach men 200 x 200 - ceramic 200x200																						
FR2 - Gach quart - Quart tile																						
	FR1	2.05	3.20	1.00	1	7										6.56						
	FR2	9.80	4.80	1.00	1	47											47.04					
	FR2	2.05	3.20	1.00	-1	-7											-6.56					
E. Hoan thien töông (m2)																						
WL1 - Gach men 200 x 250 - ceramic 200x250																						
	WL1	18.00	1.00	2.00	1	36															36.00	
D01	WL1	0.90	1.00	2.00	-1	-2															-1.80	
D02	WL1	0.60	1.00	2.00	-1	-1															-1.20	
WL2- Sôn nöôc - water paint																						
= PL1+PL2-WL1	WL2	194.79	1.00	1.00	1	195																194.79
F. Hoan thien tran -Ceiling finishes (m2)																						
CL1- Tam tran villa - Villa board ceiling																						
CL2- Tam tran plaster board - Plasterboard ceiling																						
CL3- Tran thep treo Lysaght ceidek- Lysaght ceidek ceiling (BHP)																						
	CL1	2.05	3.20	1.00	1	7												6.56				
	CL2	10.00	5.00	1.00	1	50													50.00			
	CL2	2.05	3.20	1.00	-1	-7													-6.56			
	CL3	11.60	1.17	1.00	2	27														27.14		
	CL3	5.30	0.80	1.00	2	8														8.48		
	TOTAL						81.98	51.30	83.52	104.40	23.20	17.80	37.6	163.96	63.83	6.56	40.48	6.56	43.44	35.62	33.00	194.79

Mo ta Description	K.H SIGN	KHOI LÖÔNG - QUANTITY					XAY TÖÔNG BRICK WALL		MAI ROOFING					HOAN THIEN FINISHES								
		L	W	H	n	TOTAL	BR1	BR2	RF1	RF2	RF3	RF4	RF5	PL1	PL2	FR1	FR2	CL1	CL2	CL3	WL1	WL2

MO TA - DESCRIPTION	K. HIEU	Ñ. Vò UNIT	Khoi löông Quantity		
Xay töông day 190 190 thick brick wall	BR1	m2	81.98		
Xay töông day 90 90 thick brick wall	BR2	m2	51.30	133.28	
Tam lôp mai Spandek (BHP) Spandek Hi-ten roofsheet (BHP)	RF1	m2	83.52		
Xa go thep C203x76x1.5 (BHP) Purlin C203x76x1.5 (BHP)	RF2	m	104.40		
Mang xoi treo (BHP) Eave gutter (BHP)	RF3	m	23.20		
Ong xoi 72x105 (BHP) Down spout 72x105 (BHP)	RF4	m	17.80		
Flasing H=400	RF5	m2	37.60		

MO TA - DESCRIPTION	KY HIEU	ÑÔN Vò	Khoi löông Quantity	
Trat töông, cot day 20mm 20mm thick cement/sand plastering on walls, coloumns	PL1	m2	163.96	
Trat ña dam day 20mm 20mm thick cement/sand plastering on ña, dam	PL2	m2	63.83	
Lat gach men 200 x 200 tren san Ceramic tile 200 x 200 on floors	FR1	m2	6.56	
Lat gach quart Quart tile	FR2	m2	40.48	
Tan tran villa Villa board ceiling	CL1	m2	6.56	
Tam tran Plasterboard Plasterboard ceiling	CL2	m2	43.44	
He thong tran thep treo (BHP) Lysaght cedek- Suspended steel ceiling system (BHP)	CL3	m2	35.62	85.62
Op gach töông 200x250 Ceramic tile on 200x250 walls	WL1	m2	33.00	
Tret ba va sôn 2 lôp len töông Apply admixture and 2 paint layers on walls	WL2	m2	194.79	

BAÛNG KHOÛI LÖÔÛNG
TABLE B.1.5 (4) BREAKDOWN OF QUANTITIES

HAÛNG MUÛC : TRAÛM BÔM THANH ÑA
ITEM : THANH ÑA PUMP STATION
COÂNG TAÙC : CÖÛA VAÙ CÖÛA SOÅ
WORK : DOOR AND WINDOW

Moâ taû Description	K.HIEÄU SIGN	KHOÁI LÖÔÏNG - QUANTITY					CÖÛA VAÙ CÖÛA SOÅ DOORS AND WINDOWS				
		L	W	H	n	TOTAL	DR1	DR2	DR3	WD1	WD2
Cöûa vaù cöûa soå - Doors and windows											
Cöûa nhoâm kính Aluminium glass door											
- D01 (1 NO.)	DR1	0.75	1.00	2.20	1	2	1.65				
- D03 (3 No)	DR1	0.90	1.00	2.20	3	6	5.94				
Cöûa nhöïa Plastic doors						0					
- D02 (2 No)	DR2	0.65	1.00	2.00	2	3		2.60			
Cöûa sat kính Steel glass doors						0					
- D04 (1 No)	DR3	1.50	1.00	2.20	1	3			3.30		
Cöûa soå nhoâm kính Aluminium glass windows						0					
- W02 (5 No)	WD1	2.00	1.00	1.45	5	15				14.50	
Cöûa soå nhoâm bat Flash aluminium windows						0					
- W01 (1 No)	WD2	0.60	1.00	0.60	1	0					0.36
						0					
	TOTAL						7.59	2.60	3.30	14.50	0.36

MOÂ TAÛ - DESCRIPTION	**K. HIEÄU SIGN**	**Ñ. VÒ UNIT**	**Khoái löôïng Quantity**
Cöûa nhoâm kính Aluminium glass door	DR1	m2	7.59
Cöûa nhöïa Plastic doors	DR2	m2	2.60
Cöûa kính sat Steel glass door	DR3	m2	3.30
Cöûa soå nhoâm Aluminium window	WD1	m2	14.50
Cöûa soå nhoâm bat Flash aluminium windows	WD2	m2	0.36

TABLE B.1.6 MECHANICAL EQUIPMENT LIST OF TANH DA PUMPING STATION

	No.	Name	Model	Spec	Q'ty	Remarks
2.5.1 Mechanical Equipment	2.5.1.1	Main pump	Submersible motor pump	400mm dia. x 0.35m3/s x 3.52m	2	
	2.5.1.2	Pipework	Steel made	400 to 600mm dia.	2	
	2.5.1.3	Flap valve	Steel made single door	600mm dia.	2	
	2.5.1.4	Inlet gate (1)	Steel made	1.2m W x 1.2m H	1	
	2.5.1.5	Inlet gate (2)	Steel made	1.0m W x 1.0m H	1	
	2.5.1.6	By-pass gate	Steel made	1.4m W x 1.4m H	1	
	2.5.1.7	Outlet gate	Steel made	1.4m W x 1.4m H	1	
	2.5.1.8	Flap gate	Steel made	1.0m dia.	1	
	2.5.1.9	Flap gate	Steel made	1.2m dia.	1	
	2.5.1.10	Stop logs	Wooden made	1.5m W	8	
	2.5.1.11	Bar screen	Steel made	Bar pitch: 25mm	2	
	2.5.1.12	Pump lifting device	Steel made	1ton	1	
	2.5.1.13	Flap gate for sewer outlet	Steel made	1.0m dia.	5	
	2.5.1.14	Spare parts			1lot	

TABLE B.1.7 (1/4) ELECTRICAL WORK QUANTITIES OF THANH DA PUMPING STATION

Item		Description	Specification	Q'ty	unit
Electrical Equipment					
A		Electrical Equipment			
A-1		Distribution Panel	Outdoor type	1	unit
A-2		Pump and Gate Control Panel	Outdoor type	2	units
A-3		Alarm Panel	Outdoor type	1	unit
A-4		Switch Box	Outdoor type	5	unit
A-5		Mechanical anchor	M8	20	pcs
A-6		Mechanical anchor	M10	16	pcs
A-7		Grip anchor	M12	24	pcs
A-8		Concrete anchor plug	M6	50	pcs
A-9		Silicon seal		3	pcs
A-10		Checker plate	t=3.2	1.0	m2
A-11		Plaster board	t=9.2	1.0	m2
A-12		Cable entrance seal		5	kg
A-13		Heat protect seal		5	kg
B		Instrumentation Equipment			
B-1		Submerged Diaphram Type Level Meter		1	sets
B-2		Electrode Type Level Contorol Switch		2	sets
B-3		Mechanical anchor	M10	20	pcs
B-4		Silicon seal		1	pcs
B-5		Cable entrance seal		2	kg
B-6		Heat protect seal		2	kg
C		Cable and wiring materials			
C-1		Power Cable			
	1	600V Power Cable	CV 3C- 3.5sqmm	200	m
	2	600V Power Cable	CV 4C- 8sqmm	50	m
	3	600V Power Cable	CV 4C- 22sqmm	35	m
	4	600V Power Cable	CV 4C- 38sqmm	50	m
	5	600V Power Cable	CV 3C-100sqmm	50	m
	6	600V Power Cable	CV 1C-150sqmm	25	m
	7	600V Power Cable	CV 3C-150sqmm	25	m
	8	600V Cable termination	CV 4C- 38sqmm	2	sets
	9	600V Cable termination	CV 3C-100sqmm	4	sets
	10	600V Cable termination	CV 1C-150sqmm	2	sets
	11	600V Cable termination	CV 3C-150sqmm	2	sets
	12	termina	3.5sqmm-4	50	pcs
	13	termina	3.5sqmm-6	50	pcs
	14	termina	3.5sqmm-10	50	pcs
	15	termina	8sqmm-5	12	pcs
	16	termina	8sqmm-10	12	pcs
	17	termina	22sqmm-6	12	pcs
	18	termina	22sqmm-10	12	pcs
	19	termina	22sqmm-12	12	pcs
	20	termina	38sqmm-8	12	pcs
	21	termina	38sqmm-10	12	pcs
	22	termina	38sqmm-12	12	pcs
C-2		Control Cable			
	1	Control Cable	CVVS 3.5- 2C	85	m
	2	Control Cable	CVVS 3.5- 6C	205	m
	3	Control Cable	CVVS 3.5- 15C	85	m
	4	termina	3.5sqmm-4	300	pcs
	5	termina	3.5sqmm-6	300	pcs
	6	termina	3.5sqmm-10	300	pcs
C-3		Piping Materials			

TABLE B.1.7 (2/4) ELECTRICAL WORK QUANTITIES OF THANH DA PUMPING STATION

Item		Description	Specification	Q'ty	unit
Electrical Equipment					
	1	Flexible Polyethylen Pipe (FEP)	FEP 30φ	60	m
	2	Flexible Polyethylen Pipe (FEP)	FEP 50φ	60	m
	3	Flexible Polyethylen Pipe (FEP)	FEP 100φ	120	m
	4	Flexible Polyethylen Pipe (FEP)	FEP 125φ	60	m
	5	Bell Mouth for FEP	for FEP 30φ	6	pcs
	6	Bell Mouth for FEP	for FEP 50φ	6	pcs
	7	Bell Mouth for FEP	for FEP 100φ	12	pcs
	8	Bell Mouth for FEP	for FEP 125φ	6	pcs
	9	Joint Connector for FEP	for FEP 30φ	5	pcs
	10	Joint Connector for FEP	for FEP 50φ	5	pcs
	11	Joint Connector for FEP	for FEP 100φ	5	pcs
	12	Joint Connector for FEP	for FEP 125φ	5	pcs
	13	Waterproof cap for FEP	for FEP 30φ	12	pcs
	14	Waterproof cap for FEP	for FEP 50φ	12	pcs
	15	Waterproof cap for FEP	for FEP 100φ	24	pcs
	16	Waterproof cap for FEP	for FEP 125φ	12	pcs
	17	Conduit pipe	G22	60	m
	18	Conduit pipe	G28	60	m
	19	Conduit pipe	G36	60	m
	20	Conduit pipe	G42	30	m
	21	Conduit pipe	G54	30	m
	22	Conduit pipe	G70	30	m
	23	Conduit pipe	G82	30	m
	24	Conduit pipe	G104	60	m
	25	Conduit pipe (Normal bend)	for G22	5	pcs
	26	Conduit pipe (Normal bend)	for G28	5	pcs
	27	Conduit pipe (Normal bend)	for G36	5	pcs
	28	Conduit pipe (Normal bend)	for G42	5	pcs
	29	Conduit pipe (Normal bend)	for G54	5	pcs
	30	Conduit pipe (Normal bend)	for G70	5	pcs
	31	Conduit pipe (Normal bend)	for G82	5	pcs
	32	Conduit pipe (Normal bend)	for G104	5	pcs
	33	Conduit pipe (Coupling)	for G22	10	pc
	34	Conduit pipe (Coupling)	for G28	10	pc
	35	Conduit pipe (Coupling)	for G36	10	pc
	36	Conduit pipe (Coupling)	for G42	10	pc
	37	Conduit pipe (Coupling)	for G54	10	pc
	38	Conduit pipe (Coupling)	for G70	10	pcs
	39	Conduit pipe (Coupling)	for G82	10	pcs
	40	Conduit pipe (Coupling)	for G104	10	pcs
	41	Conduit pipe (Lock nut)	for G22	10	pcs
	42	Conduit pipe (Lock nut)	for G28	10	pcs
	43	Conduit pipe (Lock nut)	for G36	10	pcs
	44	Conduit pipe (Lock nut)	for G42	10	pcs
	45	Conduit pipe (Lock nut)	for G54	10	pcs
	46	Conduit pipe (Lock nut)	for G70	10	pcs
	47	Conduit pipe (Lock nut)	for G82	10	pcs
	48	Conduit pipe (Lock nut)	for G104	10	pcs
	49	Conduit pipe (Bushing)	for G22	10	pcs
	50	Conduit pipe (Bushing)	for G28	10	pcs
	51	Conduit pipe (Bushing)	for G36	10	pcs
	52	Conduit pipe (Bushing)	for G42	10	pcs
	53	Conduit pipe (Bushing)	for G54	10	pcs
	54	Conduit pipe (Bushing)	for G70	10	pcs
	55	Conduit pipe (Bushing)	for G82	10	pcs
	56	Conduit pipe (Bushing)	for G104	10	pcs
	57	Ducter	D2 (40x30x2500)	3	pcs

TABLE B.1.7 (3/4) ELECTRICAL WORK QUANTITIES OF THANH DA PUMPING STATION

Item		Description	Specification	Q'ty	unit
Electrical Equipment					
	58	Ducter clip	for G22	30	pcs
	59	Ducter clip	for G28	30	pcs
	60	Ducter clip	for G36	30	pcs
	61	Ducter clip	for G42	30	pcs
	62	Ducter clip	for G54	30	pcs
	63	Ducter clip	for G70	30	pcs
	64	Ducter clip	for G82	30	pcs
	65	Ducter clip	for G104	30	pcs
	66	Mechanical anchor	M10	50	pcs
	67	Concrete anchor plug	M6	100	pcs
	68	Flexible metal conduit pipe	24φ	20	m
	69	Flexible metal conduit pipe	30φ	20	m
	70	Flexible metal conduit pipe	38φ	20	m
	71	Flexible metal conduit pipe	50φ	20	m
	72	Flexible metal conduit pipe	63φ	20	m
	73	Flexible metal conduit pipe	76φ	20	m
	74	Flexible metal conduit pipe	83φ	20	m
	75	Flexible metal conduit pipe	101φ	20	m
	76	Conbination coupling	for 24φ-G22	10	pcs
	77	Conbination coupling	for 30φ-G28	10	pcs
	78	Conbination coupling	for 38φ-G36	10	pcs
	79	Conbination coupling	for 50φ-G42	10	pcs
	80	Conbination coupling	for 63φ-G54	10	pcs
	81	Conbination coupling	for 76φ-G70	10	pcs
	82	Conbination coupling	for 83φ-G82	10	pcs
	83	Conbination coupling	for 101φ-G104	10	pcs
	84	Box connector	for 24φ	20	pcs
	85	Box connector	for 30φ	20	pcs
	86	Box connector	for 38φ	20	pcs
	87	Box connector	for 50φ	20	pcs
	88	Box connector	for 63φ	20	pcs
	89	Box connector	for 76φ	20	pcs
	90	Box connector	for 83φ	20	pcs
	91	Box connector	for 101φ	20	pcs
	92	Bushing	for 24φ	20	pcs
	93	Bushing	for 30φ	20	pcs
	94	Bushing	for 38φ	20	pcs
	95	Bushing	for 50φ	20	pcs
	96	Bushing	for 63φ	20	pcs
	97	Bushing	for 76φ	20	pcs
	98	Bushing	for 83φ	20	pcs
	99	Bushing	for 101φ	20	pcs
	100	Suddle	for 24φ	50	pcs
	101	Suddle	for 30φ	50	pcs
	102	Suddle	for 38φ	50	pcs
	103	Suddle	for 50φ	50	pcs
	104	Suddle	for 63φ	50	pcs
	105	Suddle	for 76φ	50	pcs
	106	Suddle	for 83φ	50	pcs
	107	Suddle	for 101φ	50	pcs
	108	Pull Box	100x100	3	pcs
	109	Pull Box	200x200	2	pcs
	110	Pull Box	250x250	2	pcs
	111	Pull Box	400x400	8	pcs
	112	Hand hole	1200x1200x1200	4	pcs
C-4		Earthing materials			

TABLE B.1.7 (4/4) ELECTRICAL WORK QUANTITIES OF THANH DA PUMPING STATION

Item		Description	Specification	Q'ty	unit
Electrical Equipment					
	1	IV wire	IV 2.0	100	m
	2	IV wire	IV 3.5	50	m
	3	IV wire	IV 5.5	50	m
	4	IV wire	IV 8	50	m
	5	IV wire	IV 14	50	m
	6	IV wire	IV 22	50	m
	7	IV wire	IV 38	50	m
	8	IV wire	IV 60	100	m
	9	IV wire	IV 100	200	m
	10	IV wire	IV 150	50	m
	11	T-type connector	38sqmm	50	pcs
	12	T-type connector	100sqmm	50	pcs
	13	T-type connector	150sqmm	50	pcs
	14	T-type connector	250sqmm	50	pcs
	15	T-type connector	400sqmm	50	pcs
	16	termina	2.0sqmm-4	200	pcs
	17	termina	2.0sqmm-6	200	pcs
	18	termina	2.0sqmm-8	200	pcs
	19	termina	3.5sqmm-4	200	pcs
	20	termina	3.5sqmm-6	200	pcs
	21	termina	3.5sqmm-10	200	pcs
	22	termina	5.5sqmm-4	200	pcs
	23	termina	5.5sqmm-6	200	pcs
	24	termina	5.5sqmm-10	200	pcs
	25	termina	8sqmm-5	100	pcs
	26	termina	8sqmm-10	100	pcs
	27	termina	14sqmm-5	100	pcs
	28	termina	14sqmm-10	100	pcs
	29	termina	14sqmm-12	100	pcs
	30	termina	22sqmm-6	100	pcs
	31	termina	22sqmm-10	100	pcs
	32	termina	22sqmm-12	100	pcs
	33	termina	38sqmm-8	100	pcs
	34	termina	38sqmm-10	100	pcs
	35	termina	38sqmm-12	100	pcs
	36	termina	60sqmm-8	100	pcs
	37	termina	60sqmm-10	100	pcs
	38	termina	60sqmm-12	100	pcs
	39	termina	100sqmm-10	100	pcs
	40	termina	100sqmm-12	100	pcs
	41	termina	100sqmm-20	100	pcs
	42	termina	150sqmm-10	100	pcs
	43	termina	150sqmm-12	100	pcs
	44	termina	150sqmm-20	100	pcs
	45	Earthing Rod	1500mmx16φ	40	pcs
	46	Earthing Plate	900x900x1.5t	2	pcs
	47	Earthing wire connection box	Concrete type	2	pcs
	48	Earthing rod embed sign pole		4	pcs
	49	Earthing terminal box	Outdoor type	1	pcs
D		Outdoor Lighting Equipment			
D-1		Streight Pole Head Type Lighting Fixture	N360W	4	sets
D-2		Outdoor lighting control panel		1	set
D-3		Mechanical anchor	M10	50	pcs
D-4		Silicon seal		3	pcs
D-5		Cable entrance seal		5	kg
D-6		Heat protect seal		5	kg

Table B.1.8 (1) Sewer line : TD2 (Pipe Diameter : 800)

Bill of Quantity

Area : TD Pipe Diameter : 800 Shoring Type : TIMBER

Sewer Line Name : TD2 Foundation Type : T OK ! T

Manhole No. : M1 M6

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream / Downstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.49	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type / Length (m)	Concrete 4.00		$_m$ 2.5	
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.520	-0.388	1.91	0.41		2.32														pipes	m			
M2	1.526	-0.440	1.97	0.41	1.90	2.38	2.35	30.00	1.20	28.80	133.95	0.00	133.95	28.51	57.00	27.93	45.91	60.11	133.95	7	0.80	28.80	30.00	0.00
M2	1.526	-0.440	1.97	0.41		2.38																		
M3	1.516	-0.490	2.01	0.41	1.90	2.42	2.40	30.00	1.20	28.80	136.80	0.00	136.80	28.51	57.00	27.93	45.91	62.96	136.80	7	0.80	28.80	30.00	0.00
M3	1.516	-0.490	2.01	0.41		2.42																		
M4	1.474	-0.541	2.02	0.41	1.90	2.43	2.43	30.00	1.20	28.80	138.51	0.00	138.51	28.51	57.00	27.93	45.91	64.67	138.51	7	0.80	28.80	30.00	0.00
M4	1.474	-0.541	2.02	0.41		2.43																		
M5	1.460	-0.600	2.06	0.41	1.90	2.47	2.45	32.00	1.20	30.80	148.96	0.00	148.96	30.49	60.80	29.79	49.10	70.07	148.96	7	2.80	30.80	32.00	0.00
M5	1.460	-0.600	2.06	0.41		2.47																		
M6	1.460	-0.650	2.11	0.41	1.90	2.52	2.50	32.00	1.20	30.80	152.00	0.00	152.00	30.49	60.80	29.79	49.10	73.11	152.00	7	2.80	30.80	32.00	0.00
								154.00	6.00	148.00	710.22	0.00	710.22	146.51	292.60	143.37	235.93	330.92	710.22	35	8.00	148.00	154.00	0.00

Concrete G 39.22 m3

Timber piles 12197 m

2711 trees

Table B.1.8 (2) Sewer line : TD4 (Pipe Diameter : 400)

Bill of Quantity

Area : TD Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : TD4 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand	Black Sand		Type	Concrete			
						Downstream					<= 6 m	=> 6 m				0.49	Sand Backfill	Sandy Soil Backfill		Length (m)	4.00		$_m$ 2.5	
		IE_1 IE_2	ID_1 ID_2	H_1	W_1	H_2 H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I7	1.320	0.046	1.27	0.33		1.60														pipes	m			
M7	1.320	-0.150	1.47	0.33	1.40	1.80	1.70	9.80	1.40	8.40	23.33	0.00	23.33	2.28	13.72	6.72	8.30	8.31	23.33	2	0.40	8.40	9.80	0.00
								9.80	1.40	8.40	23.33	0.00	23.33	2.28	13.72	6.72	8.30	8.31	23.33	2	0.40	8.40	9.80	0.00

Concrete G : 0.64 m3

Timber piles : 424 m

95 trees

Table B.1.8 (3) Sewer line : TD4 (Pipe Diameter : 800)

Bill of Quantity

Area : TD Pipe Diameter : 800 Temporary Work Type : TIMBER

Sewer Line Name : TD4 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe	Clamshell	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand	Black Sand	Residual Soil (m^3)	Pipe Number Type / Length (m)	Concrete 4.00	Pipe Foundation Length (m)	Sheet Pile (Piles) $_m$ TIMBER	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_1 / H_2	H_3	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_8	V_5	V_6	V_7	N		L_2	L_3	W_2
I5	1.410	-0.090	1.50	0.41		1.91														pipes	m			
M5	1.410	-0.150	1.56	0.41	1.90	1.97	1.94	3.00	1.40	1.60	11.06	0.00	11.06	1.58	5.70	2.79	2.55	5.72	11.06	0	1.60	1.60	0.00	0.00
I6	1.450	-0.090	1.54	0.41		1.95																		
M6	1.450	-0.150	1.60	0.41	1.90	2.01	1.98	3.00	1.40	1.60	11.29	0.00	11.29	1.58	5.70	2.79	2.55	5.95	11.29	0	1.60	1.60	0.00	0.00
								6.00	2.80	3.20	22.35	0.00	22.35	3.16	11.40	5.59	5.10	11.66	22.35	0	3.20	3.20	0.00	0.00

Concrete G 0.85 m3

Timber piles 476 m

106 trees

Table B.1.8 (4) Sewer line : TD4 (Pipe Diameter : 1000)

Bill of Quantity

Area : TD Pipe Diameter : 1000 Shoring Type : TIMBER

Sewer Line Name : TD4 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.49	Yellow Sand Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete		$_m$ 2.5	
						Downstream														Length (m)	4.00			
		IE_1 IE_2	ID_1 ID_2	H_1	W_1	H_2 H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I8	1.290	-0.760	2.05	0.45		2.50														pipes	m			
M8	1.290	-0.900	2.19	0.45	2.10	2.64	2.57	7.00	1.40	5.60	37.78	0.00	37.78	8.36	14.70	7.20	10.22	20.36	37.78	1	1.60	5.60	7.00	0.00
								7.00	1.40	5.60	37.78	0.00	37.78	8.36	14.70	7.20	10.22	20.36	37.78	1	1.60	5.60	7.00	0.00

Concrete G 2.23 m3

Timber pile 706 m

157 trees

Table B.1.8 (5) Sewer line : TD4 (Pipe Diameter : 1200)

Bill of Quantity

Area : TD Pipe Diameter : 1200 Shoring Type : TIMBER

Sewer Line Name : TD4 Foundation Type : T OK ! T

Manhole No. : M1 Mp1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 3.00	Pipe Bedding Length (m)	Sheeting (m) $_m$ 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.400	-1.000	2.40	0.50		2.90														pipes	m			
M2	1.370	-1.028	2.40	0.50	2.60	2.90	2.90	23.00	1.20	21.80	173.42	0.00	173.42	47.76	59.80	29.30	56.53	87.59	173.42	7	0.80	21.80	23.00	0.00
M2	1.370	-1.028	2.40	0.50		2.90																		
M3	1.340	-1.056	2.40	0.50	2.60	2.90	2.90	24.00	1.20	22.80	180.96	0.00	180.96	49.95	62.40	30.58	59.13	91.25	180.96	7	1.80	22.80	24.00	0.00
M3	1.340	-1.056	2.40	0.50		2.90																		
M4	1.370	-1.100	2.47	0.50	2.60	2.97	2.94	36.00	1.20	34.80	275.19	0.00	275.19	76.25	93.60	45.86	90.23	139.10	275.19	11	1.80	34.80	36.00	0.00
M4	1.370	-1.100	2.47	0.50		2.97																		
M5	1.410	-1.140	2.55	0.50	2.60	3.05	3.01	32.00	1.20	30.80	250.44	0.00	250.44	67.48	83.20	40.77	79.87	129.80	250.44	10	0.80	30.80	32.00	0.00
M5	1.410	-1.140	2.55	0.50		3.05																		
M6	1.450	-1.175	2.63	0.50	2.60	3.13	3.09	31.00	1.50	29.50	249.06	0.00	249.06	64.63	80.60	39.49	76.50	133.07	249.06	9	2.50	29.50	31.00	0.00
M6	1.450	-1.175	2.63	0.50		3.13																		
M7	1.320	-1.211	2.53	0.50	2.60	3.03	3.08	30.00	1.20	28.80	240.24	0.00	240.24	63.10	78.00	38.22	74.68	127.34	240.24	9	1.80	28.80	30.00	0.00
M7	1.320	-1.211	2.53	0.50		3.03																		
M8	1.290	-1.248	2.54	0.50	2.60	3.04	3.04	31.00	1.60	29.40	245.03	0.00	245.03	64.42	80.60	39.49	76.23	129.31	245.03	9	29.40	29.40	31.00	0.00
M8	1.290	-1.248	2.54	0.50		3.04																		
Mp1	1.290	-1.260	2.55	0.50	2.60	3.05	3.05	9.40	1.60	7.80	74.55	0.00	74.55	17.09	24.44	11.98	20.23	42.34	74.55	2	1.80	7.80	9.40	0.00
								216.40	10.70	205.70	1688.89	0.00	1688.89	450.68	562.64	275.69	533.40	879.80	1688.89	64	40.70	205.70	216.40	0.00

Concrete G : 115.61 m3

Timber piles : 26488 m

5887 trees

Table B.1.8 (6) Sewer line : TD5 (Pipe Diameter : 600)

Bill of Quantity

Area : TD Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : TD5 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Designed Thickness (m) 0.49 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type N	Concrete 4.00	Pipe Bedding Length (m) L_2	Sheeting (m) L_3	Waling & Strut (ton) W_2
																				pipes	m			
I2	1.410	-0.099	1.51	0.39		1.90																		
M2	1.410	-0.171	1.58	0.39	1.60	1.97	1.94	3.60	1.10	2.50	11.18	0.00	11.18	1.45	5.76	2.82	3.19	5.17	11.18	0	2.50	2.50	3.60	0.00
I3	1.480	-0.128	1.61	0.39		2.00																		
M3	1.480	-0.200	1.68	0.39	1.60	2.07	2.04	3.60	1.10	2.50	11.76	0.00	11.76	1.45	5.76	2.82	3.19	5.75	11.76	0	2.50	2.50	3.60	0.00
I5	1.460	-0.184	1.64	0.39		2.03																		
M5	1.460	-0.256	1.72	0.39	1.60	2.11	2.07	3.60	1.10	2.50	11.93	0.00	11.93	1.45	5.76	2.82	3.19	5.92	11.93	0	2.50	2.50	3.60	0.00
								10.80	3.30	7.50	34.87	0.00	34.87	4.35	17.28	8.47	9.57	16.83	34.87	0	7.50	7.50	10.80	0.00

Concrete G : 1.29 m3

Timber piles : 700 m

156 trees

Table B.1.8 (7) Sewer line : TD5 (Pipe Diameter : 800)

Bill of Quantity

Area : TD Pipe Diameter : 800 Shoring Type : TIMBER

Sewer Line Name : TD5 Foundation Type : T OK ! T

Manhole No. : M1 M7

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.330	-0.340	1.67	0.41		2.08														pipes	m			
M2	1.410	-0.371	1.78	0.41	1.90	2.19	2.14	20.00	1.20	18.80	81.32	0.00	81.32	18.61	38.00	18.62	29.97	32.73	81.32	4	2.80	18.80	20.00	0.00
M2	1.410	-0.371	1.78	0.41		2.19																		
M3	1.480	-0.400	1.88	0.41	1.90	2.29	2.25	20.00	1.20	18.80	85.50	0.00	85.50	18.61	38.00	18.62	29.97	36.91	85.50	4	2.80	18.80	20.00	0.00
M3	1.480	-0.400	1.88	0.41		2.29																		
M4	1.470	-0.427	1.90	0.41	1.90	2.31	2.30	26.00	1.20	24.80	113.62	0.00	113.62	24.55	49.40	24.21	39.53	49.88	113.62	6	0.80	24.80	26.00	0.00
M4	1.470	-0.427	1.90	0.41		2.31																		
M5	1.460	-0.456	1.92	0.41	1.90	2.33	2.32	26.00	1.20	24.80	114.61	0.00	114.61	24.55	49.40	24.21	39.53	50.87	114.61	6	0.80	24.80	26.00	0.00
M5	1.460	-0.456	1.92	0.41		2.33																		
M6	1.430	-0.478	1.91	0.41	1.90	2.32	2.33	25.00	1.20	23.80	110.68	0.00	110.68	23.56	47.50	23.28	37.94	49.47	110.68	5	3.80	23.80	25.00	0.00
M6	1.430	-0.478	1.91	0.41		2.32																		
M7	1.410	-0.500	1.91	0.41	1.90	2.32	2.32	28.00	1.20	26.80	123.43	0.00	123.43	26.53	53.20	26.07	42.72	54.64	123.43	6	2.80	26.80	28.00	0.00
								145.00	7.20	137.80	629.16	0.00	629.16	136.41	275.50	135.00	219.66	274.51	629.16	31	13.80	137.80	145.00	0.00

Concrete G : 36.52 m3

Timber piles : 11484 m

2552 trees

Table B.1.8 (8) Sewer line : TD6 (Pipe Diameter : 400)

Bill of Quantity

Area : TD Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : TD6 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type	Pipe Number Concrete	Pipe Bedding Length (m)	Sheeting (m) $_m$ 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	I_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N: pipes	N: m	L_2	L_3	W_2
I'7	1.250	-0.668	1.92	0.33		2.24																		
M7	1.250	-0.750	2.00	0.33	1.40	2.33	2.29	4.10	1.10	3.00	13.15	0.00	13.15	0.82	5.74	2.81	2.96	7.38	13.15	0	3.00	3.00	4.10	0.00
I'8	1.270	-0.668	1.94	0.33		2.26																		
M8	1.270	-0.750	2.02	0.33	1.40	2.35	2.31	4.10	1.10	3.00	13.26	0.00	13.26	0.82	5.74	2.81	2.96	7.49	13.26	0	3.00	3.00	4.10	0.00
								8.20	2.20	6.00	26.41	0.00	26.41	1.64	11.48	5.63	5.92	14.86	26.41	0	6.00	6.00	8.20	0.00

Concrete G : 0.46 m3

Timber piles : 355 m

79 trees

Table B.1.8 (9) Sewer line : TD6 (Pipe Diameter : 1000)

Bill of Quantity

Area : TD Pipe Diameter : 1000 Shoring Type : TIMBER

Sewer Line Name : TD6 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I9	1.310	-0.712	2.02	0.45		2.47														pipes	m			
M9	1.310	-0.800	2.11	0.45	2.10	2.56	2.52	4.40	1.10	3.30	23.29	0.00	23.29	4.92	9.24	4.53	6.03	12.73	23.29	0	3.30	3.30	4.40	0.00
								4.40	1.10	3.30	23.29	0.00	23.29	4.92	9.24	4.53	6.03	12.73	23.29	0	3.30	3.30	4.40	0.00

Concrete G : 1.32 m3

Timber piles : 444 m

99 trees

Table B.1.8 (10) Sewer line : TD6-7 (Pipe Diameter : 1000)

Bill of Quantity

Area : TD Pipe Diameter : 1000 Shoring Type : TIMBER

Sewer Line Name : TD 6-7 Foundation Type : T OK ! T

Manhole No. : M1 Mp2

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area	Designed Thickness (m)	Yellow Sand	Black Sand		Type	Concrete		$_m$	
		IE_1	ID_1			H_2					<= 6 m	=> 6 m			(m^2)	0.49	Sand Backfill	Sandy Soil Backfill		Length (m)	4.00		2.5	
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.460	-0.700	2.16	0.45		2.61														pipes	m			
M2	1.330	-0.756	2.09	0.45	2.10	2.53	2.57	33.00	1.20	31.80	178.11	0.00	178.11	47.45	69.30	33.96	58.06	86.09	178.11	7	3.80	31.80	33.00	0.00
M2	1.330	-0.756	2.09	0.45		2.53																		
M3	1.240	-0.812	2.05	0.45	2.10	2.50	2.52	33.00	1.20	31.80	174.64	0.00	174.64	47.45	69.30	33.96	58.06	82.62	174.64	7	3.80	31.80	33.00	0.00
M3	1.240	-0.812	2.05	0.45		2.50																		
M4	1.180	-0.868	2.05	0.45	2.10	2.49	2.50	33.00	1.20	31.80	173.25	0.00	173.25	47.45	69.30	33.96	58.06	81.23	173.25	7	3.80	31.80	33.00	0.00
M4	1.180	-0.868	2.05	0.45		2.49																		
M5	1.220	-0.923	2.14	0.45	2.10	2.59	2.55	32.00	1.20	30.80	171.36	0.00	171.36	45.95	67.20	32.93	56.24	82.19	171.36	7	2.80	30.80	32.00	0.00
M5	1.220	-0.923	2.14	0.45		2.59																		
M6	1.230	-0.933	2.16	0.45	2.10	2.61	2.60	6.00	1.20	4.80	32.76	0.00	32.76	7.16	12.60	6.17	8.77	17.82	32.76	1	0.80	4.80	6.00	0.00
M6	1.230	-0.933	2.16	0.45		2.61																		
M7	1.260	-0.979	2.24	0.45	2.10	2.68	2.65	31.00	1.20	29.80	172.52	0.00	172.52	44.46	65.10	31.90	54.42	86.20	172.52	7	1.80	29.80	31.00	0.00
M7	1.260	-0.979	2.24	0.45		2.68																		
M8	1.270	-1.025	2.30	0.45	2.10	2.74	2.72	25.00	1.20	23.80	142.80	0.00	142.80	35.51	52.50	25.73	43.46	73.62	142.80	5	23.80	23.80	25.00	0.00
M8	1.270	-1.025	2.30	0.45		2.74																		
M9	1.310	-1.070	2.38	0.45	2.10	2.83	2.79	24.50	1.20	23.30	143.55	0.00	143.55	34.76	51.45	25.21	42.55	75.79	143.55	5	3.30	23.30	24.50	0.00
M9	1.310	-1.070	2.38	0.45		2.83																		
Mp2	1.310	-1.100	2.41	0.45	2.10	2.86	2.84	17.50	1.20	16.30	104.37	0.00	104.37	24.32	36.75	18.01	29.76	56.60	104.37	4	0.30	16.30	17.50	0.00
								235.00	10.80	224.20	1293.36	0.00	1293.36	334.51	493.50	241.82	409.38	642.17	1293.36	50	44.20	224.20	235.00	0.00

Concrete G : 89.24 m3

Timber piles 23688 m

5264 trees

Table B.1.8 (11) Manhole

List of Manhole

Thanh Da Pump Drainage Area

Route	Manhole No.	Concrete Volume (m^3)				Level Conc	Sand	Timber Wood	Invert			Frame Work				Ladder	Bar
		Slub		Wall					Vol	Area		Slub		Wall			
		Bottom S_b (m^3)	Up S_u (m^3)	Main C_m (m^3)	Up C_u (m^3)	L_e (m^3)	S_a (m^3)	T_w (no)	I_v (m^3)	BQ I_{a1} (m^2)	I_{a2} (m^2)	Bottom F_b (m^2)	Up F_u (m^2)	Main F_m (m^2)	Up F_u (m^2)	L_a (no)	W (kg)
TD5	M1	1.02	0.69	1.98	0.06	0.42	0.84	67	0.72	1.80	2.35	2.22	3.81	17.28	0.56	4	225.0
	M2	1.02	0.69	1.84	0.06	0.42	0.84	67	0.72	1.80	2.35	2.22	3.81	18.56	0.56	4	234.5
	M3	1.02	0.69	2.00	0.06	0.42	0.84	67	0.72	1.80	2.35	2.22	3.81	19.84	0.56	4	244.1
	M4	1.02	0.69	2.12	0.06	0.42	0.84	67	0.72	1.80	2.35	2.22	3.81	19.84	0.56	4	244.1
	M5	1.02	0.69	2.16	0.06	0.42	0.84	67	0.72	1.80	2.35	2.22	3.81	21.12	0.56	5	253.6
	M6	1.02	0.69	2.12	0.06	0.42	0.84	67	0.72	1.80	2.35	2.22	3.81	19.84	0.56	5	244.1
	M7	1.20	0.84	2.33	0.06	0.48	0.97	78	0.84	2.25	3.11	2.40	4.41	24.50	0.56	5	296.7
TD2	M1	1.20	0.84	2.17	0.06	0.48	0.97	78	0.90	2.25	2.93	2.40	4.41	21.70	0.56	5	275.8
	M2	1.02	0.69	2.28	0.06	0.42	0.84	67	0.72	1.80	2.35	2.22	3.81	21.12	0.56	5	253.6
	M3	1.02	0.69	2.28	0.06	0.42	0.84	67	0.72	1.80	2.35	2.22	3.81	21.12	0.56	5	253.6
	M4	1.02	0.69	2.44	0.06	0.42	0.84	67	0.72	1.80	2.35	2.22	3.81	22.40	0.56	5	263.2
	M5	1.02	0.69	2.44	0.06	0.42	0.84	67	0.72	1.80	2.35	2.22	3.81	22.40	0.56	5	263.2
	M6	1.20	0.84	2.60	0.06	0.48	0.97	78	0.90	2.25	2.93	2.40	4.41	25.90	0.56	5	307.2
TD 4-1	M1	1.91	1.21	3.78	0.14	0.64	1.29	104	1.22	3.00	3.75	3.29	5.51	32.80	1.36	6	408.2
	M2	1.64	1.01	3.58	0.14	0.56	1.12	90	0.98	2.40	3.00	3.08	4.76	30.40	1.36	6	367.0
TD 4-2	M3	1.64	1.01	3.58	0.14	0.56	1.12	90	0.98	2.40	3.00	3.08	4.76	30.40	1.36	6	367.0
TD 4-3	M4	1.64	1.01	3.58	0.22	0.56	1.12	90	0.98	2.40	3.00	3.08	4.76	30.40	2.16	6	373.0
	M5	1.91	1.21	3.73	0.30	0.64	1.29	104	1.22	3.00	3.75	3.29	5.51	32.80	2.96	6	420.1
TD 4-5	M6	1.91	1.21	3.73	0.30	0.64	1.29	104	1.22	3.00	3.75	3.29	5.51	32.80	2.96	7	420.1
	M7	1.64	1.01	3.52	0.30	0.56	1.12	90	0.98	2.40	3.00	3.08	4.76	30.40	2.96	6	378.9
TD 4-6	M8	1.91	1.21	3.61	0.30	0.64	1.29	104	1.22	3.00	3.75	3.29	5.51	32.80	2.96	6	420.1
TD7	M1	1.20	0.84	2.42	0.06	0.48	0.97	78	0.84	2.25	3.11	2.40	4.41	25.90	0.56	5	307.2
	M2	1.02	0.69	2.25	0.06	0.42	0.84	67	0.68	1.80	2.48	2.22	3.81	22.40	0.56	5	263.2
	M3	1.02	0.69	2.25	0.06	0.42	0.84	67	0.68	1.80	2.48	2.22	3.81	22.40	0.56	5	263.2
	M4	1.02	0.69	2.25	0.06	0.42	0.84	67	0.68	1.80	2.48	2.22	3.81	22.40	0.56	5	263.2
TD 6-2	M5	1.74	1.29	2.98	0.06	0.68	1.36	110	1.35	3.60	4.97	2.94	6.21	32.56	0.56	5	410.6
	M6	1.02	0.69	2.41	0.06	0.42	0.84	67	0.68	1.80	2.48	2.22	3.81	23.68	0.56	5	272.7
	M7	1.02	0.69	2.52	0.06	0.42	0.84	67	0.68	1.80	2.48	2.22	3.81	24.96	0.56	5	282.3
TD 6-3	M8	1.02	0.69	2.60	0.10	0.42	0.84	67	0.68	1.80	2.48	2.22	3.81	25.60	0.96	6	290.0
	M9	1.02	0.69	2.38	0.18	0.42	0.84	67	0.68	1.80	2.48	2.22	3.81	25.60	1.76	6	296.0
		38	25	80	3	15	29	2,337	26	65	85	76	130	754	32	157	9,161

Table B.1.8 (12) Inlet Pit

Inlet Pit

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
TD	TD4	400	1	E	I7	1.320	0.046	2,154	1,674	0.360	1.257	1.617	0.196	0.392	32	6	118.2	1.2	13.1
TD	TD4	800	1	E	I5	1.410	-0.090	2,380	1,900	0.360	1.332	1.692	0.196	0.392	32	7	131.6	1.2	14.9
TD	TD4	1000	1	E	I8	1.290	-0.760	2,930	2,450	0.360	1.698	2.058	0.196	0.392	32	8	164.5	1.2	19.3
TD	TD5	600	2	D	I2	1.410	-0.099	2,159	1,679	0.360	1.217	1.577	0.196	0.392	32	6	119.0	1.2	13.2
TD	TD5	600	2	D	I3	1.480	-0.128	2,258	1,778	0.360	1.296	1.656	0.196	0.392	32	6	125.0	1.2	14.0
TD	TD5	600	2	D	I5	1.460	-0.184	2,294	1,814	0.360	1.325	1.685	0.196	0.392	32	6	127.1	1.2	14.2
TD	TD6	400	1	E	I'7	1.250	-0.668	2,798	2,318	0.360	1.772	2.132	0.196	0.392	32	8	156.6	1.2	18.2
TD	TD6	400	1	E	I'8	1.270	-0.668	2,818	2,338	0.360	1.788	2.148	0.196	0.392	32	8	157.8	1.2	18.4
Total										2.880	11.686	14.566	1.568	3.136	256	55	1,099.7	9.6	125.2

Type D	3	min	1.577
Type E	5	max	2.148
		ave	1.821

2. BEN ME COC (1) PUMPING DRAINAGE AREA

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TABLE B.2.1 (1/2) WORK QUANTITIES OF TEMPORARY DIKE CONSTRUCTION IN BEN ME COC (1)

Item			Quantity
1. Clearing and Grubbing			(m2)
(1)	Type A	1.5m x 1,550m =	2,325.00
(2)	Type B	0.50m x 1,077m =	538.50
(3)	Type C	1.00m x 910m =	910.00
(4)	Type D	1.20m x 365m =	438.00
(5)	Type E	1.00m x 61m =	61.00
(6)	Type F	0.7m x 105m =	73.50
(7)	Type G	1.50m x 224m =	336.00
(8)	Type H (pier)	1.50m x 37m =	55.50
		Total	4,737.50
		Allowance: 3%	**4,880 m2**
2. Excavation			(m3)
(1)	Type A	0.75m3/m x 1,550m =	1,163.00
(2)	Type C	020m3/m x 910 m =	182.00
(3)	Type D	0.28m3/m x 365m =	102.20
(4)	Type E	0.09m3/m x 61m =	5.49
(5)	Type F	0.084m3/m x 105m =	8.82
(6)	Type G	0.51m3/m x 224m =	114.24
		Total	1575.75
		Allowance: 5%	**1,660 m3**
3. Sandy Soil Backfill			(m3)
(1)	Type A	0.33 m3/m x 1,550m =	1,163.00
(2)	Type C	0.05m3/m x 910 m =	45.50
(3)	Type D	0.07m3/m x 365m =	25.55
(4)	Type G	0.06m3/m x 224m =	13.44
		Total	1247.49
		Allowance: 5%	**1,310 m3**
4. Sandy Soil Fill			(m^3)
(1)	Type G (Pier)	0.30m3/m x 37m =	11.10
		Total	11.10
		Allowance: 5%	**12 m3**
5. Leveling Concrete (Concrete Type G)			
(1)	Type A	0.10m3/m x 1,550m =	155.00
(2)	Type E	0.03m3/m x 61m =	1.83
(3)	Type F	0.03m3/m x 105m =	3.15
(4)	Type G	0.05m3/m x 910 m =	45.50
		Total	205.48
		Allowance: 3%	**220 m3**

TABLE B.2.1 (2/2) WORK QUANTITIES OF TEMPORARY DIKE CONSTRUCTION IN BEN ME COC (1)

Item			Quantity
6. Wet Stone Masonry			
(1)	Type A	0.84m3/m x 1,550m =	1,302.00
(2)	Type B	0.275m3/m x 1,077m =	296.18
(3)	Type C	0.375m3/m x 910m =	341.25
(4)	Type D	0.46m3/m x 365m =	167.90
(5)	Type E	0.48m3.m x 61m =	29.28
(6)	Type F	0.203m3/m x 105m =	21.32
(7)	Type G	0.70m3/m x 224m =	156.80
(8)	Type H (pier)	0.30m3/m x 37m =	0.34
		Total	2,315.06
		Allowance: 3%	**2,390 m3**
7. Joint Filler			(kg)
(1)	Type A	0.84m2 x 1,550m/25m =	52.08
(2)	Type B	0.275m2 x 1,077m/25m =	12.10
(3)	Type C	0.375m2 x 910m/25m =	256.04
(4)	Type D	0.46m2 x 365m/25m =	6.90
(5)	Type E	0.48m2 x 61m/25m =	1.44
(6)	Type F	0.203m2 x 105m/25m =	1.02
(7)	Type G	0.70m2 x 224m/25m =	6.30
(8)	Type H (pier)	0.30m2 x 37m/25m =	0.60
		Total	336.48
		Allowance: 3%	**350 m2**

TABLE B.2.2 (1/7) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (1)

Item			Calculation	Quantity
1. Clearing and Grubbing				(m2)
	(1)	E-1 (M1 - M14)	2.60m x 389.0m =	1,011.40
	(2)	E-1 (M14 - M25)	2.60m x 343.0m =	891.80
	(3)	E-1 (M25 - M35)	2.90m x 312.0m =	904.80
	(4)	E-2 (M1 - M15)	2.60m x 373.0m =	969.80
	(5)	E-3 (M1 - M1)	1.60m x 35.0m =	56.00
	(6)	E-3 (M1 - M6)	2.00m x 152.0m =	304.00
	(7)	E-3 (M6 - M24)	2.90m x 542.0m =	1,571.80
	(8)	E-3 (M24 - M28)	2.90m x 99.0m =	287.10
	(9)	W-1 (M1 - M13)	2.00m x 381.0m =	762.00
	(10)	W-1 (M13 - M28)	2.60m x 513.0m =	1,333.80
	(11)	W-1 (M28 - M42)	2.95m x 459.0m =	1,354.05
	(12)	W-2 (M1 - M14)	2.10m x 439.0m =	921.90
	(13)	W-2 (M14 - M26)	2.60m x 411.0m =	1,068.60
	(14)	W-2 (M27 - M29)	1.40m x 67.0m =	93.80
			Total	11,530.85
			Allowance: 3%	**11,880 m2**
2. Earth Work (refer to the other sheets prepared by local Engineer)				
	2.1 Excavation (Depth: D<= 6.0m)			(m3)
	(1)	E-1 (M1 - M14)	2.60m x 389.0m x (2.17 - 2.71)m =	2,409.71
	(2)	E-1 (M14 - M25)	2.60m x 343.0m x (2.83 - 3.15)m =	2,596.64
	(3)	E-1 (M25 - M35)	2.60m x 312.0m x (3.40 - 4.28)m =	3,322.38
	(4)	E-2 (M1 - M15)	2.60m x 373.0m x (2.38 - 3.01)m =	2,548.38
	(5)	E-3 (M0 - M1)	1.60m x 35.0m x (1.84 - 1.89)m =	105.61
	(6)	E-3 (M1 - M6)	2.00m x 152.7m x (2.00 - 2.46)m =	678.98
	(7)	E-3 (M6 - M24)	2.90m x 542.0m x (3.10 - 3.62)m =	5,155.46
	(8)	E-3 (M24 - M28)	2.90m x 99.0m x (3.66 - 4.20)m =	1,075.63
	(9)	W-1 (M1 - M13)	2.00m x 381.0m x (1.73 - 2.48)m =	1,734.24
	(10)	W-1 (M13 - M28)	2.60m x 513.0m x (2.84 - 3.28)m =	3,967.92
	(11)	W-1 (M28 - M42)	(2.95 - 3.30)m x 459.0m x (4.00 - 4.61)m -	5,753.06
	(12)	W-2 (M1 - M14)	2.10m x 439.0m x (2.42 - 2.78)m -	2,412.04
	(13)	W-2 (M14 - M26)	2.60m x 411.0m x (3.08 - 3.93)m =	3,713.66
	(14)	W-2 (M27 - M29)	1.40m x 67.0m x (1.77 - 1.79)m =	166.96
	(15)	CP-400 (E-1, E-2, E-3)	41.00 + 118.11 + 101.29 + 140.10 + 183.31 + 13.98 + 223.1	821.01
	(16)	CP-400 (W-1, W-2)	34.65 + 180.82 + 187.88 + 126.77 + 166.86 + 423.45 =	1,120.43
	(17)	CP-600 (E-1,E-2,E-3,W-1,W-2)	95.49 + 43.28 + 144.07 + 101.96 + 35.97 =	420.77
	(18)	CP-1000 (E1)	207.38	207.38
	(19)	Outlet and Rip Rap	1,872.43 + 195.6	2,068.03
			Total	40,278.29
			Allowance: 5%	**42,300 m3**
			Hauling to Designed Site: 95% ,42,300 x 0.95 = 40,300 m3	**40,300 m3**
			Hauling to Stocpile in the vicinity: 5%, 42,300 x 0.05 = 2,000 m3	**2,000 m3**
	2.2 Channel Excavation in front of Outlet (refer to the other sheets prepared by local Engineer)			
	(1)	Outlet 1 -5	19.6 + 30.12 + 154.88 + 0.0 + 0.0 =	204.60
	(2)	Outlet 6 -10	15.07 + 146.12 + 526.0 + 87.15 + 97. 68 =	872.02
			Total	1076.62
			Allowance: 5%	**1,130 m3**

TABLE B.2.2 (2/7) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (1)

Item			Calculation	Quantity
2.3 Sand Backfill (Yellow Sand)				
	(1)	E-1 (M1 - M14)		954.08
	(2)	E-1 (M14 - M25)		850.26
	(3)	E-1 (M25 - M35)		844.06
	(4)	E-2 (M1 - M15)		894.32
	(5)	E-3 (M0 - M1)		42.66
	(6)	E-3 (M1 - M6)		249.20
	(7)	E-3 (M6 - M24)		1,567.34
	(8)	E-3 (M24 - M28)		266.99
	(9)	W-1 (M1 - M13)		624.68
	(10)	W-1 (M13 - M28)		1,278.86
	(11)	W-1 (M28 - M42)		1,314.88
	(12)	W-2 (M1 - M14)		752.66
	(13)	W-2 (M14 - M26)		1,000.41
	(14)	W-2 M27 - M29)		64.61
	(15)	CP-400 (E-1, E-2, E-3)	9.10 + 26.51 + 23.73 + 39.50 + 40.05 + 3.16 + 51.76 =	193.81
	(16)	CP-400 (W-1, W-2)	7.71 + 42.52 + 45.61 + 25.61 +35.20 + 143.19 =	299.84
	(17)	CP-600 (E-1,E-2,E-3,W-1,W-2)	21.97 + 8.72 + 32.72 + 24.41 + 6.64 =	94.46
	(18)	CP-1000 (E1)	43.09	43.09
			Total	11,336.21
			Allowance: 5%	**11,900 m3**
2.4 Sandy Soil Backfill (Black Sand)				(m3)
	(1)	E-1 (M1 - M14)	Refer to Breakdown	960.04
	(2)	E-1 (M14 - M25)		1,309.40
	(3)	E-1 (M25 - M35)		2,048.64
	(4)	E-2 (M1 - M15)		1,178.86
	(5)	E-3 (M0 - M1)		35.51
	(6)	E-3 (M1 - M6)		280.82
	(7)	E-3 (M6 - M24)		2,817.94
	(8)	E-3 (M24 - M28)		669.73
	(9)	W-1 (M1 - M13)		736.18
	(10)	W-1 (M13 - M28)		2,035.50
	(11)	W-1 (M28 - M42)		3,757.89
	(12)	W-2 (M1 - M14)		1,207.65
	(13)	W-2 (M14 - M26)		2,189.64
	(14)	W-2 M27 - M29)		56.39
	(15)	CP-400 (E-1, E-2, E-3)	21.75 + 62.65 + 53.28 + 61.84 + 101.07 + 7.66 + 120.97 =	429.22
	(16)	CP-400 (W-1, W-2)	18.30 + 92.20 + 96.99 + 71.87 + 93.72 + 168.79 =	541.87
	(17)	CP-600 (E-1,E-2,E-3,W-1,W-2)	53.06 + 24.84 + 82.50 + 54.50 + 21.80 =	236.70
	(18)	CP-1000 (E1)	138.57	138.57
	(19)	Outlet and Rip Rap	774.44	774.40
			Total	21,404.95
			Allowance: 5%	22,480 m3
			Out of Sandy Soil Backfilling of 22,480m3, 2,000m3 shall be backfilled by the excavated materials from stockpile	**20,480 m3**

TABLE B.2.2 (3/7) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (1)

Item			Calculation		Quantity
3. Pipe Installation					
3.1 Pipe					(m)
	(1)	Precast R/C Pipe (400 dia)	65.4	Allo	**66**
	(2)	Precast R/C Pipe (600 dia)	33.4	Allo	**34**
	(3)	Precast R/C Pipe (900 dia)	145.3 + 364.25 = 509.55	Allo	**515**
	(4)	Precast R/C Pipe (1000 dia)	364.7 + 412.2 = 776.9	Allo	**785**
	(5)	Precast R/C Pipe (1200 dia)	327.9 + 344.9 + 493.2 + 385.8 =1,551.8	Allo	**1,567**
	(6)	Precast R/C Pipe (1500 dia)	299.2 + 520.4 + 90.3 = 909.9	Allo	**919**
	(7)	Precast R/C Pipe (1800 dia)	439.9	Allo	**444**
				Total	4,230.0
				Allowance: 0%	**4,230 m**
3.2 Foundation Piles (Timber Pile)					
	(1)	Precast R/C Pipe (400 dia)	16pcs./m2 x 0.57m x 65.4m x 4.5m =		2,684.0
	(2)	Precast R/C Pipe (600 dia)	16pcs./m2 x 0.85m x 33.4m x 4.5m =		2,044.0
	(3)	Precast R/C Pipe (900 dia)	16pcs./m2 x 1.24m x 509.55m x 4.5m =		45,493.0
	(4)	Precast R/C Pipe (1000 dia)	16pcs./m2 x 1.36m x 776.9m x 4.5m =		76,074.0
	(5)	Precast R/C Pipe (1200 dia)	16pcs./m2 x 1.63m x 1,551.8m x 4.5m =		182,119.0
	(6)	Precast R/C Pipe (1500 dia)	16pcs./m2 x 1.97m x 909.9m x 4.5m =		129,060.0
	(7)	Precast R/C Pipe (1800 dia)	16pcs./m2 x 2.35m x 439.9m x 4.5m =		74,431.0
				Total	511,905.0
				Allowance: 1%	**517,020 m**
3.3 Foundation Concrete (Concrete Type G)					
	(1)	Precast R/C Pipe (400 dia)	0.076 m3/m x 65.4m =		4.97
	(2)	Precast R/C Pipe (600 dia)	0.171m3/m x 33.4m =		5.71
	(3)	Precast R/C Pipe (900 dia)	0.329m3/m x 509.55m =		167.64
	(4)	Precast R/C Pipe (1000 dia)	0.398m3/m x 776.9m -		309.20
	(5)	Precast R/C Pipe (1200 dia)	0.562m3/m x 1,551.8m =		872.11
	(6)	Precast R/C Pipe (1500 dia)	0.816m3/m x 909.9m =		742.48
	(7)	Precast R/C Pipe (1800 dia)	1.109m3/m x 439.9m =		487.85
				Total	2,589.96
				Allowance: 3%	**2,670 m3**
4. Construction of Manholes					
4.1 Foundation Piles (Timber Piles)					(m)
			14,849pcs. x 4.5m =		66,820.50
				Total	66,820.50
				Allowance: 1%	**67,490 m**
4.2 Sand Bedding					(m3)
				Total	184.71
				Allowance: 3%	**190 m3**
4.3 Concrete Type E					(m3)
					977.83
				Total	977.83
				Allowance: 3%	**1,010 m3**
4.4 Concrete Type F					(m3)
				Total	159.56
				Allowance: 3%	**165 m3**

TABLE B.2.2 (4/7) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (1)

Item	Calculation	Quantity
4.5 Concrete Type G		(m3)
	Total	92.36
	Allowance: 3%	**95 m3**
4.6 Invert Mortal (Granolithic Topping)		(m2)
	Total	437.85
	Allowance: 1%	**440 m2**
4.7 Reinforcing Bars		(kg)
		59,712.00
	Total	59,712.00
	Allowance: 3%	**61,500 kg**
4.8 Cast Iron Manhole Covers (Type A)		(set)
	Total	150.00
	Allowance: 0%	**150 set**
4.9 Ladder Rungs		(set)
	Total	930.00
	Allowance: 1%	**940 No.**
5. Construction of Inlet Pit (refer to other sheets prepared by Mr. Sato)		
5.1 Foundation Piles (Timber Piles)		(m)
	5,760nos. x 4.5m =	25,920.0
	Total	25,920.0
	Allowance: 1%	**26,180 m**
5.2 Sand Bedding		(m3)
		70.56
	Total	70.56
	Allowance: 3%	**75 m3**
5.3 Concrete Type E		(m3)
		350.90
	Total	350.90
	Allowance: 3%	**360 m3**
5.4 Concrete Type G (for Leveling Concrete)		(m3)
		35.28
	Total	35.28
	Allowance: 3%	**40 m3**
5.5 Reinforcing Bars		(kg)
		25,863.08
	Total	25,863.08
	Allowance: 3%	**26,640 kg**
5.6 Precast Concrete Manhole Covers (Type D)		(set)
	Total	180.00
	Allowance: 0%	**180 set**

TABLE B.2.2 (5/7) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (1)

Item	Calculation	Quantity
5.7 Ladder Rungs		(No.)
		1,318.0
	Total	1,318.0
	Allowance: 1%	**1,330 No.**
5.8 Connection Pipe		(m)
(1) Precast R/C Pipe (400 dia)	10 + 27 + 24 + 40 + 41 + 4 + 53 + 8 + 43 + 47 + 26 + 36 +	**503**
(2) Precast R/C Pipe (600 dia)	18 + 7 + 26 + 20 + 6 =	**77**
(4) Precast R/C Pipe (1000 dia)	24	**24**
	Total	604
	Allowance: 0%	**604 m**
6. Construction of Outlet		
6.1 Foundation Pile (Timber Pile)		(m)
	N= 1,035+1,357+1,519+1,347+944+1,259+1,865+1,928+1,666+1,157=14,07	
	L = 14,077pcs. x 4.5m =	63,347.0
	Allowance: 1%	**63,980 m**
6.2 Sand Bedding		(m3)
	V= 3.95+5.15+5.81+5.24+4.38+3.12+7.08+7.54+4.54+2.83	49.63
	Allowance: 3%	**50 m3**
6.3 Concrete Type E		(m3)
(1) Outlet	16.65+22.0+23.13+20.52+15.71+14.18+29.10+30.25+18.5	201.10
	Total	201.10
	Allowance:3%	**207 m3**
6.4 Deformed Reinforcing Bars		(kg)
(1) W2	65kg/m3 x 16.65m3 =	1,082.25
(2) W2	65kg/m3 x 22.00m3 =	1,430.00
(3) E3	65kg/m3 x 23.13m3 =	1,503.45
(4) E3	65kg/m3 x 20.52m3 =	1,333.80
(5) E1	65kg/m3 x 15.71m3 =	1,021.15
(6) E1	65kg/m3 x 14.18m3 =	921.70
(7) E1	65kg/m3 x 29.40m3 =	1,911.00
(8) W1	65kg/m3 x 30.25m3 =	1,966.25
(9) W1	65kg/m3 x 18.53m3 =	1,204.45
(10) W1	65kg/m3 x 11.03m3 =	716.95
		13,091.00
	Allowance: 3%	**13,490 kg**
6.5 Concrete Type F (Backfill Concrete)		(m3)
	1.84+2.53+2.85+2.45+1.26+3.15+3.60+3.62+4.07+2.89=	28.26
	Total	28.26
	Allowance:3%	**30 m3**
6.6 Concrete G		(m3)
	2.29 + 2.90 + 3.23 + 2.94 + 2.51 + 1.88 + 3.86 + 4.09 + 2.5	28.02
	Allowance:3%	**30 m3**
6.7 Free Draining Gravel		(m3)
	5.53 + 7.59 + 8.54 + 7.34 + 3.79 + 9.45 + 10.8 + 10.86 + 12	84.78
	Total	84.78
	Allowance:3%	**90 m3**

TABLE B.2.2 (6/7) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (1)

Item		Calculation	Quantity
6.8 Geotcxitile Cloth			(m2)
		18.44+25.31+28.47+24.45+12.62+31.49+35.99+36.19+40.	282.59
		Total	282.59
		Allowance:3%	**290 m2**
6.9 Wet Stone Masonry			(m3)
		5.53 + 7.59 + 8.54 + 7.34 + 3.79 + 9.45 + 10.8 + 10.86 + 12	84.78
		Total	84.78
		Allowance:3%	**90 m3**
6.10 Rip Rap			(m3)
		18.75+19.65+20.4+19.5+19.05+18.45+21.0+21.45+19.35+	195.60
		Total	195.60
		Allowance:3%	**200 m3**
6.11 Flap Gate			(set)
(1)	Flap Gate (900 dia)		2
(2)	Flap Gate (1000 dia)		2
(3)	Flap Gate (1200 dia)		3
(4)	Flap Gate (1500 dia)		2
(5)	Flap Gate (1800 dia)		1
		Total	10
		Allowance:0%	**10 set**
7. Road works			
7.1 Concrete Curb			
(1)	E1	2 x 1,022m =	2,044.00
(2)	E2	2 x 372m =	744.00
(3)	E3	2 x 817m =	1,634.00
(4)	W1	2 x 1,282m =	2,564.00
(5)	W2	2 x 562m =	1,124.00
		Total	8,110.00
		Allowance: 3%	**8,350 m2**
7.2 Subgrade Preparation			(m2)
(1)	E1	6m x 1,022m =	6,132.00
(2)	E2	6m x 372m =	2,232.00
(3)	E3	6m x 817m =	4,902.00
(4)	W1	6m x 1,282m =	7,692.00
(5)	W2	6m x 562m =	3,372.00
		Total	24,330.00
		Allowance: 3%	**25,070 m2**
7.3 Sub Base Course			
(1)	E1	6,132m2 x 0.20m =	1,226.40
(2)	E2	2,238m2 x 0.20m =	447.60
(3)	E3	4,902m2 x 0.20m =	980.40
(4)	W1	7,692m2 x 0.20m =	1,538.40
(5)	W2	3,372m2 x 0.20m =	674.40
		Total	4,867.20
		Allowance: 3%	**5,010 m3**

TABLE B.2.2 (7/7) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (1)

Item		Calculation	Quantity
7.4 Base Course (crushed Aggragate)			(m3)
(1)	E1	6,132m2 x 0.19m =	1,165.08
(2)	E2	2,238m2 x 0.19m =	425.22
(3)	E3	4,902m2 x 0.19m =	931.38
(4)	W1	7,692m2 x 0.19m =	1,461.48
(5)	W2	3,372m2 x 0.19m =	640.68
		Total	4,623.84
		Allowance: 3%	**4,760 m3**
7.5 Asphalt Binder Course			(ton)
(1)	E1	6,132m2 x 0.05m x 2.2ton/m3 =	674.52
(2)	E2	2,238m2 x 0.05m x 2.2ton/m3 =	246.18
(3)	E3	4,902m2 x 0.05m x 2.2ton/m3 =	539.22
(4)	W1	7,692m2 x 0.05m x 2.2ton/m3 =	846.12
(5)	W2	3,372m2 x 0.05m x 2.2ton/m3 =	370.92
		Total	2,676.96
		Allowance: 3%	**2,760 ton**
7.6 Asphalt Surface Course			(ton)
(1)	E1	6,132m2 x 0.05m x 2.2ton/m3 =	674.52
(2)	E2	2,238m2 x 0.05m x 2.2ton/m3 =	246.18
(3)	E3	4,902m2 x 0.05m x 2.2ton/m3 =	539.22
(4)	W1	7,692m2 x 0.05m x 2.2ton/m3 =	846.12
(5)	W2	3,372m2 x 0.05m x 2.2ton/m3 =	370.92
		Total	2,676.96
		Allowance: 3%	**2,760 ton**
7.7 Prime Coat			(litre)
(1)	E1	6,132m2 x 1.5l/m2 =	9,198.00
(2)	E2	2,238m2 x 1.5l/m2 =	3,357.00
(3)	E3	4,902m2 x 1.5l/m2 =	7,353.00
(4)	W1	7,692m2 x 1.5l/m2 =	11,538.00
(5)	W2	3,372m2 x 1.5l/m2 =	5,058.00
		Total	36,504.00
		Allowance: 3%	**37,600 ltre**
7.8 Tack Coat			(litre)
(1)	E1	6,132m2 x 0.5l/m2 =	3,066.00
(2)	E2	2,238m2 x 0.5l/m2 =	1,119.00
(3)	E3	4,902m2 x 0.5l/m2 =	2,451.00
(4)	W1	7,692m2 x 0.5l/m2 =	3,846.00
(5)	W2	3,372m2 x 0.5l/m2 =	1,686.00
		Total	12,168.00
		Allowance: 3%	**12,530 litre**

TABLE B.2.3 (1/9) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) PUMPING STATION

Item	Calculation	Quantity
1. Clearing and Grubbing		(m2)
(1) Pumping Station Area	Width: 10m west from the edge of the existing ring road	
	Length: 60 m along the existing road	
	Area = 10m x 60m =	600.0
	Allowance: 0 %	**600 m2**
2. Demolision of Existing Stone Masonry Revetment (refer to other sheets prepared by local Engineer)		
2.1 Sluice Way and Outlet of Sewer		(m3)
(1) Wet Masonry	4.20m in width, 300mm in thick and 7.30m length	9.20
(2) Plain Concrete	4.20m width, 100mm thick and 7.30m length	3.07
(39 Plain Concrete	600mm width, 400 height and 7.30m length	1.75
	Total	14.02
	Allowance: 3 %	**15 m3**
3. Excavation (refer to other sheets prepared by local Engineer)		
3.1 Excavation for Pumping Station		(m3)
(1) No.6	7.10W x 4.40H x 10.80L =	337.39
(2) No.7	7.10W x 2.30H x 4.00L =	65.32
(3) No.8	(8.50W x 1.50H x 16.00L) + (Other Part of 13.05 x 16.00)=	412.80
(4) No.8add*	3.00W x 2.00H x 10.0L) =	60.00
(5) No.8add**	0.50W x 1.00H x 12.00L =	6.00
(6) No.9 =	0 + Other part of 13.53m2 x 12.00m =	162.36
(7) No.9add*	3.00W x 2.00H x 8.00L =	48.00
(8) No.9add**	0.50W x 1.00H x 12.00L =	6.00
(9) Outlet 1	10.90W x 2.00H x 10.00L =	218.00
(10) Outlet 2	18.00W x 1.50H x 15.00L =	405.00
	Toatl	1,720.87
	Allowance: 5%	**1,810 m3**
3.2 Excavation of Road Works		(m3)
	10.0m x 0.50m x 60.0m =	300.00
	Total	300.00
	Allowance: 5%	**315 m3**
4. Sandy Soil Fill		(m3)
(1) No.6	0 + 0 =	0.00
(2) No.7	(41.68 + 41.68) x 4.00m =	333.44
(3) No.8	(6.64 + 60.98) x 16.00 =	1,081.92
(4) No.8add*	2.50 x 10.00 =	25.00
(5) No.8add**	2.50 x 12.00 =	30.00
(6) No.9	(13.53 + 3.50) x 12.00 =	204.36
(7) No.9add*	2.50 x 8.00 =	20.00
(8) No.9add**	2.50 x 12.00 =	30.00
(9) Outlet 1	0 + 0 =	0.00
(10) Outlet 2	0 + 0 =	0.00
	Total	1,724.72
	Allowance: 5%	**1,810 m3**

TABLE B.2.3 (2/9) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) PUMPING STATION

Item			Calculation	Quantity
5. Sandy Soil Backfill				(m3)
(1)	No.6		22.98m2 x 10.80m =	248.18
(2)	No.7		8.07m2 x 4.00m =	32.28
(3)	No.8		4.49m2 x 16.00 =	71.84
(4)	No.8add*		3.90 m2 x 10.00m =	39.00
(5)	No.8add**		-	-
(6)	No.9		-	-
(7)	No.9add*		3.90m2 x 8.00m -	31.20
(8)	No.9add**		-	-
(9)	Outlet 1		10.00 x 10.00m =	100.00
(10)	Outlet 2		-	
			Total	522.50
			Allowance: 5%	**550 m3**
6.Reinforced Concrete (Concrete Type C)				
6.1 Pumping station				(m^3)
	(1)	Pump Room Base	(4.50+1.66+2.45)x0.50x3.50=	15.07
	(2)	Pump Room Wall	{1/2x(2.00+3.50)x0.72+8.00x3.80}x0.45x2=	29.14
	(3)	Pump Room Wall	4.72x2.60x0.45=	6.14
	(4)	Pump Room Slab	1.50x0.30x2.60=	1.17
	(5)	Pump Room Slab	3.50x0.30x2.60=	2.73
	(6)	Pump Room Hanch	1/2x0.30x0.30x(4.50+1.66+2.00)=	0.37
	(7)	Pump Room Hanch	1/2x0.30x0.30x(2.60+4.22x2)=	0.50
	(8)	Discharge Basin Base	{1/2x(0.45+0.57)x0.12+4.95x0.50}3.50	8.88
	(9)	Discharge Basin Wall	(4.95x4.00x0.45)x2-2.00x2.00=	13.82
	(10)	Discharge Basin Wall	(4.00x2.60-2.00x2.00)x0.45=	2.88
	(11)	Discharge Basin Slab	(3.00x2.60-2.20x0.40)x0.30=	2.08
	(12)	Discharge Basin Color	(3.14x3.04-2.54x2.59)0.50=	1.48
			Sub-total	84.26
6.2 Pit				(m^3)
	(1)	Base	3.00x2.00x0.30=	1.80
	(2)	Wall	2.00x4.00x0.30=	2.40
	(3)	Wall	(2.70x4.00-3.14x0.900.90)x0.30x2=	4.95
	(4)	Slab	(1.40x2.70-1.80x0.30)x0.30=	0.97
			Sub-total	10.12
6.3 Sluice Way (Box Culvert)				(m^3)
	(1)	Box Culvert	(2.50x2.50-2.00x2.00+1/2x0/20x0.20x4)x18.00=	41.94
	(2)	Gate: Base	2.00x2.90x0.5-=	2.90
	(3)	Gate: Wall	(1.00x0.45+1.00x0.25)x2.25x2=	3.15
	(4)	Gate: Colum	(1.30x0.25+2.40x0.30)x2.70x2=	5.64
	(5)	Gate: Slab	2.00x1.00x0.25=	0.50
	(6)	Colum: Wall	2.00x2.75x0.30=	1.62
	(7)	Colum: Slab	1.30x2.90x0.25=	4.02
	(8)	Colum: Haunch	1/2x0.30x0.30x2.90=	0.13
	(9)	Wing (Left)	(2.00x0.38+3.02x0.30)x3.60=	6.00
	(10)	Wing (Right)	(2.00x0.38+3.02x0.30)x0.75=	1.25
	(11)	Outlet: Revetment Base	{1.50x0.30x(7.00+2.50)+1/2x(0.25+0.50)x0.70x4.00}x2=	10.65

TABLE B.2.3 (3/9) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) PUMPING STATION

Item			Calculation	Quantity
	(12)	Outlet: Revetment Wall	{1/2X(2.00X2.90)x3.55+2.00x(3.50+3.20)}x0.30x2=	13.26
	(13)	Outlet: Center Base	4.25x7.00x0.30+1/2(0.25+0.50)x0.70x4.25=	10.04
			Sub-total	101.10
6.4 Sewer Manhole				(m^3)
	(1)	Base	2.60 x 2.60 x 0.35 =	2.37
	(2)	Lower Wall	(2.60 x 2.60 - 2.00 x 2.00) x 2.50 =	6.90
	(3)	Slab	(2.60 x 2.60 - 0.80 x 0.80) x 0.25 =	1.53
	(4)	Upper Wall	(1.20 x 1.20 - 0.80 x 0.80) x 1.02 =	0.82
			Sub-total	11.61
			Total	207.09
			Allowance: 3%	**215 m3**
7. Plain Concrete (Concrete Type F)				
7.1 Sewer Pipe				(m^3)
	(1)	Pipe Fundation	[0.405x1.80-{1/4x3.14x0.87x0.87-1/2x0.87x0.87}]x(24.50+2.7)=	13.95
	(2)	Pipe Fundation	[0.255x1.80-{1/4x3.14x0.87x0.87-1/2x0.87x0.87}]x1.70=	0.41
	(3)	Invert Concrete		1.00
			Total	15.36
			Allowance: 3%	**16 m3**
8. Leveling Concrete (Concrete Type G)				
8.1 Pumping Station				(m^3)
	(1)	Pump Room	3.70x(4.486+1.66+2.664)x0.10=	3.26
	(2)	Discharge Basin	4.90x3.70x0.10=	1.81
	(3)	Colar	0.60x3.24x0.10=	0.19
			Sub-total	5.26
8.2 Pit			3.00x2.20x0.10=	0.66
8.3 Sluice Way				(m^3)
	(1)	Box Culvert	17.50x2.70x0.10=	4.73
	(2)	Gate	2.00x7.45x0.10=	1.49
	(3)	Outlet	7.45x5.50x0.10=	4.10
	(4)	Outlet	12.425x1.70x0.10=	2.11
			Sub-total	12.43
8.4 Sewer Manhole			2.40x2.40x0.1=	0.58
			Total	18.93
			Allowance: 3%	**20 m3**
9. Forming				
9.1 Pumping Station				(m^2)
	(1)	Pump Room Base	0.50x(3.50+4.50+1.66+2.45)x2=	12.11
	(2)	Pump Room Wall	{1/2x(2.45+3.95)x0.72+(8.45+0.45)x3.80}x2=	72.25
	(3)	Pump Room Wall	{1/2x(2.00+3.50)x0.72+3.50x8.00+2.50x0.3+0.15x3.8x4}x2=	66.02
	(4)	Pump Room Wall	4.34x2.84+0.20x3.50+0.22X3.5+4.00X2.60=	24.20
	(5)	Pump Room Slab	(1.50+0.30x2)x2.60+(3.50+0.30)x2.60=	5.46
	(6)	Discharge Basin Base	{1/2x(0.45+0.57)x0.12+0.50x4.95}x2	5.07
	(7)	Discharge Basin Wall	4.95x4.00x2-2.00x2.00+0.45x2.00x3=	38.03
	(8)	Discharge Basin Wall	(4.50x3.70+0.30x1.50)x2-2.00x2.00=	30.20
	(9)	Discharge Basin Wall	2.60x3.70-2.00x2.00	5.62
	(10)	Discharge Basin Wall	0.23x4.62x2+1.48x3.50+0.27x2.59x2+0.27x2.00=	9.24

TABLE B.2.3 (4/9) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) PUMPING STATION

Item			Calculation	Quantity
	(11)	Discharge Basin Slab	(3.00+0.30)x2.60=	8.58
	(12)	Discharge Basin Color	(3.14x2+3.04+2.59x2+2.54)+(3.04x3.14-2.54x2.59)=	20.01
			Sub-total	296.79
9.2 Pit				(m^2)
	(1)	Base	(3.00x2+2.00)x0.30=	2.40
	(2)	Wall	(3.00x4.00+2.70X3.70-3.14x0.90x0.90x2+2x3.14x0.90x0.30)x2=	37.20
	(3)	Wall	2.00x4.00+1.40X3.70=	13.18
	(4)	Slab	1.40x2.70-0.30x2.00+(0.30+2.00)x0.3x2	4.56
			Sub-total	57.34
9.3 Sluice Way				(m^2)
	(1)	Box Culvert Base	18.00 x 0.30 x 2 =	10.80
	(2)	Box Culvert Wall	(2.25 + 2.16) x 18.00 x 2 =	158.76
	(3)	Box Culvert Slab	1.60 x 18.0 =	28.80
	(4)	Gate Base	(2.00 x 2 +2.90) x 0.50 =	3.45
	(5)	Gate Wall	{1.70 x 2.25 + (1.00 + 0.20 + 1.00) x 2.00 + 1.00 x 0.25} x 2 =	16.95
	(6)	Gate Slab	1.00 x 2.16 + 0.25 x 2.40 =	2.76
	(7)	Colum	{(1.30 + 0.25) x 3.00 + 1/2 x 0.30 x 0.30 + 1.00 x 2.75} x 2 =	14.89
	(8)	Colum Wall	3.12 x 2.90 + 2.40 x 2.75 =	15.65
	(9)	Colum Slab	(0.60 + 0.25 + 0.25 + 0.25) x 2.40 + 0.40 x 0.25 x 2 =	3.44
	(10)	Wing Base	0.38 x (0.75 + 2.00 + 0.75 + 3.78 + 2.00 + 3.78) =	4.96
	(11)	Wing Wall	3.02 x (0.75 + 3.78 + 0.30) x 2 =	29.17
	(12)	Outlet Base	{(5.50 + 2.50 + 1.50 + 7.00) x 2 + 12.25} x 0.30 + 0.70 x 12.25 x 2 =	30.73
	(13)	Outlet Wall	{1/2 x (2.00 + 2.90) x 3.50 + 2.00 x 3.50} x 2 =	31.15
	(14)	Outlet Wall	{1/2 x (2.00 +2.90) x 3.50 + 2.00 x 3.25} x 2 =	30.15
	(15)	Outlet Wall	(3.50 + 0.25 + 3.25) x 2.00 x 2=	28.00
			Sub-total	409.66
9.4 Sewer Manhole				(m^2)
	(1)	Base	0.35 x 2.60 x 4 =	3.64
	(2)	LowerWall	(2.60 + 2.00) x 4 - 3.14 x 0.87 x 0.87 x 3 =	11.27
	(3)	Slab	0.25 x 2.60 x 4 + 2.00 x 2.00 - 0.80 x 0.80 =	5.96
	(4)	Upper Wall	(1.20 + 0.80) x 0.25 x 4 =	2.00
			Sub-total	22.87
9.7 Sewer Pipe				(m^2)
	(1)	Base	(0.405x(24.5+2.70)+0.255x1.70}x2=	22.90
			Total	809.56
			Allowance: 3%	**810 m2**
10. Reinforcig Bar (Mr. Miura's Estimation)				(kg)
	(1)	Pumping Station	65kg/m3 x 84.3 =	5,480.00
	(2)	Discharge Basin	65kg/m3 x 10.1m3 =	660.00
	(3)	Sluice Way	105kg/m3 x 101.1 =	10,620.00
	(4)	Manhole	55kg/m3 x 11.6m3 =	640.00
			Total	17,400.00
			Allowance: 5%	**18,270 kg**

TABLE B.2.3 (5/9) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) PUMPING STATION

Item		Calculation	Quantity
11. Sand Bed			
11.1 Pumping Station			(m^3)
(1)	Pump Room	3.70x(4.486+1.66+2.664)x0.20=	3.26
(2)	Discharge Basin	4.90x3.70x0.20=	1.81
(3)	Colar	0.60x3.24x0.20=	0.19
		Sub-total	5.26
11.2 Pit		3.00x2.20x0.20=	0.66
11.3 Sluice Way			(m^3)
(1)	Box Culvert	17.50x2.70x0.20=	9.45
(2)	Gate	2.00x7.45x0.20=	2.98
(3)	Outlet	7.45x5.50x0.20=	8.20
(4)	Outlet	12.425x1.70x0.20=	4.22
		Sub-total	24.85
11.4 Sewer Manhole		2.40x2.40x0.20=	1.15
11.7 Sewer Pipe		0.20x2.00x(24.5+2.70)	10.88
		Total	42.80
		Allowance: 3%	**45 m3**
12. Foundation Pile			
12.1 Reinforced Concrete Pile (300x300, L=12,000)			(No.)
(1)	Pump Room		4
(2)	Discharge Basin		8
(3)	Pit		1
		Total	13
		Allowance: 0%	**13 No.**
12.2 Wooden Pile (f80 - 100mm, L=4,500mm)			(nos).
(1)	Sluice Way	25 pcs./m^2 x 18.00x2.50=	1,125.0
(2)	Gate	25 pcs./m^2 x 2.00x7.25=	363.0
(3)	Outlet	25 pcs./m^2 x (7.25x5.50+1.50x12.25)=	1,456.0
(4)	Sewer Manhole	25 pcs./m^2 x 2.20x2.20=	121.0
(5)	Sewer Pipe	25 pcs./m^2 x 1.50x24.50=	919.0
		Total	3984.0
		Allowance: 1%	**4,030 m**
13. Revetment (Reinforced Concrete and Stone Masonry)			
13.1 Foundation Pile by Wooden Pile (ϕ80 - 100mm, L=4,500mm)			(m)
(1)	R/C Revetment (1)	25 pcs./m2 x 3.00 x 8.00 x 4.50 =	2,700.0
(2)	R/C Revetment (2)	25 pcs./m2 x 3.00 x 11.00 x 4.50 =	3,712.5
(3)	S/M Revetment (1)	25 pcs./m^2 x (10.50+1/2x3.14x2.50)x0.70x4.50 =	1,134.0
(4)	S/M Revetment (2)	25 pcs./m^2 x (11.00+1/2x3.14x2.50)x0.70x4.50 =	1,174.5
		Total	8,721.0
		Allowance: 1%	**8,800 m**
13.2 Concrete Type G (Leveling Concrete)			(m^3)
(1)	R/C Revetment (1)	3.20x8.1x0.1=	2.59
(2)	R/C Revetment (2)	3.20x11.10x0.10=	3.55
(3)	S/M Revetment (1)	0.70x(10.50+1/2x3.14x2.50)x0.10=	1.01
(4)	S/M Revetment (2)	0.70x(10.50+1/2x3.14x2.50)x0.10=	1.04
		Total	8.19
		Allowance: 3%	**10 m3**

TABLE B.2.3 (6/9) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) PUMPING STATION

Item		Calculation	Quantity
13.3 Sand Bed			(m^3)
(1)	R/C Revetment (1)	3.20x8.1x0.20=	5.18
(2)	R/C Revetment (2)	3.20x11.10x0.20=	7.10
(3)	S/M Revetment (1)	0.70x(10.50+1/2x3.14x2.50)x0.20=	2.02
(4)	S/M Revetment (2)	0.70x(10.50+1/2x3.14x2.50)x0.20=	2.08
		Total	16.38
		Allowance: 3%	**17 m3**
13.4 Reinforced Concrete Type E			(m^3)
(1)	R/C Revetment (1)	3.00x8.00x0.50 + 1/2x(0.30+0.40)x3.80x8.00 =	22.64
(2)	R/C Revetment (2)	3.00x11.00x0.50 + 1/2x(0.30+0.40)x3.80x11.00 =	31.13
(3)	S/M Revetment (1)	0.50x0.30x(10.50+1/2x3.14x2.50)=	2.16
(4)	S/M Revetment (2)	0.50x0.30x(11.00+1/2x3.14x2.50)=	2.24
		Total	58.17
		Allowance: 3%	**60 m3**
13.5 Forming			(m^2)
(1)	R/C Revetment (1)	0.50x(3.00+8.00)x2 + 3.80x8.00x2+1/2x(0.30+0.40)x3.80 =	72.47
(2)	R/C Revetment (2)	0.50x(3.00+11.00)x2 + 3.80x11.00x2+ 1/2x(0.30+0.40)x3.80 =	98.27
		Total	170.74
		Allowance: 3%	**175 m2**
13.6 Reinforced Bars (Mr. Miura's Estimation)			(kg)
(1)	R/C Revetment (1)	85kg/m3 x 22.64m3 =	1,924.40
(2)	R/C Revetment (2)	85kg/m3 x 31.13m3 =	1,796.05
(3)	S/M Revetment (1)	115kg/m3 x 2.16m3 =	248.40
(4)	S/M Revetment (2)	115kg/m3 x 2.24m3 =	257.60
		Total	4,226.45
		Allowance: 3%	**4,350 kg**
13.7 Plain Concrete Type F (Backfill Concrete for Stone Masonry)			(m^3)
(1)	S/M Revetment (1)	3.535X0.10x(10.50+1/2x3.14x2.5)=	5.10
(2)	S/M Revetment (2)	3.535x0.35x(11.00+1/2x3.14x2.5)=	5.27
		Total	8804.75
		Allowance: 3%	**11 m3**
13.8 Stone Masonry			(m^3)
(1)	S/M Revetment (1)	3.535x0.35x(10.50+1/2x3.14x2.5)=	17.85
(2)	S/M Revetment (2)	3.535x0.35x(11.00+1/2x3.14x2.5)=	18.47
		Total	36.32
		Allowance: 3%	**40 m3**
13.9 Free Draing Gravel			(m^3)
(1)	S/M Revetment (1)	3.535x0.20x(10.50+1/2x3.14x2.5)=	10.20
(2)	S/M Revetment (2)	3.535x020x(11.00+1/2x3.14x2.5)=	10.55
		Total	20.75
		Allowance: 3%	**22 m3**
13.10 Geotexitile Sheet			(m2)
(1)	S/M Revetment (1)	3.535x(10.50+1/2x3.14x2.5)=	51.00
(2)	S/M Revetment (2)	3.535x(11.00+1/2x3.14x2.5)=	52.76
		Total	103.76
		Allowance: 3%	**110 m2**

TABLE B.2.3 (7/9) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) PUMPING STATION

Item			Calculation	Quantity
13.11 Weep Hole				(No.)
	(1)	R/C Revetment (1)	2 pcs. X {(8.0m -2.0m)/2.0m + 1} =	8
	(2)	R/C Revetment (2)	2 pcs. X {(11.0m -3.0m)/2.0m + 1} =	10
	(3)	S/M Revetment (1)	2 pcs. X {(10.5m -2.5m)/2.0m + 1} =	8
	(4)	S/M Revetment (2)	2 pcs. X {(11.0m -3.0m)/2.0m + 1} =	10
			Total	36
			Allowance: 3%	**40 No.**
14. Rip Rap				
14.1 Retarding Pond Site				(m^3)
	(1)	Bottom	(4.00x6.50+3.00x17.0)x0.30=	23.10
	(2)	Slope	1/2x(4.00+7.90+9.50+17.30+17.00+20.9)x4.11x0.30=	47.22
			Sub-total	70.32
14.2 Canal Side			7.00x12.25x0.50=	42.88
			Total	113.20
			Allowance: 0%	**120 m3**
15. Precast Reinforced Concrete Pipe				(No.)
		PR/C Pipe (ϕ1500)	L = 25.00	25
			Allowance: 0%	**25 m**
16. Cast Iron Manhole Cover (Type A)				(No.)
	(1)	Sewer Manhole		1
			Allowance: 0%	**1 No.**
17. Fabricated Manhole Cover				(No.)
	(1)	Inlet Pit		1
	(2)	Pump Pit		1
			Total	2
			Allowance: 0%	**2 No.**
18. Rudder Rungs				(No.)
	(1)	Sewer manhole		13
	(2)	Inlet Pit		13
	(3)	Pump Pit	13 + 15 =	28
	(4)	Discharge Basin		13
	(5)	Outlet of Sluice Way		0
			Total	67
			Allowance: 3%	**70 No.**
19. Expantion Joint				(m)
	(1)	Pump Station - Box Culvert	(2.25 + 2.30) x 2 =	9.10
	(2)		**Allowance 3%**	**10 m**
20. Wet Stone Masonry Restoration				(m3)
	(1)	Stone Masonry	4.20m Width, 300mm thick and 2.00m length = 2.52 m3 (Allow.3%)	**3 m3**
	(2)	Plain Concrete	4.20m Width, 1thick and 2.00m length = 0.84 m3 (Allowance 3%)	**1 m3**
	(3)	Concrete Foundation	600mm width, 400 height and 2.00n length = 0.48 m3 (Allow. 3%)	**1 m3**

TABLE B.2.3 (8/9) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) PUMPING STATION

Item		Calculation	Quantity
21. Landscape Work (refer to other sheets prepared by Mr. Tanaka)			
21.1 Gate and Fence including Concrete Post (Type A)			
(1)	East side	19.5 + 1.5 + 2.6 =	23.6
(2)	South side (Front Side)	35.0 + 5.3 + 15.0 =	55.3
(3)	West side	3.0	3.0
		Total	81.90
		Allowance: 0%	**82 m**
212 Concrete Curb including leveling concrete and gravel bedding			
(1)	Around O/M Office	1.0 + 4.5 + 3.5 + 4.0 + 6.6 + 7.0 + 7.0 =	33.60
(2)	Around Electic Equipment	10.0 + 5.0 +3.0 + 1.5 =	19.50
(3)	Around retarding Pond	1.0 + 5.0 +0.5 + 21.0 + 2.0 =	29.50
		Total	82.60
		Allowance: 3%	**85 m**
21.3Concrete Pavement including Sand Bedding			(m2)
(1)	Around Pumping Station	1.5 x 10.0 + 2.0 x 4.0 + 2.0 x 7.0 =	37.00
(2)	Around Electic Equipment	7.0 x 16.0 + 4.0 x 16.0 =	176.00
(3)	Around retarding Pond	3.0 x 7.0 + 1.5 x 20.0 =	51.00
		Total	264.00
		Allowance: 3%	**270 m2**
21.4 Planting			
(1)	Tree	Lagerstroemia regnae	**3 No.**
(2)	Tree	Plumeria rubra	**1 No.**
(3)	Shrub	Ixora coccina	**2 m2**
(4)	Shrub	Bauhinia purpurea	**10 m2**
(5)	Shrub	Hibiscus rosa-sinensis	**13 m2**
(6)	Grass Sprigs	Axonopus compressus	**540 m2**
22. Road Works			
22.1 Concrete Curb (Concrete Type F: 200 x 300)			
		8.0m + 34.0m +34.0m +8.0m +8.0m +18.0m +19.0m +11.0m =	140.00
		Total	140.00
		Allowance: 3%	**145 m**
22.2 Road Pavement			
(1)	Subgrade Preparation	5.50 x 60.0 + 6.00 x 8.00 =	378 m2
		Allowance: 3%	**390 m2**
(2)	Sub Base Course		
		378 m2 x 0.20m =	76.00
		Allowance: 3%	**80 m3**
(3)	Base Course (Crushed Aggragate)		
		378 m2 x 0.19m =	71.82
		Allowance: 3%	**75 m3**
(4)	Asphalt Binder Course		
		378 m2 x 0.05m x 2.2 ton/m3 =	42 ton
		Allowance: 3%	**45 ton**
(5)	Asphalt Surface Course		(ton)
		378 m2 x 0.05m x 2.2ton/m3 =	42.00
		Allowance: 3%	**45 ton**

TABLE B.2.3 (9/9) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) PUMPING STATION

Item	Calculation	Quantity
(6) Prime Coat		
	378m2 x 1.5l/m2 =	567 litre
	Allowance: 3%	**585 litre**
(7) Tac Coat		
	378 m2 x 0.5l/m2 =	189 litre
	Allowance: 3%	**195.00**
22.3 Concrete Color Block including sand bedding		
	34.0m x 3.0m + 18.0m x 3.0m =	156.00
	Allowance: 1%	**160 m2**

TABLE B.2.4 (1/5) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) CONTROL GATE

Item			Quantity
1. Clearing and Grubbing			(m2)
(1)	East Bank	15.0 x 10.0 =	150.00
(2)	West Bank	10.0 x 15.0 =	150.00
		Total	300.00
		Allowance: 3%	**310 m2**
2. Demolish of Existing Control Gate (refer to other sheets prepared by local Engineer			(m3)
(1)	Mouth Part	10.35 + 5.4 =	15.75
(2)	Body	5.25 + 4.5 + 1.5 + 3.6 =	14.85
		Total	30.60
		Allowance: 3%	**32 m3**
3. Excavation (refer to the other sheets prepared by local Engineer, Mr. Tuan)			(m3)
(1)	No.16 to No.1	1/2 x (2.65 + 7.78) x 6.0 =	31.29
(2)	No.1 to No.2	1/2 x (7.78 + 18.26) x 7.50 =	97.65
(3)	No.2 to No.3	1/2 x (18.26 + 46.21) x 7.50 =	241.76
(4)	No.3 to No.4	1/2 x (46.21 + 9.60) x 7.50 =	209.28
(5)	No.4 to No.5	1/2 x (9.60 + 12.24) x 5.00 =	54.60
(6)	No.5 to No.6	1/2 x (12.24 + 6.20) x 5.00 =	46.10
(7)	No.6 to No.7	1/2 x (6.20 + 5.06) x 7.50 =	42.23
(8)	No.7 to No.8	1/2 x (5.06 + 2.46) x 7.50 =	28.20
		Total	751.11
		Allowance: 5%	**790 m3**
4. Sandy Soil Backfill			(m3)
(1)	No.16 to No.1	1/2 x (1.34 + 0) x 6.00 =	4.02
(2)	No.1 to No.2	1/2 x (1.34 + 0.30) x 7.50 =	12.30
(3)	No.2 to No.3	1/2 x (0.30 + 0) x 7.50 =	1.13
(4)	No.3 to No.4	1/2 x (0 + 2.5) x 7.50 =	9.38
(5)	No.4 to No.5	1/2 x (2.5 + 0) x 5.00 =	6.25
(6)	No.5 to No.6	0	0.00
(7)	No.6 to No.7	0	0.00
(8)	No.7 to No.8	0	0.00
		Total	33.08
		Allowance: 5%	**35 m3**
5. Sandy Soil Fill			
(1)	No.16 to No.1	1/2 x (7.80 + 11.22) x 6.00 =	57.06
(2)	No.1 to No.2	1/2 x (11.22 + 5.00) x 7.50 =	60.83
(3)	No.2 to No.3	1/2 x (5.00 + 0) x 7.50 =	18.75
(4)	No.3 to No.4	1/2 x (0 + 39.08) x 7.50 =	146.55
(5)	No.4 to No.5	1/2 x (39.08 + 33.58) x 5.00 =	181.65
(6)	No.5 to No.6	1/2 x (33.58 + 0) x 5.00 =	83.95
(7)	No.6 to No.7	0	0.00
(8)	No.7 to No.8	0	0.00
		Total	548.79
		Allowance: 3%	**580 m3**

TABLE B.2.4 (2/5) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) CONTROL GATE

Item		Quantity
5.Reinforced Concrete (Concrete Type E)		(m^3)
(1) Box Culvert: Base	{3.75x3.125+1/2x(3.75+4.00)x0.65}x0.30=	4.27
(2) Box Culvert: Wall	1.80x3.75x0.25x2=	3.38
(3) Box Culvert: Wall	{0.25x3.125+1/2x(0.25+0.50)x0.625}x1.80	1.83
(4) Box Culvert: Slab	{3.75x3.125+1/2x(3.75+4.00)x0.65}x0.25=	3.56
(5) Box Culvert: Upper Wall	3.25x1.45x0.25+1/2x0.25x0.25x3.25=	1.28
(6) Box Culvert: Upper Wall	2.90x1.45x0.25x2	2.10
(7) Gate : Base	1.25x4.30x0.50=	2.69
(8) Gate : Wall	1.25x2.05x0.40x2=	2.05
(9) Gate: Wall	1.25x2.05x0.50=	1.28
(10) Colum	{4.30x1.25-3.80x1.00+0.20x0.75}x2.65+1/2x0.30x0.30x4.30=	4.76
(11) Colum: Upper Slab	0.70x3.80x0.25-0.20x0.75x0.25=	0.70
(12) Wing (Down): Base	1.00x2.00x0.30x2=	1.48
(13) Wing (Down): Wall	4.20x2.00x0.25x2=	4.20
(14) Gate Room: Base	{1/2x(1.30+2.75)x1.90x0.30+2.75x1.00x0.50}x2	5.06
(15) Gate Room: Wall	{1/2x(1.30+2.75)x1.90+1.75x2.75}-{1/2x(1.176+2.50)x1.65+0.75x2.50}x2=	7.50
(16) Gate and Pipe Hole	{1.10x1.10+1.40x1.40+3.14x(0.72x0.72+0.87x0.87)}x0.25=	-1.79
(17) Gate Room: Slab	{1/2(1.176+2.50)x1.65+0.75x2.50}x2-0.30x1.50-0.30x1.80}x0.25=	2.21
(18) Wing (Up): Base	1.00x2.00x0.30x2=	1.20
(19) Wing (Up): Wall	3.50x2.00x0.25x2=	3.50
	Total	51.26
	Allowance: 3%	**55 m3**
6. Plain Concrete (Concrete Type F)		
(1) Temporary Wall (1)	3.14 x 0.60 x 0.60 x 0.20 =	0.23
(2) Temporary Wall (2)	1.20 x 1.20 x 0,20 =	0.29
	Total	0.52
	Allowance: 3%	**1.0 m3**
7. Leveling Concrete and Pipe Foundation (Concrete Type G)		
(1) Box Culvert	{3.75 x 3.225 + 1/2 x (3.75 + 4.00) x 0.65} x 0.10 =	1.46
(2) Gate	1.35 x 4.30 x 0.10 =	0.58
(3) Wing (Down)	1.20 x 2.10 x 0.10 x 2 =	0.50
(4) Gate Room	{1/2 x (1.40 + 2.85) x 2.00 x 0.10 + 2.85 x 1.10 x 0.10} x 2 =	1.48
(5) Wing (Up)	2.10 x 1.20 x 0.10 x 2 =	0.50
(6) Pipe Fundation (1200 dia)	0.562m2 x 23.0m =	12.93
(7) Pipe Fundation (1500 dia)	0.816m2 x 24.0m =	19.58
	Total	37.03
	Allowance: 3%	**39 m3**
8. Forming		
(1)		
(2)		
(3)		
(4)		
(5)		
(6)		
	Total	
	Allowance: 3%	**m2**

TABLE B.2.4 (3/5) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) CONTROL GATE

Item			Quantity
9. Reinforcig Bar (Mr. Miura's Estimation)			(kg)
(1)	Control Gate	105kg/m3 x 55m3 =	5,780.00
		Total	5,780.00
		Allowance: 5%	**6,070 kg**
10. Sand Bed			(m^3)
(1)	Box Culvert	{3.75x3.225+1/2x(3.75+4.00)x0.65}x0.20=	2.92
(2)	Gate	1.35x4.30x0.20=	1.16
(3)	Wing (Down)	1.20x2.10x0.20x2=	1.00
(4)	Gate Room	{1/2x(1.40+2.85)x2.00x0.20+2.85x1.10x0.20}x2	2.96
(5)	Wing (Up)	2.10x1.20x0.20x2=	1.00
		Total	9.04
		Allowance: 3%	**10 m3**
11. Wooden Foundation Pile			(m)
(1)	Box Culvert	25 pcs./m^2 x 14.24 m^2 x 4.5m =	1,602
(2)	Gate	25 pcs./m^2 x 5.38 m^2 x 4.5m =	608
(3)	Wing (Down)	25 pcs./m^2 x 4.0 m^2 x 4.5m =	450
(4)	Gate Room	25 pcs./m^2 x 13.20 m^2 x 4.5m =	1,485
(5)	Wing (Up)	25 pcs./m^2 x 4.0 m^2 x 4.5m =	450
(6)	Sewer Pipe (1200 dia)	16 pcs./m^2 x 1.63m x 23.0m x 4.5m =	2,699
(7)	Sewer Pipe (1500 dia)	16 pcs./m^2 x 1.93m x 24.0m x 4.5m =	3,335
		Total	10,629
		Allowance: 1%	**10,740 m**
12. Revetment by Stone Masonry			
12.1 Foundation Pile			(m)
(1)	Canal side (Left Bank)	25 pcs./m^2 x 8.00 x 0.80 x 4.5m =	720
(2)	Canal side (Right Bank)	25 pcs./m^2 x 8.00 x 0.80 x 4.5m =	720
(3)	Pond Side (Left Bank)	25 pcs./m^2 x 20.00 x 0.80 x 4.5 m =	1,800
(4)	Pond Side (Right Bank)	25 pcs./m^2 x 20.00 x 0.80 x 4.5m =	1,800
		Total	5,040
		Allowance: 1%	**5,090 No.**
12.2 Leveling Concrete (Concrete Type G)			(m^3)
(1)	Canal side (Left Bank)	0.80x8.00x0.10=	0.64
(2)	Canal side (Right Bank)	0.80x8.00x0.10=	0.64
(3)	Pond Side (Left Bank)	0.80x20.00x0.10=	1.60
(4)	Pond Side (Right Bank)	0.80x20.00x0.10=	1.60
		Total	4.48
		Allowance:3 %	**5 m3**
12.3Gravel Beding			(m^3)
(1)	Canal side (Left Bank)	0.80x8.00x0.20=	1.28
(2)	Canal side (Right Bank)	0.80x8.00x0.20=	1.28
(3)	Pond Side (Left Bank)	0.80x20.00x0.20=	3.20
(4)	Pond Side (Right Bank)	0.80x20.00x0.20=	3.20
		Total	8.96
		Allowance:3 %	**10 m3**

TABLE B.2.4 (4/5) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) CONTROL GATE

Item			Quantity
12.4 Reinforced Concrete Foundation (Concrete Type E)			(m^3)
(1)	Canal side (Left Bank)	0.60x0.40x8.00=	1.92
(2)	Canal side (Right Bank)	0.60x0.40x8.00=	1.92
(3)	Pond Side (Left Bank)	0.60x0.40x20.00=	4.80
(4)	Pond Side (Right Bank)	0.60x0.40x20.00=	4.80
		Total	13.44
		Allowance:3 %	**14 m3**
12.5 Stone Masonry			(m^3)
(1)	Canal side (Left Bank)	0.35x1/2x(3.913+6.313)x8.00+0.25x0.70x11.50=	16.32
(2)	Canal side (Right Bank)	0.35x1/2x(3.913+6.313)x8.00+0.25x0.70x13.50=	16.67
(3)	Pond Side (Left Bank)	0.35{3.913x5.00+1/2x(3.913+2.46)x3.00+2.46x2.00+1/2x(2.46+3.966)x10.00}=	23.16
(4)	Pond Side (Right Bank)	0.35{3.913x5.00+1/2x(3.913+2.46)x3.00+2.46x2.00+1/2x(2.46+3.966)x10.00}=	23.16
		Total	79.31
		Allowance:3 %	**82 m3**
12.6 Plain Concrete			(m^3)
(1)	Canal side (Left Bank)	0.10x1/2x(3.913+6.313)x8.00+0.10x1.00x11.50=	5.24
(2)	Canal side (Right Bank)	0.10x1/2x(3.913+6.313)x8.00+0.10x1.00x13.50=	5.44
(3)	Pond Side (Left Bank)	0.10{3.913x5.00+1/2x(3.913+2.46)x3.00+2.46x2.00+1/2x(2.46+3.966)x10.00}=	6.62
(4)	Pond Side (Right Bank)	0.10{3.913x5.00+1/2x(3.913+2.46)x3.00+2.46x2.00+1/2x(2.46+3.966)x10.00}=	6.62
		Total	23.92
		Allowance:3 %	**25 m3**
12.6 Free Drain Gravel			(m^3)
(1)	Canal side (Left Bank)	0.20x1/2x(3.913+6.313)x8.00+0.20x1.00x11.50=	9.33
(2)	Canal side (Right Bank)	0.20x1/2x(3.913+6.313)x8.00+0.20x1.00x13.50=	9.53
(3)	Pond Side (Left Bank)	0.20{3.913x5.00+1/2x(3.913+2.46)x3.00+2.46x2.00+1/2x(2.46+3.966)x10.00}=	13.23
(4)	Pond Side (Right Bank)	0.20{3.913x5.00+1/2x(3.913+2.46)x3.00+2.46x2.00+1/2x(2.46+3.966)x10.00}=	13.23
		Total	45.32
		Allowance:3 %	**47 m3**
12.7 Geotexityle Sheet			(m^2)
(1)	Canal side (Left Bank)	1/2x(3.913+6.313)x8.00=	40.90
(2)	Canal side (Right Bank)	1/2x(3.913+6.313)x8.00=	40.90
(3)	Pond Side (Left Bank)	3.913x5.00+1/2x(3.913+2.46)x3.00+2.46x2.00+1/2x(2.46+3.966)x10.00=	66.17
(4)	Pond Side (Right Bank)	3.913x5.00+1/2x(3.913+2.46)x3.00+2.46x2.00+1/2x(2.46+3.966)x10.00=	66.17
		Total	214.14
		Allowance:3 %	**220 m3**
12.8 Weep Hole			
(1)	Canal side (Left Bank)	2 pcs. x (6m/2m + 1) =	8
(2)	Canal side (Right Bank)	2 pcs. x (6m/2m + 1) =	8
(3)	Pond Side (Left Bank)	2 pcs. x (18m/2m + 1) =	20
(4)	Pond Side (Right Bank)	2 pcs. x (18m/2m + 1) =	20
		Total	56.00
		Allowance:0 %	**56 No.**
13. Rip Rap			
(1)	River Side	4.30x8.00x0.30=	10.32
(2)	Pond Side	13.25x10.00x0.30=	39.75
		Total	50.07
		Allowance:3 %	**52 m3**

TABLE B.2.4 (5/5) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) CONTROL GATE

Item		Quantity
14. Fabricated Manhole Cover		
(1) Gate Room		2
	Total	2
	Allowance:0 %	**2 No.**
15. Ladder Rungs		
(1) Gate Room	11 x 2 =	22
	Total	22
	Allowance:0 %	**22 No.**
16. Landscape Work		
16.1 Fence (Type A)	Gate: same as Thanh Da P.S.	(m)
	Fence (3.0mx2) + Gate (4.225m x 1) + Fence (3.0m x 2) =	16.23
	Total	16.23
	Allowance:0 %	**16.23 m**
16.2 Fence (Type B)		(m)
(1) East Side	7.0 + 4.0 +2.0 + 6.0 + 15.0 =	34.00
(2) West Side	3.5 +7.0 +6.0 +14.0 +5.0 + 4.0 =	39.50
	Total	73.50
	Allowance:1 %	**75 m**
16.3 Concrete Curb		(m)
(1) East Side	4.5m	4.50
(2) West Side	14.0m	14.00
	Total	18.50
	Allowance: 3%	**20 m**
16.4 Concrete Pavement		(m2)
(1) East Side	1/2 x (10.0 + 12.5) x 7.0 + 1/2 (7.5 + 12.5) x 1.0 =	88.75
	1/2 x (9.5 + 10.0) x 2.0 + 1/2 x(7.0 + 9.5) x 4.0 =	55.00
	1.5 x 3.5 + 1/2 x (2.0 + 5.0) x 5.5 + 2.00 x 8.0 =	40.50
(2) West Side	1/2 x (3.0 + 4.5) x 7.5 + 8.5 x 2.00 + 1.5 x 2.5 =	48.88
	1/2 x (4.0 + 5.5) x 2.5 + 2.0 x 5.0 + 3.0 x 8.0 =	45.88
	Total	279.00
	Allowance: 3%	**290 m2**
16.5 Plantation		
(1) Tree	Lagerstroemia regine	**3 Nos.**
(2) Tree	Plumeria rubra	**4 Nos.**
(3) Shrub	Ixora coccina	**2.0m2**
(4) Shrub	Bauhinia purpurea	**5 Nos.**
(5) Shrub	Hibiscus rosa-sinensis	**10 Nos.**
(6) Grass Spring	Axonopus compressues	**95.0m2**

TABLE B.2.5 (1/2) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) RETARDING POND

Item		Quantity
1. Clearing and Grubbing		(m2)
(1) East Bank	2.00m x 339.0m =	678.00
(2) West Bank	2.00m x 435.0m =	870.00
	Total	1548.00
	Allowance: 3%	**1,600 m2**
2. Excavation (refer to the other sheets prepared by local Engineer)		(m3)
(1) No. 9 (P.S.) - No.1	1/2 x (13.53 + 10.48) x 14.00 =	168.07
(2) No.1 - No.2	1/2 x (10.48 + 13.39) x 25.00 =	298.38
(3) No.2 - No.3	1/2 x (13.39 + 12.30) x 25.00 =	321.13
(4) No.3 - No.4	1/2 x (12.30 + 16.57) x 25.00 =	360.88
(5) No.4 - No.5	1/2 x (16.57 + 14.64) x 25.00 =	190.13
(6) No.5 - No.6	1/2 x (14.64 + 16.35) x 25.00 =	387.38
(7) No.6 - No.7	1/2 x (16.35 + 13.86) x 25.00 =	377.63
(8) No.7 - No.8	1/2 x (13.86 + 11.07) x 25.00 =	311.63
(9) No.8 - No.9	1/2 x (11.07 + 8.18) x 25.00 =	238.50
(10) No.9 - No.10	1/2 x (8.18 + 5.92) x 25.00 =	176.25
(11) No.10 - No.11	1/2 x (5.92 + 4.46) x 25.00 =	129.75
(12) No.11 - No.12	1/2 x (4.46 + 6.44) x 25.00 =	136.25
(13) No.12 - No.13	1/2 x (6.44 + 3.71) x 30.00 =	152.25
(14) No.13 - No.14	1/2 x (3.71 + 6.17) x 25.00 =	123.50
(15) No.14 - No.15	1/2 x (6.17 + 3.15) x 25.00 =	116.50
(16) No.15 - No.16	1/2 x (3.15 + 2.65) x 30.00 =	87.00
	Total	3,575.20
	Allowance: 5%	**3,760 m3**
3. Sandy Soil Filling	(West Bank) + (East Bank)	(m3)
(1) No.7 - No.8	0 + 1/2 x (6.64 + 6.64) x 12.5 =	83.00
(2) No.8 - No.9	0 + 1/2 x (6.64 + 3.50) x 12.5 =	63.38
(3) No. 9 (P.S.) - No.1	1/2 x (3.50 + 3.60) x 4.00 + 1/2 x (3.32 + 3.25) x 25.00 =	96.33
(4) No.1 - No.2	1/2 x (3.60 + 4.14) x 25.00 + 1/2 x (3.25 + 2.76) x 25.00 =	171.88
(5) No.2 - No.3	1/2 x (4.14 + 4.47) x 25.00 + 1/2 x (2.76 + 3.01) x 25.00 =	179.75
(6) No.3 - No.4	1/2 x (4.47 + 4.96) x 25.00 + 1/2 x (3.01 + 4.68) x 25.00 =	214.00
(7) No.4 - No.5	1/2 x (4.96 + 4.58) x 25.00 + 1/2 x (4.68 + 4.11) x 25.00 =	229.00
(8) No.5 - No.6	1/2 x (4.58 + 4.20) x 25.00 + 1/2 x (4.11 + 3.87) x 25.00 =	209.50
(9) No.6 - No.7	1/2 x (4.20 + 3.52) x 25.00 + 1/2 x (3.87 + 4.29) x 25.00 =	198.50
(10) No.7 - No.8	1/2 x (3.52 + 3.78) x 25.00 + 1/2 x (4.29 + 2.54) x 25.00 =	176.63
(11) No.8 - No.9	1/2 x (3.78 + 4.47) x 25.00 + 1/2 x (2.54 + 4.03) x 25.00 =	185.25
(12) No.9 - No.10	1/2 x (4.47 + 4.50) x 25.00 + 1/2 x (4.03 + 3.30) x 25.00 =	203.75
(13) No.10 - No.11	1/2 x (4.50 + 3.92) x 25.00 + 1/2 x (3.30 + 4.34) x 25.00 =	200.75
(14) No.11 - No.12	1/2 x (3.92 + 3.99) x 25.00 + 1/2 x (4.34 + 3.37) x 25.00 =	195.25
(15) No.12 - No.13	1/2 x (3.99 + 4.48) x 30.00 + 1/2 x (3.37 + 3.82) x 30.00 =	234.90
(16) No.13 - No.14	1/2 x (4.48 + 4.65) x 25.00 + 1/2 x (3.82 + 3.28) x 25.00 =	202.88
(17) No.14 - No.15	1/2 x (4.65 + 4.46) x 25.00 + 1/2 x (3.28 + 3.38) x 25.00 =	197.13
(18) No.15 - No.16	1/2 x (4.46 + 3.90) x 30.00 + 1/2 x (3.38 + 3.90) x 30.00 =	234.60
	Total	3,276.45
	Allowance: 5%	**3,440 m3**

TABLE B.2.5 (2/2) WORK QUANTITIES FOR CONSTRUCTION OF BEN ME COC (1) RETARDING POND

Item		Quantity
4. Sodding	(West Bank) + (East Bank)	(m3)
(1) No.7 - No.8	2.00 x (0 + 12.5) =	25.00
(2) No.8 - No.9	2.00 x (0 + 12.5) =	25.00
(3) No. 9 (P.S.) - No.1	2.00 x (25.0 + 4.0) =	58.00
(4) No.1 - No.2	2.00 x (25.0 + 25.0) =	100.00
(5) No.2 - No.3	2.00 x (25.0 + 25.0) =	100.00
(6) No.3 - No.4	2.00 x (25.0 + 25.0) =	100.00
(7) No.4 - No.5	2.00 x (25.0 + 25.0) =	100.00
(8) No.5 - No.6	2.00 x (25.0 + 25.0) =	100.00
(9) No.6 - No.7	2.00 x (25.0 + 25.0) =	100.00
(10) No.7 - No.8	2.00 x (25.0 + 25.0) =	100.00
(11) No.8 - No.9	2.00 x (25.0 + 25.0) =	100.00
(12) No.9 - No.10	2.00 x (25.0 + 25.0) =	100.00
(13) No.10 - No.11	2.00 x (25.0 + 25.0) =	100.00
(14) No.11 - No.12	2.00 x (25.0 + 25.0) =	100.00
(15) No.12 - No.13	2.00 x (30.0 + 30.0) =	120.00
(16) No.13 - No.14	2.00 x (25.0 + 25.0) =	100.00
(17) No.14 - No.15	2.00 x (25.0 + 25.0) =	100.00
(18) No.15 - No.16	2.00 x (30.0 + 30.0) =	120.00
	Total	1,648.00
	Allowance: 5%	**1,730 m2**
5. O/M Road		
5.1 Subgrade Preparation		(m2)
(1) East Bank	1.70m x 339.0m =	576.30
(2) West Bank	1.70m x 435.0m =	739.50
	Total	1315.80
	Allowance: 3%	**1,360 m2**
5.2 Sand Bedding		
(1) East Bank	1.70m x 0.10 x 339.0m =	57.63
(2) West Bank	1.70m x 0.10 x 435.0m =	73.95
	Total	131.58
	Allowance: 3%	**140 m3**
5.3 Concrete Pavement		
(1) East Bank	1.60m x 0.10 x 339.0m =	54.24
(2) West Bank	1.60m x 0.10 x 435.0m =	69.60
	Total	123.84
	Allowance: 3%	**130 m3**
5.4 Fence (Type B) with Concrete Pole		
(1) East Bank		414.00
(2) West Bank		412.00
	Total	826.00
	Allowance: 3%	**835 m**

TABLE B.2.6 WORK QUANTITIES OF O/M OFFICE CONSTRUCTION

Table B.2.6 (1) Work Quantities of O/M Office Construction (Reinforcing Bar)

Table B.2.6 (2) Work Quantities of O/M Office Construction
(Earth Work, Pileing, Concrete and Forming)

Table B.2.6 (3) Work Quantities of O/M Office Construction
(Brick Work, Roofing, Plastering and Finishing)

BAÛNG KHOÁI LÖÔÏNG

TABLE B.2.6 (1) BREAKDOWN OF QUANTITIES

HAÏNG MUÏC : TRAÏM BÔM BEÁN MEÏ COÏC
ITEM : BEN ME COC PUMP STATION
COÂNG TAÙC : COÁT THEÙP
WORK : REINFORCEMENT

VÒ TRÍ LOCATION	Ñ.K. DIA.	CHIEU DAI THANH LENGTH OF BAR							SO THANH NOS OF BAR				TONG CHIEU DAI TOTAL LENGTH										
		1	2	3	4	8D	42D	TOTAL	L	a	n	TOTAL	6	8	10	12	14	16	18	20	22	25	28
Mong -Foundation																							
-M1 (8 No)																							
1	18	2.05	0.25					2.30	8	1	8	64							147.2				
3	12	2.4	0.2	0.2				2.80	1.6	0.15	8	88				246.4							
4	12	1.6	0.2	0.2				2.00	2.4	0.2	8	96				192							
2	6	0.25	0.25	0.25	0.25	2		1.10	0.4	0.2	8	16	17.6										
-M2 (4 No)_(GUARD HOUSE)																							
1	12	2.65	0.25					2.90	4	1	4	16				46.4							
2	6	0.25	0.25	0.25	0.25	2		1.10	1.35	0.2	4	28	30.8										
3	12	1.5	0.2	0.2				1.90	1.5	0.2	4	32				60.8							
4	12	1.5	0.2	0.2				1.90	1.5	0.2	4	32				60.8							
	GRANT TOTAL WEIGHT (Ton)							**0.84**	TOTAL LENGTH			(m)	48.4	0	0	606.4	0	0	147.2	0	0	0	0
	TONG TROÏNG LÖÔÏNG								UNIT WEIGHT			(Kg/m)	0.222	0.394	0.616	0.888	1.208	1.579	1.998	2.466	2.984	3.854	4.834
									TOTAL WEIGHT			(Ton)	**0.01**	**0**	**0**	**0.54**	**0**	**0**	**0.29**	**0**	**0**	**0**	**0**
Cot - Columns																							
-C1 (8 No)																							
1	18	3.7						3.70	8	1	8	64							236.8				
2	6	0.25	0.25	0.25	0.25	2		1.10	2.4	0.1	6	144	158.4										
	6	0.25	0.25	0.25	0.25	2		1.10	1.3	0.2	6	42	46.2										
-C2 (4No)_(GUARD HOUSE)																							
1	12	3.05						3.05	4	1	4	16				48.8							
2	6	0.15	0.15	0.15	0.15	2		0.70	2	0.1	4	80	56										
	6	0.15	0.15	0.15	0.15	2		0.70	1.05	0.2	4	20	14										
-BT (5No)																							
1	12	3.7						3.70	4	1	5	20				74							
2	6	0.15	0.15	0.15	0.15	2		0.70	2.5	0.1	5	125	87.5										
	6	0.15	0.15	0.15	0.15	2		0.70	1.2	0.2	5	30	21										
-Bo tru (4No)-sub column BTM																							
1	12	0.7						0.70	4	1	4	16				11.2							
2	6	0.15	0.15	0.15	0.15	2		0.70	0.4	0.1	4	16	11.2										
	6	0.15	0.15	0.15	0.15	2		0.70	0.3	0.2	4	8	5.6										

VÒ TRÍ LOCATION	Ñ.K. DIA.	CHIEU DAI THANH LENGTH OF BAR							SO THANH NOS OF BAR				TONG CHIEU DAI TOTAL LENGTH										
		1	2	3	4	8D	42D	TOTAL	L	a	n	TOTAL	6	8	10	12	14	16	18	20	22	25	28
-Bo tru (2No)-sub column BTM1 (GUARD HOUSE)																							
1	12	0.7						0.70	4	1	2	8				5.6							
2	6	0.15	0.15	0.15	0.15	2		0.70	0.4	0.1	2	8	5.6										
	6	0.15	0.15	0.15	0.15	2		0.70	0.3	0.2	2	4	2.8										
	GRANT TOTAL WEIGHT (Ton)							0.68	TOTAL LENGTH			(m)	408.3	0	0	139.6	0	0	236.8	0	0	0	0
	TONG TRONG LÖÔNG								UNIT WEIGHT			(Kg/m)	0.222	0.394	0.616	0.888	1.208	1.579	1.998	2.466	2.984	3.854	4.834
									TOTAL WEIGHT			(Ton)	0.09	0	0	0.12	0	0	0.47	0	0	0	0
Ña Kieng - Ground beam																							
DK1 (2No)																							
1	20	16.3	0.55	0.55				17.40	2	1	2	4								69.6			
2	16	16.3	0.3	0.3				16.90	2	1	2	4						67.6					
3	16	6						6.00	2	1	2	4						24					
4	16	3						3.00	4	1	2	8						24					
5	6	0.15	0.15	0.55	0.55	2		1.50	7.1	0.15	2	94	141										
	6	0.15	0.15	0.55	0.55	2		1.50	8	0.2	2	80	120										
DK2 (2No)																							
1	16	6.3	0.4	0.4				7.10	2	1	2	4						28.4					
2	20	6.3	0.2	0.2				6.70	2	1	2	4								26.8			
3	20	4.4						4.40	2	1	2	4								17.6			
4	6	0.15	0.15	0.4	0.4	2		1.20	4.2	0.15	2	56	67.2										
	6	0.15	0.15	0.4	0.4	2		1.20	2.1	0.2	2	22	26.4										
DK3 (2No)																							
1	16	6.3	0.15	0.15				6.60	2	1	2	4						26.4					
2	16	6.3	0.1	0.1				6.50	2	1	2	4						26					
3	6	0.15	0.15	0.15	0.15	2		0.70	4.2	0.15	2	56	39.2										
	6	0.15	0.15	0.15	0.15	2		0.70	2.1	0.2	2	22	15.4										
DK1a,DM1a (2No)_(GUARD HOUSE)																							
1	16	4.2	0.25	0.25				4.70	2	1	4	8						37.6					
2	20	4.2	0.15	0.15				4.50	2	1	4	8								36			
3	6	0.15	0.15	0.25	0.25	2		0.90	2.1	0.15	4	56	50.4										
	6	0.15	0.15	0.25	0.25	2		0.90	2.1	0.2	4	44	39.6										
DK2a (2No)_(GUARD HOUSE)																							
1	16	3.2	0.25	0.25				3.70	2	1	2	4						14.8					
2	20	3.2	0.15	0.15				3.50	2	1	2	4								14			
3	6	0.15	0.15	0.25	0.25	2		0.90	1.6	0.15	2	22	19.8										
	6	0.15	0.15	0.25	0.25	2		0.90	1.6	0.2	2	16	14.4										
DM2a (2No)_(GUARD HOUSE)																							
1	16	5.2	0.25	0.25				5.70	2	1	2	4						22.8					
2	20	5.2	0.15	0.15				5.50	2	1	2	4								22			
3	6	0.15	0.15	0.25	0.25	2		0.90	2.6	0.15	2	34	30.6										
	6	0.15	0.15	0.25	0.25	2		0.90	2.6	0.2	2	26	23.4										

VÒ TRÍ LOCATION	Ñ.K. DIA.	CHIEU DAI THANH LENGTH OF BAR							SOÌ THANH NOS OF BAR				TOÏNG CHIEU DAI TOTAL LENGTH										
		1	2	3	4	8D	42D	TOTAL	L	a	n	TOTAL	6	8	10	12	14	16	18	20	22	25	28
Dam mai - Roof beam																							
DM1 (2 No)																							
1	16	16.3	0.55	0.55				17.40	2	1	2	4						69.6					
2	16	16.3	0.3	0.3				16.90	2	1	2	4						67.6					
3	16	6						6.00	1	1	2	2						12					
4	16	3						3.00	4	1	2	8						24					
5	6	0.15	0.15	0.55	0.55	2		1.50	7.1	0.15	2	94	141										
	6	0.15	0.15	0.55	0.55	2		1.50	8	0.2	2	80	120										
DM2 (4 No)																							
1	20	8.2	0.15	0.15				8.50	2	1	4	8								68			
2	16	8.3	0.1	0.1				8.50	2	1	4	8						68					
3	16	4.4						4.40	2	1	4	8						35.2					
4	16	2.7						2.70	4	1	4	16						43.2					
5	6	0.25	0.25	0.35	0.35	2		1.30	2.9	0.15	4	76	98.8										
	6	0.25	0.25	0.35	0.35	2		1.30	2.8	0.2	4	56	72.8										
	6	0.25	0.25	0.3	0.3	2		1.20	1.9	0.15	4	52	62.4										
DG1 (4No)																							
1	12	8.8	0.2	0.2				9.20	2	1	4	8				73.6							
2	12	7.6	0.1	0.1				7.80	2	1	4	8				62.4							
3	6	0.15	0.15	0.15	0.15	2		0.70	4.4	0.15	4	116	81.2										
	6	0.15	0.15	0.15	0.15	2		0.70	4.4	0.2	4	88	61.6										
DG1a (2No)_(GUARD HOUSE)																							
1	12	5.8	0.2	0.2				6.20	2	1	4	8				49.6							
2	12	5.8	0.1	0.1				6.00	2	1	4	8				48							
3	6	0.15	0.15	0.15	0.15	2		0.70	2.9	0.15	4	76	53.2										
	6	0.15	0.15	0.15	0.15	2		0.70	2.9	0.2	4	60	42										
Ña lanh toï - Lintels																							
- D11 (3 N0.)	16	1.30	0.2	0.2				1.70	4	1	3	12						20.4					
	6	0.15	0.15	0.15	0.15	2		0.70	1.7	0.15	3	33	23.1										
- D12 (2 No)	16	1.15	0.2	0.2				1.55	2	1	2	4						6.2					
	6	0.15				2		0.25	1.15	0.15	2	16	4										
- D13 (3 No)	16	1.05	0.2	0.2				1.45	2	1	3	6						8.7					
	6	0.15				2		0.25	1.45	0.15	3	30	7.5										
- D14 (1 No)	16	1.30	0.2	0.2		2		1.96	2	1	1	2						3.92					
	6	0.15				2		0.25	1.3	0.15	1	9	2.25										
-W11 (1 No)	16	4.80	0.2	0.2		2		5.46	4	1	1	4						21.84					
	6	0.15	0.15	0.15	0.15	2		0.70	4.8	0.15	1	32	22.4										
- W12 (6 No)	16	2.40	0.2	0.2		2		3.06	4	1	6	24						73.44					
	6	0.15	0.15	0.15	0.15	2		0.70	2.4	0.15	6	96	67.2										
W13 (3 No)	16	1.00	0.2	0.2		2		1.66	2	1	3	6						9.96					
	6	0.15				2		0.25	1	0.15	3	21	5.25										
	GRANT TOTAL WEIGHT (Ton)							**2.32**	TOTAL LENGTH		(m)		1452.1	0	0	233.6	0	735.66	0	254	0	0	0
	TOÏNG TROÏNG LÖÔÏNG								UNIT WEIGHT		(Kg/m)		0.222	0.394	0.616	0.888	1.208	1.579	1.998	2.466	2.984	3.854	4.834
									TOTAL WEIGHT		(Ton)		**0.32**	**0**	**0**	**0.21**	**0**	**1.16**	**0**	**0.63**	**0**	**0**	**0**

VÒ TRÍ LOCATION	Ñ.K. DIA.	CHIEÀU DAØI THANH LENGTH OF BAR							SOÁ THANH NOS OF BAR				TOÅNG CHIEÀU DAØI TOTAL LENGTH									
		1	2	3	4	8D	42D	TOTAL	L	a	n	TOTAL	6	8	10	12	14	16	18	20	22	25	28
Nen nha -Ground floor slab																						
	12	16.4						16.40	6	0.2	1	30				492						
	12	6.4						6.40	8.6	0.2	1	43				275.2						
Guard house	12	4.2						4.20	2.8	0.2	1	14				58.8						
	12	3.2						3.20	3.8	0.2	1	19				60.8						
	GRANT TOTAL WEIGHT (Ton)							**0.79**	TOTAL LENGTH			(m)	0	0	0	886.8	0	0	0	0	0	0
	TOÅNG TROÏNG LÖÔÏNG								UNIT WEIGHT			(Kg/m)	0.222	0.394	0.616	0.888	1.208	1.579	1.998	2.466	2.984	3.854	4.834
									TOTAL WEIGHT			(Ton)	**0**	**0**	**0**	**0.787**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

BAÛNG KHOÛI LÖÔÛNG
TABLE B.2.6 (2) BREAKDOWN OF QUANTITIES

HAÛNG MUÏC : TRAÏM BÔM BEÛN MEÏ COÏC
ITEM : BEN MEÏ COÏC PUMP STATION
CONG TAÏC : CT. ÑAÏT, COÏC, BT, VAÙN KHUOÂN
WORK : EARTHWORK, PILING, CONCRETE,

Mo ta Description	K.H SIGN	KHOI LUONG QUANTITY					CT.NAT, COC PILING , EARTH WORK				BE TONG & VAN KHUON CONCRETE & FORMWORK							
		L	W	H	n	TOTAL	PL	EW1	EW2	EW3	CF1	CF2	CC1	CB1	CS	FF	FC	FB
A. Cong tac ñat - EARTH WORK (m3)																		
Nao ñat ho mong - Excavation for footings																		
- M1 (8No)	EW1	2.60	1.80	2.25	8.0	84.24		84.24										
- M2 (4No)(GUARD HOUSE	EW1	1.70	1.70	2.25	4.0	26.01		26.01										
Nap va ñam ñat nen nha- Fill and compact soil base (m3)																		
	EW2	16.00	6.00	0.20	1.0	19.20			19.20									
	EW2	4.00	4.00	0.20	1.0	3.20			3.20									
Tam nhöa Polyethylene - Polyethylene Sheet (m2)																		
	EW3	16.00	6.00	1.00	1.0	96.00				96.00								
	EW3	4.00	4.00	1.00	1.0	16.00				16.00								
C. Cöø tram - WOODEN PILES (No.)																		
Cöø tram d=80~100, L=5m, 25piles/m2 - Wooden piles (No)																		
- M1 (8 No)	PL	2.60	1.80	25.00	8	936.00	936.00											
- M2 (4 No)	PL	1.70	1.70	25.00	4	289.00	289.00											
A. Be tong - Concrete																		
Be tong lot, mac 100, ña 4x6																		
Lean concrete garde 100, stone 40x60 (CF1)																		
- M1 (8 No)	CF1	2.80	2.00	0.10	8	4.48					4.48							
- M2 (4 No)	CF1	1.90	1.90	0.10	4	1.44					1.44							
- Ground slab	CF1	16.60	6.00	0.10	1	9.96					9.96							
	CF1	3.80	3.80	0.10	1	1.44					1.44							
Be tong mac 300, ña 1x2 - Concrete garde 300, stone 10x20 (CC1)																		
Mong - Footing(m3)																		
-M1 (8 No.)	CF2	2.40	1.60	0.25	8	7.68						7.68						
	CF2	0.42	1.00	1.00	8	3.36						3.36						
-M2 (4 No)._ (GUARD HOUS	CF2	1.50	1.50	0.20	4	1.80						1.80						
	CF2	0.20	1.50	0.10	4	0.12						0.12						
Ña kieng - Ground beam (m3)																		
DK1(2No)	CB1	15.10	0.20	0.60	2	3.62								3.62				
DK2(3No)	CB1	5.70	0.20	0.45	2	1.03								1.03				
DK3(1No)	CB1	5.70	0.20	0.20	2	0.46								0.46				
DK1a, DM1a (2No)(GUARD H	CB1	4.00	0.20	0.30	4	0.96								0.96				
DK2a (2No)(GUARD HOUSE	CB1	3.00	0.20	0.30	2	0.36								0.36				
DM2a (2No)(GUARD HOUSE	CB1	4.80	0.20	0.30	2	0.58								0.58				
Cot - Columns (m3)																		
C1(8No)	CC1	0.30	0.30	4.45	8	3.20							3.20					
C2 (4No)(GUARD HOUSE)	CC1	0.20	0.20	3.05	4	0.49							0.49					
BT (5No)	CC1	0.20	0.20	3.70	5	0.74							0.74					
BTM (4No)	CC1	0.20	0.20	0.70	4	0.11							0.11					
BTM1 (2No)(GUARD HOUSE	CC1	0.20	0.20	0.50	2	0.04							0.04					
Ña - Beam (m3)																		
Be tong mac 300, ña 1x2																		
Concrete garde 300, stone 10x20																		
DM1(2No)	CB1	15.10	0.20	0.60	2	3.62								3.62				
DM2(4No)	CB1	5.50	0.30	0.40	4	2.64								2.64				
	CB1	0.95	0.30	0.40	4	0.46								0.46				
DG1 (4No)	CB1	8.80	0.20	0.20	4	1.41								1.41				
DG1a (2No) (GUARD HOUSE	CB1	5.80	0.20	0.20	4	0.93								0.93				
Ña lanh to - Lintels																		
- D11 (3 N0.)	CB1	1.30	0.20	0.20	3	0.16								0.16				
- D12 (2 No)	CB1	1.15	0.20	0.10	2	0.05								0.05				
- D13 (3 No)	CB1	1.05	0.20	0.10	3	0.06								0.06				
- D14 (1 No)	CB1	1.30	0.20	0.10	1	0.03								0.03				
- W11 (1 No)	CB1	4.80	0.20	0.20	1	0.19								0.19				
- W12 (6 No)	CB1	2.40	0.20	0.20	6	0.58								0.58				
- W13 (3 No)	CB1	1.00	0.20	0.10	3	0.06								0.06				
Nen																		
	CS	15.60	6.00	0.15	1	14.04									14.04			
	CS	3.80	3.80	0.15	1	2.17									2.17			
B. Van khuon - Formwork																		
1. Mong																		
-M1 (8 No.)	FF	8.00	1.00	0.25	8	16.00										16.00		
-M2 (4 No)._ (GUARD HOUS	FF	1.50	1.50	0.20	4	1.80										1.80		
2. Ña kieng																		
DK1(2No)	FB	30.20	1.00	0.60	2	36.24												36.24
DK2(2No)	FB	11.40	1.00	0.45	3	15.39												15.39
DK3(1No)	FB	11.40	1.00	0.20	1	2.28												2.28
DK1a, DM1a (2No)(GUARD H	FB	8.00	1.00	0.30	1	2.40												2.40
DK2a (2No)(GUARD HOUSE	FB	6.00	1.00	0.30	1	1.80												1.80
3. Cot - Columns (m2)																		
C1(8No)	FC	1.00	1.20	4.45	8	42.72											42.72	
C2 (4No)(GUARD HOUSE)	FC	1.00	0.80	3.05	4	9.76											9.76	
BT (5No)	FC	1.00	0.80	3.70	5	14.80											14.80	
BTM (4No)	FC	1.00	0.80	0.70	4	2.24											2.24	
BTM1 (2No)(GUARD HOUSE	FC	1.00	0.80	0.50	2	0.80											0.80	

Mo ta Description	K.H SIGN	KHOI LOONG QUANTITY					CT.NAT, COC PILING , EARTH WORK				BE TONG & VAN KHUON CONCRETE & FORMWORK							
		L	W	H	n	TOTAL	PL	EW1	EW2	EW3	CF1	CF2	CC1	CB1	CS	FF	FC	FB
4. Na - Beam (m2)																		
DM1 (2No)	FB	15.10	1.40	1.00	2	42.28												42.28
DM2 (4No)	FB	5.50	1.10	1.00	4	24.20												24.20
	FB	0.95	1.10	1.00	4	4.18												4.18
DG1 (4No)	FB	8.80	0.60	1.00	4	21.12												21.12
DG1a (2No) (GUARD HOUSE	FB	5.80	0.60	1.00	4	13.92												13.92
Na lanh to - Lintels																		
- W11 (1 No)	CB1	4.80	0.60	1.00	1	2.88								2.88				
- W12 (6 No)	CB1	2.40	0.60	1.00	6	8.64								8.64				
- W13 (3 No)	CB1	1.00	0.40	1.00	3	1.20								1.20				
- D11 (3 N0.)	FB	1.30	0.60	1.00	3	2.34												2.34
- D12 (2 No)	FB	1.15	0.40	1.00	2	0.92												0.92
- D13 (3 No)	FB	1.05	0.40	1.00	3	1.26												1.26
- D14 (1 No)	FB	1.30	0.40	1.00	1	0.52												0.52
	TOTAL						1225.00	110.25	22.40	112.00	17.33	12.96	4.58	29.90	16.21	17.80	70.32	168.85

MO TA - DESCRIPTION	K. HIEU SIGN	Ñ. VÒ UNIT	Khoi löông Quantity
Cöø tram L= 5m Wooden pile	WP	m	1225.00
Ñao mong, lap ñat ho mong Excavation and backfill soil for footings	EW1	m3	110.25
Ñap va ñam ñat nen nha Fill and compact soil base	EW2	m3	22.40
Tam nhöa Polyethylene Polyethylene sheet	EW3	m2	112.00
Be tong lot , mac 100, ña 4x6 Lean concrete, garde 100, stone 40x60	CF1	m3	17.33
Be tong mong mac 300, ña 4x6 Concrete garde 300, stone 10x20 - Footings	CF2	m3	12.96
Be tong cot mac 300, ña 1x2 Concrete garde 300, stone 10x20 - Coloumns	CC1	m3	4.58

MO TA - DESCRIPTION	KY HIEU SIGN	ÑÔN VÒ UNIT	Khoi löông Quantity
Be tong ña mac 300, ña 1x2 Concrete garde 300, stone 10x20 - Beams	CB1	m3	29.90
Be tong san mac 300, ña 4x6 Slab concrete garde 300, stone 10x20 - Slab	CS	m3	16.21
Van khuon mong Formwork - Footings	FF	m2	17.80
Van khuon cot Formwork - Columns	FC	m2	70.32
Van khuon ña Formwork - Beams	FB	m2	168.85

BAÛNG KHOÛI LÖÔÛNG

TABLE 2.6 (3) BREAKDOWN OF QUANTITIES

HAÏNG MUÏC : TRAÏM BÔM BEN MEÌ COÏC
ITEM : BEN MEÌ COC PUMP STATION
CONG TAC : XAY TO, MAÏI, CÖA, HOAN THIEN
WORK : BRICKWORK, ROOFING, DOOR&WINDOWS, FINISHES

Mo ta Description	K.H SIGN	KHOÛI LÖÔÛNG - QUANTITY L	W	H	n	TOTAL	XAY TÖÔÛNG BRICK WALL BR1	BR2	MAÏI ROOFING RF1	RF2	RF3	RF4	RF5	CÖA VAÏ CÖA SOÅ DOORS AND WINDOWS DR1	DR2	DR3	WD1	WD2	HOAN THIEN FINISHES PL1	PL2	CL1	CL2	CL3	FR1	FR2	WL1	WL2
A. Xay töông - Brickwork																											
BR1: day 200mm, BR2: day 100mm (m2)																											
BR1: 190mm thick, BR2:90mm thick																											
- Truc - Gridline 1,4	BR1	5.10	1.00	3.7	2	37.74	37.74																				
	BR1	3.00	1.00	0.5	4	5.40	5.40																				
W11	BR1	4.00	1.00	1.2	-1	-4.80	-4.80																				
W12	BR1	2.00	1.00	1.2	-1	-2.40	-2.40																				
- Truc - Gridline 2	BR2	10.40	1.00	3.7	1	38.48		38.48																			
D11	BR1	0.90	1.00	2.2	-1	-1.98	-1.98																				
- Truc - Gridline 3'	BR1	5.80	1.00	3.7	1	21.46	21.46																				
D11	BR1	0.90	1.00	2.2	-1	-1.98	-1.98																				
- Truc - Gridline A,B	BR1	14.90	1.00	3.7	2	110.26	110.26																				
D11	BR1	0.90	1.00	2.2	-1	-1.98	-1.98																				
W12	BR1	2.00	1.00	1.2	-5	-12.00	-12.00																				
- Truc - Gridline B'	BR2	2.10	1.00	3.7	2	15.54		15.54																			
D12	BR2	0.80	1.00	2.2	-1	-1.76		-1.76																			
D13	BR2	0.60	1.00	2.0	-2	-2.40		-2.40																			
A'. Xay töông - Brickwork (GUARD HOUSE)																											
- Truc - Gridline 1,2	BR2	8.40	1.00	3.1	2	51.24		51.24																			
	BR2	1.50	1.00	0.4	4	2.10		2.10																			
D12	BR2	0.80	1.00	2.2	-1	-1.76		-1.76																			
D14	BR2	0.90	1.00	2.2	-1	-1.98		-1.98																			
- Truc - Gridline A,B	BR2	3.80	1.00	3.1	2	23.18		23.18																			
W12	BR2	0.60	1.00	0.6	-1	-0.36		-0.36																			
B. Mai - Roofing																											
Tam lôp mai Spandek (BHP) - Spandek Hi-ten roofsheet (BHP) (m2) - RF1																											
	RF1	18.34	8.34	1.00	1	152.96			152.96																		
Xa go thep C203x71x1.5 - Purlin (BHP) (m) - RF2																											
	RF2	18.34	1.00	1.00	10	183.40				183.40																	
Mang xoi treo (BHP) - Eave gutter (BHP) (m) - RF3																											
	RF3	18.34	1.00	1.00	2	36.68					36.68																
Ong xoi - Down spout 72x105 (BHP) - RF4																											
	RF4	5.17	1.00	1.00	4	20.68						20.68															
Flashing H=400 (m)																											
	RF5	18.34	1.00	1.00	2	36.68							36.68														
	RF5	8.34	1.00	1.00	2	16.68							16.68														
B'. Mai - Roofing (GUARD HOUSE)																											
Tam lôp mai Spandek (BHP) - Spandek Hi-ten roofsheet (BHP) (m2) - RF1																											
	RF1	6.34	5.34	1.00	1	33.86			33.86																		
Xa go thep C203x71x1.5 - Purlin (BHP) (m) - RF2																											
	RF2	6.34	1.00	1.00	7	44.38				44.38																	
Mang xoi treo (BHP) - Eave gutter (BHP) (m) - RF3																											
	RF3	6.34	1.00	1.00	2	12.68					12.68																
Ong xoi - Down spout 72x105 (BHP) - RF4																											

Mo ta Description	K.H SIGN	KHOI LÖÔNG - QUANTITY					XAY TÖÔNG BRICK WALL		MAI ROOFING					CÖA VAI CÖA SO DOORS AND WINDOWS					HOAN THIEN FINISHES								
		L	W	H	n	TOTAL	BR1	BR2	RF1	RF2	RF3	RF4	RF5	DR1	DR2	DR3	WD1	WD2	PL1	PL2	CL1	CL2	CL3	FR1	FR2	WL1	WL2
	RF4	4.42	1.00	1.00	4	17.68						17.68															
Flashing H=400																											
	RF5	6.34	1.00	1.00	4	25.36							25.36														
C. To trat - Plastering (m2)																											
Trat töông day 20mm - 20mm thick cement/sand plastering on wall																											
- Töông 190mm - 190mm thick wal																											
= BR1X2	PL1	149.72	1.00	1.00	2	299.44													299.44								
- Töông 90mm - 90mm thick wall																											
= BR2X2	PL1	122.28	1.00	1.00	2	244.56													244.56								
Trat cot day 20mm - 20mm thick cement/sand plastering on columns																											
- C1 (8 No.)	PL2	1.00	0.90	3.10	8	22.32														22.32							
BTM(4No)	PL2	1.00	0.40	0.70	4	1.12														1.12							
Trat cot day 20mm - 20mm (GUARD HOUSE)																											
- C2 (4 No.)	PL2	1.00	0.60	2.75	4	6.60														6.60							
BTM(4No)	PL2	1.00	0.40	0.50	2	0.40														0.40							
Trat dam day 20mm																											
DM1 (2No)	PL2	15.10	1.00	1.20	2	36.24														36.24							
DM2 (4No)	PL2	5.50	1.00	0.80	4	17.60														17.60							
	PL2	0.95	1.00	1.10	4	4.18														4.18							
DG1 (4No)	PL2	8.80	1.00	0.40	4	14.08														14.08							
DG1a (2No) (GUARD HOU	PL2	5.80	1.00	0.40	4	9.28														9.28							
D. Cöa vai cöa so (m2)																											
Cöa so nhom kính Aluminium windows glass																											
- D11 (3 N0.)	DR1	0.90	1.00	2.20	3	5.94								5.94													
- D12 (2 No)	DR1	0.75	1.00	2.20	1	1.65								1.65													
Cöa nhöa Plastic doors																											
- D13 (3 No)	DR2	0.65	1.00	2.00	3	3.90									3.90												
Cöa sat kính Steel glass doors																											
- D14 (1 No)	DR3	0.90	1.00	2.20	1	1.98										1.98											
Cöa so nhom Aluminium window																											
- W11 (1 No)	WD1	4.80	0.60	1.00	1	2.88											2.88										
- W12 (6 No)	WD1	2.40	0.60	1.00	6	8.64											8.64										
Cöa so nhom bat Flash aluminium windows																											
- W13 (3 No)	WD2	1.00	0.40	1.00	3	1.20												1.20									
D. Hoan thien tran -Ceiling finishes (m2)																											
CL1- Tam tran villa - Villa board ceiling																											
CL2- Tam tran plaster board - Plasterboard ceiling																											
CL3- Tran thep treo Lysaght ceidek- Lysaght ceidek ceiling (BHP)																											
	CL1	1.80	3.00	1.00	1	5															5.40						
(GUARD HOUSE)	CL1	0.90	3.00	1.00	1	3															2.70						
	CL2	16.00	6.00	1.00	1	96																96.00					
	CL2	1.80	3.00	1.00	-1	-5																-5.40					
(GUARD HOUSE)	CL2	4.00	3.00	1.00	1	12																12.00					
	CL2	0.90	3.00	1.00	-1	-3																-2.70					
	CL3	52.00	1.00	1.00	1	52																	52.00				
(GUARD HOUSE)	CL3	19.00	1.00	1.00	1	19																	19.00				
D. Hoan thien san (m2)																											

Mo ta Description	K.H SIGN	KHOI LÖÔNG - QUANTITY					XAY TÖÔNG BRICK WALL		MAI ROOFING					CÖA VA CÖA SO DOORS AND WINDOWS					HOAN THIEN FINISHES								
		L	W	H	n	TOTAL	BR1	BR2	RF1	RF2	RF3	RF4	RF5	DR1	DR2	DR3	WD1	WD2	PL1	PL2	CL1	CL2	CL3	FR1	FR2	WL1	WL2
FR1- Gach ceramic 200x200 - Ceramic tile 200x200																											
FR2- Gach Quart - quart tile																											
	FR1	1.80	3.00	1.00	1	5																		5.40			
(GUARD HOUSE)	FR1	0.90	3.00	1.00	1	3																		2.70			
	FR2	16.00	6.00	1.00	1	96																			96.00		
	FR2	1.80	3.00	1.00	-1	-5																			-5.40		
(GUARD HOUSE)	FR2	4.00	3.00	1.00	1	12																			12.00		
	FR2	0.90	3.00	1.00	-1	-3																			-2.70		
D. Hoan thien töông (m2)																											
WL1- Gach ceramic 200x250 - Ceramic tile 200x250																											
WL2- Sôn nöôc - water paint																											
	WL1	1.80	1.00	2.00	4	14																				14.4	
	WL1	1.50	1.00	2.00	2	6																				6.0	
	WL1	3.00	1.00	2.00	2	12																				12.0	
Guard house	WL1	3.00	1.00	2.00	2	12																				12.0	
	WL1	0.90	1.00	2.00	4	7																				7.2	
- D13 (3 No)	WL1	0.65	1.00	2.00	-6	-8																				-7.8	
- D12 (2 No)	WL1	0.90	1.00	2.00	-2	-4																				-3.6	
- W13	WL1	0.60	1.00	0.60	-3	-1																				-1.1	
= PL1+PL2-WL1	WL2	584.82	1.00	1.00	1	585																					584.82
	TOTAL						149.72	122.28	186.81	227.78	49.36	38.36	78.7	7.59	3.90	1.98	11.52	1.20	544.00	111.82	8.10	99.90	71.00	8.10	99.90	39.1	584.82

MO TA - DESCRIPTION	K. HIEU	Ñ. VÒ UNIT	Khoi löông Quantity
Xay töông day 190 190 thick brick wall	BR1	m2	149.72
Xay töông day 90 90 thick brick wall	BR2	m2	122.28
Tam lôp mai Spandek (BHP) Spandek Hi-ten roofsheet (BHP)	RF1	m2	186.81
Xa go thep C203x76x1.5 (BHP) Purlin C203x76x1.5 (BHP)	RF2	m	227.78
Mang xoi treo (BHP) Eave gutter (BHP)	RF3	m	49.36
Ong xoi 72x105 (BHP) Down spout 72x105 (BHP)	RF4	m	38.36
Flasing H=400 (BHP)	RF5	m	78.72

MO TA - DESCRIPTION	KY HIE	ÑÔN VÒ	Khoi löông Quantity
Cöa nhom kính Aluminium glass doors	DR1	m2	7.59
Cöa sat kính Steel glass doors	DR2	m2	3.90
Cöa nhöa Plastic doors	DR3	m2	1.98
Cöa so nhom kính Aluminium windows glass	WD1	m2	11.52
Cöa so nhom bat kính trong Aluminium windows glass	WD2	m2	1.20
Trat töông, cot day 20mm 20mm thick cement/sandplastering on walls, coloumns	PL1	m2	544.00
Trat ña day 20mm 20mm thick cement/sandplastering on beam	PL2	m2	111.82
Tan tran villa Villa board ceiling	CL1	m2	8.10
Tam tran Plasterboard Plasterboard ceiling	CL2	m2	99.90
He thong tran thep treo (BHP) Lysaght cedek- Suspended steel ceiling system (BHP)	CL3	m2	71.00
Lat gach ceramic 200x200 Ceramic tile 200x200 on floor	FR1	m2	8.10
Lat gach quart Quart tile	FR2	m2	99.90
Op gach töông 200x250 Ceramic tile on 200x250 walls	WL1	m2	39.12
Tret ba va sôn 2 lôp len töông Apply admixture and 2 paint layers on walls	WL2	m2	584.82

TABLE B.2.7 WORK QUANTITIES OF GUARD HOUSE CONSTRUCTION

Table B.2.7 (1) Work Quantities of Guard House Construction (Reinforcing Bar)

Table B.2.7 (2) Work Quantities of Guard House Construction
(Earth Work, Pileing, Concrete and Forming)

Table B.2.7 (3) Work Quantities of Guard House Construction
(Brick Work, Roofing, Plastering and Finishing)

BAÛNG KHOÁI LÖÔÏNG

TABLE B.2.7 (1) BREAKDOWN OF QUANTITIES

HAÏNG MUÏC : NHAØ BAÛO VEÄ - TRAÏM BÔM BEN MEÏ COÏC
ITEM : GUARD HOUSE - BEN MEÏ COÏC PUMP STATION
COÂNG TAÙC : COÂT THEÙP
WORK : REINFORCEMENT

VÒ TRÍ	Ñ.K.	CHIEU DAI THANH - LENGTH OF BAR							SO THANH - NOS OF BAR				TONG CHIEU DAI - TOTAL LENGTH									
LOCATION	DIA.	1	2	3	4	8D	42D	TOTAL	L	a	n	TOTAL	6	8	10	12	14	16	18	20	22	25	28
Mong -Foundation																							
-M2 (4 No)																							
1	12	2.65	0.25					2.90	4	1	4	16				46.4							
2	6	0.25	0.25	0.25	0.25	2		1.10	1.35	0.2	4	28	30.8										
3	12	1.5	0.2	0.2				1.90	1.5	0.2	4	32				60.8							
4	12	1.5	0.2	0.2				1.90	1.5	0.2	4	32				60.8							
	GRANT TOTAL WEIGHT (Ton)							**0.16**	TOTAL LENGTH			(m)	30.8	0	0	108	0	0	0	0	0	0	0
	TONG TROÏNG LÖÔÏNG								UNIT WEIGHT			(Kg/m)	0.222	0.394	0.616	0.888	1.208	1.579	1.998	2.466	2.984	3.854	4.834
									TOTAL WEIGHT			(Ton)	**0.01**	**0**	**0**	**0.15**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Cot - Columns																							
-C2 (4No)																							
1	12	3.05						3.05	4	1	4	16				48.8							
2	6	0.15	0.15	0.15	0.15	2		0.70	2	0.1	4	80	56										
	6	0.15	0.15	0.15	0.15	2		0.70	1.05	0.2	4	20	14										
-Bo tru (2No)-sub column BTM1																							
1	12	0.7						0.70	4	1	2	8				5.6							
2	6	0.15	0.15	0.15	0.15	2		0.70	0.4	0.1	2	8	5.6										
	6	0.15	0.15	0.15	0.15	2		0.70	0.3	0.2	2	4	2.8										
	GRANT TOTAL WEIGHT (Ton)							**0.07**	TOTAL LENGTH			(m)	78.4	0	0	544	0	0	0	0	0	0	0
	TONG TROÏNG LÖÔÏNG								UNIT WEIGHT			(Kg/m)	0.222	0.394	0.616	0.888	1.208	1.579	1.998	2.466	2.984	3.854	4.834
									TOTAL WEIGHT			(Ton)	**0.02**	**0**	**0**	**0.05**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Ña Kieng, Ña mai - Ground and roof beams																							
DK1a,DM1a (4No)																							
1	16	4.2	0.25	0.25				4.70	2	1	4	8						37.6					
2	20	4.2	0.15	0.15				4.50	2	1	4	8								36			
3	6	0.15	0.15	0.25	0.25	2		0.90	2.1	0.15	4	56	50.4										
	6	0.15	0.15	0.25	0.25	2		0.90	2.1	0.2	4	44	39.6										
DK2a (2No)																							
1	16	3.2	0.25	0.25				3.70	2	1	2	4						14.8					
2	20	3.2	0.15	0.15				3.50	2	1	2	4								14			
3	6	0.15	0.15	0.25	0.25	2		0.90	1.6	0.15	2	22	19.8										
	6	0.15	0.15	0.25	0.25	2		0.90	1.6	0.2	2	16	14.4										

VÒ TRÍ	Ñ.K.	CHIEU DAI THANH - LENGTH OF BAR							SO THANH - NOS OF BAR				TONG CHIEU DAI - TOTAL LENGTH										
LOCATION	DIA.	1	2	3	4	8D	42D	TOTAL	L	a	n	TOTAL	6	8	10	12	14	16	18	20	22	25	28
DM2a (2No)																							
1	16	5.2	0.25	0.25				5.70	2	1	2	4						22.8					
2	20	5.2	0.15	0.15				5.50	2	1	2	4								22			
3	6	0.15	0.15	0.25	0.25	2		0.90	2.6	0.15	2	34	30.6										
	6	0.15	0.15	0.25	0.25	2		0.90	2.6	0.2	2	26	23.4										
DG1a (2No)																							
1	12	5.8	0.2	0.2				6.20	2	1	4	8				49.6							
2	12	5.8	0.1	0.1				6.00	2	1	4	8				48							
3	6	0.15	0.15	0.15	0.15	2		0.70	2.9	0.15	4	76	53.2										
	6	0.15	0.15	0.15	0.15	2		0.70	2.9	0.2	4	60	42										
Ña lanh to - Lintels																							
- D12 (1 No)	16	1.15	0.2	0.2				1.55	2	1	1	2						3.1					
	6	0.15				2		0.25	1.15	0.15	1	8	2										
- D13 (1 No)	16	1.05	0.2	0.2				1.45	2	1	1	2						2.9					
	6	0.15				2		0.25	1.45	0.15	1	10	2.5										
- D14 (1 No)	16	1.30	0.2	0.2		2		1.96	2	1	1	2						3.92					
	6	0.15				2		0.25	1.3	0.15	1	9	2.25										
- W12 (1 No)	16	2.40	0.2	0.2		2		3.06	4	1	1	4						12.24					
	6	0.15	0.15	0.15	0.15	2		0.70	2.4	0.15	1	16	11.2										
W13 (1 No)	16	1.00	0.2	0.2		2		1.66	2	1	1	2						3.32					
	6	0.15				2		0.25	1	0.15	1	7	1.75										
	GRANT TOTAL WEIGHT (Ton)							0.50	TOTAL LENGTH			(m)	293.1	0	0	97.6	0	100.68	0	72	0	0	0
	TONG TRONG LÖÔNG								UNIT WEIGHT			(Kg/m)	0.222	0.394	0.616	0.888	1.208	1.579	1.998	2.466	2.984	3.854	4.834
									TOTAL WEIGHT			(Ton)	0.07	0	0	0.09	0	0.16	0	0.18	0	0	0
Nen nhaø -Ground floor slab																							
	12	4.2						4.20	2.8	0.2	1	14				58.8							
	12	3.2						3.20	3.8	0.2	1	19				60.8							
	GRANT TOTAL WEIGHT (Ton)							0.11	TOTAL LENGTH			(m)	0	0	0	1196	0	0	0	0	0	0	0
	TONG TRONG LÖÔNG								UNIT WEIGHT			(Kg/m)	0.222	0.394	0.616	0.888	1.208	1.579	1.998	2.466	2.984	3.854	4.834
									TOTAL WEIGHT			(Ton)	0	0	0	0.106	0	0	0	0	0	0	0

BAÛNG KHOÁI LÖÔÏNG

TABLE B.2.7 (2) BREAKDOWN OF QUANTITIES

HAÏNG MUÏC : NHAØ BAÛO VEÄ - TRAÏM BÔM BEÅN MEÄ COÏC
ITEM : GUARD HOUSE - BEN MEÄ COÏC PUMP STATION
COÂNG TAÙC : CT. ÑAÁT, COÏC, BT, VAÙN KHUOÂN
WORK : EARTHWORK, PILING, CONCRETE, FORMWORK

Moâ taû Description	K.HIEÄU SIGN	KHOÁI LÖÔÏNG QUANTITY					CT.ÑAÁT, COÏC - PILING , EARTH WORK				BEÂ TOÂNG & VAÙN KHUOÂN CONCRETE & FORMWORK							
		L	W	H	n	TOTAL	PL	EW1	EW2	EW3	CF1	CF2	CC1	CB1	CS	FF	FC	FB
A. Coâng taùc ñaát - EARTH WORK (m3)																		
Ñaøo ñaát hoá moùng - Excavation for footings																		
- M2 (4No)	EW1	1.70	1.70	2.25	4.0	26.01		26.01										
Ñaép vaø ñaàm ñaát neàn nhaø- Fill and compact soil base (m3)																		
	EW2	4.00	4.00	0.20	1.0	3.20			3.20									
Taám nhöïa Polyethylene - Polyethylene Sheet (m2)																		
	EW3	4.00	4.00	1.00	1.0	16.00				16.00								
C. Cöø tram - WOODEN PILES (No.)																		
Cöø tram d=80~100, L=5m, 25piles/m2 - Wooden piles (No)																		
- M2 (4 No)	PL	1.70	1.70	25.00	4	289.00	289.00											
A. Beâ toâng - Concrete																		
Beâ toâng loùt, maùc 100, ñaù 4x6																		
Lean concrete garde 100, stone 40x60 (CF1)																		
- M2 (4 No)	CF1	1.90	1.90	0.10	4	1.44					1.44							
- Ground slab	CF1	3.80	3.80	0.10	1	1.44					1.44							
Beâ toâng maùc 300, ñaù 1x2 -																		
Moùng - Footing(m3)																		
-M2 (4 No).	CF2	1.50	1.50	0.20	4	1.80						1.80						
	CF2	0.20	1.50	0.10	4	0.12						0.12						
Coät - Columns (m3)																		
C2 (4No)	CC1	0.20	0.20	3.05	4	0.49							0.49					
BTM1 (2No)	CC1	0.20	0.20	0.50	2	0.04							0.04					
Ñaø - Beams (m3)																		
DK1a, DM1a (2No)	CB1	4.00	0.20	0.30	4	0.96								0.96				
DK2a (2No)	CB1	3.00	0.20	0.30	2	0.36								0.36				
DM2a (2No)	CB1	4.80	0.20	0.30	2	0.58								0.58				
DG1a (2No)	CB1	5.80	0.20	0.20	2	0.46								0.46				
Ñaø lanh toâ - Lintels																		
- D12 (1 No)	CB1	1.15	0.20	0.10	1	0.02								0.02				
- D13 (2 No)	CB1	1.05	0.20	0.10	2	0.04								0.04				
- D14 (1 No)	CB1	1.30	0.20	0.10	1	0.03								0.03				
- W12 (1 No)	CB1	2.40	0.20	0.20	1	0.10								0.10				
- W13 (1 No)	CB1	1.00	0.20	0.10	1	0.02								0.02				
Neàn																		
	CS	3.80	3.80	0.15	1	2.17									2.17			
B. Vaùn khuoân - Formwork																		
1. Moùng - Footing																		
-M2 (4 No).	FF	6.00	1.00	0.20	4	4.80										4.80		
2. Ñaø - Beam																		
DK1a, DM1a (2No)	FB	8.00	0.80	1.00	1	6.40												6.40
DK2a (2No)	FB	6.00	0.80	1.00	1	4.80												4.80
DM2a (2No)	FB	4.80	0.80	1.00	2	7.68												7.68
DG1a (2No)	FB	5.80	0.60	1.00	2	6.96												6.96
Ñaø lanh toâ - Lintels																		
- W12 (1 No)	FB	2.40	0.60	1.00	1	1.44												1.44
- W13 (1 No)	FB	1.00	0.60	1.00	3	1.80												1.80
- D12 (1 No)	FB	1.15	0.40	1.00	1	0.46												0.46
- D13 (1 No)	FB	1.05	0.40	1.00	1	0.42												0.42
- D14 (1 No)	FB	1.30	0.40	1.00	1	0.52												0.52
3. Coät - Columns (m2)																		
C2 (4No)	FC	1.00	0.80	3.05	4	9.76											9.76	
BTM1 (2No)	FC	1.00	0.80	0.50	2	0.80											0.80	
	TOTAL						289.00	26.01	3.20	16.00	2.89	1.92	0.53	2.57	2.17	4.80	10.56	30.48

MOÂ TAÛ - DESCRIPTION	K. HIEU	Ñ. VÒ UNIT	Khoái löôïng Quantity
Cöø tram L= 5m Wooden pile	WP	No	289.00
Ñaøo moùng, lap ñaát hoá moùng Excavation and backfill soil for footings	EW1	m3	26.01
Ñaép vaø ñaàm ñaát neàn nhaø Fill and compact soil base	EW2	m3	3.20
Taám nhöïa Polyethylene Polyethylene sheet	EW3	m2	16.00
Beâ toâng loùt , maùc 100, ñaù 4x6 Lean concrete, garde 100, stone 40x60	CF1	m3	2.89
Beâ toâng moùng maùc 300, ñaù 4x6 Concrete garde 300, stone 10x20 - Footings	CF2	m3	1.92
Beâ toâng coät maùc 300, ñaù 1x2 Concrete garde 300, stone 10x20 - Coloumns	CC1	m3	0.53

MOÂ TAÛ - DESCRIPTION	KY HIEU	ÑÔN VÒ	Khoái löôïng Quantity
Beâ toâng ñaù maùc 300, ñaù 1x2 Concrete garde 300, stone 10x20 -	CB1	m3	2.57
Beâ toâng saøn maùc 300, ñaù 4x6 Slab concrete garde 300, stone 10x20 -	CS	m3	2.17
Vaùn khuoân moùng Formwork - Footings	FF	m2	4.80
Vaùn khuoân coät Formwork - Columns	FC	m2	10.56
Vaùn khuoân ñaø Formwork - Beams	FB	m2	30.48

BAÛNG KHOÁI LÖÔÏNG

TABLE B.2.7 (3) BREAKDOWN OF QUANTITIES

HAÏNG MUÏC : NHAØ BAÛO VEÄ - TRAÏM BÔM BEN MEÏ COC
ITEM : GUARD HOUSE - BEN MEÏ COC PUMP STATION
CONG TAC : XAÂY TOÂ, MAÏI, CÖÛA, HOAØN THIEÄN
WORK : BRICKWORK, ROOFING, DOOR&WINDOWS, FINISHES

Moâ taû Description	K.HIEÄU SIGN	KHOÁI LÖÔÏNG - QUANTITY					XAÂY TOÂÏNG BRICK WALL		MAÏI ROOFING					CÖÛA VAØ CÖÛA SOÅ DOORS AND WINDOWS					HOAØN THIEÄN FINISHES								
		L	W	H	n	TOTAL	BR1	BR2	RF1	RF2	RF3	RF4	RF5	DR1	DR2	DR3	WD1	WD2	PL1	PL2	CL1	CL2	CL3	FR1	FR2	WL1	WL2
A. Xaây toâng - Brickwork																											
BR1: day 200mm, BR2: day 100mm (m2)																											
BR1: 190mm thick, BR2:90mm thick																											
- Truc - Gridline 1,2	BR2	8.40	1.00	3.1	2	51.24		51.24																			
	BR2	1.50	1.00	0.4	4	2.10		2.10																			
D12	BR2	0.80	1.00	2.2	-1	-1.76		-1.76																			
D14	BR2	0.90	1.00	2.2	-1	-1.98		-1.98																			
- Truc - Gridline A,B	BR2	3.80	1.00	3.1	2	23.18		23.18																			
W12	BR2	0.60	1.00	0.6	-1	-0.36		-0.36																			
B. Mai - Roofing																											
Tam lôp mai Spandek (BHP) - Spandek Hi-ten roofsheet (BHP) (m2) - RF1																											
	RF1	6.34	5.34	1.00	1	33.86			33.86																		
Xa go thep C203x71x1.5 - Purlin (BHP) (m) - RF2																											
	RF2	6.34	1.00	1.00	7	44.38				44.38																	
Mang xoi treo (BHP) - Eave gutter (BHP) (m) - RF3																											
	RF3	6.34	1.00	1.00	2	12.68					12.68																
Ong xoi - Down spout 72x105 (BHP) - RF4																											
	RF4	4.42	1.00	1.00	4	17.68						17.68															
Flashing H=400																											
	RF5	6.34	1.00	1.00	4	25.36							25.36														
C. Toâ trat - Plastering (m2)																											
Trat toâng day 20mm - 20mm thick cement/sand plastering on wall																											
- Toâng 90mm - 90mm thick wall																											
= BR2X2	PL1	72.42	1.00	1.00	2	144.84													144.84								
Trat cot day 20mm - 20mm																											
- C2 (4 No.)	PL2	1.00	0.60	2.75	4	6.60														6.60							
BTM(2No)	PL2	1.00	0.40	0.50	2	0.40														0.40							
Trat dam day 20mm																											
DM1a (2No)	PL2	4.20	0.80	1.00	2	6.72														6.72							
DM2a (2No)	PL2	5.20	0.80	1.00	2	8.32														8.32							
DG1a (2No) (GUARD HOUS	PL2	5.80	1.00	0.40	2	4.64														4.64							
D. Cöa vaø cöa soå (m2)																											
Cöa so nhom kính Aluminium windows glass																											
- D12 (1 No)	DR1	0.75	1.00	2.20	1	1.65								1.65													
Cöa nhöa Plastic doors																											
- D13 (1 No)	DR3	0.65	1.00	2.00	1	1.30										1.30											
Cöa sat kính Steel glass doors																											
- D14 (1 No)	DR2	0.90	1.00	2.20	1	1.98									1.98												
Cöa so nhom Aluminium window																											
- W12 (1 No)	WD1	2.00	1.20	1.00	1	2.40											2.40										
Cöa so nhom bat Flash aluminium windows																											
- W13 (1 No)	WD2	0.60	0.60	1.00	1	0.36												0.36									

Mo ta Description	K.H SIGN	KHOI LÖÔNG - QUANTITY					XAY TÖÔNG BRICK WALL		MAI ROOFING					CÖA VA CÖA SO DOORS AND WINDOWS					HOAN THIEN FINISHES							
		L	W	H	n	TOTAL	BR1	BR2	RF1	RF2	RF3	RF4	RF5	DR1	DR2	DR3	WD1	WD2	PL1	PL2	CL1	CL2	CL3	FR1	FR2	WL1	WL2
D. Hoan thien tran -Ceiling finishes (m2)																											
CL1- Tam tran villa - Villa board ceiling																											
CL2- Tam tran plaster board - Plasterboard ceiling																											
CL3- Tran thep treo Lysaght ceidek- Lysaght ceidek ceiling (BHP)																											
	CL1	0.90	3.00	1.00	1	3															2.70						
	CL2	4.00	3.00	1.00	1	12																12.00					
	CL2	0.90	3.00	1.00	-1	-3																-2.70					
	CL3	19.00	1.00	1.00	1	19																	19.00				
D. Hoan thien san (m2)																											
FR1- Gach ceramic 200x200 - Ceramic tile 200x200																											
FR2- Gach Quart - quart tile																											
	FR1	0.90	3.00	1.00	1	3																		2.70			
	FR2	4.00	3.00	1.00	1	12																			12.00		
	FR2	0.90	3.00	1.00	-1	-3																			-2.70		
D. Hoan thien töông (m2)																											
WL1- Gach ceramic 200x250 - Ceramic tile 200x250																											
WL2- Sôn nöôc - water paint																											
	WL1	3.00	1.00	2.00	2	12																				12.0	
	WL1	0.90	1.00	2.00	4	7																				7.2	
- D13 (1 No)	WL1	0.65	1.00	2.00	-2	-3																				-2.6	
- D12 (1 No)	WL1	0.90	1.00	2.00	-1	-2																				-1.8	
- W13	WL1	0.60	1.00	0.60	-1	0																				-0.4	
= PL1+PL2-WL1	WL2	152.52	1.00	1.00	1	153																					152.52
	TOTAL						0.00	72.42	33.86	44.38	12.68	17.68	25.4	1.65	1.98	1.30	2.40	0.36	144.84	26.68	2.70	9.30	19.00	2.70	9.30	14.4	152.52

MO TA - DESCRIPTION	K. HIEU	Ñ. VÒ UNIT	Khoi löông Quantity
Xay töông day 190 190 thick brick wall	BR1	m2	0.00
Xay töông day 90 90 thick brick wall	BR2	m2	72.42
Tam lôp mai Spandek (BHP) Spandek Hi-ten roofsheet (BHP)	RF1	m2	33.86
Xa go thep C203x76x1.5 (BHP) Purlin C203x76x1.5 (BHP)	RF2	m	44.38
Mang xoi treo (BHP) Eave gutter (BHP)	RF3	m	12.68
Ong xoi 72x105 (BHP) Down spout 72x105 (BHP)	RF4	m	17.68
Flasing H=400 (BHP)	RF5	m	25.36

MO TA - DESCRIPTION	KY HIEU	ÑÔN VÒ	Khoi löông Quantity
Cöa nhom kính Aluminium glass doors	DR1	m2	1.65
Cöa sat kính Steel glass doors	DR2	m2	1.98
Cöa nhöa Plastic doors	DR3	m2	1.30
Cöa so nhom kính Aluminium windows glass	WD1	m2	2.40
Cöa so nhom bat kính trong Aluminium windows glass	WD2	m2	0.36
Trat töông, cot day 20mm 20mm thick cement/sand plastering on walls, coloumns	PL1	m2	144.84
Trat ña day 20mm 20mm thick cement/sand plastering on beam	PL2	m2	26.68
Tan tran villa Villa board ceiling	CL1	m2	2.70
Tam tran Plasterboard Plasterboard ceiling	CL2	m2	9.30
He thong tran thep treo (BHP) Lysaght cedek- Suspended steel ceiling system (BHP)	CL3	m2	19.00
Lat gach ceramic 200x200 Ceramic tile 200x200 on floor	FR1	m2	2.70
Lat gach quart Quart tile	FR2	m2	9.30
Op gach töông 200x250 Ceramic tile on 200x250 walls	WL1	m2	14.44
Tret ba va sôn 2 lôp len töông Apply admixture and 2 paint layers on walls	WL2	m2	152.52

TABLE B.2.8 MECHANICAL EQUIPMENT LIST OF BEN ME COC (1) PUMPING STATION (PHASE I)

	No.	Name	Model	Spec	Q'ty	Remarks
3.6.1 Mechanical Equipment	3.6.1.1	Main pump	Submersible motor pump	400mm dia. x 0.35m3/s x 3.7m	2	
	3.6.1.2	Pipework	Steel made	400 to 600mm dia.	2	
	3.6.1.3	Flap valve	Steel made single door	600mm dia.	2	
	3.6.1.4	Inlet gate	Steel made	1.4m W x 1.4m H	1	
	3.6.1.5	Bypass gate	Steel made	2.0m W x 2.0m H	1	
	3.6.1.6	Outlet gate	Steel made	2.0m W x 2.0m H	1	
	3.6.1.7	Flap gate	Steel made	1.5m dia.	1	
	3.6.1.8	Control gate	Steel made	1.5m W x 1.8m H	2	
	3.6.1.9	Inlet gate (1)	Steel made	1.4m W x 1.4m H	1	
	3.6.1.10	Stop logs	Wooden made	2.6m W	8	
	3.6.1.11	Bar screen	Steel made	Bar pitch: 25mm	1	
	3.6.1.12	Pump lifting device	Steel made	1ton	1	
	3.6.1.13	Flap gate for sewer outlet	Steel made	0.9m dia.	2	
	3.6.1.14	Flap gate for sewer outlet	Steel made	1.0m dia.	2	
	3.6.1.15	Flap gate for sewer outlet	Steel made	1.2m dia.	3	
	3.6.1.16	Flap gate for sewer outlet	Steel made	1.5m dia.	2	
	3.6.1.17	Flap gate for sewer outlet	Steel made	1.8m dia.	1	
	3.6.1.19	Spare parts			1lot	

TABLE B.2.9 (1/4) ELECTRICAL WORK QUANTITIES OF BEN ME COC (1) PUMPING STATION

Item		Description	Specification	Q'ty	unit
A		Electrical Equipment			
A-1		Distribution Panel	Outdoor type	1	unit
A-2		Pump and Gate Control Panel	Outdoor type	2	units
A-3		Gate Control Panel	Outdoor type	1	unit
A-4		Switch Box	Outdoor type	5	unit
A-5		Mechanical anchor	M8	20	pcs
A-6		Mechanical anchor	M10	16	pcs
A-7		Grip anchor	M12	24	pcs
A-8		Grip anchor	M16	50	pcs
A-9		Concrete anchor plug	M6	3	pcs
A-10		Silicon seal		1	pcs
A-12		Checker plate	t=3.2	1.0	m2
A-13		Plaster board	t=9.2	1.0	m2
A-14		Cable entrance seal		5	kg
A-15		Heat protect seal		5	kg
B		Instrumentation Equipment			
B-1		Submerged Diaphram Type Level Meter		1	sets
B-2		Electrode Type Level Contorol Switch		2	sets
B-3		Mechanical anchor	M10	20	pcs
B-4		Silicon seal		1	pcs
B-5		Cable entrance seal		2	kg
B-6		Heat protect seal		2	kg
C		Cable and wiring materials			
C-1		Power Cable			
	1	600V Power Cable	CV 3C- 3.5sqmm	240	m
	2	600V Power Cable	CV 3C- 5.5sqmm	90	m
	3	600V Power Cable	CV 4C- 8sqmm	50	m
	4	600V Power Cable	CV 4C- 38sqmm	50	m
	5	600V Power Cable	CV 3C-100sqmm	100	m
	6	600V Power Cable	CV 1C-250sqmm	60	m
	7	600V Power Cable	CV-MAZV 3C-38sq	550	m
	8	600V Cable termination	CV 4C- 38sqmm	2	sets
	9	600V Cable termination	CV 3C-100sqmm	4	sets
	10	600V Cable termination	CV 1C-250sqmm	12	sets
	11	termina	3.5sqmm-4	50	pcs
	12	termina	3.5sqmm-6	50	pcs
	13	termina	3.5sqmm-10	50	pcs
	14	termina	5.5sqmm-4	50	pcs
	15	termina	5.5sqmm-6	50	pcs
	16	termina	5.5sqmm-10	50	pcs
	17	termina	8sqmm-5	12	pcs
	18	termina	8sqmm-10	12	pcs
	19	termina	38sqmm-8	12	pcs
	20	termina	38sqmm-10	12	pcs
	21	termina	38sqmm-12	12	pcs
C-2		Control Cable			
	1	Control Cable	CVVS 3.5- 2C	85	m
	2	Control Cable	CVVS 3.5- 6C	290	m
	3	Control Cable	CVVS 3.5- 15C	50	m
	4	Control Cable	CVVS-MAZV3.5- 20C	550	m
	5	termina	3.5sqmm-4	300	pcs
	6	termina	3.5sqmm-6	300	pcs
	7	termina	3.5sqmm-10	300	pcs

TABLE B.2.9 (2/4) ELECTRICAL WORK QUANTITIES OF BEN ME COC (1) PUMPING STATION

Item		Description	Specification	Q'ty	unit
C-3		Piping Materials			
	1	Flexible Polyethylen Pipe (FEP)	FEP 30φ	60	m
	2	Flexible Polyethylen Pipe (FEP)	FEP 50φ	60	m
	3	Flexible Polyethylen Pipe (FEP)	FEP 100φ	120	m
	4	Flexible Polyethylen Pipe (FEP)	FEP 125φ	60	m
	5	Bell Mouth for FEP	for FEP 30φ	6	pcs
	6	Bell Mouth for FEP	for FEP 50φ	6	pcs
	7	Bell Mouth for FEP	for FEP 100φ	12	pcs
	8	Bell Mouth for FEP	for FEP 125φ	6	pcs
	9	Joint Connector for FEP	for FEP 30φ	5	pcs
	10	Joint Connector for FEP	for FEP 50φ	5	pcs
	11	Joint Connector for FEP	for FEP 100φ	5	pcs
	12	Joint Connector for FEP	for FEP 125φ	5	pcs
	13	Waterproof cap for FEP	for FEP 30φ	12	pcs
	14	Waterproof cap for FEP	for FEP 50φ	12	pcs
	15	Waterproof cap for FEP	for FEP 100φ	24	pcs
	16	Waterproof cap for FEP	for FEP 125φ	12	pcs
	17	Conduit pipe	G22	60	m
	18	Conduit pipe	G28	60	m
	19	Conduit pipe	G36	60	m
	20	Conduit pipe	G42	30	m
	21	Conduit pipe	G54	30	m
	22	Conduit pipe	G70	30	m
	23	Conduit pipe	G82	30	m
	24	Conduit pipe	G104	60	m
	25	Conduit pipe (Normal bend)	for G22	5	pcs
	26	Conduit pipe (Normal bend)	for G28	5	pcs
	27	Conduit pipe (Normal bend)	for G36	5	pcs
	28	Conduit pipe (Normal bend)	for G42	5	pcs
	29	Conduit pipe (Normal bend)	for G54	5	pcs
	30	Conduit pipe (Normal bend)	for G70	5	pcs
	31	Conduit pipe (Normal bend)	for G82	5	pcs
	32	Conduit pipe (Normal bend)	for G104	5	pcs
	33	Conduit pipe (Coupling)	for G22	10	pc
	34	Conduit pipe (Coupling)	for G28	10	pc
	35	Conduit pipe (Coupling)	for G36	10	pc
	36	Conduit pipe (Coupling)	for G42	10	pc
	37	Conduit pipe (Coupling)	for G54	10	pc
	38	Conduit pipe (Coupling)	for G70	10	pcs
	39	Conduit pipe (Coupling)	for G82	10	pcs
	40	Conduit pipe (Coupling)	for G104	10	pcs
	41	Conduit pipe (Lock nut)	for G22	10	pcs
	42	Conduit pipe (Lock nut)	for G28	10	pcs
	43	Conduit pipe (Lock nut)	for G36	10	pcs
	44	Conduit pipe (Lock nut)	for G42	10	pcs
	45	Conduit pipe (Lock nut)	for G54	10	pcs
	46	Conduit pipe (Lock nut)	for G70	10	pcs
	47	Conduit pipe (Lock nut)	for G82	10	pcs
	48	Conduit pipe (Lock nut)	for G104	10	pcs
	49	Conduit pipe (Bushing)	for G22	10	pcs
	50	Conduit pipe (Bushing)	for G28	10	pcs
	51	Conduit pipe (Bushing)	for G36	10	pcs
	52	Conduit pipe (Bushing)	for G42	10	pcs
	53	Conduit pipe (Bushing)	for G54	10	pcs
	54	Conduit pipe (Bushing)	for G70	10	pcs
	55	Conduit pipe (Bushing)	for G82	10	pcs
	56	Conduit pipe (Bushing)	for G104	10	pcs

TABLE B.2.9 (3/4) ELECTRICAL WORK QUANTITIES OF BEN ME COC (1) PUMPING STATION

Item		Description	Specification	Q'ty	unit
	57	Ducter	D2 (40x30x2500)	3	pcs
	58	Ducter clip	for G22	30	pcs
	59	Ducter clip	for G28	30	pcs
	60	Ducter clip	for G36	30	pcs
	61	Ducter clip	for G42	30	pcs
	62	Ducter clip	for G54	30	pcs
	63	Ducter clip	for G70	30	pcs
	64	Ducter clip	for G82	30	pcs
	65	Ducter clip	for G104	30	pcs
	66	Mechanical anchor	M10	50	pcs
	67	Concrete anchor plug	M6	100	pcs
	68	Flexible metal conduit pipe	24φ	20	m
	69	Flexible metal conduit pipe	30φ	20	m
	70	Flexible metal conduit pipe	38φ	20	m
	71	Flexible metal conduit pipe	50φ	20	m
	72	Flexible metal conduit pipe	63φ	20	m
	73	Flexible metal conduit pipe	76φ	20	m
	74	Flexible metal conduit pipe	83φ	20	m
	75	Flexible metal conduit pipe	101φ	20	m
	76	Conbination coupling	for 24φ-G22	10	pcs
	77	Conbination coupling	for 30φ-G28	10	pcs
	78	Conbination coupling	for 38φ-G36	10	pcs
	79	Conbination coupling	for 50φ-G42	10	pcs
	80	Conbination coupling	for 63φ-G54	10	pcs
	81	Conbination coupling	for 76φ-G70	10	pcs
	82	Conbination coupling	for 83φ-G82	10	pcs
	83	Conbination coupling	for 101φ-G104	10	pcs
	84	Box connector	for 24φ	20	pcs
	85	Box connector	for 30φ	20	pcs
	86	Box connector	for 38φ	20	pcs
	87	Box connector	for 50φ	20	pcs
	88	Box connector	for 63φ	20	pcs
	89	Box connector	for 76φ	20	pcs
	90	Box connector	for 83φ	20	pcs
	91	Box connector	for 101φ	20	pcs
	92	Bushing	for 24φ	20	pcs
	93	Bushing	for 30φ	20	pcs
	94	Bushing	for 38φ	20	pcs
	95	Bushing	for 50φ	20	pcs
	96	Bushing	for 63φ	20	pcs
	97	Bushing	for 76φ	20	pcs
	98	Bushing	for 83φ	20	pcs
	99	Bushing	for 101φ	20	pcs
	100	Suddle	for 24φ	50	pcs
	101	Suddle	for 30φ	50	pcs
	102	Suddle	for 38φ	50	pcs
	103	Suddle	for 50φ	50	pcs
	104	Suddle	for 63φ	50	pcs
	105	Suddle	for 76φ	50	pcs
	106	Suddle	for 83φ	50	pcs
	107	Suddle	for 101φ	50	pcs
	108	Pull Box	100x100	3	pcs
	109	Pull Box	200x200	2	pcs
	110	Pull Box	250x250	2	pcs
	111	Pull Box	400x400	8	pcs
	112	Hand hole	1200x1200x1200	4	pcs

TABLE B.2.9 (4/4) ELECTRICAL WORK QUANTITIES OF BEN ME COC (1) PUMPING STATION

Item		Description	Specification	Q'ty	unit
C-4		Earthing materials			
	1	IV wire	IV 2.0	100	m
	2	IV wire	IV 3.5	50	m
	3	IV wire	IV 5.5	50	m
	4	IV wire	IV 8	50	m
	5	IV wire	IV 14	50	m
	6	IV wire	IV 22	50	m
	7	IV wire	IV 38	50	m
	8	IV wire	IV 60	100	m
	9	IV wire	IV 100	200	m
	10	IV wire	IV 150	50	m
	11	T-type connector	38sqmm	50	pcs
	12	T-type connector	100sqmm	50	pcs
	13	T-type connector	150sqmm	50	pcs
	14	T-type connector	250sqmm	50	pcs
	15	T-type connector	400sqmm	50	pcs
	16	termina	2.0sqmm-4	200	pcs
	17	termina	2.0sqmm-6	200	pcs
	18	termina	2.0sqmm-8	200	pcs
	19	termina	3.5sqmm-4	200	pcs
	20	termina	3.5sqmm-6	200	pcs
	21	termina	3.5sqmm-10	200	pcs
	22	termina	5.5sqmm-4	200	pcs
	23	termina	5.5sqmm-6	200	pcs
	24	termina	5.5sqmm-10	200	pcs
	25	termina	8sqmm-5	100	pcs
	26	termina	8sqmm-10	100	pcs
	27	termina	14sqmm-5	100	pcs
	28	termina	14sqmm-10	100	pcs
	29	termina	14sqmm-12	100	pcs
	30	termina	22sqmm-6	100	pcs
	31	termina	22sqmm-10	100	pcs
	32	termina	22sqmm-12	100	pcs
	33	termina	38sqmm-8	100	pcs
	34	termina	38sqmm-10	100	pcs
	35	termina	38sqmm-12	100	pcs
	36	termina	60sqmm-8	100	pcs
	37	termina	60sqmm-10	100	pcs
	38	termina	60sqmm-12	100	pcs
	39	termina	100sqmm-10	100	pcs
	40	termina	100sqmm-12	100	pcs
	41	termina	100sqmm-20	100	pcs
	42	termina	150sqmm-10	100	pcs
	43	termina	150sqmm-12	100	pcs
	44	termina	150sqmm-20	100	pcs
	45	Earthing Rod	1500mmx16φ	40	pcs
	46	Earthing Plate	900x900x1.5t	2	pcs
	47	Earthing wire connection box	Concrete type	2	pcs
	48	Earthing rod embed sign pole		3	pcs
	49	Earthing terminal box	Outdoor type	1	pcs
D		Outdoor Lighting Equipment			
D-1		Streight Pole Head Type Lighting Fixture	N360W	4	sets
D-2		Outdoor lighting control panel		1	set
D-3		Mechanical anchor	M10	50	pcs
D-4		Silicon seal		3	pcs
D-5		Cable entrance seal		5	kg
D-6		Heat protect seal		5	kg

Table B.2.10 (1) Sewer Line : E1 (Diameter : 1000)

Bill of Quantity

Area : BM1 Pipe Diameter : 1000 Shoring Type : TIMBER

Sewer Line Name : E1 Foundation Type : T OK ! T

Manhole No. : M1 M14

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand	Backfill (m^3) Black Sand / Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type	Pipe Number Concrete	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N: Length (m) pipes	N: 4.00 m	L_2	L_3	W_2
M1	1.330	-0.378	1.71	0.45		2.15																		
M2	1.330	-0.400	1.73	0.45	2.10	2.18	2.17	22.00	1.20	20.80	100.26	0.00	100.26	31.03	46.20	22.64	37.98	39.64	100.26	5	0.80	20.80	22.00	0.00
M2	1.330	-0.400	1.73	0.45		2.18																		
M3	1.330	-0.422	1.75	0.45	2.10	2.20	2.19	22.00	1.20	20.80	101.18	0.00	101.18	31.03	46.20	22.64	37.98	40.56	101.18	5	0.80	20.80	22.00	0.00
M3	1.330	-0.422	1.75	0.45		2.20																		
M4	1.330	-0.457	1.79	0.45	2.10	2.23	2.22	35.00	1.20	33.80	163.17	0.00	163.17	50.43	73.50	36.02	61.72	65.44	163.17	8	1.80	33.80	35.00	0.00
M4	1.330	-0.457	1.79	0.45		2.23																		
M5	1.330	-0.490	1.82	0.45	2.10	2.27	2.25	33.00	2.00	31.00	155.93	0.00	155.93	46.25	69.30	33.96	56.61	65.36	155.93	7	3.00	31.00	33.00	0.00
M5	1.330	-0.490	1.82	0.45		2.27																		
M6	1.310	-0.518	1.83	0.45	2.10	2.27	2.27	28.00	2.00	26.00	133.48	0.00	133.48	38.79	58.80	28.81	47.48	57.19	133.48	6	2.00	26.00	28.00	0.00
M6	1.310	-0.518	1.83	0.45		2.27																		
M7	1.300	-0.547	1.85	0.45	2.10	2.29	2.29	29.00	2.00	27.00	139.47	0.00	139.47	40.28	60.90	29.84	49.31	60.32	139.47	6	3.00	27.00	29.00	0.00
M7	1.300	-0.547	1.85	0.45		2.29																		
M8	1.300	-0.575	1.88	0.45	2.10	2.32	2.31	28.00	2.00	26.00	135.83	0.00	135.83	38.79	58.80	28.81	47.48	59.54	135.83	6	2.00	26.00	28.00	0.00
M8	1.300	-0.575	1.88	0.45		2.32																		
M9	1.320	-0.605	1.93	0.45	2.10	2.37	2.35	30.00	2.00	28.00	148.05	0.00	148.05	41.78	63.00	30.87	51.12	66.06	148.05	7	0.00	28.00	30.00	0.00
M9	1.320	-0.605	1.93	0.45		2.37																		
M10	1.350	-0.637	1.99	0.45	2.10	2.43	2.41	32.00	2.00	30.00	161.96	0.00	161.96	44.76	67.20	32.93	54.78	74.25	161.96	7	2.00	30.00	32.00	0.00
M10	1.350	-0.637	1.99	0.45		2.43																		
M11	1.430	-0.669	2.10	0.45	2.10	2.54	2.49	32.00	2.00	30.00	167.33	0.00	167.33	44.76	67.20	32.93	54.78	79.62	167.33	7	2.00	30.00	32.00	0.00
M11	1.430	-0.669	2.10	0.45		2.54																		
M12	1.480	-0.695	2.18	0.45	2.10	2.62	2.59	26.00	2.00	24.00	141.42	0.00	141.42	35.81	54.60	26.75	43.82	70.85	141.42	6	0.00	24.00	26.00	0.00
M12	1.480	-0.695	2.18	0.45		2.62																		
M13	1.520	-0.722	2.24	0.45	2.10	2.69	2.66	27.00	2.00	25.00	150.83	0.00	150.83	37.30	56.70	27.78	45.65	77.40	150.83	6	1.00	25.00	27.00	0.00
M13	1.520	-0.722	2.24	0.45		2.69																		
M14	1.520	-0.749	2.27	0.45	2.10	2.71	2.71	27.00	2.00	25.00	153.66	0.00	153.66	37.30	56.70	27.78	45.65	80.23	153.66	6	1.00	25.00	27.00	0.00
M9	1.320	-0.605	1.93	0.45		2.37																		
OUTLET	1.520	-0.623	2.14	0.45	2.10	2.59	2.48	18.00	0.70	17.30	93.75	0.00	93.75	25.81	37.80	18.52	31.59	43.64	93.75	4	1.30	17.30	18.00	0.00
								389.00	24.30	364.70	1946.32	0.00	1946.32	544.12	816.90	400.28	665.95	880.09	1946.32	86	20.70	364.70	389.00	0.00

Concrete G : 145.1506 m3

Timber piles : 39212 m
8714 trees

Table B.2.10 (2) Sewer Line : E1 (Pipe Diameter : 1200)

Bill of Quantity

Area : BM1 Pipe Diameter : 1200 Shoring Type : TIMBER

Sewer Line Name : E1 Foundation Type : T OK ! T

Manhole No. : M14 M25

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream / Downstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.49	Yellow Sand Sand Backfill	Black Sand Sandy Soil Backfill		Type / Length (m)	Concrete 3.00		$_m$ 2.5	
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M14	1.520	-0.949	2.47	0.50		2.97														pipes	m			
M15	1.460	-0.978	2.44	0.50	2.60	2.94	2.96	29.00	1.20	27.80	223.19	0.00	223.19	60.91	75.40	36.95	72.09	114.15	223.19	9	0.80	27.80	29.00	0.00
M15	1.460	-0.978	2.44	0.50		2.94																		
M16	1.390	-1.005	2.40	0.50	2.60	2.90	2.92	27.00	1.20	25.80	204.99	0.00	204.99	56.53	70.20	34.40	66.90	103.69	204.99	8	1.80	25.80	27.00	0.00
M16	1.390	-1.005	2.40	0.50		2.90																		
M17	1.290	-1.035	2.33	0.50	2.60	2.83	2.86	30.00	1.20	28.80	223.08	0.00	223.08	63.10	78.00	38.22	74.68	110.18	223.08	9	1.80	28.80	30.00	0.00
M17	1.290	-1.035	2.33	0.50		2.83																		
M18	1.270	-1.065	2.34	0.50	2.60	2.84	2.83	30.00	1.20	28.80	220.74	0.00	220.74	63.10	78.00	38.22	74.68	107.84	220.74	9	1.80	28.80	30.00	0.00
M18	1.270	-1.065	2.34	0.50		2.84																		
M19	1.270	-1.095	2.37	0.50	2.60	2.87	2.85	30.00	1.20	28.80	222.30	0.00	222.30	63.10	78.00	38.22	74.68	109.40	222.30	9	1.80	28.80	30.00	0.00
M19	1.270	-1.095	2.37	0.50		2.87																		
M20	1.255	-1.125	2.38	0.50	2.60	2.88	2.88	30.00	1.20	28.80	224.64	0.00	224.64	63.10	78.00	38.22	74.68	111.74	224.64	9	1.80	28.80	30.00	0.00
M20	1.255	-1.125	2.38	0.50		2.88																		
M21	1.250	-1.155	2.41	0.50	2.60	2.91	2.90	30.00	1.20	28.80	226.20	0.00	226.20	63.10	78.00	38.22	74.68	113.30	226.20	9	1.80	28.80	30.00	0.00
M21	1.250	-1.155	2.41	0.50		2.91																		
M22	1.250	-1.185	2.44	0.50	2.60	2.94	2.92	30.00	1.20	28.80	227.76	0.00	227.76	63.10	78.00	38.22	74.68	114.86	227.76	9	1.80	28.80	30.00	0.00
M22	1.250	-1.185	2.44	0.50		2.94																		
M23	1.210	-1.218	2.43	0.50	2.60	2.93	2.94	33.00	1.20	31.80	252.26	0.00	252.26	69.67	85.80	42.04	82.46	127.76	252.26	10	1.80	31.80	33.00	0.00
M23	1.210	-1.218	2.43	0.50		2.93																		
M24	1.180	-1.253	2.43	0.50	2.60	2.93	2.94	35.00	1.20	33.80	267.54	0.00	267.54	74.06	91.00	44.59	87.64	135.31	267.54	11	0.80	33.80	35.00	0.00
M24	1.180	-1.253	2.43	0.50		2.93																		
M25	1.222	-1.288	2.51	0.50	2.60	3.01	2.98	35.00	2.10	32.90	271.18	0.00	271.18	72.08	91.00	44.59	85.31	141.28	271.18	10	2.90	32.90	35.00	0.00
M25	1.222	-1.288	2.51	0.50		3.01																		
OUTLET	1.490	-1.292	2.78	0.50	2.60	3.28	3.15	4.00	1.00	3.00	32.76	0.00	32.76	6.57	10.40	5.10	7.78	19.88	32.76	1	0.00	3.00	4.00	0.00
								343.00	15.10	327.90	2596.64	0.00	2596.64	718.42	891.80	436.98	850.26	1309.40	2596.64	103	18.90	327.90	343.00	0.00

Concrete G : 184.2798 m3

Timber piles : 41984 m

9330 trees

Table B.2.10 (3) Sewer Line : E1 (Pipe Diameter : 1500)

Bill of Quantity

Area : BM1 Pipe Diameter : 1500 Shoring Type : TIMBER

Sewer Line Name : E1 Foundation Type : T OK ! T

Manhole No. : M25 Mps

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 3.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M25	1.222	-1.588	2.81	0.54		3.35														pipes	m			
M26	1.300	-1.619	2.92	0.54	2.90	3.45	3.40	31.00	1.60	29.40	305.66	0.00	305.66	93.90	89.90	44.05	88.56	173.05	305.66	9	2.40	29.40	31.00	0.00
M26	1.300	-1.619	2.92	0.54		3.45																		
M27	1.360	-1.646	3.01	0.54	2.90	3.54	3.50	27.00	1.20	25.80	274.05	0.00	274.05	82.41	78.30	38.37	77.70	157.98	274.05	8	1.80	25.80	27.00	0.00
M27	1.360	-1.646	3.01	0.54		3.54																		
M28	1.440	-1.675	3.12	0.54	2.90	3.65	3.60	29.00	1.20	27.80	302.76	0.00	302.76	88.79	84.10	41.21	83.74	177.81	302.76	9	0.80	27.80	29.00	0.00
M28	1.440	-1.675	3.12	0.54		3.65																		
M29	1.450	-1.705	3.16	0.54	2.90	3.69	3.67	30.00	1.20	28.80	319.29	0.00	319.29	91.99	87.00	42.63	86.74	189.92	319.29	9	1.80	28.80	30.00	0.00
M29	1.450	-1.705	3.16	0.54		3.69																		
M30	1.430	-1.739	3.17	0.54	2.90	3.70	3.70	34.00	1.20	32.80	364.82	0.00	364.82	104.76	98.60	48.31	98.80	217.71	364.82	10	2.80	32.80	34.00	0.00
M30	1.430	-1.739	3.17	0.54		3.70																		
M31	1.400	-1.773	3.17	0.54	2.90	3.71	3.71	34.00	1.20	32.80	365.81	0.00	365.81	104.76	98.60	48.31	98.80	218.70	365.81	10	2.80	32.80	34.00	0.00
M31	1.400	-1.773	3.17	0.54		3.71																		
M32	1.580	-1.807	3.39	0.54	2.90	3.92	3.82	34.00	1.20	32.80	376.66	0.00	376.66	104.76	98.60	48.31	98.80	229.55	376.66	10	2.80	32.80	34.00	0.00
M32	1.580	-1.807	3.39	0.54		3.92																		
M33	1.820	-1.842	3.66	0.54	2.60	4.20	4.06	35.00	1.20	33.80	369.46	0.00	369.46	107.96	91.00	44.59	80.10	244.77	369.46	11	0.80	33.80	35.00	0.00
M33	1.820	-1.842	3.66	0.54		4.20																		
M34	1.902	-1.862	3.76	0.54	2.60	4.30	4.25	20.00	1.20	18.80	221.00	0.00	221.00	60.05	52.00	25.48	44.55	150.97	221.00	6	0.80	18.80	20.00	0.00
M34	1.902	-1.862	3.76	0.54		4.30																		
Mps	1.810	-1.900	3.71	0.54	2.60	4.25	4.28	38.00	1.60	36.40	422.87	0.00	422.87	116.26	98.80	48.41	86.27	288.19	422.87	12	0.40	36.40	38.00	0.00
								312.00	12.80	299.20	3322.38	0.00	3322.38	955.64	876.90	429.68	844.06	2048.64	3322.38	94	17.20	299.20	312.00	0.00

Concrete G : 244.1472 m3

Timber piles : 44928 m

9984 trees

Table B.2.10 (4) Sewer Line : E2 (Pipe Diameter : 1200)

Bill of Quantity

Area : BM1 Pipe Diameter : 1200 Shoring Type : TIMBER

Sewer Line Name : E2 Foundation Type : T OK ! T

Manhole No. : M1 M15

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete		2.5	
						Downstream					<= 6 m	=> 6 m				0.49				Length (m)	3.00			
		IE_1	ID_1			H_2																		
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.240	-0.717	1.96	0.50		2.46														pipes	m			
M2	1.500	-0.750	2.25	0.50	2.60	2.75	2.61	25.00	1.60	23.40	169.65	0.00	169.65	51.27	65.00	31.85	60.68	77.12	169.65	7	2.40	23.40	25.00	0.00
M2	1.500	-0.749	2.25	0.50		2.75																		
M3	1.080	-0.780	1.86	0.50	2.60	2.36	2.56	25.00	2.00	23.00	166.40	0.00	166.40	50.39	65.00	31.85	59.64	74.91	166.40	7	2.00	23.00	25.00	0.00
M3	1.080	-0.782	1.86	0.50		2.36																		
M4	1.090	-0.810	1.90	0.50	2.60	2.40	2.39	24.00	2.00	22.00	149.14	0.00	149.14	48.20	62.40	30.58	57.05	61.51	149.14	7	1.00	22.00	24.00	0.00
M4	1.090	-0.813	1.90	0.50		2.40																		
M5	1.000	-0.848	1.85	0.50	2.60	2.35	2.38	27.00	2.00	25.00	167.08	0.00	167.08	54.78	70.20	34.40	64.82	67.86	167.08	8	1.00	25.00	27.00	0.00
M5	1.000	-0.848	1.85	0.50		2.35																		
M6	1.090	-0.880	1.97	0.50	2.60	2.47	2.41	24.00	2.00	22.00	150.39	0.00	150.39	48.20	62.40	30.58	57.05	62.76	150.39	7	1.00	22.00	24.00	0.00
M6	1.090	-0.879	1.97	0.50		2.47																		
M7	1.090	-0.910	2.00	0.50	2.60	2.50	2.49	27.00	2.00	25.00	174.80	0.00	174.80	54.78	70.20	34.40	64.82	75.58	174.80	8	1.00	25.00	27.00	0.00
M7	1.090	-0.914	2.00	0.50		2.50																		
M8	1.120	-0.950	2.07	0.50	2.60	2.57	2.54	27.00	2.00	25.00	178.31	0.00	178.31	54.78	70.20	34.40	64.82	79.09	178.31	8	1.00	25.00	27.00	0.00
M8	1.120	-0.950	2.07	0.50		2.57																		
M9	1.140	-0.980	2.12	0.50	2.60	2.62	2.60	24.00	2.00	22.00	162.24	0.00	162.24	48.20	62.40	30.58	57.05	74.61	162.24	7	1.00	22.00	24.00	0.00
M9	1.135	-0.981	2.12	0.50		2.62																		
M10	1.120	-1.012	2.13	0.50	2.60	2.63	2.63	24.00	2.00	22.00	164.12	0.00	164.12	48.20	62.40	30.58	57.05	76.49	164.12	7	1.00	22.00	24.00	0.00
M10	1.120	-1.012	2.13	0.50		2.63																		
M11	1.100	-1.050	2.15	0.50	2.60	2.65	2.65	29.00	2.00	27.00	199.81	0.00	199.81	59.16	75.40	36.95	70.01	92.85	199.81	9	0.00	27.00	29.00	0.00
M11	1.100	-1.050	2.15	0.50		2.65																		
M12	1.070	-2.085	3.16	0.50	2.60	3.66	3.16	27.00	2.00	25.00	221.84	0.00	221.84	54.78	70.20	34.40	64.82	122.62	221.84	8	1.00	25.00	27.00	0.00
M12	1.070	-1.085	2.16	0.50		2.66																		
M13	1.070	-1.190	2.26	0.50	2.60	2.76	2.71	26.00	2.00	24.00	183.20	0.00	183.20	52.58	67.60	33.12	62.24	87.84	183.20	8	0.00	24.00	26.00	0.00
M13	1.070	-1.190	2.26	0.50		2.76																		
M14	1.090	-1.550	2.64	0.50	2.60	3.14	2.95	28.00	2.00	26.00	214.76	0.00	214.76	56.97	72.80	35.67	67.41	111.68	214.76	8	2.00	26.00	28.00	0.00
M14	1.090	-1.550	2.64	0.50		3.14																		
M15	1.170	-1.200	2.37	0.50	2.60	2.87	3.01	36.00	2.50	33.50	281.74	0.00	281.74	73.40	93.60	45.86	86.86	149.02	281.74	11	0.50	33.50	36.00	0.00
								373.00	28.10	344.90	2583.48	0.00	2583.48	755.69	969.80	475.20	894.32	1213.96	2583.48	110	14.90	344.90	373.00	0.00

Concrete G : 193.8338 m3

Timber piles : 45656 m
10146 trees

Table B.2.10 (5) Sewer Line : E3 (Pipe Diameter : 600)

Bill of Quantity

Area : BM1 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : E3 Foundation Type : T OK ! T

Manhole No. : M0 M1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Backfill	Black Sand Sandy Soil		Type	Concrete			
						Downstream					<= 6 m	=> 6 m				0.49		Backfill		Length (m)	4.00		2.5	
		IE_1	ID_1			H_2																		
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M0	1.492	-0.163	1.66	0.39		2.05														pipes	m			
I1	1.100	-0.227	1.33	0.39	1.60	1.72	1.89	32.00	0.80	31.20	96.77	0.00	96.77	18.06	51.20	25.09	39.85	31.83	96.77	7	3.20	31.20	32.00	0.00
I1	1.100	-0.227	1.33	0.39		1.72																		
M1	1.040	-0.527	1.57	0.39	1.60	1.96	1.84	3.00	0.80	2.20	8.84	0.00	8.84	1.27	4.80	2.35	2.81	3.68	8.84	0	2.20	2.20	3.00	0.00
								35.00	1.60	33.40	105.61	0.00	105.61	19.33	56.00	27.44	42.66	35.51	105.61	7	5.40	33.40	35.00	0.00

Concrete G : 5.7448 m3

Timber piles : 2268 m

504 trees

Table B.2.10 (6) Sewer Line : E3 (Pipe Diameter : 900)

Bill of Quantity

Area : BM1 Pipe Diameter : 900 Shoring Type : TIMBER

Sewer Line Name : E3 Foundation Type : T OK ! T

Manhole No. : M1 M6

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand	Black Sand		Type	Concrete		m_m	
						Downstream					<= 6 m	=> 6 m				0.49	Sand Backfill	Sandy Soil Backfill		Length (m)	4.00		2.5	
		IE_1	ID_1			H_2														N				
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8			L_2	L_3	W_2
M1	1.040	-0.527	1.57	0.43		2.00														pipes	m			
M2	1.140	-0.558	1.70	0.43	2.00	2.13	2.07	31.00	1.20	29.80	128.34	0.00	128.34	37.10	62.00	30.38	51.11	46.85	128.34	7	1.80	29.80	31.00	0.00
M2	1.140	-0.558	1.70	0.43		2.13																		
M3	1.180	-0.589	1.77	0.43	2.00	2.20	2.17	31.00	1.20	29.80	134.54	0.00	134.54	37.10	62.00	30.38	51.11	53.05	134.54	7	1.80	29.80	31.00	0.00
M3	1.180	-0.589	1.77	0.43		2.20																		
M4	1.220	-0.620	1.84	0.43	2.00	2.27	2.24	31.00	1.20	29.80	138.88	0.00	138.88	37.10	62.00	30.38	51.11	57.39	138.88	7	1.80	29.80	31.00	0.00
M4	1.220	-0.620	1.84	0.43		2.27																		
M5	1.260	-0.643	1.90	0.43	2.00	2.33	2.31	23.00	1.20	21.80	106.26	0.00	106.26	27.14	46.00	22.54	37.39	46.33	106.26	5	1.80	21.80	23.00	0.00
M5	1.260	-0.643	1.90	0.43		2.33																		
M6	1.260	-0.671	1.93	0.43	2.00	2.36	2.35	28.00	1.20	26.80	131.60	0.00	131.60	33.37	56.00	27.44	45.96	58.20	131.60	6	2.80	26.80	28.00	0.00
M6	1.260	-0.671	1.93	0.43		2.36																		
OUTLET	1.440	-0.679	2.12	0.43	2.00	2.55	2.46	8.00	0.70	7.30	39.36	0.00	39.36	9.09	16.00	7.84	12.52	19.00	39.36	1	3.30	7.30	8.00	0.00
								152.00	6.70	145.30	678.98	0.00	678.98	180.90	304.00	148.96	249.20	280.82	678.98	33	13.30	145.30	152.00	0.00

Concrete G : 47.8037 m3

Timber piles : 14228 m

3162 trees

Table B.2.10 (7) Sewer Line : E3 (Pipe Diameter : 1500)

Bill of Quantity

Area : BM1 Pipe Diameter : 1500 Shoring Type : TIMBER

Sewer Line Name : E3 Foundation Type : T OK ! T

Manhole No. : M6 M24

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.49 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type N	Pipe Number Concrete Length (m) 3.00	Pipe Bedding Length (m) L_2	Sheeting (m) 2.5 L_3	Waling & Strut (ton) W_2
M6	1.260	-1.271	2.53	0.54		3.07														pipes	m			
M7	1.250	-1.303	2.55	0.54	2.90	3.09	3.08	32.00	1.20	30.80	285.83	0.00	285.83	98.38	92.80	45.47	92.76	147.60	285.83	10	0.80	30.80	32.00	0.00
M7	1.250	-1.303	2.55	0.54		3.09																		
M8	1.240	-1.330	2.57	0.54	2.90	3.11	3.10	27.00	1.20	25.80	242.73	0.00	242.73	82.41	78.30	38.37	77.70	126.66	242.73	8	1.80	25.80	27.00	0.00
M8	1.240	-1.330	2.57	0.54		3.11																		
M9	1.220	-1.360	2.58	0.54	2.90	3.12	3.11	30.00	1.20	28.80	270.57	0.00	270.57	91.99	87.00	42.63	86.74	141.20	270.57	9	1.80	28.80	30.00	0.00
M9	1.220	-1.360	2.58	0.54		3.12																		
M10	1.170	-1.390	2.56	0.54	2.90	3.10	3.11	30.00	1.20	28.80	270.57	0.00	270.57	91.99	87.00	42.63	86.74	141.20	270.57	9	1.80	28.80	30.00	0.00
M10	1.170	-1.390	2.56	0.54		3.10																		
M11	1.130	-1.420	2.55	0.54	2.90	3.09	3.09	30.00	1.20	28.80	268.83	0.00	268.83	91.99	87.00	42.63	86.74	139.46	268.83	9	1.80	28.80	30.00	0.00
M11	1.130	-1.420	2.55	0.54		3.09																		
M12	1.140	-1.455	2.60	0.54	2.90	3.13	3.11	35.00	1.20	33.80	315.67	0.00	315.67	107.96	101.50	49.74	101.80	164.14	315.67	11	0.80	33.80	35.00	0.00
M12	1.140	-1.455	2.60	0.54		3.13																		
M13	1.160	-1.485	2.65	0.54	2.90	3.18	3.16	30.00	1.20	28.80	274.92	0.00	274.92	91.99	87.00	42.63	86.74	145.55	274.92	9	1.80	28.80	30.00	0.00
M13	1.160	-1.485	2.65	0.54		3.18																		
M14	1.190	-1.515	2.71	0.54	2.90	3.24	3.21	30.00	1.20	28.80	279.27	0.00	279.27	91.99	87.00	42.63	86.74	149.90	279.27	9	1.80	28.80	30.00	0.00
M14	1.190	-1.515	2.71	0.54		3.24																		
M15	1.160	-1.549	2.71	0.54	2.90	3.24	3.25	34.00	1.20	32.80	320.45	0.00	320.45	104.76	98.60	48.31	98.80	173.34	320.45	10	2.80	32.80	34.00	0.00
M15	1.160	-1.549	2.71	0.54		3.24																		
M16	1.120	-1.579	2.70	0.54	2.90	3.23	3.24	30.00	1.20	28.80	281.88	0.00	281.88	91.99	87.00	42.63	86.74	152.51	281.88	9	1.80	28.80	30.00	0.00
M16	1.120	-1.579	2.70	0.54		3.23																		
M17	1.110	-1.609	2.72	0.54	2.90	3.25	3.25	30.00	1.20	28.80	282.75	0.00	282.75	91.99	87.00	42.63	86.74	153.38	282.75	9	1.80	28.80	30.00	0.00
M17	1.110	-1.609	2.72	0.54		3.25																		
M18	1.150	-1.641	2.79	0.54	2.90	3.33	3.29	32.00	1.20	30.80	305.32	0.00	305.32	98.38	92.80	45.47	92.76	167.09	305.32	10	0.80	30.80	32.00	0.00
M18	1.150	-1.641	2.79	0.54		3.33																		
M19	1.220	-1.666	2.89	0.54	2.90	3.42	3.38	25.00	1.20	23.80	245.05	0.00	245.05	76.02	72.50	35.53	71.68	137.85	245.05	7	2.80	23.80	25.00	0.00
M19	1.220	-1.666	2.89	0.54		3.42																		
M20	1.270	-1.708	2.98	0.54	2.90	3.51	3.47	42.00	1.20	40.80	422.65	0.00	422.65	130.32	121.80	59.68	122.88	240.09	422.65	13	1.80	40.80	42.00	0.00
M20	1.270	-1.708	2.98	0.54		3.51																		
M21	1.285	-1.735	3.02	0.54	2.90	3.56	3.54	27.00	1.20	25.80	277.19	0.00	277.19	82.41	78.30	38.37	77.70	161.12	277.19	8	1.80	25.80	27.00	0.00
M21	1.285	-1.735	3.02	0.54		3.56																		
M22	1.270	-1.757	3.03	0.54	2.90	3.56	3.56	22.00	1.20	20.80	227.13	0.00	227.13	66.44	63.80	31.26	62.64	133.23	227.13	6	2.80	20.80	22.00	0.00
M22	1.270	-1.757	3.03	0.54		3.56																		
M23	1.270	-1.785	3.06	0.54	2.90	3.59	3.58	28.00	1.20	26.80	290.70	0.00	290.70	85.60	81.20	39.79	80.72	170.19	290.70	8	2.80	26.80	28.00	0.00
M23	1.270	-1.785	3.06	0.54		3.59																		
M24	1.300	-1.813	3.11	0.54	2.90	3.65	3.62	28.00	1.20	26.80	293.95	0.00	293.95	85.60	81.20	39.79	80.72	173.44	293.95	8	2.80	26.80	28.00	0.00
								542.00	21.60	520.40	5155.46	0.00	5155.46	1662.21	1571.80	770.18	1567.34	2817.94	5155.46	162	34.40	520.40	542.00	0.00

Concrete G : 424.6464 m3

Timber piles : 78048 m
17344 trees

Table B.2.10 (8) Sewer Line : E3 (Pipe Diameter : 1500)

Bill of Quantity

Area : BM1 Pipe Diameter : 1500 Shoring Type : TIMBER

Sewer Line Name : E3 Foundation Type : T OK ! T

Manhole No. : M24 OUTLET

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 3.00		Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
																				pipes	m			
M24	1.300	-1.813	3.11	0.54		3.65																		
M25	1.290	-1.839	3.13	0.54	2.90	3.66	3.66	26.00	1.20	24.80	275.97	0.00	275.97	79.21	75.40	36.95	74.70	164.32	275.97	8	0.80	24.80	26.00	0.00
M25	1.290	-1.839	3.13	0.54		3.66																		
M26	1.240	-1.865	3.11	0.54	2.90	3.64	3.66	26.00	1.20	24.80	275.97	0.00	275.97	79.21	75.40	36.95	74.70	164.32	275.97	8	0.80	24.80	26.00	0.00
M26	1.240	-1.865	3.11	0.54		3.64																		
M27	1.670	-1.900	3.57	0.54	2.90	4.11	3.88	35.00	2.10	32.90	393.82	0.00	393.82	105.08	101.50	49.74	99.10	244.99	393.82	10	2.90	32.90	35.00	0.00
M27	1.670	-1.900	3.57	0.54		4.11																		
M28	1.850	-1.909	3.76	0.54	2.60	4.29	4.20	9.00	2.10	6.90	98.28	0.00	98.28	22.04	23.40	11.47	16.35	70.46	98.28	2	0.90	6.90	9.00	0.00
M27	1.670	-1.900	3.57	0.54		4.11																		
OUTLET	1.540	-1.903	3.44	0.54	2.60	3.98	4.05	3.00	2.10	0.90	31.59	0.00	31.59	2.87	7.80	3.82	2.14	25.63	31.59	0	0.90	0.90	3.00	0.00
								99.00	8.70	90.30	1075.63	0.00	1075.63	288.41	283.50	138.92	266.99	669.73	1075.63	28	6.30	90.30	99.00	0.00

Concrete G : 73.6848 m3

Timber piles : 14256 m

3168 trees

Table B.2.10 (9) Sewer Line : W1 (Pipe Diameter : 900)

Bill of Quantity

Area : BM1 Pipe Diameter : 900 Shoring Type : TIMBER

Sewer Line Name : W1 Foundation Type : T OK ! T

Manhole No. : M1 M13

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 / IE_2	Sewer Invert Depth (m) ID_1 / ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream / Downstream H_2 / H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.49 V_5	Backfill (m^3) Yellow Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type / Length (m) N	Pipe Number Concrete 4.00	Pipe Bedding Length (m) L_2	Sheeting (m) 2.5 L_3	Waling & Strut (ton) W_2
																				pipes	m			
M1	1.467	-0.360	1.83	0.43		2.26																		
M2	1.330	-0.373	1.70	0.43	2.00	2.13	2.20	27.00	1.20	25.80	118.80	0.00	118.80	32.12	54.00	26.46	44.25	48.09	118.80	6	1.80	25.80	27.00	0.00
M2	1.330	-0.373	1.70	0.43		2.13																		
M3	1.335	-0.394	1.73	0.43	2.00	2.16	2.15	25.00	1.20	23.80	107.50	0.00	107.50	29.63	50.00	24.50	40.82	42.18	107.50	5	3.80	23.80	25.00	0.00
M3	1.335	-0.394	1.73	0.43		2.16																		
M4	1.340	-0.407	1.75	0.43	2.00	2.18	2.17	40.00	1.20	38.80	173.60	0.00	173.60	48.31	80.00	39.20	66.54	67.86	173.60	9	2.80	38.80	40.00	0.00
M4	1.340	-0.407	1.75	0.43		2.18																		
M5	1.360	-0.423	1.78	0.43	2.00	2.21	2.20	35.00	1.20	33.80	154.00	0.00	154.00	42.08	70.00	34.30	57.97	61.73	154.00	8	1.80	33.80	35.00	0.00
M5	1.360	-0.423	1.78	0.43		2.21																		
M6	1.370	-0.439	1.81	0.43	2.00	2.24	2.23	33.00	1.20	31.80	147.18	0.00	147.18	39.59	66.00	32.34	54.54	60.30	147.18	7	3.80	31.80	33.00	0.00
M6	1.370	-0.439	1.81	0.43		2.24																		
M7	1.390	-0.454	1.84	0.43	2.00	2.27	2.26	30.00	1.20	28.80	135.60	0.00	135.60	35.86	60.00	29.40	49.39	56.81	135.60	7	0.80	28.80	30.00	0.00
M7	1.390	-0.454	1.84	0.43		2.27																		
M8	1.430	-0.469	1.90	0.43	2.00	2.33	2.31	30.00	1.80	28.20	138.60	0.00	138.60	35.11	60.00	29.40	48.36	60.84	138.60	7	0.20	28.20	30.00	0.00
M8	1.430	-0.469	1.90	0.43		2.33																		
M9	1.444	-0.484	1.93	0.43	2.00	2.36	2.35	30.00	1.80	28.20	141.00	0.00	141.00	35.11	60.00	29.40	48.36	63.24	141.00	7	0.20	28.20	30.00	0.00
M9	1.444	-0.484	1.93	0.43		2.36																		
M10	1.426	-0.499	1.93	0.43	2.00	2.36	2.36	30.00	1.20	28.80	141.60	0.00	141.60	35.86	60.00	29.40	49.39	62.81	141.60	7	0.80	28.80	30.00	0.00
M10	1.426	-0.499	1.93	0.43		2.36																		
M11	1.444	-0.514	1.96	0.43	2.00	2.39	2.38	30.00	1.20	28.80	142.80	0.00	142.80	35.86	60.00	29.40	49.39	64.01	142.80	7	0.80	28.80	30.00	0.00
M11	1.444	-0.514	1.96	0.43		2.39																		
M12	1.480	-0.529	2.01	0.43	2.00	2.44	2.42	30.00	1.20	28.80	145.20	0.00	145.20	35.86	60.00	29.40	49.39	66.41	145.20	7	0.80	28.80	30.00	0.00
M12	1.480	-0.529	2.01	0.43		2.44																		
M13	1.530	-0.545	2.08	0.43	2.00	2.51	2.48	31.00	1.60	29.40	153.76	0.00	153.76	36.60	62.00	30.38	50.42	72.96	153.76	7	1.40	29.40	31.00	0.00
M8	1.430	-0.469	1.90	0.43		2.33																		
OUTLET	0.210	-0.474	0.68	0.43	2.00	1.11	1.73	10.00	0.75	9.25	34.60	0.00	34.60	11.52	20.00	9.80	15.86	8.94	34.60	2	1.25	9.25	10.00	0.00
								381.00	16.75	364.25	1734.24	0.00	1734.24	453.51	762.00	373.38	624.68	736.18	1734.24	86	20.25	364.25	381.00	0.00

Concrete G : 119.83825 m3

Timber piles : 35662 m

7925 trees

Table B.2.10 (10) Sewer Line : W1(Pipe Diamter : 1200)

Bill of Quantity

Area : BM1 Pipe Diameter : 1200 Shoring Type : TIMBER

Sewer Line Name : W1 Foundation Type : T OK ! T

Manhole No. : M13 M28

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 3.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N	L_2	L_3	W_2
M13	1.530	-0.845	2.38	0.50		2.88														pipes	m		
M14	1.560	-0.860	2.42	0.50	2.60	2.92	2.90	31.00	1.60	29.40	233.74	0.00	233.74	64.42	80.60	39.49	76.23	118.02	233.74	9	2.40	29.40	31.00	0.00
M14	1.560	-0.860	2.42	0.50		2.92																	
M15	1.526	-0.878	2.40	0.50	2.60	2.90	2.92	35.00	1.20	33.80	265.72	0.00	265.72	74.06	91.00	44.59	87.64	133.49	265.72	11	0.80	33.80	35.00	0.00
M15	1.526	-0.878	2.40	0.50		2.90																	
M16	1.480	-0.893	2.37	0.50	2.60	2.87	2.89	30.00	1.20	28.80	225.42	0.00	225.42	63.10	78.00	38.22	74.68	112.52	225.42	9	1.80	28.80	30.00	0.00
M16	1.480	-0.893	2.37	0.50		2.87																	
M17	1.430	-0.908	2.34	0.50	2.60	2.84	2.86	30.00	1.20	28.80	223.08	0.00	223.08	63.10	78.00	38.22	74.68	110.18	223.08	9	1.80	28.80	30.00	0.00
M17	1.430	-0.908	2.34	0.50		2.84																	
M18	1.450	-0.926	2.38	0.50	2.60	2.88	2.86	36.00	1.20	34.80	267.70	0.00	267.70	76.25	93.60	45.86	90.23	131.61	267.70	11	1.80	34.80	36.00	0.00
M18	1.450	-0.926	2.38	0.50		2.88																	
M19	1.435	-0.943	2.38	0.50	2.60	2.88	2.88	35.00	1.20	33.80	262.08	0.00	262.08	74.06	91.00	44.59	87.64	129.85	262.08	11	0.80	33.80	35.00	0.00
M19	1.435	-0.943	2.38	0.50		2.88																	
M20	1.420	-0.961	2.38	0.50	2.60	2.88	2.88	35.00	1.20	33.80	262.08	0.00	262.08	74.06	91.00	44.59	87.64	129.85	262.08	11	0.80	33.80	35.00	0.00
M20	1.420	-0.961	2.38	0.50		2.88																	
M21	1.400	-0.978	2.38	0.50	2.60	2.88	2.88	35.00	1.20	33.80	262.08	0.00	262.08	74.06	91.00	44.59	87.64	129.85	262.08	11	0.80	33.80	35.00	0.00
M21	1.400	-0.978	2.38	0.50		2.88																	
M22	1.430	-0.994	2.42	0.50	2.60	2.92	2.91	32.00	1.20	30.80	242.12	0.00	242.12	67.48	83.20	40.77	79.87	121.48	242.12	10	0.80	30.80	32.00	0.00
M22	1.430	-0.994	2.42	0.50		2.92																	
M23	1.470	-1.013	2.48	0.50	2.60	2.98	2.96	37.00	1.20	35.80	284.76	0.00	284.76	78.44	96.20	47.14	92.83	144.79	284.76	11	2.80	35.80	37.00	0.00
M23	1.470	-1.013	2.48	0.50		2.98																	
M24	1.500	-1.031	2.53	0.50	2.60	3.03	3.01	37.00	1.20	35.80	289.57	0.00	289.57	78.44	96.20	47.14	92.83	149.60	289.57	11	2.80	35.80	37.00	0.00
M24	1.500	-1.031	2.53	0.50		3.03																	
M25	1.545	-1.044	2.59	0.50	2.60	3.09	3.06	25.00	1.20	23.80	198.90	0.00	198.90	52.15	65.00	31.85	61.71	105.34	198.90	7	2.80	23.80	25.00	0.00
M25	1.545	-1.044	2.59	0.50		3.09																	
M26	1.590	-1.060	2.65	0.50	2.60	3.15	3.12	33.00	1.20	31.80	267.70	0.00	267.70	69.67	85.80	42.04	82.46	143.20	267.70	10	1.80	31.80	33.00	0.00
M26	1.590	-1.060	2.65	0.50		3.15																	
M27	1.680	-1.080	2.76	0.50	2.60	3.26	3.21	40.00	1.20	38.80	333.84	0.00	333.84	85.01	104.00	50.96	100.61	182.27	333.84	12	2.80	38.80	40.00	0.00
M27	1.680	-1.080	2.76	0.50		3.26																	
M28	1.700	-1.095	2.80	0.50	2.60	3.30	3.28	30.00	1.60	28.40	255.84	0.00	255.84	62.22	78.00	38.22	73.65	143.97	255.84	9	1.40	28.40	30.00	0.00
M28	1.700	-1.095	2.80	0.50		3.30																	
OUTLET	1.070	-1.101	2.17	0.50	2.60	2.67	2.99	12.00	1.00	11.00	93.29	0.00	93.29	24.10	31.20	15.29	28.52	49.48	93.29	3	2.00	11.00	12.00	0.00
								513.00	19.80	493.20	3967.92	0.00	3967.92	1080.62	1333.80	653.56	1278.86	2035.50	3967.92	155	28.20	493.20	513.00	0.00

Concrete G : 277.1784 m3

Timber piles : 62792 m
13954 trees

Table B.2.10 (11) Sewer Line : W1(Pipe Diameter : 1800)

Bill of Quantity

Area : BM1 Pipe Diameter : 1800 Shoring Type : TIMBER

Sewer Line Name : W1 Foundation Type : T OK ! T

Manhole No. : M28 M42

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Backfill (m^3) Yellow Sand Sand Backfill	Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type	Pipe Number Concrete 3.00	Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_6	V_7	V_8	N: pipes	N: Length (m)	L_2	L_3	W_2
M28	1.700	-1.695	3.40	0.59		3.98												m			
M29	1.710	-1.712	3.42	0.59	3.30	4.01	4.00	33.00	1.60	31.40	435.60	0.00	435.60	115.46	266.78	435.60	10	1.40	31.40	33.00	0.00
M29	1.710	-1.712	3.42	0.59		4.01															
M30	1.670	-1.729	3.40	0.59	3.30	3.98	4.00	35.00	1.20	33.80	462.00	0.00	462.00	124.28	281.13	462.00	11	0.80	33.80	35.00	0.00
M30	1.670	-1.729	3.40	0.59		3.98															
M31	1.680	-1.744	3.42	0.59	3.30	4.01	4.00	30.00	1.20	28.80	396.00	0.00	396.00	105.90	241.59	396.00	9	1.80	28.80	30.00	0.00
M31	1.690	-1.760	3.45	0.59		4.04															
M32	1.700	-1.775	3.48	0.59	2.95	4.06	4.05	32.00	1.20	30.80	382.32	0.00	382.32	86.30	249.76	382.32	10	0.80	30.80	32.00	0.00
M32	1.700	-1.775	3.48	0.59		4.06															
M33	1.700	-1.785	3.49	0.59	2.95	4.07	4.07	30.00	1.20	28.80	360.20	0.00	360.20	80.70	236.14	360.20	9	1.80	28.80	30.00	0.00
M33	1.700	-1.785	3.49	0.59		4.07															
M34	1.700	-1.803	3.50	0.59	2.95	4.09	4.08	20.00	1.20	18.80	240.72	0.00	240.72	52.68	159.13	240.72	6	0.80	18.80	20.00	0.00
M34	1.700	-1.803	3.50	0.59		4.09															
M35	1.700	-1.820	3.52	0.59	2.95	4.11	4.10	30.00	1.20	28.80	362.85	0.00	362.85	80.70	238.79	362.85	9	1.80	28.80	30.00	0.00
M35	1.700	-1.820	3.52	0.59		4.11															
M36	1.700	-1.837	3.54	0.59	2.95	4.12	4.12	35.00	1.20	33.80	425.39	0.00	425.39	94.71	280.09	425.39	11	0.80	33.80	35.00	0.00
M36	1.700	-1.820	3.52	0.59		4.11															
M37	1.700	-1.837	3.54	0.59	2.95	4.12	4.12	35.00	1.20	33.80	425.39	0.00	425.39	94.71	280.09	425.39	11	0.80	33.80	35.00	0.00
M37	1.700	-1.837	3.54	0.59		4.12															
M38	1.720	-1.854	3.57	0.59	2.95	4.16	4.15	35.00	1.20	33.80	428.49	0.00	428.49	94.71	283.19	428.49	11	0.80	33.80	35.00	0.00
M38	1.720	-1.854	3.57	0.59		4.16															
M39	1.770	-1.871	3.64	0.59	2.95	4.23	4.20	35.00	1.20	33.80	433.65	0.00	433.65	94.71	288.35	433.65	11	0.80	33.80	35.00	0.00
M39	1.770	-1.871	3.64	0.59		4.23															
M40	1.870	-1.888	3.76	0.59	2.95	4.34	4.29	35.00	1.20	33.80	442.95	0.00	442.95	94.71	297.65	442.95	11	0.80	33.80	35.00	0.00
M40	1.870	-1.888	3.76	0.59		4.34															
M41	1.960	-1.905	3.87	0.59	2.95	4.45	4.40	35.00	1.20	33.80	454.30	0.00	454.30	94.71	309.00	454.30	11	0.80	33.80	35.00	0.00
M41	1.960	-1.905	3.87	0.59		4.45															
M42	1.900	-1.923	3.82	0.59	2.95	4.41	4.43	36.00	1.85	34.15	470.47	0.00	470.47	95.69	322.74	470.47	11	1.15	34.15	36.00	0.00
M42	1.900	-1.923	3.82	0.59		4.41															
OUTLET	2.290	-1.925	4.22	0.59	2.95	4.80	4.61	3.00	1.25	1.75	40.80	0.00	40.80	4.91	31.55	40.80	0	1.75	1.75	3.00	0.00
								459.00	19.10	439.90	5761.13	0.00	5761.13	1314.88	3765.96	5761.13	141.00	16.90	439.90	459.00	0.00

Concrete G : 487.8491 m3

Timber piles : 79316 m
17626 trees

Table B.2.10 (12) Sewer Line : W2 (Pipe Diamter : 1000)

Bill of Quantity

Area : BM1 Pipe Diameter : 1000 Shoring Type : TIMBER

Sewer Line Name : W2 Foundation Type : T OK ! T

Manhole No. : M1 OUTLET

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.430	-0.705	2.14	0.45		2.58														pipes	m			
M2	1.168	-0.741	1.91	0.45	2.10	2.35	2.47	30.00	1.60	28.40	155.61	0.00	155.61	42.37	63.00	30.87	51.86	72.88	155.61	7	0.40	28.40	30.00	0.00
M2	1.168	-0.741	1.91	0.45		2.35																		
M3	1.241	-0.793	2.03	0.45	2.10	2.48	2.42	41.00	2.00	39.00	208.37	0.00	208.37	58.19	86.10	42.19	71.21	94.97	208.37	9	3.00	39.00	41.00	0.00
M3	1.241	-0.793	2.03	0.45		2.48																		
M4	1.250	-0.839	2.09	0.45	2.10	2.53	2.51	40.00	2.00	38.00	210.84	0.00	210.84	56.70	84.00	41.16	69.38	100.30	210.84	9	2.00	38.00	40.00	0.00
M4	1.250	-0.839	2.09	0.45		2.53																		
M5	1.232	-0.873	2.11	0.45	2.10	2.55	2.55	29.00	2.00	27.00	155.30	0.00	155.30	40.28	60.90	29.84	49.31	76.15	155.30	6	3.00	27.00	29.00	0.00
M5	1.232	-0.873	2.11	0.45		2.55																		
M6	1.191	-0.914	2.11	0.45	2.10	2.55	2.55	34.00	2.00	32.00	182.07	0.00	182.07	47.74	71.40	34.99	58.44	88.64	182.07	8	0.00	32.00	34.00	0.00
M6	1.191	-0.914	2.11	0.45		2.55																		
M7	1.170	-0.954	2.12	0.45	2.10	2.57	2.56	33.00	2.00	31.00	177.41	0.00	177.41	46.25	69.30	33.96	56.61	86.84	177.41	7	3.00	31.00	33.00	0.00
M7	1.170	-0.954	2.12	0.45		2.57																		
M8	1.170	-0.997	2.17	0.45	2.10	2.61	2.60	36.00	2.00	34.00	196.56	0.00	196.56	50.73	75.60	37.04	62.08	97.44	196.56	8	2.00	34.00	36.00	0.00
M8	1.170	-0.997	2.17	0.45		2.61																		
M9	1.210	-1.040	2.25	0.45	2.10	2.70	2.66	35.00	2.00	33.00	195.51	0.00	195.51	49.24	73.50	36.02	60.25	99.25	195.51	8	1.00	33.00	35.00	0.00
M9	1.210	-1.040	2.25	0.45		2.70																		
M10	1.216	-1.081	2.30	0.45	2.10	2.74	2.72	36.00	2.00	34.00	205.64	0.00	205.64	50.73	75.60	37.04	62.08	106.52	205.64	8	2.00	34.00	36.00	0.00
M10	1.216	-1.081	2.30	0.45		2.74																		
M11	1.240	-1.123	2.36	0.45	2.10	2.81	2.78	34.00	2.00	32.00	198.50	0.00	198.50	47.74	71.40	34.99	58.44	105.07	198.50	8	0.00	32.00	34.00	0.00
M11	1.240	-1.123	2.36	0.45		2.81																		
M12	1.140	-1.153	2.29	0.45	2.10	2.74	2.78	25.00	2.00	23.00	145.95	0.00	145.95	34.32	52.50	25.73	41.99	78.24	145.95	5	3.00	23.00	25.00	0.00
M12	1.140	-1.153	2.29	0.45		2.74																		
M13	1.110	-1.183	2.29	0.45	2.10	2.74	2.74	25.00	2.00	23.00	143.85	0.00	143.85	34.32	52.50	25.73	41.99	76.14	143.85	5	3.00	23.00	25.00	0.00
M13	1.110	-1.183	2.29	0.45		2.74																		
M14	1.130	-1.221	2.35	0.45	2.10	2.80	2.77	32.00	2.20	29.80	186.15	0.00	186.15	44.46	67.20	32.93	54.42	98.80	186.15	7	1.80	29.80	32.00	0.00
M13	1.110	-1.183	2.29	0.45		2.74																		
OUTLET	0.940	-1.194	2.13	0.45	2.10	2.58	2.66	9.00	1.00	8.00	50.28	0.00	50.28	11.94	18.90	9.26	14.60	26.42	50.28	2	0.00	8.00	9.00	0.00
								439.00	26.80	412.20	2412.04	0.00	2412.04	615.01	921.90	451.73	752.66	1207.65	2412.04	97	24.20	412.20	439.00	0.00

Concrete G : 164.0556 m3

Timber piles : 44252 m

9834 trees

Table B.2.10 (13) Sewer Line : W2 (Pipe Diamter : 1200)

Bill of Quantity

Area : BM1 Pipe Diameter : 1200 Shoring Type : TIMBER

Sewer Line Name : W2 Foundation Type : T OK ! T

Manhole No. : M14 M26

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 3.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N	L_2	L_3	W_2
M14	1.130	-1.421	2.55	0.50		3.05														pipes	m		
M15	1.140	-1.457	2.60	0.50	2.60	3.10	3.08	30.00	2.20	27.80	240.24	0.00	240.24	60.91	78.00	38.22	72.09	129.93	240.24	9	0.80	27.80	30.00	0.00
M15	1.140	-1.457	2.60	0.50		3.10																	
M16	1.140	-1.493	2.63	0.50	2.60	3.13	3.12	30.00	2.00	28.00	243.36	0.00	243.36	61.35	78.00	38.22	72.60	132.54	243.36	9	1.00	28.00	30.00	0.00
M16	1.140	-1.493	2.63	0.50		3.13																	
M17	1.160	-1.536	2.70	0.50	2.60	3.20	3.17	36.00	2.00	34.00	296.72	0.00	296.72	74.49	93.60	45.86	88.17	162.69	296.72	11	1.00	34.00	36.00	0.00
M17	1.160	-1.536	2.70	0.50		3.20																	
M18	1.180	-1.560	2.74	0.50	2.60	3.24	3.22	36.00	2.00	34.00	301.40	0.00	301.40	74.49	93.60	45.86	88.17	167.37	301.40	11	1.00	34.00	36.00	0.00
M18	1.180	-1.580	2.76	0.50		3.26																	
M19	1.210	-1.616	2.83	0.50	2.60	3.33	3.30	30.00	2.00	28.00	257.40	0.00	257.40	61.35	78.00	38.22	72.60	146.58	257.40	9	1.00	28.00	30.00	0.00
M19	1.210	-1.616	2.83	0.50		3.33																	
M20	1.260	-1.652	2.91	0.50	2.60	3.41	3.37	30.00	2.00	28.00	262.86	0.00	262.86	61.35	78.00	38.22	72.60	152.04	262.86	9	1.00	28.00	30.00	0.00
M20	1.260	-1.652	2.91	0.50		3.41																	
M21	1.340	-1.695	3.04	0.50	2.60	3.54	3.48	36.00	2.00	34.00	325.73	0.00	325.73	74.49	93.60	45.86	88.17	191.70	325.73	11	1.00	34.00	36.00	0.00
M21	1.340	-1.695	3.04	0.50		3.54																	
M22	1.400	-1.738	3.14	0.50	2.60	3.64	3.59	36.00	2.00	34.00	336.03	0.00	336.03	74.49	93.60	45.86	88.17	202.00	336.03	11	1.00	34.00	36.00	0.00
M22	1.400	-1.738	3.14	0.50		3.64																	
M23	1.450	-1.781	3.23	0.50	2.60	3.73	3.69	36.00	2.00	34.00	345.39	0.00	345.39	74.49	93.60	45.86	88.17	211.36	345.39	11	1.00	34.00	36.00	0.00
M23	1.450	-1.781	3.23	0.50		3.73																	
M24	1.460	-1.823	3.28	0.50	2.60	3.78	3.76	35.00	2.00	33.00	342.16	0.00	342.16	72.30	91.00	44.59	85.57	212.00	342.16	11	0.00	33.00	35.00	0.00
M24	1.460	-1.823	3.28	0.50		3.78																	
M25	1.522	-1.864	3.39	0.50	2.60	3.89	3.84	34.00	2.00	32.00	339.46	0.00	339.46	70.11	88.40	43.32	82.98	213.16	339.46	10	2.00	32.00	34.00	0.00
M25	1.522	-1.864	3.39	0.50		3.89																	
M26	1.570	-1.900	3.47	0.50	2.60	3.97	3.93	30.00	2.00	28.00	306.54	0.00	306.54	61.35	78.00	38.22	72.60	195.72	306.54	9	1.00	28.00	30.00	0.00
M26	1.570	-1.900	3.47	0.50		3.97																	
OUTLET	1.000	-1.914	2.91	0.50	2.60	3.41	3.70	12.00	1.00	11.00	115.44	0.00	115.44	24.10	31.20	15.29	28.52	71.63	115.44	3	2.00	11.00	12.00	0.00
								411.00	25.20	385.80	3712.73	0.00	3712.73	845.27	1068.60	523.61	1000.41	2188.71	3712.73	124	13.80	385.80	411.00	0.00

Concrete G : 216.8196 m3

Timber piles : 50307 m
11180 trees

Table B.2.10 (14) Sewer Line : W2 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : W2 Foundation Type : T OK ! T

Inlet No. : M27 M29

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M27	1.232	-0.200	1.43	0.33		1.76														pipes	m			
M28	1.191	-0.250	1.44	0.33	1.40	1.77	1.77	34.00	0.80	33.20	84.26	0.00	84.26	9.03	47.60	23.32	32.80	28.14	84.26	8	1.20	33.20	34.00	0.00
M28	1.191	-0.250	1.44	0.33		1.77																		
M29	1.170	-0.300	1.47	0.33	1.40	1.80	1.79	33.00	0.80	32.20	82.70	0.00	82.70	8.76	46.20	22.64	31.81	28.25	82.70	8	0.20	32.20	33.00	0.00
								67.00	1.60	65.40	166.96	0.00	166.96	17.79	93.80	45.96	64.61	56.39	166.96	16	1.40	65.40	67.00	0.00

Concrete G : 4.9704 m3

Timber piles : 2895 m

644 trees

Table B.2.10 (15) Sewer Line : E1 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : E1 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream / Downstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.49	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type / Length (m)	Concrete 4.00		$_m$ 2.5	
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I1	1.330	0.082	1.25	0.33		1.57														pipes	m			
M1	1.330	0.000	1.33	0.33	1.40	1.66	1.62	4.10	1.10	3.00	9.30	0.00	9.30	0.82	5.74	2.81	2.96	3.53	9.30	0	3.00	3.00	4.10	0.00
I2	1.330	0.082	1.25	0.33		1.57																		
M2	1.330	0.000	1.33	0.33	1.40	1.66	1.62	4.10	1.10	3.00	9.30	0.00	9.30	0.82	5.74	2.81	2.96	3.53	9.30	0	3.00	3.00	4.10	0.00
I3	1.330	0.082	1.25	0.33		1.57																		
M3	1.330	0.000	1.33	0.33	1.40	1.66	1.62	4.10	1.10	3.00	9.30	0.00	9.30	0.82	5.74	2.81	2.96	3.53	9.30	0	3.00	3.00	4.10	0.00
I4	1.330	0.032	1.30	0.33		1.62																		
M4	1.330	-0.050	1.38	0.33	1.40	1.71	1.67	4.10	1.10	3.00	9.59	0.00	9.59	0.82	5.74	2.81	2.96	3.82	9.59	0	3.00	3.00	4.10	0.00
I'4	1.330	-0.396	1.73	0.33		2.05																		
M4	1.330	-0.458	1.79	0.33	1.40	2.11	2.09	3.10	1.10	2.00	9.08	0.00	9.08	0.54	4.34	2.13	1.98	4.97	9.08	0	2.00	2.00	3.10	0.00
I5	1.330	0.032	1.30	0.33		1.62																		
M5	1.330	-0.050	1.38	0.33	1.40	1.71	1.67	4.10	1.10	3.00	9.59	0.00	9.59	0.82	5.74	2.81	2.96	3.82	9.59	0	3.00	3.00	4.10	0.00
I'5	1.330	-0.429	1.76	0.33		2.08																		
M5	1.330	-0.491	1.82	0.33	1.40	2.15	2.12	3.10	1.10	2.00	9.21	0.00	9.21	0.54	4.34	2.13	1.98	5.10	9.21	0	2.00	2.00	3.10	0.00
I6	1.310	0.032	1.28	0.33		1.60																		
M6	1.310	-0.050	1.36	0.33	1.40	1.69	1.65	4.10	1.10	3.00	9.48	0.00	9.48	0.82	5.74	2.81	2.96	3.71	9.48	0	3.00	3.00	4.10	0.00
I'6	1.310	-0.438	1.75	0.33		2.07																		
M6	1.310	-0.500	1.81	0.33	1.40	2.14	2.11	3.10	1.10	2.00	9.16	0.00	9.16	0.54	4.34	2.13	1.98	5.05	9.16	0	2.00	2.00	3.10	0.00
I7	1.300	0.032	1.27	0.33		1.59																		
M7	1.300	-0.050	1.35	0.33	1.40	1.68	1.64	4.10	1.10	3.00	9.42	0.00	9.42	0.82	5.74	2.81	2.96	3.65	9.42	0	3.00	3.00	4.10	0.00
I'7	1.300	-0.438	1.74	0.33		2.06																		
M7	1.300	-0.500	1.80	0.33	1.40	2.13	2.10	3.10	1.10	2.00	9.12	0.00	9.12	0.54	4.34	2.13	1.98	5.01	9.12	0	2.00	2.00	3.10	0.00
I8	1.300	0.032	1.27	0.33		1.59																		
M8	1.300	-0.050	1.35	0.33	1.40	1.68	1.64	4.10	1.10	3.00	9.42	0.00	9.42	0.82	5.74	2.81	2.96	3.65	9.42	0	3.00	3.00	4.10	0.00
I10	1.350	0.082	1.27	0.33		1.59																		
M10	1.350	0.000	1.35	0.33	1.40	1.68	1.64	4.10	1.10	3.00	9.42	0.00	9.42	0.82	5.74	2.81	2.96	3.65	9.42	0	3.00	3.00	4.10	0.00
I'10	1.350	-0.388	1.74	0.33		2.06																		
M10	1.350	-0.450	1.80	0.33	1.40	2.13	2.10	3.10	1.10	2.00	9.12	0.00	9.12	0.54	4.34	2.13	1.98	5.01	9.12	0	2.00	2.00	3.10	0.00
I11	1.430	0.132	1.30	0.33		1.62																		
M11	1.430	0.050	1.38	0.33	1.40	1.71	1.67	4.10	1.10	3.00	9.59	0.00	9.59	0.82	5.74	2.81	2.96	3.82	9.59	0	3.00	3.00	4.10	0.00
								56.50	16.50	40.00	140.10	0.00	140.10	10.90	79.10	38.76	39.50	61.84	140.10	0	40.00	40.00	56.50	0.00

Concrete G : 3.04 m3

Timber piles : 2441 m

543 trees

Table B.2.10 (16) Sewer Line : E1 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : E1 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00	Pipe Number Concrete	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N: pipes	N: m	L_2	L_3	W_2
I12	1.480	0.182	1.30	0.33		1.62																		
M12	1.480	0.100	1.38	0.33	1.40	1.71	1.67	4.10	1.10	3.00	9.59	0.00	9.59	0.82	5.74	2.81	2.96	3.82	9.59	0	3.00	3.00	4.10	0.00
I'12	1.480	-0.288	1.77	0.33		2.09																		
M12	1.480	-0.350	1.83	0.33	1.40	2.16	2.13	3.10	1.10	2.00	9.25	0.00	9.25	0.54	4.34	2.13	1.98	5.14	9.25	0	2.00	2.00	3.10	0.00
M13	1.520	0.232	1.29	0.33		1.61																		
M13	1.520	0.150	1.37	0.33	1.40	1.70	1.66	4.10	1.10	3.00	9.53	0.00	9.53	0.82	5.74	2.81	2.96	3.76	9.53	0	3.00	3.00	4.10	0.00
I'13	1.520	-0.188	1.71	0.33		2.03																		
M13	1.520	-0.250	1.77	0.33	1.40	2.10	2.07	3.10	1.10	2.00	8.99	0.00	8.99	0.54	4.34	2.13	1.98	4.88	8.99	0	2.00	2.00	3.10	0.00
I'15	1.460	-0.466	1.93	0.33		2.25																		
M15	1.460	-0.550	2.01	0.33	1.40	2.34	2.30	4.20	1.40	2.80	13.53	0.00	13.53	0.76	5.88	2.88	2.77	7.88	13.53	0	2.80	2.80	4.20	0.00
I'16	1.390	-0.516	1.91	0.33		2.23																		
M16	1.390	-0.600	1.99	0.33	1.40	2.32	2.28	4.20	1.40	2.80	13.41	0.00	13.41	0.76	5.88	2.88	2.77	7.76	13.41	0	2.80	2.80	4.20	0.00
I'18	1.270	-0.466	1.74	0.33		2.06																		
M18	1.270	-0.550	1.82	0.33	1.40	2.15	2.11	4.20	1.40	2.80	12.41	0.00	12.41	0.76	5.88	2.88	2.77	6.76	12.41	0	2.80	2.80	4.20	0.00
I'20	1.255	-0.466	1.72	0.33		2.05																		
M20	1.255	-0.550	1.81	0.33	1.40	2.13	2.09	4.20	1.40	2.80	12.29	0.00	12.29	0.76	5.88	2.88	2.77	6.64	12.29	0	2.80	2.80	4.20	0.00
I'21	1.250	-0.466	1.72	0.33		2.04																		
M21	1.250	-0.550	1.80	0.33	1.40	2.13	2.09	4.20	1.40	2.80	12.29	0.00	12.29	0.76	5.88	2.88	2.77	6.64	12.29	0	2.80	2.80	4.20	0.00
								35.40	11.40	24.00	101.29	0.00	101.29	6.52	49.56	24.28	23.73	53.28	101.29	0	24.00	24.00	35.40	0.00

Concrete G : 1.824 m3

Timber piles : 1530 m

340 trees

Table B.2.10 (17) Sewer Line : E1 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : E1 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream / Downstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.49	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type / Length (m)	Concrete 4.00		L_m 2.5	
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
																				pipes	m			
I'23	1.210	-0.516	1.73	0.33		2.05														0	2.80	2.80	4.20	0.00
M23	1.210	-0.600	1.81	0.33	1.40	2.14	2.10	4.20	1.40	2.80	12.35	0.00	12.35	0.76	5.88	2.88	2.77	6.70	12.35					
I'24	1.180	-0.566	1.75	0.33		2.07																		
M24	1.180	-0.650	1.83	0.33	1.40	2.16	2.12	4.20	1.40	2.80	12.47	0.00	12.47	0.76	5.88	2.88	2.77	6.82	12.47	0	2.80	2.80	4.20	0.00
I'26	1.300	-0.516	1.82	0.33		2.14																		
M26	1.300	-0.600	1.90	0.33	1.40	2.23	2.19	4.20	1.40	2.80	12.88	0.00	12.88	0.76	5.88	2.88	2.77	7.23	12.88	0	2.80	2.80	4.20	0.00
I'27	1.360	-0.466	1.83	0.33		2.15																		
M27	1.360	-0.550	1.91	0.33	1.40	2.24	2.20	4.20	1.40	2.80	12.94	0.00	12.94	0.76	5.88	2.88	2.77	7.29	12.94	0	2.80	2.80	4.20	0.00
I28	1.440	0.164	1.28	0.33		1.60																		
M28	1.440	0.100	1.34	0.33	1.40	1.67	1.64	3.20	1.40	1.80	7.35	0.00	7.35	0.49	4.48	2.20	1.78	3.37	7.35	0	1.80	1.80	3.20	0.00
I'28	1.440	-0.366	1.81	0.33		2.13																		
M28	1.440	-0.450	1.89	0.33	1.40	2.22	2.18	4.20	1.40	2.80	12.82	0.00	12.82	0.76	5.88	2.88	2.77	7.17	12.82	0	2.80	2.80	4.20	0.00
I29	1.450	0.164	1.29	0.33		1.61																		
M29	1.450	0.100	1.35	0.33	1.40	1.68	1.65	3.20	1.40	1.80	7.40	0.00	7.40	0.49	4.48	2.20	1.78	3.42	7.40	0	1.80	1.80	3.20	0.00
I30	1.430	0.164	1.27	0.33		1.59																		
M30	1.430	0.100	1.33	0.33	1.40	1.66	1.63	3.20	1.40	1.80	7.31	0.00	7.31	0.49	4.48	2.20	1.78	3.33	7.31	0	1.80	1.80	3.20	0.00
I'30	1.430	-0.366	1.80	0.33		2.12																		
M30	1.430	-0.450	1.88	0.33	1.40	2.21	2.17	4.20	1.40	2.80	12.76	0.00	12.76	0.76	5.88	2.88	2.77	7.11	12.76	0	2.80	2.80	4.20	0.00
I31	1.400	0.214	1.19	0.33		1.51																		
M31	1.400	0.150	1.25	0.33	1.40	1.58	1.55	3.20	1.40	1.80	6.95	0.00	6.95	0.49	4.48	2.20	1.78	2.97	6.95	0	1.80	1.80	3.20	0.00
I'31	1.400	-0.416	1.82	0.33		2.14																		
M31	1.400	-0.500	1.90	0.33	1.40	2.23	2.19	4.20	1.40	2.80	12.88	0.00	12.88	0.76	5.88	2.88	2.77	7.23	12.88	0	2.80	2.80	4.20	0.00
								42.20	15.40	26.80	118.11	0.00	118.11	7.28	59.08	28.95	26.51	62.65	118.11	0	26.80	26.80	42.20	0.00

Concrete G : 2.0368 m3

Timber piles : 1824 m

406 trees

Table B.2.10 (18) Sewer Line : E1 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : E1 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream / Downstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.49	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type / Length (m)	Concrete 4.00		$_m$ 2.5	
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I32	1.580	0.264	1.32	0.33		1.64														pipes	m			
M32	1.580	0.200	1.38	0.33	1.40	1.71	1.68	3.20	1.40	1.80	7.53	0.00	7.53	0.49	4.48	2.20	1.78	3.55	7.53	0	1.80	1.80	3.20	0.00
I'32	1.580	-0.216	1.80	0.33		2.12																		
M32	1.580	-0.300	1.88	0.33	1.40	2.21	2.17	4.20	1.40	2.80	12.76	0.00	12.76	0.76	5.88	2.88	2.77	7.11	12.76	0	2.80	2.80	4.20	0.00
I33	1.820	0.464	1.36	0.33		1.68																		
M33	1.820	0.400	1.42	0.33	1.40	1.75	1.72	3.20	1.40	1.80	7.71	0.00	7.71	0.49	4.48	2.20	1.78	3.73	7.71	0	1.80	1.80	3.20	0.00
I'33	1.820	-0.016	1.84	0.33		2.16																		
M33	1.820	-0.100	1.92	0.33	1.40	2.25	2.21	4.20	1.40	2.80	13.00	0.00	13.00	0.76	5.88	2.88	2.77	7.35	13.00	0	2.80	2.80	4.20	0.00
								14.80	5.60	9.20	41.00	0.00	41.00	2.50	20.72	10.15	9.10	21.75	41.00	0	9.20	9.20	14.80	0.00

Concrete G : 0.6992 m3

Timber piles : 640 m
143 trees

Table B.2.10 (19) Sewer Line : E2 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : E2 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00	Pipe Number Concrete	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N: pipes	N: m	L_2	L_3	W_2
I'1	1.240	-0.578	1.82	0.33		2.14																		
M1	1.240	-0.660	1.90	0.33	1.40	2.23	2.19	4.10	1.40	2.70	12.58	0.00	12.58	0.73	5.74	2.81	2.67	7.10	12.58	0	2.70	2.70	4.10	0.00
I'2	1.150	-0.618	1.77	0.33		2.09																		
M2	1.150	-0.700	1.85	0.33	1.40	2.18	2.14	4.10	1.40	2.70	12.29	0.00	12.29	0.73	5.74	2.81	2.67	6.81	12.29	0	2.70	2.70	4.10	0.00
I'3	1.080	-0.668	1.75	0.33		2.07																		
M3	1.080	-0.750	1.83	0.33	1.40	2.16	2.12	4.10	1.40	2.70	12.17	0.00	12.17	0.73	5.74	2.81	2.67	6.69	12.17	0	2.70	2.70	4.10	0.00
I'4	1.090	-0.668	1.76	0.33		2.08																		
M4	1.090	-0.750	1.84	0.33	1.40	2.17	2.13	4.10	1.40	2.70	12.23	0.00	12.23	0.73	5.74	2.81	2.67	6.75	12.23	0	2.70	2.70	4.10	0.00
I'5	1.100	-0.668	1.77	0.33		2.09																		
M5	1.100	-0.750	1.85	0.33	1.40	2.18	2.14	4.10	1.40	2.70	12.29	0.00	12.29	0.73	5.74	2.81	2.67	6.81	12.29	0	2.70	2.70	4.10	0.00
I'6	1.090	-0.668	1.76	0.33		2.08																		
M6	1.090	-0.750	1.84	0.33	1.40	2.17	2.13	4.10	1.40	2.70	12.23	0.00	12.23	0.73	5.74	2.81	2.67	6.75	12.23	0	2.70	2.70	4.10	0.00
I'7	1.090	-0.668	1.76	0.33		2.08																		
M7	1.090	-0.750	1.84	0.33	1.40	2.17	2.13	4.10	1.40	2.70	12.23	0.00	12.23	0.73	5.74	2.81	2.67	6.75	12.23	0	2.70	2.70	4.10	0.00
I'8	1.120	-0.618	1.74	0.33		2.06																		
M8	1.120	-0.700	1.82	0.33	1.40	2.15	2.11	4.10	1.40	2.70	12.12	0.00	12.12	0.73	5.74	2.81	2.67	6.64	12.12	0	2.70	2.70	4.10	0.00
I'9	1.135	-0.618	1.75	0.33		2.08																		
M9	1.135	-0.700	1.84	0.33	1.40	2.16	2.12	4.10	1.40	2.70	12.17	0.00	12.17	0.73	5.74	2.81	2.67	6.69	12.17	0	2.70	2.70	4.10	0.00
I'10	1.120	-0.618	1.74	0.33		2.06																		
M10	1.120	-0.700	1.82	0.33	1.40	2.15	2.11	4.10	1.40	2.70	12.12	0.00	12.12	0.73	5.74	2.81	2.67	6.64	12.12	0	2.70	2.70	4.10	0.00
I'11	1.100	-0.668	1.77	0.33		2.09																		
M11	1.100	-0.750	1.85	0.33	1.40	2.18	2.14	4.10	1.40	2.70	12.29	0.00	12.29	0.73	5.74	2.81	2.67	6.81	12.29	0	2.70	2.70	4.10	0.00
I'12	1.070	-0.668	1.74	0.33		2.06																		
M12	1.070	-0.750	1.82	0.33	1.40	2.15	2.11	4.10	1.40	2.70	12.12	0.00	12.12	0.73	5.74	2.81	2.67	6.64	12.12	0	2.70	2.70	4.10	0.00
I'13	1.070	-0.668	1.74	0.33		2.06																		
M13	1.070	-0.750	1.82	0.33	1.40	2.15	2.11	4.10	1.40	2.70	12.12	0.00	12.12	0.73	5.74	2.81	2.67	6.64	12.12	0	2.70	2.70	4.10	0.00
I'14	1.090	-0.668	1.76	0.33		2.08																		
M14	1.090	-0.750	1.84	0.33	1.40	2.17	2.13	4.10	1.40	2.70	12.23	0.00	12.23	0.73	5.74	2.81	2.67	6.75	12.23	0	2.70	2.70	4.10	0.00
I'15	1.170	-0.568	1.74	0.33		2.06																		
M15	1.170	-0.650	1.82	0.33	1.40	2.15	2.11	4.10	1.40	2.70	12.12	0.00	12.12	0.73	5.74	2.81	2.67	6.64	12.12	0	2.70	2.70	4.10	0.00
								61.50	21.00	40.50	183.31	0.00	183.31	10.95	86.10	42.19	40.05	101.07	183.31	0	40.50	40.50	61.50	0.00

Concrete G : 3.078 m3

Timber piles : 2657 m

591 trees

Table B.2.10 (20) Sewer Line : E3 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : E3 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00		Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
																				pipes	m			
I2	1.140	-0.466	1.61	0.33		1.93																		
M2	1.140	-0.558	1.70	0.33	1.40	2.02	1.98	4.60	1.10	3.50	12.76	0.00	12.76	0.95	6.44	3.16	3.46	6.14	12.76	0	3.50	3.50	4.60	0.00
I3	1.180	-0.497	1.68	0.33		2.00																		
M3	1.180	-0.589	1.77	0.33	1.40	2.09	2.05	4.60	1.10	3.50	13.21	0.00	13.21	0.95	6.44	3.16	3.46	6.59	13.21	0	3.50	3.50	4.60	0.00
I4	1.220	-0.528	1.75	0.33		2.07																		
M4	1.220	-0.620	1.84	0.33	1.40	2.17	2.12	4.60	1.10	3.50	13.66	0.00	13.66	0.95	6.44	3.16	3.46	7.04	13.66	0	3.50	3.50	4.60	0.00
I5	1.260	-0.551	1.81	0.33		2.14																		
M5	1.260	-0.643	1.90	0.33	1.40	2.23	2.19	4.60	1.10	3.50	14.11	0.00	14.11	0.95	6.44	3.16	3.46	7.49	14.11	0	3.50	3.50	4.60	0.00
I7	1.250	-0.558	1.81	0.33		2.13																		
M7	1.250	-0.650	1.90	0.33	1.40	2.23	2.18	4.60	1.40	3.20	14.04	0.00	14.04	0.87	6.44	3.16	3.16	7.72	14.04	0	3.20	3.20	4.60	0.00
I8	1.240	-0.558	1.80	0.33		2.12																		
M8	1.240	-0.650	1.89	0.33	1.40	2.22	2.17	4.60	1.40	3.20	13.98	0.00	13.98	0.87	6.44	3.16	3.16	7.66	13.98	0	3.20	3.20	4.60	0.00
I9	1.220	-0.608	1.83	0.33		2.15																		
M9	1.220	-0.700	1.92	0.33	1.40	2.25	2.20	4.60	1.40	3.20	14.17	0.00	14.17	0.87	6.44	3.16	3.16	7.85	14.17	0	3.20	3.20	4.60	0.00
I10	1.170	-0.658	1.83	0.33		2.15																		
M10	1.170	-0.750	1.92	0.33	1.40	2.25	2.20	4.60	1.40	3.20	14.17	0.00	14.17	0.87	6.44	3.16	3.16	7.85	14.17	0	3.20	3.20	4.60	0.00
I11	1.130	-0.708	1.84	0.33		2.16																		
M11	1.130	-0.800	1.93	0.33	1.40	2.26	2.21	4.60	1.40	3.20	14.24	0.00	14.24	0.87	6.44	3.16	3.16	7.92	14.24	0	3.20	3.20	4.60	0.00
I12	1.140	-0.708	1.85	0.33		2.17																		
M12	1.140	-0.800	1.94	0.33	1.40	2.27	2.22	4.60	1.40	3.20	14.30	0.00	14.30	0.87	6.44	3.16	3.16	7.98	14.30	0	3.20	3.20	4.60	0.00
I13	1.160	-0.708	1.87	0.33		2.19																		
M13	1.160	-0.800	1.96	0.33	1.40	2.29	2.24	4.60	1.40	3.20	14.43	0.00	14.43	0.87	6.44	3.16	3.16	8.11	14.43	0	3.20	3.20	4.60	0.00
I16	1.120	-0.708	1.83	0.33		2.15																		
M16	1.120	-0.800	1.92	0.33	1.40	2.25	2.20	4.60	1.40	3.20	14.17	0.00	14.17	0.87	6.44	3.16	3.16	7.85	14.17	0	3.20	3.20	4.60	0.00
I17	1.110	-0.708	1.82	0.33		2.14																		
M17	1.110	-0.800	1.91	0.33	1.40	2.24	2.19	4.60	1.40	3.20	14.11	0.00	14.11	0.87	6.44	3.16	3.16	7.79	14.11	0	3.20	3.20	4.60	0.00
I21	1.285	-0.508	1.79	0.33		2.12																		
M21	1.285	-0.600	1.89	0.33	1.40	2.21	2.17	4.60	1.40	3.20	13.98	0.00	13.98	0.87	6.44	3.16	3.16	7.66	13.98	0	3.20	3.20	4.60	0.00
I23	1.270	-0.508	1.78	0.33		2.10																		
M23	1.270	-0.600	1.87	0.33	1.40	2.20	2.15	4.60	1.40	3.20	13.85	0.00	13.85	0.87	6.44	3.16	3.16	7.53	13.85	0	3.20	3.20	4.60	0.00
I24	1.300	-0.508	1.81	0.33		2.13																		
M24	1.300	-0.600	1.90	0.33	1.40	2.23	2.18	4.60	1.40	3.20	14.04	0.00	14.04	0.87	6.44	3.16	3.16	7.72	14.04	0	3.20	3.20	4.60	0.00
I25	1.290	-0.508	1.80	0.33		2.12																		
M25	1.290	-0.600	1.89	0.33	1.40	2.22	2.17	4.60	1.40	3.20	13.98	0.00	13.98	0.87	6.44	3.16	3.16	7.66	13.98	0	3.20	3.20	4.60	0.00
								78.20	22.60	55.60	237.20	0.00	237.20	15.11	109.48	53.65	54.92	128.63	237.20	0	55.60	55.60	78.20	0.00

Concrete G : 4.2256 m3

Timber piles : 3379 m

751 trees

Table B.2.10 (21) Sewer Line : W1 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : W1 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N	L_2	L_3	W_2
I1	1.470	-0.268	1.74	0.33		2.06														pipes			
M1	1.470	-0.350	1.82	0.33	1.40	2.15	2.11	4.10	1.10	3.00	12.12	0.00	12.12	0.82	5.74	2.81	2.96	6.35	12.12	0	3.00	4.10	0.00
I2	1.390	-0.268	1.66	0.33		1.98														m			
M2	1.390	-0.350	1.74	0.33	1.40	2.07	2.03	4.10	1.10	3.00	11.66	0.00	11.66	0.82	5.74	2.81	2.96	5.89	11.66	0	3.00	4.10	0.00
I3	1.340	-0.268	1.61	0.33		1.93																	
M3	1.340	-0.350	1.69	0.33	1.40	2.02	1.98	4.10	1.10	3.00	11.37	0.00	11.37	0.82	5.74	2.81	2.96	5.60	11.37	0	3.00	4.10	0.00
I4	1.340	-0.318	1.66	0.33		1.98																	
M4	1.340	-0.400	1.74	0.33	1.40	2.07	2.03	4.10	1.10	3.00	11.66	0.00	11.66	0.82	5.74	2.81	2.96	5.89	11.66	0	3.00	4.10	0.00
I5	1.360	-0.318	1.68	0.33		2.00																	
M5	1.360	-0.400	1.76	0.33	1.40	2.09	2.05	4.10	1.10	3.00	11.77	0.00	11.77	0.82	5.74	2.81	2.96	6.00	11.77	0	3.00	4.10	0.00
I6	1.370	-0.358	1.73	0.33		2.05																	
M6	1.370	-0.440	1.81	0.33	1.40	2.14	2.10	4.10	1.10	3.00	12.06	0.00	12.06	0.82	5.74	2.81	2.96	6.29	12.06	0	3.00	4.10	0.00
I7	1.390	-0.368	1.76	0.33		2.08																	
M7	1.390	-0.450	1.84	0.33	1.40	2.17	2.13	4.10	1.10	3.00	12.23	0.00	12.23	0.82	5.74	2.81	2.96	6.46	12.23	0	3.00	4.10	0.00
I8	1.430	-0.368	1.80	0.33		2.12																	
M8	1.430	-0.450	1.88	0.33	1.40	2.21	2.17	4.10	1.10	3.00	12.46	0.00	12.46	0.82	5.74	2.81	2.96	6.69	12.46	0	3.00	4.10	0.00
I9	1.444	-0.368	1.81	0.33		2.14																	
M9	1.444	-0.450	1.89	0.33	1.40	2.22	2.18	4.10	1.10	3.00	12.52	0.00	12.52	0.82	5.74	2.81	2.96	6.75	12.52	0	3.00	4.10	0.00
I10	1.426	-0.368	1.79	0.33		2.12																	
M10	1.426	-0.450	1.88	0.33	1.40	2.20	2.16	4.10	1.10	3.00	12.40	0.00	12.40	0.82	5.74	2.81	2.96	6.63	12.40	0	3.00	4.10	0.00
I11	1.444	-0.168	1.61	0.33		1.94																	
M11	1.444	-0.250	1.69	0.33	1.40	2.02	1.98	4.10	1.10	3.00	11.37	0.00	11.37	0.82	5.74	2.81	2.96	5.60	11.37	0	3.00	4.10	0.00
I12	1.480	-0.138	1.62	0.33		1.94																	
M12	1.480	-0.220	1.70	0.33	1.40	2.03	1.99	4.10	1.10	3.00	11.43	0.00	11.43	0.82	5.74	2.81	2.96	5.66	11.43	0	3.00	4.10	0.00
I14	1.560	0.034	1.53	0.33		1.85																	
M14	1.560	-0.050	1.61	0.33	1.40	1.94	1.90	4.20	1.40	2.80	11.18	0.00	11.18	0.76	5.88	2.88	2.77	5.53	11.18	0	2.80	4.20	0.00
I15	1.526	-0.016	1.54	0.33		1.87																	
M15	1.526	-0.100	1.63	0.33	1.40	1.95	1.91	4.20	1.40	2.80	11.24	0.00	11.24	0.76	5.88	2.88	2.77	5.59	11.24	0	2.80	4.20	0.00
I16	1.480	-0.066	1.55	0.33		1.87																	
M16	1.480	-0.150	1.63	0.33	1.40	1.96	1.92	4.20	1.40	2.80	11.29	0.00	11.29	0.76	5.88	2.88	2.77	5.64	11.29	0	2.80	4.20	0.00
I18	1.450	-0.066	1.52	0.33		1.84																	
M18	1.450	-0.150	1.60	0.33	1.40	1.93	1.89	4.20	2.40	1.80	11.12	0.00	11.12	0.49	5.88	2.88	1.78	6.46	11.12	0	1.80	4.20	0.00
								66.00	19.80	46.20	187.88	0.00	187.88	12.61	92.40	45.28	45.61	96.99	187.88	0	46.20	46.20	66.00	0.00

Concrete G : 3.5112 m3

Timber piles : 2852 m

634 trees

Table B.2.10 (22) Sewer Line : W1 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : W1 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete		$_m$	
						Downstream					<= 6 m	=> 6 m				0.49				Length (m)	4.00		2.5	
		IE_1	ID_1			H_2																		
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
																				pipes	m			
I18	1.450	-0.066	1.52	0.33		1.84																		
M18	1.450	-0.150	1.60	0.33	1.40	1.93	1.89	4.20	1.40	2.80	11.12	0.00	11.12	0.76	5.88	2.88	2.77	5.47	11.12	0	2.80	2.80	4.20	0.00
I20	1.420	-0.116	1.54	0.33		1.86																		
M20	1.420	-0.200	1.62	0.33	1.40	1.95	1.91	4.20	1.40	2.80	11.24	0.00	11.24	0.76	5.88	2.88	2.77	5.59	11.24	0	2.80	2.80	4.20	0.00
I21	1.400	-0.116	1.52	0.33		1.84																		
M21	1.400	-0.200	1.60	0.33	1.40	1.93	1.89	4.20	1.40	2.80	11.12	0.00	11.12	0.76	5.88	2.88	2.77	5.47	11.12	0	2.80	2.80	4.20	0.00
I22	1.430	-0.116	1.55	0.33		1.87																		
M22	1.430	-0.200	1.63	0.33	1.40	1.96	1.92	4.20	1.40	2.80	11.29	0.00	11.29	0.76	5.88	2.88	2.77	5.64	11.29	0	2.80	2.80	4.20	0.00
I23	1.470	-0.066	1.54	0.33		1.86																		
M23	1.470	-0.150	1.62	0.33	1.40	1.95	1.91	4.20	1.40	2.80	11.24	0.00	11.24	0.76	5.88	2.88	2.77	5.59	11.24	0	2.80	2.80	4.20	0.00
I25	1.545	0.034	1.51	0.33		1.84																		
M25	1.545	-0.050	1.60	0.33	1.40	1.92	1.88	4.20	1.40	2.80	11.06	0.00	11.06	0.76	5.88	2.88	2.77	5.41	11.06	0	2.80	2.80	4.20	0.00
I27	1.680	0.134	1.55	0.33		1.87																		
M27	1.680	0.050	1.63	0.33	1.40	1.96	1.92	4.20	1.40	2.80	11.29	0.00	11.29	0.76	5.88	2.88	2.77	5.64	11.29	0	2.80	2.80	4.20	0.00
I30	1.670	0.134	1.54	0.33		1.86																		
M30	1.670	0.050	1.62	0.33	1.40	1.95	1.91	4.20	1.60	2.60	11.24	0.00	11.24	0.71	5.88	2.88	2.57	5.79	11.24	0	2.60	2.60	4.20	0.00
I31	1.680	0.134	1.55	0.33		1.87																		
M31	1.680	0.050	1.63	0.33	1.40	1.96	1.92	4.20	1.60	2.60	11.29	0.00	11.29	0.71	5.88	2.88	2.57	5.84	11.29	0	2.60	2.60	4.20	0.00
I32	1.690	0.134	1.56	0.33		1.88																		
M32	1.690	0.050	1.64	0.33	1.40	1.97	1.93	4.20	1.60	2.60	11.35	0.00	11.35	0.71	5.88	2.88	2.57	5.90	11.35	0	2.60	2.60	4.20	0.00
I33	1.700	0.134	1.57	0.33		1.89																		
M33	1.700	0.050	1.65	0.33	1.40	1.98	1.94	4.20	1.60	2.60	11.41	0.00	11.41	0.71	5.88	2.88	2.57	5.96	11.41	0	2.60	2.60	4.20	0.00
I34	1.700	0.134	1.57	0.33		1.89																		
M34	1.700	0.050	1.65	0.33	1.40	1.98	1.94	4.20	1.60	2.60	11.41	0.00	11.41	0.71	5.88	2.88	2.57	5.96	11.41	0	2.60	2.60	4.20	0.00
I35	1.700	0.134	1.57	0.33		1.89																		
M35	1.700	0.050	1.65	0.33	1.40	1.98	1.94	4.20	1.60	2.60	11.41	0.00	11.41	0.71	5.88	2.88	2.57	5.96	11.41	0	2.60	2.60	4.20	0.00
I36	1.700	0.134	1.57	0.33		1.89																		
M36	1.700	0.050	1.65	0.33	1.40	1.98	1.94	4.20	1.60	2.60	11.41	0.00	11.41	0.71	5.88	2.88	2.57	5.96	11.41	0	2.60	2.60	4.20	0.00
I37	1.700	0.134	1.57	0.33		1.89																		
M37	1.700	0.050	1.65	0.33	1.40	1.98	1.94	4.20	1.60	2.60	11.41	0.00	11.41	0.71	5.88	2.88	2.57	5.96	11.41	0	2.60	2.60	4.20	0.00
I38	1.720	0.134	1.59	0.33		1.91																		
M38	1.720	0.050	1.67	0.33	1.40	2.00	1.96	4.20	1.60	2.60	11.53	0.00	11.53	0.71	5.88	2.88	2.57	6.08	11.53	0	2.60	2.60	4.20	0.00
								67.20	24.20	43.00	180.82	0.00	180.82	11.71	94.08	46.10	42.52	92.20	180.82	0	43.00	43.00	67.20	0.00

Concrete G : 3.268 m3

Timber piles : 2904 m

646 trees

Table B.2.10 (23) Sewer Line : W1 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : W1 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00	Pipe Number Concrete	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I39	1.770	0.184	1.59	0.33		1.91														pipes	m			
M39	1.770	0.100	1.67	0.33	1.40	2.00	1.96	4.20	1.60	2.60	11.53	0.00	11.53	0.71	5.88	2.88	2.57	6.08	11.53	0	2.60	2.60	4.20	0.00
I40	1.840	0.234	1.61	0.33		1.93																		
M40	1.840	0.150	1.69	0.33	1.40	2.02	1.98	4.20	1.60	2.60	11.65	0.00	11.65	0.71	5.88	2.88	2.57	6.20	11.65	0	2.60	2.60	4.20	0.00
I42	1.910	0.334	1.58	0.33		1.90																		
M42	1.910	0.250	1.66	0.33	1.40	1.99	1.95	4.20	1.60	2.60	11.47	0.00	11.47	0.71	5.88	2.88	2.57	6.02	11.47	0	2.60	2.60	4.20	0.00
								12.60	4.80	7.80	34.65	0.00	34.65	2.13	17.64	8.64	7.71	18.30	34.65	0	7.80	7.80	12.60	0.00

Concrete G : 0.5928 m3

Timber piles : 545 m
122 trees

Table B.2.10 (24) Sewer Line : W2 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : W2 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream / Downstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.49	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type / Length (m)	Concrete 4.00		$_m$ 2.5	
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I1	1.430	0.102	1.33	0.33		1.65														pipes	m			
M1	1.430	-0.250	1.68	0.33	1.40	2.01	1.83	17.60	1.10	16.50	45.10	0.00	45.10	4.49	24.64	12.07	16.30	16.73	45.10	4	0.50	16.50	17.60	0.00
I'1	1.430	-0.522	1.95	0.33		2.28																		
M1	1.430	-0.570	2.00	0.33	1.40	2.33	2.31	2.40	1.10	1.30	7.77	0.00	7.77	0.35	3.36	1.65	1.29	4.83	7.77	0	1.30	1.30	2.40	0.00
I2	1.160	-0.148	1.31	0.33		1.63																		
M2	1.160	-0.500	1.66	0.33	1.40	1.99	1.81	17.60	1.10	16.50	44.60	0.00	44.60	4.49	24.64	12.07	16.30	16.23	44.60	4	0.50	16.50	17.60	0.00
I3	1.240	-0.048	1.29	0.33		1.61																		
M3	1.240	-0.400	1.64	0.33	1.40	1.97	1.79	17.60	1.10	16.50	44.11	0.00	44.11	4.49	24.64	12.07	16.30	15.74	44.11	4	0.50	16.50	17.60	0.00
I4	1.250	-0.048	1.30	0.33		1.62																		
M4	1.250	-0.400	1.65	0.33	1.40	1.98	1.80	17.60	1.10	16.50	44.36	0.00	44.36	4.49	24.64	12.07	16.30	15.99	44.36	4	0.50	16.50	17.60	0.00
I'6	1.190	-0.752	1.94	0.33		2.27																		
M6	1.190	-0.800	1.99	0.33	1.40	2.32	2.30	2.40	1.10	1.30	7.73	0.00	7.73	0.35	3.36	1.65	1.29	4.79	7.73	0	1.30	1.30	2.40	0.00
I7	1.170	-0.148	1.32	0.33		1.64																		
M7	1.170	-0.500	1.67	0.33	1.40	2.00	1.82	17.60	1.10	16.50	44.85	0.00	44.85	4.49	24.64	12.07	16.30	16.48	44.85	4	0.50	16.50	17.60	0.00
I'7	1.170	-0.802	1.97	0.33		2.30																		
M7	1.170	-0.850	2.02	0.33	1.40	2.35	2.33	2.40	1.10	1.30	7.83	0.00	7.83	0.35	3.36	1.65	1.29	4.89	7.83	0	1.30	1.30	2.40	0.00
I8	1.170	-0.148	1.32	0.33		1.64																		
M8	1.170	-0.500	1.67	0.33	1.40	2.00	1.82	17.60	1.10	16.50	44.85	0.00	44.85	4.49	24.64	12.07	16.30	16.48	44.85	4	0.50	16.50	17.60	0.00
I'8	1.170	-0.802	1.97	0.33		2.30																		
M8	1.170	-0.850	2.02	0.33	1.40	2.35	2.33	2.40	1.10	1.30	7.83	0.00	7.83	0.35	3.36	1.65	1.29	4.89	7.83	0	1.30	1.30	2.40	0.00
I9	1.210	-0.048	1.26	0.33		1.58																		
M9	1.210	-0.400	1.61	0.33	1.40	1.94	1.76	17.60	1.10	16.50	43.37	0.00	43.37	4.49	24.64	12.07	16.30	15.00	43.37	4	0.50	16.50	17.60	0.00
I'9	1.210	-0.752	1.96	0.33		2.29																		
M9	1.210	-0.800	2.01	0.33	1.40	2.34	2.32	2.40	1.10	1.30	7.80	0.00	7.80	0.35	3.36	1.65	1.29	4.86	7.80	0	1.30	1.30	2.40	0.00
I10	1.216	-0.048	1.26	0.33		1.59																		
M10	1.216	-0.400	1.62	0.33	1.40	1.94	1.77	17.60	1.10	16.50	43.62	0.00	43.62	4.49	24.64	12.07	16.30	15.25	43.62	4	0.50	16.50	17.60	0.00
I'10	1.216	-0.752	1.97	0.33		2.29																		
M10	1.216	-0.800	2.02	0.33	1.40	2.34	2.32	2.40	1.10	1.30	7.80	0.00	7.80	0.35	3.36	1.65	1.29	4.86	7.80	0	1.30	1.30	2.40	0.00
I11	1.240	-0.338	1.58	0.33		1.90																		
M11	1.240	-0.400	1.64	0.33	1.40	1.97	1.94	3.10	1.10	2.00	8.42	0.00	8.42	0.54	4.34	2.13	1.98	4.31	8.42	0	2.00	2.00	3.10	0.00
I'11	1.240	-0.666	1.91	0.33		2.23																		
M11	1.240	-0.750	1.99	0.33	1.40	2.32	2.28	4.20	1.10	3.10	13.41	0.00	13.41	0.84	5.88	2.88	3.07	7.46	13.41	0	3.10	3.10	4.20	0.00
								162.50	17.60	144.90	423.45	0.00	423.45	39.40	227.50	111.48	143.19	168.79	423.45	32	16.90	144.90	162.50	0.00

Concrete G : 11.0124 m3

Timber piles : 7020 m
1560 trees

Table B.2.10 (25) Sewer Line : W2 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : W2 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream / Downstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.49	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type / Length (m)	Concrete 4.00		$_m$ 2.5	
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I12	1.140	-0.438	1.58	0.33		1.90														pipes	m			
M12	1.140	-0.500	1.64	0.33	1.40	1.97	1.94	3.10	1.10	2.00	8.42	0.00	8.42	0.54	4.34	2.13	1.98	4.31	8.42	0	2.00	2.00	3.10	0.00
I'12	1.140	-0.766	1.91	0.33		2.23																		
M12	1.140	-0.850	1.99	0.33	1.40	2.32	2.28	4.20	1.10	3.10	13.41	0.00	13.41	0.84	5.88	2.88	3.07	7.46	13.41	0	3.10	3.10	4.20	0.00
I'13	1.110	-0.816	1.93	0.33		2.25																		
M13	1.110	-0.900	2.01	0.33	1.40	2.34	2.30	4.20	1.10	3.10	13.53	0.00	13.53	0.84	5.88	2.88	3.07	7.58	13.53	0	3.10	3.10	4.20	0.00
I14	1.130	-0.438	1.57	0.33		1.89																		
M14	1.130	-0.500	1.63	0.33	1.40	1.96	1.93	3.10	1.20	1.90	8.38	0.00	8.38	0.52	4.34	2.13	1.87	4.38	8.38	0	1.90	1.90	3.10	0.00
I'14	1.130	-0.766	1.90	0.33		2.22																		
M14	1.130	-0.850	1.98	0.33	1.40	2.31	2.27	4.20	1.20	3.00	13.35	0.00	13.35	0.82	5.88	2.88	2.96	7.51	13.35	0	3.00	3.00	4.20	0.00
I15	1.140	-0.438	1.58	0.33		1.90																		
M15	1.140	-0.500	1.64	0.33	1.40	1.97	1.94	3.10	1.40	1.70	8.42	0.00	8.42	0.46	4.34	2.13	1.68	4.61	8.42	0	1.70	1.70	3.10	0.00
I'15	1.140	-0.766	1.91	0.33		2.23																		
M15	1.140	-0.850	1.99	0.33	1.40	2.32	2.28	4.20	1.40	2.80	13.41	0.00	13.41	0.76	5.88	2.88	2.77	7.76	13.41	0	2.80	2.80	4.20	0.00
I16	1.140	-0.438	1.58	0.33		1.90																		
M16	1.140	-0.500	1.64	0.33	1.40	1.97	1.94	3.10	1.40	1.70	8.42	0.00	8.42	0.46	4.34	2.13	1.68	4.61	8.42	0	1.70	1.70	3.10	0.00
I'16	1.140	-0.766	1.91	0.33		2.23																		
M16	1.140	-0.850	1.99	0.33	1.40	2.32	2.28	4.20	1.40	2.80	13.41	0.00	13.41	0.76	5.88	2.88	2.77	7.76	13.41	0	2.80	2.80	4.20	0.00
I17	1.160	-0.438	1.60	0.33		1.92																		
M17	1.160	-0.500	1.66	0.33	1.40	1.99	1.96	3.10	1.40	1.70	8.51	0.00	8.51	0.46	4.34	2.13	1.68	4.70	8.51	0	1.70	1.70	3.10	0.00
I'17	1.160	-0.766	1.93	0.33		2.25																		
M17	1.160	-0.850	2.01	0.33	1.40	2.34	2.30	4.20	1.40	2.80	13.53	0.00	13.53	0.76	5.88	2.88	2.77	7.88	13.53	0	2.80	2.80	4.20	0.00
I18	1.180	-0.438	1.62	0.33		1.94																		
M18	1.180	-0.500	1.68	0.33	1.40	2.01	1.98	3.10	1.40	1.70	8.60	0.00	8.60	0.46	4.34	2.13	1.68	4.79	8.60	0	1.70	1.70	3.10	0.00
I'18	1.180	-0.766	1.95	0.33		2.27																		
M18	1.180	-0.850	2.03	0.33	1.40	2.36	2.32	4.20	1.40	2.80	13.65	0.00	13.65	0.76	5.88	2.88	2.77	8.00	13.65	0	2.80	2.80	4.20	0.00
I19	1.210	-0.338	1.55	0.33		1.87																		
M19	1.210	-0.400	1.61	0.33	1.40	1.94	1.91	3.10	1.40	1.70	8.29	0.00	8.29	0.46	4.34	2.13	1.68	4.48	8.29	0	1.70	1.70	3.10	0.00
I'19	1.210	-0.716	1.93	0.33		2.25																		
M19	1.210	-0.800	2.01	0.33	1.40	2.34	2.30	4.20	1.40	2.80	13.53	0.00	13.53	0.76	5.88	2.88	2.77	7.88	13.53	0	2.80	2.80	4.20	0.00
								55.30	19.70	35.60	166.86	0.00	166.86	9.66	77.42	37.94	35.20	93.72	166.86	0	35.60	35.60	55.30	0.00

Concrete G : 2.7056 m3

Timber piles : 2389 m

531 trees

Table B.2.10 (26) Sewer Line : W2 (Pipe Diameter : 400)

Bill of Quantity

Area : BM1 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : W2 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream / Downstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.49	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type / Length (m)	Concrete 4.00		2.5 m	
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I20	1.260	-0.338	1.60	0.33		1.92														pipes	m			
M20	1.260	-0.400	1.66	0.33	1.40	1.99	1.96	3.10	1.40	1.70	8.51	0.00	8.51	0.46	4.34	2.13	1.68	4.70	8.51	0	1.70	1.70	3.10	0.00
I'20	1.260	-0.616	1.88	0.33		2.20																		
M20	1.260	-0.700	1.96	0.33	1.40	2.29	2.25	4.20	1.40	2.80	13.23	0.00	13.23	0.76	5.88	2.88	2.77	7.58	13.23	0	2.80	2.80	4.20	0.00
I21	1.340	-0.238	1.58	0.33		1.90																		
M21	1.340	-0.300	1.64	0.33	1.40	1.97	1.94	3.10	1.40	1.70	8.42	0.00	8.42	0.46	4.34	2.13	1.68	4.61	8.42	0	1.70	1.70	3.10	0.00
I'21	1.340	-0.588	1.93	0.33		2.25																		
M21	1.340	-0.650	1.99	0.33	1.40	2.32	2.29	3.10	1.40	1.70	9.94	0.00	9.94	0.46	4.34	2.13	1.68	6.13	9.94	0	1.70	1.70	3.10	0.00
I22	1.400	-0.138	1.54	0.33		1.86																		
M22	1.400	-0.200	1.60	0.33	1.40	1.93	1.90	3.10	1.40	1.70	8.25	0.00	8.25	0.46	4.34	2.13	1.68	4.44	8.25	0	1.70	1.70	3.10	0.00
I'22	1.400	-0.516	1.92	0.33		2.24																		
M22	1.400	-0.600	2.00	0.33	1.40	2.33	2.29	4.20	1.40	2.80	13.47	0.00	13.47	0.76	5.88	2.88	2.77	7.82	13.47	0	2.80	2.80	4.20	0.00
I23	1.450	-0.088	1.54	0.33		1.86																		
M23	1.450	-0.150	1.60	0.33	1.40	1.93	1.90	3.10	1.40	1.70	8.25	0.00	8.25	0.46	4.34	2.13	1.68	4.44	8.25	0	1.70	1.70	3.10	0.00
I'23	1.450	-0.466	1.92	0.33		2.24																		
M23	1.450	-0.550	2.00	0.33	1.40	2.33	2.29	4.20	1.40	2.80	13.47	0.00	13.47	0.76	5.88	2.88	2.77	7.82	13.47	0	2.80	2.80	4.20	0.00
I24	1.460	-0.088	1.55	0.33		1.87																		
M24	1.460	-0.150	1.61	0.33	1.40	1.94	1.91	3.10	1.40	1.70	8.29	0.00	8.29	0.46	4.34	2.13	1.68	4.48	8.29	0	1.70	1.70	3.10	0.00
I'24	1.460	-0.416	1.88	0.33		2.20																		
M24	1.460	-0.500	1.96	0.33	1.40	2.29	2.25	4.20	1.40	2.80	13.23	0.00	13.23	0.76	5.88	2.88	2.77	7.58	13.23	0	2.80	2.80	4.20	0.00
I25	1.522	0.012	1.51	0.33		1.84																		
M25	1.522	-0.050	1.57	0.33	1.40	1.90	1.87	3.10	1.40	1.70	8.12	0.00	8.12	0.46	4.34	2.13	1.68	4.31	8.12	0	1.70	1.70	3.10	0.00
I'25	1.522	-0.416	1.94	0.33		2.26																		
M25	1.522	-0.500	2.02	0.33	1.40	2.35	2.31	4.20	1.40	2.80	13.59	0.00	13.59	0.76	5.88	2.88	2.77	7.94	13.59	0	2.80	2.80	4.20	0.00
								42.70	16.80	25.90	126.77	0.00	126.77	7.02	59.78	29.29	25.61	71.87	126.77	0	25.90	25.90	42.70	0.00

Concrete G : 1.9684 m3

Timber piles : 1845 m

410 trees

Table B.2.10 (27) Sewer Line : E1 (Pipe Diamter : 600)

Bill of Quantity

Area : BM1 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : E1 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N: pipes / m	L_2	L_3	W_2
I'8	1.300	0.012	1.29	0.39		1.68																	
M8	1.300	-0.050	1.35	0.39	1.60	1.74	1.71	3.10	1.10	2.00	8.49	0.00	8.49	1.16	4.96	2.43	2.55	3.51	8.49	0 / 2.00	2.00	3.10	0.00
I'9	1.320	-0.544	1.86	0.39		2.25																	
M9	1.320	-0.606	1.93	0.39	1.60	2.32	2.29	3.10	1.10	2.00	11.36	0.00	11.36	1.16	4.96	2.43	2.55	6.38	11.36	0 / 2.00	2.00	3.10	0.00
I'11	1.430	-0.508	1.94	0.39		2.33																	
M11	1.430	-0.570	2.00	0.39	1.60	2.39	2.36	3.10	1.10	2.00	11.71	0.00	11.71	1.16	4.96	2.43	2.55	6.73	11.71	0 / 2.00	2.00	3.10	0.00
I'17	1.290	-0.616	1.91	0.39		2.30																	
M17	1.290	-0.700	1.99	0.39	1.60	2.38	2.34	4.20	1.40	2.80	15.73	0.00	15.73	1.62	6.72	3.29	3.58	8.86	15.73	0 / 2.80	2.80	4.20	0.00
I'19	1.270	-0.666	1.94	0.39		2.33																	
M19	1.270	-0.750	2.02	0.39	1.60	2.41	2.37	4.20	1.40	2.80	15.93	0.00	15.93	1.62	6.72	3.29	3.58	9.06	15.93	0 / 2.80	2.80	4.20	0.00
I'22	1.250	-0.666	1.92	0.39		2.31																	
M22	1.250	-0.750	2.00	0.39	1.60	2.39	2.35	4.20	1.40	2.80	15.80	0.00	15.80	1.62	6.72	3.29	3.58	8.93	15.80	0 / 2.80	2.80	4.20	0.00
I'29	1.450	-0.566	2.02	0.39		2.41																	
M29	1.450	-0.650	2.10	0.39	1.60	2.49	2.45	4.20	1.40	2.80	16.47	0.00	16.47	1.62	6.72	3.29	3.58	9.60	16.47	0 / 2.80	2.80	4.20	0.00
								26.10	8.90	17.20	95.49	0.00	95.49	9.96	41.76	20.46	21.97	53.06	95.49	0 / 17.20	17.20	26.10	0.00

Concrete G : 2.9584 m3

Timber piles : 1692 m

376 trees

Table B.2.10 (28) Sewer Line : E2 (Pipe Diamter : 600)

Bill of Quantity

Area : BM1 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : E2 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) / 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N	L_2	L_3	W_2
																				pipes / m			
I4	1.090	-0.648	1.74	0.39		2.13																	
M4	1.090	-0.710	1.80	0.39	1.60	2.19	2.16	3.10	1.40	1.70	10.72	0.00	10.72	0.98	4.96	2.43	2.18	6.11	10.72	0 / 1.70	1.70	3.10	0.00
I9	1.135	-0.638	1.77	0.39		2.16																	
M9	1.135	-0.700	1.84	0.39	1.60	2.23	2.20	3.10	1.40	1.70	10.92	0.00	10.92	0.98	4.96	2.43	2.18	6.31	10.92	0 / 1.70	1.70	3.10	0.00
I12	1.070	-0.688	1.76	0.39		2.15																	
M12	1.070	-0.750	1.82	0.39	1.60	2.21	2.18	3.10	1.40	1.70	10.82	0.00	10.82	0.98	4.96	2.43	2.18	6.21	10.82	0 / 1.70	1.70	3.10	0.00
I15	1.170	-0.588	1.76	0.39		2.15																	
M15	1.170	-0.650	1.82	0.39	1.60	2.21	2.18	3.10	1.40	1.70	10.82	0.00	10.82	0.98	4.96	2.43	2.18	6.21	10.82	0 / 1.70	1.70	3.10	0.00
								12.40	5.60	6.80	43.28	0.00	43.28	3.92	19.84	9.72	8.72	24.84	43.28	0 / 6.80	6.80	12.40	0.00

Concrete G : 1.1696 m3

Timber piles : 804 m

179 trees

Table E.2.10 (29) Sewer Line : E3 (Pipe Diamter : 600)

Bill of Quantity

Area : BM1 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : E3 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Excavation Work (m^3) Clamshell Depth => 6 m	Excavation Work (m^3) Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N: pipes	N: m	L_2	L_3	W_2
I14	1.190	-0.808	2.00	0.39		2.39																		
M14	1.190	-0.900	2.09	0.39	1.60	2.48	2.44	4.60	1.40	3.20	17.96	0.00	17.96	1.85	7.36	3.61	4.09	10.26	17.96	0	3.20	3.20	4.60	0.00
I15	1.160	-0.858	2.02	0.39		2.41																		
M15	1.160	-0.950	2.11	0.39	1.60	2.50	2.46	4.60	1.40	3.20	18.11	0.00	18.11	1.85	7.36	3.61	4.09	10.41	18.11	0	3.20	3.20	4.60	0.00
I18	1.150	-0.858	2.01	0.39		2.40																		
M18	1.150	-0.950	2.10	0.39	1.60	2.49	2.45	4.60	1.40	3.20	18.04	0.00	18.04	1.85	7.36	3.61	4.09	10.34	18.04	0	3.20	3.20	4.60	0.00
I19	1.220	-0.808	2.03	0.39		2.42																		
M19	1.220	-0.900	2.12	0.39	1.60	2.51	2.47	4.60	1.40	3.20	18.18	0.00	18.18	1.85	7.36	3.61	4.09	10.48	18.18	0	3.20	3.20	4.60	0.00
I20	1.270	-0.758	2.03	0.39		2.42																		
M20	1.270	-0.850	2.12	0.39	1.60	2.51	2.47	4.60	1.40	3.20	18.18	0.00	18.18	1.85	7.36	3.61	4.09	10.48	18.18	0	3.20	3.20	4.60	0.00
I22	1.270	-0.708	1.98	0.39		2.37																		
M22	1.270	-0.800	2.07	0.39	1.60	2.46	2.42	4.60	1.40	3.20	17.82	0.00	17.82	1.85	7.36	3.61	4.09	10.12	17.82	0	3.20	3.20	4.60	0.00
I26	1.240	-0.758	2.00	0.39		2.39																		
M26	1.240	-0.850	2.09	0.39	1.60	2.48	2.44	4.60	1.40	3.20	17.96	0.00	17.96	1.85	7.36	3.61	4.09	10.26	17.96	0	3.20	3.20	4.60	0.00
I27	1.670	-0.308	1.98	0.39		2.37																		
M27	1.670	-0.400	2.07	0.39	1.60	2.46	2.42	4.60	1.40	3.20	17.82	0.00	17.82	1.85	7.36	3.61	4.09	10.12	17.82	0	3.20	3.20	4.60	0.00
								36.80	11.20	25.60	144.07	0.00	144.07	14.80	58.88	28.85	32.72	82.50	144.07	0	25.60	25.60	36.80	0.00

Concrete G : 4.4032 m3

Timber piles : 2385 m

530 trees

Table B.2.10 (30) Sewer Line : W1 (Pipe Diameter : 600)

Bill of Quantity

Area : BM1 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : W1 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Excavation Work (m^3) Clamshell Depth => 6 m	Excavation Work (m^3) Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
																				pipes	m			
I17	1.430	-0.316	1.75	0.39		2.14																		
M17	1.430	-0.400	1.83	0.39	1.60	2.22	2.18	4.20	1.40	2.80	14.65	0.00	14.65	1.62	6.72	3.29	3.58	7.78	14.65	0	2.80	2.80	4.20	0.00
I19	1.435	-0.316	1.75	0.39		2.14																		
M19	1.435	-0.400	1.84	0.39	1.60	2.23	2.19	4.20	1.40	2.80	14.72	0.00	14.72	1.62	6.72	3.29	3.58	7.85	14.72	0	2.80	2.80	4.20	0.00
I24	1.500	-0.216	1.72	0.39		2.11																		
M24	1.500	-0.300	1.80	0.39	1.60	2.19	2.15	4.20	1.40	2.80	14.45	0.00	14.45	1.62	6.72	3.29	3.58	7.58	14.45	0	2.80	2.80	4.20	0.00
I26	1.610	-0.116	1.73	0.39		2.12																		
M26	1.610	-0.200	1.81	0.39	1.60	2.20	2.16	4.20	1.40	2.80	14.52	0.00	14.52	1.62	6.72	3.29	3.58	7.65	14.52	0	2.80	2.80	4.20	0.00
I28	1.700	-0.016	1.72	0.39		2.11																		
M28	1.700	-0.100	1.80	0.39	1.60	2.19	2.15	4.20	1.50	2.70	14.45	0.00	14.45	1.56	6.72	3.29	3.45	7.71	14.45	0	2.70	2.70	4.20	0.00
I29	1.710	-0.016	1.73	0.39		2.12																		
M29	1.710	-0.100	1.81	0.39	1.60	2.20	2.16	4.20	1.60	2.60	14.52	0.00	14.52	1.51	6.72	3.29	3.32	7.91	14.52	0	2.60	2.60	4.20	0.00
I41	1.930	0.184	1.75	0.39		2.14																		
M41	1.930	0.100	1.83	0.39	1.60	2.22	2.18	4.20	1.60	2.60	14.65	0.00	14.65	1.51	6.72	3.29	3.32	8.04	14.65	0	2.60	2.60	4.20	0.00
								29.40	10.30	19.10	101.96	0.00	101.96	11.06	47.04	23.05	24.41	54.50	101.96	0	19.10	19.10	29.40	0.00

Concrete G : 3.2852 m3

Timber piles : 1906 m

424 trees

Table B.2.10 (31) Sewer Line : W2 (Pipe Diamter 600)

Bill of Quantity

Area : BM1 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : W2 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Excavation Work (m^3) Clamshell Depth => 6 m	Excavation Work (m^3) Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N pipes	N m	L_2	L_3	W_2
I'2	1.160	-0.696	1.86	0.39		2.25																		
M2	1.160	-0.744	1.90	0.39	1.60	2.29	2.27	2.40	1.10	1.30	8.72	0.00	8.72	0.75	3.84	1.88	1.66	5.18	8.72	0	1.30	1.30	2.40	0.00
I'3	1.240	-0.712	1.95	0.39		2.34																		
M3	1.240	-0.760	2.00	0.39	1.60	2.39	2.37	2.40	1.10	1.30	9.11	0.00	9.11	0.75	3.84	1.88	1.66	5.57	9.11	0	1.30	1.30	2.40	0.00
I'4	1.250	-0.702	1.95	0.39		2.34																		
M4	1.250	-0.750	2.00	0.39	1.60	2.39	2.37	2.40	1.10	1.30	9.11	0.00	9.11	0.75	3.84	1.88	1.66	5.57	9.11	0	1.30	1.30	2.40	0.00
I'5	1.230	-0.702	1.93	0.39		2.32																		
M5	1.230	-0.750	1.98	0.39	1.60	2.37	2.35	2.40	1.10	1.30	9.03	0.00	9.03	0.75	3.84	1.88	1.66	5.49	9.03	0	1.30	1.30	2.40	0.00
								9.60	4.40	5.20	35.97	0.00	35.97	3.00	15.36	7.53	6.64	21.80	35.97	0	5.20	5.20	9.60	0.00

Concrete G : 0.8944 m3

Timber piles : 623 m

139 trees

Table B.2.10 (32) Sewer Line : E1 (Pipe Diameter : 1000)

Bill of Quantity

Area : BM1 Pipe Diameter : 1000 Shoring Type : TIMBER

Sewer Line Name : E1 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N	L_2	L_3	W_2
I'34	1.920	-1.300	3.22	0.45		3.67														pipes	m		
M34	1.920	-1.862	3.78	0.45	2.10	4.23	3.95	25.00	1.40	23.60	207.38	0.00	207.38	35.21	52.50	25.73	43.09	138.57	207.38	5	3.60	23.60	25.00	0.00
								25.00	1.40	23.60	207.38	0.00	207.38	35.21	52.50	25.73	43.09	138.57	207.38	5	3.60	23.60	25.00	0.00

Concrete G : 9.3928 m3

Timber piles : 2520 m

560 trees

Table B.2.10 (33) Manhole Construction (1/3)

List of Manhole

Ben Me Coc 1 Pumpr Drainage Area

Route	Manhole No.	Concrete Volume (m^3)				Level Conc	Sand	Timber Wood	Invert			Frame Work				Ladder	Bar
		Slub		Wall					Vol	Area		Slub		Wall			
		Bottom S_b (m^3)	Up S_u (m^3)	Main C_m (m^3)	Up C_u (m^3)	L_e (m^3)	S_a (m^3)	T_w (no)	I_v (m^3)	BQ I_{a1} (m^2)	I_{a2} (m^2)	Bottom F_b (m^2)	Up F_u (m^2)	Main F_m (m^2)	Up F_u (m^2)	L_a (no)	W (kg)
BM1 W1-1	M1	1.200	0.840	2.434	0.056	0.484	0.968	78	0.865	2.250	3.021	2.400	4.410	21.700	0.560	4	275.8
	M2	1.020	0.690	1.653	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	17.280	0.560	4	225.0
	M3	1.020	0.690	1.813	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	18.560	0.560	4	234.5
	M4	1.020	0.690	1.813	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	18.560	0.560	4	234.5
	M5	1.020	0.690	1.813	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	18.560	0.560	4	234.5
	M6	1.020	0.690	1.973	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	19.840	0.560	4	244.1
	M7	1.020	0.690	1.973	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	19.840	0.560	4	244.1
	M8	1.740	1.290	2.674	0.056	0.682	1.364	110	1.385	3.600	4.833	2.940	6.210	27.280	0.560	4	371.2
	M9	1.020	0.690	2.133	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	21.120	0.560	4	253.6
	M10	1.020	0.690	2.133	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	21.120	0.560	4	253.6
	M11	1.020	0.690	2.133	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	21.120	0.560	5	253.6
	M12	1.020	0.690	2.293	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	22.400	0.560	5	263.2
BM1 W1-2	M13	2.366	1.530	4.757	0.136	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	1.360	6	476.8
	M14	2.366	1.530	4.425	0.136	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	1.360	6	476.8
	M15	1.638	1.010	3.524	0.136	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	1.360	6	367.0
	M16	1.638	1.010	3.524	0.136	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	1.360	6	367.0
	M17	1.638	1.010	3.447	0.136	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	1.360	6	367.0
	M18	1.638	1.010	3.524	0.136	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	1.360	6	367.0
	M19	1.638	1.010	3.447	0.136	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	1.360	6	367.0
	M20	1.638	1.010	3.524	0.136	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	1.360	6	367.0
	M21	1.638	1.010	3.524	0.136	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	1.360	6	367.0
	M22	1.638	1.010	3.524	0.136	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	1.360	6	367.0
	M23	1.638	1.010	3.524	0.216	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	2.160	6	373.0
	M24	1.638	1.010	3.447	0.296	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	2.960	6	378.9
	M25	1.638	1.010	3.524	0.296	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	2.960	6	378.9
	M26	1.638	1.010	3.447	0.376	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	3.760	7	384.9
	M27	1.638	1.010	3.524	0.456	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	4.560	7	390.9
BM1 W1-4	M28	3.906	2.630	6.998	0.536	1.254	2.508	201	2.328	7.500	8.658	4.690	11.010	61.000	5.360	9	818.4
	M29	1.953	1.235	4.236	0.616	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	6.160	9	523.6
	M30	1.953	1.235	4.313	0.536	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	5.360	9	517.7
	M31	1.953	1.235	4.313	0.616	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	6.160	9	523.6
	M32	1.953	1.235	4.313	0.616	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	6.160	9	523.6
	M33	1.953	1.235	4.313	0.616	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	6.160	9	523.6
	M34	1.953	1.235	4.313	0.616	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	6.160	9	523.6
	M35	1.953	1.235	4.313	0.696	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	6.960	10	529.6
	M36	1.953	1.235	4.313	0.696	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	6.960	10	529.6
	M37	1.953	1.235	4.313	0.696	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	6.960	10	529.6
	M38	1.953	1.235	4.313	0.696	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	6.960	10	529.6
	M39	1.953	1.235	4.313	0.776	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	7.760	10	535.6
	M40	1.953	1.235	4.313	0.856	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	8.560	10	541.5
	M41	1.953	1.235	4.236	0.936	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	9.360	11	547.5
	M42	1.953	1.235	4.313	0.936	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	9.360	11	547.5
E 3-1	M0	0.507	-	-	0.675	0.225	0.45	36	0.158	0.640	0.914	1.560	-	-	8.560	2	75.5
	I1	0.507	-	-	0.835	0.225	0.45	36	0.158	0.640	0.914	1.560	-	-	10.160	3	87.5
	M1	1.200	0.840	1.845	0.056	0.484	0.968	78	0.865	2.250	3.021	2.400	4.410	17.500	0.560	3	244.5
	M2	1.020	0.690	1.653	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	17.280	0.560	4	225.0
	M3	1.020	0.690	1.813	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	18.560	0.560	4	234.5
	M4	1.020	0.690	1.973	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	19.840	0.560	4	244.1
	M5	1.020	0.690	1.973	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	19.840	0.560	4	244.1
BM1 E 3-2	M6	2.366	1.530	4.257	0.296	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	2.960	6	488.7
	M7	1.638	1.010	3.074	0.296	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	2.960	6	378.9
	M8	1.638	1.010	3.074	0.296	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	2.960	6	378.9
	M9	1.638	1.010	3.074	0.296	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	2.960	6	378.9
	M10	1.638	1.010	3.074	0.296	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	2.960	6	378.9
	M11	1.638	1.010	3.074	0.296	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	2.960	6	378.9
	M12	1.638	1.010	3.074	0.296	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	2.960	6	378.9

Table B.2.10 (33) Manhole Construction (2/3)

Route	Manhole No.	Concrete Volume (m^3)				Level Conc	Sand	Timber Wood	Invert			Frame Work				Ladder	Bar
		Slub		Wall					Vol	Area		Slub		Wall			
		Bottom S_b (m^3)	Up S_u (m^3)	Main C_m (m^3)	Up C_u (m^3)	L_e (m^3)	S_a (m^3)	T_w (no)	I_v (m^3)	BQ I_{a1} (m^2)	I_{a2} (m^2)	Bottom F_b (m^2)	Up F_u (m^2)	Main F_m (m^2)	Up F_u (m^2)	L_a (no)	W (kg)
	M13	1.638	1.010	3.074	0.376	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	3.760	7	384.9
	M14	1.638	1.010	2.997	0.376	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	3.760	7	384.9
	M15	1.638	1.010	2.997	0.376	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	3.760	7	384.9
	M16	1.638	1.010	3.074	0.376	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	3.760	7	384.9
	M17	1.638	1.010	3.074	0.376	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	3.760	7	384.9
	M18	1.638	1.010	2.997	0.456	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	4.560	7	390.9
	M19	1.638	1.010	2.997	0.536	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	5.360	7	396.8
	M20	1.638	1.010	2.997	0.616	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	6.160	8	402.8
	M21	1.638	1.010	3.074	0.616	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	6.160	8	402.8
	M22	1.638	1.010	2.997	0.616	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	6.160	8	402.8
	M23	1.638	1.010	3.074	0.696	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	6.960	8	408.8
	M24	1.638	1.010	3.074	0.696	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	6.960	8	408.8
	M25	1.638	1.010	3.074	0.696	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	6.960	8	408.8
	M26	1.638	1.010	2.997	0.696	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	6.960	8	408.8
	M27	3.276	2.180	4.444	1.096	1.064	2.128	171	1.825	6.000	7.297	4.340	9.260	44.800	10.960	10	685.6
	M28	1.638	1.010	3.133	1.256	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	12.560	10	450.5
BM1 E1-1	M1	1.200	0.840	2.215	0.056	0.484	0.968	78	0.845	2.250	3.106	2.400	4.410	20.300	0.560	4	265.4
	M2	1.020	0.690	1.724	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	18.560	0.560	4	234.5
	M3	1.020	0.690	1.724	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	18.560	0.560	4	234.5
	M4	1.500	1.090	2.255	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	23.200	0.560	4	316.9
	M5	1.500	1.090	2.455	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	24.800	0.560	4	328.8
	M6	1.500	1.090	2.455	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	24.800	0.560	4	328.8
	M7	1.500	1.090	2.455	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	24.800	0.560	4	328.8
	M8	1.500	1.090	2.391	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	24.800	0.560	4	328.8
	M9	1.740	1.290	2.696	0.056	0.682	1.364	110	1.352	3.600	4.970	2.940	6.210	29.040	0.560	4	384.3
	M10	1.500	1.090	2.655	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	26.400	0.560	4	340.7
	M11	1.500	1.090	2.791	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	28.000	0.560	5	352.7
	M12	1.500	1.090	3.055	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	29.600	0.560	5	364.6
	M13	1.500	1.090	3.255	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	31.200	0.560	5	376.5
BM1 E1-2	M14	2.366	1.530	4.703	0.216	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.160	6	482.8
	M15	2.366	1.530	4.425	0.216	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.160	6	482.8
	M16	2.366	1.530	4.425	0.136	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	1.360	6	476.8
	M17	2.366	1.530	4.348	0.056	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	0.560	6	470.8
	M18	2.366	1.530	4.425	0.136	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	1.360	6	476.8
	M19	2.366	1.530	4.348	0.136	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	1.360	6	476.8
	M20	2.366	1.530	4.425	0.136	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	1.360	6	476.8
	M21	2.366	1.530	4.425	0.136	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	1.360	6	476.8
	M22	2.366	1.530	4.348	0.216	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.160	6	482.8
	M23	2.366	1.530	4.425	0.136	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	1.360	6	476.8
	M24	2.366	1.530	4.425	0.216	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.160	6	482.8
BM1 E1-3	M25	2.730	1.790	3.821	0.456	0.896	1.792	144	1.460	4.800	5.837	3.920	7.760	40.000	4.560	7	555.6
	M26	2.366	1.530	3.975	0.536	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	5.360	8	506.6
	M27	2.366	1.530	3.975	0.616	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	6.160	8	512.6
	M28	2.366	1.530	3.975	0.696	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	6.960	8	518.6
	M29	2.366	1.530	3.821	0.776	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	7.760	8	524.5
	M30	2.366	1.530	3.975	0.776	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	7.760	8	524.5
	M31	2.366	1.530	3.975	0.776	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	7.760	8	524.5
	M32	2.366	1.530	3.975	0.936	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	9.360	9	536.5
	M33	2.366	1.530	3.975	1.176	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	11.760	10	554.4
	M34	1.911	1.205	3.165	1.256	0.644	1.288	104	0.912	3.000	3.648	3.290	5.510	32.800	12.560	10	491.7
BM1 W2-1	M1	1.020	0.690	2.588	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	23.680	0.560	5	272.7
	M2	1.500	1.090	2.391	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	24.800	0.560	4	328.8
	M3	1.500	1.090	2.791	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	28.000	0.560	5	352.7
	M4	1.500	1.090	2.791	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	28.000	0.560	5	352.7
	M5	1.020	0.690	2.140	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	22.400	0.560	5	263.2
	M6	1.020	0.690	2.364	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	23.680	0.560	5	272.7
	M7	1.500	1.090	3.055	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	29.600	0.560	5	364.6
	M8	1.500	1.090	3.055	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	29.600	0.560	5	364.6
	M9	1.500	1.090	3.255	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	31.200	0.560	5	376.5

Table B.2.10 (33) Manhole Construction (3/3)

Route	Manhole No.	Concrete Volume (m^3)				Level Conc	Sand	Timber Wood	Invert			Frame Work				Ladder	Bar
		Slub		Wall					Vol	Area		Slub		Wall			
		Bottom S_b (m^3)	Up S_u (m^3)	Main C_m (m^3)	Up C_u (m^3)	L_e (m^3)	S_a (m^3)	T_w (no)	I_v (m^3)	BQ I_{a1} (m^2)	I_{a2} (m^2)	Bottom F_b (m^2)	Up F_u (m^2)	Main F_m (m^2)	Up F_u (m^2)	L_a (no)	W (kg)
	M10	1.500	1.090	3.255	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	31.200	0.560	5	376.5
	M11	1.500	1.090	3.355	0.096	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	32.000	0.960	6	385.5
	M12	1.500	1.090	3.255	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	31.200	0.560	5	376.5
	M13	1.740	1.290	3.421	0.056	0.682	1.364	110	1.352	3.600	4.970	2.940	6.210	34.320	0.560	5	423.7
BM1 W2-2	M14	2.366	1.530	4.586	0.296	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.960	6	488.7
	M15	2.366	1.530	4.425	0.296	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.960	6	488.7
	M16	2.366	1.530	4.425	0.376	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	3.760	7	494.7
	M17	2.366	1.530	4.425	0.376	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	3.760	7	494.7
	M18	2.366	1.530	4.425	0.456	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	4.560	7	500.7
	M19	2.366	1.530	4.425	0.456	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	4.560	7	500.7
	M20	2.366	1.530	4.425	0.536	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	5.360	8	506.6
	M21	2.366	1.530	4.425	0.696	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	6.960	8	518.6
	M22	2.366	1.530	4.425	0.776	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	7.760	8	524.5
	M23	2.366	1.530	4.425	0.856	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	8.560	9	530.5
	M24	2.366	1.530	4.425	0.856	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	8.560	9	530.5
	M25	2.366	1.530	4.425	0.936	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	9.360	9	536.5
	M26	2.366	1.530	4.054	1.016	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	10.160	9	542.4
	M27	0.507	-	-	1.137	0.225	0.45	36	0.197	0.640	0.823	1.560	-	-	11.760	4	110.0
	M28	0.507	-	-	1.097	0.225	0.45	36	0.197	0.640	0.823	1.560	-	-	11.760	4	107.1
	M29	0.507	-	-	1.097	0.225	0.45	36	0.197	0.640	0.823	1.560	-	-	11.760	4	107.1
BM1 E-2	M1	2.366	1.530	4.145	0.056	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	31.280	0.560	4	429.6
	M2	1.638	1.010	2.612	0.056	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	24.320	0.560	4	315.7
	M3	1.638	1.010	2.612	0.056	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	24.320	0.560	4	315.7
	M4	2.366	1.530	3.244	0.056	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	29.440	0.560	4	415.9
	M5	1.638	1.010	2.840	0.056	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	25.840	0.560	4	327.0
	M6	1.638	1.010	2.840	0.056	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	25.840	0.560	4	327.0
	M7	1.638	1.010	2.840	0.056	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	25.840	0.560	5	327.0
	M8	1.638	1.010	3.068	0.056	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	27.360	0.560	5	338.3
	M9	2.366	1.530	3.796	0.056	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	33.120	0.560	5	443.4
	M10	1.638	1.010	3.296	0.056	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	28.880	0.560	5	349.7
	M11	1.638	1.010	3.296	0.056	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	28.880	0.560	5	349.7
	M12	2.366	1.530	4.072	0.056	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	34.960	0.560	5	457.1
	M13	1.638	1.010	3.296	0.056	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	28.880	0.560	5	349.7
	M14	1.638	1.010	3.524	0.056	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	0.560	5	361.0
	M15	2.366	1.530	4.348	0.136	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	1.360	6	476.8
		264	170	493	51	92	185	14,849	160	438	552	460	794	4,573	518	930	59,712

Table B.2.10 (34) Inlet Pit Construction (1/6)

Inlet Pit

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
BM1	W1	400	1	D	I1	1.470	-0.288	2,638	2,158	0.360	1.644	2.004	0.196	0.392	32	7	147.0	1.2	16.9
BM1	W1	400	1	D	I2	1.390	-0.288	2,558	2,078	0.360	1.580	1.940	0.196	0.392	32	7	142.3	1.2	16.3
BM1	W1	400	1	D	I3	1.340	-0.288	2,508	2,028	0.360	1.540	1.900	0.196	0.392	32	7	139.3	1.2	15.9
BM1	W1	400	1	D	I4	1.340	-0.338	2,558	2,078	0.360	1.580	1.940	0.196	0.392	32	7	142.3	1.2	16.3
BM1	W1	400	1	D	I5	1.360	-0.338	2,578	2,098	0.360	1.596	1.956	0.196	0.392	32	7	143.5	1.2	16.5
BM1	W1	400	1	D	I6	1.370	-0.378	2,628	2,148	0.360	1.636	1.996	0.196	0.392	32	7	146.4	1.2	16.9
BM1	W1	400	1	D	I7	1.390	-0.388	2,658	2,178	0.360	1.660	2.020	0.196	0.392	32	8	148.2	1.2	17.1
BM1	W1	400	1	D	I8	1.430	-0.388	2,698	2,218	0.360	1.692	2.052	0.196	0.392	32	8	150.6	1.2	17.4
BM1	W1	400	1	D	I9	1.444	-0.388	2,712	2,232	0.360	1.703	2.063	0.196	0.392	32	8	151.5	1.2	17.5
BM1	W1	400	1	D	I10	1.426	-0.388	2,694	2,214	0.360	1.689	2.049	0.196	0.392	32	8	150.4	1.2	17.4
BM1	W1	400	1	D	I11	1.444	-0.188	2,512	2,032	0.360	1.543	1.903	0.196	0.392	32	7	139.5	1.2	15.9
BM1	W1	400	1	D	I12	1.480	-0.158	2,518	2,038	0.360	1.548	1.908	0.196	0.392	32	7	139.9	1.2	16.0
BM1	W1	400	1	D	I14	1.560	0.022	2,418	1,938	0.360	1.468	1.828	0.196	0.392	32	7	133.9	1.2	15.2
BM1	W1	400	1	D	I15	1.526	-0.028	2,434	1,954	0.360	1.481	1.841	0.196	0.392	32	7	134.9	1.2	15.3
BM1	W1	400	1	D	I16	1.480	-0.078	2,438	1,958	0.360	1.484	1.844	0.196	0.392	32	7	135.1	1.2	15.3
BM1	W1	400	1	D	I18	1.450	-0.058	2,388	1,908	0.360	1.444	1.804	0.196	0.392	32	7	132.1	1.2	14.9
BM1	W1	400	1	D	I18	1.450	-0.078	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM1	W1	400	1	D	I20	1.420	-0.128	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM1	W1	400	1	D	I21	1.400	-0.128	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM1	W1	400	1	D	I22	1.430	-0.128	2,438	1,958	0.360	1.484	1.844	0.196	0.392	32	7	135.1	1.2	15.3
BM1	W1	400	1	D	I23	1.470	-0.078	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM1	W1	400	1	D	I25	1.545	0.022	2,403	1,923	0.360	1.456	1.816	0.196	0.392	32	7	133.0	1.2	15.1
BM1	W1	400	1	D	I27	1.680	0.122	2,438	1,958	0.360	1.484	1.844	0.196	0.392	32	7	135.1	1.2	15.3
BM1	W1	400	1	D	I30	1.670	0.122	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM1	W1	400	1	D	I31	1.680	0.122	2,438	1,958	0.360	1.484	1.844	0.196	0.392	32	7	135.1	1.2	15.3
BM1	W1	400	1	D	I32	1.690	0.122	2,448	1,968	0.360	1.492	1.852	0.196	0.392	32	7	135.7	1.2	15.4
BM1	W1	400	1	D	I33	1.700	0.122	2,458	1,978	0.360	1.500	1.860	0.196	0.392	32	7	136.3	1.2	15.5
BM1	W1	400	1	D	I34	1.700	0.122	2,458	1,978	0.360	1.500	1.860	0.196	0.392	32	7	136.3	1.2	15.5
BM1	W1	400	1	D	I35	1.700	0.122	2,458	1,978	0.360	1.500	1.860	0.196	0.392	32	7	136.3	1.2	15.5
BM1	W1	400	1	D	I36	1.700	0.122	2,458	1,978	0.360	1.500	1.860	0.196	0.392	32	7	136.3	1.2	15.5
BM1	W1	400	1	D	I37	1.700	0.122	2,458	1,978	0.360	1.500	1.860	0.196	0.392	32	7	136.3	1.2	15.5
BM1	W1	400	1	D	I38	1.720	0.122	2,478	1,998	0.360	1.516	1.876	0.196	0.392	32	7	137.5	1.2	15.7

Table B.2.10 (34) Inlet Pit Construction (2/6)

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
BM1	W1	400	1	D	I39	1.770	0.172	2,478	1,998	0.360	1.516	1.876	0.196	0.392	32	7	137.5	1.2	15.7
BM1	W1	400	1	D	I40	1.840	0.222	2,498	2,018	0.360	1.532	1.892	0.196	0.392	32	7	138.7	1.2	15.8
BM1	W1	400	1	D	I42	1.910	0.322	2,468	1,988	0.360	1.508	1.868	0.196	0.392	32	7	136.9	1.2	15.6
BM1	W1	600	1	D	I17	1.430	-0.328	2,638	2,158	0.360	1.592	1.952	0.196	0.392	32	7	147.0	1.2	16.9
BM1	W1	600	1	D	I19	1.435	-0.328	2,643	2,163	0.360	1.596	1.956	0.196	0.392	32	7	147.3	1.2	17.0
BM1	W1	600	1	D	I24	1.500	-0.228	2,608	2,128	0.360	1.568	1.928	0.196	0.392	32	7	145.2	1.2	16.7
BM1	W1	600	1	D	I26	1.610	-0.128	2,618	2,138	0.360	1.576	1.936	0.196	0.392	32	7	145.8	1.2	16.8
BM1	W1	600	1	D	I28	1.700	-0.028	2,608	2,128	0.360	1.568	1.928	0.196	0.392	32	7	145.2	1.2	16.7
BM1	W1	600	1	D	I29	1.710	-0.028	2,618	2,138	0.360	1.576	1.936	0.196	0.392	32	7	145.8	1.2	16.8
BM1	W1	600	1	D	I41	1.930	0.172	2,638	2,158	0.360	1.592	1.952	0.196	0.392	32	7	147.0	1.2	16.9
BM1	E3	400	1	D	I2	1.140	-0.466	2,486	2,006	0.360	1.522	1.882	0.196	0.392	32	7	138.0	1.2	15.7
BM1	E3	400	1	D	I3	1.180	-0.497	2,557	2,077	0.360	1.579	1.939	0.196	0.392	32	7	142.2	1.2	16.3
BM1	E3	400	1	D	I4	1.220	-0.528	2,628	2,148	0.360	1.636	1.996	0.196	0.392	32	7	146.4	1.2	16.9
BM1	E3	400	1	D	I5	1.260	-0.551	2,691	2,211	0.360	1.686	2.046	0.196	0.392	32	8	150.2	1.2	17.4
BM1	E3	400	1	D	I7	1.250	-0.558	2,688	2,208	0.360	1.684	2.044	0.196	0.392	32	8	150.0	1.2	17.3
BM1	E3	400	1	D	I8	1.240	-0.558	2,678	2,198	0.360	1.676	2.036	0.196	0.392	32	8	149.4	1.2	17.3
BM1	E3	400	1	D	I9	1.220	-0.608	2,708	2,228	0.360	1.700	2.060	0.196	0.392	32	8	151.2	1.2	17.5
BM1	E3	400	1	D	I10	1.170	-0.658	2,708	2,228	0.360	1.700	2.060	0.196	0.392	32	8	151.2	1.2	17.5
BM1	E3	400	1	D	I11	1.130	-0.708	2,718	2,238	0.360	1.708	2.068	0.196	0.392	32	8	151.8	1.2	17.6
BM1	E3	400	1	D	I12	1.140	-0.708	2,728	2,248	0.360	1.716	2.076	0.196	0.392	32	8	152.4	1.2	17.7
BM1	E3	400	1	D	I13	1.160	-0.708	2,748	2,268	0.360	1.732	2.092	0.196	0.392	32	8	153.6	1.2	17.8
BM1	E3	400	1	D	I16	1.120	-0.708	2,708	2,228	0.360	1.700	2.060	0.196	0.392	32	8	151.2	1.2	17.5
BM1	E3	400	1	D	I17	1.110	-0.708	2,698	2,218	0.360	1.692	2.052	0.196	0.392	32	8	150.6	1.2	17.4
BM1	E3	400	1	D	I21	1.285	-0.508	2,673	2,193	0.360	1.672	2.032	0.196	0.392	32	8	149.1	1.2	17.2
BM1	E3	400	1	D	I23	1.270	-0.508	2,658	2,178	0.360	1.660	2.020	0.196	0.392	32	8	148.2	1.2	17.1
BM1	E3	400	1	D	I24	1.300	-0.508	2,688	2,208	0.360	1.684	2.044	0.196	0.392	32	8	150.0	1.2	17.3
BM1	E3	400	1	D	I25	1.290	0.000	2,170	1,690	0.360	1.270	1.630	0.196	0.392	32	6	119.1	1.2	13.2
BM1	E3	600	1	D	I14	1.190	-0.808	2,878	2,398	0.360	1.784	2.144	0.196	0.392	32	8	161.4	1.2	18.9
BM1	E3	600	1	D	I15	1.160	-0.858	2,898	2,418	0.360	1.800	2.160	0.196	0.392	32	8	162.6	1.2	19.0
BM1	E3	600	1	D	I18	1.150	-0.858	2,888	2,408	0.360	1.792	2.152	0.196	0.392	32	8	162.0	1.2	18.9
BM1	E3	600	1	D	I19	1.220	-0.808	2,908	2,428	0.360	1.808	2.168	0.196	0.392	32	8	163.1	1.2	19.1
BM1	E3	600	1	D	I20	1.270	-0.758	2,908	2,428	0.360	1.808	2.168	0.196	0.392	32	8	163.1	1.2	19.1

Table B.2.10 (34) Inlet Pit Construction (3/6)

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
BM1	E3	600	1	D	I22	1.270	-0.708	2,858	2,378	0.360	1.768	2.128	0.196	0.392	32	8	160.2	1.2	18.7
BM1	E3	600	1	D	I26	1.240	-0.758	2,878	2,398	0.360	1.784	2.144	0.196	0.392	32	8	161.4	1.2	18.9
BM1	E3	600	1	D	I27	1.670	-0.308	2,858	2,378	0.360	1.768	2.128	0.196	0.392	32	8	160.2	1.2	18.7
BM1	E1	400	1	D	I1	1.330	0.082	2,128	1,648	0.360	1.236	1.596	0.196	0.392	32	6	116.6	1.2	12.9
BM1	E1	400	1	D	I2	1.330	0.082	2,128	1,648	0.360	1.236	1.596	0.196	0.392	32	6	116.6	1.2	12.9
BM1	E1	400	1	D	I3	1.330	0.082	2,128	1,648	0.360	1.236	1.596	0.196	0.392	32	6	116.6	1.2	12.9
BM1	E1	400	1	D	I4	1.330	0.032	2,178	1,698	0.360	1.276	1.636	0.196	0.392	32	6	119.6	1.2	13.3
BM1	E1	400	1	D	I'4	1.330	-0.396	2,606	2,126	0.360	1.618	1.978	0.196	0.392	32	7	145.1	1.2	16.7
BM1	E1	400	1	D	I5	1.330	0.032	2,178	1,698	0.360	1.276	1.636	0.196	0.392	32	6	119.6	1.2	13.3
BM1	E1	400	1	D	I'5	1.330	-0.429	2,639	2,159	0.360	1.645	2.005	0.196	0.392	32	7	147.1	1.2	16.9
BM1	E1	400	1	D	I6	1.310	0.032	2,158	1,678	0.360	1.260	1.620	0.196	0.392	32	6	118.4	1.2	13.1
BM1	E1	400	1	D	I'6	1.310	-0.438	2,628	2,148	0.360	1.636	1.996	0.196	0.392	32	7	146.4	1.2	16.9
BM1	E1	400	1	D	I7	1.300	0.032	2,148	1,668	0.360	1.252	1.612	0.196	0.392	32	6	117.8	1.2	13.0
BM1	E1	400	1	D	I'7	1.300	-0.438	2,618	2,138	0.360	1.628	1.988	0.196	0.392	32	7	145.8	1.2	16.8
BM1	E1	400	1	D	I8	1.300	0.032	2,148	1,668	0.360	1.252	1.612	0.196	0.392	32	6	117.8	1.2	13.0
BM1	E1	400	1	D	I10	1.350	0.082	2,148	1,668	0.360	1.252	1.612	0.196	0.392	32	6	117.8	1.2	13.0
BM1	E1	400	1	D	I'10	1.350	-0.388	2,618	2,138	0.360	1.628	1.988	0.196	0.392	32	7	145.8	1.2	16.8
BM1	E1	400	1	D	I11	1.430	0.132	2,178	1,698	0.360	1.276	1.636	0.196	0.392	32	6	119.6	1.2	13.3
BM1	E1	400	1	D	I12	1.480	0.182	2,178	1,698	0.360	1.276	1.636	0.196	0.392	32	6	119.6	1.2	13.3
BM1	E1	400	1	D	I'12	1.480	-0.288	2,648	2,168	0.360	1.652	2.012	0.196	0.392	32	7	147.6	1.2	17.0
BM1	E1	400	1	D	I13	1.520	0.232	2,168	1,688	0.360	1.268	1.628	0.196	0.392	32	6	119.0	1.2	13.2
BM1	E1	400	1	D	I'13	1.520	-0.188	2,588	2,108	0.360	1.604	1.964	0.196	0.392	32	7	144.1	1.2	16.5
BM1	E1	400	1	D	I'15	1.460	-0.478	2,818	2,338	0.360	1.788	2.148	0.196	0.392	32	8	157.8	1.2	18.4
BM1	E1	400	1	D	I'16	1.390	-0.528	2,798	2,318	0.360	1.772	2.132	0.196	0.392	32	8	156.6	1.2	18.2
BM1	E1	400	1	D	I'18	1.270	-0.478	2,628	2,148	0.360	1.636	1.996	0.196	0.392	32	7	146.4	1.2	16.9
BM1	E1	400	1	D	I'20	1.255	-0.478	2,613	2,133	0.360	1.624	1.984	0.196	0.392	32	7	145.5	1.2	16.7
BM1	E1	400	1	D	I'21	1.250	-0.478	2,608	2,128	0.360	1.620	1.980	0.196	0.392	32	7	145.2	1.2	16.7
BM1	E1	400	1	D	I'23	1.210	-0.528	2,618	2,138	0.360	1.628	1.988	0.196	0.392	32	7	145.8	1.2	16.8
BM1	E1	400	1	D	I'24	1.180	-0.578	2,638	2,158	0.360	1.644	2.004	0.196	0.392	32	7	147.0	1.2	16.9
BM1	E1	400	1	D	I'26	1.300	-0.528	2,708	2,228	0.360	1.700	2.060	0.196	0.392	32	8	151.2	1.2	17.5
BM1	E1	400	1	D	I'27	1.360	-0.478	2,718	2,238	0.360	1.708	2.068	0.196	0.392	32	8	151.8	1.2	17.6
BM1	E1	400	1	D	I28	1.440	0.152	2,168	1,688	0.360	1.268	1.628	0.196	0.392	32	6	119.0	1.2	13.2
BM1	E1	400	1	D	I'28	1.440	-0.378	2,698	2,218	0.360	1.692	2.052	0.196	0.392	32	8	150.6	1.2	17.4

Table B.2.10 (34) Inlet Pit Construction (4/6)

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
BM1	E1	400	1	D	I29	1.450	0.152	2,178	1,698	0.360	1.276	1.636	0.196	0.392	32	6	119.6	1.2	13.3
BM1	E1	400	1	D	I30	1.430	0.152	2,158	1,678	0.360	1.260	1.620	0.196	0.392	32	6	118.4	1.2	13.1
BM1	E1	400	1	D	I'30	1.430	-0.378	2,688	2,208	0.360	1.684	2.044	0.196	0.392	32	8	150.0	1.2	17.3
BM1	E1	400	1	D	I31	1.400	0.202	2,078	1,598	0.360	1.196	1.556	0.196	0.392	32	6	113.6	1.2	12.5
BM1	E1	400	1	D	I'31	1.400	-0.428	2,708	2,228	0.360	1.700	2.060	0.196	0.392	32	8	151.2	1.2	17.5
BM1	E1	400	1	D	I32	1.580	0.252	2,208	1,728	0.360	1.300	1.660	0.196	0.392	32	6	121.4	1.2	13.5
BM1	E1	400	1	D	I32	1.580	-0.228	2,688	2,208	0.360	1.684	2.044	0.196	0.392	32	8	150.0	1.2	17.3
BM1	E1	400	1	D	I33	1.820	0.452	2,248	1,768	0.360	1.332	1.692	0.196	0.392	32	6	123.8	1.2	13.8
BM1	E1	400	1	D	I'33	1.820	-0.028	2,728	2,248	0.360	1.716	2.076	0.196	0.392	32	8	152.4	1.2	17.7
BM1	E1	600	1	D	I'8	1.300	0.012	2,168	1,688	0.360	1.216	1.576	0.196	0.392	32	6	119.0	1.2	13.2
BM1	E1	600	1	D	I'9	1.320	-0.544	2,744	2,264	0.360	1.677	2.037	0.196	0.392	32	8	153.4	1.2	17.8
BM1	E1	600	1	D	I'11	1.430	-0.508	2,818	2,338	0.360	1.736	2.096	0.196	0.392	32	8	157.8	1.2	18.4
BM1	E1	600	1	D	I'17	1.290	-0.628	2,798	2,318	0.360	1.720	2.080	0.196	0.392	32	8	156.6	1.2	18.2
BM1	E1	600	1	D	I'19	1.270	-0.678	2,828	2,348	0.360	1.744	2.104	0.196	0.392	32	8	158.4	1.2	18.5
BM1	E1	600	1	D	I'22	1.250	-0.678	2,808	2,328	0.360	1.728	2.088	0.196	0.392	32	8	157.2	1.2	18.3
BM1	E1	600	1	D	I'29	1.450	-0.578	2,908	2,428	0.360	1.808	2.168	0.196	0.392	32	8	163.1	1.2	19.1
BM1	E1	1000	1	D	I'34	1.920	-1.300	4,100	3,620	0.360	2.634	2.994	0.196	0.392	32	12	234.3	1.2	28.6
BM1	W2	400	1	D	I1	1.430	0.102	2,208	1,728	0.360	1.300	1.660	0.196	0.392	32	6	121.4	1.2	13.5
BM1	W2	400	1	D	I'1	1.430	-0.522	2,832	2,352	0.360	1.799	2.159	0.196	0.392	32	8	158.6	1.2	18.5
BM1	W2	400	1	D	I2	1.160	-0.148	2,188	1,708	0.360	1.284	1.644	0.196	0.392	32	6	120.2	1.2	13.3
BM1	W2	400	1	D	I3	1.240	-0.048	2,168	1,688	0.360	1.268	1.628	0.196	0.392	32	6	119.0	1.2	13.2
BM1	W2	400	1	D	I4	1.250	-0.048	2,178	1,698	0.360	1.276	1.636	0.196	0.392	32	6	119.6	1.2	13.3
BM1	W2	400	1	D	I'6	1.190	-0.752	2,822	2,342	0.360	1.791	2.151	0.196	0.392	32	8	158.0	1.2	18.4
BM1	W2	400	1	D	I7	1.170	-0.148	2,198	1,718	0.360	1.292	1.652	0.196	0.392	32	6	120.8	1.2	13.4
BM1	W2	400	1	D	I'7	1.170	-0.802	2,852	2,372	0.360	1.815	2.175	0.196	0.392	32	8	159.8	1.2	18.7
BM1	W2	400	1	D	I8	1.170	-0.148	2,198	1,718	0.360	1.292	1.652	0.196	0.392	32	6	120.8	1.2	13.4
BM1	W2	400	1	D	I'8	1.170	-0.802	2,852	2,372	0.360	1.815	2.175	0.196	0.392	32	8	159.8	1.2	18.7
BM1	W2	400	1	D	I9	1.210	-0.048	2,138	1,658	0.360	1.244	1.604	0.196	0.392	32	6	117.2	1.2	12.9
BM1	W2	400	1	D	I'9	1.210	-0.752	2,842	2,362	0.360	1.807	2.167	0.196	0.392	32	8	159.2	1.2	18.6
BM1	W2	400	1	D	I10	1.216	-0.048	2,144	1,664	0.360	1.249	1.609	0.196	0.392	32	6	117.6	1.2	13.0
BM1	W2	400	1	D	I'10	1.216	-0.752	2,848	2,368	0.360	1.812	2.172	0.196	0.392	32	8	159.6	1.2	18.6
BM1	W2	400	1	D	I11	1.240	-0.348	2,468	1,988	0.360	1.508	1.868	0.196	0.392	32	7	136.9	1.2	15.6
BM1	W2	400	1	D	I'11	1.240	-0.678	2,798	2,318	0.360	1.772	2.132	0.196	0.392	32	8	156.6	1.2	18.2

Table B.2.10 (34) Inlet Pit Construction (5/6)

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
BM1	W2	400	1	D	I12	1.140	-0.448	2,468	1,988	0.360	1.508	1.868	0.196	0.392	32	7	136.9	1.2	15.6
BM1	W2	400	1	D	I'12	1.140	-0.778	2,798	2,318	0.360	1.772	2.132	0.196	0.392	32	8	156.6	1.2	18.2
BM1	W2	400	1	D	I'13	1.110	-0.828	2,818	2,338	0.360	1.788	2.148	0.196	0.392	32	8	157.8	1.2	18.4
BM1	W2	400	1	D	I14	1.130	-0.448	2,458	1,978	0.360	1.500	1.860	0.196	0.392	32	7	136.3	1.2	15.5
BM1	W2	400	1	D	I'14	1.130	-0.778	2,788	2,308	0.360	1.764	2.124	0.196	0.392	32	8	156.0	1.2	18.1
BM1	W2	400	1	D	I15	1.140	-0.448	2,468	1,988	0.360	1.508	1.868	0.196	0.392	32	7	136.9	1.2	15.6
BM1	W2	400	1	D	I'15	1.140	-0.778	2,798	2,318	0.360	1.772	2.132	0.196	0.392	32	8	156.6	1.2	18.2
BM1	W2	400	1	D	I16	1.140	-0.448	2,468	1,988	0.360	1.508	1.868	0.196	0.392	32	7	136.9	1.2	15.6
BM1	W2	400	1	D	I'16	1.140	-0.778	2,798	2,318	0.360	1.772	2.132	0.196	0.392	32	8	156.6	1.2	18.2
BM1	W2	400	1	D	I17	1.160	-0.448	2,488	2,008	0.360	1.524	1.884	0.196	0.392	32	7	138.1	1.2	15.7
BM1	W2	400	1	D	I'17	1.160	-0.778	2,818	2,338	0.360	1.788	2.148	0.196	0.392	32	8	157.8	1.2	18.4
BM1	W2	400	1	D	I18	1.180	-0.448	2,508	2,028	0.360	1.540	1.900	0.196	0.392	32	7	139.3	1.2	15.9
BM1	W2	400	1	D	I'18	1.180	-0.778	2,838	2,358	0.360	1.804	2.164	0.196	0.392	32	8	159.0	1.2	18.5
BM1	W2	400	1	D	I19	1.210	-0.348	2,438	1,958	0.360	1.484	1.844	0.196	0.392	32	7	135.1	1.2	15.3
BM1	W2	400	1	D	I'19	1.210	-0.728	2,818	2,338	0.360	1.788	2.148	0.196	0.392	32	8	157.8	1.2	18.4
BM1	W2	400	1	D	I20	1.260	-0.348	2,488	2,008	0.360	1.524	1.884	0.196	0.392	32	7	138.1	1.2	15.7
BM1	W2	400	1	D	I'20	1.260	-0.628	2,768	2,288	0.360	1.748	2.108	0.196	0.392	32	8	154.8	1.2	18.0
BM1	W2	400	1	D	I21	1.340	-0.248	2,468	1,988	0.360	1.508	1.868	0.196	0.392	32	7	136.9	1.2	15.6
BM1	W2	400	1	D	I'21	1.340	-0.598	2,818	2,338	0.360	1.788	2.148	0.196	0.392	32	8	157.8	1.2	18.4
BM1	W2	400	1	D	I22	1.400	-0.148	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM1	W2	400	1	D	I'22	1.400	-0.528	2,808	2,328	0.360	1.780	2.140	0.196	0.392	32	8	157.2	1.2	18.3
BM1	W2	400	1	D	I23	1.450	-0.098	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM1	W2	400	1	D	I'23	1.450	-0.478	2,808	2,328	0.360	1.780	2.140	0.196	0.392	32	8	157.2	1.2	18.3
BM1	W2	400	1	D	I24	1.460	-0.098	2,438	1,958	0.360	1.484	1.844	0.196	0.392	32	7	135.1	1.2	15.3
BM1	W2	400	1	D	I'24	1.460	-0.428	2,768	2,288	0.360	1.748	2.108	0.196	0.392	32	8	154.8	1.2	18.0
BM1	W2	400	1	D	I25	1.522	0.002	2,400	1,920	0.360	1.454	1.814	0.196	0.392	32	7	132.8	1.2	15.0
BM1	W2	400	1	D	I'25	1.522	-0.428	2,830	2,350	0.360	1.798	2.158	0.196	0.392	32	8	158.5	1.2	18.5
BM1	W2	600	1	D	I'2	1.160	-0.696	2,736	2,256	0.360	1.671	2.031	0.196	0.392	32	8	152.9	1.2	17.7
BM1	W2	600	1	D	I'3	1.240	-0.712	2,832	2,352	0.360	1.748	2.108	0.196	0.392	32	8	158.6	1.2	18.5
BM1	W2	600	1	D	I'4	1.250	-0.702	2,832	2,352	0.360	1.748	2.108	0.196	0.392	32	8	158.6	1.2	18.5
BM1	W2	600	1	D	I'5	1.230	-0.702	2,812	2,332	0.360	1.732	2.092	0.196	0.392	32	8	157.4	1.2	18.3
BM1	E2	400	1	D	I'1	1.240	-0.618	2,738	2,258	0.360	1.724	2.084	0.196	0.392	32	8	153.0	1.2	17.7
BM1	E2	400	1	D	I'2	1.150	-0.658	2,688	2,208	0.360	1.684	2.044	0.196	0.392	32	8	150.0	1.2	17.3

Table B.2.10 (34) Inlet Pit Construction (6/6)

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
BM1	E2	400	1	D	I'3	1.080	-0.708	2,668	2,188	0.360	1.668	2.028	0.196	0.392	32	8	148.8	1.2	17.2
BM1	E2	400	1	D	I'4	1.090	-0.708	2,678	2,198	0.360	1.676	2.036	0.196	0.392	32	8	149.4	1.2	17.3
BM1	E2	400	1	D	I'5	1.100	-0.708	2,688	2,208	0.360	1.684	2.044	0.196	0.392	32	8	150.0	1.2	17.3
BM1	E2	400	1	D	I'6	1.090	-0.708	2,678	2,198	0.360	1.676	2.036	0.196	0.392	32	8	149.4	1.2	17.3
BM1	E2	400	1	D	I'7	1.090	-0.708	2,678	2,198	0.360	1.676	2.036	0.196	0.392	32	8	149.4	1.2	17.3
BM1	E2	400	1	D	I'8	1.120	-0.658	2,658	2,178	0.360	1.660	2.020	0.196	0.392	32	8	148.2	1.2	17.1
BM1	E2	400	1	D	I'9	1.135	-0.658	2,673	2,193	0.360	1.672	2.032	0.196	0.392	32	8	149.1	1.2	17.2
BM1	E2	400	1	D	I'10	1.120	-0.658	2,658	2,178	0.360	1.660	2.020	0.196	0.392	32	8	148.2	1.2	17.1
BM1	E2	400	1	D	I'11	1.100	-0.708	2,688	2,208	0.360	1.684	2.044	0.196	0.392	32	8	150.0	1.2	17.3
BM1	E2	400	1	D	I'12	1.070	-0.708	2,658	2,178	0.360	1.660	2.020	0.196	0.392	32	8	148.2	1.2	17.1
BM1	E2	400	1	D	I'13	1.070	-0.708	2,658	2,178	0.360	1.660	2.020	0.196	0.392	32	8	148.2	1.2	17.1
BM1	E2	400	1	D	I'14	1.090	-0.708	2,678	2,198	0.360	1.676	2.036	0.196	0.392	32	8	149.4	1.2	17.3
BM1	E2	400	1	D	I'15	1.170	-0.608	2,658	2,178	0.360	1.660	2.020	0.196	0.392	32	8	148.2	1.2	17.1
BM1	E2	600	1	D	I4	1.090	-0.648	2,618	2,138	0.360	1.576	1.936	0.196	0.392	32	7	145.8	1.2	16.8
BM1	E2	600	1	D	I9	1.135	-0.638	2,653	2,173	0.360	1.604	1.964	0.196	0.392	32	8	147.9	1.2	17.1
BM1	E2	600	1	D	I12	1.070	-0.688	2,638	2,158	0.360	1.592	1.952	0.196	0.392	32	7	147.0	1.2	16.9
BM1	E2	600	1	D	I15	1.170	-0.588	2,638	2,158	0.360	1.592	1.952	0.196	0.392	32	7	147.0	1.2	16.9
Total										64.800	286.095	350.895	35.280	70.560	5,760	1,318	25,863.1	216.0	2,968.3

180		min	1.556
180		max	2.994
		ave	1.949

Table B.2.10 (35) Sewer Outlet Construction

BEN ME COC 1

No.	POSITION	D	Earth work	Yellowsand	Concrete G	Wooden piles		Free stone	Stone masonry	Concrete E	Concrete F	Dredging canal	Deformed	Residual soil	Backfill by sandy soil	Earth work for freestone	Gravel	Geotextile Sheet
		(mm)	(m3)	(m3)	(m3)	(trees)	(mdeep)	(m3)	(m3)	(m3)	(m3)	(m3)	(Tons)	(m3)	(m3)	(m3)	(m3)	(m2)
1	W2_0+420.5	1000	116.48	3.95	2.29	1035	4658	18.75	5.53	16.65	1.84	19.6		154.83	51.2	18.75	5.53	18.44
2	W2_0+851.8	1200	157.80	5.15	2.90	1357	6107	19.65	7.59	22.00	2.53	30.12		207.57	66.44	19.65	7.59	25.31
3	E3_0+623	1500	249.78	5.81	3.23	1519	6836	20.40	8.54	23.13	2.85	154.88		425.06	100.92	20.40	8.54	28.47
4	E3_0+320.15	900	185.44	5.24	2.94	1347	6062	19.50	7.34	20.52	2.45	0		204.94	79.76	19.50	7.34	24.45
5	E1_0+221	1000	98.16	4.38	2.51	944	4248	19.05	3.79	15.71	1.26	0		117.21	42.68	19.05	3.79	12.62
6	E1_0+003	1200	130.49	3.12	1.88	1259	5666	18.45	9.45	14.18	3.15	15.066		164.01	57.36	18.45	9.45	31.49
7	E1_0+318	1500	327.85	7.08	3.86	1865	8393	21.00	10.80	29.10	3.60	146.12		494.97	129.84	21.00	10.80	35.99
8	W1_1+335	1800	346.94	7.54	4.09	1928	8676	21.45	10.86	30.25	3.62	526		894.39	133.44	21.45	10.86	36.19
9	W1_0+879	1200	177.47	4.54	2.59	1666	7497	19.35	12.21	18.53	4.07	87.15		283.97	75.52	19.35	12.21	40.71
10	W1_0+229.5	900	82.02	2.83	1.73	1157	5207	18.00	8.67	11.03	2.89	97.68		197.70	37.28	18.00	8.67	28.91
TOTAL			**1,872.43**	**49.63**	**28.02**	**14,077**	**63,350**	**195.60**	**84.78**	**201.10**	**28.26**	**1,076.62**		**3,144.65**	**774.44**	**195.60**	**84.78**	**282.59**

3. BEN ME COC (2) PUMPING DRAINAGE AREA

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Table B.3.3 Brekdown of Work Quantities for Sewer Line Construction in Ben Me Coc (2)

(Main Pipe)

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Table B.3.3 (2) Pipe Installation Work for Sewer Line: N1 (ϕ 1500)

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Table B.3.3 (11) Pipe Installation Work for Sewer Line: S2 (ϕ 1500)

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(Connection Pipe (ϕ 400))

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(Connection Pipe (ϕ 600))

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(Manhole and Inlet Pit)

Table B.3.3 (37) (1/3) - (3/3) Manhole Construction

Table B.3.3 (38) (1/6) - (6/6) Inlet Pit Construction

(Sewer Outlet)

Table B.3.3 (39) sewer Outlet Construction

TABLE B.3.1 WORK QUANTITIES OF TEMPORARY DIKE CONSTRUCTION
IN BEN ME COC (2)

Item		Quantity
1. Clearing and Grubbing		(m2)
(1) Type A	1.5m x 1,770m =	2,325.00
(3) Type C	1.0m x 1,860m =	455.00
	Total	2,780.00
	Allowance: 3%	**2,870 m2**
2. Excavation		(m3)
(1) Type A	0.75m3/m x 1,770m =	1,327.50
(2) Type C	020m3/m x 1,860 m =	372.00
	Total	1699.50
	Allowance: 5%	**1,790 m3**
3. Sandy Soil Backfill		(m3)
(1) Type A	0.33 m3/m x 1,770m =	584.10
(2) Type C	0.05m3/m x 1,860 m =	93.00
	Total	677.10
	Allowance: 5%	**710 m3**
4. Leveling Concrete (Concrete Type G)		
(1) Type A	0.10m3/m x 1,770m =	177.00
	Total	177.00
	Allowance: 3%	**183 m3**
5. Wet Stone Masonry		
(1) Type A	0.84m3/m x 1,770m =	1,486.80
(3) Type C	0.375m3/m x 1,860m =	651.00
	Total	2,137.80
	Allowance: 3%	**2,200 m3**
6. Joint Filler		(kg)
(1) Type A	0.84m2 x 1,770m/25m =	59.64
(3) Type C	0.375m2 x 1,860m/25m =	28.13
	Total	87.77
	Allowance: 3%	**90 m2**

TABLE B.3.2 (1/8) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (2)

Item			Calculation	Quantity
1. Clearing and Grubbing				(m2)
	(1)	N-1 (M1 - M20)	2.10m x 598.0m =	1255.80
	(2)	N-1 (M20 - M29)	2.90m x 310.0m =	899.00
	(3)	N-2 (M1 - M11)	2.00m x 361.0m =	722.00
	(4)	N-2 (M11 - M23)	2.60m x 374.0m =	972.40
	(5)	N-2 (M23 - M28)	2.90m x 190.0m =	551.00
	(6)	N-2 (M29 - M31)	1.40m x 50.0m =	70.00
	(7)	S-1 (M1 - M18)	2.10m x 574.0m =	1205.40
	(8)	S-1 (M18 - M26)	2.90m x 275.0m =	797.50
	(9)	S-1 (M26 - M31)	3.30m x 178.0m =	587.40
	(10)	S-2 (M1 - M12)	2.10m x 345.0m =	724.50
	(11)	S-2 (M12 - M17)	2.90m x 159.0m =	461.10
	(12)	S-1-3 (M1 - M5)	2.10m x 127.4m =	267.54
	(13)	S-1-5 (M1 - M5)	1.90m x 137.0m =	260.30
	(14)	N-12 (M1 - M7)	1.90m x 208.0m =	395.20
	(15)	N14 (M1 - M7)	2.00m x 207.0m =	414.00
			Total	9,583.14
			Allowance: 3%	**9,880 m2**
2. Earth Work (refer to the other sheets prepared by local Engineer)				
2.1 Excavation (Depth: D<= 6.0m)				(m3)
	(1)	N-1 (M1 - M20)	2.10m x 598m x (2.16 - 2.72)m =	3,061.81
	(2)	N-1 (M20 - M29)	2.90m x 310m x (3.31 - 3.72)m =	3,079.54
	(3)	N-2 (M1 - M11)	2.00m x 361m x (2.36 - 2.67)m =	1,788.78
	(4)	N-2 (M11 - M23)	2.60m x 374.0m x (2.86 - 3.12)m =	2,866.72
	(5)	N-2 (M23 - M28)	2.90m x 190.0m x (3.38 - 3.59)m =	1,915.88
	(6)	N-2 (M29 - M31)	1.40m x 50.0m x (1.93)m =	135.10
	(7)	S-1 (M1 - M18)	2.10m x 574.0m x (2.15 - 2.43)m =	2,767.22
	(8)	S-1 (M18 - M26)	2.90m x 275.0m x (3.06 - 3.19)m =	2,492.06
	(9)	S-1 (M26 - M31)	3.30m x 178.0m x (3.51 - 3.65)m =	2,103.07
	(10)	S-2 (M1 - M12)	2.10m x 345.0m x (2.53 - 2.62)m =	1,867.32
	(11)	S-2 (M12 - M17)	2.90m x 159.0m x (3.21 - 3.29)m =	1,496.57
	(12)	S-1-3 (M1 - M5)	2.10m x 127.4m x (2.28 - 2.44)m =	634.08
	(13)	S-1-5 (M1 - M5)	1.90m x 137.0m x (2.15 - 2.34)m =	584.47
	(14)	N-12 (M1 - M7)	1.90m x 208.0m x (2.26 - 2.40)m =	927.56
	(15)	N14 (M1 - M7)	2.00m x 207.0m x (2.35 - 2.40)m =	991.94
	(16)	N-1, 2 (400 dia)	160.38 + 147.56 + 121.44 + 274.39 + 397.63 + 77.86 +105.68 +80.56 =	1,365.50
	(17)	S-1, 2 (400 dia)	186.67 + 34.95 + 166.91 + 65.01 + 56.94 =	510.48
	(18)	N-1, 2 (600 dia)	66.22 + 31.66 + 15.83 + 61.02 + 137.31 + 12.77 + 8.93 + 24.59 =	358.33
	(19)	Outlet and Rip Rap	1,434.69 + 173.55 =	1,608.24
			Total	30,554.67
			Allowance: 5%	**32,080 m3**
			Hauling to the designed site: 32,080m3 x 0.95 = 30,500m3	**30,500 m3**
			Hauling to stockpile in vicinity of the site: 32.080 x 0.05 = 1600m3	**1,600 m3**

TABLE B.3.2 (2/8) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (2)

Item			Calculation	Quantity
2.2 Channel Excavation (Dredging)				
	(1)	Outlet No.1 - No.5	37.0 + 217.17 + 217.42 + 55.53 + 183.68 =	710.80
	(2)	Outlet No.6 - No.9	53.90 + 325.11 + 382.5 + 175.93 =	937.44
			Total	1,648.24
			Allowance: 5%	**1,730 m3**
2.3 Sand Backfill (Yellow Sand)				(m3)
	(1)	N-1 (M1 - M20)		1,033.92
	(2)	N-1 (M20 - M29)		877.10
	(3)	N-2 (M1 - M11)		594.76
	(4)	N-2 (M11 - M23)		902.09
	(5)	N-2 (M23 - M28)		536.15
	(6)	N-2 (M29 - M31)		47.04
	(7)	S-1 (M1 - M18)		984.52
	(8)	S-1 (M18 - M26)		769.86
	(9)	S-1 (M26 - M31)		609.84
	(10)	S-2 (M1 - M12)		588.43
	(11)	S-2 (M12 - M17)		448.78
	(12)	S-1-3 (M1 - M5)		218.75
	(13)	S-1-5 (M1 - M5)		206.25
	(14)	N-12 (M1 - M7)		322.60
	(15)	N14 (M1 - M7)		330.97
	(16)	N-1, 2 (400 dia)	47.36 + 43.54 + 33.05 + 82.01 + 120.91 + 19.74 + 30.66 + 22.58 =	399.85
	(17)	S-1, 2 (400 dia)	51.26 + 8.31 + 44.74 + 18.22 + 16.62 =	139.15
	(18)	N-1, 2 (600 dia)	18.14 + 8.94 + 4.47 + 17.36 + 35.74 + 3.96 + 2.55 + 7.15 =	98.31
	(19)	Outlet and Rip Rap		0.00
			Total	9,108.37
			Allowance: 5%	**9,560 m3**
2.4 Sandy Soil Backfill (Black Sand)				(m3)
	(1)	N-1 (M1 - M20)		1412.55
	(2)	N-1 (M20 - M29)		1761.93
	(3)	N-2 (M1 - M11)		840.24
	(4)	N-2 (M11 - M23)		1488.15
	(5)	N-2 (M23 - M28)		1109.74
	(6)	N-2 (M29 - M31)		53.76
	(7)	S-1 (M1 - M18)		1192.05
	(8)	S-1 (M18 - M26)		1331.43
	(9)	S-1 (M26 - M31)		1205.40
	(10)	S-2 (M1 - M12)		923.89
	(11)	S-2 (M12 - M17)		821.85
	(12)	S-1-3 (M1 - M5)		284.24
	(13)	S-1-5 (M1 - M5)		250.67
	(14)	N-12 (M1 - M7)		411.31
	(15)	N14 (M1 - M7)		458.11
	(16)	N-1, 2 (400 dia)	68.02 + 62.31 +53.27 + 122.82 + 177.39 + 35.76 + 45.45 + 36.30 =	601.32
	(17)	S-1, 2 (400 dia)	87.12 + 17.58 + 78.95 + 28.89 +24.27 =	236.81

TABLE B.3.2 (3/8) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (2)

Item			Calculation		Quantity
	(18)	N-1, 2 (600 dia)	33.03 + 15.51 + 7.75 + 27.82 + 70.52 + 5.52 + 3.95 + 11.32 =		175.42
	(19)	Outlet and Rip Rap			449.92
				Total	15,008.79
				Allowance: 5%	**15,860 m3**
				Out of Sandy Soil Backfill of 15,860m3, 1,600m3 shall be	
				backfilled by excavated materials from stockpile	**14,160 m3**
3. Pipe Installation					
3.1 Pipe					(m)
	(1)	Precast R/C Pipe (400 dia)	47.6m	Allowance: 1%	**50**
	(2)	Precast R/C Pipe (800 dia)	129.4 + 202.4 = 331.8m	Allowance: 1%	**335**
	(3)	Precast R/C Pipe (900 dia)	346.8 + 193.0 = 539.8m	Allowance: 1%	**545**
	(4)	Precast R/C Pipe (1000 dia)	561.25 + 539.2 + 322.3 + 119.8 = 1,542.55	Allowance: 1%	**1,560**
	(5)	Precast R/C Pipe (1200 dia)	347.9	Allowance: 1%	**350**
	(6)	Precast R/C Pipe (1500 dia)	291.2 + 178.0 +255.6 + 149.0 = 873.8m	Allowance: 1%	**880**
	(7)	Precast R/C Pipe (1800 dia)	165.85m	Allowance: 1%	**168**
				Total	3,888.0
				Allowance: 5%	**3,888 m**
3.2 Foundation Piles (Timber Pile)					(m)
	(1)	Precast R/C Pipe (400 dia)	16pcs./m2 x 0.57m x 47.6m x 4.5m =		1,954.0
	(2)	Precast R/C Pipe (800 dia)	16pcs./m2 x 1.10m x 331.8m x 4.5m =		26,279.0
	(3)	Precast R/C Pipe (900 dia)	16pcs./m2 x 1.24m x 539.8m x 4.5m =		48,193.0
	(4)	Precast R/C Pipe (1000 dia)	16pcs./m2 x 1.36m x 1,542.55m x 4.5m =		151,046.0
	(5)	Precast R/C Pipe (1200 dia)	16pcs./m2 x 1.63m x 347.9m x 4.5m =		40,830.0
	(6)	Precast R/C Pipe (1500 dia)	16pcs./m2 x 1.97m x 873.8m x 4.5m =		123,940.0
	(7)	Precast R/C Pipe (1800 dia)	16pcs./m2 x 2.35m x 165.85m x 4.5m =		28,062.0
				Total	420,304.0
				Allowance: 1%	**424,500 m**
3.3 Foundation Concrete (Concrete Type G)					(m3)
	(1)	Precast R/C Pipe (400 dia)	0.049m3/m x 47.6m =		2.33
	(2)	Precast R/C Pipe (800 dia)	0.265m3/m x 331.8m =		87.93
	(3)	Precast R/C Pipe (900 dia)	0.329m3/m x 539.8m =		177.59
	(4)	Precast R/C Pipe (1000 dia)	0.398m3.m x 1,542.55 =		613.93
	(5)	Precast R/C Pipe (1200 dia)	0.562m3/m x 347.9m =		195.52
	(6)	Precast R/C Pipe (1500 dia)	0.816m3/m x 873.8m =		713.02
	(7)	Precast R/C Pipe (1800 dia)	1.109m3/m x 165.85m =		183.93
				Total	1,974.25
				Allowance: 3%	**2,035 m3**
4. Construction of Manholes					
4.1 Foundation Piles (Timber Piles)					(m)
			11,986pcs. x 4.5m =		53,937.00
				Total	53,937.00
				Allowance: 1%	**54,480 m**
4.2 Sand Bedding					(m3)
					149.03
				Total	149.03
				Allowance: 5%	**160 m3**

TABLE B.3.2 (4/8) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (2)

Item	Calculation	Quantity
4.3 Concrete Type E		(m3)
	202.779 + 135.310 + 372.210 + 26.868 =	737.17
	Total	737.17
	Allowance: 3%	**760 m3**
4.4 Concrete Type F		(m3)
	Total	127.70
	Allowance: 3%	**130 m3**
4.5 Concrete Type G		(m3)
	Total	74.52
	Allowance: 3%	**80 m3**
4.6 Invert Mortal (Granolithic Topping)		(m2)
	Total	358.17
	Allowance: 1%	**360 m2**
4.7 Reinforcing Bars		(kg)
	46,084 kg	46,084.0
	Total	46,084.0
	Allowance: 0%	**46,100 kg**
4.8 Cast Iron Manhole Covers (Type A)		(set)
		126.0
	Total	126.0
	Allowance: 0%	**126 set**
4.9 Ladder Rungs		(set)
	Total	705.00
	Allowance: 1%	**710 set**
5. Construction of Inlet Pit (refer to other sheets prepared by Mr. Sato)		
5.1 Foundation Piles (Timber Piles)		(m)
	5,632nos. x 4.5m =	25,344.0
	Total	25,344.0
	Allowance: 1%	**25,600 m**
5.2 Sand Bedding		(m3)
		68.99
	Total	68.99
	Allowance: 3%	**70 m3**
5.3 Concrete Type E		(m3)
		310.01
	Total	310.01
	Allowance: 3%	**320 m3**
5.4 Concrete Type G (for Leveling Concrete)		(m3)
		34.50
	Total	34.50
	Allowance: 3%	**35 m3**

TABLE B.3.2 (5/8) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (2)

Item	Calculation	Quantity
5.5 Reinforcing Bars		(kg)
		22,794.24
	Total	22,794.24
	Allowance: 3%	**23,480 kg**
5.6 Precast Concrete Manhole Covers (Type D)		(set)
		176.000
	Total	176.000
	Allowance: 0%	**176 set**
5.7 Ladder Rungs		(set)
		1,168
	Total	1,168
	Allowance: 1%	**1,180 No.**
5.8 Connection Pipe		(m)
(1) Precast R/C Pipe (400 dia)	455.05m Allowance: 1%	**460 m**
(2) Precast R/C Pipe (600 dia)	63.0m Allowance: 1%	**64 m**
	Total	524.0
	Allowance: 0%	**524 m**
6. Outlet		
6.1 Foundation Pile (Wooden Pile)		(m)
	N=955+1,426+1,426+1,174+809+1,481+1,845+1,618+1,147 = 11,881 L = 11,881pcs. X 4.4m/pcs.= 53,465 m	
	Alloance: 1%	**54,000 m**
6.2 Sand Bedding		(m3)
	3.76 + 3.12 + 3.12 + 2.59 + 1.95 + 2.23 + 3.11 + 2.59 + 1.74 =	39.55
	Total	39.55
	Allowance: 3%	**40 m3**
6.3 Concrete Type E		(m3)
	15.55+23.43+23.43+19.0+13.35+15.53+21.7+17.92+10.92 =	160.84
	Total	160.84
	Allowance: 3%	**165 m3**
6.4 Deformed Reinforcing Bars		(kg)
(1) N1	65kg/m3 x 15.55m3 =	1,010.75
(2) N1	65kg/m3 x 23.43m3 =	1,522.95
(3) N2	65kg/m3 x 23.43m3 =	1,522.95
(4) N2	65kg/m3 x 19.00m3 =	1,235.00
(5) N2	65kg/m3 x 13.35m3 =	867.75
(6) S2	65kg/m3 x 15.53m3 =	1,009.45
(7) S1	65kg/m3 x 21.70m3 =	1,410.50
(8) S1	65kg/m3 x 17.92m3 =	1,164.80
(9) S1	65kg/m3 x 10.92m3 =	709.80
	Total	10,453.95
	Allowance: 3%	**10,770 kg**
6.5 Concrete type G		(m3)
	2.20 + 3.12 + 3.12 + 2.59 + 1.95 + 2.23 + 3.11 + 2.59 + 1.74 =	22.65
	Total	22.65
	Allowance: 3%	**24 m3**

TABLE B.3.2 (6/8) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (2)

Item	Calculation	Quantity
6.6 Free Draining Gravel		(m3)
	4.86+7.73+7.73+6.31+3.85+11.07+12.81+11.64+8.53 =	74.52
	Total	74.52
	Allowance: 3%	**77 m3**
6.7 Backfill Plain Concrete (Concrete Type F)		(m3)
	1.62 + 2.58 + 2.58 + 2.10 + 1.28 + 3.69 + 4.27 + 3.88 + 2.84 =	24.84
	Total	24.84
	Allowance: 3%	**26 m3**
6.8 Geotextile Cloth		(m2)
	16.20+25.78+25.76+21.03+12.83+36.90+42.69+38.79+28.43 =	248.41
	Total	248.41
	Allowance: 3%	**256 m2**
6.9 Wet Stone Masonry		(m3)
	4.86+7.73+7.73+6.31+3.85+11.07+12.81+12.81+11.64+8.53 =	74.52
	Total	74.52
	Allowance: 3%	**77 m3**
6.10 Rip Rap		(m3)
	18.75+20.10+20.10+19.35+18.30+18.75+20.55+19.50+18.15 =	173.55
	Total	173.55
	Allowance: 3%	**180 m3**
6.11 Flap Gate		(set)
(1) Flap Gate (900 dia)		1
(2) Flap Gate (1000 dia)		3
(3) Flap Gate (1200 dia)		1
(4) Flap Gate (1500 dia)		3
(5) Flap Gate (1800 dia)		1
	Total	9.00
	Allowance: 0%	**9 set**
7. Road works		
7.1 Excavation		
(1) N-1	5.0m x 207.0m =	1,035.00
(2) N-2	5.0m x 208.0m =	1,040.00
(3) S-1	5.0m x 878.0m =	4,390.00
(4) S-2	5.0m x 892.0m =	4,460.00
7.2 Concrete Curb		
(1) N-1	2 x 1,217m =	2,434.00
(2) N-2	2 x 1,057m =	2,114.00
(3) S-1	2 x 1,099m =	2,198.00
(4) S-2	2 x 824m =	1,648.00
	Total	8,394.00
	Allowance: 3%	**8,650 m**

TABLE B.3.2 (7/8) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (2)

Item		Calculation	Quantity
7.3 Subgrade Preparation			(m2)
(1)	N-1	6.0m x 1,217m =	7,302.00
(2)	N-2	6.0m x 1,057m =	6,342.00
(3)	S-1	6.0m x 1,099m =	6,594.00
(4)	S-2	6.0m x 824m =	4,944.00
		Total	25,182.00
		Allowance: 3%	**25,940 m2**
7.4 Sub Base Course			(m3)
(1)	N-1	7,302.0m2 x 0.20m =	1,460.40
(2)	N-2	6,342.0m2 x 0.20m =	1,268.40
(3)	S-1	6,594.0m2 x 0.20m =	1,318.80
(4)	S-2	4,944.0m2 x 0.20m =	988.80
		Total	5,036.40
		Allowance: 3%	**5,190 m3**
7.5 Base Course (crushed Aggragate)			(m3)
(1)	N-1	7,302.0m2 x 0.19m =	1,387.38
(2)	N-2	6,342.0m2 x 0.19m =	1,204.98
(3)	S-1	6,594.0m2 x 0.19m =	1,252.86
(4)	S-2	4,944.0m2 x 0.19m =	939.36
		Total	4,784.58
		Allowance: 3%	**4,930 m3**
7.6 Asphalt Binder Course			(ton)
(1)	N-1	7,302.0m2 x 0.05m x 2.2ton/m3 =	803.22
(2)	N-2	6,342.0m2 x 0.05m x 2.2ton/m3 =	697.62
(3)	S-1	6,594.0m2 x 0.05m x 2.2ton/m3 =	725.34
(4)	S-2	4,944.0m2 x 0.05m x 2.2ton/m3 =	543.84
		Total	2,770.02
		Allowance: 3%	**2,850 ton**
7.7 Asphalt Surface Course			(ton)
(1)	N-1	7,302.0m2 x 0.05m x 2.2ton/m3 =	803.22
(2)	N-2	6,342.0m2 x 0.05m x 2.2ton/m3 =	697.62
(3)	S-1	6,594.0m2 x 0.05m x 2.2ton/m3 =	725.34
(4)	S-2	4,944.0m2 x 0.05m x 2.2ton/m3 =	543.84
		Total	2,770.02
		Allowance: 3%	**2,850 ton**
7.8 Prime Coat			(litre)
(1)	N-1	7,302.0m2 x 1.50litre =	10,953.00
(2)	N-2	6,342.0m2 x 1.50litre =	9,513.00
(3)	S-1	6,594.0m2 x 1.50litre =	9,891.00
(4)	S-2	4,944.0m2 x 1.50litre =	7,416.00
		Total	37,773.00
		Allowance: 3%	**38,900 litre**

TABLE B.3.2 (8/8) WORK QUANTITIES OF SEWER LINE CONSTRUCTION IN BEN ME COC (2)

Item		Calculation	Quantity
7.9 Tack Coat			(litre)
(1)	N-1	7,302.0m2 x 0.50litre =	3,651.00
(2)	N-2	6,342.0m2 x 0.50litre =	3,171.00
(3)	S-1	6,594.0m2 x 0.50litre =	3,297.00
(4)	S-2	4,944.0m2 x 0.50litre =	2,472.00
		Total	12,591.00
		Allowance: 3%	**12,970 litre**

Table B.3.3 (1) Sewer Line : N1 (Pipe Diameter : 1000)

Bill of Quantity

Area : BM2 Pipe Diameter : 1000 Shoring Type : TIMBER

Sewer Line Name : N1 Foundation Type : t OK ! T

Manhole No. : M1 M20

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.230	-0.486	1.72	0.45		2.16														pipes	m			
M2	1.210	-0.518	1.73	0.45	2.10	2.17	2.17	30.00	1.60	28.40	136.71	0.00	136.71	42.37	63.00	30.87	51.86	53.98	136.71	7	0.40	28.40	30.00	0.00
M2	1.210	-0.518	1.73	0.45		2.17																		
M3	1.190	-0.547	1.74	0.45	2.10	2.18	2.18	26.00	2.00	24.00	119.03	0.00	119.03	35.81	54.60	26.75	43.82	48.46	119.03	6	0.00	24.00	26.00	0.00
M3	1.190	-0.547	1.74	0.45		2.18																		
M4	1.200	-0.575	1.78	0.45	2.10	2.22	2.21	26.00	2.00	24.00	120.67	0.00	120.67	35.81	54.60	26.75	43.82	50.10	120.67	6	0.00	24.00	26.00	0.00
M4	1.200	-0.575	1.78	0.45		2.22																		
M5	1.200	-0.604	1.80	0.45	2.10	2.25	2.24	26.00	2.00	24.00	122.31	0.00	122.31	35.81	54.60	26.75	43.82	51.74	122.31	6	0.00	24.00	26.00	0.00
M5	1.200	-0.604	1.80	0.45		2.25																		
M6	1.200	-0.632	1.83	0.45	2.10	2.28	2.27	26.00	2.00	24.00	123.95	0.00	123.95	35.81	54.60	26.75	43.82	53.38	123.95	6	0.00	24.00	26.00	0.00
M6	1.200	-0.632	1.83	0.45		2.28																		
M7	1.200	-0.660	1.86	0.45	2.10	2.31	2.30	25.00	2.00	23.00	120.75	0.00	120.75	34.32	52.50	25.73	41.99	53.04	120.75	5	3.00	23.00	25.00	0.00
M7	1.200	-0.660	1.86	0.45		2.31																		
M8	1.230	-0.700	1.93	0.45	2.10	2.38	2.34	36.00	2.00	34.00	176.91	0.00	176.91	50.73	75.60	37.04	62.08	77.79	176.91	8	34.00	34.00	36.00	0.00
M8	1.230	-0.700	1.93	0.45		2.38																		
M9	1.250	-0.733	1.98	0.45	2.10	2.43	2.41	30.00	2.00	28.00	151.83	0.00	151.83	41.78	63.00	30.87	51.12	69.84	151.83	7	0.00	28.00	30.00	0.00
M9	1.250	-0.733	1.98	0.45		2.43																		
M10	1.260	-0.771	2.03	0.45	2.10	2.48	2.46	35.00	2.00	33.00	180.81	0.00	180.81	49.24	73.50	36.02	60.25	84.55	180.81	8	1.00	33.00	35.00	0.00
M10	1.260	-0.771	2.03	0.45		2.48																		
M11	1.260	-0.804	2.06	0.45	2.10	2.51	2.50	30.00	2.00	28.00	157.50	0.00	157.50	41.78	63.00	30.87	51.12	75.51	157.50	7	0.00	28.00	30.00	0.00
M11	1.260	-0.804	2.06	0.45		2.51																		
M12	1.260	-0.840	2.10	0.45	2.10	2.55	2.53	33.00	1.20	31.80	175.33	0.00	175.33	47.45	69.30	33.96	58.06	83.31	175.33	7	3.80	31.80	33.00	0.00
M12	1.260	-0.840	2.10	0.45		2.55																		
M13	1.240	-0.878	2.12	0.45	2.10	2.56	2.56	35.00	1.20	33.80	188.16	0.00	188.16	50.43	73.50	36.02	61.72	90.43	188.16	8	1.80	33.80	35.00	0.00
M13	1.240	-0.878	2.12	0.45		2.56																		
M14	1.160	-0.917	2.08	0.45	2.10	2.52	2.55	35.00	1.20	33.80	187.43	0.00	187.43	50.43	73.50	36.02	61.72	89.70	187.43	8	1.80	33.80	35.00	0.00
M14	1.160	-0.917	2.08	0.45		2.52																		
M15	1.110	-0.955	2.07	0.45	2.10	2.51	2.52	35.00	1.20	33.80	185.22	0.00	185.22	50.43	73.50	36.02	61.72	87.49	185.22	8	1.80	33.80	35.00	0.00
M15	1.110	-0.955	2.07	0.45		2.51																		
M16	1.080	-0.991	2.07	0.45	2.10	2.52	2.52	32.00	1.20	30.80	169.35	0.00	169.35	45.95	67.20	32.93	56.24	80.18	169.35	7	2.80	30.80	32.00	0.00
M16	1.080	-0.991	2.07	0.45		2.52																		
M17	1.120	-1.024	2.14	0.45	2.10	2.59	2.56	30.00	1.20	28.80	161.28	0.00	161.28	42.97	63.00	30.87	52.59	77.82	161.28	7	0.80	28.80	30.00	0.00
M17	1.120	-1.024	2.14	0.45		2.59																		
M18	1.090	-1.057	2.15	0.45	2.10	2.59	2.60	31.00	1.20	29.80	169.26	0.00	169.26	44.46	65.10	31.90	54.42	82.94	169.26	7	1.80	29.80	31.00	0.00
M18	1.090	-1.057	2.15	0.45		2.59																		
M19	1.020	-1.091	2.11	0.45	2.10	2.56	2.58	32.00	1.20	30.80	173.38	0.00	173.38	45.95	67.20	32.93	56.24	84.21	173.38	7	2.80	30.80	32.00	0.00
M19	1.020	-1.091	2.11	0.45		2.56																		
M20	1.150	-1.124	2.27	0.45	2.10	2.72	2.64	33.00	1.80	31.20	182.96	0.00	182.96	46.55	69.30	33.96	56.97	92.03	182.96	7	3.20	31.20	33.00	0.00
M15	1.110	-0.955	2.07	0.45		2.51																		
OUTLET	0.740	-0.967	1.71	0.45	2.10	2.15	2.34	12.00	0.75	11.25	58.97	0.00	58.97	16.79	25.20	12.35	20.54	26.08	58.97	2	3.25	11.25	12.00	0.00
								598.00	31.75	566.25	3061.81	0.00	3061.81	844.87	1255.80	615.34	1033.92	1412.55	3061.81	134	62.25	566.25	598.00	0.00

Concrete G : 225.3675 m3

Timber piles : 60279 m

13396 trees

Table B.3.3 (2) Sewer Line : N1 (Pipe Diameter : 1500)

Bill of Quantity

Area : BM2 Pipe Diameter : 1500 Shoring Type : TIMBER

Sewer Line Name : N1 Foundation Type : T OK ! T

Manhole No. : M20 M29

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 3.00		Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M20	1.150	-1.624	2.77	0.54		3.31														pipes	m			
M21	1.140	-1.665	2.81	0.54	2.90	3.34	3.33	33.00	1.80	31.20	318.69	0.00	318.69	99.65	95.70	46.89	93.98	177.82	318.69	10	1.20	31.20	33.00	0.00
M21	1.140	-1.665	2.81	0.54		3.34																		
M22	1.100	-1.703	2.80	0.54	2.90	3.34	3.34	35.00	2.00	33.00	339.01	0.00	339.01	105.40	101.50	49.74	99.40	189.88	339.01	11	0.00	33.00	35.00	0.00
M22	1.100	-1.703	2.80	0.54		3.34																		
M23	1.100	-1.730	2.83	0.54	2.90	3.37	3.36	28.00	2.00	26.00	272.84	0.00	272.84	83.04	81.20	39.79	78.32	154.73	272.84	8	2.00	26.00	28.00	0.00
M23	1.100	-1.730	2.83	0.54		3.37																		
M24	1.100	-1.760	2.86	0.54	2.90	3.40	3.38	27.00	2.00	25.00	264.66	0.00	264.66	79.85	78.30	38.37	75.30	150.99	264.66	8	1.00	25.00	27.00	0.00
M24	1.100	-1.760	2.86	0.54		3.40																		
M25	1.050	-1.790	2.84	0.54	2.90	3.38	3.39	32.00	2.00	30.00	314.60	0.00	314.60	95.82	92.80	45.47	90.36	178.77	314.60	10	0.00	30.00	32.00	0.00
M25	1.050	-1.790	2.84	0.54		3.38																		
M26	1.040	-1.830	2.87	0.54	2.90	3.41	3.39	32.00	2.00	30.00	314.60	0.00	314.60	95.82	92.80	45.47	90.36	178.77	314.60	10	0.00	30.00	32.00	0.00
M26	1.040	-1.830	2.87	0.54		3.41																		
M27	1.060	-1.860	2.92	0.54	2.90	3.46	3.43	32.00	2.00	30.00	318.31	0.00	318.31	95.82	92.80	45.47	90.36	182.48	318.31	10	30.00	30.00	32.00	0.00
M27	1.060	-1.860	2.92	0.54		3.46																		
M28	1.100	-1.900	3.00	0.54	2.90	3.54	3.50	37.00	2.00	35.00	375.55	0.00	375.55	111.79	107.30	52.58	105.42	217.55	375.55	11	2.00	35.00	37.00	0.00
M28	1.100	-1.900	3.00	0.54		3.54																		
M29	1.100	-1.950	3.05	0.54	2.90	3.59	3.56	41.00	2.00	39.00	423.29	0.00	423.29	124.57	118.90	58.26	117.46	247.57	423.29	13	0.00	39.00	41.00	0.00
M29	1.100	-1.950	3.05	0.54		3.59																		
OUTLET	1.220	-1.964	3.18	0.54	2.90	3.72	3.66	13.00	1.00	12.00	137.99	0.00	137.99	38.33	37.70	18.47	36.14	83.38	137.99	4	0.00	12.00	13.00	0.00
								310.00	18.80	291.20	3079.54	0.00	3079.54	930.09	899.00	440.51	877.10	1761.93	3079.54	95	36.20	291.20	310.00	0.00

Concrete G : 237.6192 m3

Timber piles : 44640 m
9920 trees

Table B.3.3 (3) Sewer Line : N2 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : N2 Foundation Type : T OK ! T

Manhole No. : M29 M31

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.49 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type N	Pipe Number Concrete Length (m) 4.00 N	Pipe Bedding Length (m) L_2	Sheeting (m) L_3	Waling & Strut (ton) W_2
M29	1.350	-0.250	1.60	0.33		1.93														pipes	m			
M30	1.300	-0.300	1.60	0.33	1.40	1.93	1.93	25.00	1.20	23.80	67.55	0.00	67.55	6.47	35.00	17.15	23.52	26.88	67.55	5	3.80	23.80	25.00	0.00
M30	1.300	-0.300	1.60	0.33		1.93																		
M31	1.260	-0.350	1.61	0.33	1.40	1.94	1.93	25.00	1.20	23.80	67.55	0.00	67.55	6.47	35.00	17.15	23.52	26.88	67.55	5	3.80	23.80	25.00	0.00
								50.00	2.40	47.60	135.10	0.00	135.10	12.94	70.00	34.30	47.04	53.76	135.10	10	7.60	47.60	50.00	0.00

Concrete G : 3.6176 m3

Timber piles : 2160 m

480 trees

Table B.3.3 (4) Sewer Line : N2 (Pipe Diameter : 900)

Bill of Quantity

Area : BM2 Pipe Diameter : 900 Shoring Type : TIMBER

Sewer Line Name : N2 Foundation Type : T OK ! T

Manhole No. : M1 M11

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.780	-0.381	2.16	0.43		2.59														pipes	m			
M2	1.530	-0.421	1.95	0.43	2.00	2.38	2.49	37.00	1.20	35.80	184.26	0.00	184.26	44.57	74.00	36.26	61.40	86.60	184.26	8	3.80	35.80	37.00	0.00
M2	1.530	-0.421	1.95	0.43		2.38																		
M3	1.460	-0.463	1.92	0.43	2.00	2.35	2.37	38.00	1.20	36.80	180.12	0.00	180.12	45.82	76.00	37.24	63.11	79.77	180.12	9	0.80	36.80	38.00	0.00
M3	1.460	-0.463	1.92	0.43		2.35																		
M4	1.450	-0.485	1.94	0.43	2.00	2.37	2.36	20.00	1.20	18.80	94.40	0.00	94.40	23.41	40.00	19.60	32.24	42.56	94.40	4	2.80	18.80	20.00	0.00
M4	1.450	-0.485	1.94	0.43		2.37																		
M5	1.430	-0.524	1.95	0.43	2.00	2.38	2.38	35.00	1.20	33.80	166.60	0.00	166.60	42.08	70.00	34.30	57.97	74.33	166.60	8	1.80	33.80	35.00	0.00
M5	1.430	-0.524	1.95	0.43		2.38																		
M6	1.410	-0.561	1.97	0.43	2.00	2.40	2.40	34.00	1.20	32.80	163.20	0.00	163.20	40.84	68.00	33.32	56.25	73.63	163.20	8	0.80	32.80	34.00	0.00
M6	1.410	-0.561	1.97	0.43		2.40																		
M7	1.400	-0.598	2.00	0.43	2.00	2.43	2.42	34.00	1.20	32.80	164.56	0.00	164.56	40.84	68.00	33.32	56.25	74.99	164.56	8	0.80	32.80	34.00	0.00
M7	1.400	-0.598	2.00	0.43		2.43																		
M8	1.410	-0.637	2.05	0.43	2.00	2.48	2.46	35.00	1.20	33.80	172.20	0.00	172.20	42.08	70.00	34.30	57.97	79.93	172.20	8	1.80	33.80	35.00	0.00
M8	1.410	-0.637	2.05	0.43		2.48																		
M9	1.420	-0.674	2.09	0.43	2.00	2.52	2.51	34.00	1.20	32.80	170.68	0.00	170.68	40.84	68.00	33.32	56.25	81.11	170.68	8	0.80	32.80	34.00	0.00
M9	1.420	-0.674	2.09	0.43		2.52																		
M10	1.440	-0.708	2.15	0.43	2.00	2.58	2.56	31.00	1.20	29.80	158.72	0.00	158.72	37.10	62.00	30.38	51.11	77.23	158.72	7	1.80	29.80	31.00	0.00
M10	1.440	-0.708	2.15	0.43		2.58																		
M11	1.560	-0.759	2.32	0.43	2.00	2.75	2.67	46.00	1.20	44.80	245.64	0.00	245.64	55.78	92.00	45.08	76.83	123.73	245.64	11	0.80	44.80	46.00	0.00
M7	1.400	-0.598	2.00	0.43		2.43																		
OUTLET	1.710	-0.617	2.33	0.43	2.00	2.76	2.60	17.00	2.20	14.80	88.40	0.00	88.40	18.43	34.00	16.66	25.38	46.36	88.40	3	2.80	14.80	17.00	0.00
								361.00	14.20	346.80	1788.78	0.00	1788.78	431.79	722.00	353.78	594.76	840.24	1788.78	82	18.80	346.80	361.00	0.00

Concrete G : 114.0972 m3

Timber piles : 33790 m
7509 trees

Table B.3.3 (5) Sewer Line : N2 (Pipe Diameter : 1200)

Bill of Quantity

Area : BM2 Pipe Diameter : 1200 Shoring Type : TIMBER

Sewer Line Name : N2 Foundation Type : T OK ! T

Manhole No. : M11 M23

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete			
						Downstream					<= 6 m	=> 6 m				0.49				Length (m)	3.00		2.5 m	
		IE_1	ID_1			H_2																		
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M11	1.560	-1.059	2.62	0.50		3.12														pipes	m			
M12	1.420	-1.082	2.50	0.50	2.60	3.00	3.07	21.00	1.60	19.40	167.63	0.00	167.63	42.51	54.60	26.75	50.30	90.58	167.63	6	1.40	19.40	21.00	0.00
M12	1.420	-1.082	2.50	0.50		3.00																		
M13	1.280	-1.113	2.39	0.50	2.60	2.89	2.95	28.00	2.00	26.00	214.76	0.00	214.76	56.97	72.80	35.67	67.41	111.68	214.76	8	2.00	26.00	28.00	0.00
M13	1.280	-1.113	2.39	0.50		2.89																		
M14	1.220	-1.143	2.36	0.50	2.60	2.86	2.88	27.00	2.00	25.00	202.18	0.00	202.18	54.78	70.20	34.40	64.82	102.96	202.18	8	1.00	25.00	27.00	0.00
M14	1.220	-1.143	2.36	0.50		2.86																		
M15	1.170	-1.177	2.35	0.50	2.60	2.85	2.86	31.00	2.00	29.00	230.52	0.00	230.52	63.54	80.60	39.49	75.20	115.83	230.52	9	2.00	29.00	31.00	0.00
M15	1.170	-1.177	2.35	0.50		2.85																		
M16	1.190	-1.212	2.40	0.50	2.60	2.90	2.88	32.00	2.00	30.00	239.62	0.00	239.62	65.73	83.20	40.77	77.79	121.06	239.62	10	0.00	30.00	32.00	0.00
M16	1.190	-1.212	2.40	0.50		2.90																		
M17	1.170	-1.241	2.41	0.50	2.60	2.91	2.91	26.00	2.00	24.00	196.72	0.00	196.72	52.58	67.60	33.12	62.24	101.36	196.72	8	0.00	24.00	26.00	0.00
M17	1.170	-1.241	2.41	0.50		2.91																		
M18	1.100	-1.278	2.38	0.50	2.60	2.88	2.90	34.00	2.00	32.00	256.36	0.00	256.36	70.11	88.40	43.32	82.98	130.06	256.36	10	2.00	32.00	34.00	0.00
M18	1.100	-1.278	2.38	0.50		2.88																		
M19	1.100	-1.327	2.43	0.50	2.60	2.93	2.91	44.00	2.00	42.00	332.91	0.00	332.91	92.02	114.40	56.06	108.91	167.94	332.91	14	0.00	42.00	44.00	0.00
M19	1.100	-1.327	2.43	0.50		2.93																		
M20	1.140	-1.360	2.50	0.50	2.60	3.00	2.97	30.00	2.00	28.00	231.66	0.00	231.66	61.35	78.00	38.22	72.60	120.84	231.66	9	1.00	28.00	30.00	0.00
M20	1.140	-1.360	2.50	0.50		3.00																		
M21	1.090	-1.395	2.49	0.50	2.60	2.99	3.00	32.00	2.00	30.00	249.60	0.00	249.60	65.73	83.20	40.77	77.79	131.04	249.60	10	0.00	30.00	32.00	0.00
M21	1.090	-1.395	2.49	0.50		2.99																		
M22	1.080	-1.431	2.51	0.50	2.60	3.01	3.00	33.00	2.00	31.00	257.40	0.00	257.40	67.92	85.80	42.04	80.38	134.98	257.40	10	1.00	31.00	33.00	0.00
M22	1.080	-1.431	2.51	0.50		3.01																		
M23	1.090	-1.453	2.54	0.50	2.60	3.04	3.03	20.00	2.00	18.00	157.56	0.00	157.56	39.44	52.00	25.48	46.67	85.41	157.56	6	0.00	18.00	20.00	0.00
M23	1.090	-1.453	2.54	0.50		3.04																		
OUTLET	1.210	-1.470	2.68	0.50	2.60	3.18	3.12	16.00	2.50	13.50	129.80	0.00	129.80	29.58	41.60	20.38	35.00	74.42	129.80	4	1.50	13.50	16.00	0.00
								374.00	26.10	347.90	2866.72	0.00	2866.72	762.26	972.40	476.48	902.09	1488.15	2866.72	112	11.90	347.90	374.00	0.00

Concrete G : 195.5198 m3

Timber piles : 45778 m
10173 trees

Table B.3.3 (6) Sewer Line : N2 (Pipe Diameter : 1500)

Bill of Quantity

Area : BM2 Pipe Diameter : 1500 Shoring Type : TIMBER

Sewer Line Name : N2 Foundation Type : T OK ! T

Manhole No. : M23 M28

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.49 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type N pipes	Pipe Number Concrete m	Pipe Bedding Length (m) L_2	Sheeting (m) $_m$ 2.5 L_3	Waling & Strut (ton) W_2
M23	1.090	-1.753	2.84	0.54		3.38																		
M24	1.040	-1.797	2.84	0.54	2.90	3.37	3.38	40.00	2.50	37.50	392.08	0.00	392.08	119.78	116.00	56.84	112.95	222.29	392.08	12	1.50	37.50	40.00	0.00
M24	1.040	-1.797	2.84	0.54		3.37																		
M25	1.080	-1.825	2.91	0.54	2.90	3.44	3.41	25.00	2.00	23.00	247.23	0.00	247.23	73.46	72.50	35.53	69.28	142.43	247.23	7	2.00	23.00	25.00	0.00
M25	1.080	-1.825	2.91	0.54		3.44																		
M26	1.120	-1.864	2.98	0.54	2.90	3.52	3.48	36.00	2.00	34.00	363.32	0.00	363.32	108.60	104.40	51.16	102.40	209.76	363.32	11	1.00	34.00	36.00	0.00
M26	1.120	-1.864	2.98	0.54		3.52																		
M27	1.130	-1.908	3.04	0.54	2.90	3.57	3.55	40.00	2.00	38.00	411.80	0.00	411.80	121.37	116.00	56.84	114.46	240.50	411.80	12	2.00	38.00	40.00	0.00
M27	1.130	-1.908	3.04	0.54		3.57																		
M28	1.120	-1.949	3.07	0.54	2.90	3.60	3.59	37.00	2.50	34.50	385.21	0.00	385.21	110.19	107.30	52.58	103.92	228.71	385.21	11	1.50	34.50	37.00	0.00
M28	1.120	-1.949	3.07	0.54		3.60																		
OUTLET	0.570	-1.962	2.53	0.54	2.90	3.07	3.34	12.00	1.00	11.00	116.24	0.00	116.24	35.13	34.80	17.05	33.14	66.05	116.24	3	2.00	11.00	12.00	0.00
				0.54																				
				0.54																				
								190.00	12.00	178.00	1915.88	0.00	1915.88	568.53	551.00	269.99	536.15	1109.74	1915.88	56	10.00	178.00	190.00	0.00

Concrete G : 145.248 m3

Timber piles : 27360 m

6080 trees

Table B.3.3 (7) Sewer Line S1 (Pipe Diameter : 1000)

Bill of Quantity

Area : BM2 Pipe Diameter : 1000 Shoring Type : TIMBER

Sewer Line Name : S1 Foundation Type : T OK ! T

Manhole No. : M1 M18

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.230	-0.425	1.66	0.45		2.10														pipes	m			
M2	1.310	-0.440	1.75	0.45	2.10	2.20	2.15	30.00	2.00	28.00	135.45	0.00	135.45	41.78	63.00	30.87	51.12	53.46	135.45	7	0.00	28.00	30.00	0.00
M2	1.310	-0.440	1.75	0.45		2.20																		
M3	1.360	-0.451	1.81	0.45	2.10	2.26	2.23	22.00	2.00	20.00	103.03	0.00	103.03	29.84	46.20	22.64	36.52	43.87	103.03	5	0.00	20.00	22.00	0.00
M3	1.360	-0.451	1.81	0.45		2.26																		
M4	1.320	-0.466	1.79	0.45	2.10	2.23	2.25	30.00	2.00	28.00	141.75	0.00	141.75	41.78	63.00	30.87	51.12	59.76	141.75	7	0.00	28.00	30.00	0.00
M4	1.320	-0.466	1.79	0.45		2.23																		
M5	1.290	-0.482	1.77	0.45	2.10	2.22	2.23	31.00	2.00	29.00	145.18	0.00	145.18	43.27	65.10	31.90	52.95	60.33	145.18	7	1.00	29.00	31.00	0.00
M5	1.290	-0.482	1.77	0.45		2.22																		
M6	1.280	-0.499	1.78	0.45	2.10	2.22	2.23	35.00	2.00	33.00	163.91	0.00	163.91	49.24	73.50	36.02	60.25	67.65	163.91	8	1.00	33.00	35.00	0.00
M6	1.280	-0.499	1.78	0.45		2.22																		
M7	1.270	-0.516	1.79	0.45	2.10	2.23	2.23	34.00	2.00	32.00	159.23	0.00	159.23	47.74	71.40	34.99	58.44	65.80	159.23	8	0.00	32.00	34.00	0.00
M7	1.270	-0.516	1.79	0.45		2.23																		
M8	1.280	-0.534	1.81	0.45	2.10	2.26	2.25	35.00	2.00	33.00	165.38	0.00	165.38	49.24	73.50	36.02	60.25	69.12	165.38	8	33.00	33.00	35.00	0.00
M8	1.280	-0.534	1.81	0.45		2.26																		
M9	1.290	-0.551	1.84	0.45	2.10	2.29	2.28	35.00	2.00	33.00	167.58	0.00	167.58	49.24	73.50	36.02	60.25	71.32	167.58	8	1.00	33.00	35.00	0.00
M9	1.290	-0.551	1.84	0.45		2.29																		
M10	1.330	-0.567	1.90	0.45	2.10	2.34	2.32	32.00	2.20	29.80	155.91	0.00	155.91	44.46	67.20	32.93	54.42	68.56	155.91	7	1.80	29.80	32.00	0.00
M10	1.330	-0.567	1.90	0.45		2.34																		
M11	1.310	-0.584	1.89	0.45	2.10	2.34	2.35	34.00	2.20	31.80	167.79	0.00	167.79	47.45	71.40	34.99	58.06	74.74	167.79	7	3.80	31.80	34.00	0.00
M11	1.310	-0.584	1.89	0.45		2.34																		
M12	1.240	-0.601	1.84	0.45	2.10	2.29	2.32	34.00	2.00	32.00	165.65	0.00	165.65	47.74	71.40	34.99	58.44	72.22	165.65	8	0.00	32.00	34.00	0.00
M12	1.240	-0.601	1.84	0.45		2.29																		
M13	1.270	-0.615	1.89	0.45	2.10	2.33	2.31	27.00	2.00	25.00	130.98	0.00	130.98	37.30	56.70	27.78	45.65	57.55	130.98	6	1.00	25.00	27.00	0.00
M13	1.270	-0.615	1.89	0.45		2.33																		
M14	1.290	-0.630	1.92	0.45	2.10	2.37	2.35	30.00	2.00	28.00	148.05	0.00	148.05	41.78	63.00	30.87	51.12	66.06	148.05	7	0.00	28.00	30.00	0.00
M14	1.290	-0.630	1.92	0.45		2.37																		
M15	1.270	-0.645	1.92	0.45	2.10	2.36	2.37	30.00	2.00	28.00	149.31	0.00	149.31	41.78	63.00	30.87	51.12	67.32	149.31	7	0.00	28.00	30.00	0.00
M15	1.270	-0.645	1.92	0.45		2.36																		
M16	1.300	-0.662	1.96	0.45	2.10	2.41	2.39	35.00	2.00	33.00	175.67	0.00	175.67	49.24	73.50	36.02	60.25	79.41	175.67	8	1.00	33.00	35.00	0.00
M16	1.300	-0.662	1.96	0.45		2.41																		
M17	1.320	-0.680	2.00	0.45	2.10	2.45	2.43	35.00	2.00	33.00	178.61	0.00	178.61	49.24	73.50	36.02	60.25	82.35	178.61	8	1.00	33.00	35.00	0.00
M17	1.320	-0.680	2.00	0.45		2.45																		
M18	1.330	-0.697	2.03	0.45	2.10	2.47	2.46	35.00	1.70	33.30	180.81	0.00	180.81	49.68	73.50	36.02	60.81	83.99	180.81	8	1.30	33.30	35.00	0.00
M10	1.330	-0.567	1.90	0.45		2.34																		
OUTLET	0.830	-0.595	1.43	0.45	2.10	1.87	2.11	30.00	0.70	29.30	132.93	0.00	132.93	43.72	63.00	30.87	53.50	48.56	132.93	7	1.30	29.30	30.00	0.00
								574.00	34.80	539.20	2767.22	0.00	2767.22	804.49	1205.40	590.65	984.52	1192.05	2767.22	131	47.20	539.20	574.00	0.00

Concrete G : 214.6016 m3

Timber piles : 57860 m
12858 trees

Table B.3.3 (8) Sewer Line : S1 (Pipe Diameter : 1500)

Bill of Quantity

Area : BM2 Pipe Diameter : 1500 Shoring Type : TIMBER

Sewer Line Name : S1 Foundation Type : T OK ! T

Manhole No. : M18 M26

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete		m_m	
						Downstream					<= 6 m	=> 6 m				0.49				Length (m)	3.00		2.5	
		IE_1	ID_1			H_2																		
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M18	1.330	-1.197	2.53	0.54		3.06														pipes	m			
M19	1.310	-1.220	2.53	0.54	2.90	3.07	3.07	46.00	2.70	43.30	409.54	0.00	409.54	138.30	133.40	65.37	130.42	213.75	409.54	14	1.30	43.30	46.00	0.00
M19	1.310	-1.220	2.53	0.54		3.07																		
M20	1.330	-1.235	2.57	0.54	2.90	3.10	3.09	31.00	2.50	28.50	277.80	0.00	277.80	91.03	89.90	44.05	85.84	147.91	277.80	9	1.50	28.50	31.00	0.00
M20	1.330	-1.235	2.57	0.54		3.10																		
M21	1.350	-1.250	2.60	0.54	2.90	3.14	3.12	30.00	2.00	28.00	271.44	0.00	271.44	89.43	87.00	42.63	84.34	144.47	271.44	9	1.00	28.00	30.00	0.00
M21	1.350	-1.250	2.60	0.54		3.14																		
M22	1.380	-1.265	2.65	0.54	2.90	3.18	3.16	30.00	2.00	28.00	274.92	0.00	274.92	89.43	87.00	42.63	84.34	147.95	274.92	9	1.00	28.00	30.00	0.00
M22	1.380	-1.265	2.65	0.54		3.18																		
M23	1.380	-1.279	2.66	0.54	2.90	3.19	3.19	27.00	2.00	25.00	249.78	0.00	249.78	79.85	78.30	38.37	75.30	136.11	249.78	8	1.00	25.00	27.00	0.00
M23	1.380	-1.279	2.66	0.54		3.19																		
M24	1.320	-1.292	2.61	0.54	2.90	3.15	3.18	27.00	2.00	25.00	249.00	0.00	249.00	79.85	78.30	38.37	75.30	135.33	249.00	8	1.00	25.00	27.00	0.00
M24	1.320	-1.292	2.61	0.54		3.15																		
M25	1.280	-1.308	2.59	0.54	2.90	3.12	3.14	31.00	2.00	29.00	282.29	0.00	282.29	92.63	89.90	44.05	87.34	150.90	282.29	9	29.00	29.00	31.00	0.00
M25	1.280	-1.308	2.59	0.54		3.12																		
M26	1.280	-1.323	2.60	0.54	2.90	3.14	3.14	30.00	2.00	28.00	273.18	0.00	273.18	89.43	87.00	42.63	84.34	146.21	273.18	9	1.00	28.00	30.00	0.00
M19	1.310	-1.220	2.53	0.54		3.07																		
OUTLET	1.260	-1.242	2.50	0.54	2.90	3.04	3.06	23.00	2.20	20.80	204.11	0.00	204.11	66.44	66.70	32.68	62.64	108.79	204.11	6	2.80	20.80	23.00	0.00
								275.00	19.40	255.60	2492.06	0.00	2492.06	816.39	797.50	390.78	769.86	1331.43	2492.06	81	39.60	255.60	275.00	0.00

Concrete G : 208.5696 m3

Timber piles : 39600 m

8800 trees

Table B.3.3 (9) Sewer Line : S1 (Pipe Diameter : 1800)

Bill of Quantity

Area : BM2 Pipe Diameter : 1800 Shoring Type : TIMBER

Sewer Line Name : S1 Foundation Type : T OK ! T

Manhole No. : M26 M31

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete			
						Downstream					<= 6 m	=> 6 m				0.49				Length (m)	3.00		2.5	
		IE_1	ID_1			H_2																		
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M26	1.280	-1.623	2.90	0.59		3.49														pipes	m			
M27	1.290	-1.639	2.93	0.59	3.30	3.51	3.51	33.00	2.25	30.75	382.24	0.00	382.24	140.62	108.90	53.36	113.07	215.81	382.24	10	0.75	30.75	33.00	0.00
M27	1.290	-1.639	2.93	0.59		3.51																		
M28	1.340	-1.656	3.00	0.59	3.30	3.58	3.55	34.00	2.00	32.00	398.31	0.00	398.31	146.34	112.20	54.98	117.66	225.67	398.31	10	2.00	32.00	34.00	0.00
M28	1.340	-1.656	3.00	0.59		3.58																		
M29	1.350	-1.671	3.02	0.59	3.30	3.61	3.60	29.00	2.00	27.00	344.52	0.00	344.52	123.47	95.70	46.89	99.28	198.35	344.52	9	0.00	27.00	29.00	0.00
M29	1.350	-1.671	3.02	0.59		3.61																		
M30	1.360	-1.685	3.05	0.59	3.30	3.63	3.62	29.00	2.00	27.00	346.44	0.00	346.44	123.47	95.70	46.89	99.28	200.27	346.44	9	0.00	27.00	29.00	0.00
M30	1.360	-1.685	3.05	0.59		3.63																		
M31	1.370	-1.700	3.07	0.59	3.30	3.66	3.65	30.00	2.70	27.30	361.35	0.00	361.35	124.84	99.00	48.51	100.39	212.45	361.35	9	0.30	27.30	30.00	0.00
M30	1.360	-1.685	3.05	0.59		3.63																		
OUTLET	1.180	-1.708	2.89	0.59	3.30	3.47	3.56	23.00	1.20	21.80	270.21	0.00	270.21	99.69	75.90	37.19	80.16	152.86	270.21	7	0.80	21.80	23.00	0.00
								178.00	12.15	165.85	2103.07	0.00	2103.07	758.43	587.40	287.83	609.84	1205.40	2103.07	54	3.85	165.85	178.00	0.00

Concrete G : 183.92765 m3

Timber piles : 30759 m

6836 trees

Table B.3.3 (10) Sewer Line : S2 (Pipe Diameter : 1000)

Bill of Quantity

Area : BM2 Pipe Diameter : 1000 Shoring Type : TIMBER

Sewer Line Name : S2 Foundation Type : T OK ! T

Manhole No. : M1 M12

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.740	-0.460	2.20	0.45		2.65														pipes	m			
M2	1.590	-0.487	2.08	0.45	2.10	2.52	2.59	30.00	2.00	28.00	163.17	0.00	163.17	41.78	63.00	30.87	51.12	81.18	163.17	7	0.00	28.00	30.00	0.00
M2	1.590	-0.487	2.08	0.45		2.52																		
M3	1.570	-0.514	2.08	0.45	2.10	2.53	2.53	30.00	2.00	28.00	159.39	0.00	159.39	41.78	63.00	30.87	51.12	77.40	159.39	7	0.00	28.00	30.00	0.00
M3	1.570	-0.514	2.08	0.45		2.53																		
M4	1.550	-0.541	2.09	0.45	2.10	2.54	2.54	30.00	2.00	28.00	160.02	0.00	160.02	41.78	63.00	30.87	51.12	78.03	160.02	7	0.00	28.00	30.00	0.00
M4	1.550	-0.541	2.09	0.45		2.54																		
M5	1.520	-0.568	2.09	0.45	2.10	2.53	2.54	30.00	2.00	28.00	160.02	0.00	160.02	41.78	63.00	30.87	51.12	78.03	160.02	7	0.00	28.00	30.00	0.00
M5	1.520	-0.568	2.09	0.45		2.53																		
M6	1.510	-0.595	2.11	0.45	2.10	2.55	2.55	30.00	2.00	28.00	160.65	0.00	160.65	41.78	63.00	30.87	51.12	78.66	160.65	7	0.00	28.00	30.00	0.00
M6	1.510	-0.595	2.11	0.45		2.55																		
M7	1.500	-0.622	2.12	0.45	2.10	2.57	2.56	30.00	2.00	28.00	161.28	0.00	161.28	41.78	63.00	30.87	51.12	79.29	161.28	7	0.00	28.00	30.00	0.00
M7	1.500	-0.622	2.12	0.45		2.57																		
M8	1.500	-0.649	2.15	0.45	2.10	2.59	2.59	30.00	2.00	28.00	163.17	0.00	163.17	41.78	63.00	30.87	51.12	81.18	163.17	7	28.00	28.00	30.00	0.00
M8	1.500	-0.649	2.15	0.45		2.59																		
M9	1.490	-0.676	2.17	0.45	2.10	2.61	2.61	30.00	2.00	28.00	164.43	0.00	164.43	41.78	63.00	30.87	51.12	82.44	164.43	7	0.00	28.00	30.00	0.00
M9	1.490	-0.676	2.17	0.45		2.61																		
M10	1.470	-0.703	2.17	0.45	2.10	2.62	2.62	30.00	2.00	28.00	165.06	0.00	165.06	41.78	63.00	30.87	51.12	83.07	165.06	7	0.00	28.00	30.00	0.00
M10	1.470	-0.703	2.17	0.45		2.62																		
M11	1.440	-0.730	2.17	0.45	2.10	2.62	2.62	30.00	2.00	28.00	165.06	0.00	165.06	41.78	63.00	30.87	51.12	83.07	165.06	7	0.00	28.00	30.00	0.00
M11	1.440	-0.730	2.17	0.45		2.62																		
M12	1.400	-0.757	2.16	0.45	2.10	2.60	2.61	30.00	2.00	28.00	164.43	0.00	164.43	41.78	63.00	30.87	51.12	82.44	164.43	7	0.00	28.00	30.00	0.00
M11	1.180	-0.730	1.91	0.45		2.36																		
OUTLET	1.560	-0.746	2.31	0.45	2.10	2.75	2.56	15.00	0.70	14.30	80.64	0.00	80.64	21.34	31.50	15.44	26.11	39.10	80.64	3	2.30	14.30	15.00	0.00
								345.00	22.70	322.30	1867.32	0.00	1867.32	480.92	724.50	355.01	588.43	923.89	1867.32	80	30.30	322.30	345.00	0.00

Concrete G : 128.2754 m3

Timber piles : 34776 m
7728 trees

Table B.3.3 (11) Sewer Line : S2 (Pipe Diameter : 1500)

Bill of Quantity

Area : BM2 Pipe Diameter : 1500 Shoring Type : TIMBER

Sewer Line Name : S2 Foundation Type : T OK ! T

Manhole No. : M12 M17

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.49 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type Length (m) N pipes	Pipe Number Concrete 3.00 m 1.00	Pipe Bedding Length (m) L_2	Sheeting (m) 2.5 m L_3	Waling & Strut (ton) W_2
M12	1.400	-1.257	2.66	0.54		3.19																		
M13	1.390	-1.287	2.68	0.54	2.90	3.21	3.21	33.00	2.00	31.00	307.20	0.00	307.20	99.01	95.70	46.89	93.38	166.93	307.20	10	1.00	31.00	33.00	0.00
M13	1.390	-1.287	2.68	0.54		3.21																		
M14	1.380	-1.315	2.70	0.54	2.90	3.23	3.23	31.00	2.00	29.00	290.38	0.00	290.38	92.63	89.90	44.05	87.34	158.99	290.38	9	2.00	29.00	31.00	0.00
M14	1.380	-1.315	2.70	0.54		3.23																		
M15	1.360	-1.343	2.70	0.54	2.90	3.24	3.24	32.00	2.00	30.00	300.68	0.00	300.68	95.82	92.80	45.47	90.36	164.85	300.68	10	0.00	30.00	32.00	0.00
M15	1.360	-1.343	2.70	0.54		3.24																		
M16	1.360	-1.372	2.73	0.54	2.90	3.27	3.26	32.00	2.00	30.00	302.53	0.00	302.53	95.82	92.80	45.47	90.36	166.70	302.53	10	0.00	30.00	32.00	0.00
M16	1.360	-1.372	2.73	0.54		3.27																		
M17	1.370	-1.394	2.76	0.54	2.90	3.30	3.29	31.00	2.00	29.00	295.78	0.00	295.78	92.63	89.90	44.05	87.34	164.39	295.78	9	2.00	29.00	31.00	0.00
								159.00	10.00	149.00	1496.57	0.00	1496.57	475.91	461.10	225.94	448.78	821.85	1496.57	48	5.00	149.00	159.00	0.00

Concrete G : 121.584 m3

Timber piles : 22896 m

5088 trees

Table B.3.3 (12) Sewer Line : S1-3 (Pipe Diameter 1000)

Bill of Quantity

Area : BM2 Pipe Diameter : 1000 Shoring Type : TIMBER

Sewer Line Name : S1-3 Foundation Type : T OK ! T

Manhole No. : M1 M5

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.240	-0.546	1.79	0.45		2.23														pipes	m			
M2	1.300	-0.584	1.88	0.45	2.10	2.33	2.28	32.00	1.60	30.40	153.22	0.00	153.22	45.36	67.20	32.93	55.51	64.78	153.22	7	2.40	30.40	32.00	0.00
M2	1.300	-0.584	1.88	0.45		2.33																		
M3	1.320	-0.623	1.94	0.45	2.10	2.39	2.36	32.00	2.00	30.00	158.60	0.00	158.60	44.76	67.20	32.93	54.78	70.89	158.60	7	2.00	30.00	32.00	0.00
M3	1.320	-0.623	1.94	0.45		2.39																		
M4	1.290	-0.660	1.95	0.45	2.10	2.40	2.40	31.00	2.00	29.00	156.24	0.00	156.24	43.27	65.10	31.90	52.95	71.39	156.24	7	1.00	29.00	31.00	0.00
M4	1.290	-0.660	1.95	0.45		2.40																		
M18	1.330	-0.697	2.03	0.45	2.10	2.47	2.44	32.40	2.00	30.40	166.02	0.00	166.02	45.36	68.04	33.34	55.51	77.17	166.02	7	2.40	30.40	32.40	0.00
								127.40	7.60	119.80	634.08	0.00	634.08	178.75	267.54	131.09	218.75	284.24	634.08	28	7.80	119.80	127.40	0.00

Concrete G : 47.6804 m3

Timber piles : 12842 m

2854 trees

Table B.3.3 (13) Sewer Line : S1-5 (Pipe Diameter : 800)

Bill of Quantity

Area : BM2 Pipe Diameter : 800 Shoring Type : TIMBER

Sewer Line Name : S1-5 Foundation Type : T OK ! T

Manhole No. : M1 M5

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00	Pipe Number Concrete	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.320	-0.419	1.74	0.41		2.15														pipes	m			
M2	1.270	-0.464	1.73	0.41	1.90	2.14	2.15	31.00	1.60	29.40	126.64	0.00	126.64	29.11	58.90	28.86	46.86	50.92	126.64	7	1.40	29.40	31.00	0.00
M2	1.270	-0.464	1.73	0.41		2.14																		
M3	1.280	-0.509	1.79	0.41	1.90	2.20	2.18	30.00	2.00	28.00	124.26	0.00	124.26	27.72	57.00	27.93	44.63	51.70	124.26	7	0.00	28.00	30.00	0.00
M3	1.280	-0.509	1.79	0.41		2.20																		
M4	1.380	-0.566	1.95	0.41	1.90	2.36	2.28	38.00	2.00	36.00	164.62	0.00	164.62	35.64	72.20	35.38	57.38	71.86	164.62	9	0.00	36.00	38.00	0.00
M4	1.380	-0.566	1.95	0.41		2.36																		
M26	1.280	-0.623	1.90	0.41	1.90	2.31	2.34	38.00	2.00	36.00	168.95	0.00	168.95	35.64	72.20	35.38	57.38	76.19	168.95	9	0.00	36.00	38.00	0.00
								137.00	7.60	129.40	584.47	0.00	584.47	128.11	260.30	127.55	206.25	250.67	584.47	32	1.40	129.40	137.00	0.00

Concrete G : 34.291 m3

Timber piles : 10851 m

2412 trees

Table B.3.3 (14) Sewer Line : N12 (Pipe Diameter : 800)

Bill of Quantity

Area : BM2 Pipe Diameter : 800 Temporary Work Type : TIMBER

Sewer Line Name : N12 Foundation Type : T OK ! T

Manhole No. : M1 M7

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe	Clamshell	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand	Black Sand	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00		Pipe Foundation Length (m)	Sheet Pile (Piles)$_m$ TIMBER	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_1 / H_2	H_3	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_8	V_5	V_6	V_7	N		L_2	L_3	W_2
M1	1.210	-0.630	1.84	0.41		2.25														pipes	m			
M2	1.190	-0.670	1.86	0.41	1.90	2.27	2.26	28.00	0.80	27.20	120.24	0.00	120.24	26.93	53.20	26.07	43.35	50.82	120.24	6	3.20	27.20	0.00	0.00
M2	1.190	-0.670	1.86	0.41		2.27																		
M3	1.220	-0.708	1.93	0.41	1.90	2.34	2.31	28.00	0.80	27.20	122.90	0.00	122.90	26.93	53.20	26.07	43.35	53.48	122.90	6	3.20	27.20	0.00	0.00
M3	1.220	-0.708	1.93	0.41		2.34																		
M4	1.230	-0.753	1.98	0.41	1.90	2.39	2.37	32.00	0.80	31.20	144.10	0.00	144.10	30.89	60.80	29.79	49.73	64.58	144.10	7	3.20	31.20	0.00	0.00
M4	1.230	-0.753	1.98	0.41		2.39																		
M5	1.160	-0.799	1.96	0.41	1.90	2.37	2.39	31.00	0.80	30.20	140.78	0.00	140.78	29.90	58.90	28.86	48.14	63.78	140.78	7	2.20	30.20	0.00	0.00
M5	1.160	-0.799	1.96	0.41		2.37																		
M6	1.100	-0.837	1.94	0.41	1.90	2.35	2.36	27.00	0.80	26.20	121.07	0.00	121.07	25.94	51.30	25.14	41.76	54.17	121.07	6	2.20	26.20	0.00	0.00
M6	1.100	-0.837	1.94	0.41		2.35																		
M7	1.020	-0.882	1.90	0.41	1.90	2.31	2.33	32.00	0.80	31.20	141.67	0.00	141.67	30.89	60.80	29.79	49.73	62.15	141.67	7	3.20	31.20	0.00	0.00
M7	1.020	-0.882	1.90	0.41		2.31																		
M20	1.150	-0.923	2.07	0.41	1.90	2.48	2.40	30.00	0.80	29.20	136.80	0.00	136.80	28.91	57.00	27.93	46.54	62.33	136.80	7	29.20	29.20	0.00	0.00
								208.00	5.60	202.40	927.56	0.00	927.56	200.39	395.20	193.65	322.60	411.31	927.56	46	46.40	202.40	0.00	0.00

Concrete G : 53.636 m3

Timber piles : 16474 m

3661 trees

Table B.3.3 (15) Sewer Line : N14 (Pipe Diameter : 900)

Bill of Quantity

Area : BM2 Pipe Diameter : 900 Shoring Type : TIMBER

Sewer Line Name : N14 Foundation Type : T OK ! T

Manhole No. : M1 M7

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
M1	1.400	-0.612	2.01	0.43		2.44														pipes	m			
M2	1.350	-0.649	2.00	0.43	2.00	2.43	2.44	31.00	2.00	29.00	151.28	0.00	151.28	36.11	62.00	30.38	49.73	71.17	151.28	7	1.00	29.00	31.00	0.00
M2	1.350	-0.649	2.00	0.43		2.43																		
M3	1.280	-0.686	1.97	0.43	2.00	2.40	2.42	31.00	2.00	29.00	150.04	0.00	150.04	36.11	62.00	30.38	49.73	69.93	150.04	7	1.00	29.00	31.00	0.00
M3	1.280	-0.686	1.97	0.43		2.40																		
M4	1.240	-0.716	1.96	0.43	2.00	2.39	2.40	25.00	2.00	23.00	120.00	0.00	120.00	28.64	50.00	24.50	39.44	56.06	120.00	5	3.00	23.00	25.00	0.00
M4	1.240	-0.716	1.96	0.43		2.39																		
M5	1.220	-0.742	1.96	0.43	2.00	2.39	2.39	22.00	2.00	20.00	105.16	0.00	105.16	24.90	44.00	21.56	34.30	49.30	105.16	5	0.00	20.00	22.00	0.00
M5	1.220	-0.742	1.96	0.43		2.39																		
M6	1.200	-0.778	1.98	0.43	2.00	2.41	2.40	30.00	2.00	28.00	144.00	0.00	144.00	34.86	60.00	29.40	48.02	66.58	144.00	7	0.00	28.00	30.00	0.00
M6	1.200	-0.778	1.98	0.43		2.41																		
M7	1.100	-0.816	1.92	0.43	2.00	2.35	2.38	31.00	2.00	29.00	147.56	0.00	147.56	36.11	62.00	30.38	49.73	67.45	147.56	7	1.00	29.00	31.00	0.00
M7	1.100	-0.816	1.92	0.43		2.35																		
M27	1.060	-0.860	1.92	0.43	2.00	2.35	2.35	37.00	2.00	35.00	173.90	0.00	173.90	43.58	74.00	36.26	60.02	77.62	173.90	8	35.00	35.00	37.00	0.00
								207.00	14.00	193.00	991.94	0.00	991.94	240.31	414.00	202.86	330.97	458.11	991.94	46	41.00	193.00	207.00	0.00

Concrete G : 63.497 m3

Timber piles : 19376 m

4306 trees

Table B.3.3 (16) Sewer Line : N1 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : N1 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1	ID_1			H_2														pipes / m			
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N	L_2	L_3	W_2
I1	1.230	0.068	1.16	0.33		1.49														pipes			
M1	1.230	0.000	1.23	0.33	1.40	1.56	1.53	3.40	1.10	2.30	7.29	0.00	7.29	0.63	4.76	2.33	2.27	2.69	7.29	0	2.30	3.40	0.00
I'1	1.230	-0.304	1.53	0.33		1.86																	
M1	1.230	-0.400	1.63	0.33	1.40	1.96	1.91	4.80	1.10	3.70	12.84	0.00	12.84	1.01	6.72	3.29	3.65	5.90	12.84	0	3.70	4.80	0.00
I2	1.210	0.068	1.14	0.33		1.47																	
M2	1.210	0.000	1.21	0.33	1.40	1.54	1.51	3.40	1.10	2.30	7.19	0.00	7.19	0.63	4.76	2.33	2.27	2.59	7.19	0	2.30	3.40	0.00
I'2	1.210	-0.304	1.51	0.33		1.84																	
M2	1.210	-0.400	1.61	0.33	1.40	1.94	1.89	4.80	1.10	3.70	12.71	0.00	12.71	1.01	6.72	3.29	3.65	5.77	12.71	0	3.70	4.80	0.00
I3	1.190	-0.032	1.22	0.33		1.55																	
M3	1.190	-0.100	1.29	0.33	1.40	1.62	1.59	3.40	1.10	2.30	7.57	0.00	7.57	0.63	4.76	2.33	2.27	2.97	7.57	0	2.30	3.40	0.00
I'3	1.190	-0.304	1.49	0.33		1.82																	
M3	1.190	-0.400	1.59	0.33	1.40	1.92	1.87	4.80	1.10	3.70	12.57	0.00	12.57	1.01	6.72	3.29	3.65	5.63	12.57	0	3.70	4.80	0.00
I5	1.200	0.018	1.18	0.33		1.51																	
M5	1.200	-0.050	1.25	0.33	1.40	1.58	1.55	3.40	1.10	2.30	7.38	0.00	7.38	0.63	4.76	2.33	2.27	2.78	7.38	0	2.30	3.40	0.00
I'5	1.200	-0.304	1.50	0.33		1.83																	
M5	1.200	-0.400	1.60	0.33	1.40	1.93	1.88	4.80	1.10	3.70	12.64	0.00	12.64	1.01	6.72	3.29	3.65	5.70	12.64	0	3.70	4.80	0.00
I6	1.200	0.018	1.18	0.33		1.51																	
M6	1.200	-0.050	1.25	0.33	1.40	1.58	1.55	3.40	1.10	2.30	7.38	0.00	7.38	0.63	4.76	2.33	2.27	2.78	7.38	0	2.30	3.40	0.00
I'6	1.200	-0.304	1.50	0.33		1.83																	
M6	1.200	-0.400	1.60	0.33	1.40	1.93	1.88	4.80	1.10	3.70	12.64	0.00	12.64	1.01	6.72	3.29	3.65	5.70	12.64	0	3.70	4.80	0.00
I7	1.200	0.018	1.18	0.33		1.51																	
M7	1.200	-0.050	1.25	0.33	1.40	1.58	1.55	3.40	1.10	2.30	7.38	0.00	7.38	0.63	4.76	2.33	2.27	2.78	7.38	0	2.30	3.40	0.00
I'7	1.200	-0.304	1.50	0.33		1.83																	
M7	1.200	-0.400	1.60	0.33	1.40	1.93	1.88	4.80	1.10	3.70	12.64	0.00	12.64	1.01	6.72	3.29	3.65	5.70	12.64	0	3.70	4.80	0.00
			0.00	0.33		0.33																	
			0.00	0.33	0.00	0.33	0.33			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00
I8	1.230	0.068	1.16	0.33		1.49																	
M8	1.230	0.000	1.23	0.33	1.40	1.56	1.53	3.40	1.10	2.30	7.29	0.00	7.29	0.63	4.76	2.33	2.27	2.69	7.29	0	2.30	3.40	0.00
I'8	1.230	-0.304	1.53	0.33		1.86																	
M8	1.230	-0.400	1.63	0.33	1.40	1.96	1.91	4.80	1.10	3.70	12.84	0.00	12.84	1.01	6.72	3.29	3.65	5.90	12.84	0	3.70	4.80	0.00
I9	1.250	0.068	1.18	0.33		1.51																	
M9	1.250	0.000	1.25	0.33	1.40	1.58	1.55	3.40	1.10	2.30	7.38	0.00	7.38	0.63	4.76	2.33	2.27	2.78	7.38	0	2.30	3.40	0.00
I'9	1.250	-0.254	1.50	0.33		1.83																	
M9	1.250	-0.350	1.60	0.33	1.40	1.93	1.88	4.80	1.10	3.70	12.64	0.00	12.64	1.01	6.72	3.29	3.65	5.70	12.64	0	3.70	4.80	0.00
								65.60	17.60	48.00	160.38	0.00	160.38	13.12	91.84	45.00	47.36	68.02	160.38	0	48.00	48.00	65.60	0.00

Concrete G : 3.648 m3

Timber piles : 2834 m

630 trees

Table B.3.3 (17) Sewer Line : N1 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : N1 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I10	1.260	0.068	1.19	0.33		1.52														pipes	m			
M10	1.260	0.000	1.26	0.33	1.40	1.59	1.56	3.40	1.10	2.30	7.43	0.00	7.43	0.63	4.76	2.33	2.27	2.83	7.43	0	2.30	2.30	3.40	0.00
I11	1.260	0.068	1.19	0.33		1.52																		
M11	1.260	0.000	1.26	0.33	1.40	1.59	1.56	3.40	1.10	2.30	7.43	0.00	7.43	0.63	4.76	2.33	2.27	2.83	7.43	0	2.30	2.30	3.40	0.00
I'11	1.260	-0.254	1.51	0.33		1.84																		
M11	1.260	-0.350	1.61	0.33	1.40	1.94	1.89	4.80	1.10	3.70	12.71	0.00	12.71	1.01	6.72	3.29	3.65	5.77	12.71	0	3.70	3.70	4.80	0.00
I'12	1.260	-0.254	1.51	0.33		1.84																		
M12	1.260	-0.350	1.61	0.33	1.40	1.94	1.89	4.80	1.10	3.70	12.71	0.00	12.71	1.01	6.72	3.29	3.65	5.77	12.71	0	3.70	3.70	4.80	0.00
I13	1.240	0.068	1.17	0.33		1.50																		
M13	1.240	0.000	1.24	0.33	1.40	1.57	1.54	3.40	1.10	2.30	7.34	0.00	7.34	0.63	4.76	2.33	2.27	2.74	7.34	0	2.30	2.30	3.40	0.00
I'13	1.240	-0.254	1.49	0.33		1.82																		
M13	1.240	-0.350	1.59	0.33	1.40	1.92	1.87	4.80	1.10	3.70	12.57	0.00	12.57	1.01	6.72	3.29	3.65	5.63	12.57	0	3.70	3.70	4.80	0.00
I14	1.160	-0.032	1.19	0.33		1.52																		
M14	1.160	-0.100	1.26	0.33	1.40	1.59	1.56	3.40	1.10	2.30	7.43	0.00	7.43	0.63	4.76	2.33	2.27	2.83	7.43	0	2.30	2.30	3.40	0.00
I'14	1.160	-0.354	1.51	0.33		1.84																		
M14	1.160	-0.450	1.61	0.33	1.40	1.94	1.89	4.80	1.10	3.70	12.71	0.00	12.71	1.01	6.72	3.29	3.65	5.77	12.71	0	3.70	3.70	4.80	0.00
I16	1.080	-0.082	1.16	0.33		1.49																		
M16	1.080	-0.150	1.23	0.33	1.40	1.56	1.53	3.40	1.10	2.30	7.29	0.00	7.29	0.63	4.76	2.33	2.27	2.69	7.29	0	2.30	2.30	3.40	0.00
I'16	1.080	-0.404	1.48	0.33		1.81																		
M16	1.080	-0.500	1.58	0.33	1.40	1.91	1.86	4.80	1.10	3.70	12.50	0.00	12.50	1.01	6.72	3.29	3.65	5.56	12.50	0	3.70	3.70	4.80	0.00
I17	1.120	-0.062	1.18	0.33		1.51																		
M17	1.120	-0.130	1.25	0.33	1.40	1.58	1.55	3.40	1.10	2.30	7.38	0.00	7.38	0.63	4.76	2.33	2.27	2.78	7.38	0	2.30	2.30	3.40	0.00
I'17	1.120	-0.404	1.52	0.33		1.85																		
M17	1.120	-0.500	1.62	0.33	1.40	1.95	1.90	4.80	1.10	3.70	12.77	0.00	12.77	1.01	6.72	3.29	3.65	5.83	12.77	0	3.70	3.70	4.80	0.00
			0.00	0.33		0.33																		
			0.00	0.33	0.00	0.33	0.33			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00
I18	1.090	-0.082	1.17	0.33		1.50																		
M18	1.090	-0.150	1.24	0.33	1.40	1.57	1.54	3.40	1.10	2.30	7.34	0.00	7.34	0.63	4.76	2.33	2.27	2.74	7.34	0	2.30	2.30	3.40	0.00
I'18	1.090	-0.404	1.49	0.33		1.82																		
M18	1.090	-0.500	1.59	0.33	1.40	1.92	1.87	4.80	1.10	3.70	12.57	0.00	12.57	1.01	6.72	3.29	3.65	5.63	12.57	0	3.70	3.70	4.80	0.00
I20	1.150	-0.032	1.18	0.33		1.51																		
M20	1.150	-0.100	1.25	0.33	1.40	1.58	1.55	3.40	1.28	2.13	7.38	0.00	7.38	0.58	4.76	2.33	2.10	2.95	7.38	0	2.13	2.13	3.40	0.00
								60.80	16.68	44.13	147.56	0.00	147.56	12.06	85.12	41.71	43.54	62.31	147.56	0	44.13	44.13	60.80	0.00

Concrete G : 3.3535 m3

Timber piles : 2627 m

584 trees

Table B.3.3 (18) Sewer Line : N1 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : N1 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete			
						Downstream					<= 6 m	=> 6 m				0.49				Length (m)	4.00		2.5	
		IE_1 IE_2	ID_1 ID_2	H_1	W_1	H_2 H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I21	1.140	-0.032	1.17	0.33		1.50														pipes	m			
M21	1.140	-0.100	1.24	0.33	1.40	1.57	1.54	3.40	1.10	2.30	7.34	0.00	7.34	0.63	4.76	2.33	2.27	2.74	7.34	0	2.30	2.30	3.40	0.00
I'21	1.140	-0.354	1.49	0.33		1.82																		
M21	1.140	-0.450	1.59	0.33	1.40	1.92	1.87	4.80	1.28	3.53	12.57	0.00	12.57	0.96	6.72	3.29	3.48	5.80	12.57	0	3.53	3.53	4.80	0.00
I22	1.100	-0.082	1.18	0.33		1.51																		
M22	1.100	-0.150	1.25	0.33	1.40	1.58	1.55	3.40	1.40	2.00	7.38	0.00	7.38	0.54	4.76	2.33	1.98	3.07	7.38	0	2.00	2.00	3.40	0.00
I'22	1.100	-0.404	1.50	0.33		1.83																		
M22	1.100	-0.500	1.60	0.33	1.40	1.93	1.88	4.80	1.40	3.40	12.64	0.00	12.64	0.92	6.72	3.29	3.36	5.99	12.64	0	3.40	3.40	4.80	0.00
I23	1.100	-0.082	1.18	0.33		1.51																		
M23	1.100	-0.150	1.25	0.33	1.40	1.58	1.55	3.40	1.40	2.00	7.38	0.00	7.38	0.54	4.76	2.33	1.98	3.07	7.38	0	2.00	2.00	3.40	0.00
I'23	1.100	-0.404	1.50	0.33		1.83																		
M23	1.100	-0.500	1.60	0.33	1.40	1.93	1.88	4.80	1.40	3.40	12.64	0.00	12.64	0.92	6.72	3.29	3.36	5.99	12.64	0	3.40	3.40	4.80	0.00
I24	1.100	-0.082	1.18	0.33		1.51																		
M24	1.100	-0.150	1.25	0.33	1.40	1.58	1.55	3.40	1.40	2.00	7.38	0.00	7.38	0.54	4.76	2.33	1.98	3.07	7.38	0	2.00	2.00	3.40	0.00
I'25	1.050	-0.482	1.53	0.33		1.86																		
M25	1.050	-0.550	1.60	0.33	1.40	1.93	1.90	3.40	1.40	2.00	9.05	0.00	9.05	0.54	4.76	2.33	1.98	4.74	9.05	0	2.00	2.00	3.40	0.00
I26	1.040	-0.132	1.17	0.33		1.50																		
M26	1.040	-0.200	1.24	0.33	1.40	1.57	1.54	3.40	1.40	2.00	7.34	0.00	7.34	0.54	4.76	2.33	1.98	3.03	7.34	0	2.00	2.00	3.40	0.00
I'26	1.040	-0.104	1.14	0.33		1.47																		
M26	1.040	-0.200	1.24	0.33	1.40	1.57	1.52	4.80	1.40	3.40	10.22	0.00	10.22	0.92	6.72	3.29	3.36	3.57	10.22	0	3.40	3.40	4.80	0.00
I27	1.070	-0.132	1.20	0.33		1.53																		
M27	1.070	-0.200	1.27	0.33	1.40	1.60	1.57	3.40	1.40	2.00	7.48	0.00	7.48	0.54	4.76	2.33	1.98	3.17	7.48	0	2.00	2.00	3.40	0.00
I28	1.100	-0.082	1.18	0.33		1.51																		
M28	1.100	-0.150	1.25	0.33	1.40	1.58	1.55	3.40	1.40	2.00	7.38	0.00	7.38	0.54	4.76	2.33	1.98	3.07	7.38	0	2.00	2.00	3.40	0.00
			0.00	0.33		0.33																		
			0.00	0.33	0.00	0.33	0.33			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00
I'29	1.100	-0.404	1.50	0.33		1.83																		
M29	1.100	-0.500	1.60	0.33	1.40	1.93	1.88	4.80	1.40	3.40	12.64	0.00	12.64	0.92	6.72	3.29	3.36	5.99	12.64	0	3.40	3.40	4.80	0.00
								51.20	17.78	33.43	121.44	0.00	121.44	9.05	71.68	35.12	33.05	53.27	121.44	0	33.43	33.43	51.20	0.00

Concrete G : 2.5403 m3

Timber piles : 2212 m

492 trees

Table B.3.3 (19) Sewer Line : N2 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : N2 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N: pipes / m	L_2	L_3	W_2
I1	1.780	0.242	1.54	0.33		1.86																	
M1	1.780	0.150	1.63	0.33	1.40	1.96	1.91	4.60	1.10	3.50	12.31	0.00	12.31	0.95	6.44	3.16	3.46	5.69	12.31	0	3.50	3.50	4.60	0.00
I2	1.530	-0.008	1.54	0.33		1.86																	
M2	1.530	-0.100	1.63	0.33	1.40	1.96	1.91	4.60	1.10	3.50	12.31	0.00	12.31	0.95	6.44	3.16	3.46	5.69	12.31	0	3.50	3.50	4.60	0.00
I3	1.460	-0.058	1.52	0.33		1.84																	
M3	1.460	-0.150	1.61	0.33	1.40	1.94	1.89	4.60	1.10	3.50	12.18	0.00	12.18	0.95	6.44	3.16	3.46	5.56	12.18	0	3.50	3.50	4.60	0.00
I5	1.430	-0.058	1.49	0.33		1.81																	
M5	1.430	-0.150	1.58	0.33	1.40	1.91	1.86	4.60	1.10	3.50	11.98	0.00	11.98	0.95	6.44	3.16	3.46	5.36	11.98	0	3.50	3.50	4.60	0.00
I6	1.410	-0.108	1.52	0.33		1.84																	
M6	1.410	-0.200	1.61	0.33	1.40	1.94	1.89	4.60	1.10	3.50	12.18	0.00	12.18	0.95	6.44	3.16	3.46	5.56	12.18	0	3.50	3.50	4.60	0.00
I8	1.410	-0.108	1.52	0.33		1.84																	
M8	1.410	-0.200	1.61	0.33	1.40	1.94	1.89	4.60	1.10	3.50	12.18	0.00	12.18	0.95	6.44	3.16	3.46	5.56	12.18	0	3.50	3.50	4.60	0.00
I9	1.420	-0.108	1.53	0.33		1.85																	
M9	1.420	-0.200	1.62	0.33	1.40	1.95	1.90	4.60	1.10	3.50	12.24	0.00	12.24	0.95	6.44	3.16	3.46	5.62	12.24	0	3.50	3.50	4.60	0.00
I10	1.440	-0.108	1.55	0.33		1.87																	
M10	1.440	-0.200	1.64	0.33	1.40	1.97	1.92	4.60	1.10	3.50	12.37	0.00	12.37	0.95	6.44	3.16	3.46	5.75	12.37	0	3.50	3.50	4.60	0.00
I11	1.560	-0.108	1.67	0.33		1.99																	
M11	1.560	-0.200	1.76	0.33	1.40	2.09	2.04	4.60	1.20	3.40	13.14	0.00	13.14	0.92	6.44	3.16	3.36	6.62	13.14	0	3.40	3.40	4.60	0.00
I12	1.510	-0.052	1.56	0.33		1.89																	
M12	1.510	-0.100	1.61	0.33	1.40	1.94	1.92	2.40	1.40	1.00	6.46	0.00	6.46	0.27	3.36	1.65	0.99	3.82	6.46	0	1.00	1.00	2.40	0.00
I'12	1.510	0.052	1.46	0.33		1.78																	
M12	1.510	-0.300	1.81	0.33	1.40	2.14	1.96	17.60	1.40	16.20	48.30	0.00	48.30	4.41	24.64	12.07	16.00	20.23	48.30	4	0.20	16.20	17.60	0.00
I13	1.480	-0.072	1.55	0.33		1.88																	
M13	1.480	-0.120	1.60	0.33	1.40	1.93	1.91	2.40	1.40	1.00	6.42	0.00	6.42	0.27	3.36	1.65	0.99	3.78	6.42	0	1.00	1.00	2.40	0.00
			0.00	0.33		0.33																	
			0.00	0.33	0.00	0.33	0.33			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00
I'13	1.480	0.052	1.43	0.33		1.75																	
M13	1.480	-0.300	1.78	0.33	1.40	2.11	1.93	17.60	1.40	16.20	47.56	0.00	47.56	4.41	24.64	12.07	16.00	19.49	47.56	4	0.20	16.20	17.60	0.00
I14	1.360	-0.202	1.56	0.33		1.89																	
M14	1.360	-0.250	1.61	0.33	1.40	1.94	1.92	2.40	1.40	1.00	6.46	0.00	6.46	0.27	3.36	1.65	0.99	3.82	6.46	0	1.00	1.00	2.40	0.00
I'14	1.360	-0.098	1.46	0.33		1.78																	
M14	1.360	-0.450	1.81	0.33	1.40	2.14	1.96	17.60	1.40	16.20	48.30	0.00	48.30	4.41	24.64	12.07	16.00	20.23	48.30	4	0.20	16.20	17.60	0.00
								101.40	18.40	83.00	274.39	0.00	274.39	22.56	141.96	69.56	82.01	122.82	274.39	12	35.00	83.00	101.40	0.00

Concrete G : 6.308 m3

Timber piles : 4381 m

974 trees

Table B.3.3 (20) Sewer Line : N2 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : N2 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N pipes	N m	L_2	L_3	W_2
I15	1.380	-0.202	1.58	0.33		1.91																		
M15	1.380	-0.250	1.63	0.33	1.40	1.96	1.94	2.40	1.40	1.00	6.52	0.00	6.52	0.27	3.36	1.65	0.99	3.88	6.52	0	1.00	1.00	2.40	0.00
I'15	1.380	-0.098	1.48	0.33		1.80																		
M15	1.380	-0.450	1.83	0.33	1.40	2.16	1.98	17.60	1.40	16.20	48.79	0.00	48.79	4.41	24.64	12.07	16.00	20.72	48.79	4	0.20	16.20	17.60	0.00
I16	1.370	-0.202	1.57	0.33		1.90																		
M16	1.370	-0.250	1.62	0.33	1.40	1.95	1.93	2.40	1.40	1.00	6.49	0.00	6.49	0.27	3.36	1.65	0.99	3.85	6.49	0	1.00	1.00	2.40	0.00
I'16	1.370	-0.098	1.47	0.33		1.79																		
M16	1.370	-0.450	1.82	0.33	1.40	2.15	1.97	17.60	1.40	16.20	48.55	0.00	48.55	4.41	24.64	12.07	16.00	20.48	48.55	4	0.20	16.20	17.60	0.00
I17	1.350	-0.202	1.55	0.33		1.88																		
M17	1.350	-0.250	1.60	0.33	1.40	1.93	1.91	2.40	1.40	1.00	6.42	0.00	6.42	0.27	3.36	1.65	0.99	3.78	6.42	0	1.00	1.00	2.40	0.00
I'17	1.350	-0.098	1.45	0.33		1.77																		
M17	1.350	-0.450	1.80	0.33	1.40	2.13	1.95	17.60	1.40	16.20	48.05	0.00	48.05	4.41	24.64	12.07	16.00	19.98	48.05	4	0.20	16.20	17.60	0.00
I18	1.300	-0.252	1.55	0.33		1.88																		
M18	1.300	-0.300	1.60	0.33	1.40	1.93	1.91	2.40	1.40	1.00	6.42	0.00	6.42	0.27	3.36	1.65	0.99	3.78	6.42	0	1.00	1.00	2.40	0.00
I19	1.260	-0.302	1.56	0.33		1.89																		
M19	1.260	-0.350	1.61	0.33	1.40	1.94	1.92	2.40	1.40	1.00	6.46	0.00	6.46	0.27	3.36	1.65	0.99	3.82	6.46	0	1.00	1.00	2.40	0.00
I'19	1.260	-0.198	1.46	0.33		1.78																		
M19	1.260	-0.550	1.81	0.33	1.40	2.14	1.96	17.60	1.40	16.20	48.30	0.00	48.30	4.41	24.64	12.07	16.00	20.23	48.30	4	0.20	16.20	17.60	0.00
I20	1.310	-0.252	1.56	0.33		1.89																		
M20	1.310	-0.300	1.61	0.33	1.40	1.94	1.92	2.40	1.40	1.00	6.46	0.00	6.46	0.27	3.36	1.65	0.99	3.82	6.46	0	1.00	1.00	2.40	0.00
I'20	1.310	-0.148	1.46	0.33		1.78																		
M20	1.310	-0.500	1.81	0.33	1.40	2.14	1.96	17.60	1.40	16.20	48.30	0.00	48.30	4.41	24.64	12.07	16.00	20.23	48.30	4	0.20	16.20	17.60	0.00
I21	1.320	-0.252	1.57	0.33		1.90																		
M21	1.320	-0.300	1.62	0.33	1.40	1.95	1.93	2.40	1.40	1.00	6.49	0.00	6.49	0.27	3.36	1.65	0.99	3.85	6.49	0	1.00	1.00	2.40	0.00
			0.00	0.33		0.33																		
			0.00	0.33	0.00	0.33	0.33			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00
I'21	1.320	-0.148	1.47	0.33		1.79																		
M21	1.320	-0.500	1.82	0.33	1.40	2.15	1.97	17.60	1.40	16.20	48.55	0.00	48.55	4.41	24.64	12.07	16.00	20.48	48.55	4	0.20	16.20	17.60	0.00
I22	1.180	-0.402	1.58	0.33		1.91																		
M22	1.180	-0.450	1.63	0.33	1.40	1.96	1.94	2.40	1.40	1.00	6.52	0.00	6.52	0.27	3.36	1.65	0.99	3.88	6.52	0	1.00	1.00	2.40	0.00
I'22	1.180	-0.298	1.48	0.33		1.80																		
M22	1.180	-0.650	1.83	0.33	1.40	2.16	1.98	17.60	1.40	16.20	48.79	0.00	48.79	4.41	24.64	12.07	16.00	20.72	48.79	4	0.20	16.20	17.60	0.00
I23	1.180	-0.402	1.58	0.33		1.91																		
M23	1.180	-0.450	1.63	0.33	1.40	1.96	1.94	2.40	1.40	1.00	6.52	0.00	6.52	0.27	3.36	1.65	0.99	3.88	6.52	0	1.00	1.00	2.40	0.00
								144.80	22.40	122.40	397.63	0.00	397.63	33.30	202.72	99.33	120.91	177.39	397.63	28	10.40	122.40	144.80	0.00

Concrete G : 9.3024 m3

Timber piles : 6256 m

1391 trees

Table B.3.3 (21) Sewer Line : N2 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : N2 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete		$_m$	
						Downstream					<= 6 m	=> 6 m				0.49				Length (m)	4.00		2.5	
		IE_1	ID_1			H_2																		
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I24	1.100	-0.440	1.54	0.33		1.87														pipes	m			
M24	1.100	-0.500	1.60	0.33	1.40	1.93	1.90	3.00	1.40	1.60	7.98	0.00	7.98	0.44	4.20	2.06	1.58	4.34	7.98	0	1.60	1.60	3.00	0.00
I'24	1.100	-0.062	1.16	0.33		1.49																		
M24	1.100	-0.150	1.25	0.33	1.40	1.58	1.54	4.40	1.40	3.00	9.49	0.00	9.49	0.82	6.16	3.02	2.96	3.51	9.49	0	3.00	3.00	4.40	0.00
I25	1.090	-0.440	1.53	0.33		1.86																		
M25	1.090	-0.500	1.59	0.33	1.40	1.92	1.89	3.00	1.40	1.60	7.94	0.00	7.94	0.44	4.20	2.06	1.58	4.30	7.94	0	1.60	1.60	3.00	0.00
I'25	1.090	-0.062	1.15	0.33		1.48																		
M25	1.090	-0.150	1.24	0.33	1.40	1.57	1.53	4.40	1.40	3.00	9.43	0.00	9.43	0.82	6.16	3.02	2.96	3.45	9.43	0	3.00	3.00	4.40	0.00
I26	1.110	-0.440	1.55	0.33		1.88																		
M26	1.110	-0.500	1.61	0.33	1.40	1.94	1.91	3.00	1.40	1.60	8.03	0.00	8.03	0.44	4.20	2.06	1.58	4.39	8.03	0	1.60	1.60	3.00	0.00
I'26	1.110	-0.062	1.17	0.33		1.50																		
M26	1.110	-0.150	1.26	0.33	1.40	1.59	1.55	4.40	1.40	3.00	9.55	0.00	9.55	0.82	6.16	3.02	2.96	3.57	9.55	0	3.00	3.00	4.40	0.00
I27	1.140	-0.390	1.53	0.33		1.86																		
M27	1.140	-0.450	1.59	0.33	1.40	1.92	1.89	3.00	1.40	1.60	7.94	0.00	7.94	0.44	4.20	2.06	1.58	4.30	7.94	0	1.60	1.60	3.00	0.00
I'27	1.140	-0.012	1.15	0.33		1.48																		
M27	1.140	-0.100	1.24	0.33	1.40	1.57	1.53	4.40	1.40	3.00	9.43	0.00	9.43	0.82	6.16	3.02	2.96	3.45	9.43	0	3.00	3.00	4.40	0.00
I28	1.120	-0.440	1.56	0.33		1.89																		
M28	1.120	-0.500	1.62	0.33	1.40	1.95	1.92	3.00	1.40	1.60	8.07	0.00	8.07	0.44	4.20	2.06	1.58	4.43	8.07	0	1.60	1.60	3.00	0.00
								32.60	12.60	20.00	77.86	0.00	77.86	5.48	45.64	22.36	19.74	35.76	77.86	0	20.00	20.00	32.60	0.00

Concrete G : 1.52 m3

Timber piles : 1409 m

314 trees

Table B.3.3 (22) Sewer Line : N1-N2 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : N1-2 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N: pipes	N: m	L_2	L_3	W_2
I1	1.210	-0.308	1.52	0.33		1.84																		
M1	1.210	-0.400	1.61	0.33	1.40	1.94	1.89	4.60	1.10	3.50	12.18	0.00	12.18	0.95	6.44	3.16	3.46	5.56	12.18	0	3.50	3.50	4.60	0.00
I'1	1.210	0.062	1.15	0.33		1.47																		
M1	1.210	0.000	1.21	0.33	1.40	1.54	1.51	3.10	1.10	2.00	6.56	0.00	6.56	0.54	4.34	2.13	1.98	2.45	6.56	0	2.00	2.00	3.10	0.00
I2	1.190	-0.308	1.50	0.33		1.82																		
M2	1.190	-0.400	1.59	0.33	1.40	1.92	1.87	4.60	1.10	3.50	12.05	0.00	12.05	0.95	6.44	3.16	3.46	5.43	12.05	0	3.50	3.50	4.60	0.00
I'2	1.190	0.062	1.13	0.33		1.45																		
M2	1.190	0.000	1.19	0.33	1.40	1.52	1.49	3.10	1.10	2.00	6.47	0.00	6.47	0.54	4.34	2.13	1.98	2.36	6.47	0	2.00	2.00	3.10	0.00
I3	1.220	-0.308	1.53	0.33		1.85																		
M3	1.220	-0.400	1.62	0.33	1.40	1.95	1.90	4.60	1.10	3.50	12.24	0.00	12.24	0.95	6.44	3.16	3.46	5.62	12.24	0	3.50	3.50	4.60	0.00
I4	1.230	-0.308	1.54	0.33		1.86																		
M4	1.230	-0.400	1.63	0.33	1.40	1.96	1.91	4.60	1.10	3.50	12.31	0.00	12.31	0.95	6.44	3.16	3.46	5.69	12.31	0	3.50	3.50	4.60	0.00
I5	1.160	-0.358	1.52	0.33		1.84																		
M5	1.160	-0.450	1.61	0.33	1.40	1.94	1.89	4.60	1.10	3.50	12.18	0.00	12.18	0.95	6.44	3.16	3.46	5.56	12.18	0	3.50	3.50	4.60	0.00
I'5	1.160	0.062	1.10	0.33		1.42																		
M5	1.160	0.000	1.16	0.33	1.40	1.49	1.46	3.10	1.10	2.00	6.34	0.00	6.34	0.54	4.34	2.13	1.98	2.23	6.34	0	2.00	2.00	3.10	0.00
I'6	1.100	-0.038	1.14	0.33		1.46																		
M6	1.100	-0.100	1.20	0.33	1.40	1.53	1.50	3.10	1.10	2.00	6.51	0.00	6.51	0.54	4.34	2.13	1.98	2.40	6.51	0	2.00	2.00	3.10	0.00
I7	1.020	-0.508	1.53	0.33		1.85																		
M7	1.020	-0.600	1.62	0.33	1.40	1.95	1.90	4.60	1.10	3.50	12.24	0.00	12.24	0.95	6.44	3.16	3.46	5.62	12.24	0	3.50	3.50	4.60	0.00
I'7	1.020	-0.138	1.16	0.33		1.48																		
M7	1.020	-0.200	1.22	0.33	1.40	1.55	1.52	3.10	1.10	2.00	6.60	0.00	6.60	0.54	4.34	2.13	1.98	2.49	6.60	0	2.00	2.00	3.10	0.00
								43.10	12.10	31.00	105.68	0.00	105.68	8.40	60.34	29.57	30.66	45.45	105.68	0	31.00	31.00	43.10	0.00

Concrete G : 8.215 m3

Timber piles : 1862 m

414 trees

Table B.3.3 (23) Sewer Line : N1-4 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : N1-4 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N	L_2	L_3	W_2
I2	1.350	-0.166	1.52	0.33		1.84														pipes			
M2	1.350	-0.250	1.60	0.33	1.40	1.93	1.89	4.20	1.10	3.10	11.12	0.00	11.12	0.84	5.88	2.88	3.07	5.17	11.12	0 m 3.10	3.10	4.20	0.00
I'2	1.350	0.164	1.19	0.33		1.51																	
M2	1.350	0.100	1.25	0.33	1.40	1.58	1.55	3.20	1.10	2.10	6.95	0.00	6.95	0.57	4.48	2.20	2.08	2.67	6.95	0 2.10	2.10	3.20	0.00
I3	1.280	-0.216	1.50	0.33		1.82																	
M3	1.280	-0.300	1.58	0.33	1.40	1.91	1.87	4.20	1.10	3.10	11.00	0.00	11.00	0.84	5.88	2.88	3.07	5.05	11.00	0 3.10	3.10	4.20	0.00
I4	1.240	-0.266	1.51	0.33		1.83																	
M4	1.240	-0.350	1.59	0.33	1.40	1.92	1.88	4.20	1.10	3.10	11.06	0.00	11.06	0.84	5.88	2.88	3.07	5.11	11.06	0 3.10	3.10	4.20	0.00
I5	1.220	-0.316	1.54	0.33		1.86																	
M5	1.220	-0.400	1.62	0.33	1.40	1.95	1.91	4.20	1.10	3.10	11.24	0.00	11.24	0.84	5.88	2.88	3.07	5.29	11.24	0 3.10	3.10	4.20	0.00
I6	1.200	-0.316	1.52	0.33		1.84																	
M6	1.200	-0.400	1.60	0.33	1.40	1.93	1.89	4.20	1.10	3.10	11.12	0.00	11.12	0.84	5.88	2.88	3.07	5.17	11.12	0 3.10	3.10	4.20	0.00
I'6	1.200	0.014	1.19	0.33		1.51																	
M6	1.200	-0.050	1.25	0.33	1.40	1.58	1.55	3.20	1.10	2.10	6.95	0.00	6.95	0.57	4.48	2.20	2.08	2.67	6.95	0 2.10	2.10	3.20	0.00
I7	1.100	-0.416	1.52	0.33		1.84																	
M7	1.100	-0.500	1.60	0.33	1.40	1.93	1.89	4.20	1.10	3.10	11.12	0.00	11.12	0.84	5.88	2.88	3.07	5.17	11.12	0 3.10	3.10	4.20	0.00
								31.60	8.80	22.80	80.56	0.00	80.56	6.18	44.24	21.68	22.58	36.30	80.56	0 22.80	22.80	31.60	0.00

Concrete G : 1.7328 m3

Timber piles : 1366 m

304 trees

Table B.3.3 (24) Sewer Line : S1 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : S1 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete		m_m	
						Downstream					<= 6 m	=> 6 m				0.49				Length (m)	4.00		2.5	
		IE_1	ID_1			H_2																		
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I1	1.230	-0.312	1.54	0.33		1.87														pipes	m			
M1	1.230	-0.400	1.63	0.33	1.40	1.96	1.92	4.40	1.10	3.30	11.83	0.00	11.83	0.90	6.16	3.02	3.26	5.55	11.83	0	3.30	3.30	4.40	0.00
I2	1.310	-0.212	1.52	0.33		1.85																		
M2	1.310	-0.300	1.61	0.33	1.40	1.94	1.90	4.40	1.10	3.30	11.71	0.00	11.71	0.90	6.16	3.02	3.26	5.43	11.71	0	3.30	3.30	4.40	0.00
I3	1.360	-0.162	1.52	0.33		1.85																		
M3	1.360	-0.250	1.61	0.33	1.40	1.94	1.90	4.40	1.10	3.30	11.71	0.00	11.71	0.90	6.16	3.02	3.26	5.43	11.71	0	3.30	3.30	4.40	0.00
I4	1.320	-0.212	1.53	0.33		1.86																		
M4	1.320	-0.300	1.62	0.33	1.40	1.95	1.91	4.40	1.10	3.30	11.77	0.00	11.77	0.90	6.16	3.02	3.26	5.49	11.77	0	3.30	3.30	4.40	0.00
I5	1.290	-0.212	1.50	0.33		1.83																		
M5	1.290	-0.300	1.59	0.33	1.40	1.92	1.88	4.40	1.10	3.30	11.59	0.00	11.59	0.90	6.16	3.02	3.26	5.31	11.59	0	3.30	3.30	4.40	0.00
I7	1.270	-0.212	1.48	0.33		1.81																		
M7	1.270	-0.300	1.57	0.33	1.40	1.90	1.86	4.40	1.10	3.30	11.46	0.00	11.46	0.90	6.16	3.02	3.26	5.18	11.46	0	3.30	3.30	4.40	0.00
I8	1.280	-0.212	1.49	0.33		1.82																		
M8	1.280	-0.300	1.58	0.33	1.40	1.91	1.87	4.40	1.10	3.30	11.52	0.00	11.52	0.90	6.16	3.02	3.26	5.24	11.52	0	3.30	3.30	4.40	0.00
I9	1.290	-0.212	1.50	0.33		1.83																		
M9	1.290	-0.300	1.59	0.33	1.40	1.92	1.88	4.40	1.10	3.30	11.59	0.00	11.59	0.90	6.16	3.02	3.26	5.31	11.59	0	3.30	3.30	4.40	0.00
I11	1.310	-0.212	1.52	0.33		1.85																		
M11	1.310	-0.300	1.61	0.33	1.40	1.94	1.90	4.40	1.10	3.30	11.71	0.00	11.71	0.90	6.16	3.02	3.26	5.43	11.71	0	3.30	3.30	4.40	0.00
I14	1.290	-0.212	1.50	0.33		1.83																		
M14	1.290	-0.300	1.59	0.33	1.40	1.92	1.88	4.40	1.10	3.30	11.59	0.00	11.59	0.90	6.16	3.02	3.26	5.31	11.59	0	3.30	3.30	4.40	0.00
I15	1.270	-0.262	1.53	0.33		1.86																		
M15	1.270	-0.350	1.62	0.33	1.40	1.95	1.91	4.40	1.10	3.30	11.77	0.00	11.77	0.90	6.16	3.02	3.26	5.49	11.77	0	3.30	3.30	4.40	0.00
I16	1.300	-0.212	1.51	0.33		1.84																		
M16	1.300	-0.300	1.60	0.33	1.40	1.93	1.89	4.40	1.10	3.30	11.65	0.00	11.65	0.90	6.16	3.02	3.26	5.37	11.65	0	3.30	3.30	4.40	0.00
			0.00	0.33		0.33																		
			0.00	0.33	0.00	0.33	0.33			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00
I17	1.320	-0.212	1.53	0.33		1.86																		
M17	1.320	-0.300	1.62	0.33	1.40	1.95	1.91	4.40	1.10	3.30	11.77	0.00	11.77	0.90	6.16	3.02	3.26	5.49	11.77	0	3.30	3.30	4.40	0.00
I20	1.330	-0.212	1.54	0.33		1.87																		
M20	1.330	-0.300	1.63	0.33	1.40	1.96	1.92	4.40	1.40	3.00	11.83	0.00	11.83	0.82	6.16	3.02	2.96	5.85	11.83	0	3.00	3.00	4.40	0.00
I21	1.350	-0.162	1.51	0.33		1.84																		
M21	1.350	-0.250	1.60	0.33	1.40	1.93	1.89	4.40	1.40	3.00	11.65	0.00	11.65	0.82	6.16	3.02	2.96	5.67	11.65	0	3.00	3.00	4.40	0.00
I25	1.280	-0.212	1.49	0.33		1.82																		
M25	1.280	-0.300	1.58	0.33	1.40	1.91	1.87	4.40	1.40	3.00	11.52	0.00	11.52	0.82	6.16	3.02	2.96	5.54	11.52	0	3.00	3.00	4.40	0.00
								70.40	18.50	51.90	186.67	0.00	186.67	14.16	98.56	48.29	51.26	87.12	186.67	0	51.90	51.90	70.40	0.00

Concrete G : 3.9444 m3

Timber piles : 3042 m

676 trees

Table B.3.3 (25) Sewer Line : S1 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : S1 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N	L_2	L_3	W_2
I27	1.290	-0.212	1.50	0.33		1.83														pipes	m			
M27	1.290	-0.300	1.59	0.33	1.40	1.92	1.88	4.40	1.60	2.80	11.59	0.00	11.59	0.76	6.16	3.02	2.77	5.80	11.59	0	2.80	2.80	4.40	0.00
I29	1.350	-0.162	1.51	0.33		1.84																		
M29	1.350	-0.250	1.60	0.33	1.40	1.93	1.89	4.40	1.60	2.80	11.65	0.00	11.65	0.76	6.16	3.02	2.77	5.86	11.65	0	2.80	2.80	4.40	0.00
I30	1.360	-0.162	1.52	0.33		1.85																		
M30	1.360	-0.250	1.61	0.33	1.40	1.94	1.90	4.40	1.60	2.80	11.71	0.00	11.71	0.76	6.16	3.02	2.77	5.92	11.71	0	2.80	2.80	4.40	0.00
								13.20	4.80	8.40	34.95	0.00	34.95	2.28	18.48	9.06	8.31	17.58	34.95	0	8.40	8.40	13.20	0.00

Concrete G : 0.6384 m3

Timber piles : 571 m

127 trees

Table B.3.3 (26) Sewer Line : S2 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : S2 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream / Downstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.49	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type / Length (m)	Concrete 4.00		2.5 m	
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I'1	1.740	0.234	1.51	0.33		1.83														pipes	m			
M1	1.740	0.150	1.59	0.33	1.40	1.92	1.88	4.20	1.10	3.10	11.06	0.00	11.06	0.84	5.88	2.88	3.07	5.11	11.06	0	3.10	3.10	4.20	0.00
I'2	1.590	0.084	1.51	0.33		1.83																		
M2	1.590	0.000	1.59	0.33	1.40	1.92	1.88	4.20	1.10	3.10	11.06	0.00	11.06	0.84	5.88	2.88	3.07	5.11	11.06	0	3.10	3.10	4.20	0.00
I'3	1.570	0.084	1.49	0.33		1.81																		
M3	1.570	0.000	1.57	0.33	1.40	1.90	1.86	4.20	1.10	3.10	10.94	0.00	10.94	0.84	5.88	2.88	3.07	4.99	10.94	0	3.10	3.10	4.20	0.00
I'5	1.520	-0.016	1.54	0.33		1.86																		
M5	1.520	-0.100	1.62	0.33	1.40	1.95	1.91	4.20	1.10	3.10	11.24	0.00	11.24	0.84	5.88	2.88	3.07	5.29	11.24	0	3.10	3.10	4.20	0.00
I'6	1.510	-0.016	1.53	0.33		1.85																		
M6	1.510	-0.100	1.61	0.33	1.40	1.94	1.90	4.20	1.10	3.10	11.18	0.00	11.18	0.84	5.88	2.88	3.07	5.23	11.18	0	3.10	3.10	4.20	0.00
I'7	1.500	-0.016	1.52	0.33		1.84																		
M7	1.500	-0.100	1.60	0.33	1.40	1.93	1.89	4.20	1.10	3.10	11.12	0.00	11.12	0.84	5.88	2.88	3.07	5.17	11.12	0	3.10	3.10	4.20	0.00
I'8	1.500	-0.016	1.52	0.33		1.84																		
M8	1.500	-0.100	1.60	0.33	1.40	1.93	1.89	4.20	1.10	3.10	11.12	0.00	11.12	0.84	5.88	2.88	3.07	5.17	11.12	0	3.10	3.10	4.20	0.00
I'9	1.490	-0.016	1.51	0.33		1.83																		
M9	1.490	-0.100	1.59	0.33	1.40	1.92	1.88	4.20	1.10	3.10	11.06	0.00	11.06	0.84	5.88	2.88	3.07	5.11	11.06	0	3.10	3.10	4.20	0.00
I'10	1.470	-0.066	1.54	0.33		1.86																		
M10	1.470	-0.150	1.62	0.33	1.40	1.95	1.91	4.20	1.10	3.10	11.24	0.00	11.24	0.84	5.88	2.88	3.07	5.29	11.24	0	3.10	3.10	4.20	0.00
I'11	1.440	-0.066	1.51	0.33		1.83																		
M11	1.440	-0.150	1.59	0.33	1.40	1.92	1.88	4.20	1.10	3.10	11.06	0.00	11.06	0.84	5.88	2.88	3.07	5.11	11.06	0	3.10	3.10	4.20	0.00
I'12	1.400	-0.116	1.52	0.33		1.84																		
M12	1.400	-0.200	1.60	0.33	1.40	1.93	1.89	4.20	1.20	3.00	11.12	0.00	11.12	0.82	5.88	2.88	2.96	5.28	11.12	0	3.00	3.00	4.20	0.00
I'13	1.390	-0.116	1.51	0.33		1.83																		
M13	1.390	-0.200	1.59	0.33	1.40	1.92	1.88	4.20	1.40	2.80	11.06	0.00	11.06	0.76	5.88	2.88	2.77	5.41	11.06	0	2.80	2.80	4.20	0.00
			0.00	0.33		0.33																		
			0.00	0.33	0.00	0.33	0.33			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00
I'14	1.380	-0.166	1.55	0.33		1.87																		
M14	1.380	-0.250	1.63	0.33	1.40	1.96	1.92	4.20	1.40	2.80	11.29	0.00	11.29	0.76	5.88	2.88	2.77	5.64	11.29	0	2.80	2.80	4.20	0.00
I'15	1.360	-0.166	1.53	0.33		1.85																		
M15	1.360	-0.250	1.61	0.33	1.40	1.94	1.90	4.20	1.40	2.80	11.18	0.00	11.18	0.76	5.88	2.88	2.77	5.53	11.18	0	2.80	2.80	4.20	0.00
I'16	1.360	-0.166	1.53	0.33		1.85																		
M16	1.360	-0.250	1.61	0.33	1.40	1.94	1.90	4.20	1.40	2.80	11.18	0.00	11.18	0.76	5.88	2.88	2.77	5.53	11.18	0	2.80	2.80	4.20	0.00
								63.00	17.80	45.20	166.91	0.00	166.91	12.26	88.20	43.22	44.74	78.95	166.91	0	45.20	45.20	63.00	0.00

Concrete G : 3.4352 m3

Timber piles : 2722 m

605 trees

Table B.3.3 (27) Sewer Line : S1-3 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : S1-3 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream / Downstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.49	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type / Length (m)	Concrete 4.00		2.5 m	
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
																				pipes	m			
I'1	1.240	-0.316	1.56	0.33		1.88																		
M1	1.240	-0.400	1.64	0.33	1.40	1.97	1.93	4.20	1.10	3.10	11.35	0.00	11.35	0.84	5.88	2.88	3.07	5.40	11.35	0	3.10	3.10	4.20	0.00
I2	1.300	0.112	1.19	0.33		1.51																		
M2	1.300	0.050	1.25	0.33	1.40	1.58	1.55	3.10	1.10	2.00	6.73	0.00	6.73	0.54	4.34	2.13	1.98	2.62	6.73	0	2.00	2.00	3.10	0.00
I'2	1.300	-0.216	1.52	0.33		1.84																		
M2	1.300	-0.300	1.60	0.33	1.40	1.93	1.89	4.20	1.10	3.10	11.12	0.00	11.12	0.84	5.88	2.88	3.07	5.17	11.12	0	3.10	3.10	4.20	0.00
I3	1.320	0.112	1.21	0.33		1.53																		
M3	1.320	0.050	1.27	0.33	1.40	1.60	1.57	3.10	1.10	2.00	6.82	0.00	6.82	0.54	4.34	2.13	1.98	2.71	6.82	0	2.00	2.00	3.10	0.00
I'3	1.320	-0.216	1.54	0.33		1.86																		
M3	1.320	-0.300	1.62	0.33	1.40	1.95	1.91	4.20	1.10	3.10	11.24	0.00	11.24	0.84	5.88	2.88	3.07	5.29	11.24	0	3.10	3.10	4.20	0.00
I4	1.290	0.112	1.18	0.33		1.50																		
M4	1.290	0.050	1.24	0.33	1.40	1.57	1.54	3.10	1.10	2.00	6.69	0.00	6.69	0.54	4.34	2.13	1.98	2.58	6.69	0	2.00	2.00	3.10	0.00
I'4	1.290	-0.216	1.51	0.33		1.83																		
M4	1.290	-0.300	1.59	0.33	1.40	1.92	1.88	4.20	1.10	3.10	11.06	0.00	11.06	0.84	5.88	2.88	3.07	5.11	11.06	0	3.10	3.10	4.20	0.00
								26.10	7.70	18.40	65.01	0.00	65.01	4.98	36.54	17.90	18.22	28.89	65.01	0	18.40	18.40	26.10	0.00

Concrete G : 1.3984 m3

Timber piles : 1128 m

251 trees

Table B.3.3 (28) Sewer Line : S1-5 (Pipe Diameter : 400)

Bill of Quantity

Area : BM2 Pipe Diameter : 400 Shoring Type : TIMBER

Sewer Line Name : S1-5 Foundation Type : T OK ! T

Inlet No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.49	Yellow Sand Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete		$m_{2.5}$	
						Downstream														Length (m)	4.00			
		IE_1 IE_2	ID_1 ID_2	H_1	W_1	H_2 H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I1	1.320	0.164	1.16	0.33		1.48														pipes	m			
M1	1.320	0.100	1.22	0.33	1.40	1.55	1.52	3.20	1.10	2.10	6.81	0.00	6.81	0.57	4.48	2.20	2.08	2.53	6.81	0	2.10	2.10	3.20	0.00
I'1	1.320	-0.188	1.51	0.33		1.83																		
M1	1.320	-0.280	1.60	0.33	1.40	1.93	1.88	4.60	1.10	3.50	12.11	0.00	12.11	0.95	6.44	3.16	3.46	5.49	12.11	0	3.50	3.50	4.60	0.00
I2	1.270	0.064	1.21	0.33		1.53																		
M2	1.270	0.000	1.27	0.33	1.40	1.60	1.57	3.20	1.10	2.10	7.04	0.00	7.04	0.57	4.48	2.20	2.08	2.76	7.04	0	2.10	2.10	3.20	0.00
I'2	1.270	-0.208	1.48	0.33		1.80																		
M2	1.270	-0.300	1.57	0.33	1.40	1.90	1.85	4.60	1.10	3.50	11.92	0.00	11.92	0.95	6.44	3.16	3.46	5.30	11.92	0	3.50	3.50	4.60	0.00
I'3	1.280	-0.208	1.49	0.33		1.81																		
M3	1.280	-0.300	1.58	0.33	1.40	1.91	1.86	4.60	1.10	3.50	11.98	0.00	11.98	0.95	6.44	3.16	3.46	5.36	11.98	0	3.50	3.50	4.60	0.00
I4	1.380	0.164	1.22	0.33		1.54																		
M4	1.380	0.100	1.28	0.33	1.40	1.61	1.58	3.20	1.10	2.10	7.08	0.00	7.08	0.57	4.48	2.20	2.08	2.80	7.08	0	2.10	2.10	3.20	0.00
								23.40	6.60	16.80	56.94	0.00	56.94	4.56	32.76	16.05	16.62	24.27	56.94	0	16.80	16.80	23.40	0.00

Concrete G : 1.2768 m3

Timber piles : 1011 m

225 trees

Table B.3.3 (29) Sewer Line : N1 (Pipe Diameter : 600)

Bill of Quantity

Area : BM2 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : N1 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Excavation Work (m^3) Clamshell Depth => 6 m	Excavation Work (m^3) Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I'10	1.260	-0.454	1.71	0.39		2.10														pipes	m			
M10	1.260	-0.550	1.81	0.39	1.60	2.20	2.16	4.80	1.10	3.70	16.59	0.00	16.59	2.14	7.68	3.76	4.73	8.10	16.59	0	3.70	3.70	4.80	0.00
I'15	1.110	-0.604	1.71	0.39		2.10																		
M15	1.110	-0.700	1.81	0.39	1.60	2.20	2.16	4.80	1.10	3.70	16.59	0.00	16.59	2.14	7.68	3.76	4.73	8.10	16.59	0	3.70	3.70	4.80	0.00
I'24	1.100	-0.604	1.70	0.39		2.09																		
M24	1.100	-0.700	1.80	0.39	1.60	2.19	2.15	4.80	1.40	3.40	16.52	0.00	16.52	1.97	7.68	3.76	4.34	8.42	16.52	0	3.40	3.40	4.80	0.00
I'28	1.100	-0.604	1.70	0.39		2.09																		
M28	1.100	-0.700	1.80	0.39	1.60	2.19	2.15	4.80	1.40	3.40	16.52	0.00	16.52	1.97	7.68	3.76	4.34	8.42	16.52	0	3.40	3.40	4.80	0.00
								19.20	5.00	14.20	66.22	0.00	66.22	8.22	30.72	15.05	18.14	33.03	66.22	0	14.20	14.20	19.20	0.00

Concrete G : 2.4424 m3

Timber piles : 1245 m

277 trees

Table B.3.3 (30) Sewer Line : N2 (Pipe Diameter : 600)

Bill of Quantity

Area : BM2 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : N2 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (m)	Waling & Strut (ton)
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete			
						Downstream					<= 6 m	=> 6 m				0.49				Length (m)	4.00		2.5 m	
		IE_1	ID_1			H_2																		
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I4	1.450	-0.258	1.71	0.39		2.10														pipes	m			
M4	1.450	-0.350	1.80	0.39	1.60	2.19	2.15	4.60	1.10	3.50	15.83	0.00	15.83	2.03	7.36	3.61	4.47	7.75	15.83	0	3.50	3.50	4.60	0.00
I7	1.400	-0.308	1.71	0.39		2.10																		
M7	1.400	-0.400	1.80	0.39	1.60	2.19	2.15	4.60	1.10	3.50	15.83	0.00	15.83	2.03	7.36	3.61	4.47	7.75	15.83	0	3.50	3.50	4.60	0.00
								9.20	2.20	7.00	31.66	0.00	31.66	4.06	14.72	7.21	8.94	15.51	31.66	0	7.00	7.00	9.20	0.00

Concrete G : 1.204 m3

Timber piles : 597 m

133 trees

Table B.3.3 (31) Sewer Line : N1-2 (Pipe Diameter : 600)

Bill of Quantity

Area : BM2 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : N1-2 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00	Pipe Number Concrete	Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I6	1.100	-0.608	1.71	0.39		2.10														pipes	m			
M6	1.100	-0.700	1.80	0.39	1.60	2.19	2.15	4.60	1.10	3.50	15.83	0.00	15.83	2.03	7.36	3.61	4.47	7.75	15.83	0	3.50	3.50	4.60	0.00
								4.60	1.10	3.50	15.83	0.00	15.83	2.03	7.36	3.61	4.47	7.75	15.83	0	3.50	3.50	4.60	0.00

Concrete G : 0.602 m3

Timber piles : 299 m

67 trees

Table B.3.3 (32) Sewer Line : N1-4 (Pipe Diameter : 600)

Bill of Quantity

Area : BM2 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : N1-4 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Excavation Work (m^3) Clamshell Depth => 6 m	Excavation Work (m^3) Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I1	1.400	-0.316	1.72	0.39		2.11														pipes	m			
M1	1.400	-0.400	1.80	0.39	1.60	2.19	2.15	4.20	1.10	3.10	14.45	0.00	14.45	1.79	6.72	3.29	3.96	7.20	14.45	0	3.10	3.10	4.20	0.00
I'1	1.400	-0.036	1.44	0.39		1.83																		
M1	1.400	-0.100	1.50	0.39	1.60	1.89	1.86	3.20	1.10	2.10	9.53	0.00	9.53	1.22	5.12	2.51	2.68	4.34	9.53	0	2.10	2.10	3.20	0.00
I'3	1.280	-0.136	1.42	0.39		1.81																		
M3	1.280	-0.200	1.48	0.39	1.60	1.87	1.84	3.20	1.10	2.10	9.43	0.00	9.43	1.22	5.12	2.51	2.68	4.24	9.43	0	2.10	2.10	3.20	0.00
I'4	1.240	-0.136	1.38	0.39		1.77																		
M4	1.240	-0.200	1.44	0.39	1.60	1.83	1.80	3.20	1.10	2.10	9.22	0.00	9.22	1.22	5.12	2.51	2.68	4.03	9.22	0	2.10	2.10	3.20	0.00
I'5	1.220	-0.136	1.36	0.39		1.75																		
M5	1.220	-0.200	1.42	0.39	1.60	1.81	1.78	3.20	1.10	2.10	9.12	0.00	9.12	1.22	5.12	2.51	2.68	3.93	9.12	0	2.10	2.10	3.20	0.00
I'7	1.100	-0.286	1.39	0.39		1.78																		
M7	1.100	-0.350	1.45	0.39	1.60	1.84	1.81	3.20	1.10	2.10	9.27	0.00	9.27	1.22	5.12	2.51	2.68	4.08	9.27	0	2.10	2.10	3.20	0.00
								20.20	6.60	13.60	61.02	0.00	61.02	7.89	32.32	15.84	17.36	27.82	61.02	0	13.60	13.60	20.20	0.00

Concrete G : 2.3392 m3

Timber piles : 1309 m

291 trees

Table B.3.3 (33) Sewer Line : S1 (Pipe Diameter : 600)

Bill of Quantity

Area : BM2 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : S1 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Excavation Work (m^3) Clamshell Depth => 6 m	Excavation Work (m^3) Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type	Pipe Number Concrete Length (m) 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I6	1.280	-0.412	1.69	0.39		2.08														pipes	m			
M6	1.280	-0.500	1.78	0.39	1.60	2.17	2.13	4.40	1.10	3.30	15.00	0.00	15.00	1.91	7.04	3.45	4.21	7.34	15.00	0	3.30	3.30	4.40	0.00
I10	1.330	-0.412	1.74	0.39		2.13																		
M10	1.330	-0.500	1.83	0.39	1.60	2.22	2.18	4.40	1.10	3.30	15.35	0.00	15.35	1.91	7.04	3.45	4.21	7.69	15.35	0	3.30	3.30	4.40	0.00
I12	1.240	-0.512	1.75	0.39		2.14																		
M12	1.240	-0.600	1.84	0.39	1.60	2.23	2.19	4.40	1.10	3.30	15.42	0.00	15.42	1.91	7.04	3.45	4.21	7.76	15.42	0	3.30	3.30	4.40	0.00
I13	1.270	-0.462	1.73	0.39		2.12																		
M13	1.270	-0.550	1.82	0.39	1.60	2.21	2.17	4.40	1.10	3.30	15.28	0.00	15.28	1.91	7.04	3.45	4.21	7.62	15.28	0	3.30	3.30	4.40	0.00
I19	1.310	-0.412	1.72	0.39		2.11																		
M19	1.310	-0.500	1.81	0.39	1.60	2.20	2.16	4.40	1.40	3.00	15.21	0.00	15.21	1.74	7.04	3.45	3.83	7.93	15.21	0	3.00	3.00	4.40	0.00
I22	1.380	-0.362	1.74	0.39		2.13																		
M22	1.380	-0.450	1.83	0.39	1.60	2.22	2.18	4.40	1.40	3.00	15.35	0.00	15.35	1.74	7.04	3.45	3.83	8.07	15.35	0	3.00	3.00	4.40	0.00
I23	1.380	-0.362	1.74	0.39		2.13																		
M23	1.380	-0.450	1.83	0.39	1.60	2.22	2.18	4.40	1.40	3.00	15.35	0.00	15.35	1.74	7.04	3.45	3.83	8.07	15.35	0	3.00	3.00	4.40	0.00
I24	1.320	-0.412	1.73	0.39		2.12																		
M24	1.320	-0.500	1.82	0.39	1.60	2.21	2.17	4.40	1.40	3.00	15.28	0.00	15.28	1.74	7.04	3.45	3.83	8.00	15.28	0	3.00	3.00	4.40	0.00
I28	1.340	-0.362	1.70	0.39		2.09																		
M28	1.340	-0.450	1.79	0.39	1.60	2.18	2.14	4.40	1.60	2.80	15.07	0.00	15.07	1.62	7.04	3.45	3.58	8.04	15.07	0	2.80	2.80	4.40	0.00
								39.60	11.60	28.00	137.31	0.00	137.31	16.22	63.36	31.05	35.74	70.52	137.31	0	28.00	28.00	39.60	0.00

Concrete G : 4.816 m3

Timber piles : 2567 m

571 trees

Table B.3.3 (34) Sewer Line : S2 (Pipe Diameter : 600)

Bill of Quantity

Area : BM2 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : S2 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete Length (m) 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N	L_2	L_3	W_2
I'4	1.550	0.084	1.47	0.39		1.86														pipes			
M4	1.550	0.000	1.55	0.39	1.60	1.94	1.90	4.20	1.10	3.10	12.77	0.00	12.77	1.79	6.72	3.29	3.96	5.52	12.77	0 m 3.10	3.10	4.20	0.00
								4.20	1.10	3.10	12.77	0.00	12.77	1.79	6.72	3.29	3.96	5.52	12.77	0 3.10	3.10	4.20	0.00

Concrete G : 0.5332 m3

Timber piles : 273 m

61 trees

Table B.3.3 (35) Sewer Line : S1-3 (Pipe Diameter : 600)

Bill of Quantity

Area : BM2 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : S1-3 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I1	1.240	-0.138	1.38	0.39		1.77														pipes	m			
M1	1.240	-0.200	1.44	0.39	1.60	1.83	1.80	3.10	1.10	2.00	8.93	0.00	8.93	1.16	4.96	2.43	2.55	3.95	8.93	0	2.00	2.00	3.10	0.00
								3.10	1.10	2.00	8.93	0.00	8.93	1.16	4.96	2.43	2.55	3.95	8.93	0	2.00	2.00	3.10	0.00

Concrete G : 0.344 m3

Timber piles : 201 m

45 trees

Table B.3.3 (36) Sewer Line : S1-5 (Pipe Diameter : 600)

Bill of Quantity

Area : BM2 Pipe Diameter : 600 Shoring Type : TIMBER

Sewer Line Name : S1-5 Foundation Type : T OK ! T

Manhole No. :

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.49	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (m) 2.5 m	Waling & Strut (ton)
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2	L_3	W_2
I3	1.280	-0.036	1.32	0.39		1.71														pipes	m			
M3	1.280	-0.100	1.38	0.39	1.60	1.77	1.74	3.20	1.10	2.10	8.91	0.00	8.91	1.22	5.12	2.51	2.68	3.72	8.91	0	2.10	2.10	3.20	0.00
I'4	1.380	-0.308	1.69	0.39		2.08																		
M4	1.380	-0.400	1.78	0.39	1.60	2.17	2.13	4.60	1.10	3.50	15.68	0.00	15.68	2.03	7.36	3.61	4.47	7.60	15.68	0	3.50	3.50	4.60	0.00
								7.80	2.20	5.60	24.59	0.00	24.59	3.25	12.48	6.12	7.15	11.32	24.59	0	5.60	5.60	7.80	0.00

Concrete G : 0.9632 m3

Timber piles : 506 m

113 trees

Table B.3.3 (37) Manhole Construction (1/3)

List of Manhole

Ben Me Coc 2 Pump Drainage Area

Route	Manhole No	Concrete Volume (m^3)				Level Conc	Sand	Timber Wood	Invert			Frame Work				Ladder	Bar
		Slub		Wall					Vol	Area		Slub		Wall			
		Bottom S_b (m^3)	Up S_u (m^3)	Main C_m (m^3)	Up C_u (m^3)	L_e (m^3)	S_a (m^3)	T_w (no)	I_v (m^3)	BQ I_{a1} (m^2)	I_{a2} (m^2)	Bottom F_b (m^2)	Up F_u (m^2)	Main F_m (m^2)	Up F_u (m^2)	L_a (no)	W (kg)
BM2 N1-1	M1	1.020	0.690	1.948	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	18.560	0.560	4	234.5
	M2	1.500	1.090	2.255	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	23.200	0.560	4	316.9
	M3	1.500	1.090	2.255	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	23.200	0.560	4	316.9
	M4	1.020	0.690	1.773	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	18.560	0.560	4	234.5
	M5	1.500	1.090	2.255	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	23.200	0.560	4	316.9
	M6	1.500	1.090	2.455	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	24.800	0.560	4	328.8
	M7	1.500	1.090	2.455	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	24.800	0.560	4	328.8
	M8	1.500	1.090	2.655	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	26.400	0.560	4	340.7
	M9	1.500	1.090	2.655	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	26.400	0.560	4	340.7
	M10	1.500	1.090	2.791	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	28.000	0.560	5	352.7
	M11	1.500	1.090	2.855	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	28.000	0.560	5	352.7
	M12	1.020	0.690	2.204	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	22.400	0.560	5	263.2
	M13	1.500	1.090	3.055	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	29.600	0.560	5	364.6
	M14	1.500	1.090	2.855	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	28.000	0.560	5	352.7
	M15	1.740	1.290	2.916	0.056	0.682	1.364	110	1.352	3.600	4.970	2.940	6.210	30.800	0.560	5	397.4
	M16	1.500	1.090	2.855	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	28.000	0.560	5	352.7
	M17	1.500	1.090	3.055	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	29.600	0.560	5	364.6
	M18	1.500	1.090	3.055	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	29.600	0.560	5	364.6
	M19	1.020	0.690	2.413	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	23.680	0.560	5	272.7
BM2 N1-3	M20	2.730	1.790	4.683	0.456	0.896	1.792	144	1.460	4.800	5.837	3.920	7.760	40.000	4.560	7	555.6
	M21	2.366	1.530	3.975	0.456	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	4.560	7	500.7
	M22	2.366	1.530	3.975	0.456	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	4.560	7	500.7
	M23	2.366	1.530	3.975	0.536	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	5.360	7	506.6
	M24	2.366	1.530	3.898	0.536	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	5.360	7	506.6
	M25	1.638	1.010	3.074	0.536	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	5.360	7	396.8
	M26	2.366	1.530	3.975	0.536	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	5.360	7	506.6
BM2 N1-5	M27	2.730	1.790	4.240	0.616	0.896	1.792	144	1.460	4.800	5.837	3.920	7.760	40.000	6.160	8	567.5
	M28	2.366	1.530	3.898	0.616	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	6.160	8	512.6
	M29	1.638	1.010	3.074	0.696	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	6.960	8	408.8
Nguyen Duy	M1	1.200	0.840	2.040	0.056	0.484	0.968	78	0.845	2.250	3.106	2.400	4.410	18.900	0.560	3	255.0
BM2 S1-1	M2	1.020	0.690	1.724	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	18.560	0.560	4	234.5
	M3	1.020	0.690	1.884	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	19.840	0.560	4	244.1
	M4	1.020	0.690	1.724	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	18.560	0.560	4	234.5
	M5	1.020	0.690	1.724	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	18.560	0.560	4	234.5
	M6	1.020	0.690	1.660	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	18.560	0.560	4	234.5
	M7	1.020	0.690	1.724	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	18.560	0.560	4	234.5
	M8	1.020	0.690	1.884	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	19.840	0.560	4	244.1
	M9	1.020	0.690	1.884	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	19.840	0.560	4	244.1
	M10	1.740	1.290	2.476	0.056	0.682	1.364	110	1.352	3.600	4.970	2.940	6.210	27.280	0.560	4	371.2
	M11	1.020	0.690	1.884	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	19.840	0.560	4	244.1
	M12	1.020	0.690	1.820	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	19.840	0.560	4	244.1
	M13	1.020	0.690	1.820	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	19.840	0.560	4	244.1
	M14	1.020	0.690	2.044	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	21.120	0.560	4	253.6
	M15	1.020	0.690	2.044	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	21.120	0.560	4	253.6
	M16	1.020	0.690	2.044	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	21.120	0.560	4	253.6
	M17	1.020	0.690	2.044	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	21.120	0.560	5	253.6
BM2 S1-4	M18	1.911	1.205	3.550	0.216	0.644	1.288	104	0.912	3.000	3.648	3.290	5.510	32.800	2.160	6	414.1
	M19	3.276	2.180	4.444	0.296	1.064	2.128	171	1.825	6.000	7.297	4.340	9.260	44.800	2.960	6	626.0
	M20	1.638	1.010	3.074	0.296	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	2.960	6	378.9
	M21	1.638	1.010	3.074	0.296	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	2.960	7	378.9
	M22	1.638	1.010	2.997	0.376	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	3.760	7	384.9
	M23	1.638	1.010	2.997	0.376	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	3.760	7	384.9
	M24	1.638	1.010	2.997	0.296	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	2.960	7	378.9
	M25	1.638	1.010	3.074	0.296	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	2.960	6	378.9
BM2 S1-6	M26	2.279	1.468	4.930	0.216	0.759	1.518	122	1.164	3.750	4.329	3.640	6.510	46.000	2.160	8	543.9
	M27	1.953	1.235	4.313	0.216	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	2.160	8	493.8
	M28	1.953	1.235	4.236	0.216	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	2.160	8	493.8
	M29	1.953	1.235	4.313	0.296	0.66	1.32	106	0.931	3.000	3.463	3.430	5.610	43.000	2.960	8	499.8
	M30	4.449	3.018	6.724	0.296	1.419	2.838	228	2.716	8.750	10.101	5.040	12.510	66.000	2.960	8	884.1

Table B.3.3 (37) Manhole Construction (2/3)

Route	Manhole No	Concrete Volume (m^3)				Level Conc	Sand	Timber Wood	Invert			Frame Work				Ladder	Bar
		Slub		Wall					Vol	Area		Slub		Wall			
		Bottom S_b (m^3)	Up S_u (m^3)	Main C_m (m^3)	Up C_u (m^3)	L_e (m^3)	S_a (m^3)	T_w (no)	I_v (m^3)	BQ I_{a1} (m^2)	I_{a2} (m^2)	Bottom F_b (m^2)	Up F_u (m^2)	Main F_m (m^2)	Up F_u (m^2)	L_a (no)	W (kg)
	M31	2.821	1.855	4.651	0.456	0.924	1.848	148	1.230	5.000	5.725	3.990	8.010	51.000	4.560	9	645.4
Nguyen Duy	M1	1.200	0.840	2.915	0.056	0.484	0.968	78	0.845	2.250	3.106	2.400	4.410	25.900	0.560	5	307.2
BM2 S2-1	M2	1.020	0.690	2.204	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	22.400	0.560	5	263.2
	M3	1.020	0.690	2.204	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	22.400	0.560	5	263.2
	M4	1.020	0.690	2.140	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	22.400	0.560	5	263.2
	M5	1.020	0.690	2.204	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	22.400	0.560	5	263.2
	M6	1.020	0.690	2.204	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	22.400	0.560	5	263.2
	M7	1.020	0.690	2.364	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	23.680	0.560	5	272.7
	M8	1.020	0.690	2.364	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	23.680	0.560	5	272.7
	M9	1.020	0.690	2.364	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	23.680	0.560	5	272.7
	M10	1.020	0.690	2.364	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	23.680	0.560	5	272.7
	M11	1.740	1.290	3.201	0.056	0.682	1.364	110	1.352	3.600	4.970	2.940	6.210	32.560	0.560	5	410.6
BM2 S2-2	M12	1.638	1.010	3.460	0.376	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	3.760	7	384.9
	M13	1.638	1.010	3.074	0.376	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	3.760	7	384.9
	M14	1.638	1.010	3.074	0.376	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	3.760	7	384.9
	M15	1.638	1.010	3.074	0.376	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	3.760	7	384.9
	M16	1.638	1.010	3.074	0.456	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	4.560	7	390.9
BM2 N2-1	M1	1.200	0.840	2.959	0.056	0.484	0.968	78	0.865	2.250	3.021	2.400	4.410	25.900	0.560	5	307.2
	M2	1.020	0.690	2.133	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	21.120	0.560	5	253.6
	M3	1.020	0.690	2.133	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	21.120	0.560	4	253.6
	M4	1.020	0.690	2.069	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	21.120	0.560	4	253.6
	M5	1.020	0.690	2.133	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	21.120	0.560	5	253.6
	M6	1.020	0.690	2.133	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	21.120	0.560	5	253.6
	M7	1.740	1.290	2.894	0.056	0.682	1.364	110	1.385	3.600	4.833	2.940	6.210	29.040	0.560	5	384.3
	M8	1.020	0.690	2.293	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	22.400	0.560	5	263.2
	M9	1.020	0.690	2.293	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	22.400	0.560	5	263.2
	M10	1.020	0.690	2.453	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	23.680	0.560	5	272.7
BM2 N2-2	M11	1.638	1.010	3.738	0.296	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	2.960	7	378.9
	M12	2.366	1.530	4.425	0.296	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.960	6	488.7
	M13	2.366	1.530	4.425	0.296	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.960	7	488.7
	M14	2.366	1.530	4.425	0.216	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.160	6	482.8
	M15	2.366	1.530	4.425	0.296	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.960	6	488.7
	M16	2.366	1.530	4.425	0.296	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.960	7	488.7
	M17	2.366	1.530	4.425	0.296	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.960	7	488.7
	M18	1.638	1.010	3.524	0.296	0.56	1.12	90	0.975	2.400	3.001	3.080	4.760	30.400	2.960	7	378.9
	M19	2.366	1.530	4.425	0.296	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.960	6	488.7
	M20	2.366	1.530	4.425	0.376	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	3.760	7	494.7
	M21	2.366	1.530	4.425	0.376	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	3.760	7	494.7
	M22	2.366	1.530	4.425	0.296	0.784	1.568	126	1.625	4.000	5.002	3.640	6.760	36.800	2.960	7	488.7
BM2 N2-3	M23	3.276	2.180	4.971	0.616	1.064	2.128	171	1.825	6.000	7.297	4.340	9.260	44.800	6.160	8	649.8
	M24	2.366	1.530	3.975	0.536	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	5.360	7	506.6
	M25	2.366	1.530	3.975	0.536	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	5.360	8	506.6
	M26	2.366	1.530	3.975	0.616	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	6.160	8	512.6
	M27	2.366	1.530	3.975	0.696	0.784	1.568	126	1.217	4.000	4.864	3.640	6.760	36.800	6.960	8	518.6
	M28	1.638	1.010	3.074	0.696	0.56	1.12	90	0.730	2.400	2.919	3.080	4.760	30.400	6.960	8	408.8
	M29	0.507	-	-	1.217	0.225	0.45	36	0.197	0.640	0.823	1.560	-	-	12.560	4	116.0
	M30	0.507	-	-	1.177	0.225	0.45	36	0.197	0.640	0.823	1.560	-	-	12.560	4	113.0
	M31	0.507	-	-	1.177	0.225	0.45	36	0.197	0.640	0.823	1.560	-	-	12.560	4	113.0
BM2 N1-2	M1	1.020	0.690	2.201	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	19.840	0.560	4	244.1
	M2	1.500	1.090	2.640	0.056	0.594	1.188	96	1.196	3.000	3.913	2.700	5.410	24.800	0.560	4	328.8
	M3	1.020	0.690	2.229	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	21.120	0.560	5	253.6
	M4	1.020	0.690	2.229	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	21.120	0.560	5	253.6
	M5	1.500	1.090	2.840	0.056	0.594	1.188	96	1.196	3.000	3.913	2.700	5.410	26.400	0.560	5	340.7
	M6	1.500	1.090	2.776	0.056	0.594	1.188	96	1.196	3.000	3.913	2.700	5.410	26.400	0.560	5	340.7
	M7	1.500	1.090	2.640	0.056	0.594	1.188	96	1.196	3.000	3.913	2.700	5.410	24.800	0.560	5	328.8
BM2 S1-5	M1	1.020	0.690	2.041	0.056	0.418	0.836	67	0.718	1.800	2.348	2.220	3.810	18.560	0.560	4	234.5
	M2	1.500	1.090	2.440	0.056	0.594	1.188	96	1.196	3.000	3.913	2.700	5.410	23.200	0.560	4	316.9
	M3	1.500	1.090	2.376	0.056	0.594	1.188	96	1.196	3.000	3.913	2.700	5.410	23.200	0.560	4	316.9

Table B.3.3 (37) Manhole Construction (3/3)

Route	Manhole No	Concrete Volume (m^3)				Level Conc	Sand	Timber Wood	Invert			Frame Work				Ladder	Bar
		Slub		Wall					Vol	Area		Slub		Wall			
		Bottom S_b (m^3)	Up S_u (m^3)	Main C_m (m^3)	Up C_u (m^3)	L_e (m^3)	S_a (m^3)	T_w (no)	I_v (m^3)	BQ I_{a1} (m^2)	I_{a2} (m^2)	Bottom F_b (m^2)	Up F_u (m^2)	Main F_m (m^2)	Up F_u (m^2)	L_a (no)	W (kg)
	M4	1.500	1.090	2.776	0.056	0.594	1.188	96	1.196	3.000	3.913	2.700	5.410	26.400	0.560	5	340.7
BM2 S1-3	M1	1.020	0.690	1.884	0.056	0.418	0.836	67	0.676	1.800	2.485	2.220	3.810	18.560	0.560	4	234.5
	M2	1.500	1.090	2.455	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	24.800	0.560	4	328.8
	M3	1.500	1.090	2.655	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	26.400	0.560	4	340.7
	M4	1.500	1.090	2.655	0.056	0.594	1.188	96	1.126	3.000	4.142	2.700	5.410	26.400	0.560	4	340.7
BM2 N1-4	M1	1.020	0.690	2.344	0.056	0.418	0.836	67	0.692	1.800	2.416	2.220	3.810	22.400	0.560	5	263.2
	M2	1.500	1.090	2.744	0.056	0.594	1.188	96	1.154	3.000	4.027	2.700	5.410	26.400	0.560	5	340.7
	M3	1.500	1.090	2.744	0.056	0.594	1.188	96	1.154	3.000	4.027	2.700	5.410	26.400	0.560	5	340.7
	M4	1.500	1.090	2.744	0.056	0.594	1.188	96	1.154	3.000	4.027	2.700	5.410	26.400	0.560	5	340.7
	M5	1.500	1.090	2.744	0.056	0.594	1.188	96	1.154	3.000	4.027	2.700	5.410	26.400	0.560	5	340.7
	M6	1.500	1.090	2.744	0.056	0.594	1.188	96	1.154	3.000	4.027	2.700	5.410	26.400	0.560	5	340.7
	M7	1.500	1.090	2.744	0.056	0.594	1.188	96	1.154	3.000	4.027	2.700	5.410	26.400	0.560	4	340.7
		203	135	372	27	75	149	11,986	128	358	463	363	655	3,573	271	705	46,084

Table B.3.3 (38) Inlet Pit Construction (1/6)

List of Inlet Pit Ben Me Coc 2

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
BM2	N1	400	1	D	I1	1.230	0.048	2,062	1,582	0.360	1.183	1.543	0.196	0.392	32	6	112.7	1.2	12.3
BM2	N1	400	1	D	I'1	1.230	-0.304	2,414	1,934	0.360	1.465	1.825	0.196	0.392	32	7	133.7	1.2	15.1
BM2	N1	400	1	D	I2	1.210	0.048	2,042	1,562	0.360	1.167	1.527	0.196	0.392	32	5	111.5	1.2	12.2
BM2	N1	400	1	D	I'2	1.210	-0.304	2,394	1,914	0.360	1.449	1.809	0.196	0.392	32	7	132.5	1.2	15.0
BM2	N1	400	1	D	I3	1.190	-0.052	2,122	1,642	0.360	1.231	1.591	0.196	0.392	32	6	116.2	1.2	12.8
BM2	N1	400	1	D	I'3	1.190	-0.304	2,374	1,894	0.360	1.433	1.793	0.196	0.392	32	7	131.3	1.2	14.8
BM2	N1	400	1	D	I5	1.200	-0.002	2,082	1,602	0.360	1.199	1.559	0.196	0.392	32	6	113.9	1.2	12.5
BM2	N1	400	1	D	I'5	1.200	-0.304	2,384	1,904	0.360	1.441	1.801	0.196	0.392	32	7	131.9	1.2	14.9
BM2	N1	400	1	D	I6	1.200	-0.002	2,082	1,602	0.360	1.199	1.559	0.196	0.392	32	6	113.9	1.2	12.5
BM2	N1	400	1	D	I'6	1.200	-0.304	2,384	1,904	0.360	1.441	1.801	0.196	0.392	32	7	131.9	1.2	14.9
BM2	N1	400	1	D	I7	1.200	-0.002	2,082	1,602	0.360	1.199	1.559	0.196	0.392	32	6	113.9	1.2	12.5
BM2	N1	400	1	D	I'7	1.200	-0.304	2,384	1,904	0.360	1.441	1.801	0.196	0.392	32	7	131.9	1.2	14.9
BM2	N1	400	1	D	I8	1.230	0.048	2,062	1,582	0.360	1.183	1.543	0.196	0.392	32	6	112.7	1.2	12.3
BM2	N1	400	1	D	I'8	1.230	-0.304	2,414	1,934	0.360	1.465	1.825	0.196	0.392	32	7	133.7	1.2	15.1
BM2	N1	400	1	D	I9	1.250	0.048	2,082	1,602	0.360	1.199	1.559	0.196	0.392	32	6	113.9	1.2	12.5
BM2	N1	400	1	D	I'9	1.250	-0.254	2,384	1,904	0.360	1.441	1.801	0.196	0.392	32	7	131.9	1.2	14.9
BM2	N1	400	1	D	I10	1.260	0.048	2,092	1,612	0.360	1.207	1.567	0.196	0.392	32	6	114.5	1.2	12.6
BM2	N1	400	1	D	I11	1.260	0.048	2,092	1,612	0.360	1.207	1.567	0.196	0.392	32	6	114.5	1.2	12.6
BM2	N1	400	1	D	I'11	1.260	-0.254	2,394	1,914	0.360	1.449	1.809	0.196	0.392	32	7	132.5	1.2	15.0
BM2	N1	400	1	D	I'12	1.260	-0.254	2,394	1,914	0.360	1.449	1.809	0.196	0.392	32	7	132.5	1.2	15.0
BM2	N1	400	1	D	I13	1.240	0.048	2,072	1,592	0.360	1.191	1.551	0.196	0.392	32	6	113.3	1.2	12.4
BM2	N1	400	1	D	I'13	1.240	-0.254	2,374	1,894	0.360	1.433	1.793	0.196	0.392	32	7	131.3	1.2	14.8
BM2	N1	400	1	D	I14	1.160	-0.052	2,092	1,612	0.360	1.207	1.567	0.196	0.392	32	6	114.5	1.2	12.6
BM2	N1	400	1	D	I'14	1.160	-0.354	2,394	1,914	0.360	1.449	1.809	0.196	0.392	32	7	132.5	1.2	15.0
BM2	N1	400	1	D	I16	1.080	-0.102	2,062	1,582	0.360	1.183	1.543	0.196	0.392	32	6	112.7	1.2	12.3
BM2	N1	400	1	D	I'16	1.080	-0.404	2,364	1,884	0.360	1.425	1.785	0.196	0.392	32	7	130.7	1.2	14.7
BM2	N1	400	1	D	I17	1.120	-0.082	2,082	1,602	0.360	1.199	1.559	0.196	0.392	32	6	113.9	1.2	12.5
BM2	N1	400	1	D	I'17	1.120	-0.404	2,404	1,924	0.360	1.457	1.817	0.196	0.392	32	7	133.1	1.2	15.1
BM2	N1	400	1	D	I18	1.090	-0.102	2,072	1,592	0.360	1.191	1.551	0.196	0.392	32	6	113.3	1.2	12.4
BM2	N1	400	1	D	I'18	1.090	-0.404	2,374	1,894	0.360	1.433	1.793	0.196	0.392	32	7	131.3	1.2	14.8
BM2	N1	400	1	D	I20	1.150	-0.052	2,082	1,602	0.360	1.199	1.559	0.196	0.392	32	6	113.9	1.2	12.5

Table B.3.3 (38) Inlet Pit Construction (2/6)

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
BM2	N1	400	1	D	I21	1.140	-0.052	2,072	1,592	0.360	1.191	1.551	0.196	0.392	32	6	113.3	1.2	12.4
BM2	N1	400	1	D	I'21	1.140	-0.354	2,374	1,894	0.360	1.433	1.793	0.196	0.392	32	7	131.3	1.2	14.8
BM2	N1	400	1	D	I22	1.100	-0.102	2,082	1,602	0.360	1.199	1.559	0.196	0.392	32	6	113.9	1.2	12.5
BM2	N1	400	1	D	I'22	1.100	-0.404	2,384	1,904	0.360	1.441	1.801	0.196	0.392	32	7	131.9	1.2	14.9
BM2	N1	400	1	D	I23	1.100	-0.102	2,082	1,602	0.360	1.199	1.559	0.196	0.392	32	6	113.9	1.2	12.5
BM2	N1	400	1	D	I'23	1.100	-0.404	2,384	1,904	0.360	1.441	1.801	0.196	0.392	32	7	131.9	1.2	14.9
BM2	N1	400	1	D	I24	1.100	-0.102	2,082	1,602	0.360	1.199	1.559	0.196	0.392	32	6	113.9	1.2	12.5
BM2	N1	400	1	D	I'25	1.050	-0.502	2,432	1,952	0.360	1.479	1.839	0.196	0.392	32	7	134.7	1.2	15.3
BM2	N1	400	1	D	I26	1.040	-0.152	2,072	1,592	0.360	1.191	1.551	0.196	0.392	32	6	113.3	1.2	12.4
BM2	N1	400	1	D	I'26	1.040	-0.104	2,024	1,544	0.360	1.153	1.513	0.196	0.392	32	5	110.4	1.2	12.0
BM2	N1	400	1	D	I27	1.070	-0.152	2,102	1,622	0.360	1.215	1.575	0.196	0.392	32	6	115.1	1.2	12.7
BM2	N1	400	1	D	I28	1.100	-0.102	2,082	1,602	0.360	1.199	1.559	0.196	0.392	32	6	113.9	1.2	12.5
BM2	N1	400	1	D	I'29	1.100	-0.404	2,384	1,904	0.360	1.441	1.801	0.196	0.392	32	7	131.9	1.2	14.9
BM2	N1	600	1	D	I'10	1.260	-0.454	2,594	2,114	0.360	1.557	1.917	0.196	0.392	32	7	144.4	1.2	16.6
BM2	N1	600	1	D	I'15	1.110	-0.604	2,594	2,114	0.360	1.557	1.917	0.196	0.392	32	7	144.4	1.2	16.6
BM2	N1	600	1	D	I'24	1.100	-0.604	2,584	2,104	0.360	1.549	1.909	0.196	0.392	32	7	143.8	1.2	16.5
BM2	N1	600	1	D	I'28	1.100	-0.604	2,584	2,104	0.360	1.549	1.909	0.196	0.392	32	7	143.8	1.2	16.5
BM2	S1	400	1	D	I1	1.230	-0.328	2,438	1,958	0.360	1.484	1.844	0.196	0.392	32	7	135.1	1.2	15.3
BM2	S1	400	1	D	I2	1.310	-0.228	2,418	1,938	0.360	1.468	1.828	0.196	0.392	32	7	133.9	1.2	15.2
BM2	S1	400	1	D	I3	1.360	-0.178	2,418	1,938	0.360	1.468	1.828	0.196	0.392	32	7	133.9	1.2	15.2
BM2	S1	400	1	D	I4	1.320	-0.228	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM2	S1	400	1	D	I5	1.290	-0.228	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	S1	400	1	D	I7	1.270	-0.228	2,378	1,898	0.360	1.436	1.796	0.196	0.392	32	7	131.5	1.2	14.9
BM2	S1	400	1	D	I8	1.280	-0.228	2,388	1,908	0.360	1.444	1.804	0.196	0.392	32	7	132.1	1.2	14.9
BM2	S1	400	1	D	I9	1.290	-0.228	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	S1	400	1	D	I11	1.310	-0.228	2,418	1,938	0.360	1.468	1.828	0.196	0.392	32	7	133.9	1.2	15.2
BM2	S1	400	1	D	I14	1.290	-0.228	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	S1	400	1	D	I15	1.270	-0.278	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM2	S1	400	1	D	I16	1.300	-0.228	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM2	S1	400	1	D	I17	1.320	-0.228	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM2	S1	400	1	D	I20	1.330	-0.228	2,438	1,958	0.360	1.484	1.844	0.196	0.392	32	7	135.1	1.2	15.3
BM2	S1	400	1	D	I21	1.350	-0.178	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM2	S1	400	1	D	I25	1.280	-0.228	2,388	1,908	0.360	1.444	1.804	0.196	0.392	32	7	132.1	1.2	14.9
BM2	S1	400	1	D	I27	1.290	-0.228	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0

Table B.3.3 (38) Inlet Pit Construction (3/6)

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
BM2	S1	400	1	D	I29	1.350	-0.178	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM2	S1	400	1	D	I30	1.360	-0.178	2,418	1,938	0.360	1.468	1.828	0.196	0.392	32	7	133.9	1.2	15.2
BM2	S1	600	1	D	I6	1.280	-0.428	2,588	2,108	0.360	1.552	1.912	0.196	0.392	32	7	144.1	1.2	16.5
BM2	S1	600	1	D	I10	1.330	-0.428	2,638	2,158	0.360	1.592	1.952	0.196	0.392	32	7	147.0	1.2	16.9
BM2	S1	600	1	D	I12	1.240	-0.528	2,648	2,168	0.360	1.600	1.960	0.196	0.392	32	7	147.6	1.2	17.0
BM2	S1	600	1	D	I13	1.270	-0.478	2,628	2,148	0.360	1.584	1.944	0.196	0.392	32	7	146.4	1.2	16.9
BM2	S1	600	1	D	I19	1.310	-0.428	2,618	2,138	0.360	1.576	1.936	0.196	0.392	32	7	145.8	1.2	16.8
BM2	S1	600	1	D	I22	1.380	-0.378	2,638	2,158	0.360	1.592	1.952	0.196	0.392	32	7	147.0	1.2	16.9
BM2	S1	600	1	D	I23	1.380	-0.378	2,638	2,158	0.360	1.592	1.952	0.196	0.392	32	7	147.0	1.2	16.9
BM2	S1	600	1	D	I24	1.320	-0.428	2,628	2,148	0.360	1.584	1.944	0.196	0.392	32	7	146.4	1.2	16.9
BM2	S1	600	1	D	I28	1.340	-0.378	2,598	2,118	0.360	1.560	1.920	0.196	0.392	32	7	144.6	1.2	16.6
BM2	S2	400	1	D	I'1	1.740	0.222	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	S2	400	1	D	I'2	1.590	0.072	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	S2	400	1	D	I'3	1.570	0.072	2,378	1,898	0.360	1.436	1.796	0.196	0.392	32	7	131.5	1.2	14.9
BM2	S2	400	1	D	I'5	1.520	-0.028	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM2	S2	400	1	D	I'6	1.510	-0.028	2,418	1,938	0.360	1.468	1.828	0.196	0.392	32	7	133.9	1.2	15.2
BM2	S2	400	1	D	I'7	1.500	-0.028	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM2	S2	400	1	D	I'8	1.500	-0.028	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM2	S2	400	1	D	I'9	1.490	-0.028	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	S2	400	1	D	I'10	1.470	-0.078	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM2	S2	400	1	D	I'11	1.440	-0.078	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	S2	400	1	D	I'12	1.400	-0.128	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM2	S2	400	1	D	I'13	1.390	-0.128	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	S2	400	1	D	I'14	1.380	-0.178	2,438	1,958	0.360	1.484	1.844	0.196	0.392	32	7	135.1	1.2	15.3
BM2	S2	400	1	D	I'15	1.360	-0.178	2,418	1,938	0.360	1.468	1.828	0.196	0.392	32	7	133.9	1.2	15.2
BM2	S2	400	1	D	I'16	1.360	-0.178	2,418	1,938	0.360	1.468	1.828	0.196	0.392	32	7	133.9	1.2	15.2
BM2	S2	600	1	D	I'4	1.550	0.072	2,358	1,878	0.360	1.368	1.728	0.196	0.392	32	7	130.3	1.2	14.7
BM2	N2	400	1	D	I1	1.780	0.242	2,418	1,938	0.360	1.468	1.828	0.196	0.392	32	7	133.9	1.2	15.2
BM2	N2	400	1	D	I2	1.530	-0.008	2,418	1,938	0.360	1.468	1.828	0.196	0.392	32	7	133.9	1.2	15.2
BM2	N2	400	1	D	I3	1.460	-0.058	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	N2	400	1	D	I5	1.430	-0.058	2,368	1,888	0.360	1.428	1.788	0.196	0.392	32	7	130.9	1.2	14.8
BM2	N2	400	1	D	I6	1.410	-0.108	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	N2	400	1	D	I8	1.410	-0.108	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0

Table B.3.3 (38) Inlet Pit Construction (4/6)

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
BM2	N2	400	1	D	I9	1.420	-0.108	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM2	N2	400	1	D	I10	1.440	-0.108	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM2	N2	400	1	D	I11	1.560	-0.108	2,548	2,068	0.360	1.572	1.932	0.196	0.392	32	7	141.7	1.2	16.2
BM2	N2	400	1	D	I12	1.510	-0.052	2,442	1,962	0.360	1.487	1.847	0.196	0.392	32	7	135.3	1.2	15.4
BM2	N2	400	1	D	I'12	1.510	0.052	2,338	1,858	0.360	1.404	1.764	0.196	0.392	32	6	129.1	1.2	14.5
BM2	N2	400	1	D	I13	1.480	-0.072	2,432	1,952	0.360	1.479	1.839	0.196	0.392	32	7	134.7	1.2	15.3
BM2	N2	400	1	D	I'13	1.480	-0.224	2,584	2,104	0.360	1.601	1.961	0.196	0.392	32	7	143.8	1.2	16.5
BM2	N2	400	1	D	I14	1.360	-0.202	2,442	1,962	0.360	1.487	1.847	0.196	0.392	32	7	135.3	1.2	15.4
BM2	N2	400	1	D	I'14	1.360	-0.098	2,338	1,858	0.360	1.404	1.764	0.196	0.392	32	6	129.1	1.2	14.5
BM2	N2	400	1	D	I15	1.380	-0.202	2,462	1,982	0.360	1.503	1.863	0.196	0.392	32	7	136.5	1.2	15.5
BM2	N2	400	1	D	I'15	1.380	-0.098	2,358	1,878	0.360	1.420	1.780	0.196	0.392	32	7	130.3	1.2	14.7
BM2	N2	400	1	D	I16	1.370	-0.202	2,452	1,972	0.360	1.495	1.855	0.196	0.392	32	7	135.9	1.2	15.5
BM2	N2	400	1	D	I'16	1.370	-0.098	2,348	1,868	0.360	1.412	1.772	0.196	0.392	32	6	129.7	1.2	14.6
BM2	N2	400	1	D	I17	1.350	-0.202	2,432	1,952	0.360	1.479	1.839	0.196	0.392	32	7	134.7	1.2	15.3
BM2	N2	400	1	D	I'17	1.350	-0.098	2,328	1,848	0.360	1.396	1.756	0.196	0.392	32	6	128.5	1.2	14.5
BM2	N2	400	1	D	I18	1.300	-0.252	2,432	1,952	0.360	1.479	1.839	0.196	0.392	32	7	134.7	1.2	15.3
BM2	N2	400	1	D	I19	1.260	-0.302	2,442	1,962	0.360	1.487	1.847	0.196	0.392	32	7	135.3	1.2	15.4
BM2	N2	400	1	D	I'19	1.260	-0.198	2,338	1,858	0.360	1.404	1.764	0.196	0.392	32	6	129.1	1.2	14.5
BM2	N2	400	1	D	I20	1.310	-0.252	2,442	1,962	0.360	1.487	1.847	0.196	0.392	32	7	135.3	1.2	15.4
BM2	N2	400	1	D	I'20	1.310	-0.148	2,338	1,858	0.360	1.404	1.764	0.196	0.392	32	6	129.1	1.2	14.5
BM2	N2	400	1	D	I21	1.320	-0.252	2,452	1,972	0.360	1.495	1.855	0.196	0.392	32	7	135.9	1.2	15.5
BM2	N2	400	1	D	I'21	1.320	-0.148	2,348	1,868	0.360	1.412	1.772	0.196	0.392	32	6	129.7	1.2	14.6
BM2	N2	400	1	D	I22	1.180	-0.402	2,462	1,982	0.360	1.503	1.863	0.196	0.392	32	7	136.5	1.2	15.5
BM2	N2	400	1	D	I'22	1.180	-0.298	2,358	1,878	0.360	1.420	1.780	0.196	0.392	32	7	130.3	1.2	14.7
BM2	N2	400	1	D	I23	1.180	-0.402	2,462	1,982	0.360	1.503	1.863	0.196	0.392	32	7	136.5	1.2	15.5
BM2	N2	400	1	D	I24	1.100	-0.452	2,432	1,952	0.360	1.479	1.839	0.196	0.392	32	7	134.7	1.2	15.3
BM2	N2	400	1	D	I'24	1.100	-0.074	2,054	1,574	0.360	1.177	1.537	0.196	0.392	32	6	112.2	1.2	12.3
BM2	N2	400	1	D	I25	1.090	-0.452	2,422	1,942	0.360	1.471	1.831	0.196	0.392	32	7	134.1	1.2	15.2
BM2	N2	400	1	D	I'25	1.090	-0.074	2,044	1,564	0.360	1.169	1.529	0.196	0.392	32	5	111.6	1.2	12.2
BM2	N2	400	1	D	I26	1.110	-0.452	2,442	1,962	0.360	1.487	1.847	0.196	0.392	32	7	135.3	1.2	15.4
BM2	N2	400	1	D	I'26	1.110	-0.074	2,064	1,584	0.360	1.185	1.545	0.196	0.392	32	6	112.8	1.2	12.3
BM2	N2	400	1	D	I27	1.140	-0.402	2,422	1,942	0.360	1.471	1.831	0.196	0.392	32	7	134.1	1.2	15.2
BM2	N2	400	1	D	I'27	1.140	-0.024	2,044	1,564	0.360	1.169	1.529	0.196	0.392	32	5	111.6	1.2	12.2
BM2	N2	400	1	D	I28	1.120	-0.452	2,452	1,972	0.360	1.495	1.855	0.196	0.392	32	7	135.9	1.2	15.5

Table B.3.3 (38) Inlet Pit Construction (5/6)

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
BM2	N2	600	1	D	I4	1.450	-0.258	2,588	2,108	0.360	1.552	1.912	0.196	0.392	32	7	144.1	1.2	16.5
BM2	N2	600	1	D	I7	1.400	-0.308	2,588	2,108	0.360	1.552	1.912	0.196	0.392	32	7	144.1	1.2	16.5
BM2	N1-2	400	1	D	I1	1.210	-0.328	2,418	1,938	0.360	1.468	1.828	0.196	0.392	32	7	133.9	1.2	15.2
BM2	N1-2	400	1	D	I'1	1.210	0.042	2,048	1,568	0.360	1.172	1.532	0.196	0.392	32	5	111.8	1.2	12.2
BM2	N1-2	400	1	D	I2	1.190	-0.328	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	N1-2	400	1	D	I'2	1.190	0.042	2,028	1,548	0.360	1.156	1.516	0.196	0.392	32	5	110.6	1.2	12.1
BM2	N1-2	400	1	D	I3	1.220	-0.328	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM2	N1-2	400	1	D	I4	1.230	-0.328	2,438	1,958	0.360	1.484	1.844	0.196	0.392	32	7	135.1	1.2	15.3
BM2	N1-2	400	1	D	I5	1.160	-0.378	2,418	1,938	0.360	1.468	1.828	0.196	0.392	32	7	133.9	1.2	15.2
BM2	N1-2	400	1	D	I'5	1.160	0.042	1,998	1,518	0.360	1.132	1.492	0.196	0.392	32	5	108.8	1.2	11.8
BM2	N1-2	400	1	D	I'6	1.100	-0.058	2,038	1,558	0.360	1.164	1.524	0.196	0.392	32	5	111.2	1.2	12.1
BM2	N1-2	400	1	D	I7	1.020	-0.528	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM2	N1-2	400	1	D	I'7	1.020	-0.158	2,058	1,578	0.360	1.180	1.540	0.196	0.392	32	6	112.4	1.2	12.3
BM2	N1-2	600	1	D	I6	1.100	-0.628	2,608	2,128	0.360	1.568	1.928	0.196	0.392	32	7	145.2	1.2	16.7
BM2	S1-5	400	1	D	I1	1.320	0.152	2,048	1,568	0.360	1.172	1.532	0.196	0.392	32	5	111.8	1.2	12.2
BM2	S1-5	400	1	D	I'1	1.320	-0.188	2,388	1,908	0.360	1.444	1.804	0.196	0.392	32	7	132.1	1.2	14.9
BM2	S1-5	400	1	D	I2	1.270	0.052	2,098	1,618	0.360	1.212	1.572	0.196	0.392	32	6	114.8	1.2	12.6
BM2	S1-5	400	1	D	I'2	1.270	-0.208	2,358	1,878	0.360	1.420	1.780	0.196	0.392	32	7	130.3	1.2	14.7
BM2	S1-5	400	1	D	I'3	1.280	-0.208	2,368	1,888	0.360	1.428	1.788	0.196	0.392	32	7	130.9	1.2	14.8
BM2	S1-5	400	1	D	I4	1.380	0.152	2,108	1,628	0.360	1.220	1.580	0.196	0.392	32	6	115.4	1.2	12.7
BM2	S1-5	600	1	D	I3	1.280	-0.048	2,208	1,728	0.360	1.248	1.608	0.196	0.392	32	6	121.4	1.2	13.5
BM2	S1-5	600	1	D	I'4	1.380	-0.308	2,568	2,088	0.360	1.536	1.896	0.196	0.392	32	7	142.9	1.2	16.4
BM2	S1-3	400	1	D	I'1	1.240	-0.328	2,448	1,968	0.360	1.492	1.852	0.196	0.392	32	7	135.7	1.2	15.4
BM2	S1-3	400	1	D	I2	1.300	0.092	2,088	1,608	0.360	1.204	1.564	0.196	0.392	32	6	114.2	1.2	12.5
BM2	S1-3	400	1	D	I'2	1.300	-0.228	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM2	S1-3	400	1	D	I3	1.320	0.092	2,108	1,628	0.360	1.220	1.580	0.196	0.392	32	6	115.4	1.2	12.7
BM2	S1-3	400	1	D	I'3	1.320	-0.228	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM2	S1-3	400	1	D	I4	1.290	0.092	2,078	1,598	0.360	1.196	1.556	0.196	0.392	32	6	113.6	1.2	12.5
BM2	S1-3	400	1	D	I'4	1.290	-0.228	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	S1-3	600	1	D	I1	1.240	-0.158	2,278	1,798	0.360	1.304	1.664	0.196	0.392	32	6	125.6	1.2	14.1

Table B.3.3 (38) Inlet Pit Construction (6/6)

Area	Sewer Line	Dia D (mm)	Type of Inlet	Type of Cover	Inlet No.	GL (m)	Invert Level I (m)	H (m)	h_1 (m)	Concrete Vol Slub S (m^3)	Concrete Vol Wall W (m^3)	Concrete Vol Total (m^3)	Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Pile T_w (no)	Ladder L_a (no)	Bar (kg)	Frame Work F_s (m^2)	Frame Work F_w (m^2)
BM2	N1-4	400	1	D	I2	1.350	-0.178	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM2	N1-4	400	1	D	I'2	1.350	0.152	2,078	1,598	0.360	1.196	1.556	0.196	0.392	32	6	113.6	1.2	12.5
BM2	N1-4	400	1	D	I3	1.280	-0.228	2,388	1,908	0.360	1.444	1.804	0.196	0.392	32	7	132.1	1.2	14.9
BM2	N1-4	400	1	D	I4	1.240	-0.278	2,398	1,918	0.360	1.452	1.812	0.196	0.392	32	7	132.7	1.2	15.0
BM2	N1-4	400	1	D	I5	1.220	-0.328	2,428	1,948	0.360	1.476	1.836	0.196	0.392	32	7	134.5	1.2	15.3
BM2	N1-4	400	1	D	I6	1.200	-0.328	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM2	N1-4	400	1	D	I'6	1.200	0.002	2,078	1,598	0.360	1.196	1.556	0.196	0.392	32	6	113.6	1.2	12.5
BM2	N1-4	400	1	D	I7	1.100	-0.428	2,408	1,928	0.360	1.460	1.820	0.196	0.392	32	7	133.3	1.2	15.1
BM2	N1-4	600	1	D	I1	1.400	-0.328	2,608	2,128	0.360	1.568	1.928	0.196	0.392	32	7	145.2	1.2	16.7
BM2	N1-4	600	1	D	I'1	1.400	-0.048	2,328	1,848	0.360	1.344	1.704	0.196	0.392	32	6	128.5	1.2	14.5
BM2	N1-4	600	1	D	I'3	1.280	-0.148	2,308	1,828	0.360	1.328	1.688	0.196	0.392	32	6	127.3	1.2	14.3
BM2	N1-4	600	1	D	I'4	1.240	-0.148	2,268	1,788	0.360	1.296	1.656	0.196	0.392	32	6	125.0	1.2	14.0
BM2	N1-4	600	1	D	I'5	1.220	-0.148	2,248	1,768	0.360	1.280	1.640	0.196	0.392	32	6	123.8	1.2	13.8
BM2	N1-4	600	1	D	I'7	1.100	-0.298	2,278	1,798	0.360	1.304	1.664	0.196	0.392	32	6	125.6	1.2	14.1
Total										63.360	246.648	310.008	34.496	68.992	5,632	1,168	22,794.2	211.2	2,568.0

176

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min 1.492

max 1.961

ave 1.761

Table B.3.3 (39) Sewer Outlet Construction

BEN ME COC 2

No.	POSITION	D	Earth work	Yellowsand	Concrete G	Wooden piles		Free stone	Stone masonry	Concrete E	Concrete F	Dredged Soil	Deformed	Residual soil	Backfill by sandy soil	Earth work for freestone	Gravel	Geotextile Sheet
		(mm)	(m3)	(m3)	(m3)	(trees)	(mdeep)	(m3)	(m3)	(m3)	(m3)	(m3)	(Tons)	(m3)	(m3)	(m3)	(m3)	(m2)
1	N1_0+427.5	1000	57.79	3.76	2.20	955.00	4298	18.75	4.86	15.55	1.62	37.00		113.53	25.4	18.75	4.86	16.20
2	N1_0+876	1500	250.98	5.61	3.12	1426.00	6417	20.10	7.73	23.43	2.58	217.17		488.25	102.44	20.10	7.73	25.78
3	N2_0+900	1500	248.23	5.61	3.12	1426.00	6417	20.10	7.73	23.43	2.58	217.42		485.76	101.32	20.10	7.73	25.76
4	N2_0+720	1200	145.89	4.54	2.59	1174.00	5283	19.35	6.31	19.00	2.10	55.53		220.77	62.08	19.35	6.31	21.03
5	N2_0+205	900	131.54	3.26	1.95	809.00	3641	18.30	3.85	13.35	1.28	183.68		333.52	59.12	18.30	3.85	12.83
6	S2_0+319	1000	113.75	3.82	2.23	1481.00	6665	18.75	11.07	15.53	3.69	53.90		186.40	50	18.75	11.07	36.90
7	S1_0+921	1800	199.68	5.57	3.11	1845.00	8303	20.55	12.81	21.70	4.27	325.11		545.33	79.08	20.55	12.81	42.69
8	S1_0+589	1500	186.62	4.54	2.59	1618.00	7281	19.50	11.64	17.92	3.88	382.50		588.62	77.76	19.50	11.64	38.79
9	S1_0+282	1000	100.21	2.85	1.74	1147.00	5162	18.15	8.53	10.92	2.84	175.93		294.29	45.04	18.15	8.53	28.43
TOTAL			**1,434.69**	**39.55**	**22.65**	**11,881**	**53,467**	**173.55**	**74.52**	**160.84**	**24.84**	**1,648.23**	**0.00**	**3,256.47**	**602.24**	**173.55**	**74.52**	**248.41**

0.174533333
0.176327402
0.17364858
0.984807682

CHAPTER 3
INTERCEPTOR SEWER CONSTRUCTION (PACKAGE C)

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Table C.1.1 Work Quantities Of Interceptor Sewer Construction

Main Interceptor																																							
Sewer Line Name			IE1	IE2-IE4(1)	IE2-IE4(2)	IE5-IE6	IE7-IE8	IE9-IE14(1)	IE10IE14(2)	IE15-IE16	IE17																												
Earth Works;																																							
Excavation (m^3)												Total																											
<4 m												**0.00**																											
4 m < D < 6 m			766.92	5,657.44	1,449.00	6,713.70	2,154.60	2,780.40	18,629.10	7,167.30	4,242.00	**49,560.46**																											
6 m <			0.00	0.00	50.72	776.79	379.11	638.46	6,641.06	3,760.73	2,743.09	**14,989.96**																											
Sand Backfill (m^3)			114.97	815.18	207.59	1,052.93	359.54	519.24	599.26	226.82	136.75	**4,032.28**																											
Sandy Soil Backfill (m^3)			546.11	4,168.03	1,139.99	5,732.62	1,947.94	2,607.68	22,714.84	9,948.64	6,402.93	**55,208.78**																											
Pipe Installation;																																							
Concrete Class E (m^3)			0.00	0.00					654.36	320.24	332.41	**1307.01**																											
Concrete Class F (m^3)					5.02	33.83	22.60	48.41				**109.86**																											
Reinforced Bar (kg)									23,514.67	10,664.52	7,447.68	**41,626.87**																											
Length (m/m)									30.93	37.07	42.93																											
Unit Weight (kg/m)									0.888	0.888	0.888																											
Sewer Length (m)																																							
φ300 mm			78.00									**78.00**																											
φ400 mm				508.20	66.10							**574.30**																											
φ500 mm						304.80						**304.80**																											
φ600 mm							96.60					**96.60**																											
φ800 mm								126.40	856.05			**982.45**																											
φ900 mm										324.00		**324.00**																											
φ1200 mm											195.35	**195.35**																											
												2,555.50																											
Excavated Road Area (m^2)			168	1070.2	241.5	1132.95	338.1	463.4	3104.85	1194.55	707	**8,420.55**																											
Secondary Interceptor																																							
Sewer Line Name			H.T.MAU1	H.T.MAU2	T.T.DAM	PASTEUR1	PASTEUR2	NKKN1	NKKN2	PDC1	PDC2	CALMETTE1	CALMETTE2	CALMETTE3	KY CON1	KKY CON2	YERSIN1	YERSIN2	N.T.HOC1	N.T.HOC2	DETHAM1	DETHAM2	H.H.HON	T.D.XU	N.C.CHAN	N.V.CU	N.BIEU1	N.BIEU2	TB.TRONG	HM.DAT	NHIEUTAN							
Earth Works;																																							
Excavation (m^3)																																							Total
<4 m			450.51		853.72	874.58		242.80		581.52		270.24		3,934.44	1032.78		498.31				1558.77					1014.34												**11,312.01**
4 m < D < 6 m				320.12			408.00		2,139.83		1,108.03		749.90			490.03		3,752.49	1112.28	4,188.05		401.00	742.74	3,564.79	2,958.87		4,715.52	181.29	4,076.72	2,323.37	1,212.91						**34,445.94**
6 m <																																							**0.00**
Sand Backfill (m^3)			65.80	42.57	161.77	167.93	72.52	43.49	354.64	123.39	255.83	47.25	133.10	755.88	208.17	96.72	103.52	646.58	180.49	721.35	320.11	78.92	162.25	633.82	512.72	271.38	849.20	26.96	677.15	412.54	263.77						**8,389.82**
Sandy Soil Backfill (m^3)			321.86	237.06	567.69	577.10	283.48	165.62	1,525.17	379.90	715.18	185.67	519.39	2,743.32	677.03	328.54	315.69	2,672.79	798.23	3,050.23	1,011.24	269.08	484.98	2,503.68	2,100.59	534.83	3,374.59	137.26	3,031.14	1,685.90	760.97						**31,958.21**
Pipe Installation;																																							
Concrete Class E (m^3)																																							**0.00**
Concrete Class F (m^3)																												2.49	90.51	55.14								**148.14**
Reinforced Bar (kg)																																							**0.00**
Length (m/m)																																							
Unit Weight (kg/m)																																							
Sewer Length (m)																																							
φ225 mm			82.25	36.70																																			**118.95**
φ300 mm					162.75	168.95	49.20	43.75	240.60			47.55	90.30				104.15		122.45							273.05												**1,302.75**
φ400 mm															195.65	60.30		403.10			300.85	49.20		395.15	319.65												**1,971.80**
φ600 mm										95.95	137.10			405.10						386.60			86.95				455.12	14.45									**1,581.27**
φ800 mm																													340.28	207.30								**547.58**
																																						5,522.35
Excavated Road Area (m^2)			118.58	76.40	234.50	244.44	100.00	63.56	490.60	147.60	277.40	70.42	183.80	821.20	278.46	122.20	149.24	817.20	252.00	785.80	429.10	100.00	180.20	806.20	652.00	392.70	927.80	32.20	695.16	424.40	355.04						**10,925.75**

Road Works;

Main Interceptor — Excavated Area = 8,420.55 m^2

Wearing Course (t)	0.05	926.26
Tack Coat (litter)	0.5	4,210.28
Binder Course (t)	0.07	1,296.76
Prime Coat (litter)	1.5	12,630.83
Base Course (m^3)	0.29	2,441.96
Sub Base Course (m^3)	0.2	1,684.11

Shaft Area — Excavated Area = 692.60 m^2

Wearing Course (t)	0.05	76.19
Tack Coat (litter)	0.5	346.30
Binder Course (t)	0.07	106.66
Prime Coat (litter)	1.5	1,038.90
Base Course (m^3)	0.29	200.85
Sub Base Course (m^3)	0.2	138.52

Secondary Interceptor — Excavated Area = 10,925.75 m^2

Wearing Course (t)	0.05	1,201.83
Tack Coat (litter)	0.5	5,462.88
Binder Course (t)	0.09	983.32
Prime Coat (litter)	1.5	12,630.83
Base Course (m^3)	0.26	2,840.70
Sub Base Course (m^3)	0.15	1,638.86

Total

Wearing Course (t)	2,204.28
Tack Coat (litter)	10,019.45
Binder Course (t)	2,386.74
Prime Coat (litter)	26,300.55
Base Course (m^3)	5,483.51
Sub Base Course (m^3)	3,461.49

Adjusted Volume of Earth Work

Main Interceptor

		Calculated	Adjusted	1%
Excavation (4 m < D < 6 m)	(m^3)	49,560	50,057	
Excavation (6 m < D)	(m^3)	14,990	15,140	
Total of Excavation		64,550	65,197	
Sand Backfill	(m^3)	4,032	4,073	
Sandy Soil Backfill	(m^3)	55,209	55,761	
Total of Backfill		59,241	59,834	

Secondary Interceptor

		Calculated	Adjusted
Excavation (D < 4 m)	(m^3)	11,312	11,426
Excavation (4 m < D < 6 m)	(m^3)	34,446	34,791
Total of Excavation		45,758	46,217
Sand Backfill	(m^3)	8,390	8,474
Sandy Soil Backfill	(m^3)	31,958	32,278
Total of Backfill		40,348	40,752

Table C.1.2 (1) Pipe Installation Work For Main Interceptor (IE1-1_IE2-1)

Bill of Quantity

Area : MI Pipe Diameter : 300

Sewer Line Name : IE1 Foundation Type : S360 OK ! S360

Manhole No. : IE1-1 IE2-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.63	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Concrete 4.00		Pipe Bedding Length (m)	Sheeting (piles) Type	Sheeting (piles) Height (m)	Sheeting (piles) Length (m)	Sheeting (piles) Area (m^2)	Waling & Strut (ton)	Shoring Type
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
IE1-1	2.25	-2.05	4.30	0.25		4.55														pipes	m							
IE1-2	2.13	-2.15	4.28	0.25	2.00	4.53	4.54	42.00	3.10	38.90	381.36	0.00	381.36	4.90	84.00	52.92	57.34	271.10	381.36	9.00	2.90	38.90	FSP-2	8.6	77.80	669.08	20.33	TYPE1
IE1-2	2.13	-2.15	4.28	0.25		4.53																						
IE2-1	2.15	-2.25	4.40	0.25	2.00	4.65	4.59	42.00	2.90	39.10	385.56	0.00	385.56	4.93	84.00	52.92	57.63	275.01	385.56	9.00	3.10	39.10	FSP-2	8.6	78.20	672.52	20.33	TYPE1
								84.00	6.00	78.00	766.92	0.00	766.92	9.83	168.00	105.84	114.97	546.11	766.92	18.00	6.00	78.00			156.00	1,341.60	40.66	

Area of Concrete Bedding (m^2): 0.00

Volume of Concrete Bedding (m^3): 0.00

Table C.1.2 (2) Pipe Installation Work For Main Interceptor (IE2-1_IE4-2)

Bill of Quantity

Area : MI Pipe Diameter : 400
Sewer Line Name : IE2-IE4 (1) Foundation Type : S360 OK ! S360
Manhole No. : IE2-1 IE4-2

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete		Type	Height (m)	Length (m)	Area (m^2)		
						Downstream					<= 6 m	=> 6 m				0.63				Length (m)	4.00							
		IL_1	ID_1			H_2																						
		IL_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
IE2-1	2.15	-2.35	4.50	0.25		4.75														pipes	m							
IE2-2	2.19	-2.48	4.67	0.25	2.00	4.92	4.84	63.00	2.90	60.10	609.84	0.00	609.84	11.78	126.00	79.38	96.40	434.06	609.84	15	0.10	60.10	FSP-2	8.6	120.20	1,033.72	30.49	TYPE1
IE2-2	2.19	-2.48	4.67	0.25		4.92																						
IE2-3	2.14	-2.61	4.75	0.25	2.00	5.00	4.96	62.30	3.10	59.20	618.02	0.00	618.02	11.60	124.60	78.50	94.96	444.56	618.02	14	3.20	59.20	FSP-2	8.6	118.40	1,018.24	30.15	TYPE1
IE2-3	2.14	-2.61	4.75	0.25		5.00																						
IE2-4	2.10	-2.74	4.84	0.25	2.00	5.09	5.05	62.00	3.10	58.90	626.20	0.00	626.20	11.54	124.00	78.12	94.48	453.60	626.20	14	2.90	58.90	FSP-2	10.1	117.80	1,189.78	36.58	TYPE2
IE2-4	2.10	-2.74	4.84	0.25		5.09																						
IE2-5	2.06	-2.87	4.93	0.25	2.00	5.18	5.14	62.00	3.10	58.90	637.36	0.00	637.36	11.54	124.00	78.12	94.48	464.76	637.36	14	2.90	58.90	FSP-2	10.1	117.80	1,189.78	36.58	TYPE2
IE2-5	2.06	-2.87	4.93	0.25		5.18																						
IE3-1	2.07	-3.00	5.07	0.25	2.00	5.32	5.25	62.00	2.90	59.10	651.00	0.00	651.00	11.58	124.00	78.12	94.80	478.08	651.00	14	3.10	59.10	FSP-2	10.1	118.20	1,193.82	36.58	TYPE2
IE3-1	2.07	-3.00	5.07	0.25		5.32																						
IE3-2	2.12	-3.10	5.22	0.25	2.00	5.47	5.40	50.00	2.90	47.10	540.00	0.00	540.00	9.23	100.00	63.00	75.55	401.45	540.00	11	3.10	47.10	FSP-2	10.1	94.20	951.42	29.50	TYPE2
IE3-2	2.12	-3.10	5.22	0.25		5.47																						
IE3-3	2.14	-3.19	5.33	0.25	2.00	5.58	5.53	42.50	3.10	39.40	470.05	0.00	470.05	7.72	85.00	53.55	63.20	353.30	470.05	9	3.40	39.40	FSP-2	10.1	78.80	795.88	25.08	TYPE2
IE3-3	2.14	-3.19	5.33	0.25		5.58																						
IE4-1	2.07	-3.32	5.39	0.25	2.00	5.64	5.62	61.90	2.90	59.00	695.76	0.00	695.76	11.56	123.80	77.99	94.64	523.13	695.76	14	3.00	59.00	FSP-2	10.1	295.00	2,979.50	36.52	TYPE2
IE4-1	2.07	-3.32	5.39	0.25		5.64																						
IE4-2	2.28	-3.47	5.75	0.25	2.00	6.00	5.83	69.40	2.90	66.50	809.21	0.00	809.21	13.03	138.80	87.44	106.67	615.10	809.21	16	2.50	66.50	FSP-2	10.1	332.50	3,358.25	40.95	TYPE2
								535.10	26.90	508.20	5,657.44	0.00	5,657.44	99.58	1,070.20	674.23	815.18	4,168.03	5,657.44	121	24.20	508.20			1,392.90	13,710.39	302.43	

Area of Concrete Bedding (m^2): 0.00
Volume of Concrete Bedding (m^3): 0.00

Table C.1.2 (3) Pipe Installation Work For Main Interceptor (IE4-2_IE5-1)

Bill of Quantity

Area : MI Pipe Diameter : 400

Sewer Line Name : IE2-IE4 (2) Foundation Type : C120 OK ! C120

Manhole No. : IE4-2 IE5-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream / Downstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.63	Yellow Sand Backfill	Black Sand / Sandy Soil Backfill		Type / Length (m)	Concrete 4.00		Type	Height (m)	Length (m)	Area (m^2)		
		IL_1 / IL_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
IE4-2	2.28	-3.47	5.75	0.33		6.07														pipes	m							
IE5-1	2.40	-3.61	6.01	0.33	3.50	6.34	6.21	69.00	2.90	66.10	1,449.00	50.72	1,499.72	17.98	241.50	152.15	207.59	1,139.99	1,499.72	16	2.10	66.10	FSP-2	11.2	132.20	1,480.64	60.58	TYPE3
								69.00	2.90	66.10	1,449.00	50.72	1,499.72	17.98	241.50	152.15	207.59	1,139.99	1,499.72	16	2.10	66.10			132.20	1,480.64	60.58	

Area of Concrete Bedding (m^2): 0.08

Volume of Concrete Bedding (m^3): 5.02

Table C.1.2 (4) Pipe Installation Work For Main Interceptor (IE5-1_IE7-1)

Bill of Quantity

Area : MI Pipe Diameter : 500

Sewer Line Name : IE5-IE6 Foundation Type : C120 OK ! C120

Manhole No. : IE5-1 IE7-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IL_1 IL_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.63 V_5	Backfill (m^3) Yellow Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type pipes N	Pipe Number Concrete m	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Sheeting (piles) Height (m) h	Sheeting (piles) Length (m) L_3	Sheeting (piles) Area (m^2)	Waling & Strut (ton) W_2	Shoring Type
IE5-1	2.40	-3.71	6.11	0.35		6.46														pipes	m							
IE5-2	2.43	-3.85	6.28	0.35	3.50	6.62	6.54	66.00	2.90	63.10	1,386.00	124.74	1,510.74	26.06	231.00	145.53	217.98	1,147.23	1,510.74	15	3.10	63.10	FSP-2	13.0	126.20	1,640.60	58.74	TYPE4
IE5-2	2.43	-3.85	6.28	0.35		6.62																						
IE5-3	2.26	-3.98	6.24	0.35	3.50	6.58	6.61	66.00	3.10	62.90	1,386.00	140.91	1,526.91	25.98	231.00	145.53	217.29	1,164.09	1,526.91	15	2.90	62.90	FSP-2	13.0	125.80	1,635.40	58.74	TYPE4
IE5-3	2.26	-3.98	6.24	0.35		6.58																						
IE6-1	2.20	-4.11	6.31	0.35	3.50	6.65	6.62	65.00	2.90	62.10	1,365.00	141.05	1,506.05	25.65	227.50	143.33	214.52	1,148.21	1,506.05	15	2.10	62.10	FSP-2	13.0	124.20	1,614.60	57.85	TYPE4
IE6-1	2.20	-4.11	6.31	0.35		6.65																						
IE6-2	2.33	-4.24	6.57	0.35	3.50	6.91	6.79	64.00	2.90	61.10	1,344.00	176.96	1,520.96	25.23	224.00	141.12	211.07	1,168.77	1,520.96	15	1.10	61.10	FSP-2	13.0	122.20	1,588.60	56.96	TYPE4
IE6-2	2.33	-4.24	6.57	0.35		6.91																						
IE7-1	2.27	-4.35	6.62	0.35	3.50	6.97	6.94	56.70	3.10	53.60	1,190.70	186.55	1,377.25	22.14	198.45	125.02	185.16	1,067.07	1,377.25	13	1.60	53.60	FSP-2	13.0	107.20	1,393.60	50.46	TYPE4
								317.70	14.90	302.80	6,671.70	770.21	7,441.91	125.06	1,111.95	700.53	1,046.02	5,695.36	7,441.91	73	10.80	302.80			605.60	7,872.80	282.75	

Area of Concrete Bedding (m^2): 0.11

Volume of Concrete Bedding (m^3): 33.61

Table C.1.2 (5) Pipe Installation Work For Main Interceptor (IE7-1_IE9-1)

Bill of Quantity

Area : MI Pipe Diameter : 600

Sewer Line Name : IE7-IE8 Foundation Type : C180 OK ! C180

Manhole No. : IE7-1 IE9-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.63	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (piles) Type	Sheeting (piles) Height (m)	Sheeting (piles) Length (m)	Sheeting (piles) Area (m^2)	Waling & Strut (ton)	Shoring Type
		IL_1 / IL_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	I_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
IE7-1	2.27	-4.45	6.72	0.38		7.10														pipes	m							
IE8-1	2.08	-4.56	6.64	0.38	3.50	7.02	7.06	58.30	3.10	55.20	1,224.30	216.30	1,440.60	37.98	204.05	128.55	205.45	1,106.60	1,440.60	13	3.20	55.20	FSP-2	13.0	110.40	1,435.20	51.89	TYPE4
IE8-1	2.08	-4.56	6.64	0.38		7.02																						
IE9-1	2.05	-4.64	6.69	0.38	3.50	7.07	7.05	44.30	2.90	41.40	930.30	162.81	1,093.11	28.48	155.05	97.68	154.09	841.34	1,093.11	10	1.40	41.40	FSP-2	13.0	82.80	1,076.40	39.43	TYPE4
								102.60	6.00	96.60	2,154.60	379.11	2,533.71	66.46	359.10	226.23	359.54	1,947.94	2,533.71	23	4.60	96.60			193.20	2,511.60	91.31	

Area of Concrete Bedding (m^2): 0.23

Volume of Concrete Bedding (m^3): 22.60

Table C.1.2 (6) Pipe Installation Work For Main Interceptor (IE9-1_IE10-2)

Bill of Quantity

Area : MI Pipe Diameter : 800

Sewer Line Name : IE9-IE14 (1) Foundation Type : C180 OK ! C180

Manhole No. : IE9-1 IE10-2

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IL_1 IL_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.63 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type N	Pipe Number Concrete Length (m) 4.00	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Sheeting (piles) Height (m) h	Sheeting (piles) Length (m) L_3	Sheeting (piles) Area (m^2)	Walling & Strut (ton) W_2	Shoring Type
IE9-1	2.05	-4.84	6.89	0.41		7.30														pipes	m							
IE10-1	2.08	-4.89	6.97	0.41	3.50	7.38	7.34	32.40	2.90	29.50	680.40	151.96	832.36	32.66	113.40	71.44	121.18	639.74	832.36	7	1.50	29.50	FSP-2	13.0	59.00	767.0	28.84	TYPE4
IE10-1	2.08	-4.89	6.97	0.41		7.38																						
IE10-2	1.94	-5.04	6.98	0.41	3.50	7.39	7.39	100.00	3.10	96.90	2,100.00	486.50	2,586.50	107.27	350.00	220.50	398.06	1,967.94	2,586.50	24	0.90	96.90	FSP-2	13.0	193.80	2,519.4	89.00	TYPE4
								132.40	6.00	126.40	2,780.40	638.46	3,418.86	139.93	463.40	291.94	519.24	2,607.68	3,418.86	31	2.40	126.40			252.80	3286.40	117.84	

Area of Concrete Bedding (m^2): 0.38

Volume of Concrete Bedding (m^3): 48.41

Table C.1.2 (7) Pipe Installation Work For Main Interceptor (IE10-2_IE15-1)

Bill of Quantity

Area : MI Pipe Diameter : 800

Sewer Line Name : IE10-IE14 (2) Foundation Type : C360 OK ! C360

Manhole No. : IE10-2 IE15-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IL_1 IL_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.63 V_5	Backfill (m^3) Yellow Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number N	Pipe Concrete Length (m)	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Heigth (m) h	Length (m) L_3	Area (m^2)	Waling & Strut (ton) W_2	Shoring Type
																				pipes	m							
IE10-2	1.94	-5.04	6.98	0.41		7.39																						
IE11-1	2.10	-5.19	7.29	0.41	3.50	7.70	7.55	100.00	3.55	96.45	2,100.00	542.50	2,642.50	143.56	350.00	220.50	67.52	2,354.48	2,642.50	24	0.45	96.45	FSP-3	14.3	192.90	2,758.47	100.00	TYPE5
IE11-1	2.10	-5.19	7.29	0.41		7.70																						
IE12-1	1.97	-5.35	7.32	0.41	3.50	7.73	7.72	104.00	4.00	100.00	2,184.00	626.08	2,810.08	148.84	364.00	229.32	70.00	2,510.76	2,810.08	25	0.00	100.00	FSP-3	14.3	200.00	2,860.00	104.00	TYPE5
IE12-1	1.97	-5.35	7.32	0.41		7.73																						
IE12-2	1.91	-5.48	7.39	0.41	3.50	7.80	7.77	86.00	3.55	82.45	1,806.00	532.77	2,338.77	122.72	301.00	189.63	57.72	2,091.42	2,338.77	20	2.45	82.45	FSP-3	14.3	164.90	2,358.07	86.00	TYPE5
IE12-2	1.91	-5.48	7.39	0.41		7.80																						
IE12-3	1.91	-5.61	7.52	0.41	3.50	7.93	7.87	86.00	3.10	82.90	1,806.00	562.87	2,368.87	123.39	301.00	189.63	58.03	2,121.21	2,368.87	20	2.90	82.90	FSP-3	14.3	165.80	2,370.94	86.00	TYPE5
IE12-3	1.91	-5.61	7.52	0.41		7.93																						
IE13-1	1.95	-5.74	7.69	0.41	3.50	8.10	8.02	85.80	3.55	82.25	1,801.80	606.61	2,408.41	122.42	300.30	189.19	57.58	2,161.64	2,408.41	20	2.25	82.25	FSP-4	16.1	164.50	2,648.45	93.87	TYPE6
IE13-1	1.95	-5.74	7.69	0.41		8.10																						
IE13-2	1.98	-5.90	7.88	0.41	3.50	8.29	8.20	108.00	3.55	104.45	2,268.00	831.60	3,099.60	155.46	378.00	238.14	73.12	2,788.34	3,099.60	26	0.45	104.45	FSP-4	16.1	208.90	3,363.29	118.15	TYPE6
IE13-2	1.98	-5.90	7.88	0.41		8.29																						
IE14-1	2.13	-6.06	8.19	0.41	3.50	8.60	8.45	106.50	3.10	103.40	2,236.50	913.24	3,149.74	153.90	372.75	234.83	72.38	2,842.53	3,149.74	25	3.40	103.40	FSP-4	16.1	206.80	3,329.48	116.51	TYPE6
IE14-1	2.13	-6.06	8.19	0.41		8.60																						
IE14-2	2.16	-6.22	8.38	0.41	3.50	8.79	8.70	105.00	3.10	101.90	2,205.00	992.25	3,197.25	151.67	367.50	231.53	71.33	2,894.40	3,197.25	25	1.90	101.90	FSP-4	16.1	203.80	3,281.18	114.87	TYPE6
IE14-2	2.16	-6.22	8.38	0.41		8.79																						
IE15-1	2.00	-6.37	8.37	0.41	3.50	8.78	8.79	105.80	3.55	102.25	2,221.80	1,033.14	3,254.94	152.19	370.30	233.29	71.58	2,950.07	3,254.94	25	2.25	102.25	FSP-4	16.1	204.50	3,292.45	115.75	TYPE6
								887.10	31.05	856.05	18,629.10	6,641.06	25,270.16	1,274.15	3,104.85	1,956.06	599.26	22,714.84	25,270.16	210	16.05	856.05			1,712.10	26,262.33	935.14	

Area of Concrete Bedding (m^2): 0.76

Volume of Concrete Bedding (m^3): 654.36

Table C.1.2 (8) Pipe Installation Work For Main Interceptor (IE15-1_IE17-1)

Bill of Quantity

Area : MI Pipe Diameter : 900

Sewer Line Name : IE15-IE16 Foundation Type : C360 OK ! C360

Manhole No. : IE15-1 IE17-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream / Downstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.63	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type / Length (m)	Concrete 4.00		Type	Height (m)	Length (m)	Area (m^2)		
		IL_1 / IL_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	I_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
IE15-1	2.00	-6.47	8.47	0.44		8.91														pipes	m							
IE15-2	1.90	-6.51	8.41	0.44	3.50	8.85	8.89	22.30	3.55	18.75	468.30	225.57	693.87	35.71	78.05	49.17	13.13	631.57	693.87	4	2.75	18.75	FSP-4	16.1	37.50	603.8	24.40	TYPE6
IE15-2	1.90	-6.51	8.41	0.44		8.85																						
IE15-3	2.02	-6.62	8.64	0.44	3.50	9.08	8.97	76.00	3.10	72.90	1,596.00	790.02	2,386.02	138.83	266.00	167.58	51.03	2,167.41	2,386.02	18	0.90	72.90	FSP-4	16.1	145.80	2,347.4	83.14	TYPE6
IE15-3	2.02	-6.62	8.64	0.44		9.08																						
IE16-1	1.94	-6.73	8.67	0.44	3.50	9.11	9.10	75.20	3.55	71.65	1,579.20	815.92	2,395.12	136.45	263.20	165.82	50.16	2,179.14	2,395.12	17	3.65	71.65	FSP-4	17.0	143.30	2,436.1	97.16	TYPE7
IE16-1	1.94	-6.73	8.67	0.44		9.11																						
IE16-2	1.95	-6.86	8.81	0.44	3.50	9.25	9.19	84.00	3.55	80.45	1,764.00	937.86	2,701.86	153.21	294.00	185.22	56.32	2,460.32	2,701.86	20	0.45	80.45	FSP-4	17.0	160.90	2,735.3	108.53	TYPE7
IE16-2	1.95	-6.86	8.81	0.44		9.25																						
IE17-1	2.07	-6.99	9.06	0.44	3.50	9.50	9.38	83.80	3.55	80.25	1,759.80	991.36	2,751.16	152.83	293.30	184.78	56.18	2,510.20	2,751.16	20	0.25	80.25	FSP-4	17.0	160.50	2,728.5	108.27	TYPE7
								341.30	17.30	324.00	7,167.30	3,760.73	10,928.03	617.03	1,194.55	752.57	226.82	9,948.64	10,928.03	79	8.00	324.00			648.00	10851.03	421.50	

Area of Concrete Bedding (m^2): 0.99

Volume of Concrete Bedding (m^3): 320.24

Table C.1.2 (9) Pipe Installation Work For Main Interceptor (IE17-1_IE18-1)

Bill of Quantity

Area : MI Pipe Diameter : 1200

Sewer Line Name : IE17 Foundation Type : C360 OK ! C360

Manhole No. : IE17-1 IE18-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Number Type	Number Concrete		Type	Height (m)	Length (m)	Area (m^2)		
						Downstream					<= 6 m	=> 6 m				0.63				Length (m)	3.00							
		IL_1 IL_2	ID_1 ID_2	H_1	W_1	H_2 H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
IE17-1	2.07	-7.29	9.36	0.51		9.87														pipes	m							
IE17-2	1.94	-7.41	9.35	0.51	3.50	9.86	9.87	102.00	3.55	98.45	2,142.00	1,381.59	3,523.59	327.90	357.00	224.91	68.92	3,229.76	3,523.59	32	2.45	98.45	FSP-4	18.0	196.90	3,544.20	100.78	TYPE8
IE17-2	1.94	-7.41	9.35	0.51		9.86																						
IE18-1	1.87	-7.53	9.40	0.51	3.50	9.91	9.89	100.00	3.10	96.90	2,100.00	1,361.50	3,461.50	322.74	350.00	220.50	67.83	3,173.17	3,461.50	32	0.90	96.90	FSP-4	18.0	193.80	3,488.40	98.80	TYPE8
								202.00	6.65	195.35	4,242.00	2,743.09	6,985.09	650.64	707.00	445.41	136.75	6,402.93	6,985.09	64	3.35	195.35			390.70	7,032.60	199.58	

Area of Concrete Bedding (m^2): 1.70

Volume of Concrete Bedding (m^3): 332.41

Table C.1.3 (1) Pipe Installation Work For Secondary Interceptor (DC1_IE11-1)

Bill of Quantity

Area : SI Pipe Diameter : 225 PVC

Sewer Line Name : H.T.MAU1 Foundation Type : S360 OK ! S360

Manhole No. : DC1 IE11-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Sand Backfill	Black Sand Sandy Soil Backfill		Number Type	Concrete		Type	Height (m)	Length (m)	Area (m^2)		
						Downstream					<= 6 m	=> 6 m				0.53				Length (m)	4.00							
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
DC1	2.02	-1.40	3.42	0.21		3.63														pipes	m							
M1-1	1.93	-1.62	3.55	0.21	1.40	3.77	3.70	44.70	1.65	43.05	231.55	0.00	231.55	1.72	62.58	33.17	34.44	163.94	231.55	10	3.05	43.05	-	2.5	44.70	111.75	0.00	TIMBER
M1-1	1.93	-1.62	3.55	0.21		3.77																						
M1-2	2.01	-1.82	3.83	0.21	1.40	4.05	3.91	40.00	0.80	39.20	218.96	0.00	218.96	1.57	56.00	29.68	31.36	157.92	218.96	9	3.20	39.20	-	2.5	40.00	100.00	0.00	TIMBER
								84.70	2.45	82.25	450.51	0.00	450.51	3.29	118.58	62.85	65.80	321.86	450.51	19	6.25	82.25			84.70	211.75	0.00	

Area of Concrete Bedding (m^2): 0.00

Volume of Concrete Bedding (m^3): 0.00

Table C.1.3 (2) Pipe Installation Work For Secondary Interceptor (M1-2_IE11-1)

Bill of Quantity

Area : SI Pipe Diameter : 225 PVC

Sewer Line Name : H.T.MAU2 Foundation Type : S360 OK ! S360

Manhole No. : M1-2 IE11-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.53 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number N Type pipes	Pipe Number N Concrete m	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Sheeting (piles) Height (m) h	Sheeting (piles) Length (m) L_3	Sheeting (piles) Area (m^2)	Waling & Strut (ton) W_2	Shoring Type
M1-2	2.01	-1.84	3.83	0.21		4.05														pipes	m							
IE11-1	2.10	-2.02	4.12	0.21	2.00	4.33	4.19	38.20	1.50	36.70	320.12	0.00	320.12	1.47	76.40	40.49	42.57	237.06	320.12	9	0.70	36.70	FSP-2	8.6	73.40	631.24	18.49	TYPE1
								38.20	1.50	36.70	320.12	0.00	320.12	1.47	76.40	40.49	42.57	237.06	320.12	9	0.70	36.70			73.40	631.24	18.49	

Area of Concrete Bedding (m^2): 0.00

Volume of Concrete Bedding (m^3): 0.00

Table C.1.3 (3) Pipe Installation Work For Secondary Interceptor (DC2_IE12-1)

Bill of Quantity

Area : SI Pipe Diameter : 300

Sewer Line Name : T.T.DAM Foundation Type : S360 OK ! S360

Manhole No. : DC2 IE12-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.53	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number / Type / Length (m)	Pipe Concrete 4.00	Pipe Bedding Length (m)	Sheeting (piles) Type	Sheeting (piles) Height (m)	Sheeting (piles) Length (m)	Sheeting (piles) Area (m^2)	Waling & Strut (ton)	Shoring Type
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	I_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
DC-2	2.00	-1.03	3.03	0.25		3.28														pipes	m							
M2-1	2.07	-1.23	3.30	0.25	1.40	3.55	3.42	50.70	1.65	49.05	242.76	0.00	242.76	6.18	70.98	37.62	48.76	156.38	242.76	12	1.05	49.05	-	2.5	50.70	126.75	0.00	TIMBER
M2-1	2.07	-1.23	3.30	0.25		3.55																						
M2-2	2.04	-1.43	3.47	0.25	1.40	3.72	3.64	50.00	0.80	49.20	254.80	0.00	254.80	6.20	70.00	37.10	48.90	168.80	254.80	12	1.20	49.20	-	2.5	50.00	125.00	0.00	TIMBER
M2-2	2.04	-1.43	3.47	0.25		3.72																						
M2-3	1.96	-1.63	3.59	0.25	1.40	3.84	3.78	49.50	0.80	48.70	261.96	0.00	261.96	6.14	69.30	36.73	48.40	176.83	261.96	12	0.70	48.70	-	2.5	49.50	123.75	0.00	TIMBER
M2-3	1.96	-1.63	3.59	0.25		3.84																						
IE12-1	1.99	-1.70	3.69	0.25	1.40	3.94	3.89	17.30	1.50	15.80	94.22	0.00	94.22	1.99	24.22	12.84	15.71	65.67	94.22	3	3.80	15.80	-	2.5	17.30	43.25	0.00	TIMBER
								167.50	4.75	162.75	853.74	0.00	853.74	20.51	234.50	124.29	161.77	567.69	853.74	39	6.75	162.75			167.50	418.75	0.00	

Area of Concrete Bedding (m^2): 0.00

Volume of Concrete Bedding (m^3): 0.00

Table C.1.3 (4) Pipe Installation Work For Secondary Interceptor (DC3_M4-2)

Bill of Quantity

Area : SI Pipe Diameter : 300
Sewer Line Name : PASTEUR1 Foundation Type : S360 OK ! S360
Manhole No. : DC3 M4-2

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.53 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number N: Type / Length (m)	Pipe Number N: Concrete 4.00	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Sheeting (piles) Height (m) h	Sheeting (piles) Length (m) L_3	Sheeting (piles) Area (m^2)	Waling & Strut (ton) W_2	Shoring Type
																				pipes	m							
DC-3	2.03	-0.80	2.83	0.25		3.08																						
M3-1	2.10	-0.92	3.02	0.25	1.40	3.27	3.18	30.40	1.65	28.75	135.35	0.00	135.35	3.62	42.56	22.56	28.58	84.21	135.35	7	0.75	28.75	-	2.5	30.40	76.00	0.00	TIMBER
M3-1	2.10	-0.92	3.02	0.25		3.27																						
M3-2	2.13	-1.04	3.17	0.25	1.40	3.42	3.35	30.00	0.80	29.20	140.70	0.00	140.70	3.68	42.00	22.26	29.02	89.42	140.70	7	1.20	29.20	-	2.5	30.00	75.00	0.00	TIMBER
M3-2	2.13	-1.04	3.17	0.25		3.42																						
M3-3	2.18	-1.10	3.28	0.25	1.40	3.53	3.48	13.50	0.80	12.70	65.78	0.00	65.78	1.60	18.90	10.02	12.62	43.14	65.78	3	0.70	12.70	-	2.5	13.50	33.75	0.00	TIMBER
M3-3	2.18	-1.10	3.28	0.25		3.53																						
M3-4	2.18	-1.15	3.33	0.25	1.40	3.58	3.56	12.90	0.80	12.10	64.30	0.00	64.30	1.52	18.06	9.57	12.03	42.70	64.30	3	0.10	12.10	-	2.5	12.90	32.25	0.00	TIMBER
M3-4	2.18	-1.15	3.33	0.25		3.58																						
M3-5	2.23	-1.30	3.53	0.25	1.40	3.78	3.68	37.80	0.80	37.00	194.75	0.00	194.75	4.66	52.92	28.05	36.78	129.92	194.75	9	1.00	37.00	-	2.5	37.80	94.50	0.00	TIMBER
M3-5	2.23	-1.30	3.53	0.25		3.78																						
M3-6	2.28	-1.50	3.78	0.25	1.40	4.03	3.91	50.00	0.80	49.20	273.70	0.00	273.70	6.20	70.00	37.10	48.90	187.70	273.70	12	1.20	49.20	-	2.5	50.00	125.00	0.00	TIMBER
								174.60	5.65	168.95	874.58	0.00	874.58	21.28	244.44	129.55	167.93	577.10	874.58	41	4.95	168.95			174.60	436.50	0.00	

Area of Concrete Bedding (m^2): 0.00
Volume of Concrete Bedding (m^3): 0.00

Table C.1.3 (5) Pipe Installation Work For Secondary Interceptor (M3-6_M4-2)

Bill of Quantity

Area : SI Pipe Diameter : 300

Sewer Line Name : PASTEUR2 Foundation Type : S360 OK ! S360

Manhole No. : M3-6 M4-2

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.53	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Number Type	Concrete Length (m) 4.00		Type	Height (m)	Length (m)	Area (m^2)		
		IE_1	ID_1			H_2																						
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
M3-6	2.28	-1.50	3.76	0.25		4.01																						
M4-2	2.19	-1.70	3.89	0.25	2.00	4.14	4.08	50.00	0.80	49.20	408.00	0.00	408.00	6.20	100.00	52.00	72.52	283.48	408.00	12	1.20	49.20	FSP-2	8.6	98.40	860.00	24.20	TYPE1
								50.00	0.80	49.20	408.00	0.00	408.00	6.20	100.00	52.00	72.52	283.48	408.00	12	1.20	49.20			98.40	860.00	24.20	

Area of Concrete Bedding (m^2): 0.00

Volume of Concrete Bedding (m^3): 0.00

Table C.1.3 (6) Pipe Installation Work For Secondary Interceptor (DC4_IE13-1)

Bill of Quantity

Area : SI Pipe Diameter : 300

Sewer Line Name : NKKN1 Foundation Type : S360 OK ! S360

Manhole No. : DC4 IE13-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand	Black Sand		Number			Type	Height (m)	Length (m)	Area (m^2)		
						Downstream					<= 6 m	=> 6 m				0.53	Sand Backfill	Sandy Soil Backfill		Type	Concrete							
																				Length (m)	4.00							
		IE_1	ID_1			H_2																						
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	I_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
DC-4	1.99	-1.50	3.49	0.25		3.74														pipes	m							
M4-1	1.95	-1.68	3.63	0.25	1.40	3.88	3.82	45.40	1.65	43.75	242.80	0.00	242.80	5.51	63.56	33.69	43.49	165.62	242.80	10	3.75	43.75	-	2.5	45.40	113.50	0.00	TIMBER
								45.40	1.65	43.75	242.80	0.00	242.80	5.51	63.56	33.69	43.49	165.62	242.80	10	3.75	43.75			45.40	113.50	0.00	

Area of Concrete Bedding (m^2): 0.00

Volume of Concrete Bedding (m^3): 0.00

Table C.1.3 (7) Pipe Installation Work For Secondary Interceptor (M4-1_IE13-1)

Bill of Quantity

Area : SI Pipe Diameter : 300
Sewer Line Name : NKKN2 Foundation Type : S360 OK ! S360
Manhole No. : M4-1 IE13-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Number Type	Concrete		Type	Height (m)	Length (m)	Area (m^2)		
						Downstream					<= 6 m	=> 6 m				0.53				Length (m)	4.00							
		IE_1	ID_1			H_2																						
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
M4-1	1.95	-1.68	3.60	0.25		3.85														pipes	m							
M4-2	2.19	-1.87	4.06	0.25	2.00	4.31	4.08	46.00	0.80	45.20	375.36	0.00	375.36	5.70	92.00	48.76	66.62	259.98	375.36	11	1.20	45.20	FSP-2	8.6	90.40	777.44	22.26	TYPE1
M4-2	2.19	-1.87	4.06	0.25		4.31																						
M4-3	1.93	-2.03	3.96	0.25	2.00	4.21	4.26	50.00	0.80	49.20	426.00	0.00	426.00	6.20	100.00	53.00	72.52	300.48	426.00	12	1.20	49.20	FSP-2	8.6	98.40	846.24	24.20	TYPE1
M4-3	1.93	-2.03	3.96	0.25		4.21																						
M4-4	1.94	-2.20	4.14	0.25	2.00	4.39	4.30	50.00	0.80	49.20	430.00	0.00	430.00	6.20	100.00	53.00	72.52	304.48	430.00	12	1.20	49.20	FSP-2	8.6	98.40	846.24	24.20	TYPE1
M4-4	1.94	-2.20	4.14	0.25		4.39																						
M4-5	1.96	-2.36	4.32	0.25	2.00	4.57	4.48	50.00	0.80	49.20	448.00	0.00	448.00	6.20	100.00	53.00	72.52	322.48	448.00	12	1.20	49.20	FSP-2	8.6	98.40	846.24	24.20	TYPE1
M4-5	1.96	-2.36	4.32	0.25		4.57																						
IE13-1	1.98	-2.52	4.50	0.25	2.00	4.75	4.67	49.30	1.50	47.80	460.47	0.00	460.47	6.02	98.60	52.26	70.46	337.75	460.47	11	3.80	47.80	FSP-2	8.6	95.60	822.16	23.86	TYPE1
								245.30	4.70	240.60	2139.83	0.00	2139.83	30.32	490.60	260.02	354.64	1525.17	2139.83	58	8.60	240.60			481.20	4,138.32	118.73	

Area of Concrete Bedding (m^2): 0.00
Volume of Concrete Bedding (m^3): 0.00

Table C.1.3 (8) Pipe Installation Work For Secondary Interceptor (DC5_M6-4)

Bill of Quantity

Area : SI Pipe Diameter : 600
Sewer Line Name : PDC1 Foundation Type : S360 OK ! S360
Manhole No. : DC5 M6-4

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.53	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Concrete 4.00	Pipe Bedding Length (m)	Sheeting (piles) Type	Height (m)	Length (m)	Area (m^2)	Waling & Strut (ton)	Shoring Type
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N pipes	m	L_2		h	L_3		W_2	
DC-5	2.06	-1.58	3.64	0.28		3.92																						
M5-1	2.00	-1.66	3.66	0.28	1.50	3.94	3.93	50.00	1.65	48.35	294.75	0.00	294.75	21.95	75.00	39.75	62.18	192.82	294.75	12	0.35	48.35	-	2.5	50.00	125.00	0.00	TIMBER
M5-1	2.00	-1.66	3.66	0.28		3.94																						
M5-2	1.93	-1.74	3.67	0.28	1.50	3.95	3.95	48.40	0.80	47.60	286.77	0.00	286.77	21.61	72.60	38.48	61.21	187.08	286.77	11	3.60	47.60	-	2.5	48.40	121.00	0.00	TIMBER
								98.40	2.45	95.95	581.52	0.00	581.52	43.56	147.60	78.23	123.39	379.90	581.52	23	3.95	95.95			98.40	246.00	0.00	

Area of Concrete Bedding (m^2): 0.00
Volume of Concrete Bedding (m^3): 0.00

Table C.1.3 (9) Pipe Installation Work For Secondary Interceptor (M5-2_M6-4)

Bill of Quantity

Area : SI | Pipe Diameter : 600

Sewer Line Name : PD.C2 | Foundation Type : S360 | OK ! | S360

Manhole No. : M5-2 M6-4

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Excavation Work (m^3) Clamshell Depth => 6 m	Excavation Work (m^3) Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.53	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type Length (m) 4.00	Pipe Concrete	Pipe Bedding Length (m)	Sheeting (piles) Type	Sheeting (piles) Height (m)	Sheeting (piles) Length (m)	Sheeting (piles) Area (m^2)	Waling & Strut (ton)	Shoring Type
	IE_1 IE_2	ID_1 ID_2	H_1	W_1	H_2 H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2		
M5-2	1.93	-1.74	3.74	0.28		4.02														pipes	m							
M5-3	1.80	-1.85	3.72	0.28	2.00	4.00	4.01	68.00	0.80	67.20	545.36	0.00	545.36	30.51	136.00	72.08	125.39	347.89	545.36	16	3.20	67.20	FSP-2	8.6	134.40	1,155.84	32.91	TYPE1
M5-3	1.80	-1.85	3.72	0.28		4.00																						
M6-4*	1.84	-1.96	3.81	0.28	2.00	4.09	4.05	70.70	0.80	69.90	572.67	0.00	572.67	31.73	141.40	74.94	130.44	367.29	572.67	17	1.90	69.90	FSP-2	8.6	139.80	1,202.28	34.22	TYPE1
								138.70	1.60	137.10	1118.03	0.00	1118.03	62.24	277.40	147.02	255.83	715.18	1118.03	33	5.10	137.10			274.20	2,358.12	67.13	

Area of Concrete Bedding (m^2): 0.00

Volume of Concrete Bedding (m^3): 0.00

Table C.1.3 (10) Pipe Installation Work For Secondary Interceptor (DC6_IE15-1)

Bill of Quantity

Area : SI Pipe Diameter : 300
Sewer Line Name : CALMETTE1 Foundation Type : S360 OK ! S360
Manhole No. : DC6 IE15-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.53	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete 4.00		Type	Height (m)	Length (m)	Area (m^2)		
						Downstream														Length (m)								
		IE_1 IE_2	ID_1 ID_2	H_1	W_1	H_2 H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
DC-6	1.81	-1.75	3.56	0.25		3.81														pipes	m						
M6-1	1.78	-1.76	3.54	0.25	1.40	3.79	3.81	4.30	1.95	2.35	22.94	0.00	22.94	0.30	6.02	3.19	2.33	17.42	22.94	0	2.35	2.35	-	2.5	4.30	10.75	0.00	TIMBER
M6-1	1.78	-1.76	3.54	0.25		3.79																					
M6-2	1.72	-1.92	3.64	0.25	1.40	3.89	3.84	46.00	0.80	45.20	247.30	0.00	247.30	5.70	64.40	34.13	44.92	168.25	247.30	11	1.20	45.20	-	2.5	46.00	115.00	0.00	TIMBER
								50.30	2.75	47.55	270.24	0.00	270.24	6.00	70.42	37.32	47.25	185.67	270.24	11	3.55	47.55			50.30	125.75	0.00	

Area of Concrete Bedding (m^2): 0.00
Volume of Concrete Bedding (m^3): 0.00

Table C.1.3 (11) Pipe Installation Work For Secondary Interceptor (M6-2_IE15-1)

Bill of Quantity

Area : SI Pipe Diameter : 300
Sewer Line Name : CALMETTE2 Foundation Type : S360 OK ! S360
Manhole No. : M6-2 IE15-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream / Downstream H_2 H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.53 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number N: Type / Length (m)	Pipe Number N: Concrete 4.00	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Sheeting (piles) Height (m) h	Sheeting (piles) Length (m) L_3	Sheeting (piles) Area (m^2)	Waling & Strut (ton) W_2	Shoring Type
M6-2	1.72	-1.92	3.64	0.25		3.89														pipes	m							
M6-3	1.72	-2.07	3.92	0.25	2.00	4.17	4.03	46.00	0.80	45.20	370.76	0.00	370.76	5.70	92.00	48.76	66.62	255.38	370.76	11	1.20	45.20	FSP-2	8.6	90.40	777.44	22.26	TYPE1
M6-3	1.72	-2.07	3.92	0.25		4.17																						
M6-4*	1.84	-2.22	3.83	0.25	2.00	4.08	4.13	45.90	0.80	45.10	379.14	0.00	379.14	5.68	91.80	48.65	66.48	264.01	379.14	11	1.10	45.10	FSP-2	8.6	90.20	775.72	22.22	TYPE1
								91.90	1.60	90.30	749.90	0.00	749.90	11.38	183.80	97.41	133.10	519.39	749.90	22	2.30	90.30			180.60	1,553.16	44.48	

Area of Concrete Bedding (m^2): 0.00
Volume of Concrete Bedding (m^3): 0.00

Table C.1.3 (12) Pipe Installation Work For Secondary Interceptor (M6-4_IE15-1)

Bill of Quantity

Area : SI Pipe Diameter : 600

Sewer Line Name : CALMETTE3 Foundation Type : S360 OK ! S360

Manhole No. : M6-4 IE15-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 / IE_2	Sewer Invert Depth (m) ID_1 / ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream / Downstream H_2 / H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.53 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number N	Pipe Type	Pipe Concrete Length (m)	Pipe Concrete 4.00	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Sheeting (piles) Height (m) h	Sheeting (piles) Length (m) L_3	Sheeting (piles) Area (m^2)	Waling & Strut (ton) W_2	Shoring Type
M6-4	1.84	-2.52	4.36	0.28		4.64														pipes	m									
M6-5	1.61	-2.62	4.23	0.28	2.00	4.51	4.58	65.00	0.80	64.20	595.40	0.00	595.40	29.15	130.00	68.90	119.79	406.71	595.40	16	0.20	64.20	FSP-2	8.6	128.40	1,104.24	31.46	TYPE1
M6-5	1.61	-2.62	4.23	0.28		4.51																							
M6-6	1.55	-2.73	4.28	0.28	2.00	4.56	4.54	66.00	0.80	65.20	599.28	0.00	599.28	29.60	132.00	69.96	121.66	407.66	599.28	16	1.20	65.20	FSP-2	8.6	130.40	1,121.44	31.94	TYPE1
M6-6	1.55	-2.73	4.28	0.28		4.56																							
M6-7	1.61	-2.84	4.45	0.28	2.00	4.73	4.65	70.00	0.80	69.20	651.00	0.00	651.00	31.42	140.00	74.20	129.12	447.68	651.00	17	1.20	69.20	FSP-2	8.6	138.40	1,190.24	33.88	TYPE1
M6-7	1.61	-2.84	4.45	0.28		4.73																							
M6-8	1.68	-2.95	4.63	0.28	2.00	4.91	4.83	70.00	0.80	69.20	676.20	0.00	676.20	31.42	140.00	74.20	129.12	472.88	676.20	17	1.20	69.20	FSP-2	8.6	138.40	1,190.24	33.88	TYPE1
M6-8	1.68	-2.52	4.20	0.28		4.48																							
M6-9	1.79	-3.07	4.86	0.28	2.00	5.14	4.81	70.00	0.80	69.20	673.40	0.00	673.40	31.42	140.00	74.20	129.12	470.08	673.40	17	1.20	69.20	FSP-2	8.6	138.40	1,190.24	33.88	TYPE1
M6-9	1.79	-3.07	4.86	0.28		5.14																							
IE15-1	2.01	-3.18	5.19	0.28	2.00	5.47	5.31	69.60	1.50	68.10	739.16	0.00	739.16	30.92	139.20	73.78	127.07	538.31	739.16	17	0.10	68.10	FSP-2	10.1	136.20	1,375.62	41.06	TYPE2
								410.60	5.50	405.10	3934.44	0.00	3934.44	183.93	821.20	435.24	755.88	2743.32	3934.44	100	5.10	405.10			810.20	7,172.02	206.11	

Area of Concrete Bedding (m^2): 0.00

Volume of Concrete Bedding (m^3): 0.00

Table C.1.3 (13) Pipe Installation Work For Secondary Interceptor (DC7_M8-2)

Bill of Quantity

Area : SI Pipe Diameter : 400

Sewer Line Name : KY CON1 Foundation Type : S360 OK ! S360

Manhole No. : DC7 M8-2

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IL_1 IL_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream / Downstream H_2 H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.53 V_5	Backfill (m^3) Yellow Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number N	Pipe Concrete 4.00 m	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Sheeting (piles) Height (m) h	Sheeting (piles) Length (m) L_3	Sheeting (piles) Area (m^2)	Waling & Strut (ton) W_2	Shoring Type
																				pipes								
DC7	1.84	-1.40	3.24	0.25		3.49																						
M7-1	1.78	-1.58	3.36	0.25	1.40	3.61	3.55	70.00	1.65	68.35	347.90	0.00	347.90	13.40	98.00	51.94	72.72	223.24	347.90	17	0.35	68.35	-	2.5	70.00	175.00	0.00	TIMBER
M7-1	1.78	-1.58	3.36	0.25		3.61																						
M7-2	1.84	-1.75	3.59	0.25	1.40	3.84	3.73	68.90	0.80	68.10	359.80	0.00	359.80	13.35	96.46	51.12	72.46	236.22	359.80	17	0.10	68.10	-	2.5	68.90	172.25	0.00	TIMBER
M7-2	1.84	-1.75	3.59	0.25		3.84																						
M7-3	1.75	-1.90	3.65	0.25	1.40	3.90	3.87	60.00	0.80	59.20	325.08	0.00	325.08	11.60	84.00	44.52	62.99	217.57	325.08	14	3.20	59.20	-	2.5	60.00	150.00	0.00	TIMBER
								198.90	3.25	195.65	1032.78	0.00	1032.78	38.35	278.46	147.58	208.17	677.03	1032.78	48	3.65	195.65			198.90	497.25	0.00	

Area of Concrete Bedding (m2): 0.00

Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (14) Pipe Installation Work For Secondary Interceptor (M7-3_M8-2)

Bill of Quantity

Area : SI Pipe Diameter : 400
Sewer Line Name : KY CON2 Foundation Type : S360 OK ! S360
Manhole No. : M7-3 M8-2

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.53	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (piles) Type	Sheeting (piles) Height (m)	Sheeting (piles) Length (m)	Sheeting (piles) Area (m^2)	Waling & Strut (ton)	Shoring Type
		IL_1 / IL_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
M7-3	1.75	-1.90	3.65	0.25		3.90														pipes	m							
M8-2*	1.83	-2.05	3.87	0.25	2.00	4.12	4.01	61.10	0.80	60.30	490.03	0.00	490.03	11.82	122.20	64.77	96.72	328.54	490.03	15	0.30	60.30	FSP-2	8.6	120.60	1,037.16	29.57	TYPE1
								61.10	0.80	60.30	490.03	0.00	490.03	11.82	122.20	64.77	96.72	328.54	490.03	15	0.30	60.30			120.60	1,037.16	29.57	

Area of Concrete Bedding (m2): 0.00
Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (15) Pipe Installation Work For Secondary Interceptor (DC8_M8-2)

Bill of Quantity

Area : SI Pipe Diameter : 300

Sewer Line Name : YERSIN1 Foundation Type : S360 OK ! S360

Manhole No. : DC8 M8-2

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.53	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Concrete 4.00	Pipe Bedding Length (m)	Sheeting (piles) Type	Height (m)	Length (m)	Area (m^2)	Waling & Strut (ton)	Shoring Type
		IL_1 / IL_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
DC8	1.81	-1.13	2.94	0.25		3.19														pipes	m							
M8-1	1.76	-1.31	3.07	0.25	1.40	3.32	3.26	54.00	1.65	52.35	246.46	0.00	246.46	6.60	75.60	40.07	52.03	154.36	246.46	13	0.35	52.35	-	2.5	54.00	135.00	0.00	TIMBER
M8-1	1.76	-1.31	3.07	0.25		3.32																						
M8-2*	1.79	-1.48	3.27	0.25	1.40	3.52	3.42	52.60	0.80	51.80	251.85	0.00	251.85	6.53	73.64	39.03	51.49	161.33	251.85	12	3.80	51.80	-	2.5	52.60	131.50	0.00	TIMBER
								106.60	2.45	104.15	498.31	0.00	498.31	13.13	149.24	79.10	103.52	315.69	498.31	25	4.15	104.15			106.60	266.50	0.00	

Area of Concrete Bedding (m2): 0.00

Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (16) Pipe Installation Work For Secondary Interceptor (M8-2_IE16-1)

Bill of Quantity

Area : SI Pipe Diameter : 400
Sewer Line Name : YERSIN2 Foundation Type : S360 OK ! S360
Manhole No. : M8-2 IE16-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe Number		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Type	Concrete		Type	Height (m)	Length (m)	Area (m^2)		
						Downstream					<= 6 m	=> 6 m				0.53				Length (m)	4.00							
		IE_1	ID_1			H_2																						
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	I_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
M8-2	1.79	-2.05	3.84	0.25		4.09														pipes	m							
M8-3	1.60	-2.24	3.84	0.25	2.00	4.09	4.10	77.00	0.80	76.20	631.40	0.00	631.40	14.94	154.00	81.62	122.22	427.56	631.40	19	0.20	76.20	FSP-2	8.6	152.40	1,310.64	37.27	TYPE1
M8-3	1.60	-2.24	3.84	0.25		4.09																						
M8-4	1.79	-2.44	4.23	0.25	2.00	4.48	4.29	78.00	0.80	77.20	669.24	0.00	669.24	15.13	156.00	82.68	123.83	462.73	669.24	19	1.20	77.20	FSP-2	8.6	154.40	1,327.84	37.75	TYPE1
M8-4	1.79	-2.44	4.23	0.25		4.48																						
M8-5	1.81	-2.63	4.44	0.25	2.00	4.69	4.59	75.00	0.80	74.20	688.50	0.00	688.50	14.54	150.00	79.50	119.02	489.98	688.50	18	2.20	74.20	FSP-2	8.6	148.40	1,276.24	36.30	TYPE1
M8-5	1.81	-2.63	4.44	0.25		4.69																						
M8-6	1.78	-2.81	4.59	0.25	2.00	4.84	4.77	75.00	0.80	74.20	715.50	0.00	715.50	14.54	150.00	79.50	119.02	516.98	715.50	18	2.20	74.20	FSP-2	8.6	148.40	1,276.24	36.30	TYPE1
M8-6	1.78	-2.81	4.59	0.25		4.84																						
M8-7	1.89	-3.00	4.89	0.25	2.00	5.14	5.00	75.40	0.80	74.60	754.00	0.00	754.00	14.62	150.80	79.92	119.66	554.42	754.00	18	2.60	74.60	FSP-2	8.6	149.20	1,283.12	36.49	TYPE1
M8-7	1.89	-3.00	4.89	0.25		5.14																						
IE16-1	1.94	-3.07	5.01	0.25	2.00	5.26	5.21	28.20	1.50	26.70	293.85	0.00	293.85	5.23	56.40	29.89	42.83	221.13	293.85	6	2.70	26.70	FSP-2	10.1	53.40	539.34	16.64	TYPE2
								408.60	5.50	403.10	3752.49	0.00	3752.49	79.00	817.20	433.12	646.58	2672.79	3752.49	98	11.10	403.10			806.20	7,013.42	200.75	

Area of Concrete Bedding (m2): 0.00
Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (17) Pipe Installation Work For Secondary Interceptor (DC9_M9-3)

Bill of Quantity

Area : SI
Pipe Diameter : 300
Sewer Line Name : N.T.HOC1
Foundation Type : S360 OK ! S360
Manhole No. : DC9 M9-3

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Designed Thickness (m) 0.53	Backfill (m^3) Yellow Sand Sand Backfill	Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type Length (m)	Concrete 4.00	Pipe Bedding Length (m)	Sheeting (piles) Type	Height (m)	Length (m)	Area (m^2)	Waling & Strut (ton)	Shoring Type
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
DC9	1.73	-2.20	3.93	0.25		4.18														pipes	m							
M9-1	1.73	-2.28	4.01	0.25	2.00	4.26	4.23	25.50	1.95	23.55	215.73	0.00	215.73	2.97	51.00	27.03	34.71	153.99	215.73	5	3.55	23.55	FSP-2	8.6	47.10	405.06	12.34	TYPE1
M9-1	1.73	-2.28	4.01	0.25		4.26																						
M9-2	1.76	-2.45	4.21	0.25	2.00	4.46	4.37	50.00	0.80	49.20	437.00	0.00	437.00	6.20	100.00	53.00	72.52	311.48	437.00	12	1.20	49.20	FSP-2	8.6	98.40	846.24	24.20	TYPE1
M9-2	1.76	-2.45	4.21	0.25		4.46																						
M9-3	1.77	-2.62	4.39	0.25	2.00	4.64	4.55	50.50	0.80	49.70	459.55	0.00	459.55	6.26	101.00	53.53	73.26	332.76	459.55	12	1.70	49.70	FSP-2	8.6	99.40	854.84	24.44	TYPE1
								126.00	3.55	122.45	1112.28	0.00	1112.28	15.43	252.00	133.56	180.49	798.23	1112.28	29	6.45	122.45			244.90	2,106.14	60.98	

Area of Concrete Bedding (m2): 0.00
Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (18) Pipe Installation Work For Secondary Interceptor (M9-3_IE17-1)

Bill of Quantity

Area : SI Pipe Diameter : 600

Sewer Line Name : N.T.HOC2 Foundation Type : S360 OK ! S360

Manhole No. : M9-3 IE17-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream / Downstream H_2 H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.53 V_5	Backfill (m^3) Yellow Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number N	Pipe Type	Pipe Concrete Length (m) 4.00	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Sheeting (piles) Height (m) h	Sheeting (piles) Length (m) L_3	Sheeting (piles) Area (m^2)	Waling & Strut (ton) W_2	Shoring Type
M9-3*	1.77	-2.92	4.69	0.28		4.97															pipes	m							
M9-4	1.75	-3.04	4.79	0.28	2.00	5.07	5.02	75.00	0.80	74.20	753.00	0.00	753.00	33.69	150.00	79.50	138.45	535.05	753.00	18	2.20	74.20	FSP-2	10.1	148.40	1,498.84	44.25	TYPE2
M9-4	1.75	-3.04	4.79	0.28		5.07																						
M9-5	1.75	-3.05	4.80	0.28	2.00	5.08	5.08	8.90	0.80	8.10	90.43	0.00	90.43	3.68	17.80	9.43	15.11	65.89	90.43	2	0.10	8.10	FSP-2	10.1	16.20	163.62	5.25	TYPE2
M9-5	1.75	-3.05	4.80	0.28		5.08																						
M9-6	1.73	-3.16	4.89	0.28	2.00	5.17	5.13	70.00	0.80	69.20	718.20	0.00	718.20	31.42	140.00	74.20	129.12	514.88	718.20	17	1.20	69.20	FSP-2	10.1	138.40	1,397.84	41.30	TYPE2
M9-6	1.73	-3.16	4.89	0.28		5.17																						
M9-7	1.79	-3.28	5.07	0.28	2.00	5.35	5.27	75.00	0.80	74.20	790.50	0.00	790.50	33.69	150.00	79.50	138.45	572.55	790.50	18	2.20	74.20	FSP-2	10.1	148.40	1,498.84	44.25	TYPE2
M9-7	1.79	-3.28	5.07	0.28		5.35																						
M9-8	1.84	-3.40	5.24	0.28	2.00	5.52	5.44	75.00	0.80	74.20	816.00	0.00	816.00	33.69	150.00	79.50	138.45	598.05	816.00	18	2.20	74.20	FSP-2	10.1	148.40	1,498.84	44.25	TYPE2
M9-8	1.84	-3.40	5.24	0.28		5.52																						
M9-9	2.07	-3.52	5.59	0.28	2.00	5.87	5.70	75.00	0.80	74.20	855.00	0.00	855.00	33.69	150.00	79.50	138.45	637.05	855.00	18	2.20	74.20	FSP-2	10.1	148.40	1,498.84	44.25	TYPE2
M9-9	2.07	-3.52	5.59	0.28		5.87																						
IE17-1	2.07	-3.55	5.62	0.28	2.00	5.90	5.89	14.00	1.50	12.50	164.92	0.00	164.92	5.68	28.00	14.84	23.32	126.76	164.92	3	0.50	12.50	FSP-2	10.1	25.00	252.50	8.26	TYPE2
								392.90	6.30	386.60	4188.05	0.00	4188.05	175.54	785.80	416.47	721.35	3050.23	4188.05	94	10.60	386.60			773.20	7,809.32	231.81	

Area of Concrete Bedding (m2): 0.00

Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (19) Pipe Installation Work For Secondary Interceptor (DC10_M9-3)

Bill of Quantity

Area : SI Pipe Diameter : 400

Sewer Line Name : DETHAM1 Foundation Type : S360 OK ! S360

Manhole No. : DC10_M9-3

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.53 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type Length (m) N	Pipe Concrete 4.00 m	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Sheeting (piles) Height (m) h	Sheeting (piles) Length (m) L_3	Sheeting (piles) Area (m^2)	Waling & Strut (ton) W_2	Shoring Type
DC10	1.89	-1.25	3.14	0.25		3.39														pipes								
M10-1	1.92	-1.35	3.27	0.25	1.40	3.52	3.46	40.40	1.65	38.75	195.70	0.00	195.70	7.60	56.56	29.98	41.23	124.49	195.70	9	2.75	38.75	-	2.5	40.40	101.00	0.00	TIMBER
M10-1	1.92	-1.35	3.27	0.25		3.52																						
M10-2	1.86	-1.49	3.35	0.25	1.40	3.60	3.56	55.00	0.80	54.20	274.12	0.00	274.12	10.62	77.00	40.81	57.67	175.64	274.12	13	2.20	54.20	-	2.5	55.00	137.50	0.00	TIMBER
M10-2	1.86	-1.49	3.35	0.25		3.60																						
M10-3	1.71	-1.62	3.33	0.25	1.40	3.58	3.59	53.10	0.80	52.30	266.89	0.00	266.89	10.25	74.34	39.40	55.65	171.84	266.89	13	0.30	52.30	-	2.5	53.10	132.75	0.00	TIMBER
M10-3	1.71	-1.62	3.33	0.25		3.58																						
M10-4	1.60	-1.76	3.36	0.25	1.40	3.61	3.60	55.00	0.80	54.20	277.20	0.00	277.20	10.62	77.00	40.81	57.67	178.72	277.20	13	2.20	54.20	-	2.5	55.00	137.50	0.00	TIMBER
M10-4	1.60	-1.76	3.36	0.25		3.61																						
M10-5	1.66	-1.91	3.57	0.25	1.40	3.82	3.72	60.00	0.80	59.20	312.48	0.00	312.48	11.60	84.00	44.52	62.99	204.97	312.48	14	3.20	59.20	-	2.5	60.00	150.00	0.00	TIMBER
M10-5	1.66	-1.91	3.57	0.25		3.82																						
M10-6	1.63	-2.02	3.65	0.25	1.40	3.90	3.86	43.00	0.80	42.20	232.38	0.00	232.38	8.27	60.20	31.91	44.90	155.57	232.38	10	2.20	42.20	-	2.5	43.00	107.50	0.00	TIMBER
								306.50	5.65	300.85	1558.77	0.00	1558.77	58.96	429.10	227.42	320.11	1011.24	1558.77	72	12.85	300.85			306.50	766.25	0.00	

Area of Concrete Bedding (m2): 0.00

Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (20) Pipe Installation Work For Secondary Interceptor (M10-6_M9-3)

Bill of Quantity

Area : SI Pipe Diameter : 400

Sewer Line Name : DETHAM2 Foundation Type : S360 OK ! S360

Manhole No. : M10-6 M9-3

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.53	Yellow Sand Sand Backfill	Black Sand Sandy Soil Backfill		Number Type Length (m)	Concrete 4.00		Type	Height (m)	Length (m)	Area (m^2)		
		IE_1	ID_1			H_2																						
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
M10-6	1.63	-2.02	3.64	0.25		3.89														pipes	m							
M9-3*	1.77	-2.14	3.87	0.25	2.00	4.12	4.01	50.00	0.80	49.20	401.00	0.00	401.00	9.64	100.00	53.00	78.92	269.08	401.00	12	1.20	49.20	FSP-2	8.6	98.40	846.24	24.20	TYPE1
								50.00	0.80	49.20	401.00	0.00	401.00	9.64	100.00	53.00	78.92	269.08	401.00	12	1.20	49.20			98.40	846.24	24.20	

Area of Concrete Bedding (m2): 0.00

Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (21) Pipe Installation Work For Secondary Interceptor (DC11_IE20-1)

Bill of Quantity

Area : SI Pipe Diameter : 600

Sewer Line Name : H.H.HON Foundation Type : S360 OK ! S360

Manhole No. : DC11 IE20-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.53	Yellow Sand Sand Backfill	Black Sand Sandy Soil Backfill		Number Type Length (m)	Concrete 4.00		Type	Height (m)	Length (m)	Area (m^2)		
		IE_1 IE_2	ID_1 ID_2	H_1	W_1	H_2 H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
DC11	1.77	-1.85	3.62	0.28		3.90														pipes	m							
M11-1	2.00	-1.95	3.95	0.28	2.00	4.23	4.07	64.20	1.65	62.55	522.59	0.00	522.59	28.40	128.40	68.05	116.72	337.82	522.59	15	2.55	62.55	FSP-2	8.6	125.10	1,075.86	31.07	TYPE1
M11-1	2.00	-1.95	3.95	0.28		4.23																						
IE20-1	2.00	-1.99	3.99	0.28	2.00	4.27	4.25	25.90	1.50	24.40	220.15	0.00	220.15	11.08	51.80	27.45	45.53	147.17	220.15	6	0.40	24.40	FSP-2	8.6	48.80	419.68	12.54	TYPE1
								90.10	3.15	86.95	742.74	0.00	742.74	39.48	180.20	95.51	162.25	484.98	742.74	21	2.95	86.95			173.90	1,495.54	43.61	

Area of Concrete Bedding (m2): 0.00

Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (22) Pipe Installation Work For Secondary Interceptor (DC12_IE21-1)

Bill of Quantity

Area : SI Pipe Diameter : 400

Sewer Line Name : T.D.XU Foundation Type : S360 OK ! S360

Manhole No. : DC12 IE21-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream / Downstream H_2 H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.53 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type / Length (m) N	Pipe Number Concrete 4.00 m	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Sheeting (piles) Height (m) h	Sheeting (piles) Length (m) L_3	Sheeting (piles) Area (m^2)	Waling & Strut (ton) W_2	Shoring Type
DC12	1.94	-1.80	3.74	0.25		3.99														pipes	m							
M12-1	1.95	-1.95	3.90	0.25	2.00	4.15	4.07	60.00	1.65	58.35	488.40	0.00	488.40	11.44	120.00	63.60	93.59	331.21	488.40	14	2.35	58.35	FSP-2	8.6	116.70	1,003.62	29.04	TYPE1
M12-1	1.95	-1.95	3.90	0.25		4.15																						
M12-2	1.80	-2.10	3.90	0.25	2.00	4.15	4.15	60.00	0.80	59.20	498.00	0.00	498.00	11.60	120.00	63.60	94.96	339.44	498.00	14	3.20	59.20	FSP-2	8.6	118.40	1,018.24	29.04	TYPE1
M12-2	1.80	-2.10	3.90	0.25		4.15																						
M12-3	1.78	-2.20	3.98	0.25	2.00	4.23	4.19	40.00	0.80	39.20	335.20	0.00	335.20	7.68	80.00	42.40	62.88	229.92	335.20	9	3.20	39.20	FSP-2	8.6	78.40	674.24	19.36	TYPE1
M12-3	1.78	-2.20	3.98	0.25		4.23																						
M12-4	1.78	-2.28	4.06	0.25	2.00	4.31	4.27	30.00	0.80	29.20	256.20	0.00	256.20	5.72	60.00	31.80	46.84	177.56	256.20	7	1.20	29.20	FSP-2	8.6	58.40	502.24	14.52	TYPE1
M12-4	1.78	-2.28	4.06	0.25		4.31																						
M12-5	1.78	-2.38	4.16	0.25	2.00	4.41	4.36	42.00	0.80	41.20	366.24	0.00	366.24	8.08	84.00	44.52	66.08	255.64	366.24	10	1.20	41.20	FSP-2	8.6	82.40	708.64	20.33	TYPE1
M12-5	1.78	-2.38	4.16	0.25		4.41																						
M12-6	1.81	-2.57	4.38	0.25	2.00	4.63	4.52	75.00	0.80	74.20	678.00	0.00	678.00	14.54	150.00	79.50	119.02	479.48	678.00	18	2.20	74.20	FSP-2	8.6	148.40	1,276.24	36.30	TYPE1
M12-6	1.81	-2.57	4.38	0.25		4.63																						
M12-7	2.04	-2.75	4.79	0.25	2.00	5.04	4.84	71.10	0.80	70.30	688.25	0.00	688.25	13.78	142.20	75.37	112.76	500.12	688.25	17	2.30	70.30	FSP-2	8.6	140.60	1,209.16	34.41	TYPE1
M12-7	2.04	-2.75	4.79	0.25		5.04																						
IE21-1	2.07	-2.81	4.88	0.25	2.00	5.13	5.09	25.00	1.50	23.50	254.50	0.00	254.50	4.61	50.00	26.50	37.69	190.31	254.50	5	3.50	23.50	FSP-2	10.1	47.00	474.70	14.75	TYPE2
								403.10	7.95	395.15	3564.79	0.00	3564.79	77.45	806.20	427.29	633.82	2503.68	3564.79	94	19.15	395.15			790.30	6,867.08	197.75	

Area of Concrete Bedding (m2): 0.00

Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (23) Pipe Installation Work For Secondary Interceptor (DC13_IE23-1)

Bill of Quantity

Area : SI Pipe Diameter : 400

Sewer Line Name : N.C.CHAN Foundation Type : S360 OK ! S360

Manhole No. : DC13 IE23-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 IE_2	Sewer Invert Depth (m) ID_1 ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Clamshell Depth => 6 m V_2	Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.53 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type Length (m) N	Pipe Number Concrete 4.00 m	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Sheeting (piles) Height (m) h	Sheeting (piles) Length (m) L_3	Sheeting (piles) Area (m^2)	Waling & Strut (ton) W_2	Shoring Type
DC13	1.89	-2.09	3.98	0.25		4.23														pipes								
M13-1	1.69	-2.27	3.96	0.25	2.00	4.21	4.22	70.00	1.65	68.35	590.80	0.00	590.80	13.40	140.00	74.20	109.63	406.97	590.80	17	0.35	68.35	FSP-2	8.6	136.70	1,175.62	33.88	TYPE1
M13-1	1.69	-2.27	3.96	0.25		4.21																						
M13-2	1.65	-2.44	4.09	0.25	2.00	4.34	4.28	70.00	0.80	69.20	599.20	0.00	599.20	13.56	140.00	74.20	111.00	414.00	599.20	17	1.20	69.20	FSP-2	8.6	138.40	1,190.24	33.88	TYPE1
M13-2	1.65	-2.44	4.09	0.25		4.34																						
M13-3	1.69	-2.58	4.27	0.25	2.00	4.52	4.43	55.00	0.80	54.20	487.30	0.00	487.30	10.62	110.00	58.30	86.94	342.06	487.30	13	2.20	54.20	FSP-2	8.6	108.40	932.24	26.62	TYPE1
M13-3	1.69	-2.58	4.27	0.25		4.52																						
M13-4	1.86	-2.72	4.58	0.25	2.00	4.83	4.68	56.00	0.80	55.20	524.16	0.00	524.16	10.82	112.00	59.36	88.54	376.26	524.16	13	3.20	55.20	FSP-2	8.6	110.40	949.44	27.10	TYPE1
M13-4	1.86	-2.72	4.58	0.25		4.83																						
M13-5	2.05	-2.86	4.91	0.25	2.00	5.16	5.00	55.50	0.80	54.70	555.00	0.00	555.00	10.72	111.00	58.83	87.74	408.43	555.00	13	2.70	54.70	FSP-2	8.6	109.40	940.84	26.86	TYPE1
M13-5	2.05	-2.86	4.91	0.25		5.16																						
IE23-1	2.05	-2.91	4.96	0.25	2.00	5.21	5.19	19.50	1.50	18.00	202.41	0.00	202.41	3.53	39.00	20.67	28.87	152.87	202.41	4	2.00	18.00	FSP-2	10.1	36.00	363.60	11.51	TYPE2
								326.00	6.35	319.65	2958.87	0.00	2958.87	62.65	652.00	345.56	512.72	2100.59	2958.87	77	11.65	319.65			639.30	5,551.98	159.85	

Area of Concrete Bedding (m2): 0.00

Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (24) Pipe Installation Work For Secondary Interceptor (DC14_IE25-1)

Bill of Quantity

Area : SI Pipe Diameter : 300
Sewer Line Name : N.V.CU Foundation Type : S360 OK ! S360
Manhole No. : DC14 IE25-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream					Backhoe Depth	Clamshell Depth	Total		Excavated Area (m^2)	Designed Thickness (m)	Yellow Sand	Black Sand		Number			Type	Height	Length	Area (m^2)		
						Downstream					<= 6 m	=> 6 m				0.53	Sand Backfill	Sandy Soil Backfill		Type	Concrete							
		IE_1	ID_1			H_2														Length (m)	4.00							
		IE_2	ID_2	H_1	W_1	H_3	H_4	L_1	I_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
DC14	1.92	-0.05	1.97	0.25		2.22														pipes	m							
M14-1	1.92	-0.11	2.03	0.25	1.40	2.28	2.25	9.90	1.95	7.95	31.19	0.00	31.19	1.00	13.86	7.35	7.90	15.94	31.19	1	3.95	7.95	-	2.5	9.90	24.75	0.00	TIMBER
M14-1	1.92	-0.11	2.03	0.25		2.28																						
M14-2	1.68	-0.27	1.95	0.25	1.40	2.20	2.25	50.00	0.80	49.20	157.50	0.00	157.50	6.20	70.00	37.10	48.90	71.50	157.50	12	1.20	49.20	-	2.5	50.00	125.00	0.00	TIMBER
M14-2	1.68	-0.27	1.95	0.25		2.20																						
M14-3	1.69	-0.42	2.11	0.25	1.40	2.36	2.29	45.00	0.80	44.20	144.27	0.00	144.27	5.57	63.00	33.39	43.93	66.95	144.27	11	0.20	44.20	-	2.5	45.00	112.50	0.00	TIMBER
M14-3	1.69	-0.42	2.11	0.25		2.36																						
M14-4	1.74	-0.59	2.33	0.25	1.40	2.58	2.48	51.00	0.80	50.20	177.08	0.00	177.08	6.33	71.40	37.84	49.89	89.35	177.08	12	2.20	50.20	-	2.5	51.00	127.50	0.00	TIMBER
M14-4	1.74	-0.59	2.33	0.25		2.58																						
M14-5	1.75	-0.76	2.51	0.25	1.40	2.76	2.67	50.00	0.80	49.20	186.90	0.00	186.90	6.20	70.00	37.10	48.90	100.90	186.90	12	1.20	49.20	-	2.5	50.00	125.00	0.00	TIMBER
M14-5	1.75	-0.76	2.51	0.25		2.76																						
M14-6	1.91	-0.91	2.82	0.25	1.40	3.07	2.92	45.00	0.80	44.20	183.96	0.00	183.96	5.57	63.00	33.39	43.93	106.64	183.96	11	0.20	44.20	-	2.5	45.00	112.50	0.00	TIMBER
M14-6	1.91	-0.91	2.82	0.25		3.07																						
IE25-1	2.12	-1.00	3.12	0.25	1.40	3.37	3.22	29.60	1.50	28.10	133.44	0.00	133.44	3.54	41.44	21.96	27.93	83.55	133.44	7	0.10	28.10	-	2.5	29.60	74.00	0.00	TIMBER
								280.50	7.45	273.05	1014.34	0.00	1014.34	34.41	392.70	208.13	271.38	534.83	1014.34	66	9.05	273.05			280.50	701.25	0.00	

Area of Concrete Bedding (m2): 0.00
Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (25) Pipe Installation Work For Secondary Interceptor (DC15_M15-10)

Bill of Quantity

Area : SI Pipe Diameter : 600

Sewer Line Name : N.BIEU(1) Foundation Type : S360 OK ! S360

Manhole No. : DC15 M15-10

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.53	Backfill (m^3) Yellow Sand Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (piles) Type	Heigth (m)	Length (m)	Area (m^2)	Waling & Strut (ton)	Shoring Type
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
DC15	1.88	-2.60	4.48	0.28		4.76														pipes	m							
M15-1	1.88	-2.64	4.52	0.28	2.00	4.80	4.78	21.60	1.58	20.02	206.50	0.00	206.50	9.09	43.20	22.90	37.36	146.24	206.50	5	0.02	20.02	FSP-2	8.6	40.04	344.34	10.45	TYPE1
M15-1	1.88	-2.64	4.52	0.28		4.80																						
M15-2	1.86	-2.74	4.60	0.28	2.00	4.88	4.84	65.00	0.80	64.20	629.20	0.00	629.20	29.15	130.00	68.90	119.79	440.51	629.20	16	0.20	64.20	FSP-2	8.6	128.40	1,104.24	31.46	TYPE1
M15-2	1.86	-2.74	4.60	0.28		4.88																						
M15-3	1.85	-2.84	4.69	0.28	2.00	4.97	4.93	60.00	0.80	59.20	591.60	0.00	591.60	26.88	120.00	63.60	110.46	417.54	591.60	14	3.20	59.20	FSP-2	8.6	118.40	1,018.24	29.04	TYPE1
M15-3	1.85	-2.84	4.69	0.28		4.97																						
M15-4	1.80	-2.91	4.71	0.28	2.00	4.99	4.98	47.50	0.80	46.70	473.10	0.00	473.10	21.20	95.00	50.35	87.14	335.61	473.10	11	2.70	46.70	FSP-2	8.6	93.40	803.24	22.99	TYPE1
M15-4	1.80	-2.91	4.71	0.28		4.99																						
M15-5	1.77	-2.97	4.74	0.28	2.00	5.02	5.01	35.00	0.80	34.20	350.70	0.00	350.70	15.53	70.00	37.10	63.81	249.79	350.70	8	2.20	34.20	FSP-2	10.1	68.40	690.84	20.65	TYPE2
M15-5	1.77	-2.97	4.74	0.28		5.02																						
M15-6	1.75	-3.02	4.77	0.28	2.00	5.05	5.04	30.00	0.80	29.20	302.40	0.00	302.40	13.26	60.00	31.80	54.48	216.12	302.40	7	1.20	29.20	FSP-2	10.1	58.40	589.84	17.70	TYPE2
M15-6	1.75	-3.02	4.77	0.28		5.05																						
M15-7	1.75	-3.08	4.83	0.28	2.00	5.11	5.08	40.00	0.80	39.20	406.40	0.00	406.40	17.80	80.00	42.40	73.14	290.86	406.40	9	3.20	39.20	FSP-2	10.1	78.40	791.84	23.60	TYPE2
M15-7	1.75	-3.08	4.83	0.28		5.11																						
M15-8	1.84	-3.17	5.01	0.28	2.00	5.29	5.20	55.00	0.80	54.20	572.00	0.00	572.00	24.61	110.00	58.30	101.13	412.57	572.00	13	2.20	54.20	FSP-2	10.1	108.40	1,094.84	32.45	TYPE2
M15-8	1.84	-3.17	5.01	0.28		5.29																						
M15-9	1.85	-3.26	5.11	0.28	2.00	5.39	5.34	60.00	0.80	59.20	640.80	0.00	640.80	26.88	120.00	63.60	110.46	466.74	640.80	14	3.20	59.20	FSP-2	10.1	118.40	1,195.84	35.40	TYPE2
M15-9	1.85	-3.26	5.11	0.28		5.39																						
M15-10	1.88	-3.34	5.22	0.28	2.00	5.50	5.45	49.80	0.80	49.00	542.82	0.00	542.82	22.25	99.60	52.79	91.43	398.60	542.82	12	1.00	49.00	FSP-2	10.1	98.00	989.80	29.38	TYPE2
								463.90	8.78	455.12	4715.52	0.00	4715.52	206.65	927.80	491.73	849.20	3374.59	4715.52	109	19.12	455.12			910.24	8,623.06	253.13	

Area of Concrete Bedding (m2): 0.00

Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (26) Pipe Installation Work For Secondary Interceptor (M15-10_IE26-1)

Bill of Quantity

Area : SI Pipe Diameter : 600
Sewer Line Name : N.BIEU(2) Foundation Type : S360 OK ! S360
Manhole No. : M15-10 IE26-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m)	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3)			Pipe & Foundation Volume (m^3)	Road		Backfill (m^3)		Residual Soil (m^3)	Pipe		Pipe Bedding Length (m)	Sheeting (piles)				Waling & Strut (ton)	Shoring Type
						Upstream					Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total		Excavated Area (m^2)	Designed Thickness (m) 0.53	Yellow Sand Backfill	Black Sand Sandy Soil Backfill		Number Type	Concrete		Type	Height (m)	Length (m)	Area (m^2)		
						Downstream														Length (m)	4.00							
		IE_1 IE_2	ID_1 ID_2	H_1	W_1	H_2 H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
M15-10	1.88	-3.34	5.22	0.28		5.50														pipes	m							
IE26-1	1.88	-3.37	5.25	0.28	2.00	5.53	5.52	16.10	1.65	14.45	177.75	0.00	177.75	6.56	32.20	17.07	26.96	133.72	177.75	3	2.45	14.45	FSP-2	10.1	28.90	291.89	9.50	TYPE2
								16.10	1.65	14.45	177.75	0.00	177.75	6.56	32.20	17.07	26.96	133.72	177.75	3	2.45	14.45			28.90	291.89	9.50	

Area of Concrete Bedding (m2): 0.00
Volume of Concrete Bedding (m3): 0.00

Table C.1.3 (27) Pipe Installation Work For Secondary Interceptor (DC16_IE27-1)

Bill of Quantity

Area : SI Pipe Diameter : 800

Sewer Line Name : TB.TRONG Foundation Type : C120 OK ! C120

Manhole No. : DC16 IE27-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.53	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (piles) Type	Sheeting (piles) Height (m)	Sheeting (piles) Length (m)	Sheeting (piles) Area (m^2)	Waling & Strut (ton)	Shoring Type
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	N		L_2		h	L_3		W_2	
DC16	2.10	-3.06	5.16	0.41		5.57														pipes	m							
M16-1	2.14	-3.11	5.25	0.41	2.00	5.66	5.62	40.00	1.85	38.15	449.60	0.00	449.60	37.77	80.00	42.40	75.92	331.28	449.60	9	2.15	38.15	FSP-2	10.1	76.30	770.63	23.60	TYPE2
M16-1	2.14	-3.11	5.25	0.41		5.66																						
M16-2	2.30	-3.23	5.53	0.41	2.00	5.94	5.80	100.00	1.20	98.80	1160.00	0.00	1160.00	97.81	200.00	106.00	196.61	857.39	1160.00	24	2.80	98.80	FSP-2	10.1	197.60	1,995.76	59.00	TYPE2
M16-2	2.30	-3.23	5.53	0.41		5.94																						
M16-3	2.26	-3.33	5.59	0.41	2.00	6.00	5.97	83.50	1.20	82.30	996.99	0.00	996.99	81.48	167.00	88.51	163.77	744.71	996.99	20	2.30	82.30	FSP-2	10.1	164.60	1,662.46	49.27	TYPE2
M16-3	2.26	-3.33	5.59	0.41		6.00																						
M16-4	2.01	-3.45	5.46	0.41	2.00	5.87	5.94	102.12	1.20	100.92	1213.19	0.00	1213.19	99.91	204.24	108.25	200.83	904.11	1213.19	25	0.92	100.92	FSP-2	10.1	201.84	2,038.58	60.25	TYPE2
M16-4	2.01	-3.45	5.46	0.41		5.87																						
IE27-1	1.94	-3.48	5.42	0.41	2.00	5.83	5.85	21.96	1.85	20.11	256.94	0.00	256.94	19.91	43.92	23.28	40.02	193.64	256.94	5	0.11	20.11	FSP-2	10.1	40.22	406.22	12.96	TYPE2
								347.58	7.30	340.28	4076.72	0.00	4076.72	336.88	695.16	368.43	677.15	3031.14	4076.72	83	8.28	340.28			680.56	6,873.66	205.07	

Area of Concrete Bedding (m2): 0.27

Volume of Concrete Bedding (m3): 90.51

Table C.1.3 (28) Pipe Installation Work For Secondary Interceptor (DC17_IE29-1)

Bill of Quantity

Area : SI
Sewer Line Name : HM.DAT
Manhole No. : DC17 IE29-1

Pipe Diameter : 800
Foundation Type : C120 OK ! C120

Manhole No.	Ground Level (m)	Sewer Invert Level (m) IE_1 / IE_2	Sewer Invert Depth (m) ID_1 / ID_2	Foundation Height (m) H_1	Excavation Width (m) W_1	Excavation Depth (m) Upstream H_2 / Downstream H_3	Average Excavation Depth (m) H_4	Excavation Length (m) L_1	Length in Manhole (m) l_1	Pipe Length (m) L_2	Excavation Work (m^3) Backhoe Depth <= 6 m V_1	Excavation Work (m^3) Clamshell Depth => 6 m V_2	Excavation Work (m^3) Total V_3	Pipe & Foundation Volume (m^3) V_4	Road Excavated Area (m^2) S_1	Road Designed Thickness (m) 0.53 V_5	Backfill (m^3) Yellow Sand Sand Backfill V_6	Backfill (m^3) Black Sand Sandy Soil Backfill V_7	Residual Soil (m^3) V_8	Pipe Number Type Length (m) 4.00 N (pipes)	Pipe Concrete (m)	Pipe Bedding Length (m) L_2	Sheeting (piles) Type	Sheeting (piles) Height (m) h	Sheeting (piles) Length (m) L_3	Sheeting (piles) Area (m^2)	Waling & Strut (ton) W_2	Shoring Type
DC17	1.83	-3.16	4.99	0.41		5.40																						
M17-1	1.73	-3.27	5.00	0.41	2.00	5.41	5.41	90.70	1.85	88.85	981.38	0.00	981.38	87.96	181.40	96.14	176.81	708.43	981.38	22	0.85	88.85	FSP-2	10.1	177.70	1,794.77	53.51	TYPE2
M17-1	1.73	-3.27	5.00	0.41		5.41																						
M17-2	1.79	-3.39	5.18	0.41	2.00	5.59	5.50	101.90	1.20	100.70	1120.90	0.00	1120.90	99.69	203.80	108.01	200.40	812.49	1120.90	25	0.70	100.70	FSP-2	10.1	201.40	2,034.14	60.12	TYPE2
M17-2	1.79	-3.39	5.18	0.41		5.59																						
IE29-1	1.85	-3.42	5.27	0.41	2.00	5.68	5.64	19.60	1.85	17.75	221.09	0.00	221.09	17.57	39.20	20.78	35.33	164.98	221.09	4	1.75	17.75	FSP-2	10.1	35.50	358.55	11.56	TYPE2
								212.20	4.90	207.30	2323.37	0.00	2323.37	205.22	424.40	224.93	412.54	1685.90	2323.37	51	3.30	207.30			414.60	4,187.46	125.20	

Area of Concrete Bedding (m2): 0.27
Volume of Concrete Bedding (m3): 55.14

Table C.1.3 (29) Pipe Installation Work For Secondary Interceptor (DC18_IE30-1)

Bill of Quantity

Area : SI Pipe Diameter : 400

Sewer Line Name : NHIEUTAM Foundation Type : S360 OK ! S360

Manhole No. : DC18 IE30-1

Manhole No.	Ground Level (m)	Sewer Invert Level (m)	Sewer Invert Depth (m)	Foundation Height (m)	Excavation Width (m)	Excavation Depth (m) Upstream / Downstream	Average Excavation Depth (m)	Excavation Length (m)	Length in Manhole (m)	Pipe Length (m)	Excavation Work (m^3) Backhoe Depth <= 6 m	Clamshell Depth => 6 m	Total	Pipe & Foundation Volume (m^3)	Road Excavated Area (m^2)	Road Designed Thickness (m) 0.53	Backfill (m^3) Yellow Sand Backfill	Backfill (m^3) Black Sand Sandy Soil Backfill	Residual Soil (m^3)	Pipe Number Type / Length (m)	Pipe Number Concrete 4.00	Pipe Bedding Length (m)	Sheeting (piles) Type	Sheeting (piles) Height (m)	Sheeting (piles) Length (m)	Sheeting (piles) Area (m^2)	Waling & Strut (ton)	Shoring Type
		IE_1 / IE_2	ID_1 / ID_2	H_1	W_1	H_2 / H_3	H_4	L_1	l_1	L_2	V_1	V_2	V_3	V_4	S_1	V_5	V_6	V_7	V_8	pipes N	m	L_2		h	L_3		W_2	
DC18	1.99	-0.94	2.93	0.25		3.18																						
M18-1	1.98	-0.98	2.96	0.25	1.40	3.21	3.20	15.00	1.65	13.35	67.20	0.00	67.20	2.62	21.00	11.13	14.20	41.87	67.20	3	1.35	13.35	-	2.5	15.00	37.50	0.00	TIMBER
M18-1	1.98	-0.98	2.96	0.25		3.21																						
M18-2	1.94	-1.17	3.11	0.25	1.40	3.36	3.29	75.00	0.80	74.20	345.45	0.00	345.45	14.54	105.00	55.65	78.95	210.85	345.45	18	2.20	74.20	-	2.5	75.00	187.50	0.00	TIMBER
M18-2	1.94	-1.17	3.11	0.25		3.36																						
M18-3	1.96	-1.35	3.31	0.25	1.40	3.56	3.46	75.00	0.80	74.20	363.30	0.00	363.30	14.54	105.00	55.65	78.95	228.70	363.30	18	2.20	74.20	-	2.5	75.00	187.50	0.00	TIMBER
M18-3	1.96	-1.35	3.31	0.25		3.56																						
M18-4	1.71	-1.53	3.24	0.25	1.40	3.49	3.53	72.30	0.80	71.50	357.31	0.00	357.31	14.01	101.22	53.65	76.08	227.58	357.31	17	3.50	71.50	-	2.5	72.30	180.75	0.00	TIMBER
M18-4	1.71	-1.53	3.24	0.25		3.49																						
IE30-1	1.66	-1.57	3.23	0.25	1.40	3.48	3.49	16.30	1.65	14.65	79.65	0.00	79.65	2.87	22.82	12.09	15.59	51.97	79.65	3	2.65	14.65	-	2.5	16.30	40.75	0.00	TIMBER
								253.60	5.70	247.90	1212.91	0.00	1212.91	48.58	355.04	188.17	263.77	760.97	1212.91	59	11.90	247.90			253.60	634.00	0.00	

Area of Concrete Bedding (m2): 0.00

Volume of Concrete Bedding (m3): 0.00

Table C.1.4 Construction Of Diversion Chambers And Special Manholes For Main Interceptor (1/2) - Summary

Class E Class G Class F

	Concrete Volume (m^3)			Total	Level Conc	Sand	Timber Wood	Invert			Ladder	Bar	
	Slub		Wall					Vol	Area				
	Bottom S_b (m^3)	Up S_s (m^3)	Main W_w (m^3)	(m^3)	L_e (m^3)	S_a (m^3)	T_w (no)	I_v (m^3)	BQ I_{a1} (m^2)	Cost Estimate I_{a2} (m^2)	L_a (no)	Wt (kg)	Unit Wt (kg/m3)
DC 1	15.776	7.690	47.538	71.004	4.464	8.928	0	0.000	0.000	0.000	42	4,260	60.0
DC 2	120.120	47.682	350.425	518.228	17.712	35.424	0	41.411	93.960	121.292	187	31,094	60.0
Sub Total	135.896	55.372	397.963	589.231	22.176	44.352	0	41.411	93.960	121.292	229	35,354	60.0
Special Manhole													
St 1 - 17	408.350	139.115	1,619.269	2,166.734	54.220	108.440	0	86.222	197.260	235.885	752	130,004	60.0
St 18 - 34	379.500	146.541	1,977.434	2,503.475	41.202	82.404	0	59.782	149.340	176.516	774	150,209	60.0
Total	923.746	341.028	3,994.666	5,259.440	117.598	235.196	0	187.415	440.560	533.693	1755	315,566	

	Type of Manhole Cover					Frame Work			Volume of Structure V (m^3)	Average Concrete Volume for Structure (m^3)	Bulstrade (kg)
						Slub		Wall			
	A (no)	B (no)	F (no)	G (no)	H (no)	Bottom F_b (m^2)	Up F_u (m^2)	F_m (m^2)			
DC 1	4	0	4	0	4	20.160	32.749	291.236	138.583	17.8	0.0
DC 2	12	6	6	0	6	95.920	192.119	1,386.839	991.748	86.4	297.0
Sub Total	16	6	10	0	10	116.080	224.868	1,678.075	1,130.331	104.1	297.0
Special Manhole											
St 1 - 17	31	31	0	0	0	408.260	482.830	5,352.856	3,395.050	69.9	2706.0
St 18 - 34	17	17	0	0	0	321.120	367.600	5,661.792	4,083.679	147.3	4587.0
Total	64	54	10	0	10	845.460	1,075.298	12,692.723	8,609.060	321.3	7590.0

Table C.1.4 Construction Of Diversion Chambers And Special Manholes For Main Interceptor (2/2) - Detail

Route No	Manhole No	Type: Diversion Chamber	Type: Manhole	Orifice Dia P_4 (mm)	Flap Gate (mm)	Concrete Volume (m^3): Slub Bottom S_b (m^3)	Slub Up S_s (m^3)	Wall Main W_w (m^3)	Total (m^3)	Level Conc L_c (m^3)	Sand S_a (m^3)	Frame Work: slub bottom F_{sb} (m2)	slub up $F_{sm}+F_{su}$ (m^2)	wall F_w (m^2)	Vol of struct (m^3)	Ladder L_a (no)	Invert: Vol I_v (m^3)	Area BQ I_{a1} (m^2)	Area Cost Es I_{a2} (m^2)	Type of Manhole Cover: A (no)	B (no)	F (no)	G (no)	H (no)	Bulstrade wt 54kg/m^2 (kg)
Diversion and Manhole																									
IE1	IE1-1a	DC1		225	1500	4	2	13	1.1	2	5	5	8	82	38	12				1		1		1	
	IE1-1b		SPM1			8	3	21	1.4	3	10	10	9	84	48	13	2	5	5	1	1				0
	IE1-2		SPM1			8	3	20	1.4	3	10	10	9	81	47	13	2	5	5	1	1				0
IE2	IE2-1	DC2		160	1000	19	8	44	3.0	6	15	15	28	181	131	24	6	16	19	2	1	1		1	0
	IE2-2		SPM1			8	3	23	1.4	3	10	10	9	91	52	14	2	5	6	1	1				0
	IE2-3		SPM1			8	3	24	1.4	3	10	10	9	93	53	14	2	5	6	1	1				0
	IE2-4		SPM1			8	3	24	1.4	3	10	10	9	96	54	15	2	5	6	1	1				0
	IE2-5		SPM1			8	3	25	1.4	3	10	10	9	98	55	15	2	5	6	1	1				0
IE3	IE3-1	DC2		160	1200	19	8	50	3.0	6	15	15	28	201	147	25	6	16	19	2	1	1		1	0
	IE3-2		SPM1			8	3	27	1.4	3	10	10	9	105	59	16	2	5	6	1	1				0
	IE3-3		SPM1			8	3	28	1.4	3	10	10	9	107	60	16	2	5	6	1	1				0
IE4	IE4-1	DC2		225	1200	19	8	55	3.0	6	15	15	28	220	155	28	6	16	19	2	1	1		1	0
	IE4-2		SPM1			8	3	34	1.4	3	10	10	13	127	71	22	2	5	6	1	1				66
IE5	IE5-1	DC2		160	1200	19	8	63	3.0	6	15	15	36	250	174	37	7	16	20	2	1	1		1	99
	IE5-2		SPM1			8	3	38	1.4	3	10	10	13	138	77	23	2	5	6	1	1				66
	IE5-3		SPM1			8	3	38	1.4	3	10	10	13	138	77	23	2	5	6	1	1				66
IE6	IE6-1	DC2		160	1200	19	8	65	3.0	6	15	15	36	251	180	35	7	16	20	2	1	1		1	99
	IE6-2		SPM1			8	3	40	1.4	3	10	10	13	146	80	24	2	5	6	1	1				66
IE7	IE7-1a		SPM1			8	3	41	1.4	3	10	10	13	148	82	25	2	5	6	1	1				66
	IE7-1b	DC1		100	800	4	2	10	1.1	2	5	5	8	61	30	9				1		1		1	0
IE8	IE8-1a		SPM1			8	3	41	1.4	3	10	10	13	148	82	24	2	5	6	1	1				66
	IE8-1b	DC1		100	1000	4	2	15	1.1	2	5	5	8	87	40	12				1		1		1	0
IE9	IE9-1	DC2		300	1200	25	8	74	3.0	6	20	20	36	283	204	38	8	16	23	2	1	1		1	99
IE10	IE10-1a		SPM1	225		15	5	57	1.8	4	15	15	17	183	117	25	3	7	8	1	1				66
	IE10-1b	DC1		225	1000	4	2	10	1.1	2	5	5	8	61	30	9				1		1		1	0
	IE10-2		SPM2			16	5	58	2.0	4	15	15	17	185	122	25	3	7	8	1	1				99
Manhole (Trench Method)																									0
IE11	IE11-1		SPM2	225		19	6	69	2.3	5	17	17	21	216	151	26	4	9	11	1	1				165
IE12	IE12-1		SPM2	225		19	6	69	2.3	5	17	17	21	216	151	26	4	9	11	1	1				165
	IE12-2		SPM2			16	5	62	2.0	4	15	15	17	196	128	26	3	7	8	1	1				99
	IE12-3		SPM2			16	5	63	2.0	4	15	15	17	199	130	27	3	7	8	1	1				99
IE13	IE13-1		SPM2	225		19	6	73	2.3	5	17	17	21	229	158	27	4	9	11	1	1				165
	IE13-2		SPM2			16	5	66	2.0	4	15	15	17	209	136	28	3	7	8	1	1				99
IE14	IE14-1		SPM5			16	5	69	2.0	4	15	15	17	218	141	29	3	7	8	1	1				99
	IE14-2		SPM2			16	5	70	2.0	4	15	15	17	220	143	30	3	7	8	1	1				99
IE15	IE15-1		SPM2	400		19	6	81	2.3	5	17	17	21	250	172	30	4	9	11	1	1				165
	IE15-2		SPM5			16	5	71	2.0	4	15	15	17	223	145	30	3	7	8	1	1				99
	IE15-3		SPM2			16	5	73	2.0	4	15	15	17	228	148	30	3	7	8	1	1				99
IE16	IE16-1		SPM2	300		19	6	83	2.3	5	17	17	21	256	176	31	4	9	11	1	1				165
	IE16-2		SPM2			16	5	75	2.0	4	15	15	17	234	151	31	3	7	8	1	1				99
IE17	IE17-1		SPM2	400		19	8	85	2.3	5	17	17	29	260	180	37	4	9	11	1	1				330
	IE17-2		SPM2			16	6	73	2.0	4	15	15	24	231	151	37	3	7	8	1	1				198
Pipe Jacking																									0
IE18	IE18-1		SPM2			16	6	74	2.0	4	15	15	17	234	153	37	3	7	8	1	1				198
IE19	IE19-1		SPM2			16	6	76	2.0	4	15	15	17	239	156	38	3	7	8	1	1				198
IE20	IE20-1		SPM2	400		19	8	94	2.3	5	17	17	21	284	196	39	4	9	11	1	1				330
IE21	IE21-1		SPM2	300		19	8	96	2.3	5	17	17	21	293	201	40	4	9	11	1	1				330
IE22	IE22-1		SPM2			16	6	86	2.0	4	15	15	17	266	172	41	3	7	8	1	1				198
IE23	IE23-1		SPM2	300		19	8	102	2.3	5	17	17	21	308	211	42	4	9	11	1	1				330
IE24	IE24-1		SPM2			16	6	90	2.0	4	15	15	17	280	180	43	3	7	8	1	1				198
IE25	IE25-1		SPM5	225		19	8	106	2.3	5	17	17	21	320	219	43	4	9	11	1	1				330
IE26	IE26-1		SPM3	400		25	9	124	2.7	5	20	20	24	349	260	45	4	10	12	1	1				330
IE27	IE27-1		SPM3	500		25	9	130	2.7	5	20	20	24	365	271	46	4	10	12	1	1				198
IE28	IE28-1		SPM3			21	8	115	2.3	5	18	18	19	332	231	47	3	8	9	1	1				198
IE29	IE29-1		SPM3	500		25	9	135	2.7	5	20	20	24	378	279	48	4	10	12	1	1				330
IE30	IE30-1		SPM3	300		25	9	134	2.7	5	20	20	24	378	279	48	4	10	12	1	1				330
IE31	IE31-1		SPM6			21	8	119	2.3	5	18	18	19	343	239	48	3	8	9	1	1				198
IE32	IE32-1		SPM4			34	14	168	3.1	6	26	26	29	433	358	55	4	12	13	1	1				297
IE33	IE33-1		SPM4			31	13	160	2.8	6	24	24	25	422	334	56	3	10	11	1	1				297
IE34	IE34-1		SPM4			31	13	168	2.8	6	24	24	25	438	346	58	3	10	11	1	1				297
	DC1					16	8	48	4.5	9	20	20	33	291	139	42	0	0	0	4	0	4	0	4	0
	DC2					120	48	350	17.7	35	96	96	192	1,387	992	187	41	94	121	12	6	6	0	6	297
	st 1- 17					408	139	1,619	54.2	108	408	408	483	5,353	3,395	752	86	197	236	31	31	0	0	0	2,706
	st 18- 34					380	147	1,977	41.2	82	321	321	368	5,662	4,084	774	60	149	177	17	17	0	0	0	4,587

Table C.1.5 Construction Of Diversion Chambers And Standard And Special Manholes For Secondary Interceptor (1/2) - Summary

Class E Class G Class F

	Concrete Volume (m^3)				Level Conc L_e (m^3)	Sand S_a (m^3)	Timber Wood T_w (no)	Invert			Ladder L_a (no)	Bar	
	Slub		Wall	Total				Vol	Area				
	Bottom S_b (m^3)	Up S_u (m^3)	Main C_m (m^3)	(m^3)				I_v (m^3)	BQ I_{a1} (m^2)	cost est I_{a2} (m^2)		Wt (kg)	Unit Wt (kg/m3)
DC	93.254	46.051	319.472	458.777	26.827	53.654	0	4.493	13.171	15.962	331	25,233	55.0
Manhole	94.129	52.515	355.113	501.757	33.554	67.108	0	45.928	134.640	163.168	1,150	27,597	55.0
Total	187.383	98.566	674.585	960.534	60.381	120.762	0	50.421	147.811	179.131	1,481	52,829	

	Cover Type					Frame Work			Struct Vol V (m^2)
						Slub		Wall	
	A	B	F	G	H	Bottom F_b (m^2)	Up F_u (m^2)	Main F_m (m^2)	
DC	27	9	7	11	18	119.983	226.814	2,067.184	959.176
Manhole	92	0	0	0	0	220.220	306.660	3,509.000	973.989
Total	119	9	7	11	18	340.203	533.474	5,576.184	1,933.165

Quantity of Diversion Chamber shown in above is multipied by 9/92 to Table C.1.5 (2/2) and added.
92 is a number of manholes, and 9 is a number of diversion chambers which are installed valve.

Table C.1.5 Construction Of Diversion Chambers And Special Manholes For Main Interceptor (2/2) - Detail

Street	Manhole No	Type of Manhole	Flap Gate	Concrete Volume (m^3)				Level Conc	Sand	Frame Work			Struct Vol	Ladder	Invert			Cover Type				
				Slub		Wall	Total			Slub		Wall			Vol	Area						
				Bottom	Up	Main				Bottom	Up					BQ	cost est					
				S_b	S_u	C_m		L_e	S_a	F_b	F_u	F_m	V	L_a	I_v	I_{a1}	I_{a2}	A	B	F	G	H
			(m)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^2)	(m^2)	(m^2)	(m^2)	(no)	(m^3)	(m^2)	(m^2)					
HT.MAU	DC1		ϕ 1.2	3.7	1.8	12.9	18.4	1.0	2.1	4.9	8.7	78.4	35.6	12.0				1		1		1
	M1-1	1-A		1.0	0.6	3.6	5.2	0.4	0.7	2.4	3.3	33.4	9.7	11.0	0.3	1.4	1.6	1				
	M1-2	1-A		1.0	0.6	3.8	5.3	0.4	0.7	2.4	3.3	35.8	10.1	12.0	0.3	1.4	1.6	1				
TT.DAM	DC2		ϕ 1.2	3.7	1.8	11.2	16.7	1.0	2.1	4.9	8.7	68.3	31.9	10.0				1		1		1
	M2-1	1-A		1.0	0.6	3.5	5.0	0.4	0.7	2.4	3.3	31.8	9.4	10.0	0.5	1.4	1.6	1				
	M2-2	1-A		1.0	0.6	3.6	5.1	0.4	0.7	2.4	3.3	33.4	9.7	11.0	0.5	1.4	1.6	1				
	M2-3	1-A		1.0	0.6	3.6	5.2	0.4	0.7	2.4	3.3	34.2	9.8	11.0	0.5	1.4	1.6	1				
Pasteur NCT	DC3		ϕ 1.2	3.7	1.8	10.4	15.8	1.0	2.1	4.9	8.7	63.3	30.1	10.0				1		1		1
	M3-1	1-A		1.0	0.6	3.6	5.1	0.4	0.7	2.4	3.3	33.4	9.7	11.0	0.5	1.4	1.6	1				
	M3-2	1-A		1.0	0.6	3.4	4.9	0.4	0.7	2.4	3.3	30.2	9.1	10.0	0.5	1.4	1.6	1				
	M3-3	1-A		1.0	0.6	3.5	5.0	0.4	0.7	2.4	3.3	31.8	9.4	10.0	0.5	1.4	1.6	1				
	M3-4	1-A		1.0	0.6	3.5	5.0	0.4	0.7	2.4	3.3	31.8	9.4	10.0	0.5	1.4	1.6	1				
	M3-5	1-A		1.0	0.6	3.6	5.1	0.4	0.7	2.4	3.3	33.4	9.7	11.0	0.5	1.4	1.6	1				
	M3-6	1-A		1.0	0.6	3.7	5.3	0.4	0.7	2.4	3.3	35.0	10.0	12.0	0.5	1.4	1.6	1				
NKKN	DC4		ϕ 1.2	3.7	1.8	13.4	18.8	1.0	2.1	4.9	8.7	80.9	36.5	12.0				1		1		1
	M4-1	1-A		1.0	0.6	3.6	5.2	0.4	0.7	2.4	3.3	34.2	9.8	11.0	0.5	1.4	1.6	1				
	M4-2*	1-C		1.0	0.6	3.8	5.4	0.4	0.7	2.4	3.3	37.4	10.4	13.0	0.5	1.4	1.6	1				
	M4-3	1-A		1.0	0.6	3.8	5.4	0.4	0.7	2.4	3.3	36.6	10.3	12.0	0.5	1.4	1.6	1				
	M4-4	1-A		1.0	0.6	3.9	5.5	0.4	0.7	2.4	3.3	38.2	10.5	13.0	0.5	1.4	1.6	1				
	M4-5	1-A		1.0	0.6	4.0	5.6	0.4	0.7	2.4	3.3	39.8	10.8	13.0	0.5	1.4	1.6	1				
PD.CHINH	DC5		ϕ 1.8	5.4	2.6	16.6	24.6	1.5	3.0	5.9	12.4	101.0	52.9	12.0				1			1	1
	M5-1	1-A		1.0	0.6	3.6	5.2	0.4	0.7	2.4	3.3	35.0	10.0	11.0	0.5	1.4	1.9	1				
	M5-2	1-A		1.0	0.6	3.6	5.2	0.4	0.7	2.4	3.3	35.0	10.0	11.0	0.5	1.4	1.9	1				
	M5-3	1-A		1.0	0.6	3.6	5.2	0.4	0.7	2.4	3.3	35.0	10.0	11.0	0.5	1.4	1.9	1				
CALMET	DC6		Box 2.0*2.0	5.6	2.8	17.6	26.1	1.6	3.1	6.0	13.1	106.7	56.8	12.0				1			1	1
	M6-1	1-A		1.0	0.6	3.6	5.1	0.4	0.7	2.4	3.3	33.4	9.7	11.0	0.5	1.4	1.6	1				
	M6-2	1-A		1.0	0.6	3.6	5.2	0.4	0.7	2.4	3.3	34.2	9.8	11.0	0.5	1.4	1.6	1				
	M6-3	1-A		1.0	0.6	3.7	5.3	0.4	0.7	2.4	3.3	35.8	10.1	12.0	0.5	1.4	1.6	1				
	M6-4*	1-C		1.0	0.6	3.9	5.5	0.4	0.7	2.4	3.3	39.8	10.8	13.0	0.5	1.4	1.9	1				
	M6-5	1-A		1.0	0.6	3.9	5.4	0.4	0.7	2.4	3.3	39.0	10.7	13.0	0.5	1.4	1.9	1				
	M6-6	1-A		1.0	0.6	3.9	5.4	0.4	0.7	2.4	3.3	39.0	10.7	13.0	0.5	1.4	1.9	1				
	M6-7	1-A		1.0	0.6	4.0	5.5	0.4	0.7	2.4	3.3	40.6	11.0	13.0	0.5	1.4	1.9	1				
	M6-8	1-A		1.0	0.6	4.1	5.7	0.4	0.7	2.4	3.3	42.2	11.3	14.0	0.5	1.4	1.9	1				
	M6-9	1-A		1.0	0.6	4.2	5.8	0.4	0.7	2.4	3.3	43.8	11.5	15.0	0.5	1.4	1.9	1				
KY CON	DC7		Box 1.5*1.5	5.0	2.4	14.5	21.8	1.4	2.8	5.6	11.5	88.1	45.4	11.0				1			1	1
	M7-1	1-A		1.0	0.6	3.4	5.0	0.4	0.7	2.4	3.3	31.8	9.4	10.0	0.5	1.4	1.7	1				
	M7-2	1-A		1.0	0.6	3.6	5.2	0.4	0.7	2.4	3.3	34.2	9.8	11.0	0.5	1.4	1.7	1				
	M7-3	1-A		1.0	0.6	3.6	5.2	0.4	0.7	2.4	3.3	34.2	9.8	11.0	0.5	1.4	1.7	1				
YERSIN	DC8		Box 1.5*1.5	5.0	2.4	13.4	20.8	1.4	2.8	5.6	11.5	82.1	42.9	10.0				1			1	1
	M8-1	1-A		1.0	0.6	3.3	4.9	0.4	0.7	2.4	3.3	29.4	9.0	9.0	0.5	1.4	1.6	1				
	M8-2*	1-C		1.0	0.6	3.8	5.3	0.4	0.7	2.4	3.3	36.6	10.3	12.0	0.5	1.4	1.7	1				
	M8-3	1-A		1.0	0.6	3.7	5.3	0.4	0.7	2.4	3.3	35.8	10.1	12.0	0.5	1.4	1.7	1				
	M8-4	1-A		1.0	0.6	3.9	5.5	0.4	0.7	2.4	3.3	39.0	10.7	13.0	0.5	1.4	1.7	1				
	M8-5	1-A		1.0	0.6	4.1	5.6	0.4	0.7	2.4	3.3	40.6	11.0	14.0	0.5	1.4	1.7	1				
	M8-6	1-A		1.0	0.6	4.2	5.7	0.4	0.7	2.4	3.3	42.2	11.3	14.0	0.5	1.4	1.7	1				
	M8-7	1-A		1.0	0.6	4.3	5.9	0.4	0.7	2.4	3.3	44.6	11.7	15.0	0.5	1.4	1.7	1				
NT.HOC	DC9		Box 2.2*2.2	5.9	3.0	19.8	28.6	1.6	3.3	6.2	13.7	119.2	63.9	13.0				1			1	1
	M9-1	1-A		1.0	0.6	3.9	5.4	0.4	0.7	2.4	3.3	37.4	10.4	13.0	0.5	1.4	1.6	1				
	M9-2	1-A		1.0	0.6	4.0	5.5	0.4	0.7	2.4	3.3	39.0	10.7	13.0	0.5	1.4	1.6	1				
	M9-3*	1-C		1.0	0.6	4.1	5.7	0.4	0.7	2.4	3.3	42.2	11.3	14.0	0.5	1.4	1.9	1				
	M9-4	1-A		1.0	0.6	4.2	5.8	0.4	0.7	2.4	3.3	43.8	11.5	14.0	0.5	1.4	1.9	1				
	M9-5	1-A		1.0	0.6	4.2	5.8	0.4	0.7	2.4	3.3	43.8	11.5	15.0	0.5	1.4	1.9	1				
	M9-6	1-A		1.0	0.6	4.3	5.8	0.4	0.7	2.4	3.3	44.6	11.7	15.0	0.5	1.4	1.9	1				
	M9-7	1-A		1.0	0.6	4.3	5.9	0.4	0.7	2.4	3.3	45.4	11.8	15.0	0.5	1.4	1.9	1				
	M9-8	1-A		1.0	0.6	4.4	6.0	0.4	0.7	2.4	3.3	47.0	12.1	16.0	0.5	1.4	1.9	1				
	M9-9	1-A		1.0	0.6	4.6	6.2	0.4	0.7	2.4	3.3	49.4	12.6	17.0	0.5	1.4	1.9	1				

Street	Manhole No	Type of Manhole	Flap Gate	Concrete Volume (m^3)				Level Conc L_e (m^3)	Sand S_a (m^3)	Frame Work			Struct Vol V (m^2)	Ladder L_a (no)	Invert			Cover Type				
				Slub		Wall Main C_m (m^3)	Total (m^3)			Slub		Wall			Vol	Area						
				Bottom S_b (m^3)	Up S_u (m^3)					Bottom F_b (m^2)	Up F_u (m^2)	F_m (m^2)			I_v (m^3)	BQ I_{a1} (m^2)	cost est I_{a2} (m^2)	A	B	F	G	H
			(m)																			
DE THAM	DC10		ϕ 1.0	3.5	1.6	10.9	15.9	1.0	2.0	4.7	8.2	66.2	30.1	10.0				1		1		1
	M10-1	1-A		1.0	0.6	3.4	5.0	0.4	0.7	2.4	3.3	31.8	9.4	10.0	0.5	1.4	1.7	1				
	M10-2	1-A		1.0	0.6	3.4	5.0	0.4	0.7	2.4	3.3	31.8	9.4	10.0	0.5	1.4	1.7	1				
	M10-3	1-A		1.0	0.6	3.4	5.0	0.4	0.7	2.4	3.3	31.8	9.4	10.0	0.5	1.4	1.7	1				
	M10-4	1-A		1.0	0.6	3.4	5.0	0.4	0.7	2.4	3.3	31.8	9.4	10.0	0.5	1.4	1.7	1				
	M10-5	1-A		1.0	0.6	3.5	5.1	0.4	0.7	2.4	3.3	33.4	9.7	11.0	0.5	1.4	1.7	1				
	M10-6	1-A		1.0	0.6	3.6	5.2	0.4	0.7	2.4	3.3	34.2	9.8	11.0	0.5	1.4	1.7	1				
HH.HON	DC11		Box 2.0*2.0	5.6	2.8	17.6	26.0	1.6	3.1	6.0	13.1	106.7	56.8	12.0				1			1	1
	M11-1	1-A		1.0	0.6	3.7	5.3	0.4	0.7	2.4	3.3	36.6	10.3	12.0	0.5	1.4	1.9	1				
TD-XU	DC12		ϕ 1.5	4.0	2.0	14.9	20.9	1.1	2.3	5.1	9.5	89.9	41.6	13.0				1			1	1
	M12-1	1-A		1.0	0.6	3.8	5.3	0.4	0.7	2.4	3.3	36.6	10.3	12.0	0.5	1.4	1.7	1				
	M12-2	1-A		1.0	0.6	3.8	5.3	0.4	0.7	2.4	3.3	36.6	10.3	12.0	0.5	1.4	1.7	1				
	M12-3	1-A		1.0	0.6	3.8	5.4	0.4	0.7	2.4	3.3	37.4	10.4	12.0	0.5	1.4	1.7	1				
	M12-4	1-A		1.0	0.6	3.8	5.4	0.4	0.7	2.4	3.3	37.4	10.4	12.0	0.5	1.4	1.7	1				
	M12-5	1-A		1.0	0.6	3.9	5.5	0.4	0.7	2.4	3.3	39.0	10.7	13.0	0.5	1.4	1.7	1				
	M12-6	1-A		1.0	0.6	4.2	5.7	0.4	0.7	2.4	3.3	42.2	11.3	14.0	0.5	1.4	1.7	1				
	M12-7	1-A		1.0	0.6	4.3	5.9	0.4	0.7	2.4	3.3	43.8	11.5	15.0	0.5	1.4	1.7	1				
NC.CHAN	DC13		Box 2.0*2.0	5.6	2.8	19.3	27.7	1.6	3.1	6.0	13.1	116.4	61.1	13.0				1			1	1
	M12-1	1-A		1.0	0.6	3.8	5.3	0.4	0.7	2.4	3.3	36.6	10.3	12.0	0.5	1.4	1.7	1				
	M12-2	1-A		1.0	0.6	3.9	5.5	0.4	0.7	2.4	3.3	38.2	10.5	12.0	0.5	1.4	1.7	1				
	M12-3	1-A		1.0	0.6	4.1	5.6	0.4	0.7	2.4	3.3	40.6	11.0	14.0	0.5	1.4	1.7	1				
	M12-4	1-A		1.0	0.6	4.2	5.7	0.4	0.7	2.4	3.3	42.2	11.3	14.0	0.5	1.4	1.7	1				
	M12-5	1-A		1.0	0.6	4.3	5.9	0.4	0.7	2.4	3.3	44.6	11.7	15.0	0.5	1.4	1.7	1				
NV-CU	DC14		ϕ 0.6	3.3	1.5	7.7	12.6	0.9	1.9	4.6	7.9	48.0	23.0	8.0				1		1		1
	M14-1	1-A		1.0	0.6	2.8	4.3	0.4	0.7	2.4	3.3	22.6	7.7	6.0	0.5	1.4	1.6	1				
	M14-2	1-A		1.0	0.6	2.3	3.9	0.4	0.7	2.4	3.3	19.1	6.8	6.0	0.5	1.4	1.6	1				
	M14-3	1-A		1.0	0.6	2.6	4.2	0.4	0.7	2.4	3.3	21.4	7.4	6.0	0.5	1.4	1.6	1				
	M14-4	1-A		1.0	0.6	2.9	4.5	0.4	0.7	2.4	3.3	23.8	7.9	7.0	0.5	1.4	1.6	1				
	M14-5	1-A		1.0	0.6	3.0	4.6	0.4	0.7	2.4	3.3	25.4	8.2	7.0	0.5	1.4	1.6	1				
	M14-6	1-A		1.0	0.6	3.2	4.8	0.4	0.7	2.4	3.3	27.8	8.7	8.0	0.5	1.4	1.6	1				
N-BIEU	DC15		ϕ 1.5	5.0	2.4	23.6	31.0	1.4	2.8	5.6	11.5	142.5	67.7	17.0				1			1	1
	M15-1	1-A		1.0	0.6	4.3	5.9	0.4	0.7	2.4	3.3	45.4	11.8	15.0	0.5	1.4	1.9	1				
	M15-2	1-A		1.0	0.6	4.4	5.9	0.4	0.7	2.4	3.3	46.2	12.0	16.0	0.5	1.4	1.9	1				
	M15-3	1-A		1.0	0.6	4.4	6.0	0.4	0.7	2.4	3.3	47.0	12.1	16.0	0.5	1.4	1.9	1				
	M15-4	1-A		1.0	0.6	4.4	6.0	0.4	0.7	2.4	3.3	47.0	12.1	16.0	0.5	1.4	1.9	1				
	M15-5	1-A		1.0	0.6	4.4	6.0	0.4	0.7	2.4	3.3	47.0	12.1	16.0	0.5	1.4	1.9	1				
	M15-6	1-A		1.0	0.6	4.5	6.1	0.4	0.7	2.4	3.3	47.8	12.3	16.0	0.5	1.4	1.9	1				
	M15-7	1-A		1.0	0.6	4.5	6.1	0.4	0.7	2.4	3.3	47.8	12.3	16.0	0.5	1.4	1.9	1				
	M15-8	1-A		1.0	0.6	4.6	6.2	0.4	0.7	2.4	3.3	49.4	12.6	17.0	0.5	1.4	1.9	1				
	M15-9	1-A		1.0	0.6	4.6	6.2	0.4	0.7	2.4	3.3	50.2	12.7	17.0	0.5	1.4	1.9	1				
	M15-10	1-A		1.0	0.6	4.7	6.3	0.4	0.7	2.4	3.3	51.0	12.8	18.0	0.5	1.4	1.9	1				
TB.TRONG	DC16		Box 2.5*2.0	6.3	3.2	26.3	35.8	1.7	3.5	6.4	14.6	157.7	83.8	17.0				1			1	1
	M16-1	2-A		1.2	0.7	4.6	6.5	0.4	0.8	2.6	3.8	49.4	13.4	16.0	0.7	1.8	2.3	1				
	M16-2	2-A		1.2	0.7	4.8	6.7	0.4	0.8	2.6	3.8	51.8	13.9	17.0	0.7	1.8	2.3	1				
	M16-3	2-A		1.2	0.7	4.8	6.7	0.4	0.8	2.6	3.8	52.6	14.0	17.0	0.7	1.8	2.3	1				
	M16-4	2-A		1.2	0.7	4.7	6.6	0.4	0.8	2.6	3.8	51.0	13.7	16.0	0.7	1.8	2.3	1				
HM-DAT	DC17		Box 2.5*2.0	5.6	2.8	24.1	32.6	1.6	3.1	6.0	13.1	145.3	73.7	16.0				1			1	1
	M17-1	2-A		1.2	0.7	4.6	6.4	0.4	0.8	2.6	3.8	48.6	13.3	15.0	0.7	1.8	2.3	1				
	M17-2	2-A		1.2	0.7	4.6	6.5	0.4	0.8	2.6	3.8	49.4	13.4	16.0	0.7	1.8	2.3	1				
NHIEU TAM	DC18		ϕ 1.2	3.7	1.8	10.4	15.8	1.0	2.1	4.9	8.7	63.3	30.1	10.0				1		1		1
	M18-1	1-A		1.0	0.6	3.2	4.8	0.4	0.7	2.4	3.3	28.6	8.8	9.0	0.5	1.4	1.7	1				
	M18-2	1-A		1.0	0.6	3.3	4.8	0.4	0.7	2.4	3.3	29.4	9.0	9.0	0.5	1.4	1.7	1				
	M18-3	1-A		1.0	0.6	3.4	5.0	0.4	0.7	2.4	3.3	31.0	9.2	10.0	0.5	1.4	1.7	1				
	M18-4	1-A		1.0	0.6	3.4	5.0	0.4	0.7	2.4	3.3	31.0	9.2	9.0	0.5	1.4	1.7	1				
	DC			84	41	285	410	24	47	98	197	1724	864	218	0	0	0	18	0	7	11	18
	Manhole			94	53	355	502	34	67	220	307	3509	974	1150	46	135	163	92	0	0	0	0
	Total			178	93	640	911	57	114	319	503	5233	1838	1368	46	135	163	110	0	7	11	18