

Omo Valley Farm Co-operation P.L.C

Addis Ababa

Feasibility Study and Detail Design of Omo Valley Farm Irrigation Project

Section-II: Tender Documents Volume-III: Bill of Quantities

May, 2015



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Feasibility Study and Detail Design of Omo Valley Farm Irrigation Project

Bill of Quantity and Engineering Cost Estimate

May, 2015

Issue and Revision Record

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PREAMBLE

1. The quantities in the Bill of Quantities are estimated amounts and the Client does not expressly nor by implication agree that the actual amount of work to be performed will correspond therewith. No payments will be made on account of anticipated profits for work covered by the Contract which is not performed, nor will any adjustment in the unit prices set forth in the Bill of Quantities be made because of an increase or decrease in the actual quantity from the estimated quantity indicated therein except as otherwise provided in Clause 38 Variation Exceeding Fifteen percent, of the Conditions of Contract.
2. The Bill of Quantities shall be read in conjunction with the Conditions of Contract, the special provisions (Contract Data), the specifications and the Drawings.
3. Bidders shall fill out completely the Bill of Quantities with all rates and amounts expressed in Ethiopian Birr.
4. Rates and Sums to be for Works Completed
It is to be clearly understood by the contractor that the rates and sums which he enters in the Bills of Quantities are to be for the work finished complete in every respect.
5. The cost of any item against which no Contract Rate is entered shall be deemed to be covered by other Contract Rates.
6. Where a discrepancy exists between the unit rate and the extended total amount, the unit rates shall be taken as correct and the total amount adjusted accordingly.
7. The S.I system of weights and measures is used throughout the Bill of Quantities.

A. A. SUMMARY OF THE ENGINEERING COST ESTIMATES

S.No.	Description	Cost (Eth.birr)	Remark
1	Headworks		
	1.1 Main Pump Station	138,097,133.97	
	1.2 Booster Pump Station	18,489,125.00	
2	Irrigation and Drainage System		
	2.1 Main Canal (0+13,140m)	82,844,810.90	
	2.2 Main Canal, MC-01 (0+4,807m)	32,364,255	
	2.3 Secondary Canals: SC-1 to SC-5 (Phase-I Area)	298,006,339	
	2.4 Secondary Canals: SC-01 to SC-03 (Phase-II Area)	462,526,768	
	2.5 Cross-drain Culverts, Collector & Interceptor Drain Canals	454,534,524	
	Sum	1,486,862,955.87	
	Cost per hectare	265,511.24	

For further information, the detail cost break-downs are presented below.

B. BILL OF QUANTITY FOR HEAD WORKS DESIGN

MAIN PUMP STATION

Item	Description	Unit	Quantity	Unit Rate	Total Amount
				<i>ETB</i>	
1	Earth Works				
1.1	Clearing and Stripping				
	Clearing and stripping of construction area of the pump station to formation level on completion and disposal of surplus in spoil tips including placing up to 500 m away	m ²	18000	10.75	193,500.00
1.2	Excavation				
	Excavation to formation level on completion and disposal of surplus in spoil tips including placing up to 500 m away	m ³	49715	251.10	12,483,436.50
1.3	Compacted Fill				
	Compacted fill with selected material obtained from excavated borrow pits and transported soil to the pump station as shown on the drawings	m ³	23700	296.15	7,018,755.00
2	Inlet Part Work				
2.1	Inlet Work				

Item	Description	Unit	Quantity	Unit Rate	Total Amount
					<i>ETB</i>
2.1.1	Stone masonry of slope & bedding over 500mm thick sand & gravel in Inlet canal	m ³	37.83	2379.45	90,014.59
2.1.3	Reinforced bedding concrete C-25 over 500mm thick sand & gravel in Inlet canal	m ³	17.35	3736.30	64,824.81
2.1.4	Φ-16 reinforcement of Inlet Bedding concrete	t	0.88	40000.00	35,200.00
2.1.5	Φ-14 reinforcement of Inlet Bedding concrete	t	0.66	40000.00	26,400.00
2.1.6	Reinforced concrete C-25 of Inlet Wall	m ³	42.40	3736.30	158,419.12
2.1.7	Φ-16 reinforcement of Inlet wall concrete	t	1.63	40000.00	65,200.00
2.1.8	Φ-14 reinforcement of Inlet wall concrete	t	1.24	40000.00	49,600.00
2.1.9	Reinforced concrete C-25 gate post of Inlet	m ³	31.52	3736.30	117,768.18
2.1.10	Inlet Gate with size; BxH (1.22mx1.40m)	Nr	3	100000.00	300,000.00
2.1.11	Reinforcement Φ-16 of gate post	t	0.98	40000.00	39,200.00
2.1.12	Reinforcement Φ-14 of gate post	t	0.74	40000.00	29,600.00
2.1.13	Reinforced concrete C-25 of Bridge	m ³	5.46	3736.30	20,400.20
2.1.14	Reinforcement Φ-12 of Bridge concrete	t	0.79	40000.00	31,600.00
2.1.15	Reinforcement-Φ16mm of Trash rack	t	0.09	40000.00	3,600.00
2.1.16	Reinforcement-Φ12mm of Trash rack	t	0.25	40000.00	10,000.00
2.1.17	Wrought Formwork	m ²	164.43	280.00	46,040.40
2.2	Pipe Part Work				
2.2.1	Pipe floor concrete C-20 over 400mm thick sand & gravel	m ³	51.00	3466.55	176,794.05
2.2.2	Reinforced concrete C-25 pipe over 300mm thick concrete floor	m ³	37.39	3736.30	139,700.26
2.2.3	Reinforcement Φ-12 of pipe	t	4.14	40000.00	165,600.00
2.2.4	Reinforced concrete C-25 of Pipe support	m ³	7.50	3736.30	28,022.25
2.2.5	Reinforcement Φ-12 of pipe support	T	0.34	40000.00	13,600.00
2.2.6	Big stone pitching on slope with size; t=500mm	m ³	1591.00	2740.85	4,360,692.35
2.2.7	Wrought Formwork	m ²	163.01	280.00	45,642.80
3	Pump Station Part Work				
3.1	Intake Work				
3.1.1	Reinforced concrete C-25 of Intake Bedding	m ³	173.61	3736.30	648,659.04

Item	Description	Unit	Quantity	Unit Rate	Total Amount
					<i>ETB</i>
3.1.2	Reinforced concrete C-25 of Intake Wall	m ³	874.4	3736.30	3,267,027.45
3.1.3	Reinforced concrete C-25 of Intake Slab	m ³	3.942	3736.30	14,728.49
3.1.4	Reinforcement Φ -32 of Intake	T	34.97	40000.00	1,398,683.32
3.1.5	Reinforcement Φ -16 of Intake	T	9.51	40000.00	380,459.74
3.1.6	Reinforcement Φ -12 of Intake	T	6.07	40000.00	242,606.51
3.1.7	Reinforcement pipe: Φ -50 of Intake Handrail	M	64.32	40000.00	2,572,800.00
3.1.8	Reinforcement pipe: Φ -30 of Intake Handrail	M	52	40000.00	2,080,000.00
3.1.9	Intake Gate with size; BxH (1.22mx1.40m)	Nr	3	100000.00	300,000.00
3.1.10	Wrought Formwork	m ²	1788	280.00	500,730.01
3.2	Sump Work				
3.2.1	Reinforced concrete C-25 of Sump Bedding	m ³	1102.04	3736.30	4,117,561.39
3.2.2	Reinforced concrete C-25 of Sump Wall	m ³	1689.45	3736.30	6,312,296.14
3.2.3	Reinforced concrete C-25 of Sump Slab	m ³	57.42	3736.30	214,538.35
3.2.4	Reinforced concrete C-25 of Sump Beam (Size; B*H=0.3*0.3m)	m ³	6.91	3736.30	25,825.31
3.2.5	Reinforcement Φ -32 of Sump	T	205.52	40000.00	8,220,907.33
3.2.6	Reinforcement Φ -20 of Sump	T	30.58	40000.00	1,223,080.05
3.2.7	Reinforcement Φ -14 of Sump	T	24.81	40000.00	992,257.21
3.2.8	Reinforcement Φ -12 of Sump	T	21.68	40000.00	867,244.32
3.2.9	Reinforcement Φ -10 of Sump	T	0.21	40000.00	8,523.01
3.2.10	Reinforcement Φ -16 of Sump Ladder	T	0.44	40000.00	17,727.87
3.2.11	Wrought Formwork	m ²	4854.90	280.00	1,359,372.99
3.3	Pump Station Building Work				
3.3.1	Concrete C-20 of Floor	m ³	248.88	3466.55	862,754.96
3.3.2	Reinforced concrete C-25 of Pump seat	m ³	86.00	3736.30	321,321.80
3.3.3	Concrete C-20 of Wall Base	m ³	294.54	3466.55	1,021,051.50
3.3.4	Reinforced concrete C-25 of Wall Post	m ³	86.33	3736.30	322,560.46
3.3.5	Reinforced concrete C-25 of Wall Beam	m ³	106.56	3736.30	398,140.13
3.3.6	Concrete C-20 of Wall	m ³	281.19	3466.55	974,759.19
3.3.7	Pump House gates with Size; B*H=1.5*2.4m	Nr	5	9357.89	46,789.45
3.3.8	Windows with size; b*h=1.2mx1.5m	Nr	28	9650.00	270,200.00
3.3.9	Wrought Formwork	m ²	1876	280.00	525,268.63

Item	Description	Unit	Quantity	Unit Rate	Total Amount
					<i>ETB</i>
3.3.10	Supply and fix steel RHS steel truss according to the structural drawing. Price shall include one coat of antirust and two coats of synthetic enamel painting and all other necessary accessories to complete the work	m	359.67	700.00	251,766.67
3.3.11	In Truss Upper and lower members size 100X100X5mm	m	282.53	420.00	118,664.00
3.3.12	Diagonal and vertical internal members size 80X80X4.5mm	m	359.23	700.00	251,463.33
3.3.13	In Purlin size 60x60x3mm	m ²	1052.2	317.00	333,534.72
3.3.14	Plates size 263*100*8mm	pcs	40.00	123.9	4,956.00
3.3.15	Plates size 271*100*8mm	pcs	40.00	127.65	5,106.00
3.3.16	Plates size 277*100*8mm	pcs	40.00	130.45	5,218.00
3.3.17	Plates size 220*200*8mm	pcs	200.00	207.25	41,450.00
3.3.18	Plates size 250*200*8mm	pcs	80.00	235.5	18,840.00
3.3.19	Anchor U bolts diam. 20mm, 810mm long	pcs	80.00	200	16,000.00
3.3.20	GIS Roof cover fixed to RHS Purlins.	m ²	1052.16	228.5	240,418.56
3.3.21	Supply and fix 0.4mm thick flat metal sheet gutter. Price shall include metal bracket support and all other necessary accessories. Development Length =500mm	m	130	201.4	26,182.00
3.3.22	Supply and fix 100mm diameter PVC down pipe. Price shall include metal strap supports c/c 1000mm, wire strainer and all other necessary accessories.	m	340	100	34,000.00
3.4	Main Pumping Station Mechanical Works				
3.4.1	Suction pipes & fittings, PN 10				
3.4.1.1	S/flanged stainless steel pipe DN900, PN10, L = 2.5m welded with s/flanged 90° bend DN900, PN10	NOs	10	40,000	400,000.00
3.4.1.2	S/flanged stainless steel pipe with puddle DN900, PN10, L = 1.6m	NOs	5	32,000	160,000.00
3.4.1.3	D/flanged butterfly valve DN900, PN10	Unit	10	20,000	200,000.00
3.4.1.4	Flanged dismantling piece DN900, PN10	NOs	10	50,000	500,000.00
3.4.1.5	D/flanged eccentric reducer DN900/600, (the DN600 flange shall be PN16 as per the pump data from KBL model UP500/68 and the other DN900 flange shall	NOs	10	15,000	150,000.00

Item	Description	Unit	Quantity	Unit Rate	Total Amount
					<i>ETB</i>
	be PN10				
3.4.1.6	Pressure gauge glycerin filled, ø100 mm, scale -1-1.5 bars, G1/2" male connection, with isolating cock.	NOs	10	5,000	50,000.00
3.4.1.7	D/flanged steel pipe DN900, PN10, L = 6.95m	NOs	5	55,000	275,000.00
3.4.1.8	Horizontal split double suction centrifugal pump, capacity Q=1m ³ /s, H=55m with diesel engine drive unit with all accessories.	Set	10	3,000,000	30,000,000.00
3.4.2	Delivery pipes & fittings, PN 10				
3.4.2.1	D/flanged concentric enlarger DN500/800, (the DN500 flange shall be PN16 as per the pump data from KBL model UP500/68 and the other DN800 flange shall be PN10)	NOs	10	13,000	130,000.00
3.4.2.2	D/flanged non-return valve DN800, PN10	Unit	10	30,000	300,000.00
3.4.2.3	D/flanged short piece steel pipe DN800, PN10, L = 1m	PCs	5	18,000	90,000.00
3.4.2.4	Flanged dismantling piece DN800, PN10	Unit	10	45,000	450,000.00
3.4.2.5	D/flanged butterfly valve DN800, PN10	Unit	10	18,500	185,000.00
3.4.2.6	D/flanged steel pipe DN800, PN10, L = 5m	PCs	5	45,000	225,000.00
3.4.2.7	D/flanged steel pipe DN800, PN10, L = 4.5m	PCs	5	40,500	202,500.00
3.4.2.8	D/flanged steel pipe DN800, PN10, L = 2m	PCs	1	18,000	18,000.00
3.4.2.9	D/flanged steel pipe DN800, PN10, L = 1.6m	PCs	1	14,400	14,400.00
3.4.2.10	Pressure gauge glycerin filled, ø100 mm, scale 0-10 bars, G1/2" male connection, with isolating cock.	NOs	10	8,000	80,000.00
3.4.2.11	Double acting air release valve DN80 PN10	Unit	10	11,000	110,000.00
3.4.3	Others				
3.4.3.1	Single/Double girder overhead traveling crane capacity = 10 t complete with chain trolley and associated structural steel works	Set	1	2,000,000	2,000,000.00
3.4.3.2	Vacuum pumps with discharge capacity of 2m ³ /min	Set	4	100,000	100,000.00
3.4.3.3	Complete bolts, nuts, washers & flat gaskets.	LS	1	50,000	50,000.00
4	Settling basin Works				
4.1	Earth Works				

Item	Description	Unit	Quantity	Unit Rate	Total Amount
					<i>ETB</i>
4.1.1	Clearing and Stripping				
	Clearing and stripping of construction area of the settling basin to formation level on completion and disposal of surplus in spoil tips including placing up to 500 m away	m ²	6000	10.75	64,500.00
4.1.2	Excavation				
	Excavate of ordinary soil to formation level on completion and disposal of surplus in spoil tips including placing up to 500 m away	m ³	16800	251.10	4,218,480.00
4.1.3	Compacted Fill				
	Compacted fill with selected material obtained from excavated borrow pits and transport soil to the settling basin as shown on the drawings	m ³	3360	296.15	995,064.00
4.2	Structure works				
4.2.1	Cement stone masonry of basin Wall	m ³	2015.00	2740.85	5,522,812.75
4.2.2	Stone masonry of Canal Bed and Wall	m ³	56.70	2379.45	134,914.82
4.2.3	Concrete Class C-25 of Canal Bed	m ³	648.00	3736.30	2,421,122.40
4.2.4	First Gate Post Concrete Class C-25	m ³	46.99	3736.30	175,568.74
4.2.5	Second Gate Post Concrete Class C-25	m ³	7.66	3736.30	28,620.06
4.2.6	Last Gate Post Concrete Class C-25	m ³	11.48	3736.30	42,892.72
4.2.7	Partition Wall Concrete Class C-25	m ³	496.00	3736.30	1,853,204.80
4.2.8	Bridge Concrete Class C-25	m ³	12.08	3736.30	45,134.50
4.2.9	Φ-12mm reinforcement Bar	t	0.69	40000.00	27,600.00
4.2.10	Φ-50mm Gate Post Handrail	t	1.22	40000.00	48,800.00
4.2.11	Wrought Formwork	m ²	2077.75	280.00	581,770.00
4.3	Slide Gate				
4.3.1	BxH (2mx4.1m-4.1)	Nr	8	105000.00	840,000.00
4.3.2	BxH (1.7mx2.2m-2.2)	Nr	3	105000.00	315,000.00
4.3.3	BxH (2.5mx2.m-4.6)	Nr	2	105000.00	210,000.00
			Total		120,084,464.32
			VAT @ 15 %		18,012,669.65
			Grand Total		138,097,133.97

BOOSTER PUMP STATION

Item	Description	Unit	Qty.	Unit Price	Amount Supply Total Price
Suction pipes & fittings, PN 10					
1	Pump suction pipe line DN600, PN10 as shown	NOs	10	25000	250,000.00
2	D/ flanged steel pipe, DN600, PN10, L=1.55m	NOs	5	19000	95,000.00
3	D/flanged butterfly valve DN600, PN10	Unit	10	13000	130,000.00
4	Flanged dismantling piece DN600, PN10	Unit	10	28000	280,000.00
5	D/flanged eccentric reducer DN600/400,	NOs	10	16000	160,000.00
6	Pressure gauge glycerin filled, ø100 mm, scale -1-1.5 bars, G1/2" male connection, with isolating cock.	NOs	10	5000	50,000.00
7	Horizontal split double suction centrifugal pump, capacity Q=1500m ³ /h, H=65m with diesel engine drive unit with all accessories.	Set	10	1200000	12,000,000.00
8	D/flanged steel pipe DN600, PN10, L = 3.15m	NOs	10	22000	220,000.00
Delivery pipes & fittings, PN 10					
9	D/flanged concentric enlarger DN300/500,	NOs	10	14000	140,000.00
10	D/flanged non-return valve DN500, PN10	Unit	10	18750	187,500.00
11	D/flanged short piece steel pipe DN500, PN10, L = 0.75m	PCs	10	14000	140,000.00
12	Flanged dismantling piece DN500, PN10	Unit	10	23000	230,000.00
13	D/flanged butterfly valve DN500, PN10	Unit	10	11000	110,000.00
14	D/flanged steel pipe DN500, PN10, L = 3.24m	PCs	10	21000	210,000.00
15	D/flanged steel pipe DN500, PN10, L = 4.75m	PCs	5	29000	145,000.00
16	Pressure gauge glycerin filled, ø100 mm, scale 0-10 bars, G1/2" male connection, with isolating cock.	PCs	10	8000	80,000.00
17	Single/Double girder overhead traveling crane capacity = 8 t complete with chain trolley and associated structural steel works	Set	1	1600000	1,600,000.00
18	Complete bolts, nuts, washers & flat gaskets.	LS	1	50000	50,000.00
				Total	16,077,500.00
				VAT @ 15 %	2,411,625.00
				Grand Total	18,489,125.00

C. BILL OF QUANTITY OF IRRIGATION AND DRAINAGE SYSTEM

1.1 Bill of Quantity of Main Canal (MC) from 0m to 13140m

Item	Description	Unit	Quantity	Rate (Eth. Birr)	Total Cost (Eth. Birr)
1	Canal				
	Site Clearing				
1.1	Clear and grub the area from bushes trees and shrubs on the alignment of canal to the width of canal and embankment	m ²	177,636	3.20	568,435.37
1.2	Stripping of top soil under canal embankment with an average thickness of 150mm on the alignment of canal and disposal of soil free haul 100m away	m ²	177,636	10.75	1,909,587.59
	Earth Work				
1.3	Canal excavation of common material open to the lines and grades as shown in the drawing and disposal of surplus to spoil pits and spreading, free haul 500m	m ³	63,503	251.10	15,945,654.95
1.4	Obtain excavated material from borrow areas at a distance 7.5km and place as compacted fill in layer 250mm to form canal embankment including trimming and shaping compaction and proctor test as directed	m ³	99,047	325.80	32,269,628.98
	Sub Total				50,693,307
	Stone Masonry Work(L=3900m)				
1.5	400mm. Thick Stone masonry of canal bed	m ³	9,828.00	2,379.45	23,385,234.60
1.6	Stone masonry of canal vertical wall	m ³	18434.05	2,379.45	43,862,905.03
	Sub Total				67,248,140
2	Cross Regulator				
	<u>Note</u> : This section includes quantity for 4Nr structures.				
	Earth Work				
2.1	Excavate to cutoff walls, abutment walls and wing walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 200m away "soft"	m ³	1240	251.10	311,364.00
2.2	compacted back fill with selected material	m ³	537	296.15	159,032.55
	Main Structure	m ³			

Item	Description	Unit	Quantity	Rate (Eth. Birr)	Total Cost (Eth. Birr)
2.3	Cutoff wall stone masonry of u/s and d/s canal bed and sides	m ³	71.33	2,379.45	169,734.25
2.4	400mm. Thick stone pitching of u/s canal bed	m ³	187.02	281.60	52,665.39
2.5	800mm. Thick stone pitching of u/s and d/s canal bed	m ³	162.62	563.22	91,591.40
2.6	600mm*600mm*400mm. with size fabricated concrete block of u/s and d/s canal bed	m ⁴	29.50	3,466.55	102,270.16
2.7	Cement stone masonry of u/s canal vertical wall	m ³	59.39	2,379.45	141,326.93
2.8	Cement stone masonry of d/s canal vertical wall	m ³	59.39	2,379.45	141,326.93
2.9	Wall mass concrete C-20	m ³	140.17	3,466.55	485,914.63
2.10	Floor mass concrete C-20	m ³	144.99	3,466.55	502,611.62
2.11	Reinforced concrete class C-25 to gate post	m ³	32.81	3,736.30	122,593.23
2.12	Concrete class C-25 to pier	m ³	20.04	3,736.30	74,873.21
2.13	Reinforcement concrete class C-25 to Bridge	m ³	4.08	3,736.30	15,244.10
2.14	Wrought formwork to item 2-2,3/2,4	m ²	196.48	280.00	55,013.89
2.15	Mild steel reinforcement bars Dia.16mm to gate post	t	0.108	40,000.00	4,320.00
2.16	Mild steel reinforcement bars Dia.12mm to gate post	t	0.677	40,000.00	27,080.00
2.17	Mild steel reinforcement bars Dia.10mm to gate post	t	0.454	40,000.00	18,160.00
2.18	Mild steel reinforcement Pipe Dia.50mm of handrail	t	0.195	40,000.00	7,781.32
2.19	Mild steel reinforcement Pipe Dia.30mm of handrail	t	0.042	40,000.00	1,678.40
2.20	Mild steel reinforcement bars Dia.16mm of handrail	t	0.022	40,000.00	880.52
2.21	Mild steel reinforcement bars Dia.12mm to bridge	t	0.028	40,000.00	1,115.20
2.22	Mild steel reinforcement bars Dia.10mm to bridge	t	0.025	40,000.00	1,006.80
2.23	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 9.0 Tons, 2000mm width x2200mm depth with a spindle diameter of 25mm.	Nr	3.00	150,000.00	450,000.00
2.24	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 2.5Tons, 1600mm width x1900mmdepth with a spindle diameter of 25mm.	Nr	3.00	105,000.00	315,000.00

Item	Description	Unit	Quantity	Rate (Eth. Birr)	Total Cost (Eth. Birr)
2.25	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 1.3 Tons, 1200mm width x1500mmdepth with a spindle diameter of 25mm .	Nr	1.00	100,000.00	100,000.00
2.26	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 2.5Tons, 1400mm width x1800mmdepth with a spindle diameter of 25mm .	Nr	2.00	105,000.00	210,000.00
	Sub Total				3,562,585
3	Off-take				
	<u>Note</u> : This section includes quantity for 5Nr structures.				
	Earth Work				
3.1	Excavate to cutoff walls, abutment walls and wing walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 500m away "soft"	m ³	167.8	251.10	42,131.63
3.2	compacted back fill with selected material	m ³	91.8	296.15	27,184.13
	Main Structure		-		
3.3	400mm. Thick cemented stone masonry of d/s canal bed	m3	14.23	2,379.45	33,850.06
3.4	400mm. Thick cemented stone masonry of d/s canal sides	m3	65.63	2,379.45	156,173.15
3.5	Face wall mass concrete C-20 of assembling reinforcement concrete pipe	m3	23.59	3,466.55	81,760.84
3.6	Bedding concrete C-15 of assembling reinforcement concrete pipe	m3	7.71	2,992.40	23,071.40
3.7	Reinforced concrete class C-25 to gate post	m3	4.65	3,736.30	17,389.21
3.8	Wrought formwork to item 2-2,3/2,4	m2	147.34	280.00	41,255.05
3.9	Mild steel reinforcement bars Dia.14mm to gate post	t	0.272	40,000.00	10,880.00
3.10	Mild steel reinforcement bars Dia.12mm to gate post	t	1.854	40,000.00	74,160.00
3.11	Mild steel reinforcement bars Dia.10mm to gate post	t	1.226	40,000.00	49,040.00
3.12	Mild steel reinforcement Pipe Dia.50mm of handrail	t	0.579	40,000.00	23,173.52
3.13	Mild steel reinforcement Pipe Dia.30mm of handrail	t	0.082	40,000.00	3,264.00

Item	Description	Unit	Quantity	Rate (Eth. Birr)	Total Cost (Eth. Birr)
3.14	Mild steel reinforcement bars Dia.16mm of handrail	t	0.094	40,000.00	3,777.36
3.15	Wing wall mass concrete C-20 of assembling reinforcement concrete pipe	m3	7.73	3,466.55	26,779.10
3.16	Assembling concrete C-15 to tube	m3	5.52	2,992.40	16,518.05
3.17	Reinforced concrete class C-25 to tube	m3	38.28	3,736.30	143,025.56
3.18	Assembling reinforcement concrete pipe of size D=1050mm	m	12.00	3,134.00	37,608.00
3.19	Assembling reinforcement concrete pipe of size D=750mm	m	24.00	2,800.00	67,200.00
3.20	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 0.8 Tons, 1050mm width x1100mm depth with a spindle diameter of 25mm.	Nr	1.00	70,000.00	70,000.00
3.21	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 0.1 Tons, 750mm width x800mmdepth with a spindle diameter of 25mm.	Nr	1.00	30,000.00	30,000.00
3.22	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 1.2 Tons, 1600mm width x1550mmdepth with a spindle diameter of 25mm.	Nr	1.00	100,000.00	100,000.00
3.23	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 0.8 Tons, 1200mm width x1450mmdepth with a spindle diameter of 25mm.	Nr	1.00	90,000.00	90,000.00
3.24	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 0.25 Tons, 750mm width x800mm depth with a spindle diameter of 25mm.	Nr	1.00	60,000.00	60,000.00
				Sub Total	1,228,241
				Total	72,038,966.00
				VAT @ 15 %	10,805,844.90
				Grand Total	82,844,810.90

1.2 Bill of Quantity of Main Canal (MC-01) from 0m to 4807m

Item	Description	Unit	Quantity	Rate	Amount (Birr)
1	Canal				
	Site Clearing				
1.1	Clear and grub the area from bushes trees and shrubs on the alignment of canal to the width of canal and embankment	m ²	75,532.61	3.20	241,704.34
1.2	Stripping of top soil under canal embankment with an average thickness of 150mm on the alignment of canal and disposal of soil free haul 100m away	m ²	75533	10.75	811,975.50
	Earth Work				
1.3	Canal excavation of common material open to the lines and grades as shown in the drawing and disposal of surplus to spoil pits and spreading, free haul 500m	m ³	16,356	251.10	4,106,942.95
1.4	Obtain excavated material from borrow areas at a distance 7.5km and place as compacted fill in layer 250mm to form canal embankment including trimming and shaping compaction and proctor test as directed	m ³	35,864	325.80	11,684,403.79
	Sub Total				16,845,027
2	Cross Regulator				
	Note: This section includes quantity for 2Nr structures.				
	Earth Work				
2.1	Excavate to cutoff walls, abutment walls and wing walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 200m away "soft"	m ³	764	251.10	191,865.51
2.2	compacted back fill with selected material	m ³	306	296.15	90,515.29
	Main Structure	m ³			
2.3	Cutoff wall stone masonry of u/s and d/s canal bed and sides	m ³	138.60	2,379.45	329,791.77
2.4	400mm. Thick stone pitching of u/s & d/s canal bed	m ³	20.48	281.60	5,767.17
2.5	600mm*600mm*400mm. with size fabricated concrete block of u/s and d/s canal bed	m ⁴	8.80	3,466.55	30,505.64
2.6	Wall mass concrete C-20	m ³	16.92	3,466.55	58,667.89
2.7	Floor mass concrete C-20	m ³	11.30	3,466.55	39,185.88
2.8	Reinforced concrete class C-25 to	m ³	17.80	3,736.30	66,502.40

Item	Description	Unit	Quantity	Rate	Amount (Birr)
	gate post				
2.9	Sand& Gravel for Floor	m ³	18.90	732.30	13,840.47
2.10	Wrought formwork to item 2-2,3/2,4	m ²	68.63	280.00	19,215.78
2.11	Mild steel reinforcement bars to gate post	t	0.556	40,000.00	22,240.00
2.12	Mild steel reinforcement Pipe Dia.50mm of handrail	t	0.551	40,000.00	22,040.00
2.13	Mild steel reinforcement Pipe Dia.30mm of handrail	t	0.155	40,000.00	6,200.00
2.14	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 1.5 Tons, 1500mm width x1700mm depth with a spindle diameter of 25mm .	Nr	2.00	100,000.00	200,000.00
2.15	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 0.8Tons, 1300mm width x1200mmdepth with a spindle diameter of 25mm .	Nr	1.00	70,000.00	70,000.00
	Sub Total				1,166,338
3	Off-take				
	<u>Note</u> : This section includes quantity for 4Nr structures.				
	Earth Work				
3.1	Excavate to cutoff walls, abutment walls and wing walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 500m away "soft"	m ³	139.6	251.10	35,063.60
3.2	compacted back fill with selected material	m ³	55.9	296.15	16,541.75
	Main Structure				
3.3	400mm. Thick cemented stone masonry of d/s canal bed & slope	m3	140.34	2,379.45	333,936.77
3.4	Bottom concrete C-20	m3	20.89	3,466.55	72,423.16
3.5	Reinforced concrete class C-25 to gate post	m3	14.72	3,736.30	54,994.60
3.6	Wrought formwork to item 2-2,3/2,4	m2	103.82	280.00	29,070.05
3.7	Mild steel reinforcement bars to gate post and Tube	t	4.078	40,000.00	163,104.00
3.8	Mild steel reinforcement Pipe Dia.50mm of handrail	t	0.278	40,000.00	11,120.00
3.9	Mild steel reinforcement Pipe Dia.30mm of handrail	t	0.173	40,000.00	6,912.00
3.10	Mild steel reinforcement bars Dia.16mm of handrail	t	0.035	40,000.00	1,380.80
3.11	Reinforced concrete class C-25 to	m3	36.22	3,736.30	135,313.84

Item	Description	Unit	Quantity	Rate	Amount (Birr)
	tube				
3.12	Assembling reinforcement concrete pipe of size D=900mm	m	16.00	3,134.00	50,144.00
3.13	Assembling reinforcement concrete pipe of size D=750mm	m	12.00	2,800.00	33,600.00
3.14	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 1.2 Tons, 1500mm width x1400mm depth with a spindle diameter of 25mm .	Nr	2.00	100,000.00	200,000.00
3.15	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 0.4 Tons, 900mm width x950mmdepth with a spindle diameter of 25mm .	Nr	2.00	70,000.00	140,000.00
3.16	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 0.25 Tons, 750mm width x930mmdepth with a spindle diameter of 25mm .	Nr	1.00	60,000.00	60,000.00
	Sub Total				1,343,605
4	Drop structure				
	<u>Note</u> : This section includes quantity for 13 Nr structures.				
	Earth Work	m ³			
4.1	Excavate to upstream and downstream cutoff trench walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 500m away "soft"	m ³	14826	251.10	3,722,792.88
	compacted back fill with selected material		4448	296.15	1,317,210.41
4.2	Main work				
4.3	Stone masonry 400mm thick	m ³	1575.09	2,379.45	3,747,856.87
				Sub Total	8,787,860
				Total	28,142,830
				VAT @ 15 %	4,221,424.5
				Grand Total	32,364,255

1.3 Bill of Quantity of Cross Drain Culverts, Collector and Interceptor Drain Canals

Item	Description	Unit	Quantity	Rate	Amount (Birr)
1	Interceptor Drain Canals (Protection Dyke 1-8)				
	Site clearing				
1.1	Clear and grub the area from bushes trees and shrubs on the alignment of canal to the width of canal and embankment	m ²	385,814	3.20	1,234,605.28
1.2	Stripping of top soil under canal embankment with an average thickness of 150mm on the alignment of canal and disposal of soil free haul 100m away	m ²	385,814	10.75	4,147,502.13
	Earth work				
1.3	Canal excavation of common material open to the lines and grades as shown in the drawing and disposal of surplus to spoil pits and spreading, free haul 500m	m ³	431,957	251.10	108,464,518.54
1.4	Obtain excavated material from borrow areas at a distance 7.5km and place as compacted fill in layer 250mm to form canal embankment including trimming and shaping compaction and proctor test as directed	m ³	21,916	325.80	7,140,323.19
	Sub Total				120,986,949
2	Collector Drain Canals				
	Site clearing				
2.1	Clear and grub the area from bushes trees and shrubs on the alignment of drain canal to the width of canal and embankment *	m ²	361,596	3.20	1,157,107.25
2.2	Stripping of top soil under canal embankment with an average thickness of 150mm on the alignment of drain canal and disposal of soil free haul 100m away	m ²	361,596	10.75	3,887,157.17
	Earth work				
2.3	Canal excavation of common material open to the lines and grades as shown in the drawing and disposal of surplus to spoil pits and spreading, free haul 500m	m ³	375,751	251.10	94,351,201.08
2.4	Obtain excavated material from borrow areas at a distance 7.5km and place as compacted fill in layer 250mm to form canal embankment including trimming and shaping compaction and proctor test as directed	m ³	21,578	325.80	7,030,170.11
	Sub Total				106,425,636

Item	Description	Unit	Quantity	Rate	Amount (Birr)
3	Drop structure in Interceptor Drain Canals (Protection Dyke-1-8)				
	<u>Note</u> : This section includes quantity for 70 Nr structures.				
	Earth Work				
3.1	Excavate to upstream and downstream cutoff trench walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 500m away "soft"	m ³	273,358	251.10	68,640,251.41
3.2	compacted back fill with selected material	m ³	82,007	296.15	24,286,511.89
	Main work				
3.3	Stone masonry 400mm thick	m ³	13,538	2,379.45	32,212,139.26
	Sub Total				125,138,903
4	Drop structure in Catchment Drain Canal-1~4				
	<u>Note</u> : This section includes quantity for 63 Nr structures.				
	Earth Work				
4.1	Excavate to upstream and downstream cutoff trench walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 500m away "soft"	m ³	38,968	251.10	9,784,850.23
4.2	compacted back fill with selected material	m ³	11,690	296.15	3,462,106.81
	Main work				
4.3	Stone masonry 400mm thick	m ³	9,235	2,379.45	21,973,686.36
	Sub Total				35,220,643
5	Cross Drain Culvert -1~4				
	<u>Note</u> : This section includes quantity for 4Nr structures.				
	Earth Work				
5.1	Excavate to cutoff walls, abutment walls and wing walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 200m away "soft"	m3	9,297.1	251.10	2,334,508.66
5.2	compacted back fill with selected material	m3	4,648.6	296.15	1,376,672.12
	Main Structure				
5.3	400mm. thick stone Riprap of u/s and d/s canal bed	m3	283.07	281.60	79,711.77
5.4	400mm. thick stone Riprap of u/s and	m3	333.02	281.60	93,777.31

Item	Description	Unit	Quantity	Rate	Amount (Birr)
	d/s canal slope				
5.5	400mm. thick stone Riprap of u/s & d/s canal bed & slope	m3	156.68	281.60	44,122.45
5.6	C-20 Face concrete of u/s & d/s	m3	41.66	3,466.55	144,419.11
5.7	400mm. thick stone Riprap of tube floor	m3	132.75	281.60	37,381.13
5.8	C-15 flooring concrete of tube bedding	m3	53.09	2,992.40	158,868.01
5.9	C-25 reinforcement concrete of tube	m3	456.01	3,736.30	1,703,778.95
5.10	C-25 reinforcement concrete of support	m3	37.44	3,737.30	139,913.30
5.11	C-25 reinforcement concrete of joint	m3	31.11	3,738.30	116,283.56
5.12	Wrought formwork	m2	526.41	280.00	147393.6999
5.13	Mild steel reinforcement bars between 14mm diameter.	t	2.27	40,000.00	90,933.20
5.14	Mild steel reinforcement bars between 12mm diameter.	t	16.10	40,000.00	644,014.00
5.15	Mild steel reinforcement bars between 10mm diameter.	t	9.09	40,000.00	363,504.00
	Sub Total				7,475,281
	Total			Total	395,247,412
				VAT @ 15 %	59,287,112
				Grand Total	454,534,524

1.4 Bill of Quantity of Irrigation and Drainage System in SC-1 to SC-5 Blocks (2695ha)

Item	Description	Unit	Quantity	Rate	Amount (Birr)
1	Canal				
	Site clearing				
1.1	Clear and grub the area from bushes trees and shrubs on the alignment of canal to the width of canal and embankment	m ²	442,020	3.20	1,414,464.00
1.2	Stripping of top soil under canal embankment with an average thickness of 150mm on the alignment of canal and disposal of soil free haul 100m away	m ²	442,020	10.75	4,751,715.00
	Earth work				-
1.3	Canal excavation of common material open to the lines and grades as shown in the drawing and disposal of surplus to spoil pits and spreading, free haul 500m	m ³	24,668	251.10	6,194,134.80
1.4	Obtain excavated material from borrow areas at a distance 7.5km	m ³	243,842	325.80	79,443,723.60

Item	Description	Unit	Quantity	Rate	Amount (Birr)
	and place as compacted fill in layer 250mm to form canal embankment including trimming and shaping compaction and proctor test as directed				
	Sub Total				91,804,037
2	Drain Canal				
	Site clearing				
2.1	Clear and grub the area from bushes trees and shrubs on the alignment of drain canal to the width of canal and embankment *	m ²	449,428	3.20	1,438,169.60
2.2	Stripping of top soil under canal embankment with an average thickness of 150mm on the alignment of drain canal and disposal of soil free haul 100m away	m ²	449,428	10.75	4,831,351.00
	Earth work				-
2.3	Canal excavation of common material open to the lines and grades as shown in the drawing and disposal of surplus to spoil pits and spreading, free haul 500m	m ³	204,688	251.10	51,397,156.80
2.4	Obtain excavated material from borrow areas at a distance 7.5km and place as compacted fill in layer 250mm to form canal embankment including trimming and shaping compaction and proctor test as directed	m ³	2,348	325.80	764,978.40
	Sub Total				58,431,656
3	Division Box for TC				
	Note : This section includes quantity for 89 Nr structures				
	Earth work				
3.1	Excavation for structure to formation level including backfilling on completion and disposal of surplus as fill in embankments or in spoil pits including placing and spreading up to 100m away	m ³	1,594	251.10	400,283.16
3.2	compacted back fill with selected material	m ³	654	296.15	193,750.16
	Main Structure				-
3.3	Masonry in wall and floor	m ³	980.71	2,379.45	2,333,558.00
3.4	Division Box Wall Concrete (C25)	m ³	727.26	3,736.30	2,717,262.05

Item	Description	Unit	Quantity	Rate	Amount (Birr)
3.5	Reinforced Precast concrete pipe diameters1050mm and thickness as mentioned in the drawing (5 Nr)	m	52.00	3,134.00	162,968.00
3.6	Reinforced Precast concrete pipe diameters900mm and thickness as mentioned in the drawing (1Nr)	m	8.00	3,134.00	25,072.00
3.7	Reinforced Precast concrete pipe diameters750mm and thickness as mentioned in the drawing (3Nr)	m	30.00	2,800.00	84,000.00
3.8	Reinforced Precast concrete pipe diameters600mm and thickness as mentioned in the drawing (15Nr)	m	150.00	2,400.00	360,000.00
3.9	Reinforced Precast concrete pipe diameters450mm and thickness as mentioned in the drawing (2Nr)	m	20.00	2,000.00	40,000.00
3.10	Reinforced Precast concrete pipe diameters375mm and thickness as mentioned in the drawing (5Nr)	m	50.00	1,750.00	87,500.00
3.11	Tube Concrete (C25) (1.25x1.25x0.3m)-2Nr	m3	15.00	3,736.30	56,044.50
3.12	Tube Concrete (C25) (1.5x1.25x0.3m)-1Nr	m3	8.00	3,736.30	29,890.40
3.13	Concrete class c-15 to base of ditto	m3	104.17	2,992.40	311,718.31
3.14	Wrought formwork to item5-5,4 / 5,8	m2	746.08	280.00	208,903.46
3.15	Mild steel reinforcement bars Dia. mm to ditto (10,12,8mm)	kg	6,062.87	40.00	242,514.88
3.16	Gate				
3.17	Single leaf metal sheet Vertical hand lifted sliding gate.0.35m X0.77m , 0.36x0.56m,0.37x0.52m	Nr	10.00	20,000.00	200,000.00
3.18	Single leaf metal sheet Vertical hand lifted sliding gate 0.4m X 0.5m,0.4x0.6~0.8	Nr	19.00	30,000.00	570,000.00
3.19	Single leaf metal sheet Vertical hand lifted sliding gate 0.45m X 0.60m~0.4x0.9m	Nr	15.00	40,000.00	600,000.00
3.20	Single leaf metal sheet Vertical hand lifted sliding gate 0.50m X 0.60m~0.5mx1.0m	Nr	24.00	50,000.00	1,200,000.00
3.21	Single leaf metal sheet Vertical hand lifted sliding gate 0.55m X 0.70m~0.55mx1.0m	Nr	11.00	60,000.00	660,000.00
3.22	Single leaf metal sheet Vertical hand lifted sliding gate. 0.6m X0.7m ~0.6mx1.0m	Nr	18.00	70,000.00	1,260,000.00

Item	Description	Unit	Quantity	Rate	Amount (Birr)
3.23	Single leaf metal sheet Vertical hand lifted sliding gate. 0.65m X0.7m ~0.65mx1.0m	Nr	6.00	80,000.00	480,000.00
3.24	Single leaf metal sheet Vertical hand lifted sliding gate. 0.7m X0.7m ~0.7mx1.0m	Nr	11.00	90,000.00	990,000.00
3.25	Single leaf metal sheet Vertical hand lifted sliding gate. 0.8m X0.7m ~0.8mx1.1m	Nr	1.00	100,000.00	100,000.00
3.26	Single leaf metal sheet Vertical hand lifted sliding gate. 0.9m X0.7m ~0.9mx1.1m	Nr	2.00	110,000.00	220,000.00
3.27	Single leaf metal sheet Vertical hand lifted sliding gate. 1.1m X0.9m ~1.1mx1.2m	Nr	3.00	110,000.00	330,000.00
3.28	Single leaf metal sheet Vertical hand lifted sliding gate. 0.42m X0.5m ~0.43mx0.9m	Nr	6.00	80,000.00	480,000.00
3.29	Single leaf metal sheet Vertical hand lifted sliding gate. 0.39m X0.5m ~0.38mx0.6m	Nr	6.00	20,000.00	120,000.00
3.30	Single leaf metal sheet Vertical hand lifted sliding gate. 0.37m X0.5m ~.0.37mx0.6m	Nr	3.00	20,000.00	60,000.00
3.31	Single leaf metal sheet Vertical hand lifted sliding gate. 0.48m X0.5m ~.0.48mx0.9m0.~47mx0.8m	Nr	13.00	30,000.00	390,000.00
	Sub Total				14,913,465
4	Culvert Structure				
	<u>Note</u> : This section includes quantity for 39Nr structures.				
	Earth work				
4.1	Excavation for structure to formation level and disposal of surplus as fill in embankments or in spoil pits including placing and spreading up to 100m away	m ³	3,197	251.10	802,830.23
4.2	Obtain excavated material from channel and drains and place as compacted fill in canal embankment including trimming and shaping, free haul 500m including compaction on 250mm layers and proctor test	m ³	1,918	325.80	624,999.02
	Main Structure				-
4.3	C-15 grade concrete work in pipe bedding	m ³	24.79	2,992.40	74,169.63
4.4	C-20 mass concrete work	m ³	71.87	3,466.55	249,154.81
4.5	C-25 mass concrete work	m ³	9.83	3,736.30	36,735.30
4.6	Wrought formwork to item 24-24,4	m ²	181.04	280.00	50,690.19

Item	Description	Unit	Quantity	Rate	Amount (Birr)
4.7	Stone rip-rap 200mm thick over 100mm thick sand and gravel	m ³	261.65	732.30	191,607.00
4.8	Reinforced Precast concrete pipe diameters 750mm and thickness as mentioned in the drawing	m	117.00	2,800.00	327,600.00
4.9	Reinforced Precast concrete pipe diameters 600mm and thickness as mentioned in the drawing	m	207.00	2,400.00	496,800.00
4.10	Reinforced Precast concrete pipe diameters 450mm and thickness as mentioned in the drawing	m	27.00	2,000.00	54,000.00
4.11	400mm. Thick cemented stone pitching in u/s and d/s canal bed and side	m ³	261.65	1,740.25	455,336.41
	Sub Total				3,363,923
5	Drain Culvert Structure				
	<u>Note</u> : This section includes quantity for 62 Nr structures.				
	Earth work				
5.1	Excavation for structure to formation level and disposal of surplus as fill in embankments or in spoil pits including placing and spreading up to 100m away	m ³	2,633	251.10	661,194.21
5.2	Obtain excavated material from channel and drains and place as compacted fill in canal embankment including trimming and shaping, free haul 500m including compaction on 250mm layers and proctor test	m ³	1,580	325.80	514,736.14
	Main Structure				-
5.3	C-15 grade concrete work in pipe bedding	m ³	35.85	2,992.40	107,288.76
5.4	C-20 mass concrete work	m ³	95.61	3,466.55	331,436.85
5.5	C-25 mass concrete work	m ³	12.29	3,736.30	45,935.57
5.6	Wrought formwork to item 24-24,4	m ²	244.39	280.00	68,428.88
5.7	Stone rip-rap 200mm thick over 100mm thick sand and gravel	m ³	238.69	732.30	174,793.64
5.8	Reinforced Precast concrete pipe diameters 600mm and thickness as mentioned in the drawing	m	83.00	2,400.00	199,200.00
5.9	Reinforced Precast concrete pipe diameters 450mm and thickness as mentioned in the drawing	m	334.00	1,750.00	584,500.00
5.10	Reinforced Precast concrete pipe diameters 300mm and thickness as mentioned in the drawing	m	253.00	800.00	202,400.00
5.11	400mm. Thick cemented stone pitching in u/s and d/s canal bed	m ³	238.69	2,740.85	654,217.06

Item	Description	Unit	Quantity	Rate	Amount (Birr)
	and side				
	Sub Total				3,544,131
6	Canal Drop structure				
	<u>Note</u> : This section includes quantity for 309 Nr structures.				
	Earth Work				
6.1	Excavate to upstream and downstream cutoff trench walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 500m away "soft"	m ³	99,105	251.10	24,885,378.98
6.2	compacted back fill with selected material	m ³	29,732	296.15	8,805,023.88
	Main work				
6.3	Stone masonry 400mm thick	m ³	11,441.57	2,379.45	27,224,640.81
	Sub Total				60,915,044
7	Drain Canal Drop structure				
	<u>Note</u> : This section includes quantity for 352 Nr structures.				
	Earth Work				
7.1	Excavate to upstream and downstream cutoff trench walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 500m away "soft"	m ³	38,968	251.10	9,784,850.23
7.2	compacted back fill with selected material	m ³	11,690	296.15	3,462,106.81
	Main work				
7.3	Stone masonry 400mm thick	m ³	4,746.12	2,379.45	11,293,145.77
	Sub Total				24,540,103
8	Outfall structure				
	<u>Note</u> : This section includes quantity for 132 Nr structures.				
	Earth Work				
8.1	Excavate to upstream and downstream cutoff trench walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 500m away "soft"	m ³	3,027	251.10	759,987.72
8.2	compacted back fill with selected material	m ³	777	296.15	230,007.62
	Main work				
8.3	Stone Rip-Rap 400mm thick	m ³	2,249.97	281.60	633,592.82

Item	Description	Unit	Quantity	Rate	Amount (Birr)
				Sub Total	1,623,588
				Total	259,135,947
				VAT @ 15 %	38,870,392
				Grand Total	298,006,339

1.5 Bill of Quantity of Irrigation and Drainage System in SC-01-1 to SC-01-3 Blocks (1946ha)

Item	Description	Unit	Quantity	Rate	Amount (Birr)
1.	Canal				
	Site clearing				
1.1	Clear and grub the area from bushes trees and shrubs on the alignment of canal to the width of canal and embankment	m2	380789	3.20	1,218,526.15
1.2	Stripping of top soil under canal embankment with an average thickness of 150mm on the alignment of canal and disposal of soil free haul 100m away	m2	380789	10.75	4,093,486.28
	Earth work				-
1.3	Canal excavation of common material open to the lines and grades as shown in the drawing and disposal of surplus to spoil pits and spreading, free haul 500m	m3	34606	251.10	8,689,443.71
1.4	Obtain excavated material from borrow areas at a distance 7.5km and place as compacted fill in layer 250mm to form canal embankment including trimming and shaping compaction and proctor test as directed	m3	225744	325.80	73,547,297.74
	Sub Total				87,548,754
2	Drain Canal				
	Site clearing				
2.1	Clear and grub the area from bushes trees and shrubs on the alignment of drain canal to the width of canal and embankment *	m2	463184	3.20	1,482,187.22
2.2	Stripping of top soil under canal embankment with an average thickness of 150mm on the alignment of drain canal and disposal of soil free haul 100m away	m2	463184	10.75	4,979,222.70
	Earth work				
2.3	Canal excavation of common	m3	268345	251.10	67,381,350.97

Item	Description	Unit	Quantity	Rate	Amount (Birr)
	material open to the lines and grades as shown in the drawing and disposal of surplus to spoil pits and spreading, free haul 500m				
2.4	Obtain excavated material from borrow areas at a distance 7.5km and place as compacted fill in layer 250mm to form canal embankment including trimming and shaping compaction and proctor test as directed	m3	3601	325.80	1,173,269.69
	Sub Total				75,016,031
3	Division Box				
	Note : This section includes quantity for 70 Nr structures				
	Earth work				
3.1	Excavation for structure to formation level including backfilling on completion and disposal of surplus as fill in embankments or in spoil pits including placing and spreading up to 100m away	m3	146	251.10	36,768.57
3.2	compacted back fill with selected material	m3	728	296.15	215,597.20
	Main Structure				
3.3	400mm. Thick stone masonry of u/s & d/s canal bed	m3	125.45	2,379.45	298,502.00
3.4	400mm. Thick stone masonry of u/s & d/s canal slope	m3	460.62	2,379.45	1,096,022.26
3.5	Mass concrete C-20 of Cistern wall	m3	424.49	3,466.55	1,471,515.81
3.6	400mm. Thick stone masonry of cistern bed	m3	223.76	2,379.45	532,425.73
3.7	Mass concrete C-20 of d/s protection	m3	56.15	3,466.55	194,646.78
3.8	Mass concrete C-25 of Bridge	m3	1.03	3,736.30	3,848.39
3.9	Mass concrete C-20 of Face wall	m3	18.49	3,466.55	64,096.51
3.10	Mass concrete C-20 of Wing wall	m3	35.20	3,466.55	122,022.56
3.11	Concrete C-15 of Flooring	m3	26.24	2,992.40	78,520.58
3.12	Reinforcement Concrete C-25 of Tube	m3			
3.13	Assembling reinforcement concrete pipe of size D=1050mm	m	24.00	3,134.00	75,216.00
3.14	Assembling reinforcement concrete pipe of size D=900mm	m	56.00	3,134.00	175,504.00
3.15	Assembling reinforcement concrete pipe of size D=750mm	m	24.00	2,800.00	67,200.00

Item	Description	Unit	Quantity	Rate	Amount (Birr)
3.16	Assembling reinforcement concrete pipe of size D=600mm	m	24.00	2,400.00	57,600.00
3.17	Provide for the manufacturing and supervision of Cross regulator gates including hoisting device with a capacity 0.01~0.4 Tons, 200~900mm width x300~900mm depth with a spindle diameter of 25mm .	Nr	119	60,000.00	7,140,000.00
	Sub Total				11,629,486
4	Canal Culvert Structure				
	Note : This section includes quantity for 32Nr structures.				
	Earth work				
4.1	Excavation for structure to formation level and disposal of surplus as fill in embankments or in spoil pits including placing and spreading up to 100m away	m3	3,027	251.10	760,026.04
4.2	Obtain excavated material from channel and drains and place as compacted fill in canal embankment including trimming and shaping, free haul 500m including compaction on 250mm layers and proctor test	m3	1,816	325.80	591,676.18
	Main Structure				
4.3	C-15 grade concrete work in pipe bedding	m3	22.96	2,992.40	68,695.78
4.4	C-20 mass concrete work	m3	82.11	3,466.55	284,629.75
4.5	C-25 mass concrete work	m3	8.51	3,736.30	31,800.40
4.6	400mm. Thick cemented stone pitching in u/s and d/s canal bed and side	m3	234.67	1,740.25	408,385.81
4.7	Wrought formwork to item 24-24,4	m2	193.08	280.00	54,061.91
4.8	Reinforced Precast concrete pipe diameters 900mm and thickness as mentioned in the drawing	m	46.00	3,134.00	144,164.00
4.9	Reinforced Precast concrete pipe diameters 750mm and thickness as mentioned in the drawing	m	159.00	2,800.00	445,200.00
4.10	Reinforced Precast concrete pipe diameters 600mm and thickness as mentioned in the drawing	m	73.00	2,400.00	175,200.00
4.11	Reinforced Precast concrete pipe diameters 450mm and thickness as mentioned in the drawing	m	18.00	2,000.00	36,000.00

Item	Description	Unit	Quantity	Rate	Amount (Birr)
	Sub Total				2,999,840
5	Drain Culvert Structure				
	Note : This section includes quantity for 54 Nr structures.				
	Earth work				
5.1	Excavation for structure to formation level and disposal of surplus as fill in embankments or in spoil pits including placing and spreading up to 100m away	m3	3,846	251.10	965,730.60
5.2	Obtain excavated material from channel and drains and place as compacted fill in canal embankment including trimming and shaping, free haul 500m including compaction on 250mm layers and proctor test	m3	2,308	325.80	751,946.40
	Main Structure				
5.3	C-15 grade concrete work in pipe bedding	m3	38.70	2,992.40	115,805.88
5.4	C-20 mass concrete work	m3	121.40	3,466.55	420,839.17
5.5	C-25 mass concrete work	m3	12.70	3,736.30	47,451.01
5.6	400mm. Thick cemented stone pitching in u/s and d/s canal bed and side	m3	330.50	1,740.25	575,152.63
5.7	Wrought formwork to item 24-24,4	m2	293.70	280.00	82,236.00
5.8	Reinforced Precast concrete pipe diameters 900mm and thickness as mentioned in the drawing	m	28.00	3,134.00	87,752.00
5.9	Reinforced Precast concrete pipe diameters 750mm and thickness as mentioned in the drawing	m	170.00	2,800.00	476,000.00
5.10	Reinforced Precast concrete pipe diameters 600mm and thickness as mentioned in the drawing	m	64.00	2,400.00	153,600.00
5.11	Reinforced Precast concrete pipe diameters 450mm and thickness as mentioned in the drawing	m	282.00	2,000.00	564,000.00
5.12	Reinforced Precast concrete pipe diameters 300mm and thickness as mentioned in the drawing	m	48.00	1,740.25	83,532.00
	Sub Total				4,324,046
6	Canal Drop structure				
	Note : This section includes quantity for 309 Nr structures.				
	Earth Work				

Item	Description	Unit	Quantity	Rate	Amount (Birr)
6.1	Excavate to upstream and downstream cutoff trench walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 500m away "soft"	m3	226,136	251.10	56,782,727.65
6.2	compacted back fill with selected material	m3	67,841	296.15	20,091,045.15
	Main work				
6.3	Stone masonry 400mm thick	m3	25,774.81	2,379.45	61,329,868.16
	Sub Total				138,203,641
7	Drain Canal Drop structure				
	Note: This section includes quantity for 701 Nr structures.				
	Earth Work				
7.1	Excavate to upstream and downstream cutoff trench walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 500m away "soft"	m3	131,779	251.10	33,089,683.33
7.2	Compacted back fill with selected material	m3	39,534	296.15	11,707,896.92
	Main work				
7.3	Stone masonry 400mm thick	m3	15,573.70	2,379.45	37,056,833.29
	Sub Total				81,854,414
8	Outfall structure				
	Note: This section includes quantity for 107 Nr structures.				
	Earth Work				
8.1	Excavate to upstream and downstream cutoff trench walls to formation level including backfilling of selected granular material and disposal of surplus as fill in embankments or in spoil tips up to 500m away "soft"	m3	1,822	251.10	457,504.20
8.2	Compacted back fill with selected material	m3	552	296.15	163,474.80
				Total	402,197,190
				VAT @ 15 %	60,329,578
				Grand Total	462,526,768